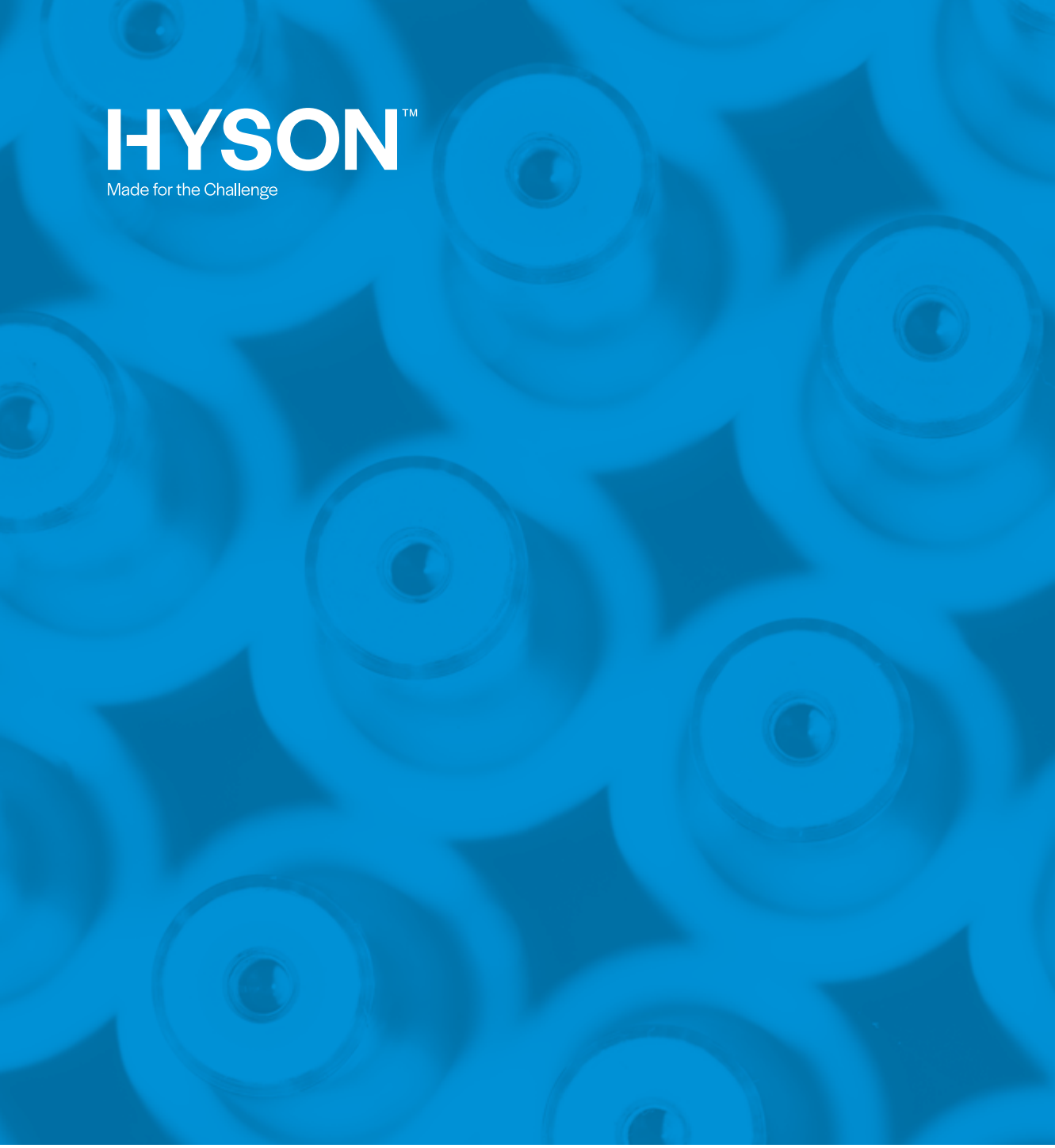
HYSON™

Made for the Challenge



Product Catalog

Edition 1.2024

Would you like to order this product?
All available information at HysonSolutions.com

Content

Hyson™ | Made for the Challenge

Hyson stands at the forefront of innovation, tracing its roots back to 1939 when it designed and manufactured the first Pneumatic Die Cylinder. Over the decades, we have continuously evolved and today we remain at the head of technological advancement that meet the needs of our customers.

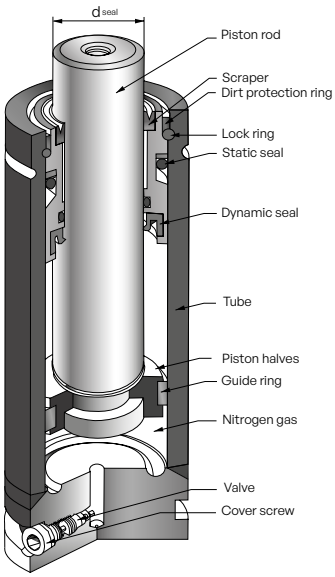
Choosing Hyson means choosing solutions as exceptional as your unique applications. Hyson proudly delivers authentic and proven solutions that set the standard for excellence.

When you partner with Hyson, you can expect:

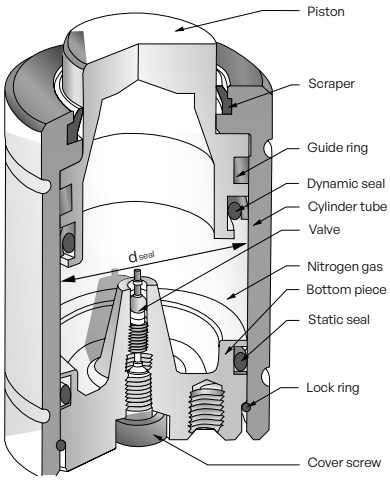
- Solutions from a technically leading supplier with decades of experience and expertise.
- Personalized solutions tailored to the distinctive demands of your application.
- A highly collaborative and focused team dedicated to developing innovative solutions.
- Ongoing support and follow-through even after a project is completed.
- Seamless access to our products and services through our extensive global network of partners and locations.

To learn more visit HysonSolutions.com.

Main groups of Gas Springs



Piston Rod Sealed Gas Spring



Bore Sealed Gas Spring

Hyson™ is committed to providing the highest quality products and services to meet the performance expectations of our global customers.

AS9100D/ISO9001:2015

The Hyson™ Brecksville, OH facility successfully completed and passed its AS9100D/ISO9001:2015 recertification audit! With this certification, our customers can remain confident when purchasing and receiving Hyson products.

AS9100D is endorsed by all major aerospace regulators including the US Department of Defense (DoD), Federal Aviation Administration (FAA) and NASA and is the required Quality Management Standard for organizations in the aerospace sector.

AS9100D is the latest and most stringent revision with requirements including:

- Processes for change management
- Accountability
- Communication
- Safety ethics and supplier monitoring

Training

Hyson has been dedicated to providing safer and more reliable products with worldwide support and service. We are continually at the forefront of innovative product design, and engineer forward-thinking features into our product lines, enabling our customers to provide safer working environments. We offer training on nitrogen safety, charging and discharging, and product maintenance for manifolds, Gas Springs, and more.

2 Gas Springs

About Gas Springs

Safety Features

Using Hyson products in your applications ensures your team and facility have the latest technology on the market. Genuinely Hyson solutions are designed with state-of-the-art features:

Overload Protection (V>max)

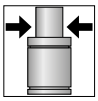
Cylinders are designed to vent gas in a controlled manner between the seal and piston rod if an overload occurs because of a jammed tool, part, or rod side-load.

Overstroke Protection (S>max)

Cylinders are designed to release pressure if there are double hits, incorrect shut heights, or debris in the die.

Overpressure Protection (P>max)

Cylinders are designed to vent excessive gas if a system becomes over pressurized.



Flex Guide™

Flex Guide is specially engineered to prolong service life by absorbing normal lateral movements and misalignments because of clearances in the die.

In-Person Training

Receive comprehensive training from an expert in Gas Springs. Get a complete understanding of best practices and safety protocols from the leaders in Gas Spring technology.

DualSeal™

Less production interruptions from leaking joints experiencing vibration. Incorporates a dual seal design using both metal to metal and O-ring sealing to simplify installation and minimize the impact from high vibration applications.

Genuinely Hyson Safety App

Empowering customers to verify the authenticity of their Gas Springs helps to avoid preventable hazards, deter the distribution of counterfeit springs, and achieve a safer working environment.

PED Approval

Ensure safer component cycle life with 2-million-stroke PED approval. The Pressure Equipment Directive (PED) strives to assure free movement of the products in their scope while ensuring a high level of safety.

The Pressure Equipment Directive (PED)

PED Approved

The majority of Hyson's Gas Springs have been approved to withstand a minimum of 2 million full cycles, in accordance with the Pressure Equipment Directive 2014/68/EU. This applies to the design, manufacture, and conformity assessment of stationary pressure equipment with a maximum allowable pressure greater than 0.5 bar.

For more information about PED, please check European Commission web page: Pressure Equipment Directive (europa.eu)

PED approval is only available on select parts. Ask your Hyson contact for more details.

Nitrogen Gas Spring Selection Guide

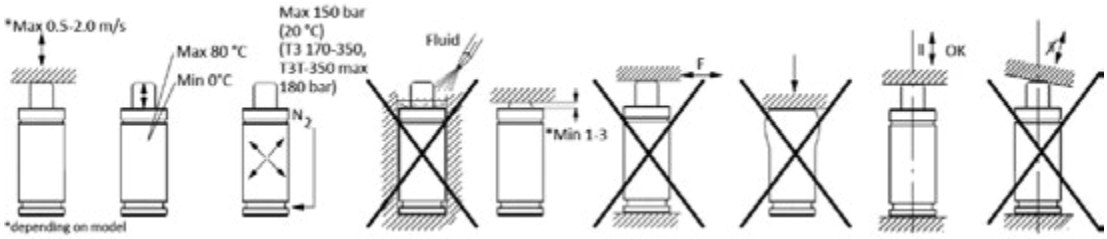
Spring Series Application	Product Line	Model	Contact Force N/lbf	Stroke Length mm	Seal Type
Tanker Series					
High Force/Contamination Resistance	Tanker T & S	TNKT: 1000, 2400, 4200, 6600 TNKS: 1000, 2400, 4200, 6600	N: 9,630 - 68,435 lbf: 2,165 - 15,385	13 - 225	Bore
High Performance/Speed	Tanker 400 XP	TNK: 400, 400HS	N: 3,940 lbf: 885	6.3 - 76.2	Bore
T2 Series					
Mechanical and Coil Replacement	T2 Mini	T2-50, T2-70, T2-90, T2-180, T2-200, T2SS3-16, T2SS3-16GM, T2SS2-24	N: 57 - 2,000 lbf: 13 - 450	7 - 125	Rod
Medium Force Compact Height	T2L	T2L-250, T2L-500, T2L-750	N: 2,650 - 7,400 lbf: 595 - 1,665	6.3 - 127	Rod
T3 Series					
High Force Shortest Height	T3	T3-170, T3-320, T3-350, T3-500, T3-750, T3-1000, T3-1500, T3-2400, T3-4200, T3-6600, T3-9500, T3-20000	N: 1,700 - 200,000 lbf: 382 - 44,960	7 - 125	Rod
High Force Mid Height	T3F	T3F-750, T3F-1000, T3F-1500, T3F-2400	N: 7,400 - 24,000 lbf: 1,665 - 5,395	10 - 125	Rod
High Force Short Height	T3T	T3T-350, T3T-500, T3T-750, T3T-1000, T3T-1500, T3T-2400, T3T-4200, T3T-6600, T3T-9500	N: 3,600 - 95,000 lbf: 810 - 21,360	10 - 125	Rod
T4 Series					
High Force Full Height	T4	T4-750, T4-1000, T4-1500, T4-2400, T4-4200, T4-6600, T4-9500, T4-20000	N: 7,400 - 200,000 lbf: 1,665 - 45,000	12.7 - 300	Rod
Highest Force Short Height	T4SC	T4SC-420, T4SC-740, T4SC-1000, T4SC-1800, T4SC-2900, T4SC-4700, T4SC-7500, T4SC-11800, T4SC-18300	N: 4,250 - 183,000 lbf: 955 - 41,140	6 - 65	Bore
T5 Series					
Ultra High Force Compact Design	T5	T5-500, T5-1000, T5-1900	N: 5,100 - 19,200 lbf: 1,150 - 4,320	10 - 80	Rod
NP Series					
Medium Force Full Height	NP	NP-500, NP-750, NP-1500, NP-3000, NP-5000, NP-7500, NP-10000	N: 4,700 - 106,000 lbf: 1,055 - 23,830	10 - 300	Rod
Medium Force Compact Height	NPL	NPL-750, NPL-1500, NPL-3000, NPL-5000, NPL-7500	N: 7,400 - 75,000 lbf: 1,665 - 16,860	12.5 - 250	Rod

Spring Series Application	Product Line	Model	Contact Force N/lbf	Stroke Length mm	Seal Type
Stock Lifters					
Guided Lifting Systems	SL	T2-SLT-170, T2SLE-170, T2SLM-300, T2SRL-800, T2DPL-90, T2DPL-200	N: 1,700 - 7,100 lbf: 382 - 1,596	23 - 210	Rod
Specialty Solutions					
High Working Temperatures	T2M, T3M	T2M-16, T2M 24, T3M-300, T3M-500, T3M-750, T3M-1000	N: 420 - 9,200 lbf: 420 - 2,068	10 - 80	Rod
Die Separation	NDS	NDS-3000, NDS-5000, NDS-7500	N: 30,000 - 75,000 lbf: 6,500 - 16,860	80 - 300	Rod
Smooth Return Series	SRS	SRS 750, SRS 1500, SRS 3000, SRS 5000	N: 7,400 - 50,000 lbf: 1,665 - 11,250	80 - 300	Rod
Delay Systems					
Controllable Gas Springs	CS2	CS2 1500, CS2 3000, CS2 5000, CS2 7500	N: 15,000 - 75,000 lbf: 3,372 - 16,860	4 - 160	Rod
Adjustable Controllable Gas Springs	CS2 - A	CS2-A 1500, CS2-A 3000, CS2-A 5000, CS2-A 7500	N: 15,000 - 75,000 lbf: 3,372 - 16,860	5 - 167	Rod

User Guide

To achieve the best possible service-life and safety from the Gas Spring, the instructions below must be followed. The Gas Spring is intended for use in tool and machine applications. For marking and general information of the product, see the back page.

Use of Nitrogen Gas Springs



Product Specifications	
Pressure Medium	Nitrogen gas, N_2
Max. charging pressure (T3 170-350, T3T-350 max. 180 bar)	150 bar/2175 psi
Min. charging pressure	20 bar/290 psi
Operating temperature	0 to +80° C
Max, piston rod velocity	1.6 m/s (T4SC 0.8 m/s)
Force increase by temp	0.3% / ° C

Mounting Instructions

Secure the Gas Spring to the tool/machine whenever possible, using the threaded hole(s) in the base of the Gas Spring or a suitable Flange.

The threaded hole in the piston rod top should not be used for mounting purposes. It is only to be used when servicing the Gas Spring.

Do not use the Gas Spring in such a way that the piston rod is released freely from its compressed position, as this could cause internal damage to the Gas Spring.

Make sure the Gas Spring is mounted parallel to the direction of the compression stroke.

Ensure the contact surface of the piston rod top is perpendicular to the direction of the compression stroke and is sufficiently hardened.

The Gas Spring should not be subjected to side loads.

Protect the piston rod against mechanical damage and contact with fluids.

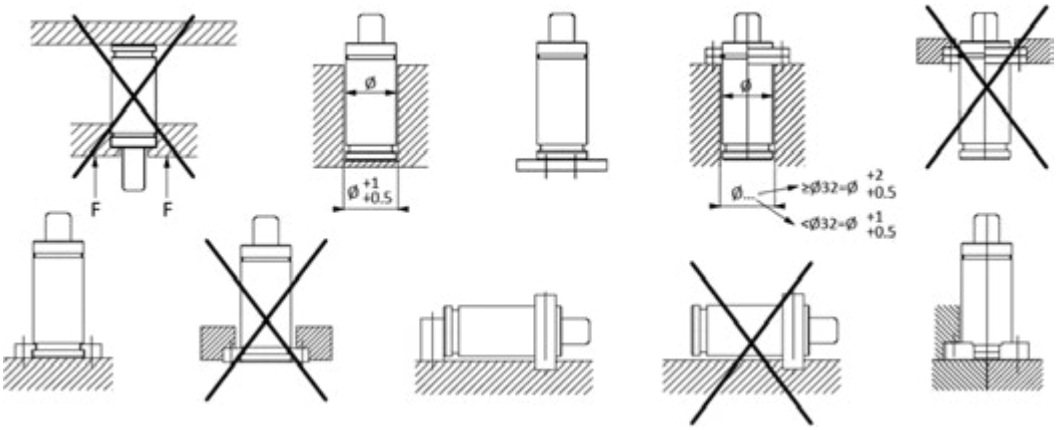
We do not recommend the last 5 mm or the last 10% of the nominal stroke being utilized.

The maximum charging pressure (at 20 °C) must not be exceeded, as it may affect the safety of the product.

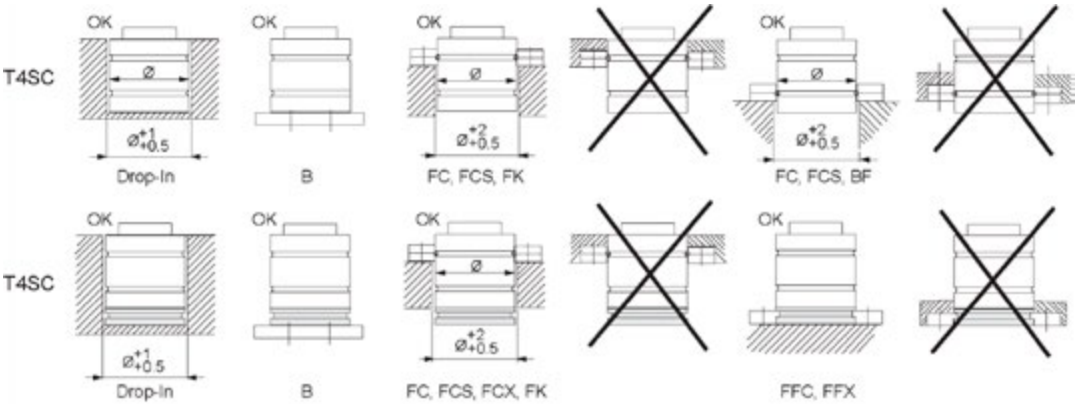
Exceeding the Gas Spring's recommended operating temperature will shorten the service life of the Gas Spring.

Mounts

Below are the various Gas Spring mounting possibilities, which differ from model to model. Only use mounts manufactured or approved by HYSON.



Below are the various Gas Spring mounting possibilities for the T4SC models



Service Information

All HYSON Gas Springs included in this user guide are approved for min. 2,000,000 full strokes.

⚠ Caution!
Never work in the tool before the piston rod is in its upper position.

⚠ Caution!
Make sure the Gas Spring is empty of gas before handling.

If correctly installed and used, the following minimum Gas Spring service-intervals can be expected:

- Stroke lengths up to and including 50 mm–1,000,000 strokes.
- Stroke lengths above 50 mm–100,000 stroke meters.

The Gas Springs are fully serviceable (except T3 170-320, T4SC-420 and T3/T3T/T3F 2400-16 is not recommended to be repaired as the lock ring is difficult to remove). To service a Gas Spring, repair kits and tool kits are available, see HYSON product catalog for seal kit number. Service instructions are included with every repair kit.

⚠ Caution!
Only specially trained personnel with a good knowledge of the products should service the Gas Spring. Mistakes made during assembly and charging may infringe on safety and/or detrimentally effect the service-life of the Gas Spring.

⚠ Caution!
Do not modify the product in any way.

For more information see HysonSolutions.com or contact your local distributor.

NP Series

NP-500 to NP-10000

Full Height ISO Nitrogen Gas Springs

Product Features

- Seven models with contact forces from 1,055 to 23,830 lbs.
- Extended stroke lengths to 300 mm/11.81 in.
- Variety of mounting options available.
- Fully meets ISO 11901 and major automotive die standards.
- Flexible guide absorbs lateral movement and misalignments in the die.

Advanced Safety Features

- Guide features built-in pressure relief if assembled upside down.
- Secondary piston retaining ring for extra protection.
- Overload, overstroke and overpressure protection vents internal gas pressure in a controlled manner.

Product Specifications

Pressure medium ..... Nitrogen
Min. charging pressure ..... 25 bar
Max. charging pressure ..... 150 bar
Operating temperature ..... 0º to 80ºC
Force increase by temperature ..... ±0.3% per ºC
Recommended max strokes/min ..... ~15-40 except for NP-500 which is ~40-80
Max piston rod velocity ..... 96m per min.
Inlet valve 56-072-5500
Charge fitting T2-770-G1/8-P

Ordering Options

NP-5000	X	50
Model		Stroke (mm)
NP-500 NP-750 NP-1500 NP-3000 NP-5000 NP-7500 NP-10000		See Dimensional Information Charts

Repair Kits

Gas Spring	NP Repair kit number
NP-500	3026631
NP-750	3019999
NP-1500	3020000
NP-3000	3020001
NP-5000	3020002
NP-7500	3020003
NP-10000	3020004

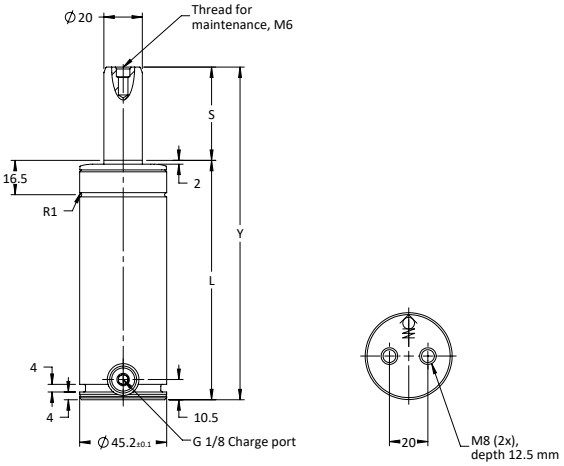
NP-500 provides full stroke force between 6,000 N (1,350 lbf) and 6,700 N (1,510 lbf) and is available in 10 stroke lengths.

A variety of mounting options are available which utilize the upper C-groove, lower U-groove and bottom threaded holes.

Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 4700
Contact Force at max. pressure (lbf) 1055
Recommended max strokes/min (at 20°C) ..... ~ 40-80
Cylinder diameter (mm) 45
Charge port ..... G 1/8”
Repair kit 3019997
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



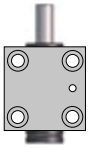
Order number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height		Gas vol.	Weight	
	S		2175 psi at 68 ° F				Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
NP-500x25	25	0.98	4,700	1,055	6,400	1,440	135	5.31	110	4.33	0.038	1.04	2.293
NP-500x50	50	1.97			6,600	1,480	185	7.28	135	5.31	0.063	1.21	2.668
NP-500x80	80	3.15			6,700	1,510	245	9.65	165	6.50	0.093	1.43	3.153
NP-500x100	100	3.94			6,700	1,510	285	11.22	185	7.28	0.114	1.57	3.461
NP-500x125	125	4.92			6,700	1,510	335	13.19	210	8.27	0.139	1.74	3.836
Alternative Stroke Lengths													
NP-500x10	10	0.39	4,700	1,055	6,000	1,350	105	4.13	95	3.74	0.023	0.93	2.050
NP-500x12.7	12.7	0.50			6,100	1,370	110.4	4.35	97.7	3.85	0.025	0.95	2.094
NP-500x38.1	38.1	1.50			6,500	1,460	161.2	6.35	123.1	4.85	0.051	1.13	2.491
NP-500x63.5	63.5	2.50			6,600	1,480	212	8.35	148.5	5.85	0.077	1.31	2.888
NP-500x160	160	6.30			6,700	1,510	405	15.94	245	9.65	0.175	1.99	4.387

Note! All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top Mount
FC, FCS, FCSC

Foot Mount
FFC, LM-lug, L



Body Mount
HMF, S

Base Mount
MP, RM

Recommended Flanges

FC-500

235

FCS-500

238

FFC-500

240

HMF-500

243

MP-500

246

S-500

248

Additional Flanges

FCSC-500

239

SF-500

249

HM-500

242

LM-LUG-500

244

L-500

245

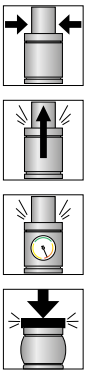
RM-500

247

Note!
For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

NP-750 provides full stroke force between 12,000 N (2,700 lbf) and 12,100 N (2,720 lbf) and is available in 12 stroke lengths.

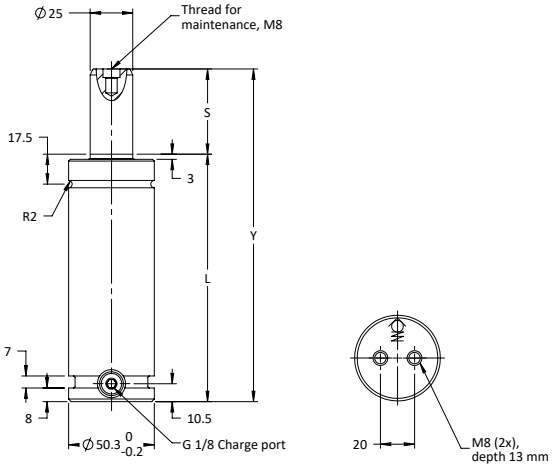
A variety of mounting options are available which utilize the upper C-groove, lower U-groove and bottom threaded holes.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 7400
Contact Force at max. pressure (lbf) 1665
Recommended max strokes/min (at 20°C) ..... ~ 15-40
Cylinder diameter (mm) 50
Charge port ..... G 1/8”
Repair kit 3019999
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



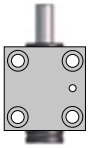
Order number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height		Gas vol.	Weight	
	S		2175 psi at 68 ° F				Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
NP-750x25	25.0	0.98	7,400	1,665	12,000	2,700	145	5.71	120	4.72	0.04	1.44	3,175
NP-750x50	50	1.97			12,000	2,700	195	7.68	145	5.71	0.07	1.68	3,704
NP-750x80	80	3.15			12,000	2,700	255	10.04	175	6.89	0.11	1.94	4,277
NP-750x100	100	3.94			12,000	2,700	295	11.61	195	7.68	0.14	2.13	4,696
NP-750x125	125	4.92			12,100	2,720	345	13.58	220	8.66	0.17	2.37	5,225
NP-750x160	160	6.30			12,100	2,720	415	16.34	255	10.04	0.21	2.70	5,952
Alternative Stroke Lengths													
NP-750x12.7	12.7	0.50	7,400	1,665	12,000	2,700	120.4	4.74	107.7	4.24	0.03	1.33	2,932
NP-750x38.1	38.1	1.50			12,000	2,700	171.2	6.74	133.1	5.24	0.06	1.57	3,461
NP-750x63.5	63.5	2.50			12,000	2,700	222	8.74	158.5	6.24	0.09	1.78	3,924
NP-750x200	200	7.87			12,100	2,720	495	19.49	295	11.61	0.26	3.08	6,790
NP-750x250	250	9.84			12,100	2,720	595	23.43	345	13.58	0.33	3.55	7,826
NP-750x300	300	11.81			12,100	2,720	695	27.36	395	15.55	0.39	4.03	8,885

Note! All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top Mount
FC, FCS,
FCSC

Foot Mount
FFC, SF,
LM-lug, L



Body Mount
HM, HMF, S

Base Mount
MP, RM

Recommended Flanges

FC-750
235

FCS-750
238

FFC-750
240

HMF-750
243

MP-750
246

S-750
248

Additional Flanges

FCSC-750
239

SF-750
249

HM-750
242

LM-LUG-750
244

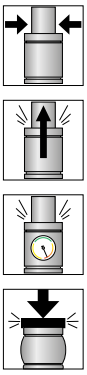
L-750
245

RM-750
247

Note!
For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

NP-1500 provides full stroke force 23,000 (5,170 lbf) and is available in 12 stroke lengths.

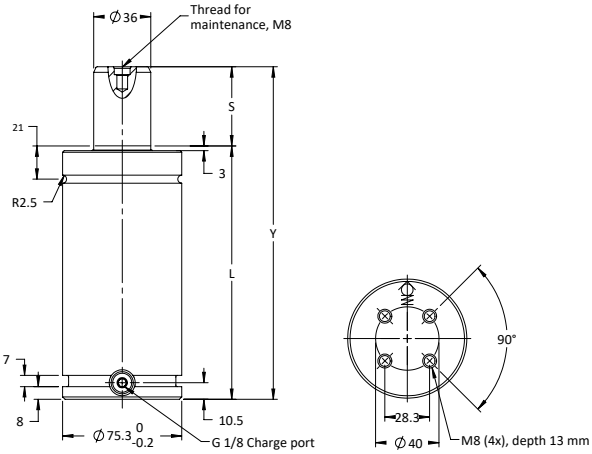
Strokes 25, 50, 80, 100, 125 and 160 are offered as a part of the Hyson Preferred Program which provides optimal delivery.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 15000
Contact Force at max. pressure (lbf) 3375
Recommended max strokes/min (at 20°C) ..... ~ 15-40
Cylinder diameter (mm) 75
Charge port ..... G 1/8”
Repair kit 3020000
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



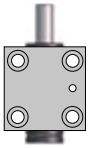
Order number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height		Gas vol.	Weight	
	S		2175 psi at 68 ° F				Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
NP-1500x25	25.0	0.98	15,000	3,375	23,000	5,170	160	6.30	135	5.31	0.10	3.65	7.474
NP-1500x50	50	1.97					210	8.27	160	6.30	0.18	4.11	8.047
NP-1500x80	80	3.15					270	10.63	190	7.48	0.28	4.66	8.576
NP-1500x100	100	3.94					310	12.2	210	8.27	0.34	5.02	9.061
NP-1500x125	125	4.92					360	14.17	235	9.25	0.42	5.48	9.590
NP-1500x160	160	6.30					430	16.93	270	10.63	0.53	6.12	10.274
Alternative Stroke Lengths													
NP-1500x12.7	12.7	0.50	15,000	3,375	23,000	5,170	135.4	5.33	123	4.84	0.07	3.39	11.067
NP-1500x38.1	38.1	1.50					186.2	7.33	148.1	5.83	0.15	3.89	12.081
NP-1500x63.5	63.5	2.50					237	9.33	173.5	6.83	0.22	4.35	13.492
NP-1500x200	200	7.87					510	20.08	310	12.20	0.68	6.86	15.124
NP-1500x250	250	9.84					610	24.02	360	14.17	0.81	7.77	17.130
NP-1500x300	300	11.81					710	27.95	410	16.14	0.96	8.69	19.158

Note! All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top Mount
FC, FCS,
FCSC

Foot Mount
FFC, SF, LM-lug,
L



Body Mount
HM, HMF,
S

Base Mount
MP, RM

Recommended Flanges

FC-1500

235

FCS-1500

238

FFC-1500

240

HMF-1500

243

MP-1500

246

S-1500

248

Additional Flanges

FCSC-1500

239

SF-1500

249

HM-1500

242

LM-1500

244

L-1500

245

RM-1500

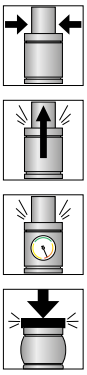
247

Note!

For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

NP-3000 provides full stroke force between 42,000 N (9,440 lbf) and 48,000 N (10,790 lbf) and is available in 12 stroke lengths.

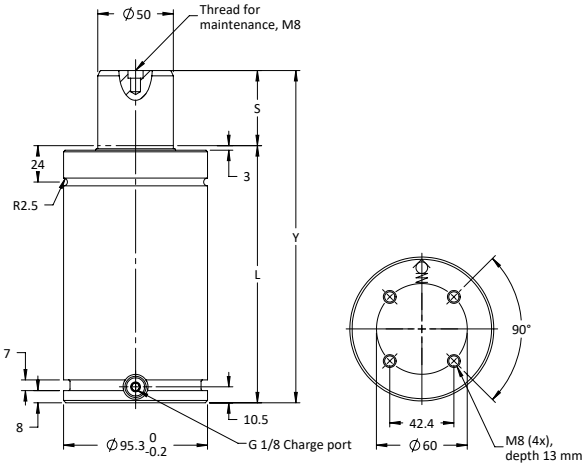
Strokes 25, 50, 80, 100, 125 and 160 are offered as a part of the Hyson Preferred Program which provides optimal delivery.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20ºC) ..... 25 bar
Max. charging pressure (at 20ºC) ..... 150 bar
Contact Force at max. pressure (N) 30000
Contact Force at max. pressure (lbf) 6750
Recommended max strokes/min (at 20ºC) ..... ~ 15-40
Cylinder diameter (mm) 95
Charge port ..... G 1/8”
Repair kit 3020001
Operating temperature ..... 0 to +80ºC
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/ºC
Pressure medium ..... Nitrogen



Order number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height		Gas vol.	Weight	
	S		2175 psi at 68 º F				Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
NP-3000x25	25	0.98	30,000	6,750	42,000	9,440	170.0	6.69	145	5.71	0.20	6.45	14.220
NP-3000x50	50	1.97			44,000	9,890	220	8.66	170	6.69	0.32	7.25	15.984
NP-3000x80	80	3.15			46,000	10,340	280	11.02	200	7.87	0.46	8.20	18.078
NP-3000x100	100	3.94			47,000	10,570	320	12.60	220	8.66	0.56	8.83	19.467
NP-3000x125	125	4.92			47,000	10,570	370	14.57	245	9.65	0.69	9.63	21.231
NP-3000x160	160	6.30			47,000	10,570	440	17.32	280	11.02	0.87	10.74	23.678
Alternative Stroke Lengths													
NP-3000x12.7	12.7	0.50	30,000	6,750	42,000	9,440	145.4	5.72	133	5.22	0.14	5.8	12.787
NP-3000x38.1	38.1	1.50			43,000	9,670	196.2	7.72	158.1	6.22	0.26	6.87	15.146
NP-3000x63.5	63.5	2.50			45,000	10,100	247	9.72	183.5	7.22	0.38	7.67	16.909
NP-3000x200	200	7.87			48,000	10,790	520	20.47	320	12.60	1.07	12.00	26.455
NP-3000x250	250	9.84			48,000	10,790	620	24.41	370	14.57	1.32	13.59	29.961
NP-3000x300	300	11.81			48,000	10,790	720	28.35	420	16.54	1.57	15.18	33.466

Note! All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top Mount
FC, FCS,
FCSC

Foot Mount
FFC, SF,
LM-lug, L

Base Mount
MP, RM

Recommended Flanges

FC-3000

235

FCS-3000

238

FFC-3000

240

HMF-3000

243

MP-3000

246

S-3000

248

Additional Flanges

FCSC-3000

239

SF-3000

249

HM-3000

242

LM-3000

244

L-3000

245

RM-3000

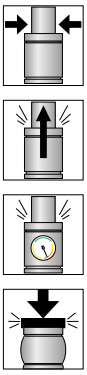
247

Note!

For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

NP-5000 provides full stroke force between 71,000 N (15,960 lbf) and 84,000 N (18,880 lbf) and is available in 11 stroke lengths.

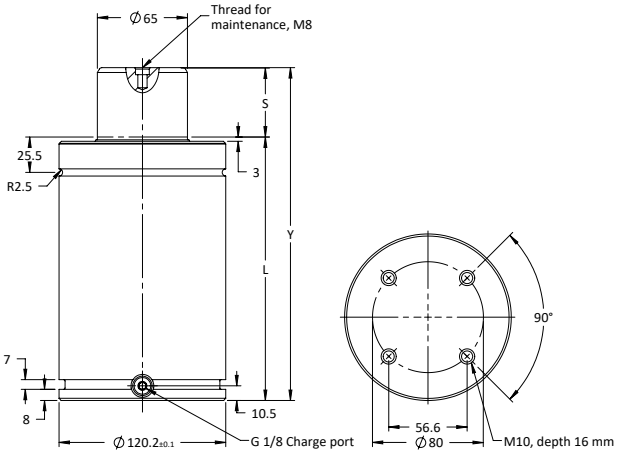
Strokes 25, 50, 80, 100, 125 and 160 are offered as a part of the Hyson Preferred Program which provides optimal delivery.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 50000
Contact Force at max. pressure (lbf) 11240
Recommended max strokes/min (at 20°C) ..... ~ 15-40
Cylinder diameter (mm) 120
Charge port ..... G 1/8”
Repair kit 3020002
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



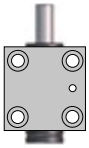
Order number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height		Gas vol.	Weight	
	S		2175 psi at 68 ° F				Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
NP-5000x25	25	0.98	50,000	11,240	71,000	15,960	190	7.48	165	6.50	0.32	12.40	27,337
NP-5000x50	50	1.97			77,000	17,310	240	9.45	190	7.48	0.51	13.70	30,203
NP-5000x80	80	3.15			81,000	18,210	300	11.81	220	8.66	0.73	15.30	33,731
NP-5000x100	100	3.94			82,000	18,430	340	13.39	240	9.45	0.89	16.40	36,156
NP-5000x125	125	4.92			82,000	18,430	390	15.35	265	10.43	1.09	17.70	39,022
NP-5000x160	160	6.30			83,000	18,660	460	18.11	300	11.81	1.36	19.60	43,211
Alternative Stroke Lengths													
NP-5000x38.1	38.1	1.50	50,000	11,240	75,000	16,860	216.2	8.51	178.1	7.01	0.42	13.10	28,881
NP-5000x63.5	63.5	2.50			80,000	17,990	267	10.51	203.5	8.01	0.60	14.40	31,747
NP-5000x200	200	7.87			84,000	18,880	540	21.26	340	13.39	1.68	21.70	47,840
NP-5000x250	250	9.84			84,000	18,880	640	25.20	390	15.35	2.07	22.40	49,384
NP-5000x300	300	11.81			84,000	18,880	740	29.13	440	17.32	2.46	27.10	59,745

Note! All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top Mount
FC, FCS,
FCSC

Foot Mount
FFC, SF,
LM-lug, L



Body Mount
HMF, S

Base Mount
MP, RM

Recommended Flanges

FC-5000

235

FCS-5000

238

FFC-5000

240

HMF-5000

243

MP-5000

246

S-5000

248

Additional Flanges

FCSC-5000

239

SF-5000

249

LM-5000

242

L-5000

244

RM-5000

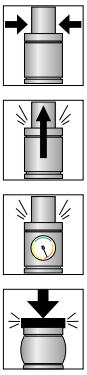
247

Note!

For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

NP-7500 provides full stroke force between 105,000 N (23,600 lbf) and 124,000 N (27,7880 lbf) and is available in 11 stroke lengths.

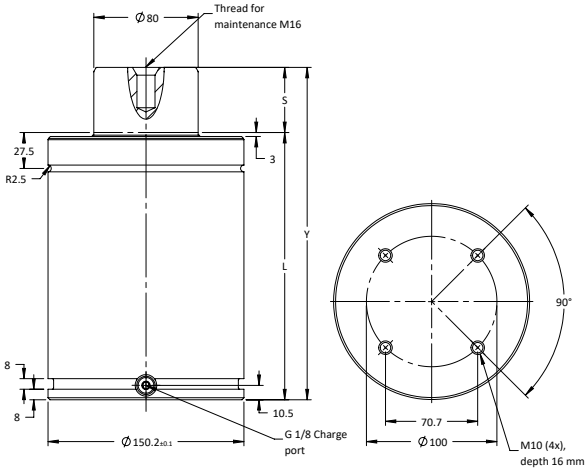
Strokes 25, 50, 80, 100, 125 and 160 are offered as a part of the Hyson Preferred Program which provides optimal delivery.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 75000
Contact Force at max. pressure (lbf) 16860
Recommended max strokes/min (at 20°C) ..... ~ 15-40
Cylinder diameter (mm) 150
Charge port ..... G 1/8”
Repair kit 3020003
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



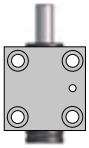
Order number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height		Gas vol.	Weight	
	S		2175 psi at 68 ° F				Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
NP-7500x25	25	0.98	75,000	16,860	105,000	23,600	205	8.07	180	7.09	0.51	20.30	44.754
NP-7500x50	50	1.97			113,000	25,400	255	10.04	205	8.07	0.81	22.40	49.384
NP-7500x80	80	3.15			117,000	26,300	315	12.40	235	9.25	1.18	24.80	54.675
NP-7500x100	100	3.94			119,000	26,750	355	13.98	255	10.04	1.43	26.50	58.422
NP-7500x125	125	4.92			121,000	27,200	405	15.94	280	11.02	1.74	28.50	62.832
NP-7500x160	160	6.30			122,000	27,430	475	18.70	315	12.40	2.17	31.40	69.225
Alternative Stroke Lengths													
NP-7500x38.1	38.1	1.50	75,000	16,860	110,000	24,730	231.2	9.10	193.1	7.60	0.67	21.40	47.179
NP-7500x63.5	63.5	2.50			115,000	25,850	282	11.10	218.5	8.60	0.98	23.50	51.809
NP-7500x200	200	7.87			123,000	27,650	555	21.85	355	13.98	2.66	34.70	76.500
NP-7500x250	250	9.84			124,000	27,880	655	25.79	405	15.94	3.27	38.80	85.539
NP-7500x300	300	11.81			124,000	27,880	755	29.72	455	17.91	3.88	42.90	94.578

Note! All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top Mount
FC, FCS,
FCSC

Foot Mount
FFC, SF,
LM-lug, L



Body Mount
HMF, S

Base Mount
MP, RM

Recommended Flanges

FC-7500

235

FCS-7500

238

FFC-7500

240

HMF-7500

243

MP-7500

246

S-7500

248

Additional Flanges

FCSC-7500

239

SF-7500

249

LM-LUG-7500

242

L-7500

244

RM-7500

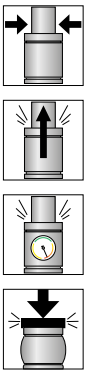
247

Note!

For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

NP-10000 provides full stroke force between 138,000 N (31,020 lbf) and 160,000 N (35,970 lbf) and is available in 11 stroke lengths.

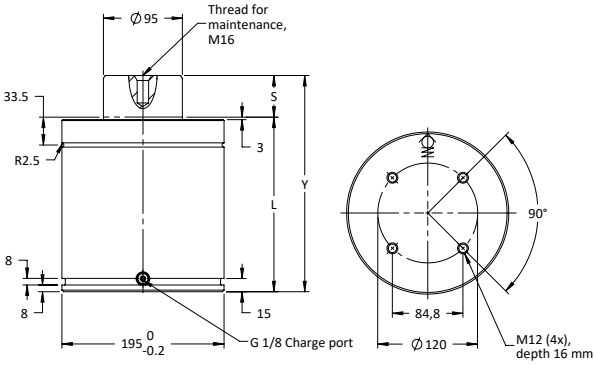
Strokes 50, 80, 100, 125, 160, 200, and 250 are offered as a part of the Hyson Preferred Program which provides optimal delivery.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 106000
Contact Force at max. pressure (lbf) 23830
Recommended max strokes/min (at 20°C) ..... ~ 15-40
Cylinder diameter (mm) 195
Charge port ..... G 1/8”
Repair kit 3020004
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



Order number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height		Gas vol.	Weight	
	S		2175 psi at 68 ° F				Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
NP-10000x50*	50	1.97	106,000	23,830	147,000	33,050	260	10.24	210	8.27	1.37	39.20	86.421
NP-10000x80*	80	3.15			152,000	34,170	320	12.60	240	9.45	1.98	43.20	95.240
NP-10000x100*	100	3.94			156,000	35,070	360	14.17	260	10.24	2.38	45.80	100.972
NP-10000x125*	125	4.92			157,000	35,300	410	16.14	285	11.22	2.88	49.10	108.247
NP-10000x160*	160	6.30			158,000	35,520	480	18.90	320	12.60	3.59	53.70	118.388
NP-10000x200*	200	7.87			160,000	35,970	560	22.05	360	14.17	4.39	59.00	130.073
NP-10000x250*	250	9.84			160,000	35,970	660	25.98	410	16.14	5.40	65.60	144.623
Alternative Stroke Lengths													
NP-10000x25	25	0.98	106,000	23,830	138,000	31,020	210	8.27	185	7.28	0.87	35.90	79.146
NP-10000x38.1	38.1	1.50			143,000	32,150	236.2	9.30	198.1	7.80	1.13	37.60	82.894
NP-10000x63.5	63.5	2.50			150,000	33,720	287	11.30	223.5	8.80	1.64	41.00	90.390
NP-10000x300	300	11.81			160,000	35,970	760	29.92	460	18.11	6.40	72.20	159.174

* Recommended stroke length for optimal delivery
Note! All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top Mount
FCS

Foot Mount
FFC, LM-lug

Base Mount
MP

Recommended Flanges

FCS-10000

238

FFC-10000

240

MP-10000

246

Additional Flanges

LM-LUG-10000

242

Note!

For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

NPL Series

NPL-750 to NPL-7500

Low Height Nitrogen Gas Springs

NPL Product Value

- Lower Height:
  Provides the force needed in a shorter profile where height is restricted.
- Force Adjustability & Increased Productivity:
  Hyson Gas Springs are adjustable simply by modifying gas pressure through a hosed control panel while the die is in the press.
- Balanced, Consistent Force:
  Hyson Gas Springs provide for a balanced pad and high quality parts while, as Coil Springs start to fatigue and break, the pad can become imbalanced resulting in poor quality parts.

Advanced Safety Features

- Overpressure Protection: designed to safely vent excessive gas pressure in the event of an over-pressure situation such as overcharged gas springs or the ingestion of large amounts of drawing or cooling fluids.
- Overstroke Protection: A patented system allows the venting of gas in a pre-determined manner with deformation or knock-out plug in the event of a mechanical overload of the gas spring body.
- Overload Protection: In the case of blockage in the tool that causes excessive piston return speed, a speciallyde-signed rod and integral safety stops retain the piston rod in the gas spring and allow gas to vent safely.

Product Specifications

Pressure medium ..... Nitrogen
Min. charging pressure ..... 25 bar
Max. charging pressure ..... 150 bar
Operating temperature ..... 0º to 80ºC
Force increase by temperature ..... ±0.3% per ºC
Recommended max strokes/min ..... ~15-40 @ 20ºC
Max piston rod velocity ..... 1.6 m/s
Inlet valve 56-072-5500
Charge fitting T2-770-G1/8-P

Ordering Options

NPL-5000	X	50
Model		Stroke (mm)
NPL-750 NPL-1500 NPL-3000 NPL-5000 NPL-7500		See Dimensional Information Charts

Repair Kits

Gas Spring	NP Repair kit number
NPL-750	3324118
NPL-1500	3324144
NPL-3000	3324171
NPL-5000	3324178
NPL-7500	3325027

NPL-750 provides full stroke force between 11,400 N (2,560 lbf) and 12,000 (2,700 lbf) and is available in 18 stroke lengths.

Strokes 25, 50, 80, 100, and 125 are offered as a part of the Hyson Preferred Program which provides optimal delivery.

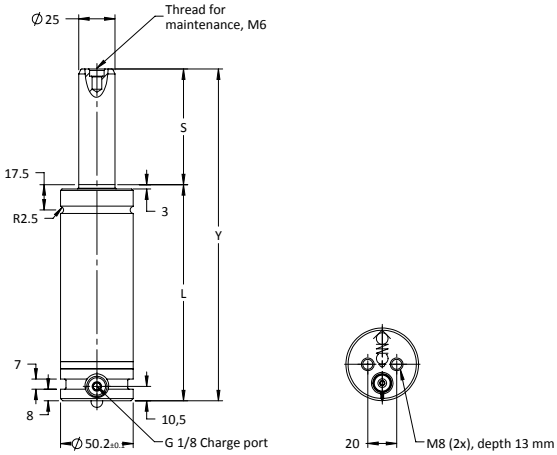





Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 7400
Contact Force at max. pressure (lbf) 1660
Recommended max strokes/min (at 20°C) ..... ~ 15-40
Cylinder diameter (mm) 50
Charge port ..... G 1/8”
Repair kit 3324118
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



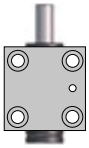
Order number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height		Gas vol.	Weight	
	S		2175 psi at 68 ° F				Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
NPL-750X25*	25	.98	7,400	1,665	11,700	2,630	120	4.72	95	3.35	0.04	1.08	2.38
NPL-750X50*	50	1.97			11,900	2,670	170	6.69	120	4.72	0.08	1.32	2.91
NPL-750X80*	80	3.15			11,900	2,670	230	9.06	150	5.91	0.11	1.58	3.48
NPL-750X100*	100	3.94			11,900	2,670	270	10.63	170	6.69	0.14	1.77	3.90
NPL-750X125*	125	4.92			12,000	2,700	320	12.60	195	7.68	0.15	2.01	4.43
NPL-750X160*	160	6.30			12,000	2,700	390	15.35	230	9.06	0.20	2.34	5.16
Alternative Stroke Lengths													
NPL-750X12.5	12.5	.49	7,400	1,665	11,400	2,560	95	3.74	82.5	3.25	0.03	.97	2.14
NPL-750X37.5	37.5	1.48			11,800	2,650	145	5.71	107.5	4.23	0.06	1.20	2.65
NPL-750X62.5	62.5	2.46			11,900	2,670	195	7.68	132.5	5.22	0.09	1.42	3.13
NPL-750X75	75	2.95			11,900	2,675	220	8.66	145	5.71	0.11	1.53	3.37
NPL-750X87.5	87.5	3.44			11,900	2,670	245	9.65	157.5	6.20	0.11	1.65	3.64
NPL-750X112.5	112.5	4.43			12,000	2,700	295	11.61	182.5	7.19	0.15	1.89	4.17
NPL-750X137.5	137.5	5.41			12,000	2,700	345	13.58	207.5	8.17	0.17	2.13	4.70
NPL-750X150	150	5.91			12,000	2,700	370	14.57	220	8.66	0.19	2.25	4.96
NPL-750X175	175	6.89			12,000	2,700	420	16.54	245	9.65	0.23	2.48	5.47
NPL-750X200	200	7.87			12,000	2,700	470	18.50	270	10.63	0.26	2.72	6.00
NPL-750X225	225	8.86			12,000	2,700	520	20.47	295	11.61	0.30	2.96	6.53
NPL-750X250	250	9.84			12,000	2,700	570	22.44	320	12.60	0.33	3.19	7.03

Note! All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top mount
FC, FCS,
FCSC

Foot mount
FFC, SF,
LM-lug, L



Body mount
HM, HMF,
S

Base mount
MP, RM

Recommended Flanges

FC-750

235

FCS-750

238

FFC-750

240

HMF-750

243

MP-750

246

S-750

248

Additional Flanges

FCSC-750

239

SF-750

249

HM-750

242

LM-LUG-750

244

L-750

245

RM-750

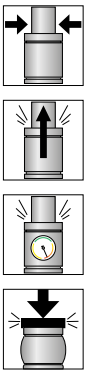
247

Note!

For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

NPL-1500 provides full stroke force between 18,000 N (4,050 lbf) and 22,200 (4,990 lbf) and is available in 18 stroke lengths.

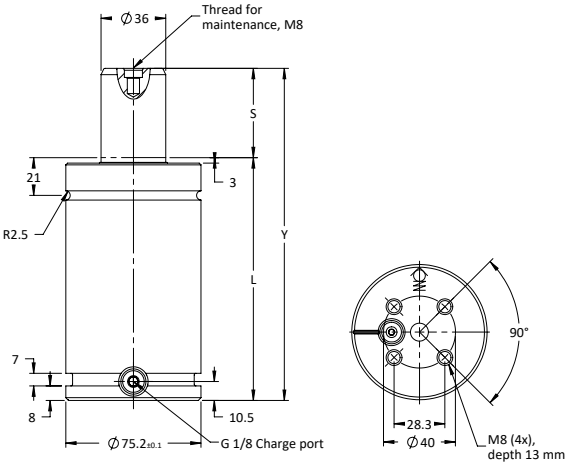
Strokes 25, 50, 80, 100, 125 and 160 are offered as a part of the Hyson Preferred Program which provides optimal delivery.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20ºC) ..... 25 bar
Max. charging pressure (at 20ºC) ..... 150 bar
Contact Force at max. pressure (N) 15000
Contact Force at max. pressure (lbf) 3370
Recommended max strokes/min (at 20ºC) ..... ~ 15-40
Cylinder diameter (mm) 75
Charge port ..... G 1/8”
Repair kit 3324144
Operating temperature ..... 0 to +80ºC
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/ºC
Pressure medium ..... Nitrogen



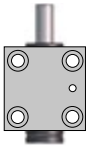
Order number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height		Gas vol.	Weight	
	S		2175 psi at 68 º F				Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
NPL-1500X25*	25	.98	15,000	3,375	19,200	4,320	135	5.31	110	4.33	0.15	2.88	6.35
NPL-1500X50*	50	1.97			20,400	4,590	185	7.28	135	5.31	0.23	3.34	7.36
NPL-1500X80*	80	3.15			21,000	4,720	245	9.65	165	6.50	0.33	3.89	8.58
NPL-1500X100*	100	3.94			21,200	4,770	285	11.22	185	7.28	0.39	4.26	9.39
NPL-1500X125*	125	4.92			21,500	4,830	335	13.19	210	8.27	0.47	4.71	10.38
NPL-1500X160*	160	6.30			22,100	4,970	405	15.95	245	9.65	0.56	5.36	11.82
Alternative Stroke Lengths													
NPL-1500X12.5	12.5	.49	15,000	3,375	18,000	4,050	110	4.33	97.5	3.84	0.11	2.65	5.84
NPL-1500X37.5	37.5	1.48			20,000	4,500	160	6.30	122.5	4.82	0.19	3.11	6.86
NPL-1500X62.5	62.5	2.46			20,700	4,650	210	8.27	147.5	5.81	0.27	3.57	7.87
NPL-1500X75	75	2.95			20,900	4,700	235	9.25	160	6.30	0.31	3.88	8.55
NPL-1500X87.5	87.5	3.44			21,100	4,740	260	10.24	172.5	6.79	0.35	4.03	8.88
NPL-1500X112.5	112.5	4.43			21,400	4,810	310	12.20	197.5	7.78	0.43	4.49	9.90
NPL-1500X137.5	137.5	5.41			22,000	4,950	360	14.17	222.5	8.76	0.49	4.94	10.89
NPL-1500X150	150	5.91			22,000	4,950	385	15.16	235	9.25	0.52	5.17	11.40
NPL-1500X175	175	6.89			22,100	4,970	435	17.13	260	10.24	0.60	5.63	12.41
NPL-1500X200	200	7.87			22,100	4,970	485	19.09	285	11.22	0.68	6.09	13.43
NPL-1500X225	225	8.86			22,200	4,990	535	21.06	310	12.20	0.76	6.55	14.44
NPL-1500X250	250	9.84			22,200	4,990	585	23.03	335	13.19	0.84	7.01	15.45

* Recommended stroke length for optimal delivery
Note! All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top mount
FC, FCS,
FCSC

Foot mount
FFC, SF,
LM-lug, L



Body mount
HM, HMF,
S

Base mount
MP, RM

Recommended Flanges

FC-1500

235

FCS-1500

238

FFC-1500

240

HMF-1500

243

MP-1500

246

S-1500

248

Additional Flanges

FCSC-1500

239

SF-1500

249

HM-1500

242

LM-LUG-1500

244

L-1500

245

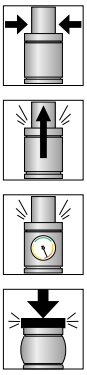
RM-1500

247

Note!
For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

NPL-3000 provides full stroke force between 38,700 N (8,710 lbf) and 47,300 (10,640 lbf) and is available in 18 stroke lengths.

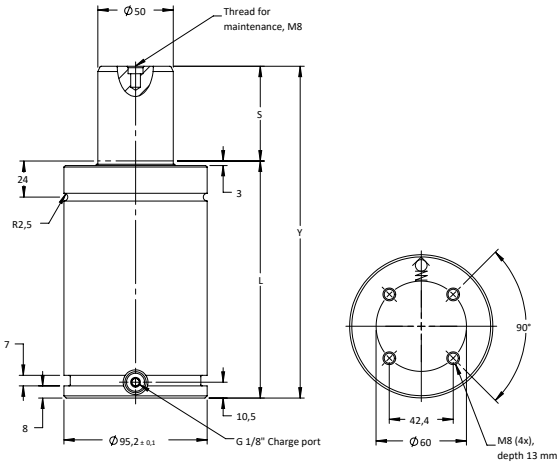
Strokes 25, 50, 80, 100, 125 and 160 are offered as a part of the Hyson Preferred Program which provides optimal delivery.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20ºC) ..... 25 bar
Max. charging pressure (at 20ºC) ..... 150 bar
Contact Force at max. pressure (N) 30000
Contact Force at max. pressure (lbf) 6750
Recommended max strokes/min (at 20ºC) ..... ~ 15-40
Cylinder diameter (mm) 95
Charge port ..... G 1/8”
Repair kit 3324171
Operating temperature ..... 0 to +80ºC
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/ºC
Pressure medium ..... Nitrogen



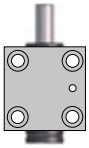
Order number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height		Gas vol.	Weight	
	S		2175 psi at 68 º F				Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
NPL-3000X25*	25	.98	30,000	6,750	41,800	9,400	145	5.71	120	4.72	0.21	5.24	11.55
NPL-3000X50*	50	1.97			44,400	9,980	195	7.68	145	5.71	0.33	6.03	13.29
NPL-3000X80*	80	3.15			45,600	10,260	255	10.04	175	6.89	0.48	7.12	15.70
NPL-3000X100*	100	3.94			46,100	10,360	295	11.61	195	7.68	0.58	7.62	16.80
NPL-3000X125*	125	4.92			46,500	10,450	345	13.58	220	8.66	0.71	8.41	18.54
NPL-3000X160*	160	6.30			46,900	10,530	415	16.34	255	10.04	0.89	9.53	21.01
Alternative Stroke Lengths													
NPL-3000X12.5	12.5	.49	30,000	6,750	38,700	8,710	120	4.72	107.5	4.23	0.14	4.84	10.67
NPL-3000X37.5	37.5	1.48			43,500	9,770	170	6.69	132.5	5.22	0.27	5.64	12.43
NPL-3000X62.5	62.5	2.46			45,100	10,130	220	8.66	157.5	6.20	0.40	6.43	14.18
NPL-3000X75	75	2.95			45,500	10,230	245	9.65	170	6.69	0.46	6.83	15.06
NPL-3000X87.5	87.5	3.44			45,800	10,300	270	10.63	182.5	7.19	0.52	7.23	15.94
NPL-3000X112.5	112.5	4.43			46,300	10,410	320	12.60	207.5	8.17	0.65	8.02	17.68
NPL-3000X137.5	137.5	5.41			46,600	10,490	370	14.57	232.5	9.15	0.77	8.84	19.49
NPL-3000X150	150	5.91			46,800	10,510	395	15.55	245	9.65	0.84	9.21	20.30
NPL-3000X175	175	6.89			47,000	10,560	445	17.52	270	10.63	0.96	10.00	22.05
NPL-3000X200	200	7.87			47,100	10,590	495	19.49	295	11.61	1.09	10.79	23.79
NPL-3000X225	225	8.86			47,200	10,620	545	21.46	320	12.60	1.21	11.59	25.55
NPL-3000X250	250	9.84			47,300	10,640	595	23.43	345	13.58	1.34	12.38	27.29

* Recommended stroke length for optimal delivery
Note! All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top mount
FC, FCS,
FCSC

Foot mount
FFC, SF,
LM-lug, L



Body mount
HM, HMF,
S

Base mount
MP, RM

Recommended Flanges

FC-3000

235

FCS-3000

238

FFC-3000

240

HMF-3000

243

MP-3000

246

S-3000

248

Additional Flanges

FCSC-3000

239

SF-3000

249

HM-3000

242

LM-LUG-3000

244

L-3000

245

RM-3000

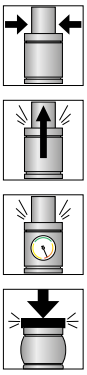
247

Note!

For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

NPL-5000 provides full stroke force between 80,100 N (18,000 lbf) and 85,400 (19,190 lbf) and is available in 17 stroke lengths.

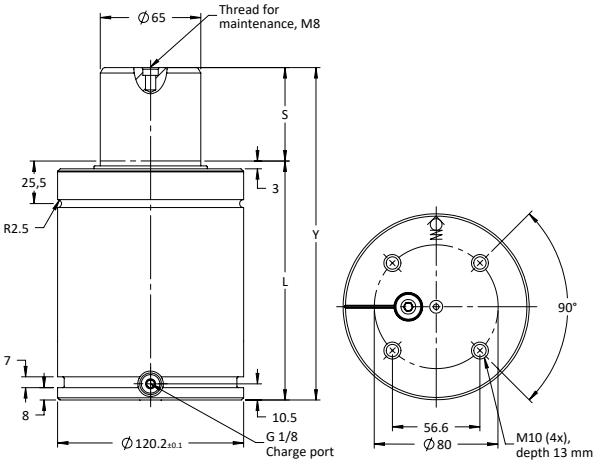
Strokes 25, 50, 80, 100, 125 and 160 are offered as a part of the Hyson Preferred Program which provides optimal delivery.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 50000
Contact Force at max. pressure (lbf) 11200
Recommended max strokes/min (at 20°C) ..... ~ 15-40
Cylinder diameter (mm) 120
Charge port ..... G 1/8”
Repair kit 3324178
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



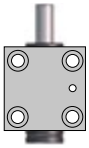
Order number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height		Gas vol.	Weight	
	S		2175 psi at 68 ° F				Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
NPL-5000X25	25	.98	50,000	11,240	80,100	18,000	152.5	6.00	127.5	5.02	0.2	9.04	19.93
NPL-5000X50	50	1.97			82,800	18,620	202.5	7.97	152.5	6.00	0.4	10.35	22.82
NPL-5000X80	80	3.15			84,000	18,870	262.5	10.33	182.5	7.19	0.7	11.93	26.30
NPL-5000X100	100	3.94			84,400	18,970	302.5	11.91	202.5	7.97	0.8	12.98	28.62
NPL-5000X125	125	4.92			84,700	19,040	352.5	13.88	227.5	8.96	1.0	14.30	31.53
NPL-5000X160	160	6.30			85,000	19,100	422.5	16.63	262.5	10.33	1.3	16.14	35.58
Alternative Stroke Lengths													
NPL-5000X37.5	37.5	1.48	50,000	11,240	81,900	18,410	177.5	6.99	140	5.51	0.3	9.70	21.38
NPL-5000X62.5	62.5	2.46			83,500	18,760	227.5	8.96	165	6.50	0.5	11.01	24.27
NPL-5000X75	75	2.95			83,800	18,850	252.5	9.94	177.5	6.99	0.6	11.67	25.73
NPL-5000X87.5	87.5	3.44			84,100	18,920	277.5	10.93	190	7.48	0.7	12.32	27.16
NPL-5000X112.5	112.5	4.43			84,500	19,000	327.5	12.89	215	8.46	0.9	13.64	30.07
NPL-5000X137.5	137.5	5.41			84,800	19,070	377.5	14.86	240	9.45	1.1	14.96	32.98
NPL-5000X150	150	5.91			84,900	19,090	402.5	15.85	252.5	9.94	1.2	15.62	34.44
NPL-5000X175	175	6.89			85,100	19,130	452.5	17.81	277.5	10.93	1.4	16.94	37.35
NPL-5000X200	200	7.87			85,200	19,160	502.5	19.78	302.5	11.91	1.6	18.25	40.23
NPL-5000X225	225	8.86			85,300	19,180	552.5	21.75	327.5	12.89	1.8	19.57	43.14
NPL-5000X250	250	9.84			85,400	19,190	602.5	23.72	352.5	13.88	2.0	20.89	46.05

Note! All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top mount
FC, FCS,
FCSC

Foot mount
FFC, SF,
LM-lug, L



Body mount
HM, HMF,
S

Base mount
MP, RM

Recommended Flanges

FC-5000

235

FCS-5000

238

FFC-5000

240

HMF-5000

243

MP-5000

246

S-5000

248

Additional Flanges

FCSC-5000

239

SF-5000

249

LM-LUG-5000

242

L-5000

244

RM-5000

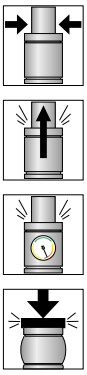
247

Note!

For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

NPL-7500 provides full stroke force between 99,900 N (22,450 lbf) and 116,000 (26,080 lbf) and is available in 17 stroke lengths.

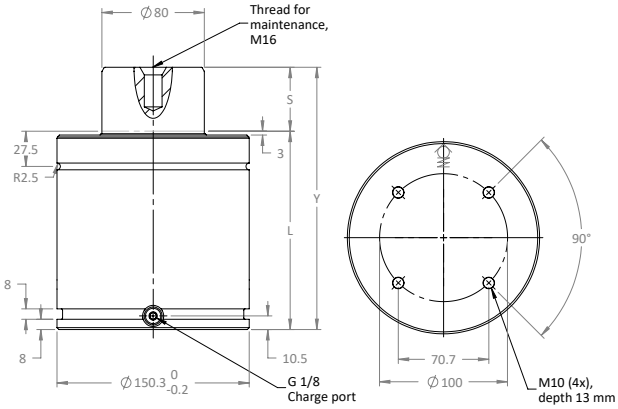
Strokes 25, 50, 80, 100, 125 and 160 are offered as a part of the Hyson Preferred Program which provides optimal delivery.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 75000
Contact Force at max. pressure (lbf) 16900
Recommended max strokes/min (at 20°C) ..... ~ 15-40
Cylinder diameter (mm) 150
Charge port ..... G 1/8”
Repair kit 3325027
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



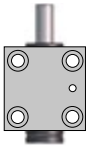
Order number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height		Gas vol.	Weight	
	S		2175 psi at 68 ° F				Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
NPL-7500X25	25	.98	75,000	16,860	99,900	22,450	155	6.10	130	5.12	0.6	13.6	29.98
NPL-7500X50	50	1.97			106,800	24,010	205	8.07	155	6.10	0.9	15.4	33.95
NPL-7500X80	80	3.15			115,600	25,990	265	10.43	185	7.28	1.4	17.5	38.58
NPL-7500X100	100	3.94			112,000	25,180	305	12.01	205	8.07	1.8	18.9	41.67
NPL-7500X125	125	4.92			113,300	25,470	355	13.98	230	9.06	2.1	20.7	45.64
NPL-7500X160	160	6.30			114,400	25,720	425	16.73	265	10.43	2.6	23.2	51.15
Alternative Stroke Lengths													
NPL-7500X37.5	37.5	1.48	75,000	16,860	104,100	23,400	180	7.09	142.5	5.61	0.7	14.5	31.97
NPL-7500X62.5	62.5	2.46			108,700	24,440	230	9.06	167.5	6.59	1.0	16.3	35.94
NPL-7500X75	75	2.95			110,100	24,750	255	10.04	180	7.09	1.3	17.2	37.92
NPL-7500X87.5	87.5	3.44			111,200	25,000	280	11.02	192.5	7.58	1.6	18.0	39.68
NPL-7500X112.5	112.5	4.43			112,700	25,340	330	12.99	217.5	8.56	1.9	19.8	43.65
NPL-7500X137.5	137.5	5.41			113,700	25,560	380	14.96	242.5	9.55	2.3	21.6	47.62
NPL-7500X150	150	5.91			114,100	25,650	405	15.94	255	10.04	2.4	22.5	49.60
NPL-7500X175	175	6.89			114,800	25,810	453	17.83	280	11.02	3.0	24.3	53.57
NPL-7500X200	200	7.87			115,300	25,920	505	19.88	305	12.01	3.3	26.1	57.54
NPL-7500X225	225	8.86			115,700	26,010	555	21.85	330	12.99	3.3	27.8	61.29
NPL-7500X250	250	9.84			116,000	26,080	605	23.82	355	13.98	3.6	29.6	65.26

Note! All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top mount
FC, FCS,
FCSC

Foot mount
FFC, SF,
LM-lug, L



Body mount
HMF, S

Base mount
MP, RM

Recommended Flanges

FC-7500

235

FCS-7500

238

FFC-7500

240

HMF-7500

243

MP-7500

246

S-7500

248

Additional Flanges

FCSC-7500

239

SF-7500

249

LM-LUG-7500

242

L-7500

244

RM-7500

247

Note!

For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T2 Mini Series

T2-50 to T2-200 plus T2SS3-16 and T2SS3-24

Mini Nitrogen Gas Springs

T2 Mini Product Value

- More Force in Less Space:
  Reduce your die footprint and the number of springs.
- Force Adjustability & Increased Productivity:
  Hyson Gas Springs are adjustable simply by modifying gas through the control panel while the die is in the press. With mechanical springs, the die must be pulled to replace worn or damaged springs, increasing downtime and lessening productivity.
- Balanced, Consistent Force:
  Hyson Gas Springs provide for a balanced pad and high quality parts while, as coil springs start to fatigue and break, the pad can become imbalanced resulting in poor quality parts.

Product Features

- Complete force adjustability
- Seven models with contact forces from 129 N to 2001 N/29 to 450 lbf, identifi able by color code
- Custom or pre-determined forces available to meet necessary force requirements
- Stroke lengths from 7 mm/.028 in to 125 mm/4.92 in
- Diameters available from 12 mm/0.47 in to 32 mm/1.26 in
- Variety of mounting options available

Advanced Safety Features

- T2-90, T2-180 and T2-200 have overstroke protection which vents internal gas pressure in a controlled manner, should the product be stroked beyond maximum capacity.

Product Specifications

Pressure medium ..... Nitrogen
Max. charging pressure ..... 180 bar
Operating temperature ..... 0° to 80°C
Force increase by temperature ..... ±0.3% per °C
Max piston rod velocity ..... 1.6m per min.

Ordering Options

Mini Springs

T2-XX	X	25	-	Yellow
Model		Stroke (mm)		Color
T2-50		See		Green
T2-70		Dimensional		Blue
T2-90		Information		Red
T2-180		Charts		Yellow
T2-200				Black

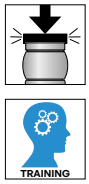
All Gas Springs shipped at maximum charge pressure unless otherwise specified.

Stripper Springs

T2SSX-XX	X	25	-	Thread Size	-	Yellow
Model		Stroke (mm)				Color
T2SS3-16		15-GM		M16 x 1.5		Green
T2SS3-16		See		(Standard)		Blue
T2SS2-24		Dimensional		-OR-		Red
		Information		M16 x 2		Yellow
		Charts		(Optional)		Black

All Gas Springs shipped at maximum charge pressure unless otherwise specified.

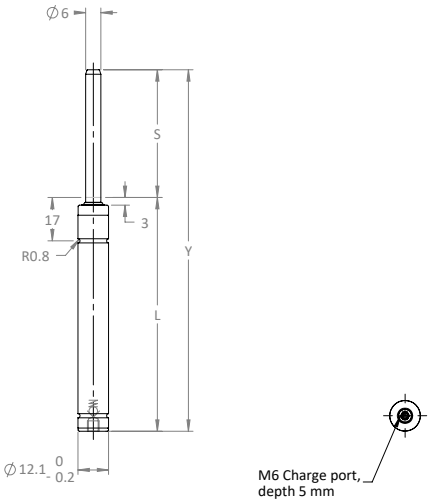
T2-50 green provides full stroke force between 149 N (34 lbf) and 207 N (47 lbf). T2-50 blue provides full stroke force between 299 (67 lbf) and 414 (93 lbf). T2-50 red provides full stroke force between 448 N (101 lbf) and 620 (139 lbf). T2-50 yellow provides full stroke force between 597 N (134 lbf) and 827 (186 lbf).



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 20 bar
Max. charging pressure (at 20°C) ..... 180 bar
Contact Force at max. pressure (N) 500
Contact Force at max. pressure (lbf) 112
Recommended max strokes/min (at 20°C) ..... ~ 40-100
Cylinder diameter (mm) 12
Charge port M6
Repair kit ..... Non-repairable
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



Order Number	Stroke		Full Stroke Force								Cylinder Height		Body Height		Weight	
	S		Green		Blue		Red		Yellow		Y ±0.25	Y ±.010	L			
	mm	in	N	lbf.	N	lbf.	N	lbf.	N	lbf.	mm	in	mm	in	kg	lb
T2-50X7	7.0	0.28	149	34	299	67	448	101	597	134	56.0	2.20	49.0	1.93	0.03	0.07
T2-50X10	10.0	0.39	158	36	317	71	475	107	634	143	62.0	2.44	52.0	2.05	0.03	0.07
T2-50X13	12.7	0.50	164	37	329	74	493	111	657	148	67.4	2.65	54.7	2.15	0.03	0.07
T2-50X15	15.0	0.59	168	38	335	75	503	113	670	151	72.0	2.83	57.0	2.24	0.03	0.07
T2-50X19	19.0	0.75	172	39	344	77	517	116	689	155	80.0	3.15	61.0	2.40	0.04	0.09
T2-50X25	25.0	0.98	177	40	354	80	530	119	707	159	92.0	3.62	67.0	2.64	0.04	0.09
T2-50X38	38.1	1.50	183	41	365	82	548	123	730	164	118.0	4.65	80.0	3.15	0.05	0.11
T2-50X50	50.0	1.97	185	42	371	83	556	125	742	167	142.0	5.59	92.0	3.62	0.05	0.11
T2-50X63	63.5	2.50	197	44	395	89	592	133	789	178	172.0	6.77	108.5	4.27	0.06	0.13
T2-50X75	75.0	2.95	197	44	394	89	591	133	788	178	195.0	7.68	120.0	4.72	0.07	0.15
T2-50X80	80.0	3.15	207	47	414	93	620	139	827	186	205.0	8.07	125.0	4.80	0.07	0.15
T2-50X100	100.0	3.94	204	46	409	92	613	138	817	184	245.0	9.65	145.0	5.71	0.08	0.18
T2-50X125	125.0	4.92	202	45	405	91	607	137	810	182	295.0	11.61	170.0	6.69	0.09	0.20

T2-50 Force					
		Contact Force		Charge Pressure	
Model	Color	N	lbf	bar	psi
T2-50	Green	130	29	45	650
T2-50	Blue	250	56	90	1,305
T2-50	Red	380	85	135	1,960
T2-50	Yellow	500	112	180	2,610
T2-50**	Black*	60-500	13-112	20-180	290-2,610

* Custom pressure. Please specify charging pressure or contact force required.
** Force to be set by the end user. Delivered with a pre-charge of 5-10 bar.

Mounting Possibilities

Top mount
FCR

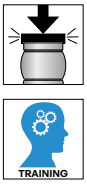
Recommended Flanges

FCR-50

236

Note!
For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

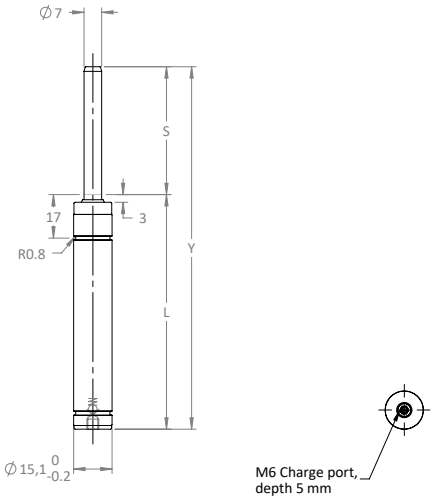
T2-70 green provides full stroke force between 216 N (49 lbf) and 273 N (61 lbf). T2-70 blue provides full stroke force between 432 (97 lbf) and 546 (123 lbf). T2-70 red provides full stroke force between 648 N (146 lbf) and 819 (184 lbf). T2-70 yellow provides full stroke force between 865 N (195 lbf) and 1,092 (246 lbf). Delivered with a pre-change of 5-10 bar.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 20 bar
Max. charging pressure (at 20°C) ..... 180 bar
Contact Force at max. pressure (N) 700
Contact Force at max. pressure (lbf) 160
Recommended max strokes/min (at 20°C) ..... ~ 100-150
Cylinder diameter (mm) 15
Charge port M6
Repair kit ..... Non-repairable
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



Order Number	Stroke		Full Stroke Force								Cylinder Height		Body Height		Weight	
	S		Green		Blue		Red		Yellow		Y ±0.25	Y ±.010	L			
	mm	in	N	lbf.	N	lbf.	N	lbf.	N	lbf.	mm	in	mm	in	kg	lb
T2-70X7	7.0	0.28	216	49	432	97	648	146	865	195	56.0	2.20	49.0	1.93	0.05	0.11
T2-70X10	10.0	0.39	224	50	447	101	671	151	895	201	62.0	2.44	52.0	2.05	0.05	0.11
T2-70X13	12.7	0.50	228	51	457	103	685	154	914	206	68.0	2.68	55.0	2.17	0.05	0.11
T2-70X15	15.0	0.59	232	52	463	104	695	156	927	209	72.0	2.83	57.0	2.24	0.05	0.11
T2-70X19	19.0	0.75	236	53	471	106	707	159	943	212	80.0	3.15	61.0	2.40	0.06	0.13
T2-70X25	25.0	0.98	240	54	480	108	720	162	961	216	92.0	3.62	67.0	2.64	0.06	0.13
T2-70X38	38.1	1.50	258	58	516	116	774	174	1,032	232	118.2	4.65	80.1	3.15	0.07	0.15
T2-70X50	50.0	1.97	258	58	516	116	774	174	1,033	232	142.0	5.59	92.0	3.62	0.08	0.18
T2-70X63	63.5	2.50	273	61	546	123	819	184	1,092	246	172.0	6.77	108.5	4.27	0.09	0.20
T2-70X75	75.0	2.95	270	61	541	122	811	182	1,082	243	195.0	7.68	120.0	4.72	0.10	0.22
T2-70X80	80.0	3.15	270	61	539	121	809	182	1,079	243	205.0	8.07	125.0	4.92	0.11	0.24
T2-70X100	100.0	3.94	267	60	534	120	802	180	1,069	240	245.0	9.65	145.0	5.71	0.12	0.26
T2-70X125	125.0	4.92	265	60	531	119	796	179	1,062	239	295.0	11.61	170.0	6.69	0.14	0.31

T2-70 Force					
		Contact Force		Charge Pressure	
Model	Color	N	lbf	bar	psi
T2-70	Green	180	40	45	650
T2-70	Blue	350	80	90	1,305
T2-70	Red	500	115	135	1,960
T2-70	Yellow	700	160	180	2,610
T2-70**	Black*	80-700	18-160	20-180	290-2,610

* Custom pressure. Please specify charging pressure or contact force required.
** Force to be set by the end user. Delivered with a pre-charge of 5-10 bar.

Mounting Possibilities

Top mount
FCR

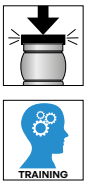
Recommended Flanges

FCR-70

236

Note!
For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

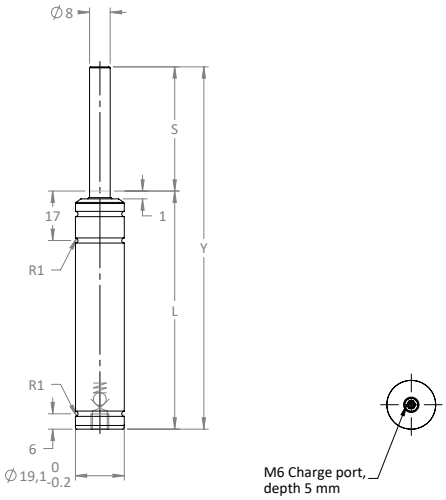
T2-90 green provides full stroke force between 410 N (92 lbf) and 530 N (119 lbf). T2-90 blue provides full stroke force between 670 (152 lbf) and 880 (199 lbf). T2-90 red provides full stroke force between 940 N (213 lbf) and 1,200 (270 lbf). T2-90 yellow provides full stroke force between 1,200 N (270 lbf) and 1,600 (360 lbf). Delivered with a pre-change of 5-10 bar.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 180 bar
Contact Force at max. pressure (N) 900
Contact Force at max. pressure (lbf) 202
Recommended max strokes/min (at 20°C) ..... ~ 100-150
Cylinder diameter (mm) 19
Charge port M6
Repair kit ..... Non-repairable
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen

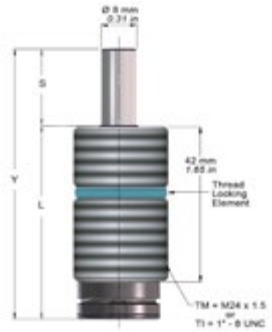


Order Number	Stroke		Full Stroke Force								Cylinder Height		Body Height		Weight	
	S		Green		Blue		Red		Yellow		Y ±0.25	Y ±.010	L			
	mm	in	N	lbf.	N	lbf.	N	lbf.	N	lbf.	mm	in	mm	in	kg	lb
T2-90X7	7.0	0.28	530	119	880	199	1,200	270	1,600	360	56.0	2.20	49.0	1.93	0.07	0.15
T2-90X10	10.0	0.39	470	105	780	175	1,100	247	1,400	315	62.0	2.44	52.0	2.05	0.08	0.18
T2-90X15	15.0	0.59	440	99	730	164	1,000	225	1,300	292	72.0	2.83	57.0	2.24	0.08	0.18
T2-90X25	25.0	0.98	420	94	700	157	980	220	1,300	292	92.0	3.62	67.0	2.64	0.08	0.18
T2-90X38	38.1	1.50	410	92	690	155	970	218	1,200	270	118.2	4.65	80.1	3.15	0.10	0.22
T2-90X50	50.0	1.97	410	92	680	154	960	216	1,200	279	142.0	5.59	92.0	3.62	0.12	0.26
T2-90X63*	63.5	2.50	410	92	680	154	950	215	1,200	270	172.0	6.77	108.5	4.27	0.13	0.29
T2-90X80	80.0	3.15	410	92	680	154	950	215	1,200	270	205.0	8.07	125.0	4.92	0.14	0.31
T2-90X100	100.0	3.94	410	92	670	152	940	213	1,200	270	245.0	9.65	145.0	5.71	0.17	0.37
T2-90X125	125.0	4.92	410	92	670	152	940	213	1,200	270	295.0	11.61	170.0	6.69	0.20	0.44

T2-90 Force					
		Contact Force		Charge Pressure	
Model	Color	N	lbf	bar	psi
T2-90	Green	300	67	60	870
T2-90	Blue	500	112	100	1,450
T2-90	Red	700	157	140	2,030
T2-90	Yellow	900	202	180	2,610
T2-90**	Black*	125-900	67-202	25-180	260-2,610

* Custom pressure. Please specify charging pressure or contact force required.
** Force to be set by the end user. Delivered with a pre-charge of 5-10 bar.

Installation Tool for Threaded Sleeve
Order No. 3020618



Mounting Possibilities

Top mount
FCR, FCR ISO

Foot mount
FM
only to be used for strokes 7-25 mm

Recommended Flanges

FM-90
232

FCR-19 VD12
236

FCR-90
236

Note!

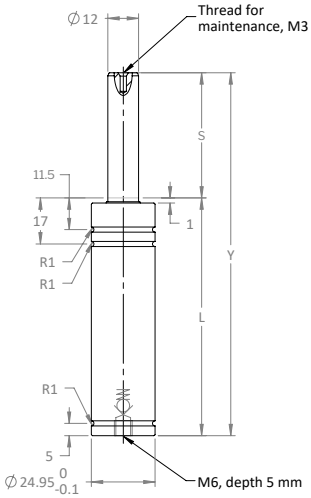
For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T2-180 offers multiple full stroke force options, green, blue, red, yellow and black (custom). Green provides full stroke force between 760 N (171 lbf) and 770 N (173 lbf). T2-180; Blue provides full stroke force between 1,520 (342 lbf) and 1,540 (346 lbf); Red provides full stroke force between 2,270 N (511 lbf) and 2,320 (522 lbf). Yellow provides full stroke force between 3,020 N (679 lbf) and 3,090 (695 lbf).

Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 180 bar
Contact Force at max. pressure (N) 2000
Contact Force at max. pressure (lbf) 450
Recommended max strokes/min (at 20°C) ..... ~ 80-100
Cylinder diameter (mm) 25
Charge port M6
Repair kit 3116385
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



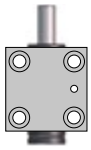
Order Number	Stroke		Full Stroke Force								Cylinder Height		Body Height		Weight	
	S		Green		Blue		Red		Yellow		Y ±0.25	Y ±.010	L			
	mm	in	N	lbf.	N	lbf.	N	lbf.	N	lbf.	mm	in	mm	in	kg	lb
T2-180X10	10.0	0.39	770	173	1,530	344	2,300	517	3,060	689	62.0	2.44	52.0	2.05	0.14	0.31
T2-180X12.7	12.7	0.50	770	173	1,530	344	2,300	517	3,070	690	67.4	2.65	54.7	2.15	0.15	0.33
T2-180X15	15.0	0.59	770	173	1,540	346	2,310	520	3,070	690	72.0	2.83	57.0	2.24	0.16	0.35
T2-180X16	16.0	0.63	770	173	1,540	346	2,310	520	3,070	690	74.0	2.91	58.0	2.28	0.16	0.35
T2-180X25	25.0	0.98	770	173	1,540	346	2,310	520	3,080	692	92.0	3.62	67.0	2.64	0.18	0.40
T2-180X38	38.1	1.50	770	173	1,540	346	2,320	522	3,090	695	118.2	4.65	80.1	3.15	0.20	0.44
T2-180X50	50.0	1.97	770	173	1,540	346	2,320	522	3,090	695	142.0	5.59	92.0	3.62	0.22	0.49
T2-180X63	63.5	2.50	760	171	1,520	342	2,270	511	3,020	679	172.0	6.77	108.5	4.27	0.26	0.57
T2-180X80	80.0	3.15	760	171	1,520	342	2,280	513	3,040	683	205.0	8.07	122.0	4.80	0.30	0.66
T2-180X100	100.0	3.94	760	171	1,520	342	2,290	515	3,050	686	245.0	9.65	142.0	5.59	0.33	0.73
T2-180X125	125	4.92	760	171	1,530	344	2,290	515	3,060	689	295	11.61	170	6.69	0.39	0.86

T2-180 Force					
		Contact Force		Charge Pressure	
Model	Color	N	lbf	bar	psi
T2-180	Green	500	112	45	655
T2-180	Blue	1,000	225	90	1,305
T2-180	Red	1,500	340	135	1,960
T2-180	Yellow	2,000	450	180	2,610
T2-180**	Black*	280-2,000	112-450	25-180	365-2,610

* Custom pressure. Please specify charging pressure or contact force required.
** Force to be set by the end user. Delivered with a pre-charge of 5-10 bar.

Mounting Possibilities

Top mount FC, FCR, FCR ISO



Body mount SM

Recommended Flanges

FC-180
235

FCR-25
236

FCR-180
236

Additional Flanges

FCN-150
235

SM-180
250

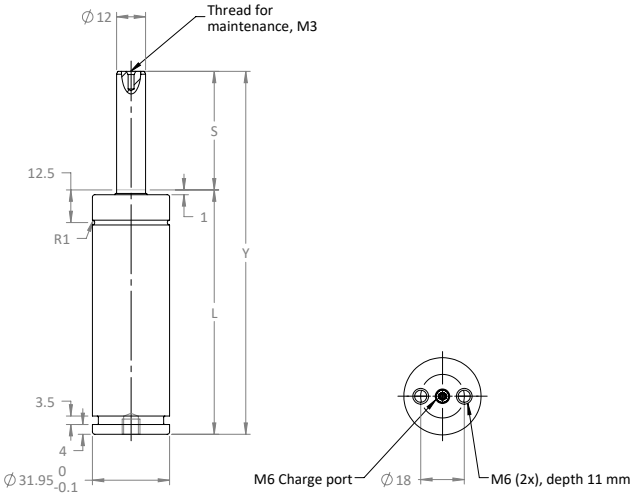
Note!
For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T2-200 [red] is available at full stroke force between 2,270 (510 lbf) and 2,310 (519 lbf). Custom pressure [black] is also available.

Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 180 bar
Contact Force at max. pressure (N) 2000
Contact Force at max. pressure (lbf) 450
Recommended max strokes/min (at 20°C) ..... ~ 80-100
Cylinder diameter (mm) 32
Charge port M6
Repair kit 3116385
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



Order Number	Stroke		Full Stroke Force		Cylinder Height		Body Height		Weight	
	S		Red		Y ±0.25	Y ±.010	L			
	mm	in	N	lbf.	mm	in	mm	in	kg	lb
T2-200X10	10.0	0.39	2,300	517	70.0	2.76	60.0	2.36	0.30	0.66
T2-200X12.7	12.7	0.50	2,300	517	75.4	2.97	62.7	2.47	0.31	0.68
T2-200X16	16.0	0.63	2,310	519	82.0	3.23	66.0	2.60	0.33	0.73
T2-200X25	25.0	0.98	2,310	519	100.0	3.94	75.0	2.95	0.38	0.84
T2-200X38.1	38.1	1.50	2,320	522	126.2	4.97	88.1	3.47	0.43	0.95
T2-200X50	50.0	1.97	2,320	522	150.0	5.91	100.0	3.94	0.48	1.06
T2-200X63.5	63.5	2.50	2,270	510	177.0	6.97	113.5	4.47	0.54	1.19
T2-200X80	80.0	3.15	2,280	513	210.0	8.27	130.0	5.12	0.62	1.37
T2-200X100	100.0	3.94	2,290	515	250.0	9.84	150.0	5.91	0.71	1.57
T2-200X125	125.0	4.92	2,290	515	300.0	11.81	175.0	6.89	0.83	1.83

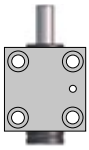
T2-200 Force					
		Contact Force		Charge Pressure	
Model	Color	N	lbf	bar	psi
T2-200	Red	1,500	340	135	1,960
T2-200**	Black*	280-2,000	63-450	25-180	290-2,610

* Custom pressure. Please specify charging pressure or contact force required.
** Force to be set by the end user. Delivered with a pre-charge of 5-10 bar.

Mounting Possibilities

Top mount
FC, FCS

Foot mount
FFC



Body mount
HMF, S

Recommended Flanges

FC-350
235

FCS-32
238

FFC-350
240

HMF-150
243

S-200
248

Note!
For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

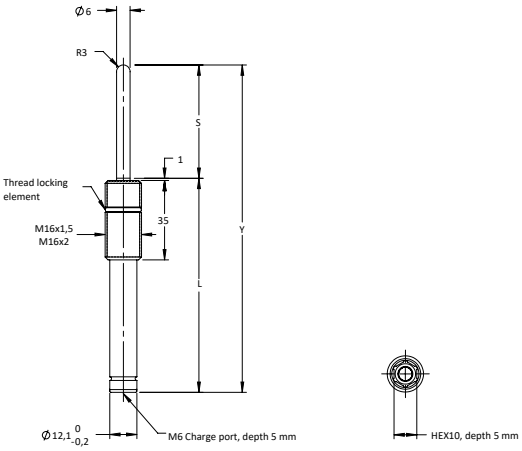
T2SS3-16 green provides full stroke force of 91 N (20 lbf). T2SS3-16 blue provides full stroke force 180 N (40 lbf). T2SS3-16 red provides full stroke force 335 N (75 lbf). T2SS3-16 yellow provides full stroke force 670 N (150 lbf). Force needs to be set by end user. Delivered with a pre-change of 5-10 bar.

Available mounting option - Lock Nut Retained Mount

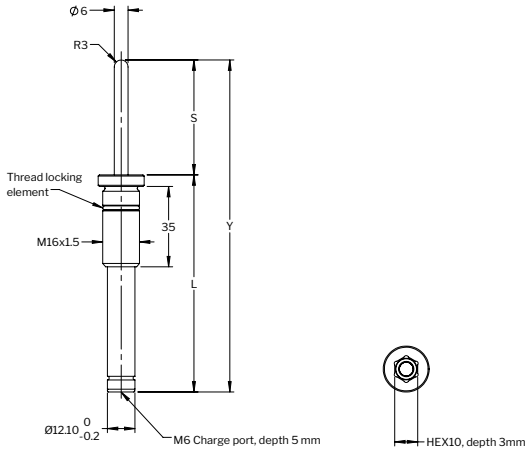
Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 10 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 420
Contact Force at max. pressure (lbf) 95
Recommended max strokes/min (at 20°C) ..... ~ 100
Cylinder diameter (mm) 16
Charge port M6
Repair kit ..... Non-repairable
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



T2SS3-16



T2SS3-16-GM

Order Number	Stroke		Full Stroke Force								Cylinder Height		Body Height		Weight	
	S		Green		Blue		Red		Yellow		Y ±0.25	Y ±.010	L			
	mm	in	N	lbf.	N	lbf.	N	lbf.	N	lbf.	mm	in	mm	in	kg	lb
T2SS3-16X1.5X10	10.0	0.39									65.0	2.56	55.0	2.17	0.06	0.13
T2SS3-16X15-GM [1]	15.0	0.59									75.0	2.95	60.0	2.36	0.06	0.13
T2SS3-16X1.5X20	20.0	0.79									85.0	3.35	65.0	2.56	0.07	0.15
T2SS3-16X1.5X30	30.0	1.18									105.0	4.13	75.0	2.95	0.07	0.15
T2SS3-16X1.5X40	40.0	1.57									125.0	4.92	85.0	3.35	0.08	0.18
T2SS3-16X1.5X50	50.0	1.97	91	20	180	40	335	75	670	150	145.0	5.71	95.0	3.74	0.08	0.18
T2SS3-16X1.5X60	60.0	2.36									165.0	6.50	105.0	4.13	0.09	0.20
T2SS3-16X1.5X70	70.0	2.76									185.0	7.28	115.0	4.53	0.10	0.22
T2SS3-16X1.5X80	80.0	3.15									205.0	8.07	125.0	4.92	0.11	0.24
T2SS3-16X1.5X100	100.0	3.94									245.0	9.65	145.0	5.71	0.11	0.24
T2SS3-16X1.5X125	125.0	4.92									295.0	11.61	170.0	6.69	0.13	0.29

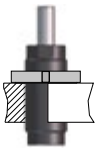
[1] Additional stroke lengths available.

T2SS3 Force					
		Contact Force		Charge Pressure	
Model	Color	N	lbf	bar	psi
T2SS3-16	Green	57	13	20	290
T2SS3-16	Blue	110	25	40	580
T2SS3-16	Red	210	47	75	1,090
T2SS3-16	Yellow	420	95	150	2,175
T2SS3-16**	Black*	40-420	9-95	20-150	290-2,175

* Custom pressure. Please specify charging pressure or contact force required.
** Force to be set by the end user. Delivered with a pre-charge of 5-10 bar.

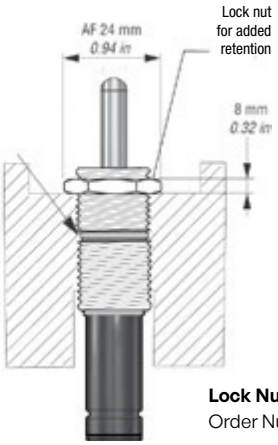
Installation Tool for T2SS3-16X15-GM
Order Number T2SS16-IT

Mounting Possibilities



Thread mount

Note
Lock nut is sold separately.



Lock Nut Retained Mount
Order Number 503681 for M16 x 1.5
503722 for M16 x 2

Note!

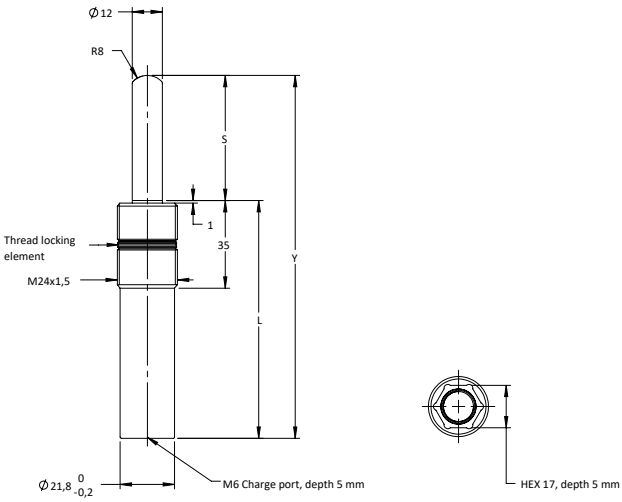
For dimensions on all mounting flanges, refer to "Flanges" in chapter 3.

T2SS3-24 green provides full stroke force of 390 N (90 lbf). T2SS3-24 blue provides full stroke force 800 N (180 lbf). T2SS3-24 red provides full stroke force 1,500 N (340 lbf). T2SS3-24 yellow provides full stroke force 2,900 N (650 lbf). Force needs to be set by end user. Delivered with a pre-change of 5-10 bar.

Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 10 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 1700
Contact Force at max. pressure (lbf) 382
Recommended max strokes/min (at 20°C) ..... ~ 30-80
Cylinder diameter (mm) 24
Charge port M6
Repair kit ..... Non-repairable
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



Order Number	Stroke		Full Stroke Force								Cylinder Height		Body Height		Weight	
	S		Green		Blue		Red		Yellow		Y ±0.25	Y ±.010	L			
	mm	in	N	lbf.	N	lbf.	N	lbf.	N	lbf.	mm	in	mm	in	kg	lb
T2SS2-24X10	10.0	0.39	390	90	800	180	1,500	340	2,900	650	65.0	2.56	55	2.17	0.14	0.31
T2SS2-24X20	20.0	0.79									85.0	3.35	65	2.56	0.15	0.33
T2SS2-24X30	30.0	1.18									105.0	4.13	75	2.95	0.17	0.37
T2SS2-24X40	40.0	1.57									125.0	4.92	85	3.35	0.19	0.42
T2SS2-24X50	50.0	1.97									145.0	5.71	95	3.74	0.21	0.46
T2SS2-24X60	60.0	2.36									165.0	6.50	105	4.13	0.23	0.51
T2SS2-24X70	70.0	2.76									185.0	7.28	115	4.53	0.25	0.55
T2SS2-24X80	80.0	3.15									205.0	8.07	125	4.92	0.27	0.60
T2SS2-24X100	100.	0 3.94									245.0	9.65	145	5.71	0.31	0.68
T2SS2-24X125	125.	0 4.92									295.0	11.61	170	6.69	0.35	0.77

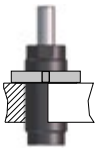
[1] Additional stroke lengths available.

T2SS2 Force					
		Contact Force		Charge Pressure	
Model	Color	N	lbf	bar	psi
T2SS2-24	Green	230	52	20	290
T2SS2-24	Blue	450	101	40	580
T2SS2-24	Red	850	191	75	1,090
T2SS2-24	Yellow	1,700	382	150	2,175
T2SS3-16**	Black*	65-1,700	52-382	6-150	290-2,175

* Custom pressure. Please specify charging pressure or contact force required.
** Force to be set by the end user. Delivered with a pre-charge of 5-10 bar.

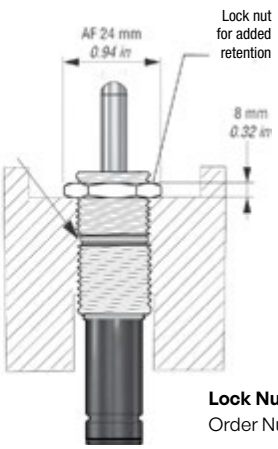
Installation Tool for T2SS3-16 and T2SS2-24
Order Number 3021000

Mounting Possibilities



Thread mount

Note
Lock nut is sold separately.



Lock Nut Retained Mount
Order Number 503928

Note!

For dimensions on all mounting flanges, refer to "Flanges" in chapter 3.

T2L Series

T2L-300 to T2L-750

Low Profile Nitrogen Gas Springs

Product Value

The T2L Series gives you the same force, the same stroke, and the same diameter as standard Gas Springs but in a much shorter overall package, ideal when shut height is limited.

Discontinued Models

The following models were discontinued in 2010 but can be replaced with T3 Gas Springs. The T3 models have the same diameters but may require a spacer in order to match the overall length. Please note that using a spacer may change the location or style of mounting groove. Spacers are provided with screws for attachment to the bottom of the Gas Spring.

Discontinued	Replace with	and Spacer
T2LS-500	T3-750*	N/A
T2LS-750	T3-1000	N/A
T2L-1500	T3-2400	3020686-0150
T2L-3000	T3-4200	3020682-0120

Please note:
T3 cylinders have larger piston rods resulting in greater contact force.
Additionally, charge ports on T3 replacements are different than L & LS cylinders
*** Body diameter is 0.75mm larger than T2LS-500**

Product Specifications

Pressure medium	Nitrogen
Max. charging pressure	150 bar
Operating temperature	0° to 80°C
Force increase by temperature	±0.3% per °C
Max piston rod velocity	1.6m per min.

Ordering Options

T2L-300	X	16	-	2175
Model		Stroke (mm)		Charge pressure
T2L-300		See Dimensional Information Charts		Max: 150 bar/2175 psi
T2L-500				
T2L-750				

Note: All T2L Gas Springs shipped at maximum charge pressure unless otherwise specified.

T2L-300 is available in 19 stroke lengths.

Flanges for T2L-300 are Circular Flange T2-250-FC, Upper Square Flange T2-250-FCS, and Lower Square Flange T2L-250-BFL.

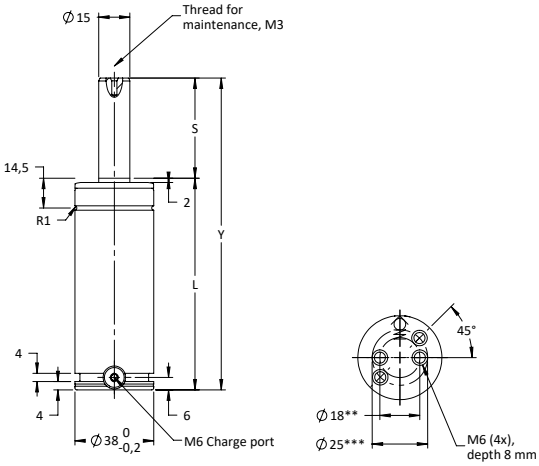





Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 50 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 2650
Contact Force at max. pressure (lbf) 595
Recommended max strokes/min (at 20°C) ..... ~ 80-100
Cylinder diameter (mm) 38
Charge port M6
Repair kit T2SLSK-300
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



Order number Model X Stroke	Stroke		Contact Force		Cylinder Height		Body Height		Weight	
	S		2175 psi at 68 ° F		Y ±0.25	Y ±0.010	L			
	mm	in	N	lbf.	mm	in	mm	in	kg	lb
Preferred Stroke Lengths (optimal delivery)										
T2L-300 x 25	25.0	0.98	2650	595	100.0	3.94	75.0	2.95	0.48	1.056
T2L-300 x 50	50.0	1.97	2650	595	150.0	5.91	100.0	3.94	0.60	1.32
T2L-300 x 80	80.0	3.15	2650	595	210.0	8.27	130.0	5.12	0.75	1.65
T2L-300 x 100	100.0	3.94	2650	595	250.0	9.84	150.0	5.91	0.85	1.87
T2L-300 x 125	125.0	4.92	2650	595	300.0	11.81	175.0	6.89	0.97	2.134
Alternative Stroke Lengths										
T2L-300 x 0.25	6.4	0.25	2650	595	62.7	2.47	56.4	2.22	0.40	0.88
T2L-300 x 10	10.0	0.39	2650	595	70.0	2.76	60.0	2.36	0.41	0.902
T2L-300 x 0.5	12.7	0.50	2650	595	75.4	2.97	62.7	2.47	0.42	0.924
T2L-300 x 16	16.0	0.63	2650	595	82.0	3.23	66.0	2.60	0.43	0.946
T2L-300 x 0.75	19.1	0.75	2650	595	88.1	3.47	69.1	2.72	0.46	1.012
T2L-300 x 1	25.4	1.00	2650	595	100.8	3.97	75.4	2.97	0.48	1.056
T2L-300 x 1.5	38.1	1.50	2650	595	126.2	4.97	88.1	3.47	0.54	1.188
T2L-300 x 2	50.8	2.00	2650	595	151.6	5.97	100.8	3.97	0.60	1.32
T2L-300 x 2.5	63.5	2.50	2650	595	177.0	6.97	113.5	4.47	0.67	1.474
T2L-300 x 3	76.2	3.00	2650	595	202.4	7.97	126.2	4.97	0.69	1.518
T2L-300 x 3.5	88.9	3.50	2650	595	227.8	8.97	138.9	5.47	0.76	1.672
T2L-300 x 4	101.6	4.00	2650	595	253.2	9.97	151.6	5.97	0.85	1.87
T2L-300 x 4.5	114.3	4.50	2650	595	278.6	10.97	164.3	6.47	0.90	1.98
T2L-300 x 5.0	127.0	5.00	2650	595	304.0	11.97	177.0	6.97	0.44	2.156

Note! All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top mount
FC, FCS,

Foot mount
FFC

Drop-in
mount

Recommended Flanges

FC-250

235

FCS-250

238

FFC-250

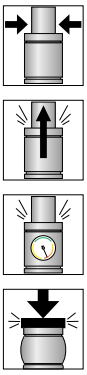
240

Note!

For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T2L-500 is available in 12 stroke lengths.

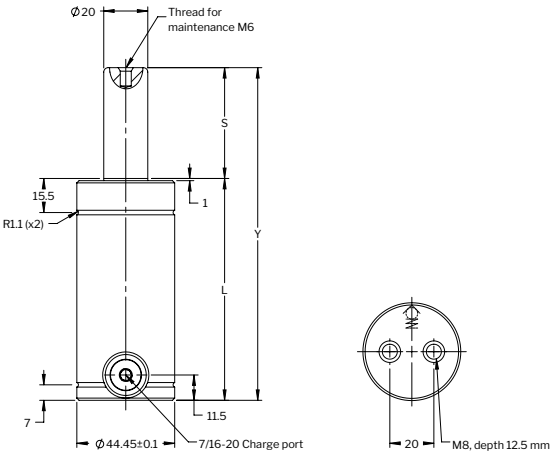
Flanges for T2L-500 are Circular Flange T2-500-FC, Upper Square Flange T2-500-FCS, and Lower Square Flange T2L-500-BFL.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20ºC) ..... 25 bar
Max. charging pressure (at 20ºC) ..... 150 bar
Contact Force at max. pressure (N) 4700
Contact Force at max. pressure (lbf) 1055
Recommended max strokes/min (at 20ºC) ..... ~ 40-80
Cylinder diameter (mm) 45
Charge port ..... G 1/8”
Repair kit T2LSK-500
Operating temperature ..... 0 to +80ºC
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/ºC
Pressure medium ..... Nitrogen



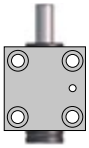
Order number Model X Stroke	Stroke		Contact Force		Cylinder Height		Body Height		Weight	
	S		2175 psi at 68 ° F		Y ±0.25	Y ±0.010	L			
	mm	in	N	lbf.	mm	in	mm	in	kg	lb
T2L-500 x 0.25	6.35	0.25	4700	1060	63.5	2.50	57.15	2.25	0.50	1.100
T2L-500 x 0.50	12.7	0.50	4700	1060	76.2	3.00	63.5	2.50	0.54	1.188
T2L-500 x 0.75	19.1	0.75	4700	1060	88.9	3.50	69.9	2.75	0.59	1.298
T2L-500 x 1	25.4	1.00	4700	1060	101.6	4.00	76.2	3.00	0.62	1.364
T2L-500 x 1.5	38.1	1.50	4700	1060	127.0	5.00	88.9	3.50	0.71	1.562
T2L-500 x 2	50.8	2.00	4700	1060	152.4	6.00	101.6	4.00	0.78	1.716
T2L-500 x 2.5	63.5	2.50	4700	1060	177.8	7.00	114.3	4.50	0.88	1.936
T2L-500 x 3	76.2	3.00	4700	1060	203.2	8.00	127.0	5.00	0.98	2.156
T2L-500 x 3.5	88.9	3.50	4700	1060	228.6	9.00	139.7	5.50	1.06	2.332
T2L-500 x 4	101.6	4.00	4700	1060	254.0	10.00	152.4	6.00	1.12	2.464
T2L-500 x 4.5	114.3	4.50	4700	1060	279.4	11.00	165.1	6.50	1.20	2.640
T2L-500 x 5	127.0	5.00	4700	1060	304.8	12.00	177.8	7.00	1.28	2.816

Note! All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top mount
FC, FCS,
FCSC

Foot mount
FFC, LM-lug,
L



Body mount
HMF

Base mount
MP

Recommended Flanges

FC-500

235

FCS-500

238

FFC-500

240

HMF-500

243

MP-500

246

Additional Flanges

FCSC-500

239

LM-LUG-500

242

L-500

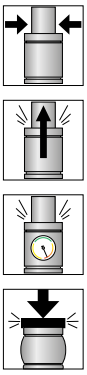
244

Note!

For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T2L-750 is available in 12 stroke lengths.

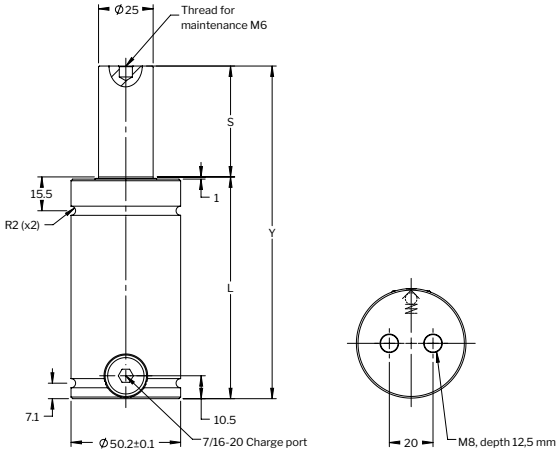
Flanges for T2L-750 are Circular Flange T2-750-FC, Upper Square Flange T2-750-FCS, and Lower Square Flange T2L-750-BFL.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 7400
Contact Force at max. pressure (lbf) 1665
Recommended max strokes/min (at 20°C) ..... ~ 15-40
Cylinder diameter (mm) 20
Charge port SAE-4
Repair kit T2LSK-750
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



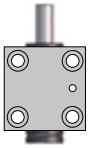
Order number Model X Stroke	Stroke		Contact Force		Cylinder Height		Body Height		Weight	
	S		2175 psi at 68 ° F		Y ±0.25	Y ±0.010	L			
	mm	in	N	lbf.	mm	in	mm	in	kg	lb
T2L-750 x 0.25	6.35	0.25	7400	1660	63.5	2.50	57.15	2.25	0.68	1.496
T2L-750 x 0.50	12.7	0.50	7400	1660	76.2	3.00	63.5	2.50	0.73	1.606
T2L-750 x 0.75	19.1	0.75	7400	1660	88.9	3.50	69.9	2.75	0.80	1.760
T2L-750 x 1	25.4	1.00	7400	1660	101.6	4.00	76.2	3.00	0.82	1.804
T2L-750 x 1.5	38.1	1.50	7400	1660	127.0	5.00	88.9	3.50	0.92	2.024
T2L-750 x 2	50.8	2.00	7400	1660	152.4	6.00	101.6	4.00	1.06	2.332
T2L-750 x 2.5	63.5	2.50	7400	1660	177.8	7.00	114.3	4.50	1.12	2.464
T2L-750 x 3	76.2	3.00	7400	1660	203.2	8.00	127.0	5.00	1.26	2.772
T2L-750 x 3.5	88.9	3.50	7400	1660	228.6	9.00	139.7	5.50	1.32	2.904
T2L-750 x 4	101.6	4.00	7400	1660	254.0	10.00	152.4	6.00	1.39	3.058
T2L-750 x 4.5	114.3	4.50	7400	1660	279.4	11.00	165.1	6.50	1.47	3.234
T2L-750 x 5	127.0	5.00	7400	1660	304.8	12.00	177.8	7.00	1.57	3.454

Note! All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top mount
FCS, FCSC

Foot mount
FFC, LM-lug, L



Body mount
HMF, S

Base mount
MP, RM

Recommended Flanges

FCS-750
238

FFC-750
240

HMF-750
243

MP-750
246

S-750
248

Additional Flanges

FCSC-750
239

LM-LUG-750
242

L-750
244

RM-750
247

Note!
For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T3 Series

T3-170 to T3-20000

High Force Gas Springs

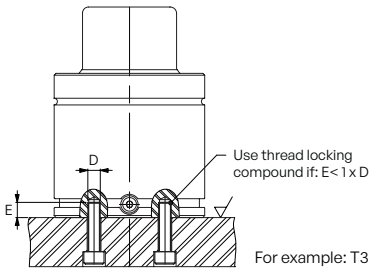
Product Value

- The highest force nitrogen Gas Spring in the smallest space.
- The T3 models comply with the standards, ISO 11901-3 and VDI 3003 Part 3.
- Reduces your cost per ton.

Product Features

- Twelve models with contact forces from 380 lbf to 45,000 lbf.
- Extended stroke lengths to 125 mm/4.92 in.
- Variety of mounting options available.
- Standard charge ports work with most charging equipment.

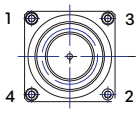
Mounting Guidelines



For example: T3 2400

For those Gas Springs whose thread depth (E) is less than 1 times its thread size (D) we recommend the following:
- select a screw length to engage all available thread depth
- use a thread locking compound
- ensure the correct screw torque setting is applied

Thread	Torque (for screw class 8.8 according to ISO 898-1)
M6	10 Nm
M8	24 Nm
M10	45 Nm
M12	80 Nm
M16	160-200 Nm



When tightening the mounting screws in the tool, apply an evenly cross like pattern according to the picture (1-2-3-4). Otherwise there is a risk for the mount to tilt.

Product Specifications

Pressure medium ..... Nitrogen
Min. charging pressure ..... 25 bar
Max. charging pressure
T3-170, T3-320, T3-350 ..... 180 bar
T3-500, T3-750, T3-1000, T3-1500, T3-2400, T3-4200, T3-6600, T3-9500, T3-20000..... 150 bar
Operating temperature ..... 0° to 80°C
Force increase by temperature ..... ±0.3% per °C
Recommended max strokes/min ..... ~15-100 @20 °C
Max piston rod velocity ..... 1.6 m/s
Max. Utilized Stroke 100%
Valve Inlet
T3-170, T3-320, T3-500, T3-750, T3-1000, T3-1500, T3-2400, T3-4200, T3-6600..... 4018112
T3-9500, T3-20000 56-072-5500
Charge fitting
T3-170, T3-320, T3-350, T3-500, T3-750, T3-1000, T3-1500, T32400..... T2-770-T3
T3-4200, T3-6600, T3-9500, T3-20000.....T2-770-G1/8-P

Ordering Options

T3-1500	X	50
Model		Stroke (mm)
T3-170 T3-320 T3-350 T3-500 T3-750 T3-1000 T3-1500 T3-2400 T3-4200 T3-6600 T3-9500 T3-20000		See Dimensional Information Charts

Repair Kits

Gas Spring	Repair Kit order number
T3-350	T3SK-350
T3-500	T3SK-500
T3-750	T3SK-750
T3-1000	T3SK-1000
T3-1500	T3SK-1500
T3-2400	T3SK-2400
T3-4200	T3SK-4200
T3-6600	T3SK-6600
T3-9500	T3SK-9500
T3-20000	T3SK-20000

Note: The T3-2400x16 and T3-2400x19 are not possible to repair.

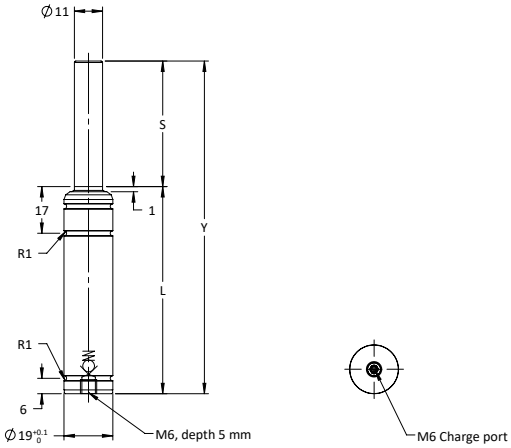
T3-170 provide full stroke force of 2,800 N (630 lbf) and is available in 12 stroke lengths.

The T3 170 has a bottom port for gas charging that can also be used to connect to a gas link system. The T3 170 has an upper ISO Standard C-groove and a lower C-groove, which together with a threaded bottom hole offer various mounting possibilities using our standard mounts.

Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 180 bar
Contact Force at max. pressure (N) 1700
Contact Force at max. pressure (lbf) 382
Recommended max strokes/min (at 20°C) ..... ~ 40-100
Cylinder diameter (mm) 19
Charge port M6
Repair kit ..... Non-repairable
Operating temperature ..... 20 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



Order number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height		Gas vol.	Weight	
	S		2610 psi				Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
T3-170x25	25	0.98	1,700	380	2,800	630	80	3.15	55	2.17	0.006	0.08	0.176
T3-170x38	38	1.50					106	4.17	68	2.68	0.009	0.09	0.198
T3-170x50	50	1.97					130	5.12	80	3.15	0.012	0.10	0.220
T3-170x63	63	2.48					156	6.14	93	3.66	0.015	0.12	0.265
Alternative Stroke Lengths													
T3-170x7	7	0.28	1,700	380	2,800	630	44	1.73	37	1.46	0.002	0.06	0.132
T3-170x10	10	0.39					50	1.97	40	1.57	0.002	0.06	0.132
T3-170x15	15	0.59					60	2.36	45	1.77	0.004	0.07	0.154
T3-170x19	19	0.75					68	2.68	49	1.93	0.005	0.07	0.154
T3-170x75	75	2.95					185	7.28	110	4.33	0.018	0.14	0.309
T3-170x80	80	3.15					195	7.68	115	4.53	0.019	0.14	0.309
T3-170x100	100	3.94					235	9.25	135	5.31	0.024	0.16	0.353
T3-170x125	125	4.92					285	11.22	160	6.30	0.030	0.19	0.419

Note! All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top mount
FCR, FCR ISO

Foot mount
FM
only to be used for strokes 7-25 mm

Recommended Flanges

FM-90
232

FCR-19 VD12
236

FCR-90
236

Note!
For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

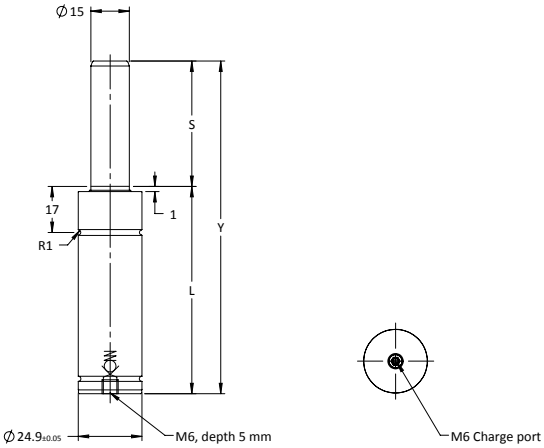
T3-320 provide full stroke force between 4,800 N (1080 lbf) and 5300 N (1190 lbf) and is available in 12 stroke lengths.

The T3 320 has a bottom port for gas charging that can also be used to connect to a gas link system. Do not use bottom thread for mounting for strokes 38, 50, 63, 75, 80, 100, and 125.

Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 180 bar
Contact Force at max. pressure (N) 3200
Contact Force at max. pressure (lbf) 720
Recommended max strokes/min (at 20°C) ..... ~ 40-100
Cylinder diameter (mm) 25
Charge port M6
Repair kit ..... Non-repairable
Operating temperature ..... 20 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen

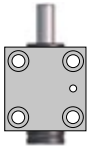


Order number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height		Gas vol.	Weight	
	S		2610 psi				Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
T3-320x25	25	0.98	3,200	720	5,200	1,170	80	3.15	55	2.17	0.011	0.14	0.14
T3-320x38	38	1.50			5,300	1,190	106	4.17	68	2.68	0.017	0.16	0.16
T3-320x50	50	1.97			5,300	1,190	130	5.12	80	3.15	0.022	0.19	0.19
T3-320x63	63	2.48			5,300	1,190	156	6.14	93	3.66	0.028	0.21	0.21
Alternative Stroke Lengths													
T3-320x7	7	0.28	3,200	720	4,800	1,080	44	1.73	37	1.46	0.004	0.10	0.10
T3-320x10	10	0.39			4,900	1,100	50	1.97	40	1.57	0.005	0.11	0.11
T3-320x15	15	0.59			5,100	1,150	60	2.36	45	1.77	0.007	0.12	0.12
T3-320x19	19	0.75			5,100	1,150	68	2.68	49	1.93	0.009	0.13	0.13
T3-320x75	75	2.95			5,300	1,190	185	7.28	110	4.33	0.034	0.24	0.24
T3-320x80	80	3.15			5,300	1,190	195	7.68	115	4.53	0.036	0.25	0.25
T3-320x100	100	3.94			5,300	1,190	235	9.25	135	5.31	0.044	0.29	0.29
T3-320x125	125	4.92			5,300	1,190	285	11.22	160	6.30	0.055	0.33	0.33

Note! All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top mount
FC, FCR,
FCR ISO



Body mount
SM

Recommended Flanges

FC-180

235

FCR-180

236

FCR-25

236

Additional Flanges

FCN-150

235

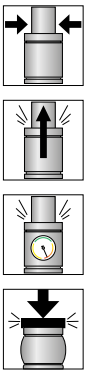
SM-180

250

Note!
For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T3-350 provide full stroke force between 5,200 N (1170 lbf) and 5900 N (1325 lbf) and is available in 13 stroke lengths.

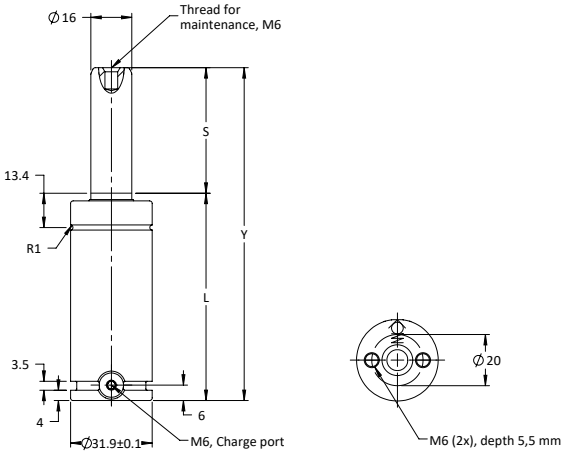
Strokes 25, 38, 50, and 63 are offered as a part of the Hyson Preferred Program which provides optimal delivery.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 180 bar
Contact Force at max. pressure (N) 3600
Contact Force at max. pressure (lbf) 810
Recommended max strokes/min (at 20°C) ..... ~ 50-100
Cylinder diameter (mm) 32
Charge port M6
Repair kit T3SK-350
Operating temperature ..... 20 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



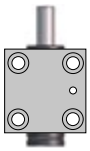
Order number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height		Gas vol.	Weight	
	S		2610 psi				Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
T3-350x25	25	0.98	3,600	810	5,500	1,235	80	3.15	55	2.17	0.02	0.22	0.485
T3-350x38	38	1.50			5,500	1,240	106	4.17	68	2.68	0.03	0.26	0.573
T3-350x50	50	1.97			5,500	1,260	130	5.12	80	3.15	0.03	0.29	0.639
T3-350x63	63	2.48			5,500	1,260	156	6.14	93	3.66	0.04	0.33	0.728
Alternative Stroke Lengths													
T3-350x10	10	0.39	3,600	810	5,900	1,330	50	1.97	40	1.57	0.01	0.17	0.375
T3-350x13	13	0.51			5,200	1,190	56	2.20	43	1.69	0.01	0.18	0.397
T3-350x16	16	0.63			5,300	1,210	62	2.44	46	1.81	0.01	0.19	0.419
T3-350x19	19	0.75			5,600	1,260	68	2.68	49	1.93	0.01	0.20	0.441
T3-350x32	32	1.26			5,500	1,235	94	3.70	62	2.44	0.02	0.24	0.529
T3-350x75	75	2.95			5,500	1,260	180	7.09	105	4.13	0.05	0.37	0.816
T3-350x80	80	3.15			5,500	1,240	190	7.48	110	4.33	0.05	0.39	0.860
T3-350x100	100	3.94			5,500	1,240	230	9.06	130	5.12	0.06	0.45	0.992
T3-350x125	125	4.92			5,500	1,240	280	11.02	155	6.10	0.08	0.53	1.168

Note! All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top mount
FC, FCS

Foot mount
FFC



Body mount
HMF, S

Recommended Flanges

FC-350 235

FCS-32 238

FFC-350 240

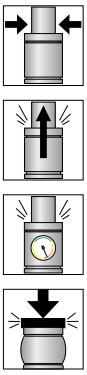
HMF-150 243

S-200 248

Note!
For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T3-500 provide full stroke force between 7,100 N (1595 lbf) and 7,400 N (1665 lbf) and is available in 13 stroke lengths.

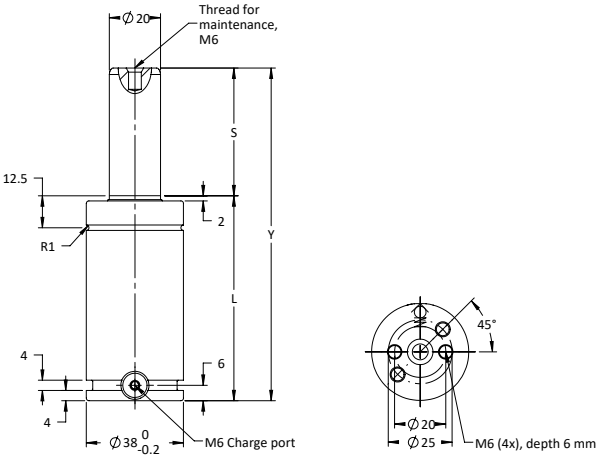
Strokes 25, 38, 50, and 63 are offered as a part of the Hyson Preferred Program which provides optimal delivery.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 4700
Contact Force at max. pressure (lbf) 1055
Recommended max strokes/min (at 20°C) ..... ~ 50-100
Cylinder diameter (mm) 38
Charge port M6
Repair kit T3SK-500
Operating temperature ..... 20 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



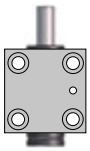
Order number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height		Gas vol.	Weight	
	S		2610 psi				Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
T3-500x25	25	0.98	4,700	1,055	7,300	1,640	80	3.15	55	2.17	0.03	0.31	0.683
T3-500x38	38	1.50			7,200	1,620	106	4.17	68	2.68	0.04	0.36	0.794
T3-500x50	50	1.97			7,200	1,620	130	5.12	80	3.15	0.05	0.41	0.904
T3-500x63	63	2.48			7,200	1,620	156	6.14	93	3.66	0.06	0.46	1.014
Alternative Stroke Lengths													
T3-500x10	10	0.39	4,700	1,055	7,200	1,620	50	1.97	40	1.57	0.01	0.25	0.551
T3-500x13	13	0.51			7,100	1,600	56	2.20	43	1.69	0.01	0.26	0.573
T3-500x16	16	0.63			7,200	1,620	62	2.44	46	1.81	0.02	0.27	0.595
T3-500x19	19	0.75			7,400	1,660	68	2.68	49	1.93	0.02	0.29	0.639
T3-500x32	32	1.26			7,200	1,620	94	3.7	62	2.44	0.03	0.34	0.750
T3-500x75	75	2.95			7,100	1,600	180	7.08	105	4.13	0.07	0.50	1.102
T3-500x80	80	3.15			7,100	1,600	190	7.48	110	4.33	0.08	0.52	1.146
T3-500x100	100	3.94			7,100	1,600	230	9.06	130	5.12	0.10	0.60	1.323
T3-500x125	125	4.92			7,100	1,600	280	11.02	155	6.10	0.12	0.69	1.521

Note! All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top mount
FC, FCS

Foot mount
FFC, LM-lug, L



Body mount
HMF

Recommended Flanges

FC-250 235

FCS-250 238

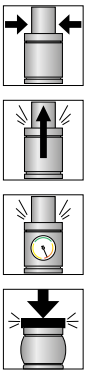
FFC-250 240

HMF-250 243

Note!
For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T3-750 provides full stroke force between 11,700 N (2630 lbf) and 12,100 N (2720 lbf) and is available in 13 stroke lengths.

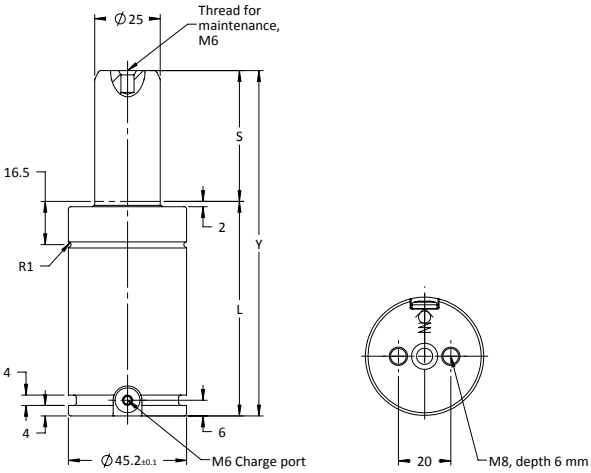
Strokes 25, 38, 50, and 63 are offered as a part of the Hyson Preferred Program which provides optimal delivery.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 7400
Contact Force at max. pressure (lbf) 1665
Recommended max strokes/min (at 20°C) ..... ~ 50-100
Cylinder diameter (mm) 45
Charge port M6
Repair kit T3SK-750
Operating temperature ..... 20 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



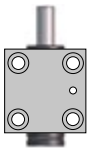
Order number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height		Gas vol.	Weight	
	S		2610 psi				Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
T3-750x25	25	0.98	7,400	1,665	11,800	2,650	82	3.23	57	2.24	0.04	0.45	0.992
T3-750x38	38	1.50			11,800	2,650	108	4.25	70	2.76	0.05	0.53	1.168
T3-750x50	50	1.97			11,800	2,650	132	5.20	82	3.23	0.07	0.61	1.345
T3-750x63	63	2.48			11,800	2,650	158	6.22	95	3.74	0.09	0.69	1.521
Alternative Stroke Lengths													
T3-750x10	10	0.39	7,400	1,665	12,100	2,720	52	2.05	42	1.65	0.02	0.37	0.816
T3-750x13	13	0.51			12,100	2,720	58	2.28	45	1.77	0.02	0.39	0.860
T3-750x16	16	0.63			12,100	2,720	64	2.52	48	1.89	0.03	0.41	0.904
T3-750x19	19	0.75			11,700	2,630	70	2.76	51	2.01	0.03	0.41	0.904
T3-750x32	32	1.26			11,800	2,650	96	3.78	64	2.52	0.05	0.50	1.102
T3-750x75	75	2.95			11,900	2,675	182	7.17	107	4.21	0.10	0.77	1.698
T3-750x80	80	3.15			11,900	2,675	192	7.56	112	4.41	0.11	0.80	1.764
T3-750x100	100	3.94			11,900	2,675	232	9.13	132	5.20	0.13	0.93	2.050
T3-750x125	125	4.92			11,900	2,675	282	11.10	157	6.18	0.17	1.09	2.403

Note! All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top mount
FC, FCS
FCSC

Foot mount
FFC, LM-lug,
L



Body mount
HMF

Recommended Flanges

FC-500

235

FCS-500

238

FFC-500

240

HMF-500

243

Additional Flanges

FCSC-500

239

LM-LUG-500

242

L-500

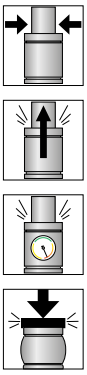
244

Note!

For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T3-1000 provides full stroke force between 13,800 N (3105 lbf) and 14,800 N (3325 lbf) and is available in 12 stroke lengths.

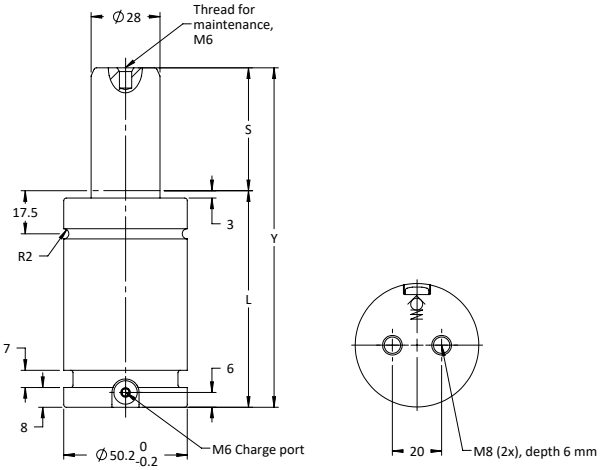
Strokes 25, 38, 50, and 63 are offered as a part of the Hyson Preferred Program which provides optimal delivery.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 9200
Contact Force at max. pressure (lbf) 2068
Recommended max strokes/min (at 20°C) ..... ~ 50-100
Cylinder diameter (mm) 50
Charge port M6
Repair kit T3SK-1000
Operating temperature ..... 20 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



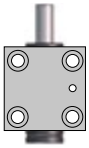
Order number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height		Gas vol.	Weight	
	S		2610 psi				Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
T3-1000x25	25	0.98	9,200	2,070	14,200	3,190	88	3.46	63	2.48	0.05	0.59	1.301
T3-1000x38	38	1.50			14,500	3,260	114	4.49	76	2.99	0.07	0.70	1.543
T3-1000x50	50	1.97			14,600	3,280	138	5.43	88	3.46	0.09	0.79	1.742
T3-1000x63	63	2.48			14,700	3,305	164	6.46	101	3.96	0.11	0.89	1.962
Alternative Stroke Lengths													
T3-1000x13	13	0.51	9,200	2,070	13,800	3,105	64	2.53	51	2.01	0.03	0.50	1.102
T3-1000x16	16	0.63			13,800	3,105	70	2.76	54	2.13	0.04	0.52	1.146
T3-1000x19	19	0.75			14,000	3,145	76	2.99	57	2.24	0.04	0.54	1.190
T3-1000x32	32	1.26			14,300	3,215	102	4.02	70	2.76	0.06	0.64	1.411
T3-1000x75	75	2.95			14,700	3,305	188	7.40	113	4.45	0.13	0.99	2.183
T3-1000x80	80	3.15			14,800	3,325	198	7.80	118	4.65	0.14	1.03	2.271
T3-1000x100	100	3.94			14,800	3,325	238	9.37	138	5.43	0.17	1.19	2.624
T3-1000x125	125	4.92			14,800	3,325	288	11.34	163	6.41	0.21	1.39	3.064

Note! All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top mount
FC, FCS,
FCSC

Foot mount
FFC, SF,
LM-lug, L



Body mount
HM, HMF,
S

Base mount
MP

Recommended Flanges

FC-750 235

FCS-750 238

FFC-750 240

HMF-750 243

MP-750 246

S-750 248

Additional Flanges

FCSC-750 239

SF-750 249

HM-750 242

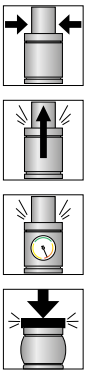
LM-LUG-750 242

L-750 244

Note!
For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T3-1500 provides full stroke force between 23,800 N (5355 lbf) and 24,300 N (5465 lbf) and is available in 12 stroke lengths.

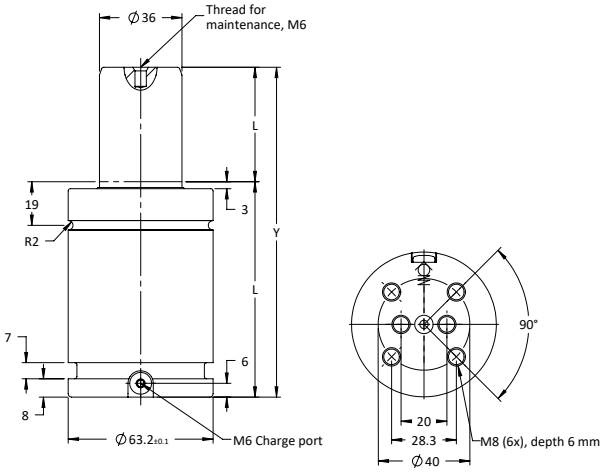
Strokes 25, 38, 50, and 63 are offered as a part of the Hyson Preferred Program which provides optimal delivery.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 15000
Contact Force at max. pressure (lbf) 3375
Recommended max strokes/min (at 20°C) ..... ~ 50-100
Cylinder diameter (mm) 63
Charge port M6
Repair kit T3SK-1500
Operating temperature ..... 20 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



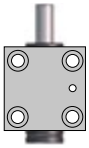
Order number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height		Gas vol.	Weight	
	S		2610 psi				Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
T3-1500x25	25	0.98	15,000	3,375	24,300	5,365	94	3.70	69	2.72	0.08	1.03	2.271
T3-1500x38	38	1.50			23,900	5,375	120	4.72	82	3.23	0.12	1.15	2.535
T3-1500x50	50	1.97			24,000	5,395	144	5.67	94	3.70	0.15	1.28	2.822
T3-1500x63	63	2.48			24,100	5,420	170	6.69	107	4.21	0.19	1.43	3.153
Alternative Stroke Lengths													
T3-1500x13	13	0.51	15,000	3,375	24,000	5,395	70	2.76	57	2.24	0.05	0.89	1.962
T3-1500x16	16	0.63			24,100	5,420	76	2.99	60	2.36	0.06	0.93	2.050
T3-1500x19	19	0.75			24,200	5,440	82	3.23	63	2.48	0.07	0.96	2.116
T3-1500x32	32	1.26			23,800	5,355	108	4.25	76	2.99	0.11	1.08	2.381
T3-1500x75	75	2.95			24,200	5,440	194	7.64	119	4.69	0.22	1.57	3.461
T3-1500x80	80	3.15			24,200	5,440	204	8.03	124	4.88	0.24	1.63	3.594
T3-1500x100	100	3.94			24,300	5,465	244	9.61	144	5.67	0.29	1.86	4.101
T3-1500x125	125	4.92			24,300	5,465	294	11.57	169	6.65	0.36	2.15	4.740

Note! All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top mount
FCS, FCSC

Foot mount
FFC, SF,
LM-lug, L



Body mount
HMF

Base mount
MP

Recommended Flanges

FCSX-1500

249

FFX-1500

240

HMFX-1500

243

MPX-1500

246

Additional Flanges

FCSCX-1500

239

SFX-1500

249

LMX-1500

244

L-T3-1500

245

Note!

For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

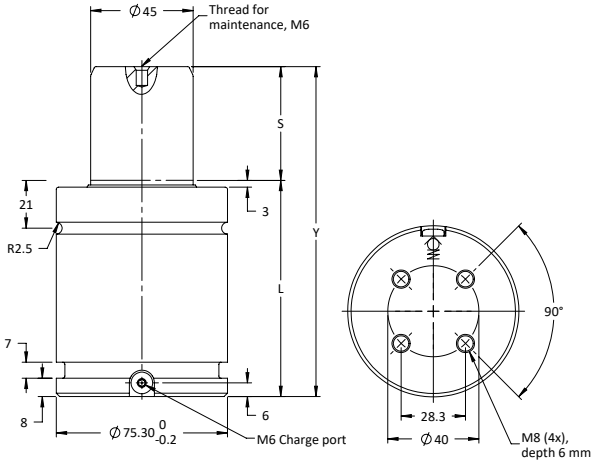
T3-2400 provides full stroke force between 38,300 N (8610 lbf) and 39,300 N (8835 lbf) and is available in 11 stroke lengths.

Strokes 25, 38, 50, and 63 are offered as a part of the Hyson Preferred Program which provides optimal delivery.

Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 24000
Contact Force at max. pressure (lbf) 5396
Recommended max strokes/min (at 20°C) ..... ~ 40-100
Cylinder diameter (mm) 75
Charge port M6
Repair kit T3SK-2400
Operating temperature ..... 20 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



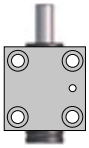
Order number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height		Gas vol.	Weight	
	S		2610 psi				Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
T3-2400x25	25	0.98	24,000	5,395	38,700	8,700	95	3.74	70	2.76	0.13	1.45	3.197
T3-2400x38	38	1.50			38,400	8,635	121	4.76	83	3.27	0.18	1.65	3.638
T3-2400x50	50	1.97			39,200	8,815	145	5.71	95	3.74	0.23	1.84	4.057
T3-2400x63	63	2.48			39,200	8,815	171	6.73	108	4.25	0.28	2.20	4.850
Alternative Stroke Lengths													
T3-2400x16	16	0.63	24,000	5,395	38,300	8,610	77	3.03	61	2.40	0.09	1.34	2.954
T3-2400x19	19	0.75			38,500	8,655	83	3.27	64	2.52	0.10	1.38	3.042
T3-2400x32	32	1.26			38,600	8,680	109	4.29	77	3.03	0.16	1.56	3.439
T3-2400x75	75	2.95			39,200	8,815	195	7.68	120	4.72	0.33	2.26	4.982
T3-2400x80	80	3.15			39,200	8,815	205	8.07	125	4.92	0.35	2.32	5.115
T3-2400x100	100	3.94			39,300	8,835	245	9.65	145	5.71	0.43	2.66	5.864
T3-2400x125	125	4.92			39,300	8,835	295	11.61	170	6.69	0.54	3.05	6.724

Note! All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top mount
FC, FCS,
FCSC

Foot mount
FFC, SF,
LM-lug, L



Body mount
HM, HMF,
S

Base mount
MP

Recommended Flanges

FC-1500

235

FCS-1500

238

FFC-1500

240

HMF-1500

243

MP-1500

246

S-1500

248

Additional Flanges

FCSC-1500

239

SF-1500

249

HM-1500

242

LM-LUG-1500

242

L-1500

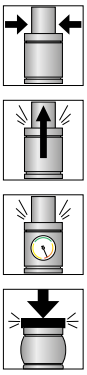
244

Note!

For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T3-4200 provides full stroke force between 60,800 N (13670 lbf) and 69,600 N (15645 lbf) and is available in 11 stroke lengths.

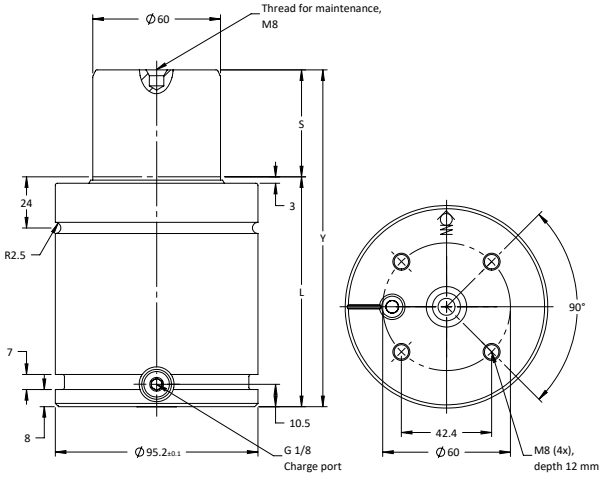
Strokes 50, 63, 80 and 100 are offered as a part of the Hyson Preferred Program which provides optimal delivery.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 42000
Contact Force at max. pressure (lbf) 9440
Recommended max strokes/min (at 20°C) ..... ~ 30-100
Cylinder diameter (mm) 95
Charge port ..... G 1/8”
Repair kit T3SK-4200
Operating temperature ..... 20 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



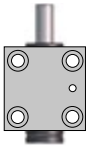
Order number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height		Gas vol.	Weight	
	S		2610 psi				Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
T3-4200x50	50	1.97	42,000	9,440	67,000	15,065	158	6.22	108	4.25	0.40	3.57	7.871
T3-4200x63	63	2.48			67,800	15,245	184	7.24	121	4.76	0.49	4.10	9.039
T3-4200x80	80	3.15			68,600	15,425	218	8.58	138	5.43	0.61	4.32	9.524
T3-4200x100	100	3.94			69,100	15,535	258	10.16	158	6.22	0.74	4.81	10.604
Alternative Stroke Lengths													
T3-4200x16	16	0.63	42,000	9,440	61,700	13,870	90	3.54	74	2.91	0.15	2.81	6.195
T3-4200x19	19	0.75			63,700	14,320	96	3.78	77	3.03	0.18	2.88	6.349
T3-4200x25	25	0.98			60,800	13,670	108	4.25	83	3.27	0.26	2.96	6.526
T3-4200x32	32	1.26			64,300	14,555	122	4.80	90	3.54	0.30	3.13	6.900
T3-4200x38	38	1.50			65,800	14,795	134	5.28	96	3.78	0.32	3.28	7.231
T3-4200x75	75	2.95			68,000	15,290	208	8.19	133	5.24	0.58	4.20	9.259
T3-4200x125	125	4.92			69,600	15,645	308	12.11	183	7.20	0.91	5.42	11.949

Note! All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top mount
FC, FCS,
FCSC

Foot mount
FFC, SF,
LM-lug, L



Body mount
HM, HMF,
S

Base mount
MP, RM

Recommended Flanges

FC-3000 235

FCS-3000 238

FFC-3000 240

HMF-3000 243

MP-3000 246

S-3000 248

Additional Flanges

FCSC-3000 239

SF-3000 249

HM-3000 242

LM-LUG-3000 242

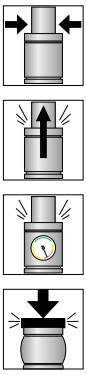
L-3000 244

RM-3000 247

Note!
For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T3-6600 provides full stroke force between 89,000 N (20,010 lbf) and 106,500 N (23,945 lbf) and is available in 11 stroke lengths.

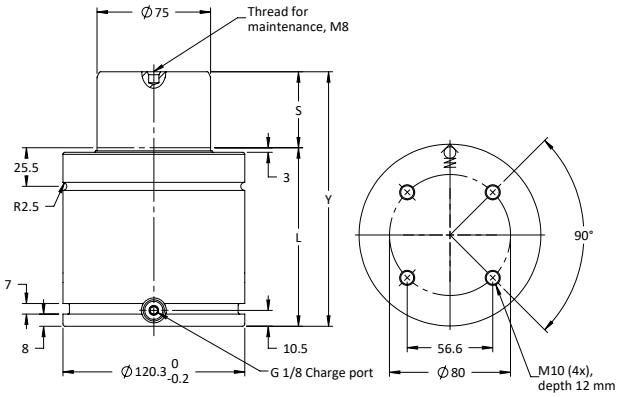
Strokes 50, 63, 80 and 100 are offered as a part of the Hyson Preferred Program which provides optimal delivery.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 66300
Contact Force at max. pressure (lbf) 14905
Recommended max strokes/min (at 20°C) ..... ~ 30-100
Cylinder diameter (mm) 120
Charge port ..... G 1/8”
Repair kit T3SK-6600
Operating temperature ..... 20 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



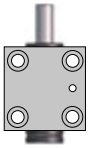
Order number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height		Gas vol.	Weight	
	S		2610 psi				Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
T3-6600x50	50	1.97	66,300	14,905	100,600	22,615	168	6.61	118	4.65	0.69	6.31	13.911
T3-6600x63	63	2.48			102,400	23,020	194	7.64	131	5.16	0.83	6.81	15.013
T3-6600x80	80	3.15			104,100	23,405	228	8.98	148	5.83	1.01	7.46	16.446
T3-6600x100	100	3.94			105,400	23,695	268	10.55	168	6.61	1.23	8.23	18.144
Alternative Stroke Lengths													
T3-6600x16	16	0.63	66,300	14,905	89,000	20,010	100	3.94	84	3.31	0.32	5.00	11.023
T3-6600x19	19	0.75			91,000	20,460	106	4.17	87	3.43	0.35	5.11	11.266
T3-6600x25	25	0.98			93,900	21,110	118	4.65	93	3.66	0.42	5.34	11.773
T3-6600x32	32	1.26			96,100	21,605	132	5.20	100	3.94	0.49	5.61	12.368
T3-6600x38	38	1.50			98,200	22,075	144	5.67	106	4.17	0.56	5.84	12.875
T3-6600x75	75	2.95			103,400	23,245	218	8.58	143	5.63	0.90	7.27	16.028
T3-6600x125	125	4.92			106,500	23,945	318	12.52	193	7.60	1.50	9.19	20.260

Note! All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top mount
FC, FCS,
FCSC

Foot mount
FFC, SF,
LM-lug



Body mount
HMF, S

Base mount
MP, RM

Recommended Flanges

FC-5000 235

FCS-5000 238

FFC-5000 240

HMF-5000 243

MP-5000 246

S-5000 248

Additional Flanges

FCSC-5000 239

SF-5000 249

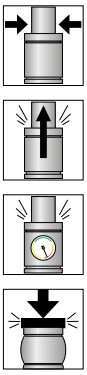
LM-LUG-5000 242

RM-5000 247

Note!
For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T3-9500 provides full stroke force between 135,000 N (30,350 lbf) and 152,000 N (34,175 lbf) and is available in 10 stroke lengths.

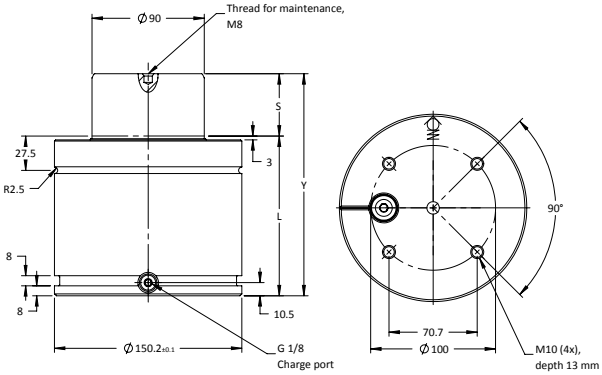
Strokes 50, 63, 80 and 100 are offered as a part of the Hyson Preferred Program which provides optimal delivery.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 95000
Contact Force at max. pressure (lbf) 21400
Recommended max strokes/min (at 20°C) ..... ~ 30-100
Cylinder diameter (mm) 150
Charge port ..... G 1/8”
Repair kit T3SK-9500
Operating temperature ..... 20 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



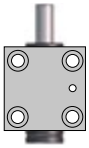
Order number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height		Gas vol.	Weight	
	S		2610 psi				Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
T3-9500x50	50	1.97	95,000	21,360	146,000	32,825	178	7.01	128	5.04	0.99	11.79	25.993
T3-9500x63	63	2.48			148,000	33,275	204	8.03	141	5.55	1.20	12.60	27.778
T3-9500x80	80	3.15			150,000	33,725	238	9.37	158	6.22	1.47	13.66	30.115
T3-9500x100	100	3.94			151,000	33,950	278	10.94	178	7.01	1.79	14.91	32.871
Alternative Stroke Lengths													
T3-9500x19	19	0.75	95,000	21,360	135,000	30,350	116	4.57	97	3.82	0.49	9.86	21.738
T3-9500x25	25	0.98			139,000	31,250	128	5.04	103	4.06	0.58	10.23	22.553
T3-9500x32	32	1.26			142,000	31,925	142	5.59	110	4.33	0.70	10.67	23.523
T3-9500x38	38	1.50			143,000	32,150	154	6.06	116	4.57	0.80	11.04	24.339
T3-9500x75	75	2.95			149,000	33,500	228	8.98	153	6.02	1.39	13.35	29.432
T3-9500x125	125	4.92			152,000	34,175	328	12.91	203	7.99	2.20	16.47	36.310
T3-6600x125	125	4.92			106,500	23,945	318	12.52	193	7.60	1.50	9.19	20.260

Note! All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top mount
FC, FCS,
FCSC

Foot mount
FFC, SF,
LM-lug, L



Body mount
HMF, S

Base mount
MP, RM

Recommended Flanges

FC-7500 235

FCS-7500 238

FFC-7500 240

HMF-7500 243

MP-7500 246

S-7500 248

Additional Flanges

FCSC-7500 239

SF-7500 249

LM-LUG-7500 242

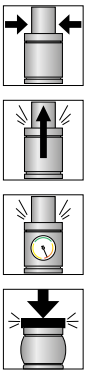
L-7500 244

RM-7500 247

Note!
For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T3-20000 provides full stroke force between 259,000 N (58,200 lbf) and 330,000 N (74,250 lbf) and is available in 10 stroke lengths.

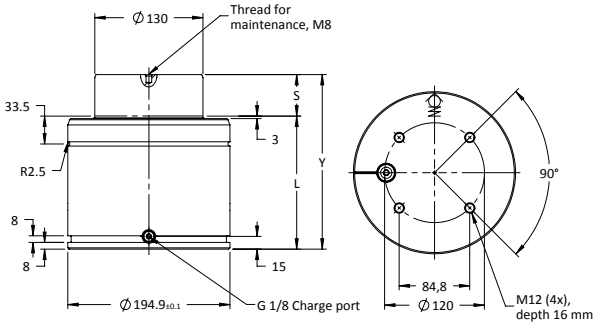
Strokes 50, 63, 80 and 100 are offered as a part of the Hyson Preferred Program which provides optimal delivery.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 200000
Contact Force at max. pressure (lbf) 45000
Recommended max strokes/min (at 20°C) ..... ~ 15-40
Cylinder diameter (mm) 195
Charge port ..... G 1/8”
Repair kit T3SK-20000
Operating temperature ..... 20 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



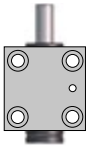
Order number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height		Gas vol.	Weight	
	S		2610 psi				Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
T3-20000x50	50	1.97	200,000	45,000	298,000	67,000	210	8.27	160	6.30	2.12	24.87	54.829
T3-20000x63	63	2.48			307,000	69,100	236	9.29	173	6.81	2.50	26.28	57.937
T3-20000x80	80	3.15			315,000	70,900	270	10.63	190	7.48	3.00	28.13	62.016
T3-20000x100	100	3.94			323,000	72,700	310	12.20	210	8.27	3.58	30.30	66.800
Alternative Stroke Lengths													
T3-20000x19	19	0.75	95,000	21,360	259,000	58,200	148	5.83	129	5.08	1.21	21.50	47.399
T3-20000x25	25	0.98			270,000	60,750	160	6.30	135	5.31	1.38	22.16	48.854
T3-20000x32	32	1.26			280,000	63,000	174	6.85	142	5.59	1.59	22.92	50.530
T3-20000x38	38	1.50			287,000	64,600	186	7.32	148	5.83	1.77	23.57	51.963
T3-20000x75	75	2.95			313,000	70,500	260	10.24	185	7.28	2.85	27.59	60.826
T3-20000x125	125	4.92			330,000	74,250	360	14.17	235	9.25	4.31	33.02	72.797

Note! All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top mount
FC, FCS,
FCSC

Foot mount
FFC, SF,
LM-lug, L



Body mount
HMF, S

Base mount
MP, RM

Recommended Flanges

FC-7500 235

FCS-7500 238

FFC-7500 240

HMF-7500 243

MP-7500 246

S-7500 248

Additional Flanges

FCSC-7500 239

SF-7500 249

LM-LUG-7500 242

L-7500 244

RM-7500 247

Note!
For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T3T Series

T3T-350 to T3T-9500

High Force Gas Springs

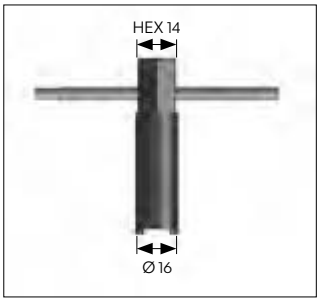
Product Value

- Deeper threads provide more secure mounting.
- Larger port provides higher nitrogen flow for quicker charge and discharge.
- T3T 350-750 models offer the most versatility with dual M6/G 1/8 port. This enables springs to be connected with DualSeal 24 or Micro24 hose systems.

Product Features

- Nine models with contact forces from 810 to 21,360 lbf.
- Extended stroke lengths to 125 mm/4.92 in.
- Variety of mounting options available.
- M6 port standard for 350, 500 and 750 models. G 1/8 port available with M6 port removal using valve plug tool below.

Valve Plug Tool



Valve Plug Installation Tool,
Models T3T-350, 500 and 750 only
Order No. 3022974

Product Specifications

Pressure medium ..... Nitrogen
Min. charging pressure ..... 25 bar
Max. charging pressure ..... 150 bar
Max. charging pressure for T3T-350 only ..... 180 bar
Operating temperature ..... 0º to 80ºC
Force increase by temperature ..... ±0.3% per ºC
Recommended max strokes/min ..... ~30-100 @20 ºC
Max piston rod velocity ..... 1.6 m/s
Valve Inlet
- 1000, 9500 56-072-5500
- 350, 500, 1500, 6600, 2400 and T3T-750 4018112

Charge fitting
- T3T-350, T3T-500 and T3T-750 ..... T2-770-T3
- T3T-1000, T3T-1500, T3T-2400, T3T-6600 and T3T-9500 ..... T2-770-G1/8-P

Ordering Options

T3T-1500 (Model) X 50 (Stroke (mm) | See Dimensional Information Charts)

- T3T-350
- T3T-500
- T3T-750
- T3T-1000
- T3T-1500
- T3T-2400
- T3T-4200
- T3T-6600
- T3T-9500

Repair Kits

Gas Spring	Repair Kit Order Number
T3T-350	3318845
T3T-500	3318846
T3T-750	3319903
T3T-1000	3318847
T3T-1500	3320434
T3T-2400	3318848
T3T-4200	3318849
T3T-6600	3319912
T3T-9500	3320614

Note: The T3-2400x16 and T3-2400x19 are not possible to repair.

T3T-350 provides full stroke force between 5,200 N (1,190 lbf) and 5,900 N (1,330 lbf) and is available in 13 stroke lengths.

Strokes 38, 50, and 63 are offered as a part of the Hyson Preferred Program which provides optimal delivery.

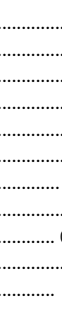


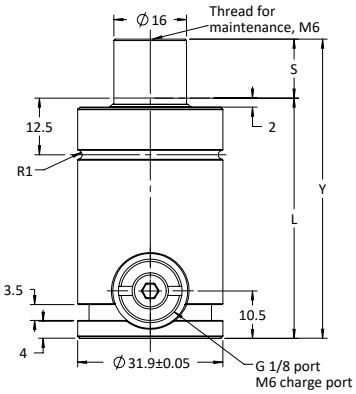


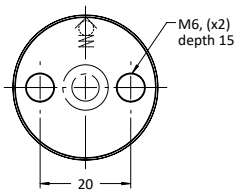

Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 180 bar
Contact Force at max. pressure (N) 3600
Contact Force at max. pressure (lbf) 810
Recommended max strokes/min (at 20°C) ..... ~ 50-100
Cylinder diameter (mm) 32
Charge port ..... M6, G 1/8”
Repair kit 3318845
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen







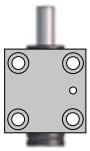
Order Number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height		Gas Volume	Weight	
	S		2610 psi at 68°F				Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	mm	ibf.	N	In	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
T3T-350x38	38	1.50	3,600	810	5,500	1,240	116	5.57	78	3.07	0.03	0.31	0.683
T3T-350x50	50	1.97			5,600	1,260	140	5.51	90	3.54	0.03	0.35	0.772
T3T-350x63	63	2.48			5,500	1,260	166	6.53	103	4.06	0.04	0.39	0.860
Alternative Stroke Lengths													
T3T-350x10	10	0.39	3,600	810	5,900	1,330	60	2.36	50	1.97	0.01	0.23	0.507
T3T-350x13	13	0.51			5,200	1,190	66	2.60	53	2.09	0.01	0.23	0.507
T3T-350x16	16	0.63			5,300	1,210	72	2.83	56	2.20	0.01	0.24	0.529
T3T-350x19	19	0.75			5,600	1,260	78	3.07	59	2.32	0.01	0.25	0.551
T3T-350x25	25	0.98			5,500	1,260	90	3.54	65	2.56	0.02	0.27	0.595
T3T-350x32	32	1.26			5,500	1,260	104	4.09	72	2.83	0.02	0.29	0.639
T3T-350x75	75	2.95			5,500	1,260	190	7.48	115	4.53	0.05	0.43	0.948
T3T-350x80	80	3.15			5,500	1,240	200	7.87	120	4.72	0.05	0.44	0.970
T3T-350x100	100	3.94			5,500	1,240	240	9.45	140	5.51	0.06	0.50	1.102
T3T-350x125	125	4.92			5,500	1,240	290	11.42	165	6.50	0.08	0.58	1.279

Note! All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top mount
FC, FCS

Foot mount
FFC



Body mount
HMF, S

Recommended Flanges

FC-350

235

FCS-32

238

FFC-T3T-350

240

HMF-150

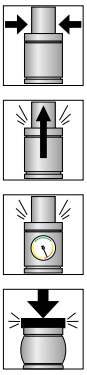
243

Note!

For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T3T-500 provides full stroke force between 7,100 N (1,600 lbf) and 7,400 N (1,660 lbf) and is available in 13 stroke lengths.

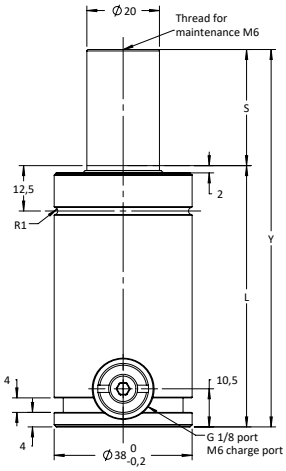
Strokes 38, 50, and 63 are offered as a part of the Hyson Preferred Program which provides optimal delivery.

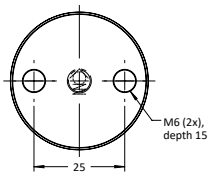


Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 4700
Contact Force at max. pressure (lbf) 1055
Recommended max strokes/min (at 20°C) ..... ~ 50-100
Cylinder diameter (mm) 38
Charge port ..... M6, G 1/8”
Repair kit 3318846
Operating temperature ..... 20 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen





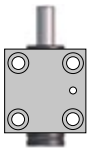
Order Number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height		Gas Volume	Weight	
	S		2175 psi at 68°F				Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	mm	ibf.	N	In	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
T3T-500x38	38	1.50	4,700	1,055	7,200	1,620	116	4.57	78	3.07	0.04	0.44	0.970
T3T-500x50	50	1.97			7,200	1,620	140	5.51	90	3.54	0.05	0.49	1.080
T3T-500x63	63	2.48			7,200	1,620	166	6.53	103	4.05	0.06	0.54	1.190
Alternative Stroke Lengths													
T3T-500x10	10	0.39	4,700	1,055	7,200	1,620	60	2.36	50	1.97	0.01	0.33	0.728
T3T-500x13	13	0.51			7,100	1,600	66	2.59	53	2.09	0.01	0.34	0.750
T3T-500x16	16	0.63			7,200	1,620	72	2.83	56	2.20	0.02	0.36	0.794
T3T-500x19	19	0.75			7,400	1,660	78	3.07	59	2.32	0.02	0.37	0.816
T3T-500x25	25	0.98			7,300	1,640	90	3.54	65	2.56	0.03	0.39	0.860
T3T-500x32	32	1.26			7,200	1,620	104	4.09	72	2.83	0.03	0.42	0.926
T3T-500x75	75	2.95			7,100	1,600	190	7.48	115	4.53	0.07	0.58	1.279
T3T-500x80	80	3.15			7,100	1,600	200	7.87	120	4.72	0.08	0.60	1.323
T3T-500x100	100	3.94			7,100	1,600	240	9.45	140	5.51	0.10	0.68	1.499
T3T-500x125	125	4.92			7,100	1,600	290	11.42	165	4.50	0.12	0.77	1.698

Note! All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top mount
FC, FCS

Foot mount
FFC, LM-lug, L



Body mount
HMF

Recommended Flanges

FC-250

235

FCS-250

238

FFC-T3T-250

240

HMF-250

243

Additional Flanges

FCSC-250

239

LM-LUG-250

242

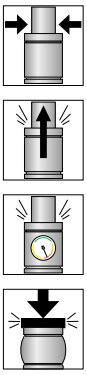
L-250

244

Note!
For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T3T-750 provides full stroke force between 11,700 N (2,630 lbf) and 12,100 N (2,720 lbf) and is available in 13 stroke lengths.

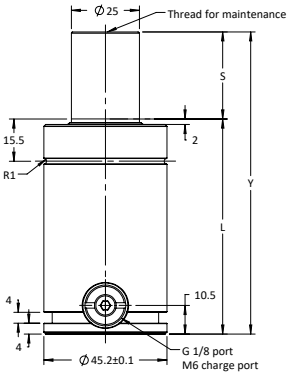
Strokes 38, 50, and 63 are offered as a part of the Hyson Preferred Program which provides optimal delivery.

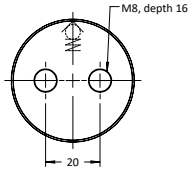


Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 7400
Contact Force at max. pressure (lbf) 1665
Recommended max strokes/min (at 20°C) ..... ~ 50-100
Cylinder diameter (mm) 45
Charge port ..... M6, G 1/8”
Repair kit 3319903
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen





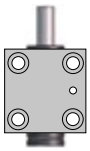
Order Number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height		Gas Volume	Weight	
	S		2175 psi at 68°F				Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	mm	ibf.	N	In	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
T3T-750x38	38	1.50	7,400	1,665	11,800	2,650	123	4.84	85	3.35	0.05	0.70	1.543
T3T-750x50	50	1.97			11,800	2,650	147	5.79	97	3.82	0.07	0.78	1.720
T3T-750x63	63	2.48			11,800	2,650	173	6.81	110	4.33	0.09	0.86	1.896
Alternative Stroke Lengths													
T3T-750x10	10	0.39	7,400	1,665	12,100	2,720	67	2.64	57	2.24	0.02	0.53	1.168
T3T-750x13	13	0.51			12,100	2,720	73	2.87	60	2.36	0.02	0.55	1.213
T3T-750x16	16	0.63			12,100	2,720	79	3.11	63	2.48	0.03	0.57	1.257
T3T-750x19	19	0.75			11,700	2,630	85	3.35	66	2.60	0.03	0.58	1.279
T3T-750x25	25	0.98			11,800	2,650	97	3.82	72	2.83	0.04	0.62	1.367
T3T-750x32	32	1.26			11,800	2,650	111	4.37	79	3.11	0.05	0.66	1.455
T3T-750x75	75	2.95			11,900	2,675	197	7.76	122	4.40	0.10	0.93	2.050
T3T-750x80	80	3.15			11,900	2,675	207	8.15	127	5.00	0.11	0.97	2.138
T3T-750x100	100	3.94			11,900	2,675	247	9.72	147	5.79	0.13	1.09	2.403
T3T-750x125	125	4.92			11,900	2,675	297	11.69	172	6.77	0.17	1.25	2.756

Note! All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top mount
FC, FCS
FCSC

Foot mount
FFC, LM-lug



Body mount
HMF

Recommended Flanges

FC-500

235

FCS-500

238

FFC-500

240

HMF-500

243

Additional Flanges

FCSC-500

239

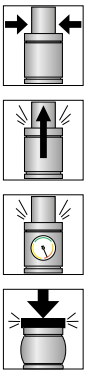
LM-LUG-500

242

Note!
For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T3T-1000 provides full stroke force between 13,800 N (3,105 lbf) and 14,800 N (3,325 lbf) and is available in 12 stroke lengths.

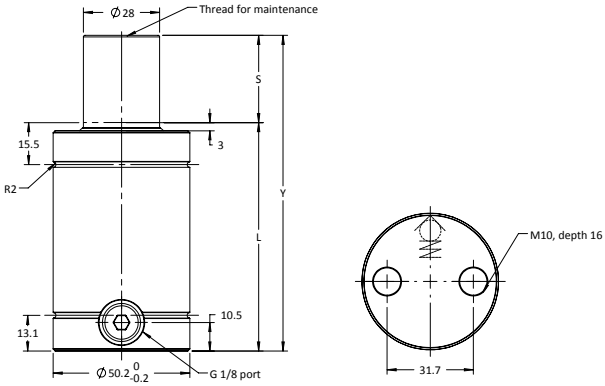
Strokes 38, 50, and 63 are offered as a part of the Hyson Preferred Program which provides optimal delivery.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 9200
Contact Force at max. pressure (lbf) 2068
Recommended max strokes/min (at 20°C) ..... ~ 50-100
Cylinder diameter (mm) 50
Charge port ..... G 1/8”
Repair kit 3318847
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



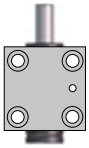
Order Number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height		Gas Volume	Weight	
	S		2175 psi at 68°F				Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	mm	ibf.	N	In	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
T3T-1000x38	38	1.50	9,200	2,070	14,500	3,260	128	5.04	90	3.54	0.07	0.92	2.028
T3T-1000x50	50	1.97			14,600	3,280	152	5.98	102	4.02	0.09	1.02	2.249
T3T-1000x63	63	2.48			14,700	3,305	178	7.01	115	4.53	0.11	1.12	2.469
Alternative Stroke Lengths													
T3T-1000x13	13	0.51	9,200	2,070	13,800	3,105	78	3.07	65	2.56	0.03	0.73	1.609
T3T-1000x16	16	0.63			13,800	3,105	84	3.31	68	2.68	0.04	0.75	1.653
T3T-1000x19	19	0.75			14,000	3,145	90	3.54	71	2.80	0.04	0.77	1.698
T3T-1000x25	25	0.98			14,200	3,190	102	4.02	77	3.03	0.05	0.82	1.808
T3T-1000x32	32	1.26			14,300	3,215	116	4.57	84	3.31	0.06	0.88	1.940
T3T-1000x75	75	2.95			14,700	3,305	202	7.95	127	5.00	0.13	1.22	2.690
T3T-1000x80	80	3.15			14,800	3,325	212	8.35	132	5.20	0.14	1.26	2.778
T3T-1000x100	100	3.94			14,800	3,325	252	9.92	152	5.98	0.17	1.42	3.131
T3T-1000x125	125	4.92			14,800	3,325	302	11.89	177	6.97	0.21	1.61	3.549

Note! All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top mount
FC, FCS,
FCSC

Foot mount
SF



Body mount
HMF, S

Recommended Flanges

FC-750

235

FCS-750

238

HMF-1000

243

S-750

248

Additional Flanges

FCSC-750

239

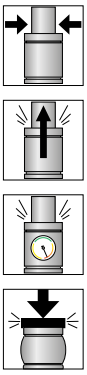
SF-750

249

Note!
For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T3T-1500 provides full stroke force between 14,700 N (5,420 lbf) and 24,300 N (5,365 lbf) and is available in 12 stroke lengths.

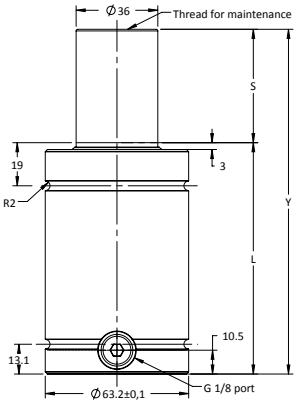
Strokes 38, 50, and 63 are offered as a part of the Hyson Preferred Program which provides optimal delivery.

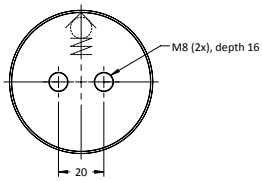


Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 15000
Contact Force at max. pressure (lbf) 3375
Recommended max strokes/min (at 20°C) ..... ~ 50-100
Cylinder diameter (mm) 63
Charge port ..... G 1/8”
Repair kit 3320434
Operating temperature ..... 20 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen





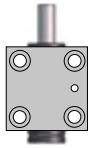
Order Number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height		Gas Volume	Weight	
	S		2175 psi at 68°F				Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	mm	ibf.	N	In	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
T3T-1500x38	38	1.50			23,900	5,375	128	5.04	90	3.54	0.12	1.42	3.131
T3T-1500x50	50	1.97	15,000	3,375	24,000	5,395	152	5.98	102	4.02	0.15	1.55	3.417
T3T-1500x63	63	2.48			14,700	5,420	178	7.01	115	4.53	0.19	1.70	3.748
Alternative Stroke Lengths													
T3T-1500x13	13	0.51			24,000	5,395	78	3.07	65	2.56	0.05	1.16	2.557
T3T-1500x16	16	0.63			24,100	5,420	84	3.31	68	2.68	0.06	1.20	2.646
T3T-1500x19	19	0.75			24,200	5,440	90	3.54	71	2.80	0.07	1.23	2.712
T3T-1500x25	25	0.98			24,300	5,365	102	4.02	77	3.03	0.08	1.30	2.866
T3T-1500x32	32	1.26	15,000	3,375	23,800	5,355	116	4.57	84	3.31	0.11	1.35	2.976
T3T-1500x75	75	2.95			24,100	5,440	202	7.95	127	5.00	0.22	1.84	4.057
T3T-1500x80	80	3.15			24,200	5,440	212	8.35	132	5.20	0.24	1.90	4.189
T3T-1500x100	100	3.94			24,300	5,465	252	9.92	152	5.98	0.29	2.13	4.696
T3T-1500x125	125	4.92			24,300	5,465	302	11.89	177	6.97	0.36	2.42	5.335

Note! All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top mount
FCS, FCSC

Foot mount
SF



Body mount
HMF

Recommended Flanges

FCSX-1500

239

HMFX-1500

243

Additional Flanges

FCSCX-1500

239

SFX-1500

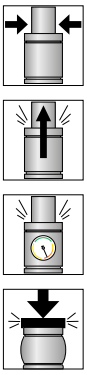
249

Note!

For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T3T-2400 provides full stroke force between 38,300 N (8,610 lbf) and 39,300 N (8,835 lbf) and is available in 11 stroke lengths.

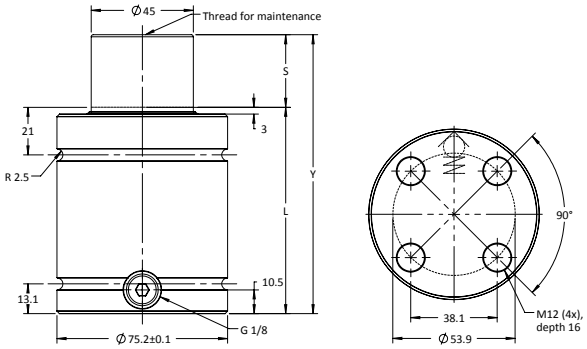
Strokes 38, 50, and 63 are offered as a part of the Hyson Preferred Program which provides optimal delivery.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 24000
Contact Force at max. pressure (lbf) 5396
Recommended max strokes/min (at 20°C) ..... ~ 40-100
Cylinder diameter (mm) 75
Charge port ..... G 1/8”
Repair kit 3318848
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



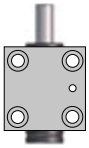
Order Number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height		Gas Volume	Weight	
	S		2175 psi at 68°F				Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	mm	ibf.	N	In	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
T3T-2400x38	38	1.50	24,000	5,395	38,400	8,635	135	5.32	97	3.82	0.18	2.13	4.696
T3T-2400x50	50	1.97			39,200	8,815	159	6.26	109	4.29	0.23	2.33	5.137
T3T-2400x63	63	2.48			39,200	8,815	185	7.28	122	4.80	0.28	2.54	5.600
Alternative Stroke Lengths													
T3T-2400x16	16	0.63	24,000	5,395	38,300	8,610	91	3.58	75	2.95	0.09	1.81	3.990
T3T-2400x19	19	0.75			38,500	8,655	97	3.82	78	3.07	0.10	1.86	4.101
T3T-2400x25	25	0.98			38,700	8,700	109	4.29	84	3.31	0.13	1.93	4.255
T3T-2400x32	32	1.26			38,600	8,680	123	4.84	91	3.58	0.16	2.04	4.497
T3T-2400x75	75	2.95			39,200	8,815	209	8.23	134	5.28	0.33	2.73	6.019
T3T-2400x80	80	3.15			39,200	8,815	219	8.62	139	5.47	0.35	2.81	6.195
T3T-2400x100	100	3.94			39,300	8,835	259	10.20	159	6.26	0.43	3.13	6.900
T3T-2400x125	125	4.92			39,300	8,835	309	12.17	184	7.24	0.54	3.52	7.760

Note! All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top mount
FC, FCS,
FCSC

Foot mount
SF



Body mount
HMF, S

Recommended Flanges

FC-1500

235

FCS-1500

238

HMF-1500

243

S-1500

248

Additional Flanges

FCSC-1500

239

SF-1500

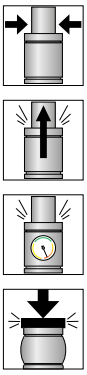
249

Note!

For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T3T-4200 provides full stroke force between 60,800 N (13,760 lbf) and 69,600 N (15,645 lbf) and is available in 11 stroke lengths.

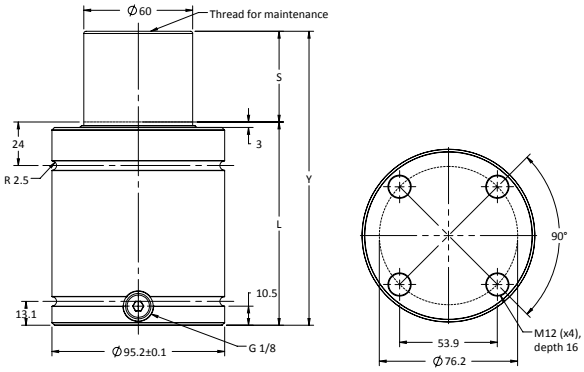
Strokes 38, 50, 63, and 100 are offered as a part of the Hyson Preferred Program which provides optimal delivery.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 42000
Contact Force at max. pressure (lbf) 9440
Recommended max strokes/min (at 20°C) ..... ~ 30-100
Cylinder diameter (mm) 95
Charge port ..... G 1/8”
Repair kit 3318849
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



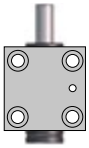
Order Number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height		Gas Volume	Weight	
	S		2175 psi at 68°F				Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	mm	ibf.	N	In	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
T3T-4200x50	50	1.97	42,000	9,440	67,000	15,065	162	6.38	112	4.41	0.40	3.79	8.356
T3T-4200x63	63	2.48			67,800	15,245	188	7.40	125	4.92	0.49	4.12	9.083
T3T-4200x75	75	2.95			68,000	15,290	212	8.35	137	5.39	0.58	4.42	9.744
T3T-4200x100	100	3.94			69,100	15,535	262	10.32	162	6.38	0.74	5.03	11.089
Alternative Stroke Lengths													
T3T-4200x16	16	0.63	42,000	9,440	61,700	13,870	94	3.70	78	3.07	0.15	3.03	6.680
T3T-4200x19	19	0.75			63,700	14,320	100	3.94	81	3.19	0.18	3.10	6.834
T3T-4200x25	25	0.98			60,800	13,670	112	4.41	87	3.43	0.26	3.18	7.011
T3T-4200x32	32	1.26			64,300	14,555	126	4.96	94	3.70	0.30	3.35	7.385
T3T-4200x38	38	1.50			65,800	14,795	138	5.43	100	3.94	0.32	3.50	7.716
T3T-4200x80	80	3.15			68,600	15,425	222	8.74	142	5.59	0.61	4.52	9.965
T3T-4200x125	125	4.92			69,600	15,645	312	12.28	187	7.36	0.91	5.64	12.434

Note! All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top mount
FC, FCS,
FCSC

Foot mount
SF



Body mount
HMF, S

Recommended Flanges

FC-3000

235

FCS-3000

238

HMF-3000

243

S-3000

248

Additional Flanges

FCSC-3000

239

SF-3000

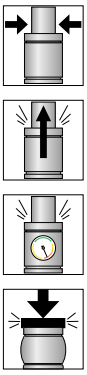
249

Note!

For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T3T-6600 provides full stroke force between 89,000 N (20,010 lbf) and 106,500 N (23,945 lbf) and is available in 11 stroke lengths.

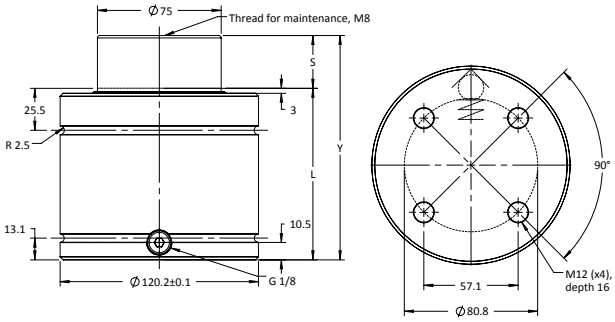
Strokes 50, 63, 75, and 100 are offered as a part of the Hyson Preferred Program which provides optimal delivery.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 66300
Contact Force at max. pressure (lbf) 14905
Recommended max strokes/min (at 20°C) ..... ~ 30-100
Cylinder diameter (mm) 120
Charge port ..... G 1/8”
Repair kit 3319912
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



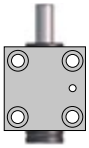
Order Number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height		Gas Volume	Weight	
	S		2175 psi at 68°F				Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	mm	ibf.	N	In	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
T3T-6600x50	50	1.97	66,300	14,905	100,600	22,615	172	6.77	122	4.80	0.69	6.70	14.771
T3T-6600x63	63	2.48			102,400	23,020	198	7.80	135	5.32	0.83	7.20	15.873
T3T-6600x75	75	2.95			103,400	23,245	222	8.74	147	5.79	0.90	7.65	16.865
T3T-6600x100	100	3.94			105,400	23,695	272	10.71	172	6.77	1.23	8.62	19.004
Alternative Stroke Lengths													
T3T-6600x16	16	0.63	66,300	14,905	89,000	20,010	104	4.09	88	3.46	0.32	5.37	11.839
T3T-6600x19	19	0.75			91,000	20,460	110	4.33	91	3.58	0.35	5.48	12.081
T3T-6600x25	25	0.98			93,900	21,110	122	4.80	97	3.82	0.42	5.71	12.588
T3T-6600x32	32	1.26			96,100	21,605	136	5.35	104	4.09	0.49	5.98	13.184
T3T-6600x38	38	1.50			98,200	22,075	148	5.83	110	4.33	0.56	6.21	13.691
T3T-6600x80	80	3.15			104,100	23,405	232	9.13	152	5.98	1.01	7.85	17.306
T3T-6600x125	125	4.92			106,500	23,945	322	12.68	197	7.76	1.50	9.58	21.120

Note! All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top mount
FC, FCS,
FCSC

Foot mount
FFC, SF



Body mount
HMF, S

Recommended Flanges

FC-5000

235

FCS-5000

238

FFC-5000

240

HMF-5000

243

S-5000

248

Additional Flanges

FCSC-5000

239

SF-5000

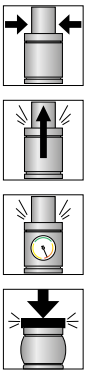
249

Note!

For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T3T-9500 provides full stroke force between 135,000 N (30,050 lbf) and 152,000 N (34,175 lbf) and is available in 10 stroke lengths.

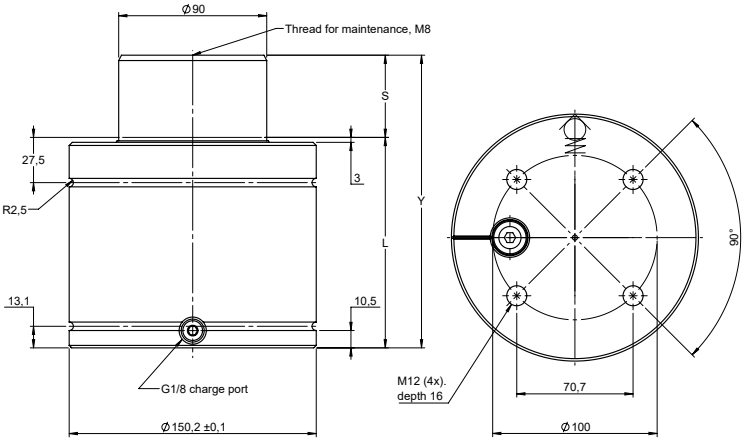
Strokes 50, 63, 75, and 100 are offered as a part of the Hyson Preferred Program which provides optimal delivery.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 95000
Contact Force at max. pressure (lbf) 21360
Recommended max strokes/min (at 20°C) ..... ~ 30-100
Cylinder diameter (mm) 150
Charge port ..... G 1/8”
Repair kit 3320614
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen

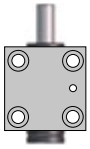


Order Number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height		Gas Volume	Weight	
	S		2175 psi at 68°F				Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	mm	ibf.	N	In	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
T3T-9500x50	50	1.97	95,000	21,360	146,000	32,825	178	7.01	128	5.04	0.99	11.84	26.103
T3T-9500x63	63	2.48			148,000	33,275	204	8.03	141	5.55	1.20	12.66	27.911
T3T-9500x75	75	2.95			149,000	33,500	228	8.98	153	6.02	1.39	13.41	29.564
T3T-9500x100	100	3.94			151,000	33,950	278	10.94	178	7.01	1.79	14.97	33.003
Alternative Stroke Lengths													
T3T-9500x19	19	0.75	95,000	21,360	135,000	30,350	116	4.57	97	3.82	0.49	9.91	21.848
T3T-9500x25	25	0.98			139,000	31,250	128	5.04	103	4.06	0.58	10.29	22.686
T3T-9500x32	32	1.26			142,000	31,925	142	5.59	110	4.33	0.70	10.72	23.634
T3T-9500x38	38	1.50			143,000	32,150	154	6.06	116	4.57	0.80	11.10	24.471
T3T-9500x80	80	3.15			150,000	33,725	238	9.37	158	6.22	1.47	13.72	30.247
T3T-9500x125	125	4.92			152,000	34,175	328	12.91	203	7.99	2.20	16.54	36.464

Note! All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top mount
FC, FCS,
FCSC



Body mount
HMF, S

Recommended Flanges

FC-7500

235

FCS-7500

238

HMF-7500

243

S-7500

248

Additional Flanges

FCSC-7500

239

Note!
For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T3F Series

T3F-750 to T3F-2400

Compact, High Force Gas Springs

Product Value

- The highest force nitrogen Gas Spring in the smallest space.
- Meets FCA Global Die Engineering Standards.

Product Features

- 750 model: G 1/8 Port with M6 Charge port.
- 1000, 1500 and 2400 models: G 1/8 Charging ports.
- Deeper bottom threads when compared to T3 Series.
- 10mm height difference when compared to T3 Series.
- Powerful contact forces ranging from 7400 to 24000 N (1665-5395 lbf).

Product Specifications

Pressure medium ..... Nitrogen
Max. charging pressure ..... 150 bar (at 20° C)
Min. charging pressure ..... 150 bar
Operating temperature ..... 0° to 80°C
Force increase by temperature ..... ±0.3% per °C
Recommended max strokes/min ..... ~30-100 @20 °C
Max piston rod velocity ..... 1.6 m/s

Ordering Options

T3F-Model size	X	Stroke Length
T3F-750 T3F-1000 T3F-1500 T3F-2400	X	See Dimensional Information Charts

Ordering Options for FCA

Model	X	Stroke	X	Charge Pressure
T3F-750 T3F-1000 T3F-1500 T3F-2400	X	See Dimensional Information Charts	X	See note

Note! FCA Global Die Engineering standards require 120 bar/1750 psi charge pressure. All orders shipped at full charge pressure (150 bar/2175 psi) unless otherwise noted on purchase order.

T3F Charge Fittings

Gas Springs	X	Order Number
T3F-750 T3F-1000 T3F-1500 T3F-2400	X	T2-770-T3 T2-770-G 1/8-P

Repair Kits

Gas Spring	Order Number
T3F-750	T3SK-750
T3F-1000	T3SK-1000
T3F-1500	T3SK-1500
T3F-2400	T3SK-2400

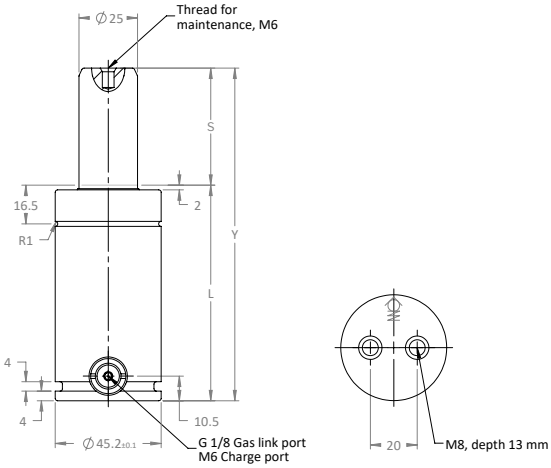
T3F-750 provides full stroke force between 11,700 N (2,655 lbf) and 12,100 N (2,720 lbf) and is available in 13 stroke lengths.

Strokes 50, 80, and 100 are offered as a part of the Hyson Preferred Program which provides optimal delivery.

Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 7400
Contact Force at max. pressure (lbf) 1665
Recommended max strokes/min (at 20°C) ..... ~ 50-100
Cylinder diameter (mm) 45
Charge port ..... G 1/8”
Repair kit T3SK-750
Min operating temperature ..... 0°C
Max operating temperature ..... 80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



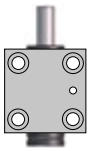
Order Number Model X Stroke	Stroke		Contact Force*		Full Stroke Force*		Cylinder Height		Body Height		Gas vol.	Weight	
	S						Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
T3F-750x50	50	1.97	7400	1665	11800	2655	142	5.59	92	3.62	0.07	0.71	1.565
T3F-750x80	80	3.15			11900	2675	202	7.95	122	4.80	0.11	0.90	1.984
T3F-750x100	100	3.94			11900	2675	242	9.53	142	5.59	0.13	1.03	2.271
Alternative Stroke Lengths													
T3F-750x10	10	0.39	7400	1665	12100	2720	62	2.44	52	2.05	0.02	0.47	1.036
T3F-750x13	13	0.51			12100	2720	68	2.68	55	2.17	0.02	0.49	1.080
T3F-750x16	16	0.63			12100	2720	74	2.91	58	2.28	0.03	0.51	1.124
T3F-750x19	19	0.75			11700	2630	80	3.15	61	2.40	0.03	0.51	1.124
T3F-750x25	25	0.98			11800	2655	92	3.62	67	2.64	0.04	0.55	1.213
T3F-750x32	32	1.26			11800	2655	106	4.17	74	2.91	0.05	0.60	1.323
T3F-750x38	38	1.50			11800	2655	118	4.65	80	3.15	0.05	0.64	1.411
T3F-750x63	63	2.48			11800	2655	168	6.61	105	4.13	0.09	0.79	1.742
T3F-750x75	75	2.95			11900	2675	192	7.56	117	4.61	0.10	0.87	1.918
T3F-750x125	125	4.92			11900	2675	292	11.50	167	6.57	0.17	1.19	2.624

* At full charge

Mounting Possibilities

Top mount
FC, FCS, FCSC

Foot mount
FFC, LM-lug, L



Body mount
HMF

Recommended Flanges

FC-500

235

FCS-500

238

FFC-500

240

HMF-500

243

Additional Flanges

FCSC-500

239

LM-LUG-500

242

L-500

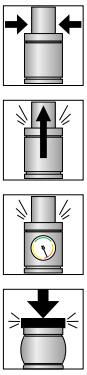
244

Note!

For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T3F-1000 provides full stroke force between 13,800 N (3,100 lbf) and 14,800 N (3,330 lbf) and is available in 12 stroke lengths.

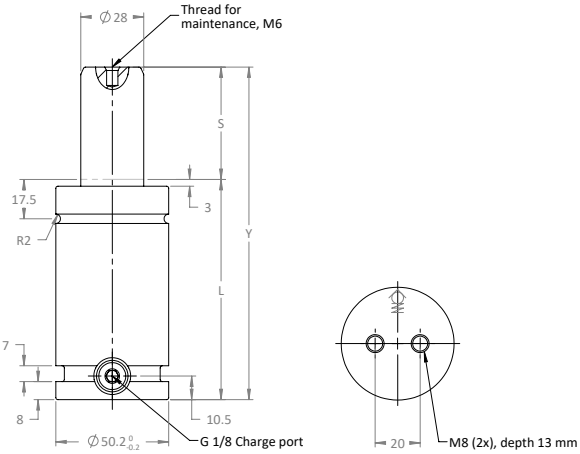
Strokes 50, 80, 100 and 125 are offered as a part of the Hyson Preferred Program which provides optimal delivery.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 9200
Contact Force at max. pressure (lbf) 2068
Recommended max strokes/min (at 20°C) ..... ~ 50-100
Cylinder diameter (mm) 50
Charge port ..... G 1/8”
Repair kit T3SK-1000
Min operating temperature ..... 0°C
Max operating temperature ..... 80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



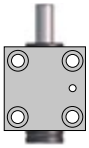
Order Number Model X Stroke	Stroke		Contact Force*		Full Stroke Force*		Cylinder Height		Body Height		Gas vol.	Weight	
	S						Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
T3F-1000x50	50	1.97	9200	2070	146000	3280	148	5.83	98	3.86	0.09	0.98	2.161
T3F-1000x80	80	3.15			148000	3325	208	8.19	128	5.04	0.14	1.22	2.690
T3F-1000x100	100	3.94			148000	3325	248	9.76	148	5.83	0.17	1.41	3.109
T3F-1000x125	125	4.92			148000	3325	298	11.73	173	6.81	0.21	1.60	3.527
Alternative Stroke Lengths													
T3F-1000x13	13	0.51	9200	2070	138000	3105	74	2.91	61	2.40	0.03	0.70	1.543
T3F-1000x16	16	0.63			138000	3105	80	3.15	64	2.52	0.04	0.72	1.587
T3F-1000x19	19	0.75			140000	3145	86	3.39	67	2.64	0.04	0.74	1.631
T3F-1000x25	25	0.98			142000	3190	98	3.86	73	2.87	0.05	0.79	1.742
T3F-1000x32	32	1.26			143000	3215	112	4.41	80	3.15	0.06	0.84	1.852
T3F-1000x38	38	1.50			145000	3260	124	4.88	86	3.39	0.07	0.89	1.962
T3F-1000x63	63	2.48			147000	3305	174	6.85	111	4.37	0.11	1.09	2.403
T3F-1000x75	75	2.95			147000	3305	198	7.80	123	4.84	0.13	1.18	2.601

* At full charge

Mounting Possibilities

Top mount
FC, FCS, FCSC

Foot mount
FFC, SF, LM-lug, L



Body mount
HM, HMF, S

Base mount
MP, RM

Recommended Flanges

FC-750

235

FCS-750

238

FFC-750

240

HMF-750

243

MP-750

246

S-750

248

Additional Flanges

FCSC-750

239

SF-750

249

HM-750

242

LM-LUG-750

242

L-750

244

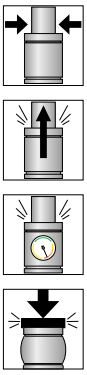
RM-750

247

Note!
For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T3F-1500 provides full stroke force between 23,800 N (5,350 lbf) and 24,300 N (5,460 lbf) and is available in 12 stroke lengths.

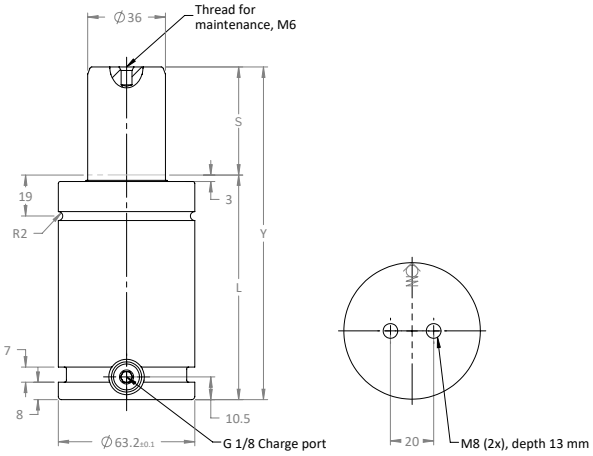
Strokes 50, 80, 100 and 125 are offered as a part of the Hyson Preferred Program which provides optimal delivery.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 15000
Contact Force at max. pressure (lbf) 3370
Recommended max strokes/min (at 20°C) ..... ~ 50-100
Cylinder diameter (mm) 63
Charge port ..... G 1/8”
Repair kit T3SK-1500
Min operating temperature ..... 0°C
Max operating temperature ..... 80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



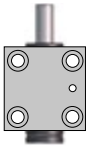
Order Number Model X Stroke	Stroke S		Contact Force*		Full Stroke Force*		Cylinder Height Y ±0.25	Y ±0.010	Body Height L		Gas vol.	Weight	
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
T3F-1500x50	50	1.97	9200	2070	24000	5395	154	6.06	104	4.09	0.15	1.39	3.064
T3F-1500x80	80	3.15			24200	5440	214	8.43	134	5.28	0.24	1.49	3.285
T3F-1500x100	100	3.94			24300	5465	254	10.00	154	6.06	0.29	2.12	4.674
T3F-1500x125	125	4.92			24300	5465	304	11.97	179	7.05	0.36	2.39	5.269
Alternative Stroke Lengths													
T3F-1500x13	13	0.51	9200	2070	24000	5395	80	3.15	67	2.64	0.05	1.14	2.513
T3F-1500x16	16	0.63			24100	5420	86	3.39	70	2.76	0.06	1.27	2.800
T3F-1500x19	19	0.75			24200	5440	92	3.62	73	2.87	0.07	1.28	2.822
T3F-1500x25	25	0.98			24300	5365	104	4.09	79	3.11	0.08	1.28	2.822
T3F-1500x32	32	1.26			23800	5355	118	4.65	86	3.39	0.11	1.33	2.932
T3F-1500x38	38	1.50			23900	5375	130	5.12	92	3.62	0.12	1.35	2.976
T3F-1500x63	63	2.48			24100	5420	180	7.09	117	4.61	0.19	1.43	3.153
T3F-1500x75	75	2.95			24200	5440	204	8.03	129	5.08	0.22	1.48	3.263

* At full charge

Mounting Possibilities

Top mount
FCS, FCSC

Foot mount
FFC, SF,
LM-lug, L



Body mount
HMF

Base mount
MP

Recommended Flanges

FCSX-1500

238

FFX-1500

240

HMF-1500

243

MPX-1500

246

Additional Flanges

FCSCX-1500

239

SFX-1500

249

LMX-1500

242

L-T3-1500

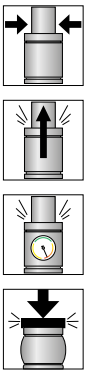
244

Note!

For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T3F-2400 provides full stroke force between 38,300 N (8,610 lbf) and 39,300 N (8,835 lbf) and is available in 11 stroke lengths.

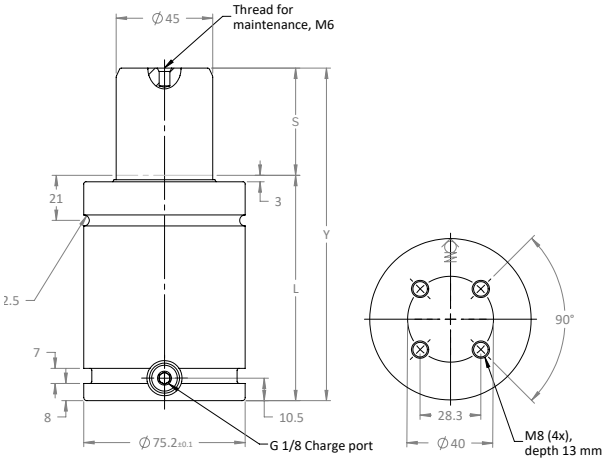
Strokes 50, 80, 100 and 125 are offered as a part of the Hyson Preferred Program which provides optimal delivery.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 24000
Contact Force at max. pressure (lbf) 5395
Recommended max strokes/min (at 20°C) ..... ~ 40-100
Cylinder diameter (mm) 75
Charge port ..... G 1/8”
Repair kit T3SK-2400
Min operating temperature ..... 0°C
Max operating temperature ..... 80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



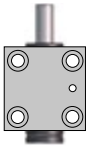
Order Number Model X Stroke	Stroke		Contact Force*		Full Stroke Force*		Cylinder Height		Body Height		Gas vol.	Weight	
	S						Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
T3F-2400x50	50	1.97	9200	2070	39200	8815	155	6.10	105	4.13	0.23	2.23	4.916
T3F-2400x80	80	3.15			39200	8815	215	8.46	135	5.31	0.35	2.72	5.997
T3F-2400x100	100	3.94			39300	8835	255	10.04	155	6.10	0.43	3.05	6.724
T3F-2400x125	125	4.92			39300	8835	305	12.01	180	7.09	0.54	3.47	7.650
Alternative Stroke Lengths													
T3F-2400x16	16	0.63	9200	2070	38300	8610	87	3.43	71	2.80	0.09	1.66	3.660
T3F-2400x19	19	0.75			38500	8655	93	3.66	74	2.91	0.10	1.71	3.770
T3F-2400x25	25	0.98			38700	8700	105	4.13	80	3.15	0.13	1.81	3.990
T3F-2400x32	32	1.26			38600	8680	119	4.69	87	3.43	0.16	1.93	4.255
T3F-2400x38	38	1.50			38400	8635	131	5.16	93	3.66	0.18	2.03	4.475
T3F-2400x63	63	2.48			39200	8815	181	7.13	118	4.65	0.28	2.44	5.379
T3F-2400x75	75	2.95			39200	8815	205	8.07	130	5.12	0.33	2.64	5.820

* At full charge

Mounting Possibilities

Top mount
FC, FCS, FCSC

Foot mount
FFC, SC, LM-lug, L



Body mount
HM, S

Base mount
MP, RM

Recommended Flanges

FC-1500

235

FCS-1500

238

FFC-1500

240

FFC-3000

243

MP-1500

246

S-1500

248

Additional Flanges

FCSC-1500

239

SF-1500

249

HM-1500

242

LM-LUG-1500

242

L-1500

244

RM-1500

247

Note!
For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T4 Series

T4-750 to T4-20000

Heavy Duty Gas Springs

Product Value

- High Force with ISO Standard Dimensions.
  Large rod and rod seal provide higher force in the same diameter and height dimensions as ISO standard springs.
- Force Adjustability & Increased Productivity.
  Our Gas Springs are adjustable simply by modifying gas pressure through a hosed control panel while the die is in the press.
- Balanced, consistent force
  Our Gas Springs provide for a balanced pad and high quality parts while, as Coil Springs start to fatigue and break, the pad can become imbalanced resulting in poor quality parts.

Product Features

- Eight models with stroke lengths to 300 mm/11.81 in.
- Diameters available from 45 mm to 195 mm/1.77 in to 7.68 in.
- Variety of mounting options available with upper C-groove and lower U-groove.
- Flexible Guide: Specially engineered to absorb normal lateral movements and misalignments due to clearances in the die to prolong service life.
- Flexible Piston Ring: Mounted to the piston, this ring provides additional guidance.

Product Specifications

Pressure medium ..... Nitrogen
Min. charging pressure ..... 25 bar
Max. charging pressure ..... 150 bar
Operating temperature ..... 0º to 80ºC
Force increase by temperature ..... ±0.3% per ºC
Recommended max strokes/min ..... ~40-100 @20 ºC
Max piston rod velocity ..... 1.6 m/s
Max utilized stroke 100%
Valve Inlet
- T4-750, T4-1000 & T4-1500 4018112
- T4-2400, T4-4200, T4-6600, T4-9500 & T4-20000 56-072-5500

Charge fitting
- T4-750, T4-1000 & T4-1500 ..... T2-770-T3
- T4-2400, T4-4200, T4-6600, T4-9500 & T4-20000 ..... T2-770-G1/8-P

Ordering Options

T4-4200	X	50	X	750 psi
Model		**Stroke (mm)**		**Charge pressure**
T4-750 T4-1000 T4-1500 T4-2400 T4-4200 T4-6600 T4-9500 T4-20000		See Dimensional Information Charts		Max=150 bar/ 2,175 psi

Repair Kits

Gas Spring	Repair Kit Order Number
T4-750	3326200
T4-1000	3323788
T4-1500	3326202
T4-2400	3322952
T4-4200	3322953
T4-6600	3322954
T4-9500	3322901
T4-20000	3326204

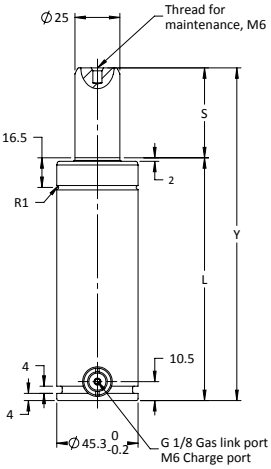
T4-750 provides full stroke force between 12,000 N (2,700 lbf) and 12,100 N (2,720 lbf) and is available in 13 stroke lengths.

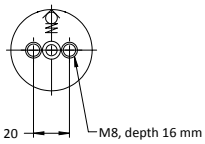
Strokes 10,16 and 25 are offered as a part of the Hyson Preferred Program which provides optimal delivery.

Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 7400
Contact Force at max. pressure (lbf) 1665
Recommended max strokes/min (at 20°C) ..... ~ 15-100
Cylinder diameter (mm) 45
Charge port ..... M6, G 1/8”
Repair kit 3326200
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen





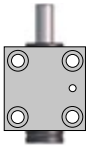
Order Number Model X Stroke	Stroke S		Contact Force**		Full Stroke Force**		Cylinder Height		Body Height		Gas Volume	Weight	
							Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	mm	ibf.	N	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
T4-750X150	150	5.91	7,400	1,665	12,100	2,720	385	15.16	235	9.25	0.22	1.72	3.79
T4-750X160	160	6.30			12,100	2,720	405	15.94	245	9.65	0.23	1.79	3.95
T4-750X175	175	6.89			12,000	2,720	435	17.13	260	10.24	0.25	1.88	4.14
T4-750X200	200	7.87			12,100	2,720	485	19.09	285	11.22	0.28	2.04	4.50
Alternative Stroke Lengths													
T4-750X13	12.7	.50	7,400	1,665	12,000	2,700	110.4	4.35	97.7	3.85	0.04	0.85	1.87
T4-750X25	25	.98			12,000	2,700	135	5.31	110	4.33	0.06	0.93	2.05
T4-750X38	38.1	1.50			12,000	2,700	161.2	6.35	123.1	4.85	0.07	1.01	2.23
T4-750X50	50	1.97			12,000	2,700	185	7.28	135	5.31	0.09	1.09	2.40
T4-750X63	63.5	2.50			12,000	2,700	212	8.35	148.5	5.85	0.11	1.17	2.58
T4-750X75	75	2.95			12,000	2,700	235	9.25	160	6.30	0.12	1.25	2.76
T4-750X80	80	3.15			12,000	2,700	245	9.65	165	6.50	0.13	1.28	2.82
T4-750X100	100	3.94			12,000	2,700	285	11.22	185	7.28	0.15	1.41	3.11
T4-750X125	125	4.92			12,100	2,720	335	13.19	210	8.27	0.19	1.56	3.44

** At full charge

Mounting Possibilities

Top mount
FC, FCS, FCSC

Foot mount
FFC, LM-lug, L



Body mount
HMF, S

Base mount
MP

Recommended Flanges

FC-500

235

FCS-500

238

FFC-500

240

HMF-500

243

MP-500

246

S-500

248

Additional Flanges

FCSC-500

239

LM-LUG-500

242

L-500

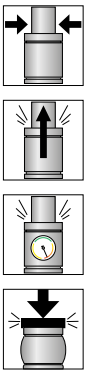
244

Note!

For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T4-1000 provides full stroke force between 11,200 N (2,525 lbf) and 14,900 N (3,350 lbf) and is available in 15 stroke lengths.

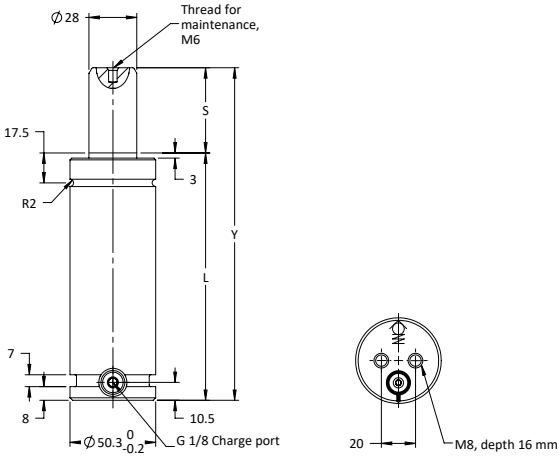
Strokes 10,16 and 25 are offered as a part of the Hyson Preferred Program which provides optimal delivery.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 9200
Contact Force at max. pressure (lbf) 2075
Recommended max strokes/min (at 20°C) ..... ~ 50-100
Cylinder diameter (mm) 50
Charge port ..... G 1/8”
Repair kit 3323788
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



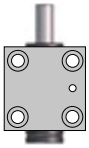
Order Number Model X Stroke	Stroke S		Contact Force**		Full Stroke Force**		Cylinder Height		Body Height		Gas Volume	Weight	
							Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	mm	ibf.	N	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
T4-1000X150	150	5.91	9,200	2,075	14,400	3,237	395	15.55	245	9.65	0.27	2.32	5.11
T4-1000X160	160	6.30			14,500	3,250	415	16.34	255	10.04	0.28	2.40	5.29
T4-1000X175	175	6.89			14,600	3,275	445	17.52	270	10.63	0.30	2.53	5.58
T4-1000X200	200	7.87			14,700	3,300	495	19.49	295	11.61	0.34	2.74	6.04
Alternative Stroke Lengths													
T4-1000X13	12.7	0.50	9,200	2,075	11,200	2,525	121	4.76	108	4.25	0.06	1.17	2.58
T4-1000X25	25	0.98			12,100	2,725	145	5.71	120	4.72	0.07	1.27	2.80
T4-1000X38	38.1	1.50			12,800	2,875	171	6.73	133	5.24	0.09	1.32	2.91
T4-1000X50	50	1.97			13,200	2,975	195	7.68	145	5.71	0.11	1.37	3.02
T4-1000X63	63.5	2.50			13,500	3,056	221	8.70	158	6.22	0.13	1.58	3.48
T4-1000X75	75	2.95			13,700	3,075	245	9.65	170	6.69	0.15	1.71	3.77
T4-1000X80	80	3.15			13,800	3,100	255	10.04	175	6.89	0.16	1.73	3.81
T4-1000X100	100	3.94			14,100	3,175	295	11.61	195	7.68	0.19	1.90	4.19
T4-1000X125	125	4.92			14,300	3,225	345	13.58	220	8.66	0.23	2.11	4.65
T4-1000X250	250	9.84			14,800	3,325	595	23.43	345	13.58	0.42	3.16	6.97
T4-1000X300	300	11.81			14,900	3,350	695	27.36	395	15.55	0.49	3.58	7.89

** At full charge

Mounting Possibilities

Top mount
FC, FCS,
FCSC

Foot mount
FFC, SF,
LM-lug, L



Body mount
HM, HMF

Base mount
MP, RM

Recommended Flanges

FC-750
235

FCS-750
238

FFC-750
240

HMF-750
243

MP-750
246

Additional Flanges

FCSC-750
239

SF-750
249

HM-750
242

LM-750
242

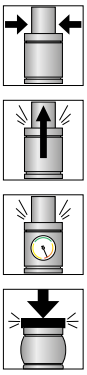
L-750
244

RM-750
247

Note!
For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T4-1500 provides full stroke force between 17,700 N (3,975 lbf) and 23,200 N (5,2150 lbf) and is available in 15 stroke lengths.

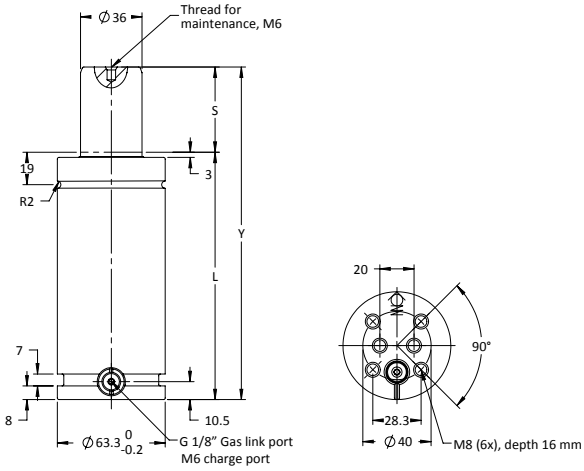
Strokes 10, 16 and 25 are offered as a part of the Hyson Preferred Program which provides optimal delivery.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 9200
Contact Force at max. pressure (lbf) 2075
Recommended max strokes/min (at 20°C) ..... ~ 50-100
Cylinder diameter (mm) 50
Charge port ..... M6, G 1/8”
Repair kit 3323788
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



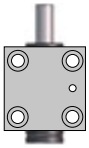
Order Number Model X Stroke	Stroke S		Contact Force**		Full Stroke Force**		Cylinder Height		Body Height		Gas Volume	Weight	
							Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	mm	ibf.	N	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
T4-1500X150	150	5.91	15,000	3,375	22,500	5058	395	15.55	245	9.65	0.47	3.33	7.34
T4-1500X160	160	6.30			22,600	5081	415	16.34	255	10.04	0.50	3.44	7.58
T4-1500X175	175	6.89			22,700	5103	445	17.52	270	10.63	0.54	3.61	7.96
T4-1500X200	200	7.87			22,800	5126	495	19.49	295	11.61	0.60	3.90	8.60
Alternative Stroke Lengths													
T4-1500X13	12.7	0.50	15,000	3,375	17,700	3979	121	4.76	108	4.25	0.10	1.76	3.88
T4-1500X25	25	0.98			19,100	4294	145	5.71	120	4.72	0.13	1.89	4.17
T4-1500X38	38.1	1.50			20,000	4496	171	6.73	133	5.24	0.17	2.04	4.50
T4-1500X50	50	1.97			20,600	4631	195	7.68	145	5.71	0.20	2.18	4.81
T4-1500X63	63.5	2.50			21,100	4743	221	8.70	158	6.22	0.23	2.33	5.14
T4-1500X75	75	2.95			21,500	4833	245	9.65	170	6.69	0.27	2.47	5.45
T4-1500X80	80	3.15			21,600	4856	255	10.04	175	6.89	0.28	2.52	5.56
T4-1500X100	100	3.94			21,700	4878	295	11.61	195	7.68	0.33	2.76	6.08
T4-1500X125	125	4.92			22,400	5036	345	13.58	220	8.66	0.40	3.04	6.70
T4-1500X250	250	9.84			23,000	5171	595	23.43	345	13.58	0.74	4.47	9.85
T4-1500X300	300	11.81			23,200	5216	695	27.36	395	15.55	0.87	5.05	11.13

** At full charge

Mounting Possibilities

Top mount
FCS, FCSC

Foot mount
FFC, SF,
LM-lug, L



Body mount
HMF

Base mount
MP

Recommended Flanges

FCSX-1500

238

FFX-1500

240

HMFX-1500

243

MPX-1500

246

Additional Flanges

FCSCX-1500

239

SFX-1500

249

LMX-1500

242

L-T3-1500

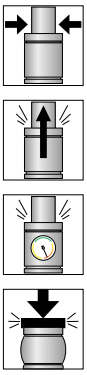
244

Note!

For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T4-2400 provides full stroke force between 37,100 N (8,350 lbf) and 39,100 N (8,800 lbf) and is available in 14 stroke lengths.

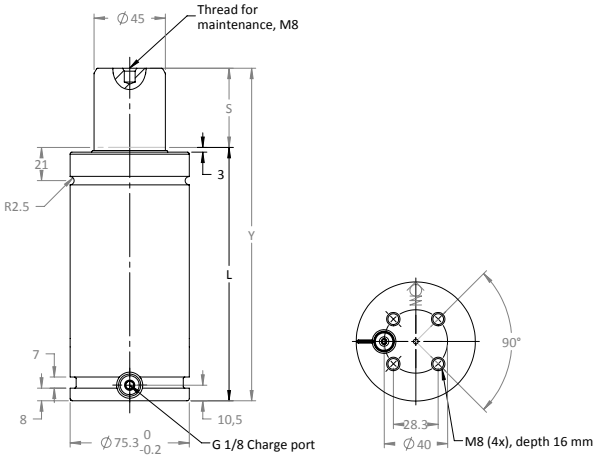
Strokes 25, 38.1, 50, 100, 125, and 160 are offered as a part of the Hyson Preffered Program which provides optimal delivery.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 9200
Contact Force at max. pressure (lbf) 2075
Recommended max strokes/min (at 20°C) ..... ~ 50-100
Cylinder diameter (mm) 50
Charge port ..... G 1/8”
Repair kit 3323788
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



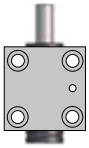
Order Number Model X Stroke	Stroke S		Contact Force**		Full Stroke Force**		Cylinder Height		Body Height		Gas Volume	Weight	
							Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
T4-2400X150	150	5.91	24,000	5,400	38,700	8,713	410	16.14	260	10.24	0.73	5.07	11.18
T4-2400X160	160	6.30			38,800	8,725	430	16.93	270	10.63	0.77	5.23	11.53
T4-2400X175	175	6.89			38,900	8,750	460	18.11	285	11.22	0.83	5.47	12.06
T4-2400X200	200	7.87			38,900	8,763	510	20.08	310	12.20	0.93	5.86	12.92
Alternative Stroke Lengths													
T4-2400X25	25	0.98	24,000	5,400	37,100	8,350	160	6.30	135	5.31	0.23	3.10	6.83
T4-2400X38	38.1	1.50			37,600	8,450	186	7.32	148	5.83	0.28	3.31	7.30
T4-2400X50	50	1.97			37,900	8,525	210	8.27	160	6.30	0.33	3.50	7.72
T4-2400X63	63.5	2.50			38,100	8,575	236	9.29	173	6.81	0.38	3.70	8.16
T4-2400X75	75	2.95			38,300	8,625	260	9.84	185	7.28	0.43	3.89	8.58
T4-2400X80	80	3.15			38,400	8,637	270	10.60	190	7.48	0.45	3.97	8.75
T4-2400X100	100	3.94			38,500	8,650	310	12.20	210	8.27	0.53	4.29	9.46
T4-2400X125	125	4.92			38,600	8,700	360	14.17	235	9.25	0.63	4.68	10.32
T4-2400X250	250	9.84			39,000	8,775	610	24.02	360	14.17	1.17	6.65	14.66
T4-2400X300	300	11.81			39,100	8,800	710	27.95	410	16.14	1.33	7.44	16.40

** At full charge

Mounting Possibilities

Top mount
FC, FCS,
FCSC

Foot mount
FFC, SF,
LM-lug, L



Body mount
HM, HMF,
S

Base mount
MP, RM

Recommended Flanges

FC-1500

235

FCS-1500

238

FFC-1500

240

HMF-1500

243

MP-1500

246

S-1500

248

Additional Flanges

FCSC-1500

239

SF-1500

249

HM-1500

242

LM-LUG-1500

242

L-1500

244

RM-1500

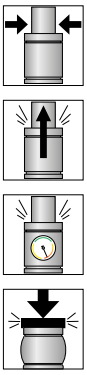
247

Note!

For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T4-4200 provides full stroke force between 52,100 N (11,725 lbf) and 68,700 N (15,450 lbf) and is available in 14 stroke lengths.

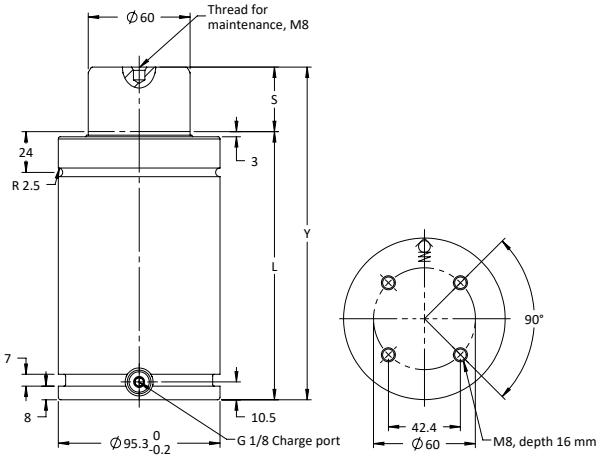
Strokes 25, 38, 50, 80, 100, 125, and 160 are offered as a part of the Hyson Preferred Program which provides optimal delivery.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 42000
Contact Force at max. pressure (lbf) 9440
Recommended max strokes/min (at 20°C) ..... ~ 40-100
Cylinder diameter (mm) 95
Charge port ..... G 1/8”
Repair kit 3322953
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



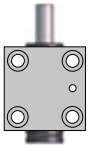
Order Number Model X Stroke	Stroke S		Contact Force**		Full Stroke Force**		Cylinder Height		Body Height		Gas Volume	Weight	
							Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	mm	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
T4-4200X150	150	5.91	42,000	9,440	65,100	14,650	420	16.54	270	10.63	1.27	8.27	18.23
T4-4200X160	160	6.30			65,500	14,750	440	17.32	280	11.02	1.33	8.53	18.81
T4-4200X175	175	6.89			66,000	14,850	470	18.50	295	11.61	1.43	8.91	19.64
T4-4200X200	200	7.87			66,800	15,025	520	20.47	320	12.60	1.60	9.55	21.05
Alternative Stroke Lengths													
T4-4200X25	25	0.98	42,000	9,440	52,100	11,725	170	6.69	145	5.71	0.43	5.08	11.20
T4-4200X38	38.1	1.50			55,100	12,387	196	7.72	158	6.22	0.52	5.41	11.93
T4-4200X50	50	1.97			57,200	12,875	220	8.66	170	6.69	0.60	5.71	12.59
T4-4200X63	63.5	2.50			59,000	13,275	246	9.69	183	7.20	0.68	6.05	13.34
T4-4200X75	75	2.95			60,300	13,575	270	10.63	195	7.68	0.76	6.35	14.00
T4-4200X80	80	3.15			60,800	13,700	280	11.02	200	7.87	0.80	6.48	14.29
T4-4200X100	100	3.94			62,500	14,050	320	12.60	220	8.66	0.93	6.99	15.41
T4-4200X250	250	9.84			67,900	15,275	620	24.41	370	14.57	1.93	11.08	24.43
T4-4200X300	300	11.81			68,700	15,450	720	28.35	420	16.54	2.27	12.11	26.70

** At full charge

Mounting Possibilities

Top mount
FC, FCS,
FCSC

Foot mount
FFC, SF,
LM-lug, L



Body mount
HM, HMF,
S

Base mount
MP, RM

Recommended Flanges

FC-3000

235

FCS-3000

238

FFC-3000

240

HMF-3000

243

MP-3000

246

S-3000

248

Additional Flanges

FCSC-3000

239

SF-3000

249

HM-3000

242

LM-3000

242

L-3000

244

RM-3000

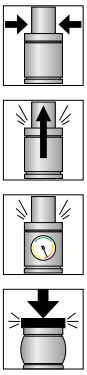
247

Note!

For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T4-6600 provides full stroke force between 79,500 N (17,900 lbf) and 105,300 N (23,700 lbf) and is available in 14 stroke lengths.

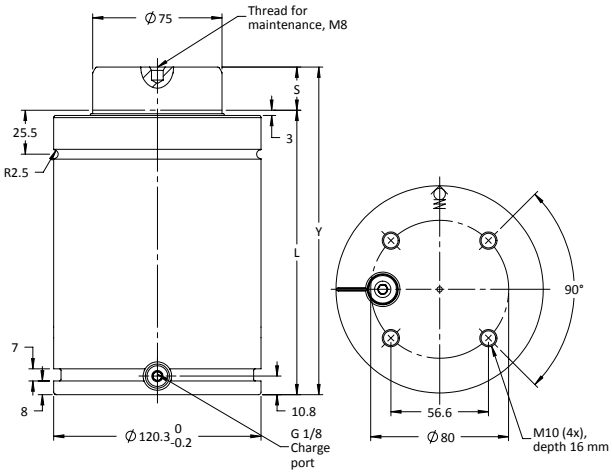
Strokes 25, 38, 50, 80, 100, and 125 are offered as a part of the Hyson Preferred Program which provides optimal delivery.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 66300
Contact Force at max. pressure (lbf) 14925
Recommended max strokes/min (at 20°C) ..... ~30-100
Cylinder diameter (mm) 120
Charge port ..... G 1/8”
Repair kit 3322954
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



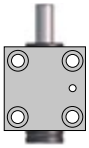
Order Number Model X Stroke	Stroke S		Contact Force**		Full Stroke Force**		Cylinder Height		Body Height		Gas Volume	Weight	
							Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
T4-6600X150	150	5.91	66,300	14,925	99,500	22,375	440	17.32	290	11.42	2.05	14.36	31.66
T4-6600X160	160	6.30			100,100	22,525	460	18.11	300	11.81	2.16	14.77	32.56
T4-6600X175	175	6.89			101,000	22,725	490	19.29	315	12.40	2.32	15.38	33.91
T4-6600X200	200	7.87			102,200	23,000	540	21.26	340	13.39	2.58	16.40	36.16
Preferred Stroke Lengths (optimal delivery)													
T4-6600X25	25	0.98	66,300	14,925	79,500	17,900	190	7.48	165	6.50	0.73	9.28	20.46
T4-6600X38	38.1	1.50			83,900	18,875	216	8.50	178	7.01	0.87	9.81	21.63
T4-6600X50	50	1.97			87,000	19,600	240	9.45	190	7.48	1.00	10.30	22.71
T4-6600X63	63.5	2.50			89,700	20,200	266	10.47	203	7.99	1.13	10.83	23.88
T4-6600X75	75	2.95			91,800	20,650	290	11.42	215	8.46	1.26	11.32	24.96
T4-6600X80	80	3.15			92,600	20,825	300	11.81	220	8.66	1.31	11.52	25.40
T4-6600X100	100	3.94			95,100	21,500	340	13.39	240	9.45	1.53	12.33	27.18
T4-6600X125	125	4.92			97,600	21,950	390	15.35	265	10.43	1.79	13.35	29.43
T4-6600X250	250	9.84			104,000	23,400	640	25.20	390	15.35	3.11	18.43	40.63
T4-6600X300	300	11.81			105,300	23,700	740	29.13	440	17.32	3.64	20.46	45.11

** At full charge

Mounting Possibilities

Top mount
FC, FCS,
FCSC

Foot mount
FFC, SF,
LM-lug, L



Body mount
HMF, S

Base mount
MP, RM

Recommended Flanges

FC-5000

235

FCS-5000

238

FFC-5000

240

HMF-5000

243

MP-5000

246

S-5000

248

Additional Flanges

FCSC-5000

239

SF-5000

249

LM-LUG-5000

242

L-5000

244

RM-5000

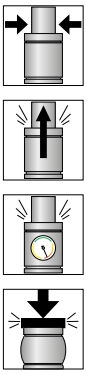
247

Note!

For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T4-9500 provides full stroke force between 113,200 N (25,500 lbf) and 148,200 N (33,340 lbf) and is available in 14 stroke lengths.

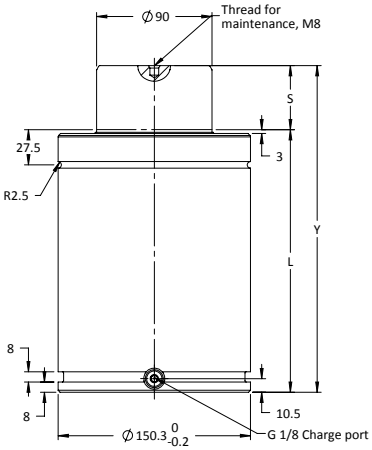
Strokes 25, 50, 80, 100, 125, and 160 are offered as a part of the Hyson Preferred Program which provides optimal delivery.

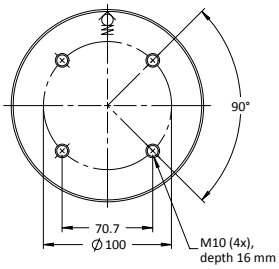


Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 95000
Contact Force at max. pressure (lbf) 21400
Recommended max strokes/min (at 20°C) ..... ~ 30-100
Cylinder diameter (mm) 150
Charge port ..... G 1/8”
Repair kit 3322901
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen





Order Number Model X Stroke	Stroke S		Contact Force**		Full Stroke Force**		Cylinder Height		Body Height		Gas Volume	Weight	
							Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
T4-9500X150	150	5.91	95,000	21,400	140,200	31,530	455	17.91	305	12.01	3.07	24.97	55.05
T4-9500X160	160	6.30			141,000	31,730	475	18.70	315	12.40	3.23	25.62	56.48
T4-9500X175	175	6.89			142,200	31,990	505	19.88	330	12.99	3.47	26.59	58.62
T4-9500X200	200	7.87			143,800	32,360	555	21.85	355	13.98	3.86	28.21	62.19
Alternative Stroke Lengths													
T4-9500X25	25	0.98	95,000	21,400	113,200	25,500	205	8.07	180	7.09	1.09	16.86	37.17
T4-9500X38	38.1	1.50			119,000	26,800	231	9.09	193	7.60	1.30	17.70	39.02
T4-9500X50	50	1.97			123,300	27,730	255	10.04	205	8.07	1.49	18.48	40.74
T4-9500X63	63.5	2.50			127,000	28,550	281	11.06	218	8.58	1.69	19.32	42.59
T4-9500X75	75	2.95			129,700	29,200	305	12.01	230	9.06	1.88	20.10	44.31
T4-9500X80	80	3.15			130,800	29,430	315	12.40	235	9.25	1.96	20.42	45.02
T4-9500X100	100	3.94			134,300	30,200	355	13.98	255	10.04	2.28	21.72	47.88
T4-9500X125	125	4.92			137,600	31,000	405	15.94	280	11.02	2.67	23.35	51.48
T4-9500X250	250	9.84			146,300	32,930	655	25.79	405	15.94	4.65	31.46	69.36
T4-9500X300	300	11.81			148,200	33,340	755	29.72	455	17.91	5.44	34.70	76.50

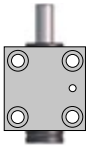
** At full charge

Note! All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top mount
FC, FCS,
FCSC

Foot mount
FFC, SF,
LM-lug, L



Body mount
HMF, S

Base mount
MP, RM

Recommended Flanges

FC-7500

235

FCS-7500

238

FFC-7500

240

HMF-7500

243

MP-7500

246

S-7500

248

Additional Flanges

FCSC-7500

239

SF-7500

249

LM-LUG-7500

242

L-7500

244

RM-7500

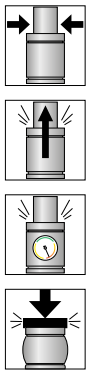
247

Note!

For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T4-20000 provides full stroke force between 242,000 N (54,404 lbf) and 330,600 N (72,322 lbf) and is available in 11 stroke lengths.

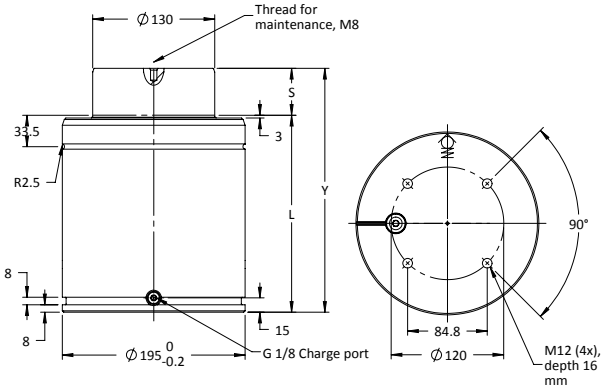
Strokes 50, 80, 100, 125, 160, 200, and 250 are offered as a part of the Hyson Preferred Program which provides optimal delivery.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 200000
Contact Force at max. pressure (lbf) 44960
Recommended max strokes/min (at 20°C) ..... ~15-100
Cylinder diameter (mm) 195
Charge port ..... G 1/8”
Repair kit 3326204
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



Order Number Model X Stroke	Stroke S		Contact Force**		Full Stroke Force**		Cylinder Height		Body Height		Gas Volume	Weight	
							Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
T4-20000X160	160	6.30	200,000	45,000	312,000	70,140	480	18.90	320	12.60	6.0	42.39	93.45
T4-20000X200	200	7.87			319,000	70,950	560	22.05	360	14.17	7.2	46.60	102.74
Alternative Stroke Lengths													
T4-20000X25	25	0.98	200,000	45,000	242,000	54,404	210	8.27	185	7.28	2.0	28.20	62.17
T4-20000X38	38.1	1.50			256,400	57,640	236	9.30	198	7.80	2.4	29.57	65.19
T4-20000X50	50	1.97			266,800	59,980	260	10.24	210	8.27	2.8	30.83	67.97
T4-20000X63	63.5	2.50			276,000	62,048	286	11.30	223	8.80	3.1	32.20	70.99
T4-20000X80	80	3.15			285,700	64,228	320	12.60	240	9.45	3.7	33.98	74.91
T4-20000X100	100	3.94			294,600	66,229	360	14.17	260	10.24	4.2	36.09	79.56
T4-20000X125	125	4.92			303,100	68,140	410	16.14	285	11.22	5.0	38.71	85.34
T4-20000X250	250	9.84			325,600	73,198	660	25.98	410	16.14	8.7	51.85	114.31
T4-20000X300	300	11.81			330,600	72,322	760	29.92	460	18.11	10.2	57.11	125.91

** At full charge

Note! All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top mount
FCS

Foot mount
FFC, LM-lug

Base mount
MP

Recommended Flanges

FCS-10000

238

FFC-10000

240

MP-10000

246

Additional Flanges

LM-LUG-10000

242

Note!

For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T5 Series

T5-500 to T5-1900

Ultra High-Force, Compact Design, Nitrogen Gas Springs

Product Value

- Ideal for applications where space is limited.
- Highest force per area of any Gas Spring on market.

Product Features

- Three models with contact forces from 5100 to 19,200 N / 1,150 to 4,320 lbf.
- Stroke lengths to 80 mm / 3.15 in.
- Variety of mounting options available.
- Flexible guide absorbs lateral movement and misalignments in the die.

Advanced Safety Features

- Secondary piston stop feature for extra protection.
- Overload, Overstroke and Overpressure protection vents internal gas pressure in a controlled manner.

Product Specifications

Pressure medium ..... Nitrogen
Min. charging pressure ..... 25 bar/365 psi
Max. charging pressure ..... 200 bar/2900 psi
Operating temperature ..... 0º to 80ºC/32º to 176ºF
Force increase by temperature ..... ±0.3% per ºC/±0.009% per ºF
Recommended max strokes/min ..... ~70 to 200 @ 20ºC
Max piston rod velocity ..... 1.6 m/s / 315 ft./min.
Charge fitting ..... Two pieces: T2-770-T3 | adapter 4026164

Ordering Options

T5-XXXX	X	38
Model T5-500 T5-1000 T5-1900		**STROKE (mm)** See Dimensional Information Charts

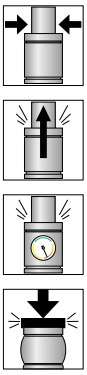
The recommendation is to not use the last 5 mm or 10% of the nominal stroke length.

Repair Kits

Gas Spring	Order Number
T5-500	3322908
T5-1000	3322836
T5-1900	3322844

T5-500 provides full stroke force between 6,600 N (1,490 lbf) and 9,200 N (2,060) lbf) and is available in seven stroke lengths.

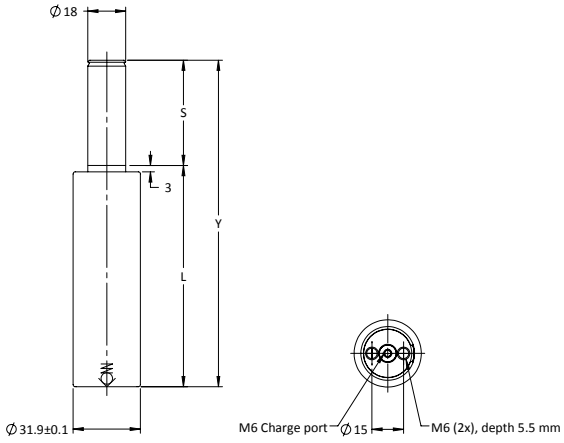
All strokes are offered as a part of the Hyson Preferred Program which provides optimal delivery.



Basic Information

For general information see “About Gas Springs”.

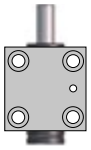
Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 200 bar
Contact Force at max. pressure (N) 5100
Contact Force at max. pressure (lbf) 1150
Recommended max strokes/min (at 20°C) ..... ~ 70-200
Cylinder diameter (mm) 32
Charge port M6
Repair kit 3322908
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



Order Number Model X Stroke	Stroke S		Contact Force**		Full Stroke Force**		Cylinder Height		Body Height		Gas Volume	Weight	
							Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
T5-500x10	10	0.39	5,100	1,150	6,600	1,490	75	2.95	65	2.56	0.01	0.27	0.595
T5-500x15	15	0.59			7,100	1,610	85	3.35	70	2.76	0.02	0.29	0.639
T5-500x25	25	0.98			7,900	1,780	105	4.13	80	3.15	0.02	0.33	0.728
T5-500x38	38*	1.50			8,700	1,960	130	5.12	92	3.62	0.03	0.37	0.816
T5-500x50	50*	1.97			9,100	2,040	155	6.10	105	4.13	0.04	0.42	0.926
T5-500x63	63*	2.48			8,800	1,990	190	7.48	127	5.00	0.05	0.50	1.102
T5-500x80	80*	3.15			9,200	2,060	225	8.86	145	5.71	0.06	0.56	1.235

*For stroke lengths over 25mm / 0.98in, the spring should be attached to the tool using the threaded holes in the bottom.
**At full charge

Mounting Possibilities



Body mount
HMF

Base mount
SPT5

Recommended Flanges

HMF-150

243

SPT5-500

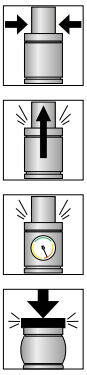
254

Note!

For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T5-1000 provides full stroke force between 13,300 N (2,980 lbf) and 17,300 N (3,880 lbf) and is available in 7 stroke lengths.

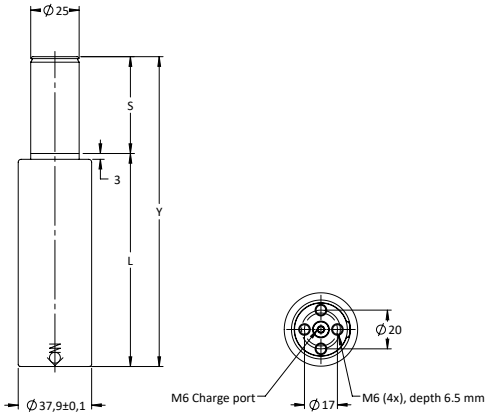
All strokes are offered as a part of the Hyson Preferred Program which provides optimal delivery.



Basic Information

For general information see “About Gas Springs”.

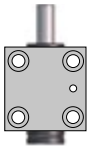
Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 200 bar
Contact Force at max. pressure (N) 9800
Contact Force at max. pressure (lbf) 2200
Recommended max strokes/min (at 20°C) ..... ~ 70-200
Cylinder diameter (mm) 38
Charge port M6
Repair kit 3322836
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



Order Number Model X Stroke	Stroke S		Contact Force**		Full Stroke Force**		Cylinder Height		Body Height		Gas Volume	Weight	
							Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
T5-500x10	10	0.39	9,800	2,200	13,300	2,980	75	2.95	65	2.56	0.03	0.36	0.794
T5-500x15	15	0.59			14,400	3,240	85	3.35	70	2.75	0.03	0.39	0.860
T5-500x25	25	0.98			16,100	3,620	105	4.13	80	3.15	0.04	0.43	0.948
T5-500x38	38*	1.50			16,900	3,800	135	5.31	97	3.82	0.06	0.50	1.102
T5-500x50	50*	1.97			17,700	3,990	160	6.30	110	4.33	0.07	0.56	1.235
T5-500x63	63*	2.48			16,500	3,710	205	8.07	142	5.60	0.10	0.67	1.477
T5-500x80	80*	3.15			17,300	3,880	240	9.44	160	6.30	0.12	0.75	1.653

*For stroke lengths over 25mm / 0.98in, the spring should be attached to the tool using the threaded holes in the bottom.
**At full charge

Mounting Possibilities



Body mount
HMF

Base mount
SPT5

Recommended Flanges

HMF-250

243

SPT5-1000

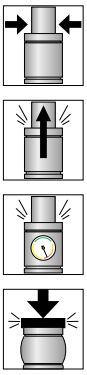
254

Note!

For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T5-1900 provides full stroke force between 26,300 N (5,920 lbf) and 35,600 N (8,000 lbf) and is available in 7 stroke lengths.

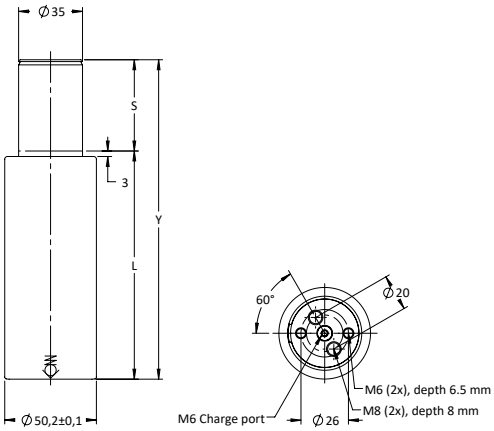
All strokes are offered as a part of the Hyson Preferred Program which provides optimal delivery.



Basic Information

For general information see “About Gas Springs”.

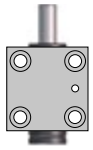
Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 200 bar
Contact Force at max. pressure (N) 9800
Contact Force at max. pressure (lbf) 2200
Recommended max strokes/min (at 20°C) ..... ~ 70-200
Cylinder diameter (mm) 38
Charge port M6
Repair kit 3322836
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



Order Number Model X Stroke	Stroke S		Contact Force**		Full Stroke Force**		Cylinder Height		Body Height		Gas Volume	Weight	
							Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
T5-1900x10	10	0.39	19,200	4,320	26,300	5,920	80	3.15	70	2.76	0.05	0.69	1.521
T5-1900x15	15	0.59			31,800	7,140	95	3.74	80	3.15	0.05	0.76	1.676
T5-1900x25	25	0.98			30,900	6,950	115	4.53	90	3.54	0.08	0.84	1.852
T5-1900x38	38*	1.50			31,900	7,160	150	5.91	112	4.41	0.12	0.98	2.161
T5-1900x50	50*	1.97			33,800	7,600	175	6.89	125	4.92	0.14	1.08	2.381
T5-1900x63	63*	2.48			34,800	7,820	205	8.07	142	5.59	0.17	1.21	2.668
T5-1900x80	80*	3.15			35,600	8,000	245	9.65	165	6.50	0.21	1.37	3.020

*For stroke lengths over 25mm / 0.98in, the spring should be attached to the tool using the threaded holes in the bottom.
**At full charge

Mounting Possibilities



Body mount
HMF

Base mount
SPT5

Recommended Flanges

HMF-500

243

SPT5-1900

254

Note!
For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

SPT5 Adapter plates

To utilize T5 Gas Spring series in hosed systems, Hyson offers side port adapter plate SPT5.
SPT5 is available as an add-on or pre-assembled solution.

Ordering Options

ADD-ON

SPT5-XXXX

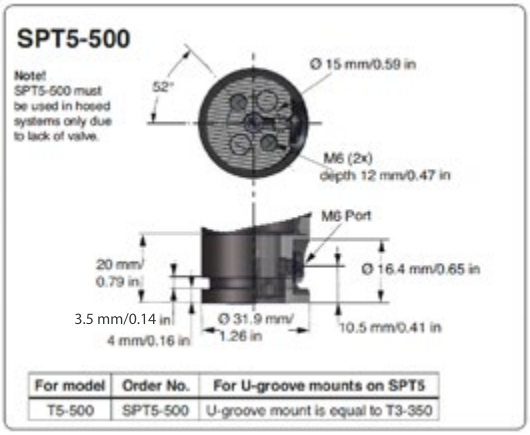
Model
SPT5-500
SPT5-1000
SPT5-1900

PRE-ASSEMBLED

T5-500 x 38 - SP

T5-XXXX	38	SP
Model-size T5-500 T5-1000 T5-1900	**Stroke (mm)** Se dimensional information charts	**Side port Adapter plate**

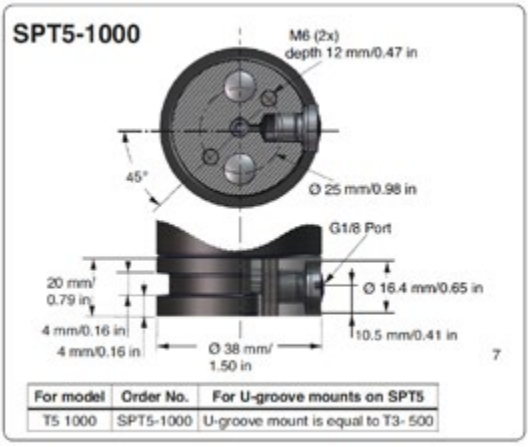
SPT5-500 can only be used in hosed systems because of lack of valve, however SPT5-1000 and SPT5-1900 can operate in both hosed systems and as self contained solutions. For use in hosed systems, we recommend using our Micro EO24TM Hose System in combination with our high-pressure control block (4717241).



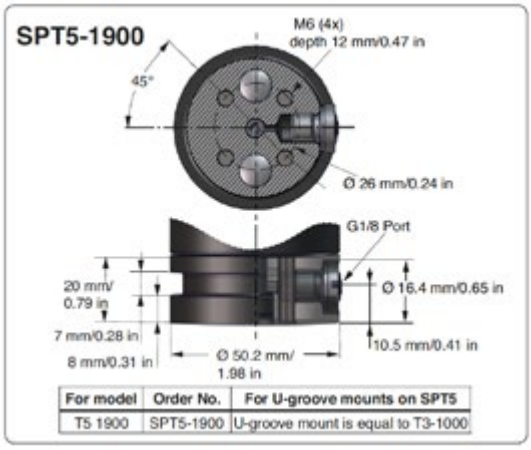
For model	Order No.	For U-groove mounts on SPT5
T5-500	SPT5-500	U-groove mount is equal to T3-350

To foot mount T5 Gas Spring series when using SPT5 side port adapter plate, use FFC fl ange:

* SPT5-500 use FFC - 350
* SPT5-1000 use FFC - 250
* SPT5-1900 use FFC - 750



For model	Order No.	For U-groove mounts on SPT5
T5 1000	SPT5-1000	U-groove mount is equal to T3- 500



For model	Order No.	For U-groove mounts on SPT5
T5 1900	SPT5-1900	U-groove mount is equal to T3-1000

Note!

For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T4SC Series

T4SC-420 to T4SC-18300

New Generation Sub-Compact Nitrogen Gas Springs

Product Value

- T4SC Gas Springs are very compact bore-sealed springs, which provide the highest force per cylinder diameter. These Gas Springs are ideal where space is limited in the die and very high forces are required.
- T4SC Gas Springs can be hosed together and charged remotely using a control panel and Hose System.
- As an option, the T4SC-1000 to 18300 springs can be delivered with a Side Port plate (SP) for applications where a side port is needed (e.g., for use in Hose Systems).
- From T4SC-1800 to 18300, the new compact unit is supplied with a new stroke length of 65mm.

Initial Force

Calculation of charge pressure (bar) for T4SC to achieve desired initial force (N):

X= Desired initial force in N

$$\text{Charge pressure} = 150 \bullet \frac{X}{\text{Initial force at 150 bar}}$$

T4SC-4700 to have a desired initial force of 25,000 N

$$\text{Charge pressure} = 150 \bullet \frac{25{,}000}{47{,}000} = 80 \text{ bar}$$

Product Specifications

Pressure medium ..... Nitrogen
Min. charging pressure ..... 25 bar/360 psi
Max. charging pressure ..... 150 bar/2175 psi
Operating temperature ..... 0º to 80ºC
Force increase by temperature ..... ±0.3% per ºC
Recommended max strokes/min for Models 420 & 740 ..... ~50-100 @20 ºC
Recommended Max. Strokes/Min for Models 1000 & 1800 ..... ~100@ 20ºC
Recommended Max. Strokes/Min for Models 2900, 4700, 7500, 11800 & 18300 ..... ~80-100 @ 20ºC
Max piston rod velocity ..... 48m/min. / 157 ft./min.
Max utilized stroke 100%
Valve Inlet ..... 4018112 in (T4SC-420 & 740 and T4SC-1800 through 18300) 56-072-5500 (T4SC-1000)
Rod Surface ..... Nitrited
Tank Surface ..... Nitrited

Ordering Options

T4SC-XXXX	X	25
MODEL		**STROKE (mm)**
T4SC-420 T4SC-740 T4SC-1000 T4SC-1800 T4SC-2900 T4SC-4700 T4SC-7500 T4SC-11800 T4SC-18300		See Dimensional Information Charts

Repair Kits

Gas Spring	Repair Kit Order Number
T4SC-420	Not Repairable
T4SC-740	Not Repairable
T4SC-1000	3324835
T4SC-1800	3324836
T4SC-2900	3324837
T4SC-4700	3324838
T4SC-7500	3324839
T4SC-11800	3324840
T4SC-18300	3324841

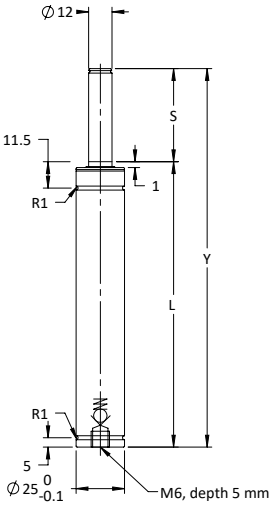
T4SC-420 provides full stroke force between 6,300 N (1,416 lbf) and 8,000 N (1,800 lbf) and is available in seven stroke lengths.

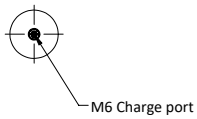
Strokes 10, 16 and 25 are offered as a part of the Hyson Preferred Program which provides optimal delivery.

Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 4250
Contact Force at max. pressure (lbf) 955
Recommended max strokes/min (at 20°C) ..... ~ 50-100
Cylinder diameter (mm) 25
Charge port M6
Repair kit ..... Non-repairable
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 0,8 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen





Order Number (model X stroke)	Stroke S		Contact Force* 2175 psi at 68°F		Full Stroke Force*		Cylinder Height		Body Height		Gas Volume	Weight	
							Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
T4SC-420x10	10	0.39	4,250	955	6,300	1,416	91	2.76	60	2.36	0.008	0.18	0.397
T4SC-420x16	16	0.63			6,300	1,416	120	3.58	75	2.95	0.011	0.22	0.485
T4SC-420x25	25	0.98			6,400	1,439	70	4.72	95	3.74	0.005	0.15	0.331
Alternative Stroke Lengths													
T4SC-420x6	6	0.24	4,250	955	7,300	1,641	56	2.20	50	1.97	0.003	0.13	0.287
T4SC-420x32	32	1.26			7,900	1,776	140	5.51	108	4.25	0.021	0.24	0.529
T4SC-420x40	40	1.57			8,000	1,800	165	6.50	125	4.92	0.026	0.27	0.595
T4SC-420x50	50	1.97			8,000	1,800	195	7.68	145	5.71	0.032	0.31	0.683

NOTE: Stroke lengths of greater than 25 mm should be base or flange mounted.
* At full charge

Mounting Possibilities

Top mount
FC, FCR, FCR

Recommended Flanges

FC-180

235

FCR-180

237

FCR-25

236

Additional Flanges

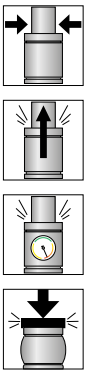
FCN-150

235

Note!
For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T4SC-740 provides full stroke force between 10,000 N (2,250 lbf) and 12,000 N (2,700 lbf) and is available in seven stroke lengths.

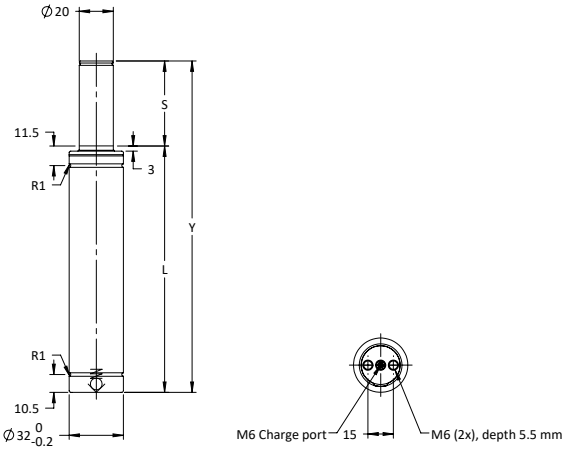
Strokes 10, 16 and 25 are offered as a part of the Hyson Preferred Program which provides optimal delivery.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 7400
Contact Force at max. pressure (lbf) 1660
Recommended max strokes/min (at 20°C) ..... ~ 50-100
Cylinder diameter (mm) 32
Charge port M6
Repair kit 3325048
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 0,8 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



Order Number (model X stroke)	Stroke S		Contact Force* 2175 psi at 68°F		Full Stroke Force*		Cylinder Height		Body Height		Gas Volume	Weight	
							Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
T4SC-740x10	10	0.39	7,400	1,663	10,000	2,250	75	2.95	65	2.56	0.017	0.24	0.529
T4SC-740x16	16	0.63			11,000	2,500	93	3.66	77	3.03	0.024	0.28	0.617
T4SC-740x25	25	0.98			12,000	2,700	120	4.72	95	3.74	0.034	0.33	0.728
Alternative Stroke Lengths													
T4SC-740x6	6	0.24	7,400	1,663	10,000	2,250	63	2.48	57	2.24	0.012	0.20	0.441
T4SC-740x32	32	1.26			12,000	2,700	140	5.51	108	4.25	0.042	0.37	0.816
T4SC-740x40	40	1.57			12,000	2,700	165	6.50	125	4.92	0.052	0.42	0.926
T4SC-740x50	50	1.97			12,000	2,700	195	7.68	145	5.71	0.063	0.48	1.058

NOTE: Stroke lengths of greater than 25 mm should be base or flange mounted.
* At full charge

Mounting Possibilities

Top mount
FC, FCS

Recommended Flanges

FC-350

235

FCS-32

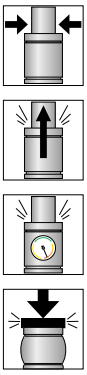
238

Note!

For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T4SC-1000 provides full stroke force is 16,000 N (3,597 lbf) and is available in seven stroke lengths.

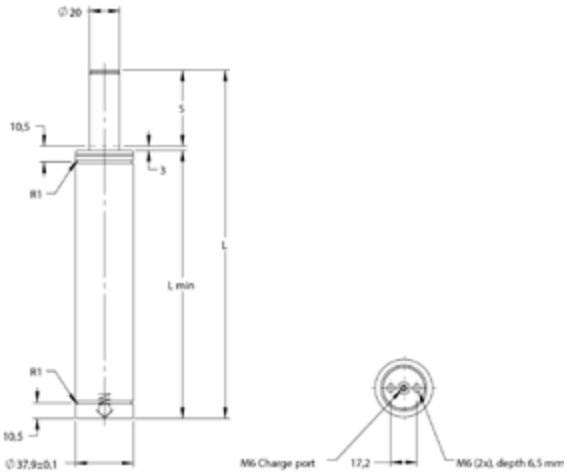
Strokes 10, 16 and 25 are offered as a part of the Hyson Preferred Program which provides optimal delivery.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 10600
Contact Force at max. pressure (lbf) 2400
Recommended max strokes/min (at 20°C) ..... ~ 100
Cylinder diameter (mm) 38
Charge port M6
Repair kit 3324835
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 0,8 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



Order Number (model X stroke)	Stroke S		Contact Force* 2175 psi at 68°F		Full Stroke Force*		Cylinder Height		Body Height		Gas Volume	Weight	
							Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
T4SC-1000x10	10	0.39	10,600	2,400	16,000	3,597	78	3.07	68	2.68	0.024	0.38	0.838
T4SC-1000x16	16	0.63					100	3.94	84	3.31	0.036	0.44	0.970
T4SC-1000x25	25	0.98					135	5.31	110	4.33	0.056	0.54	1.190
Alternative Stroke Lengths													
T4SC-1000x6	6	0.24	10,600	2,400	16,000	3,597	61	2.40	55	2.16	0.014	0.33	0.728
T4SC-1000x32	32	1.26					167	6.57	135	5.31	0.074	0.65	1.433
T4SC-1000x40	40	1.57					195	7.68	155	6.10	0.092	0.73	1.609
T4SC-1000x50	50	1.97					230	9.05	180	7.08	0.110	0.83	1.830

NOTE: Stroke lengths of greater than 25 mm should be base or flange mounted.
* At full charge

Mounting Possibilities

Top mount
FC, FCS

Foot mount
BF

Base mount
SP

Recommended Flanges

SP-1000

251

FCS-250

238

FC-250

235

BF-1000

233

Additional Flanges

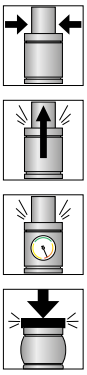
FCN-250

235

Note!
For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T4SC-1800 provides full stroke force between 25,000 N (5,620 lbf) and 28,000 N (6,294 lbf) and is available in eight stroke lengths.

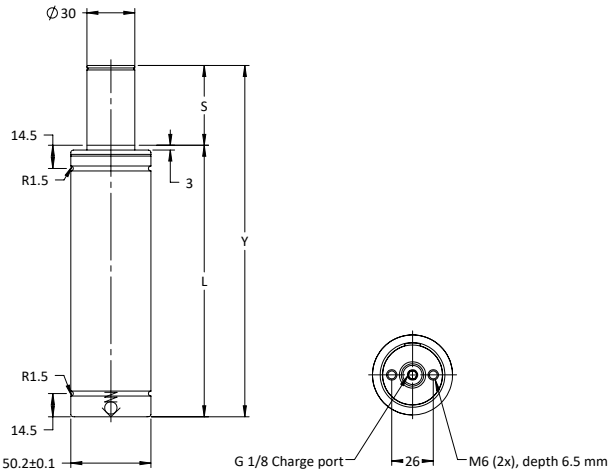
Strokes 10, 16 and 25 are offered as a part of the Hyson Preferred Program which provides optimal delivery.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 18000
Contact Force at max. pressure (lbf) 4050
Recommended max strokes/min (at 20°C) ..... ~ 100
Cylinder diameter (mm) 50
Charge port ..... G 1/8”
Repair kit 3324836
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 0.8 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



Order Number (model X stroke)	Stroke S		Contact Force* 2175 psi at 68°F		Full Stroke Force*		Cylinder Height		Body Height		Gas Volume	Weight	
							Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
T4SC-1800x10	10	0.39	18,000	4,050	25,000	5,620	80	3.15	70	2.76	0.044	0.66	1.455
T4SC-1800x16	16	0.63			25,000	5,620	106	4.17	90	3.54	0.072	0.79	1.742
T4SC-1800x25	25	0.98			26,000	5,845	135	5.31	110	4.33	0.100	0.93	2.050
Alternative Stroke Lengths													
T4SC-1800x6	6	0.24	18,000	4,050	24,000	5,395	66	2.60	60	2.36	0.030	0.60	1.323
T4SC-1800x32	32	1.26			26,000	5,845	162	6.38	130	5.12	0.126	1.06	2.337
T4SC-1800x40	40	1.57			26,000	5,845	190	7.48	150	5.90	0.150	1.19	2.624
T4SC-1800x50	50	1.97			27,000	6,070	220	8.66	170	6.69	0.179	1.32	2.910
T4SC-1800x65	65	2.56			28,000	6,294	271	10.66	206	8.11	0.240	1.52	3.351

NOTE: Stroke lengths of greater than 25 mm should be base or flange mounted.
* At full charge

Mounting Possibilities

Top mount
FK

Foot mount
BF

Base mount
SP

Recommended Flanges

SP-1800

251

FK-1800

241

BF-1800

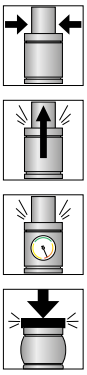
233

Note!

For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T4SC-2900 provides full stroke force between 40,000 N (8,990 lbf) and 47,000 N (10,570 lbf) and is available in seven stroke lengths.

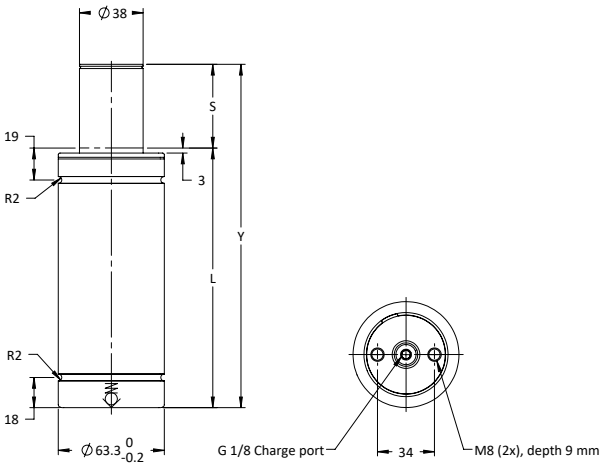
Strokes 10, 16 and 25 are offered as a part of the Hyson Preferred Program which provides optimal delivery.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 42000
Contact Force at max. pressure (lbf) 9440
Recommended max strokes/min (at 20°C) ..... ~ 40-100
Cylinder diameter (mm) 95
Charge port ..... G 1/8”
Repair kit 3322953
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



Order Number (model X stroke)	Stroke S		Contact Force* 2175 psi at 68°F		Full Stroke Force*		Cylinder Height		Body Height		Gas Volume	Weight	
							Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
T4SC-2900x10	10	0.39	29,500	6,630	40,000	8,990	85	3.35	75	2.95	0.08	1.14	2.513
T4SC-2900x16	16	0.63			42,000	9,442	103	4.05	87	3.42	0.12	1.28	2.822
T4SC-2900x25	25	0.98			45,000	10,120	130	5.12	105	4.13	0.16	1.49	3.285
Alternative Stroke Lengths													
T4SC-2900x32	32	1.26	29,500	6,630	46,000	10,340	150	5.90	118	4.64	0.20	1.64	3.616
T4SC-2900x40	40	1.57			47,000	10,570	175	6.89	135	5.31	0.24	1.83	4.034
T4SC-2900x50	50	1.97			45,000	10,120	205	8.07	155	6.10	0.29	2.06	4.542
T4SC-2900x65	65	2.56			47,000	10,570	256	10.08	191	7.52	0.35	2.39	5.269

* At full charge

Mounting Possibilities

Top mount
FCSC, FCS

Foot mount
SP

Recommended Flanges

SP-2900

251

FCSX-1500

238

Additional Flanges

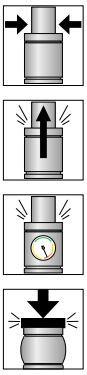
FCSCX-1500

239

Note!
For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T4SC-4700 provides full stroke force between 67,000 N (15,060 lbf) and 71,000 N (15,960 lbf) and is available in seven stroke lengths.

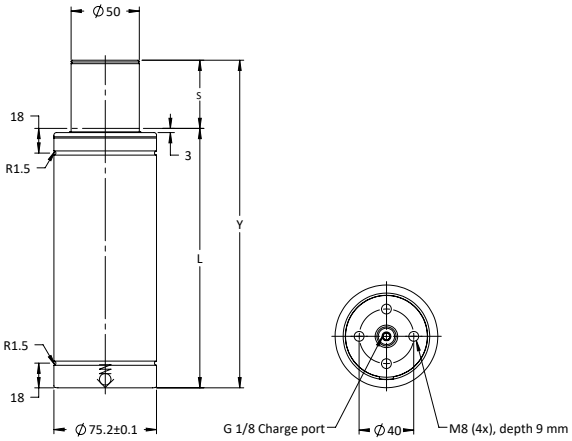
Strokes 10, 16 and 25 are offered as a part of the Hyson Preferred Program which provides optimal delivery.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 47000
Contact Force at max. pressure (lbf) 10570
Recommended max strokes/min (at 20°C) ..... ~80-100
Cylinder diameter (mm) 75
Charge port ..... G 1/8”
Repair kit 3324838
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 0.3 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



Order Number (model X stroke)	Stroke S		Contact Force* 2175 psi at 68°F		Full Stroke Force*		Cylinder Height		Body Height		Gas Volume	Weight	
							Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
T4SC-4700x10	10	0.39	47,000	10,600	67,000	15,062	80	3.15	70	2.75	0.10	1.55	3.417
T4SC-4700x16	16	0.63			66,000	14,837	106	4.17	90	3.54	0.17	1.79	3.946
T4SC-4700x25	25	0.98			68,000	15,287	135	5.31	110	4.33	0.24	2.05	4.519
Alternative Stroke Lengths													
T4SC-4700x32	32	1.26	47,000	10,600	67,000	15,062	167	6.57	135	5.31	0.32	2.34	5.159
T4SC-4700x40	40	1.57			67,000	15,062	200	7.87	160	6.29	0.41	2.65	5.842
T4SC-4700x50	50	1.97			67,000	15,062	240	9.45	190	7.48	0.52	3.01	6.636
T4SC-4700x65	65	2.56			71,000	15,961	273	10.75	208	8.19	0.62	3.12	6.878

* At full charge

Mounting Possibilities

Top mount
FK

Foot mount
BFP

Base mount
SP, SPRM

Recommended Flanges

SP-4700
251

FK-1500
241

BFP-4700
234

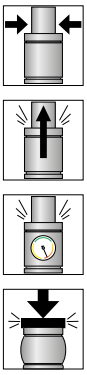
Additional Flanges

SPRM-75
253

Note!
For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T4SC-7500 provides full stroke force between 98,500 N (22,140 lbf) and 111,000 N (24,950 lbf) and is available in seven stroke lengths.

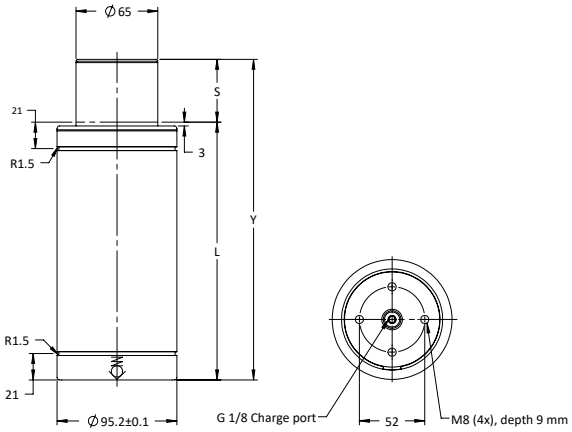
Strokes 10, 16 and 25 are offered as a part of the Hyson Preferred Program which provides optimal delivery.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 75000
Contact Force at max. pressure (lbf) 16860
Recommended max strokes/min (at 20°C) ..... ~ 80-100
Cylinder diameter (mm) 95
Charge port ..... G 1/8”
Repair kit 3324839
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 0.8 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



Order Number (model X stroke)	Stroke S		Contact Force* 2175 psi at 68°F		Full Stroke Force*		Cylinder Height		Body Height		Gas Volume	Weight	
							Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
T4SC-7500x10	10	0.39	75,000	16,650	98,500	22,143	90	3.54	80	3.15	0.18	2.86	6.305
T4SC-7500x16	16	0.63			100,000	22,480	116	4.56	100	3.94	0.30	3.22	7.099
T4SC-7500x25	25	0.98			104,000	23,380	145	5.70	120	4.72	0.41	3.61	7.959
Alternative Stroke Lengths													
T4SC-7500x32	32	1.26	75,000	16,650	102,000	22,930	182	7.16	150	5.90	0.57	4.14	9.127
T4SC-7500x40	40	1.57			104,000	23,380	210	8.27	170	6.69	0.68	4.52	9.965
T4SC-7500x50	50	1.97			103,000	23,155	255	10.04	205	8.07	0.87	5.15	11.354
T4SC-7500x65	65	2.56			111,000	24,953	279	14.92	214	8.42	1.00	5.23	11.530

* At full charge

Mounting Possibilities

Top mount
FK

Foot mount
BFP

Base mount
SP, SPRM

Recommended Flanges

SP-7500
251

FK-3000
241

BFP-7500
234

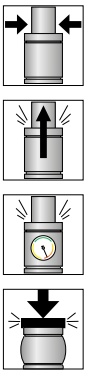
Additional Flanges

SPRM-95
253

Note!
For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T4SC-11800 provides full stroke force between 150,000 N (33,720 lbf) and 163,000 N (36,640 lbf) and is available in seven stroke lengths.

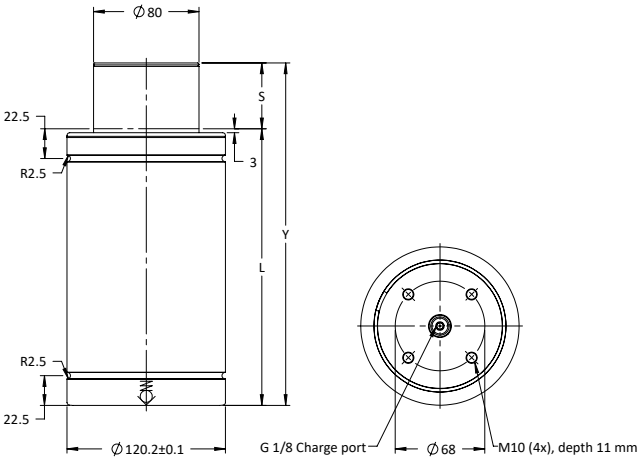
Strokes 10,16 and 25 are offered as a part of the Hyson Preferred Program which provides optimal delivery.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 118000
Contact Force at max. pressure (lbf) 26530
Recommended max strokes/min (at 20°C) ..... ~80-100
Cylinder diameter (mm) 120
Charge port ..... G 1/8”
Repair kit 3324840
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 0.8 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



Order Number (model X stroke)	Stroke S		Contact Force* 2175 psi at 68°F		Full Stroke Force*		Cylinder Height		Body Height		Gas Volume	Weight	
							Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
T4SC-11800x10	10	0.39	118,000	26,527	150,000	33,721	100	3.94	90	3.54	0.33	4.95	10.913
T4SC-11800x16	16	0.63			153,000	34,395	126	4.96	110	4.33	0.50	5.55	12.236
T4SC-11800x25	25	0.98			160,000	35,969	155	6.10	130	5.12	0.60	6.17	13.603
Alternative Stroke Lengths													
T4SC-11800x32	32	1.26	118,000	26,527	165,000	37,093	187	7.36	155	6.10	0.88	6.90	15.212
T4SC-11800x40	40	1.57			160,000	35,969	220	8.66	180	7.09	1.00	7.65	16.865
T4SC-11800x50	50	1.97			161,000	36,194	260	10.24	210	8.27	1.35	8.55	18.850
T4SC-11800x65	65	2.56			163,000	36,643	320	12.60	255	10.04	1.90	9.56	21.076

* At full charge

Mounting Possibilities

Top mount
FC, FCS

Foot mount
BF

Base mount
SP, SPRM

Recommended Flanges

SP-11800

251

FC-5000

235

FCS-5000

238

BF-11800

233

Additional Flanges

SPRM-120

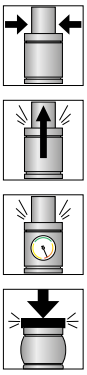
253

Note!

For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T4SC-18300 provides full stroke force between 227,000 N (51,030 lbf) and 1253,000 N (56,870 lbf) and is available in seven stroke lengths.

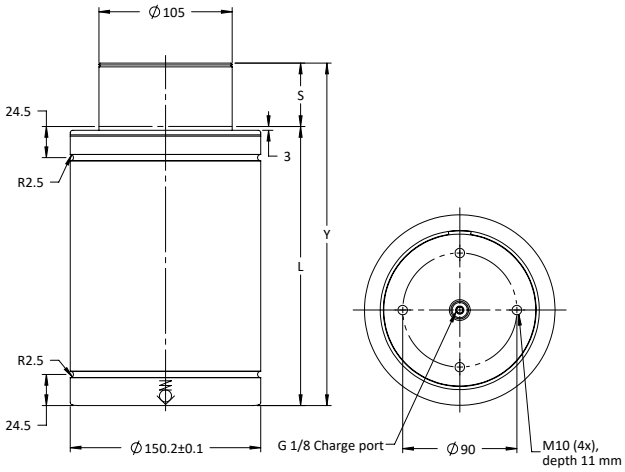
Strokes 10,16 and 25 are offered as a part of the Hyson Preferred Program which provides optimal delivery.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 183000
Contact Force at max. pressure (lbf) 41140
Recommended max strokes/min (at 20°C) ..... ~80-100
Cylinder diameter (mm) 150
Charge port ..... G 1/8”
Repair kit 3324841
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 0.8 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



Order Number	Stroke S		Contact Force* 2175 psi at 68°F		Full Stroke Force*		Cylinder Height		Body Height		Gas Volume	Weight	
							Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
T4SC-18300x10	10	0.39	183,000	41,140	227,000	51,031	110	4.33	100	3.94	0.56	8.78	19.357
T4SC-18300x16	16	0.63			233,000	52,380	136	5.35	120	4.72	0.84	9.72	21.429
T4SC-18300x25	25	0.98			244,000	54,853	165	6.50	140	5.51	1.13	10.71	23.612
Alternative Stroke Lengths													
T4SC-18300x32	32	1.26	183,000	41,140	244,000	54,853	197	7.76	165	6.50	1.45	11.80	26.015
T4SC-18300x40	40	1.57			244,000	54,853	235	9.25	195	7.68	1.86	13.28	29.277
T4SC-18300x50	50	1.97			248,000	55,752	270	10.63	220	8.66	2.19	14.50	31.967
T4SC-18300x65	65	2.56			253,000	56,876	323	12.72	258	10.16	2.90	16.30	35.935

* At full charge

Mounting Possibilities

Top mount
FC, FCS

Foot mount
BF

Base mount
SP, SPRM

Recommended Flanges

SP-18300

251

FC-7500

235

FCS-7500

238

BF-18300

233

Additional Flanges

SPRM-150

253

Note!
For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

NDS Series

NDS-3000 to NDS-7500

Nitrogen Die Separation Gas Springs

Product Value

- In addition to preventing wear, NDS springs aid in the reduction of snap through and unnecessary use of tonnage.
- NDS springs allow dies which use cushions to be stacked, in turn freeing up floor space and preventing die pin and die steel damage to storage.
- Energy savings of 70-80% when compared to traditional springs.

Product Features

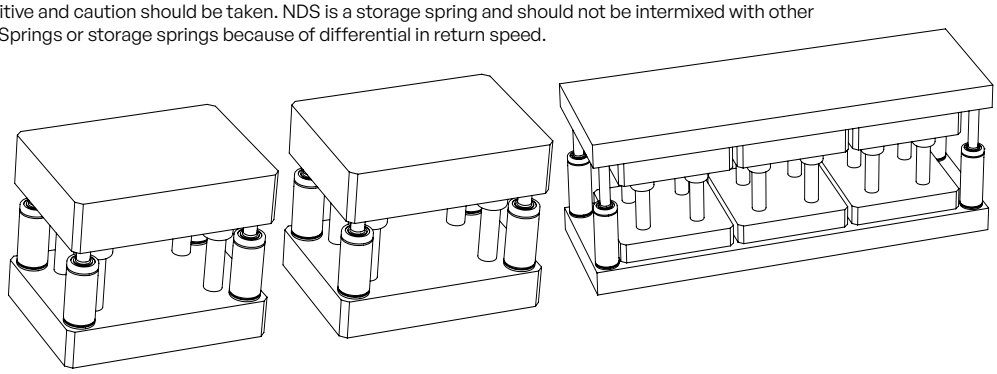
- Hyson Nitrogen Die Separation Gas Springs range from model sizes NDS-3000 to NDS-7500.
- Using the new NDS Springs is an excellent way to avoid unnecessary wear of the die, press and Gas Springs.
- Initial forces from 30,000 to 75,000 N.
- Stroke lengths of 80 up to 300 mm.
- Upper C-groove, lower U-groove and bottom threaded holes allow for various standard mounting possibilities.
- Suitable for both top up and bottom up working position in the tool.
- NDS Gas Springs have a very slow return speed compared to traditional springs and should not be intermixed with standard Gas Springs or other storage springs because of return speed differential.

Compatible to Replace NP Series in Die Storage Applications

- Based on NP outside dimension.
- Return speed approx. 150 mm / 5.90 in per min.
- Saves up to 5 kW / spring depending of used stroke.
- Longer life time because of less stroke.
- Same mounting possibilities as NP, but should not be intermixed with NP Springs.

Return Speed Variation

NDS Gas Springs are suitable for line dies or progressive dies. Some progressive dies with multiple die sets are more sensitive and caution should be taken. NDS is a storage spring and should not be intermixed with other Gas Springs or storage springs because of differential in return speed.



Product Specifications

Pressure medium ..... Nitrogen
Min. charging pressure ..... 25 bar/365 psi
Max. charging pressure ..... 150 bar/2175 psi
Operating temperature ..... 0º to 80ºC/32º to 176ºF
Max piston rod velocity ..... 1.6 m/s / 315 ft./min.
Max Return Speed ..... 3.33 mm per sec / 0.13 in per sec.
Return Speed Variation ..... /- 3%

Ordering Options

NDS-XXXX	X	125
Model NDS-3000, NDS-5000, NDS-7500		**STROKE (mm)** See Dimensional Information Charts

All Gas Springs shipped at maximum charge pressure unless otherwise specified.

Repair Kits

Gas Spring	Order Number
NDS-3000	3226825
NDS-5000	3226826
NDS-7500	3226827

NOTE: Applicable only for models with identification groove.

NDS-3000 provides full stroke force between 46,000 N (10,340 lbf) and 48,000 N (10,790 lbf) and are availabe in seven stroke lengths

Available Flanges for the 3000 model are Bottom Mounting Plate (MP-3000), Circular Flange (FC-3000), Upper Square Flange (FCS-3000), Lower Square Flange (FFC-3000), Support Mount (S-3000), and Round Mount (RM-3000).

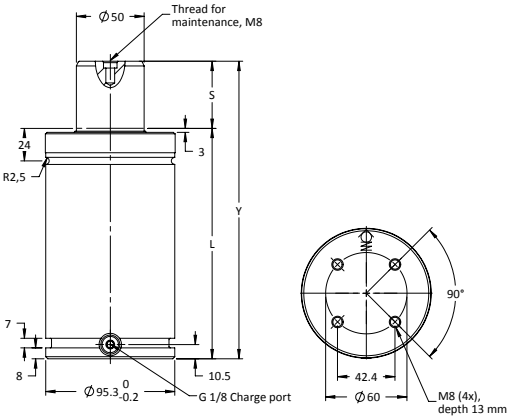





Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20ºC) ..... 25 bar
Max. charging pressure (at 20ºC) ..... 150 bar
Contact Force at max. pressure (N) 30000
Contact Force at max. pressure (lbf) 6744
Recommended max strokes/min (at 20ºC) ..... ~ 20-50
Cylinder diameter (mm) 95
Charge port ..... G 1/8”
Repair kit 3226825
Operating temperature ..... 0 to +80ºC
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/ºC
Pressure medium ..... Nitrogen



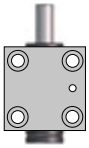
Order Number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height		Weight	
	S		2175 psi at 68ºF				Y ±0.25	Y ±0.010	L			
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	kg	lb
Preferred Stroke Lengths (optimal delivery)												
NDS-3000x80	80	3.15			46,000	10,340	280	11.02	200	7.87	8.1	17.82
NDS-3000x100	100	3.94			47,000	10,570	320	12.60	220	8.66	8.8	19.36
NDS-3000x125	125	4.92			47,000	10,570	370	14.57	245	9.65	9.6	21.12
NDS-3000x160	160	6.30	30,000	6,750	47,000	10,570	440	17.32	280	11.02	10.7	23.54
NDS-3000x200	200	7.87			48,000	10,790	520	20.47	320	12.60	12	26.4
NDS-3000x250	250	9.84			48,000	10,790	620	24.41	370	14.57	13.5	29.7
NDS-3000x300	300	11.81			48,000	10,790	720	28.35	420	16.54	15.1	33.22

NOTE:
All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top mount
FC, FCS,
FCSC

Foot mount
FFC, SF,
LM-lug, L



Body mount
HM, HMF,
S

Base mount
MP, RM

Recommended Flanges

FC-3000 235

FCS-3000 238

FFC-3000 240

MP-3000 246

S-3000 248

HMF-3000 243

Additional Flanges

FCSC-3000 239

SF-3000 249

L-3000 244

RM-3000 247

HM-3000 242

LM-3000 242

Note!
For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

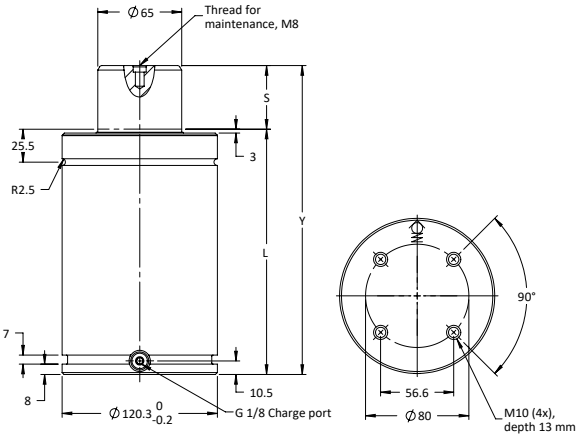
NDS-5000 provides full stroke force between 81,000 N (18,210 lbf) and 84,000 N (18,880 lbf) and are availabe in seven stroke lengths

Available Flanges for the 5000 model are Bottom Mounting Plate (MP-5000), Circular Flange (FC-5000), Upper Square Flange (FCS-5000), Lower Square Flange (FFC-5000), Support Mount (S-5000), and Round Mount (RM-5000).

Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 50000
Contact Force at max. pressure (lbf) 11240
Recommended max strokes/min (at 20°C) ..... ~ 20-50
Cylinder diameter (mm) 120
Charge port ..... M6, G 1/8”
Repair kit 3226826
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



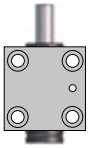
Order Number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height		Weight	
	S		2175 psi at 68°F				Y ±0.25	Y ±0.010	L			
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	kg	lb
Preferred Stroke Lengths (optimal delivery)												
NDS-5000x80	80	3.15	50,000	11,240	81,000	18,210	300	11.81	220	8.66	14.05	30.91
NDS-5000x100	100	3.94			82,000	18,430	340	13.39	240	9.45	15.11	33,242
NDS-5000x125	125	4.92			82,000	18,430	390	15.35	265	10.43	16.44	36.168
NDS-5000x160	160	6.30			83,000	18,660	460	18.11	300	11.81	18.31	40.282
NDS-5000x200	200	7.87			84,000	18,880	540	21.26	340	13.39	20.45	45.012
NDS-5000x250	250	9.84			84,000	18,880	640	25.20	390	15.35	23.09	50.798
NDS-5000x300	300	11.81			84,000	18,880	740	29.13	440	17.32	25.75	56.65

NOTE:
All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top mount
FC, FCS,
FCSC

Foot mount
FFC, SF,
LM-lug, L



Body mount
HMF, S

Base mount
MP, RM

Recommended Flanges

FC-5000

235

FCS-5000

238

FFC-5000

240

MP-5000

246

S-5000

248

HMF-5000

243

Additional Flanges

FCSC-5000

239

SF-5000

249

L-5000

244

RM-5000

247

LM-5000

242

Note!

For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

NDS-7500 provides full stroke force between 117,000 N (26,300 lbf) and 124,000 N (27,880 lbf) and are availabe in seven stroke lengths

Available Flanges for the 7500 model are Bottom Mounting Plate (MP-7500), Circular Flange (FC-7500), Upper Square Flange (FCS-7500), Lower Square Flange (FFC-7500), Support Mount (S-5000), and Round Mount (RM-7500).

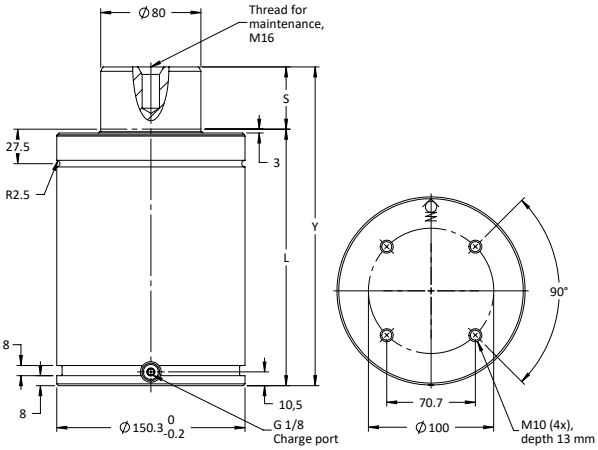





Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 75000
Contact Force at max. pressure (lbf) 16860
Recommended max strokes/min (at 20°C) ..... ~ 20-50
Cylinder diameter (mm) 150
Charge port ..... G 1/8”
Repair kit 3226827
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



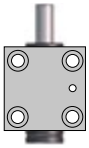
Order Number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height		Weight	
	S		2175 psi at 68°F				Y ±0.25	Y ±0.010	L			
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	kg	lb
Preferred Stroke Lengths (optimal delivery)												
NDS-7500x80	80	3.15	75,000	16,860	117,000	26,300	315	12.40	235	9.25	22.71	49.962
NDS-7500x100	100	3.94			119,000	26,750	355	13.98	255	10.04	24.35	53.57
NDS-7500x125	125	4.92			121,000	27,200	405	15.94	280	11.02	26.41	58.102
NDS-7500x160	160	6.30			122,000	27,430	475	18.70	315	12.40	29.11	64.042
NDS-7500x200	200	7.87			123,000	27,650	555	21.85	355	13.98	32.56	71.632
NDS-7500x250	250	9.84			124,000	27,880	655	25.79	405	15.94	36.67	80.674
NDS-7500x300	300	11.81			124,000	27,880	755	29.72	455	17.91	40.77	89.694

NOTE:
All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top mount
FC, FCS,
FCSC

Foot mount
FFC, SF,
LM-lug, L



Body mount
HMF, S

Base mount
MP, RM

Recommended Flanges

FC-7500

235

FCS-7500

238

FFC-7500

240

MP-7500

246

S-7500

248

HMF-7500

243

Additional Flanges

FCSC-7500

239

SF-7500

249

L-7500

244

RM-7500

247

LM-7500

242

Note!

For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T2M & T3M Series

T2M-16 to T3M-1000

High Temperature Mold Springs

Product Value

- Engineered to withstand higher working temperatures. Can be used in applications with working temperatures up to 120°C/248°F. Ideal for plastic injection mold tooling.
- Force adjustability & increased productivity. Control the force of our Gas Springs by adjusting gas pressure through the control panel to reduce downtime and increase productivity.
- Balanced, consistent force. Our Gas Springs provide for a balanced force, resulting in higher quality parts.

Product Features

- Fully adjustable charge pressure.
- Various mounting possibilities using our standard mounts as well as bottom threaded holes.
- T2M-16 and T2M-24 have a threaded body design for easy and adjustable mounting.
- Six Gas Spring models available with initial forces from 420N/95 lbf to 9200N/2068 lbf.
- Compact rod seal design.

Advanced Safety Features

- Overpressure Protection: designed to safely vent excessive gas pressure in the event of an overpressure situation such as overcharged Gas Springs or the ingestion of large amounts of drawing or cooling fluids.
- Overstroke Protection: A patented system allows the venting of gas in a predetermined manner with deformation or knock-out plug in the event of a mechanical overload of the Gas Spring body.
- Overload Protection: In the case of blockage in the tool that causes excessive piston return speed, a specially designed rod and integral safety stops retain the piston rod in the Gas Spring and allow gas to vent safely.

Temperature Considerations

Spring Model	Max. working temp. interval	Max. strokes per minute spm	Max. charge pressure at 20°C bar	Force per temperature		
				Spring temp.	Initial force N	End force at full stroke N
T2M-16	0 - 80°C	20	150	80°C	510	810
				20°C	420	670
	80 - 100°C	15	125	100°C	450	720
				20°C	355	570
	100 - 120°C	10	115	120°C	435	700
				20°C	325	520
T2M-16	0 - 80°C	20	150	80°C	2040	3250
				20°C	1700	2700
	80 - 100°C	15	125	100°C	1800	2880
				20°C	1415	2250
	100 - 120°C	10	115	120°C	1750	2800
				20°C	1300	2080
T2M-16	0 - 80°C	20	150	80°C	3,63	5,55
				20°C	3	4,6
	80 - 100°C	15	125	100°C	3,2	4,9
				20°C	2,51	3,85
	100 - 120°C	10	115	120°C	3,1	4,75
				20°C	2,31	3,54
T2M-16	0 - 80°C	20	150	80°C	5,68	8,69
				20°C	4,7	7,2
	80 - 100°C	15	125	100°C	5	7,65
				20°C	3,93	6,01
	100 - 120°C	10	115	120°C	4,85	7,42
				20°C	3,61	5,52
T2M-16	0 - 80°C	20	150	80°C	8,87	14,1
				20°C	7,4	11,76
	80 - 100°C	15	125	100°C	7,81	12,42
				20°C	6,14	9,75
	100 - 120°C	10	115	120°C	7,57	12,05
				20°C	5,65	9
T2M-16	0 - 80°C	20	150	80°C	11,13	17,5
				20°C	9,2	14,5
	80 - 100°C	15	125	100°C	9,8	15,4
				20°C	7,7	12,1
	100 - 120°C	10	115	120°C	9,5	14,9
				20°C	7,08	11,1

Product Specifications

Pressure medium ..... Nitrogen
Min. charging pressure ..... 25 bar/365 psi
Max. charging pressure ..... 150 bar/2175 psi
Operating temperature ..... 0° to 120°C/32° to 248°F
Max piston rod velocity ..... 1m/second / 197 ft/min
Max utilized stroke 100%
Inlet Valve 4018112
Charge fitting T2-770-T3

Ordering Options

T2M-16	x	25
Model		**Stroke (mm)**
T2M-16 T2M-24 T3M-300 T3M-500 T3M-750 T3M-1000		See Dimensional Information Charts

All Gas Springs shipped at maximum charge pressure unless otherwise specified.

Repair Kits

Gas Spring	Repair Kit Order Number
T2M-16	NON-REPAIRABLE
T2M-24	NON-REPAIRABLE
T3M-300	3322687
T3M-500	3322688
T3M-750	3322686
T3M-1000	3322690

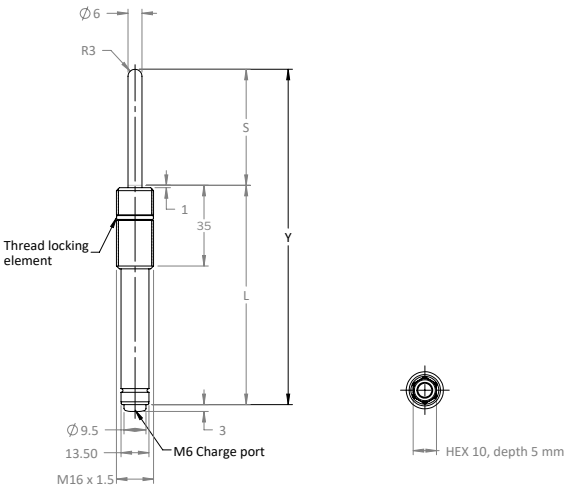
T2M-16 is available in eight stroke lengths.

Working temperature interval, maximum strokes per mine and maximum charge pressure may vary by temperature.

Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 420
Contact Force at max. pressure (lbf) 95
Recommended max strokes/min (at 20°C) 20
Cylinder diameter (mm) 16
Charge port M6
Repair kit ..... Non-repairable
Operating temperature ..... 0 to +120°C
Max piston rod velocity ..... 1 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



Order Number Model X Stroke	Stroke		Contact Force*		Cylinder Height		Body Height		Gas vol.	Weight	
	S				Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	mm	in	mm	in	ℓ	kg	lb
T2M-16X10	10	0.39	420	95	65	2.56	55	2.17	0.002	0.06	0.13
T2M-16X20	20	0.79			85	3.35	65	2.56	0.003	0.07	0.15
T2M-16X30	30	1.18			105	4.13	75	2.95	0.003	0.07	0.15
T2M-16X40	40	1.57			125	4.92	85	3.35	0.004	0.08	0.18
T2M-16X50	50	1.97			145	5.71	95	3.74	0.005	0.09	0.20
T2M-16X60	60	2.36			165	6.50	105	4.13	0.006	0.10	0.22
T2M-16X70	70	2.76			185	7.28	115	4.53	0.007	0.11	0.24
T2M-16X80	80	3.15			205	8.07	125	4.92	0.008	0.11	0.24

* = at full charge
Longer stroke lengths are available on request.

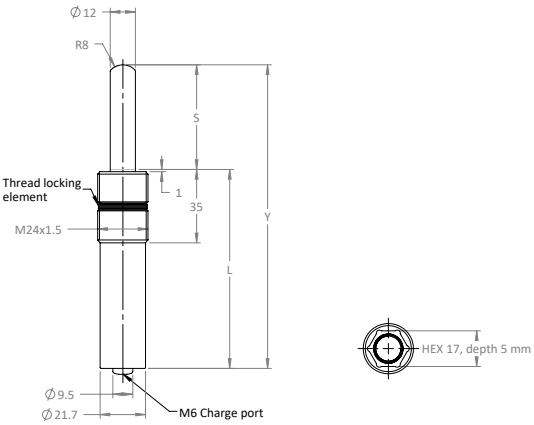
T2M-24 is available in eight stroke lengths.

Working temperature interval, maximum strokes per mine and maximum charge pressure may vary by temperature.

Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 1700
Contact Force at max. pressure (lbf) 382
Recommended max strokes/min (at 20°C) 20
Cylinder diameter (mm) 24
Charge port M6
Repair kit ..... Non-repairable
Operating temperature ..... 0 to +120°C
Max piston rod velocity ..... 1 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



Order Number Model X Stroke	Stroke		Contact Force*		Cylinder Height		Body Height		Gas vol.	Weight	
	S				Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	mm	in	mm	in	ℓ	kg	lb
T2M-24X10	10	0.39	1,700	382	65	2.56	55	2.17	0.003	0.13	0.29
T2M-24X20	20	0.79			85	3.35	65	2.56	0.006	0.15	0.33
T2M-24X30	30	1.18			105	4.13	75	2.95	0.008	0.17	0.37
T2M-24X40	40	1.57			125	4.92	85	3.35	0.011	0.19	0.42
T2M-24X50	50	1.97			145	5.71	95	3.74	0.012	0.21	0.46
T2M-24X60	60	2.36			165	6.50	105	4.13	0.014	0.23	0.51
T2M-24X70	70	2.76			185	7.28	115	4.53	0.017	0.25	0.55
T2M-24X80	80	3.15			205	8.07	125	4.92	0.019	0.27	0.60

* = at full charge
Longer stroke lengths are available on request.

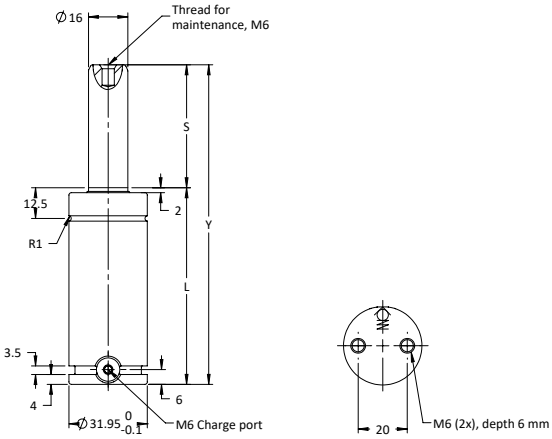
T3M-300 is available in 11 stroke lengths.

Working temperature interval, maximum strokes per mine and maximum charge pressure may vary by temperature.

Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 3000
Contact Force at max. pressure (lbf) 675
Recommended max strokes/min (at 20°C) 20
Cylinder diameter (mm) 32
Charge port M6
Repair kit 3322687
Operating temperature ..... 0 to +120°C
Max piston rod velocity ..... 1 m/s
Force increase by temperature ..... ±0.3%/°C



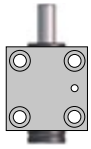
Order Number Model X Stroke	Stroke		Contact Force*		Cylinder Height		Body Height		Gas vol.	Weight	
	S				Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	mm	in	mm	in	ℓ	kg	lb
T3M-300X10	10	0.39	3,000	675	50	1.97	40	1.57	0.01	0.17	0.37
T3M-300X13	13	0.51			56	2.20	43	1.69	0.01	0.17	0.37
T3M-300X16	16	0.63			62	2.44	46	1.81	0.01	0.19	0.42
T3M-300X19	19	0.75			68	2.68	49	1.93	0.01	0.20	0.44
T3M-300X25	25	0.98			80	3.15	55	2.17	0.02	0.21	0.46
T3M-300X32	32	1.26			94	3.70	62	2.44	0.02	0.23	0.51
T3M-300X38	38	1.50			106	4.13	68	2.68	0.03	0.25	0.55
T3M-300X50	50	1.97			130	5.12	80	3.15	0.03	0.29	0.64
T3M-300X63	63	2.48			156	6.14	93	3.66	0.04	0.33	0.73
T3M-300X75	75	2.95			180	7.09	105	4.13	0.05	0.36	0.79
T3M-300X80	80	3.15			190	7.48	110	4.33	0.05	0.38	0.84

* = at full charge
Longer stroke lengths are available on request.

Mounting Possibilities

Top mount
FC, FCS

Foot mount
FFC



Body mount
HMF, S

Recommended Flanges

FC-350

235

FCS-32

238

FFC-350

240

HMF-150

243

S-200

248

Note!

For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T3M-500 is available in 11 stroke lengths.

Working temperature interval, maximum strokes per mine and maximum charge pressure may vary by temperature.

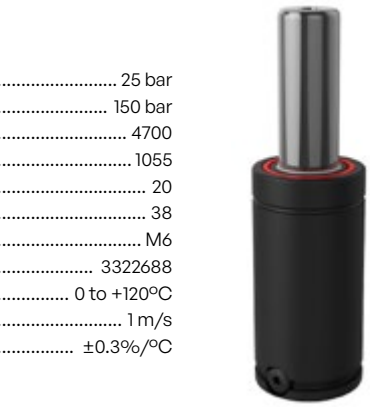


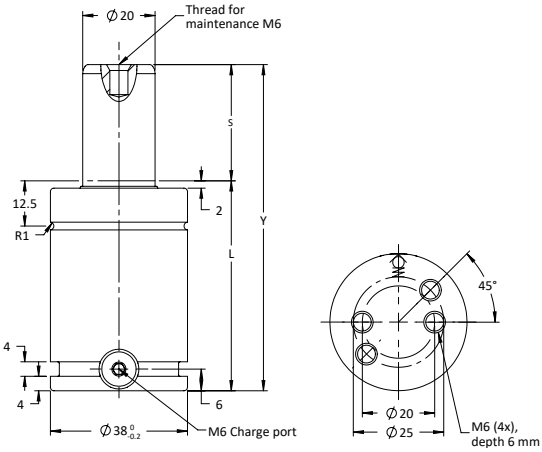



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 4700
Contact Force at max. pressure (lbf) 1055
Recommended max strokes/min (at 20°C) 20
Cylinder diameter (mm) 38
Charge port M6
Repair kit 3322688
Operating temperature ..... 0 to +120°C
Max piston rod velocity ..... 1 m/s
Force increase by temperature ..... ±0.3%/°C





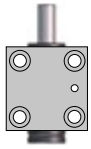
Order Number Model X Stroke	Stroke		Contact Force*		Cylinder Height		Body Height		Gas vol.	Weight	
	S				Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	mm	in	mm	in	ℓ	kg	lb
T3M-500X10	10	0.39	4,700	1,055	50	1.97	40	1.57	0.01	0.25	0.55
T3M-500X13	13	0.51			56	2.20	43	1.69	0.01	0.26	0.57
T3M-500X16	16	0.63			62	2.44	46	1.81	0.02	0.27	0.60
T3M-500X19	19	0.75			68	2.68	49	1.93	0.02	0.28	0.62
T3M-500X25	25	0.98			80	3.15	55	2.17	0.03	0.31	0.68
T3M-500X32	32	1.26			94	3.70	62	2.44	0.03	0.34	0.75
T3M-500X38	38	1.50			106	4.13	68	2.68	0.04	0.36	0.79
T3M-500X50	50	1.97			130	5.12	80	3.15	0.05	0.40	0.88
T3M-500X63	63	2.48			156	6.14	93	3.66	0.06	0.45	0.99
T3M-500X75	75	2.95			180	7.09	105	4.13	0.07	0.50	1.10
T3M-500X80	80	3.15			190	7.48	110	4.33	0.08	0.52	1.15

* = at full charge
Longer stroke lengths are available on request.

Mounting Possibilities

Top mount
FC, FCS

Foot mount
FFC, LM-lug, L



Body mount
HMF

Recommended Flanges

FC-250
235

FCS-250
238

FFC-250
240

HMF-250
243

Additional Flanges

FCN-250
235

LM-250
242

L-250
244

Note!
For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

T3M-750 is available in 11 stroke lengths.

Working temperature interval, maximum strokes per mine and maximum charge pressure may vary by temperature.

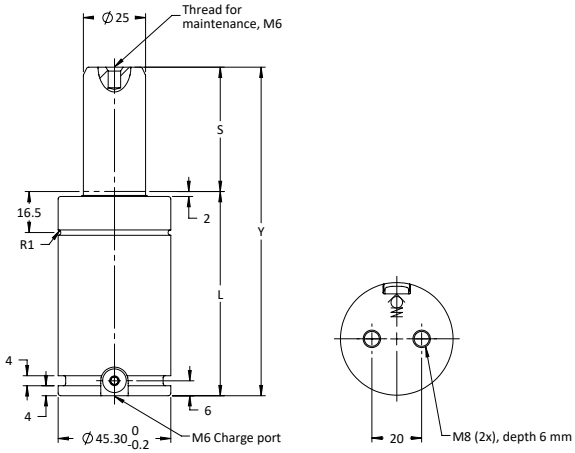





Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 7400
Contact Force at max. pressure (lbf) 1665
Recommended max strokes/min (at 20°C) 20
Cylinder diameter (mm) 45
Charge port M6
Repair kit 3322686
Operating temperature ..... 0 to +120°C
Max piston rod velocity ..... 1 m/s
Force increase by temperature ..... ±0.3%/°C



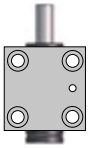
Order Number Model X Stroke	Stroke		Contact Force*		Cylinder Height		Body Height		Gas vol.	Weight	
	S				Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	mm	in	mm	in	ℓ	kg	lb
T3M-750X10	10	0.39	7,400	1,665	52	2.05	42	1.65	0.02	0.37	0.82
T3M-750X13	13	0.51			58	2.28	45	1.77	0.02	0.39	0.86
T3M-750X16	16	0.63			64	2.52	48	1.89	0.03	0.41	0.90
T3M-750X19	19	0.75			70	2.76	51	2.01	0.03	0.41	0.90
T3M-750X25	25	0.98			82	3.23	57	2.24	0.04	0.45	0.99
T3M-750X32	32	1.26			96	3.78	64	2.52	0.05	0.50	1.10
T3M-750X38	38	1.50			108	4.25	70	2.76	0.05	0.53	1.17
T3M-750X50	50	1.97			132	5.32	82	3.23	0.07	0.61	1.34
T3M-750X63	63	2.48			158	6.22	95	3.74	0.09	0.69	1.52
T3M-750X75	75	2.95			182	7.17	107	4.21	0.10	0.77	1.70
T3M-750X80	80	3.15			192	7.56	112	4.41	0.11	0.80	1.76

* = at full charge
Longer stroke lengths are available on request.

Mounting Possibilities

Top mount
FC, FCS, FCSC

Foot mount
FFC, LM-lug, L



Body mount
HMF

Recommended Flanges

FC-500

235

FCS-500

238

FFC-500

240

HMF-500

243

Additional Flanges

FCSC-500

239

LM-500

242

L-500

244

Note!
For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

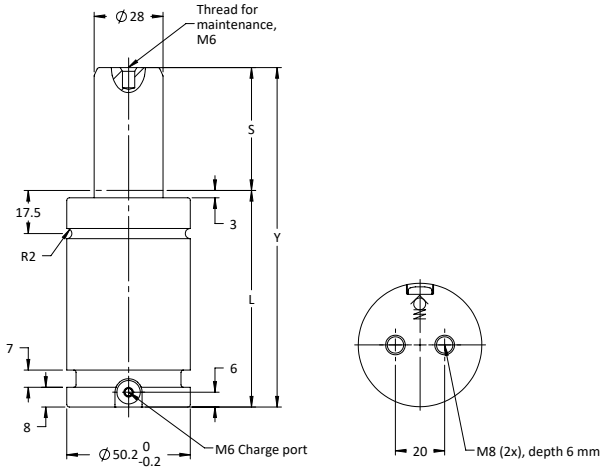
T3M-1000 is available in 10 stroke lengths.

Working temperature interval, maximum strokes per mine and maximum charge pressure may vary by temperature.

Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 9200
Contact Force at max. pressure (lbf) 2068
Recommended max strokes/min (at 20°C) 20
Cylinder diameter (mm) 50
Charge port M6
Repair kit 3322690
Operating temperature ..... 0 to +120°C
Max piston rod velocity ..... 1 m/s
Force increase by temperature ..... ±0.3%/°C



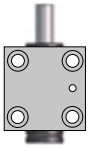
Order Number Model X Stroke	Stroke		Contact Force*		Cylinder Height		Body Height		Gas vol.	Weight	
	S				Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	mm	in	mm	in	ℓ	kg	lb
T3M-1000X13	13	0.51	9,200	2,068	64	2.52	51	2.01	0.03	0.52	1.15
T3M-1000X16	16	0.63			70	2.76	54	2.13	0.04	0.54	1.19
T3M-1000X19	19	0.75			76	2.99	57	2.24	0.04	0.56	1.23
T3M-1000X25	25	0.98			88	3.46	63	2.48	0.05	0.61	1.34
T3M-1000X32	32	1.26			102	4.02	70	2.76	0.06	0.66	1.46
T3M-1000X38	38	1.50			114	4.49	76	2.99	0.07	0.71	1.57
T3M-1000X50	50	1.97			138	5.43	88	3.46	0.09	0.81	1.79
T3M-1000X63	63	2.48			164	6.46	101	3.98	0.11	0.91	2.01
T3M-1000X75	75	2.95			188	7.40	113	4.45	0.13	1.02	2.25
T3M-1000X80	80	3.15			198	7.80	118	4.65	0.14	1.05	2.31

* = at full charge
Longer stroke lengths are available on request.

Mounting Possibilities

Top mount
FC, FCS,
FCSC

Foot mount
FFC, LM-lug, L



Body mount
HMF, S

Base mount
MP

Recommended Flanges

FC-750

235

FCS-750

238

FFC-750

240

HMF-750

243

MP-750

246

S-750

248

Additional Flanges

FCSC-750

239

LM-750

242

L-750

244

Note!

For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

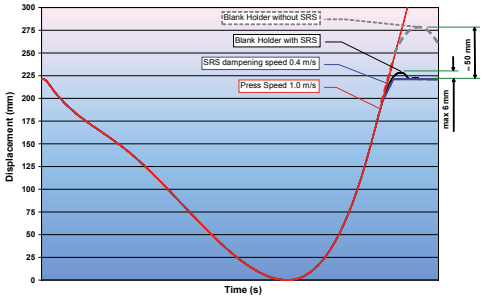
SRS

SRS 750 to SRS 5000
Smooth Return Springs

Product Value
Ideal for part position control in a fast return stoke application, the SRS Series significantly reduces pad bounce on the return stroke, allowing for repeatable stamping processes. This aids in transfer presses or line dies, where the part must be returned to the same location in each stroke, maintaining position for automation. SRS Series also reduces shock loading inside the die, extending the life of pad keepers and other mechanical stops.

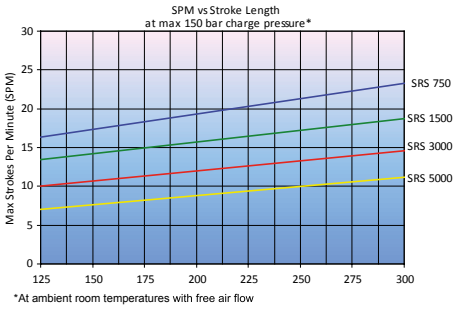
Product Features
- Easily fits into existing standard mounts.
- Upstroke damping feature reduces pad bounce.
- Can be hosed together to equalize force.

Function Example



SRS Gas Springs gave a 90% reduction of blank holder bounce!

Performance:
Allowable Strokes Per Minute



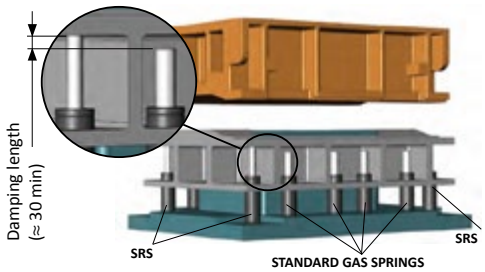
*At ambient room temperatures with free air flow

Example: SRS-5000X250 at 150 bar can run at 10 SPM. **Note** that if you reduce the fill pressure to 75 bar, you can double the SPM to 20.

Installation Options

Option 1 - Replace all springs with SRS

Option 2 - Corner Concept - replace standard springs with SRS Series Allowable Strokes Per Minute



Product Specifications

Initial Force Range ..... 7,400–50,000 N
Pressure medium ..... Nitrogen Gas
Min. charging pressure ..... 25 bar/363 psi
Max. charging pressure ..... 150 bar/2,175 psi
Operating temperature ..... 0 to 80°C/32 to 176°F
Force Increase by Temperature ..... ±0.3% / °C
Recommended Max. Strokes per Minute ..... See Performance Chart below
Damping Speed ..... 0.4 m/s

Ordering Options

SRS-XXXX	x	XXXX
Model		Stroke Length
SRS-750 SRS-1500 SRS-3000 SRS-5000		See Dimensional Information Charts

All Gas Springs shipped at maximum charge pressure unless otherwise specified.

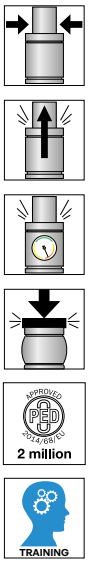
Repair Kits

Post Series	Order Number*
SRS-750	SRSSK-750
SRS-1500	SRSSK-1500
SRS-3000	SRSSK-3000
SRS-5000	SRSSK-5000

*Replacement Gas Spring sold separately.

SRS-750 provides full stroke force of 8,700 N (1,960 lbf) and is available in seven stroke lengths.

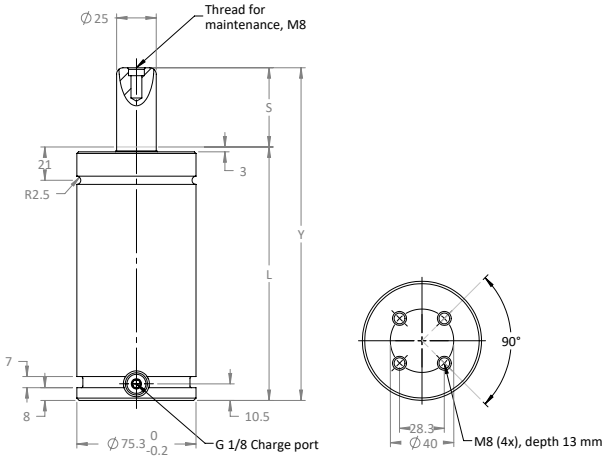
The available Flanges are Lower Square Flange (FFC-1500), Circular Flange (FC-1500), Upper Square Flange (FCS-1500), and Bottom Mounting Flange (MP-1500).



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 7400
Contact Force at max. pressure (lbf) 1665
Recommended max strokes/min (at 20°C) ..... See download tab*
Cylinder diameter (mm) 75
Charge port ..... G 1/8”
Repair kit SRSSK-750
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



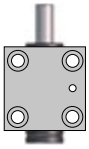
Order Number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height		Gas vol.	Weight	
	S						Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
SRS-750X80	80	0.39	7,400	1,665	8,700	1,960	270	10.63	190	7.48	0.30	5.5	12.125
SRS-750X100	100	0.79					310	12.20	210	8.27	0.36	5.8	12.787
SRS-750X125	125	1.18					360	14.17	235	9.25	0.44	6.10	13.448
SRS-750X160	160	1.57					430	16.93	270	10.63	0.55	6.60	14.551
SRS-750X200	200	1.97					510	20.08	310	12.20	0.67	7.15	15.763
SRS-750X250	250	2.36					610	24.02	360	14.17	0.83	7.85	17.306
SRS-750X300	300	2.76					710	27.95	410	16.14	0.98	8.60	18.960

Note: All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top Mount


Foot Mount


Body Mount


Base Mount

Recommended Flanges


FC-1500

235


FCS-1500

238


FFC-1500

240


MP-1500

246


S-1500

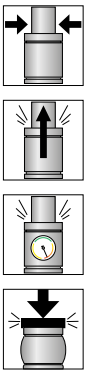
248

Note!

For dimensions on all Mounting Flanges, refer to “Flanges” in chapter 3.

SRS-1500 provides full stroke force of 19,000 N (4,275 lbf) and is available in five stroke lengths. Can be hosed toghether to equalize force.

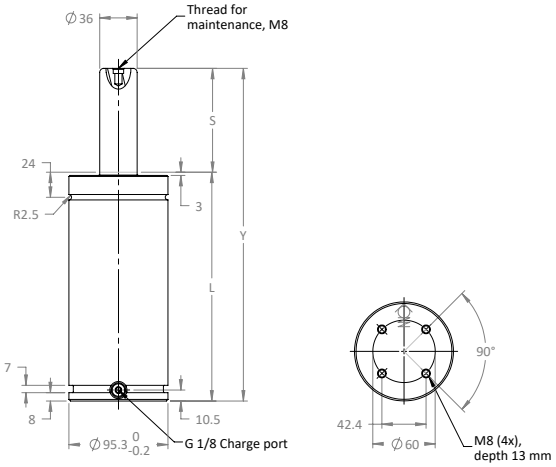
The available Flanges are Lower Square Flange (FFC-3000), Circular Flange (FC-3000), and Upper Square Flange (FCS-3000).



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20ºC) ..... 25 bar
Max. charging pressure (at 20ºC) ..... 150 bar
Contact Force at max. pressure (N) 1500
Contact Force at max. pressure (lbf) 3375
Recommended max strokes/min (at 20ºC) ..... See download tab*
Cylinder diameter (mm) 95
Charge port ..... G 1/8”
Repair kit SRSSK-1500
Operating temperature ..... 0 to +80ºC
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/ºC
Pressure medium ..... Nitrogen



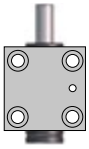
Order Number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height		Gas vol.	Weight	
	S						Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
SRS-1500X125	125	4.92	15,000	3,375	19,000	4,275	370	14.57	245	9.65	0.73	9.2	20.283
SRS-1500X160	160	6.30					440	17.32	280	11.20	0.91	10.3	22.708
SRS-1500X200	200	7.87					520	20.47	320	12.60	1.11	11.4	25.133
SRS-1500X250	250	9.84					620	24.41	370	14.57	1.36	12.9	28.440
SRS-1500X300	300	11.81					720	28.35	420	16.54	1.62	14.4	31.747

Note: All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top Mount


Foot Mount


Body Mount


Base Mount

Recommended Flanges


FC-3000

235


FCS-3000

238


FFC-3000

240


MP-3000

246


S-3000

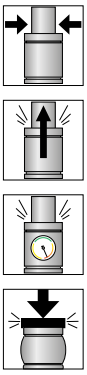
248

Note!

For dimensions on all Mounting Flanges, refer to “Flanges” in chapter 3.

SRS-3000 provides full stroke force between 38,000 N (8,550 lbf) and 39,000 N (8,775 lbf) and is available in five stroke lengths. Can be hosed toghether to equalize force.

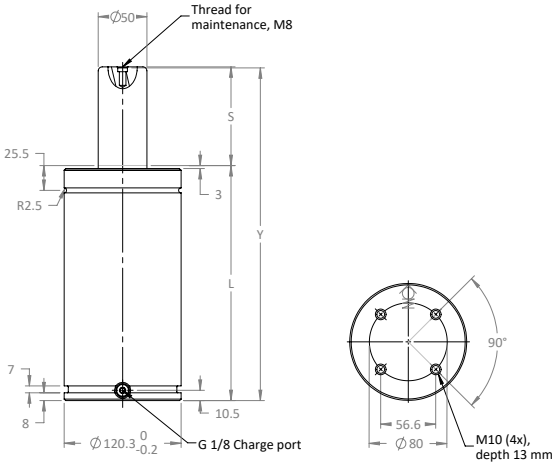
The available Flanges are Lower Square Flange (FFC-3000), Circular Flange (FC-3000), and Upper Square Flange (FCS-3000).



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20ºC) ..... 25 bar
Max. charging pressure (at 20ºC) ..... 150 bar
Contact Force at max. pressure (N) 30000
Contact Force at max. pressure (lbf) 6750
Recommended max strokes/min (at 20ºC) ..... See download tab*
Cylinder diameter (mm) 120
Charge port ..... G 1/8”
Repair kit SRSSK-3000
Operating temperature ..... 0 to +80ºC
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/ºC
Pressure medium ..... Nitrogen



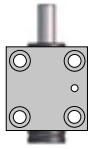
Order Number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height		Gas vol.	Weight	
	S						Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
SRS-3000X125	125	4.92	30,000	6,750	38,000	8,550	390	15.35	265	10.43	1.15	10.7	23.589
SRS-3000X160	160	6.30			38,000	8,550	460	18.11	300	11.81	1.43	11.4	25.133
SRS-3000X200	200	7.87			38,000	8,550	540	21.26	340	13.39	1.74	12.1	26.676
SRS-3000X250	250	9.84			39,000	8,775	640	25.20	390	15.35	2.14	13.1	28.881
SRS-3000X300	300	11.81			39,000	8,775	740	29.13	440	17.32	2.53	14.0	30.865

Note: All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top Mount


Foot Mount


Body Mount

Recommended Flanges


FC-5000

235


FCS-5000

238


FFC-5000

240


MP-5000

246


S-5000

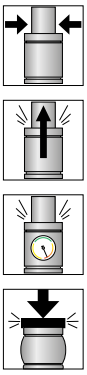
248

Note!

For dimensions on all Mounting Flanges, refer to “Flanges” in chapter 3.

SRS-5000 provides full stroke force between 64,000 N (14,400 lbf) and 66,000 N (14,850) and is available in five stroke lengths. Can be hosed toghether to equalize force.

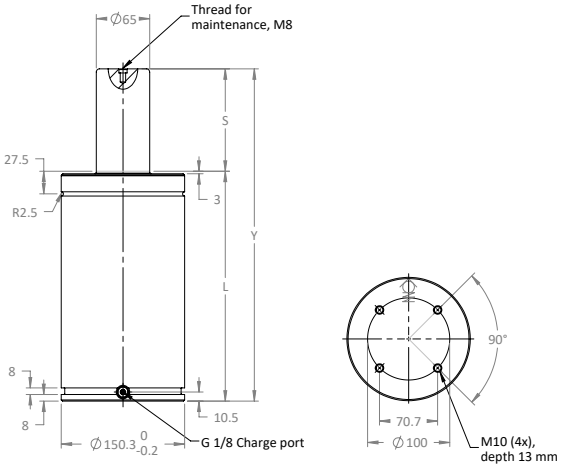
The available Flanges are Lower Square Flange (FFC-1500), Circular Flange (FC-1500), and Upper Square Flange (FCS-1500).



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20ºC) ..... 25 bar
Max. charging pressure (at 20ºC) ..... 150 bar
Contact Force at max. pressure (N) 50000
Contact Force at max. pressure (lbf) 11250
Recommended max strokes/min (at 20ºC) ..... See download tab*
Cylinder diameter (mm) 150
Charge port ..... G 1/8”
Repair kit SRSSK-5000
Operating temperature ..... 0 to +80ºC
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/ºC
Pressure medium ..... Nitrogen



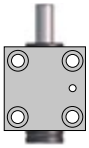
Order Number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height		Gas vol.	Weight	
	S						Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
SRS-5000X125	125	4.92	50,000	11,250	65,000	14,400	405	15.94	280	11.02	1.90	26.6	58.643
SRS-5000X160	160	6.30			65,000	14,625	475	18.70	315	12.40	2.33	28.9	63.714
SRS-5000X200	200	7.87			66,000	14,850	555	21.85	355	13.98	2.82	31.7	69.887
SRS-5000X250	250	9.84			66,000	14,850	655	25.79	405	15.94	3.43	35.0	77.162
SRS-5000X300	300	11.81			66,000	14,850	755	29.72	455	17.91	4.05	38.6	85.098

Note: All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top Mount

Foot Mount



Body Mount

Recommended Flanges

FC-7500

235

FCS-7500

238

FFC-7500

240

MP-7500

246

S-7500

248

Note!

For dimensions on all Mounting Flanges, refer to “Flanges” in chapter 3.

Tanker Series

Tanker T 1000 to 6600 and Tanker S 1000 to 6600

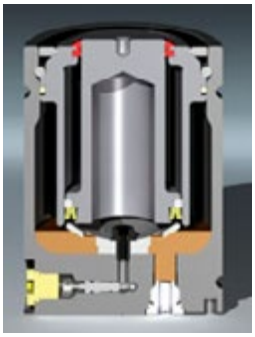
High Force in Short Heights

The new TankerT and TankerS, each with four models from which to choose, offer contact forces from 2,700-15,400 lbs. and full stroke forces from 3,900-27,600 lbs. Some models are over an inch shorter than Gas Springs with comparable forces currently available.

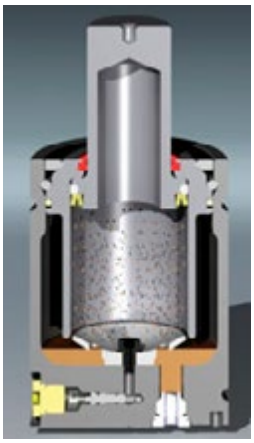
Dynamic Lubrication Extends Gas Spring Life

The patented dynamic lubrication system coats the Gas Spring wall, piston and seal with oil with every stroke of the press to reduce heat build-up and lower operating temperature which in turn reduces wear on die components and extends performance life.

Die Open



Press Closes



Press Opens

Bore Seal Resists Contamination and Leaking from Rod Damage

Both the TankerT and TankerS seal inside, on the cylinder bore, not on the rod like most Gas Springs. This provides maximum contamination resistance and keeps the Gas Spring operating even if the piston rod is damaged.

Self-Aligning Piston Rod Accepts Die Movement and a Degree of Sideload

The corrosion-resistant nitrided piston rod is self-aligning, designed to accept normal die movement and a degree of sideload without damaging the sealing surfaces. The TankerT and TankerS have been sideload-tested to more than 500,000 strokes.

Stroke Lengths to 225 mm

Long stroke lengths are available on all models.

Self-Contained or Hose System Operation

Both the TankerT and TankerS can be used as Self-Contained Gas Springs or in a Hosed System.

Wide Range of Mounting Options

Both the TankerT and TankerS offer a variety of mounting options, interchangeable with standard mounts currently in use.

Product Specifications

Pressure Medium ..... Nitrogen
Force increase by temperature (%/ °C) 0.3
Max. charging pressure (bar at 20°C) 150
Min. operating temperature (°C) 0
Max. operating temperature (°C) 80
Max. piston rod velocity (m/s) 1.6

Repair Kits

TNKS Gas Springs are field repairable. There is a seal kit with detailed instructions for each size Gas Spring. Tool kits are also available.

Gas Spring	Seal Kit Number	Tool Kit Number
TNKS1000	60-112-7000	T2TK-250-750
TNKS2400	60-175-7000	T2TK
TNKS4200	60-238-7000	
TNKS6600	60-300-7000	

NOTE: All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Valve Removal and Installation Tool

Gas Spring	Tool Order Number
TNKS1000	T2TK-IN-M6
TNKS2400	
TNKS4200	T2TK-IN-G1/8
TNKS6600	

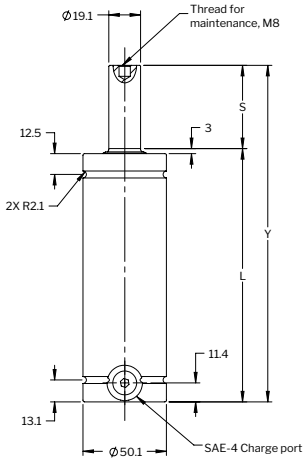
Providing full stroke force between 16,280 N (3,660 lbf) and 17,505 N (3,935 lbf) TNKT-1000 is available in 10 stroke lengths.

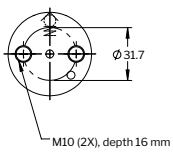
Strokes 25, 50, 80 and 125 are offered as a part of the Hyson Preferred Program which provides optimal delivery.

Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 9630
Contact Force at max. pressure (lbf) 2165
Recommended max strokes/min (at 20°C) ..... ~ 20-100
Cylinder diameter (mm) 50
Charge port SAE-4
Repair kit 60-112-7000
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen





Order Number Model X Stroke	Stroke S		Contact Force		Full Stroke Force		Cylinder Height Y ±0.25	Cylinder Height Y ±0.010	Body Height L	
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in
TNKT1000X13	13	0.51			16,280	3,660	78	3.07	65	2.56
TNKT1000X16	16	0.63			16,505	3,710	84	3.31	68	2.68
TNKT1000X19	19	0.75			16,660	3,745	90	3.54	71	2.80
TNKT1000X25	25	0.98			16,860	3,790	102	4.02	77	3.03
TNKT1000X32	32	1.26			17,015	3,825	116	4.57	84	3.31
TNKT1000X38	38	1.50			17,080	3,840	128	5.04	90	3.54
TNKT1000X50	50	1.97			17,215	3,870	152	5.98	102	4.02
TNKT1000X63	63	2.48	9,630	2,165	17,280	3,885	178	7.01	115	4.53
TNKT1000X75	75	2.95			17,325	3,895	202	7.95	127	5.00
TNKT1000X80	80	3.15			17,350	3,900	212	8.35	132	5.20
TNKT1000X100	100	3.94			17,395	3,910	252	9.92	152	5.98
TNKT1000X125	125	4.92			17,435	3,920	302	11.89	177	6.97
TNKT1000X150	150	5.91			17,460	3,925	365	14.37	215	8.46
TNKT1000X175	175	6.89			17,480	3,930	415	16.34	240	9.45
TNKT1000X200	200	7.87			17,505	3,935	465	18.31	265	10.43

Note: All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top Mount
FC, FCS

Foot Mount
SF

Recommended Flanges

FC-750

235

FCS-750

238

SF-750

249

Note!

For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

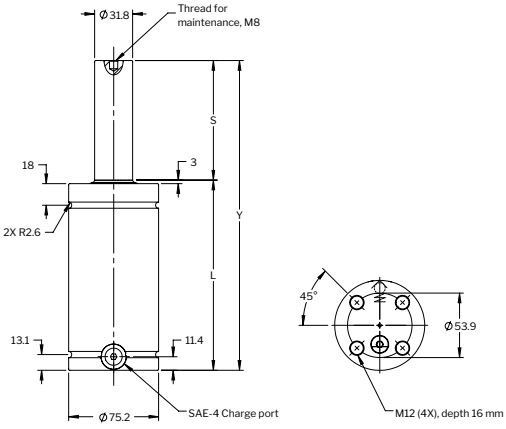
Providing full stroke force between 16,280 N (3,660 lbf) and 17,505 N (3,935 lbf) TNKT-1000 is available in 10 stroke lengths.

Strokes 25, 50, 80 and 125 are offered as a part of the Hyson Preferred Program which provides optimal delivery.

Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 9630
Contact Force at max. pressure (lbf) 2165
Recommended max strokes/min (at 20°C) ..... ~ 20-100
Cylinder diameter (mm) 50
Charge port SAE-4
Repair kit 60-112-7000
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



Order Number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height	
	S						Y ±0.25	Y ±0.010	L	
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in
TNKT2400X16	16	0.63	23,300	5,238	37,120	8,345	91	3.58	75	2.95
TNKT2400X19	19	0.75			37,655	8,465	97	3.82	78	3.07
TNKT2400X25	25	0.98			38,410	8,635	109	4.29	84	3.31
TNKT2400X32	32	1.26			38,990	8,765	123	4.84	91	3.58
TNKT2400X38	38	1.50			39,345	8,845	135	5.31	97	3.82
TNKT2400X50	50	1.97			39,810	8,950	159	6.26	109	4.29
TNKT2400X63	63	2.48			40,125	9,020	185	7.28	122	4.80
TNKT2400X75	75	2.95			40,325	9,065	209	8.23	134	5.28
TNKT2400X80	80	3.15			40,390	9,080	219	8.62	139	5.47
TNKT2400X100	100	3.94			40,590	9,125	259	10.20	159	6.26
TNKT2400X125	125	4.92			40,770	9,165	309	12.17	184	7.24
TNKT2400X150	150	5.91			40,880	9,190	370	14.57	220	8.66
TNKT2400X175	175	6.89			40,970	9,210	420	16.54	245	9.65
TNKT2400X200	200	7.87			41,035	9,225	470	18.50	270	10.63

Note: All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top Mount
FC, FCS

Foot Mount
SF

Recommended Flanges

FC-1500

235

FCS-1500

238

SF-1500

249

Note!
For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

Providing full stroke force between 68,545 N (15,410 lbf) and 77,330 N (17,385 lbf) TNKT-4200 is available in 10 stroke lengths.

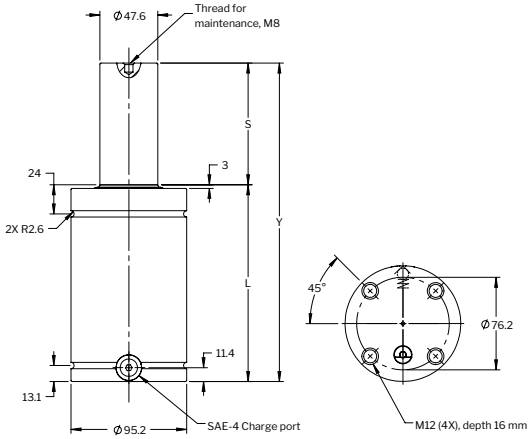
Strokes 25, 50, 80 and 125 are offered as a part of the Hyson Preferred Program which provides optimal delivery. We recommend stroke lengths of greater than 25 mm should be base or flange mounted.




Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 42900
Contact Force at max. pressure (lbf) 9645
Recommended max strokes/min (at 20°C) ..... ~ 20-100
Cylinder diameter (mm) 95
Charge port SAE-4
Repair kit 60-238-7000
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



Order Number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height	
	S						Y ±0.25	Y ±0.010	L	
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in
TNKT4200X16	16	0.63			68,545	15,410	94	3.70	78	3.07
TNKT4200X19	19	0.75			69,705	15,670	100	3.94	81	3.19
TNKT4200X25	25	0.98			71,370	16,045	112	4.41	87	3.43
TNKT4200X32	32	1.26			72,640	16,330	126	4.96	94	3.70
TNKT4200X38	38	1.50			73,395	16,500	138	5.43	100	3.94
TNKT4200X50	50	1.97			74,440	16,735	162	6.38	112	4.41
TNKT4200X63	63	2.48			75,155	16,895	188	7.40	125	4.92
TNKT4200X75	75	2.95	42,900	9,645	75,620	17,000	212	8.35	137	5.39
TNKT4200X80	80	3.15			75,775	17,035	222	8.74	142	5.59
TNKT4200X100	100	3.94			76,245	17,140	262	10.31	162	6.38
TNKT4200X125	125	4.92			76,620	17,225	312	12.28	187	7.36
TNKT4200X150	150	5.91			76,890	17,285	375	14.76	225	8.86
TNKT4200X175	175	6.89			77,090	17,330	425	16.73	250	9.84
TNKT4200X200	200	7.87			77,220	17,360	475	18.70	275	10.83
TNKT4200X225	225	8.86			77,330	17,385	525	20.67	300	11.81

Note: All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top Mount
FC, FCS

Foot Mount
SF

Recommended Flanges

FC-3000

235

FCS-3000

238

SF-3000

249

Note!
For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

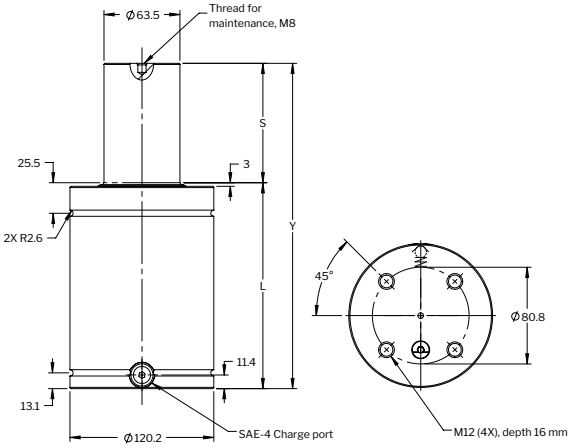
Providing full stroke force between 99,285 N 22,320 lbf) and 125,705 N (28,260 lbf) TNKT-6600 is available in 10 stroke lengths.

Strokes 25,50,100 and 150 are offered as a part of the Hyson Preferred Program which provides optimal delivery. We recommend stroke lengths of greater than 25 mm should be base or flange mounted.

Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 68435
Contact Force at max. pressure (lbf) 15385
Recommended max strokes/min (at 20°C) ..... ~ 20-100
Cylinder diameter (mm) 120
Charge port SAE-4
Repair kit 60-300-7000
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



Order Number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height	
	S						Y ±0.25	Y ±0.010	L	
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in
TNKT6600X16	16	0.63			99,285	22,320	104	4.09	88	3.46
TNKT6600X19	19	0.75			101,910	22,910	110	4.33	91	3.58
TNKT6600X25	25	0.98			106,000	23,830	122	4.80	97	3.82
TNKT6600X32	32	1.26			109,495	24,615	136	5.35	104	4.09
TNKT6600X38	38	1.50			111,740	25,120	148	5.83	110	4.33
TNKT6600X50	50	1.97			115,030	25,860	172	6.77	122	4.80
TNKT6600X63	63	2.48			117,455	26,405	198	7.80	135	5.31
TNKT6600X75	75	2.95	68,435	15,385	119,080	26,770	222	8.74	147	5.79
TNKT6600X80	80	3.15			119,635	26,895	232	9.13	152	5.98
TNKT6600X100	100	3.94			121,370	27,285	272	10.71	172	6.77
TNKT6600X125	125	4.92			122,860	27,620	322	12.68	197	7.76
TNKT6600X150	150	5.91			123,905	27,855	385	15.16	235	9.25
TNKT6600X175	175	6.89			124,660	28,025	435	17.13	260	10.24
TNKT6600X200	200	7.87			125,260	28,160	485	19.09	285	11.22
TNKT6600X225	225	8.86			125,705	28,260	535	21.06	310	12.20

Note: All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top Mount
FC, FCS

Foot Mount
SF

Recommended Flanges

FC-5000

235

FCS-5000

238

SF-5000

249

Note!
For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

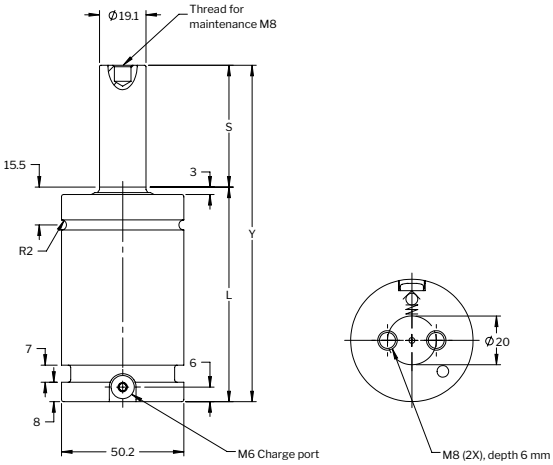
Providing full stroke force between 16,280 N (3,660 lbf) and 17,505 N (3,935 lbf) TNKS-1000 is available in 10 stroke lengths.

Strokes 25,50,80 and 125 are offered as a part of the Hyson Preferred Program which provides optimal delivery.

Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 9630
Contact Force at max. pressure (lbf) 2165
Recommended max strokes/min (at 20°C) ..... ~ 20-100
Cylinder diameter (mm) 50
Charge port M6
Repair kit 60-112-7000
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



Order Number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height	
	S						Y ±0.25	Y ±0.010	L	
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in
TNKS1000X13	13	0.51	9,630	2,165	16,280	3,660	64	2.53	51	2.01
TNKS1000X16	16	0.63			16,505	3,710	70	2.76	54	2.13
TNKS1000X19	19	0.75			16,660	3,745	76	2.99	57	2.24
TNKS1000X25	25	0.98			16,860	3,790	88	3.46	63	2.48
TNKS1000X32	32	1.26			17,015	3,825	102	4.02	70	2.76
TNKS1000X38	38	1.50			17,080	3,840	114	4.49	76	2.99
TNKS1000X50	50	1.97			17,215	3,870	138	5.43	88	3.46
TNKS1000X63	63	2.48			17,280	3,885	164	6.46	101	3.98
TNKS1000X75	75	2.95			17,325	3,895	188	7.40	113	4.45
TNKS1000X80	80	3.15			17,350	3,900	198	7.80	118	4.65
TNKS1000X100	100	3.94			17,395	3,910	238	9.37	138	5.43
TNKS1000X125	125	4.92			17,435	3,920	288	11.34	163	6.41
TNKS1000X150	150	5.91			17,460	3,925	351	13.82	201	7.91
TNKS1000X175	175	6.89			17,480	3,930	401	15.79	226	8.90
TNKS1000X200	200	7.87			17,505	3,935	451	17.76	251	9.88

Note: All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top Mount
FC, FCS

Foot Mount
FFC

Base Mount
MP

Recommended Flanges

FFC-750

240

FC-750

235

FCS-750

238

MP-750

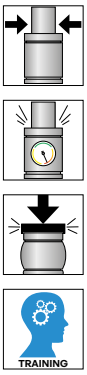
246

Note!

For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

Providing full stroke force between 37,120 N (8,345 lbf) and 41,035 N (9,225 lbf) TNKS-2400 is available in 10 stroke lengths.

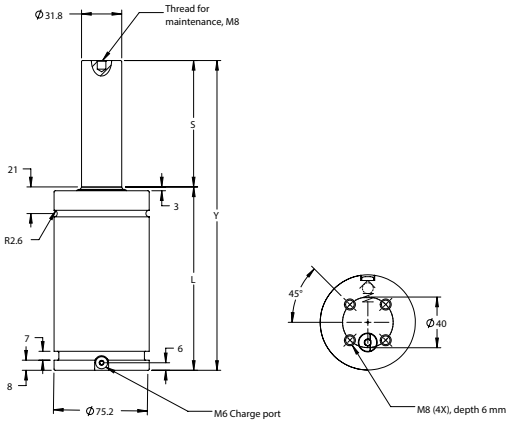
Strokes 25,50,80 100 and 125 are offered as a part of the Hyson Preferred Program which provides optimal delivery.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 23300
Contact Force at max. pressure (lbf) 5238
Recommended max strokes/min (at 20°C) ..... ~ 20-100
Cylinder diameter (mm) 75
Charge port M6
Repair kit 60-175-7000
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 1.6 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



Order Number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height	
	S						Y ±0.25	Y ±0.010	L	
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in
TNKS2400X16	16	0.63	23,300	5,238	37,120	8,345	77	3.03	61	2.40
TNKS2400X19	19	0.75			37,655	8,465	83	3.27	64	2.52
TNKS2400X25	25	0.98			38,410	8,635	95	3.74	70	2.76
TNKS2400X32	32	1.26			38,990	8,765	109	4.29	77	3.03
TNKS2400X38	38	1.50			39,345	8,845	121	4.76	83	3.27
TNKS2400X50	50	1.97			39,810	8,950	145	5.71	95	3.74
TNKS2400X63	63	2.48			40,125	9,020	171	6.73	108	4.25
TNKS2400X75	75	2.95			40,325	9,065	195	7.68	120	4.72
TNKS2400X80	80	3.15			40,390	9,080	205	8.07	125	4.92
TNKS2400X100	100	3.94			40,590	9,125	245	9.65	145	5.71
TNKS2400X125	125	4.92			40,770	9,165	295	11.61	170	6.69
TNKS2400X150	150	5.91			40,880	9,190	356	14.02	206	8.11
TNKS2400X175	175	6.89			40,970	9,210	406	15.98	231	9.09
TNKS2400X200	200	7.87			41,035	9,225	456	17.95	256	10.08

Note: All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top Mount
FC, FCS

Foot Mount
FFC

Base Mount
MP

Recommended Flanges

FFC-1500

240

FC-1500

235

FCS-1500

238

MP-1500

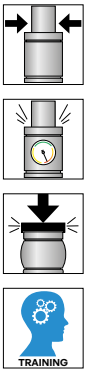
246

Note!

For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

Providing full stroke force between 68,545 N (15,410 lbf) and 77,330 N (17,385 lbf) TNKS-4200 is available in 10 stroke lengths.

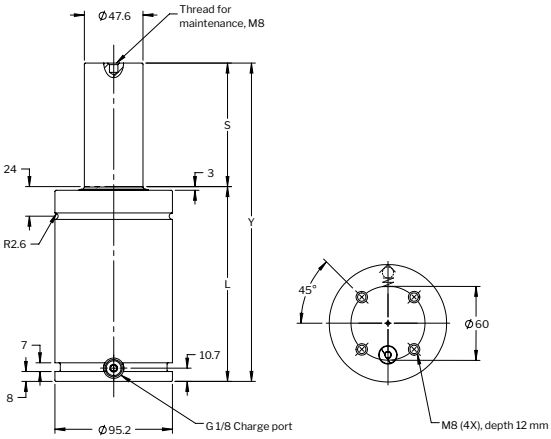
Strokes 25, 50, 80 and 125 are offered as a part of the Hyson Preferred Program which provides optimal delivery. We recommend stroke lengths of greater than 25 mm should be base or flange mounted.



Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 42900
Contact Force at max. pressure (lbf) 9645
Recommended max strokes/min (at 20°C) ..... ~ 20-100
Cylinder diameter (mm) 95
Charge port ..... G 1/8”
Repair kit 60-238-7000
Operating temperature ..... 0 to +80°C
Max piston rod velocity 1.6m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



Order Number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height	
	S						Y ±0.25	Y ±0.010	L	
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in
TNKS4200X16	16	0.63	42,900	9,645	68,545	15,410	90	3.54	74	2.91
TNKS4200X19	19	0.75			69,705	15,670	96	3.78	77	3.03
TNKS4200X25	25	0.98			71,370	16,045	108	4.25	83	3.27
TNKS4200X32	32	1.26			72,640	16,330	122	4.80	90	3.54
TNKS4200X38	38	1.50			73,395	16,500	134	5.28	96	3.78
TNKS4200X50	50	1.97			74,440	16,735	158	6.22	108	4.25
TNKS4200X63	63	2.48			75,155	16,895	184	7.24	121	4.76
TNKS4200X75	75	2.95			75,620	17,000	208	8.19	133	5.24
TNKS4200X80	80	3.15			75,775	17,035	218	8.58	138	5.43
TNKS4200X100	100	3.94			76,245	17,140	258	10.16	158	6.22
TNKS4200X125	125	4.92			76,620	17,225	308	12.11	183	7.20
TNKS4200X150	150	5.91			76,890	17,285	371	14.61	221	8.70
TNKS4200X175	175	6.89			77,090	17,330	421	16.57	246	9.69
TNKS4200X200	200	7.87			77,220	17,360	471	18.54	271	10.67
TNKS4200X225	225	8.86			77,330	17,385	521	20.51	296	11.65

Note: All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top Mount
FC, FCS

Foot Mount
FFC

Base Mount
MP

Recommended Flanges

FFC-3000

240

FC-3000

235

FCS-3000

238

MP-3000

246

Note!
For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

Providing full stroke force between 99,285 N 22,320 lbf) and 125,705 N (28,260 lbf) TNKS-6600 is available in 10 stroke lengths.

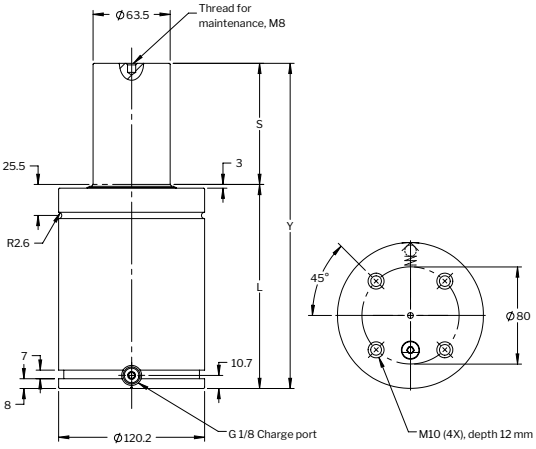
Strokes 25, 50, 100 and 150 are offered as a part of the Hyson Preferred Program which provides optimal delivery. We recommend stroke lengths of greater than 25 mm should be base or flange mounted.




Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 68435
Contact Force at max. pressure (lbf) 15385
Recommended max strokes/min (at 20°C) ..... ~ 20-100
Cylinder diameter (mm) 120
Charge port ..... G 1/8”
Repair kit 60-300-7000
Operating temperature ..... 0 to +80°C
Max piston rod velocity 1.6m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



Order Number Model X Stroke	Stroke		Contact Force		Full Stroke Force		Cylinder Height		Body Height	
	S						Y ±0.25	Y ±0.010	L	
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in
TNKS6600X16	16	0.63			99,285	22,320	100	3.94	84	3.31
TNKS6600X19	19	0.75			101,910	22,910	106	4.17	87	3.43
TNKS6600X25	25	0.98			106,000	23,830	118	4.65	93	3.66
TNKS6600X32	32	1.26			109,495	24,615	132	5.20	100	3.94
TNKS6600X38	38	1.50			111,740	25,120	144	5.67	106	4.17
TNKS6600X50	50	1.97			115,030	25,860	168	6.61	118	4.65
TNKS6600X63	63	2.48			117,455	26,405	194	7.64	131	5.16
TNKS6600X75	75	2.95	68,435	15,385	119,080	26,770	218	8.58	143	5.63
TNKS6600X80	80	3.15			119,635	26,895	228	8.98	148	5.83
TNKS6600X100	100	3.94			121,370	27,285	268	10.55	168	6.61
TNKS6600X125	125	4.92			122,860	27,620	318	12.52	193	7.60
TNKS6600X150	150	5.91			123,905	27,855	381	15.00	231	9.09
TNKS6600X175	175	6.89			124,660	28,025	431	16.97	256	10.08
TNKS6600X200	200	7.87			125,260	28,160	481	18.94	281	11.06
TNKS6600X225	225	8.86			125,705	28,260	531	20.91	306	12.05

Note: All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top Mount
FC, FCS

Foot Mount
FFC

Base Mount
MP

Recommended Flanges

FFC-5000

240

FC-5000

235

FCS-5000

238

MP-5000

246

Note!

For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

Tanker 400XP Series

Tanker 400 to 400 HS

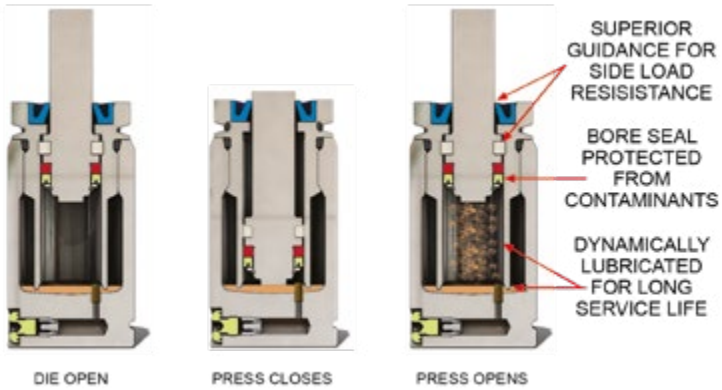
Product Value

The ideal Gas Spring for maximum life, the TNK 400 XP Series is designed for use in applications where long service life is important. The TNK 400 offers superior guidance for side load resistance, a bore seal for contamination resistance, and dynamic lubrication for long service life. The TNK 400 HS has all the features of the TNK 400 with the added benefit of being designed for high speed production environments.

Product Features

- Engineered for high performance, long service life.
- Dynamic lubrication circulates oil onto seal surfaces with every stroke.
- Improved service life compared to Coil Springs.
- Bore seal design for superior contamination resistance.
- Preloaded by gas pressure. Does not require compression in the die to preload.
- Available as self-contained or in a hosed system.
- Variety of mounting options provides flexibility in die design.

Dynamic Lubrication Extends Gas Spring Life



The patented dynamic lubrication system coats the Gas Spring wall, piston and seal with oil on every stroke of the press to reduce heat build-up and lower operating temperature, which in turn, reduces wear on die components and extends performance life.

Product Specifications

Pressure Medium	Nitrogen
Force increase by temperature (%/ °C)	0.3
Max. charging pressure (bar at 20°C)	150
Min. operating temperature (°C)	0
Max. operating temperature (°C)	80
Max. piston rod velocity (m/s)	1.6

Ordering Options

TNK 400 Model TNK-400	x	.25 STROKE (in) See Dimensional Information Charts		
TNK 400 Model TNK-400 HS	x	.25 STROKE (in) See Dimensional Information Charts	HS	

All Gas Springs shipped at maximum charge pressure unless otherwise specified.

Repair Kits

Post Series	Order Number*
TNK 400 Series	56-072-7000
TNK 400 HS Series	56-072-7000-HS

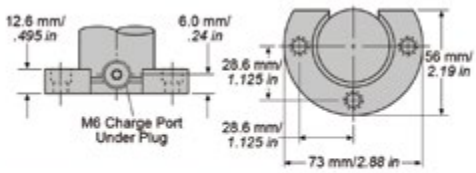
*Replacement Gas Spring sold separately.

Recommended Hose System

Micro24TM Hose & Tube System
– See catalog for full details.

TNK 400 Flange Mount

- To order Cylinder with Flange, specify "**-FI**" (for top counterbore) or "**-FH**" (for bottom counterbore) after the Order Number. Example: TNK 400X1.00-FH.
- To order Flanges only - **56-072-2002**
- To order locking wire only **- 56-072-2004**



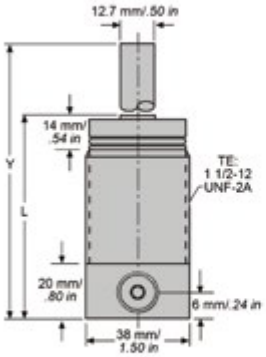
NOTES:

- The base of the spring extends past the bottom of the flange when assembled.
- The Gas Spring will sit flush once it is bolted down.

DO NOT GRIND THE GAS SPRING!

TNK 400 Threaded Body

- To order Cylinder with lock nut, specify "**-TE**" after the Order Number. Example: TNK 400X1.00-TE.
- To order lock nut only - **56-072-2013**



NOTES:

- One lock nut is included with each threaded body spring.
- The TNK 400-TE can be threaded into the die Gas Spring port from the piston rod end only.

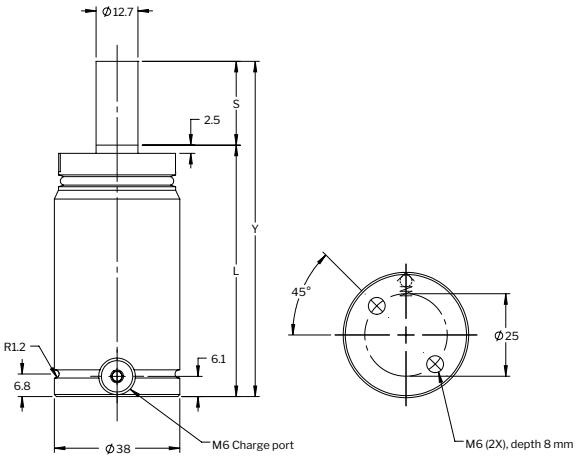
Available in forces between 6,655 N (1,496 lbf) and 6,730 N (1,513 lbf). TNK 400 are ideal for high performance.

A variety of mounting options provides flexiblility in die design. TNK 400 are available as self-contained or in a hosed system.

Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 3940
Contact Force at max. pressure (lbf) 885
Recommended max strokes/min (at 20°C) ..... ~ 80-100
Cylinder diameter (mm) 38
Charge port M6
Repair kit 56-072-7000
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 0.58 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



Order Number Model X Stroke	Stroke		Initial Contact Force*		Full Stroke Force		Cylinder Height		Body Height		Gas vol.	Weight	
	S						Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Stroke Lengths (optimal delivery)													
TNK 400X.50	12.7	0.50	3940	885	6699	1506	76.2	3.0	63.5	2.50	0.008	0.411	0.91
TNK 400X.75	19.0	0.75			6708	1508	88.9	3.5	69.9	2.75	0.012	0.442	0.98
TNK 400X1.00	25.4	1.00			6717	1510	101.6	4.0	76.2	3.00	0.016	0.474	1.04
TNK 400X1.50	38.1	1.50			6726	1512	127.0	5.0	88.9	3.50	0.024	0.537	1.18
TNK 400X2.00	50.8	2.00			6730	1513	152.4	6.0	101.6	4.00	0.032	0.599	1.32
Alternative Stroke Lengths													
TNK 400X.25	12.7	0.50	3940	885	6699	1506	76.2	3.0	63.5	2.50	0.008	0.411	0.84
TNK 400X.50	63.5	2.50			6730	1513	177.8	7.0	114.3	4.50	0.040	0.662	0.91
TNK 400X2.50	76.2	3.00			6730	1513	203.2	8.0	127.0	5.00	0.048	0.724	1.46
TNK 400X3.00	50	1.97			8,000	1,800	145	5.71	195	7.68	0.032	0.31	1.60

Note: All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top Mount


Base Mount


Foot Mount

Recommended Flanges

See page 217 for information about Flanges.

Note!
For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

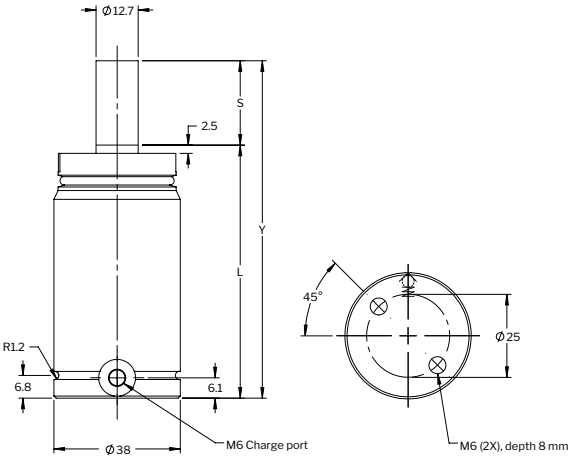
TNK 400HS provides full stroke force between 4,391 N (1,150 lbf) and 4,5690 N (1,278 lbf) and is available in four stroke lengths.

A variety of mounting options provides flexiblility in die design. TNK 400HS are available as self-contained or in a hosed system.

Basic Information

For general information see “About Gas Springs”.

Min. charging pressure (at 20°C) ..... 25 bar
Max. charging pressure (at 20°C) ..... 150 bar
Contact Force at max. pressure (N) 3940
Contact Force at max. pressure (lbf) 885
Recommended max strokes/min (at 20°C) .... 600 spm at .25” working stroke
For alternative working strokes please consult with Hyson inside sales
Cylinder diameter (mm) 38
Charge port M6
Repair kit 56-072-7000-HS
Operating temperature ..... 0 to +80°C
Max piston rod velocity ..... 0.58 m/s
Force increase by temperature ..... ±0.3%/°C
Pressure medium ..... Nitrogen



Order Number Model X Stroke	Stroke		Initial Contact Force*		Full Stroke Force		Cylinder Height		Body Height		Gas vol.	Weight	
	S						Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
TNK 400X.25 HS	6.3	0.25	3940	885	4391	1150	82.5	3.25	76.2	3.00	0.016	0.455	1.00
TNK 400X.50 HS	12.7	0.50			4392	1222	114.3	4.50	101.6	4.00	0.032	0.562	1.24
TNK 400X.75 HS	19.0	0.75			4392	1259	146.1	5.75	127.0	5.00	0.048	0.668	1.47
TNK 400X1.00 HS	25.4	1.00			4569	1278	152.0	6.00	127.0	5.00	0.048	0.674	1.49

Note: All dimensions are nominal. Data shown are typical. Actual data for any particular unit may vary.

Mounting Possibilities

Top Mount

Base Mount

Foot Mount

Recommended Flanges

See page 217 for information about Flanges.

Note!

For dimensions on all mounting flanges, refer to “Flanges” in chapter 3.

3 Flanges

Mounting Guidelines

Hyson Gas Springs are engineered for use in modern day, metal stamping dies and plastic moulding tools. Over the years, Hyson has developed a wide range of mounting methods for Gas Springs. The following is intended as a reminder of the correct procedure when using these various mounting methods.

Mounting Method Overview

Generally speaking, Hyson Gas Springs are machined with two external grooves. The C-groove being located towards the piston rod and a U-groove – or second C-groove – located just above its base. These grooves allow various Flange Mounts to be attached. It is then the Flange Mount that is clamped to the tool using mounting screws of a suitable length, property class and torque setting (see next page for more details). Only use mounts manufactured or approved by Hyson.

Drop-In

The Gas Spring is dropped into a flat bottomed pocket within the die.

Base Mount

The Gas Spring's base threaded holes are used to mount the Gas Spring directly to the tool or indirectly via a base mounting plate.

Foot Mount

A Flange Mount is used to clamp the base of the Gas Spring to the tool using the Gas Spring's lower U or C groove.

Top Mount

A Flange Mount is first attached to the Gas Spring's upper C-groove before being mounted into a hole in the die.

Thread Mount

A section of the Gas Spring's cylinder, which has an external thread (either cylinder body or base stud), is used to install the Gas Spring in the die. In some cases with an additional lock nut or Flange Mount.

Body Mount

The Body Mounts are attached to the Gas Spring to allow it to be installed in any orientation within the die.

Mounting Screws

When mounting the Gas Spring directly to the tool or via a Flange Mount, it is important to observe the following recommendations in order to prevent the Gas Spring or its mounting accessories from working loose into the tool.

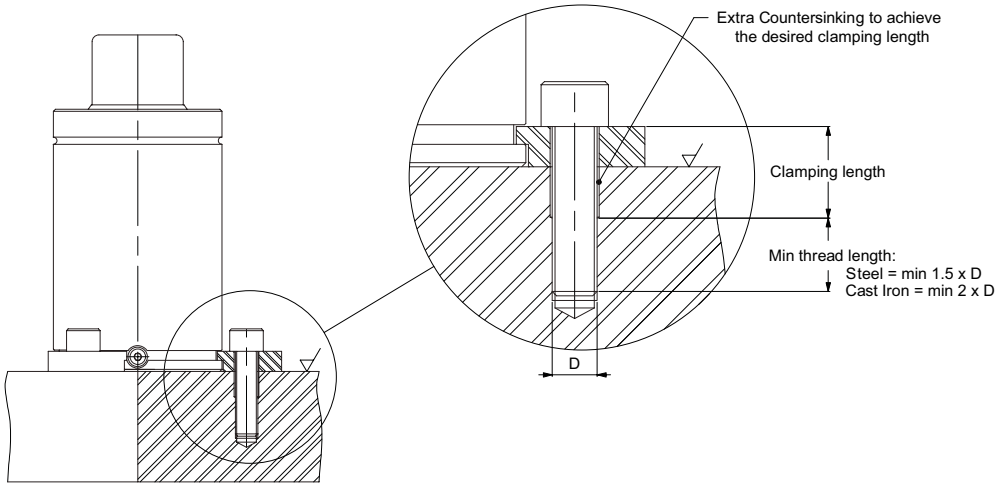
Recommendations:

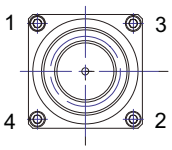
Screws should have a free length (clamping length) of two to four times their thread diameter and a thread depth of at least one-and-a-half times their thread diameter in steel and two times their thread diameter in cast iron.

If the free length cannot be achieved in any other way, the screw holes should be countersunk (see below). Please note that the specifications in Automotive standards may differ. Always use a torque wrench to apply the appropriate torque for the class of screws used.

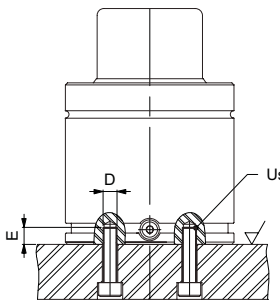
Thread	Torque (for screw class 8.8 according to ISO 898-1)
M6	10 Nm
M8	24 Nm
M10	45 Nm
M12	80 Nm
M16	160-200 Nm

For all types of Flange Mounting using mounting screws:





When tightening the mounting screws in the tool, apply an evenly cross like pattern according to the picture (1-2-3-4). Otherwise there is a risk for the mount to tilt.



For example: T3-2400

For those Gas Springs whose thread depth (E) is less than one time its thread size (D) we recommend the following:

- select a screw length to engage all available thread depth
- use a thread locking compound (middle strength or higher)
- ensure the correct screw torque setting is applied

Mounting Method: Drop-In

1. Gas Spring orientations: only vertically upright installations.

2. For stroke lengths < 25 mm: base threaded holes are optional for stroke lengths up to and including 25 mm.

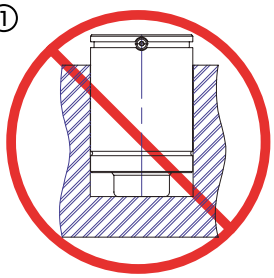
Hole depth: min 70% of the spring's Lmin length to ensure sufficient support and reduce the risk of side loading.

Hole diameter: +0.5 to +1.0 mm greater than the Gas Spring's cylinder diameter.

3. Hole drainage: recommended wherever drawing fluids and/or liquid coolants are used in the die.

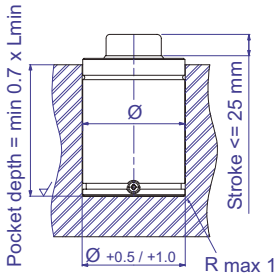
4. For stroke lengths > 25 mm: base threaded holes should always be used for longer stroke lengths to prevent possible side loads and/or Gas Spring movement within the pocket.

①



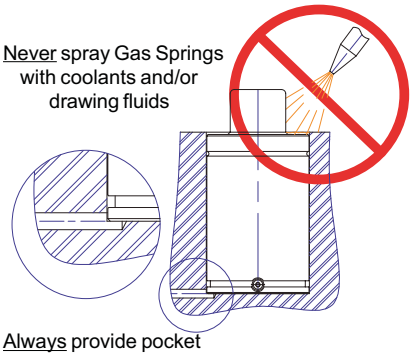
Never mount a Gas Spring in a pocket upside down

②



Always observe pocket dimension recommendations

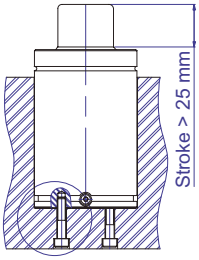
③



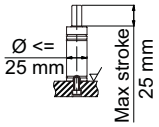
Never spray Gas Springs with coolants and/or drawing fluids

Always provide pocket drainage if coolants are used in the die

④



Use Drop-In and Base Thread: B together for longer stroke lengths



If the Gas Spring has only a single base threaded hole, then the max stroke length for this mounting method should not exceed 25 mm

Mounting Method:
Base Mount (MP, RM, SPRM, SPT5 and SP)

Stroke length suitabilty:

For cylinder diameters < Ø25 = Max stroke 25 mm

For cylinder diameters > Ø25 = OK for all stroke lengths

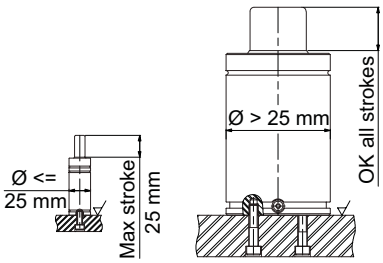
Gas Spring orientations: Vertically upright - OK for all stroke lengt ,except T2 -70, T2- 90, T3 -170, T4SC-420 and T3-320

Vertically upside down - OK up to stroke 125 mm*

Link systems: this mounting method is very suitable for gas link systems

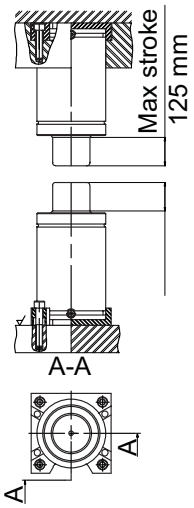
*For thread depths less than one time its thread size use a screw length that engages all thread depth, use a thread locking compound (middle strength or higher) and apply correct screw torque setting.

For base mount without flang

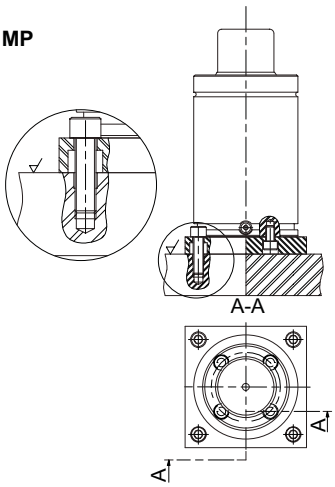


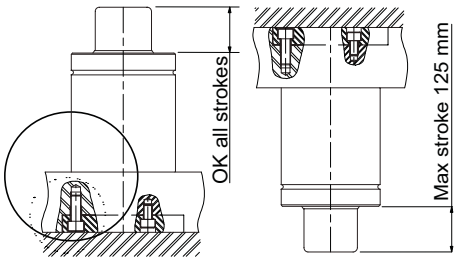
If the Gas Spring has only a single base threaded hole, then the max stroke length for this mounting method should not exceed 25 mm

For: RM



For: MP





Always support the mount to avoid compression forces being transferred through to the mounting screws.

Mounting Method:
Foot Mount (LM-lug, L, SF, FFC, BFB, BF and FM)

Gas Spring orientations: Vertically upright = OK for all stroke lengths,
except T2 -70, T2- 90, T3 -170, T4SC-420 and T3-320

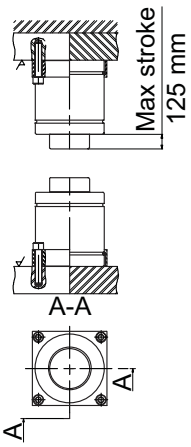
Vertically upside down = OK up to 125 mm stroke (see ***Warning!*** below)

Link systems: this mounting method is generally suitable for gas link systems, with the exception of the BF, FCR and FSL Flange Mounts that do not fully prevent rotation of the Gas Spring.

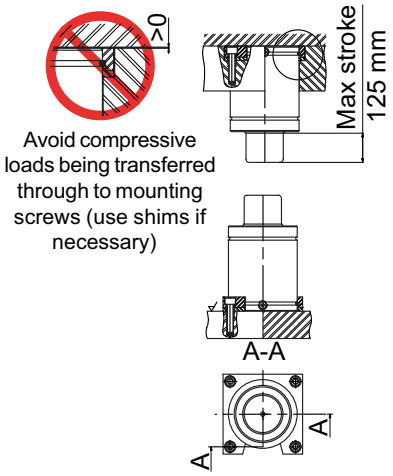
Note! A small gap between Foot Mount and mounting surface is normal before the Gas Spring is clamped to the die using the mounting screws.

Warning! Foot Mounts for vertically upside down installations.
Wherever possible, vertically upside down installations using Foot Mounts should be used in combination with base threaded holes to prevent Gas Spring rotation within the flange and to provide additional security.

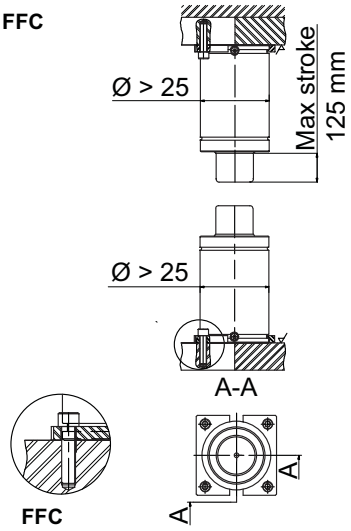
For: FM



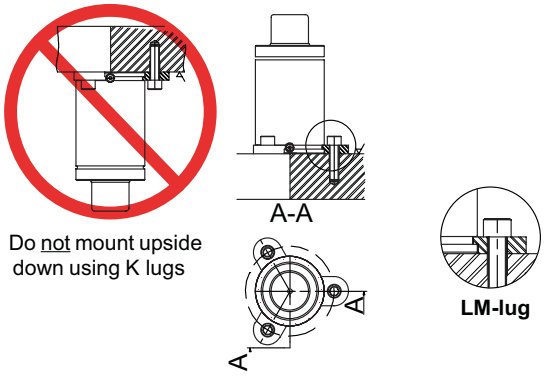
For: SF



For: FFC



For: LM-lug



Mounting Method:
Top Mount (FCR ISO, FCR, FC, FK, FCSC and FCS)

Gas Spring orientations: Vertically upright = OK for all stroke lengths

Vertically upside down = OK up to 125 mm stroke (see ***Warning!*** below)

Cylinder hole clearance for cylinder diameters < Ø32

hole Ø = cylinder Ø + 0.5 to 1.0 mm

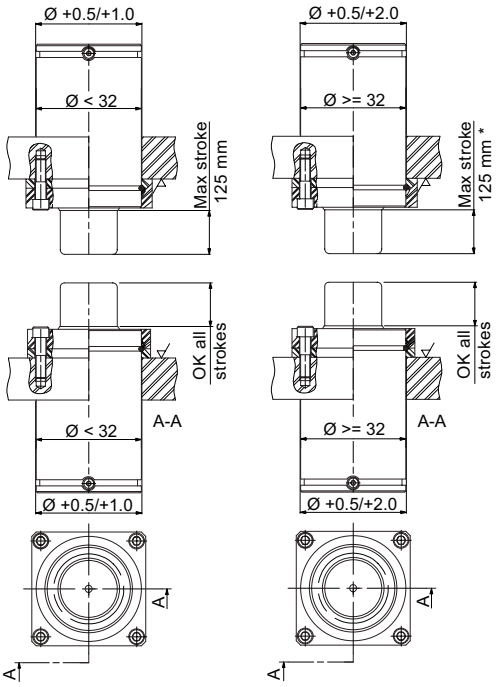
Cylinder hole clearance for cylinder diameters > Ø32

hole Ø = cylinder Ø + 0.5 to 2.0 mm

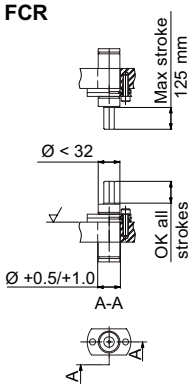
Link systems: FCSC is the preferred Flange Mount for linked systems as the Gas Spring is unable to rotate in the flange (see Note below).

Warning! Depending on the stroke speed of the press, longer stroke Gas Springs are not generally recommended for up-side down installations unless the FCSC Flange Mount is used. Top Mounts must never be installed in the die, whereby the mounting screws are required to support the full compression force of the Gas Spring when stroked (see below*).

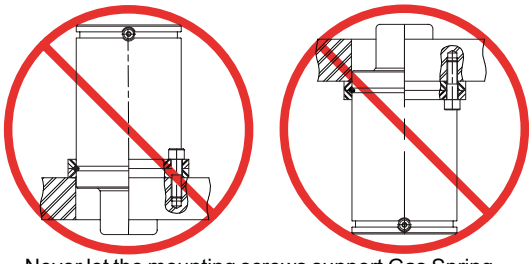
For: FCR ISO, FC, FK, FCSC and FCS



FCR



***For: all Top mounts**



Never let the mounting screws support Gas Spring compression forces

*** Note:** for the FCSC flange, upside down installation is OK for all stroke lengths

Mounting Method:
Body Mount (SM, S, HMF and HM)

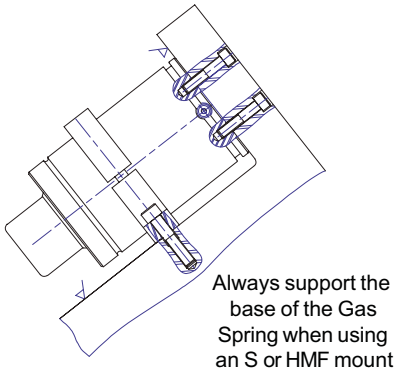
Gas Spring orientations: suitable for all stroke lengths and all Gas Spring orientations from vertically upright through to upside down (see ***Warning!*** below).

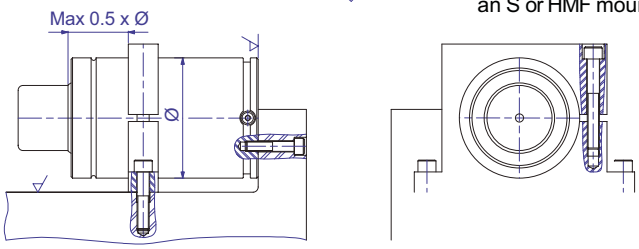
Key grooves: Key grooves should be used to either recess the Body Mount or to back up the Body Mount with an additional key, thus preventing Gas Spring compression forces exerting a shear stress on the mounting screws.

Link systems: this mounting method is very suitable for gas link systems, since the Gas Spring is unable to rotate.

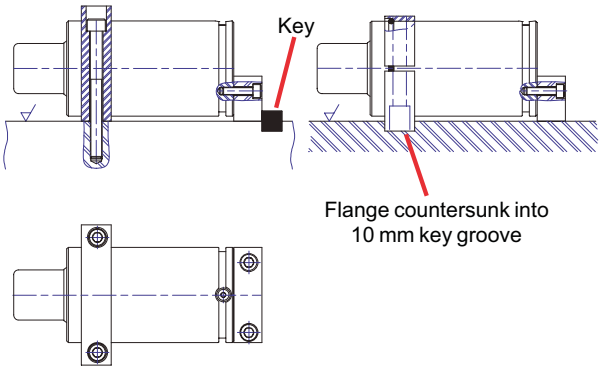
Warning!
Always ensure the Gas Spring sits parallel with its mounting surface to minimise the risk of side loading.

For: SM, S and HMF





For: HM, HMF



Mounting Method: Thread Mount

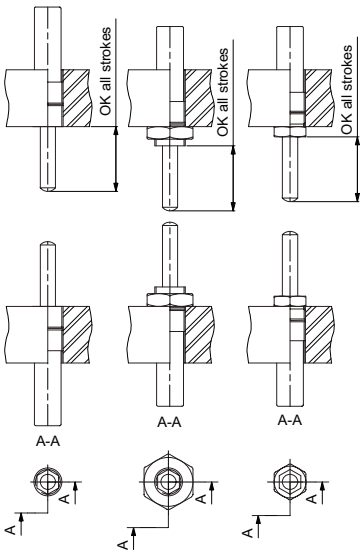
Gas Spring orientations: Vertically upright = OK for all stroke lengths

Vertically upside down = OK for all stroke lengths

Link systems: it is possible to link thread mounted Gas Springs if there is sufficient access to the spring's charge port.

Note! It is important to always use the appropriate torque setting for the springs thread size when mounting the spring to the tool in order to prevent tool vibrations working the spring loose.

Use a dismountable thread locking compound and ensure that the compound do not touch the piston rod.



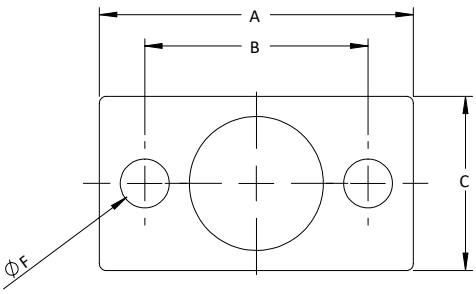
Flanges

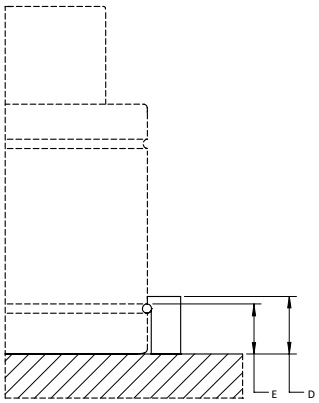
FM

Base Mount Rectangular Flange

FM is a flange used to clamp the base of the cylidner to the tool by using the lower C-groove of the cylinder.

Order No.	A		B		C		D		E		F	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
FM-90	45	1,772	32	1,26	25	0,984	10	0,394	7	0,276	7	0,276



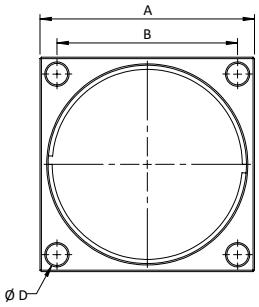


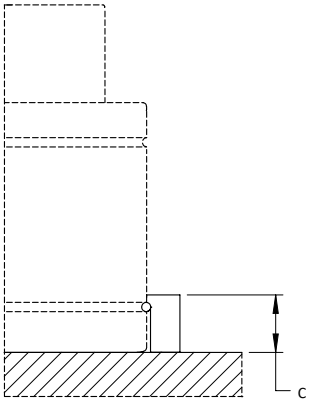
BF

Square Base Mount Flange

BF is a Flange Mount used to clamp the base of the Gas Spring to the tool by using the lower C-groove of the Gas Spring.

Order No.	A		B		C		D	
	mm	in	mm	in	mm	in	mm	in
BF-1000	52	2.047	40	1.575	14.5	0.571	7	0.276
BF-1800	70	2.756	56.5	2.224	19.5	0.768	9	0.354
BF-11800	130	5.118	109.5	4.311	29.5	1.161	13	0.512
BF-18300	162	6.378	138	5.433	34.5	1.358	17.5	0.689



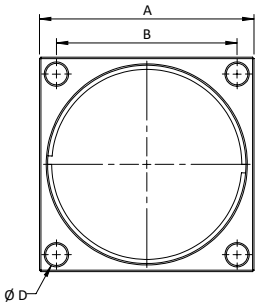


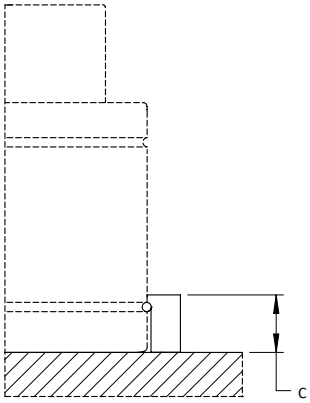
BFP

Bottom Square Flange

BFP is a Flange Mount used to clamp the base of the Gas Spring to the tool by using the lower C-groove of the Gas Spring.

Order No.	A		B		C		D	
	mm	in	mm	in	mm	in	mm	in
BFP-4700	90	3.543	73.5	2.894	24.5	0.965	11	0.433
BFP-7500	110	4.331	92	3.622	27.5	1.083	13	0.512



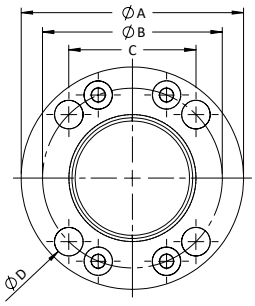


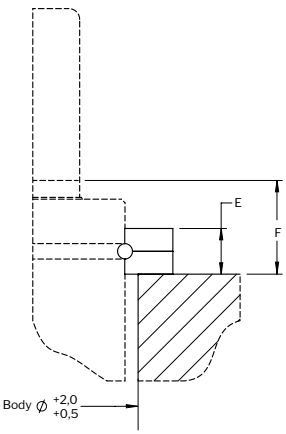
FC

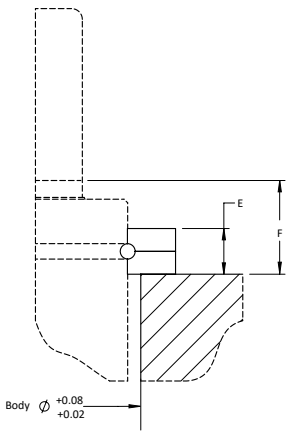
Circular Flange

FC is a round Flange Mount used to mount the Gas Spring in the upper C-groove.

Order No.	A		B		C		D		E		F	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
FC-180	50	1.969	38	1.496	26.9	1.059	7	0.276	9	0.354	16/21,5	
FC-250	68	2.677	56.5	2.224	40	1.575	7	0.276	9	0.354	15/17	
FC-350	60	2.362	49.5	1.949	35	1.378	7	0.276	9	0.354	16/17	
FC-500	86	3.386	70.7	2.783	50	1.969	9	0.354	13	0.512	22/23	
FC-750	95	3.74	80	3.15	56.5	2.224	9	0.354	13	0.512	22/24	
FC-1500	122	4.803	104	4.094	73.5	2.894	11	0.433	16	0.63	29	1.142
FC-3000	150	5.906	130	5.118	92	3.622	13.5	0.531	18	0.709	33	1.299
FC-5000	175	6.89	155	6.102	109.5	4.311	13.5	0.531	21	0.827	33/36	
FC-7500	220	8.661	195	7.677	138	5.433	17.5	0.689	27	1.063	38/41	
FCN-150	56	2.205	42	1.654	29.7	1.169	9	0.354	9	0.354	16/21,5	
FCN-250	70	2.756	56.6	2.228	40	1.575	9	0.354	9	0.354	15/17	





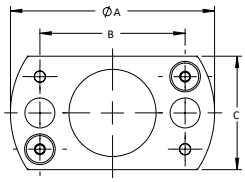


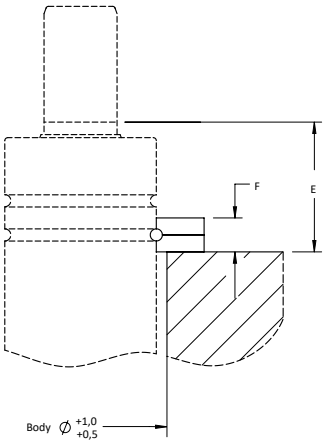
FCR

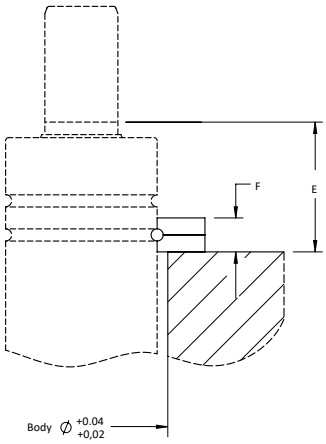
Upper Square Flange

FCR is a rectangular Flange Mount used to mount the Gas Spring in the upper C-groove. FCR meets ISO 11901-2, VDI 3003, GM 90.25 and other standards.

Order No.	A		B		C		D		E		F	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
FCR-25	50	1.969	38	1.496	30	1.181	7	0.276	16/21,5	0.63/0.85	9	0.354
FCR-50	34	1.339	24	0.945	21	0.827	6.6	0.26	21.5	0.846	9	0.354
FCR-70	37	1.457	27	1.063	24	0.945	6.6	0.26	21.5	0.846	9	0.354
FCR-19 VDI2	45	1.772	32	1.26	25	0.984	7	0.276	21.5	0.846	9	0.354





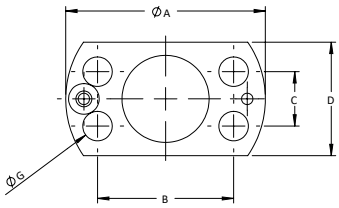


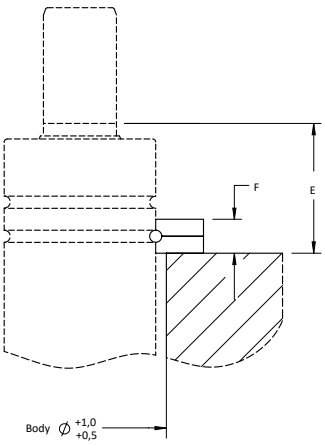
FCR ISO

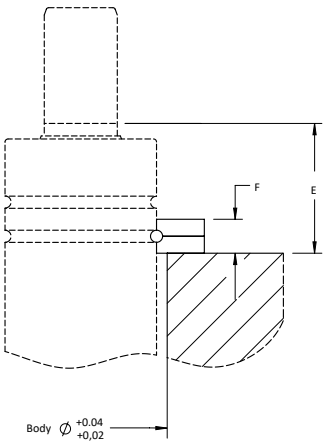
Upper Square Flange

FCR is a rectangular Flange Mount used to mount the Gas Spring in the upper C-groove. FCR meets ISO 11901-2, VDI 3003, GM 90.25 and other standards.

Order No.	A		B		C		D		E		F		G	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
FCR-90	45	1.772	30	1.181	12	0.472	25	0.984	21.5	0.846	9	0.354	7	0.276
FCR-180	50	1.969	34	1.339	18	0.709	30	1.181	16/21,5	0,63/0,85	9	0.354	7	0.276





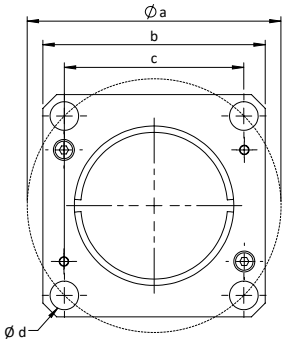


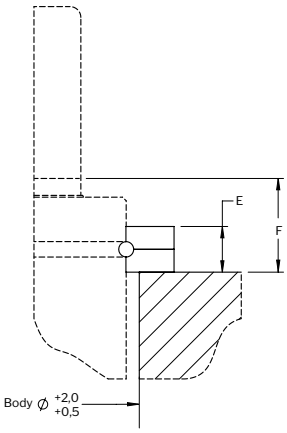
FCS

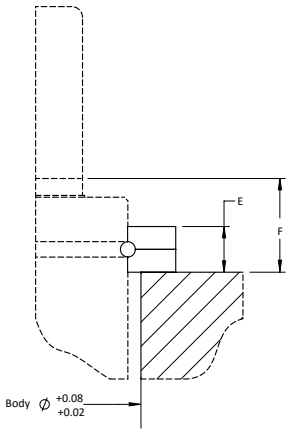
Upper Square Flange

FCS is a square Flange Mount used to mount the Gas Spring in the upper C-groove. FCS meets the ISO 11901-2, VDI 3003, Ford WDX35-62, GM 90.25 and other standards.

Order No.	A		B		C		D		E		F	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
FCS-32	49.5	1.949	45	1.772	35	1.378	7	0.276	9	0.354	16/17	0.63/0.67
FCS-250	56.5	2.224	52	2.047	40	1.575	7	0.276	9	0.354	15/17	0.59/0.67
FCS-500	70.7	2.783	64	2.52	50	1.969	9	0.354	13	0.512	22/23	0.87/0.91
FCS-750	80	3.15	70	2.756	56.5	2.224	9	0.354	13	0.512	22/24	0.87/1.14
FCS-1500	104	4.094	90	3.543	73.5	2.894	11	0.433	16	0.63	29	1.14
FCS-3000	130	5.118	110	4.331	92	3.622	13.5	0.531	18	0.709	33	1.30
FCS-5000	155	6.102	130	5.118	109.5	4.311	13.5	0.531	21	0.827	33/36	1.30/1.42
FCS-7500	195	7.677	162	6.378	138	5.433	17.5	0.689	27	1.063	38/41	1.50/1.61
FCS-10000	240.4	9.465	210	8.268	170	6.693	17.5	0.689	27	1.063	47	1.85
FCSX-1500	90.5	3.563	80	3.15	64	2.52	11	0.433	16	0.63	27	1.06





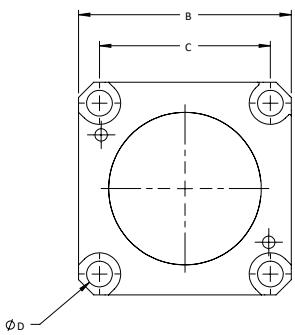


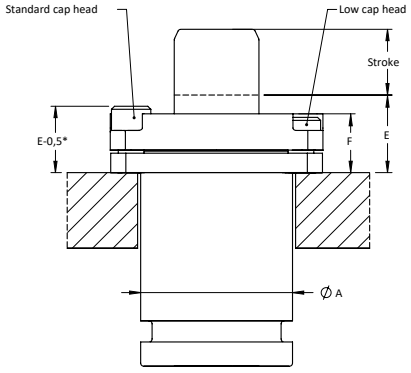
FCSC

Upper Square Flange

The FCSC Clamp Flange has a unique patented design that offers a very robust play-free connection between the Gas Spring and the mount. This play-free connection also prevents rotation of the Gas Spring. The FCSC Clamp Flange is especially suitable for Gas Springs that will be hosed together and/or are used in high-speed, long-stroke upside-down installations. The FCSC Clamp Flange is available for Gas Springs sizes from 500 up to 7,500. Note: The FCSC and FCS Flanges are fully interchangeable if low head cap mounting screws (4x) are used. Using low head cap screws ensures the top of the screw is flush with the top of the flange. If normal head cap screws are used, the top of the screw will protrude from the top of the flange by 3 mm.

Order No.	A		B		C		D		E		F	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
FCSC-500	45	1.772	64	2.52	50	1.969	8.5	0,335	22/23	0.87/0.91	18.4	0.724
FCSC-750	50	1.969	70	2.756	56.5	2.224	8.5	0,335	22/24	0.87/0.94	19.4	0.764
FCSC-1500	75	2.953	90	3.543	73.5	2.894	10.5	0.413	29	1.142	38	1.496
FCSC-3000	95	3.74	110	4.331	92	3.622	12.5	0.492	33	1.299	30	1.181
FCSC-5000	120	4.724	130	5.118	109.6	4.315	12.5	0.492	33/36	1.30/1.42	32.4	1.276
FCSC-7500	150	5.906	162	6.378	138	5.433	16.5	0.65	38/41	1.50/.161	38	1.496
FCSCX-1500	63	2.48	80	3.15	64	2.52	10.5	0.413	27	1.063	23.9	0.941





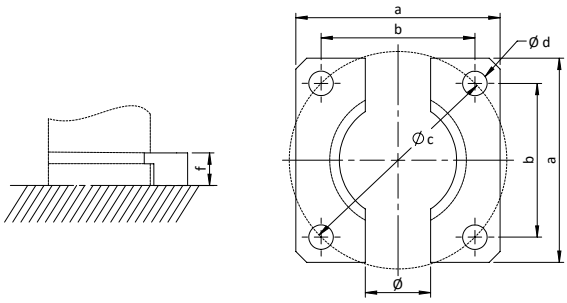
Low cap head screws are recommended
* If standard screws are used

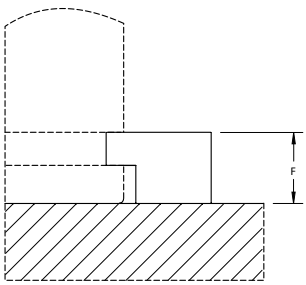
FFC

Lower Square Flange

FFC is a foot mount used to clamp the base of the Gas Spring to the tool by using U-groove of the Gas Spring. FFC meets the ISO 11901-2, VDI 3003, Ford WDX35-62, GM 90.25 and other standards.

Order No.	A		B		C		D		E		F	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
FFC-250	55	2.165	40	1.575	56.6	2.228	7	0.276	12	0.472	6.5	0.256
FFC-350	50	1.969	35	1.378	49.5	1.949	7	0.276	12	0.472	6.5	0.256
FFC-500	70	2.756	50	1.969	70.7	2.783	9	0.354	20	0.787	6.5	0.256
FFC-750	75	2.953	56.5	2.224	80	3.15	9	0.354	24	0.945	12	0.472
FFC-1500	100	3.937	73.5	2.894	104	4.094	11	0.433	24	0.945	12	0.472
FFC-3000	120	4.724	92	3.622	130	5.118	13.5	0.531	24	0.945	12	0.472
FFC-5000	140	5.512	109.5	4.311	155	6.102	13.5	0.531	24	0.945	12	0.472
FFC-7500	190	7.48	138	5.433	195.2	7.685	17.5	0.689	24	0.945	12	0.472
FFC-10000	210	8.268	170	6.693	240.4	9.465	17.5	0.689	24	0.945	13	0.512
FFC-T3T-350	50	1.969	35	1.378	49.5	1.949	7	0.276	18	0.709	6.5	0.256
FFC-T3T-500	55	2.165	40	1.575	56.6	2.228	7	0.276	18	0.709	6.5	0.256
FFX-1500	100	3.937	73.5	2.894	104	4.094	11	0.433	24	0.945	12	0.472



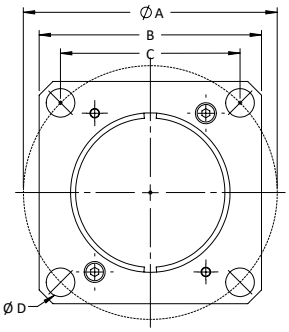


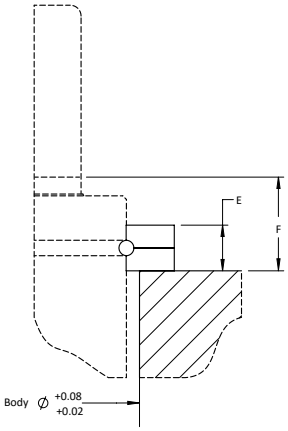
FK

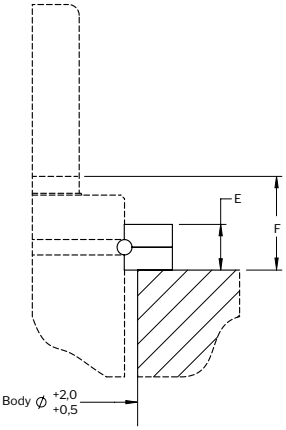
Upper Square Flange

FK is a square Flange Mount used to mount the Gas Spring in the upper C-groove.

Order No.	A		B		C		D		E		F	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
FK-1500	104	4.094	90	3.543	73.5	2.894	11	0.433	16	0.63	26/29	
FK-1800	80	3.15	70	2.756	56.5	2.224	9	0.354	13	0.512	21	0.827
FK-3000	130	5.118	110	4.331	92	3.622	13.5	0.531	18	0.709	30	1.181







HM

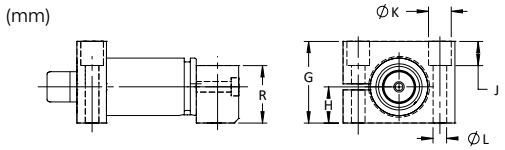
Horizonal Foot Flange Specifically for NP springs

HM (Horizontal Mount) is a mount for NP 250, 750-3000 springs. This mount meets FORD WD-X35-62-standard. The front support can be rotated 180° allowing it to be mounted in a 10 mm key groove. If the front support is not mounted in a key groove, we recommend that the rear mount is backed up using a key.The support is supplied complete with screws for attaching the mount to the spring.

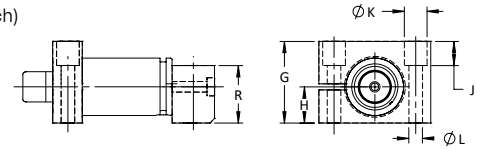
Order No.	A		B		C		D		E		F		G		H	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
HM-250	74	2.913	54	2.126	29.5	1.161	12	0.472	40	1.575	60	2.362	54	2.126	23.9	0.941
HM-750	90	3.543	68	2.677	43	1.693	13	0.512	44	1.732	65	2.559	70	2.756	30	1.181
HM-1500	125	4.921	100	3.937	45	1.772	12	0.472	57	2.244	80	3.15	94	3.701	42	1.654
HM-3000	140	5.512	115	4.528	48	1.89	15	0.591	70	2.756	95	3.74	115	4.528	52.5	2.067

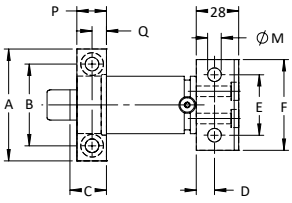
Order No.	J		K		L		M		N		P		Q		R	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
HM-250	16	0.63	15	0.591	9	0.354	9	0.35	0.354	0.01	20	0.787	10	0.394	38	1.496
HM-750	25	0.984	18	0.709	11	0.433	11	0.43	0.433	0.02	30	1.181	15	0.591	45	1.772
HM-1500	19	0.748	20	0.787	13.5	0.531	13.5	0.53	0.531	0.02	30	1.181	15	0.591	45	1.772
HM-3000	40	1.575	20	0.787	13.5	0.531	13.5	0.53	0.531	0.02	30	1.181	15	0.591	45	1.772

(mm)



(Inch)





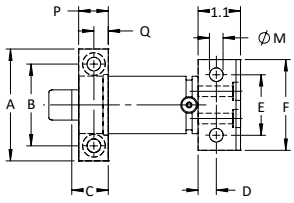


Fig. A

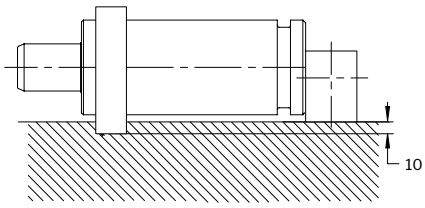
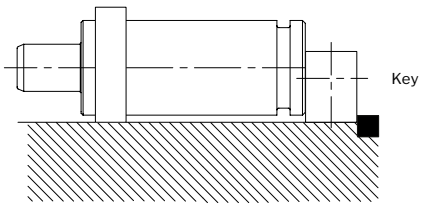
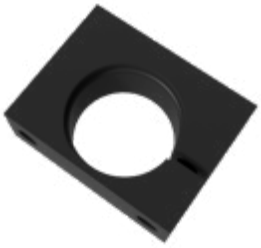


Fig. B



HMF

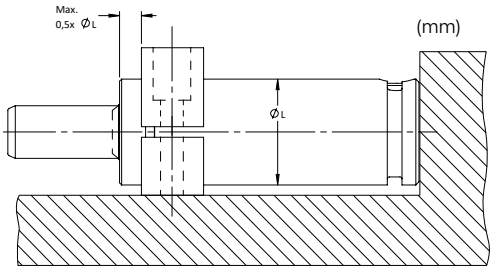


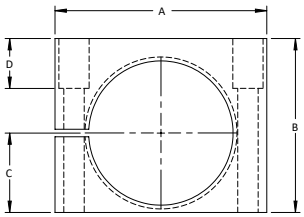
HMF is a Horizontal Body Flange

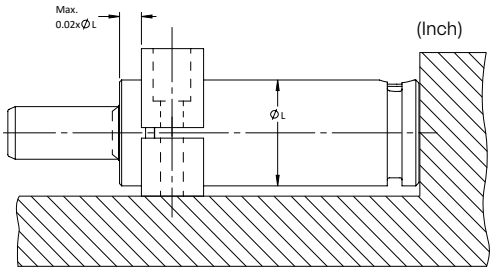
The HMF mount is a symmetric horizontal body mount similar to the S mount. The HMF mount meets the VDI 3003, Ford WD-X35-62 and GMDS 90.25.455 standard.

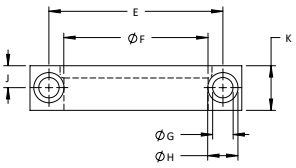
Order No.	A		B		C		D		E		F	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
HMF-150	68	2.677	48	1.89	20.9	0.823	10	0.394	50	1.969	32.1	1.264
HMF-250	74	2.913	54	2.126	23.9	0.941	16	0.63	54	2.126	38.1	1.5
HMF-500	80	3.15	60	2.362	27.5	1.083	22	0.866	60	2.362	45.4	1.787
HMF-750	90	3.543	70	2.756	30	1.181	25	0.984	68	2.677	50.4	1.984
HMF-1500	125	4.921	94	3.701	42	1.654	32	1.26	100	3.937	75.4	2.969
HMF-3000	140	5.512	115	4.528	52.5	2.067	33	1.299	115	4.528	95.4	3.756
HMF-5000	170	6.693	140	5.512	65	2.559	58	2.283	145	5.709	120.4	4.74
HMF-7500	200	7.874	170	6.693	80	3.15	68	2.677	175	6.89	150.4	5.921
HMFX-1500	108	4.252	82	3.228	36.5	1.437	27	1.063	84	3.307	63.4	2.496

Order No.	G		H		J		K		L	
	mm	in	mm	in	mm	in	mm	in	mm	in
HMF-150	9	0.354	15	0.591	10	0.394	20	0.787	31.9	1.256
HMF-250	9	0.354	15	0.591	10	0.394	20	0.787	38	1.496
HMF-500	9	0.354	15	0.591	10	0.394	20	0.787	45.2	1.78
HMF-750	11	0.433	18	0.709	15	0.591	30	1.181	50.2	1.976
HMF-1500	13.5	0.531	20	0.787	15	0.591	30	1.181	75.2	2.961
HMF-3000	13.5	0.531	20	0.787	15	0.591	30	1.181	95.2	3.748
HMF-5000	13.5	0.531	20	0.787	15	0.591	30	1.181	120.2	4.732
HMF-7500	13.5	0.531	20	0.787	15	0.591	30	1.181	150.2	5.913
HMFX-1500	11	0.433	18	0.709	15	0.591	30	1.181	63.2	2.488









LM-LUG

Lower Lug Flange

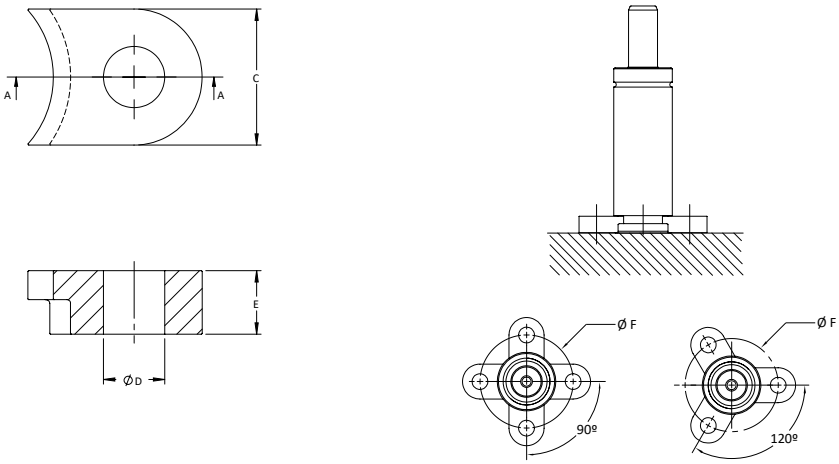
The LM-lug is used to clamp the Gas Spring vertically upright to the tool. The Gas Spring can be clamped down using 2, 3 or 4 LM-lugs. If only 2 lugs are used, then locking plate L must also be used to fix the Gas Spring.

Note: When using locking plate L together with LM-lugs, the spring cannot be hosed together as the L-plate will cover the gas charge port of the Gas Spring.

Important! The LM-lugs are only to be used to mount the spring vertically upright.

Order No.	C		D		E		F	
	mm	in	mm	in	mm	in	mm	in
LM-250	20	0.787	7	0.276	7	0.276	56.6	2.228
LM-500	25	0.984	9	0.354	7	0.276	70.7	2.783
LM-750	30	1.181	13.5	0.531	14	0.551	80	3.15
LM-1500	30	1.181	13.5	0.531	14	0.551	104	4.094
LM-3000	40	1.575	17.5	0.689	14	0.551	130	5.118
LM-5000	50	1.969	17.5	0.689	14	0.551	155	6.102
LM-7500	50	1.969	21.5	0.846	14	0.551	195	7.677
LM-10000	58	2.283	21.5	0.846	15	0.591	240	9.449
LMX-1500	30	1.181	13.5	0.531	14	0.551	92	3.622

Note: When ordering K-lugs for T3/T4 springs, a lug of smaller size than the spring must be used.

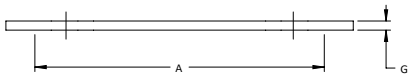


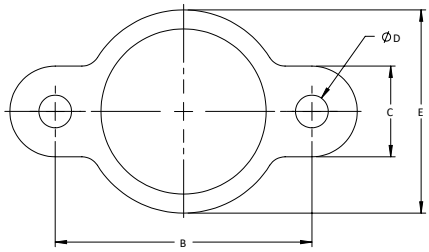
L

Locking Bracket for LM-lugs

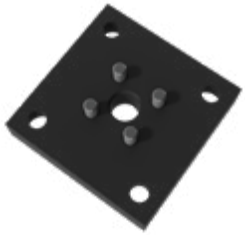
When fixing Gas Springs vertically using 2 LM-lugs, locking plate L must be used at the same time to ensure that the spring is fixed radially.

Order No.	A		B		C		D		E		F		G	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
L-250	76.6	3.016	56.6	2.228	20	0.787	7	0.276	48	1.89	9.5	0.374	2.5	0.098
L-500	95.8	3.772	70.7	2.783	25	0.984	9	0.354	56	2.205	9.5	0.374	2.5	0.098
L-750	110	4.331	80	3.15	30	1.181	13	0.512	61	2.402	16.5	0.65	2.5	0.098
L-1500	134	5.276	104	4.094	30	1.181	13	0.512	86	3.386	16.5	0.65	2.5	0.098
L-3000	170	6.693	130	5.118	40	1.575	17	0.669	106	4.173	16.5	0.65	2.5	0.098
L-5000	205	8.071	155	6.102	50	1.969	17	0.669	131	5.157	16.5	0.65	2.5	0.098
L-7500	245	9.646	195	7.677	50	1.969	21	0.827	170	6.693	16.5	0.65	2.5	0.098
L-T3-1500	122	4.803	92	3.622	30	1.181	13.5	0,531	74	2.913	16.5	0,65	2.5	0,098





MP



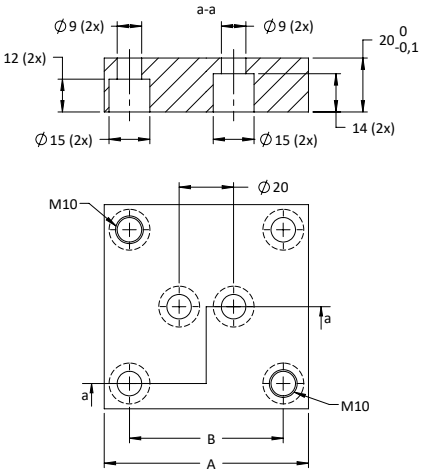
Bottom Mounting Plate

MP is a square base mount to mount the Gas Spring to the tool by using the bottom threads of the Gas Spring into the tool. MP meets the ISO 11901-2, GM 90.25 and other standards.

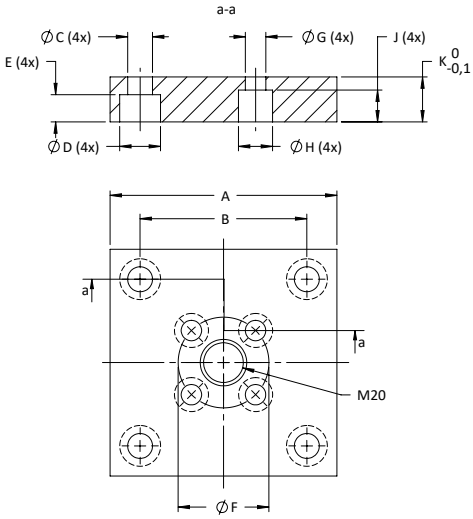
Order No.	A		B		C		D		E	
	mm	in	mm	in	mm	in	mm	in	mm	in
MP-500	70	2.756	50	1.969	9	0.354	15	0.591	12	0.472
MP-750	75	2.953	56.5	2,224	9	0.354	15	0.591	12	0.472
MP-1500	100	3.937	73.5	2,894	11	0.433	18	0.709	12	0.472
MP-3000	120	4.724	92	3.622	13.5	0,531	20	0.787	13	0.512
MP-5000	140	5.512	109.5	0,17	13.5	0,531	20	0.787	13	0.512
MP-7500	190	7.48	138	5.433	17.5	0,689	26	1.024	17	0.669
MP-10000	210	8.268	170	6.693	17.5	0,689	26	1.024	17	0.669
MPX-1500	100	3.937	73.5	2,894	10.5	0,413	18	0.709	13	0.512

Order No.	F		G		H		J		K	
	mm	in	mm	in	mm	in	mm	in	mm	in
MP-500	20	0.787	9	0.354	15	0.591	14	0.551	20	0.787
MP-750	20	0.787	9	0.354	15	0.591	14	0.551	20	0.787
MP-1500	40	1.575	9	0.354	15	0.591	14	0.551	20	0.787
MP-3000	60	2.362	9	0.354	15	0.591	14	0.551	20	0.787
MP-5000	80	3.15	11	0.433	18	0.709	15	0.591	20	0.787
MP-7500	100	3.937	11	0.433	18	0.709	20	0.787	25	0.984
MP-10000	120	4.724	13.5	0,531	20	0.787	13	0.512	25	0.984
MPX-1500	20	0.787	9	0.354	15	0.591	12	0.472	20	0.787

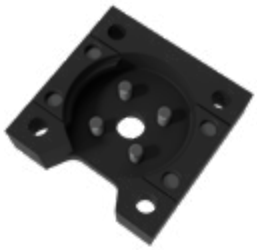
MP-500 and MP-750 (mm)



MP-1500 to MP-10000 (mm)



RM

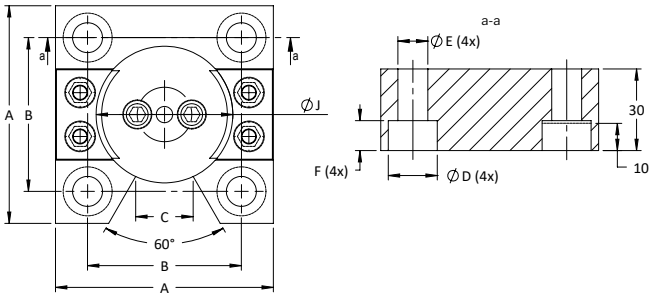


Removable Square Flange

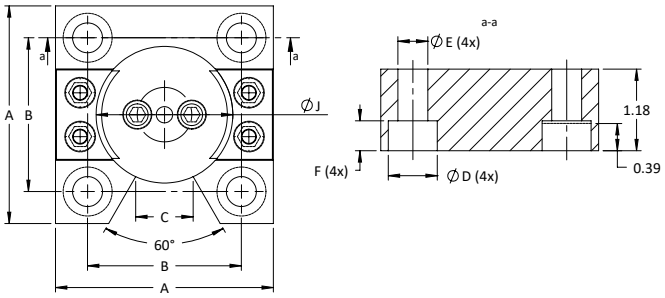
The RM mount is a removable square mount for mounting the Gas Spring in the base. The RM mount is an alternative to an SW (Square Welded) mount, making it possible to keep a more flexible inventory. The RM mount meets the Ford W-DX35-80 North America standard.

Order No.	A		B		C		D		E		F		G	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
RM-750	80	3.15	56.5	2,224	21.1	0,831	18	0.709	11	0.433	11	0.433	50.2	1,976
RM-1500	100	3.937	73.5	2,894	33.7	1,327	18	0.709	11	0.433	11	0.433	75.2	2,961
RM-3000	120	4.724	92	3.622	43.2	1,701	20	0.787	13.5	0,531	13	0.512	95.2	3,748
RM-5000	140	5.512	109.5	0,17	55.7	2,193	20	0.787	13.5	0,531	13	0.512	120.2	0,186
RM-7500	190	7.48	138	5.433	70.7	2,783	26	1.024	18	0.709	17	0.669	150.2	0,233

(mm)



(Inch)



S

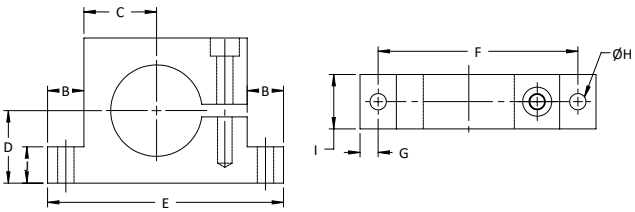
Horizontal Body Flange

The S mount is a horizontal body mount allowing the Gas Spring to be installed in any orientation within the die.

Order No.	A		B		C		D		E	
	mm	in	mm	in	mm	in	mm	in	mm	in
S-200	32.1	1,264	18	0.709	22	0.866	22.5	0,886	90	3.543
S-250	38.1	1,5	18	0.709	24	0.945	27.5	1,083	95	3.74
S-750	50.4	1,984	20	0.787	40	1.575	40	1.575	130	5.118
S-1500	75.4	2,969	22.5	0,886	52.5	2,067	52.5	2,067	160	6.299
S-3000	95.4	3,756	25	0.984	67.5	2,657	62.5	2,461	195	7.677
S-5000	120.4	0,187	27.5	1,083	77.5	3,051	74	2.913	220	8.661
S-7500	150.4	0,233	30	1.181	95	3.74	100	3.937	260	10.236
HMF-7500	45.4	1,787	17	0.669	29	1.142	30	1.181	100	3.937

Order No.	F		G		H		I		J	
	mm	in	mm	in	mm	in	mm	in	mm	in
S-200	72	2.835	9	0.354	8.5	0,335	20	0.787	15	0.591
S-250	77	3.031	8	0.315	9	0.354	20	0.787	15	0.591
S-500	82	3.228	9	0.354	9	0.354	20	0.787	15	0.591
S-750	110	4.331	10	0.394	9	0.354	30	1.181	20	0.787
S-1500	137	5.394	11.5	0,453	11	0.433	30	1.181	20	0.787
S-3000	170	6.693	12.5	0,492	13	0.512	30	1.181	20	0.787
S-5000	195	7.677	12.5	0,492	13	0.512	30	1.181	20	0.787
S-7500	230	9.055	15	0.591	13	0.512	30	1.181	20	0.787

Note! The base of the Gas Spring must always be supported when using the S mount.



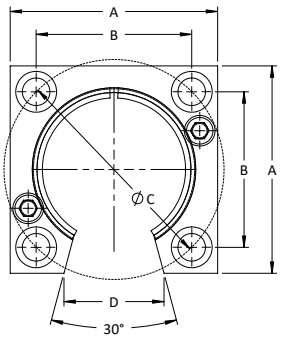
SF

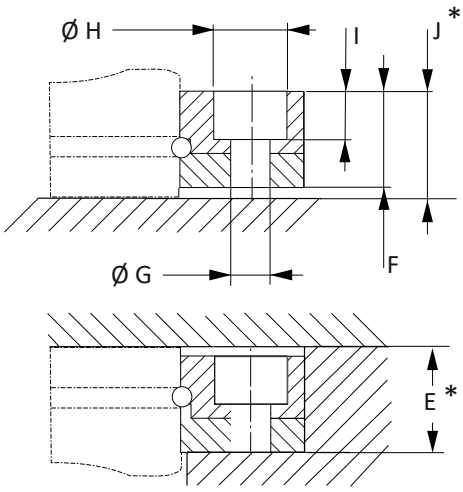
Lower Square Flange

The SF Flange type originally was developed to fit Gas Springs with a lower C-groove and consists of two halves with a lock ring between. The SF Flange can be used for both upright and upside-down installations. The SF Flange can also be used on Gas Springs with a lower U-groove by using the additional SF Adapter Ring. The SF Adapter Ring is ordered separately and is to replace the standard lock ring included in the SF Flange.

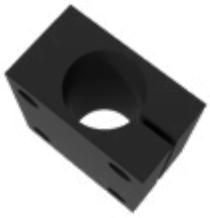
Order No.	A		B		C		D		E	
	mm	in	mm	in	mm	in	mm	in	mm	in
SF-750	76.2	3	53.9	2.122	76.2	3	35	1.378	25,7	
SF-1500	101.6	4	76.2	3	107.6	4.236	49	1.929	25,7	
SF-3000	127	5	98.3	3.87	139	5.472	61	2.402	25,7	
SF-5000	139.7	5.5	114.3	4.5	161.8	6.37	71	2.795	25,7	
SF-7500	177.8	7	139.7	5.5	197.8	7.787	88	3.465	25,7	
SFX-1500	100	3.937	73.5	2.894	103.9	4.091	49	1.929	25,5	

Order No.	F		G		H		I		J	
	mm	in	mm	in	mm	in	mm	in	mm	in
SF-750	25	0.984	11	0.433	17	0.669	11	0.433	25,7	
SF-1500	25	0.984	13	0.512	20	0.787	13	0.512	25,7	
SF-3000	25	0.984	13.5	0.531	20	0.787	13	0.512	25,7	
SF-5000	25	0.984	13.5	0.531	20	0.787	13	0.512	25,7	
SF-7500	25	0.984	18	0.709	26	1.024	17	0.669	25,7	
SFX-1500	24	0.945	11	0.433	18	0.709	11	0.433	25	





SM

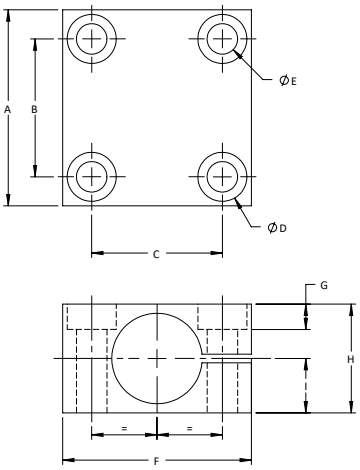


Special Body Flange

SM is a body mount for the T2-200 Gas Spring.

Order No.	A		B		C		D		E		F	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
SM-180	54	2.126	38	1.496	37	1.457	13.5	0,531	9	0.354	6.5	0,256

Order No.	G		H		I		J		K		L	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
SM-180	14.5	0,571	9	0.354	52	2.047	15	0.591	30	1.181	7	0.276



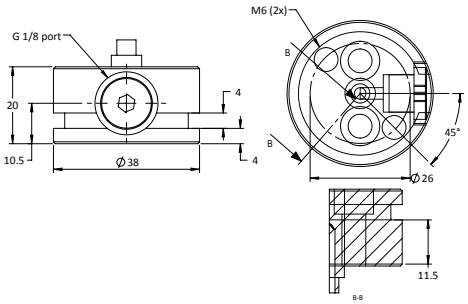
SP

Side Port Plate for the T4SC Series

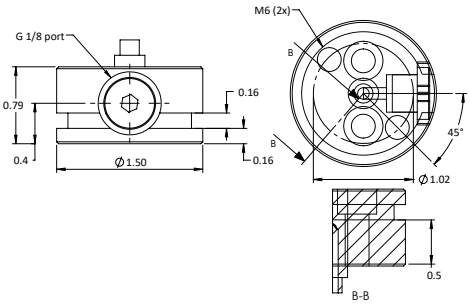
SP is a Side Port plate for the T4SC spring used for connecting into a hosed or linked system.

Order No.	B		C	
	mm	in	mm	in
SP-1000	25	0.984	38	1.496
SP-1800	26	1.024	50.2	1,976
SP-2900	34	1.339	63.2	2,488
SP-4700	40	1.575	75.2	2,961
SP-7500	52	2.047	95.2	3,748
SP-11800	68	2.677	120.2	0,186
SP-18300	90	3.543	150.2	0,233

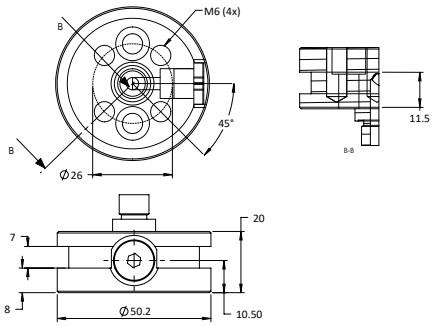
SP-1000 (mm)



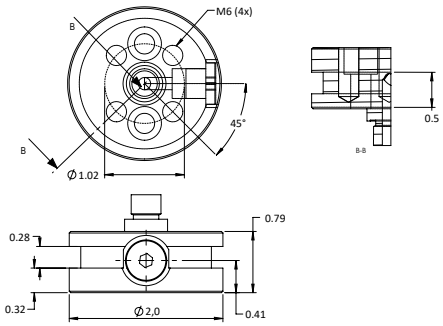
SP-1000 (Inch)



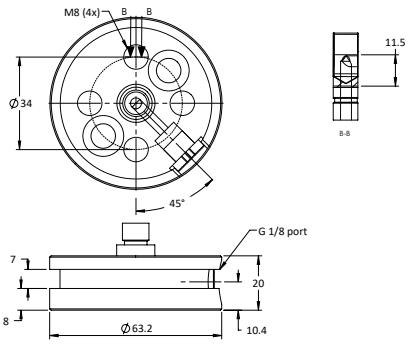
SP-1800 (mm)



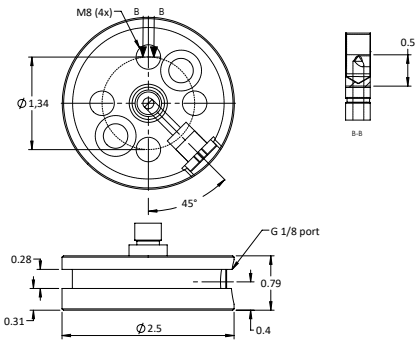
SP-1800 (Inch)



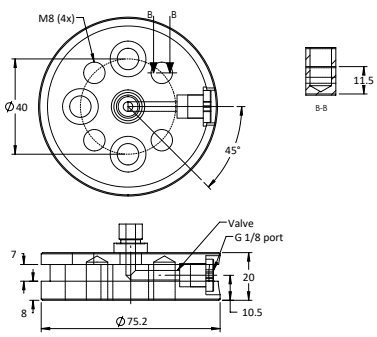
SP-2900 (mm)



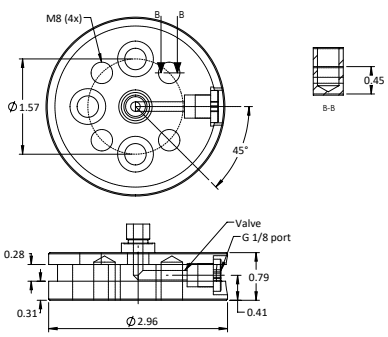
SP-2900 (mm)



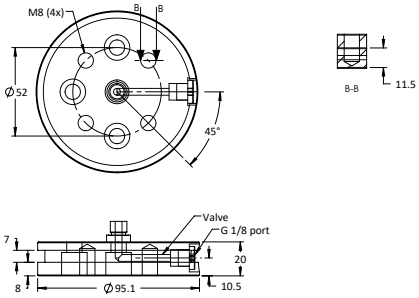
SP-4700 (mm)



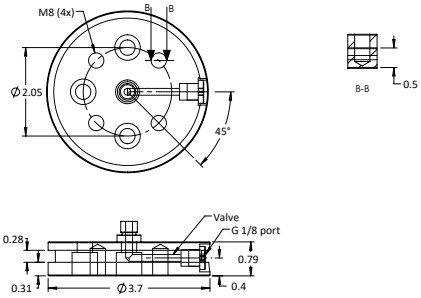
SP-4700 (Inch)



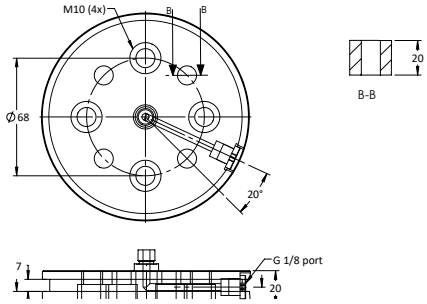
SP-7500 (mm)



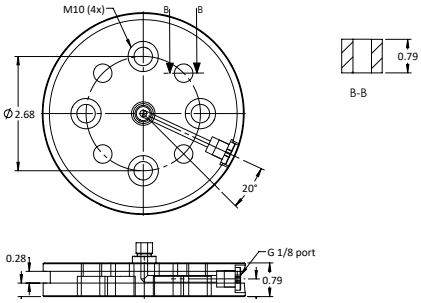
SP-7500 (Inch)



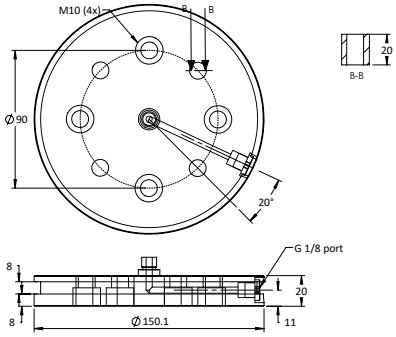
SP-11800 (mm)



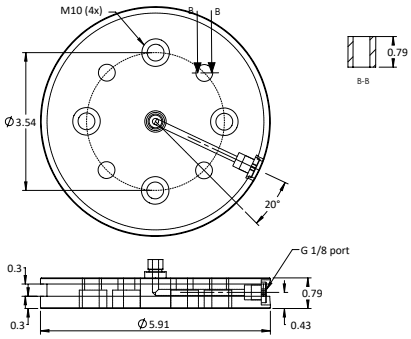
SP-11800 (Inch)



SP-11800 (mm)



SP-11800 (Inch)



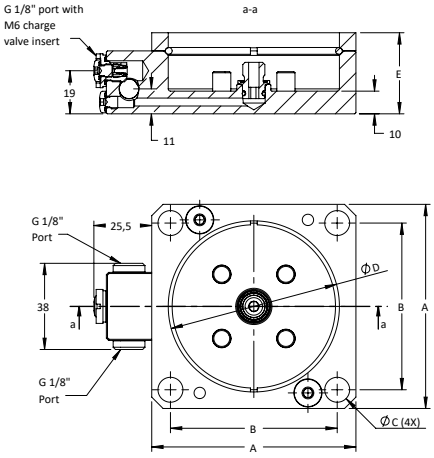
SPRM

Side Port Rear Mount

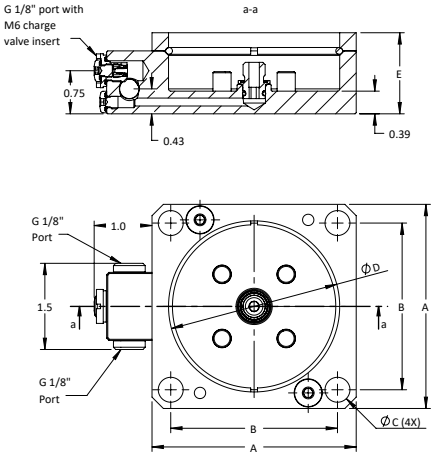
SPRM is a side port rear mount for the T4SC spring (T4SC 4700 - 18300) used for connecting into a hosed or linked system. The SPRM mount meets the Ford W-DX35-62 global standard.

Order No.	A		B		C		D		E	
	mm	in	mm	in	mm	in	mm	in	mm	in
SPRM-75	90	3.543	73.5	2,894	11	0.433	75.2	2,961	36	1.417
SPRM-95	110	4.331	92	3.622	13.5	0,531	95.2	3,748	40	1.575
SPRM-120	130	5.118	109.5	0,17	13.5	0,531	120.2	0,186	43	1.693
SPRM-150	162	6.378	138	5.433	17.5	0,689	150.2	0,233	48	1.89

(mm)



(Inch)



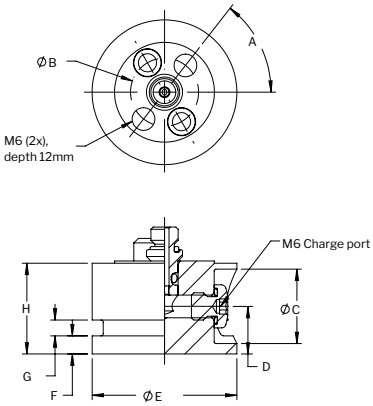
SPT5

Side Port Plate for the T5 Series

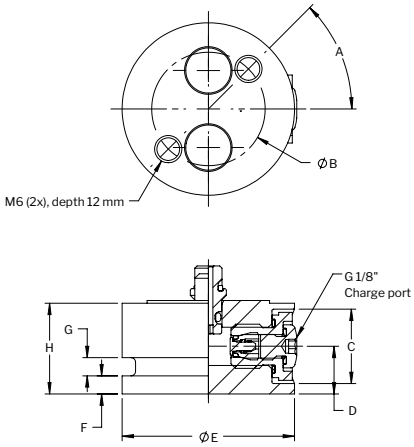
SPT5 is a side port plate for the T5 spring used for connecting into a hosed or linked system.

Order No.	A	B		C		D		E		F		G		H	
	degrees	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
SPT5-500	52°	15	0.591	16.4	0,646	10.5	0,413	31.9	1,256	4	0.157	3.5	0,138	20	0.787
SPT5-1000	45°	25	0.984	16.4	0,646	10.5	0,413	38	1.496	4	0.157	4	0.157	20	0.787
SPT5-1900	45°	26	1.024	16.4	0,646	10.5	0,413	50.2	1,976	8	0.315	7	0.276	20	0.787

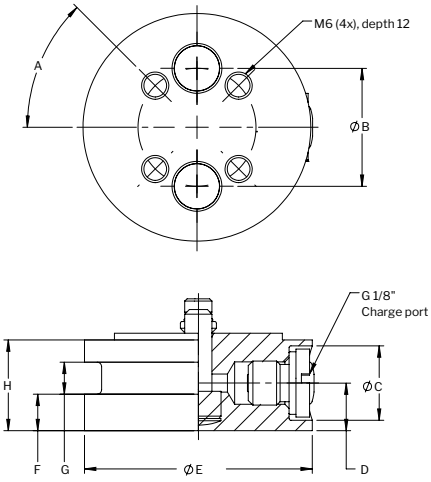
SPCX-500



SP-1000

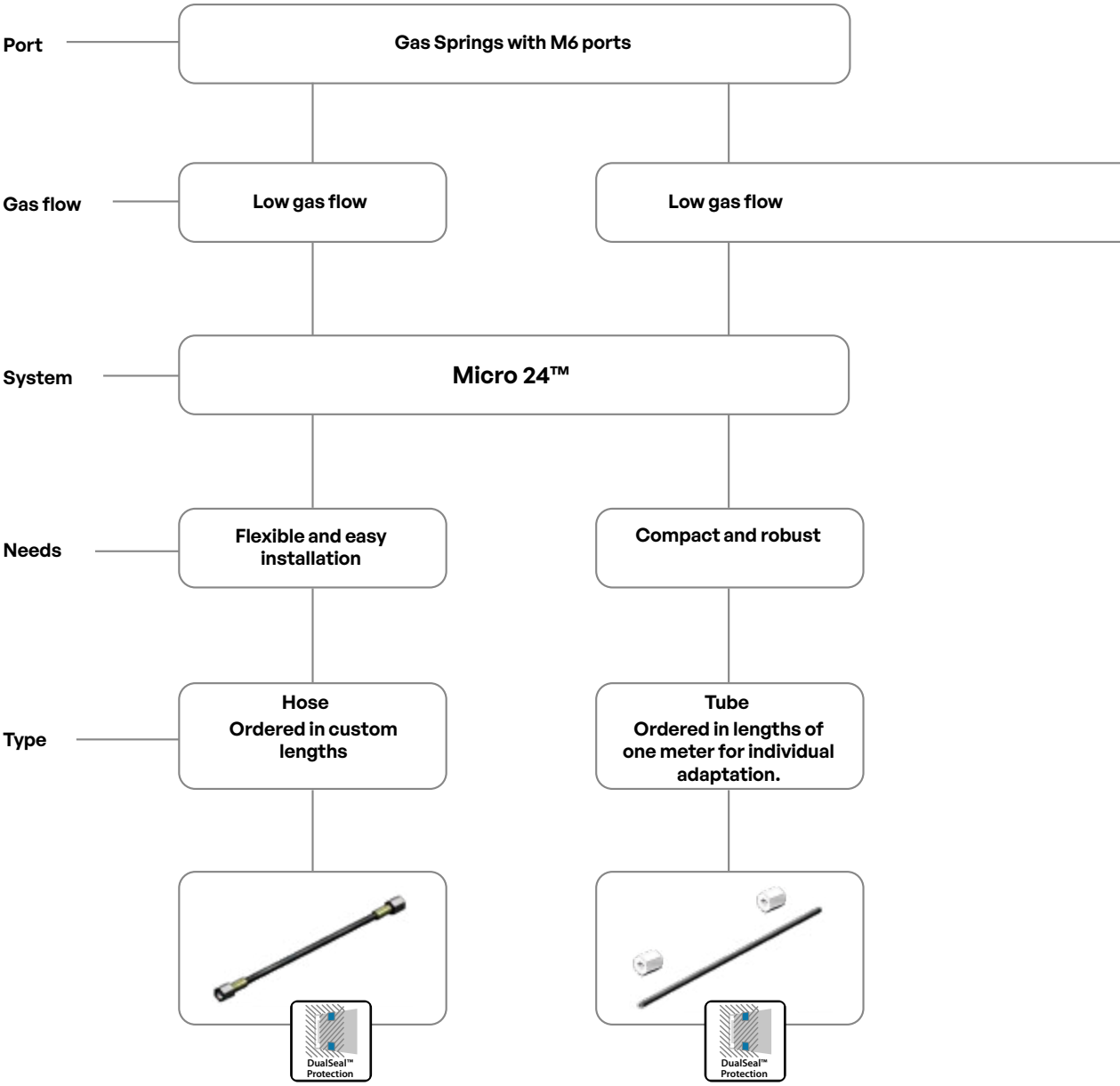


SPCX-1900



4 Hose Systems

Linking System Selection



Linking System Selection

Gas Springs with G1/8” ports

Gas Spring with G 1/8” ports or 7/16-20 ports

Low gas flow

High gas flow

EZ Hose

Dual Seal 24™

O-Ring Face Seal

Flexible and easy installation

Flexible and easy installation

Compact and robust

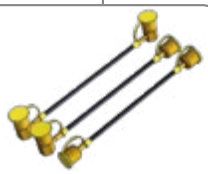
Flexible and easy installation

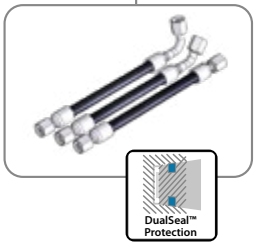
Hose
Ordered in custom lengths

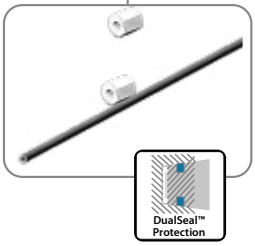
Hose
Ordered in custom lengths

Tube
Ordered in lengths of one meter for individual adaptation

Hose
Ordered in custom lengths







Introduction

Connecting nitrogen Gas Springs via hose or tube offers the distinct advantage of being able to monitor and adjust pressure as well as charge and discharge the springs from outside the die. Hyson features five separate systems for connecting Gas Springs including DualSeal 24™, Micro24™, O-Ring Face Seal and EZ Hose (CNOMO).

Micro24™/ Compact Hose & Tube System

- Featuring a dual seal design which utilizes both metal to metal & o-ring sealing, this is ideal for high vibration applications.
- Offers hard tubing options as short as 75 mm as well as the smallest hose bend radius of 20 mm which allows springs to be connected with minimum center to center distances.
- 2 mm hose and tube ID limits the speed of charge and drain times.
- Compatible for hosing springs with G 1/8, 7 /16-20 & M6 ports.

EZ/CNOMO
Hand Connection Hose System

- Offers hand tightened connections which facilitates easy.
- Connection of the Hose System with no tool required.
- 2 mm hose ID limits the speed of charge and drain times.
- The 5 mm OD hose offers a minimum bend radius of 20 mm and minimum hose length of 75 mm.
- Compatible for hosing springs with G 1/8, 7 /16-20 and M6 ports.

DualSeal 24™ Hose System/The Preferred Hose System

- Incorporates a dual seal design which utilizes both metal to metal and o-ring sealing, this is ideal for high vibration applications.
- Featuring 5 mm hose ID offering a high flow rate between springs and external tanks as well as quick charge and drain times.
- The 11 mm OD hose offers a minimum bend radius of 40 mm and minimum hose length of 120 mm.
- Compatible for hosing springs with G 1/8, 7 /16-20 & M6 ports.
- Double leak-proof joints and rotational protection.

O-Ring Face Seal

- Used for high vibration applications.
- Featuring 6.25 mm hose ID offering the highest flow rate between springs & external tanks as well as the fastest charge and drain times.
- The large diameter 13 mm OD hose requires additional accommodation to account for a minimum bend radius of 51 mm and minimum hose length of 152 mm.
- Compatible for hosing springs with G 1/8 or 7 /16-20 ports only.
- This system is recommended when high gas flow is required, such as with the CS2 Series of controllable Gas Springs or external gas tanks.

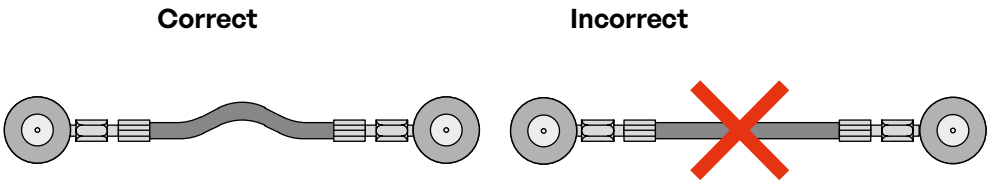
E024 Safety Guidelines

For optimum performance life:

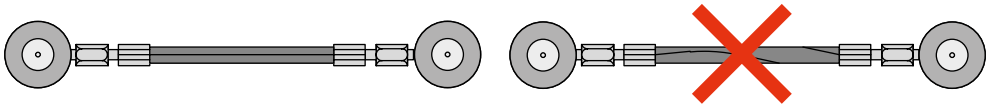
- Before connecting Gas Springs to a hosed system, discharge the nitrogen gas and remove the inlet valve from each spring.
- Position the control valve in the tool where it will be protected from mechanical damage, and on a higher level than the Gas Springs to minimize loss of lubrication oil when discharging the gas.
- Use only nitrogen (N_2) gas. The use of other types of gas can result in personal injury or failure of the Gas Spring/control panel.
- Never exceed the maximum charging pressure marked on the Gas Spring. For most standard Gas Springs, the maximum charging pressure is 150 bar/2175 psi.
- All valves on the control panel should be closed during operation.
- We do not recommend hosing Gas Springs mounted using FC or FCS Flanges as there is a risk that the Gas Spring will rotate while in operation.
- Gas Springs should be connected in a closed loop to help prevent the pad from tilting during charging.

Installation Guidelines

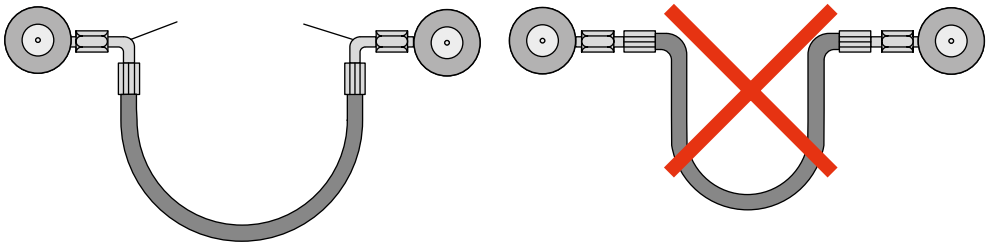
⚠ **Warning:** Never exceed the maximum values given for pressure and temperature for the hoses. Make sure that hoses and adapters are clean before assembling.



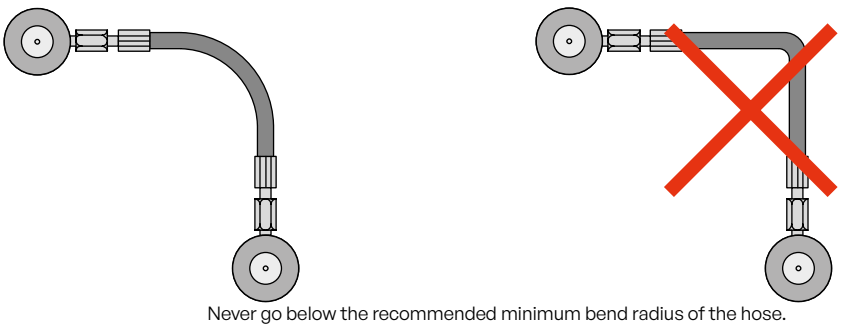
Choose a hose length that allows for a certain amount of play.



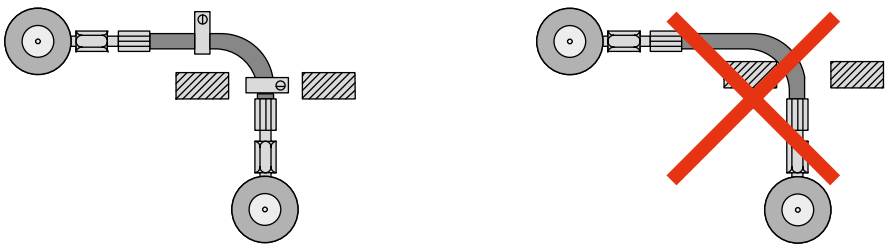
After assembly, the longitudinal marking on the hose must not be twisted.



Choose hose adapters that avoid sharp bends in the hose.



Never go below the recommended minimum bend radius of the hose.



Position the hose to avoid mechanical damage.

Micro 24™

Hose System

The Micro24™ hose features a Dual Seal System to ensure double leak-proof joints as well as rotational protection. It shares the same fittings and adapters with the Micro24™ tube for a wide range of application options. In addition, G 1/8 and G 1/4 ports can be connected to the Micro24™ using an appropriate adapter. A wide range of standard lengths is available with custom lengths 100 mm up.

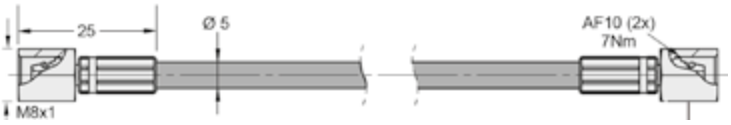
OD ..... 5 mm
ID ..... Ø2 mm
Max. Working Pressure ..... 475 bar/6888 psi
Min. Burst Pressure ..... 1900 bar/27550 psi
Min. Bend Radius ..... 20 mm
Min. Crimped Hose Length ..... 100 mm* (total length assembled)

Hose Lengths	
Order Number	**L (mm)**
4023500-0100	100
4023500-0200	200
4023500-0300	300
4023500-0400	400
4023500-0630	630
4023500-0800	800
4023500-1000	1000
4023500-1500	1500
4023500-2000	2000
4023500-XXXX	XXXX*

*** Customer specified lengths.** Assembled hose length in millimeters. Minimum order length is 100 mm. Simply add the hose length onto the Order Number (i.e., 4023500-2500 for a hose assembly of 2500 mm length).
Micro 24™ Hose and Hose End available separately.

Micro24™ Hose Only

Order Number 505081



Micro24™ Hose End

Order Number 505082

Micro24™ Hose Clip

Order Number 502646

Can be used to secure hoses using an MS screw.

Tube System

The Micro24™ tube features soft sealed and self-crimping connections to ensure leak-proof tube joints. Easily cut into correct lengths, the tube can be bent into the desired shape using a tube bending tool or even by hand.

DualSeal™ Protection

Tube (available in one meter lengths)

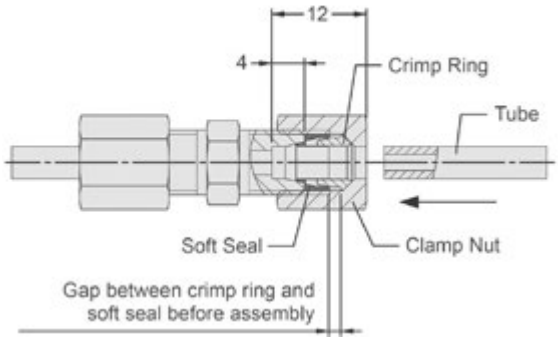
Order Number 504594-E

OD	4 mm
ID	2 mm
Max. Working Pressure	430 bar/6235 psi
Min. Burst Pressure	1100 bar/15950 psi
Min. Bend Radius	12 mm
Min. Tube Length	30 mm

Using the Micro24™ Tube

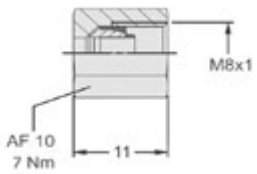
The cutting angle is 90° ± l 0. A hacksaw can be used to cut the tube. If a regular tube cutter or cutting pliers are used, the tube can become clogged limiting gas flow. Deburr the tube inside and out (max. 0.3X45° alt. R0.3) using the tube deburring tool. After cutting and deburring, clean the tube. Use compressed air to remove all loose particles.

Fit the clamp nut onto the adapter. **Note:** Do not tighten. Run the tube through the nut until it stops (~12 mm from the top surface of the nut). When tightening the nut, use a torque of 7 Nm. Tools to have available are a hacksaw, tube cutting fixture, tube bending tool, deburring tool, compressed air and torque wrench.



Tube Deburring Tool
Order Number 505096

Tube Bending Tool (Bend Radius 20 mm)
Part No. 504711

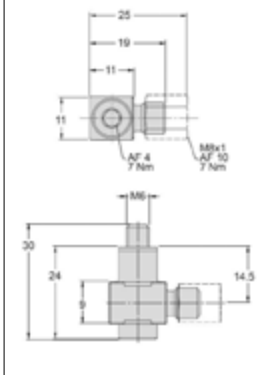


Clamp Nut
Order Number 504589

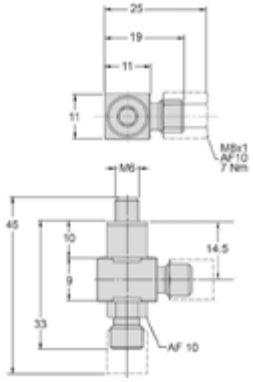
All dimensions are in millimeters unless otherwise noted.

Adapters & Connectors

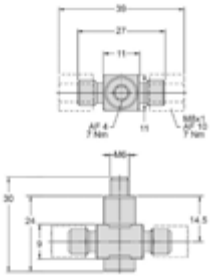
Charge Port Adapters



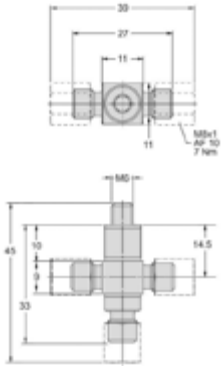
M6 Elbow Adapter for
Order Number 4022059



M6 Run Tee for
Order Number 4024092

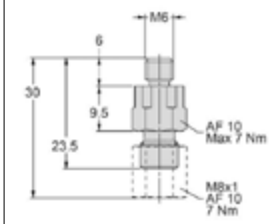


M6 Branch Tee
Order Number 4022061

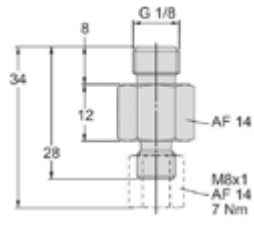


M6 Cross
Order Number 4024348

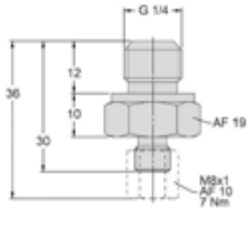
Note: When using tubes, order Clamp Nut separately.
Note: To use the M6 adapters with G 1/8 charge ports, use **Order Number 503764.** See page 264.



M6 Straight Adapter
Order Number 4022057

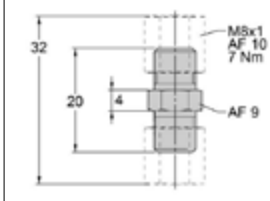


M6 Run Tee for
Order Number 4022058

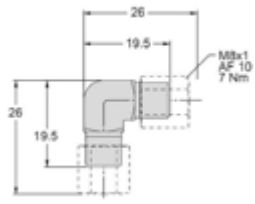


M6 Branch Tee
Order Number 4022063

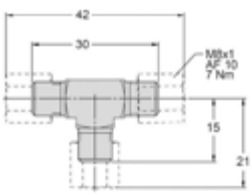
Hose-to-hose, Tube-to-Tube and Hose-to-Tube Connectors



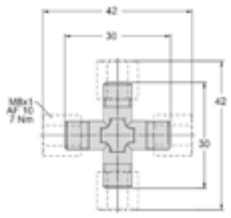
Union
Order Number 504590



Union Elbow
Order Number 504591



Union Tee
Order Number 504592



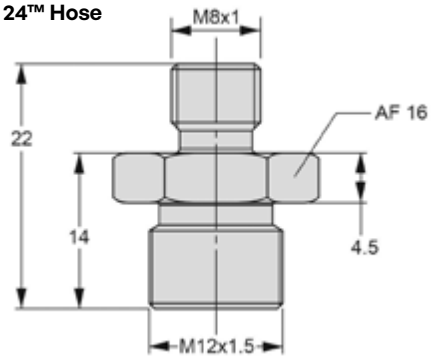
Union Cross
Order Number 504593

Note: All dimensions are nominal. Data shown are typical. Actual date for any particular unit may vary.

All dimensions are in millimeters unless otherwise noted.

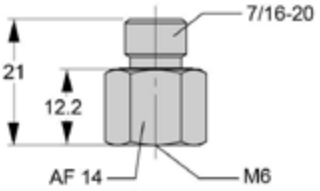
Adapters for Connecting Springs with Control Panels and Distribution Blocks

Adapter for Micro24™-to-DualSeal 24™ Hose

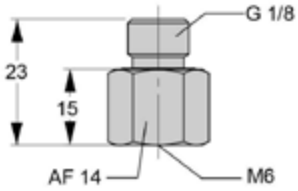


Order Number 4024351

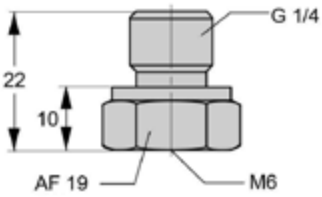
Adapters for 7/16-20, G 1/8 and G 1/4 Connection Ports



7/16-20 TO M6
Order Number 503814

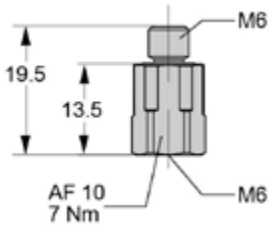


G 1/8 to M6
Order Number 503764



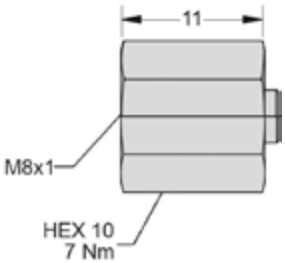
G 1/4 to M6
Order Number 503966

Adapter for Hose and Tube – M6 to M6



M6 to M6
Order Number 503762
Extension for Gas Springs using foot mounts.

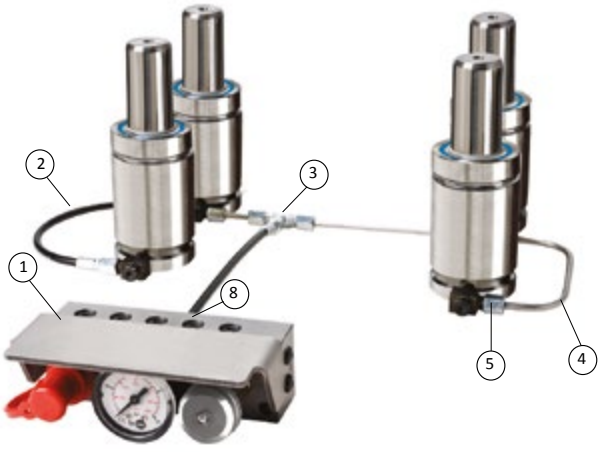
End Cap for Micro24™

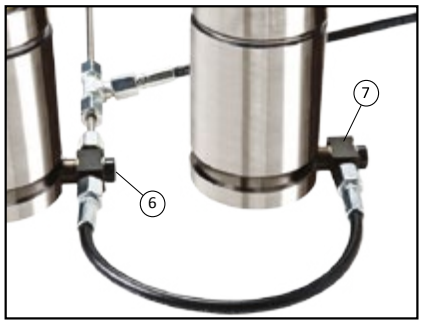


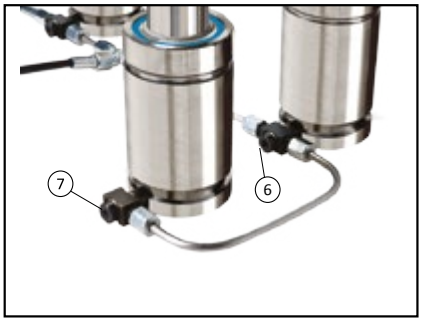
Order Number 4024353

All dimensions are in millimeters unless otherwise noted.

Installation Example







Ordering Information			
Position	**Quantity**	**Description**	**Part No.**
1	1	Micro24™ Control Panel	3123888
2	2	Micro24™ Hose	4023500-XXXX
3	1	Union Tee	504592
4	1	Micro24™ Tube	504594
5	6	Clamp Nut	504589
6	2	M6Tee	4022061
7	2	M6 Elbow	4022059
8	1	M6 Straight Adapter	4022057

Optional Accessories

Compatible with the Micro24™ Hose System, the following accessories offer additional versatility and increase the customization of your force system:

- **Pressure Monitors** which indicate pressure in hosed systems. If the pressure rises or falls below a preset level, die operation is interrupted to reduce the probability of damage to a tool, machinery or scrap parts.
- **Distribution Blocks** which allow for individual Gas Springs to be connected to a common point.
- **Modular Control Panels** allow for control of individual Gas Springs or multiple systems.

EZ Hose

Hose System

A very compact and versatile O-ring sealed system that allows connections to be tightened by hand. In addition, G 1/8 and G 1/4 ports can be connected to the EZ-Hose System using an appropriate adapter. **Not for use with compression tanks.**

A wide range of standard lengths is available with custom lengths from 150mm up.

OD ..... 5 mm
ID ..... Ø2 mm
Max. Working Pressure ..... 500 bar/7250 psi
Min. Burst Pressure ..... 2000 bar/29000 psi
Min. Bend Radius ..... 20 mm/0.79 in.
Min. Crimped Hose Length ..... 150 mm* (total length with sleeves)

EZ-Hose Clip

Order Number 502646

Secure hoses using an M5 screw.

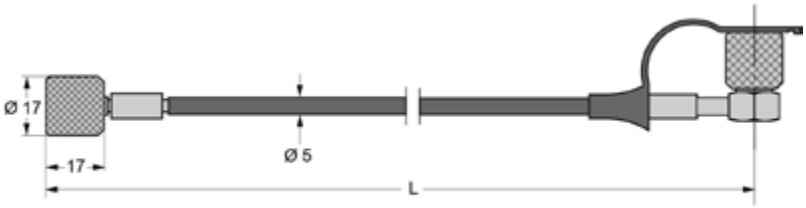
Straight–Straight

Order Number 4014974-XXXX*

Straight to Straight	
Order Number	**L (mm)**
4014974-0200	200
4014974-0300	300
4014974-0400	400
4014974-0630	630
4014974-0800	800
4014974-1000	1000
4014974-1500	1500
4014974-2000	2000
4014974-XXXX*	XXXX*

Straight–90°

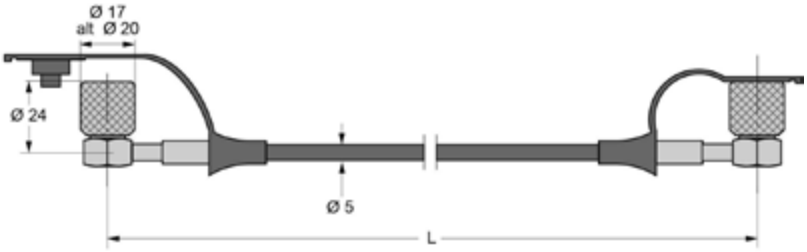
Order Number 4017568-XXXX*



Straight to 90°	
Order Number	**L (mm)**
4014974-0200	200
4014974-0300	300
4014974-0400	400
4014974-0630	630
4014974-0800	800
4014974-1000	1000
4014974-1500	1500
4014974-2000	2000
4014974-XXXX*	XXXX*

90°–90°

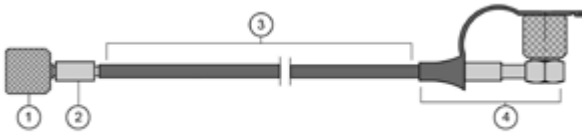
Order Number 4117568-XXXX*



90° to 90°	
Order Number	**L (mm)**
4014974-0200	200
4014974-0300	300
4014974-0400	400
4014974-0630	630
4014974-0800	800
4014974-1000	1000
4014974-1500	1500
4014974-2000	2000
4014974-XXXX*	XXXX*

* **NOTE**: "xxxx" = Assembled hose length in millimeters. Minimum order length is 120 mm. Simply add the hose length onto the Order Number (i.e., 4014974–2500 for a Straight-Straight assembly with a 2500 mm hose length).

Separate Components for EZ Hose System



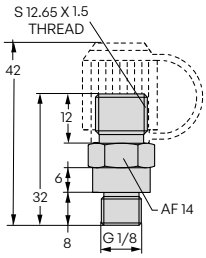
Separate Components for EZ Hose System		
	Order Number	**Description**
1	EZHF-HOSEEND	Order Ferrule Separately
2	EZHF-FERRULE	Ferrule
3	EZH-2	Hose
4	EZHF-HOSEEND-90	Comes with Ferrule and Cap

All dimensions are in millimeters unless otherwise noted.

Adapters

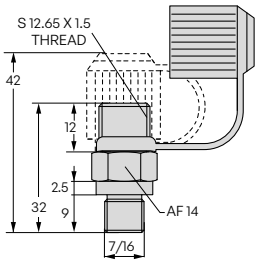
Charge Port Adapters

Hose adapters are available with three different threads: G 1/8, G 1/4, and 7/16. The G 1/8 is available with and without a check valve. We recommend the version without the check valve for Gas Springs.

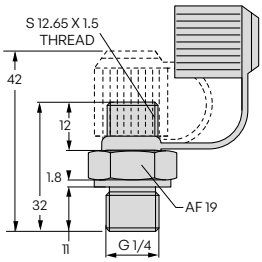


Order Number 4014973-G 1/8
(with check valve)

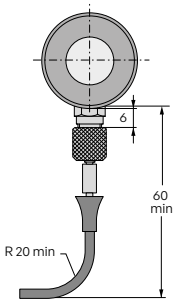
Order Number 4114973-G 1/8
(without check valve)

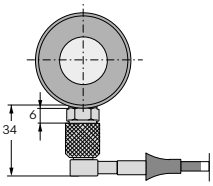


Order Number 4114973-7/16
(without check valve)



Order Number 4014973-G 1/4
(with check valve)

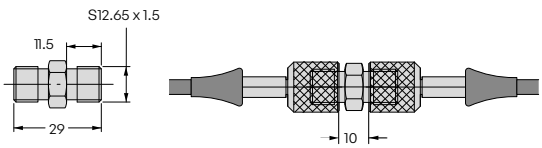




Adapter example with straight and 90° hose

Hose-to-Hose Connector Union

Order Number 503674

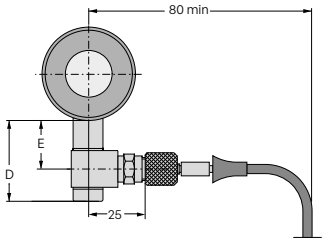


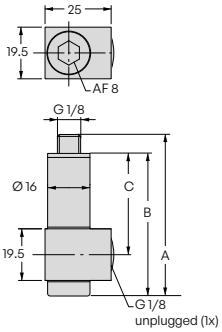
All dimensions are in millimeters unless otherwise noted.

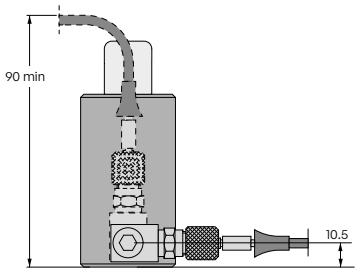
EZ-Hose Adapters for Gas Springs with G 1/8 Port

EZ-Hose Adapters						
Order Number	**A** mm	**B** mm	**C** mm	**D** mm	**E** mm	**FFC Mounting Limitations**
4016050-01	40	32.5	17	26	11	Cannot be used with FFC mounts.
4016050-02	54	46.5	31	40.5	25	Can be used only with FFC 500, 750, 1500 & 3000 mounts.
4016050-03	61	53.5	38	47.5	32	Can be used with all FFC mounts.

Application Example



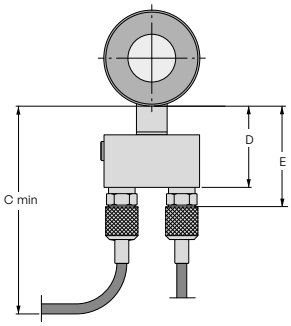


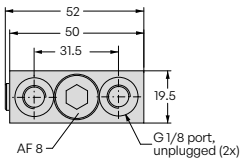


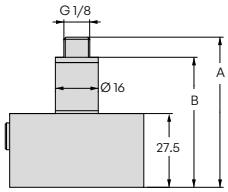
Front Adapter for Gas Springs with G 1/8 Port

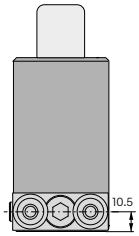
Front Adapter						
Order Number	**A** mm	**B** mm	**C** mm	**D** mm	**E** mm	**FFC Mounting Limitations**
4017314-01	42	34.5	95	28.5	40	Cannot be used with FFC mounts.
4017314-02	56	48.5	110	42.5	54	Can be used only with FFC 500, 750, 1500 & 3000 mounts.
4017314-03	63	56.5	115	49.5	61	Can be used with all FFC mounts.

Application Example





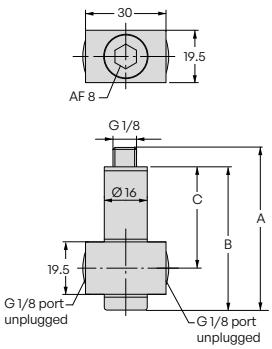




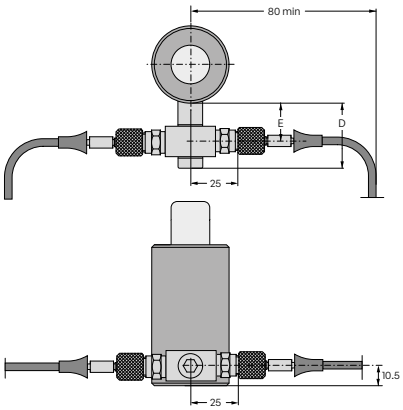
All dimensions are in millimeters unless otherwise noted.

Two-Way Adapter for Gas Springs with G 1/8 Port

Two-Way Adapter						
Order Number	**A** mm	**B** mm	**C** mm	**D** mm	**E** mm	**FFC Mounting Limitations**
4016051-01	40	32.5	17	26.5	11	Cannot be used with FFC mounts.
4016051-02	54	46.5	31	40.5	25	Can be used only with FFC 500, 750, 1500 & 3000 mounts.
4016051-03	61	53.5	38	47.5	32	Can be used with all FFC mounts.

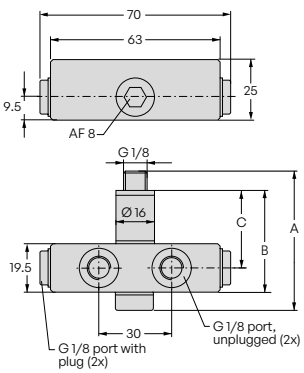


Application Example

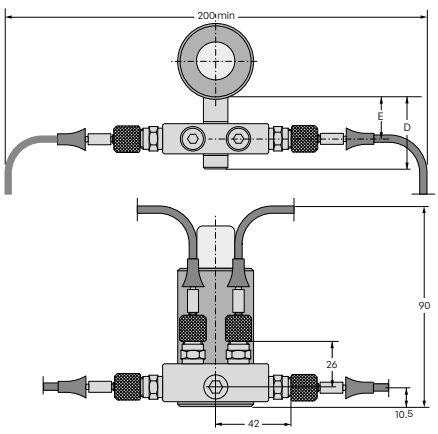


Four-Way Adapter for Gas Springs with G 1/8 Port

Four-Way Adapter						
Order Number	**A** mm	**B** mm	**C** mm	**D** mm	**E** mm	**FFC Mounting Limitations**
4015035-01	40	32.5	17	26.5	11	Cannot be used with FFC mounts.
4015035-02	54	46.5	31	40.5	25	Can be used only with FFC 500, 750, 1500 & 3000 mounts.
4015035-03	61	53.5	38	47.5	32	Can be used with all FFC mounts.



Application Example



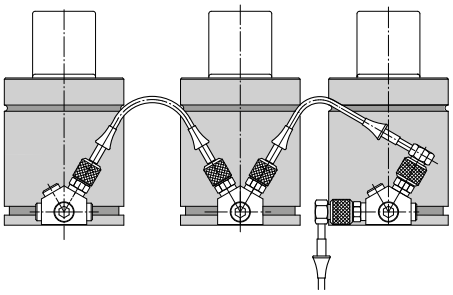
All dimensions are in millimeters unless otherwise noted.

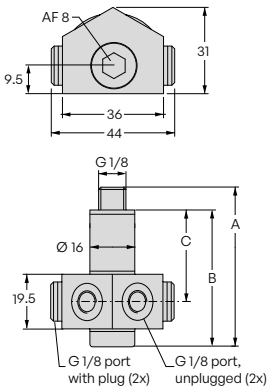
Multi-Way Adapter for Gas Springs with G 1/8 Port

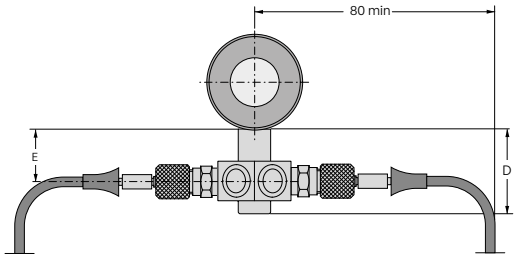
Multi-Way Adapter						
Order Number	**A** mm	**B** mm	**C** mm	**D** mm	**E** mm	**FFC Mounting Limitations**
3017191-01	40	32.5	17	26.5	11	Cannot be used with FFC mounts.
3017191-02	54	46.5	31	40.5	25	Can be used only with FFC 500, 750, 1500 & 3000 mounts.
3017191-03	61	53.5	38	47.5	32	Can be used with all FFC mounts.

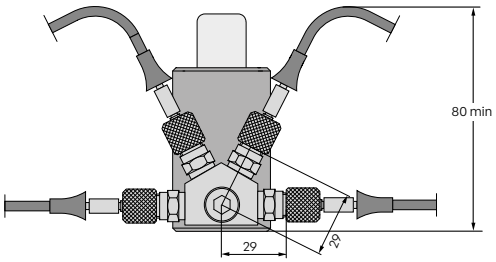
This adapter is ideal when the distance between Gas Springs is short.

Application Example





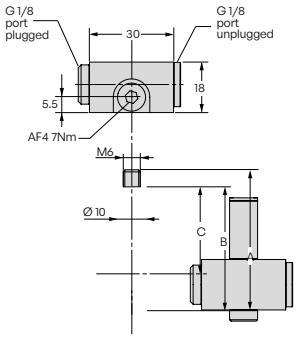




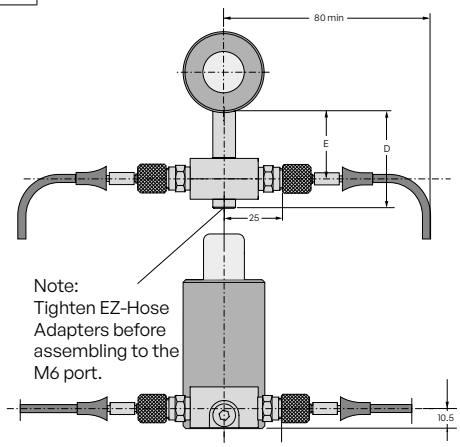
All dimensions are in millimeters unless otherwise noted.

Two-Way Adapter for Gas Springs with M6 Port

Two-Way Adapter for Gas Springs with M6 Port						
Order Number	**A** mm	**B** mm	**C** mm	**D** mm	**E** mm	**FFC Mounting Limitations**
4023519	36	30	17	25.5	12.5	Can be used only with FFC 500, 750, 1500 & 3000 mounts.
4023506	49	44	31	39.5	26.5	Can be used with all FFC mounts.

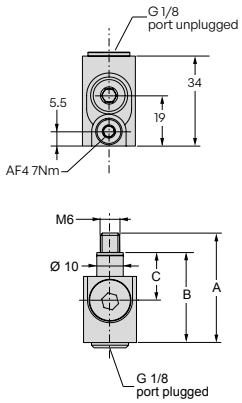


Application Example

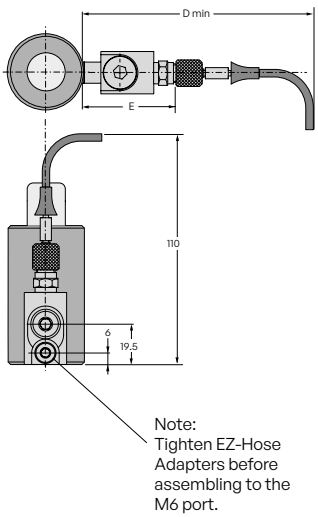


Angle Adapter for Gas Springs with M6 Port

Angle Adapter for Gas Springs with M6 Port						
Order Number	**A** mm	**B** mm	**C** mm	**D** mm	**E** mm	**FFC Mounting Limitations**
4023520	39	34	18	110	45	Can be used only with FFC 500, 750, 1500 & 3000 mounts.
4023518	51	46	30	120	57	Can be used with all FFC mounts.

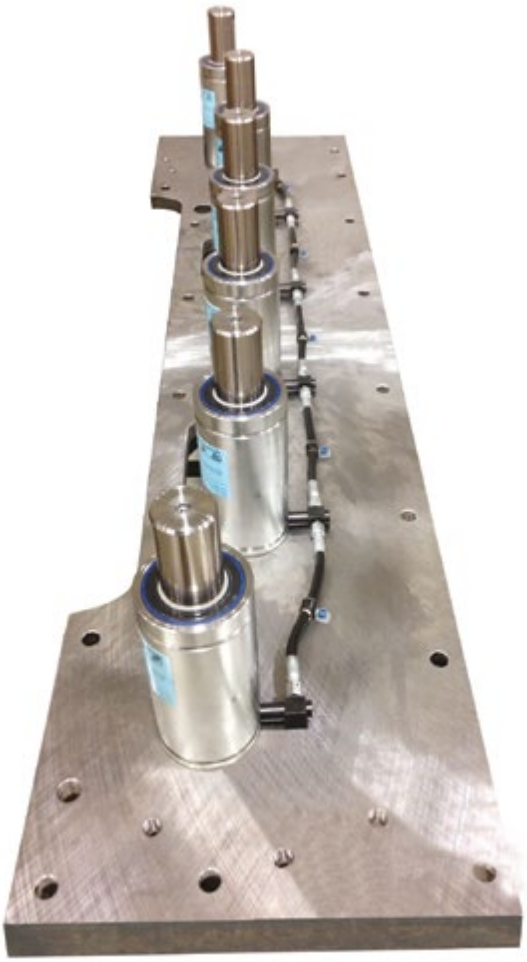


Application Example



All dimensions are in millimeters unless otherwise noted.

DualSeal 24™



Hose System

Our most popular Hose System to connect nitrogen Gas Springs, distribution blocks and control panels using an appropriate adapter. It features a DualSeal™ System to ensure double leak-proof joints as well as rotational protection.
All preassembled hose segments are factory crimped and tested for certified sealing.

OD 11mm
ID Ø5mm
Max. Working Pressure ..... 345 bar/5,000 psi
Min. Burst Pressure ..... 1,380 bar/20,000 psi
Min. Bend Radius 40mm
Min. Crimped Hose Length ..... 120mm (total length assembled)

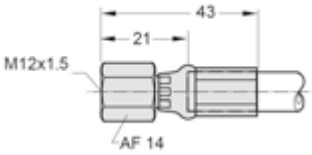
• Meets SAE 100R8 and ISO 3949-2 specifications.

DualSeal 24™ Cut-to-Length Hose

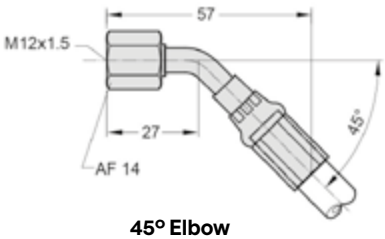
Order Number 502319-L

Sold by the millimeter.

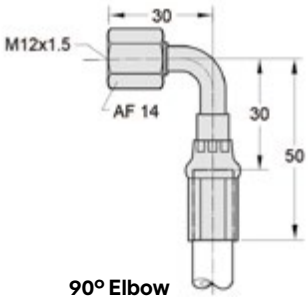
DualSeal 24™ Hose Connections for Crimping



Straight
Order Number 504141



45° Elbow
Order Number 504142



90° Elbow
Order Number 504143

DualSeal 24™ Hose Clip

Order Number HC-GM-E024

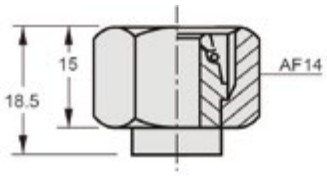
Secure hoses using an M6 screw.

All dimensions are in millimeters unless otherwise noted.

DualSeal 24™ End Cap

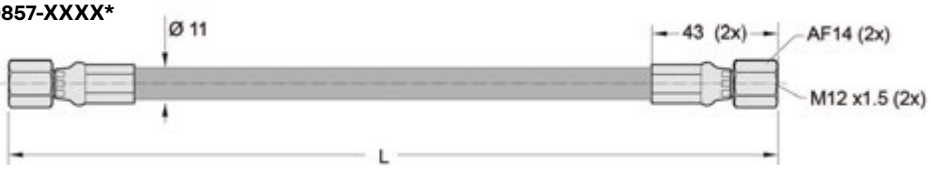
Order Number 504913

For capping unused hose connections.



Pre-Assembled Hose Segments / Straight–Straight

Order Number 3020857-XXXX*



Pre-Assembled Hose Segments / Straight–45°

Order Number 3120857-XXXX*

Pre-Assembled Hose Segments / Straight–90°

Order Number 3220857-XXXX*

*** Note:** "xxxx" = Assembled hose length in millimeters. Minimum order length is 120 mm. Simply add the hose length onto the order number (i.e., 3020857–2500 for a straight-straight assembly with a 2500 mm hose length).

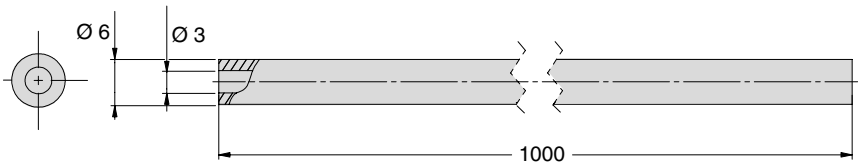
All dimensions are in millimeters unless otherwise noted.

Tube System

The DualSeal 24™ tube features soft sealed and self-crimping connections to ensure leak-proof tube joints. Easily cut into correct lengths, the tube can be bent into the desired shape using a tube bending tool or even by hand.

Tube (available in one meter lengths)

Order Number 505393

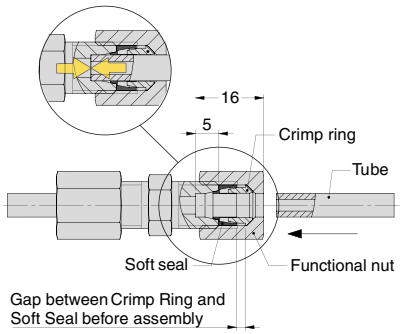


OD 6mm
ID 3mm
Max. Working Pressure ..... 400 bar/5801 psi
Min. Burst Pressure ..... 1400 bar/20305 psi
Min. Bend Radius 18mm
Min. Tube Length 75mm

Using the DualSeal 24™ Tube

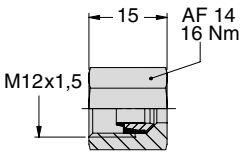
The cutting angle is 90° ± l 0. A hacksaw can be used to cut the tube. If a regular tube cutter or cutting pliers are used, the tube can become clogged limiting gas flow. Deburr the tube inside and out (max. 0.3X45° alt. R0.3) using the tube deburring tool. After cutting and deburring, clean the tube. Use compressed air to remove all loose particles.

Note: Do not tighten! Run the tube through the nut until it stops (~16 mm from the top surface of the nut). When tightening the nut, use a torque of 16 Nm. Recommended tools to have available: hacksaw, tube cutting fixture, tube bending tool, deburring tool, compressed air and a torque wrench (AF 14 mm, 16 Nm).



Tube Deburring Tool

Order Number 505096



Functional Nut

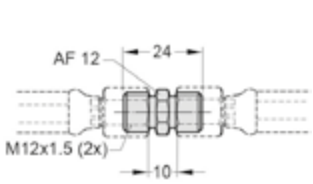
Order Number 504047

Tube Bending Tool (Bend Radius 20mm)

Order Number 505096

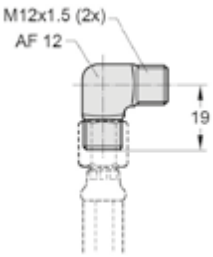
Connectors

Hose-to-Hose Connectors



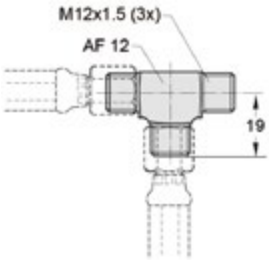
Union

Order Number 504149



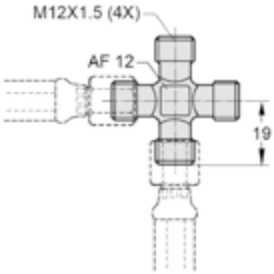
Union Elbow

Order Number 504150



Union Tee

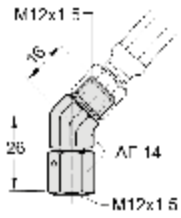
Order Number 504151



Union Cross

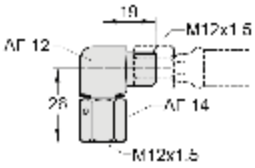
Order Number 504152

Standard Adapter-to-Hose Connectors



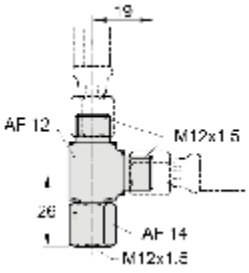
45° Elbow

Order Number 504145



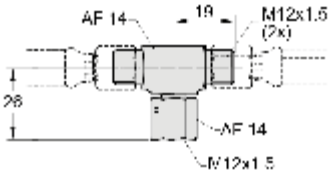
90° Elbow

Order Number 504146



Run Tee

Order Number 504147



Branch Tee

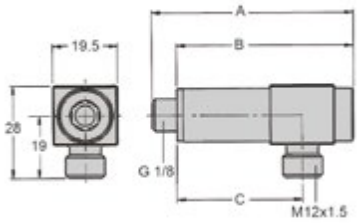
Order Number 504148

All dimensions are in millimeters unless otherwise noted.

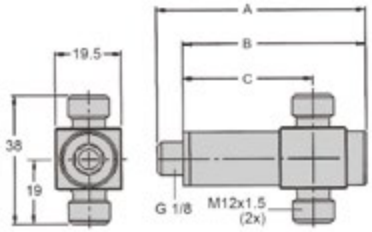
Adapters

Heavy Duty Hose Adapters for Connecting Springs with G 1/8 Port

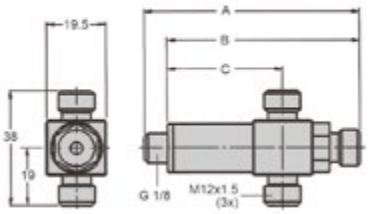
Elbow Adapter			
Order Number	**A** mm	**B** mm	**C** mm
3025562-01	40	34.5	17
3025562-02	54	48.5	31
3025562-03	61	56.5	38



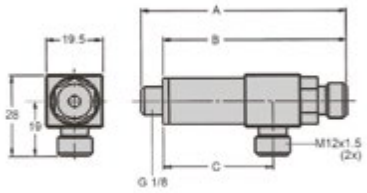
Elbow Adapter			
Order Number	**A** mm	**B** mm	**C** mm
3025551-01	40	32.5	17
3025551-02	54	46.5	31
3025551-03	61	53.5	38



Elbow Adapter			
Order Number	**A** mm	**B** mm	**C** mm
3025594-01	50	42.5	17
3025594-02	64	56.5	31
3025594-03	71	63.5	38



Elbow Adapter			
Order Number	**A** mm	**B** mm	**C** mm
3025599-01	50	42.5	17
3025599-02	64	56.5	31
3025599-03	71	63.5	38

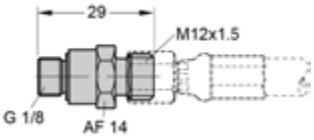


Straight Adapters

The DualSeal 24™ Hose system has M12X1.5 mm threads for connecting the springs, the control panels and the distribution blocks to the hose segments or connectors.

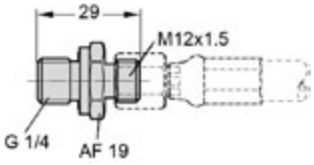
Straight G 1/8 Adapter

Order Number 503593



Straight G 1/4 Adapter

Order Number 504144



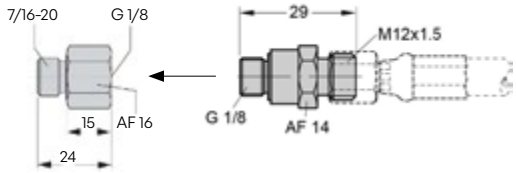
*** Note:** For applications with SAE-4 ports, utilize combination of adapters 503593 with NF-1600-G 1/8-4.

Straight 7/16-20 Adapter

Order Number

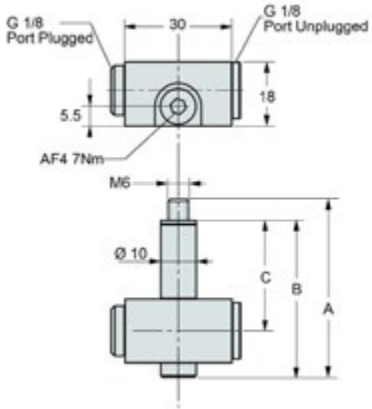
Straight G 1/8 Adapter

Order Number 503593

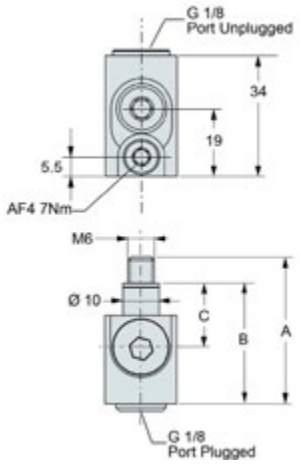


Standard Hose Adapters for Connecting Springs and Distribution Blocks with M6 Ports

Two-Way Adapter			
Order Number	**A** mm	**B** mm	**C** mm
4023519	36	30	17
4023506	49	44	31



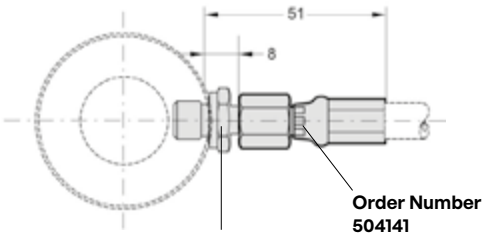
Angle Adapter			
Order Number	**A** mm	**B** mm	**C** mm
4023520	39	34	18
4023518	51	46	30



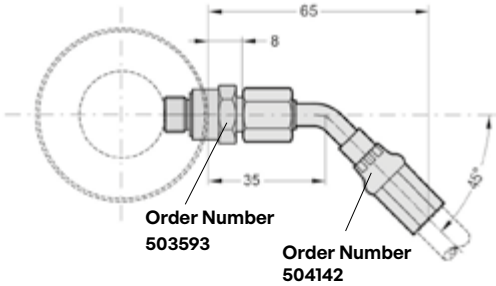
All dimensions are in millimeters unless otherwise noted.

Installation Examples

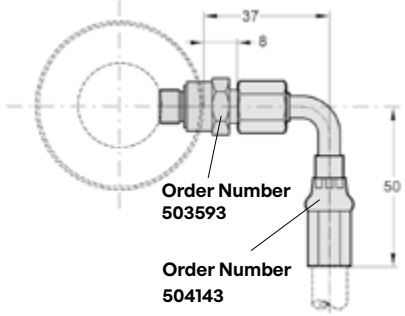
Straight Hose Connection



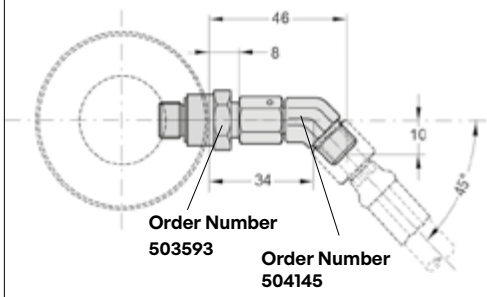
45° Hose Connection



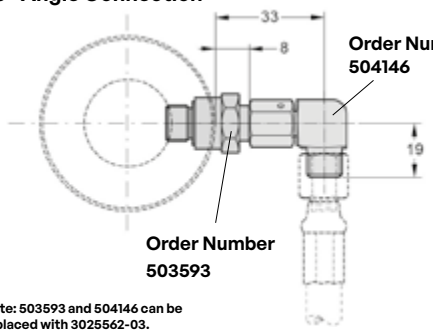
90° Hose Connection



45° Angle Connection

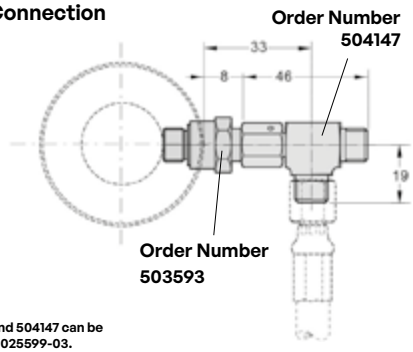


90° Angle Connection



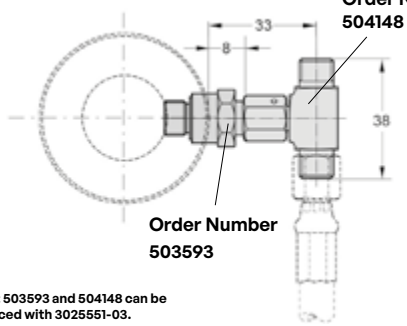
Note: 503593 and 504146 can be replaced with 3025562-03.

Run Tee Connection



Note: 503593 and 504147 can be replaced with 3025599-03.

Branch Tee Connection



Note: 503593 and 504148 can be replaced with 3025551-03.

All dimensions are in millimeters unless otherwise noted.

O-Ring Face Seal

Hose System

The O-Ring Face Seal System is used in high vibration applications and systems with high gas flow requirements.

OD..... 13mm

ID..... 6.25mm

Max. Working Pressure.....345 bar

Min. Burst Pressure..... 1380 bar

Min. Bend Radius..... 51mm

Min. Crimped Hose Length.....150mm (total length with sleeves)

Hose Clip

Order Number HC-5

Secure hoses using an M6 screw.

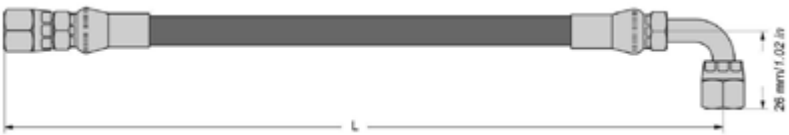
Straight – Straight
Order Number ORH-S-S-XXXX

Straight – Straight		
Order Number	**L(mm)**	**L (in)**
ORH-S-S-0200	200	7.87
ORH-S-S-0300	300	11.81
ORH-S-S-0400	400	15.75
ORH-S-S-0630	630	24.80
ORH-S-S-0800	800	31.50
ORH-S-S-1000	1000	39.37
ORH-S-S-1500	1500	59.06
ORH-S-S-2000	2000	78.74
ORH-S-S-XXXX	XXXX*	XXXX*

Straight – 45°
Order Number ORH-S-45-XXXX

Straight – 45°		
Order Number	**L(mm)**	**L (in)**
ORH-S-45-0200	200	7.87
ORH-S-45-0300	300	11.81
ORH-S-45-0400	400	15.75
ORH-S-45-0630	630	24.80
ORH-S-45-0800	800	31.50
ORH-S-45-1000	1000	39.37
ORH-S-45-1500	1500	59.06
ORH-S-45-2000	2000	78.74
ORH-S-45-XXXX	XXXX*	XXXX*

Straight – 90°
Order Number ORH-S-90-XXXX



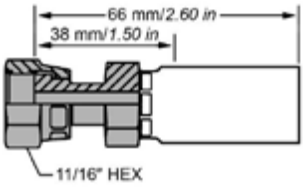
Straight – 90°		
Order Number	**L(mm)**	**L (in)**
ORH-S-90-0200	200	7.87
ORH-S-90-0300	300	11.81
ORH-S-90-0400	400	15.75
ORH-S-90-0630	630	24.80
ORH-S-90-0800	800	31.50
ORH-S-90-1000	1000	39.37
ORH-S-90-1500	1500	59.06
ORH-S-90-2000	2000	78.74
ORH-S-90-XXXX	XXXX*	XXXX*

O-Ring Face Seal Hose
Order Number ORH-4

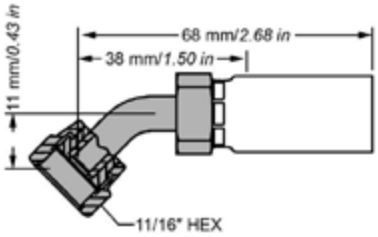
*** Note:** "xxxx" = Assembled hose length in millimeters. Minimum order length is 150mm. Simply add the hose length onto the Order Number (i.e., ORH-S-S-2500 for a Straight–Straight assembly with a 2500mm hose length).

Connectors and Adapters

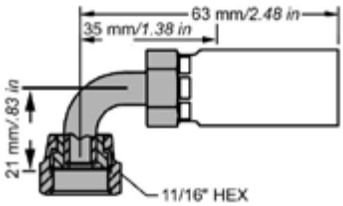
O-Ring Face Seal Hose Connections for Crimping



Straight
Order Number ORHF-4

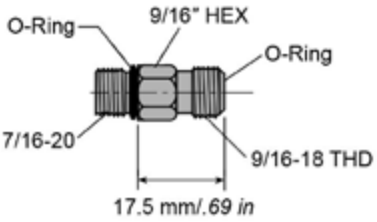


45° Elbow
Order Number ORHF-4500-4

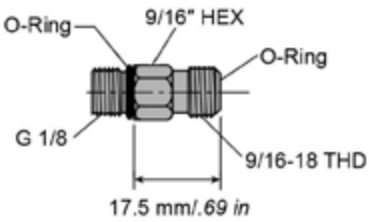


90° Elbow
Order Number ORHF-2000-4

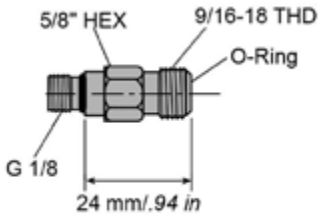
Charge Port Adapters



Straight 7/16-20 Adapter
Order Number ORF-1000-4

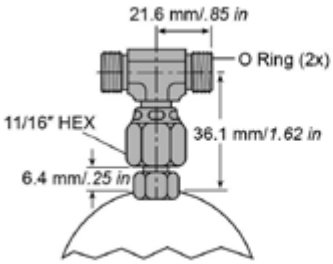


Straight G 1/8 Adapter
Order Number ORF-1000-G1/8

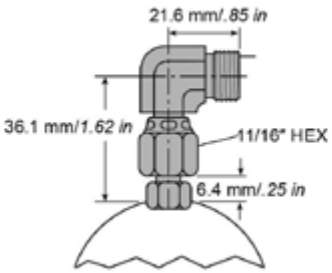


Straight G 1/8 Adapter
Order Number 9106252-F

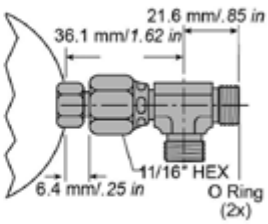
Adapter-to-Hose Connectors



Branch Tee
Order Number ORF-3000-4

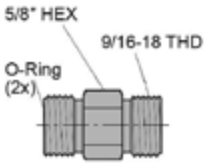


90° Elbow
Order Number ORF-2000-4

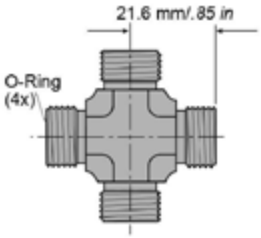


Run Tee
Order Number ORF-3300-4

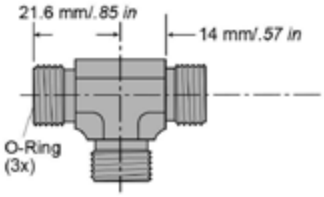
Adapter-to-Hose Connectors



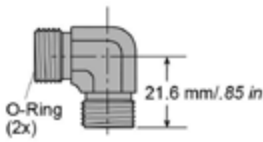
Union
Order Number ORF-1100-4



Union Cross
Order Number ORF-5500-4



Union Tee
Order Number ORF-3500-4



Union Elbow
Order Number ORF-2500-4

Hose System Accessories

Introduction

Customers who operate their Gas Springs in an interconnected Hose System recognize several advantages:

- **Greater force controllability:** Can easily monitor, adjust and control the pressure of the Gas Springs from outside the die.
- **Enhanced monitoring:** Allows for pressure monitor connections which can detect when the pressure is outside of the min/max point and automatically stop the press.
- **Customized force profile:** Accommodates volume tanks to reduce pressure rise of the Gas Spring System and thus improve the formability of parts.

Hyson recommends the DualSeal 24™ Hose System as our premier Hose System. It is the most robust and durable Hose System while being compact and easily routed through dies. In addition, Hyson offers several other Hose Systems including Micro24™ , O-Ring Face and EZ. Refer to the respective Hyson Hose System catalogs to select your specific Hose System, fittings and control panels.

For service parts applicable to all Hose Systems, refer to Hyson's Service and Maintenance Catalog.

Additional accessories found in this catalog are compatible with all Hyson Hose Systems and can offer further benefits:

- **MODCP:** When applications call for multiple points of control, MODCP panels offer the ability to control pressure of each station uniquely with centralized panel.
- **CP-XM:** A control panel designed specifically for high pressure Gas Springs TNKS, TNKT, TNKB and TS Series.
- **COMPRESSION TANKS:** When Gas Springs are preferred, but pressure rise of the system needs reduced, these tanks can reduce the pressure rise typically to the 20-30% range.
- **TNKMAN:** Provides an alternative to standard hose routing to reduce fittings including expensive elbows and tees.
- **PRESSURE MONITORS:** For greatest peace of mind, Hyson pressure monitors offer the ability to connect the Gas Spring system to the press controls such that the operation is stopped should the system pressure fall outside the allowable range.

Control Panels

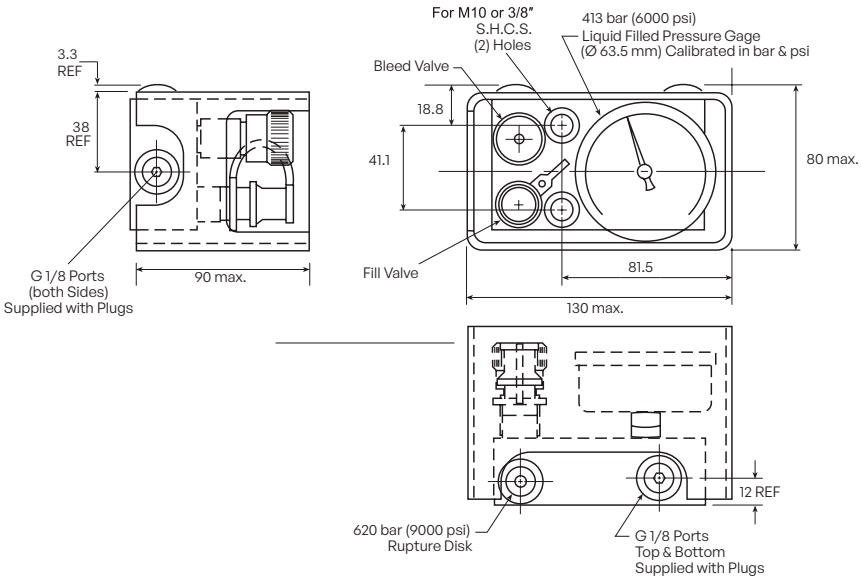
The Control Panel contains bleed and fill valves anda pressure gauge for charging, exhausting and reading pressure in the system. A rupture disk safety feature is also included to ensure all system pressure is exhausted keeping springs from becoming over-pressurized in the event the pressure exceeds a safe level for the system.

Control Panel

Order Number CP-N2-T-VR
Available with Soft Seal High Flow Bleed Down Valve.

Order Number: CP-N2-T-HF
Straight Adapter and Mounting Screws are sold separately.

⚠ Not to be used with TNKS, TNKT, TNKB and T5 Series.



Mounting Parts		
Order Number	**Description**	**For Product Line**
4022058	Straight Adapter	Micro24™
4114973-G1/8	Straight Adapter	EZ Hose (CNOMO)
503593	Straight Adapter	DualSeal 24™
ORF-1000-G1/8	Straight Adapter	0-Ring Face
CS M10-1.5X30MM	Mounting Screws - Metric	Applicable to all Hyson Hose Systems
CS 3/8-16X1250	Mounting Screws - English	

Service Parts	
Order Number	**Description**
1032773	Bleed Valve
11-700-8555	Fill Valve
51-700-9000-LG	Pressure Gauge
RD-XP	Rupture Disk
11-700-8520-HF	High Flow Bleed Valve

Sensor Ready Control Panel

For remote connection to a Manifold Plate.
Port available for adding a toolmind sensor (sold seperately).

Order Number CP N2 T-S

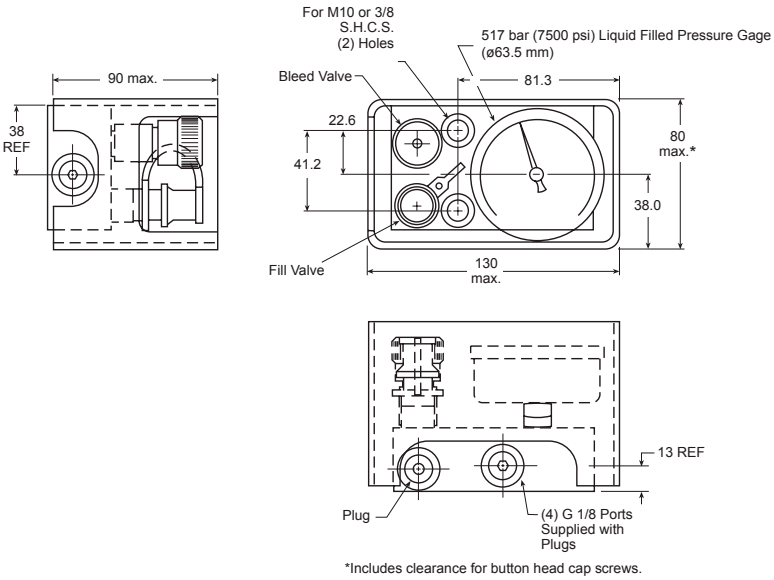
All dimensions are in millimeters unless otherwise noted.

CP-XM

Order Number CP-XM
Order Number CP-XM OR

Designed for use with higher pressure operating Gas Spring systems including TNKS, TNKT, TNKB and T5 Series.

- Does not include rupture disk.
- Straight fitting and mounting screws are sold separately.



*Includes clearance for button head cap screws.

Mounting Parts		
Order Number	**Description**	**For Product Line**
4022058	Straight Adapter	Micro24™
4114973-G1/8	Straight Adapter	EZ Hose (CNOMO)
503593	Straight Adapter	DualSeal 24™
ORF-1000-G1/8	Straight Adapter	0-Ring Face
CS M10-1.5X30MM	Mounting Screws - Metric	Applicable to all Hyson Hose Systems
CS 3/8-16X1250	Mounting Screws - English	

Service Parts	
Order Number	**Description**
1032773	Bleed Valve
11-700-8555	Fill Valve
51-700-9000-LG	Pressure Gauge

All dimensions are in millimeters unless otherwise noted.

MODCP

Utilizing Hyson's Modular Control Panels (MODCP's), users can easily set and verify gas charging pressure on each spring or spring system individually. This feature allows die designers to vary the force in each spring while still having the benefits of a Hose System and a central panel to verify and adjust pressures. The updates include:

- More compact design compared to the original MODCP product line.
- Expanded to offer up to 10 individually controlled modules
- Visual guides to easily see which modules are On/Off.
- For additional information, reference Hyson Technical Bulletin 14-06-MODCP.
- Straight adapters and mounting screws are sold separately.

⚠ NOT to be used with TNKS, TNKT, TNKB or T5 Gas Springs.

MODCP Examle

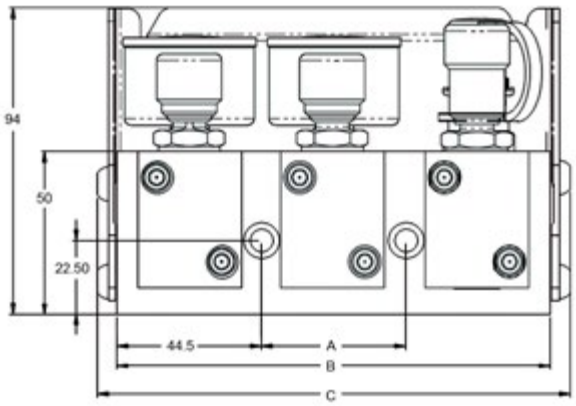
Features

- Simple operation: each module has a two-position valve that opens to bleed and closes to isolate the modules.
- Piping flexibility: each module has three G 1/8 port locations
- Easy monitoring: each 400 bar/5800 psi gauge is easy to read.
- Mounting: flush mount either horizontally or vertically.
- Bottom guard: protects modules during use.

MODCP Dimensional Information

Order Number	No of Modules	A mm	B mm	C mm	Weight kg
2022677-02	2	44.5	133.5	146.0	4.0
2022677-03	3	89.0	178.0	191.0	5.4
2022677-04	4	133.5	222.5	235.0	6.8
2022677-05	5	178.0	267.0	280.0	8.1
2022677-06	6	222.5	311.5	324.0	9.5
2022677-08	8	311.5	400.5	413.0	12.3
2022677-10	10	400.5	489.5	502.0	15.4

Note: Other sizes available on request.



Mounting Parts

Order Number	Description	For Product Line
4022058	Straight Adapter	Micro24™
4114973-G1/8	Straight Adapter	EZ Hose (CNOMO)
503593	Straight Adapter	DualSeal 24™
ORF-1000-G1/8	Straight Adapter	0-Ring Face
CS M10-1.5X30MM	Mounting Screws - Metric	Applicable to all Hyson Hose Systems
CS 3/8-16X1250	Mounting Screws - English	

All dimensions are in millimeters unless otherwise noted.

Micro24™ Control Panel

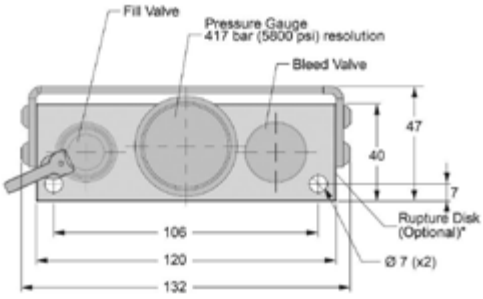
Order Number: 3023888 without rupture
Order Number: 3123888 with rupture disk*

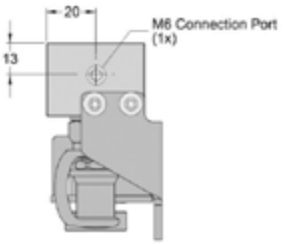
This compact control panel contains fifteen M6 and one G1/8 connection port.

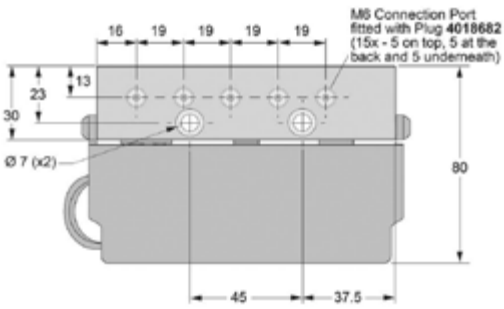
* Rupture disks are only on model 3123888 and not recommended for use where the initial charging pressure exceeds 150 bar/2175 psi.

** Control Panel comes standard with all port plugs installed

Service Parts	
Order Number	**Description**
1032773	Bleed Valve
502328	Fill Valve
502351	Pressure Gauge
3025657	Rupture Disk*
4018682	M6 Port Plug**
503593	G1/8 Port Plug**







All dimensions are in millimeters unless otherwise noted.

TNKMAN® Distribution Blocks

The TNKMAN® distribution block provides an alternative to hosing self-contained Gas Springs to each other. It eliminates as many fittings as possible, including all elbow and tee fittings, often sources of leaks.

- Straight adapters and mounting screws are sold separately.

Features

- Gas Springs can be connected outside the die.
- Two end ports can be used for additional Gas Springs or connection of a control panel and/or pressure monitor.
- Complete set of plugs included for ports not in use.

TNKMAN DISTRIBUTION BLOCKS PICTURED WITH ORF FITTINGS

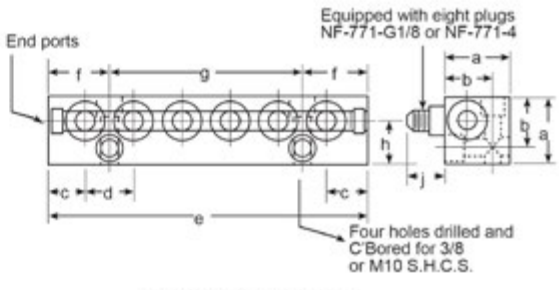
TNKMAN Order and Dimensional Information

Order Number		Port Size	A	B	C	D	E	F	G	H	J
TNKMAN 6	mm	7/16-20	38	29	22	29	187	37	114	25	22
TNKMAN 6 G 1/8	mm	G 1/8	38	29	22	29	187	37	114	25	22
TNKMAN 12	mm	7/16-20	38	29	22	29	359	37	286	25	22
TNKMAN 12 G 1/8	mm	G 1/8	38	29	22	29	359	37	286	25	22

Mounting Parts

Order Number	Port Size	Hose Type
NF-1000-4	7/16-204	JIC
ORF-1000-4		O-Ring Face
4114973-7/16		EZ/CNOMO
ORF-1000-G1/8	G 1/8	O-Ring Face
4114973-G1/8		EZ/CNOMO
503593		DualSeal 24™

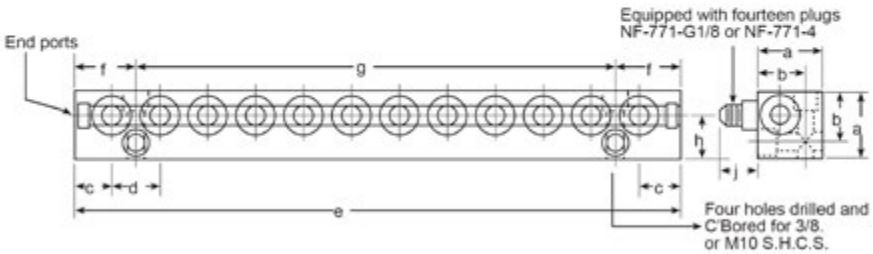
TNKMAN 6



Mounting Screws

Order Number	Description	For Product Line
CS M10-1.5X50	Mounting Screws - Metric	Applicable to all Hyson Hose Systems
CS 3/8-16X2.000	Mounting Screws - English	

TNKMAN 12



All dimensions are in millimeters unless otherwise noted.

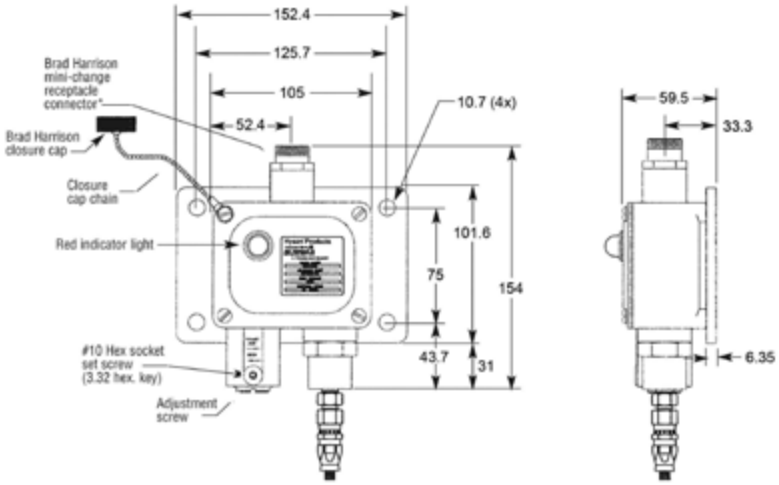
Pressure Monitors

Pressure monitors connect the Gas Spring System to the press controls. If the pressure rises above or falls below preset points, the operation is interrupted, reducing the probability of damage to a tool and/or machinery.

APM-3000

- Measures 13.8 - 206 bar (200 - 3000 psi).
- Supplied with 4.5 m / 15 ft hose assembly and femal quick disconnect.
- Brad Harrison mini-charge receptacle connector.
- Easily adjusts for lower limit.

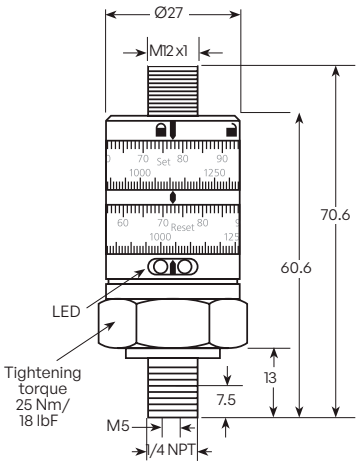
APM-5800



All dimensions are in millimeters unless otherwise noted.

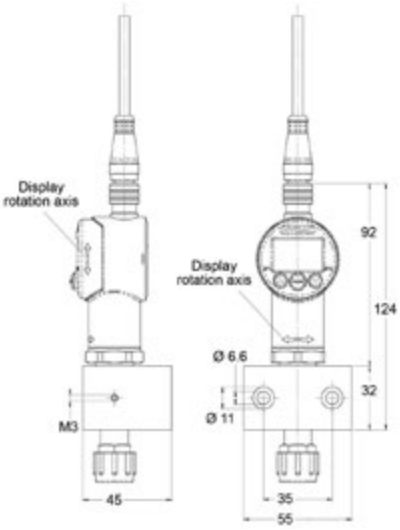
APM-5800

- Measures 0 - 400 bar (0 - 5800 psi).
- Supplied with cable and protective cover.
- 24 VCD Micro connection.
- Easily adjusts for upper and lower limit.
- Yellow screen LED indicates switching or ready for use.
- Simple set-up with dia ls that rotate quickly to select set point and reset point.



DPM-3000

- Measures 0 - 400 bar (0 - 5800 psi).
- 4-wire connection.
- Easy to read digital display.
- Easily adjusts for upper and lower limit.



Mounting Parts		
Order Number	**Description**	**For Product Line**
4022058	Straight Adapter	Micro24TM
4114973-G1/8	Straight Adapter	EZ-Hose (CNOMO)
503593-G1/8	Straight Adapter	DualSeal 24TM
ORF-1000-G1/8	Straight Adapter	O-Ring Face
EVC006	Cable	All

1. + Current feed 9 - 35 VDC	Brown
2. Set-point 1	White
3. - Current feed (0V)	Blue
4. Set-point 2	Black

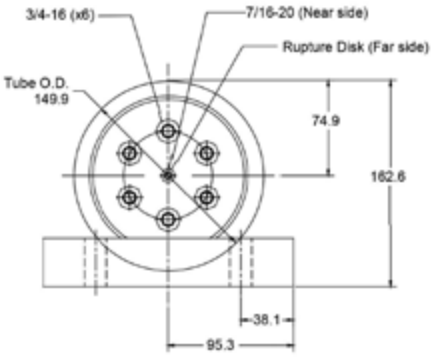
All dimensions are in millimeters unless otherwise noted.

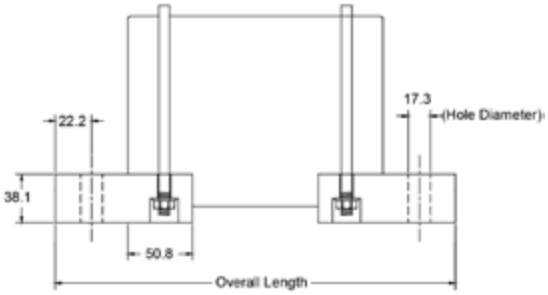
Volume Tanks

The ST Volume Tank is designed to increase the volume and lower the pressure rise in a Gas Spring System. The compact, modular design makes it less costly than conventional welded tanks.

Features

- Engineered for 150 bar/2175 psi maximum pressure.
- Less heat build-up for long Gas Spring life.
- Rupture disk plug for added safety.
- Multiple ports on each end for increased flexibility.
- Ideal for JIC or O-Ring Face Hose Systems.





ST Volume Tank Dimensional Information				
Order Number	Standard volume		Standard Overall Length	Number of Ports on Each Face
	cm³	in.³	mm	
ST-50-HP	819	50	244	6 each 3/4-16 1 face 7 /16-20 1 face Rupture Disk
ST-100-HP	1639	100	311	
ST-160-HP	2622	160	390	
ST-200-HP	3278	200	443	
ST-320-HP	5244	320	603	

Mounting Parts		
Order Number	Description	For Product Line
ORF-1000-4	Straight Adapter	O-Ring Face
NF-77-8-4	Port Reducer Adapter	Applies to both JIC & O-RIng Face

All dimensions are in millimeters unless otherwise noted.

5 HDF

Hyson High Density Fabric
High Density Fabric

294
294

Guardian™ HDF

Key Features

- Protection from contaminants.
- Easy installation.
- Multiple size options.
- Temperature resistance.
- Only adds 10 mm of length to the spring.

Temperature Performance

Operating Temperation
0 - 80°C (32 - 176°F)

Temperature Resistance
-35 - 150°C (-31 - 302°F)

SPM according to the Gas Spring

Cost Effective

Easy Integration

Increased Longevity

Reliable Protection

About Guardian ™ HDF

The Guardian™ High Density Fabric Cover (HDF), is a specialized protective cover designed to enhance the durability and reliability of Gas Springs in harsh environments. This is achieved by covering the Gas Spring rod and part of the body. The HDF can be installed on an application in which the Gas Spring has a service thread in the piston rod top and where the stroke of the Gas Spring can utilize an additional 10 mm (0.39 in). The cover itself is attached to the striker plate and sized based on cylinder diameter, then cut to length, and secured at the C-Groove during installation.

For more information visit the HysonSolutions.com
Order at Orders@HysonSolutions.com

Stroke Length	Cylinder Diameter	MOR .5	MOR 750	MOR 1/1500	MOR 1	MOR 1500	MOR 4/5000	MOR 6	MOR 8000
10-250 mm (0.39-9.84 in)	Diameter	1.75 44	1.88 48						
10-250 mm (0.39-9.84 in)	1.66 42	1.75 44	1.88 48	1.91 48	1.75 44	1.94 49	1.91 48	2.00 51	2.88 73
10-250 mm (0.39-9.84 in)	2.16 55	1.75 44	1.88 48	2.41 61	1.75 44	1.94 49	2.41 61	2.00 51	2.88 73
10-250 mm (0.39-9.84 in)	2.66 68	1.75 44	1.88 48	2.91 74	1.75 44	1.94 49	2.91 74	2.00 51	2.88 73
10-250 mm (0.39-9.84 in)	3.66 93	1.75 44	1.88 48	3.91 99	1.75 44	1.94 49	3.91 99	2.00 51	2.88 73
10-250 mm (0.39-9.84 in)	4.66 118	1.75 44	1.88 48	4.91 125	1.75 44	1.94 49	4.91 125	2.00 51	2.88 73
10-250 mm (0.39-9.84 in)	5.66 144	1.75 44	1.88 48	5.91 150	1.75 44	1.94 49	5.91 150	2.00 51	2.88 73
10-250 mm (0.39-9.84 in)	6.66 169	1.75 44	1.88 48	6.91 176	1.75 44	1.94 49	6.91 176	2.00 51	2.88 73
10-250 mm (0.39-9.84 in)	7.66 195	1.75 44	1.88 48	7.91 201	1.75 44	1.94 49	7.91 201	2.00 51	2.88 73
10-250 mm (0.39-9.84 in)	8.66 220	1.75 44	1.88 48	8.91 226	1.75 44	1.94 49	8.91 226	2.00 51	2.88 73
10-250 mm (0.39-9.84 in)				9.91 252	1.75 44	1.94 49	9.91 252	2.00 51	2.88 73
10-250 mm (0.39-9.84 in)				10.91 277	1.75 44	1.94 49	10.91 277	2.00 51	2.88 73
10-250 mm (0.39-9.84 in)							11.91 303	2.00 51	2.88 73
10-250 mm (0.39-9.84 in)							12.91 328	2.00 51	2.88 73
10-250 mm (0.39-9.84 in)							13.91 353	2.00 51	2.88 73
10-250 mm (0.39-9.84 in)									

Flange Adapter

If the Gas Spring is Flange assembled, an additional item – called a Flange Adapter (HDFF) – must be used.
The Flange Adapter must be assembled at the top of the Flange with the Flange assembly screws.
Make sure to use the right Flange Adapter model for the cylinder size, according to the table to the right.

Note: The Flange Adapter can only be combined with the Flanges in the table below.

Spare Part	Order No.
M6 Screw	1034847
M8 Short Screw	1034848
M8 Long Screw	1034849
M16 Screw	1034850
Metal Cable Ties (10 Pieces)	1032103
Cable Tie Tightening Tool	1031124

Cylinder Size	Mounting Flange	Adapter No.
ø 45 mm (1.77 in)	FCS 500	HDFF-45
ø 50 mm (1.97 in)	FCS 750	HDFF-50
ø 63 mm (2.48 in)	FCSX 1500	HDFF-63
ø 75 mm (2.95 in)	FCS 1500	HDFF-75
ø 95 mm (3.74 in)	FCS 3000	HDFF-95
ø 120 mm (4.72 in)	FCS 5000	HDFF-120
ø 150 mm (5.91 in)	FCS 7500	HDFF-150
ø 195 mm (7.68 in)	FCS 10000	HDFF-195

6 Service & Maintenance

Accessories

Tool Kit

Order Number 1714779

For 38 mm – 50 mm spring diameter

Order Number 1814779

For 75 mm – 195 mm spring diameter

The complete tool kit. Other kits are available in various sets and all come with a protective carry case.

Items included in the tool kits include:

- Lock Ring Removal Tool
- Valve Pliers
- M6 Valve Tool
- 7/16 Valve Tool
- M6/Hex Valve Tool
- M3 Piston Removal Tool
- T-Handles
- Assembly Cups

Nitrogen Gas Booster Assembly

Order Number: Standard: HPB-4350-S

Order Number: Portable: HPB-4350-M

The Nitrogen Gas Booster Assembly gets the most from your nitrogen gas supply by safely and easily boosting nitrogen gas bottles with a minimum of 30 bar (435psi). Driven by plant air, the assembly provides pressures up to 300 bar (4350 psi) to charge high pressure Gas Springs and manifold systems.

Features:

- Boosts N2 bottles containing as low as 30 Bar (435 psi).
- Suitable for all Hyson cylinders.
- Robust, lightweight design.
- Male quick release coupling for output hose connection.
- Available in two models:

  Standard: Ideal for single location. Mounted on holding place and capable of hanging on neck of nitrogen bottle.

  Portable: Ideal for on-the-go applications. Booster pump does not require removal from transport case while in use.

Charging/Discharging

Nitrogen Charging Assembly

Order Number NCA-580-2600

Transfer nitrogen gas from a commercial bottle to Gas Springs with the NCA-580-2600. The charging assembly includes a CGA-580 bottle fitting, regulator with bottle and system pressure gauges, shut-off valve and 10 feet of high pressure hose with a quick disconnect fitting. Easily connects to the Control Panel Fill Valve, Service Gauge Assembly or Pressure Indicator.

Order Number NCA-680-2600

The NCA-680-2600-HP is available for use with 3000 – 5000 psi bottles and includes a CGA-680 bottle fitting.

Other charge assemblies are available. Contact Hyson with your specific requirements.

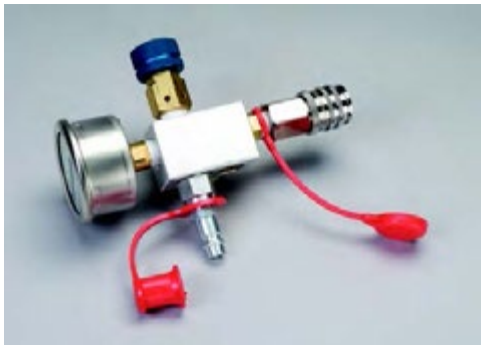
Pressure Indicator

Order Number 4215072

- Charge, discharge, bleed and measure pressure in nitrogen Gas Springs with M6 ports.
- Adapters for 7/16-20-inch and M6 ports sold separately.

Adapters		
Order Number	**Port Size**	**Notes**
3014016	G 1/8 Port	Standard port adapters included with pressure indicator
3014021	M6 Rod Port	
3014623	7/16-20-inch	Alternate port adapters sold separately
4026164	M6 (T5 models)	

Service Gauge Assembly



Order Number MGA-3000NH

- Charging and discharging Gas Springs for use in the self-contained mode is simple with the MGA-3000NH.
- Refer to male quick disconnects to selet proper fittings for Gas Spring ports.

Charging/Discharging

Male Quick Disconnects (Charge Fittings)

Hyson offers a variety of charge fittings for use with Gas Springs. For the appropriate charge fitting for your application, refer to the chart at right.

Male Quick Disconnects	
Order Number	**Port Size**
T2-770-T3	M6 (side or base)
T2-770-M6	M6 (rod)
11-770-0705 MTY	3/8"-32
T2-770-G1/8-P	G 1/8
T2-770-4-L	7/16"-20
T2-770-4	7/16"-20

T2-770-T3

T2-770-M6

11-770-0705-MTY

T2-770-G1/8-P

T2-770-4-L

T2-770-4

Valve Removal & Installation Tool

- Safely discharges Gas Springs with threaded end.
- Easy to remove valve for Hose Systems.

Valve Removal & Installation Tool	
Order Number	**Thread Size**
T2TK-IN	7/16" – 20
T2TK-IN-M6	M6
T2TK-IN-G1/8	G 1/8

Crimping Equipment

Create your own permanent hose assemblies with Hyson crimping equipment.

EZ-Crimp

Features:

- Ideal for EZ(CNOMO) and Micro24TM Hose systems. Die included. Additional dies available for crimping larger diameter hoses.
- Compact and portable
- Crimps straight, 45º and 90º fittings
- Crimping force: 955 kN

EZ-Crimp	
Order Number	**Description**
EZ-Crimp	Crimper and die for EZ(CNOMO) and Micro24™
DIE07-6	
DIE07-8	Die for 8-10mm OD hoses
DIE07-10	Die for 10-12mm OD hoses (DualSeal 24™)
DIE07-12	Die for 12-14mm OD hoses (JIC & O-Ring Face)
DIE07-14	Die for 14-16mm OD hoses

Crimping Press

Features:

- Combine with appropriate die to create hose assemblies
- Pneumatically-operated hydraulic pump
- Crimps straight, 45º and 90º fittings
- Crimping force: 300 kN

Crimping Press	
Order Number	**Description**
3121381	Crimping Press
3024010	Die for Micro24TM & EZ(CNOMO)
504196	Die for 10-12mm OD Hoses (Dualseal 24™)
ORHF-4 DIE	Die for 12-14mm OD Hoses (JIC & O-Ring Face)

Hose Cutting Plier

Order Number 502839

Test Stands

Digital Test Stand

Order Number: DTS

This lightweight test stand measures the initial contact force of self-contained Gas Springs.

Featuers

- Maximum rated capacity of 5000 lbf.
- Accuracy ±0.5% of full scale equating to 25 lbf.
- Digital read-out in lbf or kg force.
- Travel reads in inches or millimeters.
- Includes a holding fixture for smaller Gas Springs.
- Can be mounted directly to a table.
- Weighs 45 lbs.

WARNING

This test fixture should be used to measure contact force ONLY.
Stroking a Gas Spring could cause the spring to project and result in serious injury.

Digital and Analog Test Stands

DIGITAL VERSION
English Order Number: 1416713-1330

Metric Order Number: 1516713-1330

(For Gas Springs up to 760 mm max. spring height)

ANALOG VERSION
Order Number: 1516714-1330

(For Gas Springs up to 700 mm max. spring height)

This heavy-duty test stand measures the initial contact force of self-contained Gas Springs.

DIGITAL **ANALOG**

Featuers

- Maximum rated capacity of 18,000 lbf.
- Available in digital or analog models.
- Handles up to 150mm diameter springs.
- Quick height adjustment.
- Can be mounted directly to a table.
- Weighs 110 lbs.

7 Advanced products

LCF-SP

Low Contact Force Striker Plate

Ideal for reducing excessive shock loads and high noise levels

Product Value

LCP-SP dampens shockload with a specially developed element, reduces wear on presses and enables quieter press cycles. Additionally, LCF-SP also addresses poor part quality caused by contact and vibration.

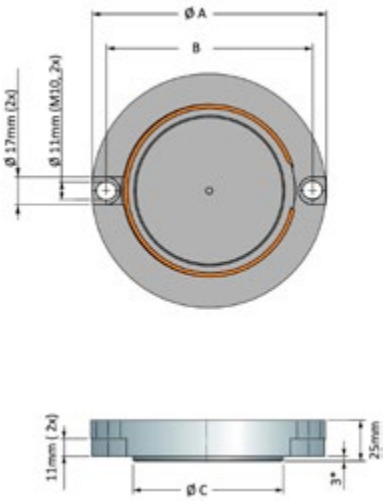
Product Features

- For spring forces from 750 to 10,000 daN (kgf)
- Up to 20 strokes per minute
- 1 million-hit service life
- Low build height
- Countersunk mounting holes
- Can be added to both Hyson Gas Spring and Manifold Cylinder applications.

Ordering Options

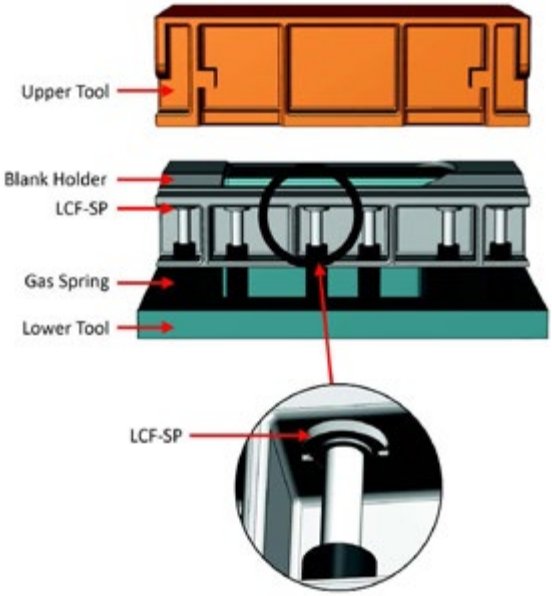
LCF-SP	X	XXXX
Model		Force
LCF-SP		1,500 5,000 10,000

Dimensions

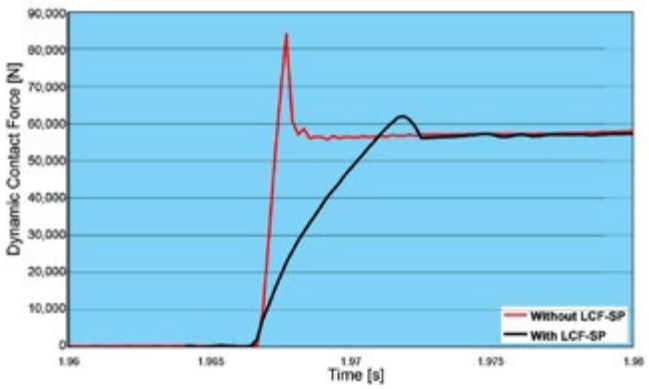


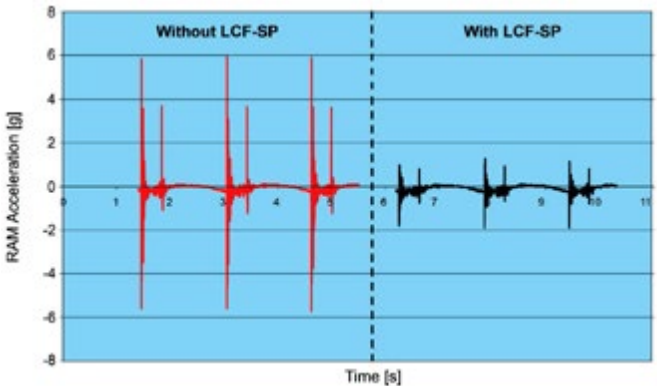
Order Number	Gas Spring Forces	Ø A	B	Ø C	Weight
		mm	mm	mm	kg
LCF-SP 1500	750 up to and including 1500	108	91	58	1.29
LCF-SP 5000	1501 up to and including 6600	143	126	92	2.74
LCF-SP 10000	6601 up to and including 10000	167	150	112	2.90

Application



Function





Stock Lifters

T2SLE, T2SLT and T2SLM

Product Value

Versatile and compact, Hyson's T2SLE and T2SLT Single Post Stock Lifters provide many guide rail mounting options for stock lifting. They can be used for single-point lifting of short rails, or multipoint lifting of long rails. Our Single Post Stock Lifters are designed to account for rail misalignment and prevent rails from sticking. Additionally, the T2SLE and T2SLT Lifters can be linked together to optimize force distribution.

Product Features

- Easily adjustable force.
- Eliminates the need for additional guide bushings and anti-rotational features.
- T2SLE and T2SLT can be hosed together for uniform force.

Product Specifications

T2SLT-170 & T2SLE-170

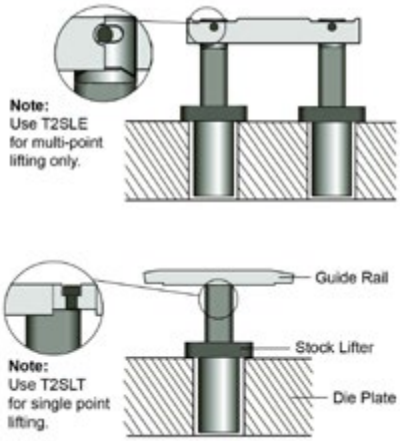
Initial Force Range	240-1,700 N
Pressure medium	Nitrogen Gas
Min. charging pressure	25 bar
Max. charging pressure	180 bar
Operating temperature	0° to 80°C
Force increase by temperature	+0.3% per °C
Recommended max strokes/min	40-100 @20 °C
Maximum Piston Rod Velocity	0.6 m/s
Maximum Utilized Stroke	100%

T2SLM-300

Initial Force Range	450–3,200 N
Pressure Medium	Nitrogen Gas
Min. Charging Pressure	25 bar/360 psi
Max. Charging Pressure	180 bar/2610 psi
Operating Temperature	0 to 80°C/32 to 176°F
Force Increase by Temperature	+0.3% / °C
Recommended max strokes/min	80–100 (at 20°C)
Maximum Piston Rod Velocity	0.8 m/s
Maximum Utilized Stroke	100%

Mounting Options

T2SLT-170 & T2SLE-170

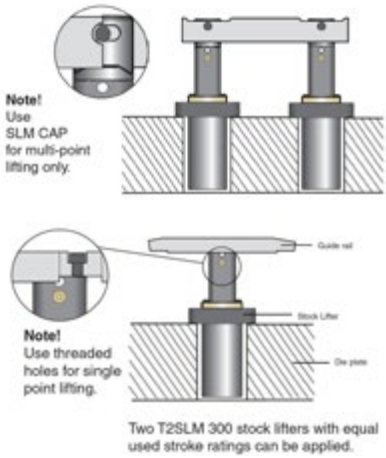


Repair/Replacement Springs

Lifter Series	Order Number
T2SLT-170 T2SLE-170	**T3-170 x (STROKE)**

Mounting Options

T2SLM-300



Repair Kit

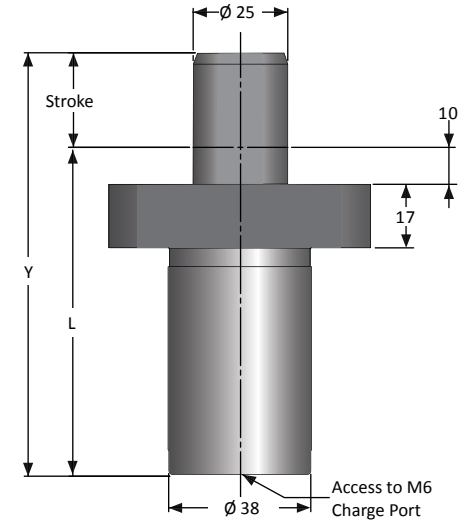
Lifter Series	Order Number
T2SLM-300	**T2SLMSK**

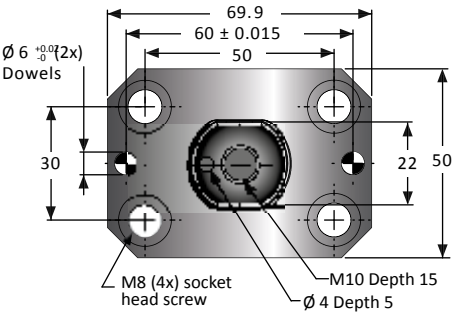
Ordering Options

T2SLX-XXX	X	XXX
Model		Stroke Length
T2SLT-170, T2SLE-170, T2SLM-300		See Dimensional Information Charts

All Gas Springs shipped at maximum charge pressure unless otherwise specified.

T2SLT





Maximum Attachment Capacity per Lifter**Metric		
Ram Velocity	Attachment Mass	
	T2SLT-170	
m/s	kg	lb
0.15	80	176.370
0.30	20	44.092
0.40	11	24.251
0.50	7	15.432
0.60	5	11.023

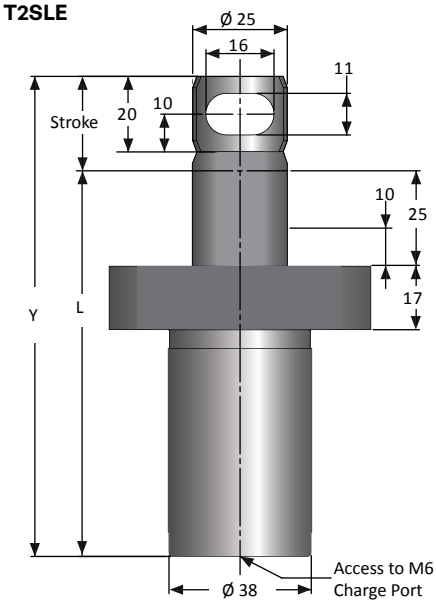
** Determine ram velocity and reference the recommended attachment mass per lifter. For increased capacity, install external positive stops to prevent lifter damage.

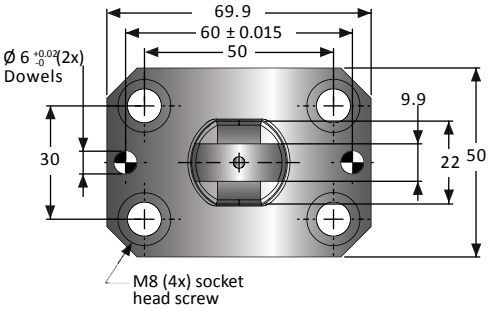
T2SLT-170 Dimensional Information

Order Number Model X Stroke	Stroke S		Initial Contact* Force +20°C		End Force at Full Stroke		Cylinder Height		Body Height		Gas Volume	Weight	
							Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Offering (optimal delivery)													
T2SLT-170x25	25	0.98	1,700	382	2,800	629	112	4.41	87	3.43	0.006	0.79	1.742
T2SLT-170x38	38	1.50					138	5.43	100	3.94	0.009	0.86	1.896
T2SLT-170x50	50	1.97					162	6.38	112	4.41	0.012	0.92	2.028
T2SLT-170x63	63	2.48					188	7.40	125	4.92	0.015	0.99	2.183
T2SLT-170x80	80	3.15					225	8.86	145	5.71	0.019	1.09	2.403
T2SLT-170x100	100	3.94					265	10.43	165	6.50	0.024	1.19	2.624
T2SLT-170x125	125	4.92					315	12.40	190	7.48	0.030	1.33	2.932

All dimensions are in millimeters unless otherwise noted.

T2SLE





Maximum Attachment Capacity per Lifter**Metric		
Ram Velocity	Attachment Mass	
	T2SLE-170	
m/s	kg	lb
0.15	80	176.370
0.30	20	44.092
0.40	11	24.251
0.50	7	15.432
0.60	5	11.023

** Determine ram velocity and reference the recommended attachment mass per lifter. For increased capacity, install external positive stops to prevent lifter damage.

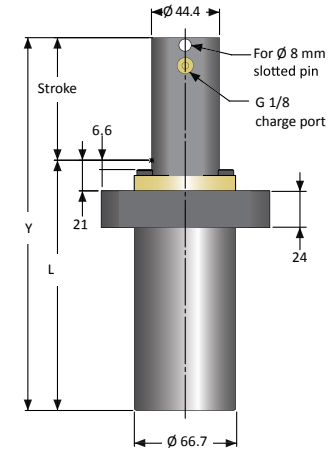
All dimensions are in millimeters unless otherwise noted.

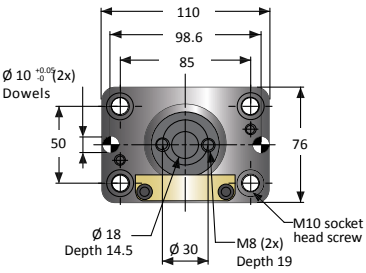
T2SLE-170 Dimensional Information

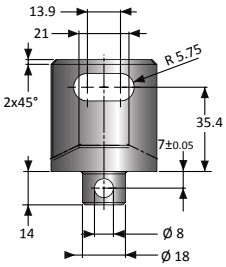
Order Number Model X Stroke	Stroke S		Initial Contact* Force +20°C		End Force at Full Stroke		Cylinder Height		Body Height		Gas Volume	Weight	
							Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	kg	lb
Preferred Offering (optimal delivery)													
T2SLE-170x25	25	0.98	1,700	382	2,800	629	127	5.00	102	4.02	0.006	0.81	1.786
T2SLE-170x38	38	1.50					153	6.02	115	4.53	0.009	0.88	1.940
T2SLE-170x50	50	1.97					177	6.97	127	5.00	0.012	0.94	2.072
T2SLE-170x63	63	2.48					203	7.99	140	5.51	0.015	1.01	2.227
T2SLE-170x80	80	3.15					240	9.45	160	6.30	0.019	1.10	2.425
T2SLE-170x100	100	3.94					280	11.02	180	7.09	0.024	1.21	2.668
T2SLE-170x125	125	4.92					330	12.99	205	8.07	0.030	1.35	2.976

* At full charge

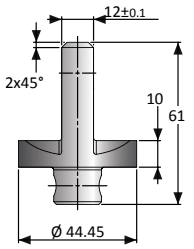
T2SLM-300







Order No. SLM CAP (sold separately)



SLM CAP option to be mounted at top of T2SLM-300 and linked to guide rails of the die with a slotted pin.

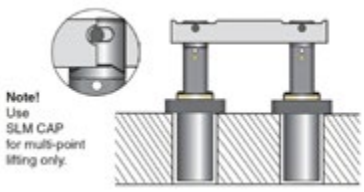
Maximum Attachment Capacity per Lifter**Metric		
Ram Velocity	Attachment Mass	
m/s	kg	lb
0.30	29	63.934
0.40	16	35.274
0.50	10	22.046
0.70	5.3	11.684
0.80	4.1	9.039

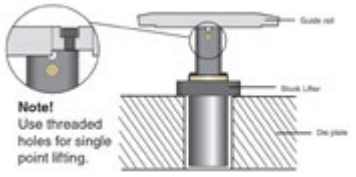
** Attachment mass assumes balanced load and actuation force.For increased capacity, install external positive stops to prevent lifter damage.

All dimensions are in millimeters unless otherwise noted.

Mounting Options

T2SLM-300





Two T2SLM 300 stock lifters with equal used stroke ratings can be applied.

Repair Kit

Lifter Series	Order Number
T2SLM-300	**T2SLMSK**

T2SLM-300 Dimensional Information													
Order Number Model X Stroke	Stroke S		Initial Contact* Force +20°C		End Force at Full Stroke		Cylinder Height		Body Height		Gas Volume	Weight	
							Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	ibf.	mm	in	mm	in	ℓ	kg	lb
Alternative Offering													
T2SLM 300x50	50	1.97	3,200	719	4,300	966	196	7.72	146	5.75	0.033	2.49	5.490
T2SLM 300x80	80	3.15			4,350	978	256	10.08	176	6.93	0.053	3.31	7.297
T2SLM 300x100	100	3.94			4,350	978	296	11.65	196	7.72	0.066	3.86	8.510
T2SLM 300x125	125	4.92			4,350	978	346	13.62	221	8.70	0.083	4.54	10.009
T2SLM 300x150	150	5.91			4,350	978	396	15.59	246	9.69	0.100	5.22	11.508
T2SLM 300x200	200	7.87			4,350	978	496	19.53	296	11.65	0.134	6.58	14.506

* At full stroke

Rail Lifters

T2SRL-800

Product Value

Ideal for lifting stock in multi-point guide rails, Hyson's T2SRL Rail Lifter has a compact design with the added benefit of return speed control, significantly reduces strip feed bounce and shock loading. The last 20 mm of return stroke is dampened to 0.2 m/s, stabilizing the part during production and leading to longer lifter life in extreme applications. SRL Rail Lifters can also be linked together to optimize force distribution.

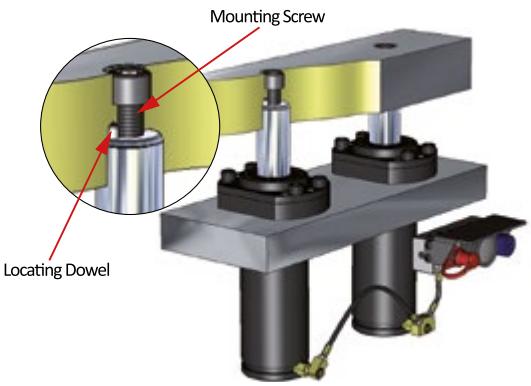
Product Features

- Simplifies tool design, saving cost and space
- Eliminates the need for additional guide bushings
- Easily adjustable force (linkable using a Hose System)
- Linkable using Hose System for uniform lifting force
- Additional mounting options using NP-1500 Flanges

Product Specifications

Pressure medium ..... Nitrogen Gas
Min. charging pressure ..... 15 bar
Max. charging pressure .....70 bar
Operating temperature ..... 0º to 80ºC
Force increase by temperature ..... +0.3% per ºC
Recommended max strokes/min ..... ≈ 25 @20 ºC
Dampening Length ..... ≈ 20 mm
Dampening Velocity ..... 0.2 m/s

Mounting Options



Maximum Attachment Capacity per Lifter Metric**

Ram Velocity	Attachment Mass T2SRL-800	
m/s	kg	lb
0.30	90	198.416
0.40	50	110.231
0.50	32	70.548
0.60	22	48.502

** Determine ram velocity and reference the recommended attachment mass per lifter. For increased capacity, install external positive stops to prevent lifter damage.

Repair kit

Lifter Series	Order Number
T2SRL-800	T2SLMSK

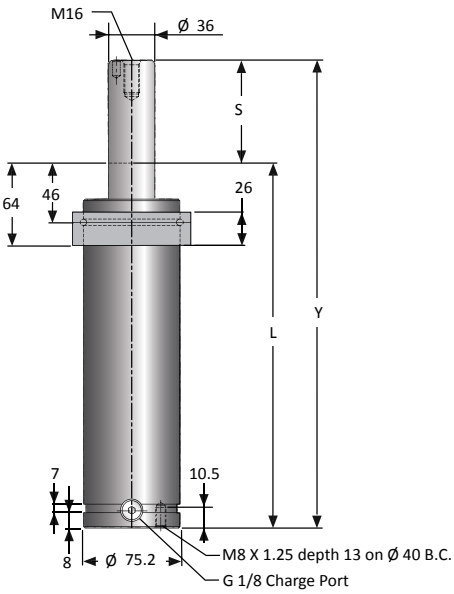
Ordering Options

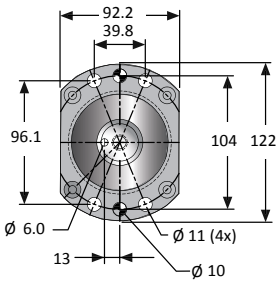
T2SRL-800 X XXXX

Stroke Length
See Dimensional Information Charts

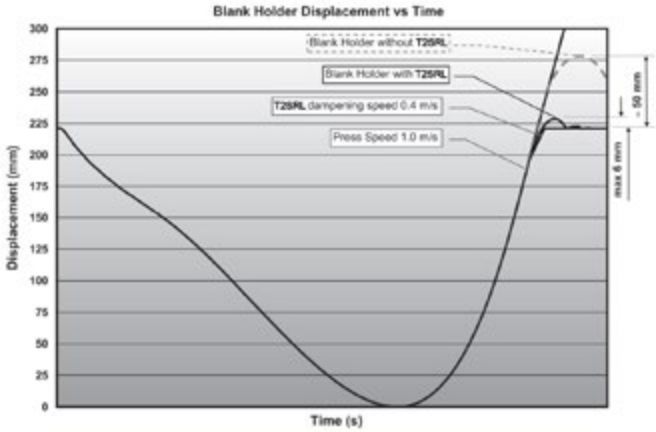
All Gas Springs shipped at maximum charge pressure unless otherwise specified.

T2SRL-800





Function Example



All dimensions are in millimeters unless otherwise noted.

T2SRL-800 Dimensional Information													
Order Number Model X Stroke	Stroke S		Initial Contact* Force +20°C		End Force at Full Stroke		Cylinder Height		Body Height		Gas Volume	Weight	
							Y ±0.25	Y ±0.010	L				
	mm	in	N	lbf.	N	ibf.	mm	in	mm	in	ℓ	kg	lb
Preferred Offering (optimal delivery)													
T2SRL-800x50	50	1.97	7,100	1,596	8,800	1,978	304	11.97	254	10.00	0.3	5.3	11.684
T2SRL-800x80	80	3.15			9,200	2,068	364	14.33	284	11.18	0.4	5.8	12.787
T2SRL-800x100	100	3.94			9,400	2,113	404	15.91	304	11.97	0.5	6.2	13.669
T2SRL-800x125	125	4.92			9,600	2,158	454	17.87	329	12.95	0.5	6.7	14.771
T2SRL-800x150	150	5.91			9,700	2,181	504	19.84	354	13.94	0.6	7.1	15.653
T2SRL-800x175	175	6.89			9,800	2,203	554	21.81	379	14.92	0.7	7.6	16.755
T2SRL-800x200	200	7.87			9,900	2,226	604	23.78	404	15.91	0.8	8.0	17.637

* At full charge

Dual Post Stock Lifters

T2DPL-90 and T2DPL-200

Product Value

With a built-in rail plate, Dual Post guidance, and upstroke damping, Hyson's Dual Post Stock Lifter gives you the most robust guidance for both single-point and multi-point rail lifting, allowing you to precisely locate your guide rail.

Product Features

- Standard dowel pin holes for accurate position
- Upstroke damping feature reduces strip feed bounce
- Drop-in mount on Gas Spring for easy replacement
- Drain holes on lower plate eliminate fluid build-up above the Gas Spring
- Linkable using Hose System for uniform lifting force

Product Specifications

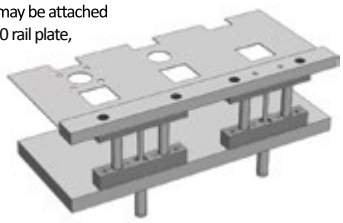
Initial Force Range - T2DPL-90 ..... 240-900 N
Initial Force Range - T2DPL-200 ..... 240-2.000N
Pressure medium ..... Nitrogen Gas
Min. charging pressure ..... 25 bar
Max. charging pressure ..... 180 bar
Operating temperature ..... 0° to 80°C
Force increase by temperature ..... +0.3% per °C
Max. Strokes/Minute T2DPL-90 ..... 40-100 @20 °C
Max. Strokes/Minute T2DPL-200 ..... 80-100 @20 °C
Max. Velocity ..... See table
Max. Utilized Stroke 95%

Application Examples

Fig. 1
Rail plate used as direct lift

Fig. 2
Rail plate with guide rail attached

Custom designed guide rails may be attached to the T2DPL-90 or T2DPL-200 rail plate, shown in Fig. 3. This arrangement allows for continuous material feed during the course of operation. When using multiple lifters, use dowel pin holes on one lifter only to prevent binding.



Maximum Attachment Capacity per Lifter**				
Ram Velocity	Attachment Mass (kg)			
	T2DPL-90		T2SRL-800	
m/s	kg	lb	kg	lb
0.30	20	44.092	31	68.343
0.40	11	24.251	17	37.479
0.50	7.3	16.094	11	24.251
0.60	5	11.023	7.7	16.976
0.70	3.7	8.157	5.6	12.346
0.80	2.8	6.173	4.3	9.480

** Determine ram velocity and reference the recommended attachment mass per lifter. For increased capacity, install external positive stops to prevent lifter damage.

Repair kit

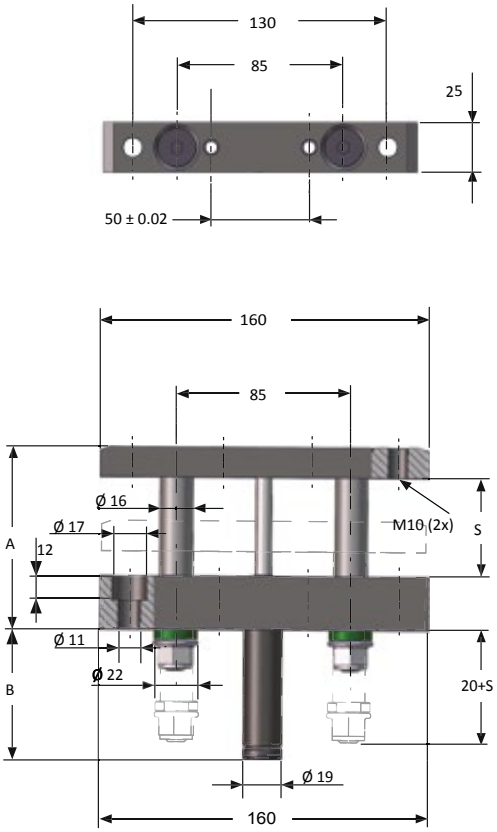
Lifter Series	Order Number
T2DPL-90	T2-90x(STROKE)
T2DPL-200	T2-180x(STROKE)

Ordering Options

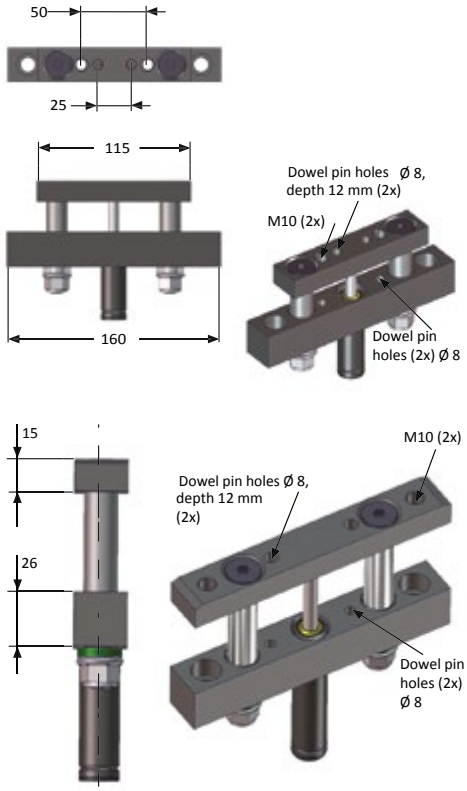
T2DPL-XXX	X	XXX
Model		Stroke Length
T2DPL-90, T2DPL-200		See Dimensional Information Charts

All Gas Springs shipped at maximum charge pressure unless otherwise specified.

T2DPL 90x38 to T2DPL 90x150



T2DPL 90x25



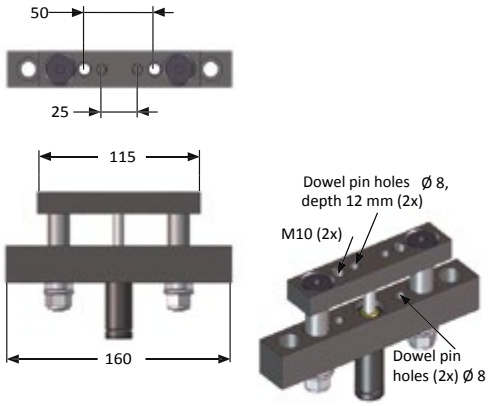
All dimensions are in millimeters unless otherwise noted.

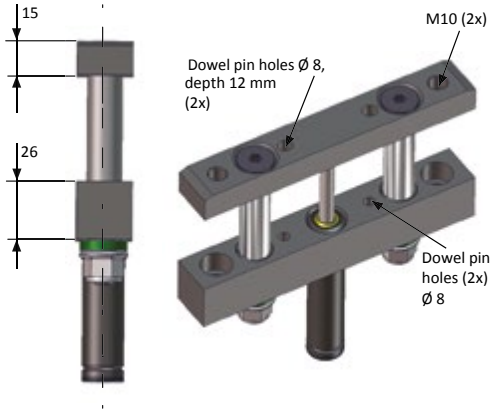
T2DPL-90 Dimensional Information

Order Number Model X Stroke	Stroke S	Initial Contact* Force +20°C		End Force* at Full Stroke		A	B	Weight	
	mm	N	lbf.	mm	ibf.	mm	ℓ	kg	lb
Preferred Offering (optimal delivery)									
T2DPL-90x25	23	900	202	1,300	292	64	40	1.27	2.800
T2DPL-90x38	36			1,200	270	77	53	1.33	2.932
T2DPL-90x50	48			1,200	270	89	65	1.38	3.042
T2DPL-90x63	61.5			1,200	270	102.5	81.5	1.43	3.153
T2DPL-90x80	78			1,200	270	119	98	1.50	3.307
T2DPL-90x100	98			1,200	270	139	118	1.58	3.483
T2DPL-90x125	123			1,200	270	164	143	1.69	3.726
T2DPL-90x150	148			1,200	270	189	168	1.79	3.946

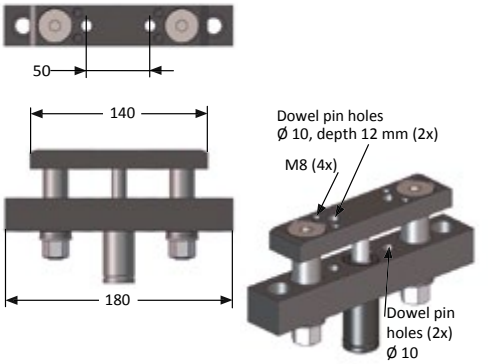
* At full charge

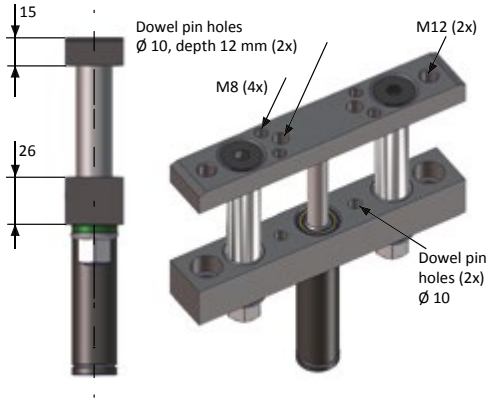
T2DPL 200x38 to T2DPL 90x200





T2DPL 200x25





All dimensions are in millimeters unless otherwise noted.

T2DPL-200 Dimensional Information									
Order Number Model X Stroke	Stroke S	Initial Contact* Force +20°C		End Force* at Full Stroke		A	B	Weight	
	mm	N	lbf.	mm	ibf.	mm	ℓ	kg	lb
Preferred Offering (optimal delivery)									
T2DPL-200x25	23	2,000	450	3,080	692	64	41	1.90	4.189
T2DPL-200x38	36			3,090	695	77	54	1.99	4.387
T2DPL-200x50	48			3,090	695	89	66	2.08	4.586
T2DPL-200x63	61.5			3,020	679	102.5	82.5	2.18	4.806
T2DPL-200x80	78			3,040	683	119	99	2.30	5.071
T2DPL-200x100	98			3,050	686	139	119	2.44	5.379
T2DPL-200x125	123			3,060	689	164	144	2.61	5.754
T2DPL-200x150	148			3,000	674	189	177	2.80	6.173
T2DPL-200x175	173			2,988	672	214	202	2.98	6.570
T2DPL-200x200	198			2,971	668	239	227	3.15	6.945

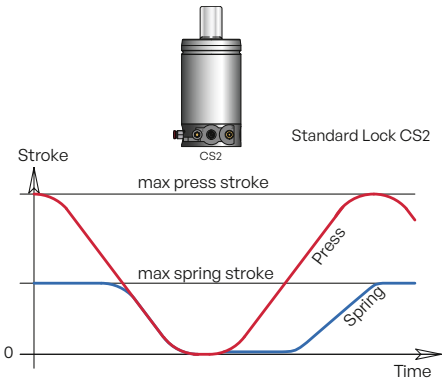
* At full charge

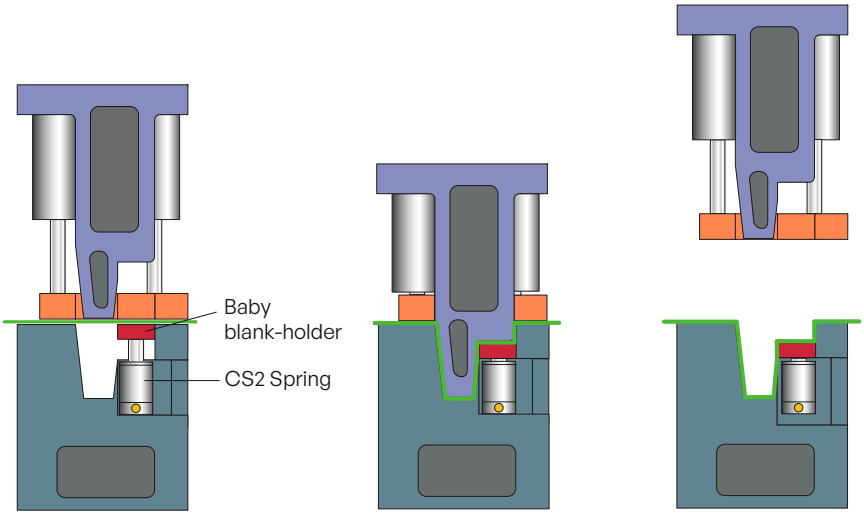
8 Controllable Systems

Controllable Gas Springs

Introduction

The CS2 Series is the next generation of the original CS Series. The CS2 Series is a family of Gas Springs used in metal forming dies; its piston rods can be locked at bottom dead center (BDC). The return stroke of the piston rod is controlled pneumatically by a valve in the base of the spring. The example below shows a drawing die where two forming stages are performed with a single press stroke.



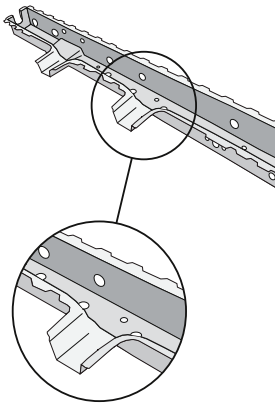


Controllable Gas Springs are available in

- Model sizes 1500, 3000, 5000 & 7500.
- Contact forces from 1.6 to 8.4 tons.
- Stroke lengths from 4 mm to 160 mm.

There are two systems available:

- Standard Lock, CS2
- Positive Lock System, CS2 + PS



Standard Lock, CS2

CS2 Controllable Gas Springs feature piston rods that can be locked at BDC.

The full stroke length of the CS2 spring must be used within 0.5 mm for optimal locking function, giving a maximum springback of 1 mm referred to as standard lock (for zero springback see Positive Lock System).

The return stroke of the piston is either controlled by the control system from the press or can be integrated into the tool itself. The springs can be self-contained or connected to a control panel through a Hose System.

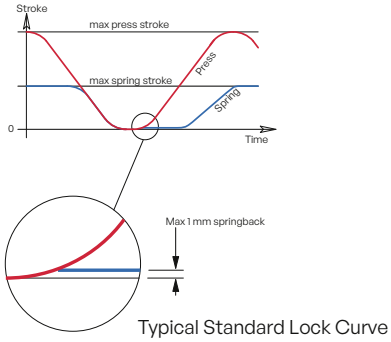
How it works

The CS2 Controllable Gas Spring consists of a cylinder [1], guide assembly [2], piston rod assembly containing non-return valves [3], internal piston rod [4] and normally open (NO) cartridge valve [5] located in the base of the spring.

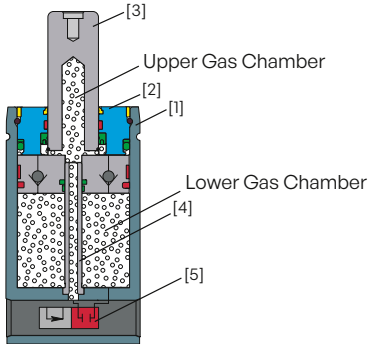
The nitrogen gas within the spring is sealed within two gas chambers, an upper and a lower. When the spring is stroked, nitrogen gas from the lower chamber passes through the non-return valves in the piston rod assembly and into the upper chamber.

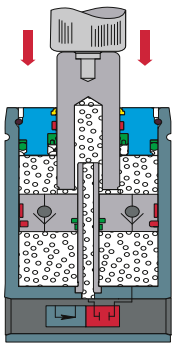
The cartridge valve is closed by applying compressed air pressure (min. 4 bar). With the cartridge valve closed, the piston rod is prevented from returning to its fully extended position. Opening the cartridge valve (taking away min. 4 bar air signal), the gas contained within the upper chamber can flow to the lower chamber via the internal piston rod [4], allowing the piston rod to return to its fully extended position.

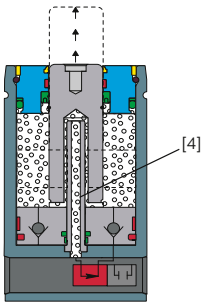
CS 2



Typical Standard Lock Curve







Positive Lock System, CS2 + PS

The CS2 + PS system combines a standard lock CS2 controllable Gas Spring [1] with a specially designed PS Passive Gas Spring [3] via a valve block [2], which together form a Positive Lock System.

The result is a Controllable Gas Spring system with **zero springback**.

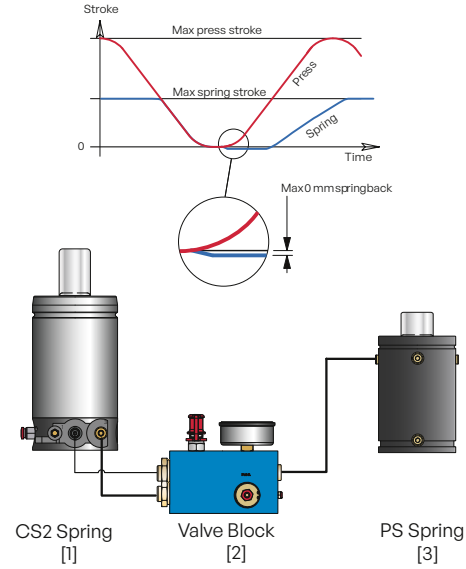
Note: The PS Passive Gas Spring is **not** to be used for any operation in the tool other than to eliminate springback in the CS2 spring(s). It can be placed anywhere in the tool except for the area you wish to lock, and can eliminate springback in up to four CS2 Controllable Gas Spring s. How much the PS Passive Gas Spring should be stroked depends on the number of CS2 springs in the system. The cartridge valve in the valve block is identical to the one in the CS2 spring.

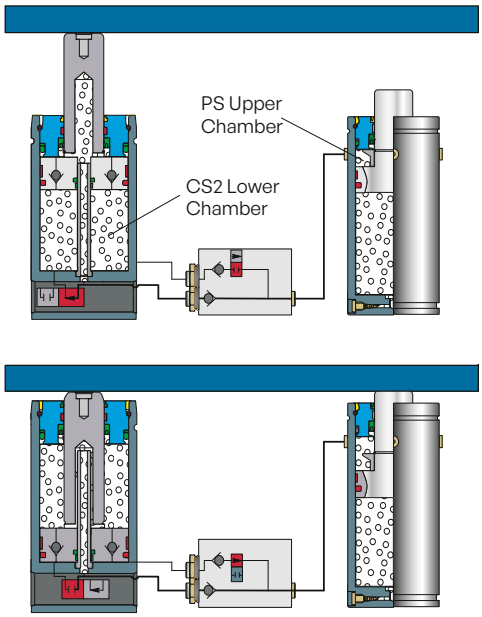
How it works

The CS2 is the active spring in the system and provides the required spring force in the tool. The PS Passive Gas Spring's function is to eliminate the max. 1 mm springback of the CS2 spring(s) at BDC.

The system works by connecting the lower gas chamber in the CS2 Controllable Gas Spring (s) to the upper chamber of the PS Passive Gas Spring via the valve block. By stroking the PS Passive Gas Spring, the pressure in its upper gas chamber is reduced, causing a pressure difference between it and the lower gas chamber in the CS2 Controllable Gas Spring(s).

At BDC, the valve in the valve block is opened, using the control system from the press or a mechanical pressure switch, and the remaining gas in the lower chamber of the CS2 spring is drawn into the upper chamber of the PS Passive Gas Spring.





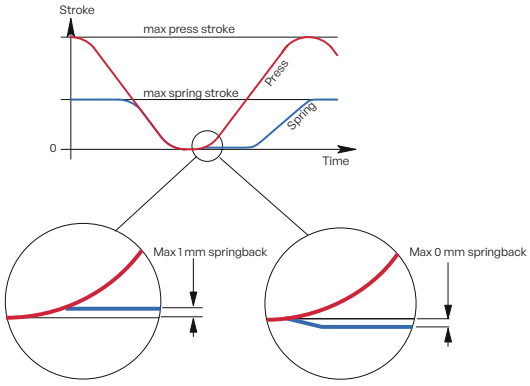
Stroking within 0.5 mm of full stroke

In order to provide the best locking function from the CS2 Controllable Gas Spring, it is important to stroke the spring 100% of the nominal stroke length at minimum, within 0.5 mm. This reduces the gas volume in the lower gas chamber to a minimum.

For a standard lock CS2 system, stroking the CS2 spring 100% of the nominal stroke length, or within 0.5 mm, will ensure a springback of no more than 1 mm.

An adjustable stroke length version of the Controllable Gas Spring, called the CS2A, is available for those applications where the exact nominal stroke length within 0.5 mm is not known until after tool tryouts.

For a positive lock system CS2 + PS, stroking the CS2 spring 100% of the nominal stroke length or within 0.5 mm is also important, although much depends on the PS Passive Gas Spring's used stroke length.



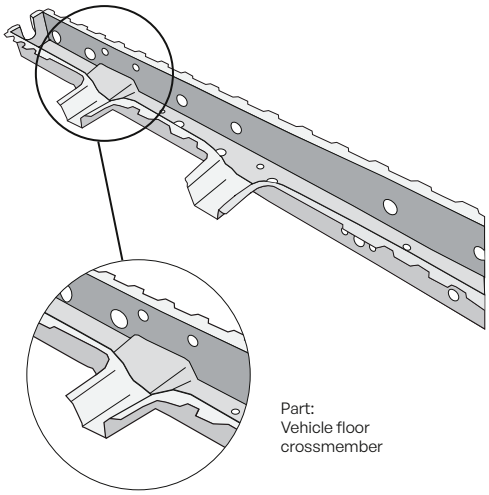
Standard Lock CS2 Positive Lock CS2 + PS

Application

Standard Lock, CS2

When forming this beam, baby blank-holders are used to form the circled area. There are two baby blank-holders in the tool that have to be locked in the bottom position to avoid deformation of the part during the return stroke.

In this case, one CS2 spring is used to control each baby blank-holder.



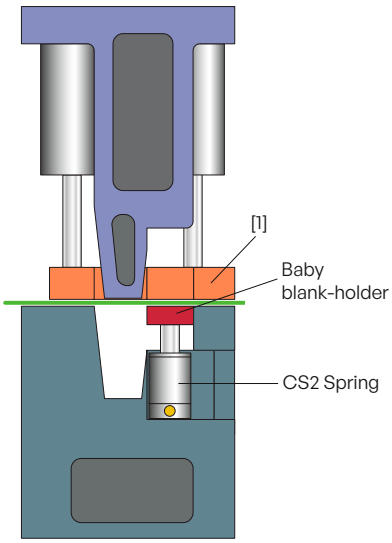
Part:
Vehicle floor
crossmember

Work Cycle

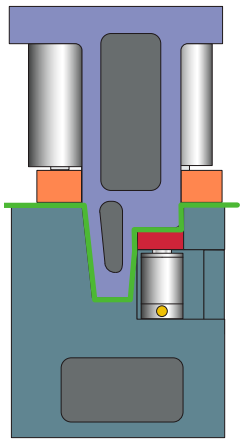
As the upper tool moves downwards, the blank holder [1] will be activated and control the flow of the blank in the tool.

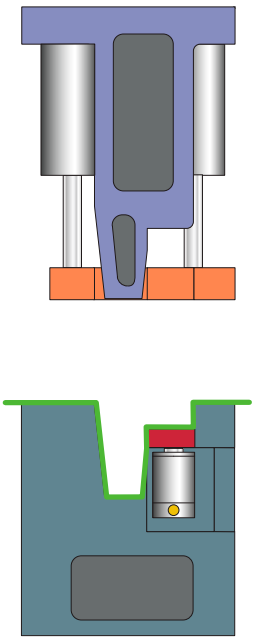
At bottom dead center the CS2 springs will lock. A small springback will, for this application, not damage the formed part.

As the press opens, the baby blank holder remains locked until that time when the CS2 spring should be unlocked and eject the part.



Standard Lock, CS2

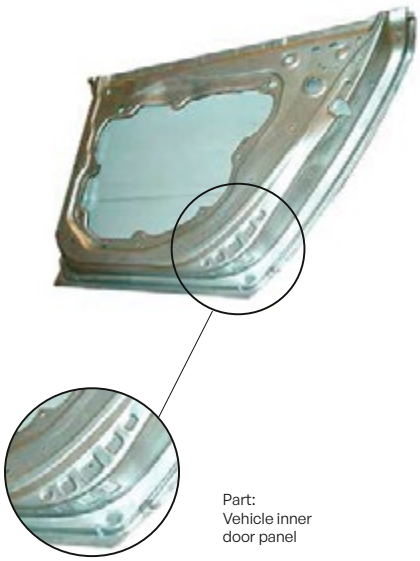




Positive Lock System, CS2 + PS

For the parts where Controllable Gas Springs are required with zero spring, the Positive Lock System is ideal. It provides a lockable blank holding force that prevents part deformation during the return stroke of the press.

The example at right shows a double stage draw forming operation made with a single stroke from the press. This large die for an inner door panel uses a total of 12 pieces CS2 springs connected to three pieces of PS Passive Gas Springs



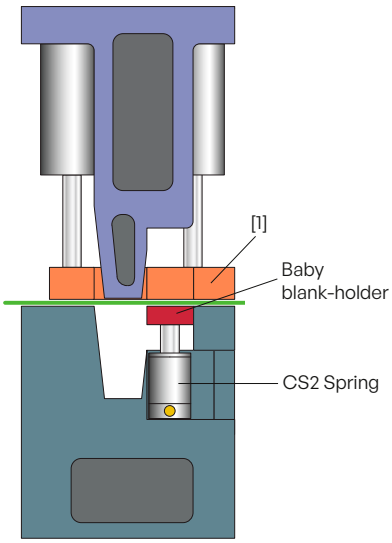
Part:
Vehicle inner door panel

Work Cycle

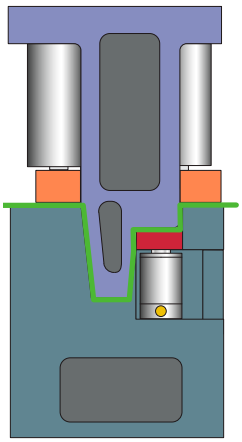
The lower tool contains the CS2 Controllable Gas Springs that provide the active blank-holding force for the deepest drawn section of the part.

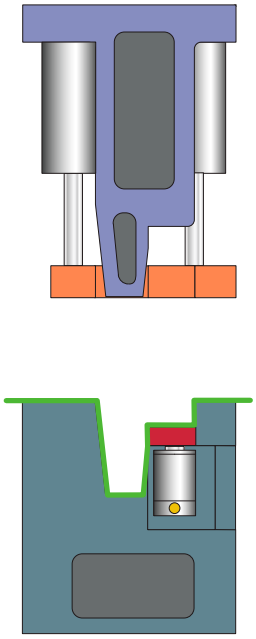
As the tool comes together, the PS Passive Gas Springs (not shown) are stroked, providing the necessary back pressure to lock the CS2 springs at BDC with zero springback.

As the tool opens, the CS2 springs remain locked until a signal from the press is given. Then the CS2 springs help eject the undamaged part from the tool.



Standard Lock, CS2





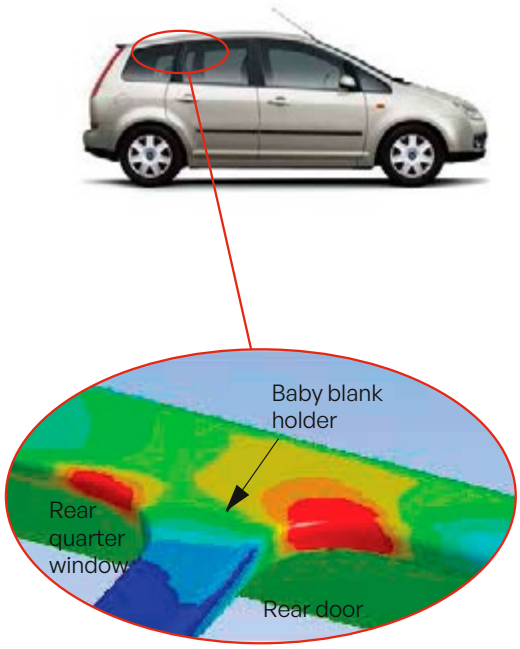
Positive Lock System, CS2 + PS

Producing side body panels of a high quality often provides challenges to the tool maker, especially where the side posts meet the outer frame.

Too much blank holding force and the part can split, too little and the part can wrinkle.

One solution is to use individual baby blank holders at these areas, whose spring forces are controlled by CS2 Controllable Gas Springs.

The result is improved part quality, increased forming control, and reduction in scrapped parts.



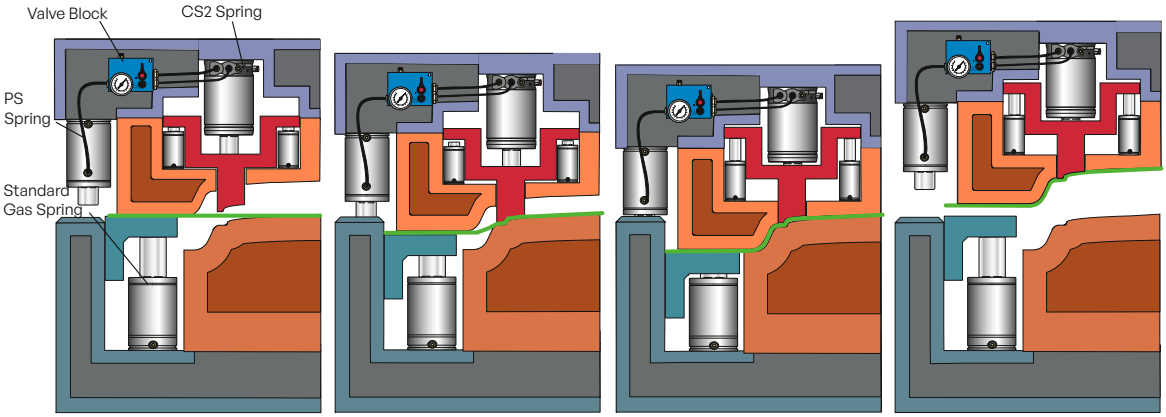
Work Cycle

The upper tool contains the CS2 Controllable Gas Springs that provide the active blank holding force for the locally situated baby blank holders.

The baby blank holders are the first to hold the blank at the problem areas as the tool starts to close.

At press BDC, the valve in the valve block opens and the PS spring is used to ensure zero springback in the CS2 springs.

As the tool opens, the CS2 springs remain locked until a signal from the press is given. Then the CS2 springs help eject the finished part from the tool.



Positive Lock System, CS2 + PS

System Configuration

Controllable Gas Springs require at least one of the following systems:

- Control System (required)
- Hose System (optional)
- Cooling System (optional, depending on requirements)

Control System

In order to lock and unlock the CS2 Controllable Gas Spring(s), a control system is required, which provides a pneumatic signal (min. 4 bar) to the normally open (NO) valve in the base of the CS2 spring.

The pneumatic signal can be provided by the control system from the press, or integrated into the tool itself using mechanical pressure switches.

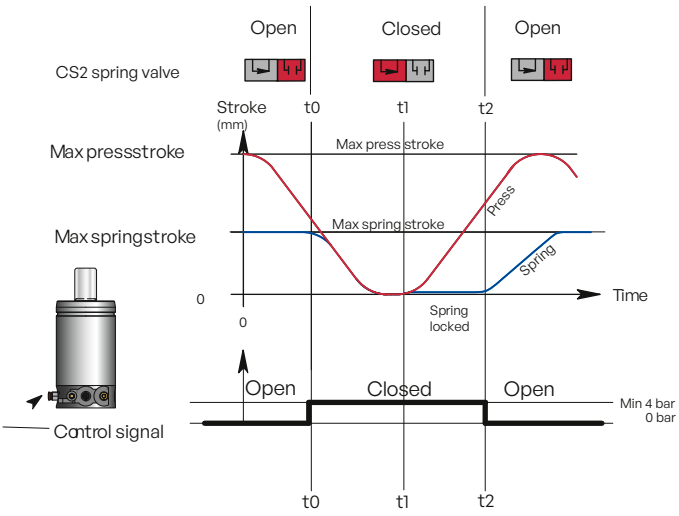
Control System - Standard Lock, CS2

The normally open (NO) valve within the base of the CS2 Controllable spring(s) is closed using compressed air (min. 4 bar). With the valve closed, t0-t2 (see diagram), the piston rod of the CS2 spring(s) is prevented from returning to its extended position.

By connecting the valves in the CS2 springs together, using pneumatic hoses, to the control system of the press, the springs can be easily locked and unlocked.

If only an electrical control signal is available from the press, then a standard electric-pneumatic control valve can be used in conjunction with shop air.

- t0 = Die closed
- t1 = Press Bottom Dead Center
- t2 = Start of spring return stroke



Control System - Positive Lock System, CS2 + PS

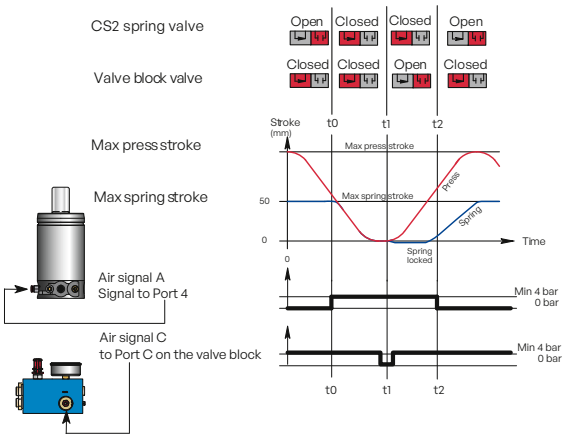
When the PS Passive Gas Spring is connected to the active CS2 spring(s) via the valve block, an additional signal from the press (or separate mechanical pressure switch) is required to control the valve within the valve block.

As the valve in the valve block is identical to that used in the CS2 springs, it is normally open (NO). Therefore, during the down-stroke of the press, it is important the valve block's valve is closed by applying compressed air (min. 4 bar) to air port C.

Note: The valve in the valve block is to be opened and closed exactly at the BDC according to the diagram.

For examples showing how to connect the CS2 + PS Controllable Gas Spring system to a control system, see Installations, page 348.

- t0 = Approximately when closing the die
- t1 = Press Bottom Dead Center
- t2 = Start of spring return stroke



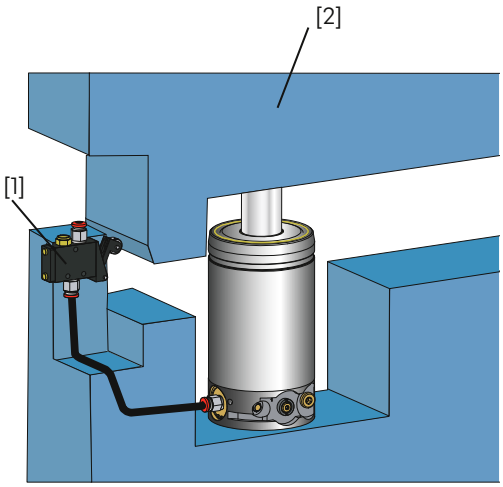
Tool Integrated Control System

The control system required to lock the CS2 spring(s) can be integrated into the tool itself by using a mechanical pressure switch. The control system required to lock and unlock the CS2 spring(s) is therefore independent of the press's own control system.

The CS2 spring(s) remain locked as long as the mechanical pressure switch [1] is activated by the tool [2].

A tool integrated control system requires a constant supply of compressed air (min. 4 bar) to the mechanical pressure switch.

Note: Can also be used to control the valve block's valve for positive lock systems.



Hose System (optional)

CS2 Controllable Gas Springs can be installed in the tool as self-contained units or linked together using a Hose System for remote gas charging and evacuation.

Controllable Gas Spring System	Recommended Hose System
Standard Lock	EZ™-Hose
Positive Lock System	EZ™-Hose and EO24 Hose

Hose System - Standard Lock, CS2

For information on recommended Hose System, see page 350.

CS2 Controllable Gas Springs are connected together in a Hose System in the same way as standard Gas Springs. For information on connecting the newer CS2 springs together with the older CS Controllable Gas Springs, see page 362.

For examples showing how to connect CS2 Controllable Gas Springs to a Hose System, see Installations, page 348.

CP-N2 LG G1/8

Hose System

Positive Lock System, CS2 + PS

You can connect up to four CS2 springs to one valve block.

A CS2 + PS Controllable Gas Spring system requires two hose connections:

- One EZ-Hose connection (see page 352)
- One EO24 Hose connection (see page 352)

EZ-Hose connections

Gas port 1, which is marked on each CS2 spring, is connected to gas port 1 on the valve block (also marked) using EZ-Hose system components.

EO24 Hose connections

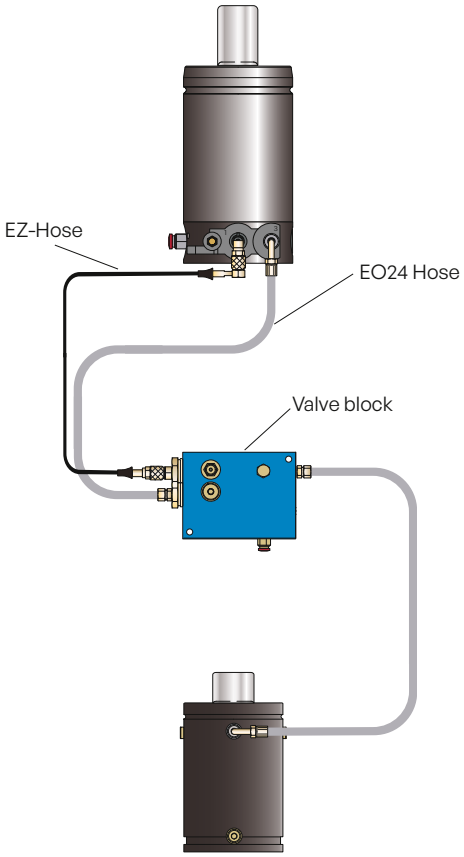
To connect the CS2 Controllable Gas Spring(s) to a PS Passive Gas Spring via the valve block, use the EO24 Hose System (or its equivalent).

Gas port 3, which is marked on each CS2 spring, is connected to gas port 3 on the valve block (also marked) using EO24 Hose System components.

Gas port 5, which is marked on the valve block, is connected to gas port 5 (also marked) on the PS Passive Gas Spring using EO24 Hose System components also.

For information on connecting the newer CS2 springs together with the older CS Controllable Gas Springs, see page 361.

For examples showing how to connect CS2 + PS Controllable Gas Spring systems to a Hose System, see Installations, page 348.



CS2 + PS
Single system assembly

Cooling System (optional)

About Cooling

There are two methods for cooling a CS2 Gas Spring system. Which method you choose depends on the required cooling effect and the number of CS2 springs to be cooled.

CS2-NC/CS2A-NC uses a Nitro Cooler, ideal for a small number of springs run at higher production rates and requiring cooling. They are also appropriate when there is insufficient space for cooling jackets and the Liquid Cooler Unit.

CS2-CJ/CS2A-CJ uses a Liquid Cooler Unit, ideal for a larger number of springs run at higher production rates and requiring cooling. Two models, 10kW and 25kW, are available. Each Gas Spring is fitted with a cooling jacket to allow the cooling liquid to circulate around it.

Every time a CS2 Controllable Gas Spring is stroked, energy is transferred from the press to the spring. The amount of energy transferred is a function of the spring force times its stroke length.

With a conventional Gas Spring, the piston rod follows the press movement on the return stroke. Therefore the energy transferred to the Gas Spring on the compression stroke is transferred back to the press on the return stroke (with the exception of some losses because of friction, etc.).

Since the return stroke of a CS2 Controllable Gas Spring does not follow the press's return stroke, the transferred energy is dissipated as heat in the CS2 spring.

To avoid overheating in some applications, cooling of the CS2 spring(s) is required.

Nitro Cooler Method

Liquid Cooler Unit Method

Heat Factor

Determining if cooling is required

The need for cooling is determined by calculating the heat factor for the application.

The heat factor is calculated by multiplying the stroke frequency in strokes per minute (spm), with the CS2 spring's stroke length (mm).

For example

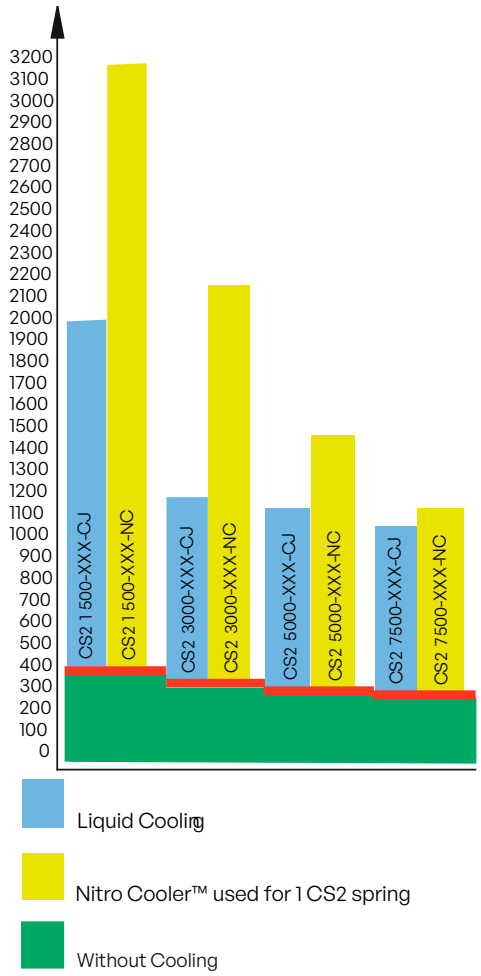
Stroke frequency: 15 spm

CS2 stroke length: 100 mm

Heat factor = stroke frequency x stroke length
= 15 x 100
= 1500

If this heat factor exceeds the maximum without cooling values given for the different CS2 spring sizes in the diagram to the right, then cooling is required.

Heat factor = Stroke length x Frequency
(mm) (stroke/minute)



Note:

Diagram is based on calculations made for CS2 Gas Springs with 150 bar charge pressure, surrounding temperature 24°C (75,2 °F), and a well-ventilated area.

How to Eliminate the Need for Cooling

1. Add More CS2 Springs

By adding CS2 Controllable Gas Spring s to the system, the charge pressure in each CS2 spring is reduced in order to maintain the same net spring force in the tool. The heat factor reduction for the CS2 spring is directly proportional to the reduction in charge pressure.

For example:
A tool is to run at 10 spm and have a stroke length of 50 mm.
The net spring force required from the tool is 300 kN.
Preferred number of springs is 10.

Option 1:
The first choice would be to select 10 pieces CS2-3000-50 springs at 150 bar charge pressure.
In this case, the heat factor would be 10 x 50 = 500.
This is 120 greater than allowed for a system without cooling.
Add 4 pieces CS2-3000-50 springs to the system and reduce nitrogen pressure to get the required force.
The total net spring force at 150 bar is 420 kN.

$$\text{New heat factor} = \text{Original heat factor} \times \left(\frac{\text{Required Net Force at Reduced Pressure}}{\text{Net Force at 150 bar}} \right) \text{Reduction Factor}$$

$$= 500 \times (300 / 420)$$

$$= 360$$

The new heat factor is now 20 below that required for CS2-3000 cooling.
The original heat factor is reduced by 29% so the fill pressure must be reduced by the same amount.
Reduced fill pressure = 71% of 150 bar = 107 bar

2. Use Larger CS2 Springs

By selecting a larger size of CS2 Controllable Gas Spring than originally planned, the charge pressure must be reduced in order to maintain the same net spring force from the tool. The heat factor reduction for the CS2 spring is directly proportional to the reduction in charge pressure.

Option 2:

Selecting 10 pieces CS2-5000-50 springs at 150 bar would provide 500 kN total net spring force.

The heat factor at 150 bar would be 10 x 50 = 500 as before.

$$\text{New heat factor} = \text{Original heat factor} \times \left(\frac{\text{Required Net Force at Reduced Pressure}}{\text{Net Force at 150 bar}} \right) \text{Reduction Factor}$$

$$= 500 \times (300 / 500)$$

$$= 300$$

The new heat factor is now 60 below that required for CS2-5000 cooling.
The original heat factor is reduced by 40% so the fill pressure must be reduced by the same amount.

Choosing a Cooling System

A liquid cooler must be used for large dies with a large number of Gas Springs. The cooling capacity is limited to 25 kW. The Nitro Cooler is suited to smaller dies with one-six Gas Springs. The Nitro Cooler must be placed as close to the springs as possible. **The return speed will be slower by approx. 40% using the Nitro Cooler.** This is a die-integrated system with a cooling capacity of 1.5 kW.

Overheat Protection

Thermal Relay

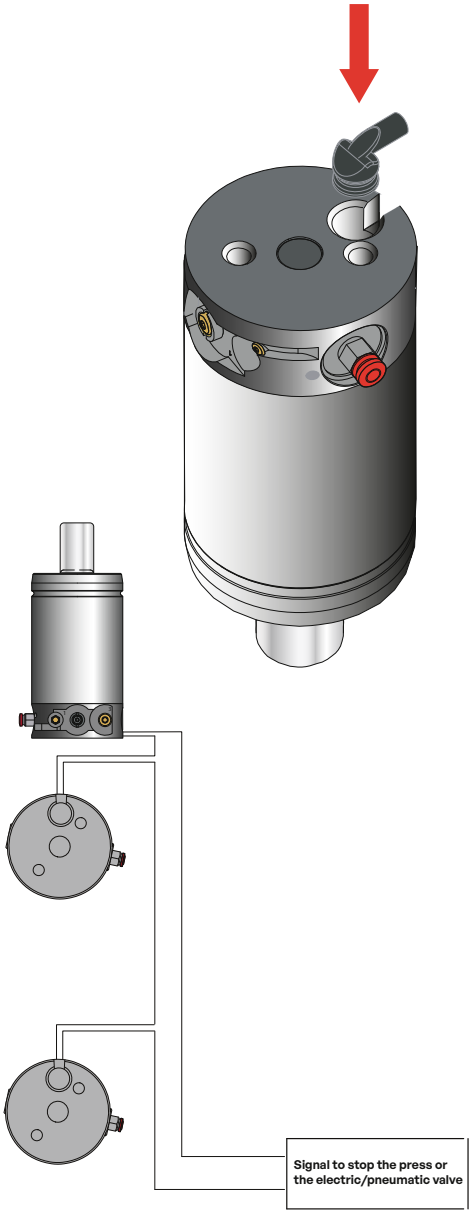
To avoid overheating the CS2 Gas Spring, a thermal relay (bimetallic) should be used to stop the press or prevent the CS2 Controllable Gas Spring (s) from locking.

If the CS2 Gas Spring temperature exceeds 80ºC (176ºF), the thermal relay will open, sending a signal to the press's control system that the springs are overheating.

The thermal relay will automatically close as the CS2 Gas Spring temperature returns to normal. Running the CS2 Gas Spring at higher temperatures will shorten the service life of the spring.

Note: A thermal relay is included with each order.

Thermal Relay
Order No. 503388

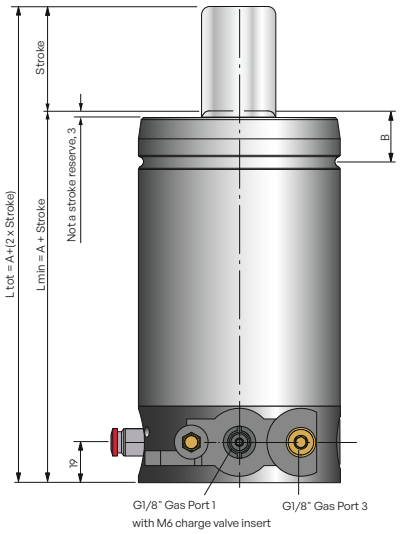


Product Specifications

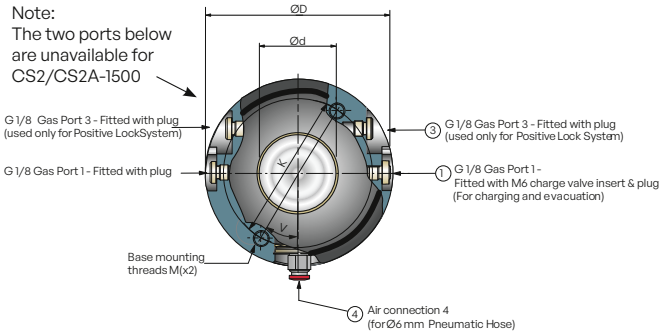
Normally closed
Break temp ..... 83±3º
Hysteresis ..... < 7ºC
Max voltage 250VAC
Max current 16A
Min current 50mA
Delivered with 2m of electric wire

Technical Information

CS2 - Dimensions, Standard Version



Top view



Model	Stroke		Contact Force at full charge		Full Stroke Force		Cylinder Height		Body Height		Gas vol.	Threads
	S						Y ±0.25	Y ±0.010	L			M
	mm	in	N	lbf.	N	lbf.	mm	in	mm	in	ℓ	size
CS2-1500	5–160	0.20-6.30	15,000	22,000	125	28.101	24	95	36	50	60°	M12×15
CS2-3000	6–160	0.24-6.30	30,000	42,000	135	30.349	25.5	120	50	95	30°	M12×15
CS2-5000	6–160	0.24-6.30	50,000	74,000	160	35.969	27.5	150	65	110	30°	M16×18
CS2-7500	8–160	0.31-6.30	75,000	98,000	180	40.466	33.5	195	80	120	30°	M16×18

- On delivery all gas ports are fitted with plugs and internal gas pressure is zero bar.
- We recommend the threaded holes in the base of the CS2 springs be used for mounting.

Product Specifications

Pressure medium ..... Nitrogen
Max. charge pressure ..... 150 bar
Min. charge pressure ..... 25 bar
Operating temperature ..... 0+80°C
Force increase by temperature ..... ±0.3%/°C
Max. piston rod velocity ..... 0.8 m/s
Return Speed Piston Rod* ..... 0.22 m/s for CS2 1500
Return Speed Piston Rod* ..... 0.15 m/s for CS2 3000
Return Speed Piston Rod* ..... 0.10 m/s for CS2 5000
Return Speed Piston Rod* ..... 0.065 m/s for CS2 7500
Tube ..... Nitrided
Rod ..... Nitrided

*Note: CS2 springs with even slower return speeds are available on request. Increased stroke length reduces the speed.
Contact order@HysonSolutions.com

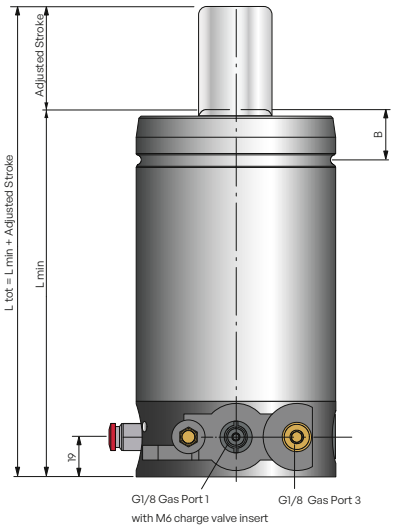
How to order

CS2-3000 - 78
Model
Stroke length [mm] in full mm between 10-160 mm, in increments of 1 mm.
For optimal function the full stroke length of the spring must be used. (Within ± 0.5 mm).

CS2A - Dimensions, Adjustable Version

For certain applications, it is difficult to know in advance exactly what stroke length will be required.

The CS2A Controllable Gas Spring models offer adjustable stroke lengths within 15 mm, with the use of four specially designed spacers that are built into the guide of the spring.



Order No.	Nominal Stroke	Min. stroke length	Max. stroke length	L min			
				1500	3000	5000	7500
CS2A-XXXX-10	10	4	17	142	152	177	197
CS2A-XXXX-20	20	12	27	152	162	187	207
CS2A-XXXX-30	30	22	37	162	172	197	217
CS2A-XXXX-40	40	32	47	172	182	207	227
CS2A-XXXX-50	50	42	57	182	192	217	237
CS2A-XXXX-60	60	52	67	192	202	227	247
CS2A-XXXX-70	70	62	77	202	212	237	257
CS2A-XXXX-80	80	72	87	212	222	247	267
CS2A-XXXX-90	90	82	97	222	232	257	277
CS2A-XXXX-100	100	92	107	232	242	267	287
CS2A-XXXX-110	110	102	117	242	252	277	297
CS2A-XXXX-120	120	112	127	252	262	287	307
CS2A-XXXX-130	130	122	137	262	272	297	317
CS2A-XXXX-140	140	132	147	272	282	307	327
CS2A-XXXX-150	150	142	157	282	292	317	337
CS2A-XXXX-160	160	152	167	292	302	327	347

For information on how to adjust the stroke length of the CS2 spring, see page 359 “How to adjust the stroke length of a CS2A.”

How to order

CS2A-3000 - 30 - 30

Model:
CS2A-1500
CS2A-3000
CS2A-5000
CS2A-7500

Nominal stroke

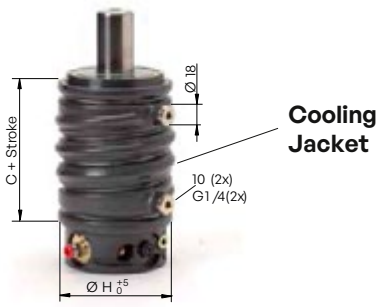
Delivered stroke

Gas Springs with Cooling Systems

CS2/CS2A with Cooling Jacket (CJ)

These Gas Springs are used with the liquid cooler (fig. 1).
The Cooling Jacket must be connected to the cooler.

Model	CS2 C	CS2A C+7	Ø H $^{+5}_{0}$
CS2/CS2A 1500-XXX-CJ	75	82	110
CS2/CS2A 3000-XXX-CJ	85	92	135
CS2/CS2A 5000-XXX-CJ	110	117	165
CS2/CS2A 7500-XXX-CJ	130	137	210

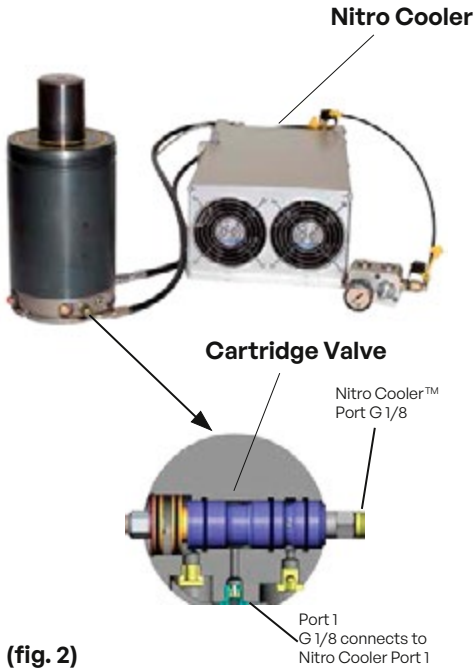


(fig. 1)

CS2/CS2A for Nitro Cooler (NC)

These Gas Springs with a special cartridge valve are used with the Nitro Cooler (fig. 2). Since nitrogen gas passes from the Gas Spring through the Nitro Cooler, **the piston rod has approximately a 40% slower return stroke when compared to a CS2 spring without a Nitro Cooler.**

NC Cartridge Valve Order No.	For Gas Spring
3021780	CS2/CS2A 1500
3121780	CS2/CS2A 3000
3221780	CS2/CS2A 5000
3321780	CS2/CS2A 7500



(fig. 2)

How to order CS2/CS2A with a Cooling Jacket (CJ)

CS2A-XXXX - XXX - CJ

- Model size: 1500, 3000, 5000, 7500
- Stroke length [mm]
- Cooling Jacket

How to order CS2/CS2A with a Nitro Cooler™ (NC)

CS2 XXXX - XXX - XXX - NC

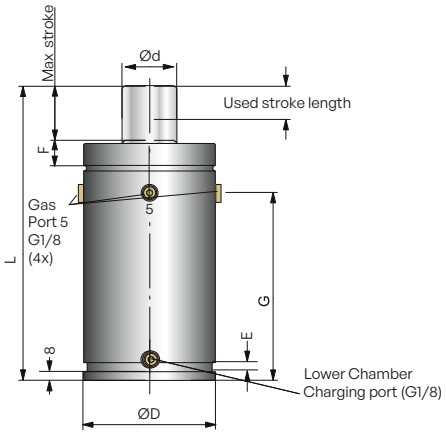
- Model size: 1500, 3000, 5000, 7500
- Nominal Stroke length [mm]
- Adjusted Stroke length [mm]
- Additional Port for Nitro Cooler™

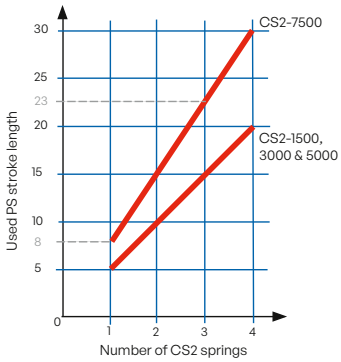
PS - Dimensions

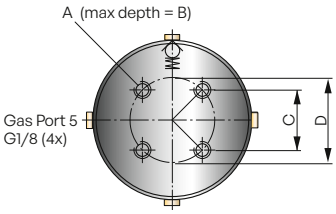
PS Passive Gas Springs should:

- Not be used for any operation in the tool other than to eliminate CS2 springback.
- Be the same model size as the CS2 spring(s)(except CS2-7500 which uses the PS-5000).
- Be connected to the valve block, using the EO24 Hose System or its equivalent, via one of the four G1/8 gas port 5 connection ports.
- Be stroked according to the table below.

Note: The PS Passive Gas Spring does not require cooling. The G1/8 charge port at the base of the spring is for gas charging and bleeding the PS spring's lower gas chamber. The PS spring's charge pressure should be the same as the CS2 spring(s).







Order No.	ØD	Ød	F	E	L	G	A	B	C	D	Max. Stroke Length
PS-1500	95	36	24	7	220	140	M8	13	42.4	60	30
PS-3000	120	50	25.5	7	220	140	M10	16	56.6	80	30
PS-5000	150	65	27.5	8	300	193	M10	16	70.7	100	35

Force in [daN] at used stroke length [mm]*							
Model	5	10	15	20	25	30	35
PS-1500	3600	5200	6700	8200	9900	11900	-
PS-3000	6000	8300	10400	12300	14400	16800	-
PS-5000	7800	10200	12500	14700	16800	19000	21300

* The forces are calculated based on a charging pressure of 150 bar in the CS2 and the PS spring(s).

Product Specifications

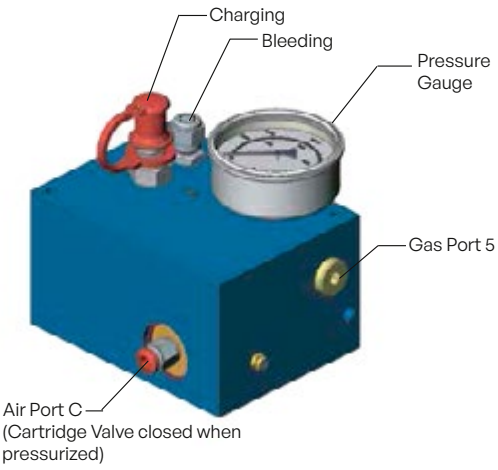
Pressure medium ..... Nitrogen
Max. charging pressure ..... 150 bar
Min. charging pressure ..... 25 bar
Operating temperature ..... 0 to +80ºC
Force increase by temperature ..... ±0.8%/ºC
Max. piston rod velocity ..... 0.8 m/s
Tube ..... Nitrided
Rod ..... Nitrided

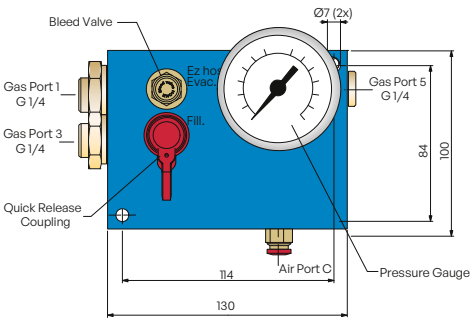
Valve Block Dimensions

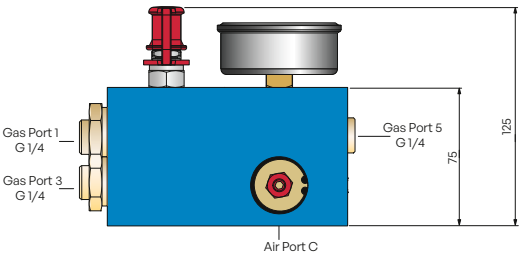
Two valve block models are available:

- all-in-one Valve Block, with built-in gas charging and bleeding equipment, plus gauge.
- Standard Valve Block, for use with separate control panel.

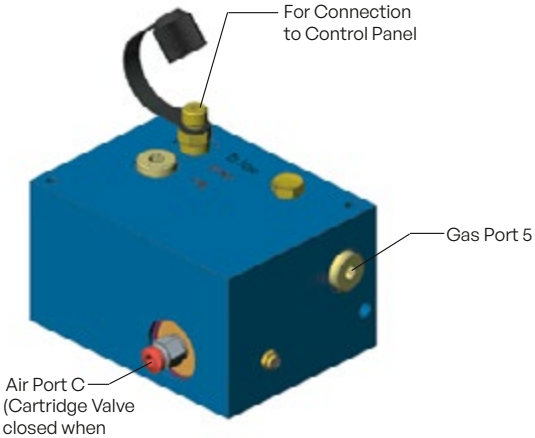
Order No. CSPSCP-AI1

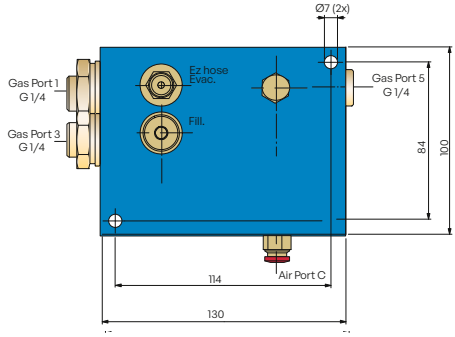


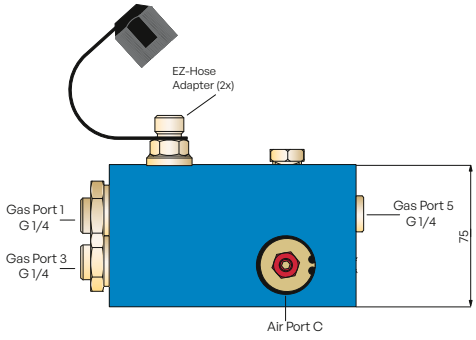




Order No. CSPSCP-SVB







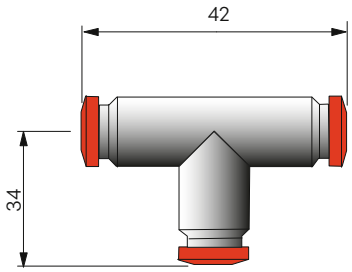
For information showing how to connect the different valve blocks to a positive lock system, see Installations, page 349.

Control System Components

Hose and fittings for Ø6 mm pneumatic hose

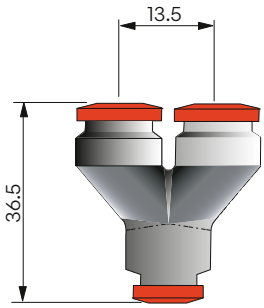
T - Connector (hose to hose)

Order No. CSNF-3500



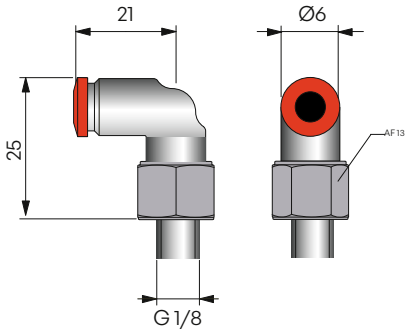
Y - Connector (hose to hose)

Order No. CSNF-3510

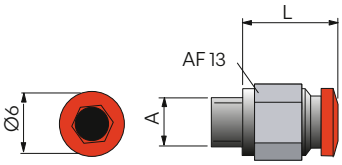


90° - G 1/8

Order No. CSNF-2000-G 1/8



Straight Connector (see Table below)



Order No.	A	L
CSNPF-1000-G1/8	G1/8	15
CSNPF-1000-G1/4	G1/4	13.5
CSNPF-1000-1/4	1/4 NPT	28

Pneumatic hose

Ø 6 mm

How to order 506795 - XX

Order the length in whole meters

Product Specifications

Material ..... Polyamid
Max. temperature ..... 130°C
Max. pressure ..... 27 bar
Color ..... Blue
Min. bend radius ..... 35 mm

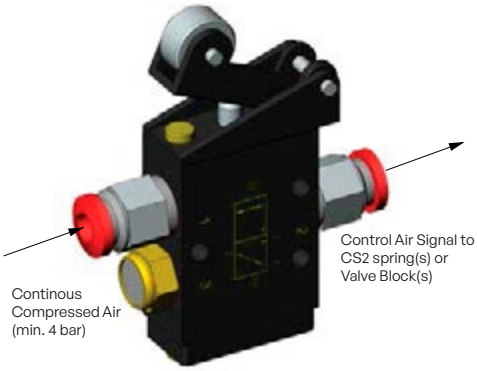
Mechanical Pressure Switch

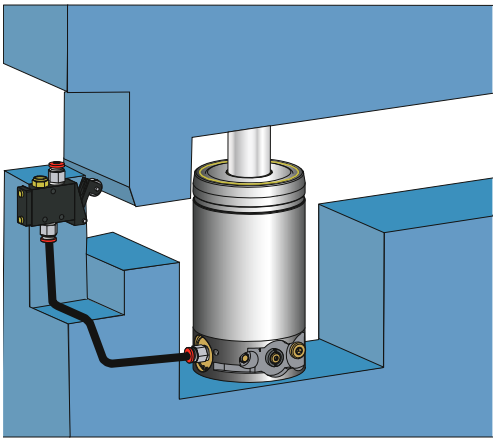
Order No. HMPS-G 1/8

The mechanical pressure switch can be used to control the valve in the CS2 Controllable Gas Spring (s) or valve block for tool integrated control systems.

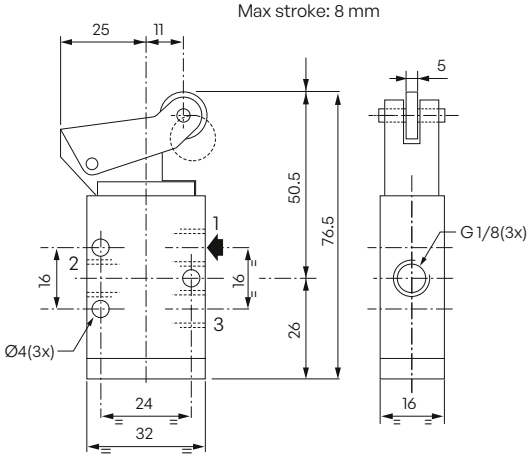
Mechanical Pressure Switches:

- **Can** control up to six pieces CS2 springs or valve blocks.
- **Require** a constant compressed air supply (min. 4 bar).





Stroke: 5 mm
Max stroke: 8 mm



Product Specifications

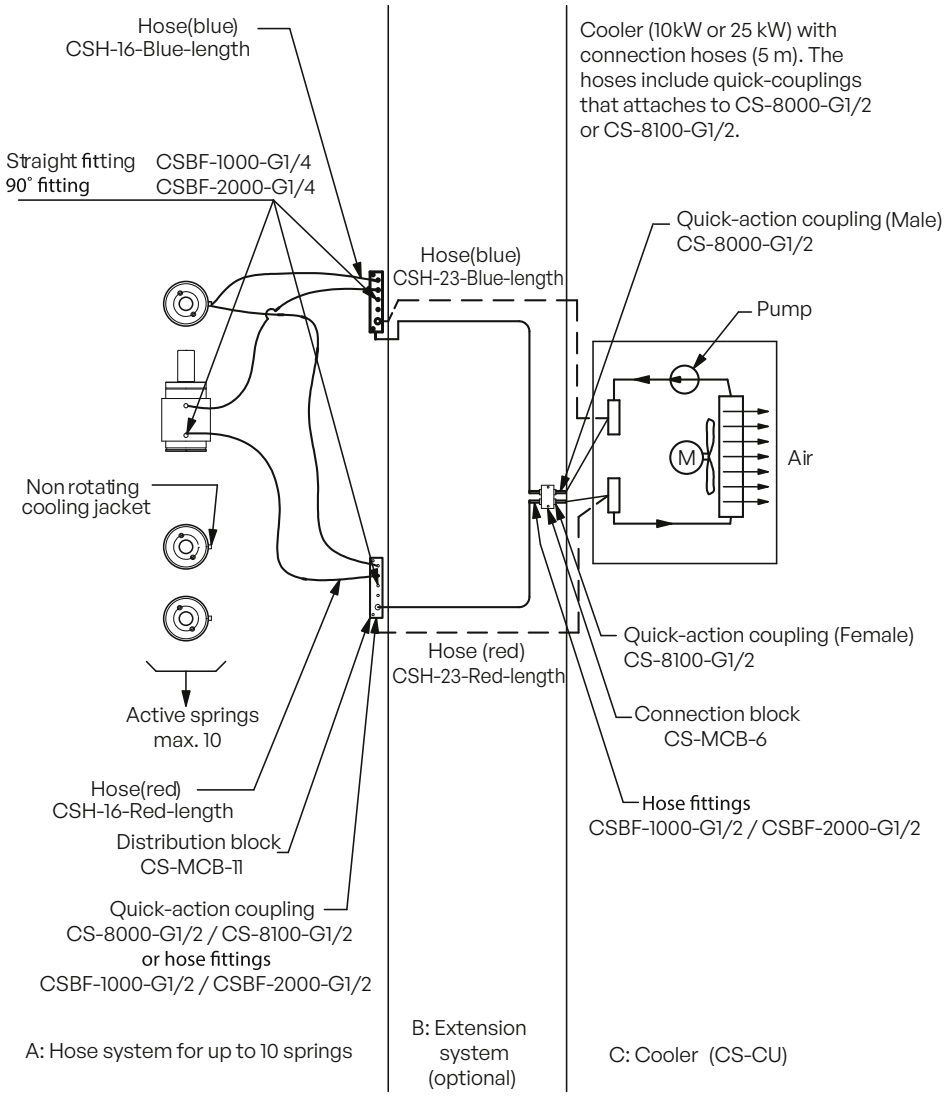
Fluid	Air or inert gas, filtered & lubricated
Pressure	0 to 10 bar
Temperarture	10°C to + 60°C
Functions	3/2
Connection ports	G 1/8 (3x)
Flow rate (at 6 bar)	200 l/min

Cooling System Components

For applications where cooling is required, each CS2 Controllable Gas Spring must be:

- **Fitted** with a Cooling Jacket (CJ).
- **Fitted** with a Thermal Relay (see Overheat Protection, page 17).
- **Connected in parallel** to the Cooler Unit as shown below.

CS2 spring fitted with Cooling Jacket (CJ)

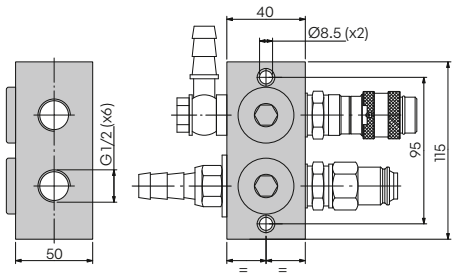


The Cooling Fluid is circulated within a closed system through the Cooling Jacket(s), to a Cooler Unit (10kW or 25kW), where heat from the CS2 spring(s) is then radiated to the surroundings.

Cooling System - Hose & Fittings

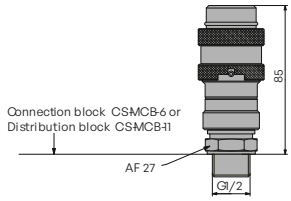
Connection Block

Order No. CS-MCB-6



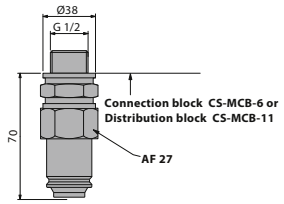
Female Quick Release Coupling

Order No. CS-8100-G 1/2



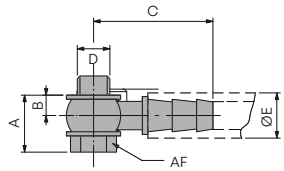
Male Quick Release Coupling

Order No. CS-8000-G 1/2



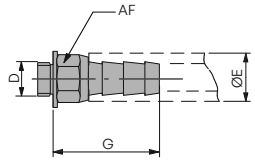
90° Hose Fitting

Order No.	D	A	B	C	E	AF
CSBF-2000-G 1/4	G1/4	23	8	44	16	17
CSBF-2000-G1/2	G1/2	30	12	68	23	27



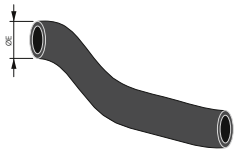
Straight Hose Fitting

Order No.	D	E	G	AF
CSBF-1000-G 1/4	G1/4	16	28	12
CSBF-1000-G1/2	G1/2	23	58	27



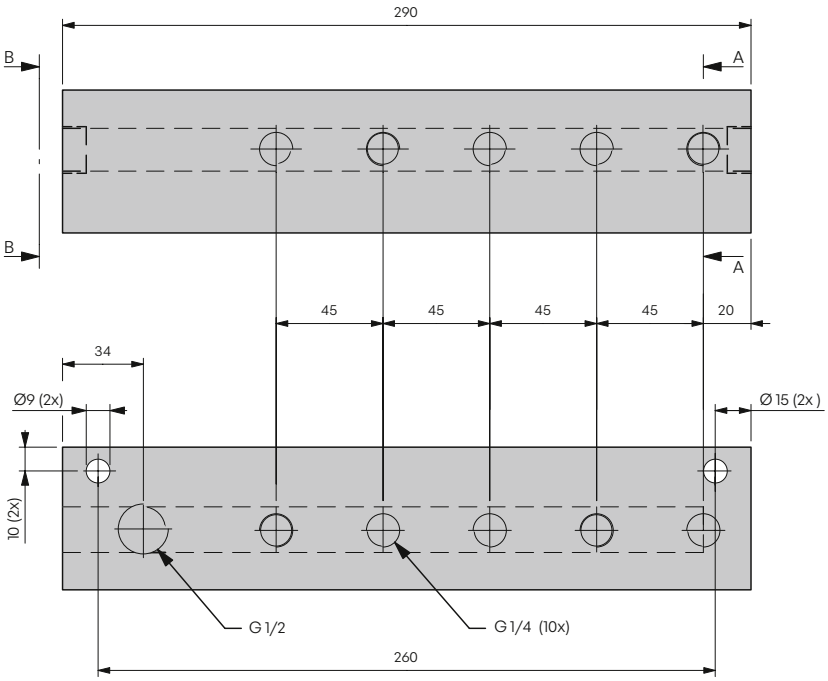
Cooling Hose

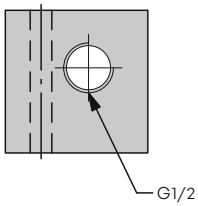
Order No.	E	DN	Color	Min. Bend Radius
CSH-16-Blue	16	10	Blue	75
CSH-16-Red	16	10	Red	75
CSH-23-Blue	23	16	Blue	150
CSH-23-Red	23	16	Red	150



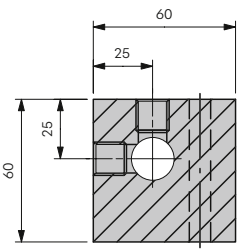
Cooling System - Hose & Fittings

Order No. CS-MCB-12





View B-B



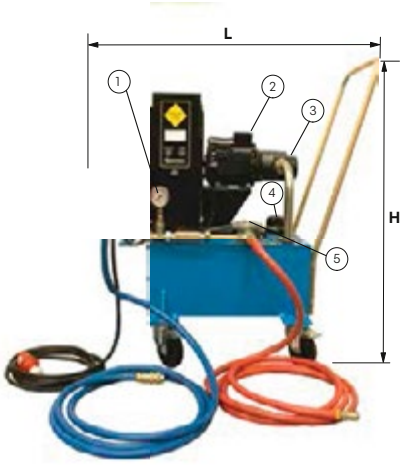
View A-A

Cooling System - Cooler Unit

There are two sizes of Cooler Unit available:

- 10 KW - Order No. CS-CU-10KW
- 25 KW - Order No. CS-CU-25KW

For information on which Cooler Unit is suitable for your application, please check the CS-Configurator at Hyson website.



1 Pressure Gauge

To monitor system pressure (8-10 bar)

2 Electric Motor

380V AC

3 Circulation Pump

Check the direction of rotation at start up

4 Cooling Fluid Port

5 Filter

6 User's Guide

7 Cooler

8 Outlet-Cooling Fluid

Delivered with 5 m hose and female quick release coupling 9 Power Switch

9 Control Button

On/Off button

10 Fluid Level Indicator

11 Inlet-Cooling Fluid

Delivered with 5 m hose and male quick release coupling

12 Drainage Plug

Cooling Fluid

The cooler unit is not delivered with cooling fluid.
We recommend using only ULTRA Safe 620 Cooling Fluid.

Note:

Do not use Cooler Unit without cooling fluid! The unit is equipped with a level/temp switch that will shut down the unit if it leaks or overheats.

Product Specifications

10 KW Cooler Unit:

Order No.	**CS-CU-10KW**
H	1000
L	900
B	700
Pump flow	40 l/min
Tank capacity	60 l
Electric motor	1.5 KW
Power supply	380 V AC
Weight	170 kg

25 KW Cooler Unit:

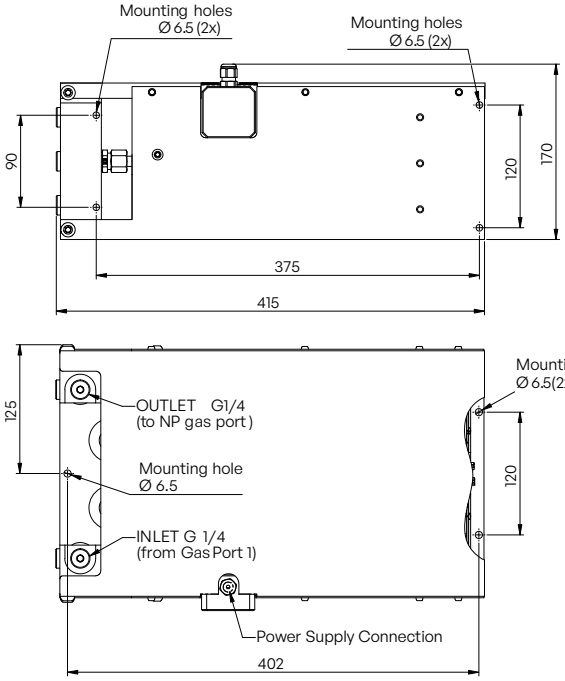
Order No.	**CS-CU-25KW**
H	1070
L	1070
B	890
Pump flow	60 l/min
Tank capacity	90 l
Electric motor	3 KW
Power supply	380 V AC
Weight	220 kg

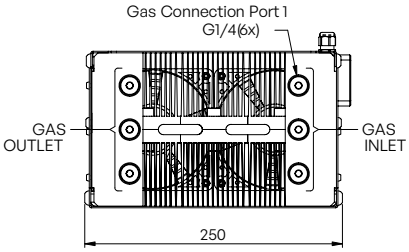
Nitrogen Cooling System - Nitro Cooler™ (NC)

The Nitro Cooler (NC) is engineered to provide tool integrated cooling for CS2/CS2A Controllable Gas Spring s running at high production rates. It is compact and provides 1.5 kW of cooling power. Each unit is able to cool up to four CS2 or CS2A Gas Springs. Gas Springs with special cartridge valves are required for use with the Nitro Cooler.

The Nitro Cooler requires 24 V DC (22W) to operate and conforms to IP64 class. Units can be mounted vertically or horizontally, inside or outside the die.

Nitro Cooler ™ - Order No. 2021641





Product Specifications

Max. cooling capacity 1.5kW
Max. charging pressure ..... 150 bar
Min. charging pressure ..... 25 bar
Operating temperature ..... 0 to 80ºC
Weight ..... 16 kg
Connection ports ..... G ¼(8x)
Power supply ..... 24 V DC (22W)
Contains a built-in thermal relay.

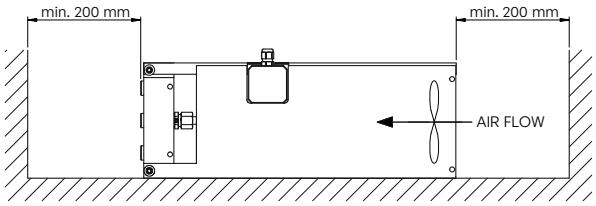
Nitrogen Cooling System - Nitro Cooler™ (NC)

Mounting Options

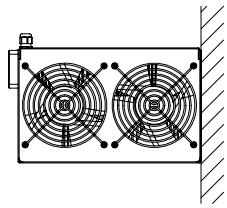
Nitro Coolers can be mounted vertically or horizontally. When mounting, it is important NOT to restrict the air flow through the cooler. If air flow is restricted, it will have a negative effect on the unit's performance.

Electrical Connections

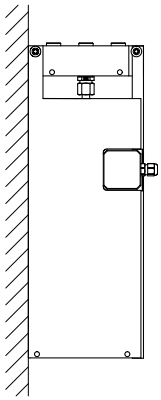
The wiring diagram (at right) for the Nitro Cooler is also included on the unit's label next to the connection box. Note: The Nitro Cooler contains a built-in thermal relay. The thermal relay has a normally closed circuit that opens if the temperature of the relay exceeds 85ºC±5%. The thermal relay should be connected to the PLC of the press to prevent overheating of the CS2-NC Gas Springs.



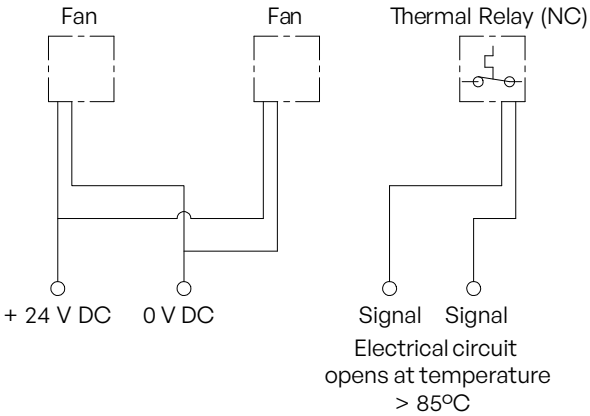
Base Mount



Horizontal Mount



Vertical Mount



Nitrogen Cooling System - Nitro Cooler™ (NC)

Nitro Cooler Performance

Depending on the amount of heat generated by the Gas Springs, up to four Gas Springs can be connected to each Nitro Cooler. These charts illustrate the maximum number of strokes per minute (SPM) allowed when one to four Gas Springs, with 150 bar pressure, are connected to a single Nitro Cooler. Along each of the four Gas Springs curves, the heat generation is 1.5 kW, the maximum cooling effect of the Nitro Cooler.

Each chart can be used to determine how many CS2-NC Gas Springs can be connected to one Nitro Cooler. For any given stroke length, DO NOT EXCEED the corresponding SPM rate curve for the number of CS2-NC Gas Springs.

Note:

When using the Nitro Cooler, the return stroke speed of the piston is decreased by approximately 50%. With a distance of 1 m between the cooler and the Gas Spring the speeds are as follow:

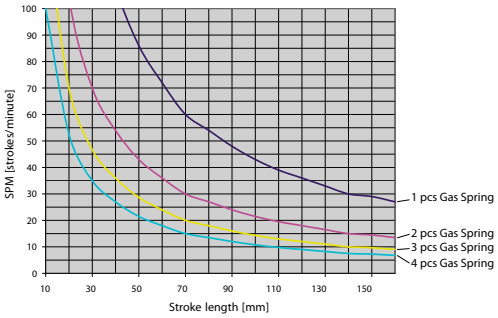
CS2/CS2A 1500 – 0.10 m/sec

CS2/CS2A 3000 – 0.08 m/sec

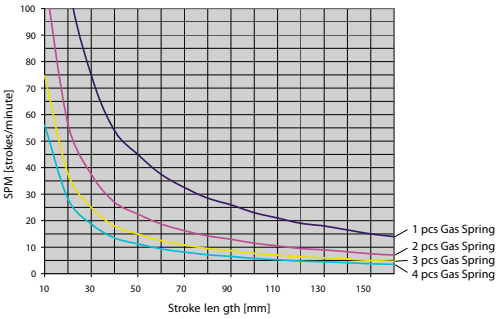
CS2/CS2A 5000 – 0.05 m/sec

CS2/CS2A 7500 – 0.03 m/sec

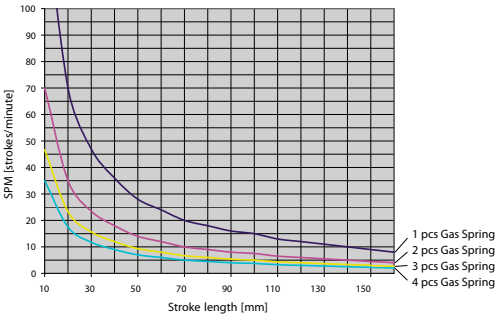
CS2/CS2A 1500



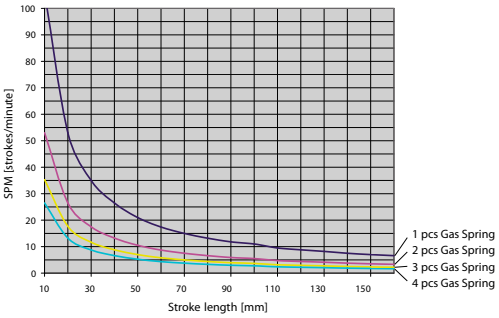
CS2/CS2A 3000



CS2/CS2A 5000



CS2/CS2A 7500



Nitrogen Cooling System - Nitro Cooler™ (NC)

How to Determine the Maximum Running Speed for an Application

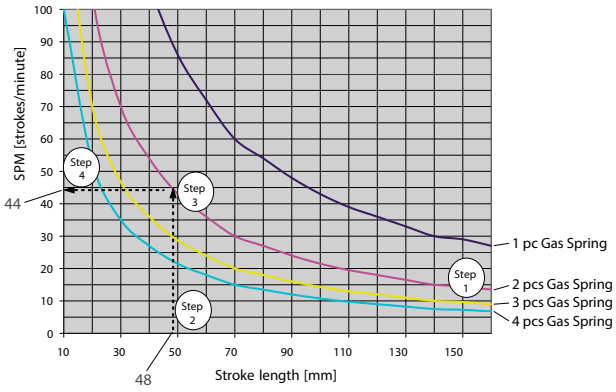
Gas Spring: CS2-1500-48-NC

Used Stroke Length : 48 mm

Pressure: 150 bar with 1.5 ton initial force

Number of Gas Springs: 2

Max SPM for one Gas Spring with one Nitro Cooler



Step 1 Choose the correct curve line according to the number of springs used.

Step 2 According to the used stroke length, go up vertically until crossing the diagram from 2 to 3.

Step 3 From point 3, go horizontally to the vertical axis SPM stroke/min point 4.

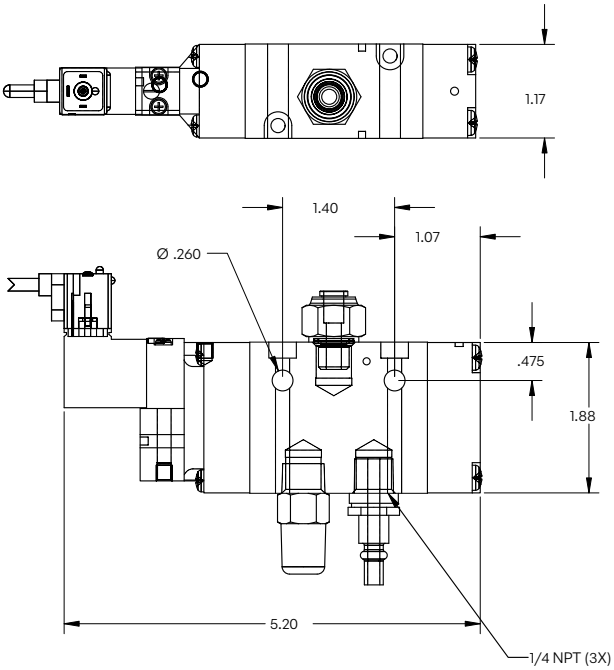
Step 4 Read the value for the maximum used SPM 44 strokes/min.

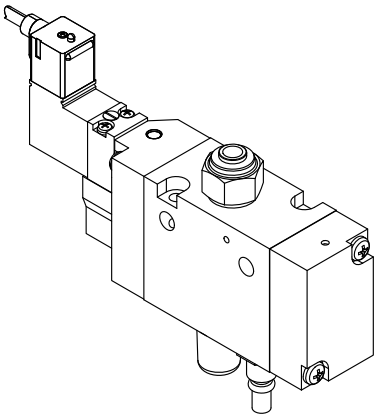
For lower charging pressure, this value increases proportionately.

For example: a charging pressure of 100 bar increases the maximum used SPM from 44 to 44 x 150/100 = 66 strokes/min.

Electric/Pneumatic Air Control Valve

Order No. CS3W2P24VDC





Note: CS3W2P24VDC comes completely assembled with (2) 1/4-NPT hose connectors for 6 mm hose, exhaust muffler and a 3-pin din connector with 6-foot cord.

Where extensions to electrical cord are needed, use 20 AWG.

Power Requirement: 24 VDC

Operation

Valve Energized: Pressure at inlet port 1 connected to outlet port 2, exhaust port 3 blocked. Valve must be energized to lock Gas Spring.

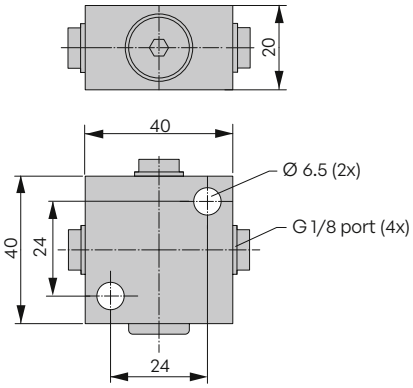
Valve De-Energized: Pressure at inlet port 1 blocked, outlet port 2 connected to exhaust port 3. When valve is not energized, Gas Spring piston rod will return to fully extended position.

Multi-Coupling Blocks

Order No. CS-MCB-14

This is a small and compact block for linking hoses. The block is provided with four G 1/8 ports.

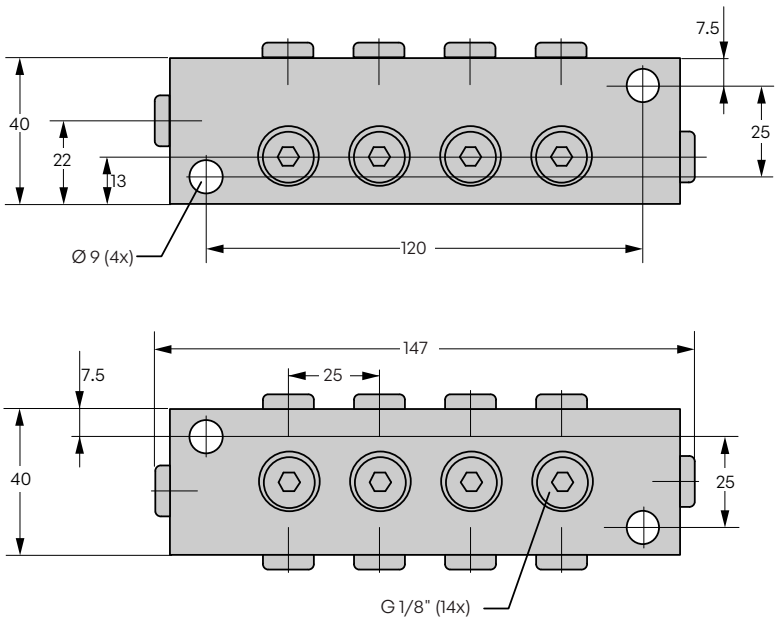
On delivery, one of the ports is provided with a sealing plug, while the other ports are provided with protective covers.



Order No. CS-MCB-14

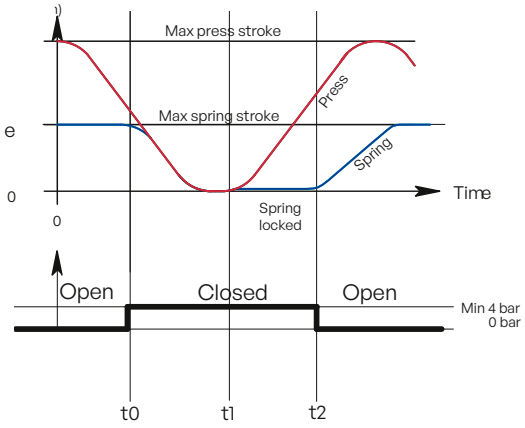
This multi-coupling block is manufactured in steel and has 13 G 1/8 connections and one G 1/4connection.

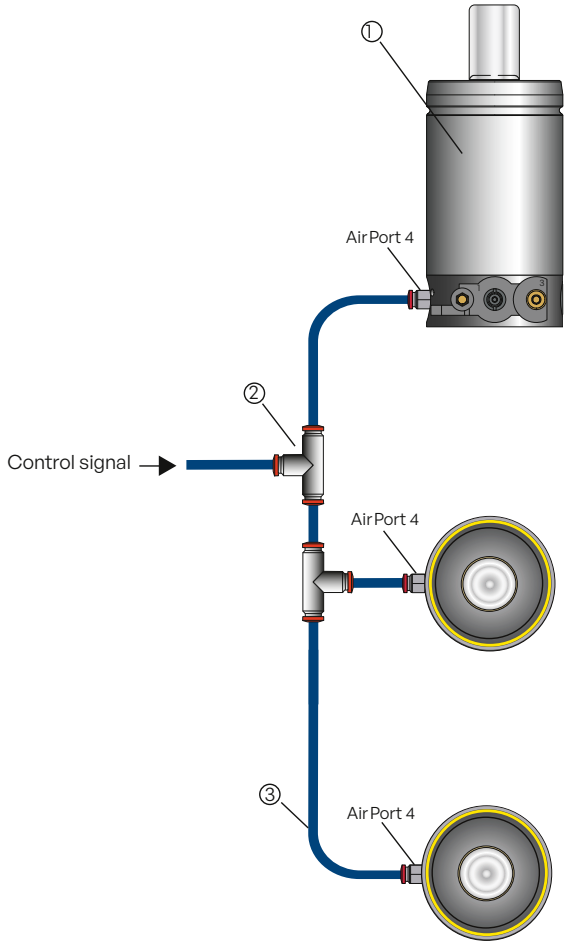
All connections are plugged on delivery.



Installations

Control System - Standard Lock CS2





Position	Quantity	Description	Order No.
1	2	Controllable Gas Spring	CS2-XXXX-XXX
2	2	T - Connector	CSNF-3500
3	1	Pneumatic Hose Ø6 mm	506795

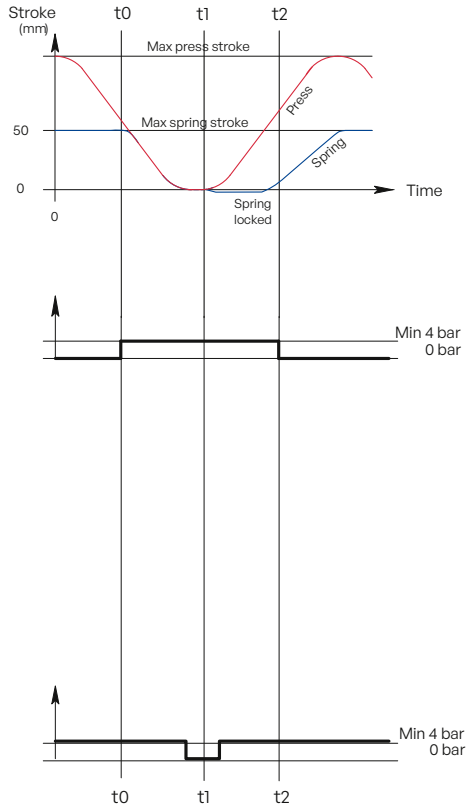
A standard lock system requires one air control signal.

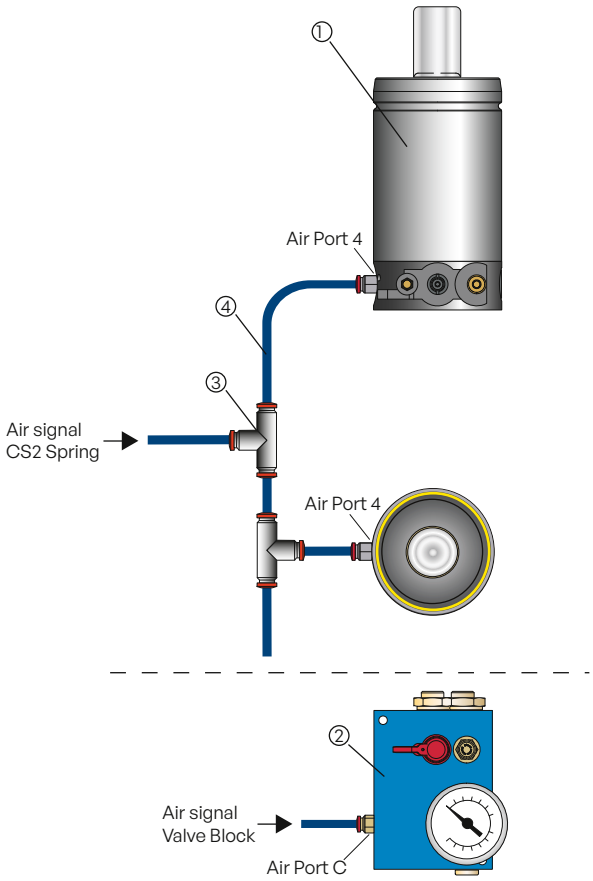
The CS2 Gas Springs are delivered with air fittings suitable for Ø6 mm air hoses.

Note: To lock and unlock all CS2 springs simultaneously, the hose lengths from the different springs to the air inlet should be close to the same length.
Cut the air hoses to the right length during the installation (push-lock system).

The CS2 spring's control valve should always have a continuous supply of filtered compressed air with a minimum pressure of 4 bar.

Control System - Positive Lock System CS2 + PS





Position	Quantity	Description	Order No.
1	2	Controllable Gas Spring	CS2-XXXX-XXX
2	1	All-in-One Valve Block	CSPSCP-AI1
3	1	T - Connector	CSNF-3500
4	1	Pneumatic Hose Ø6 mm	506795

A positive lock system requires two air control signals: one to operate the CS2 Gas Spring(s) and one to operate the valve block

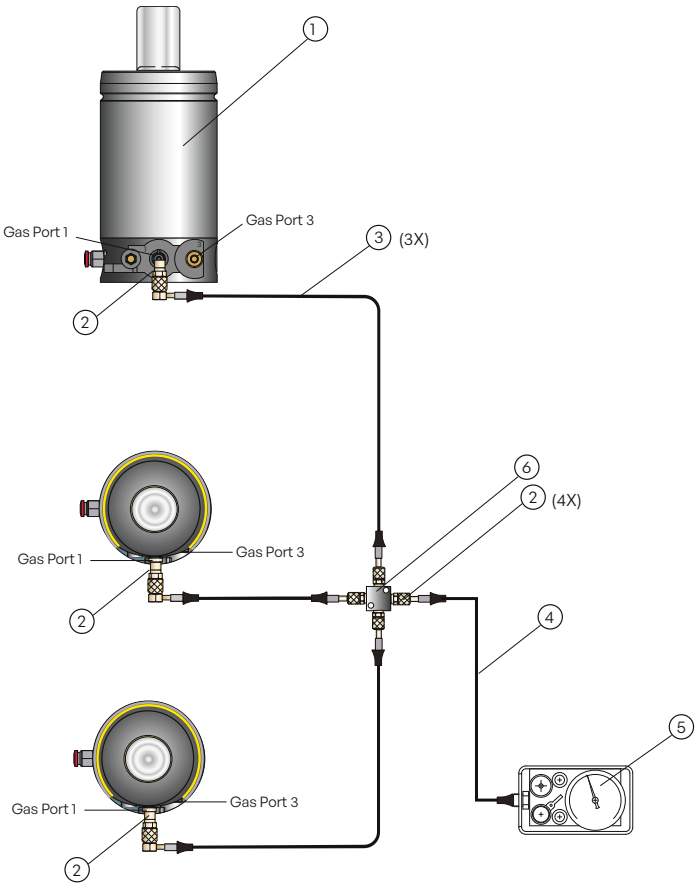
The CS2 Gas Springs and valve block are delivered with air fittings suitable for Ø6 mm pneumatic hoses.

Note: To lock and unlock all CS2 springs simultaneously, the hose lengths from the different springs to the air inlet should all be the same length.

Cut the air hoses to the right length during the installation (push-lock system). The control valve should always have a continous supply of filtered compressed air with a minimum pressure of 4 bar.

Hose System - Standard Lock CS2

Method Using Coupling Block(s)



Position	Quantity	Description	Order No.
1	3	Controllable Gas Spring	CS2-XXXX-XXX
2	7	EZ Adapter G1/8	4114973-G1/8
3	3	Hose Straight - 90°	4017568-XXXX
4	1	Hose Straight - Straight	4014974-XXXX
5	1	Control Panel	CP-N2 LG EZ
6	1	Multi-Coupling Block	CS-MCB-4

To charge, bleed and check the gas pressure for a standard lock CS2 Gas Spring system, all springs should be connected to a standard control panel (shown above connected via a coupling block).

We recommend the EZ-Hose system and fittings be used for such systems. The CS2 Gas Springs are delivered with gas ports 1 and 3 plugged. When connecting the EZ-Hose system, the charging valve in port 1 of each CS2 Gas Spring must be removed.

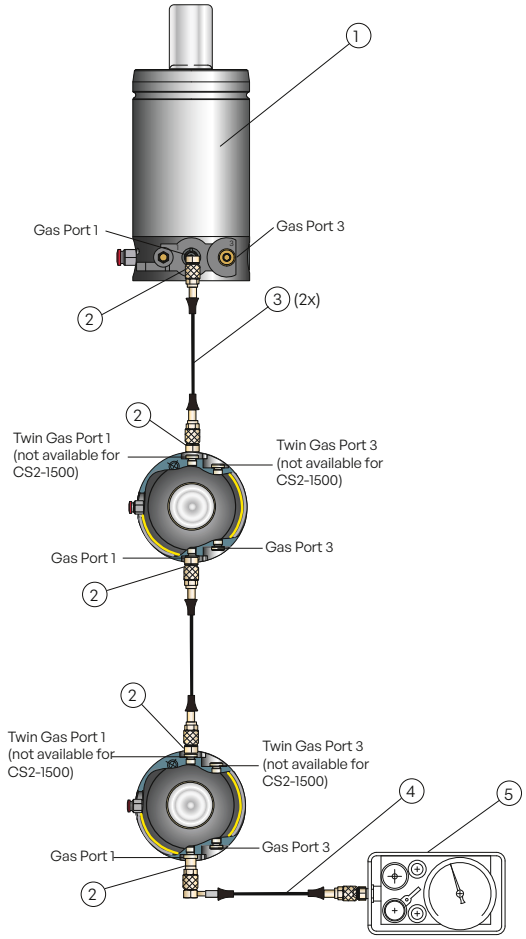
Each G 1/8 gas port, for both the CS2 Gas Spring and coupling block, requires an adapter (4114973-G1/8) for connection to an EZ-Hose.

The control panel should be placed higher than the CS2 springs to avoid loss of internal oil when bleeding.

Hose System - Standard Lock CS2

Method Using Twin Ports

(Not for use with CS2-1500 because it does not have the additional ports.)

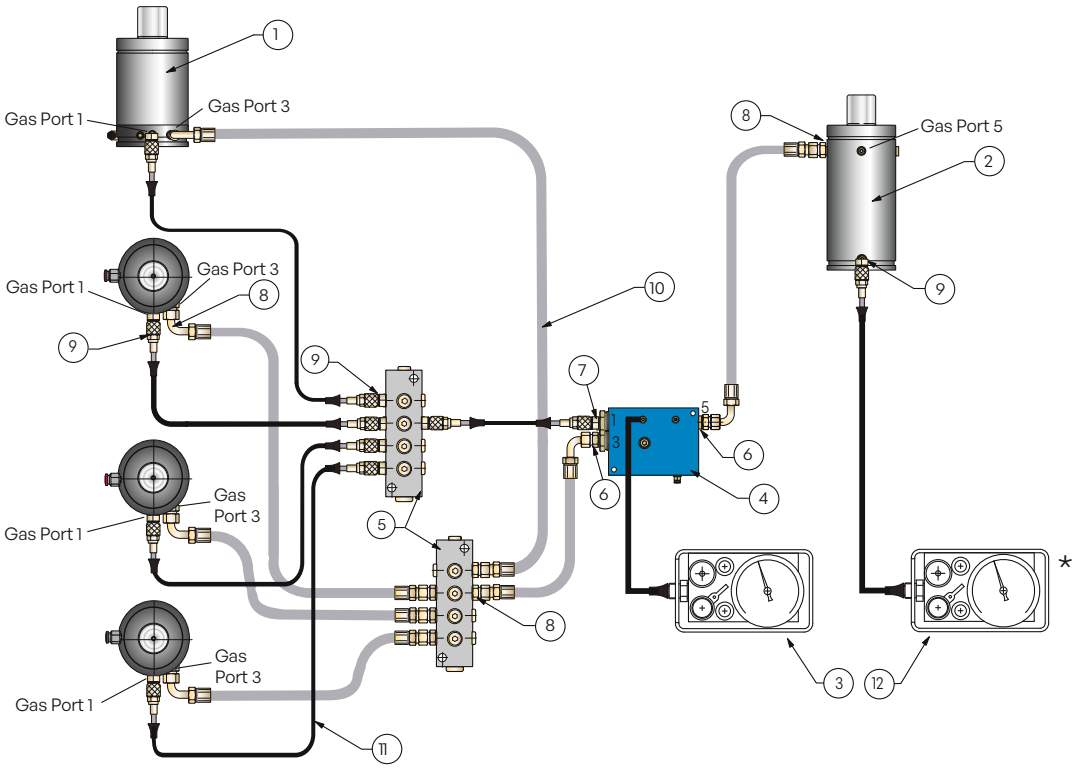


Position	Quantity	Description	Order No.
1	3	Controllable Gas Spring	CS2-XXXX-XXX
2	5	EZ Adapter G1/8	4114973-G1/8
3	2	EZ Hose Straight - Straight	4014974-XXXX
4	1	EZ Hose Straight - 90°	4017568-XXXX
5	1	Control Panel	CP-N2 LG EZ

To charge, bleed and check the gas pressure for a standard lock CS2 Gas Spring system, all springs should be connected to a standard control panel. We recommend the EZ-Hose system and fittings be used. The CS2 Gas Springs are delivered with gas ports 1 and 3 plugged. When connecting the EZ-Hose system, the charging valve in port 1 of each CS2 Gas Spring **must** first be removed. Each G 1/8 gas port, for both the CS2 Gas Spring and coupling block, requires an adapter (4114973-G1/8) for connection to EZ-Hose. The control panel should be placed higher than the CS2 springs to avoid loss of internal oil when bleeding.

Hose System - Positive Lock System CS2 + PS

Example 1



To connect CS2 Controllable Gas Spring (s) to a PS Passive Gas Spring via the valve block, you need two hose connections:

- One EZ-Hose connection
- One EO24-Hose connection.

The control panel should be placed higher than the springs to avoid loss of internal oil when bleeding.

Position	Quantity	Description	Order No.
1	4	Controllable Gas Spring	CS2-XXXX-XXX
2	1	PS Passive Spring	PS-XXXX
3	1	Control Panel	CP-N2 LG EO M10
4	1	Standard Valve Block	CSPSCP-SVB
5	2	Multi-Coupling Block G1/8	CS-MCB-14
6	2	EO24 Adapter G1/4	504144
7	1	EZ Adapter G1/4	4014973-G1/4
8	10	EO24 Adapter G1/8	503593
9	10	EZ Adapter G1/8	4114973-G1/8
10	6	EO24 Hose Straight - 90°	3220857-XXXX
11	7	EZ Hose Straight - Straight	4014974-XXXX
12	1	Control Panel	CP-N2 LG EZ

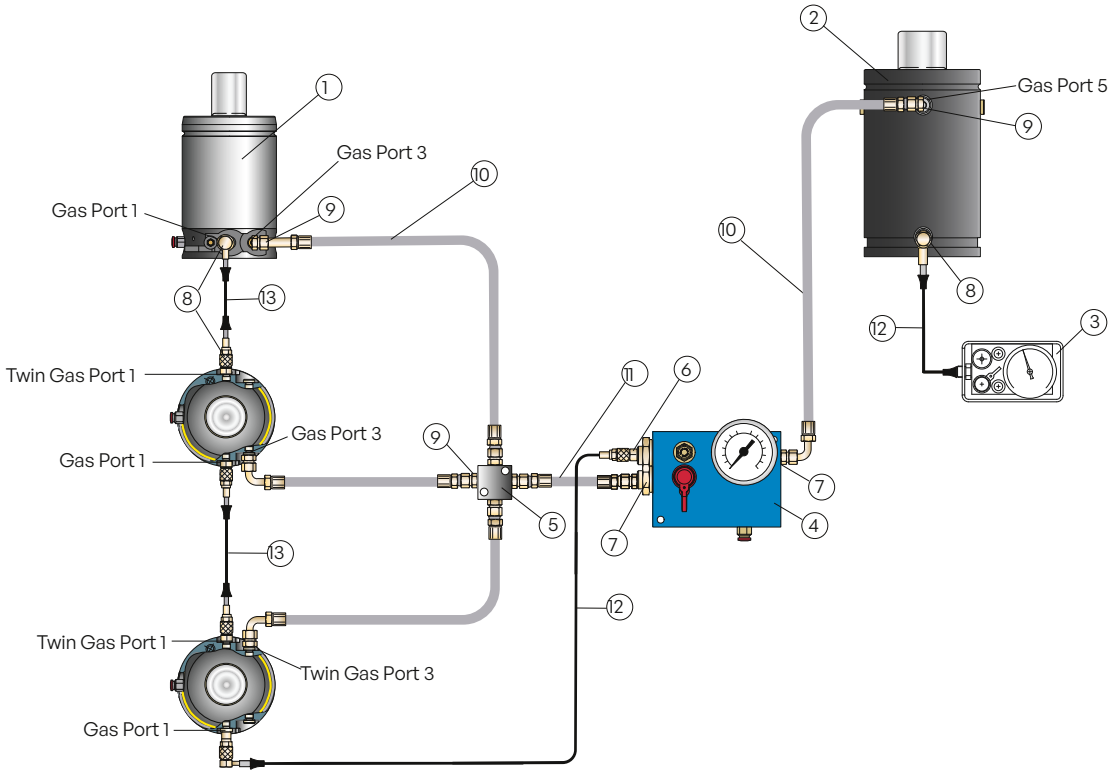
Positive Lock CS2 + PS

Gas charging and bleeding is carried out as follows:

1. Charge the lower gas chamber in the PS Passive Gas Spring through the control panel (3)*.
2. Charge the CS2 standard spring(s) and upper chamber of the PS Gas Spring via the control panel (3) connected to the standard valve block (4).

Hose System - Positive Lock System CS2 + PS

Example 2



To connect CS2 Controllable Gas Spring (s) to a PS Passive Gas Spring via the valve block, you need two hose connections:

- One EZ-Hose connection
- One EO24-Hose connection.

The control panel should be placed higher than the springs to avoid loss of internal oil when bleeding.

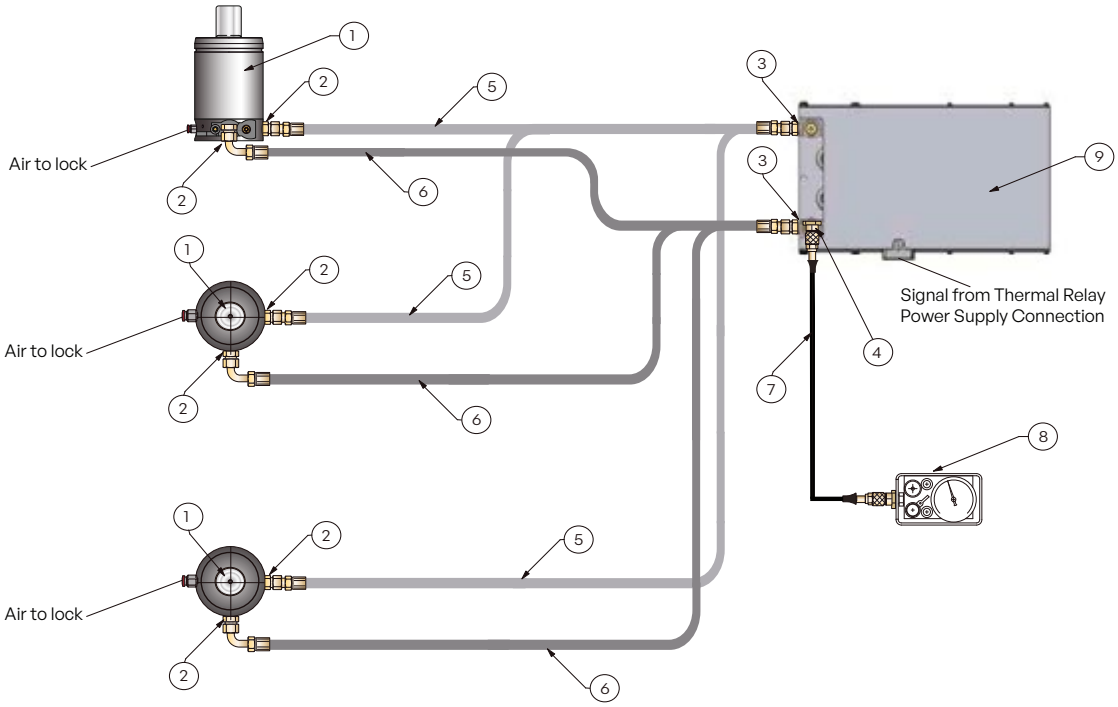
Position	Quantity	Description	Order No.
1	3	Controllable Gas Spring	CS2-XXXX-XXX
2	1	PS Passive Spring	PS-XXXX
3	1	Control Panel	CP-N2 LG EZ
4	1	All-in-One Valve Block	CSPSCP-All
5	1	Coupling Block G1/8	CS-MCB-4
6	1	EZ Adapter G1/4	4014973-G1/4
7	2	EO24 Adapter G1/4	504144
8	6	EZ Adapter G1/8	4114973-G1/8
9	8	EO24 Adapter G1/8	503593
10	3	EO24 Hose Straight - 90o	3220857-XXXX
11	1	EO24 Hose Straight - Straight	3020857-XXXX
12	2	EZ Hose Straight - 90o	4017568-XXXX
13	2	EZ Hose Straight - Straight	4014974-XXXX

Positive Lock CS2 + PS

Gas charging and bleeding is carried out as follows:

1. Charge the lower gas chamber in the PS Passive Gas Spring through the control panel (3)*.
2. Charge the CS2 standard spring(s) and upper chamber of the PS Gas Spring via the all-in-one valve block (4).

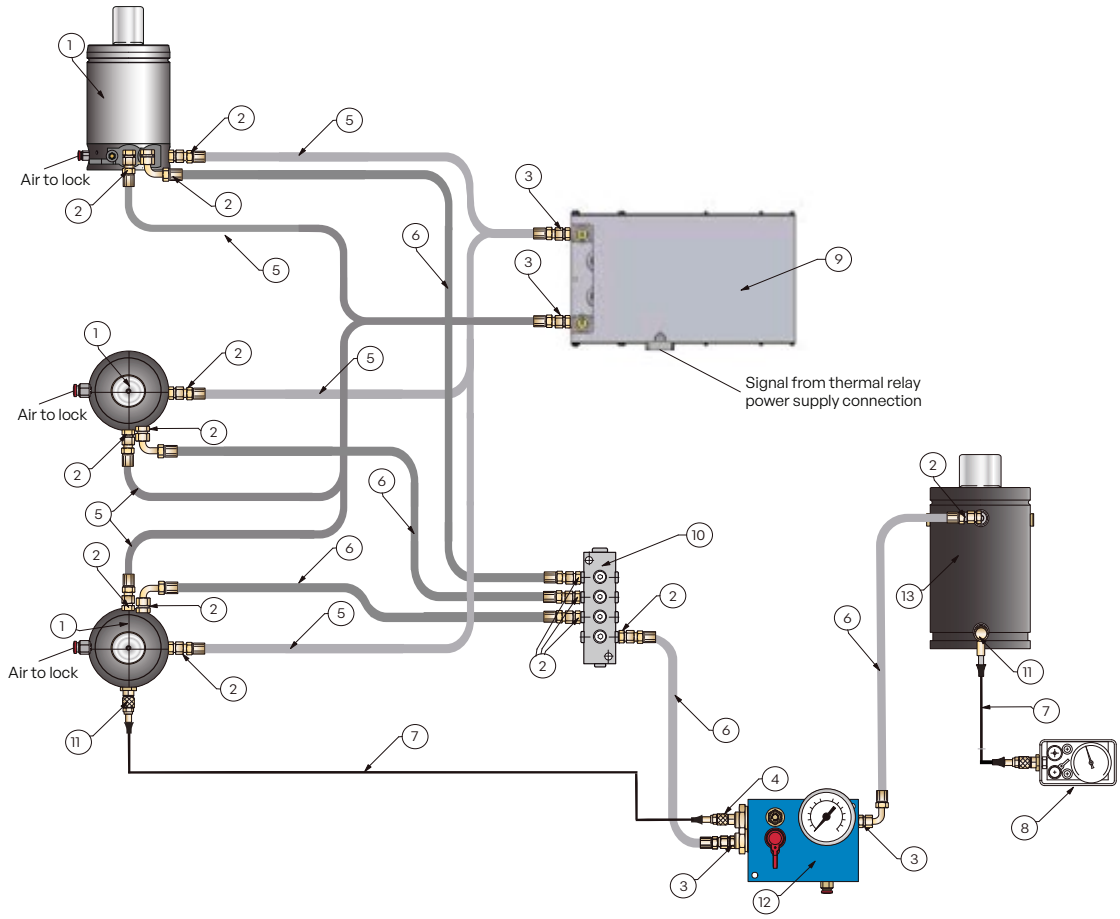
Connecting a CS2-NC Standard Lock Gas Spring with a Nitro Cooler™



Position	Quantity	Description	Order No.
1	3	Controllable Gas Spring	CS2 XXXX-XXXX-NC
2	6	EO24 Adapter G1/8	503593
3	6	EO24 Adapter G1/4	504144
4	1	EZ Adapter G1/4	4014973-G1/4
5	3	EO24 Hose Straight - Straight	3020857-XXXX
6	3	EO24 Hose Straight - 90o	3220857-XXXX
7	1	EZ Hose Straight - Straight	4014974-XXXX
8	1	Control Panel	CP-N2 LG EZ
9	1	Nitro Cooler Block	2021641

Use EO24 hoses when using a Nitro Cooler and place the Nitro Cooler as close as possible to the Gas Springs to minimize the length of the hoses. The Nitro Cooler includes heat protection so thermal relays at the Gas Springs are not necessary. If desired, a control panel for charging and bleeding can be connected to either port 2 on the Gas Springs or to the Nitro Cooler.

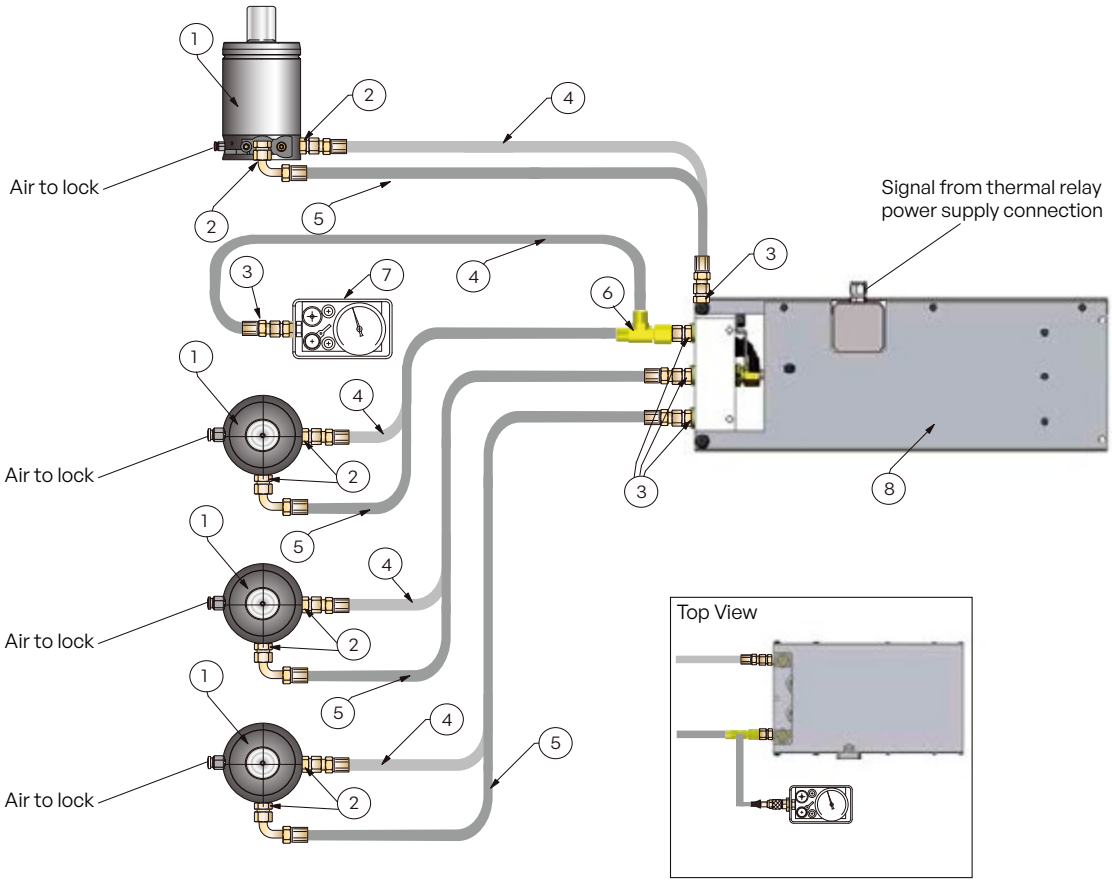
Connecting a CS2-NC Positive Lock System with a Nitro Cooler™



Position	Quantity	Description	Order No.
1	3	Controllable Gas Spring	CS2 XXXX-XXXX NC
2	14	EO24 Adapter G1/8	503593
3	8	EO24	504144
4	1	EZ Adapter G1/4	4014973-G1/4
5	6	EO24 Hose Straight - Straight	3020857-XXXX
6	5	EO24 Hose Straight - 90o	3220857-XXXX
7	2	EZ Hose Straight - Straight	4014974-XXXX
8	1	Control Panel	CP-N2 LG EZ
9	1	Nitro Cooler Block	2021641
10	1	Multi Coupling Block G1/8	CS-MCB-14
11	2	EZ Adapter G1/8	4114973-G1/8
12	1	Standard Valve Block	CSPSCP-SVB
13	1	PS Passive Cylinder	PS-XXXX

The positive lock system has the same requirements as the standard lock. Use EO24 hoses when using a Nitro Cooler and place the Nitro Cooler as close as possible to the Gas Springs to minimize the length of the hoses. The Nitro Cooler includes heat protection so thermal relays at the Gas Springs are not necessary. If desired, a control panel for charging and bleeding can be connected to either port 2 on the Gas Springs or to the Nitro Cooler.

Connecting four CS2-1500-NC Standard Lock Gas Springs with a Nitro Cooler™



Position	Quantity	Description	Order No.
1	4	Controllable Gas spring	CS2 XXXX-XXXX NC
2	8	EO24 Adapter G1/8	503593
3	9	EO24 Adapter G1/4	504144
4	5	EO24 Hose Straight - Straight	3020857-XXXX
5	4	EO24 Hose Straight - 90o	3220857-XXXX
6	1	L-Coupling	504147
7	1	Control Panel	CP-N2 LG EZ
8	1	Nitro Cooler Block	2021641

Frequently Asked Questions (FAQs)

General

What air pressure is required to operate the cartridge valves?

Four bar minimum air pressure is required to close the normally open (NO) cartridge valves.

What is the maximum air pressure allowed to operate the cartridge valves?

Ten bar maximum air pressure is allowed to operate the cartridge valves.

What service life can I expect from a CS2 Controllable Gas Spring?

As long as you use the thermal relay the following service life can be expected:
For stroke lengths up to 50 mm: half-million strokes.
For stroke lengths above 50 mm: 50,000 stroke meters.

Can I use other Hose Systems?

We cannot guarantee the function of the system if Hose Systems other than those mentioned in this brochure are used. Please contact Hyson Inside Sales at orders@HysonSolutions.com for more information.

Can I mix different size CS2 springs in the same system?

No. Please contact Hyson Inside Sales at orders@HysonSolutions.com for more information..

Standard Lock CS2

Is it possible to adjust the stroke length of the CS2 spring, or must I always use 100% of the nominal stroke (within 0.5 mm)?

There are two versions of the CS2 Controllable Gas Spring, the standard model CS2 and an adjustable model CS2A.

How fast can the CS2 spring be stroked?

0.8 m/sec is the max. allowed compression velocity. The maximum stroke frequency (spm) at which a CS2 spring can run depends on the stroke length of the spring and level of cooling.

What can I do to eliminate CS2 springback?

If you are using 100% stroke length (within 0.5 mm) of the CS2 spring, a max. 1 mm of springback can be expected. It is possible to eliminate this by converting the standard lock into a positive lock system. Please contact Hyson Inside Sales at orders@HysonSolutions.com for more information.

Can I lock a CS2 Controllable Gas Spring at any position?

Basically yes, but the less you stroke the CS2 Controllable Gas Spring, the greater the springback will be. Please contact Hyson Inside Sales at orders@HysonSolutions.com for more information.

Positive Lock System CS2+PS

How many CS2 Controllable Gas Spring s can be connected to a single PS Passive Gas Spring?

Up to four CS2 springs can be connected to a single PS spring.

How many valve blocks do I need in the system?

One valve block is required for each PS Passive Gas Spring in the system.

Can I use the PS spring in the tool for forming?

No. The PS spring is not to be used for any operation in the tool, other than to eliminate CS2 springback

Can I use just the EZ Hose System to connect up my positive lock system?

No. The EO24 Hose System (or its equivalent) must be used between the CS2 spring(s), valve block and PS Passive Gas Spring.

Can I use just the EO24 Hose System to connect up my positive lock system?

Yes.

Cooling

Is cooling always required?

Not always. Generally speaking, longer stroke lengths and faster press stroke frequencies normally require cooling.

How many CS2 Controllable Gas Springs can be connected to a single cooler unit?

The maximum heat effect for all springs together has to be lower than the cooling effect of the cooler.

Can I use my own cooling system?

Yes. It is possible to use the cooling system from the press or other coolers.

What different cooling fluids can we use?

We recommend you use water-glycol fluid (HFC) ULTRA-SAFE 620. ULTRA-SAFE 620 is approved by all major manufacturers of equipment, and is often used for running-in new machines. Equivalents to this water-glycol fluid can be used, but Hyson cannot be held responsible for poor performance.

The Nitro Cooler

How many CS2 springs can be connected to one Nitro Cooler?

Up to four CS2 springs can be connected to one Nitro Cooler, depending on how much heat is generated in the application.

Can we eliminate the decrease in return speed caused by the Nitro Cooler?

No. When using the Nitro Cooler, gas passes between the cooler and Gas Springs with every stroke so the return speed is affected. With a distance of 1m between the cooler and Gas Spring, the return stroke speed is: 0.12m/sec (CS2/CS2A 1500 & 3000) and 0.06m/sec (CS2/CS2A 5000 & 7500).

How many Nitro Cooler units can we use in one die?

There is no limit as long as there is a ventilated area for each cooler in the die.

Troubleshooting

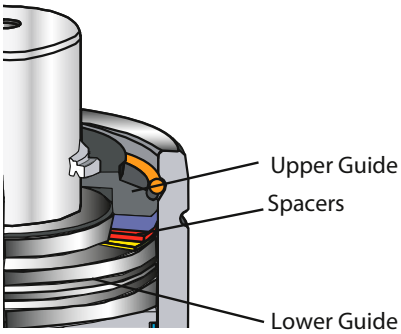
System	Problem	Solution
Standard Lock CS2	CS2 spring does not lock.	Make sure CS2 spring's air port 4 has min. 4 bar air pressure before press BDC.
		Check that all hose connections are correct.
	CS2 piston rod's springback is greater than 1 mm.	Make sure 100% of the CS2 spring's nominal stroke length (within 0.5 mm) is used.
		Make sure CS2 spring's air port 4 has min. 4 bar air pressure before press BDC.
	CS2 piston rod does not return.	Make sure CS2 spring's air port 4 has zero air pressure when required to open.
		Check for any obstructions in the tool preventing piston rod returning.
		Check that there is gas pressure in the CS2 spring.

System	Problem	Solution
Positive Lock System CS2 + PS	CS2 spring does not lock.	Make sure CS2 spring's air port 4 has min. 4 bar air pressure before press BDC.
		Check that all hose connections are correct.
	CS2 piston rod's springback is greater than 0 mm.	Make sure the cartridge valve in the valve block is closed during the press's downstroke and that the PS Passive Gas Spring is being stroked enough for this application.
		Make sure 100% of the CS2 spring's nominal stroke length (within 0.5 mm) is used.
		Check that the cartridge valve in the valve block is opened at BDC.
	CS2 piston rod does not return.	Make sure CS2 spring's air port 4 has zero air pressure when required to open.
		Check for any obstructions in the tool preventing piston rod returning.
		Check that there is gas pressure in the CS2 spring.

Appendix

Stroke Length Adjustment of CS2A

The guide in the CS2A is made up of the following main components:



1 mm of thickness
2 mm of thickness
4 mm of thickness
8 mm of thickness (not shown)

The guide length and stroke length of the spring is adjusted by installing and/or removing spacers between the upper and lower guide. To get the correct stroke length, spacers (Table 1) should be installed in the guide.

Example 1:
The stroke length is to be increased with 4 mm from the nominal stroke length.

Solution: Open the spring and guide; remove the 4 mm thick spacer. The 1 mm and 2 mm thick spacers are to be left in the guide/spring.

Caution:

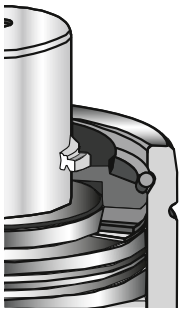
- Only fully trained personnel with experience servicing Gas Springs should make adjustments to the stroke length.
- Make sure the work surface where you will be working on the CS2A spring(s) is clean and free from contaminants.
- Make sure there is no gas pressure in the CS2A spring before proceeding.

To adjust from nominal stroke length					
		Spacer (mm)			
	Stroke length	1	2	4	8
Maximum	+7	0	0	0	0
	+6	1	0	0	0
	+5	0	1	0	0
Ex. 1	+4	1	1	0	0
	+3	0	0	1	0
	+2	1	0	1	0
	+1	0	1	1	0
*Nominal	0	1	1	1	0
	-1	0	0	0	1
	-2	1	0	0	1
	-3	0	1	0	1
	-4	1	1	0	1
	-5	0	0	1	1
	-6	1	0	1	1
	-7	0	1	1	1
Minimum	-8	1	1	1	1

Stroke Length Adjustment of CS2A

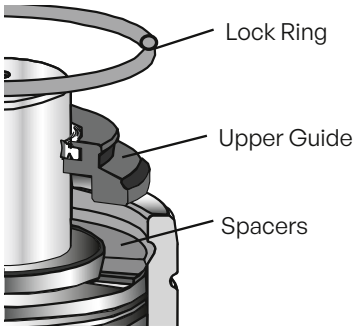
Adjustment Procedure

1. Make sure the Gas Spring is emptied of gas and remove the dust cover if applicable.



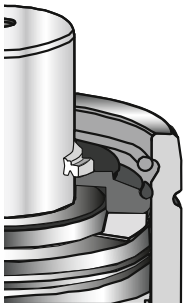
2. Knock down the guide and remove the lock ring by using a mounting sleeve and a plastic hammer.

3. Remove the upper guide and install the combination of spacers that will give you the required stroke length.



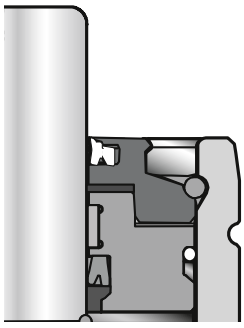
4. Install the upper guide and use the mounting sleeve and plastic hammer again to knock down the guide to expose the lock ring groove.

5. Install the lock ring and pull up the piston rod assembly using a T-handle.



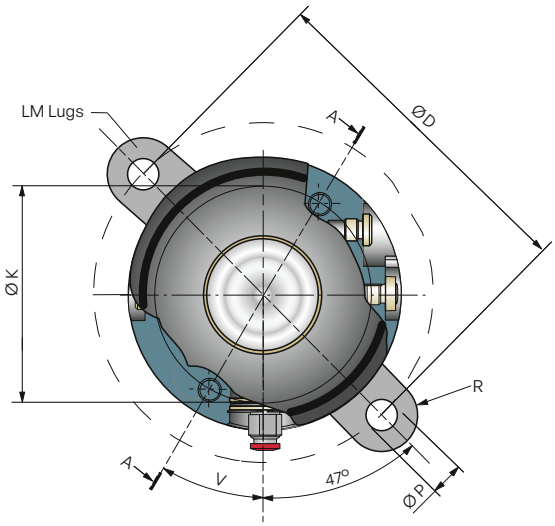
6. Make sure that the guide is flush with the top of the tube. (If not, check the installation of the lock ring.)

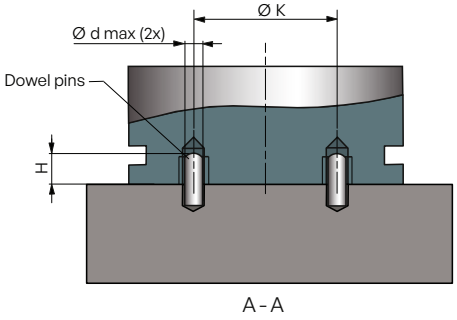
7. Fill the spring with nitrogen gas and replace the dust cover if applicable.

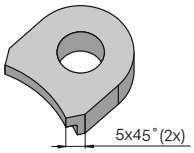


CS2/CS2A Alternative Mounting

For upside down installations, use the threaded holes in the base of the CS2/CS2A for mounting the Gas Spring to the tool. For upright installations, an alternative mounting method is to use two LM lug mounts in combination with dowel pins as shown. The dowel pins engage the threaded holes in the base and prevent the spring from moving out of position even if the lugs come loose. The dowel pins also ensure that the spring is installed in the correct position.







Modification of LM-3000 Lug

Model	ØD	Ød max.	H	ØK	V	ØP	R	Order No.
CS2/CS2A -1500	130	8	10	50	60	17.5	20	2 pcs LM-3000*
CS2/CS2A -3000	155	8	10	95	30	17.5	25	2 pcs LM-5000
CS2/CS2A -5000	195	12	10	110	30	21.5	25	2 pcs LM-7500
CS2/CS2A-7500	240	12	10	120	30	21.5	29	2 pcs LM-10000

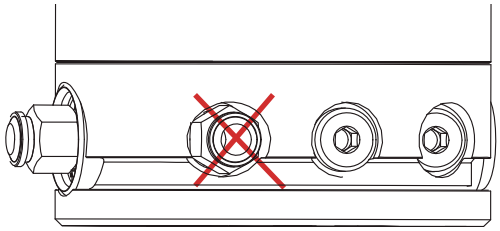
Note:
LM-3000 lugs require a slight modification as shown before they are fitted to the CS2/CS2A 1500 Gas Spring.

Note:
It is also possible to mount the CS2/CS2-A Controllable Gas Springs using an FCSC Flange Mount if cooling is required. For more information contact Hyson Inside Sales at orders@HysonSolutions.com for more information.

How does the New CS2 Differ from the Original CS?

CS2 is fitted with a normally open (NO) cartridge valve, which has the following advantages:

- Simplified control system
- Combined charge & bleed port
- Low pressure variant LP is now obsolete
- Only 4 bar air pressure required



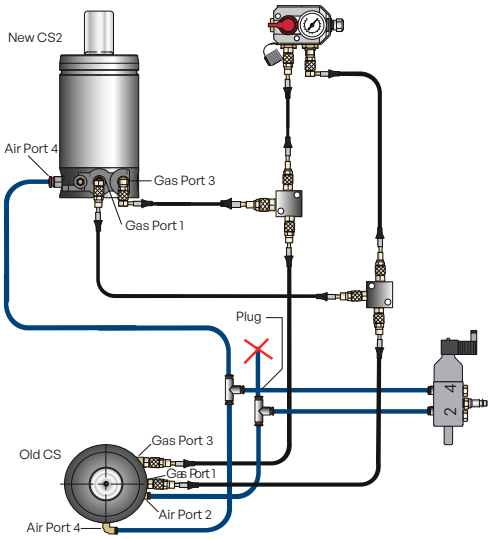
How to Fit the New CS2 to Existing CS Systems

- CS2 Controllable Gas Spring s are completely interchangeable with existing CS springs.

Standard Lock Example: Replacing an Existing CS with a New CS2

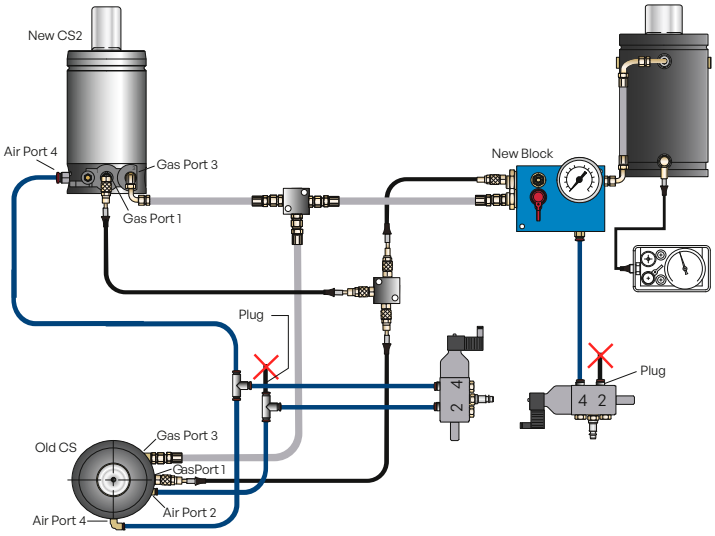
To replace an existing CS spring with a new CS2 spring in a standard lock system, simply plug the air signal that went to the CS spring's air connection port 2.

Air line plug
Order No. CSNF-77



Positive Lock System Example: Replacing an Existing CS with a New CS2

To replace an existing CS spring with a new CS2 spring in a positive lock system, simply plug the air signal that went to the CS spring's air connection port 2.



Nitro Cam

Introduction

The Nitro-Cam is an ideal system for delivering force to pierce, flange, form or trim. This unit can be easily mounted in a die at virtually any angle or position, providing the greatest flexibility of any other cam product on the market today. Nitro-Cam systems come equipped with a built-in safety overload protection, preventing damage to die components in the event an obstruction blocks the cam from its full travel, and resets without assistance.

Compact cam units or force cylinders can be coupled together, allowing for multiple operations within the same tool, performed simultaneously, and often providing the ability to produce a part with fewer tools. Nitro-Cam is easily retrofitted in existing dies when changes in engineering require additional holes or operations.

A basic Nitro-Cam system consists of a power unit and a compact cam unit or force cylinder connected with a hydraulic hose. The power unit can be conveniently positioned away from the work area to avoid interference with part movements and transfer mechanisms. A power cylinder and accumulator make up the power unit, which supplies the force to the compact cam unit. This is done by means of hydraulic oil, backed up with a nitrogen gas charge in the accumulator. As the driver strokes the power cylinder, oil moves to the compact cam unit allowing it to extend and perform its task. Compressed nitrogen gas provides the return force to reset the system.

Different types of cam units and force cylinders are available to suit almost any application.

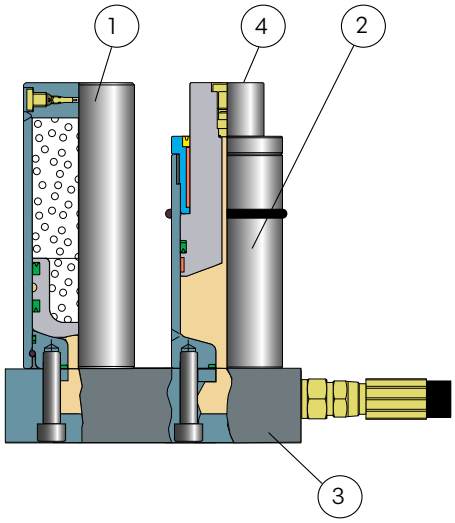
For more information, contact your local Hyson sales representative.

Features	Benefits
Simplified tool design.	Reduced tool costs.
Flanging and piercing operations can easily be performed in the same tool.	Reduces the number of tools required to produce a part, lowering costs.
Retrofittable in existing dies to add operations or simplify engineering changes.	Lowers cost, eliminating the need for new tools.
The power unit can be mounted lower than the cam, up to 6 feet away and even upside-down.	Increases mounting options and simplifies installation and retrofits, adding unique versatility available only with Nitro-Cam.
Compact cam units and force cylinders can be mounted at any angle in the die.	Increases installation possibilities.
Cam units can and should be mounted perpendicular to the panel when piercing.	Increases produced part quality and increases life of the punches.
One power unit can drive up to three cams.	Lowers initial investment and increases installation options.
Even force distribution is possible within the tool due to flexibility of power unit location.	Reduces wear and press damage.
Oil flow routes to the accumulator on the power unit in the event that the cam is unable to stroke due to an obstruction.	This built in safety feature prevents over-pressurization of the cam.
The force of the compact cam unit or force cylinder can be controlled by adjusting the nitrogen gas pressure in the accumulator.	Controllable piercing and forming force.
Self-Contained Gas Spring(s) provide the return force.	Return force is controllable by adjusting the nitrogen gas pressure, adding flexibility.
Nitrogen fill port on the accumulator and return Gas Spring on the compact cam are easily accessible.	Easy to service for both recharging and rebuilding.
Maximum charge pressure is 180 Bar (2610 psi).	Lower and safer system pressure than competitive units.
Built-in internal mechanical stop on the compact cam units and force cylinders for exact cam stroke.	Simplifies installation.

Component Description

Power Unit (HCPU)

The power unit consists of an accumulator (1), power cylinder (2), and a base plate (3). The purpose of the accumulator is to set the force of the cam and to prevent over-pressurization of the system. It will also contain some oil once the cam has reached its stop position.



When the piston of the power unit is actuated by the press or machine, the cam units will be extended.

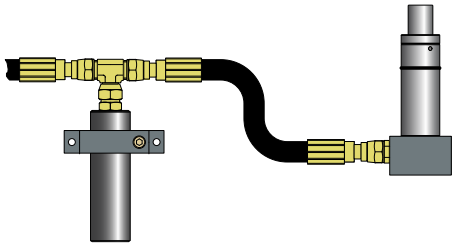
The size of the power unit is calculated from the number of cam units in the system, their sizes, and their stroke lengths.

Note that the piston (4) of the power cylinder is at the same height as the accumulator when the system is completely filled with oil.

The stroke lengths available are -35, -60, -110, and -160. Ten extra millimeters are included for the accumulator stroke.

Power Unit (HCPU-S)

When there are space restrictions within the tool, the power unit is available with a separated power cylinder and accumulator.



Note that both the power cylinder and the accumulator must be used together for proper, safe function. See page 385-418 ”Dimensions for Power and Cam Units/Force Cylinders”.

Mounting Orientation

Both HCPU and HCPU-S power units can be mounted at any angle and orientation which best fits the tool.

Alternative Driver

It is also possible to use an electrically powered hydraulic pump unit (EHC) to drive the

Cam Units. See page 438.

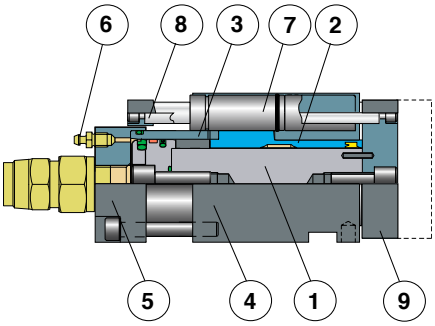
Compact Cam (HCCU)

The compact cam is a well guided unit, suited for normal piercing operations, able to withstand a small amount of side loading.

It consists of a piston rod (1), guide (2), sleeve (3), front housing (4), rear housing (5), bleed nipple (6), Gas Spring (7), anti-rotation rods (8), and a punch adapter plate (9) for punch mounting.

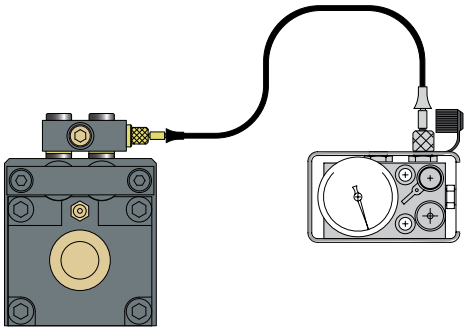
The power unit (HCPU) or hydraulic pump unit (EHC) can be used to actuate the compact cam. The cam return force is provided by one or two internally installed Gas Springs. The punch adapter plate is held in place by the two anti-rotation rods.

The use of a polyurethane stripper is recommended in piercing and cutting operations to hold the panel down and to strip the punch from the panel.



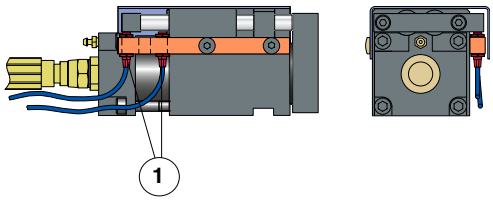
Compact Cam (HCCH) for a Hosed System

The compact cam is also available in a version where the Gas Springs in the unit can be hosed to a control panel. This way the gas pressure in the spring can be monitored from outside of the tool.



Option for HCCU and HCCH

A complete kit with proximity sensors (1), fittings, screws, etc. can be fitted to the compact cams so that the extended and retracted positions can be monitored. See page 385-418 ”Dimensions for Power and Cam Units/Force Cylinders”.



Flange Cam (HCCF)

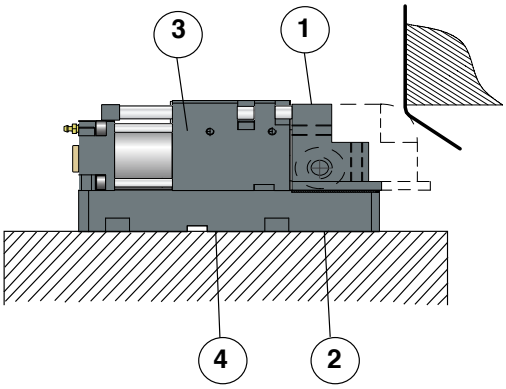
The Flange Cam is suitable for flanging and other operations with large amounts of side load.

No extra guides are required as the front adapter plate (1) is equipped with two roller bearings (2).

A compact cam unit (3) is used as a driver and a bottom plate (4) provides support for the front adapter plate.

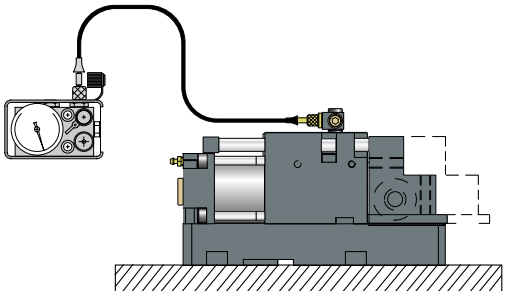
The power unit will actuate the Flange Cam and the return movement is provided by two internally installed Gas Springs.

The front adapter plate includes threaded holes to mount any customized flanging tool.



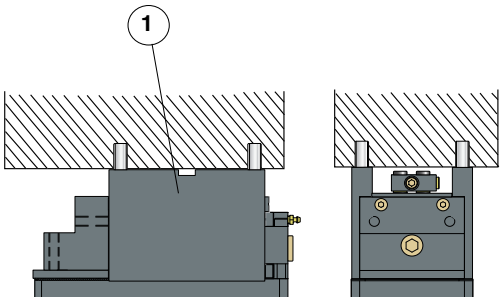
Flange Cam (HCCF-H) for Hosed System

The Flange Cam is also available in a version where the Gas Springs in the unit can be hosed to a control panel. This way the gas pressure in the spring can be monitored from outside the tool. See page 385-418 "Dimensions for Power and Cam Units/Force Cylinders".



Flange Cam Spacers (optional)

The spacers (1) are required when mounting the Flange Cam from above (top mount) as shown here.



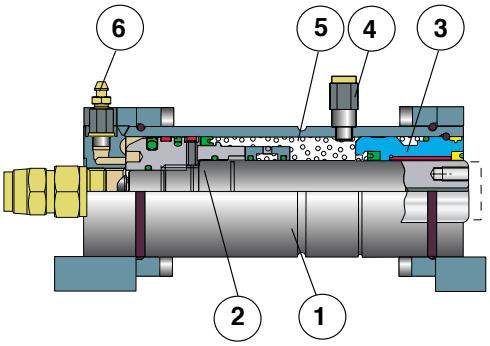
Force Cylinder (HCF)

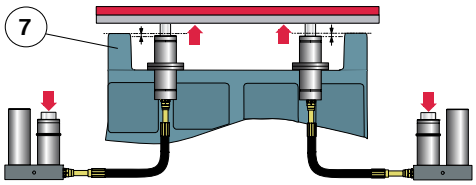
The force cylinder is suitable for forward and return motion of, for example, a flanging steel or forming punch used for various operations in the tool. Note that it is not possible to mount a punch directly onto the piston rod without a guide in the tool.

The force cylinder consists of a cylinder (1), piston rod (2), guide (3), gas charge port (4), nitrogen gas for return (5) and a bleed nipple (6).

The power unit (HCPU) or electrical pump unit (EHC) can be used to actuate the force cylinder. The return force is provided by the internal nitrogen pressure within the force cylinder. The force cylinder can be mounted using different types of Flanges.

External stops (7) are recommended for the tool (5-10 mm above cylinder) to avoid damage to the cylinder during the return stroke.





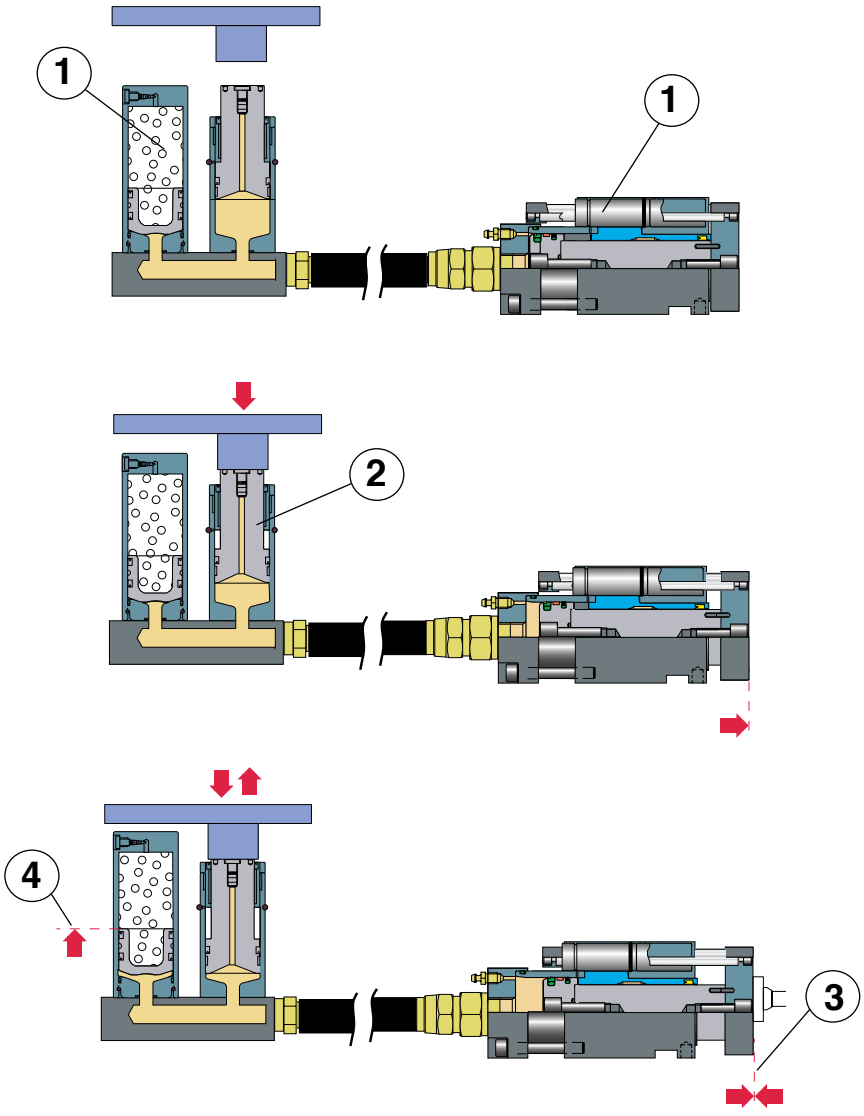
Function Description

Normal Use

The illustration below shows the power unit (HCPU) and the compact cam (HCCU). The system works identically for a compact cam (HCCU), Flange Cam (HCCF), or a force cylinder (HCF).

Before the press (or machine) activates the power unit, there is no oil pressure, but the accumulator and the Return Gas Springs in the cam (or force cylinder) are charged with nitrogen (1). When the press strikes the piston in the power unit (2), the cam will be actuated and the operation will begin.

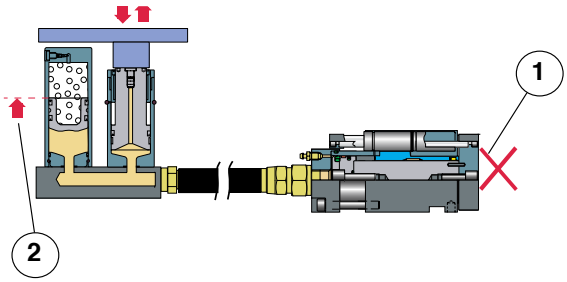
Prior to bottom of press stroke, the cam (or force cylinder) is fully extended (3) and the piston in the accumulator rises (4) providing force. When the press returns upwards, the movable parts will return to their original positions because of the Return Gas Springs in the cam (or nitrogen pressure in the force cylinder) and accumulator.



Safety Function

If the movement of the cam is restricted in the tool (1), the piston in the accumulator will be raised instead (2). The oil moves into the accumulator to prevent over-pressurization of the system.

When the restriction has been removed, the unit will function normally without needing to be refilled with oil or manually reset.



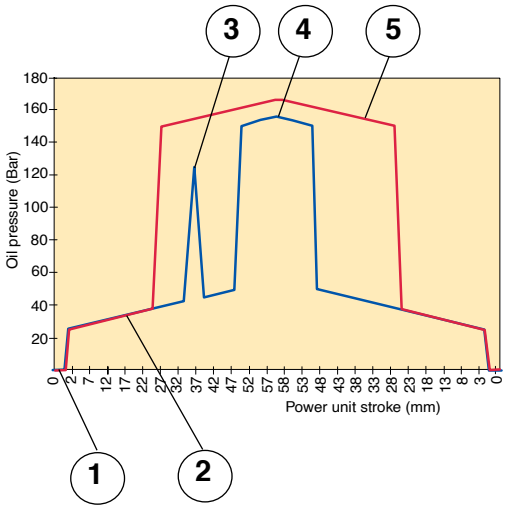
Pressure Build-up in the System

Before the power unit is activated, there is no oil pressure (1).

The force from the gas pressure in the cam unit causes the oil pressure to increase (2). The oil pressure will increase to create enough force needed to perform the operation (3).

When the cam reaches its stop position, the oil pressure increases to lift the piston in the accumulator with a force equal to the nitrogen pressure (4) within the accumulator.

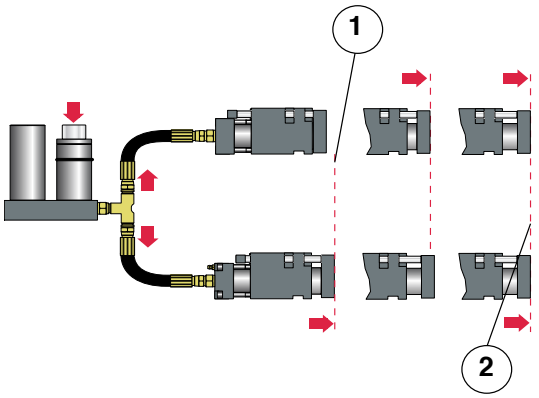
If the movement of the cam is restricted, the oil pressure will follow curve (5).



Connection of Two or More Cam Units to One Power Unit

It is possible to connect up to three cam units to one power unit. Note that the movements of the cams during the stroke are not synchronized (1) until the cams are in the fully extended position (2).

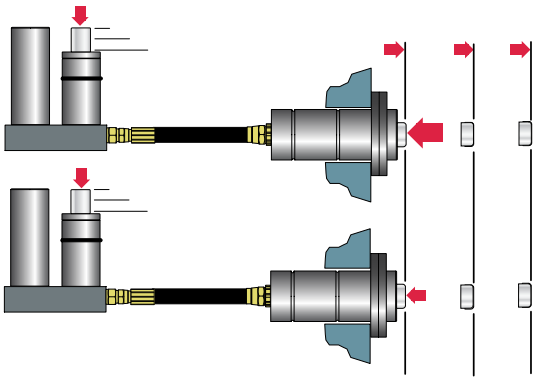
If more than three cams are connected to one power unit, the velocity in some of the cams could be too high. The system could also be difficult to bleed, therefore is not recommended.



Parallel Movements with Two Systems

For parallel movements where different forces may be required (for example, in order to move large pads in tools), using two separate systems is recommended.

Here the movement of each force cylinder is synchronized regardless of the individual force required by each force cylinder.



Adapting Cam Stroke Ratios

If you use a large power unit (eg. HCPU-40) connected to a small cam unit (eg. HCCU-15), the speed of the cam unit will increase in relation to the speed of the press.

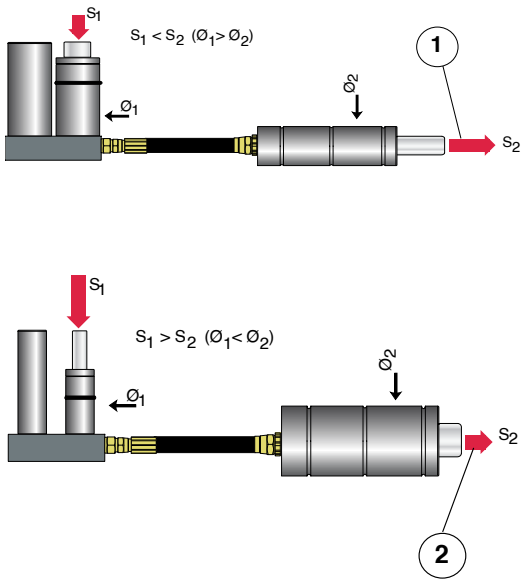
The difference in speeds is related to the speed difference in the piston area. The speed of the cam units will be faster than the speed of the press (1).

($S_{Press} < S_{Cam\ Unit}$)

The opposite is also possible using a smaller power unit. With a larger cam the press speed will be faster than the speed of the cam (2).

($S_{Press} < S_{Cam\ Unit}$)

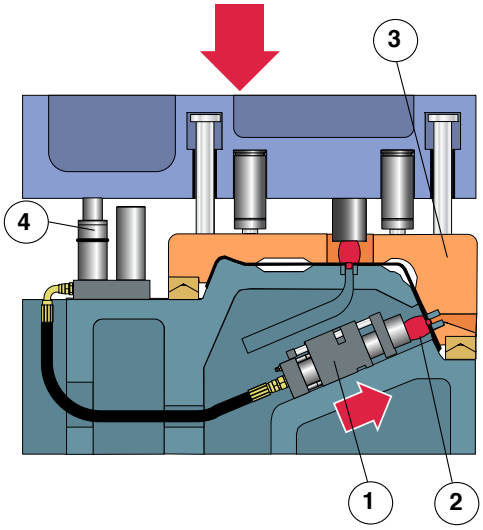
It is important that the velocity of the cam does not exceed the specifications on page 383 ”Technical data” See also page 376 ”Component selection” step 5.



Installation Examples

Application Example Using the Compact Cam

This example shows how a compact cam (1) can be used for piercing. The punch can be attached directly to the cam unit and no additional guides are required in the tool. As seen in the picture, the power unit (4) can be placed remotely from the cam unit. This gives increased flexibility compared to a conventional mechanical solution. A stripper (2) on the punch is recommended.



Work Cycle

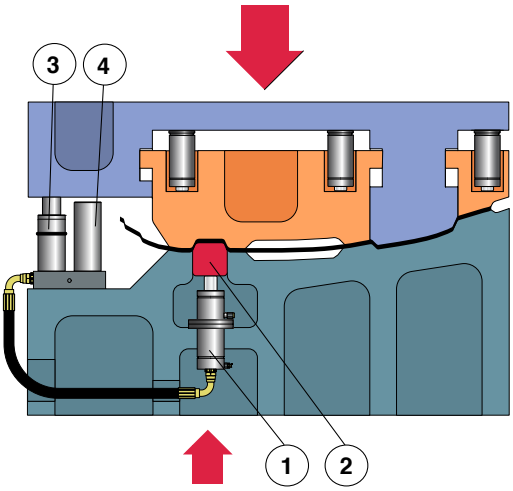
As the upper tool moves downwards, the blank holder (3) actuates and keeps the blank in position. Note the blank holder is guided relative to the lower die.

When the blank holder is in position, the power unit (4) will be activated and the cam unit will perform the punch operation

Note that the power unit can be mounted at any location and orientation to the cam unit/force cylinder and not just as depicted in these examples.

Application Example Using the Force Cylinder

This example shows how one or more force cylinders (1) can be used to drive forming punches (2) (or cam slides) in a tool. The punch (or slide) is guided in the tool. This method of driving tool 'components' allows for high flexibility in tool design. The force cylinder supplies the motion and force. Only pulling and pushing forces are possible.



Work Cycle

As the upper tool moves downwards, the blank holder actuates and keeps the blank in position. When the blank holder is in position, the power cylinder actuates, thus actuating the force cylinder. The forming force can be adjusted by simply changing the pressure in the accumulator (4).

Installations Currently in Operation

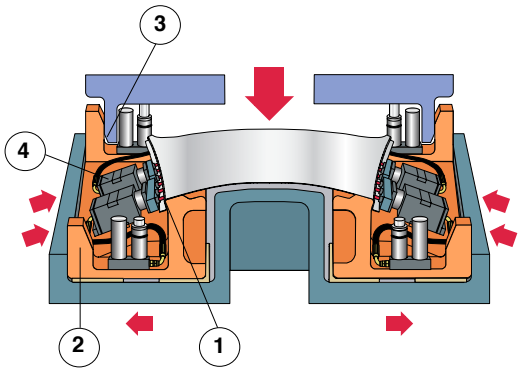
The following examples are of installations now running in production, illustrating the benefits of the Nitro-Cam in various applications.

Example 1, Piercing

Twelve holes are being pierced at an upward angle (1). In this tool, a mechanically driven pad (2) has been equipped with Nitro-Cams.

During the first part of the operation the pad moves into position, using the angled part of the drivers (3). Once the pad is in position, the drivers begin to dwell, holding the pad in position. Then the power units are activated and the holes are punched by the compact cams (4).

Using this solution, punching operations can be easily carried out perpendicularly to the blank, while the power unit is actuated away from the compact cam.

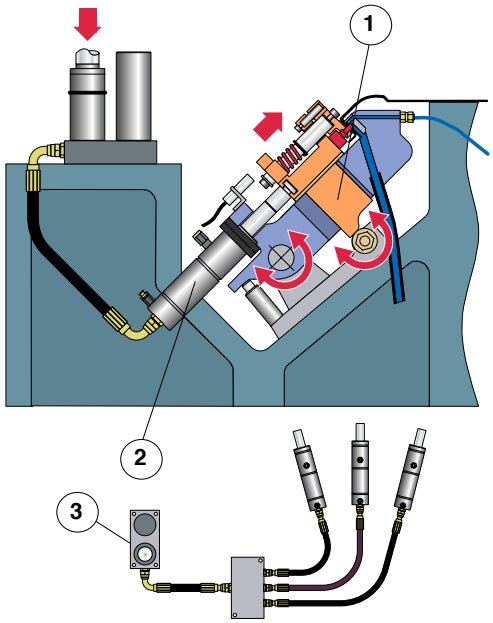


Example 2, Piercing

Six holes are being punched at an upward angle using force cylinders activating a pivoting piercing unit (1).

The picture shows the unit in its extended position (press at bottom dead center). As the force cylinder (2) starts to move backwards, the punch retracts from the hole and thereafter the whole unit will pivot down, allowing for the part to be removed. The reverse will happen as the press moves back down.

There are two systems in the tool; one on the left side, one on the right. Each system consists of one power unit (3) driving three force cylinders.

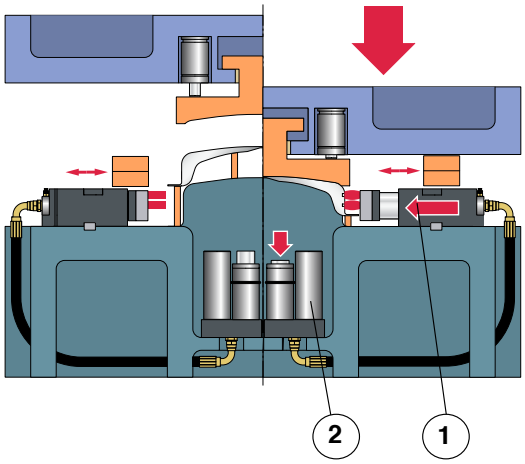


Example 3, Piercing Two Holes in Two Parts

In this tool, two parts are being produced simultaneously. The left part of the picture shows the press at its upper position. The right part shows the press in its bottom position. Shown above the cam units are the transfer arms.

Before the cam units are activated, a smaller size cam unit is connected to a larger size power unit in order to allow the flange of the part to pass the punches. In this case, a HCCU-15 (1) is connected to a HCPU-40 (2). This will give a stroke ratio of 2.5. (As the press/power unit moves 10 mm vertically, the cam unit will move 25 mm horizontally).

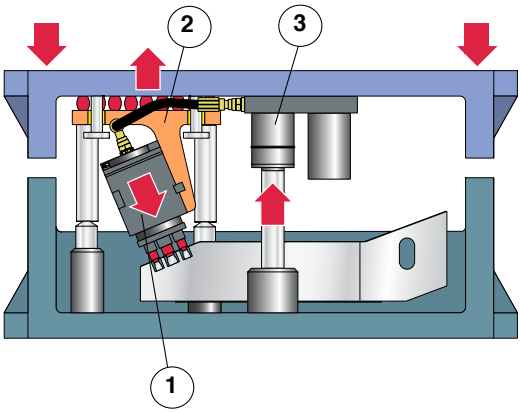
Two versions of the same part are produced; one with holes, one without. For the part without holes, the power unit driver is simply removed from the tool, thus disabling the cam units from making the holes.



Example 4, Piercing

This application uses a hydraulic cam system mounted upside down in the upper tool. The cam unit (1) is mounted on a floating die (2). The floating die is centered relative to the lower die using conical pillars and the die is backed up by springs. As the press moves downwards, and the floating die is centered, the power unit (3) is activated and the holes are punched.

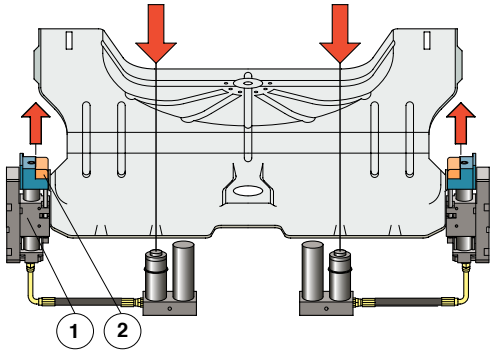
Prior to the installation of the hydraulic cam system, the holes were being punched at a vertical angle using oval-shaped punches. The production and quality enhancements of the parts formed with the Nitro-Cam, resulted in a payback time of three months for the entire system, including installation.



Example 5, Flanging

This picture shows a floor panel where Flange Cam units (1) are being used for flanging upwards (2). All side loading forces associated with the flanging operation are taken up within the Flange Cam units.

In this case, the customer saves the cost of one complete tool by using the Nitro-Cam, as these operations could be added to an existing tool. The other option would have been to produce a completely new tool with a floating pad.



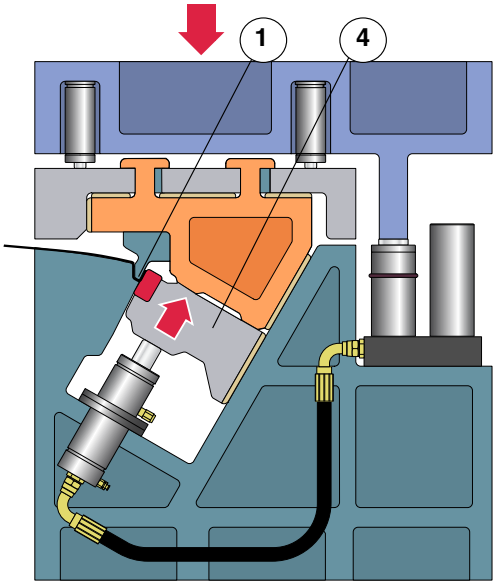
Example 6, Flanging a Wide Edge

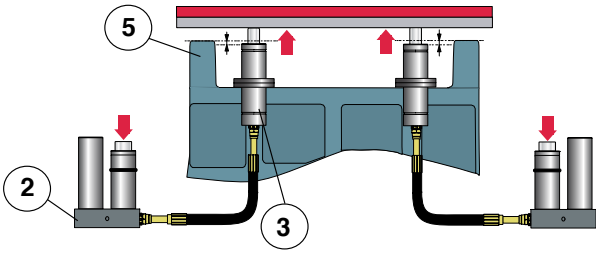
In this tool, two force cylinders are being used to drive an 800 mm wide flanging steel. As seen in the picture, the flanging (1) is carried out at an angle opposite to the direction of the press motion.

To ensure a parallel movement at both ends of the flanging steel, two separate cam systems are being used. Each system contains a power unit (2) and a force cylinder (3).

The flanging steel (4) is well guided in the tool and the force cylinders are only subject to axial forces. Using the Nitro-Cam has simplified the design of the tool, therefore reduced the tooling cost. See examples on page 364

External stops (5) are recommended for the tool (5-10 mm above cylinder) to avoid damage to the cylinder during the return stroke.





Component Selection

The following step-by-step instruction shows how to select the size of the units when taking into consideration the required forces, stroke length and the number of operations.

Step 1

(For piercing and cutting only)
Shear and stripping force calculations for piercing and cutting operations.

Sheet metal thickness ..... : t = _____ mm

Tensile strength ..... : σ = _____ N/mm^2

Shearing strength (= x 0.8) ..... : τ = _____ N/mm^2

Diameter of punch ..... : d = _____ mm

(or)

Total cut length ..... : l = _____ mm

Piercing force Fp

Piercing a round hole

$F_p = t \times \tau \times d \times \pi$

Piercing or cutting

$F_p = t \times \tau \times l$

Example

Calculate force needed to pierce a Ø 10.5 mm hole in a 1.2 mm thick panel. Tensile strength is 400 N/mm^2. (Normally between 270 - 400 N/mm2).

Fp = 1.2 x 400 x 0.8 x 10.5 x π
Fp = 12667
Fp ≈ 12.7 kN

Stripping force F_s

$F_s = F_p \times 0.11$ (roughly 11% of the required piercing force)

Example

Fs = 12667 x 0.11
Fs = 1393
Fs ≈ 1.4 kN

Step 2 Size of Cam Unit/Force Cylinder

Calculate the force required for the operation in the tool. Make sure to choose a cam unit/force cylinder with enough force to perform the operation. If the amount of force required is close to maximum for a cam unit/force cylinder, choose the larger size unit.

Required force (kN)	Cam Unit/ Force Cylinder
0-15	-15
15-40	-40
40-60	-60
60-90	-90
90-150	-150

Example

Choose a cam unit -40 if the required force is 22 kN.

Step 3 Stroke Length of Cam Unit/Force Cylinder

Check the necessary stroke of the cam unit/force cylinder to perform the operation in the tool. Choose the shortest stroke length but make sure that there is enough room for the produced part in the tool.

Required stroke length (mm)	Max stroke length, Cam Unit (mm)	Max stroke length, force Cylinder (mm)
0-24	24	25
24-49	49	50
49-99	99*	100
99-150	124**	150

* This stroke length is not available for cam unit -15

**This stroke length is only available for cam unit -40

Example

If the required stroke is 35 mm choose a cam unit/force cylinder with 50 mm stroke length.

Step 4 Order Number for the Cam Unit/Force Cylinder

Choose the cam unit/force cylinder depending on the type of the operation.

Also see earlier examples.

Example

The order number for the 40kN cam unit with 49 mm stroke length will be HCCU-40-49.

Compact Cam:

CC_____ - _____

Flange Cam:

CCF _____ - _____

Force Cylinder:

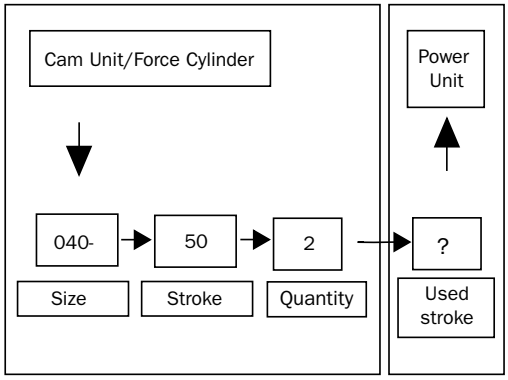
HCF _____ - _____

Step 5a Size and stroke of Power Unit

Step 5a is valid when using 1-3 cam units/force cylinders of equal sizes connected to one power unit. Step 5b is valid when different cam units/force cylinders are connected to one single power unit.

Use the table on the next page to choose the power unit. Read the table in the following order:
cam unit/force cylinder – size – stroke – quantity – power unit.
Always check that your available press stroke = used stroke power unit.

More than three cam units/force cylinders connected to one power unit is not recommended.
Do not exceed the maximum cam velocity, also see page 383 "Technical data".



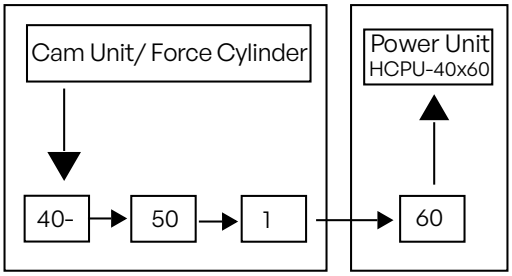
CAM UNIT / FORCE CYL.				POWER UNIT / Used stroke / Ratio CAM UNIT or FORCE CYL.-POWER UNIT													
Size	Stroke	Qty	15-	Stroke	Ratio	40-	Stroke	Ratio	60-	Stroke	Ratio	90-	Stroke	Ratio	150-	Stroke	Ratio
15-	25	1	35	35	1.0	35	20	2.5	35	16	4.0	35	14	6.3	35	13	9.8
	25	2	60	60	0.5	35	30	1.2	35	23	2.0	35	18	3.1	35	15	4.9
	25	3	110	85	0.3	60	40	0.8	35	29	1.3	35	22	2.1	35	18	3.3
	50	1	60	60	1.0	35	30	2.5	35	23	4.0	35	18	6.3	35	15	9.8
	50	2	110	110	0.5	60	50	1.2	35	35	2.0	35	26	3.1	35	20	4.9
	50	3				110	70	0.8	60	48	1.3	35	34	2.1	35	25	3.3
	100	1	110	110	1.0	60	50	2.5	35	35	4.0	35	26	6.3	35	20	9.8
	100	2				110	91	1.2	60	60	2.0	60	42	3.1	35	30	4.9
	100	3				160	131	0.8	110	85	1.3	60	58	2.1	60	41	3.3
	150	1	160	160	1.0	110	70	2.5	60	48	4.0	60	34	6.3	35	25	9.8
	150	2				160	131	1.2	110	85	2.0	60	58	3.1	60	41	4.9
	150	3							160	123	1.3	110	82	2.1	60	56	3.3
40-	25	1	110	72	0.4	35	35	1.0	35	26	1.6	35	20	2.5	35	16	3.9
	25	2				60	60	0.5	60	41	0.8	35	30	1.3	35	23	2.0
	25	3				110	85	0.3	60	57	0.5	60	40	0.8	35	29	1.3
	50	1				60	60	1.0	60	41	1.6	35	30	2.5	35	23	3.9
	50	2				110	110	0.5	110	72	0.8	60	50	1.3	35	35	2.0
	50	3				160	160	0.3	110	103	0.5	110	70	0.8	60	48	1.3
	100	1				110	110	1.0	110	72	1.6	60	50	2.5	35	35	3.9
	100	2							160	134	0.8	110	89	1.3	60	60	2.0
	100	3										160	129	0.8	110	86	1.3
	150	1							160	103	1.6	110	70	2.5	60	48	3.9
	150	2										160	129	1.3	110	86	2.0
	150	3													160	124	1.3
60-	25	1	110	110	0.3	60	50	0.6	35	35	1.0	35	26	1.6	35	20	2.4
	25	2				110	91	0.3	60	60	0.5	60	42	0.8	35	30	1.2
	25	3				160	131	0.2	110	85	0.3	60	58	0.5	60	41	0.8
	50	1				110	91	0.6	60	60	1.0	60	42	1.6	35	30	2.4
	50	2							110	110	0.5	110	74	0.8	60	51	1.2
	50	3							160	160	0.3	110	106	0.5	110	71	0.8
	100	1							110	110	1.0	110	74	1.6	60	51	2.4
	100	2										160	138	0.8	110	92	1.2
	100	3													160	133	0.8
	150	1							160	160	1.6	110	106	1.6	110	71	2.4
	150	2													160	133	1.2
90-	25	1				110	73	0.4	60	49	0.6	35	35	1.0	35	26	1.6
	25	2				160	136	0.2	110	88	0.3	60	60	0.5	60	42	0.8
	25	3							160	127	0.2	110	85	0.3	60	58	0.5
	50	1				160	136	0.4	110	88	0.6	60	60	1.0	60	42	1.6
	50	2										110	110	0.5	110	74	0.8
	50	3										160	160	0.3	110	106	0.5
	100	1										110	110	1.0	110	74	1.6
	100	2													160	138	0.8
	150	1										150	160	1.0	110	106	1.6
150-	25	1				110	108	0.3	110	71	0.4	60	49	0.6	35	35	1.0
	25	2							160	132	0.2	110	88	0.3	60	60	0.5
	25	3										160	127	0.2	110	85	0.3
	50	1							160	132	0.4	110	88	0.6	60	60	1.0
	50	2													110	110	0.5
	50	3													160	160	0.3
	100	1													110	110	1.0
	150	1													160	160	1.0

Combinations of cam units and power unit marked are normally not recommended as maximum cam velocities can be exceeded if power unit is stroked too quickly. Also see the following examples.

See the following examples:

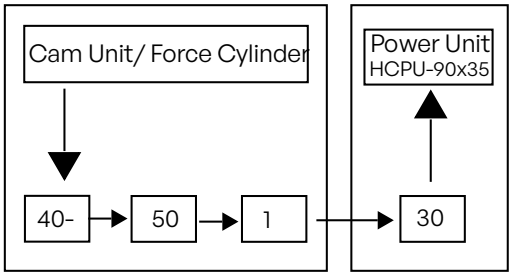
Example 1.

If you have chosen one compact cam unit, HCCU- 40x49, the normal power unit will be HCPU-40x60. The used stroke of the power unit is 60 mm. The ratio would be 1.0, which gives it the same compact cam stroke velocity as the press.
(Press stroke 10 mm —Cam stroke 10 mm).



Example 2.

If it is possible to use only 30 mm of stroke from the press to perform an operation, choose a larger power unit (HCPU-90x35) connected to one cam unit (HCCU-40x49). The used stroke of the power unit will be 30 mm and the ratio 2.5. If the press speed is 0.3 m/s the cam speed will be 2.5x0.3 = 0.75 m/s.
(Press stroke 10 mm — Cam stroke 25 mm).



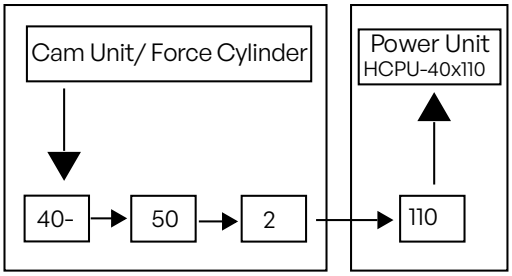
The used stroke of the power unit and the cam unit/force cylinder can always be optimized to suit the situation in the tool. In some installations it is necessary to increase the velocity of the cam relative to the press. Note that the movement of the cams during the stroke is not equal when more than one cam is connected to the power unit.

Example 3.

If you choose two cam units of size HCCU-40x49 and have a possible 110 mm of the press stroke available, then use the power unit HCPU-40x110. The used stroke of the power unit will be 110 mm and the ratio 0.5.

If the press speed is 0.3 m/s, the medium velocity of the cams will be 0.5 x 0.3 = 0.15 m/s.

(Press stroke 10 mm — Cam stroke approximately 5 mm)



Power Unit:

HCPU_____-_____

Step 5b Size and Stroke of Power Unit Using Different Sizes of Cam Units/Force Cylinders

Determine first the total oil volume for the cam units/force cylinders using the formula below. The total oil volume is the sum of the volumes of all cam units/force cylinders. The volume is the piston area times the used stroke. The total oil volume Vc for the cam units/force cylinders = minimum oil volume for the power unit in dm3.

A_n is the piston area in the cam units in dm^2 as shown in Table 1.
V_c = ((A1 x S1) + (A2 x S2).....(An x Sn))/100
A_n = Area, cam unit
S_n = Stroke length, cam unit

HCCU/HCF	15	40	60	90	150
A_n (dm^2)	0.13	0.31	0.50	0.79	1.23

Choose the appropriate power unit from table 2. The power unit has to give at least the minimum volume of oil as calculated above. Calculate the used stroke Sp of the power unit using the formula below:

S_p = ((Vc / VHCPU) * SHCPU) + 10
V_c = Total oil volume cam units/force cylinder
V_{HCPU} = Oil volume power unit
S_{HCPU} = Stroke power unit

Note, the additional 10 mm is required so that a precise cam stroke is performed. See page 8 "Function Description".

Stroke length S_{HCPU}	HCPU				
	15	40	60	90	150
25 mm	0.031	0.078	0.126	0.196	0.307
50 mm	0.063	0.156	0.251	0.393	0.614
100 mm	0.126	0.312	0.502	0.785	1.227
150 mm	0.188	0.468	0.753	1.178	1.841

Also see the following example:

Choose a power unit to supply one cam unit HCCU-15x49 and one force cylinder HCF-40x50 with only 40 mm used stroke.

$V_c = ((A_{CC} \times S_{CC}) + (A_{HCF} \times S_{HCF}))/100$
$V_c = ((0.13 \times 49) + (0.31 \times 40))/100$
(See Table 1)
$V_c = 0.189$

Choose a power unit with more than 0.189 dm^3 oil volume for example HCPU-60X60 which has 0.251 dm^3.
(Another alternative HCPU-40x110.)

Calculate used stroke of the power unit:
$S_p = ((V_c / V_p) \times S_{HCPU}) + 10$
$S_p = ((0.189 / 0.251) \times 50) + 10$
$S_p = 48$ *mm*

In the above example, a power unit HCPU-60X60 is recommended with a used stroke of 48 mm. Do not exceed the specified velocity of the cam units/force cylinders according to page 383 "Technical data". Remember that one of the cams will move slightly before the other one when using two cams coupled to one power unit.

Step 6

Choose hose and adapters according to page 419 "Dimensions for accessories".

Maximum hose length between power unit and cam unit is 2 m.
The size of the hose is always set by the size of the power unit. The size of the hose is adapted for the oil flow according to the velocities in page 383 "Technical data".

If you need a smaller hose than our normal specifications, check your press velocity and refer to Table 1 on page 383 "Technical data".

It is easiest to choose the correct hose length when the cam unit/ force cylinder and the power unit are installed in the tool.

Make sure that the hose is long enough and is protected against sharp edges and external damage. The hose will flex a little due to the oil pressure pulsation during operation. Make sure the minimum bending radius of the hoses is not below that which is specified when installed.

Table

Power Unit	Hose size - Press velocity			
	Standard size Max velocity 0.8 m/s	0.6m/s	0.4m/s	0.2m/s
HCPU-15	1/2”	3/8”	3/8”	3/8”
HCPU-40	3/4”	3/4”	1/2”	1/2”
HCPU-60	1”	3/4”	3/4”	1/2”
HCPU-90	1”	1”	3/4”	1/2”
HCPU-150	1 1/4”	1 1/4”	1”	3/4”

Technical Data

Capacity and performance

The forces in the table below are valid when the following normal gas pressures are used.

Accumulator	150 bar
Force Cylinder	20 bar
HCCU-15x40, HCCF-40 Return spring T2-180	180 bar
HCCU-60 Return spring T3-350	180 bar
HCCU-90 Return spring NP-500	150 bar
HCCU-150 Return spring T3-750	150 bar

Table

Description	Unit	Force Cylinder					Compact Cam					Flange Cam	Power Unit				
		HCF					HCCU					HCCF	HCPU				
Force (size)	kN	15	40	60	90	150	15	40	60	90	150	40	15	40	60	90	150
Working return force (min)	kN	1.5	4	6	9	14	2	4	7	10	15	4	---	---	---	---	---
Max frequency	op/min	60			30		60			30		60	60			30	
Max velocity	m/s	1.6					1.6					1.6	1.6				
Min gas pressure	bar	10					125			105		125	50				
Max gas pressure	bar	40					180			150		180	180				
Stroke length	mm	25, 50, 100, 150					24, 49, 99*, 124**					49, 99	35, 60, 110, 160				
Expected life time	op.	$1x10^6$					$1x10^6$					$1x10^6$	$1x10^6$				
Surrounding temp	°C	10-40					10-40					10-40	10-40				

* not HCCU-15
** only HCCU-40

Other values than those specified in the table above could be accepted under special conditions or combinations of stroke length, velocity and frequency.

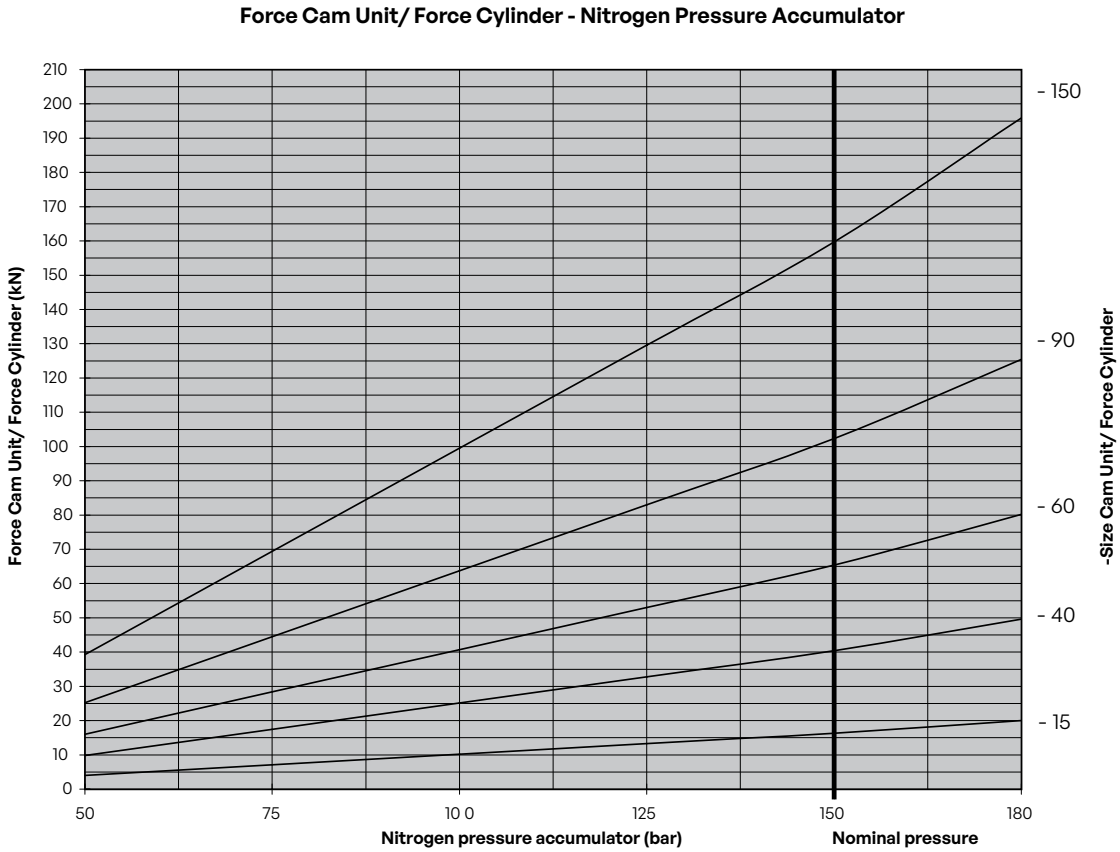
Other specifications

The recommended hydraulic oil is ISO Viscosity grade 32.

Can Unit/Force Cylinder as a Function of Nitrogen Pressure in the Accumulator

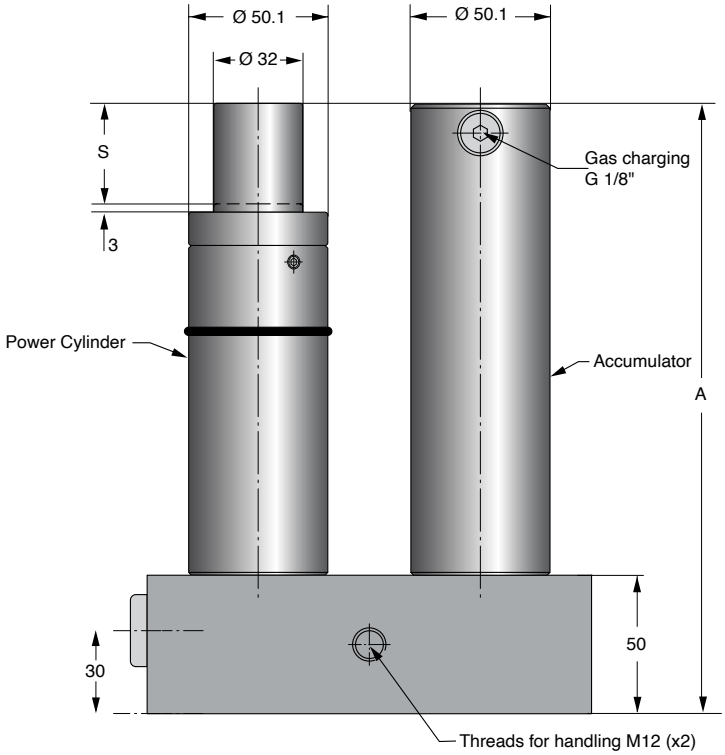
If you need to increase or decrease the force of the cam unit/force cylinder, it is possible to change the nitrogen pressure according to the diagram below.

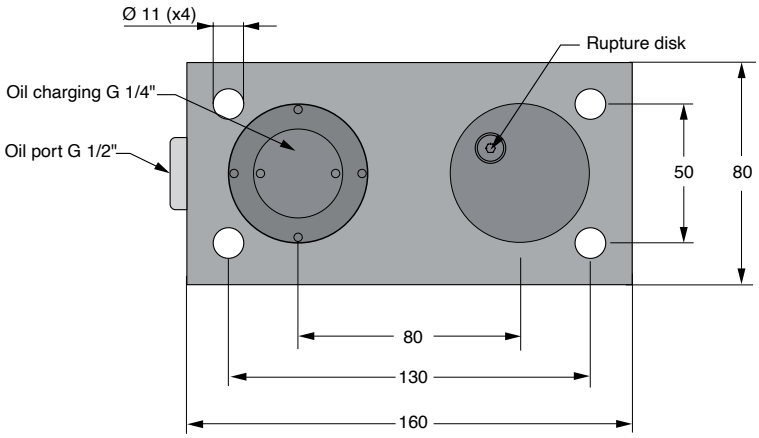
Example:
A force cylinder size 40 is used to perform a forming operation. With the normal accumulator charge pressure of 150 bar, this force cylinder gives 40 kN. If 25 kN of force is required then the accumulator charge pressure should be reduced to 100 bar instead.



Dimensions for Power and Cam Units/Force Cylinder

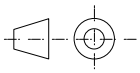
HCPU-15
Power Unit





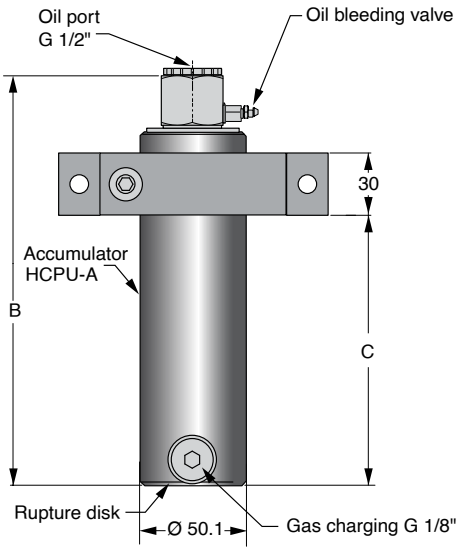
Order No.	Force (kN)	Stroke S (mm)	A	Weight (kg)
HCPU-15x35	15	35	220	8.2
HCPU-15x60	15	60	270	9.1
HCPU-15x110	15	110	370	10.5
HCPU-15x160	15	160	470	11.3

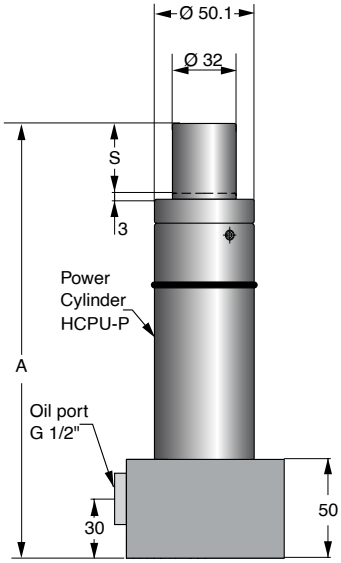
View

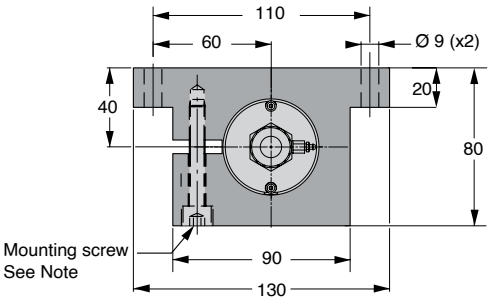


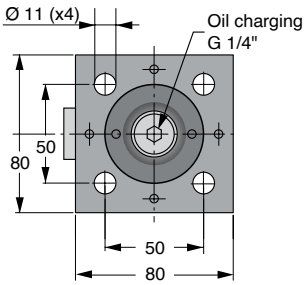
HCPU-S-15 Power Unit, with Separate Accumulator

2 million







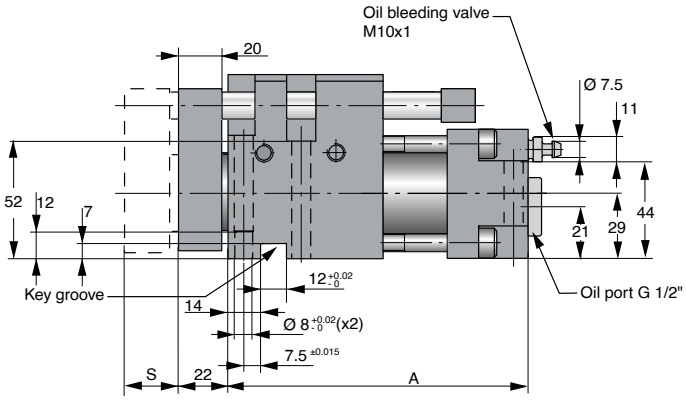


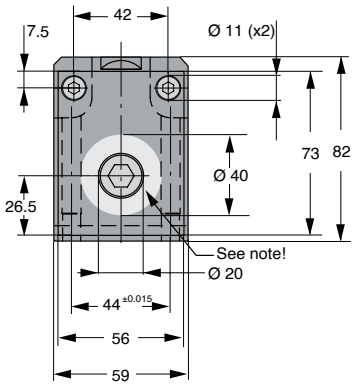
Order No. Complete Power Unit HCPU-S	Weight (kg)	Force (kN)	Stroke S (mm)	A	B	C	Order No. Separate Power Cylinder HCPU-P	Weight (kg)	Order No. Separate Accumulator HCPU-A	Weight (kg)
HCPU-S-15x35	7.3	15	35	220	213	130	HCPU-P-15x35	4.3	HCPU-A-15x35	3.0
HCPU-S-15x60	8.1	15	60	270	264	180	HCPU-P-15x60	4.7	HCPU-A-15x60	3.4
HCPU-S-15x110	9.6	15	110	370	364	280	HCPU-P-15x110	5.5	HCPU-A-15x110	4.1
HCPU-S-15x160	10.7	15	160	470	464	380	HCPU-P-15x160	6.0	HCPU-A-15x160	4.7

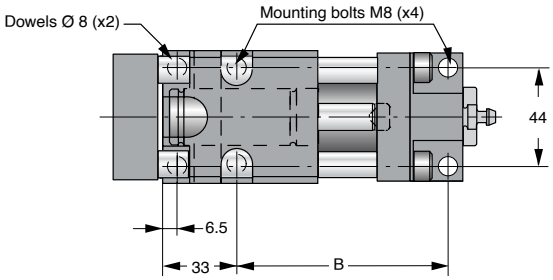
Note: The Accumulator should always be used in the system.

HCCU-15 Compact Cam

2 million



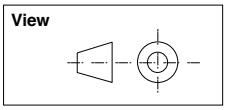




Note: Important installation information:

We recommend locating the punch in the center of the piston rod, but it is also possible to locate the force which the punch or punches will create during the operations within the area marked .

When piercing an opened hole or cutting an edge, we recommend that extra guiding is used to protect the unit against sideload.



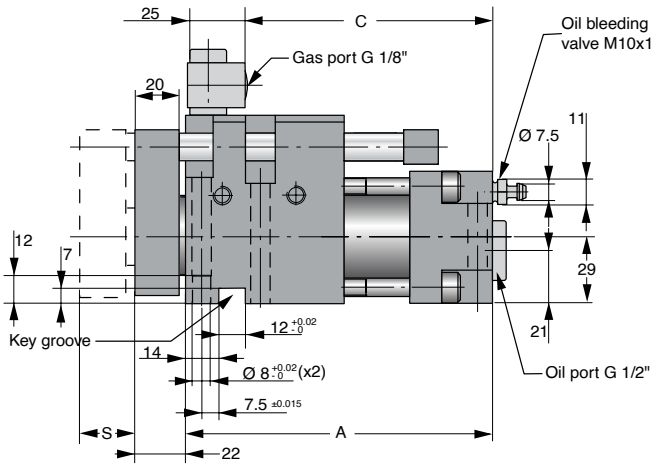
Order No.	Working force* (kN)	Return force (kN)	Stroke S (mm)	A	B	Weight (kg)
HCCU-15x24	15	2	24	133.5	94	4.2
HCCU-15x49	15	2	49	158.5	119	4.6

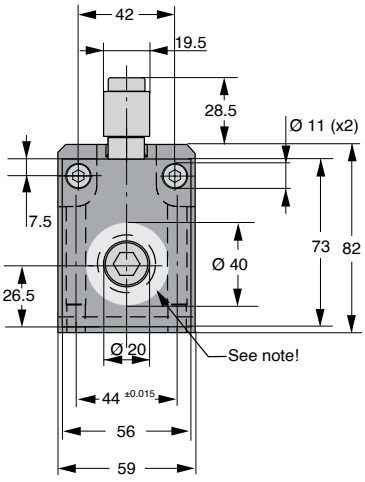
* = Nominal force available for the operation

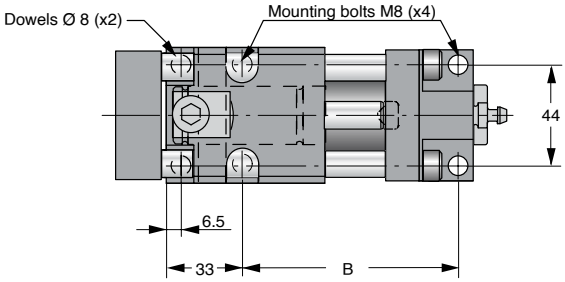
HCCH-15 Compact Cam for Pressure Control

This version can only be used together with a hosed system, as there are no gas charging valves in the springs or adapters.

APPROVED PED 97/23/EC
2 million







Note: Important installation information:

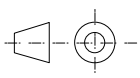
We recommend locating the punch in the center of the piston rod, but it is also possible to locate the force which the punch or punches will create during the operations within the area marked .

When piercing an opened hole or cutting an edge, we recommend that extra guiding is used to protect the unit against sideload.

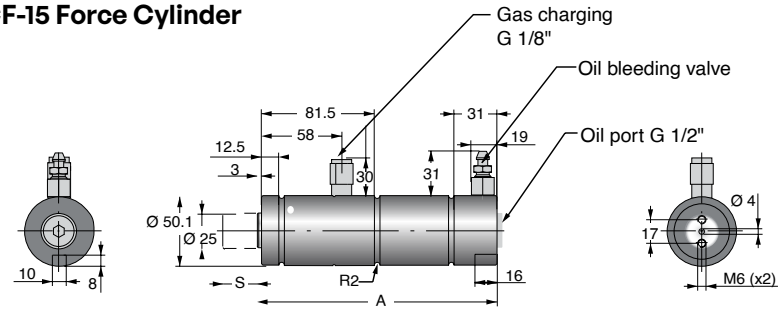
Order No.	Working force* (kN)	Return force (kN)	Stroke S (mm)	A	B	C	Weight (kg)
HCCH-15x24	15	2	24	133.5	94	107	4.3
HCCH-15x49	15	2	49	158.5	119	132	4.7

* = Nominal force available for the operation

View



HCF-15 Force Cylinder



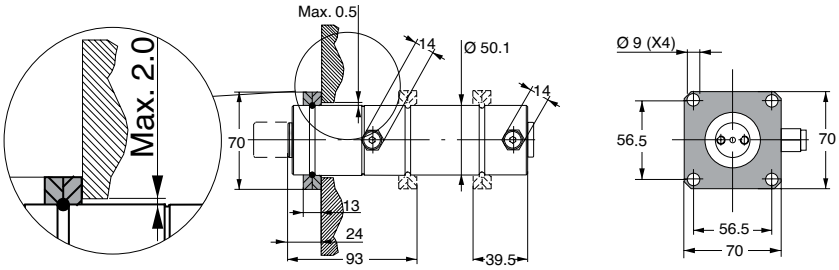
Note: External stop is recommended for the tool (5-10 mm above cylinder) to avoid high load on the cylinder during the return stroke. See picture on page 368.

Order No.	Working force* (kN)	Return force (kN)	Stroke S (mm)	A	Weight (kg)
HCF-15x25	15	1.5	25	173	2.0
HCF-15x50	15	1.5	50	223	2.5
HCF-15x100	15	1.5	100	323	3.6
HCF-15x150	15	1.5	150	423	4.6

* = Nominal force available for the operation

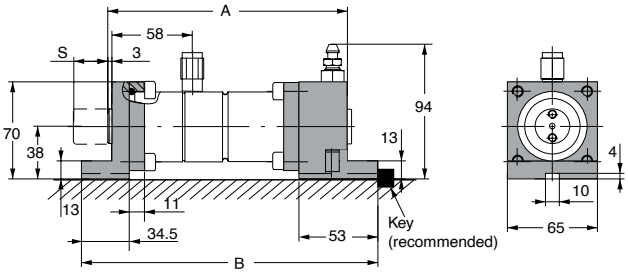
Flange mount HCF-15

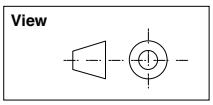
Order No.
2014677-750
(Mount only)

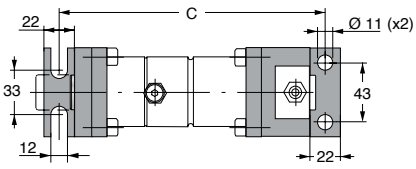


Foot Mount HCF-15

Order No.
3016977-015
(Mounts only)





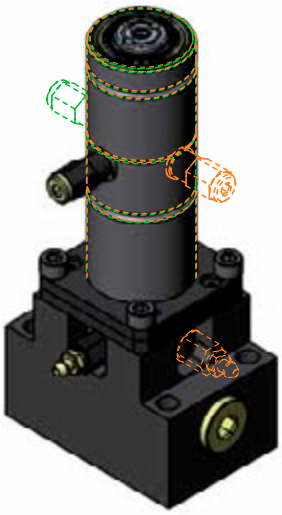


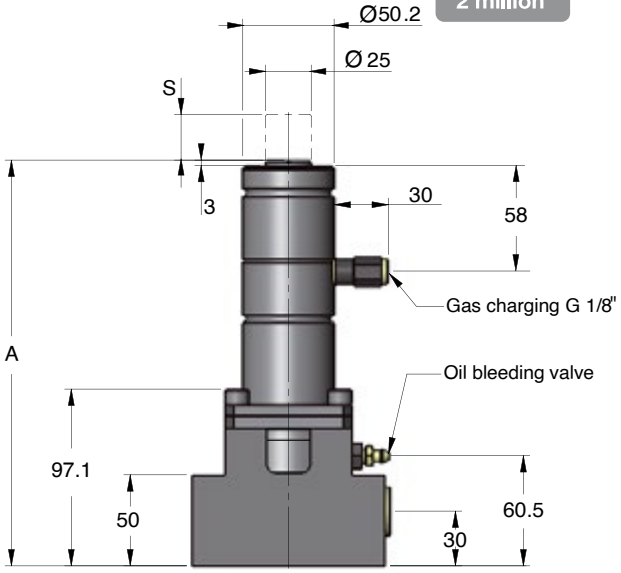
Model	A	B	C
HCF-15x25	173	214	192
HCF-15x50	223	264	242
HCF-15x100	323	364	342
HCF-15x150	423	464	442

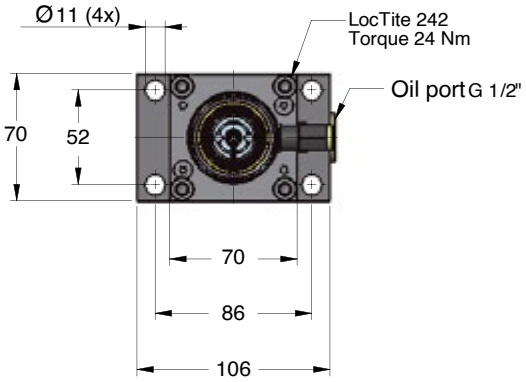
HCF-SP-15 Force Cylinder with Side Port Plate

2 million

Note: External stop is recommended for the tool (5-10 mm above cylinder) to avoid high load on the cylinder during the return stroke. See picture on page 368.



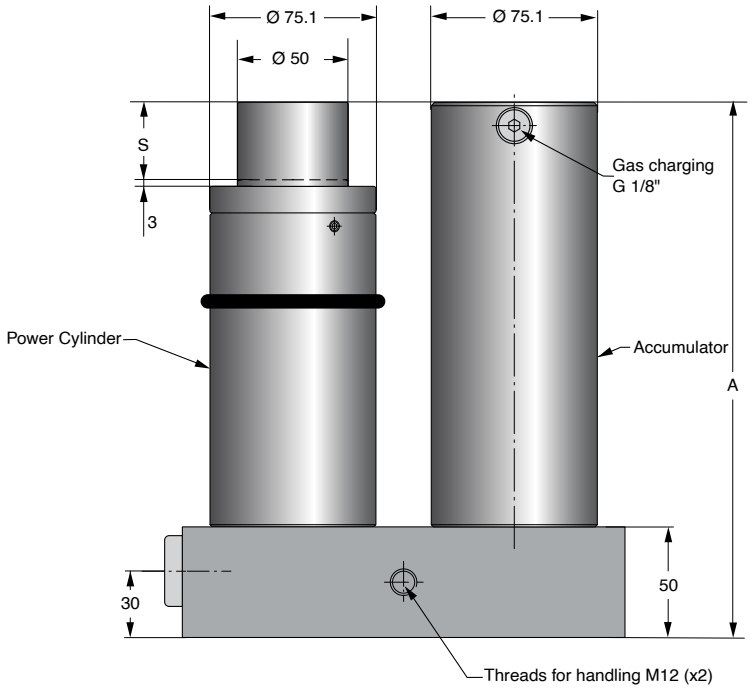


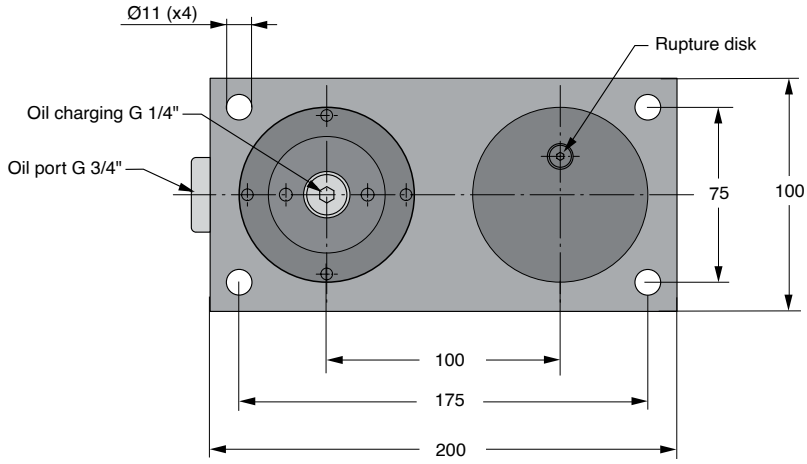


Order No.	Working force* (kN)	Return force (kN)	Stroke S (mm)	A	Weight (kg)
HCF-SP-15x25	15	1.5	25	223	5.6
HCF-SP-15x50	15	1.5	50	273	6.1
HCF-SP-15x100	15	1.5	100	373	7.1
HCF-SP-15x150	15	1.5	150	473	8.2

*= Nominal force for the operation

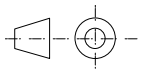
HCPU-40 Power Unit



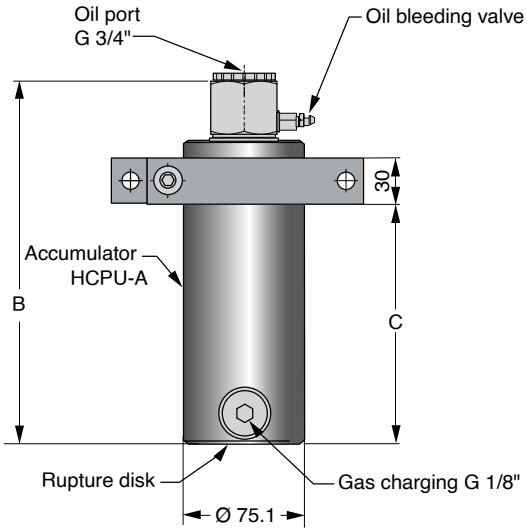


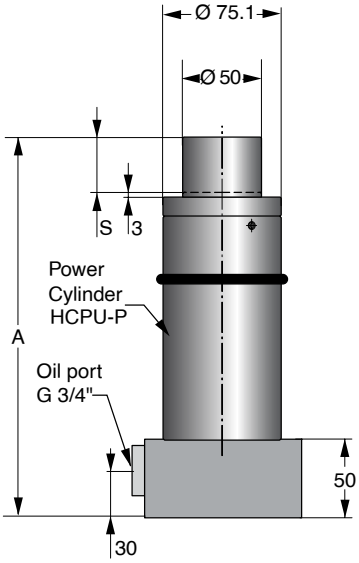
Order No.	Force (kN)	Stroke S (mm)	A	Weight (kg)
HCPU-40x35	40	35	242	15.7
HCPU-40x60	40	60	292	16.8
HCPU-40x110	40	110	392	19.1
HCPU-40x160	40	160	492	21.3

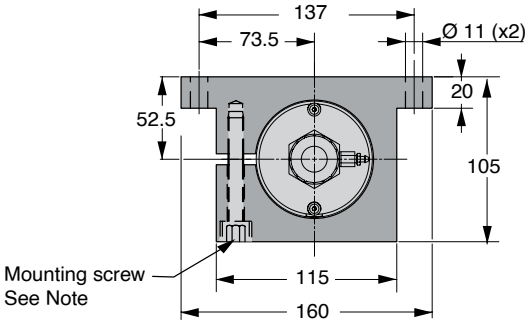
View

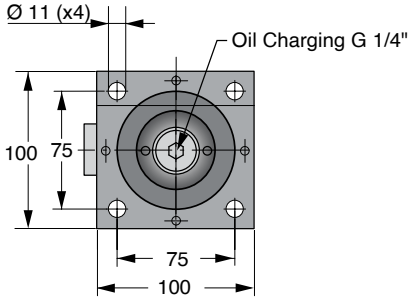


HCPU-S-40 Power Unit, with Separate Accumulator



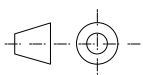






Order No. Complete Power Unit HCPU-S	Weight (kg)	Force (kN)	Stroke S (mm)	A	B	C	Order No. Separate Power Cylinder HCPU-P	Weight (kg)	Order No. Separate Accumulator HCPU-A	Weight (kg)
HCPU-S-40x35	14.0	40	35	242	231	152	HCPU-P-40x35	8.2	HCPU-A-40x35	5.8
HCPU-S-40x60	15.0	40	60	292	281	202	HCPU-P-40x60	8.7	HCPU-A-40x60	6.3
HCPU-S-40x110	17.4	40	110	392	381	302	HCPU-P-40x110	10.0	HCPU-A-40x110	7.4
HCPU-S-40x160	19.6	40	160	492	481	402	HCPU-P-40x160	11.2	HCPU-A-40x160	8.4

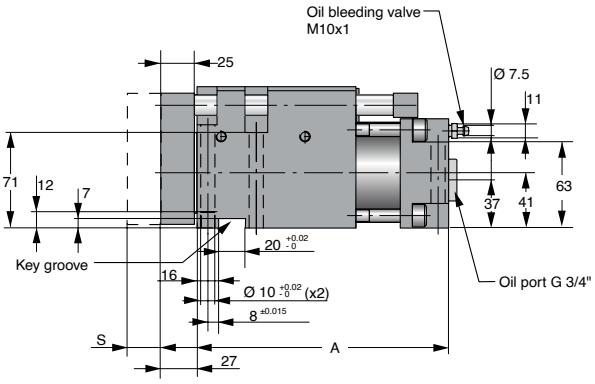
View

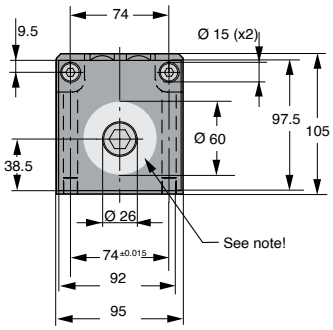


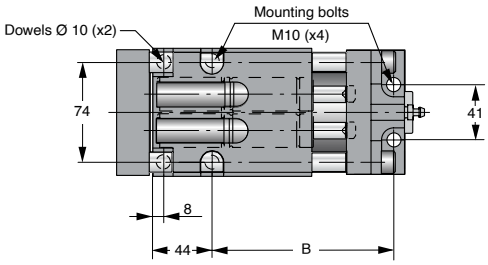
Note: The Accumulator should always be used in the system.

HCCU-40 Compact Cam

2 million



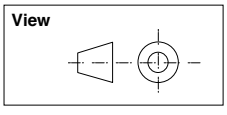




Note: Important installation information:

We recommend locating the punch in the center of the piston rod, but it is also possible to locate the force which the punch will create in the operations within the area marked .

When piercing an opened hole or cutting an edge, we recommend that extra guiding is used to protect the unit against sideload.



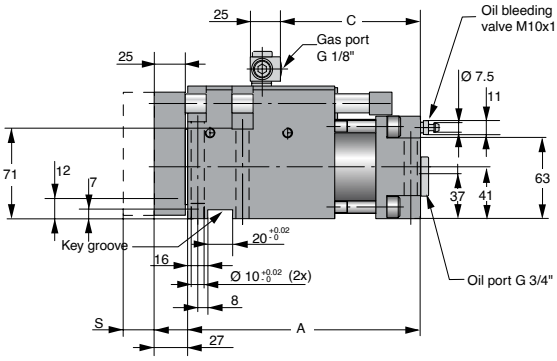
Order No.	Working force* (kN)	Return force (kN)	Stroke S (mm)	A	B	Weight (kg)
HCCU-40x24	40	4	24	187	135	10.5
HCCU-40x49	40	4	49	212	160	12.8
HCCU-40x99	40	4	99	262	210	15.0
HCCU-40x124	40	4	124	287	235	16.5

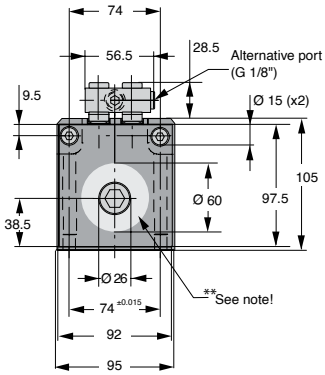
* = Nominal force available for the operation

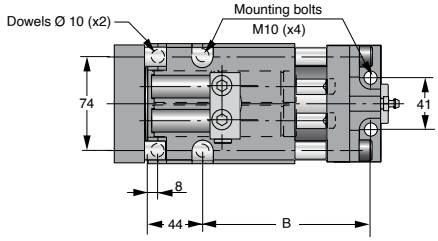
HCCH-40 Compact Cam for Pressure Control

This version can only be used together with a hosed system, as there are no gas charging valves in the springs or adapters. There are two G1/8" gas ports which can be used to couple the Hose System to. Use only one of these to connect the hose, the other should remain plugged.

2 million







****Note: Important installation information:**

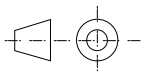
We recommend locating the punch in the center of the piston rod, but it is also possible to locate the force which the punch will create in the operations within the area marked .

When piercing an opened hole or cutting an edge, we recommend that extra guiding is used to protect the unit against sideload.

Order No.	Working force* (kN)	Return force (kN)	Stroke S (mm)	A	B	C	Weight (kg)
HCCH-40x24	40	4	24	187	135	112	10.7
HCCH-40x49	40	4	49	212	160	162	13.0
HCCH-40x99	40	4	99	262	210	237	15.2
HCCH-40x124	40	4	124	287	235	262	16.7

* = Nominal force available for the operation

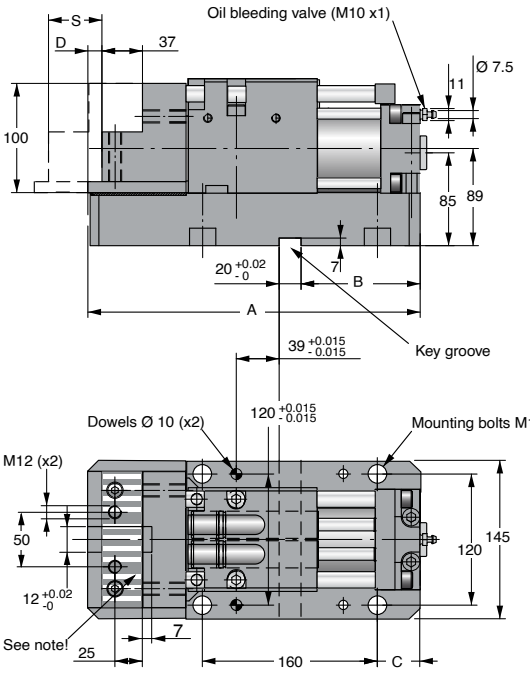
View

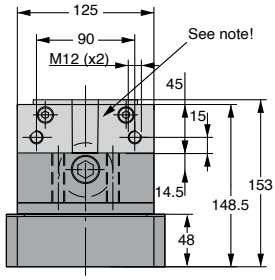


HCCF-40 Flange Cam

Patent No. SE 513031, EP 1212156

APPROVED PED 97/23/EC
2 million



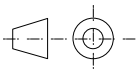


Note:

Shaded area marked can be used for dowel location for the steel insert.

Shaded area marked is not to be machined for risk of damage to underlying roller bearings.

View



Order No.	Working force* (kN)	Return force (kN)	Stroke S (mm)	A	B	C	D	Weight (kg)
HCCF-40x49	40	4	49	304	109	39	13	35
HCCF-40x99	40	4	99	404	159	89	63	43

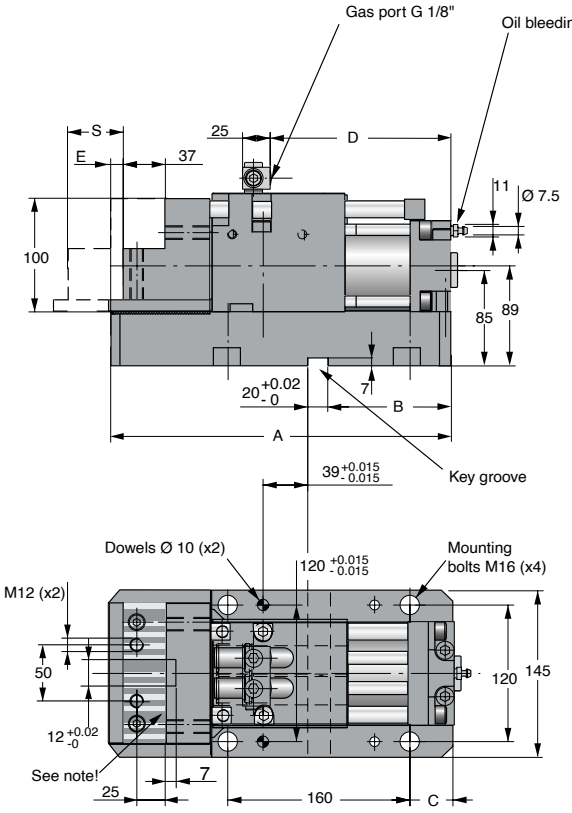
* = Nominal force available for the operation

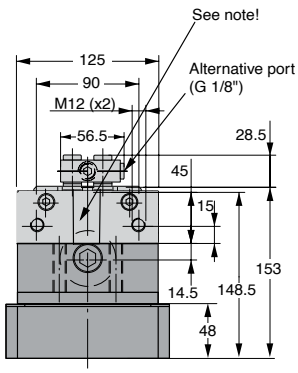
HCCF-H-40 Flange Cam

Patent No. SE 513031, EP 1212156

This version can only be used together with a hosed system, as there are no gas charging valves in the springs or adapters. There are two G 1/8" gas ports which can be used to couple a Hose System to. Use only one of these to connect the Hose System, the other should remain plugged.

APPROVED PED 97/23/EC
2 million





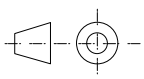
Note:

Shaded area marked can be used for dowel location for the steel insert.

Shaded area marked is not to be machined for risk of damage to underlying roller bearings.

Order No.	Working force* (kN)	Return force (kN)	Stroke S (mm)	A	B	C	D	E	Weight (kg)
HCCF-H-40x49	40	4	49	304	109	39	162	13	35
HCCF-H-40x99	40	4	99	404	159	89	237	63	43

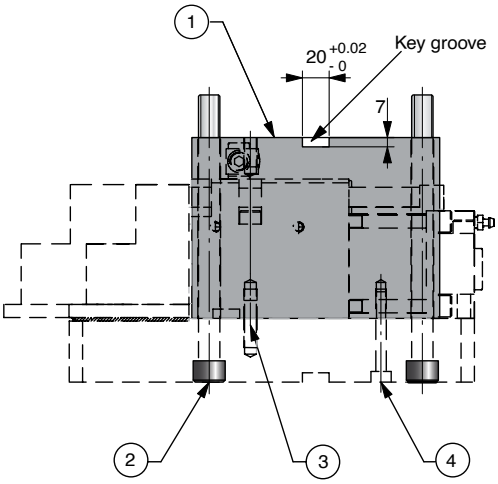
View

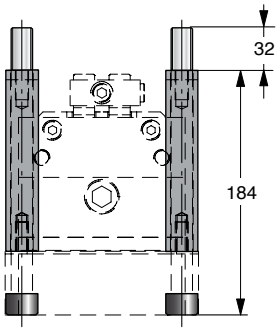


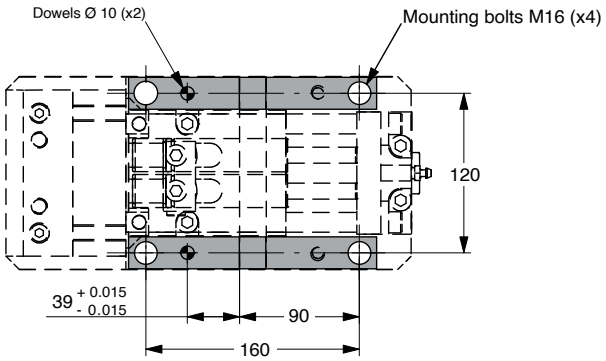
* = Nominal force available for the operation

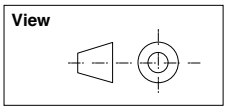
Top Mount kit for Flange Cam
HCCF-40x49 and HCCF-H-40x49
HCCF-40x99 and HCCF-H-40x99

(Order No. 2018393)



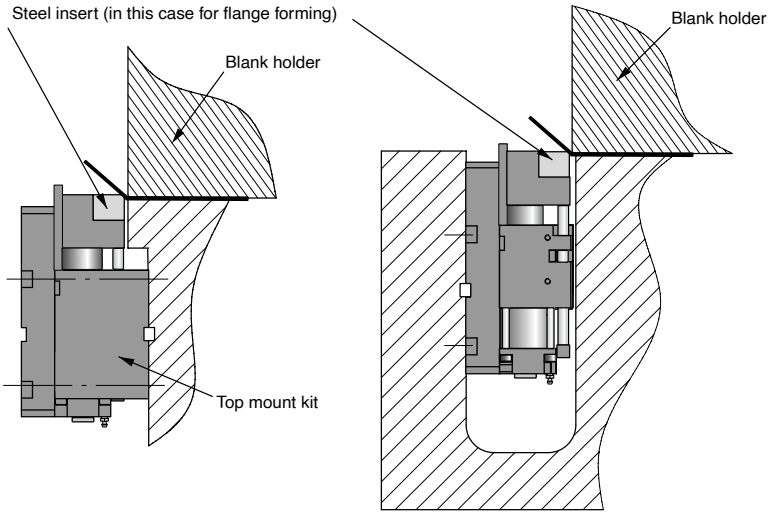






Position	Quantity	Description
1	2	Spacer
2	4	Bolt M16 x 200
3	2	Dowel pin Ø 10 x 40
4	2	Bolt M8 x 60

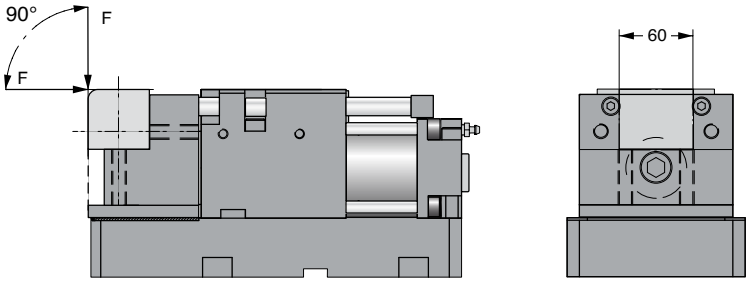
Flange Cam Installation Possibilities



Top Mount

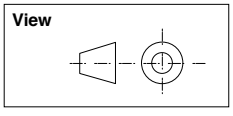
Base Mount

Flange Cam Force Directions and Location



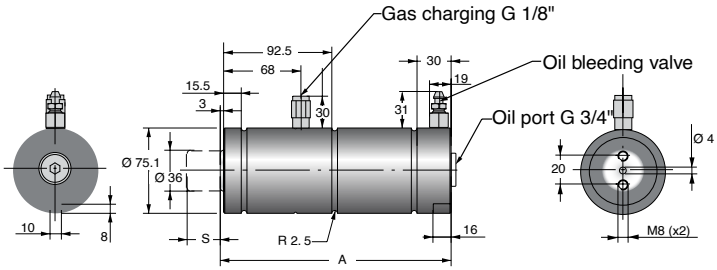
Top Mount

Allowable force directions "F" (within) created by the flanging operation.



HCF-40 Force Cylinder

2 million



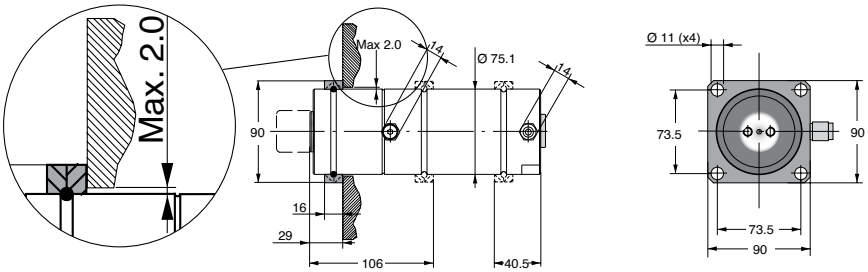
Order No.	Working force* (kN)	Return force (kN)	Stroke S (mm)	A	Weight (kg)
HCF-40x25	40	4	25	195	5.5
HCF-40x50	40	4	50	245	6.5
HCF-40x100	40	4	100	345	8.6
HCF-40x150	40	4	150	445	10.7

*= Nominal force for the operation

Note: External stop is recommended for the tool (5-10 mm above cylinder) to avoid high load on the cylinder during the return stroke. See picture on page 368.

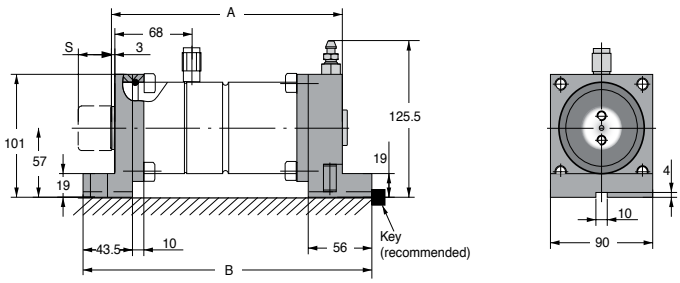
Flange mount for HCF-40

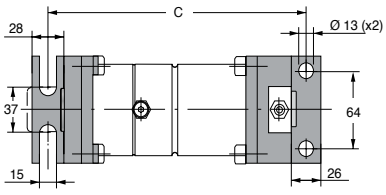
Order No.
2014677-1500
(Mount only)



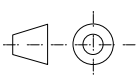
Foot Mount for HCF-40

Order No.
3016977-040
(Mounts only)



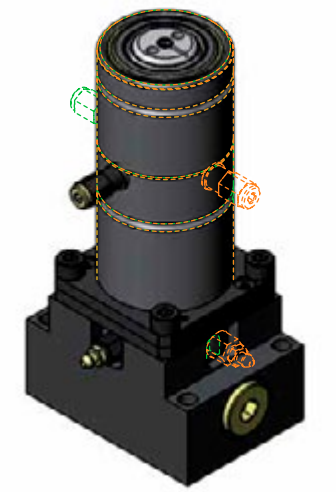


View

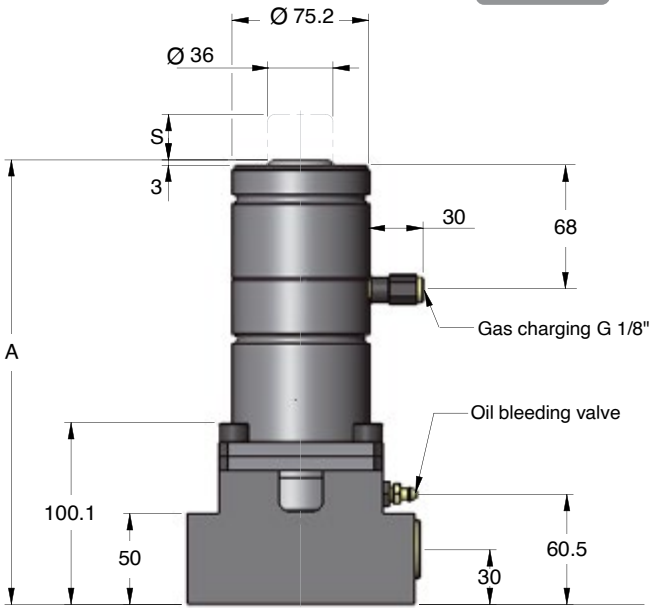


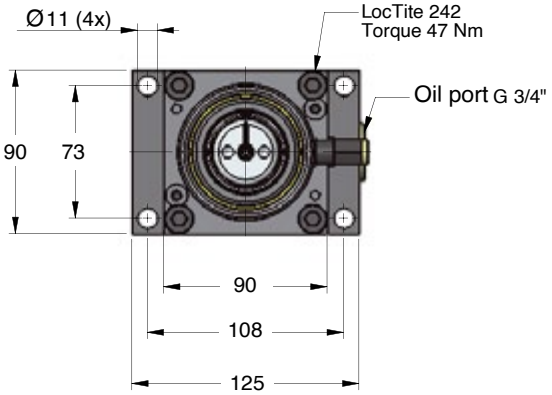
Model	A	B	C
HCF-40x25	195	246	219
HCF-40x50	245	296	269
HCF-40x100	345	396	369
HCF-40x150	445	496	469

HCF-SP-40 Force Cylinder with Side Port Plate



Note: External stop is recommended for the tool (5-10 mm above cylinder) to avoid high load on the cylinder during the return stroke. See picture on page 368.

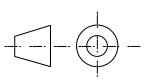




Order No.	Working force* (kN)	Return force (kN)	Stroke S (mm)	A	Weight (kg)
HCF-SP-40x25	40	4	25	245	10.3
HCF-SP-40x50	40	4	50	295	11.3
HCF-SP-40x100	40	4	100	395	13.4
HCF-SP-40x150	40	4	150	495	15.4

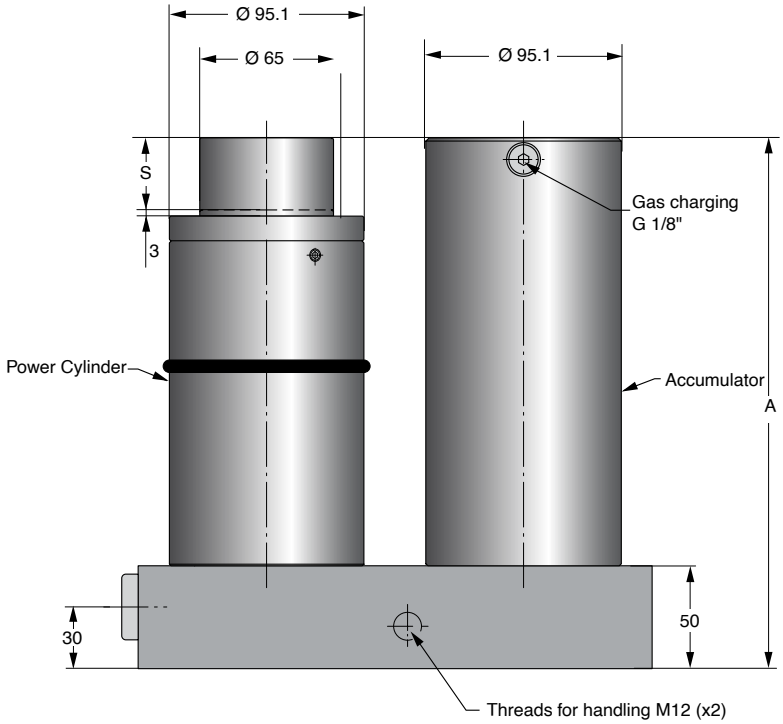
*= Nominal force for the operation

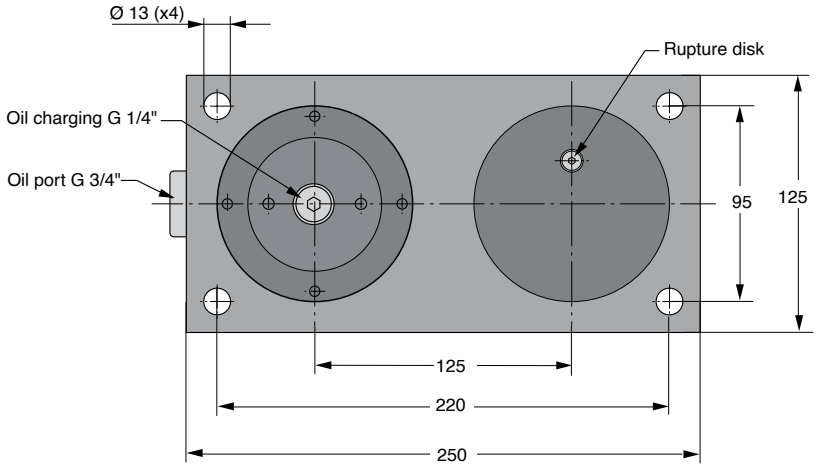
View



HCPU-60 Power Unit

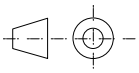
2 million





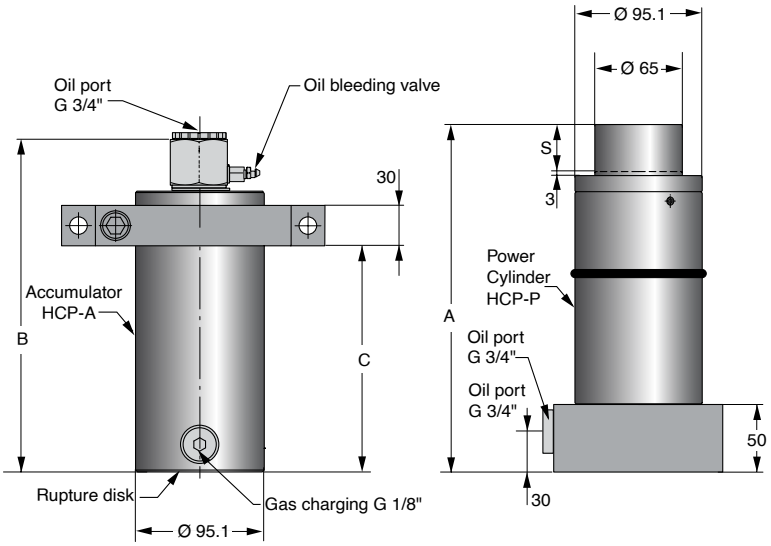
Order No.	Force (kN)	Stroke S (mm)	A	Weight (kg)
HCPU-60x35	60	35	258	26.7
HCPU-60x60	60	60	308	28.4
HCPU-60x110	60	110	408	32.2
HCPU-60x160	60	160	508	35.9

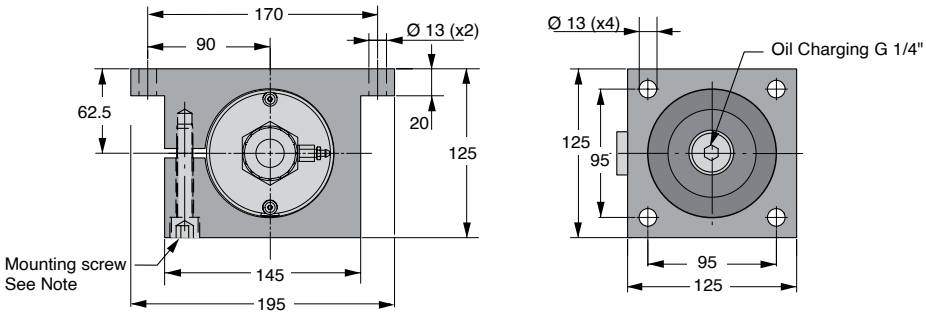
View



HCPU-S-60 Power Unit, with Separate Accumulator

2 million

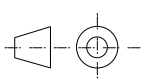




Note: The mounting screw (M12) should be tightened with torque 91Nm

Order No. Complete Power Unit HCPU-S	Weight (kg)	Force (kN)	Stroke S (mm)	A	B	C	Order No. Separate Power Cylinder HCPU-P	Weight (kg)	Order No. Separate Accumulator HCPU-A	Weight (kg)
HCPU-S-60x35	23.9	60	35	258	247	168	HCPU-P-60x35	13.9	HCPU-A-60x35	10.0
HCPU-S-60x60	25.7	60	60	308	297	218	HCPU-P-60x60	14.8	HCPU-A-60x60	10.9
HCPU-S-60x110	29.4	60	110	408	397	318	HCPU-P-60x110	16.9	HCPU-A-60x110	12.5
HCPU-S-60x160	33.1	60	160	508	497	418	HCPU-P-60x160	19.0	HCPU-A-60x160	14.1

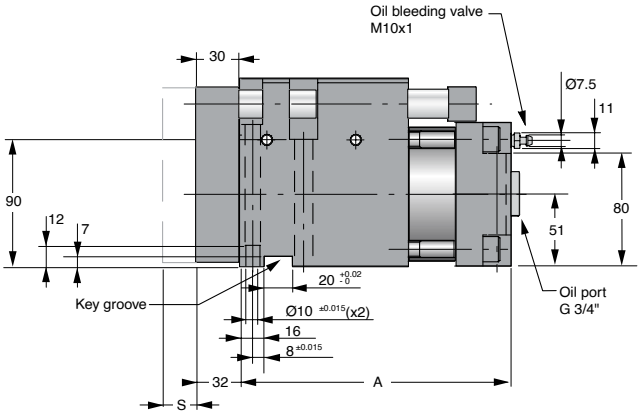
View

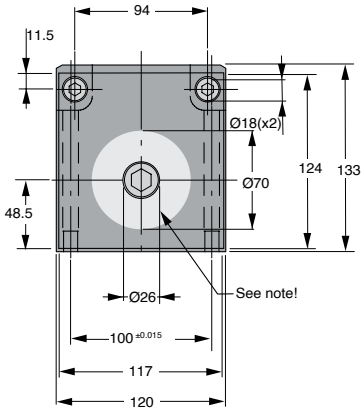


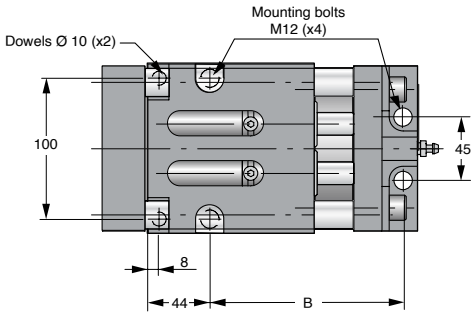
Note: The Accumulator should always be used in the system.

HCCU-60 Compact Cam

2 million







Note: Important installation information:

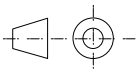
We recommend locating the punch in the center of the piston rod, but it is also possible to locate the force which the punch will create in the operations within the area marked .

When piercing an opened hole or cutting an edge, we recommend that extra guiding is used to protect the unit against sideload.

Order No.	Working force* (kN)	Return force (kN)	Stroke S (mm)	A	B	Weight (kg)
HCCU-60x24	60	7	24	191	137	22.3
HCCU-60x49	60	7	49	216	162	23.4
HCCU-60x99	60	7	99	266	212	26.0

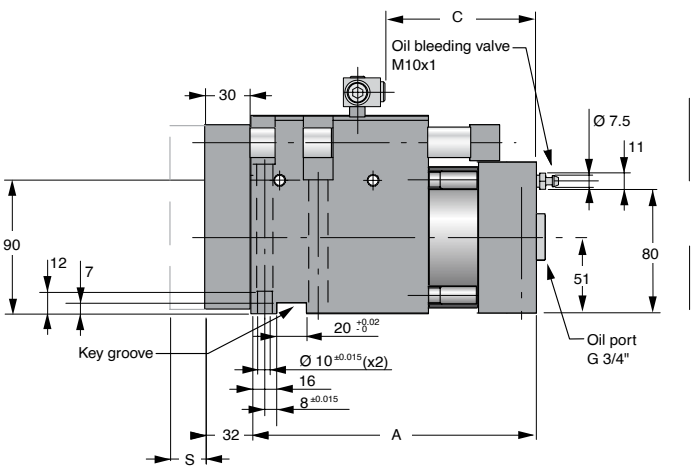
* = Nominal force available for the operation

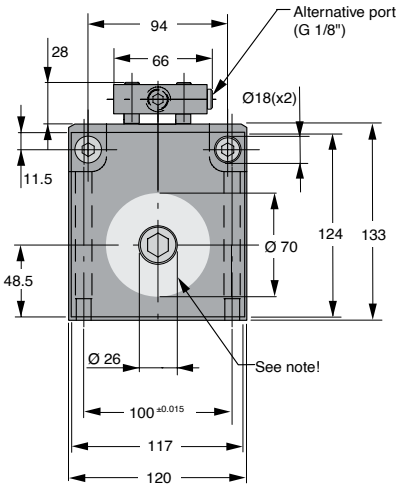
View

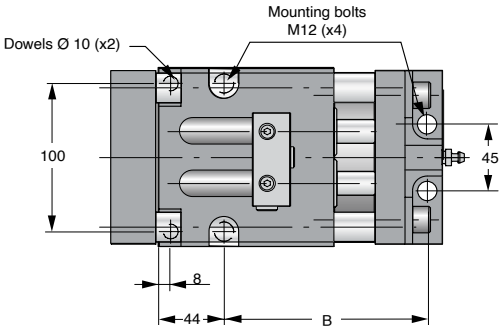


HCCH-60 Compact Cam for Pressure Control

This version can only be used together with a hosed system, as there are no gas charging valve in the springs or adapters. There are two G 1/8" gas ports which can be used to connect to a Hose System. Use only one of these to connect the Hose System, the other should remain plugged.







Note: Important installation information:

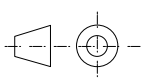
We recommend locating the punch in the center of the piston rod, but it is also possible to locate the force which the punch will create in the operations within the area marked .

When piercing an opened hole or cutting an edge, we recommend that extra guiding is used to protect the unit against sideload.

Order No.	Working force* (kN)	Return force (kN)	Stroke S (mm)	A	B	C	Weight (kg)
HCCH-60x24	60	7	24	191	137	103	22.5
HCCH-60x49	60	7	49	216	162	153	23.6
HCCH-60x99	60	7	99	266	212	228	26.2

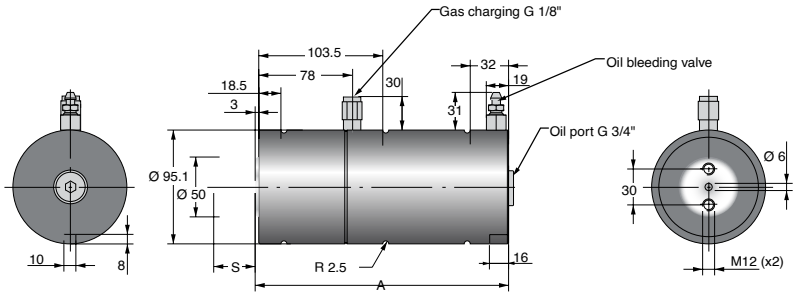
* = Nominal force available for the operation

View



HCF-60 Force Cylinder

2 million

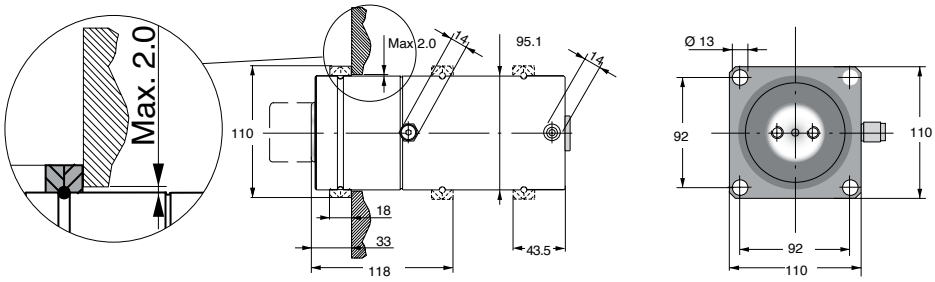


Note: External stop is recommended for the tool (5-10 mm above cylinder) to avoid high load on the cylinder during the return stroke. See picture on page 368.

Order No.	Working force* (kN)	Return force (kN)	Stroke S (mm)	A	Weight (kg)
HCF-60x25	60	6	25	211	9.8
HCF-60x50	60	6	50	261	11.6
HCF-60x100	60	6	100	361	15.1
HCF-60x150	60	6	150	461	18.6

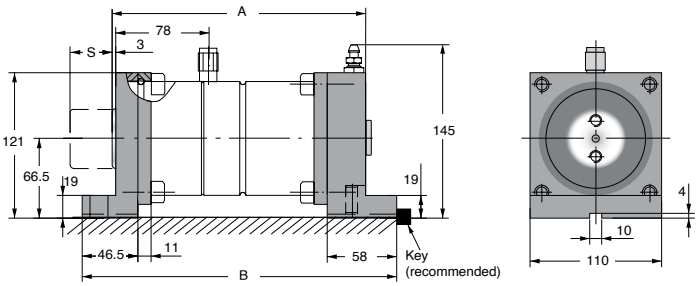
Flange mount for HCF-60

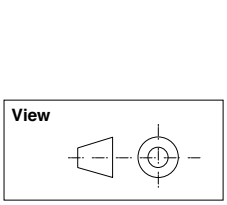
Order No. 2014677-3000 (Mount only)

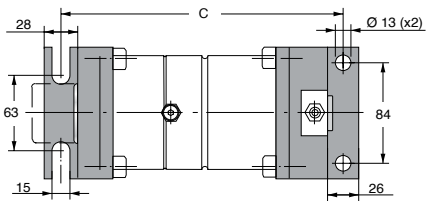


Foot Mount for HCF-60

Order No. 3016977-060 (Mounts only)

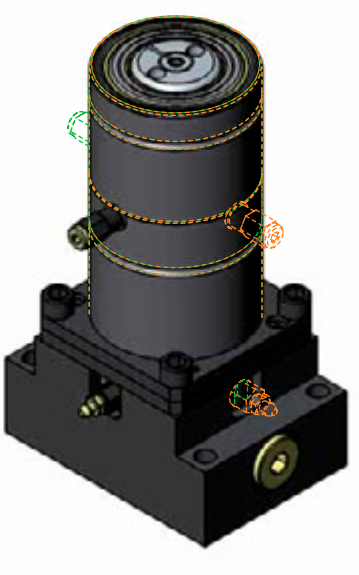


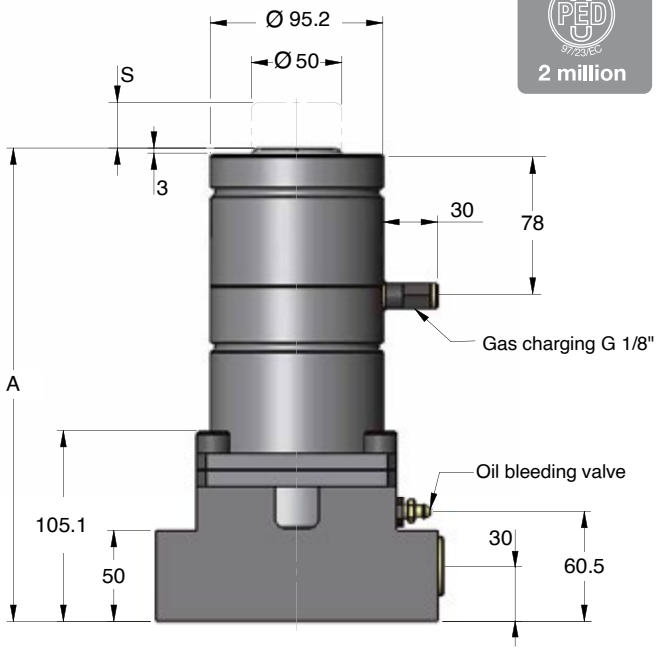




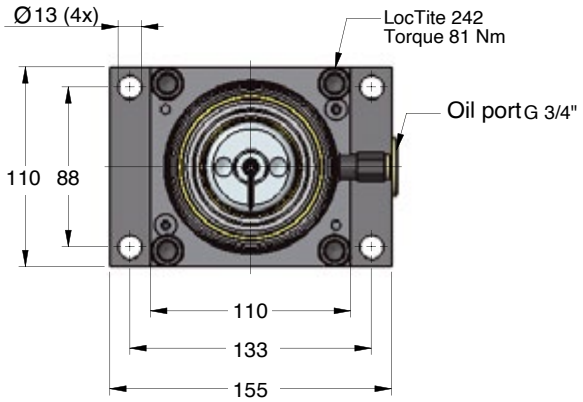
Model	A	B	C
HCF-60x25	211	262	235
HCF-60x50	261	312	285
HCF-60x100	361	412	385
HCF-60x150	461	512	485

HCF-SP-60 Force Cylinder with Side Port Plate





Note: External stop is recommended for the tool (5-10 mm above cylinder) to avoid high load on the cylinder during the return stroke. See picture on page 368.

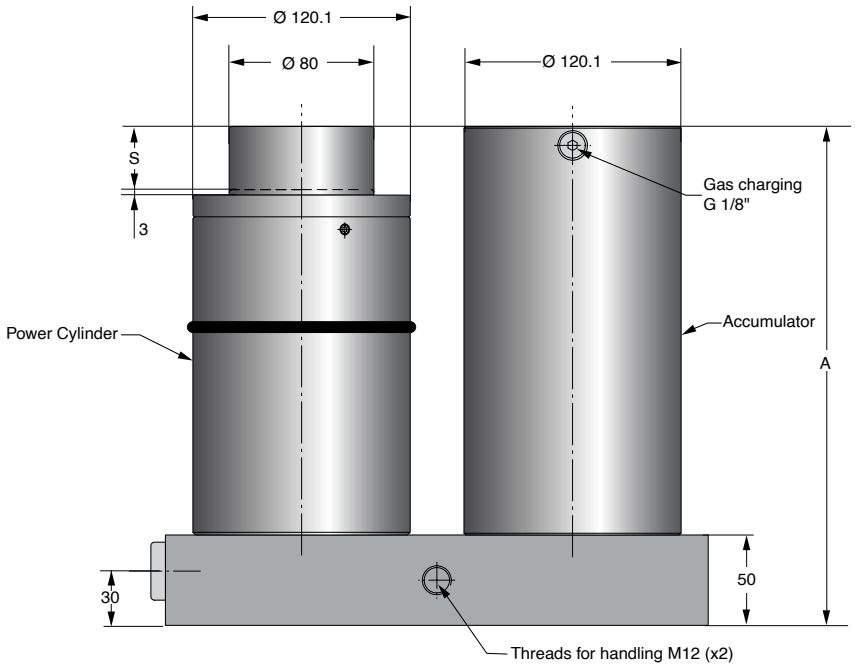


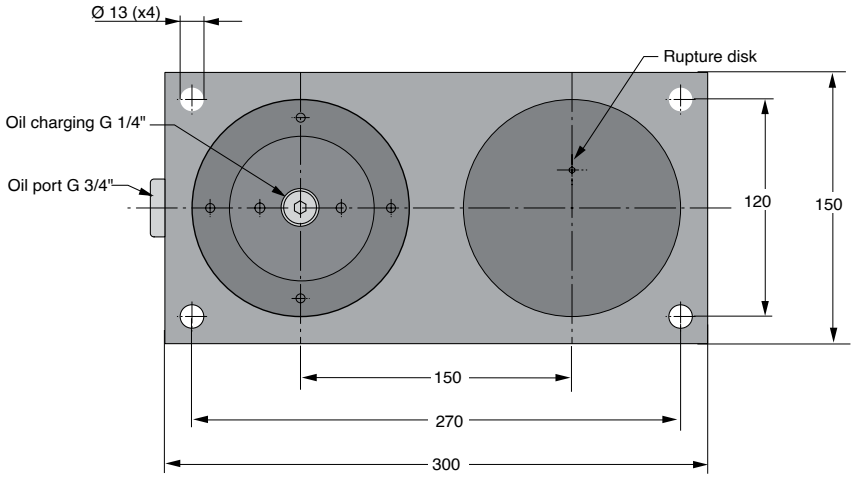
Order No.	Working force* (kN)	Return force (kN)	Stroke S (mm)	A	Weight (kg)
HCF-SP-60x25	60	6	25	261	17.4
HCF-SP-60x50	60	6	50	311	19.2
HCF-SP-60x100	60	6	100	411	22.7
HCF-SP-60x150	60	6	150	511	26.2

*= Nominal force for the operation

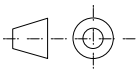
HCPU-90 Power Unit

2 million



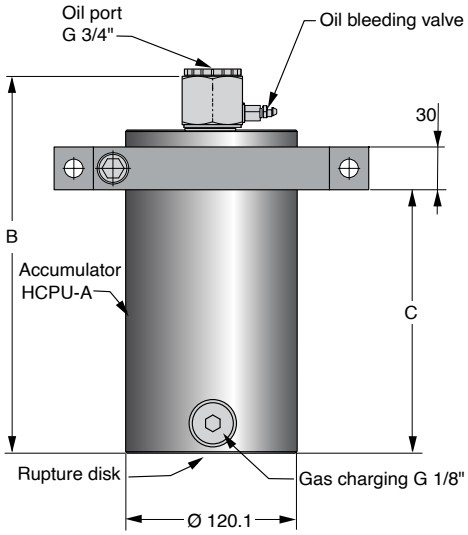


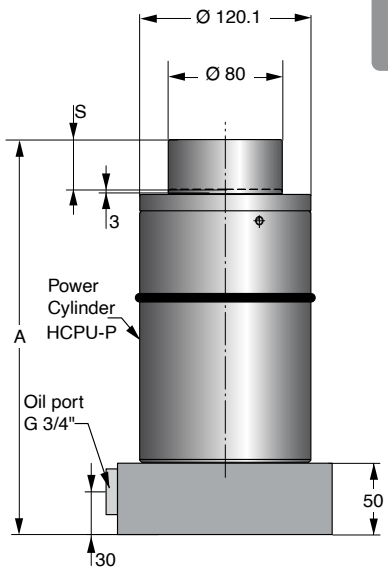
View

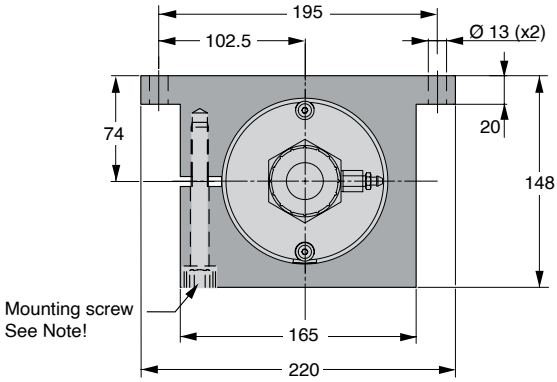


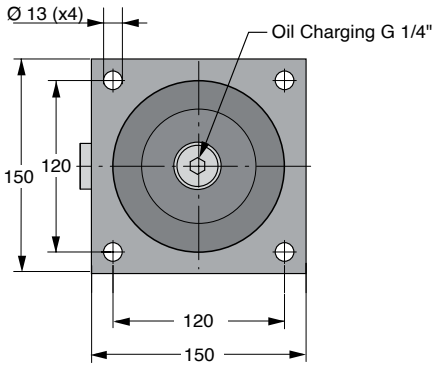
Order No.	Force (kN)	Stroke S (mm)	A	Weight (kg)
HCPU-90x35	90	35	276	43.1
HCPU-90x60	90	60	326	46.1
HCPU-90x110	90	110	426	52.1
HCPU-90x160	90	160	526	52.8

HCPU-S-90 Power Unit, with Separate Accumulator





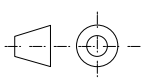




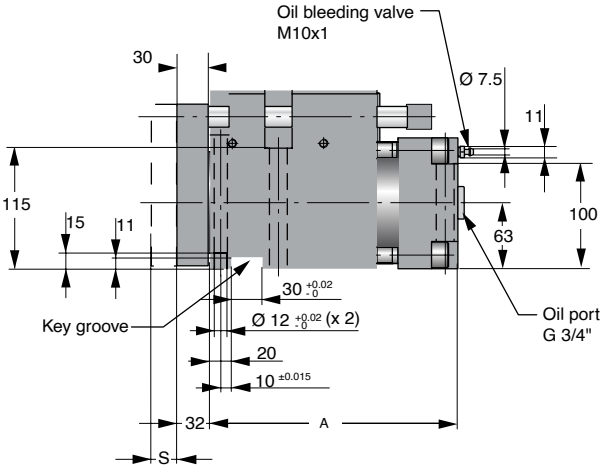
Order No. Complete Power Unit HCPU-S	Weight (kg)	Force (kN)	Stroke S (mm)	A	B	C	Order No. Separate Power Cylinder HCPU-P	Weight (kg)	Order No. Separate Accumulator HCPU-A	Weight (kg)
HCPU-S-90x35	38.3	90	35	276	265	186	HCPU-P-90x35	22.6	HCPU-A-90x35	15.7
HCPU-S-90x60	41.2	90	60	326	315	236	HCPU-P-90x60	24.2	HCPU-A-90x60	17.0
HCPU-S-90x110	47.3	90	110	426	415	336	HCPU-P-90x110	27.5	HCPU-A-90x110	19.8
HCPU-S-90x160	53.3	90	160	526	514	436	HCPU-P-90x160	30.8	HCPU-A-90x160	22.5

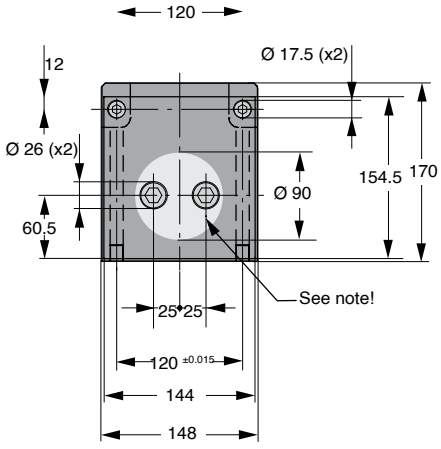
Note: The Accumulator should always be used in the system.

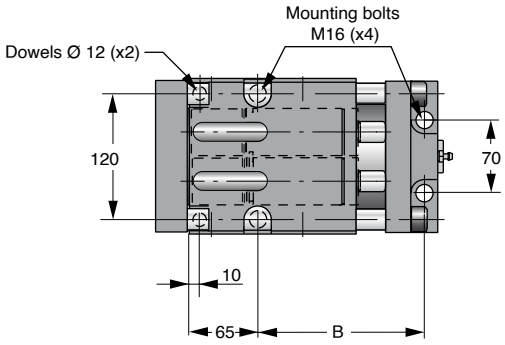
View



HCCU-90 Compact Cam



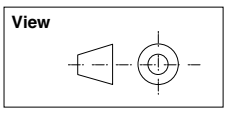




Note: Important installation information:

We recommend locating the punch in the center of the piston rod, but it is also possible to locate the force which the punch will create in the operations within the area marked .

When piercing an opened hole or cutting an edge, we recommend that extra guiding is used to protect the unit against sideload.



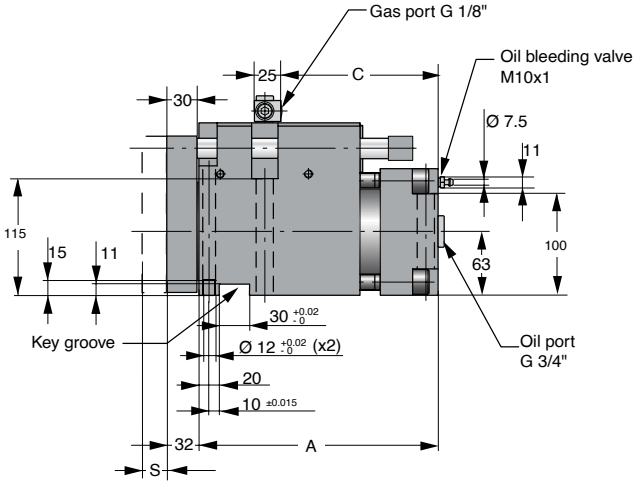
Order No.	Working force* (kN)	Return force (kN)	Stroke S (mm)	A	B	Weight (kg)
HCCU-90x24	90	10	24	236	159	33.5
HCCU-90x49	90	10	49	261	184	39.7
HCCU-90x99	90	10	99	311	234	44.9

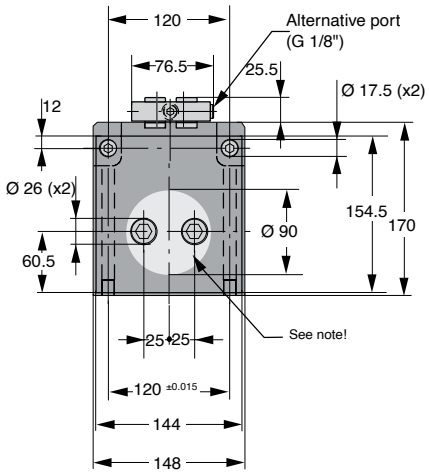
* = Nominal force available for the operation

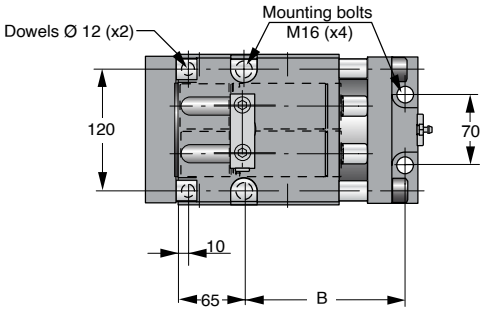
HCCH-90 Compact Cam for pressure control

This version can only be used together with a hosed system, as there are no gas charging valve in the springs or adapters. There are two G 1/8" gas ports which can be used to connect to a Hose System. Use only one of these to connect the Hose System, the other should remain plugged.

2 million







Note: Important installation information:

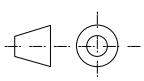
We recommend locating the punch in the center of the piston rod, but it is also possible to locate the force which the punch will create in the operations within the area marked .

When piercing an opened hole or cutting an edge, we recommend that extra guiding is used to protect the unit against sideload.

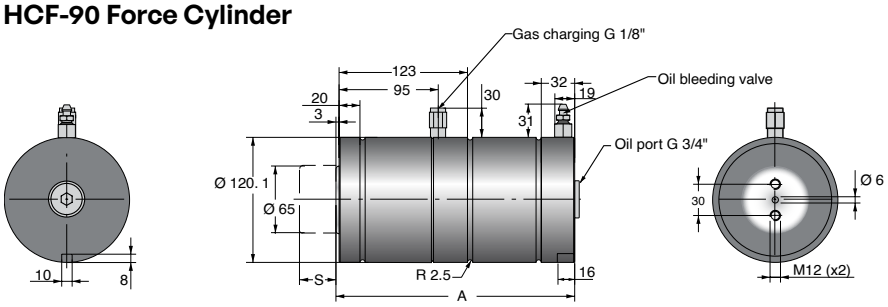
Order No.	Working force* (kN)	Return force (kN)	Stroke S (mm)	A	B	C	Weight (kg)
HCCH-90x24	90	10	24	236	159	158	33.7
HCCH-90x49	90	10	49	261	184	208	39.7
HCCH-90x99	90	10	99	311	234	283	44.9

* = Nominal force available for the operation

View



HCF-90 Force Cylinder



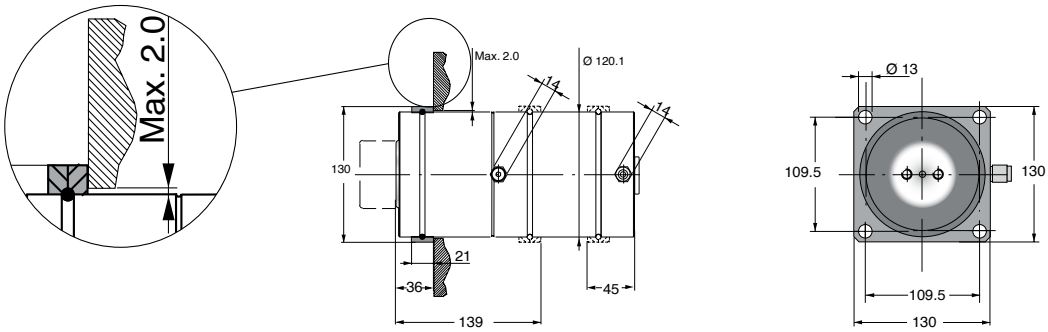
Note: External stop is recommended for the tool (5-10 mm above cylinder) to avoid high load on the cylinder during the return stroke. See picture on page 368.

Order No.	Working force* (kN)	Return force (kN)	Stroke S (mm)	A	Weight (kg)
HCF-90x25	90	9	25	229	15.8
HCF-90x50	90	9	50	279	18.7
HCF-90x100	90	9	100	379	24.5
HCF-90x150	90	9	150	479	30.3

*= Nominal force for the operation

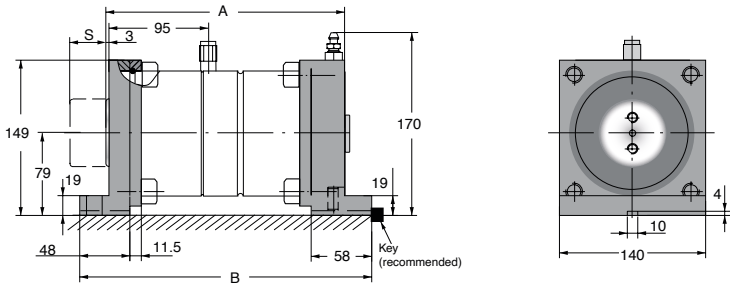
Flange mount for HCF-90

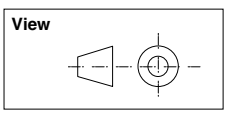
Order No. 2014677-5000 (Mount only)

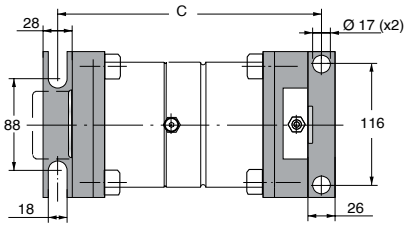


Foot Mount for HCF-90

Order No. 3016977-090 (Mounts only)



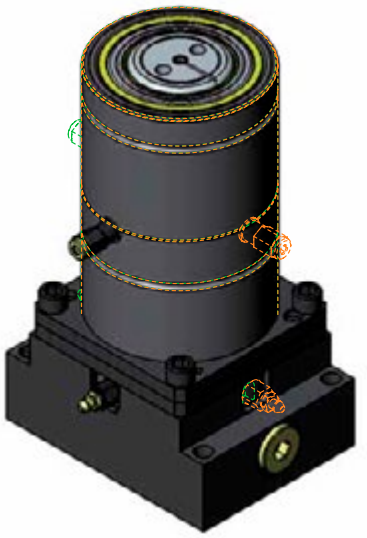


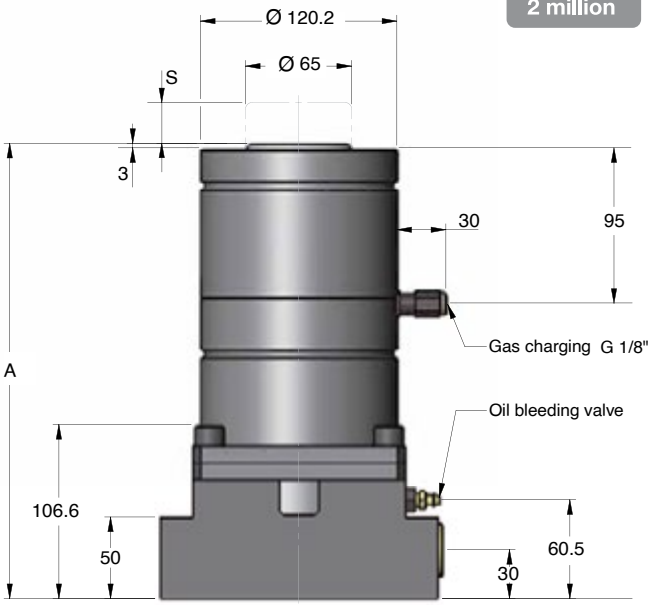


Model	A	B	C
HCF-90x25	229	280	254
HCF-90x50	279	330	304
HCF-90x100	379	430	404
HCF-90x150	479	530	504

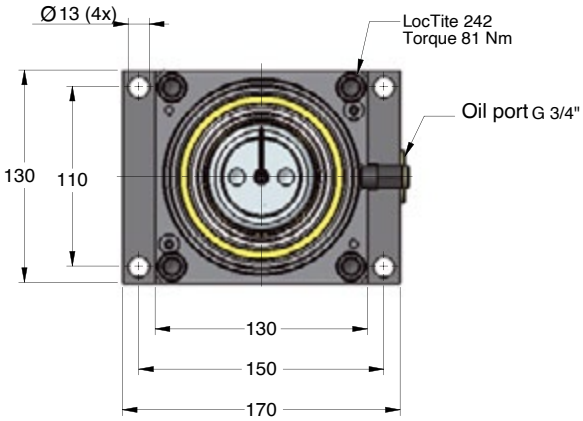
HCF-SP-90 Force Cylinder with Side Port Plate

2 million





Note: External stop is recommended for the tool (5-10 mm above cylinder) to avoid high load on the cylinder during the return stroke. See picture on page 368.

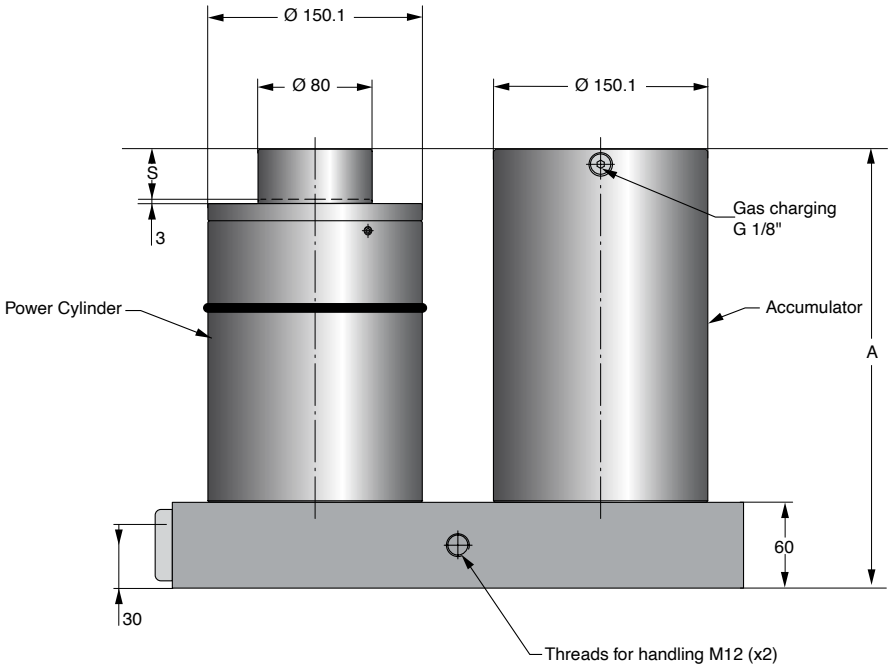


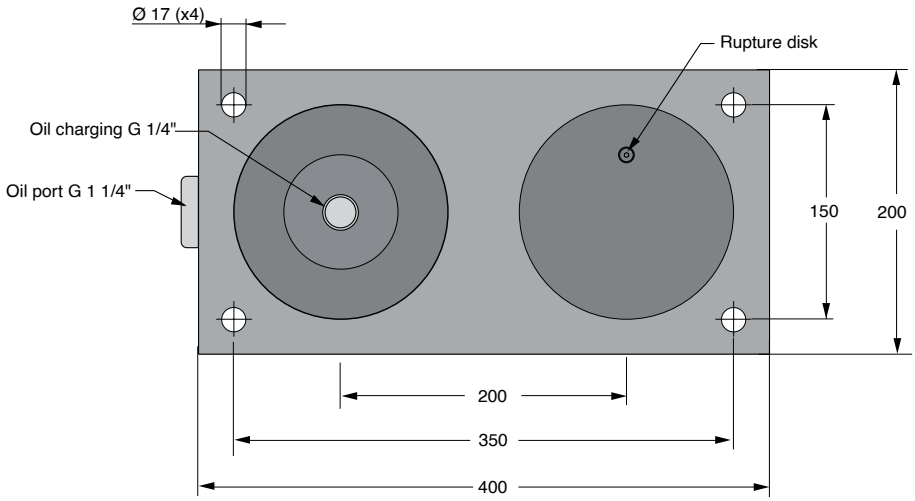
Order No.	Working force* (kN)	Return force (kN)	Stroke S (mm)	A	Weight (kg)
HCF-SP-90x25	90	9	25	279	28
HCF-SP-90x50	90	9	50	329	30.9
HCF-SP-90x100	90	9	100	429	36.8
HCF-SP-90x150	90	9	150	529	42.6

* = Nominal force for the operation

HCPU-150 Power Unit

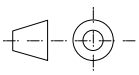
2 million





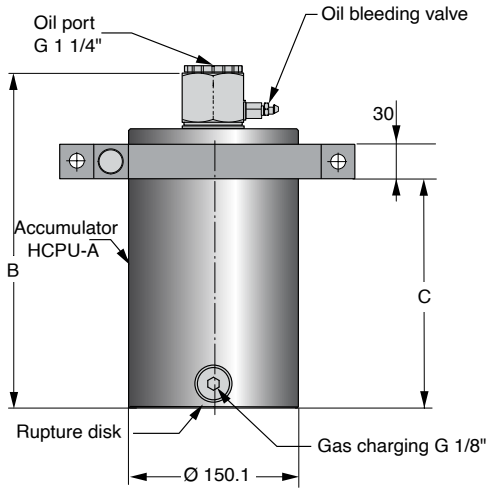
Order No.	Force (kN)	Stroke S (mm)	A	Weight (kg)
HCPU-150x35	150	35	307	83.1
HCPU-150x60	150	60	357	87.7
HCPU-150x110	150	110	457	97.0
HCPU-150x160	150	160	557	106.3

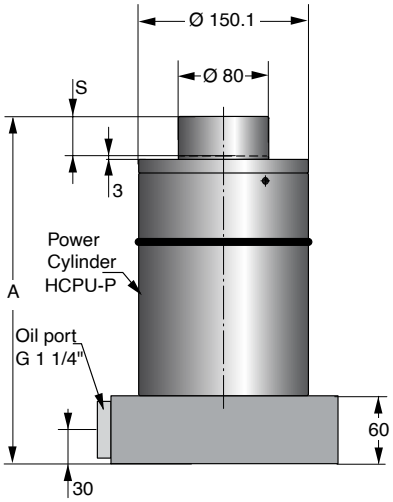
View

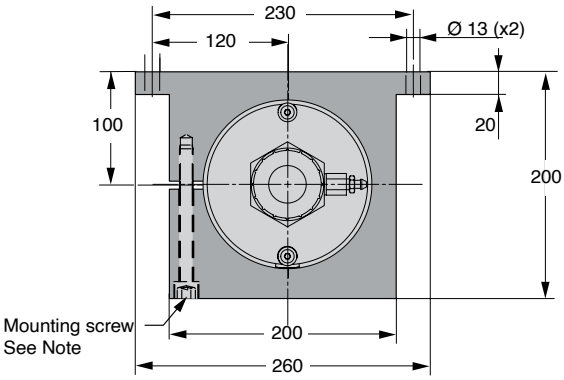


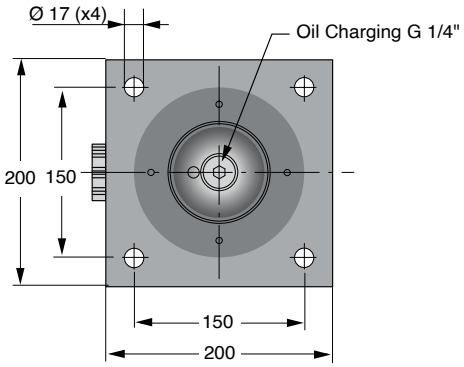
HCPU-S-150 Power Unit, with Separate Accumulator

2 million







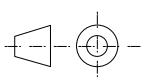


Note: The mounting screw (M12) should be tightened with torque 91Nm

Order No. Complete Power Unit HCPU-S	Weight (kg)	Force (kN)	Stroke S (mm)	A	B	C	Order No. Separate Power Cylinder HCPU-P	Weight (kg)	Order No. Separate Accumulator HCPU-A	Weight (kg)
HCPU-S-150x35	71.1	90	35	307	294	207	HCPU-P-150x35	43.6	HCPU-A-150x35	27.7
HCPU-S-150x60	75.5	90	60	357	344	257	HCPU-P-150x60	45.9	HCPU-A-150x60	29.8
HCPU-S-150x110	85.0	90	110	457	444	357	HCPU-P-150x110	50.9	HCPU-A-150x110	34.1
HCPU-S-150x160	94.3	90	160	557	544	457	HCPU-P-150x160	55.9	HCPU-A-150x160	38.4

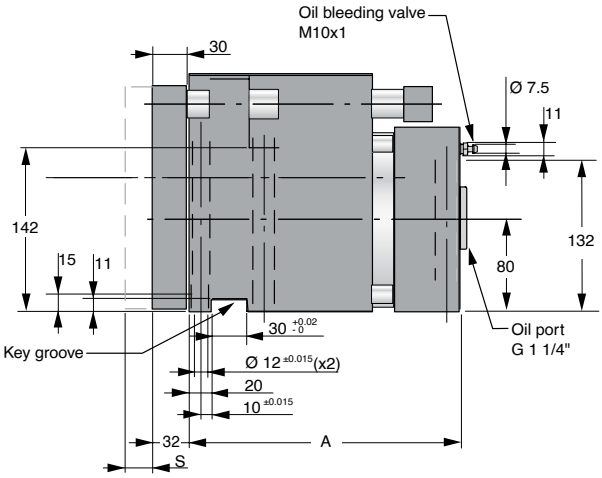
Note: The Accumulator should always be used in the system.

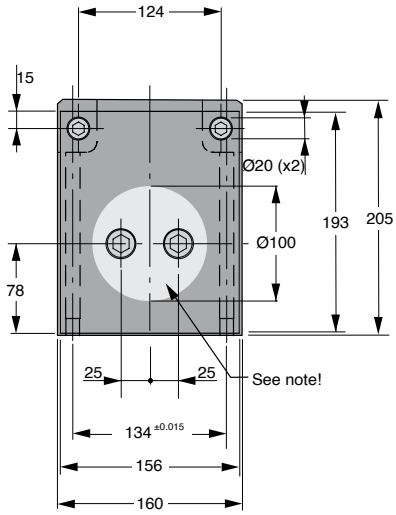
View

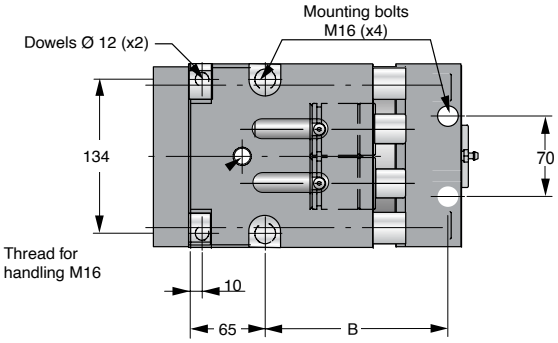


HCCU-150 Compact Cam

2 million



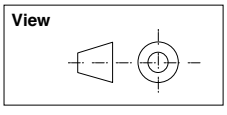




Note: Important installation information:

We recommend locating the punch in the center of the piston rod, but it is also possible to locate the force which the punch will create in the operations within the area marked .

When piercing an opened hole or cutting an edge, we recommend that extra guiding is used to protect the unit against sideload.

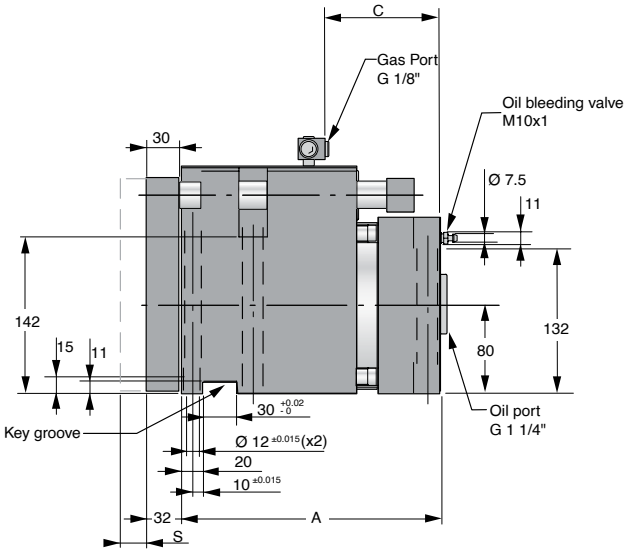


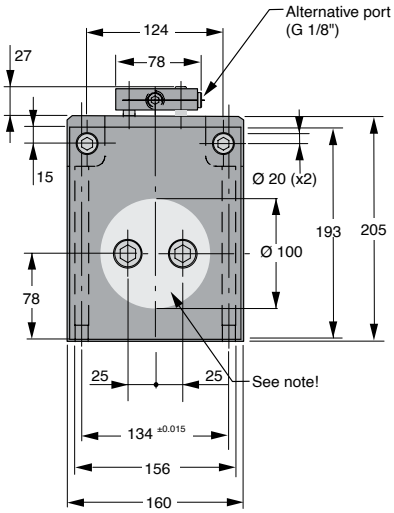
Order No.	Working force* (kN)	Return force (kN)	Stroke S (mm)	A	B	Weight (kg)
HCCU-150x24	150	15	24	236	159	57.7
HCCU-150x49	150	15	49	261	184	60.0
HCCU-150x99	150	15	99	311	234	65.6

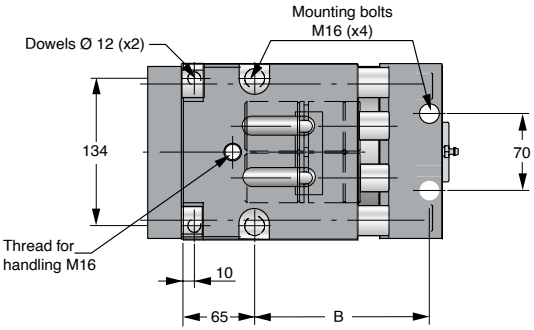
* = Nominal force for the operation

HCCH-150 Cam Unit for pressure control

This version can only be used together with a hosed system, as there are no gas charging valve in the springs or adapters. There are two G 1/8" gas ports which can be used to connect to a Hose System. Use only one of these to connect the Hose System, the other should remain plugged.







Note: Important installation information:

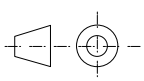
We recommend locating the punch in the center of the piston rod, but it is also possible to locate the force which the punch will create in the operations within the area marked .

When piercing an opened hole or cutting an edge, we recommend that extra guiding is used to protect the unit against sideload.

Order No.	Working force* (kN)	Return force (kN)	Stroke S (mm)	A	B	C	Weight (kg)
HCCH-150x24	150	15	24	236	159	109	57.9
HCCH-150x49	150	15	49	261	184	159	60.2
HCCH-150x99	150	15	99	311	234	234	65.8

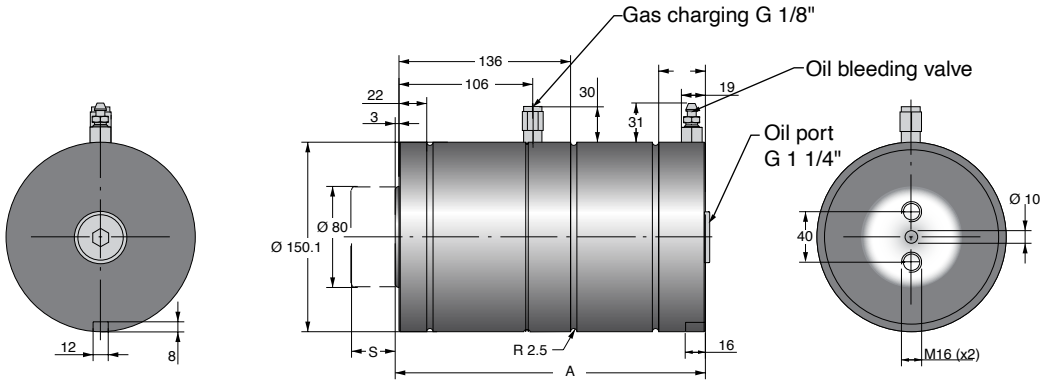
* = Nominal force for the operation

View



HCF-150 Force Cylinder

2 million

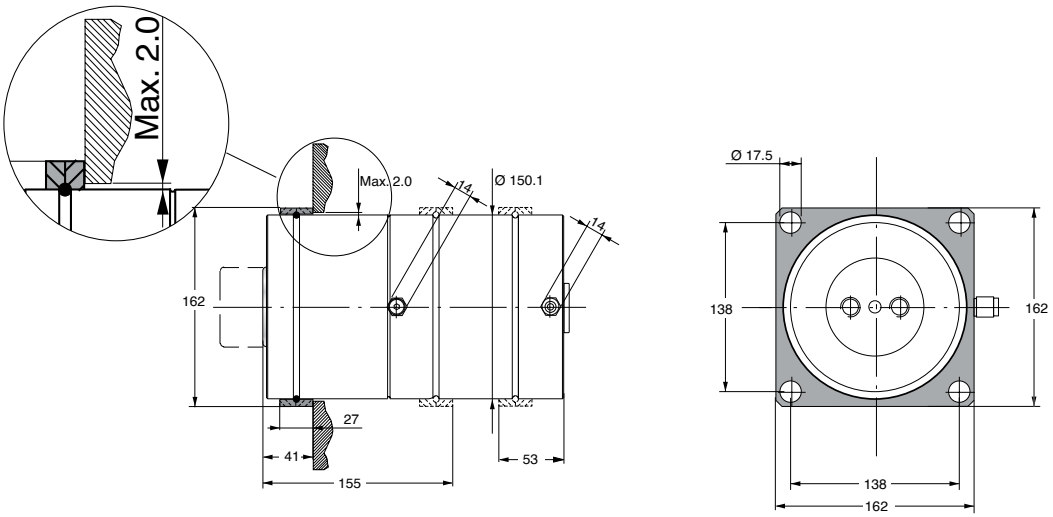


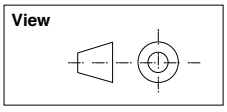
Note: External stop is recommended for the tool (5-10 mm above cylinder) to avoid high load on the cylinder during the return stroke. See picture on page 368.

Order No.	Working force* (kN)	Return force (kN)	Stroke S (mm)	A	Weight (kg)
HCF-150x25	150	30	25	250	30.1
HCF-150x50	150	30	50	300	34.7
HCF-150x100	150	30	100	400	43.7
HCF-150x150	150	30	150	500	52.7

* = Nominal force for the operation

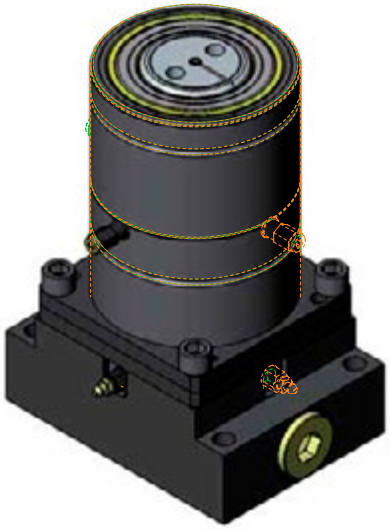
Flange mount for HCF-150 Order No. 2014677-7500



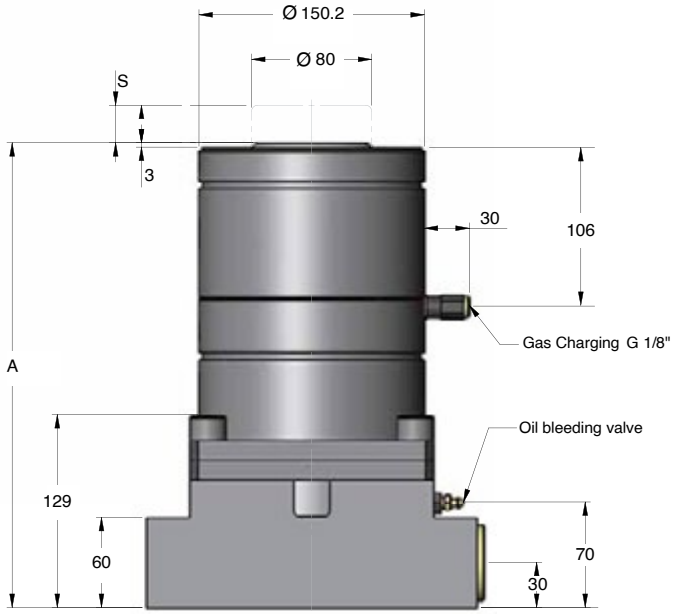


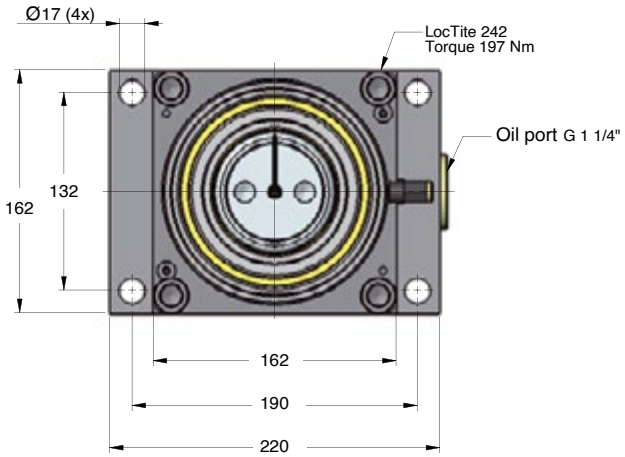
HCF-SP-150 Force Cylinder with Side Port Plate

2 million



Note: External stop is recommended for the tool (5-10 mm above cylinder) to avoid high load on the cylinder during the return stroke. See picture on page 368.



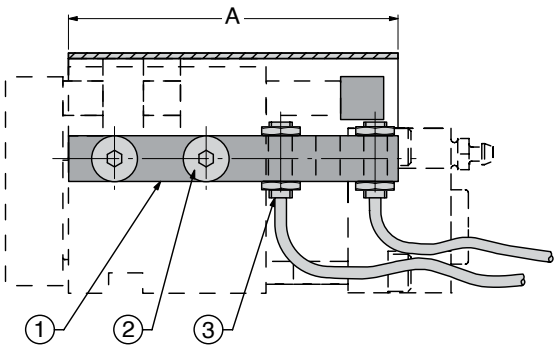


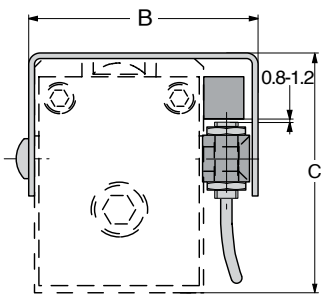
Order No.	Working force* (kN)	Return force (kN)	Stroke S (mm)	A	Weight (kg)
HCF-SP-150x25	150	14	25	310	48.6
HCF-SP-150x50	150	14	50	360	53.2
HCF-SP-150x100	150	14	100	460	62.2

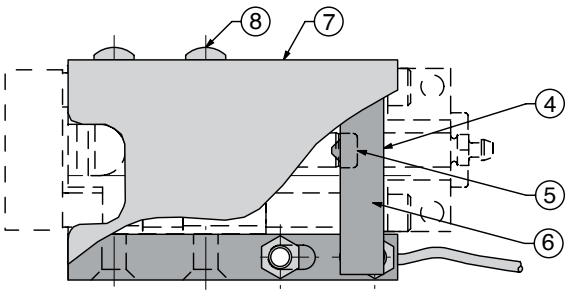
* = Nominal force for the operation

Dimensions for Accessories

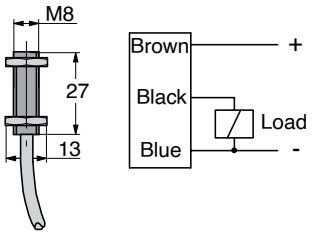
Sensor kit, option for Compact Cam, HCCU and HCCH







2 pcs sensors
Order No. 503550 (sold separately)



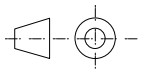
Sensor type: .....Shielded magnetic
Output configuration: .....NO (PNP)
Supply voltage: .....10-40 V DC
Max control output: .....200 mA
Ambient temperature: .....-40 - +70°C
Enclosure rating: ..... IEC IP67
Cable length: .....2000 mm
Setting distance: .....0.8 - 1.2 mm

Note: The 2 pcs sensors (Order No. 503550) are sold separately and are not included in the sensor kits themselves.

Sensor Kit Components

Position	Quantity	Description
1	1	Fixture
2	2	Screws
3	2	Sensors (not incl.)
4	1	Triggering block
5	1 or 2	Center location pin (except -60, -90, -150)
6	2	Screws
7	1	Cover plate
8	2	Screws

View

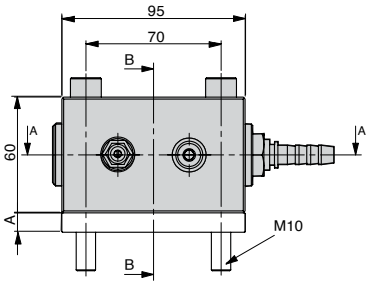


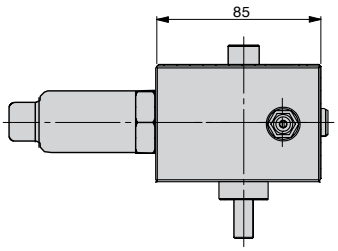
Sensor kit Order No.	Compact Cam	A	B	C
3018208-01	HCCU-15x24	115	81	84
3018208-02	HCCU-15x49	165	81	84
3018208-03	HCCU-40x24	168	117	107
3018208-04	HCCU-40x49	193	117	107
3018208-05	HCCU-40x99	271	117	107
3018208-15	HCCU-40x124	321	117	107
3018208-09	HCCU-60x24	171	142	135
3018208-10	HCCU-60x49	196	142	135
3018208-11	HCCU-60x99	271	142	135
3018208-06	HCCU-90x24	216	170	172
3018208-07	HCCU-90x49	241	170	172
3018208-08	HCCU-90x99	316	170	172
3018208-12	HCCU-150x24	216	182	207
3018208-13	HCCU-150x49	241	182	207
3018208-14	HCCU-150x99	316	182	207

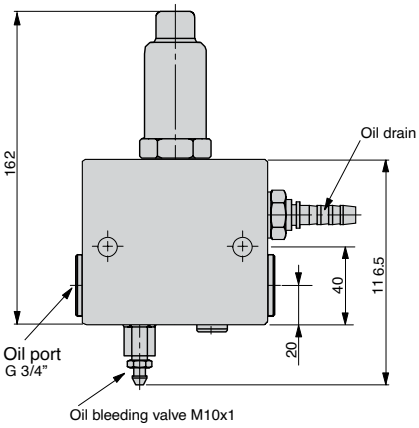
Security Block-Meets CNOMO Standard

(Renault and Peugeot/Citroen)

2 million

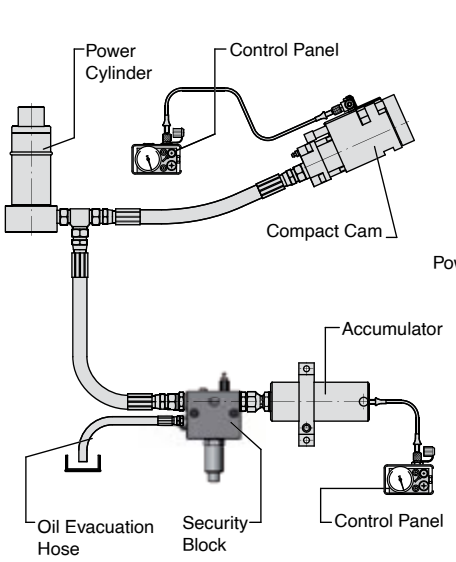


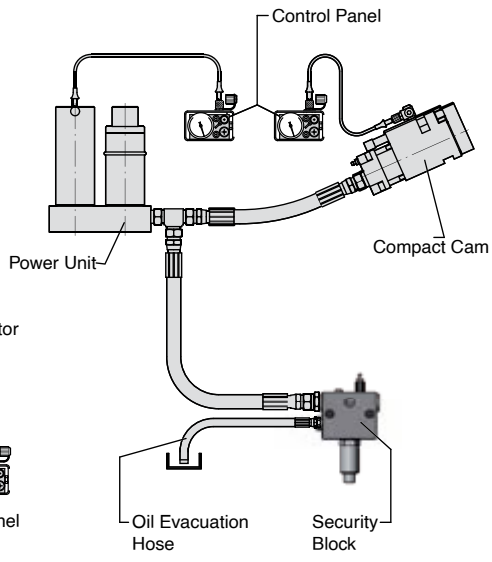




Order No.	Size	A*
3020008-15	015	10
3020008-40	040	22.5
3020008-60	060	32.5
3020008-90	090	44
3020008-150	150	70

*To be used when directly connected to the accumulator, see below.





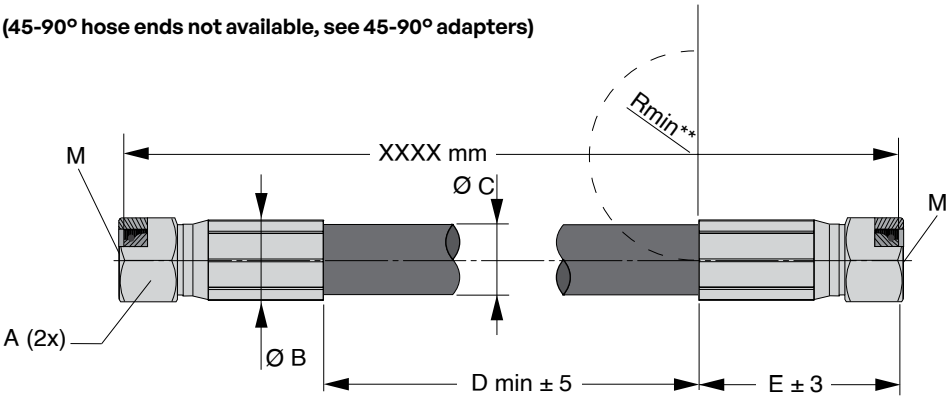
System hoses

EO24-Hose Dimensions

ISO standard: DIN EN ISO 8434

Hose, straight – straight

(45-90° hose ends not available, see 45-90° adapters)



For Power Unit	Hose size	Thread M	Order No.	A	Ø B	Ø C	D min	E	R min*
HCPU-15	3/8" **	M 20x1.5	3022215-xxxx	24	24.5	20	50	56	63
HCPU-15	1/2"	M 24x1.5	3021454-xxxx	30	28.5	24	50	63	90
HCPU-40	3/4"	M30x2	3021455-xxxx	36	35	31	50	72	120
HCPU-60 and 90	1"	M36x2	3021456-xxxx	46	44	38	50	88	150
HCPU-150	1 1/4"	M42x2	3021457-xxxx	50	52	47	50	94	210

* = Smallest recommended bending radius for the hydraulic hose
** = Hose size depends on press velocity, see below:

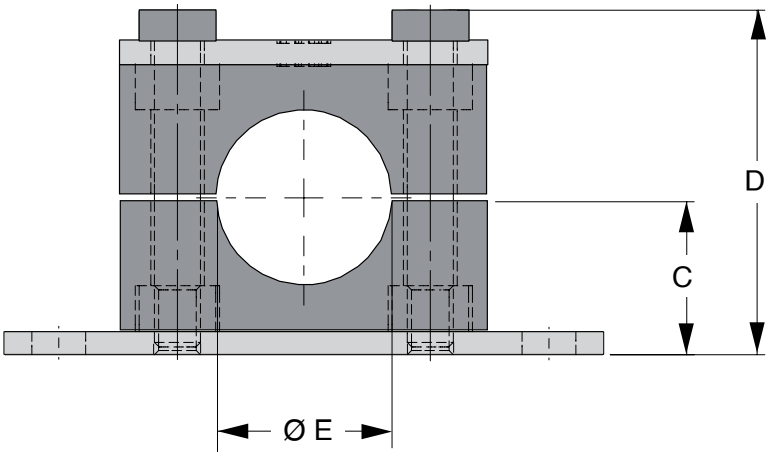
Power Unit	Standard hose size Max velocity 0.8 m/s	0.6 m/s	0.4 m/s	0.2 m/s
HCPU-15	1/2"	3/8"	3/8"	3/8"
HCPU-40	3/4"	3/4"	1/2"	1/2"
HCPU-60	1"	3/4"	3/4"	1/2"
HCPU-90	1"	1"	3/4"	1/2"
HCPU-150	1 1/4"	1 1/4"	1"	3/4"

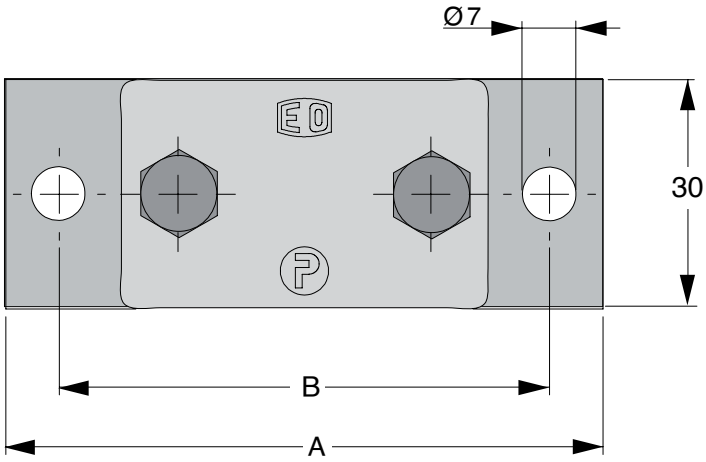
Additional Parker hose info:

Hose size	Inner Ø	Outer Ø	Hose	Max working pressure	Min burst pressure	Hose fitting
3/8"	10	20	722ST-6	280 bar	1120 bar	1C943-12-6
1/2"	12.5	24	722ST-8	280 bar	1120 bar	1C943-16-8
3/4"	19	31	722ST-12	280 bar	1120 bar	1C943-20-12
1"	25	38	722ST-16	280 bar	1120 bar	1C943-25-16
1 1/4""	31.8	47	487ST-20	210 bar	840 bar	1C977-30-20

Note: When ordering hoses direct from Parker make sure to include inside washing and end plugs.
This procedure is included when ordering hoses from KALLER.

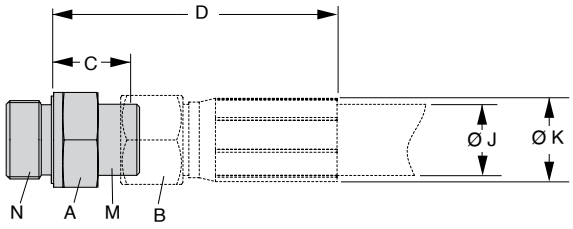
Hose Clamp





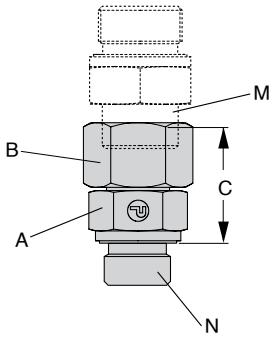
Hose size	Order No.	A	B	C	D	Ø E
3/8”	504613	78	64	20	44	20
1/2”	504614	78	64	20	44	24
3/4””	504615	87	73	24	51	31
1”	504616	100	86	32	67	38
1 1/4””	504617	116	100	36	75	47

Male Stud Connector



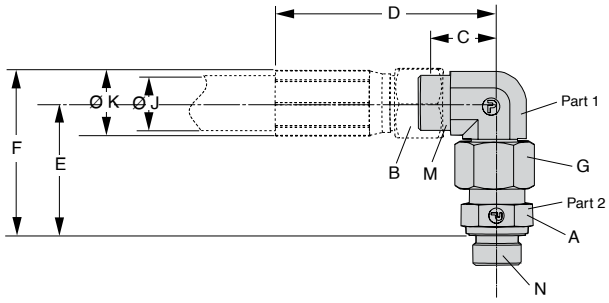
Hose size	Thread M	Thread N	Order No.	A	B	C	D	ØJ	ØK
3/8”	M 20x1.5	G 1/2”	504598	27	24	18	74	20	24.5
1/2”	M 24x1.5	G 1/2”	504321	27	30	19	82	24	30
1/2”	M24x1.5	G 3/4”	504322	32	30	21	84	24	30
3/4”	M30x2	G 1/2”	504323	32	36	21	93	31	37
3/4”	M30x2	G 3/4”	504324	32	36	21	93	31	37
3/4”	M30x2	G 1 1/4”	504325	50	36	23	95	31	37
1”	M36x2	G 1/2”	504326	41	46	23	111	38	46
1”	M36x2	G 3/4”	504327	41	46	23	111	38	46
1”	M36x2	G 1 1/4”	504328	50	46	23	111	38	46
1 1/4”	M42X2	G 3/4”	504329	41	50	24	138	46	57
1 1/4”	M42X2	G 1”	504330	46	50	24	138	46	57
1 1/4”	M42X2	G 1 1/4”	504331	50	50	27	141	46	57

Swivel Connector



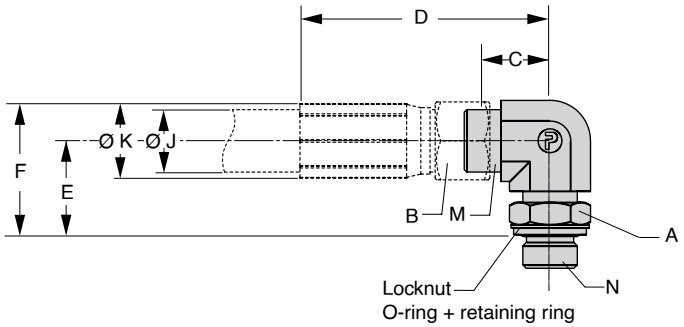
Thread M	Thread N	Order No.	A	B	C
M 20x1.5	G 1/2”	504608	27	24	35
M 24x1.5	G 1/2”	504609	27	30	37
M 30x2	G 3/4”	504610	32	36	43
M 36x2	G 1”	504611	41	46	48
M 42x2	G 1 1/4”	504612	50	50	51

Swivel Nut Elbow and Male Stud Connector



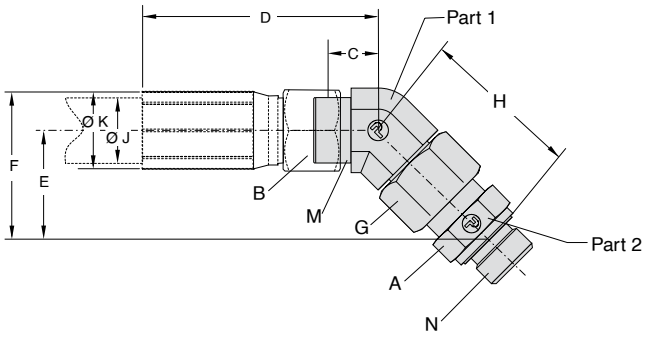
Hose size	Thread M	Thread N	Order No. Part 1	Order No. Part 2	A	B	C	D	E	F	G	ØJ	ØK
3/8"	M20x1.5	G 1/2"	504599	504598	27	24	22	78	49	61	24	20	24.5
1/2"	M24x1.5	G 1/2"	504332	504321	27	30	25	88	55	70	30	24	30
1/2"	M24x1.5	G 3/4"	504332	504322	32	30	25	88	58	73	30	24	30
3/4"	M30x2	G 1/2"	504333	504323	32	36	27	99	65	84	36	31	37
3/4"	M30x2	G 3/4"	504333	504324	32	36	27	99	65	84	36	31	37
3/4"	M30x2	G 1 1/4"	504333	504325	50	36	27	99	67	86	36	31	37
1"	M36x2	G 1/2"	504334	504326	41	46	30	118	73	96	46	38	46
1"	M36x2	G 3/4"	504334	504327	41	46	30	118	73	96	46	38	46
1"	M36x2	G 1 1/4"	504334	504328	50	46	30	118	73	96	46	38	46
1 1/4"	M42X2	G 3/4"	504335	504329	41	50	36	150	79	108	50	46	57
1 1/4"	M42X2	G 1 1/4"	504335	504331	50	50	36	150	79	108	50	46	57

Adjustable Locknut Elbow



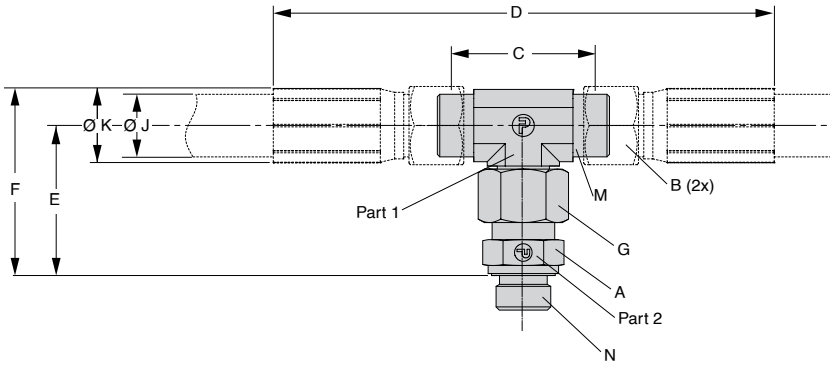
Hose size	Thread M	Thread N	Order No.	A	B	C	D	E	F	ØJ	ØK
3/8"	M20x1.5	G 1/2"	504600	27	24	22	78	36	48	20	24.5
1/2"	M24x1.5	G 1/2"	504336	27	30	25	88	36	51	24	30
3/4"	M30x2	G 3/4"	504337	36	36	28	100	39	58	31	37
1"	M36x2	G 3/4"	504338	41	46	30	118	44	67	38	46
1 1/4"	M42x2	G 1 1/4"	--	--	--	--	--	--	--	--	--

Swivel Nut 45° Elbow and Male Stud Connector



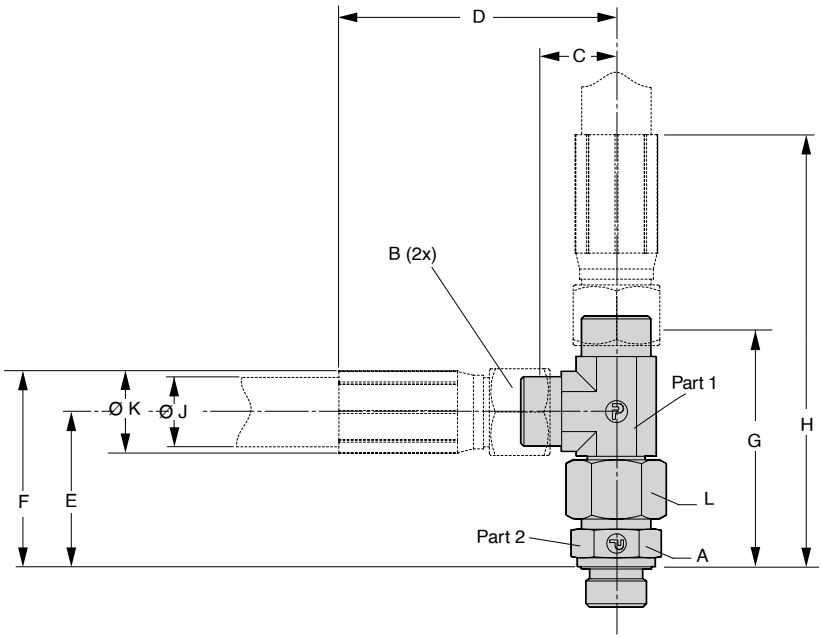
Hose size	Thread M	Thread N	Order No. Part 1	Order No. Part 2	A	B	C	D	E	F	G	H	ØJ	ØK
3/8"	M20x1.5	G 1/2"	504601	504598	27	24	17	73	35	47	24	49	20	24.5
1/2"	M24x1.5	G 1/2"	504339	504321	27	30	16	79	39	54	30	55	24	30
1/2"	M24x1.5	G 3/4"	504339	504322	32	30	16	79	40	55	30	57	24	30
3/4"	M30x2	G 1/2"	504340	504323	32	36	16	88	46	65	36	65	31	37
3/4"	M30x2	G 3/4"	504340	504324	32	36	16	88	46	65	36	65	31	37
3/4"	M30x2	G 1 1/4"	504340	504325	50	36	16	88	47	66	36	67	31	37
1"	M36x2	G 1/2"	504341	504326	41	46	19	107	52	75	46	73	38	46
1"	M36x2	G 3/4"	504341	504327	41	46	19	107	52	75	46	73	38	46
1"	M36x2	G 1 1/4"	504341	504328	50	46	19	107	52	75	46	73	38	46
1 1/4"	M42X2	G 3/4"	504342	504329	41	50	24	138	56	85	50	79	46	57
1 1/4"	M42X2	G 1 1/4"	504342	504331	50	50	24	138	56	85	50	79	46	57

Swivel Nut Branch Tee and Male Stud Connector



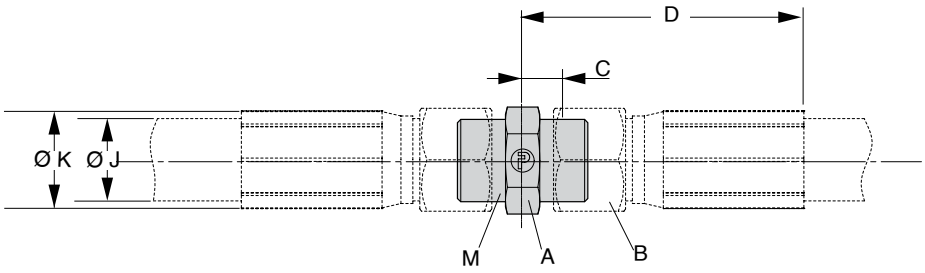
Hose size	Thread M	Thread N	Order No. Part 1	Order No. Part 2	A	B	C	D	E	F	G	ØJ	ØK
3/8"	M20x1.5	G 1/2"	504602	504598	27	24	43	155	49	61	24	20	24.5
1/2"	M24x1.5	G 1/2"	504343	504321	27	30	49	175	55	70	30	24	30
1/2"	M24x1.5	G 3/4"	504343	504322	32	30	49	175	58	73	30	24	30
3/4"	M30x2	G 1/2"	504344	504323	32	36	53	197	65	84	36	31	37
3/4"	M30x2	G 3/4"	504344	504324	32	36	53	197	65	84	36	31	37
3/4"	M30x2	G 1 1/4"	504344	504325	50	36	53	197	67	86	36	31	37
1"	M36x2	G 1/2"	504345	504326	41	46	60	236	73	96	46	38	46
1"	M36x2	G 3/4"	504345	504327	41	46	60	236	73	96	46	38	46
1"	M36x2	G 1 1/4"	504345	504328	50	46	60	236	73	96	46	38	46
1 1/4"	M42X2	G 3/4"	504346	504329	41	50	71	299	79	108	50	46	57
1 1/4"	M42X2	G 1 1/4"	504346	504331	50	50	71	299	79	108	50	46	57

Swivel Nut Run Tee and Male Stud Connector



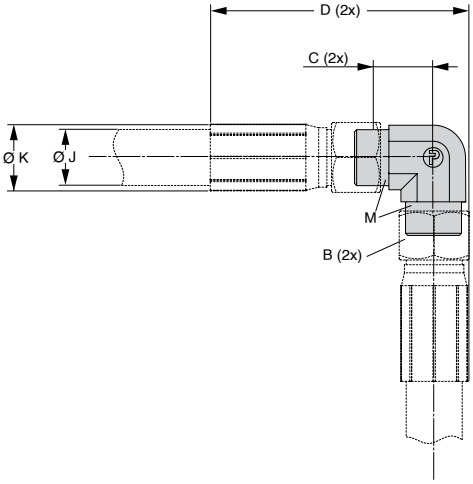
Hose size	Thread M	Thread N	Order No. Part 1	Order No. Part 2	A	B	C	D	E	F	G	H	ØJ	ØK
3/8”	M20x1.5	G 1/2”	504603	504598	27	24	22	78	49	61	71	127		
1/2”	M24x1.5	G 1/2”	504347	504321	27	30	25	88	55	70	80	143	24	30
1/2”	M24x1.5	G 3/4”	504347	504322	32	30	25	88	58	73	82	145	24	30
3/4”	M30x2	G 1/2”	504348	504323	32	36	27	99	65	84	92	164	31	37
3/4”	M30x2	G 3/4”	504348	504324	32	36	27	99	65	84	92	164	31	37
3/4”	M30x2	G 1 1/4”	504348	504325	50	36	27	99	67	86	94	166	31	37
1”	M36x2	G 1/2”	504349	504326	41	46	30	118	73	96	103	191	38	46
1”	M36x2	G 3/4”	504349	504327	41	46	30	118	73	96	103	191	38	46
1”	M36x2	G 1 1/4”	504349	504328	50	46	30	118	73	96	103	191	38	46
1 1/4”	M42X2	G 3/4”	504350	504329	41	50	36	150	79	108	114	228	46	57
1 1/4”	M42X2	G 1 1/4”	504350	504331	50	50	36	150	79	108	114	228	46	57

Union Straight



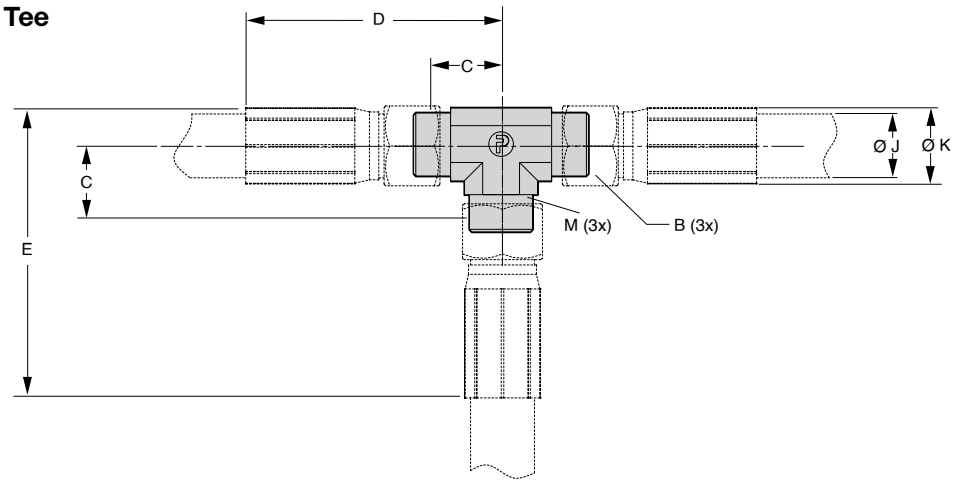
Hose size	Thread M	Order No.	A	B	C	D	ØJ	ØK
3/8”	M20x1.5	504598	22	24	10	66	20	24.5
1/2”	M24x1.5	504321	27	30	11	74	24	30
3/4”	M30x2	504322	32	36	12	84	31	37
1”	M36x2	504323	41	46	13	101	38	46
G 1 1/4”	M42x2	504324	46	50	14	128	46	57

Union Elbow



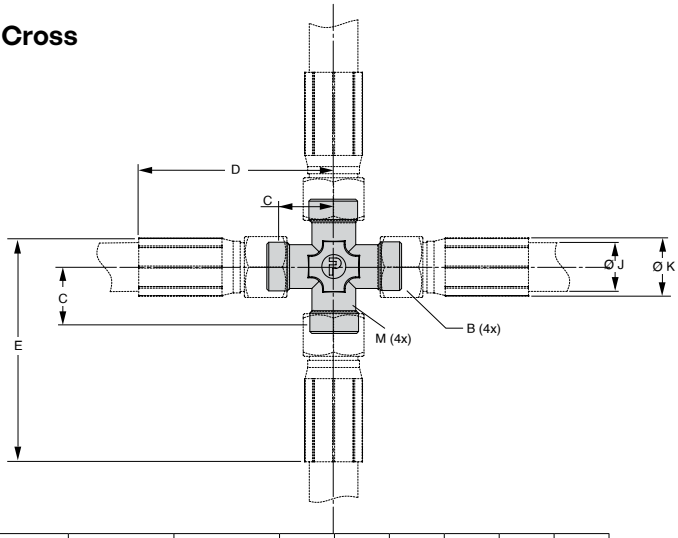
Hose size	Thread M	Order No.	B	C	D	ØJ	ØK
3/8”	M20x1.5	504598	24	22	90	20	24.5
1/2”	M24x1.5	504321	30	25	102	24	30
3/4”	M30x2	504322	36	27	117	31	37
1”	M36x2	504323	46	30	140	38	46
G 1 1/4”	M42x2	504324	50	36	178	46	57

Union Tee



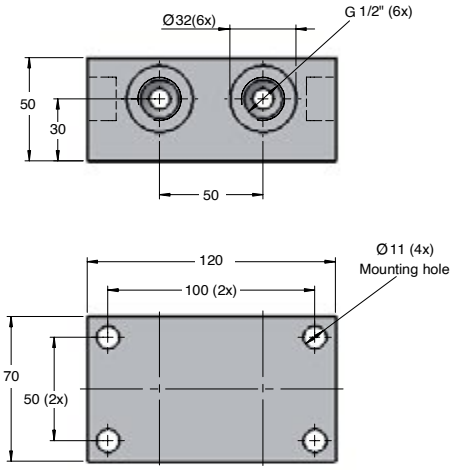
Hose size	Thread M	Order No.	B	C	D	E	ØJ	ØK
3/8”	M20x1.5	504606	24	22	78	91	20	24.5
1/2”	M24x1.5	504359	30	25	88	103	24	30
3/4”	M30x2	504360	36	27	99	117	31	37
1”	M36x2	504361	46	30	118	140	38	46
G 1 1/4”	M42x2	504362	50	36	150	178	46	57

Union Cross

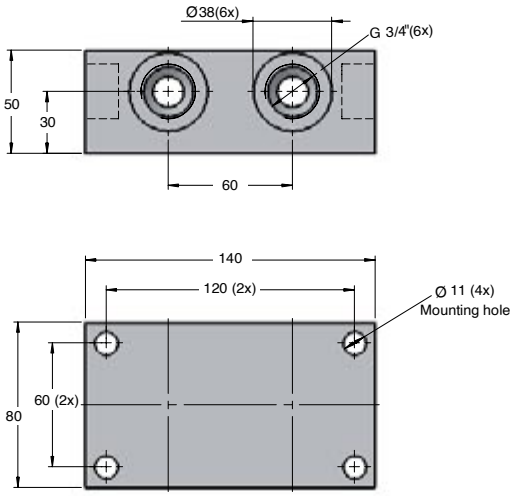


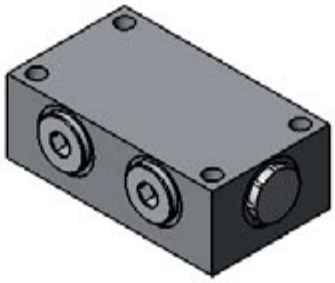
Hose size	Thread M	Order No.	B	C	D	E	ØJ	ØK
3/8”	M20x1.5	504607	24	22	78	91	20	24.5
1/2”	M24x1.5	504363	30	25	88	103	24	30
3/4”	M30x2	504364	36	27	99	117	31	37
1”	M36x2	504365	46	30	118	140	38	46
G 1 1/4”	M42x2	504366	50	36	150	178	46	57

Distribution Block 3022834



Distribution Block 3022835

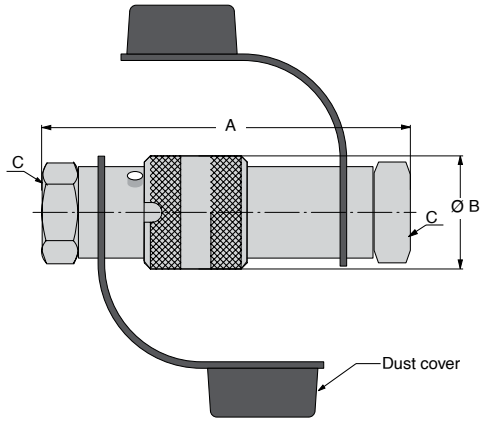




System Adapters

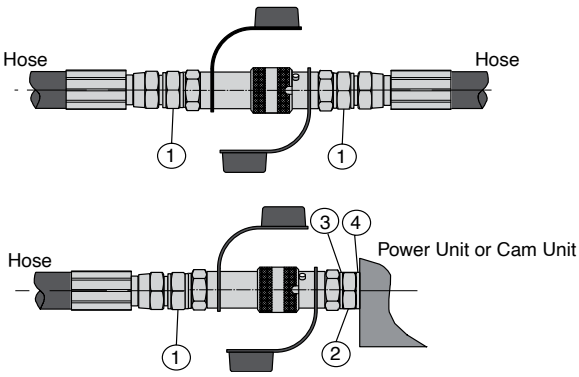
Quick Disconnect

The quick disconnect can be used to separate the power unit and the cam unit/force cylinder without refilling and bleeding the system.



Ordering No.	A	ØB	C	Max oil flow	Power Unit / Cam	Max velocity Power Unit / Cam
3018084-01	132	40	G 1/2"	100 l/min	15	0.8
3018084-02	162	50	G 3/4"	300 l/min	40, 60, 90	0.8 (90=0.6)
3018084-03	176	57	G 1	500 l/min	150	0.6

Installation possibilites



Ordering number adapter and washers				
Quick coupling	**Position 1**	**Position 2**	**Position 3**	**Position 4**
3018084-01	504321	503551	501271	501271
3018084-02	504324 or 504327*	503552	501270	501270
3018084-03	504330	503553	500282	503554

* for 1" hose size

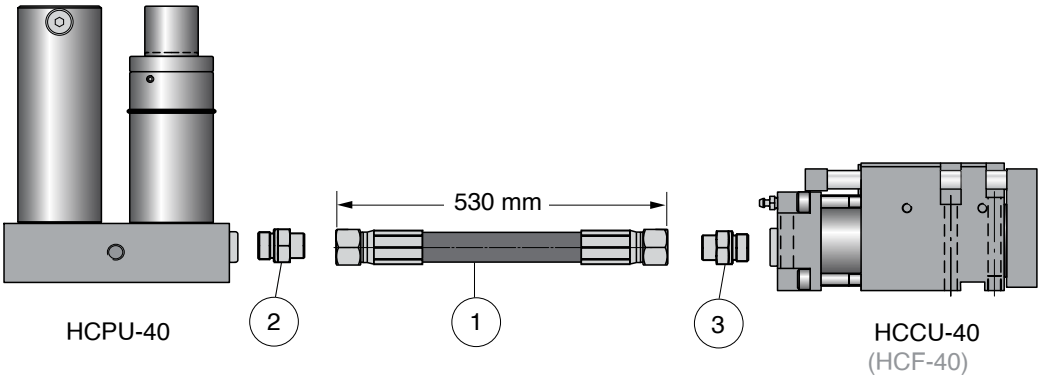
Designing your Hosed System

How to Design Your Hosed System

1. Choose the right hose size and style from page 385 (the hose size is always dictated by the Power Unit size).

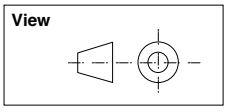
2. Choose the right size/style adapter between hose and power unit using page 423-426. The oil connection is found on the respective power unit dimension page.

3. Choose the right size/style adapter between hose and cam unit/force cylinder (HCCU or HCF) using page 423-426. The oil connection is found on the respective cam unit/force cylinder dimension page. You can also connect one hose to an other using adapters (see page 427-428)



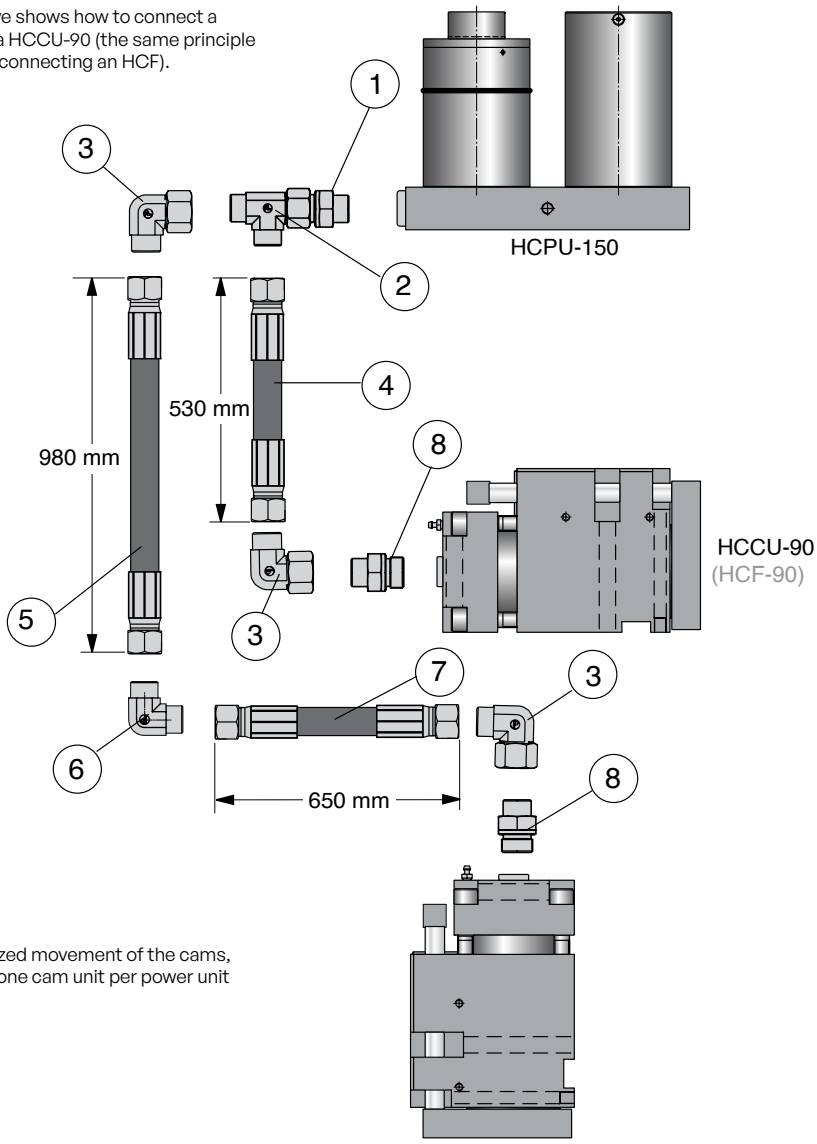
Example above shows how to connect a HCPU-40 to a HCCU-40 (the same principle applies when connecting an HCF).

Position	Order No.
1	3021455-0530
2	504324
3	504324



Designing your Hosed System

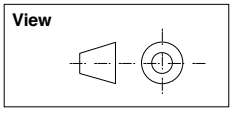
Example above shows how to connect a HCPU-150 to a HCCU-90 (the same principle applies when connecting an HCF).



Remember:

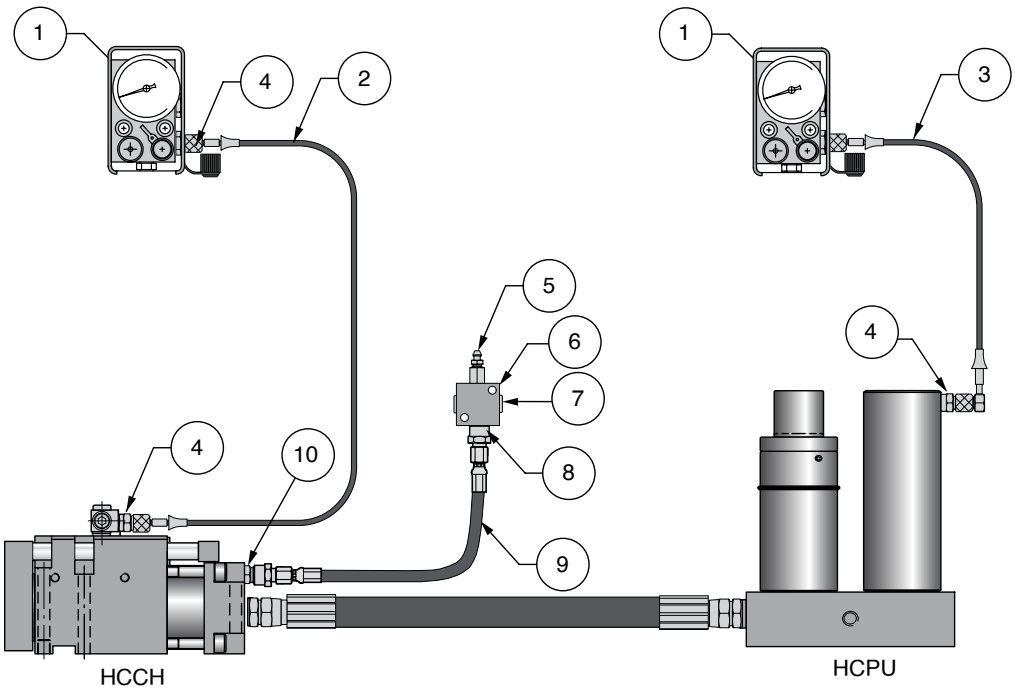
For synchronized movement of the cams, connect only one cam unit per power unit

Detail	Quantity	Order No.
1	1	504331
2	1	504350
3	3	504335
4	1	3021457-0530
5	1	3021457-0980
6	1	504358
7	1	3021457-0652
8	2	504329



Hosed Systems for Control Panels and Oil Bleeding

HCCH compact cam/HCPU power unit (example)

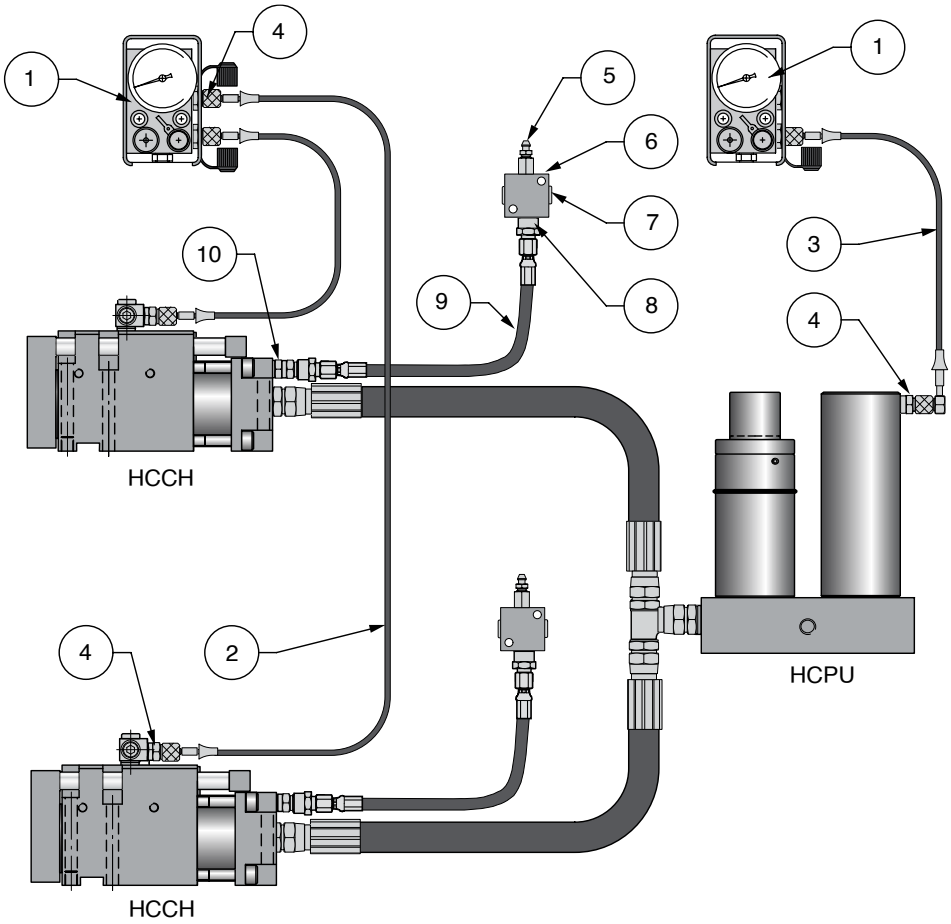


Hosed system for control Panels			
Detail	**Quantity**	**Description**	**Order No.**
1	2	Control panel	CP-N2 LG
2	1	EZ-hose	4014974-xxxx
3	1	EZ-hose	4017568-xxxx
4	4	Adapter	4114973-G 1/8”

Hose system for oil bleeding			
Detail	**Quantity**	**Description**	**Order No.**
5	1	Bleed nipple	4014007
6	1	Distribution block	4017032
7	1	Plug G 1/8”	500343
8	1	Adapter	503593
9	1	EO24-hose	3020857-xxxx
10	1	Adapter M10x1	504636

Hosed Systems for Control Panels and Oil Bleeding

Two HCCH compact cams/HCPU power unit (example)

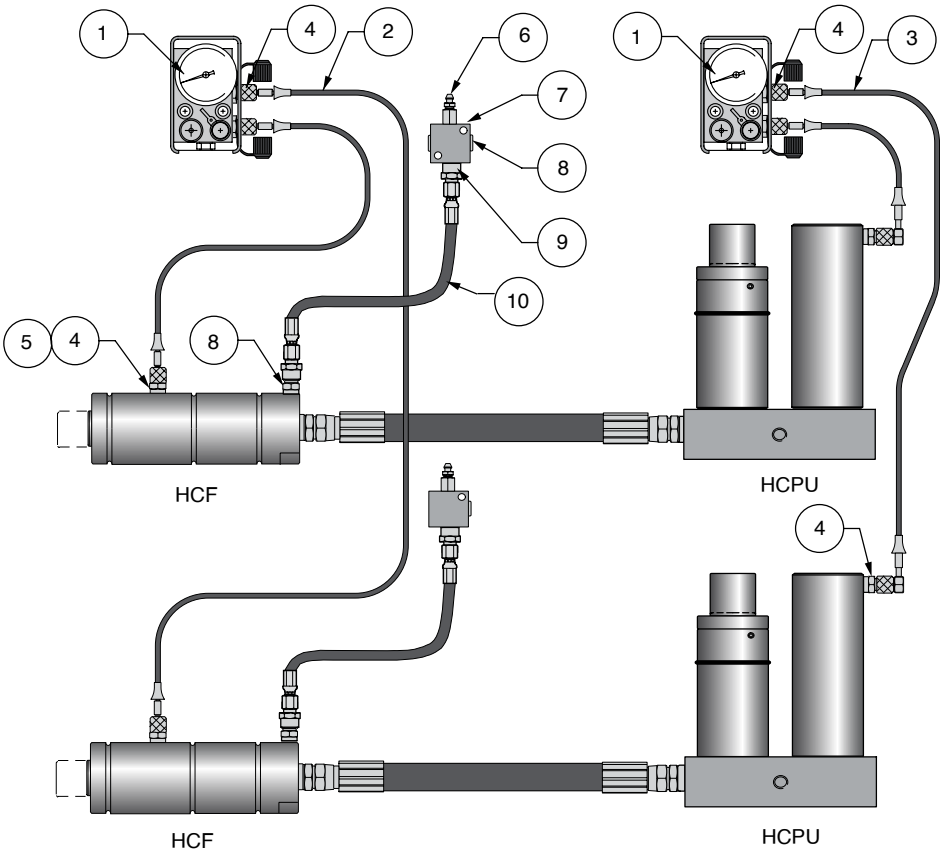


Hosed system for control Panels			
Detail	**Quantity**	**Description**	**Order No.**
1	2	Control panel	CP-N2 LG
2	2	EZ-hose	4014974-xxxx
3	1	EZ-hose	4017568-xxxx
4	6	Adapter	4114973-G 1/8”

Hose system for oil bleeding			
Detail	**Quantity**	**Description**	**Order No.**
5	2	Bleed nipple	4014007
6	2	Distribution block	4017032
7	2	Plug G 1/8”	500343
8	2	Adapter	503593
9	2	EO24-hose	3020857-xxxx
10	2	Adapter M10x1	504636

Hosed Systems for Control Panels and Oil Bleeding

Two HCF force cylinders to two HCPU power units (example)

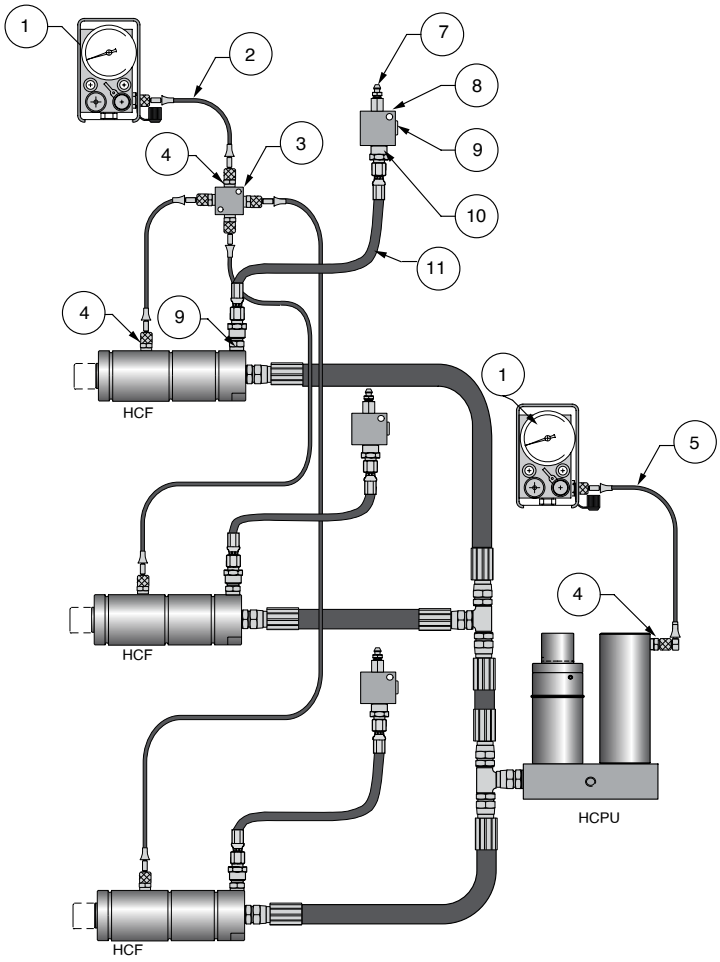


Hosed system for control Panels			
Detail	**Quantity**	**Description**	**Order No.**
1	2	Control panel	CP-N2 LG
2	2	EZ-hose	4014974-xxxx
3	2	EZ-hose	4017568-xxxx
4	8	Adapter	4114973-G 1/8”
5	1*	Washer	500472

Hose system for oil bleeding			
Detail	**Quantity**	**Description**	**Order No.**
6	2	Bleed nipple	4014007
7	2	Distribution block	4017032
8	2	Plug G 1/8”	500343
9	4	Adapter	503593
10	2	EO24-hose	3020857-xxxx

Hosed Systems for Control Panels and Oil Bleeding

Three HCF force cylinders to one HCPU power unit (example)

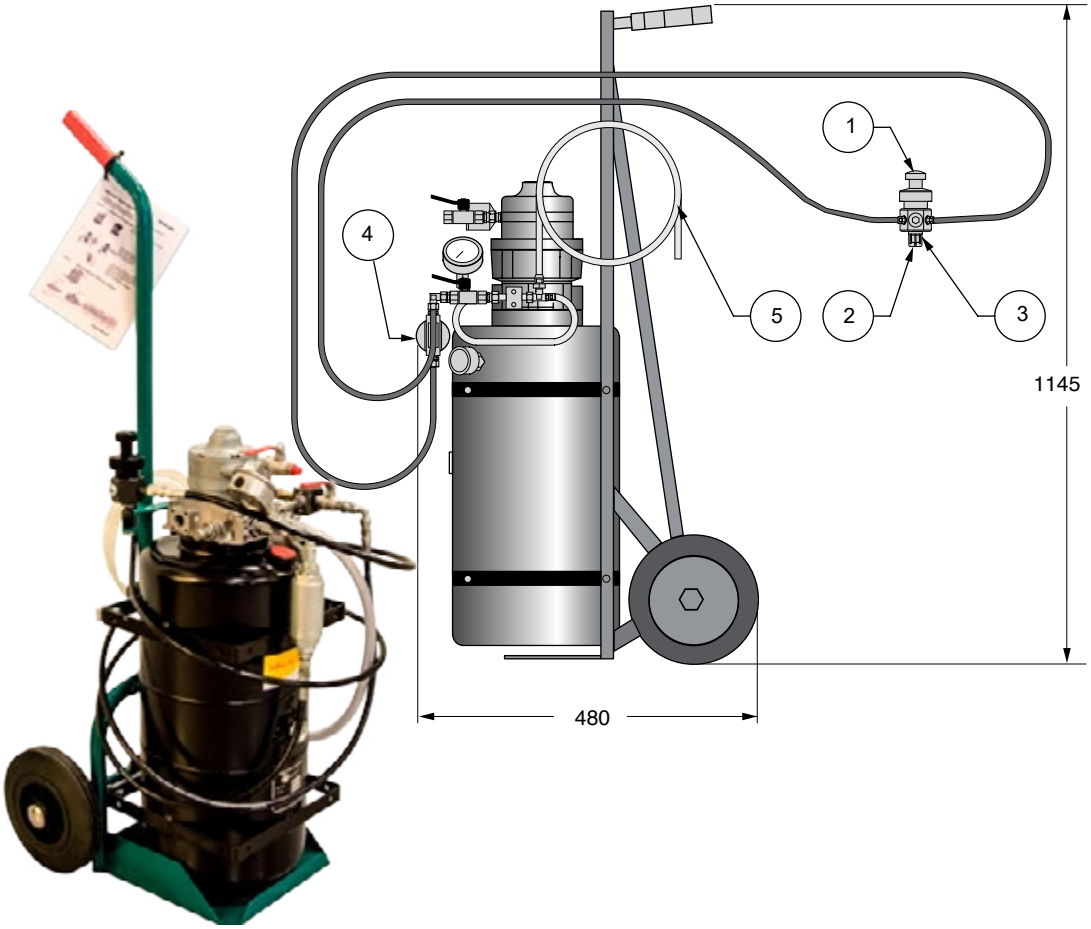


Hosed system for control Panels			
Detail	**Quantity**	**Description**	**Order No.**
1	2	Control panel	CP-N2 LG
2	4	EZ-hose	4014974-xxxx
3	1	Distribution block	4017032
4	10	Adapter	4114973-G 1/8”
5	1	EZ-hose	4017568-xxxx
6	1*	Washer	500472

*only needed for HCF-15

Hose system for oil bleeding			
Detail	**Quantity**	**Description**	**Order No.**
7	3	Bleed nipple	4014007
8	3	Distribution block	4017032
9	3	Plug G 1/8”	500343
10	6	Adapter	503593
11	3	EO24-hose	3020857-xxxx

Pump Unit
Order No. HPU-1200-HP



The hook spanner below is used to hold the piston in place when loosening/tightening the port plug.

Technical specifications

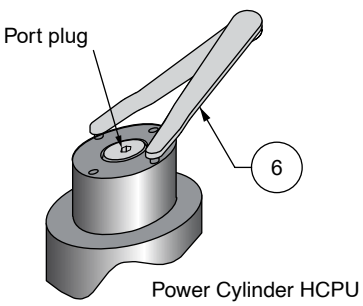
Oil flow:.....2.4 l/min at 1500 rpm

Max oil pressure:.....55 bar

Tank volume:.....18 liters

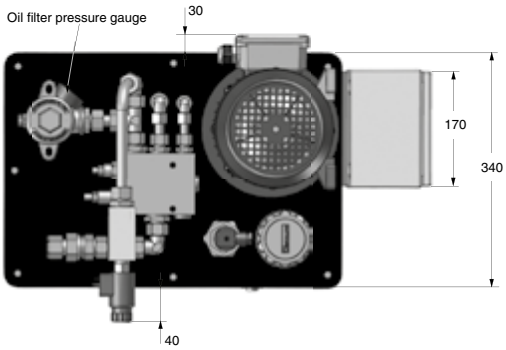
Oil filter:.....10 m

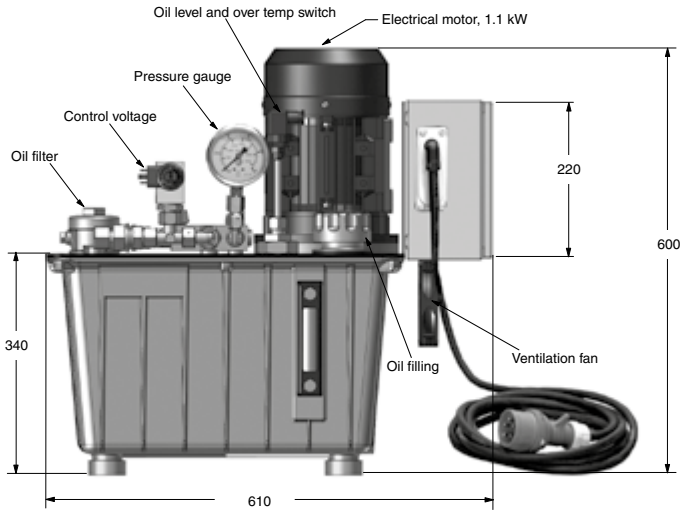
Air pressure.....5-7 bar

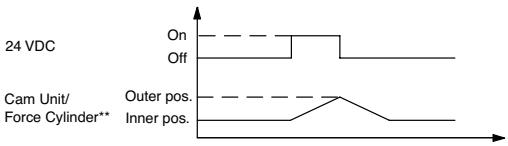


Spare parts		
Position	**Description**	**Order No.**
1	Armature (include position 2 and 3)	3013941
2	Plastic plug	502446
3	Rubber-steel washer	502160
4	Filter	505763
5	Transparent hose	503116
6	Hook spanner (HCPU-15)	503417
6	Hook spanner (HCPU-40-150)	503418

EHC Electrical Pump Unit Order No. 505776







Technical data - hydraulic system	
Oil tank volyme	25 l
Hydraulic oil ISO VG 32	DIN 51524 HVLP (or equivalent)
Min. oil flow at 180 bar	1.6 l/min
Max. oil flow at 25 bar	16 l/min
Oil pressure during cam travel	25 bar
Oil pressure during cam operation	Max. 180 bar

Technical data - electrical system	
Main voltage electrical pump	3x220-440 VAC 50-60Hz
Control voltage solenoid valve	24 VDC/22 Watts
Overtemp switch	70° C
Weight	47 kg

	Cam Unit/Force Cylinder velocity*	
	Forward + return	During operation
Cam Unit/ Force Cylinder size	(Low pressure)	(High pressure)
015	212 mm/s	21 mm/s
040	86 mm/s	9 mm/s
060	53 mm/s	5 mm/s
090	34 mm/s	3 mm/s
150	22 mm/s	2 mm/s

*The table shows approximate values based on a single Cam Unit/ Force Cylinder connected to a single EHC Electrical Pump Unit. When using more Cam Units/Force Cylinders connected to one EHC Unit divide the velocity by the number of Cam Units/ Force Cylinders.

Ex: 212/3 Cam Units/Force Cylinders = 71 mm/s

**Cam Units/Force Cylinders forward: Activated by the control signal (24 VDC)

**Cam Units/Force Cylinders return: Activated by the inbuilt gas return in the Cam Unit/Force Cylinder

Installation and Service

Safety Guidelines

Symbol to Observe

This symbol means that special attention is required.

Personnel

All personnel who operate or maintain this equipment must fully understand how it works. Always wash your hands after working with hydraulic systems.

Workplace

The workplace must be kept absolutely clean during the installation and maintenance of Nitro-Cam.

Equipment

Use only clean and functional tools and proper safety equipment for eyes and skin.

Adapters for hoses

All connections on the units are plugged upon delivery. To reduce the risk of contamination from foreign bodies, remove the plugs only when absolutely necessary.

Nitrogen products

Be very careful when working with nitrogen products. See special instructions for Gas Springs, as mishandling can lead to personal injury. Make sure there is enough room for the accumulator in the tool.

Hoses

The hoses are washed and plugged to protect them from dirt and other contaminants that can damage the system. Make sure that the hoses are protected from sharp edges and external damage. The hoses will move a little, depending on the oil pressure pulsation during operation.

Torque settings for screws

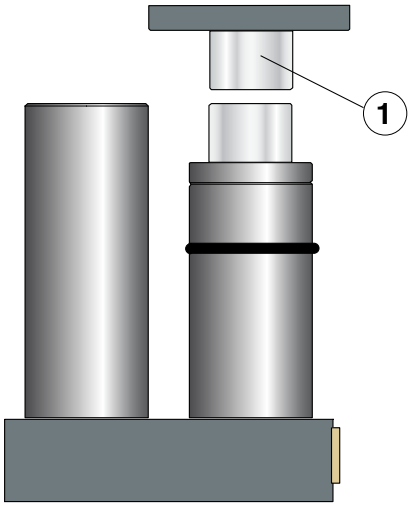
Always use a torque wrench when tightening screws. See Table 1 for 12.9 grade screws.

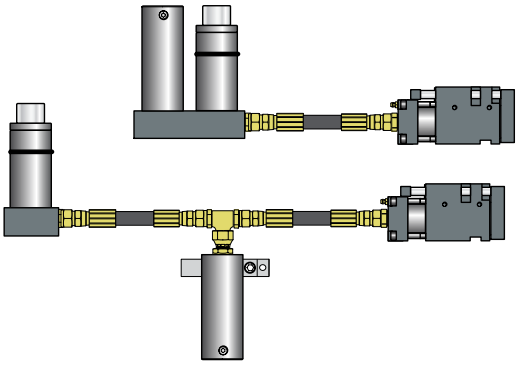
Screw dim	Allen key	Torque (Nm)
M 6	5	15
M 8	6	40
M 10	8	75
M 12	10	135
M 16	14	330
M 20	17	640

Table 1

Installation

The following information describes only the most important recommendations. If there are any questions about the installation, do not hesitate to contact your local distributor.





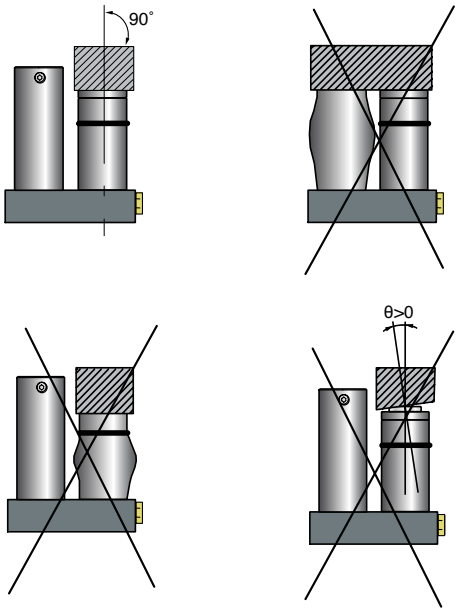
Power Unit

The power unit can be mounted in any position in the tool, including upside-down (valid for all units). A driver (1) is often used and adapted to give the right stroke length of the power cylinder.

Make sure the surface which makes contact with the piston on the top of the power cylinder is parallel and even. Make sure there is enough room for the accumulator in the tool.

Power Unit Mounting Instructions (HCPU, HCPU-S)

Mount the power unit to a flat surface with solid structure using four screws, either upright or upside-down. To ensure the cam unit/force cylinder always travels the same stroke length, it is customary to stroke the power unit an extra 10 mm, which also causes the accumulator´s piston to rise 10 mm.



Compact Cam

Use dowel pins and a key to locate the position of the cam unit in the tool.

The punch plate (1) can be removed for machining by first removing all three screws (2) from the plate.

The reaction force, created as a result of the forming/piercing operation being performed by the cam unit, can be located within any part of the shaded area (3).

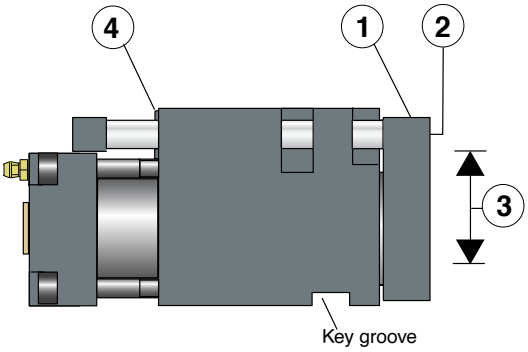
However, it is recommended to position this force directly in the center of the shaded area (3). For more information, see the respective cam unit dimensions page.

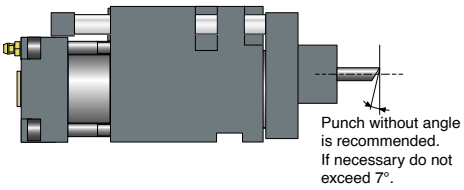
Please note, it is not recommended to put any torque on the punch plate (1).

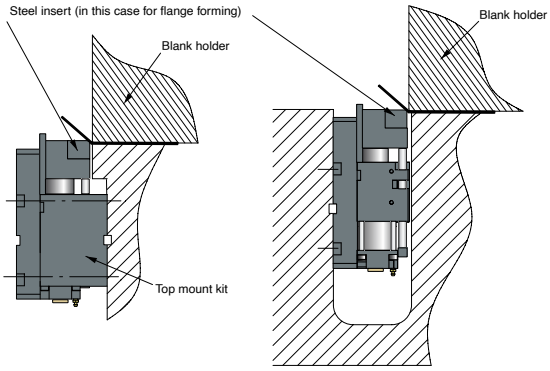
When mounting a punch directly onto the punch plate (1), or via a ball lock punch retainer, the Gas Spring (4) should be in place before any final adjustments are made.

Use the pump unit (see page 437) together with a thin metal plate or thick piece of paper to check the punch is positioned correctly.

For installation examples, please see page 372.







Flange cam installation possibilities

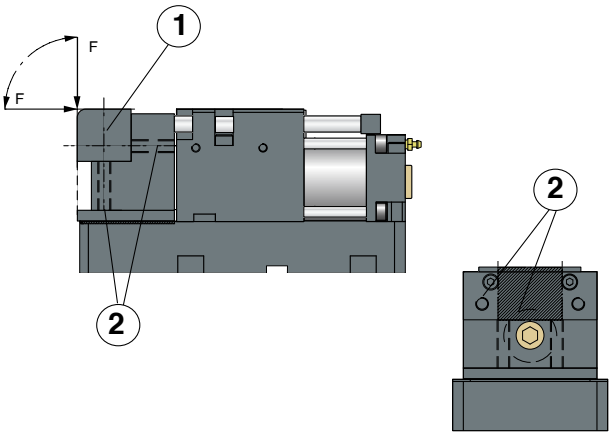
The Flange Cam can be mounted at any position in the die.

For the top mount, a "top mount kit" is needed but not for the base mount.

Flange cam force direction and location

The customized tool (1) (for flanging etc.) should be mounted using two or four bolts (2) within the designated area.

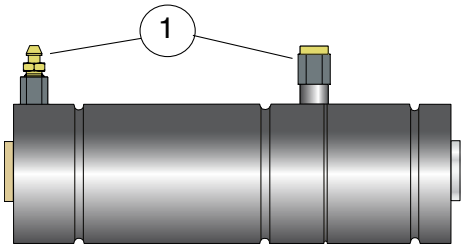
The force created by the flanging is allowed in directions "F" within the area marked ▨.



Force Cylinder

Use only Flanges or fittings intended for the force cylinder. See also page 383 for "Technical data". The threaded holes at the top of the piston rod can be used to mount the fitting for the tool in a pushing and pulling application. Note that it is not possible to load any force in an off center position or as a side load.

Make sure there is enough room to fill and bleed the force cylinder in the die (1). See also page 435-436.



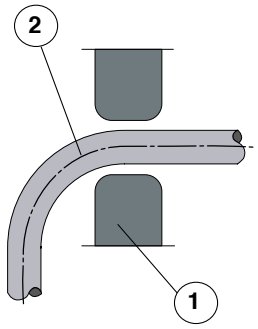
Hydraulic Hose and Adapters

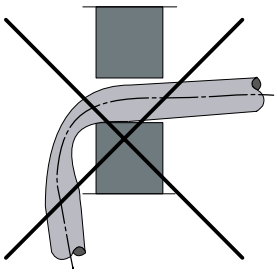
See page 421 to choose the adapters and the hose. Use as few adapters as possible and note that the hose is available with an elbow fitting.

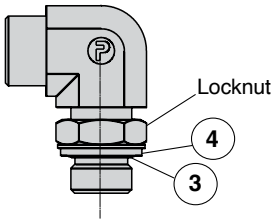
The hoses are washed and plugged to protect them from dust as this could damage the system. Make sure the hoses are protected from sharp edges and external damage. Sharp edges must be rounded (1). Hoses will move a little depending on the oil pressure pulsation during the operations. Do not use a smaller bending radius than specified (2).

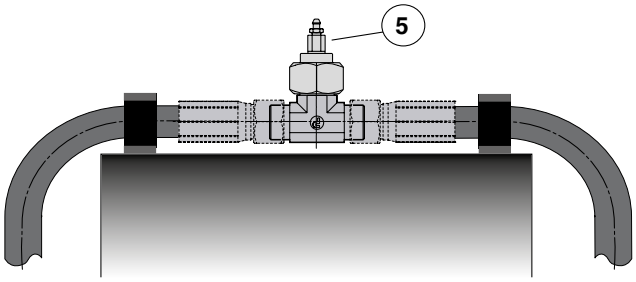
Adapters for the units have an O-ring (3) and a support washer (4) which must always be used. Check also that no movable parts can touch the units or the hoses. See also DIN 20066 for hose installations.

To simplify oil bleeding in case the hose has to be installed as shown in the picture, depending on the tool design it is possible to install an extra bleeding point. This solution may avoid the need to turn the tool around while bleeding (5).









Proper Use and Maintenance

Gas Charging for Force Cylinder and Accumulator

Equipment needed:
Nitrogen bottle with at least 180 bar
Nitrogen charging assembly NCA-2600
Pressure indicator 3012300-01
G 1/8 adapter 3014016
Hex wrench 5 mm

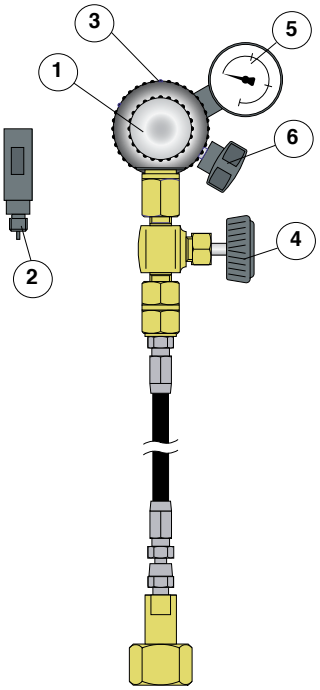
NCA-2600

Step 1 Connect the nitrogen bottle

Connect the charging assembly to the nitrogen bottle which should have at least 180 bar pressure.

Step 2 Gas charging of the force cylinder (not valid for the compact cam)

Turn the small knob (1) counterclockwise until the release pin is inside the thread. Connect the adapter (2) to the charging assembly. Remove the plug on the force cylinder and connect the adapter by turning the knob (3) clockwise. Open the gas valve carefully counterclockwise using knob (4). Charge gas until the pressure gauge (5) shows 20 bar (max 40 bar). To empty, open knob (6) and the gas valve of the force cylinder by carefully turning knob (1) clockwise. Remove the charging assembly and fit the plug.



Press. Indicator

Step 3 Charging of gas in the compact cam HCCH

If the compact cam is connected to a Hose System, the filling pressure is:

HCCU-15 180 bar

HCCU-40 180 bar

HCCU-60 180 bar

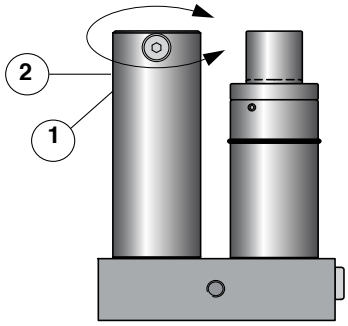
HCCU-90 150 bar

HCCU-150 150 bar

If there is no Hose System, gas charging is not required.

Step 4 Charging the accumulator with gas

Charge the accumulator with 25 bar as per the procedure above. The accumulator must be charged with 150 bar or to a pressure suitable for the operation after the oil filling procedure. See page 383.

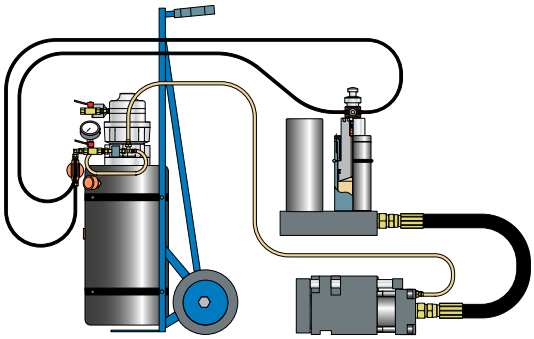


The gas port location can be changed (1) by first emptying the gas pressure, then twisting the accumulator tube to position (2).
When not using the charging assembly, empty the gas by closing the nitrogen bottle valve and opening the gas valve by turning counterclockwise.
(See previous page)

Oil filling and bleeding

Equipment	Size	Order no.
Pump unit		HPU-1200-HP
Hook spanner (-15)	3 mm	503417
Hook spanner(-40-150)	5 mm	503418
Hex wrench	6 mm	
Open-ended wrench	11 mm	
Open-ended wrench	14 mm	

18 liters of oil as per specification on page 383.



Compressed air information

Pressure must be between 5-7 bar.
Moisture trap, filter and automatic air line lubricator must be installed in the air line to feed the air motor of the pump.

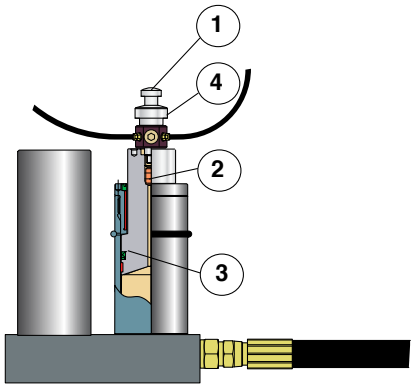
Step 1 Check the nitrogen pressure

Charge the cam unit/force cylinder and accumulator according to table at right. Make sure that the area around the units is kept clean and dry.

Cam Unit/Force Cylinder						Accumulator
HCCH					HCF	HCPU
15	40	60	90	150		
180 bar			150 bar		20 bar	25 bar

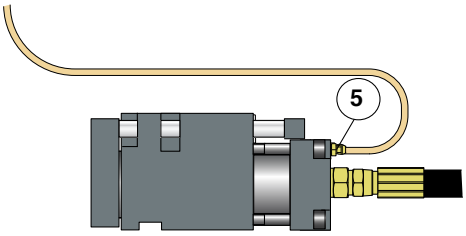
Step 2 Connect the pump unit

Turn knob (1) counterclockwise until the release pin for the valve (2) is inside the thread. Remove the plug and connect the oil armature on the top of the piston (3) by turning knob (4) clockwise. Open the valve (2) by turning knob (1) clockwise carefully until the stop is reached. Connect the transparent hose between the bleed nipple (5) and the pump unit (6). Connect compressed air to the valve (7) (thread G 1/4").



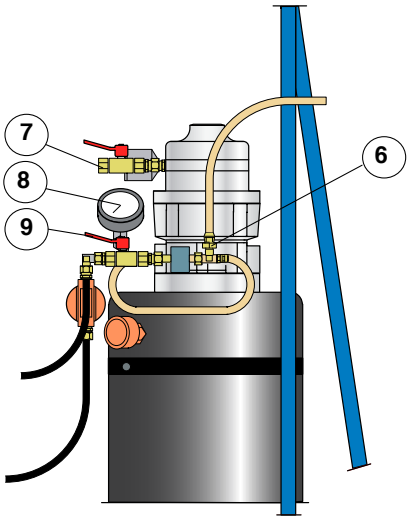
Step 3 Check the clearance of the cam unit/force cylinder

Check the clearance of the cam unit/ force cylinder and make sure that there is enough room for a full stroke.



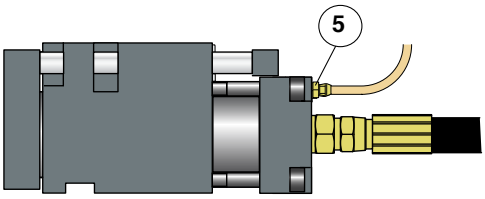
Step 4 Pump oil

Open the bleed nipple (5) and close the valve (9). Pump the oil by opening valve (7) until the oil is free from air bubbles. Close the bleed valve (5). Note that the cam unit/force cylinder will move the full stroke.



Step 5 Bleeding the cam unit/ force cylinder

Pump oil until pressure reaches 50 bar. Then open bleed nipple (5) and bleed the cam unit/ force cylinder. Have a cloth ready to collect any oil that may leak out. Close the bleed nipple (5). Repeat this until oil is free from air bubbles.



Step 6 Bleeding the power unit

Pump until the oil pressure is 50 bar, then open the valve (9) and bleed the power unit. Close the valve (9). Repeat this until the oil is free from air bubbles.

Step 7 Check that the oil is free from air

First make sure that there is no oil pressure. Try to push the piston down by hand. If it is possible to push it down a little there is some air left in the system. Repeat step 5 and 6 until the oil is totally free from air or the piston cannot be moved.

Step 8 Check for any leakage

Pump until oil pressure is 50 bar and look for any leakage from the adapters and the units. Make sure there is no oil pressure by opening the bleed valve (9).

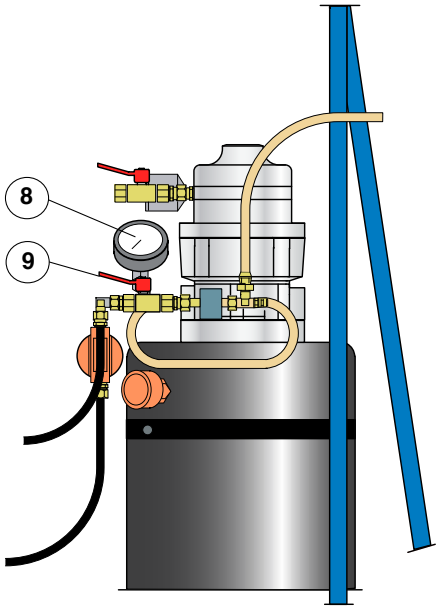
Step 9 Disconnect the pump unit

Uncouple the oil filling armature and the transparent hose. Fit the plug on the top of the power cylinder by using the hook spanner to hold the piston. Tighten the bleed valve on the cam unit/ force cylinder and clean the area.

Step 10 Charge the accumulator with nitrogen

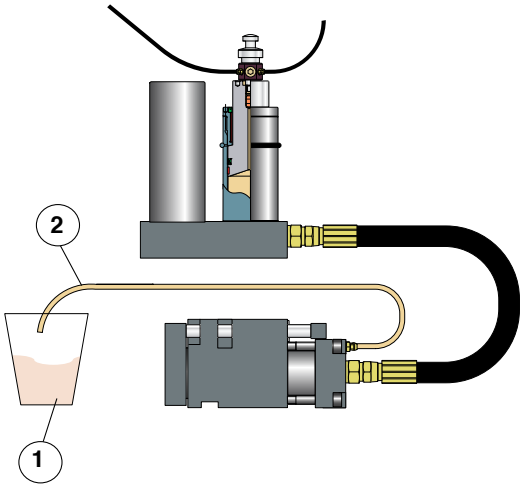
After the oil filling procedure, the accumulator has to be charged with nitrogen up to 150 bar or to the required gas pressure for the operation. Maximum pressure is 180 bar. See page 384.

The system is now ready for operation.



Changing the oil

Follow steps 1-10 as before but connect the transparent hose to a reservoir for used oil, not to the pump unit. Pump oil until new oil comes out through the transparent hose.



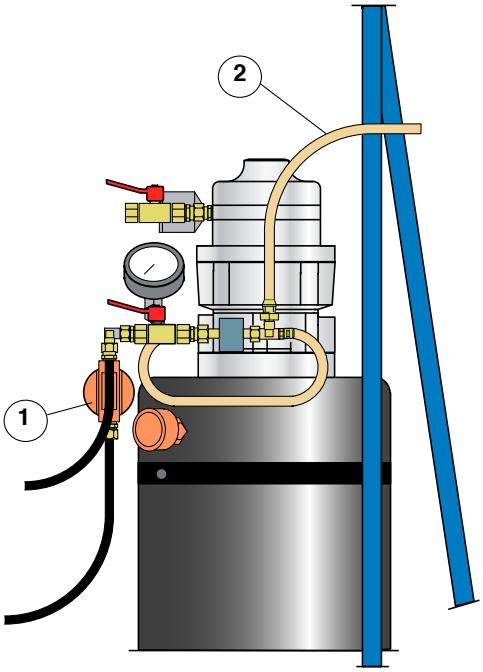
Oil

We recommend that oil is changed after 500,000 operations or every two years.

Pump Unit

Change the filter (1) and the transparent hose (2) every 200 working hours or every two years. Remove the complete filter by loosening the adapter and the hose. Put the filter in a vise and remove the bottom by turning it counter-clockvise. Replace the filter and put the new filter in position together with the washer.

Filter	Order No.: 503419
Transparent hose	Order No.: 503116



Service and maintenance

The lifetime of the products is normally 1 million strokes provided the installation and maintenance are performed correctly. In special conditions or environments the lifetime may be shorter or longer.

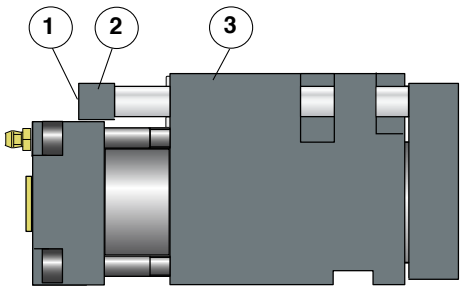
Power Unit and Force Cylinder (HCPU, HCPU-S, HCF)

Check the nitrogen pressure in the accumulator and the force cylinder every 200,000 strokes or twice a year.

Compact Cam (HCCU)/Flange Cam (HCCF)

Check the force of the return springs every 200,000 strokes or twice a year by removing the screws (1) and the spacer (2). Pull out the Gas Springs and use test unit to measure the force of the Gas Springs.

The table below shows the type of Gas Springs and force for each cam unit.



Cam Unit	Gas spring for return	Gas spring force	Min Gas Spring force*
HCCU-15	1x T2-180Xstroke	200 daN	140 daN
HCCU-15	2x T2-180Xstroke	200 daN	140 daN
HCCF-40	2x T2-180Xstroke	200 daN	140 daN
HCCU-60	2xT3-350Xstroke*	350 daN	250 daN
HCCU-90	2xNP-500Xstroke*	500 daN	350 daN
HCCU-150	2xT3-750Xstroke*	750 daN	530 daN

* If the Gas Spring force is lower than minimum, the Gas Spring has to be replaced.

Compact Cam (HCCH) and Flange Cam (HCCF-H) for Hose Systems

Check the nitrogen pressure in the compact cam every 200,000 strokes or twice a year.

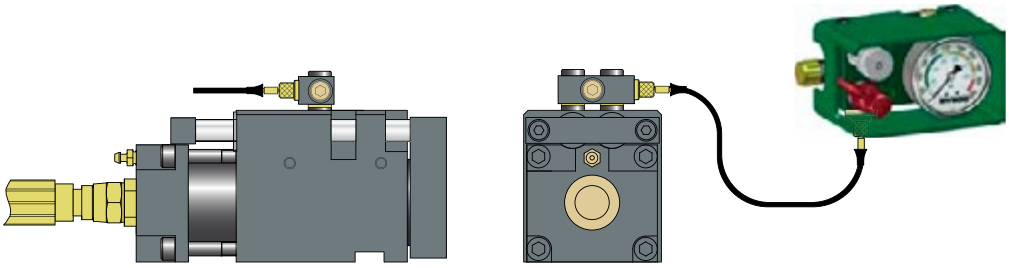
When changing the Gas Spring, do not allow the oil within the spring to escape.

The table below shows the type of Gas Springs used for each cam unit.

Cam Unit	Gas spring for return	Gas spring pressure	Min Gas Spring pressure**
HCCH-15	1xMH-200xstroke	180 bar	125 bar
HCCH-40	2xMH-200xstroke	180 bar	125 bar
HCCF-H-40	2xMH-200xstroke	180 bar	125 bar
HCCH-60	2xT3-350xstroke*	180 bar	125 bar
HCCH-90	2xNP-500xstroke*	150 bar	105 bar
HCCH-150	2xT3-750xstroke*	150 bar	105 bar

* Be sure to remove the nitrogen charging valve in the springs when connecting to a Hose System. The MH has no valve.

** If the pressure is lower than minimum, check the Hose System and if necessary change the Gas Springs.



Service

This high precision equipment containing high pressure nitrogen must only be maintained or serviced by authorized fully qualified personnel. For any advice about this equipment contact your local Hyson distributor or representative.

Troubleshooting

Problem	Possible cause	Solution
1. Cam unit/force cylinder does not perform a full stroke.	1:1 Low gas pressure in the accumulator	Charge up the gas pressure, see page 444. (max 180 bar)
	1:2 Power cylinder does not perform a full stroke	Adjust the stroke length
	1:3 Oil leakage in power cylinder A: The port plug has come loose B: Damage on the seal and/or inside of the power cylinder	A: Replace the plug and fill the system, see page 444. B: Contact your distributor for service or replacement cylinder
	1:4 Oil leakage in cam unit A: The bleeding valve has come loose B: Damage on the seal and/or inside of the cam unit	A: Replace the bleed valve and fill the system, see page 444. B: Contact your distributor for service or replacement cam unit
	1:5 Hose or adapter has come loose or been damaged.	Replace the defective parts and fill the system, see page 444.

Problem	Possible cause	Solution
2. Cam unit/force cylinder does not retract.	2:1 Low gas pressure in the force cylinder (the force cylinder has to be in retracted position)	Check if the gas adapter or the plug have become loose. Charge with gas, see page 444 max 40 bar. If the gas quickly leaks out again, contact your distributor for service or replacement force cylinder.
	2:2 Low gas pressure in the return springs of the compact cam.	Replace the Gas Springs, see page 448. If Hose System is used, see page 449.
	2:3 Gas leakage in the accumulator	Bleed the oil, see page 445. Contact your distributor for service or replacement accumulator.
	2:4 The return movement is jammed.	Contact your distributor for service or replacement cam unit/force cylinder.

Manifold Cylinders and Systems

Advantages of Nitro-Dyne Manifold Systems

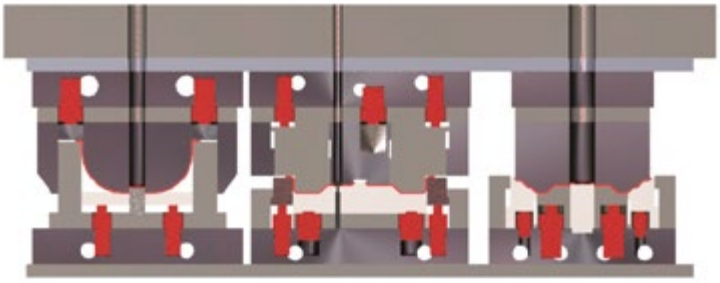
Hyson's Nitro-Dyne® Manifold System are ideal for high volume production. Die designers choose manifold systems for lower pressure rises, improved part quality, and low maintenance. Manifolds interconnect the Cylinders and provide one centralized point for pressurizing and depressurizing, with no hoses or external fittings. Hyson™, a global leader in Manifold design and manufacturing since 1964, manufactures Manifold Systems to your specifications.

Consistent Performance

Nitro-Dyne Manifold System is rugged and never tires, providing consistent force for repeatable performance. Mechanical Springs, on the other hand, can fatigue in addition to being affected by stroke rate and heat and lubrication, impacting spring quality.

Balanced Force

Compared to air cushions, Nitro-Dyne provides a balanced force on the pressure pad which improves part quality, reduces scraps, and increases uptime. Air cushions can experience uneven pad pressure if the cushion is off-center loaded. They may also require additional parts such as counterbalance pins.



Blank & Draw Station

More Force in Less Space

A single 2.5-ton Cylinder with a 1-inch stroke replaces eight, 2-inch X 8-inch Mechanical Springs. As a result, they reduce space and reduce costs in the original die construction. Maintenance costs and downtime are also reduced by replacing traditional Die Springs with Cylinders.

Full Force on Contact

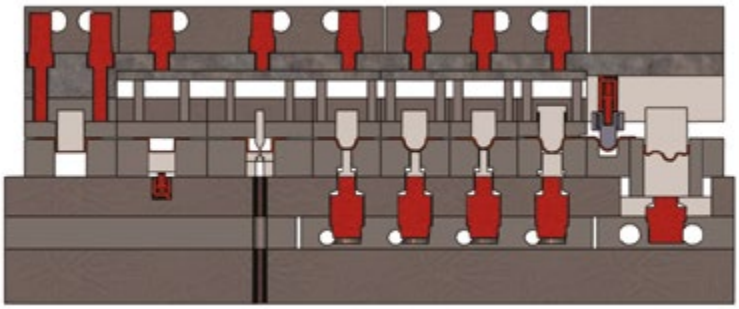
Manifold Systems provide full force on contact, unlike Mechanical Springs that require preload, for higher productivity.

Improved Performance and Quality

Designed with a 10% – 15% pressure rise so the force increase that occurs between contact and die closed is minimal for good quality parts. Self-Contained Gas Springs typically exhibit a 65% force increase that, in some applications, can lead to part tearing. This lower pressure rise also results in lower operating temperatures that add to the longevity of Cylinders and systems.

Easy Force Adjustability

Within the Manifold System, the Cylinders share a common reservoir, allowing the end user to adjust the pressure up or down as necessary depending on material tensile strength or thickness. The adjustment takes place while the die is still in the press instead of shutting down operations and pulling the die to change Mechanical Springs. This is even more important when you have multiple stations with varying stroke lengths and pressure requirements.



Fewer Leak Points

Nitro-Dyne is a self-contained plate with no external hoses or fittings, while a hosed Gas Spring system has many potential leak points hard to detect while mounted in the die.

Faster Set Up

Nitro-Dyne requires none of the Valves, Compressors, and other complex connections leading to faster set-up and increased production compared to air cushions.

Press Versatility for More Efficient Operations

Manifold Systems are inserted directly in the die and move with the die from press to press for more efficient and cost-effective operations.

Choosing the Best System for Your Operations

Selecting the most efficient and effective Cylinder system for your operation is not always simple, and often the lowest initial cost option is more expensive long term. Check out the chart below and contact the Hyson engineered products experts to ensure you get the optimum system for your needs.

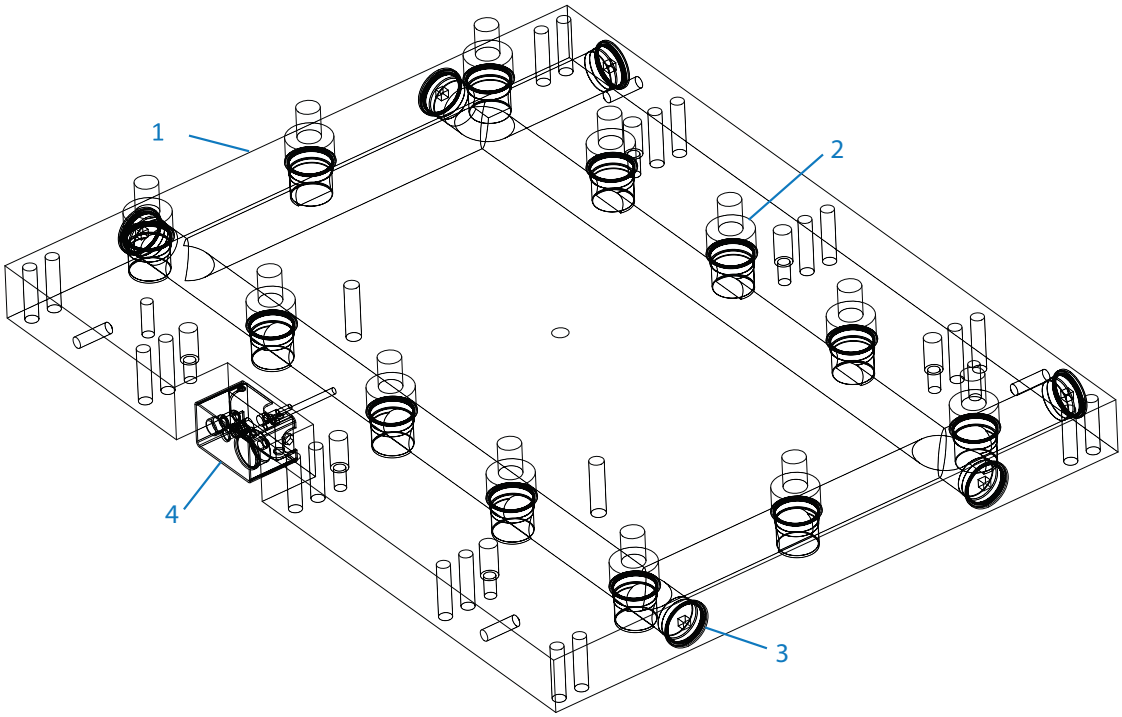
System Selection

Operation Requirement	Nitro-Dyne Manifold System	Mechanical Die Spring	Nitrogen Gas Spring	Hose System	Air Cushion
Consistent Force	Yes	No	Yes	Yes	No
Balance Force	Yes	No	Yes	Yes	No
High Tonnage/Small Space	Yes	No	Yes	Yes	No
Full Contact Force	Yes	No	Yes	Yes	Yes
Force Adjustability In-Press	Yes	No	No	Yes	Yes
Low Pressure Rise	Yes	No	No	No	No
Low Heat Generation	Yes	Yes	No	No	No
Minimum Leak Points	Yes	N/A	Yes	No	No
Low Initial Cost	No	Yes	Yes	Yes	No
Low Cost Die Assembly	Yes	No	No	No	No
Maximum Production Time	Yes	No	No	No	No

Manifold System Design

A typical Manifold System incorporates a metal plate, Cylinders, and control panel. The Manifold plate (1) is machined to hold Cylinders in place and act as a reservoir for nitrogen gas. Cylinders (2) are located wherever force is needed, threaded into the plate, and sealed by an O-ring. The Cylinders are connected by passages through which the nitrogen gas travels (3). A control panel (4) is mounted to the Manifold plate or attached with a hose for remote operation. Through the control panel, pressure within the system can be read, as well as charging and exhausting the system.

Save time and money by letting our engineers design the most cost effective and efficient Manifold System for you. Here is the information we need to expedite your quotation:



- Maximum area available: length, width, thickness, overall height with Cylinders fully extended.
- Cylinder working stroke and preferred usable stroke.
- Tonnage required.
- Maximum number of Cylinders.
- Allowable pressure rises from initial contact to end of work stroke.
- Special features: mounting holes, dowel holes, keyways, pockets, scrap chutes, etc.
- Location of control panel: recessed in plate or remote-hosed to plate.
- Press speed (Strokes Per Minute (SPM)).
- Use of drawing lubricants, e.g., can the die be flooded with lubricants?
- Annual production levels.
- CAD drawing or hand-drawn sketch with data points.

If you choose to design the system yourself, follow the step-by-step guides for designing both standard 1500 psi and high pressure 2000 psi systems.

Guide to Designing a Standard 1500 psi System

1. Force

Determine how much force is needed to form, hold, strip, or draw the part.

Example: 15 tons of force is required for a conventional draw of a rectangular part.

2. Cylinder Quantity

Determine how many pressure points are needed to distribute the pressure evenly across the pad. To accommodate variances in part thickness, tensile strength, and die wear, build in more force than required.

Example: The system design has the capability for 20 tons, more than the 15 tons required.

Cylinder Tonnages	Effective Area	
1/2 Ton	5.03 cm^2	0.78 $in.^2$
1 Ton	11.40 cm^2	1.77 $in.^2$
2.5 Ton	22.20 cm^2	3.44 $in.^2$
4 Ton	34.90 cm^2	5.42 $in.^2$
6 Ton	51.50 cm^2	7.98 $in.^2$

Eight 2.5-ton Cylinders provide a good pressure point distribution with the necessary tonnage.

3. Cylinder Stroke

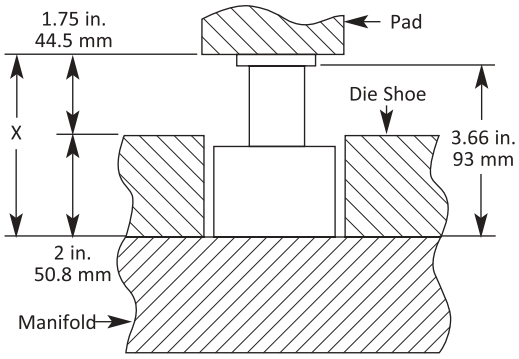
Pad travel dictates stroke length, and standard strokes for most Cylinder types are in ½ -inch increments. Choose the stroke length that will not be exceeded by the actual working stroke.

Example: The travel of the pad is 1 ¾-inch so the proper Cylinder stroke for this application is 2 inches.

4. Pressure Rise/Volume Holes

Controlled material flow is needed in conventional draw dies with Cylinders maintaining constant force throughout the stroke. This type of system is usually designed with a 10% – 20% pressure rise, while other systems can use a higher pressure rise.

Determine the volume requirements, and therefore the length and diameter of the drilled holes, by calculating the Swept Volume (SV), the amount of nitrogen displaced from the Cylinders during the stroke.



5. Pressure Rise/Volume Holes

Controlled material flow is needed in conventional draw dies with Cylinders maintaining constant force throughout the stroke. This type of system is usually designed with a 10% – 20% pressure rise, while other systems can use a higher pressure rise.

Determine the volume requirements, and therefore the length and diameter of the drilled holes, by calculating the Swept Volume (SV), the amount of nitrogen displaced from the Cylinders during the stroke.

Effective Piston Area

Cylinder Tonnages	Effective Area	
1/2 Ton	5.03 cm^2	0.78 $in.^2$
1 Ton	11.40 cm^2	1.77 $in.^2$
2.5 Ton	22.20 cm^2	3.44 $in.^2$
4 Ton	34.90 cm^2	5.42 $in.^2$
6 Ton	51.50 cm^2	7.98 $in.^2$

SV = number of cylinders X work stroke of cylinders X effective piston area of cylinders.

Example SV = 8 X 1.75 X 3.44 $in.^2$
SV = 48.16 $in.^3$

Calculate the total manifold volume by multiplying the Swept Volume by pressure rise.

Desired Pressure Rise	Pressure Rise Factor (PF)
10%	**SV X 10**
15%	**SV X 6.66**
20%	**SV X 5**

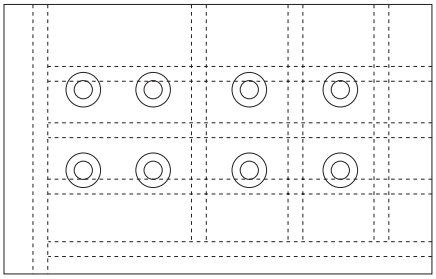
Example (for a 10% pressure rise):
Total Volume = SV X PF
Total Volume = 48.16 $in.^3$ X 10 = 481.6 $in.^3$

From the Volume Hole drilling chart that follows, identify the largest volume hole for the plate thickness.

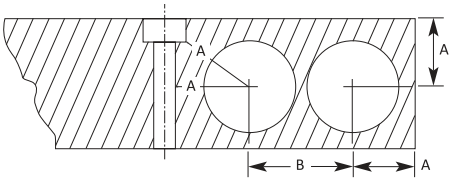
Convert the Total Volume into linear inches of drilling.

$$\text{Linear inches Drilling} = \frac{\text{Volume required}}{\text{Volume per inch of drilled hole*}}$$

*Note: when shut height allows, design the system with a thicker manifold plate and reduce the number and length of drilled holes to reduce cost.



4 holes	45 in. long	180 linear inches
3 holes	25 in. long	75 linear inches
1 hole	30 in. long	30 linear inches
		285 linear inches



Standard Manifold Volume Hole Drilling

Plugs	Thread Size	Area/ Linear Inch	mm in	Hole Diameter	A	B	Suggested Plate Thickness*	Max. Drilling Depth (1 Way)
NF-771-4	7/16-20	.71 cm^2 .110 in^2	mm in	9.53 0.375	9.53 0.375	18.75 0.738	51 2.00	584 23
NF-771-5	1/2-20	.97 cm^2 .151 in^2	mm in	11.13 0.438	10.31 0.406	22.22 0.875	51 2.00	587 23
NF-771-8	3/4-16	2.18 cm^2 .338 cm^2	mm in	16.60 0.656	14.30 0.563	30.96 1.219	51 2.00	483 19
NF-771-10	7/8-14	2.85 cm^2 .442 in^2	mm in	19.05 0.750	15.88 0.625	34.93 1.375	51 2.00	1092 43
NF-771-12	1-1/16-12	4.46 cm^2 .691 in^2	mm in	23.83 0.938	19.05 0.750	42.06 1.656	51 2.00	1092 43
NF-771-14	1-3/16-12	5.71 cm^2 .886 in^2	mm in	26.97 1.062	22.45 0.884	46.05 1.813	51 2.00	1092 43
NF-771-16	1-5/16-12	7.15 cm^2 1.108 in^2	mm in	30.18 1.188	23.83 0.938	50.80 2.000	57 2.25	1092 43
NF-771-20	1-5/8-12	11.40 cm^2 1.767 in^2	mm in	38.10 1.500	26.97 1.062	58.75 2.313	64 2.50	1143 45
NF-771-24 & NF-771-M47	1-7/8-12	15.52 cm^2 2.405 in^2	mm in	44.45 1.750	31.75 1.250	60.33 2.375	70 2.75	1194 47
NF-771-M63	M63-2	27.75 cm^2 4.301 in^2	mm in	59.44 2.340	39.70 1.563	76.20 3.000	89 3.50	1829 72
NF-771-32	2-1/2-12	28.58 cm^2 4.430 in^2	mm in	60.33 2.375	39.70 1.563	76.20 3.000	89 3.50	1829 72
NF-771-82	M82-2	48.51 cm^2 7.518 in^2	mm in	78.59 3.094	53.98 2.125	95.25 3.750	114 4.50	1524 60
NF-771-100	M100-2	71.26 cm^2 11.045 in^2	mm in	95.25 3.750	63.50 2.500	111.25 4.380	133 5.25	1829 72

Guide to Designing a Standard 2000 psi System

1. Force

Determine how much force is needed to form, hold, strip, or draw the part.

Example: 15 tons of force is required for a conventional draw of a rectangular part.

2. Cylinder Quantity

Determine how many pressure points are needed to distribute the pressure evenly across the pad. To accommodate variances in part thickness, tensile strength, and die wear, build in more force than required.

Example: The system design has the capability for 20 tons, more than the 15 tons required.

Cylinder Tonnages	Effective Piston Area	
3/4 Ton	5.03 cm^2	0.78 $in.^2$
1.5 Ton	11.40 cm^2	1.77 $in.^2$
3 Ton	22.20 cm^2	3.44 $in.^2$
5 Ton	34.90 cm^2	5.42 $in.^2$
8 Ton	51.50 cm^2	7.98 $in.^2$

Four 5-ton Cylinders provide a good pressure point distribution with the necessary tonnage.

3. Cylinder Stroke

Pad travel dictates stroke length, and standard strokes for most Cylinder types are in ½-inch increments. Choose the stroke length that will not be exceeded by the actual working stroke.

Example: The travel of the pad is 1 ¾-inch so the proper Cylinder stroke for this application is 2 inches.

4. Cylinder Profile

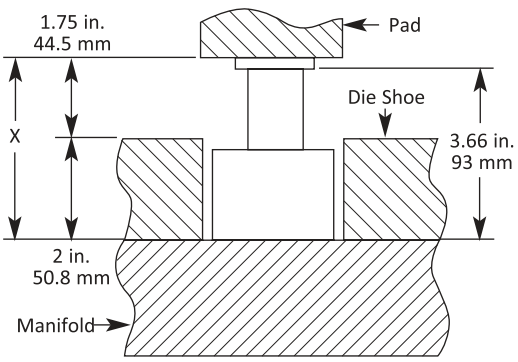
Measurement from the bottom of the shoe to the bottom of the pad in the die-open position is known as the "X" dimension. Choose a Cylinder that closely matches this dimension, remembering that the Cylinder should be always protected from overstroke.

Example: The appropriate Cylinder choice is the MORD 5000 X 2-inch stroke.

5. Pressure Rise/Volume Holes

Controlled material flow is needed in conventional draw dies with Cylinders maintaining constant force throughout the stroke. This type of system is usually designed with a 10% – 20% pressure rise, while other systems can use a higher pressure rise.

Determine the volume requirements, and therefore the length and diameter of the drilled holes, by calculating the Swept Volume (SV), the amount of nitrogen displaced from the Cylinders during the stroke.



High Force Manifold Volume Hold Drilling

Plugs	Thread SIze	Area/ Linear Inch	mm in	Hole Diameter	A	B	Suggested Plate Thickness*	Max. Drilling Depth (1 Way)
NF-771-4	7/16-20	.71 cm^2 .110 $in.^2$	mm in	9.53 0.375	9.40 0.37	19.05 0.750	51 2.00	584 23
NF-771-5	1/2-20	.97 cm^2 .151 $in.^2$	mm in	11.13 0.438	10.41 0.41	22.23 0.875	51 2.00	584 23
NF-771-8	3/4-16	2.18 cm^2 .338 $cm.^2$	mm in	16.60 0.656	15.24 0.60	30.96 1.219	51 2.00	483 19
NF-771-10	7/8-14	2.85 cm^2 .442 $in.^2$	mm in	19.05 0.750	17.53 0.69	34.93 1.375	51 2.00	1092 43
NF-771-12	1-1/16-12	4.46 cm^2 .691 $in.^2$	mm in	23.83 0.938	21.34 0.84	42.06 1.656	51 2.00	1092 43
NF-771-14	1-3/16-12	5.71 cm^2 .886 $in.^2$	mm in	26.97 1.062	23.62 0.93	46.05 1.813	51 2.00	1092 43
NF-771-16	1-5/16-12	7.15 cm^2 1.108 $in.^2$	mm in	30.18 1.188	25.91 1.02	50.80 2.000	57 2.25	1092 43
NF-771-20	1-5/8-12	11.40 cm^2 1.767 $in.^2$	mm in	38.10 1.500	31.75 1.25	60.33 2.375	67 2.62	1143 45
NF-771-24 & NF-771-M47	1-7/8-12	15.52 cm^2 2.405 $in.^2$	mm in	44.45 1.750	36.32 1.43	69.85 2.750	76 3.00	1194 47
NF-771-M63	M63-2	27.75 cm^2 4.301 $in.^2$	mm in	59.44 2.340	48.01 1.89	88.90 3.500	95 3.75	1829 72
NF-771-32	2-1/2-12	28.58 cm^2 4.430 $in.^2$	mm in	60.33 2.375	61.98 2.44	114.30 4.500	95 3.75	1829 72
NF-771-82	M82-2	48.51 cm^2 7.518 $in.^2$	mm in	78.59 3.094	76.20 3.00	114.30 4.500	124 4.88	1524 60
NF-771-100	M100-2	71.26 cm^2 11.045 $in.^2$	mm in	95.25 3.750	76.20 3.00	136.53 5.375	152 6.00	1829 72

* Drilling patterns can affect plate thickness.

Designing a Nitro-Dyne High Force 150 Bar Manifold System

1. Force

Determine how much force is needed to form, hold, strip, or draw the part.

Example: 400kN of force is required for a conventional draw of a rectangular part.

2. Cylinder Quantity

Determine how many pressure points are needed to distribute the pressure evenly across the pad and what the maximum charge pressure might be for the design. To accommodate variances in part thickness, tensile strength, and die wear, build in more force than required.

Cylinder Model	Force @ 125 bar Charge Pressure (kN)	Force @ 150 bar Charge Pressure (kN)
MOR® 5200	43.7	52.4
MOR 7700	64.4	77.3
MOR 10700	89.1	106.9

Example: The system design has the capability for 445kN at 125 bar of maximum charge pressure, slightly more force than the 400kN required. Seven MOR 7700 cylinders provide good pressure point distribution with the necessary tonnage at 125 bar charge pressure.

3. Cylinder Stroke

Pad travel dictates stroke length. Standard strokes for cylinders are in metric increments. Choose the stroke length that will not be exceeded by the actual working stroke.

Example: The travel of the pad is 80 mm so the proper cylinder stroke for this application is 100 mm, resulting in a cylinder choice of MOR 7700X100.

4. Pressure Rise/Volume Holes

Controlled material flow is needed in conventional draw dies, with cylinders maintaining constant force throughout the stroke. This type of system is usually designed with a 10%-20% pressure rise. Determine the volume requirements, and therefore the length and diameter of the drilled holes, by calculating the Swept Volume (SV), the amount of nitrogen displaced from the cylinders during the stroke. SV = number of cylinders X work stroke of cylinders (mm) X effective piston area of cylinders (mm^2)

Cylinder Tonnages	Effective Piston Area
MOR 5200	3494 mm^2
MOR 7700	5153 mm^2
MOR 10700	7130 mm^2

Example:
SV = 7 X 80 mm X 5153 mm^2
SV = 2,885,680 mm^3

Calculate the total manifold volume by multiplying the Swept Volume by pressure rise factor.

Desired Pressure Rise	Pressure Rise Factor (PF)
10%	SV X 10
15%	SV X 6.66
20%	SV X 5

Example: (for a 15% pressure rise)
Total Volume = SV X PF
Total Volume = 2,885,680 mm^3 X 6.66 = 19,218,629 mm^3

Convert the Total Volume into linear millimeters of drilling.

$$\text{Linear millimeters drilling} = \frac{\text{Volume required}}{\text{Area of drilled hole}}$$

Plug	Thread Size	Area of Drilled Hole	Hole Diameter	A	B	Max Drilling Depth (1 way)
NF-771-100	Size M100-2	7126 mm²	95.25 mm²	76.2 mm	239.7 mm	1829 mm

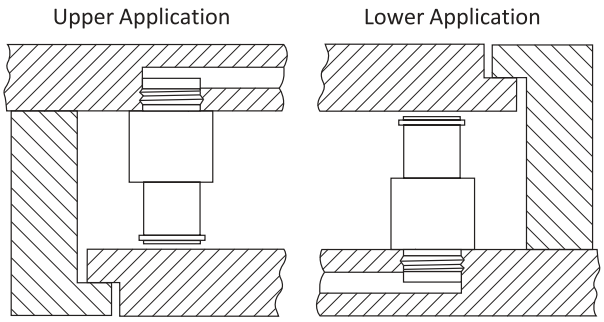
Example: For a plate measuring 150 mm X 450 mm X 1100 mm, the diameter volume hole is 95.25 mm and the area of drilled hole is 7126 mm².

$$\frac{19{,}218{,}629\ \text{mm}^3}{7126\ \text{mm}^2} = 2697\ \text{linear mm of drilling required}$$

Drills include: 2 holes 1100 mm long and 2 holes 450 mm long resulting in 3100 mm total length.

Additional Design Considerations

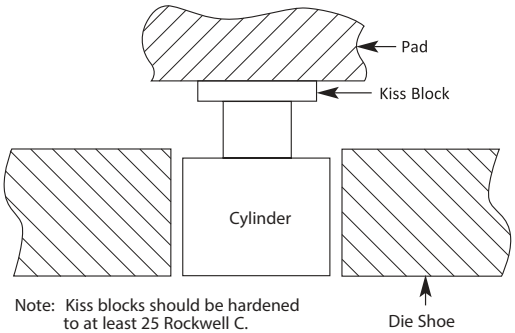
Design with Die Open Clearance



Note: The weight of the pad is not enough to preload the cylinders.

Manifolds require a minimum clearance of .01-inch (.254 mm) in the die to allow the nitrogen Cylinders to come to a full, open position. In an upper application, the clearance occurs between the end of the Cylinder rod and the pad. In a lower application, the clearance is between the pad and its retainer system.

Avoid Special Length Piston Rods

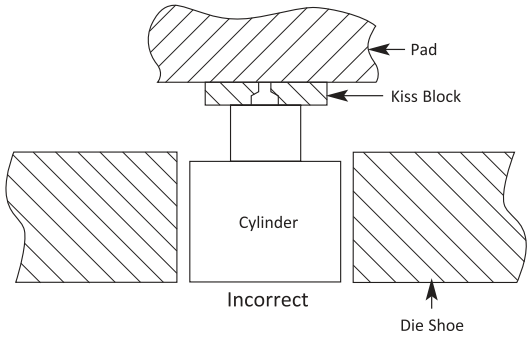


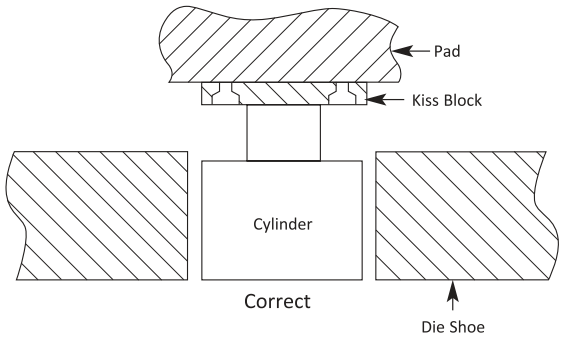
Note: Kiss blocks should be hardened to at least 25 Rockwell C.

If the height of a standard nitrogen Cylinder does not match the distance to the back of the pad, we recommend using kiss blocks to make up the height difference. Another alternative is to counterbore the Cylinders into the Manifold. Cylinders with special length piston rods are custom orders. Consult your Hyson contact for details.

Piston Rod Contact Surfaces

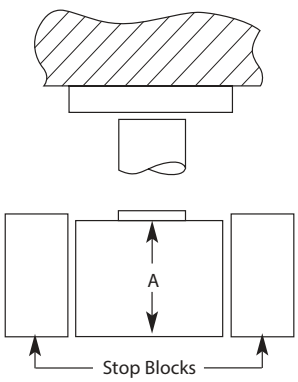
It is essential that the nitrogen Cylinder's piston rod contacts a flat surface.
Never put the piston rod against a counterbored hole, rough casting, or bolt.





Stop Blocks

Use stop blocks to prevent Cylinder damage in the event that the pad is over stroked.
The stop block should be equal to or greater than the "A" dimension on the Cylinder.



In most die designs, Cylinders are placed through a pocket in the die shoe or subplate in the die. This pocket can fill with draw lubricants, metal chips, and/or cleaning solvents that submerge the Cylinder and shorten the life of the system.

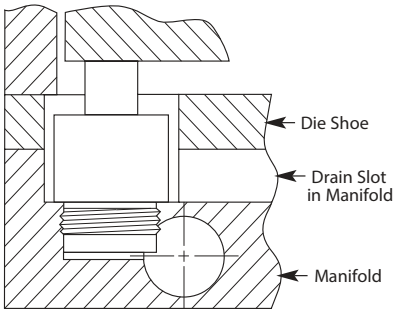
To prevent this, install drainage slots in each Cylinder pocket. They should be of sufficient size to prevent blockage. The size of the drain slots or drain holes depend on the number of Cylinders connected by one slot/hole. Contact Hyson for assistance.

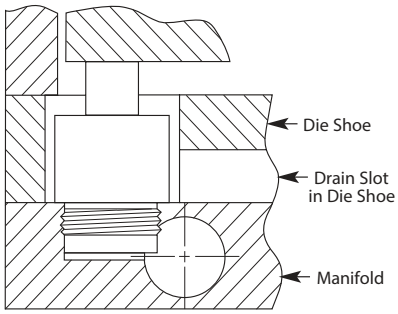
Handling Holes

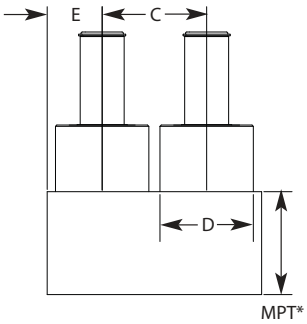
Every Manifold should have handling holes so the system can be installed, turned, and serviced without damaging the nitrogen Cylinders.

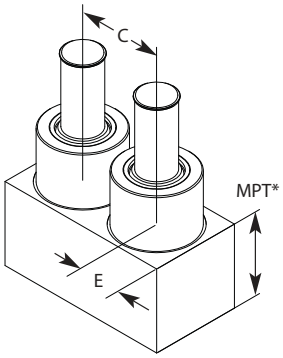
Cylinder Location

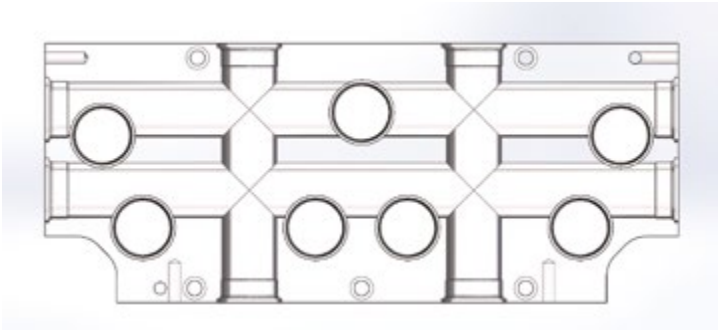
Using the charts that follow, position Cylinders for the standard 1500 psi Manifold or the high pressure 2000 psi Manifold with a minimum distance between the Cylinders and plate edge or features like taps, dowels, or counterbored holes that are open to atmospheric pressure.











Choosing a Manifold Cylinder

HYSON's nitrogen manifold cylinders are available in a wide variety of diameters, tonnages, profiles, strokes and heights to meet your stamping requirements.

MOR

The Cylinder is used most often in basic nitrogen systems. This taller Cylinder extends beyond the surface of the Manifold plate for applications where shut height is not an issue.

Example: MOR400X 1.0

MORD

A shorter Cylinder for applications where space is at a premium. Often vertical die height can be saved using a MORD profile Cylinder. Installed in a thick Manifold, the Cylinder sleeve extends deep to allow the piston to stroke into the plate.

TSB

A low body profile Cylinder for applications where shut heights are very limited. The TSB requires less die shoe machining for Cylinder body clearance and shallower pockets if counterbored in the Manifold.

SB 6X.75-BW*

Not Pictured*

A short-stroke compact Cylinder designed to provide high force in applications where die space or press shut height is very limited. This is a venting Cylinder used in relatively clean environments and usually in upper die applications.

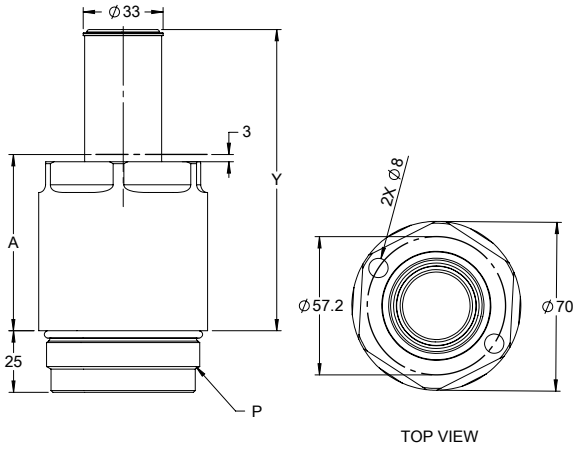
SB

A short height Cylinder for short stroke applications. Designed originally for stripper pad operations, the Cylinder profile allows for minimal clearance and weight when Manifolds are mounted in upper stripping dies.

MOR 400

The most compact Manifold Cylinder, ideal for low tonnage operations. Often used as a lift or when higher speeds are required.

MOR



Dimensional information

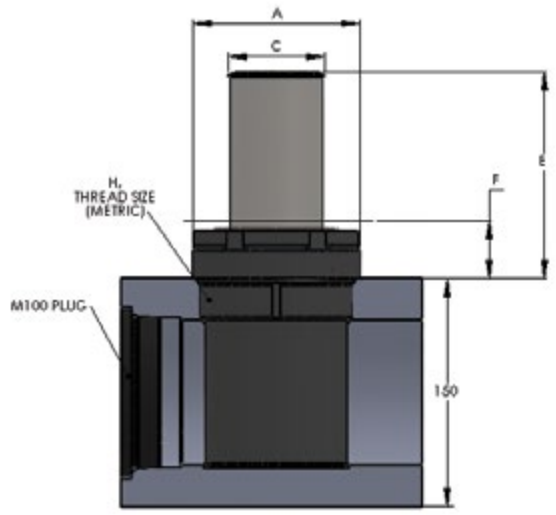
1500 psi Manifold Model/Size	2000 psi Manifold Model/Size	Effective Piston Area	Std. Stroke Lengths	K	P	R	B
MOR .5 1/2 ton	MOR 750 .75 ton	.789 in^2 5.07 cm^2	4.00 in 102 mm	1.60 in 41 mm	1-5/16-12	0.85 in 22 mm	0.88 in 22 mm
MOR 1 1 ton	MOR 1500 1.5 ton	1.77 in^2 11.40 cm^2	5.00 in 127 mm	2.12 in 54 mm	1-7/8-12	1.08 in 27 mm	0.72 in 18 mm
MOR 2.5 2.5 ton	MOR 3000 3 ton	3.45 in^2 22.26 cm^2	6.00 in 152 mm	2.75 in 70 mm	2-1/2-12	1.38 in 35 mm	1.0 in 25 mm
MOR 4 4 ton	MOR 5000 5 ton	5.41 in^2 34.92 cm^2	7.00 in 178 mm	3.56 in 90 mm	M82X2	1.86 in 47 mm	1.25 in 32 mm
MOR 6 6 ton	MOR 8000 8 ton	7.98 in^2 51.50 cm^2	8.00 in 203 mm	4.31 in 109 mm	M100X2	2.51 in 64 mm	1.25 in 32 mm

Maintenance Tools

Tonnage	Seal Kit	Face Spanner	Adjustable Spanner	Socket Wrench	Proper Torque
.5	20-100-7000	FS-482	-----	SW-.5-Ton	100 ft. lbs.
1	20-150-7000	FS-100	HS-200	SW-1-Ton	220 ft. lbs.
2.5	20-209-7000	FS-300	HS-330	SW-2.5-Ton	350 ft. lbs.
4	20-262-7000	FS-434	HS-330	SW-4-Ton	500 ft. lbs.
6	20-319-7000	FS-330	HS-330	SW-6-Ton	800 ft. lbs.

Cylinder Specifications

External hex for easy installation and removal.



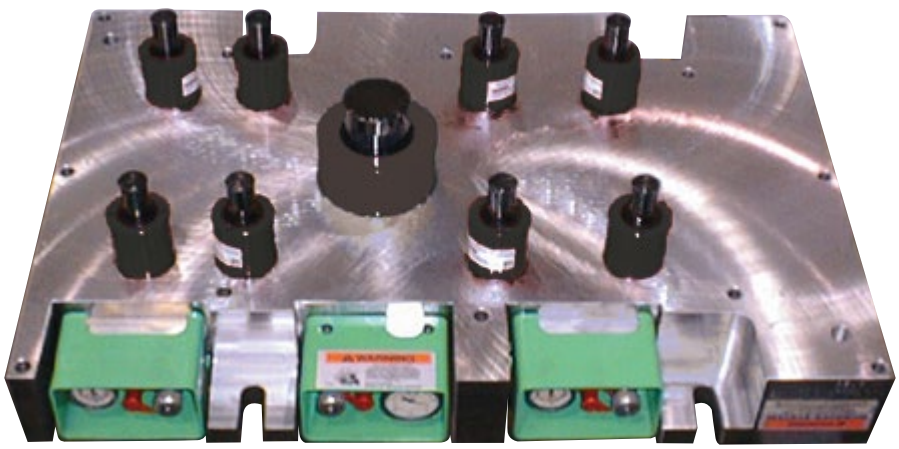
Dimensional Information

Order Number	Contact Force @ 150 Bar (2175 PSI)	Contact Force @ 125 Bar (1812 PSI)	Stroke	A	C	E	F	H
	(kN)	(kN)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)
MOR 5200 X 100	52.4	43.7	100	90.4	47.5	135	35	M82 X 2
MOR 5200 X 125			125			185	60	
MOR 5200 X 160			160			255	95	
MOR 5200 X 200			200			335	135	
MOR 7700 X 100	77.3	64.4	100	109.5	64	135	35	M100 X 2
MOR 7700 X 125			125			185	60	
MOR 7700 X 160			160			255	95	
MOR 7700 X 200			200			335	135	
MOR 7700 X 250			250			435	185	
MOR 10700 X 100	106.9	89.1	100	130	75.6	135	35	M120 X 2
MOR 10700 X 125			125			185	60	
MOR 10700 X 160			160			255	95	
MOR 10700 X 200			200			335	135	
MOR 10700 X 250			250			435	185	

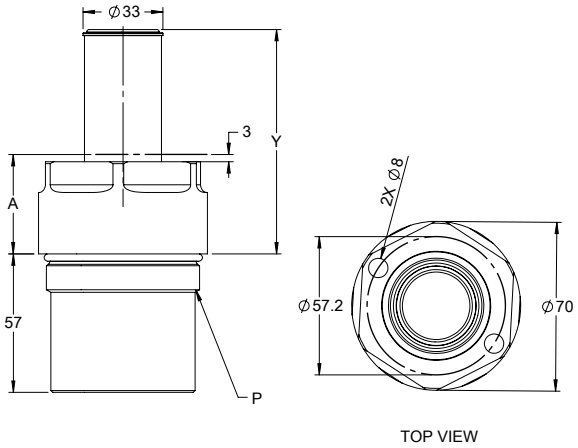
Dimensional information

Stroke	MOR .5/750		MOR .5	MOR 750	MOR 1/1500		MOR 1	MOR 1500	MOR 2.5/3000		MOR 2.5	MOR 3000	MOR 4/5000		MOR 4	MOR 5000	MOR 6/8000		MOR 6	MOR 8000
	Y	A	MPT*	MPT*	Y	A	MPT*	MPT*	Y	A	MPT*	MPT*	Y	A	MPT*	MPT*	Y	A	MPT*	MPT*
0.25 in 6 mm	1.16 29	0.91 23	1.75 44	1.88 48																
0.50 in 13 mm	1.66 42	1.16 29	1.75 44	1.88 48	1.91 48	1.41 36	1.75 44	1.94 49	1.91 48	1.41 36	2.00 51	2.18 55	1.91 48	1.41 36	2.00 51	2.25 57	1.91 48	1.41 36	2.50 64	2.88 73
0.75 in 19 mm	2.16 55	1.41 36	1.75 44	1.88 48	2.41 61	1.66 42	1.75 44	1.94 49	2.41 61	1.66 42	2.00 51	2.18 55	2.41 61	1.66 42	2.00 51	2.25 57	2.41 61	1.66 42	2.50 64	2.88 73
1.00 in 25 mm	2.66 68	1.66 42	1.75 44	1.88 48	2.91 74	1.91 49	1.75 44	1.94 49	2.91 74	1.91 49	2.00 51	2.18 55	2.91 74	1.91 49	2.00 51	2.25 57	2.91 74	1.91 49	2.50 64	2.88 73
1.50 in 38 mm	3.66 93	2.16 55	1.75 44	1.88 48	3.91 99	2.41 61	1.75 44	1.94 49	3.91 99	2.41 61	2.00 51	2.18 55	3.91 99	2.41 61	2.00 51	2.25 57	3.91 99	2.41 61	2.50 64	2.88 73
2.00 in 51 mm	4.66 118	2.66 68	1.75 44	1.88 48	4.91 125	2.91 74	1.75 44	1.94 49	4.91 125	2.91 74	2.00 51	2.18 55	4.91 125	2.91 74	2.00 51	2.25 57	4.91 125	2.91 74	2.50 64	2.88 73
2.50 in 64 mm	5.66 144	3.16 80	1.75 44	1.88 48	5.91 150	3.41 87	1.75 44	1.94 49	5.91 150	3.41 87	2.00 51	2.18 55	5.91 150	3.41 87	2.00 51	2.25 57	5.91 150	3.41 87	2.50 64	2.88 73
3.00 in 76 mm	6.66 169	3.66 93	1.75 44	1.88 48	6.91 176	3.91 99	1.75 44	1.94 49	6.91 176	3.91 99	2.00 51	2.18 55	6.91 176	3.91 99	2.00 51	2.25 57	6.91 176	3.91 99	2.50 64	2.88 73
3.50 in 89 mm	7.66 195	4.16 106	1.75 44	1.88 48	7.91 201	4.41 112	1.75 44	1.94 49	7.91 201	4.41 112	2.00 51	2.18 55	7.91 201	4.41 112	2.00 51	2.25 57	7.91 201	4.41 112	2.50 64	2.88 73
4.00 in 102 mm	8.66 220	4.66 118	1.75 44	1.88 48	8.91 226	4.91 125	1.75 44	1.94 49	8.91 226	4.91 125	2.00 51	2.18 55	8.91 226	4.91 125	2.00 51	2.25 57	8.91 226	4.91 125	2.50 64	2.88 73
4.50 in 114 mm					9.91 252	5.41 137	1.75 44	1.94 49	9.91 252	5.41 137	2.00 51	2.18 55	9.91 252	5.41 137	2.00 51	2.25 57	9.91 252	5.41 137	2.50 64	2.88 73
5.00 in 127 mm					10.91 277	5.91 150	1.75 44	1.94 49	10.91 277	5.91 150	2.00 51	2.18 55	10.91 277	5.91 150	2.00 51	2.25 57	10.91 277	5.91 150	2.50 64	2.88 73
5.50 in 140 mm									11.91 303	6.41 163	2.00 51	2.18 55	11.91 303	6.41 163	2.00 51	2.25 57	11.91 303	6.41 163	2.50 64	2.88 73
6.00 in 152 mm									12.91 328	6.91 176	2.00 51	2.18 55	12.91 328	6.91 176	2.00 51	2.25 57	12.91 328	6.91 176	2.50 64	2.88 73
6.50 in 165 mm													13.91 353	7.41 188	2.00 51	2.25 57	13.91 353	7.41 188	2.50 64	2.88 73
7.00 in 178 mm													14.91 379	7.91 201	2.00 51	2.25 57	14.91 379	7.91 201	2.50 64	2.88 73
7.50 in 191 mm																	15.91 404	8.41 214	2.50 64	2.88 73
8.00 in 203 mm																	16.91 430	8.91 226	2.50 64	2.88 73

All dimensions are nominal. Data shown are typical.
Actual data for any particular unit may vary



MORD



Dimensional information

1500 psi Manifold Model/Size	2000 psi Manifold Model/Size	Effective Piston Area	Std. Stroke Lengths	K	P	R	A
MOR .5 1/2 ton	MOR 750 .75 ton	.789 in^2 5.07 cm^2	4.00 in 102 mm	1.60 in 41 mm	1-5/16-12	0.85 in 22 mm	1.66 in 42 mm
MOR 1 1 ton	MOR 1500 1.5 ton	1.77 in^2 11.40 cm^2	5.00 in 127 mm	2.12 in 54 mm	1-7/8-12	1.08 in 27 mm	1.66 in 42 mm
MOR 2.5 2.5 ton	MOR 3000 3 ton	3.45 in^2 22.26 cm^2	6.00 in 152 mm	2.75 in 70 mm	2-1/2-12	1.38 in 35 mm	1.66 in 42 mm
MOR 4 4 ton	MOR 5000 5 ton	5.41 in^2 34.92 cm^2	7.00 in 178 mm	3.56 in 90 mm	M82X2	1.86 in 47 mm	1.66 in 42 mm
MOR 6 6 ton	MOR 8000 8 ton	7.98 in^2 51.50 cm^2	8.00 in 203 mm	4.31 in 109 mm	M100X2	2.51 in 64 mm	1.66 in 42 mm

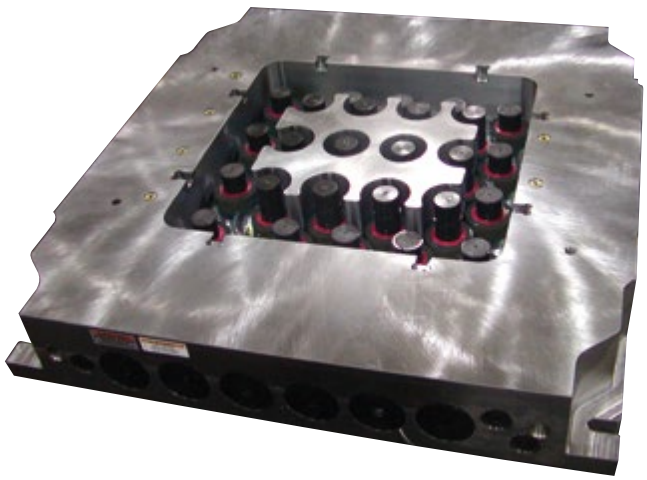
Maintenance Tools

Tonnage	Seal Kit	Face Spanner	Adjustable Spanner	Socket Wrench	Proper Torque
.5	20-100-7000	FS-482	-----	SW-.5-Ton	100 ft. lbs.
1	20-150-7000	FS-100	HS-200	SW-1-Ton	220 ft. lbs.
2.5	20-209-7000	FS-300	HS-330	SW-2.5-Ton	350 ft. lbs.
4	20-262-7000	FS-434	HS-330	SW-4-Ton	500 ft. lbs.
6	20-319-7000	FS-330	HS-330	SW-6-Ton	800 ft. lbs.

Dimensional information

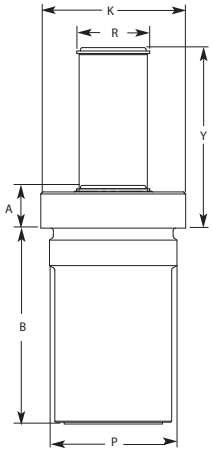
Stroke	MORD .5/750		MORD .5	MORD 750	MORD 1/1500		MORD 1	MORD 1500	MORD 2.5/3000		MORD 2.5	MORD 3000	MORD 4/5000		MORD 4	MORD 5000	MORD 6/8000		MORD 6	MORD 8000
	Y	B	MPT*	MPT*	Y	B	MPT*	MPT*	Y	B	MPT*	MPT*	Y	B	MPT*	MPT*	Y	B	MPT*	MPT*
0.25 in 6 mm	1.91 48	0.59 15	1.75 44	1.88 48																
0.50 in 13 mm	2.16 55	0.59 15	1.75 44	1.88 48																
0.75 in 19 mm	2.41 61	0.63 16	1.75 44	1.88 48																
1.00 in 25 mm	2.66 68	0.88 22	1.75 44	1.88 48	2.66 68	0.97 25	1.75 44	1.94 49	2.66 68	1.25 32	2.00 51	2.18 55	2.66 68	1.50 38	2.50 64	2.75 70	2.66 68	1.50 38	2.50 64	2.88 73
1.50 in 38 mm	3.16 80	1.38 35	1.81 46	1.94 49	3.16 80	1.47 37	1.88 48	2.07 53	3.16 80	1.75 44	2.25 57	2.43 32	3.16 80	2.00 51	2.75 70	3.00 76	3.16 80	2.00 51	2.75 70	3.13 80
2.00 in 51 mm	3.66 93	1.88 48	2.31 59	2.44 62	3.66 93	1.97 50	2.38 60	2.57 65	3.66 93	2.25 57	2.75 70	2.93 74	3.66 93	2.50 64	3.25 83	3.50 89	3.66 93	2.50 64	3.25 83	3.63 92
2.50 in 64 mm	4.16 106	2.38 60	2.81 71	2.94 75	4.16 106	2.47 63	2.88 73	3.07 78	4.16 106	2.75 70	3.25 83	3.43 87	4.16 106	3.00 76	3.75 95	4.00 102	4.16 106	3.00 76	3.75 95	4.13 105
3.00 in 76 mm	4.66 118	2.88 73	3.31 84	3.44 87	4.66 118	2.97 75	3.38 86	3.57 91	4.66 118	3.25 83	3.75 95	3.93 100	4.66 118	3.50 89	4.25 108	4.50 114	4.66 118	3.50 89	4.25 108	4.63 118
3.50 in 89 mm	5.16 131	3.38 86	3.81 97	3.94 100	5.16 131	3.47 88	3.88 98	4.07 103	5.16 131	3.75 95	4.25 108	4.43 113	5.16 131	4.00 102	4.75 121	5.00 127	5.16 131	4.00 102	4.75 121	5.13 130
4.00 in 102 mm	5.66 144	3.88 98	4.31 109	4.44 113	5.66 144	3.97 101	4.38 111	4.57 116	5.66 144	4.25 108	4.75 120	4.93 125	5.66 144	4.50 114	5.25 133	5.50 140	5.66 144	4.50 114	5.25 133	5.63 143
4.50 in 114 mm					6.16 156	4.47 113.5	4.88 124	5.07 129	6.16 156	4.75 121	5.25 133	5.43 138	6.16 156	5.00 127	5.75 146	6.00 152	6.16 156	5.00 127	5.75 146	6.13 156
5.00 in 127 mm					6.66 169	4.97 126	5.38 137	5.57 141	6.66 169	5.25 133	5.75 146	5.93 151	6.66 169	5.50 140	6.25 159	6.50 165	6.66 169	5.50 140	6.25 159	6.63 168
5.50 in 140 mm									7.16 182	5.75 146	6.25 159	6.43 163	7.16 182	6.00 152	6.75 171	7.00 178	7.16 182	6.00 152	6.75 171	7.13 181
6.00 in 152 mm									7.66 195	6.25 159	6.75 171	6.93 176	7.66 195	6.50 165	7.25 184	7.50 191	7.66 195	6.50 165	7.25 184	7.63 194
6.50 in 165 mm													8.16 207	7.00 178	7.75 197	8.00 203	8.66 220	7.50 191	8.25 210	8.63 219
7.00 in 178 mm													8.66 220	7.50 191	8.25 210	8.50 216	8.66 220	7.50 191	8.25 210	8.63 219
7.50 in 191 mm																	9.16 233	8.00 203	8.75 222	9.13 232
8.00 in 203 mm																	9.66 245	8.50 216	9.25 235	9.63 245

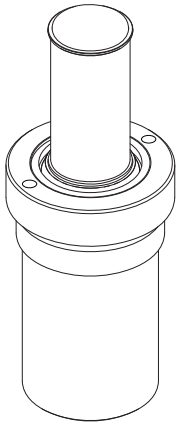
All dimensions are nominal. Data shown are typical.
Actual data for any particular unit may vary



TSB

TSB is for replacement dies only. For new die builds, Hyson recommends MORD Cylinders.





Dimensional information

1500 psi Manifold Model/Size	2000 psi Manifold Model/Size	Effective Piston Area	Std. Stroke Lengths	K	P	R	A
TSB .5 1/2 ton	TSB 750 .75 ton	.789 in^2 5.07 cm^2	4.00 in. 102 mm	1.60 in. 41 mm	1-5/16-12	0.85 in. 22 mm	0.66 in. 17 mm
TSB 1 1 ton	TSB 1500 1.5 ton	1.77 in^2 11.40 cm^2	5.00 in. 127 mm	2.12 in. 54 mm	1-7/8-12	1.08 in. 27 mm	0.66 in. 17 mm
TSM 2.5 2.5 ton	TSB 3000 3 ton	3.45 in^2 22.26 cm^2	6.00 in. 152 mm	2.75 in. 70 mm	2-1/2-12	1.38 in. 35 mm	0.66 in. 17 mm
TSB 4 4 ton	TSB 5000 5 ton	5.41 in^2 34.92 cm^2	7.00 in. 178 mm	3.56 in. 90 mm	M82X2	1.86 in. 47 mm	0.66 in. 17 mm

Maintenance Tools

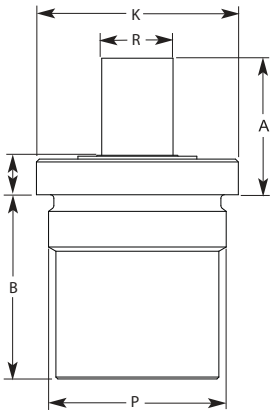
Tonnage	Seal Kit	Face Spanner	Adjustable Spanner	Socket Wrench	Proper Torque
.5	20-100-7000	FS-482	-----	SW-TNK .5	100 ft. lbs.
1	20-150-7000	FS-100	-----	SW-TNK 1	220 ft. lbs.
2.5	20-209-7000	FS-300	-----	SW-TNK 2.5	350 ft. lbs.
4	20-262-7000	FS-434	-----	SW-TNK 4	500 ft. lbs.

Dimensional information

Stroke	TSB .5/750		TSB .5	TSB 750	TSB 1/1500		TSB 1	TSB 1500	TSB 2.5/3000		TSB 2.5	TSB 3000	TSB 4/5000		TSB 6	TSB 8000
	Y	A	MPT*	MPT*	Y	A	MPT*	MPT*	Y	A	MPT*	MPT*	Y	A	MPT*	MPT*
0.25 in 6 mm	0.91 23	1.13 29	1.75 44	1.88 48												
0.50 in 13 mm	1.16 29	1.38 35	1.81 46	1.94 49	1.16 29	1.41 36	1.84 47	2.03 52	1.16 29	1.75 44	2.26 57	2.44 62	1.16 29	2.00 51	2.70 69	2.95 75
0.75 in 19 mm	1.41 36	1.63 41	2.06 52	2.19 56	1.41 36	1.66 42	2.09 53	2.28 58	1.41 36	2.00 51	2.51 64	2.69 68	1.41 36	2.25 57	2.95 75	3.20 81
1.00 in 25 mm	1.66 42	1.88 48	2.31 59	2.44 62	1.66 42	1.91 49	2.34 59	2.53 64	1.66 42	2.25 57	2.76 70	2.94 75	1.66 42	2.50 64	3.20 81	3.45 88
1.50 in 38 mm	2.16 55	2.38 60	2.81 71	2.94 75	2.16 55	2.41 61	2.84 72	3.03 77	2.16 55	2.75 70	3.26 83	3.44 87	2.16 55	3.00 76	3.70 94	3.95 100
2.00 in 51 mm	2.66 68	2.88 73	3.31 84	3.44 87	2.66 68	2.91 74	3.34 85	3.53 90	2.66 68	3.25 83	3.76 96	3.94 100	2.66 68	3.50 89	4.20 107	4.45 113
2.50 in 64 mm	3.16 80	3.38 86	3.81 97	3.94 100	3.16 80	3.41 87	3.48 97	4.03 102	3.16 80	3.75 95	4.26 108	4.44 113	3.16 80	4.00 102	4.70 119	4.95 126
3.00 in 76 mm	3.66 93	3.88 99	4.31 109	4.44 113	3.66 93	3.91 99	4.34 110	4.53 115	3.66 93	4.25 108	4.76 121	4.94 125	3.66 93	4.50 114	5.20 132	5.45 138
3.50 in 89 mm	4.16 106	4.38 111	4.81 122	4.94 125	4.16 106	4.41 112	4.84 123	5.03 128	4.16 106	4.75 121	5.26 134	5.44 138	4.16 106	5.00 127	5.70 145	5.95 151
4.00 in 102 mm	4.66 118	4.88 124	5.31 135	5.44 138	4.66 118	4.91 125	5.34 136	5.53 140	4.66 118	5.25 133	5.76 146	5.94 151	4.66 118	5.50 139	6.20 157	6.45 164
4.50 in 114 mm					5.16 131	5.41 137	5.84 148	6.03 153	5.16 131	5.75 146	6.26 159	6.44 164	5.16 131	6.00 152	6.70 170	6.95 177
5.00 in 127 mm					5.66 144	5.91 150	6.34 161	6.53 166	5.66 144	6.25 159	6.76 172	6.94 176	5.66 144	6.50 165	7.20 183	7.45 189
5.50 in 140 mm									6.16 156	6.75 171	7.26 184	7.44 189	6.16 156	7.00 178	7.70 196	7.95 202
6.00 in 152 mm									6.66 169	7.25 184	7.76 197	7.94 202	6.66 169	7.50 191	8.20 208	8.45 215
6.50 in 165 mm													7.16 182	8.00 203	8.70 221	8.95 227
7.00 in 178 mm													7.66 195	8.50 216	9.20 234	9.45 240

All dimensions are nominal. Data shown are typical.
Actual data for any particular unit may vary

SB 6X.75-BW



Dimensional information

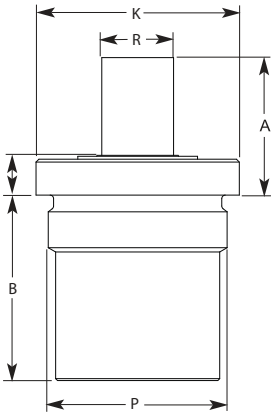
1500 psi Manifold Model/Size	2000 psi Manifold Model/Size	Effective Piston Area	K	P	R	A	B
SB 6x.75-BW 1 ton	SB 6000 6 ton	7.98 in^2 11.40 cm^2	4.38 in. 111.3 mm	3.70 in.	1.87 in 19 mm	0.63 in. 11 mm	1.97 in. 50 mm

Maintenance Tools

Tonnage	Seal Kit	Effective Piston Area	Proper Torque
6	16-319-7000 BW	FS-300	800 ft. lbs.

SB

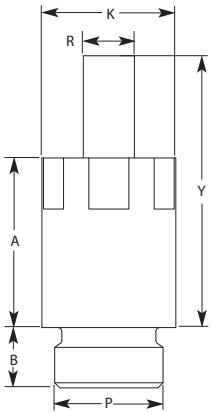
All SB 1-, 2.5-, and 4-ton Cylinders, in addition to SB 1500, 3000, 5000, and 8000 sizes, will be considered special orders, with a minimum order quantity of eight pieces. Seal kits for all SB products will continue to be available:

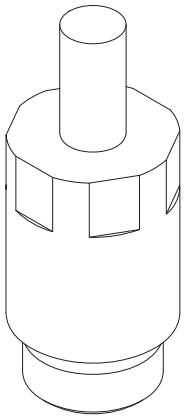


Dimensional information

Cylinder	Seal Kit Order Number
SB-1 and SB-1500	16-150-7000
SB-2.5 and SB-3000	16-209-7000
SB-4 and SB-5000	16-262-7000
SB-60 and SB-8000	16-319-7000
SB-6-ST	16-319-7000-ST
SB-6X.75-BW	16-319-7000-BW

MOR 400





Dimensional information

2000 psi Manifold Model/Size	Effective Piston Area	K	P	R	B
MOR 400 1/4 ton	0.406 in^2 2.62 cm^2	1.307 in. 33 mm	1-1/16-12	0.50 in. 13 mm	0.59 in. 14 mm

Maintenance Tools

Tonnage	Seal Kit	Socket Wrench	Proper Torque
.25	20-072-7000	1-1/4 in. Deep Well Socket	80 ft. lbs.

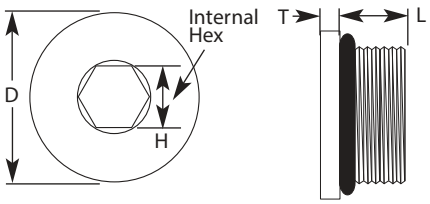
Variable Dimensions

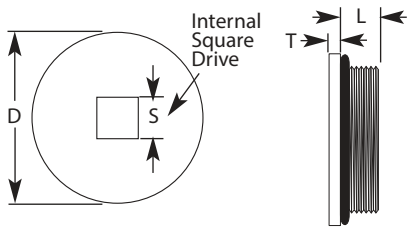
Stroke	Y	A	MPT*
0.50 in. 13 mm	1.66 42	1.16 30	1.00 25.4
0.75 in. 19 mm	2.16 55	1.41 36	1.00 25.4
1.00 in. 25 mm	2.66 68	1.66 42	1.00 25.4
1.50 in. 38 mm	3.66 93	2.16 55	1.00 25.4
2.00 in. 51 mm	4.66 118	2.66 68	1.00 25.4
2.50 in. 64 mm	5.66 144	3.16 80	1.00 25.4
3.00 in. 76 mm	6.66 169	3.66 93	1.00 25.4

Accessories

Port Plugs

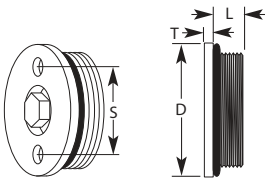
Standard Plugs





Order Number	Thread Size	O-Ring Order Number	H	D	T	L	S	Tool Needed	Torque Req.
NF-771-4	7/16-20	NF-904	0.19 mm 5 in	0.56 mm 14 in	0.11 mm 3 in	0.36 mm 9 in		3/16 Hex Head Allen Wrench	3/16 INT HEX
NF-771-5	1/2-20	NF-905	0.19 mm 5 in	0.63 mm 16 in	0.11 mm 3 in	0.36 mm 9 in		3/16 Hex Head Allen Wrench	3/16 INT HEX
NF-771-8	3/4-16	NF-908	0.31 mm 8 in	0.88 mm 22 in	0.16 mm 4 in	0.44 mm 11 in		5/16 Hex Head Allen Wrench	5/16 INT HEX
NF-771-10	7/8-14	NF-910	0.38 mm 10 in	1.00 mm 25 in	0.16 mm 4 in	0.50 mm 13 in		3/8 Hex Head Allen Wrench	3/8 INT HEX
NF-771-12	1 1/16-12	15-075-4010	0.56 mm 14 in	1.25 mm 32 in	0.18 mm 5 in	0.59 mm 15 in		9/16 Hex Head Allen Wrench	9/16 INT HEX
NF-771-14	1 3/16-12	NF-914	0.56 mm 14 in	1.38 mm 35 in	0.18 mm 5 in	0.59 mm 15 in		9/16 Hex Head Allen Wrench	9/16 INT HEX
NF-771-16	1 5/16-12	NF-916	0.63 mm 16 in	1.50 mm 38 in	0.18 mm 5 in	0.59 mm 15 in		5/8 Hex Head Allen Wrench	5/8 INT HEX
NF-771-20	1 5/8-12	NF-920		1.88 mm 48 in	0.16 mm 4 in	0.59 mm 15 in	0.50 mm 12.7 in	1/2 Sq. Drive Wrench	1/2 INT SQ
NF-771-24 NF-771-M47	1 7/8-12 M47 X 2	NF-924		2.12 mm 54 in	0.16 mm 4 in	0.59 mm 15 in	0.50 mm 12.7 in	1/2 Sq. Drive Wrench	1/2 INT SQ
NF-771-32 NF-771-M63	2 1/2-12 M63 X 2	NF-932		2.75 mm 70 in	0.16 mm 4 in	0.59 mm 15 in	0.50 mm 12.7 in	1/2 Sq. Drive Wrench	1/2 INT SQ
NF-771-82	M82 X 2	NF-982		3.50 mm 89 in	0.25 mm 6 in	0.75 mm 19 in	0.75 mm 19.1 in	3/4 Sq. Drive Wrench	3/4 INT SQ
NF-771-100	M100 X 2	NF-9100		4.25 mm 108 in	0.25 mm 6 in	0.75 mm 19 in	0.75 mm 19.1 in	3/4 Sq. Drive Wrench	1 INT SQ

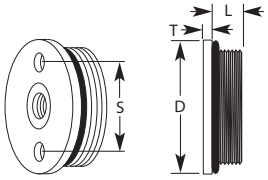
Plugs with Rupture Disc (1500 psi System)



Order Number		D	T	L	S	Tool Needed
NF-771-20 RD	in mm	1.88 48	0.16 4	0.59 15	1.00 25	FS-418 Spanner Wrench
NF-771-24 RD	in mm	2.12 54	0.16 4	0.59 15	1.25 32	FS-200 Spanner Wrench
NF-771-32 RD	in mm	2.75 70	0.16 4	0.59 15	1.75 44	FS-100 Spanner Wrench
NF-771-82 RD	in mm	3.50 89	0.25 6	0.75 19	2.25 57	FS-300 Spanner Wrench
NF-771-100 RD*	in mm	4.25 108	0.25 6	0.75 19	2.25 57	FS-300 Spanner Wrench

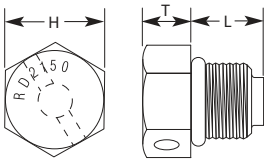
*Can be tightened using a square drive.

Plugs with Internal Ports for 1/2-20 SAE Hose Connection



Order Number		D	T	L	S	Tool Needed
NF-771-20-5	in mm	1.88 48	0.16 4	0.59 15	1.00 25	FS-418 Spanner Wrench
NF-771-24-5	in mm	2.12 54	0.16 4	0.59 15	1.25 32	FS-200 Spanner Wrench
NF-771-32-5	in mm	2.75 70	0.16 4	0.59 15	1.75 44	FS-100 Spanner Wrench
NF-771-82-5	in mm	3.50 89	0.25 6	0.75 19	2.25 57	FS-300 Spanner Wrench
NF-771-100-5	in mm	4.25 108	0.25 6	0.75 19	2.25 57	FS-300 Spanner Wrench

Rupture Disc



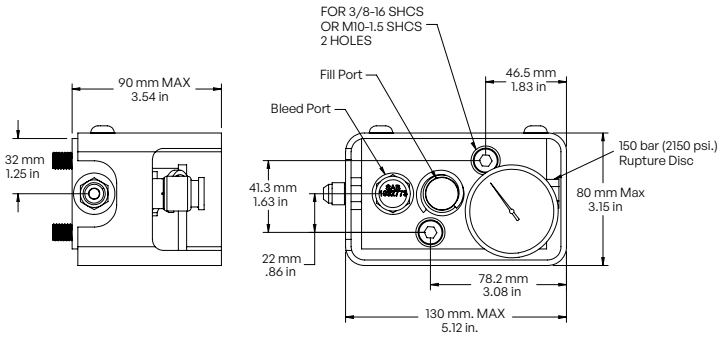
Order Number	Thread Size		H	T	L	Tool Needed
RD-2150	7/16-20	in mm	0.562 14.3	0.274 6.9	0.415 10.5	9/16 Wrench

Standard Control Panels

Standard control panels contain all the necessary controls for reading, charging, and exhausting nitrogen pressure in a psi Manifold System. Control panels should be mounted in an accessible location where the pressure gauge can be read easily.

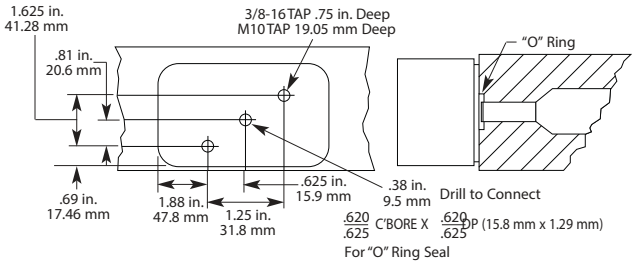
CP-1555

For remote connection to a Manifold Plate. Sensor ready version available to order with part number CPM-1555-S.



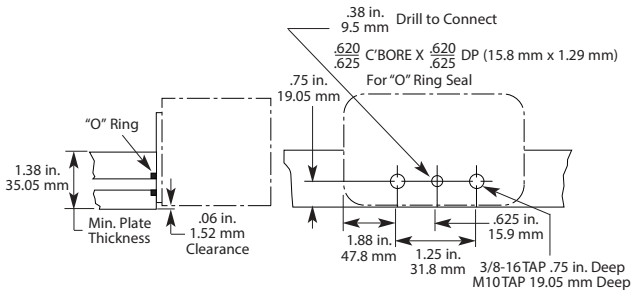
CPM-1555-M

For direct mounting to a finished Manifold Plate by an O-Ring seal. Minimum Manifold thickness required is 3 inches. Sensor ready version available to order with part number CPM-1555-M-S.



CPM-1555-E

For direct mounting to a finished Manifold Plate by an O-Ring seal. Maximum Manifold thickness required is 3 inches. Sensor ready version available to order with part number CPM-1555-E-S.

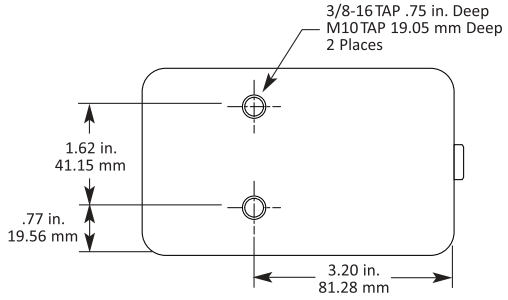


High Pressure Control Panels

High pressure control panels contain all the necessary controls for reading, charging, and exhausting nitrogen pressure in a 2000 psi Manifold System. Control panels should be mounted in an accessible location where the pressure gauge can be read easily.

CP-N2-T-VR

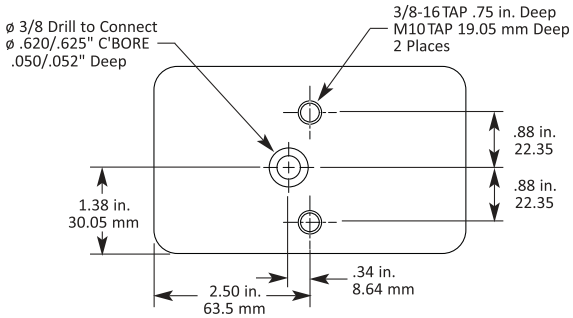
For remote connection to a Manifold Plate. Sensor ready version available to order with part number CP-N2-T-VR-S.



NOTE: For -5 applications, an NF-1000-5-G1/8 service fitting is required.

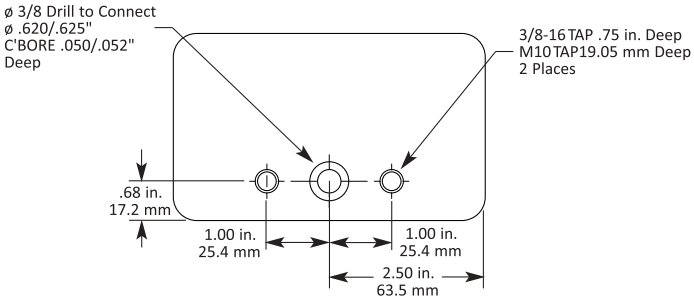
CPM-2000-M

For direct mounting to a finished Manifold Plate by an O-Ring seal. Minimum Manifold thickness required is 3 inches. Sensor ready version available to order with part number CPM-2000-M-S.

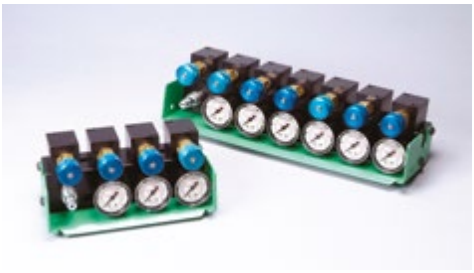


CPM-2000-E

For direct mounting to a finished Manifold Plate by an O-Ring seal. Minimum Manifold thickness required is 3 inches. Sensor ready version available to order with part number CPM-2000-E-S.



MODCP Modular Control Panel



The MODCP Modular Control Panel conveniently controls up to six Manifold systems from one central control unit. Each module can read pressure, add, or bleed pressure as needed, as if each Manifold had its own control panel. Each module features a 5000 psi/345 bar gauge that is easy to read as well as three port locations for piping flexibility.

Model/Size	No. of Modules	Length (L)		Ctr-to-Ctr on M6 Mounting Holes	
		mm	in	mm	in
MODCP	2	133.5	5.26	44.5	1.75
	3	178.0	7.01	89.0	3.50
	4	222.5	8.76	133.5	5.26
	5	267.0	10.51	178.0	7.01
	6	311.5	12.26	222.5	8.76

ST Compression Tank

The ST Compression Tank acts as a reservoir for the "Swept Volume" of the nitrogen gas forced from the Cylinders when they are stroked. This compact, modular tank is designed for pressure to 2175 psi/150 bar. It features multiple ports on each end for increased flexibility and a rupture disc plug for added safety.

Part Number	Standard Volume		Standard Overall Length		Number of Ports on Each Face
	cm^3	in^3	mm	in	
ST-50-HP	819	50	244	9.61	6 each 3/4-16 1 face 7/16-20 1 face 7/16-14
ST-100-HP	1639	100	311	12.23	
ST-160-HP	2622	160	390	15.36	
ST-200-HP	3278	200	443	17.46	
ST-320-HP	5244	320	603	23.73	
ST-460-HP	7540	460	789	31.06	
ST-730-HP	11963	730	1149	45.25	

Pressure Monitors

Automatic Pressure Monitors monitor nitrogen gas pressure in Manifold Cylinder systems. If the pressure drops below a preset lower limit, a warning light alerts the press operator, and the monitor can be wired to shut down the press automatically.

APM-5800

Use with 11-770-2700 quick disconnect to connect to Inlet valve on Hyson control panel. Available with 1/4 NPT thread (APM-5800) or G 1/4 thread (APM-5800-G 1/4).

Pressure range: 0-5800 psi (0-400 bar).

Supplied with: Cable and protective cover.

Connection: 4-wire connection.

Plugs

Order Number	Description	Thread Size	O-Ring Order Number	Required Torque (N*m)	Torque Tool Order Number
NF-771-M100	Standard plug	M100 X2	NF-9100		3/4" square drive
NF-771-M100 RD	Plug with rupture disc			1085	FS-300*
NF-771-100-G1/8	Plug with internal port for hose connection				FS-300

* This can be tightened with a 3/4 square drive.

Control Panel and Hose Connection

CP-N2-T-VR
For remote connection

Hose System	Control Panel	Pressure Monitor
E024	CP-N2-T-VR	DPM-3000

Refer to Hyson Nitrogen Gas Spring Hose System Components Catalog for complete listing of EO24 hose connections.

Seal Kits

Cylinder Model	Seal Kit Order Number
MOR 5200	20-262-7000
MOR 7700	20-319-7000
MOR 10700	20-375-7000

Maintenance Tools

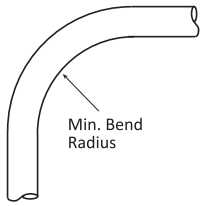
Order Number	Cylinder Model	Socket Size	Required Torque (N*m)	Square Drive Size
SW-5200	MOR 5200	3 1/4"	885	1"
SW-7700	MOR 7700	M100	1085	1"
SW-10700	MOR 10700	4 3/4"	1290	1"

Hose and Fittings

Hose assemblies can be used to connect Manifolds to each other, to connect a remote-control panel, or to connect a compression tank. The following hoses and fittings are ideal for standard 1500 psi Manifold systems. For high pressure 2000 psi Manifold Systems, contact Hyson.

Hose

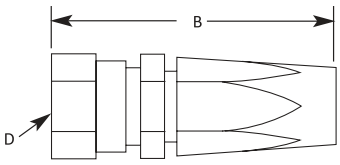
The thermoplastic hose features an abrasion-resistant cover with fiber braid reinforcement for added strength. Designed for factory preassembled or reusable fittings, its maximum working pressure is 1500 psi/103 bar.



Hose Part No.	Hose I.D.	Hose O.B	Minimum Bend Radius
NH-250	0.25 in 6mm	0.47 in 12 mm	2.50 in 64 mm
NH-375	0.38 in 10 mm	0.63 in 16 mm	4.00 in 102 mm
NH-500	0.50 in 13 mm	0.81 in 21 mm	5.50 in 140 mm

Hose Swivel Fitting

This fitting mounts to the end of each hose.



Hose Swivel Part No.	Hose Part No.	A (Thread)	B	Hex D
NHF-5	NH-250	1/2-20	2.24 in 57 mm	0.62 in 15.7 mm
NHF-8	NH-375	3/4-16	2.88 in 73 mm	0.87 in 20.6 mm
NHF-10	NH-500	7/8-14	3.37 in 86 mm	1.00 in 25.4 mm

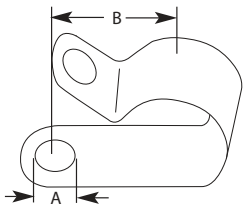
Hose Guard

The Hose Guard provides protection where hose lines are subjected to abrasion, kinking or other damage.

Hose Guard Part No.	Hose Part No.	Hose Guard I.D.
HG-5	NH-250	0.57 in 15 mm
HG-8	NH-375	0.75 in 19 mm
HG-10	NH-500	0.875 in 22 mm

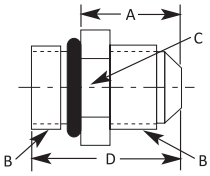
Hose Clamps

The Hose Clamps hold the hose in place to avoid twisting, minimize hose chafing, and provide support where long lengths of hose are used.



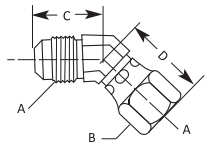
Hose Clamp Part No.	Hose Part No.	Hole A Diameter	B*
HC-5	NH-250	0.20 in 5.1 mm	0.50 in 13 mm
HC-8	NH-375	0.20 in 5.1 mm	0.62 in 16 mm
HC-10	NH-500	0.20 in 5.1 mm	0.81 in 21 mm

Hose



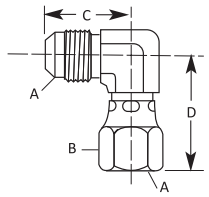
Fitting Part No.	Hose Part No.	A	B (Thread)	C (Hex)	D
NF-1000-5	NH-250	0.87 in 22 mm	1/2-20	0.62 in 15.7 mm	1.23 in 31 mm
NF-1000-8	NH-375	1.04 in 26 mm	3/4-16	0.88 in 22.4 mm	1.48 in 38 mm
NF-1000-10	NH-500	1.20 in 30 mm	7/8-14	1.00 in 25.4 mm	1.70 in 43 mm

Hose



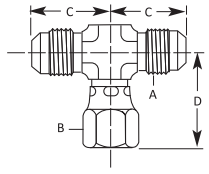
Fitting Part No.	Hose Part No.	A (Thread)	B (Hex)	C	D
SN-4500-5	NH-250	1/2-20	5/8 in	0.77 in 20 mm	1.00 in 25.4 mm
SN-4500-8	NH-375	3/4-16	7/8 in	0.98 in 25 mm	1.28 in 33 mm
SN-4500-10	NH-500	7/8-14	1 in	1.11 in 28 mm	1.44 in 37 mm

Hose



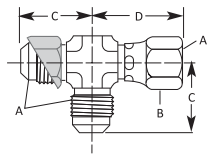
Fitting Part No.	Hose Part No.	A (Thread)	B (Hex)	C	D
SN-2000-5	NH-250	1/2-20	5/8 in	0.95 in 24 mm	1.06 in 27 mm
SN-2000-8	NH-375	3/4-16	7/8 in	1.25 in 32 mm	1.38 in 35 mm
SN-2000-10	NH-500	7/8-14	1 in	1.45 in 37 mm	1.62 in 41 mm

Hose



Fitting Part No.	Hose Part No.	A (Thread)	B (Hex)	C	D
SN-3000-5	NH-250	1/2-20	5/8 in	0.95 in 24 mm	1.06 in 27 mm
SN-3000-8	NH-375	3/4-16	7/8 in	1.25 in 32 mm	1.38 in 35 mm
SN-3000-10	NH-500	7/8-14	1 in	1.45 in 37 mm	1.62 in 41 mm

Hose



Fitting Part No.	Hose Part No.	A (Thread)	B (Hex)	C	D
SN-3300-5	NH-250	1/2-20	5/8 in	0.95 in 24 mm	1.06 in 27 mm
SN-3300-8	NH-375	3/4-16	7/8 in	1.25 in 32 mm	1.38 in 35 mm
SN-3300-10	NH-500	7/8-14	1 in	1.45 in 37 mm	1.62 in 41 mm

Dyne-A-Lube High Speed/High Volume

Understanding Dyne-A-Lube

What is Dyne-A-Lube?

Hyson Products has developed a patented lubrication system designated Dyne-A-Lube This system is available in combination with any of Hyson's nitrogen cylinder systems. A nitrogen cylinder system will operate at higher speeds and last longer when using the Dyne-A-Lube lubrication system.

What is the purpose of Dyne-A-Lube?

The lubrication system serves three purposes:

1. The lubricant acts as a coolant. When sprayed into the seal and cylinder sleeve area, the lubricant removes heat from the friction area and is cooled when recirculated.
2. The lubricant forms a film between the nitrogen seal and cylinder sleeve. The seal hydroplanes on the lubricant, reduction the friction between the seal and the sleeve.
3. The lubricant acts as a sealant. It fills in microscopic voids that may exist in the seal or cylinder sleeve. Sealing these voids prevents nitrogen gas from escaping.

What are Dyne-A-Lube benefits?

Sealing, lubricating and cooling the cylinder results in longer life and higher speeds. Customer results demonstrate that system life is substantially increased when Dyne-A-Lube is used. Many of the system running today have over 50 million strokes on the cylinders with o leakage Several of these systems have operating speeds of more than 250 strokes per minute.

Who can benefit from the use of Dyne-A-Lube?

1. The Customer interested in reducing downtime and increasing production. Dyne-A-Lube last longer meaning less maintenance to the system.
2. The customer running higher speed applications.

Where can Dyne-A-Lube be used?

The Dyne-A- Lube system may be incorporated into manifolds, hose and tank systems, press cushions and nitrogen systems installed in a die shoe. The type of Dyne-A-Lube system will vary depending on which nitrogen system is used.

There are two types of Dyne-A-Lube systems:

High Volume: A manifold design with a Dyne-A-Lube system is commonly used for high volume applications. The Dyne-A-Lube manifold system is available in a variety of stroke lengths with speeds up to 100 strokes per minute Refer to page 60j.03.01 for detailed information.

High Speed: A hose and tank design with a Dyne-A-Lube system is commonly used for high speed applications. The Dyne-A-Lube hose and tank system is available in a variety of stroke lengths. This type of design is normally used when speeds exceed 100 strokes per minute.

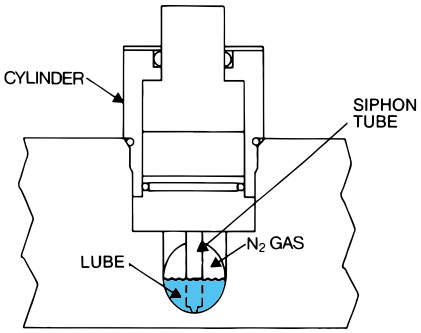
Consult a Hyson Products representative or the Engineered Products Department at 1-800-876-4976 for details on which system is best for a specific application.

Note: All dimensions are nominal unless tolerance is stated.

How it Works

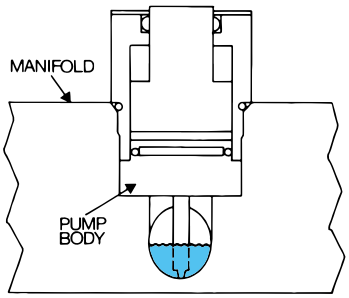
A reservoir of special lubricant rests in the manifold plate drilled volume holes. The pump body siphon tube is submerged in lubricant.

Die at Rest



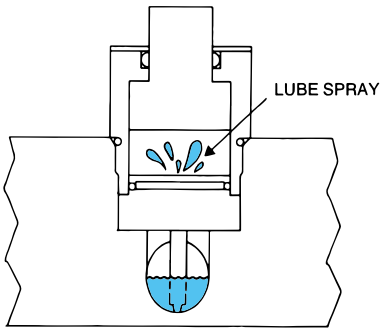
When the press closes, nitrogen is forced out of the cylinder and compressed into the manifold.

Press Closes



The higher pressure nitrogen gas is in the manifold. When the press opens, the rush of returning gas literally blows the lube ahead of it onto the cylinder wall, piston and seal to cool and lubricate the wall.

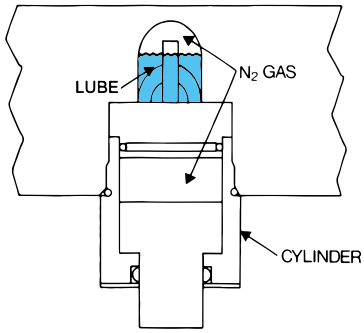
Press Opens



Inverted DYNE-A-LUBE Manifold

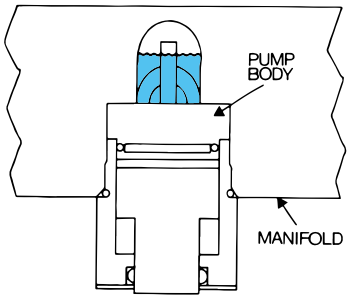
The special lubricant is stored in the manifold plate drilled volume holes.

Die at Rest



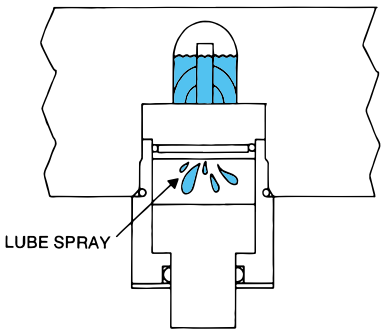
As the press closes, the lubricant and nitrogen are forced from the cylinder into the manifold.

Press Closes

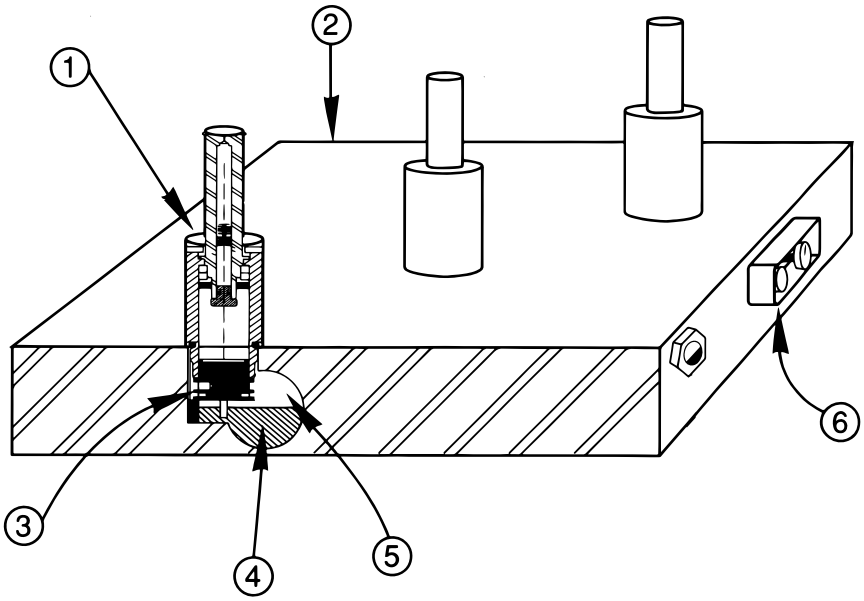


The pressure differential between the cylinder body and the manifold forces the nitrogen and lubricant through the pump body into the cylinder, lubricating and cooling the seal and cylinder body.

Press Opens



Manifold Components



A high volume Dyne-A-Lube manifold system consists of six primary components.

1. Dyne-A-Lube Cylinders

These cylinders function like standard manifold cylinders. They thread into a manifold plate and are sealed with an O-ring. The Dyne-A-Lube cylinder is different from a standard manifold cylinder because 1) the seals are designed specifically for the lubrication system, 2) the body height and total height of the cylinders are dimensioned differently. Refer to page 487 for cylinder types and specific dimensions.

2. Manifold Plate

The manifold plate is shaped cut to customer specifications and finished top and bottom. The manifold plate serves several purposes: 1) to hold the cylinders in proper location; 2) to serve as a reservoir for the nitrogen gas and lubricant; 3) to dissipate heat from the cylinders and lubricant.

3. Pump Body

This device pumps lubricant from the manifold reservoirs into the cylinder sealing area. This dynamic pumping action atomizes the lubricant, spraying the seal and the cylinder bore. In addition, the pump body returns lubricant to the manifold reservoir for cooling. The pump body is illustrated as part of the cylinder, beginning on page 487.

4. Lubricant

Hyson Products has developed a special lubricant with the proper viscosity to lubricate and cool without breaking down or foaming Lubricant is included with every Dyne-A-Lube system.

5. Nitrogen Reservoirs

A reservoir is designed to contain the nitrogen gas forced from the cylinders when they are stroked. The volume holes are designed so nitrogen can be added or exhausted without disrupting the lubrication levels.

6. Control Panel

The control panel contains all of the necessary controls for charging, exhausting and reading the nitrogen pressure level in a high volume Dyne-A-Lube system. It is connected to the manifold plate. Control panels are available in several styles, depending on the application. It is the same control panel used on a standard manifold system. Refer to page 477 of the standard manifold section for details.

Manifold Design

A Dyne-A-Lube manifold system is similar to a standard manifold system. However, there are some additional requirements to consider:

1. The pressure rise should be 20% or less for optimum performance and extended life of the system.
2. The correct amount of lubricant must be calculated.
3. The total volume of the system must account for the nitrogen gas and the lubricant.
4. The manifold of a Dyne-A-Lube system is larger than a standard manifold because of the additional volume required for lubricant and the increased cavity depths for the cylinder pump bodies.

To determine total volume required for a Dyne-A-Lube manifold system, the nitrogen volume and the lubricant volume must be calculated.

To calculate the total volume required for a Dyne-A-Lube manifold system, the nitrogen volume and the lubricant volume must be calculated.

Total Reservoir Volume Required (VR)	=	**Nitrogen** Volume (VN)	+	**Lubricant** Volume (VL)

Nitrogen volume (VN) is calculated in the same manner as in a standard manifold system Refer to page 458 of the manifold section for details on calculating nitrogen volume.

To determine Lubricant Volume (VL), first calculate how many pints of lubricant the system will take:

$$\text{Volume in Pints (VP)} = \frac{\text{Volume of Nitrogen (VN)}}{145}$$

Note: Round up to the nearest ½ pint.

Now convert pints to cubic inches. The unit of measure needs to be consistent for nitrogen volume and lubricant volume.

To convert pints to cubic inches:

$$\text{Lubricant Volume (VL)} = \text{Volume in Pints (VP)} \times 29$$

After total volume requirements are calculated, the volume hole drilling can be designed into the manifold.

This information is used in determining manifold plate size Hyson Products will review and detail all Dyne-A-Lube designs.

The following pages will provide cylinder and cavity dimensions.

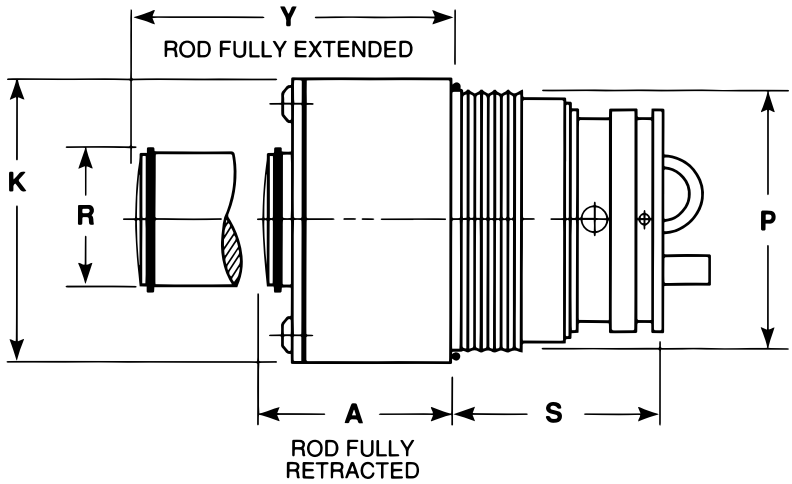
Note: The cylinders and cavity depths are different for lower and upper Dyne-A-Lube manifold systems.

Note: All dimensions are nominal unless tolerance is stated.

DL Cylinders

(for Lower Systems)

Force and Fixed Dimensions



Model	Max. Force @ 1500 psi or 103 Bar	Piston Diameter	Effective Piston Area	K	P	R	S
DL 0.5	1175 lbs.	1.00 in.	0.78 sq. in.	1.60 in.	1-5/16 - 12	0.87 in.	1.50 in.
	5,23 kN	25 mm	5,03 sq. cm	41 mm		22 mm	38 mm
DL 1+	2650 lbs.	1.50 in.	1.77 sq. in.	2.12 in.	1-7/8 - 12	1.08 in.	1.37 in.
	11,78 kN	38 mm	11,4 sq cm	54 mm		27 mm	35 mm
DL 2.5	5160 lbs.	2.09 in.	3.44 sq. in.	2.75 in.	2-1/2 - 12	1.37 in.	1.18 in.
	22,95 kN	53 mm	22,2 sq cm	70 mm		35 mm	46 mm
DL 4	8124 lbs.	2.63 in.	5.42 sq. in.	3.56 in.	M 82x2 mm	1.86 in.	1.12 in.
	36,13 kN	67 mm	34,9 sq. cm	90 mm		47 mm	54 mm
DL 6	11970 lbs.	3.19 in.	7.98 sq. in.	4.31 in.	M 100x2 mm	2.51 in.	2.12 in.
	53,24 kN	81 mm	51,5 sq. cm	109 mm		64 mm	54 mm

Note: All dimensions are nominal unless tolerance is stated.

DL Standard Stroke Dimensions

(for Lower Systems)

Variable Dimensions with Stroke

	DL 0.5		DL 1+, DL 2.5 DL 4 DL 6	
Stroke	A	Y	A	Y
0.5 in.	1.66	2.16	1.91	2.41
13 mm	42	55	49	61
1.0 in.	2.16	3.16	2.41	3.41
25 mm	55	80	61	87
1.5 in.	2.66	4.16	2.91	4.41
38 mm	67	106	74	112
2.0 in.	3.16	5.16	3.41	5.41
51 mm	80	131	87	137
2.5 in.	3.66	6.16	3.91	6.41
64 mm	93	156	99	163
3.0 in.	4.16	7.16	4.41	7.41
76 mm	106	182	112	188
3.5 in.	4.56	8.16	4.91	8.41
89 mm	118	207	125	214
4.0 in.	-	-	5.41	9.41
102 mm	-	-	137	239
4.5 in.	-	-	5.91	10.41
114 mm	-	-	150	264
5.0 in.	-	-	6.41	11.41
127 mm	-	-	163	290
5.5 in.	-	-	6.91	12.41
140 mm	-	-	176	315
6.0 in.	-	-	7.41	13.41
152 mm	-	-	188	341

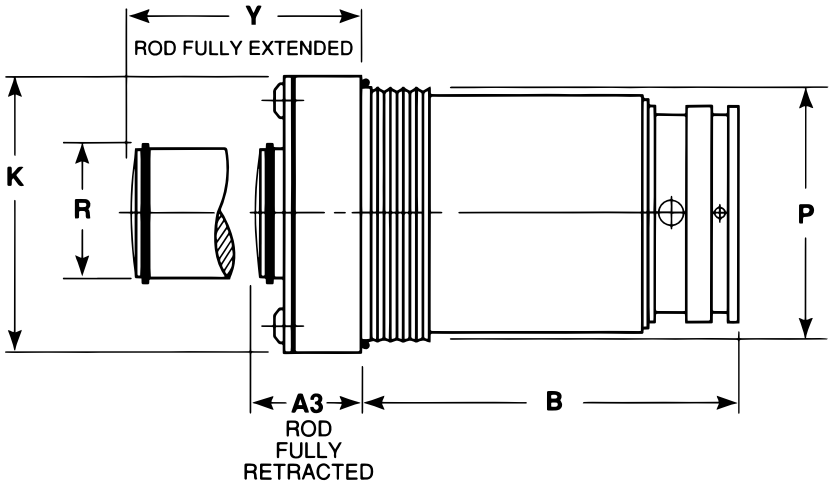
Maximum Stroke Lengths Available	
DL 0.5	3.5 in.
	89 mm
DL 1+	3.5 in.
	89 mm
DL 2.5	5.0 in.
	127 mm
DL 4	6.0
	152 mm
DL 6	6.0 in.
	152 mm

Note: All dimensions are nominal unless tolerance is stated.

DLD Cylinders

(for Lower Systems)

Force and Fixed Dimensions



Model	Max. Force @ 1500 psi Or 103 Bar	Piston Diameter	Effective Piston Area	K	P	R	A3
DLD 0.5	1175 lbs.	1.00 in.	0.78 sq. in.	1.60 in.	1-5/16 - 12	0.87 in.	1.66 in.
	5,23 kN	25 mm	5,03 sq. cm	41 mm		22 mm	41 mm
DLD 1+	2650 lbs.	1.50 in.	1.77 sq. in.	2.12 in.	1-7/8 - 12	1.08 in.	1.66 in.
	11,78 kN	38 mm	11,4 sq cm	54 mm		27 mm	41 mm
DLD 2.5	5160 lbs.	2.09 in.	3.44 sq. in.	2.75 in.	2-1/2 - 12	1.37 in.	1.66 in.
	22,95 kN	53 mm	22,2 sq cm	70 mm		35 mm	41 mm
DLD 4	8124 lbs.	2.63 in.	5.42 sq. in.	3.56 in.	M 82x2 mm	1.86 in.	1.66 in.
	36,13 kN	67 mm	34,9 sq. cm	90 mm		47 mm	41 mm
DLD 6	11970 lbs.	3.19 in.	7.98 sq. in.	4.31 in.	M 100x2 mm	2.51 in.	1.66 in.
	53,24 kN	81 mm	51,5 sq. cm	109 mm		64 mm	41 mm

Note: All dimensions are nominal unless tolerance is stated.

DLD Standard Stroke Dimensions

(for Lower Systems)

Variable Dimensions with Stroke

	DLD 0.5		DLD 1+		DLD 2.5		DLD 4		DLD 6	
Stroke	Y	B	Y	B	Y	B	Y	B	Y	B
0.5 in.	2.16	1.50	2.16	1.61	2.16	2.05	2.16	2.36	2.16	2.36
13 mm	55	38	55	41	55	52	55	60	55	60
1.0 in.	2.66	2.00	2.66	2.11	2.66	2.55	2.66	2.86	2.66	2.86
25 mm	68	51	68	54	68	65	68	73	68	73
1.5 in.	3.16	2.50	3.16	2.61	3.16	3.05	3.16	3.36	3.16	3.36
38 mm	80	64	80	66	80	77	80	85	80	85
2.0 in.	3.66	3.00	3.66	3.11	3.66	3.55	3.66	3.86	3.66	3.86
51 mm	93	76	93	79	93	90	93	98	93	98
2.5 in.	4.16	3.50	4.16	3.61	4.16	4.05	4.16	4.36	4.16	4.36
64 mm	106	89	106	82	106	103	106	111	106	111
3.0 in.	4.66	4.00	4.66	4.11	4.66	4.55	4.66	4.86	4.66	4.86
76 mm	118	102	118	104	118	116	118	123	118	123
3.5 in.	5.16	4.50	5.16	4.61	5.16	5.05	5.16	5.36	5.16	5.36
89 mm	131	114	131	117	131	128	131	136	131	136
4.0 in.	-	-	-	-	5.66	5.55	5.66	5.86	5.66	5.86
102 mm	-	-	-	-	144	141	144	149	144	149
4.5 in.	-	-	-	-	6.16	6.05	6.16	6.36	6.16	6.36
114 mm	-	-	-	-	156	154	158	162	156	162
5.0 in.	-	-	-	-	6.66	6.55	6.66	6.86	6.66	6.86
127 mm	-	-	-	-	169	166	169	174	169	174
5.5 in.	-	-	-	-	-	-	7.16	7.36	7.16	7.36
140 mm	-	-	-	-	-	-	182	187	182	187
6.0 in.	-	-	-	-	-	-	7.66	7.86	7.66	7.86
152 mm	-	-	-	-	-	-	195	200	195	200

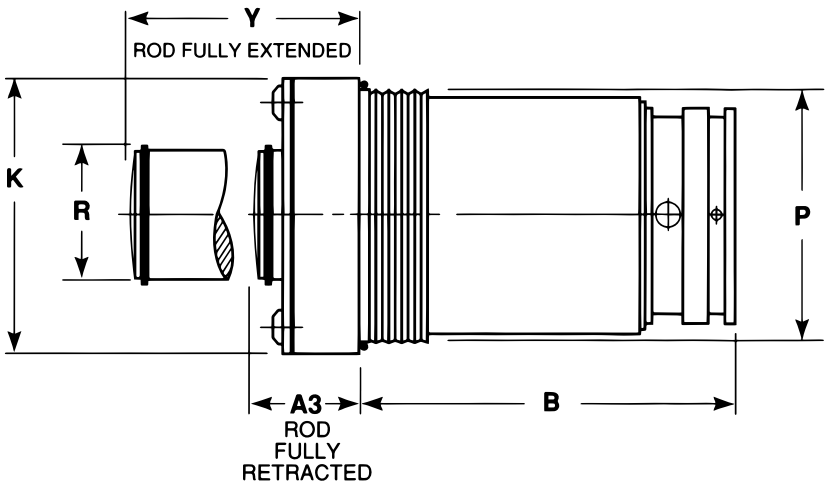
Maximum Stroke Lengths Available	
DLD 0.5	3.5 in.
	89 mm
DLD 1+	3.5 in.
	89 mm
DLD 2.5	5.0 in.
	127 mm
DLD 4	6.0
	152 mm
DLD 6	6.0 in.
	152 mm

Note: All dimensions are nominal unless tolerance is stated.

DLSB Cylinders

(for Lower Systems)

Force and Fixed Dimensions



Model	Max. Force @ 1500 psi Or 103 Bar	Piston Diameter	Effective Piston Area	K	P	R	A3
DLSB 0.5	1175 lbs.	1.00 in.	0.78 sq. in.	1.60 in.	1-5/16 - 12	0.87 in.	0.66 in.
	5,23 kN	25 mm.	5,03 sq. cm.	41 mm.		22 mm.	17 mm.
DLSB 1+	2650 lbs.	1.50 in.	1.77 sq. in.	2.12 in.	1-7/8 - 12	1.08 in.	0.66 in.
	11,78 kN	38 mm.	11,.4 sq. cm.	54 mm.		27 mm.	17 mm.
DLSB 2.5	5160 lbs.	2.09 in.	3.44 sq. in.	2.75 in.	2-1/2 - 12	1.37 in.	0.66 in.
	22,95 kN	53 mm.	22,2 sq. cm.	70 mm.		35 mm.	17 mm.
DLSB 4	8124 lbs.	2.63 in.	5.42 sq. in.	3.56 in.	M 82x2 mm	1.86 in.	0.66 in.
	36,13 kN	67 mm.	34,9 sq. cm.	90 mm.		47 mm.	17 mm.

Note: All dimensions are nominal unless tolerance is stated.

DLSB Standard Stroke Dimensions

(for Lower Systems)

Variable Dimensions with Stroke

	DLSB 0.5		DLSB 1+		DLSB 2.5		DLSB 4	
Stroke	Y	B	Y	B	Y	B	Y	B
0.5 in.	1.16	2.50	1.16	2.16	1.16	3.05	1.16	3.36
13 mm	29	64	29	66	29	77	29	85
1.0 in.	1.66	3.00	1.66	3.11	1.66	3.55	166	3.86
25 mm	42	76	42	79	42	90	42	98
1.5 in.	2.16	3.50	2.16	3.61	2.16	4.05	2.16	4.36
38 mm	55	89	55	92	55	103	55	111
2.0 in.	2.66	4.00	2.66	4.11	2.66	4.55	2.66	4.86
51 mm	68	102	68	104	68	116	68	123
2.5 in.	3.16	4.50	4.16	4.61	3.16	5.05	3.16	5.36
64 mm	80	114	80	117	80	128	80	136
3.0 in.	3.66	5.00	3.66	5.11	3.66	5.55	3.66	5.86
76 mm	93	127	93	130	93	141	93	149
3.5 in.	416	5.50	4.16	5.61	4.16	6.05	4.16	6.36
89 mm	106	140	106	142	106	154	106	162
4.0 in.	-	-	-	-	4.66	6.55	4.66	6.86
102 mm	-	-	-	-	118	166	118	174
4.5 in.	-	-	-	-	5.16	7.05	5.16	7.36
114 mm	-	-	-	-	131	179	131	187
5.0 in.	-	-	-	-	5.66	7.55	5.66	7.86
127 mm	-	-	-	-	144	192	144	1200
5.5 in.	-	-	-	-	-	-	6.16	8.36
140 mm	-	-	-	-	-	-	156	212
6.0 in.	-	-	-	-	-	-	6.66	8.86
152 mm	-	-	-	-	-	-	169	225

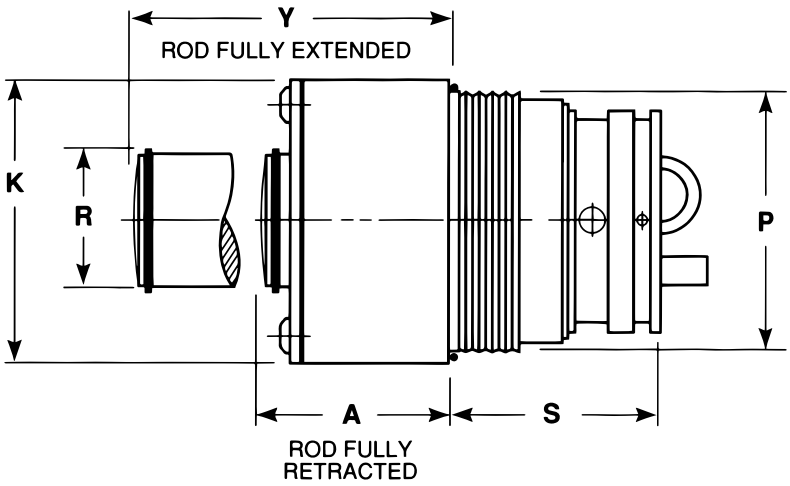
Maximum Stroke Lengths Available	
DLSB 0.5	3.5 in.
	89 mm
DLSB 1+	3.5 in.
	89 mm
DLSB 2.5	5.0 in.
	127 mm
DLSB 4	6.0
	152 mm

Note: All dimensions are nominal unless tolerance is stated.

DLU Cylinders

(for Upper Systems)

Force and Fixed Dimensions



Model	Max. Force @ 1500 psi Or 103 Bar	Piston Diameter	Effective Piston Area	K	P	R	A3
DLU 0.5	1175 lbs.	1.00 in.	0.78 sq. in.	1.60 in.	1-5/16 - 12	0.87 in.	1.50 in.
	5,23 kN	25 mm	5,03 sq. cm	41 mm		22 mm	38 mm.
DLU 1+	2650 lbs.	1.50 in.	1.77 sq. in.	2.12 in.	1-7/8 - 12	1.08 in.	1.37 in.
	11,78 kN	38 mm	11,4 sq cm	54 mm		27 mm	35 mm.
DLU 2.5	5160 lbs.	2.09 in.	3.44 sq. in.	2.75 in.	2-1/2 - 12	1.37 in.	1.81 in.
	22,95 kN	53 mm	22,2 sq cm	70 mm		35 mm	46 mm.
DLU 4	8124 lbs.	2.63 in.	5.42 sq. in.	3.56 in.	M 82x2 mm	1.86 in.	2.12 in.
	36,13 kN	67 mm	34,9 sq. cm	90 mm		47 mm	54 mm.
DLU 6	11970 lbs.	3.19 in.	7.98 sq. in.	4.31 in.	M 100x2 mm	2.51 in.	2.12 in.
	53,24 kN	81 mm	51,5 sq. cm	109 mm		64 mm	54 mm.

Note: All dimensions are nominal unless tolerance is stated.

DLU Standard Stroke Dimensions

(for Upper Systems)

Variable Dimensions with Stroke

	DLU 0.5		DLU 1+, DLU 2.5 DLU 4 DLU 6	
Stroke	A	Y	A	Y
0.5 in.	1.66	2.16	1.91	2.41
13 mm	42	55	49	61
1.0 in.	2.16	3.16	2.41	3.41
25 mm	55	80	61	87
1.5 in.	2.66	4.16	2.91	4.41
38 mm	67	106	74	112
2.0 in.	3.16	5.16	3.41	5.41
51 mm	80	131	87	137
2.5 in.	3.66	6.16	3.91	6.41
64 mm	93	156	99	163
3.0 in.	4.16	7.16	4.41	7.41
76 mm	106	182	112	188
3.5 in.	4.56	8.16	4.91	8.41
89 mm	118	207	125	214
4.0 in.	—	—	5.41	9.41
102 mm	—	—	137	239
4.5 in.	—	—	5.91	10.41
114 mm	—	—	150	264
5.0 in.	—	—	6.41	11.41
127 mm	—	—	163	290
5.5 in.	—	—	6.91	12.41
140 mm	—	—	176	315
6.0 in.	—	—	7.41	13.41
152 mm	—	—	188	341

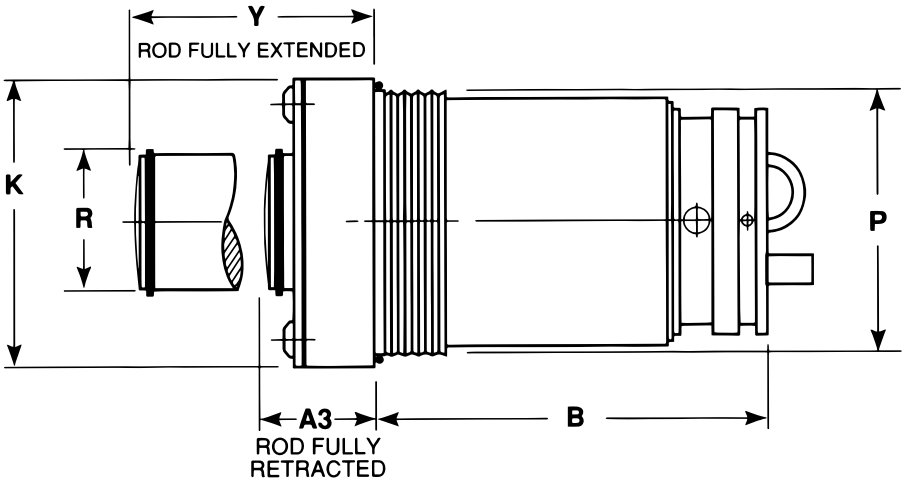
Maximum Stroke Lengths Available	
DLU 0.5	3.5 in.
	89 mm
DLU 1+	3.5 in.
	89 mm
DLU 2.5	5.0 in.
	127 mm
DLU 4	6.0
	152 mm
DLU 6	6.0 in.
	152 mm

Note: All dimensions are nominal unless tolerance is stated.

DLDU Cylinders

(for Upper Systems)

Force and Fixed Dimensions



Model	Max. Force @ 1500 psi Or 103 Bar	Piston Diameter	Effective Piston Area	K	P	R	A3
DLDU 0.5	1175 lbs.	1.00 in.	0.78 sq. in.	1.60 in.	1-5/16 - 12	0.87 in.	1.66 in.
	5,.23 kN	25 mm	5,03 sq. cm	41 mm		22 mm	42 mm.
DLDU 1+	2650 lbs.	1.50 in.	1.77 sq. in.	2.12 in.	1-7/8 - 12	1.08 in.	1.66 in.
	11,78 kN	38 mm	11,4 sq cm	54 mm		27 mm	42 mm.
DLDU 2.5	5160 lbs.	2.09 in.	3.44 sq. in.	2.75 in.	2-1/2 - 12	1.37 in.	1.66 in.
	22,95 kN	53 mm	22,2 sq cm	70 mm		35 mm	42 mm.
DLDU 4	8124 lbs.	2.63 in.	5.42 sq. in.	3.56 in.	M 82x2 mm	1.86 in.	1.66 in.
	36,13 kN	67 mm	34,9 sq. cm	90 mm		47 mm	42 mm.
DLDU 6	11970 lbs.	3.19 in.	7.98 sq. in.	4.31 in.	M 100x2 mm	2.51 in.	1.66 in.
	53,24 kN	81 mm	51,5 sq. cm	109 mm		64 mm	42 mm.

Note: All dimensions are nominal unless tolerance is stated.

DLDU Standard Stroke Dimensions

(for Upper Systems)

Variable Dimensions with Stroke

	DLDU 0.5		DLDU 1+		DLDU 2.5		DLDU 4		DLDU 6	
Stroke	Y	B	Y	B	Y	B	Y	B	Y	B
0.5 in.	2.16	1.50	2.16	1.61	2.16	2.05	2.16	2.36	2.16	2.36
13 mm	55	38	55	41	55	52	55	60	55	60
1.0 in.	2.66	2.00	2.66	2.11	2.66	2.55	2.66	2.86	2.66	2.86
25 mm	68	51	68	54	68	65	68	73	68	73
1.5 in.	3.16	2.50	3.16	2.61	3.16	3.05	3.16	3.36	3.16	3.36
38 mm	80	64	80	66	80	77	80	85	80	85
2.0 in.	3.66	3.00	3.66	3.11	3.66	3.55	3.66	3.86	3.66	3.86
51 mm	93	76	93	79	93	90	93	98	93	98
2.5 in.	4.16	3.50	4.16	3.61	4.16	4.05	4.16	4.36	4.16	4.36
64 mm	106	89	106	82	106	103	106	111	106	111
3.0 in.	4.66	4.00	4.66	4.11	4.66	4.55	4.66	4.86	4.66	4.86
76 mm	118	102	118	104	118	116	118	123	118	123
3.5 in.	5.16	4.50	5.16	4.61	5.16	5.05	5.16	5.36	5.16	5.36
89 mm	131	114	131	117	131	128	131	136	131	136
4.0 in.	—	—	—	—	5.66	5.55	5.66	5.86	53.66	5.86
102 mm	—	—	—	—	144	141	144	149	144	149
4.5 in.	—	—	—	—	6.16	6.05	6.16	6.36	6.16	6.36
114 mm	—	—	—	—	156	154	158	162	156	162
5.0 in.	—	—	—	—	6.66	6.55	6.66	6.86	6.66	6.86
127 mm	—	—	—	—	169	166	169	174	169	174
5.5 in.	—	—	—	—	—	—	7.16	7.36	7.16	7.36
140 mm	—	—	—	—	—	—	182	187	182	1887
6.0 in.	—	—	—	—	—	—	7.66	7.86	7.66	7.86
152 mm	—	—	—	—	—	—	195	200	195	200

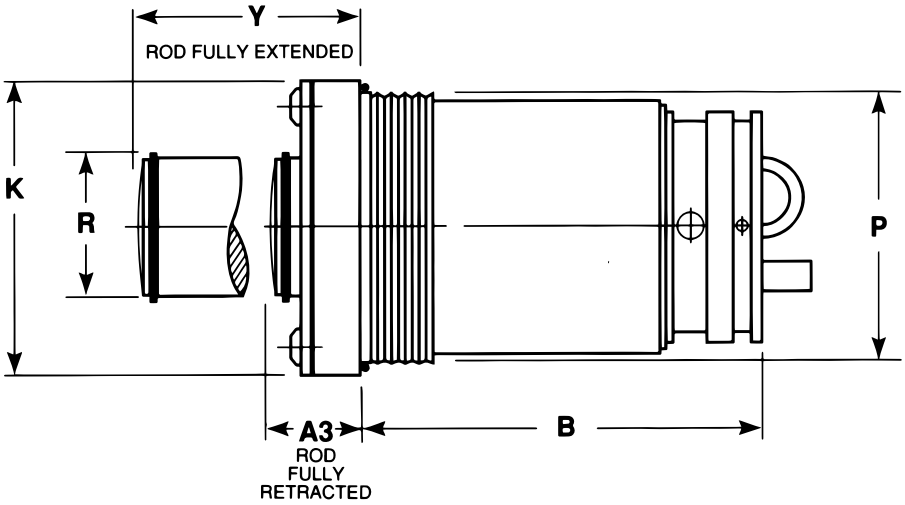
Maximum Stroke Lengths Available	
DLDU 0.5	3.5 in.
	89 mm
DLDU 1+	3.5 in.
	89 mm
DLDU 2.5	5.0 in.
	127 mm
DLDU 4	6.0
	152 mm
DDLU 6	6.0 in.
	152 mm

Note: All dimensions are nominal unless tolerance is stated.

DLSBU Cylinders

(for Upper Systems)

Force and Fixed Dimensions



Model	Max. Force @ 1500 psi Or 103 Bar	Piston Diameter	Effective Piston Area	K	P	R	A3
DLSBU 0.5	1175 lbs.	1.00 in.	0.78 sq. in.	1.60 in.	1-5/16 - 12	0.87 in.	0.66 in.
	5,.23 kN	25 mm.	5,03 sq. cm.	41 mm.		22 mm.	17 mm.
DLSBU 1+	2650 lbs.	1.50 in.	1.77 sq. in.	2.12 in.	1-7/8 - 12	1.08 in.	0.66 in.
	11,78 kN	38 mm.	11,.4 sq. cm.	54 mm.		27 mm.	17 mm.
DLSBU 2.5	5160 lbs.	2.09 in.	3.44 sq. in.	2.75 in.	2-1/2 - 12	1.37 in.	0.66 in.
	22,95 kN	53 mm.	22,2 sq. cm.	70 mm.		35 mm.	17 mm.
DLSBU 4	8124 lbs.	2.63 in.	5.42 sq. in.	3.56 in.	M 82x2 mm.	1.86 in.	0.66 in.
	36,13 kN	67 mm.	34,9 sq. cm.	90 mm.		47 mm.	17 mm.

Note: All dimensions are nominal unless tolerance is stated.

DLSBU Standard Stroke Dimensions

(for Upper Systems)

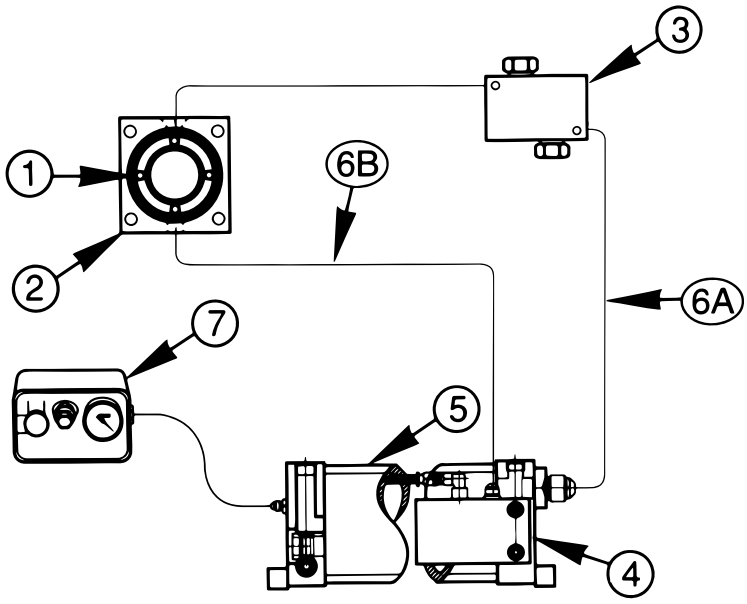
Variable Dimensions with Stroke

	DLSBU 0.5		DLSBU 1+		DLSBU 2.5		DLSBU 4	
Stroke	Y	B	Y	B	Y	B	Y	B
0.5 in.	1.16	2.50	1.16	2.16	1.16	3.05	1.16	3.36
13 mm	29	64	29	66	29	77	29	85
1.0 in.	1.66	3.00	1.66	3.11	1.66	3.55	166	3.86
25 mm	42	76	42	79	42	90	42	98
1.5 in.	2.16	3.50	2.16	3.61	2.16	4.05	2.16	4.36
38 mm	55	89	55	92	55	103	55	111
2.0 in.	2.66	4.00	2.66	4.11	2.66	4.55	2.66	4.86
51 mm	68	102	68	104	68	116	68	123
2.5 in.	3.16	4.50	4.16	4.61	3.16	5.05	3.16	5.36
64 mm	80	114	80	117	80	128	80	136
3.0 in.	3.66	5.00	3.66	5.11	3.66	5.55	3.66	5.86
76 mm	93	127	93	130	93	141	93	149
3.5 in.	416	5.50	4.16	5.61	4.16	6.05	4.16	6.36
89 mm	106	140	106	142	106	154	106	162
4.0 in.	—	—	—	—	4.66	6.55	4.66	6.86
102 mm	—	—	—	—	118	166	118	174
4.5 in.	—	—	—	—	5.16	7.05	5.16	7.36
114 mm	—	—	—	—	131	179	131	187
5.0 in.	—	—	—	—	5.66	7.55	5.66	7.86
127 mm	—	—	—	—	144	192	144	1200
5.5 in.	—	—	—	—	—	—	6.16	8.36
140 mm	—	—	—	—	—	—	156	212
6.0 in.	—	—	—	—	—	—	6.66	8.86
152 mm	—	—	—	—	—	—	169	225

Maximum Stroke Lengths Available	
DLSBU 0.5	3.5 in.
	89 mm.
DLSBU 1+	3.5 in.
	89 mm.
DLSBU 2.5	5.0 in.
	127 mm.
DLSBU 4	6.0 in.
	152 mm.

Note: All dimensions are nominal unless tolerance is stated.

Component Description



The high speed Dyne-A-Lube system consists of seven primary components.

1. Dyne-A-Lube Cylinders

Dyne-A-Lube cylinders in a hose and tank system are threaded into a base.

2. Cylinder Base

The base is used to hold the cylinder(s) in place A compression tank is connected to it with a hose. The base can hold one or more cylinders It is equipped with an RD-2150 safety rupture disc to assure adequate protection against accidental over pressurization. Refer to page 60.09.01 for details.

3. Nitrogen Control Module

This assembly is used to control the flow of nitrogen gas in the system. The nitrogen control module assures the appropriate mixing of nitrogen gas and lubricant.

4. Lube Control Module

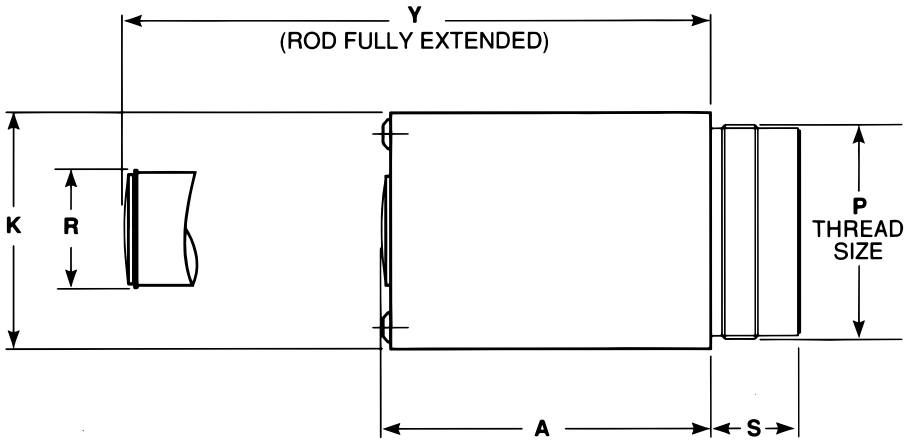
The lube control module serves two functions. The first is to control the flow of lubricant throughout the system. The second function is to monitor fluid levels. In most cases, the lube control module is attached to the tank. Refer to page 60.11.01 for details.

5. Compression/Cooling Tank

The compression tank serves two purposes. The first is to act as a reservoir for nitrogen gas and lubricant that is forced from the cylinders when they are stroked. The second purpose is to extract heat from the nitrogen gas and lubricant. Compression tanks come in a variety of sizes to suit specific applications. Volume requirements dictate compression/cooling tank size. Refer to page 60.12.01 for details.

DLB Cylinders

Force and Fixed Dimensions



DLB DYNE-A-LUBE CYLINDERS								
Model	**Size**	**Max. Force @ 1500 psi Or 103 Bar**	**Piston Diameter**	**Effective Piston Area**	**K**	**P**	**R**	**S**
DLB 0.5	1/2 ton	1175 lbs.	1.00 in	0.78 sq. in.	1.60 in.	1-5/16 – 12	0.87 in.	0.88 in
		5,23 kN	25 mm.	5.03 sq. cm.	41 mm.		22 mm.	22 mm.
DLB 1+	1+ ton	2650 lbs.	1.50 in.	1.77 sq. in.	2.12 in	1-7/8 – 12	1.08 in.	0.72 in.
		11,78 kN	38 mm.	11.4 sq. cm.	54 mm.		27 mm.	25 mm.
DLB 2.5	2.5 ton	5160 lbs.	2.09 in.	3.44 sq. in.	2.75 in.	2-1/2 – 12	1.37 in.	1.00 in.
		22,95 kN	53 mm.	22.2 sq. cm.	70 mm.		35 mm.	25 mm.
DLB 4	4 ton	8124 lbs.	2.63 in.	5.42 sq. in.	3.56 in.	M 82x2 mm.	47 mm.	32 mm.
		36,13 kN	67 mm.	34.9 sq. cm.	90 mm.		47 mm.	32 mm.
DLB 6	6 ton	11970 lbs.	3.19 in.	7.98 sq. in.	4.31 in.	M 100x2 mm.	2.51 in.	1.25 in.
		53,24 kN	81 mm.	51.5 sq. cm.	109 mm.		64 mm.	32 mm.

Note: All dimensions are nominal unless tolerance is stated.

DLB Standard Stroke Dimensions

Variable Dimensions with Stroke

	DLB 0.5		DLB 1+, 2.5, 4, 6	
Stroke	Y	A	Y	A
0.25 in.	1.16	0.91	—	—
6 mm.	29	23		
0.50 in.	1.66	1.16	—	—
13 mm.	42	29		
0.75 in.	2.16	1.41	2.41	1.66
19 mm.	55	30	61	42
1.00 in.	2.66	1.66	2.91	1.91
25 mm.	67	42	74	49
1.50 in.	3.66	2.16	3.91	2.41
38 mm.	93	55	99	61
2.00 in.	4.66	2.66	4.91	2.91
51 mm.	118	67	125	74
2.50 in.	5.66	3.16	5.91	3.41
64 mm.	144	80	150	87
3.00 in.	6.66	3.66	6.91	3.91
78 mm.	169	93	176	99
3.50 in.	7.66	4.6	7.91	4.41
89 mm.	195	106	201	112
4.00 in.	8.66	4.66	8.91	4.91
102 mm.	220	118	226	125
4.50 in.	—	—	9.91	5.41
114 mm.	—	—	252	137
5.00 in.	—	—	10.91	5.91
27 mm.	—	—	277	150
5.50 in.	—	—	11.91	6.41
140 mm.	—	—	303	163
6.00 in.	—	—	12.91	6.91
152 mm.	—	—	328	176
6.50 in.	—	—	13.91	7.41
165 mm.	—	—	353	188
7.00 in.	—	—	14.91	7.91
178 mm.	—	—	379	201
7.50 in.	—	—	15.91	8.41
191 mm.	—	—	404	214
8.00 in.	—	—	16.91	8.91
203 mm.	—	—	430	226

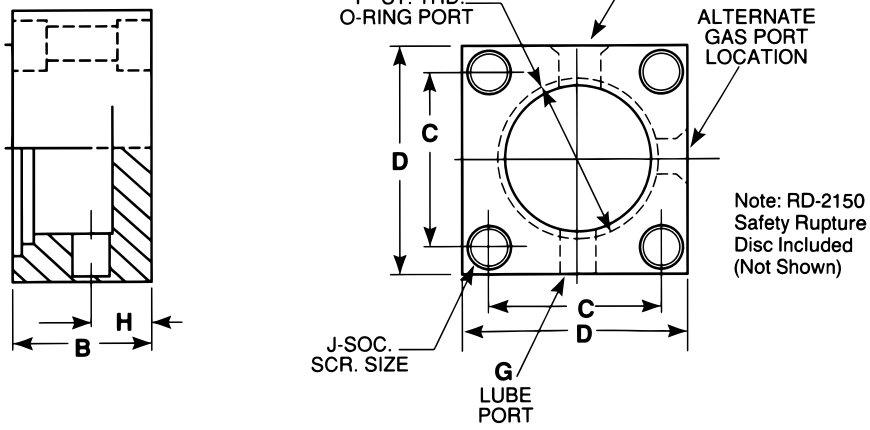
MINIMUM PLATE THICKNESS	
Model	Min. Plate Thickness
DLB 0.5	1.38 in.
	35 mm.
DLB 1+	1.38 in.
	35 mm.
DLB 2.5	1.50 in.
	38 mm.
DLB 4	2.00 in.
	51 mm.
DLB 6	2.00 in.
	51 mm.

MAXIMUM STROKE LENGTHS AVAILABLE	
Model	Min. Plate Thickness
DLB 0.5	4.00 in.
	102 mm.
DLB 1+	4.00 in.
	102 mm.
DLB 2.5	6.00 in.
	152 mm.
DLB 4	7.00 in.
	178 mm.
DLB 6	8.00 in.
	203 mm.

Note: All dimensions are nominal unless tolerance is stated.

Cylinder Bases

The cylinder base is usually customer made for a specific application. It is used to hold the cylinders in a specific location(s) The base dimensions listed below are for use with a single DLB cylinder. For bases requiring other cylinder models or more than one cylinder, consult Hyson Products.



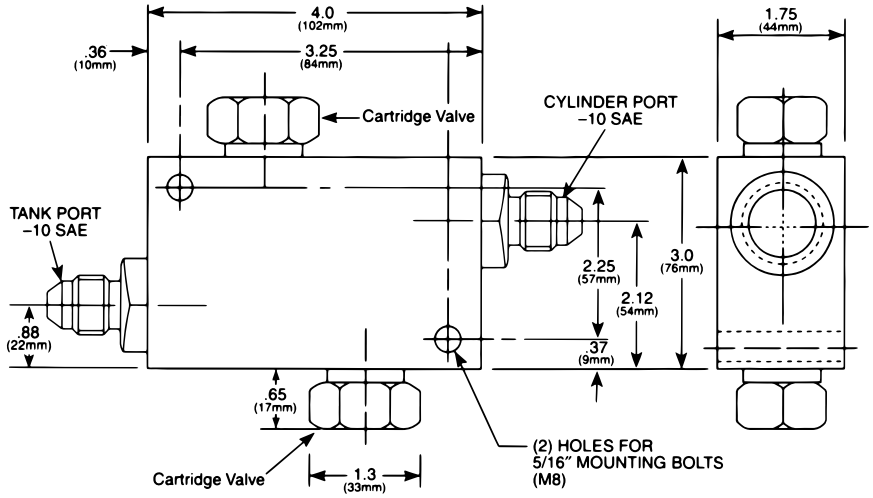
BASE SIZES FOR SINGLE HIGH SPEED DYNE-A-LUBE CYLINDERS								
Model	**B**	**H**	**C**	**D**	**Lube Port G**	**Gas Port E**	**P**	**J**
DLB 0.5	1.38 in.	0.50 in.	1.62 in.	2.25 in.	1/2 –-20	3/4 –-16	1-5/16 – 12	5/16 – 18
	35 mm.	13 mm.	41 mm.	57 mm.				M8
DLB 1+	1.38 in.	0.62 in.	2.12 in.	2.75 in.	1/2 –-20	3/4 –-16	1-7/8 – 12	5/16 – 18
	35 mm.	16 mm.	54 mm.	70 mm.				M8
DLB 2.5	1.75 in.	0.75 in.	2.75 in.	3.50 in.	1/2 –-20	3/4 –-16	2-1/2 – 12	3/8 – 18
	44 mm.	19 mm.	70 mm.	90 mm.				M10
DLB 4	2.50 in.	1.00 in.	3.50 in.	5.00 in.	1/2 –-20	7/8 –-14	M 82x2 mm.	1/2 – 20
	64 mm..	25 mm.	89 mm.	127 mm.				M12
DLB 6	2.50 in.	1.00 in.	4.25 in.	5.50 in	1/2 –-20	7/8 –-14	M 100x2 mm.	1/2 – 20
	64 mm.	25 mm.	108 mm.	140 mm.				M12

***Port sizes may vary depending on the application.**

Note: All dimensions are nominal unless tolerance is stated.

Nitrogen Control Module

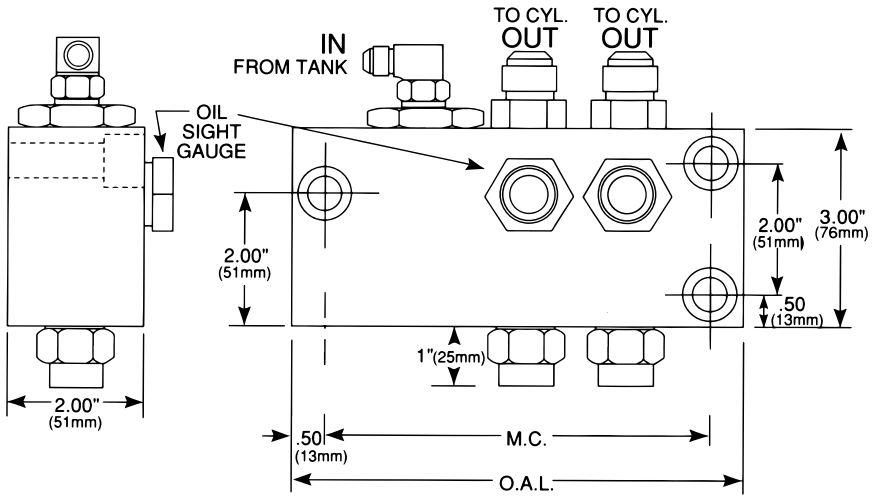
One nitrogen control module is usually required for each high speed Dyne-A-Lube cylinder. It is connected to the high speed system with hoses. The nitrogen control module should be mounted within 12 inches of the cylinder. Occasionally, the nitrogen control module can also be incorporated into a special base, rather than a separate block. Consult the factory for these details.



Note: All dimensions are nominal unless tolerance is stated.

Lube Control Module

The dimensions of the lube control module vary with the number of Dyne-A-Lube cylinders used. It has one outlet for connection to the compression/cooling tank, and an individual outlet exists for each cylinder used. The lube control module is usually attached directly to the compression/cooling tank.



	Overall Length (O.A.L.)	Mounting Center (M.C.)
1 cyl. system	5.50 in.	4.50 in.
	140 mm.	114 mm.
2 cyl. system	1.38 in.	6.00
	35 mm.	152 mm.
3 cyl. system	1.50 in.	7.50 mm.
	38 mm.	191 mm.
4 cyl. system	2.00 in.	9.00 in.
	51 mm.	229 mm.
(Note: 2 cyl. System is shown)		

***Port sizes may vary depending on the application.**

Note: All dimensions are nominal unless tolerance is stated.

Volume Calculations

The size of the compression/cooling tank is determined by the required reservoir volume. Total reservoir volume for a high speed Dyne-A-Lube system is calculated as follows:

Total Reservoir Volume Required (VR)	=	Nitrogen Volume (VN)	+	Lubricant Volume (VL)

Nitrogen volume (VN) is calculated in the same manner as in a standard hose and tank system Refer to page 20.06.01 f the hose and tank section for details on calculating nitrogen volume.

To determine Lubricant volume (VL), first calculate how many pints of lubricant the system will require:

$$\text{Volume in Pints (VP)} = \frac{\text{Volume of Nitrogen (NV)}}{145}$$

Note: Round up to the nearest ½ pint.

Now convert pints to cubic inches. The unit of measure needs to be consistent for nitrogen volume and lubricant volume.

To convert pints to cubic inches:

$$\text{Lubricant Volume (VL)} = \text{Volume in Pints (V)} \times 29$$

Once total volume requirements are calculated, refer to page 20.06.02 of the standard hose and tank section for determining compression/cooling tank size. The actual size of the tank may vary depending on the application.

Note: The orientation of the compression/cooling tank must be known at the time of design.

Note: All dimensions are nominal unless tolerance is stated.

Di-Dro

Force-Generating Solutions

Hyson offers a complete line of modular Di-Dro Advanced Forming Systems as well as custom-designed systems.

Features & Benefits

High Force Hydraulic System
High force produced in a small footprint, up to 125.5 kN/14.1 tons with a single cylinder.

Delayed Return
Cylinders can be delayed in the retracted position to prevent parts from being inverted or interfering with automation.

Low Contact and Return Force
A soft hit and very low return force decrease press wear and extend press life.

Constant Force
No pressure rise provides constant force throughout the stroke for better control of part quality.

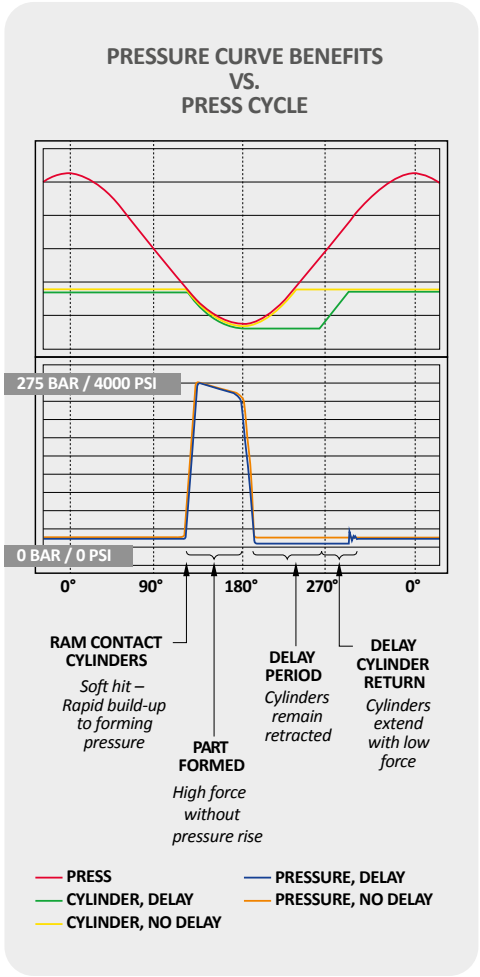
System Versatility
Used in both upper and lower operations.

Cylinder Flexibility
When space is a constraint, the modular system provides cylinders in individual bases that can be hosed to a control center with hose lengths as long as 2 m/80 in.

Bore Seal Cylinders
Corrosion-resistant cylinders withstand contamination and leakage from rod damage for longer performance life.

Self-Aligning Piston Rods
Cylinders accept some die movement and a degree of sideload without affecting performance.

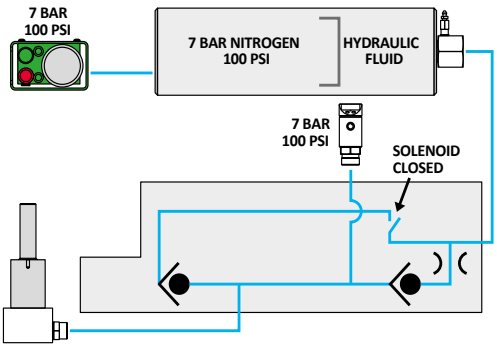
Self-Contained Option
System provided fully filled, bled and ready for installation.



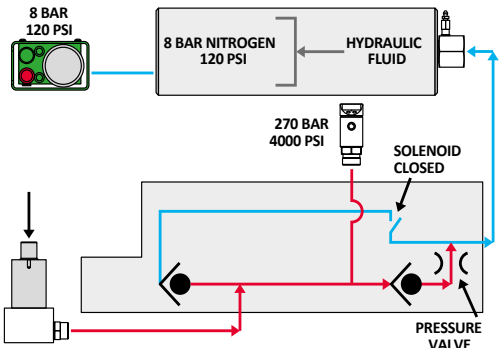
Modular System

Custom-Designed System

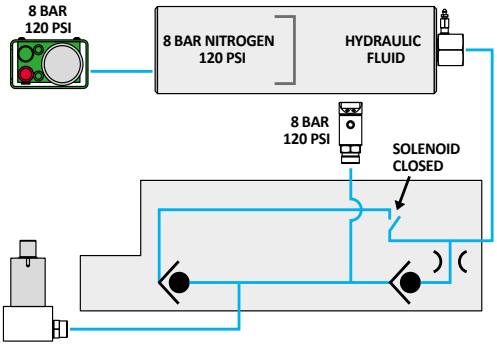
How It Works



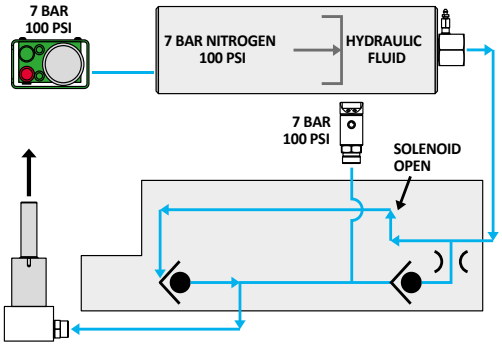
1 Cycle begins with system at low pressure (7 bar/100 psi) and solenoid closed.



2 When the cylinder is compressed, the pressure valve creates forming force. Fluid from the cylinder moves to the accumulator. High pressure occurs only while the cylinder is being compressed.



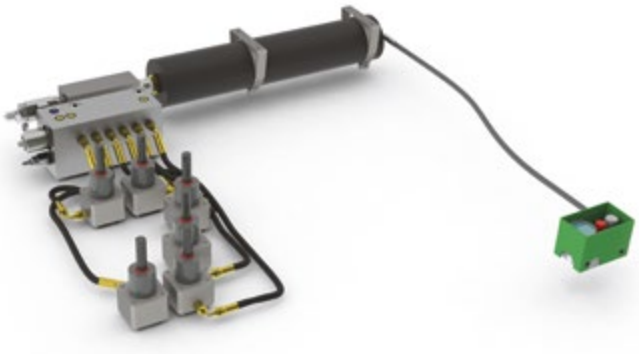
3 Cylinder is delayed in the retracted position as long as the solenoid is closed.



4 The solenoid opens and nitrogen pressure in the accumulator pushes fluid back to the cylinder which returns to the raised position. The system is reset and ready for the next cycle.

Note: Depending on the application, cylinders will springback a small amount. The springback is due to oil compressibility and will vary with pressure and oil volume.

Case Studies

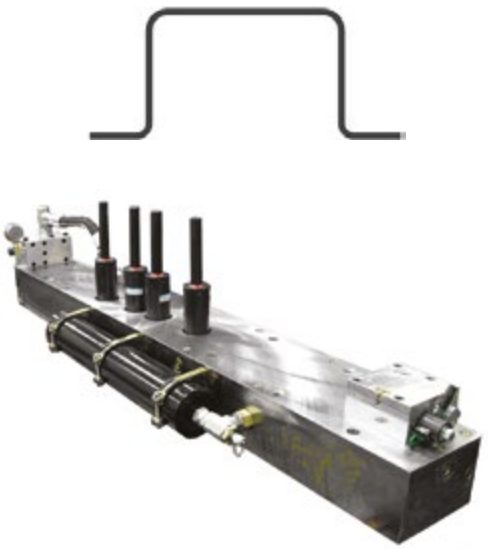


Application:
Automotive stampings.

Challenge:
Delay found to be required for this application. Space constraints occurred because die was designed for use with Gas Springs.

Solution:
In-die modular hosed system with delay.

ROI:
Di-Dro retrofitted in original die, so no new die required.



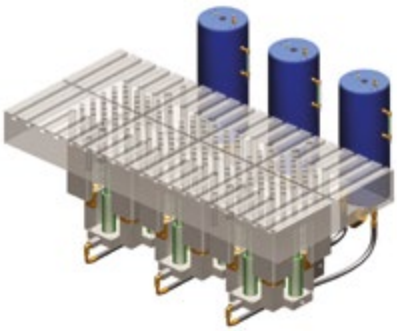
Application:
Automotive stampings.

Challenge:
Delay found to be required for this application. Space constraints occurred because die was designed for use with Gas Springs.

Solution:
Custom Di-Dro manifold system with delay.

ROI:
Di-Dro retrofitted in original die, so no new die required.

Case Studies



Application:
Heavy metal stampings.

Challenge:
Air cushions needed repair or replacement.

Solution:
In-press bolster cushion with delay.

ROI:
Significant cost savings on initial investment.

Application:
Stainless steel stove top.

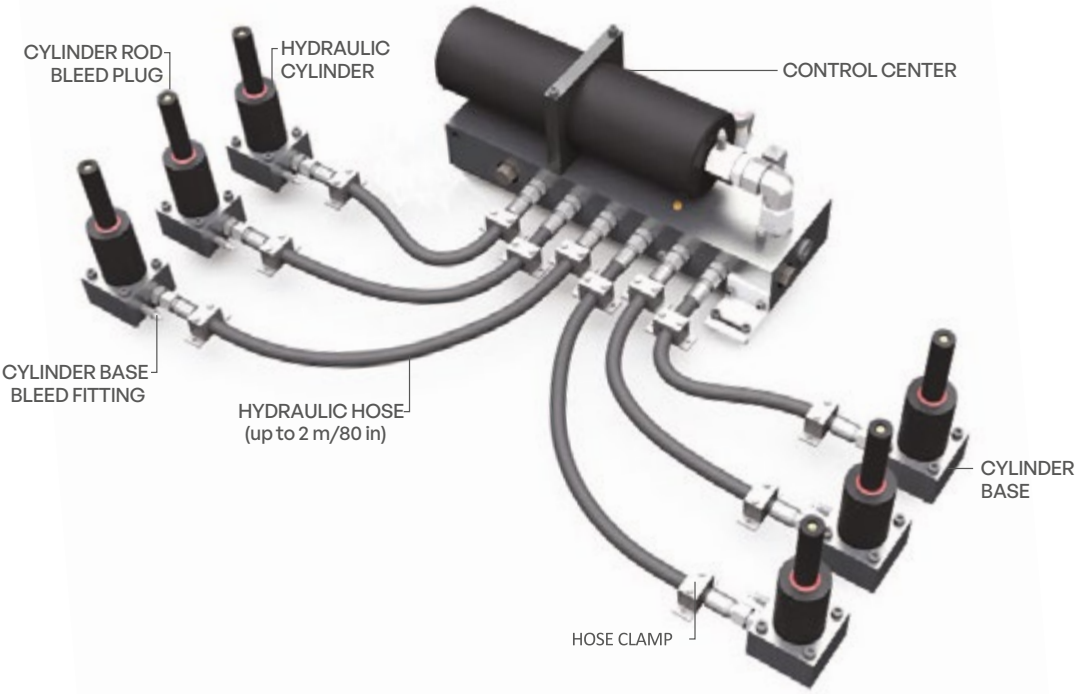
Challenge:
Required programmable cushion for the die.

Solution:
In-die lower deep draw with delay.

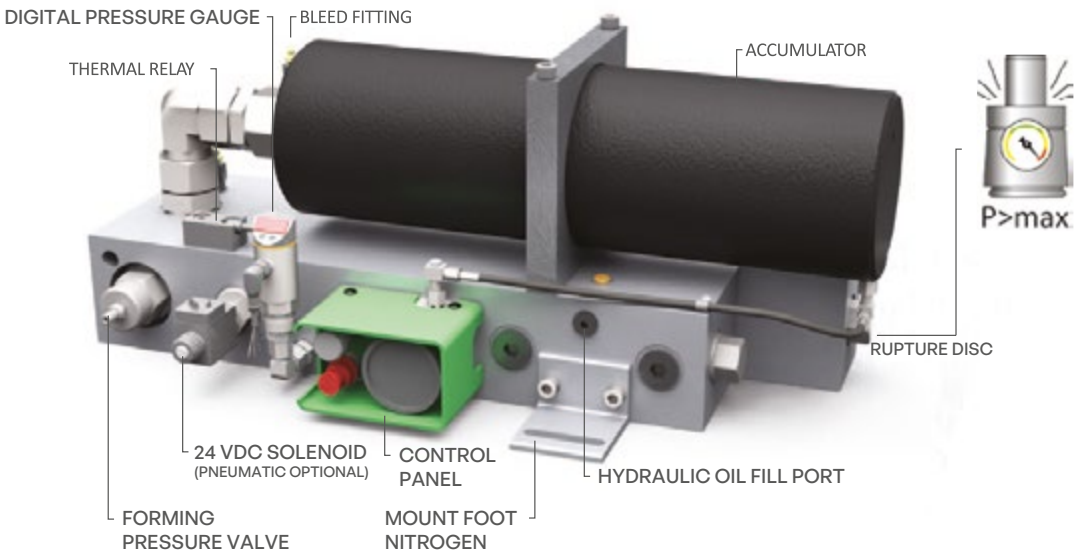
ROI:
Eliminated need and cost for programmable cushion.

Components

Modular Di-Dro System



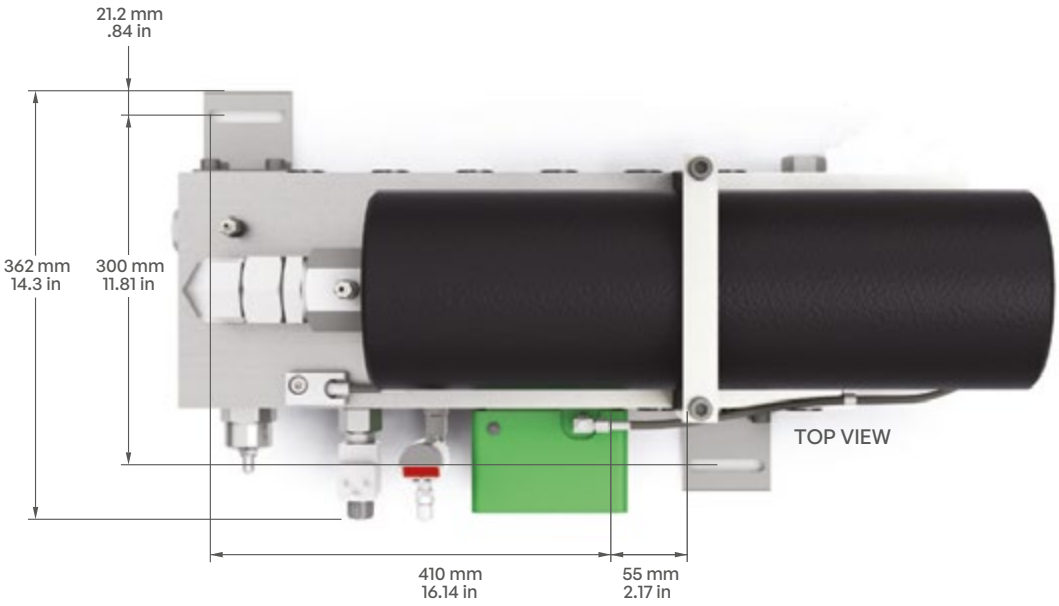
Di-Dro Control Center

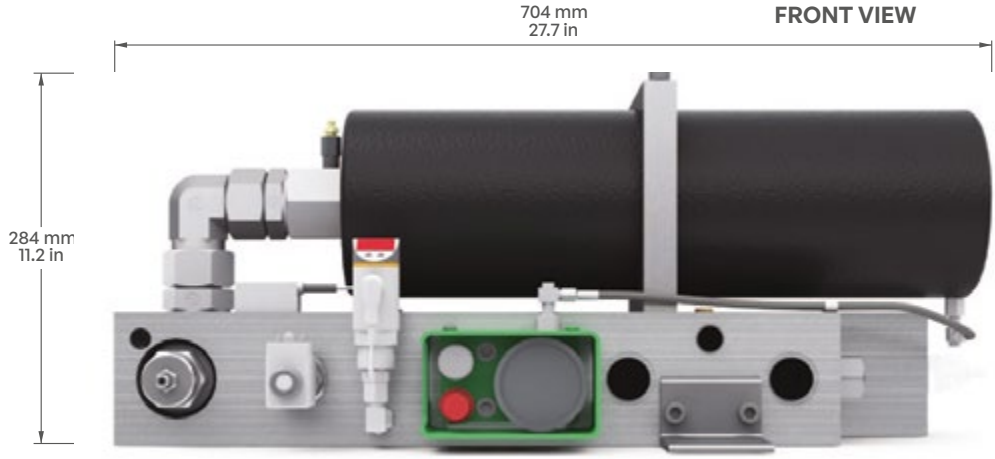


Modular Di-Dro System Configurations

- Standard (with Delay)
- Force-Only System (No Delay)
- Low Pressure System
- Pneumatic Delay
- Cooling

Dimensional Information: Control Center





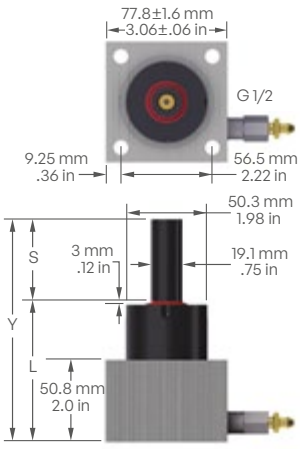
Dimensional Information: Cylinders

Pressure Medium	Hydraulic Oil	Max. Utilized Stroke	100%
Maximum Pressure	275 bar	Max. Strokes Per Minute	Dependent on Heat
Minimum Pressure	25 bar	Base Bleed Fitting	4014007
Max. Operating Temp. Max.	93°C	Cylinder Rod Bleed Plug	NF-771-3-V-ZLG
Piston Rod Velocity	96 m/min		

Ddnb 1000 - Product Specifications

Force 1780-17790 N 0.2-2.0 Tons

Repair Kit 54-112-7000 Cylinder Base 54-112-0300 Mount Screws M8

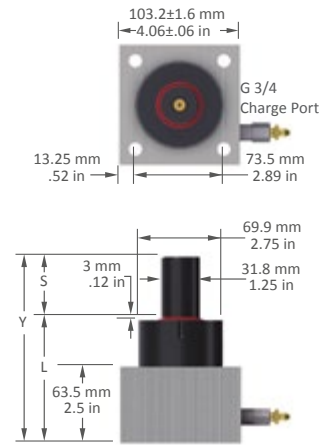


Hyson Part Number	Stroke (mm)	Stroke (in)	L (mm)	L (in)	Y (mm)	Y (in)	MAX QTY (per system)
DDNB-1000X13	13	0.51	63	2.48	76	2.99	6
DDNB-1000X16	16	0.63	63	2.48	79	3.11	6
DDNB-1000X19	19	0.75	63	2.48	82	3.23	6
DDNB-1000X25	25	0.98	63	2.48	88	3.46	6
DDNB-1000X32	32	1.26	70	2.76	102	4.02	6
DDNB-1000X38	38	1.50	76	2.99	114	4.49	6
DDNB-1000X50	50	1.97	88	3.46	138	5.43	6
DDNB-1000X63	63	2.48	101	3.98	164	6.46	6
DDNB-1000X75	75	2.95	113	4.45	188	7.40	6
DDNB-1000X80	80	3.15	118	4.65	198	7.80	6
DDNB-1000X100	100	3.94	138	5.43	238	9.37	6
DDNB-1000X125	125	4.92	163	6.42	288	11.34	6
DDNB-1000X150	150	5.91	201	7.91	351	13.82	6
DDNB-1000X175	175	6.89	226	8.90	401	15.79	6
DDNB-1000X200	200	7.87	251	9.88	451	17.76	6

Ddnb 2400 - Product Specifications

Force 4450-42700 N 0.5-4.8 Tons

Repair Kit 54-175-7000 Cylinder Base 54-175-0300 Mount Screws M10

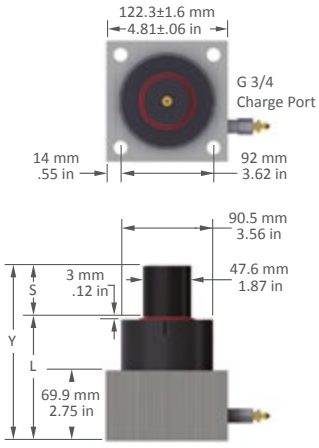


Hyson Part Number	Stroke (mm)	Stroke (in)	L (mm)	L (in)	Y (mm)	Y (in)	MAX QTY (per system)
DDNB-2400X16	16	0.63	80	3.15	96	3.78	6
DDNB-2400X19	19	0.75	80	3.15	99	3.90	6
DDNB-2400X25	25	0.98	80	3.15	105	4.13	6
DDNB-2400X32	32	1.26	87	3.42	119	4.68	6
DDNB-2400X38	38	1.50	93	3.66	131	5.16	6
DDNB-2400X50	50	1.97	105	4.13	155	6.10	6
DDNB-2400X63	63	2.48	118	4.65	181	7.13	6
DDNB-2400X75	75	2.95	130	5.12	205	8.07	6
DDNB-2400X80	80	3.15	135	5.31	215	8.46	6
DDNB-2400X100	100	3.94	155	6.10	255	10.04	6
DDNB-2400X125	125	4.92	180	7.09	305	12.01	6
DDNB-2400X150	150	5.91	216	8.50	366	14.41	6
DDNB-2400X175	175	6.89	241	9.49	416	16.38	6
DDNB-2400X200	200	7.87	266	10.47	466	18.35	6

Ddnb 4200 - Product Specifications

Force 7120-78290 N 0.8-8.8 Tons

Repair Kit 54-238-7000 Cylinder Base 54-238-0300 Mount Screws M12

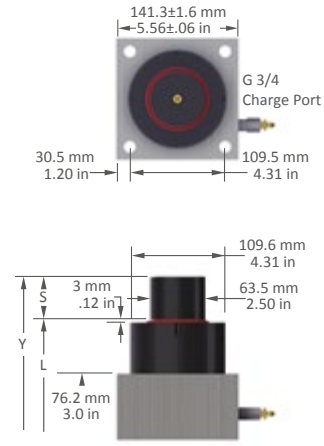


Hyson Part Number	Stroke (mm)	Stroke (in)	L (mm)	L (in)	Y (mm)	Y (in)	MAX QTY (per system)
DDNB-4200X16	16	0.63	89	3.50	105	4.13	6
DDNB-4200X19	19	0.75	92	3.62	111	4.37	6
DDNB-4200X25	25	0.98	98	3.86	123	4.84	6
DDNB-4200X32	32	1.26	105	4.13	137	5.39	6
DDNB-4200X38	38	1.50	111	4.37	149	5.87	6
DDNB-4200X50	50	1.97	123	4.84	173	6.81	6
DDNB-4200X63	63	2.48	136	5.35	199	7.83	6
DDNB-4200X75	75	2.95	148	5.83	223	8.78	6
DDNB-4200X80	80	3.15	153	6.02	233	9.17	6
DDNB-4200X100	100	3.94	173	6.81	273	10.75	6
DDNB-4200X125	125	4.92	198	7.79	323	12.72	5
DDNB-4200X150	150	5.91	236	9.29	386	15.20	4
DDNB-4200X175	175	6.89	261	10.28	436	17.16	4
DDNB-4200X200	200	7.87	286	11.26	486	19.13	3
DDNB-4200X225	225	8.86	311	12.24	536	21.10	3

Ddnb 6600 - Product Specifications

Force 11565-125440 N 1.3-14.1 Tons

Repair Kit 54-300-7000 Cylinder Base 54-300-0300 Mount Screws M12



Hyson Part Number	Stroke (mm)	Stroke (in)	L (mm)	L (in)	Y (mm)	Y (in)	MAX QTY (per system)
DDNB-6600X16	16	0.63	104	4.09	120	4.72	6
DDNB-6600X19	19	0.75	107	4.21	126	4.96	6
DDNB-6600X25	25	0.98	113	4.45	138	5.43	6
DDNB-6600X32	32	1.26	120	4.72	152	5.98	6
DDNB-6600X38	38	1.50	126	4.96	164	6.46	6
DDNB-6600X50	50	1.97	138	5.43	188	7.40	6
DDNB-6600X63	63	2.48	151	5.94	214	8.42	6
DDNB-6600X75	75	2.95	163	6.42	238	9.37	6
DDNB-6600X80	80	3.15	168	6.61	248	9.76	5
DDNB-6600X100	100	3.94	188	7.40	288	11.34	4
DDNB-6600X125	125	4.92	213	8.39	338	13.31	3
DDNB-6600X150	150	5.91	251	9.88	401	15.79	3
DDNB-6600X175	175	6.89	276	10.87	451	17.76	2
DDNB-6600X200	200	7.87	301	11.85	501	19.72	2
DDNB-6600X225	225	8.86	326	12.83	551	21.69	2

Hose and Fittings and Accessories

Select the correct hose and fittings for optimum performance for your modular Di-Dro system.

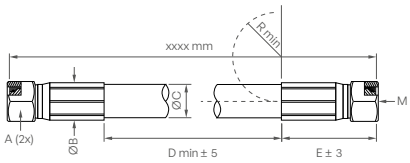
Hose

Maximum Working Pressure 280 Bar/4060 Psi Minimum Burst Pressure 1120 Bar/16240 Psi

Hyson Part Number	Hose size	Thread	A (mm)	A (in)	B (mm)	B (in)	C (mm)	C (in)	D min (mm)	D min (in)	E (mm)	E (in)	R min (mm)	R min (in)
30 214 55-xxxx	¾-in.	M30x2	36	1.42	35	1.38	31	1.22	50	1.97	72	2.83	120	4.72

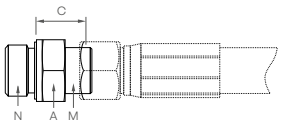
Additional Parker Specifications

PARKER PART NUMBER	Hose size	INNER Ø (mm)	INNER Ø (in)	OUTER Ø (mm)	OUTER Ø (in)	HOSE FITTING PART NUMBER
721TC-12	¾-in.	19	0.75	31	1.22	1C971-20-12



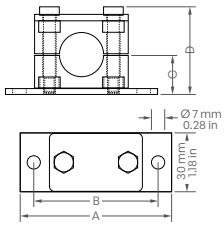
Hose Fitting

Hyson Part Number	Hose size	Thread	A (mm)	A (in)	C (mm)	C (in)
504324	¾-in.	M30x2	32	1.26	21	0.83

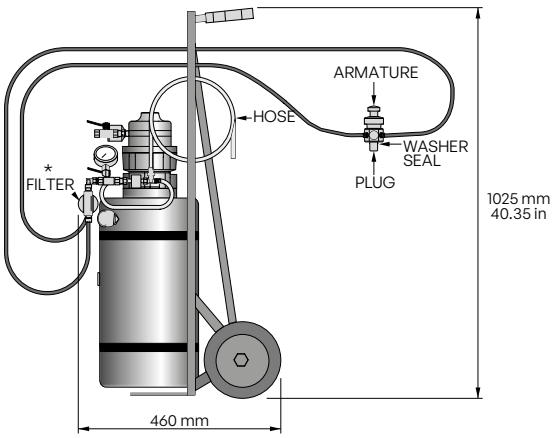


Hose Clamp

Hyson Part Number	Hose size	A (mm)	A (in)	B (mm)	B (in)	C (mm)	C (in)	D (mm)	D (in)
504615	¾-in.	87	3.43	73	2.87	24	0.94	51	2.01



Hydraulic Fill and Bleed System



Required to properly fill the Di-Dro unit with oil and remove air from the system. Trapped air causes low forming pressure and a lack of delay.

Hyson Order Number	3017075
Oil Flow	2.4 L/MIN AT 1500 RPM
Max. Oil Pressure	55 BAR/ 800 PSI
Tank Volume	18 Liters
Oil Filter	10 µm
Air Pressure	5-7 BAR/73-100 PSI

Custom Di-Dro Advanced Forming Systems

While our modular Di-Dro system is the solution for most applications, Hyson also offers custom-engineered Di-Dro systems when needed.

Consider a custom-engineered system when the application requires:

- A large number of cylinders or pressure points
- Very high force
- Cylinders integrated into the die shoe
- A ram cushion with delay capability
- A bolster cushion with delay capability

The advanced engineered systems group at Hyson is ready to partner with you to develop an integrated solution for your forming needs.

How To Get Started

To provide the system to fit your needs, complete the required short form. You may choose to complete the long form which includes equations that will allow you to select your system components.

Short Form (required)

1. Number of pressure points _____
2. Total force required (N) _____
3. Cylinder work stroke (mm) _____
4. Parts per minute (ppm) _____

5a. Maximum ram speed during work stroke (m/s) _____
OR
5b. Mechanical press stroke length (mm) _____

6. Maximum anticipated press speed in strokes per minute (spm) _____

Long Form (optional)

Equations

1. Pressure Point Force (Cylinder Size Selection)

$$\frac{\text{total force required (N)}}{\text{number of pressure points}} = \_\_\_\_\_ \text{ N}$$

Notes: Choose a cylinder size (see right) where the calculated tonnage is within the cylinder's range, near mid-range is preferred. Smaller cylinder sizes preferred.

	Part Number	Force Range	Piston Area
☐	DDNB-1000x***	1780-17790 N	641 mm^2
☐	DDNB-2400x***	4450-42700 N	1552 mm^2
☐	DDNB-4200x***	7120-78290 N	2858 mm^2
☐	DDNB-6600x***	11565-125440 N	4560 mm^2

2. Pressure

$$\frac{\text{total force required (N) x 10}}{\text{cyl. qty. x piston area (mm2)}} = \_\_\_\_\_ \text{ bar}$$

Notes: Pressure MUST be less than 275 bar. **IF NOT:** 1. Increase quantity of cylinders. 2. Increase size of cylinders.

3. System Fluid Flow Rate

If maximum ram speed during cylinder work stroke is known:

cyl. qty. x piston area (mm2) x ram speed (m/s) x 0.06 = _____ liters per minute (Lpm)

OR

If application is for a mechanical press, and stroke length and stroke per minute speed are known:

$$\frac{\text{cyl. qty. x piston area } (mm^2) \text{ x spm x press stroke (mm)}}{318310} \text{ x } (\sin(\cos^{-1}(\frac{2 \text{ x work stroke (mm)} - 1}{\text{press stroke (mm)}}))) = \_\_\_\_\_ \text{ Lpm}$$

Notes: System fluid flow rate MUST be less than 300 Lpm. IF NOT:
1. Reduce ram speed or strokes per minute.
2. Use smaller cylinders at higher pressure.
3. Use multiple systems.
4. Contact Hyson Products for custom Di-Dro options.

4. Individual Cylinder Fluid Flow Rate-Hose Size Selection

$$\frac{\text{system fluid flow rate (Lpm)}}{\text{cylinder quantity}} = \_\_\_\_\_ \text{ Lp}$$

Notes: If less than 57 Lpm, use ½-inch or ¾-inch hose.
If between 57 and 132 Lpm, use the ¾-inch hose only.
If more than 132 Lpm:
1. Reduce ram speed or strokes per minute.
2. Use smaller cylinders at higher pressure.
3. Use additional cylinders.
4. Contact Hyson Products for custom Di-Dro options.

5. Heat Generation

$$\frac{\text{total force (N) x work stroke (mm) x parts per minute (ppm)}}{60{,}000{,}000} = \_\_\_\_\_ \text{ kW}$$

Notes: Heat generation MUST be less than 2.93 kW
IF NOT:
1. Reduce total tonnage, work stroke or parts per min.
2. Use multiple systems.
3. Contact Hyson Products for cooling options or custom Di-Dro options.

Long Form (continued)

Component Selection

Control Center Part Numbers:

DD-CNTRL ASSY 1	Standard	70-275 bar with 24 VDC Delay
DD-CNTRL ASSY 3	No Delay	70-275 bar
DD-CNTRL ASSY 4	Low Pressure	25-70 bar with 24 VDC Delay
DD-CNTRL ASSY 5	Pneumatic Delay	70-275 bar with Air-Operated Delay Valve
DD-CNTRL ASSY 6	Cooling	70-275 bar with Oil Cooling Circuit

Determine Cylinder Part Number And Quantity:

1. Use cylinder size (Equation 1 - 1000, 2400, 4200, 6600)
   Cylinder fluid flow rate (Equation 4) must be less than 57 Lpm for DDNB-1000.
   Cylinder fluid flow rate (Equation 4) must be less than 132 Lpm for DDNB-2400, 4200 and 6600.
2. Stroke lengths range from 13 mm to 225 mm. See pages 10-11 for details.

Part Number
DDNB-_____ x _____
cylinder size stroke
(example: DDNB-2400 X 50)

Part Number _____
Quantity _____

Determine Hose Part Number And Quantity:

1. Use hose 30 214 54-xxxx if cylinder fluid flow rate (Equation 4) is less than 57 Lpm.
2. Use hose 30 214 55-xxxx if cylinder fluid flow rate (Equation 4) is 57-132 Lpm.
3. Maximum hose length is 2000 mm.
4. Use up to six (6) hose sizes per system. Note length and quantity for each hose required.
5. See page 516 for details.

Part Number _____
Quantity _____

Determine Fitting Part Number And Quantity:

1. Two fittings are required per cylinder (one for the cylinder, one for the control center).
2. For DDNB-1000 cylinders:
   (1) 504321 and (1) 504322.
3. For DDNB-2400, 4200 and 6600 cylinders:
   (2) 504322 or (2) 504324.
4. See page 516 for details.

Part Number _____
Quantity _____

Determine Hose Clamp Part Number And Quantity:

1. Use at least two (2) hose clamps per hose, positioning one near the cylinder and the other near the control center.
2. Use 504614 for ½-in. ID hose.
3. Use 504615 for ¾-in ID hose.
4. See page 516 for details.

Part Number _____
Quantity _____

9 Mill Solutions

Work Roll Gas Springs

Hyson Mill Duty Cylinders / Separator Cylinders

Hyson's Mill Duty Cylinders are innovative cylinder solutions for any rolling mill that wants to not only reduce costs but also increase productivity and product quality.

Our cylinders have many years of success in mills around the world, in a variety of mill cylinder applications.

Safety First

- Designed to survive safely in mill environments
- Robust design can handle side impact and misalignment
- Nitrogen gas is inert, non-toxic, and nonflammable
- Designed with custom charge ports, so the cylinder can be discharged while in the chock, if needed, for utmost safety while handling

Maximize Productivity

- Each cylinder is custom designed for your application.
- Quick and easy installation and removal
- Interchangeable with existing systems
- Self-contained system requires no additional lines/parts
- Reduced chock maintenance
- Readily available/shorter lead times

Reduce Costs

- Maintenance costs are reduced
- Wear on machinery, especially costly bushings and bearings, is reduced with design spec. separating force.
- Inventory costs are reduced by eliminating the need for additional equipment or spare parts
- Reconditioning service available to help reduce your preventative maintenance costs
- No chock modifications required in most applications

Reliable

- A large diameter rod, thick cylinder walls, and high-pressure seals are engineered into every spring
- Special coating resists corrosion and wear
- Bore seal design reduces contaminates and extends the life of the cylinder

Environmentally Friendly

- Uses nitrogen gas which makes up 78% of the air we breathe
- No MSDS sheets required!
- Steel cylinder is recyclable

How It Works:

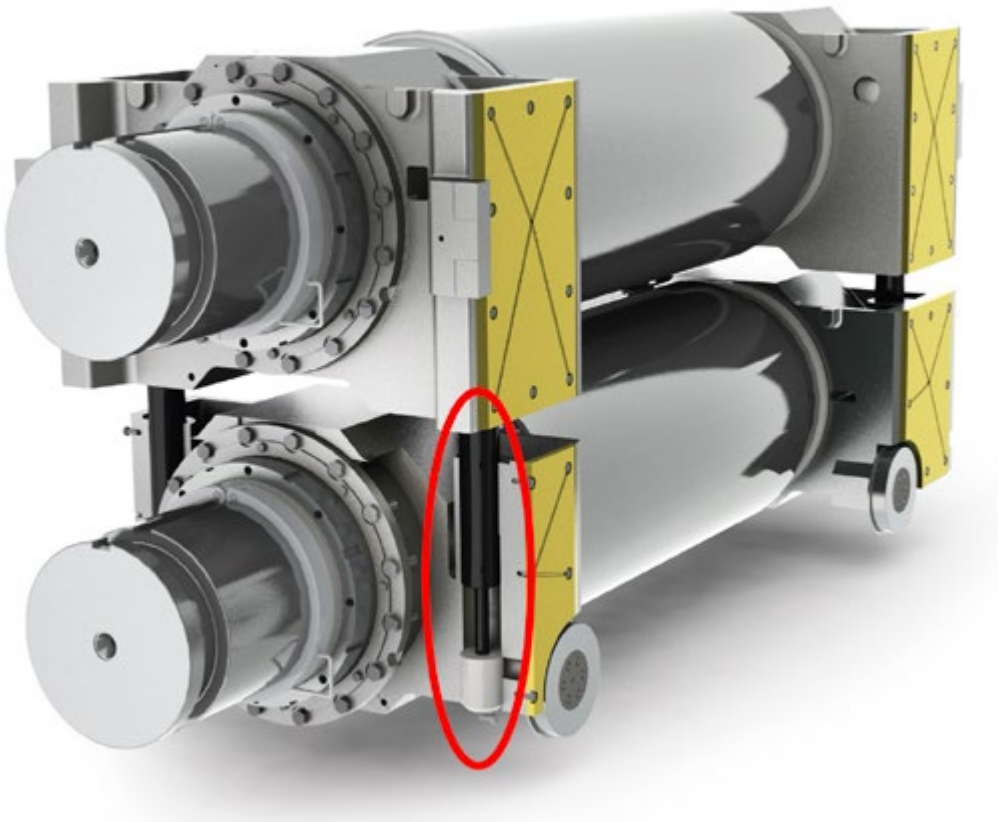
- **Cylinders are charged with nitrogen to the necessary pressure for your application.**
- **Nitrogen filled cylinders provide the full specified separating forces designed to drive backup rolls, maintain pass line height, and ensure quality rolling operations.**
- **Compared with typical hydraulic systems, customers often see visible improvements in roll stand stability and process quality.**
- **Cylinders can be dropped into existing chock cavities to replace existing hydraulic or fluid-filled cylinders.**

Protect Your Investment

- Keeps work rolls separated during installation, removal, and transport
- Prevents rolls from being damaged, scratched, dented, etc.
- Maintains integrity of the roll face to minimize product defects

Get Rolling

- Allows for quick roll changes.
- Supplies the necessary contact force to establish the motion of the roll stack
- Once engaged, provides force to prevent slippage, keeping the integrity of the roll face intact



Liquid Spring Application:

Traditional liquid-filled springs can be unsafe and have proven to be costly for rolling mills. As the side-by-side comparison illustrates, Hyson mill cylinders have many advantages including a more robust design, safety features, and the ability to be custom engineered into existing applications, so no modifications are needed.

Additional cost savings include less downtime, lower maintenance costs due to increased life of chocks and bearings, reduced inventory due to shorter lead times, and an overall more reliable system.

Hyson Mill Cylinder

Initial Force: 12,000 lbs.; 24kN
Initial Pressure: 2175 psi; 150 bar

Charge/Discharge Port

Enables easy, on-site charging and discharging for safe servicing of system.

Thick Cylinder Wall

Mill duty design resists side impact damage.

N2 Gas

Uses pressurized nitrogen gas to generate force. This safe, inert gas is readily available and harmless to the environment.

Bore Seal Design

Features internal sealing surface not exposed to external contaminants. Scratches or misalignment of rod does not result in pressure loss.

Large Diameter Rod

Mill duty design resists bending.

Standard Liquid-Filled Spring

Initial Force: 12,000 lbs.; 24kN
Initial Pressure: 22,698 psi; 1565 bar

Thin Diameter Wall

Use of non-compressible fluid requires thin wall to accommodate fluid when rod is depressed.

Silicone-Based Liquid

Uses compressed silicone-based liquid to generate force. Cannot be discharged on-site. Fluid can ooze out around rod or the rod can bend so system remains compressed and fully loaded even when not actuated by the roll.

Rod Seal Design

Features outside sealing surface exposed to external contaminants. Scratches or misalignment of rod can result in pressure loss.

Small Diameter Rod

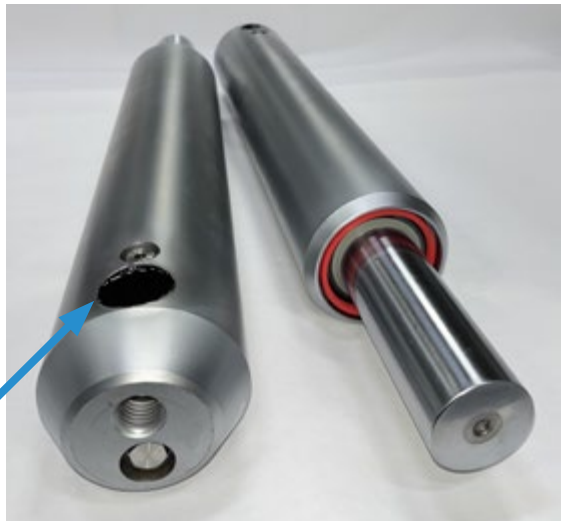
Use of non-compressible fluid requires small rod to accommodate fluid when rod is depressed. Small rod is subject to damage and bending creating safety issues.

Bluetooth Pressure Sensor

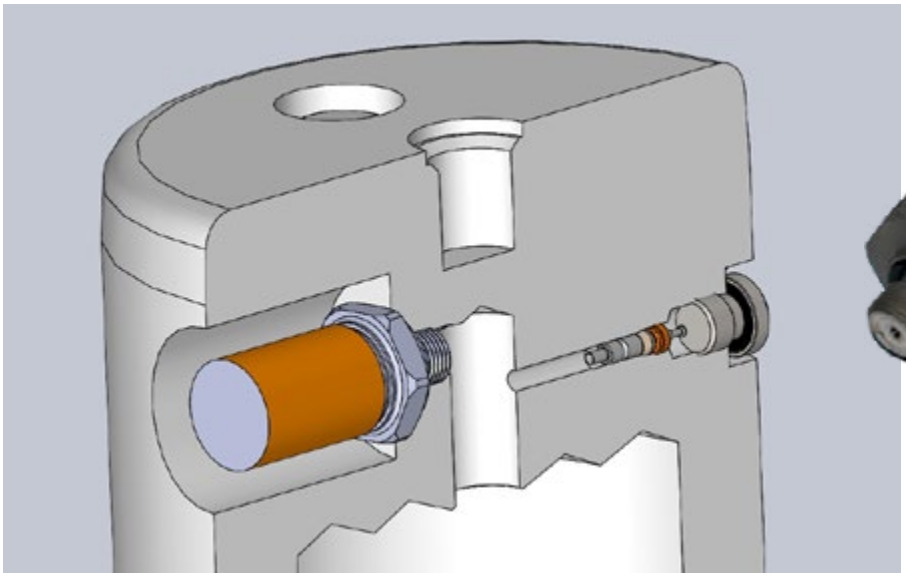
Hyson mill cylinders can be provided with a Bluetooth pressure sensor

Cylinder pressure can be verified before installing cylinders into the chocks.

- In the Roll Shop: Identify cylinders for chock build, verify the cylinder pressure, and install them into the chocks with full confidence. Wireless pressure monitoring during operation (see Toolmind section). Read pressure using our handheld reader (shown) or base station.



Sensor port sealed with epoxy to protect the sensor



CROSS-SECTION OF CYLINDER WITH PRESSURE SENSOR INSTALLED

Hyson Mill Duty Cylinders Can Replace Hydraulic Cylinders:

By switching from hydraulics to Hyson nitrogen charged mill cylinders, customers will:

- Ensure they are getting the designed force in their cylinders. No line losses in pressure or leaks.
- Eliminate labor hours to hook up hydraulic lines or install crossover pipes.
- Eliminate the possibility for errors in hooking up hydraulics.
- Eliminate costly and messy hydraulic oil spills and hydraulic oil costs. Diminish risk of fires.
- Eliminate downtime and costs for maintenance and repair of hydraulic systems.

Our engineering team has helped many customers switch from hydraulic systems to self-contained nitrogen gas cylinders in their mill stands. We support our customers with our technical resources.

Ex.: Hydraulic cylinder (left) replaced with self-contained Hyson Gas Spring (right).
Hyson engineering designed a special adapter and process to charge this cylinder after installation.
This change eliminated multiple annual hydraulic hose incidents in a bar mill.

Hyson team has modeled mill stand assemblies to help understand the roll change process and manage the process of switching from hydraulics.

Additional Applications

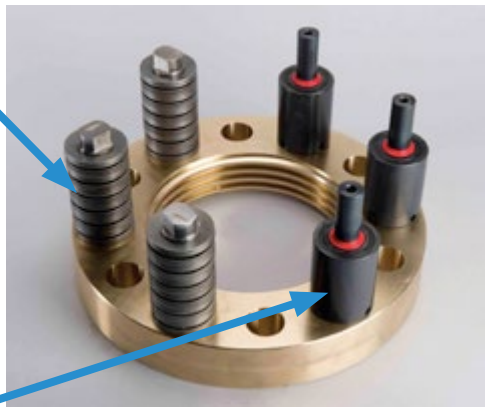
Steady Stand Springs

Hyson provides an innovative solution for bar mills, using nitrogen springs instead of Belleville washers as a shock absorber inside the chock housing. This solution stops the mill stands from jumping as the steel bites and will support deceleration forces to the neutral position to accept the next bar.

- Eliminates labor cost of assembling and adjusting individual Belleville stacks
- Preserves the life of the equipment
- Consistent and repeatable force values result in improved beam quality
- Increases mill efficiency and productivity
- Reduces maintenance costs
- Keep inventory down
- Increase uptime
- Prevents wear of bearings and threads on the mill screw
- More force in the same space
- Improved reliability and repeatability
- Improved chock load balancing resulting in reduced work roll and drive motor wear

Belleville Washers Disadvantages:

- Inconsistent contact force
- High inventory levels
- Assembly is very time consuming
- Unreliable force over time
- Short lifespan
- Fixed force
- Fatigues over time



Steady Stand Spring Advantages:

- Consistent contact force
- One-piece, stable design
- Quick installation
- Longer lifespan
- Low maintenance product
- Adjustable force
- Tighter tolerance
- Consistent product quality
- Dimensional consistency
- Ability to know exactly how much force is generated by each cylinder

INSTAclamp™ Lock Ring

INSTAclamp™ is a next generation retention solution providing a safer and more reliable lock on roll neck assemblies. Differing from traditional locking mechanisms, Hyson's INSTAclamp™ solution features an advanced single-action locking latch that requires no special tools to engage. This patented locking mechanism provides repeatable clamping force, optimizing the installation and removal process, and eliminates failures associated with thread and bolt style lock rings.

SAFER AND SIMPLER

resulting in time savings, a more repeatable process and a safer working environment for your team members.

POSITION **CLOSE** **ENGAGE**

(optional installation tools shown)

"The difference between a traditional lock ring and INSTAclamp is everything... from its materials to its latching system."

Features

When compared to traditional lock rings, Hyson's INSTAclamp offers advanced clamping force that retains the chock, AND brings additional:

- Safety
- Simplicity
- Repeatability
- Time savings

The longevity of the clamping force, provided by the patented single-action locking latch, ensures that the roll stays engaged with the chock during rolling process and roll changes.

Reduces Risk

Advanced Retention System provides a pre-set consistent positive clamping force on the roll neck

- Efficient one-snap closure eliminates the need of wrenches and air tools to install or remove, subsequently removing the potential of retention failure due to operator variability
- Hands-free mating surfaces reduce the risk of pinch points and the opportunity for injury

Increases Plant Safety

Smooth outer diameter provides ideal fit and reduces interference with lifting devices

- Eliminates the potential for damage to lifting straps or cables caused by protrusions on traditional bolt-on style rings

Improves Employee Health

Manufactured from Military Grade Aluminum offering 66% weight reduction

- Easier handling improves efficiencies and reduces damage due to mishandling
- Reduces strain to employees during roll change
- Reduces fatigue on operators
- Reduces need of multiple operators for installation

Calculate Your Potential Savings

Typical installation time for the IC Series INSTAclamp is 15 seconds – how does that compare to your current install times?

Step 1: Calculate Number of Ring Changes Per Day

1

# of Mill Stands		# of Lock Rings Per Stand		# of Mill Stands Roll Changes Per Day		
	x		x		=	**Number of Ring Changes Per Day**

Example: 8 Mill Stands x 4 Lock Rings per Stand x 4 Roll Changes per day = 128 Ring Changes per day

Step 2: Determine Time Saved by Switching to INSTAclamp™

2

Current Installation Time (in seconds)		INSTAclamp Installation Time (in seconds)		Ring Changes Per Day (Calculated in Step 1)		
	-		x		=	**Time Saving (in seconds) Per Day by Switching to INSTAclamp**

Example: With a 90 second installation time: (90-15) x 128 = 9600 seconds 160 minutes per day | 2 hours and 40 minutes per day

***Multiply x2 to include savings for removal**

Step 3: Calculate ROI

3

Time Saved (in seconds) (Calculated in Step 2)		Conversion of Seconds to Hours		Hourly Labor Rate				
	÷		x		=	**Daily ROI** x		= **Annualized ROI**

Example: With a $75/ hour labor rate:
9600 / 3600 x $75 = $200 savings per day. Working 260 days per year = $52,000

Hot Strip Mill

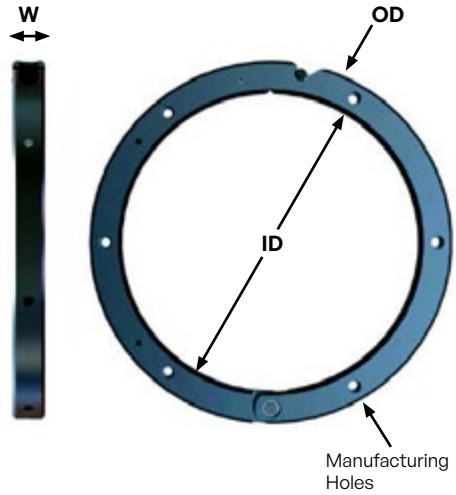
CASE STUDY

Looking for a safer, easier and sustainable solution for roll retention, a fully integrated steel mill partnered with Hyson to integrate INSTAclamp rings into 72 chock assemblies for their 8 finishing stands.

Hyson's INSTAclamp™ retention system was selected after initial try-out when they went from 90 second installation time per ring to a mere 15 seconds! With 4 roll changes per day, the operators were fully supportive of the simplified process. Beyond the installation and removal time savings, the INSTAclamp ring provided an ergonomical, repeatable roll change process with relibale clamping force on their roll neck assemblies.

IC – Series

The INSTAclamp IC Series is predesigned for retention of chocks with roll neck groove diameters from 100 mm to 650mm. The IC Series is the most common mounting style, is designed with a precision fit and spins with the roll.



IC Series Product Specifications	
Standard Material	Military Grade Aluminum 6061-T6
Minimum ID – Standard	100 mm
Primary Latching Feature	Spring Powered
Features and Material Options	See page 531

Dimensional Information (mm)				
Model Number	**ID +/-0.05**	**OD +/-0.5**	**Width +/-0.05**	**Weight (kg)**
IC0100	100	200	30	2.0
IC0150	150	250	35	3.0
IC0200	200	300	40	4.0
IC0250	250	350	50	6.0
IC0350	350	450	50	8.0
IC0450	450	550	50	9.5
IC0550	550	650	50	13.0
IC0650	650	750	50	17.0

Optional Features for the IC Series

Optional features can be added to our INSTAclamp Rings for ease of upgrading existing roll stands without modifications in addition to assisting with handling or proper alignment. A lock ring drawing identifying critical feature specifications is required.

01 – Handling Holes*

Often not necessary as INSTAclamp™ offers 66% reduction in weight compared to steel rings. Machined on face or edge of ring

02 – Face Keyways*

Machined on the face of the ring

03 – Edge Keyways*

Machined on the edge of the ring

04 – Dowel Holes*

Machined anywhere on the face of the ring

05 – Threaded Holes*

Machined on the face or edge of the ring

06 – Flange Mounted

Flange mounted to the chock set. Stays with the chock during roll change, enabling reduction in handling

07 – Material Option

†Standard

Material	Tensile Strength (Yield)
†6061-T6	270 MPa (39,000 PSI)
7075-T6	480 MPa (69,000 PSI)
A36 Steel	290 MPa (40,000 PSI)

08 – Latch Assembly

Replacement latch assemblies are available. Please reach out to your Regional Sales Manager for more information.

*Available in metric and imperial dimensions

Installation Tools

Hyson's INSTAclamp is designed to support installation and removal without the need for power tools.
We offer the following hand tools for gaining leverage during the latching and disengagement processes:

Leverage Bar

Order Number: 11673-1

Provides the most leverage when opening and closing the latch, reducing the amount of operator force required.

Note: See page 1 for demonstration of use.

T-Handle Extender

Order Number: 11609-6T

Positively engages the latch via a ball detent handle, extending the handle to simplify the installation.

During disengagement process, provides ease of positioning and leverage for disengagement.

Note: See page 1 for demonstration of use.

Customized Solutions

In addition to our standard and mounted series, Hyson offers custom engineered lock rings to fit within your existing geometry constraints.

Customization can include, but not limited to:

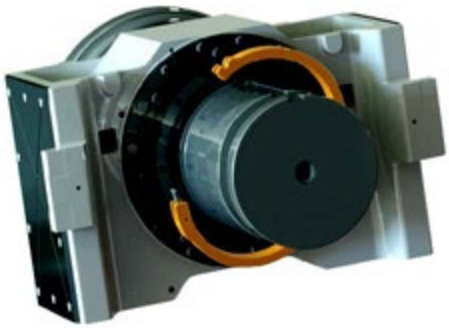
- Multiple hinges (3-piece ring)
- Custom profiles
- Alternative materials
- Keys

Product Specifications	
Material	Military Grade Aluminum
Minimum ID – Custom	100 mm
Primary Latching Feature	Spring Powered
Optional Features	See page 531

To facilitate development of customized solutions and begin design, the following information is required:

- Roll drawing
- Current retention ring drawing
- Roll and Chock assembly drawing
- Any additional design considerations
- Timing for requirement and anticipated quantity needed

A detailed application sheet is also available to aid in documentation of your application.



To develop your custom solution, Hyson application specialists are available, on-site, working directly with your roll shop to ensure a robust, mill-duty solution.

10 Counterbalance

Hyson Counterbalance

Counterbalance Cylinders

Hyson™ Counterbalance Cylinders can be found in numerous applications where a holding force or counterbalance is needed.

Developed in Sweden, Used Globally

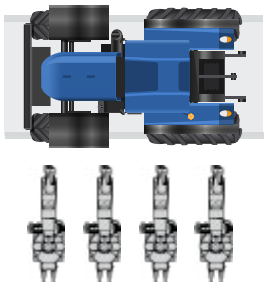
More than 20 years ago, Hyson was a pioneer in the robotics industry when we introduced an improved way to counterbalance a robotic arm with Gas Springs (Counterbalance Cylinder), replacing older solutions like Coil Springs or Hydraulics. Our long experience in robotics has made us a trusted partner and leading supplier of counterbalance globally.

Coil Springs vs Counterbalance Cylinders

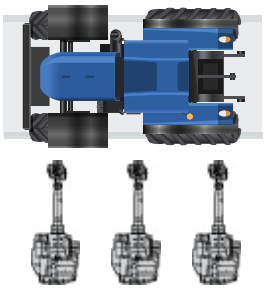
- Safer
- Lighter
- Higher Force
- Longer Lasting
- Easier Maintenance
- Adjustable Force
- Smaller Form
- No Pre-load

Efficiency

Hyson's nitrogen filled Counterbalance Cylinders provide higher force while using less space. This means more floor productivity with compact designs.



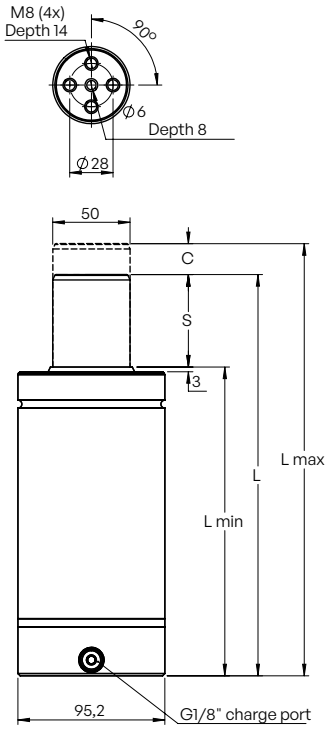
Fit more machines using Counterbalance Cylinders.

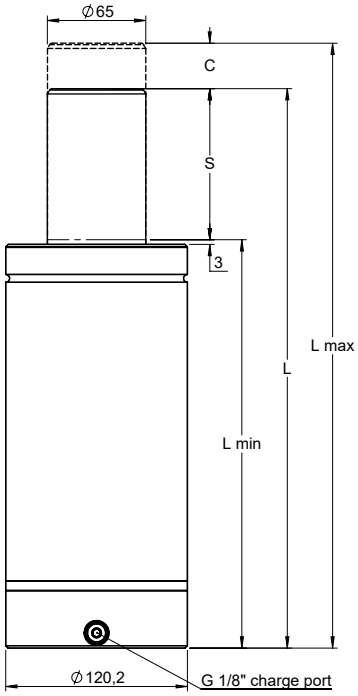


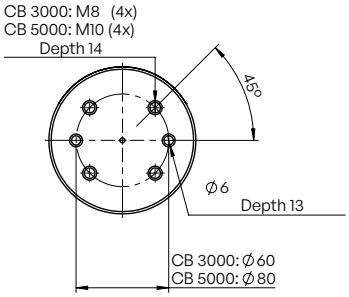
Machines with Coil Springs are larger and use more space.

Counterbalance Cylinders allow for more robots in the same space.

CB 3000 & CB 5000	Metric	Imperial
Max Charging Pressure	130 bar	1885.5 psi
Min Charging Pressure	25 bar	362.6 psi
Force Increase By Temp.	0,3 %/°C	0.17 %/°F
Max Working Temp.	+80°C	+176°F
Max Ambient Working Temp.	+45°C	+113°F
Min Ambient Working Temp.	-10°C	+14°F
Min Ambient Storage Temp.	-20°C	-4°F
Max Piston Rod Velocity	0,8 m/s	2.6 ft/s
Pressure Medium	Nitrogen	
Max Stroke Per Minute (spm)	30	





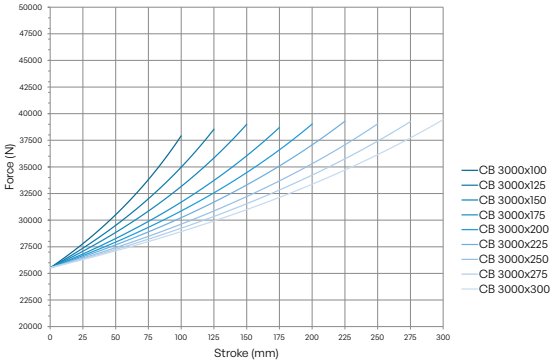


Product Name	Model Number	Stroke Length (S)		Max Length (L Max)		Min Length (L Min)		Max Usable Length (L)		Compressed Length (C)*		Initial Force**		End Force Full Stroke***		Compression Ratio	Gas Volume		Weight	
		mm	in	mm	in	mm	in	mm	in	mm	in	N	lbf	N	lbf	k	liter	in^3	kg	lbs
CB 3000x100	1034454-1000	100	3.9	380	15.0	250	9.8	350	13.8	30	1.2	25500	5700	37900	8520	1,49	0,7	45.1	9,7	21.5
CB 3000x125	1034454-1250	125	4.9	430	16.9	275	10.8	400	15.7	30	1.2	25500	5700	38500	8660	1,51	0,9	52.8	10,5	23.2
CB 3000x150	1034454-1500	150	5.9	480	18.9	300	11.8	450	17.7	30	1.2	25500	5700	39000	8760	1,53	1,0	60.5	11,3	25.0
CB 3000x175	1034454-1750	175	6.9	550	21.7	335	13.2	510	20.1	40	1.6	25500	5700	38700	8700	1,52	1,2	71.3	12,4	27.4
CB 3000x200	1034454-2000	200	7.9	600	23.6	360	14.2	560	22.0	40	1.6	25500	5700	39000	8770	1,53	1,3	78.9	13,2	29.2
CB 3000x225	1034454-2250	225	8.9	650	25.6	385	15.2	610	24.0	40	1.6	25500	5700	39300	8830	1,54	1,4	86.6	14,0	30.9
CB 3000x250	1034454-2500	250	9.8	720	28.3	420	16.5	670	26.4	50	2.0	25500	5700	39000	8780	1,53	1,6	97.4	15,1	33.4
CB 3000x275	1034454-2750	275	10.8	770	30.3	445	17.5	720	28.3	50	2.0	25500	5700	39300	8830	1,54	1,7	105.1	15,9	35.1
CB 3000x300	1034454-3000	300	11.8	820	32.3	470	18.5	770	30.3	50	2.0	25500	5700	39400	8870	1,55	1,8	112.7	16,7	36.9

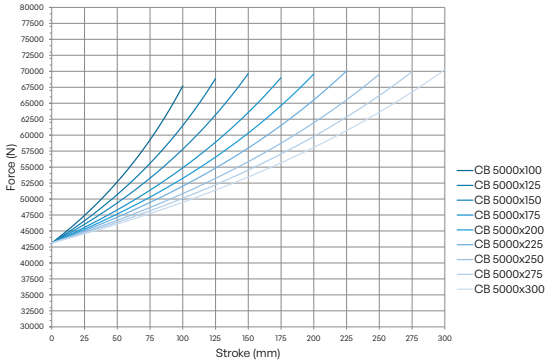
Product Name	Model Number	Stroke Length (S)		Max Length (L Max)		Min Length (L Min)		Max Usable Length (L)		Compressed Length (C)*		Initial Force**		End Force Full Stroke***		Compression Ratio	Gas Volume		Weight	
		mm	in	mm	in	mm	in	mm	in	mm	in	N	lbf	N	lbf	k	liter	in^3	kg	lbs
CB 5000x100	1034455-1000	100	3.9	400	15.7	270	10.6	370	14.6	30	1.2	43100	9700	67700	15220	1.57	1,1	69.2	17,8	39.2
CB 5000x125	1034455-1250	125	4.9	450	17.7	295	11.6	420	16.5	30	1.2	43100	9700	68800	15480	1.60	1,3	81.2	19,1	42.1
CB 5000x150	1034455-1500	150	5.9	500	19.7	320	12.6	470	18.5	30	1.2	43100	9700	69700	15660	1.61	1,5	93.2	20,4	45.1
CB 5000x175	1034455-1750	175	6.9	570	22.4	355	14.0	530	20.9	40	1.6	43100	9700	69000	15510	1.60	1,8	110.0	22,3	49.2
CB 5000x200	1034455-2000	200	7.9	620	24.4	380	15.0	580	22.8	40	1.6	43100	9700	69600	15640	1.61	2,0	122.0	23,7	52.1
CB 5000x225	1034455-2250	225	8.9	670	26.4	405	16.0	630	24.8	40	1.6	43100	9700	70000	15730	1.62	2,2	134.0	25,0	55.1
CB 5000x250	1034455-2500	250	9.8	740	29.1	440	17.3	690	27.2	50	2.0	43100	9700	69500	15630	1.61	2,5	150.8	26,9	59.2
CB 5000x275	1034455-2750	275	10.8	790	31.1	465	18.3	740	29.1	50	2.0	43100	9700	69900	15720	1.62	2,7	162.8	28,2	62.2
CB 5000x300	1034455-3000	300	11.8	840	33.1	490	19.3	790	31.1	50	2.0	43100	9700	70300	15800	1.63	2,9	174.8	29,5	65.1

* Minimum pre-compression when installed.
** Initial force is obtained when the product is charged to 130 bar with the piston rod pre-compressed by "C" mm.
*** End force is obtained with the initial force stated above (**), and the piston rod compressed "S" mm.

Isothermic Force vs Stroke Length (130bar charge @ 20°C)



Isothermic Force vs Stroke Length (130bar charge @ 20°C)



11 Industrial Solutions

XTREME Duty Gas Springs

XTREME Duty Gas Springs are a self-contained and custom-engineered industrial solution used to withstand the environmental elements that cause other Gas Springs to fail, such as, but surely not limited to; various liquids, steam, high temperatures, temperature swings, particulates and tough duty cycles.

XTREME Duty Gas Springs are offered in various stroke lengths and spring rates, as well as two types of material options:

Severe Corrosion Resistant Coating

Ideal for highly corrosive environments where up-time matters

XTREME Duty Gas Springs: Severe Environment

- Designed for the harshest of environments
- Plating offers superior corrosion resistance
- Increased life over standard off-the-shelf Gas Springs
- Highly resistant to ingestion
- Fit to your application with accessory Flanges and clevis mounts

INDUSTRIES: Agriculture and Construction Vehicles, Hot Stamping, Lift Trucks, Mining, Paper and Pulp, Steel Production and Processing

Standard Version

Ideal for applications requiring a hard-wearing, long lasting spring element

XTREME Duty Gas Springs: Standard Version

- Extreme hard coating offers increased wear resistance and good corrosion resistance
- Increased life over standard off-the-shelf Gas Springs
- Highly resistant to ingestion
- Fit to your application with accessory Flanges and clevis mounts

INDUSTRIES: Agriculture and Construction Vehicles, Hot Stamping, Lift Trucks, Mining, Paper and Pulp, Steel Production and Processing

Product Specifications and Dimensional Information

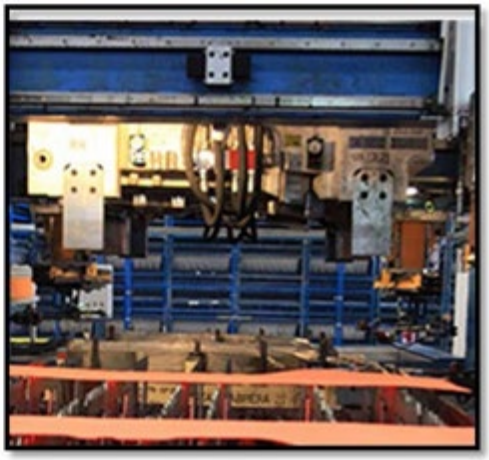
XTREME Duty Gas Springs are custom designed to fit your application considering; the environment, duty cycle, force requirements and offer a wide variety of mounting arrangements including; bolt holes, sliding pucks, clevis mounts and more.

Offered in a variety of standard models, strokes sizes and two different material options:

XD Series Product Specifications	
Material Options	Severe Corrosion and Standard
Optional Features	Custom-designed to fit application

	Dimensional Information				
Model Number	**Stroke Length in**	**Overall Length in**	**Body OD in**	**Charge Pressure**	**Max. Force (lb-f)**
XD-112	1.0-8.0	7.0-28.0	2.00	3,000 psi	4,473
XD-144	1.0-10.0	6.0-24.0	2.62	3,000 psi	7,322
XD-175	1.0-11.0	8.0-38.0	3.15	2,750 psi	10,914
XD-238	1.0-12.0	9.0-42.0	3.62	2,500 psi	35,884
XD-3 50	1.0-12.0	11.0-32.0	5.00	2,500 psi	43,688

To learn how Hyson's XTREME Duty Gas Springs can add exceptional value to your industrial applications, contact our Inside Sales team at Orders@HysonSolutions.com or visit our website.



12 Press Solution

Press Solutions

Built upon a long history and experience with force solutions for the Die, Hyson has leveraged that knowledge to engineer and manufacture innovative capital equipment solutions for the press.

By having a thorough understanding of stamping processes, at the same time positioning ourselves to have a front line perspective on future trends and challenges, The Hyson is able to develop solutions for tomorrow. As the previous rules and guidelines of the stamping industry continue to change and become obsolete, it is our commitment to provide the solutions necessary to tackle upcoming forming challenges, think outside the box, and rewrite the way metal is formed.

The Key Advantages of our Solutions are to Provide:

Flexibility

The ability to change parameters quickly, and to adapt to process and material variations.

Repeatability

The confidence that you will see the same quality on the 500,000th part that you did on the first.

Controllability

The ability to control the force dynamically throughout the stroke with a high level of accuracy and response times in milliseconds.

Next-Generation Press Cushion System

With the ability to be installed into any press, our integrated forming systems provide an immediate upgrade to stamping equipment

Press Solutions

With an extensive and unrivaled portfolio of metal forming solutions, Hyson provides the right solution for the right application. From an air cushion crossover to integrating the most sophisticated forming features on the market, we have a solution that will streamline your forming operations. Solutions are dependent upon your needs and include:

Nitrogen Press Cushion

TRUEform™

Integrated Forming System

TRUEform™ Integrated Forming System utilizes high-pressure nitrogen gas to deliver accurate force, enabling customers to attain true, high quality formation of stamped parts.

Features Include:

- Self-Contained
- Low Pressure Rise
- Compact Design
- Energy Efficient
- Ram or Bolster Mounted

Hydraulic Press Cushion

OPTIform™

Integrated Forming System

OPTIform™ Integrated Forming System utilizes high-pressure hydraulic fluid to deliver controlled force capable of lock down at BDC and optimizing your forming processes.

Features Include:

- Delay Capable
- High-Force
- Simple Force Adjustment
- Low Contact and Return Force
- Bolster Mounted

Servo-Controlled Press Cushion

MASTERform™

Integrated Forming System

MASTERform™ Integrated Forming System utilizes advanced servo valve technology to precisely control the force, allowing you to master your metal forming process.

Features Include:

- Adjustable Force Profiles
- Delay Capable
- Part Knockout
- Reverse Forming
- Pre-Acceleration
- Bolster Mounted

Press Solutions

With more force and more control, Hyson provides flexible solutions for part knockout applications. From a self-contained system to a complex active hydraulic system, we have a solution for your knockout needs.

INTELLImax™ Integrated Knockout System

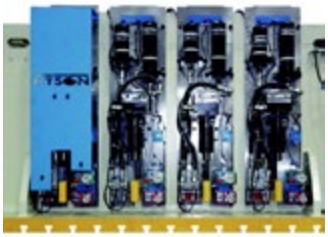
Self Contained

Integrated Knockout System

The INTELLImax™ Self Contained System utilizes a combination of nitrogen and hydraulics to deliver customized force. It is typically mounted to the ram or slide face and can be used with any tool.

Features Include:

- Completely self-contained
- Single or dual force option
- Automatically adjusts to accommodate a range of parts



Hydraulic Press Cushion

OPTIform™

Integrated Forming System

OPTIform™ Integrated Forming System utilizes high-pressure hydraulic fluid to deliver controlled force capable of lock down at BDC and optimizing your forming processes.

Features Include:

- Controlled knockout function using advanced valves
- Perfect match for automation, transfer and part catchers
- Delay/lock down capability

Teaming with Hyson

Gives Metal Stampers the Tools and Resources to:

- Eliminate die and press damage due to mechanical knockout failure
- Eliminate human error traditionally introduced during set up
- Custom engineer solutions specific to their application
- Reduce installation and set-up time
- Increase cycle time in Servo Press
- Reduce scrap

INTELLImax™ Knockout Solutions

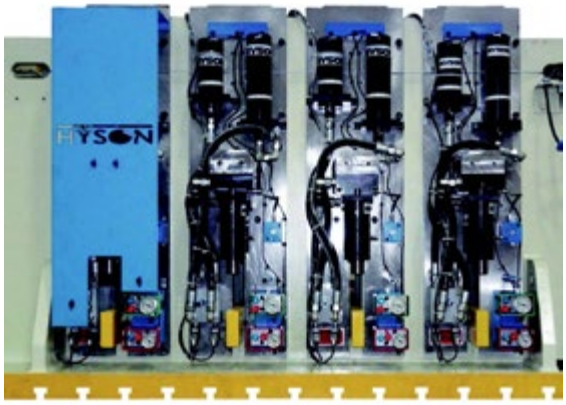
The Self Contained System

Completely self contained and operates without external hydraulics or other equipment, the force of the INTELLImax™ Self Contained System can be customized to your application by changing the charge pressure. The system is actuated by an electric signal which releases the energy to drive the press knockout bar at the user-determined time.

- With the knockout mounted directly to the slide/ram face, the need to modify or **manually adjust the system is eliminated**
- An electric signal actuates the system and drives the press knockout bars at the **user-determined time**
- Force and timing are all under your control
- Ensures **repeatability** with the **correct timing**
- Modular design allows for **ease of installation, serviceability and interchangeability**

The Self Contained System Key Components:

- High pressure accumulator
- Knockout cylinder
- Safety relief valves
- High pressure nitrogen control panel
- High pressure valve



The Active Hydraulic System

The INTELLImax™ Active Hydraulic System performs controlled Knockout without using press tonnage when forming the part. Instead, it pulls force from a compact power unit that actuates the knockout system.

- Enables **fine-tuning** anywhere within the press stroke
- Ability to start the system retracted in **home position**
- Can be implemented into **lower knockout operations**
- Ideal for:
  - Applications where **more control** is needed or when the press has reached its maximum force capability
  - **AHSS** and deep draw applications
  - Applications requiring **transfer and automation**

The Compact Power Unit Key Components:

- Heat exchanger
- Electrical control boxes
- Pump pressure gauge
- Control valve
- Knockout pressure gauge
- Flow valve

The Active Hydraulic Knockout Key Components:

- Guide and bushing assembly
- Over-stroke protection
- Transfer plate
- Nitrogen auxiliary cylinder (to retract)
- Hydraulic knockout cylinder (to extend)
- Hydraulic manifold plate

Next-Generation Knockout Solution

	Challenge					
Feature	Limited Force	Trapped Part in Upper	Trapped Part in Lower	Set Up Times	Maintenance	
Programmable Knockout		SC AH	SC AH			
Mounted In Lower			SC AH			
Mounted In Upper		SC AH				
Easy Force Adjustment				SC		
Modular Design				SC	SC	
More Force	SC AH					
Position Control				AH		
Retracted Home Position						

SC = Self Contained

AH = Active Hydraulic

	Timing With Automation and Part Catchers	Multiple Pin Lengths are Used in Dies	Not Enough Available Force for Knockout and Stamping the Part	Quality Problems When Force is Applied to the Part Before Bdc	Solution
	SC AH				Integrates knockout into press controls to perform part ejection function anytime after BDC.
					Mounts into the press bed, and under the bolster plate.
					Mounts onto the ram/slide face.
					Simplifies force adjustment utilizing nitrogen control panel.
					Provides quick install and service to these systems, in addition to interchangeable knockout stations.
					Uses high pressure components capable of operating parameters at 150 bar (2175psi) allowing for more force in the same space as other technologies.
		AH			Circuit is designed to set the return position of the knockout, allowing for pins of different heights to be utilized from die to die.
			AH	AH	Cylinder returns to retracted position after each cycle. Knockout does not actuate and provide any force until after BDC.

13 Toolmind™ Remote Monitoring System

Smart Manufacturing with toolmind®

Industry 4.1 – Manufacturing Efficiency

The emergence of what is called the fourth industrial revolution and smart factories represents a tremendous new opportunity for the manufacturing industry. In particular, the widespread deployment of sensors on factory floors across the globe is generating huge amounts of data. This provides manufacturers visibility into their assets and allows them to leverage tools for predictive maintenance. The result of which is less unplanned downtime, reduced scrap, and greater efficiency.

Edge Computing

One highly effective approach manufacturers employ today is called “edge computing.” For industries such as manufacturing, where real-time production takes place, there is a need for data analysis and resulting actions to be nearly instantaneous. Therefore, to reduce lag time between data creation and when a response is generated, manufacturers are placing smart sensors at the “edge” of where data is created, i.e., on the machines themselves. This saves time to send data through the cloud and then back to the factory floor and diminishes network reliability issues. Additionally, edge computing keeps data near the source which reduces security risks.

Toolmind Remote Pressure Monitoring

Toolmind is an edge computing device that monitors the pressure and temperature of Pressure Systems used in manufacturing. It includes customizable triggers to automatically alert or stop production of faulty parts when outside of the proper range.

How It Works: The sensor mounts into any G 1/8 port and monitors pressure and temperature, sending that encrypted signal to the Toolmind™ base station or handheld, where the user can see whether the process or storage of the monitored zone is within specified parameters.

Toolmind™ Base Station

Our in-house designed base station allows you to remotely monitor your installed Toolmind™ sensors. The base station can store in memory* up to 250 tools, with up to 12 sensors monitored per tool, all on a 10" industrial touch screen display, with an easy to use HMI.

Each sensor can be renamed, and all monitored parameters have user adjustable limits (high and/or low). The base station also features an industry standard RS232 port, so you can integrate to your PLC. Using the built-in relay allows shutting down of your operation if your process strays outside of your limits.

*__Note:__ only one tool can displayed and be monitored currently.

Models

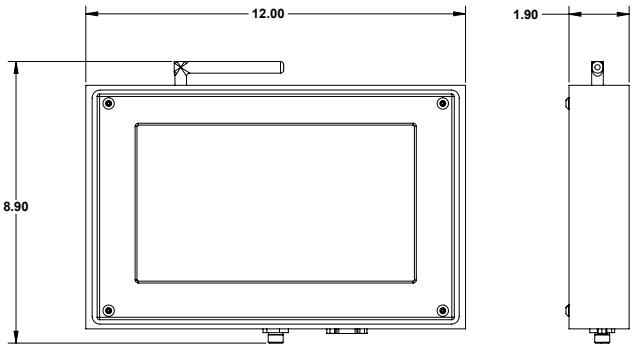
- BASE-SENSE

Wireless Features

- Bluetooth™ 5.0 Wireless Connection
- Encrypted Data Connection
- Compatible with all of Hyson's IoT system

Mechanical Features

- Rugged Aluminum Enclosure
- VESA Mounting Pattern
- 10.1" Touchscreen Display
- M12 4 Pin Connector
- Built-in Relay
- 24 VDC Power Requirement
- PNP and NPN adjustable in Settings
- DB9 RS232 Connector, for Local Data Output
- External Antenna for Better Range
- Access Control (Admin Features)



Software Features

- 250 tools
- Capable of Monitoring 12 sensors per Tool
- Sensor and Tool Naming Functions
- Warning and Fault Options
- Adjustable High & Low Pressure Limits
- Adjustable High Temperature Limit
- Fault Options will Trip Relay
- Display Units: F/PSI, C/BAR, or C/MPa

Toolmind™ Sensor

Pressure and temperature data is transmitted at intervals depending on the model to either the base station or handheld reader via encrypted Bluetooth™. The sensor only measures and transmits, it will not receive any information.

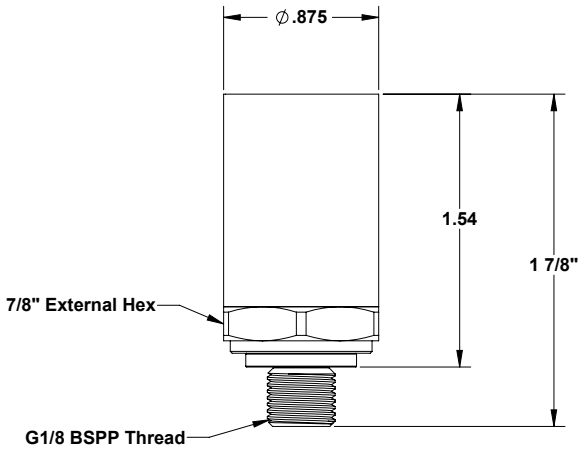
Wireless Features

- Bluetooth™ 5.0 Wireless Connection
- Compatible with all of Hyson's IoT system
- Normal, On Demand, and Low Power Storage modes of operation
- Approximately 50 foot (15 meters) range (Range Based on Obstructions)

Mechanical Features

- For use in Liquid and Gas Mediums
- Reads 0-10,000 PSIG (Full Scale =10000)
- Pressure Accuracy ±1% FS @ FS
- Operating Temperature: -20°C – 85°C
- Temperature Accuracy ±3°C
- G1/8 BSPP Thread

Features	PS1-BT-G18	PS2-BT-G18	PS3-BT-G18
Transmissions Interval	20 sec.	40 sec.	0.5 sec.
Battery Life	Approx. 1.5 years	Approx. 3 years	Approx. 4 months



Toolmind™ Handheld Reader

Ever wanted to know your pressure without breaking into the pressure zone? Our handheld, when paired with Toolmind™ sensor, does just that. Designed to be an accompaniment to our Toolmind™ base sation, the handheld allows portable scanning without having to be in range of the base station. Using continuous mode allows the handheld to listen for nearby sensors displaying their data, while on-demand mode allows direct targeting of a particular sensor by applying the Toolmind Fob. Featuring a rugged ABS housing, with a protective boot, the simple interface and user adjustable parameters allow you to check quickly and know that you have the correct pressure, right away.

Wireless Features

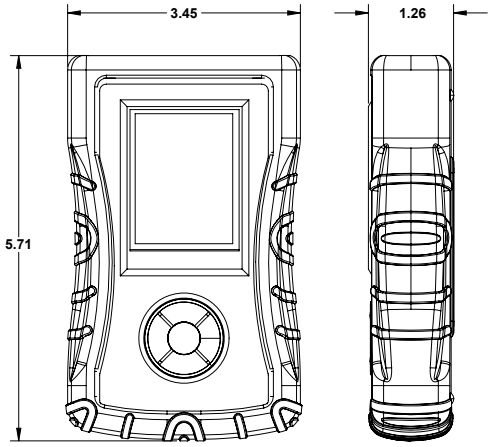
- Bluetooth™ 5.0 Wireless Connection
- Encrypted Data Connection
- Contiuous, On Demand, and Storage modes of operation

Mechanical Features

- USB-C Rechargeable on-board battery

Software Features

- Basic Sensor Naming Capabilities
- Pressure and Temperature Monitoring
- Display Units: F/PSI, C/BAR, or C/MPa



Note:

Note:

HYSON™

HysonSolutions.com