* Registered Patent; Hyson Products

Dyne-A-Lube[Pat.]
High Speed/High Volume
Understanding Dyne-A-Lube

HYSON

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 this friction area and is cooled when recirculated

2) The lubricant forms a film between the nitrogen seal and the cylinder sleeve. The seal hydroplanes on the lubricant, reducing 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 systems running today have over 50 million strokes on the cylinders with no 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 lasts 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 60.03.01 for detailed information.

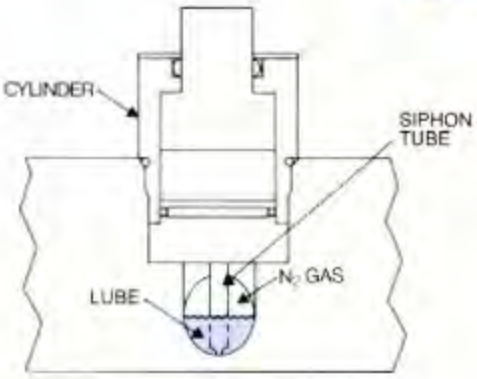
High Speed: A hose and tank design with a Dyne-A-Lube system is commonly used for high speed applications. The Dyne-A-Lube hose and tank system is available in a variety of stroke lengths. This type of design is normally used when speeds exceed 100 strokes per minute.

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.

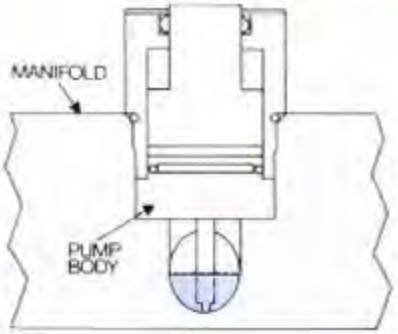
A reservoir of special lubricant rests in the manifold plate drilled volume holes. The pump body siphon tube is submerged in lubricant.

Die at Rest



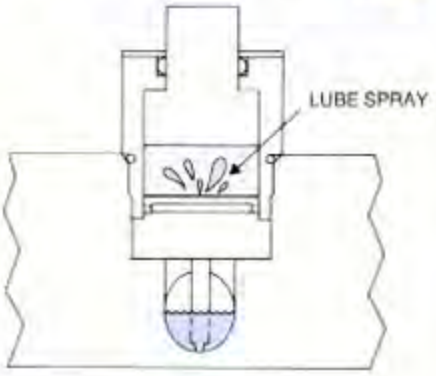
When the press closes, nitrogen is forced out of the cylinder and compressed into the manifold.

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.

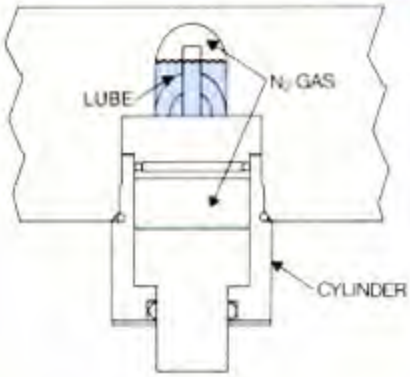
Press Opens



Inverted DYNE-A-LUBE™ Manifold

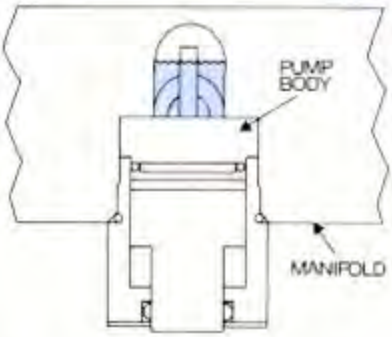
The special lubricant is stored in the manifold plate drilled volume holes.

Die at Rest



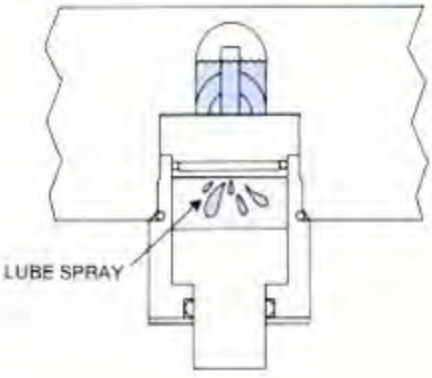
As the press closes, the lubricant and nitrogen are forced from the cylinder into the manifold.

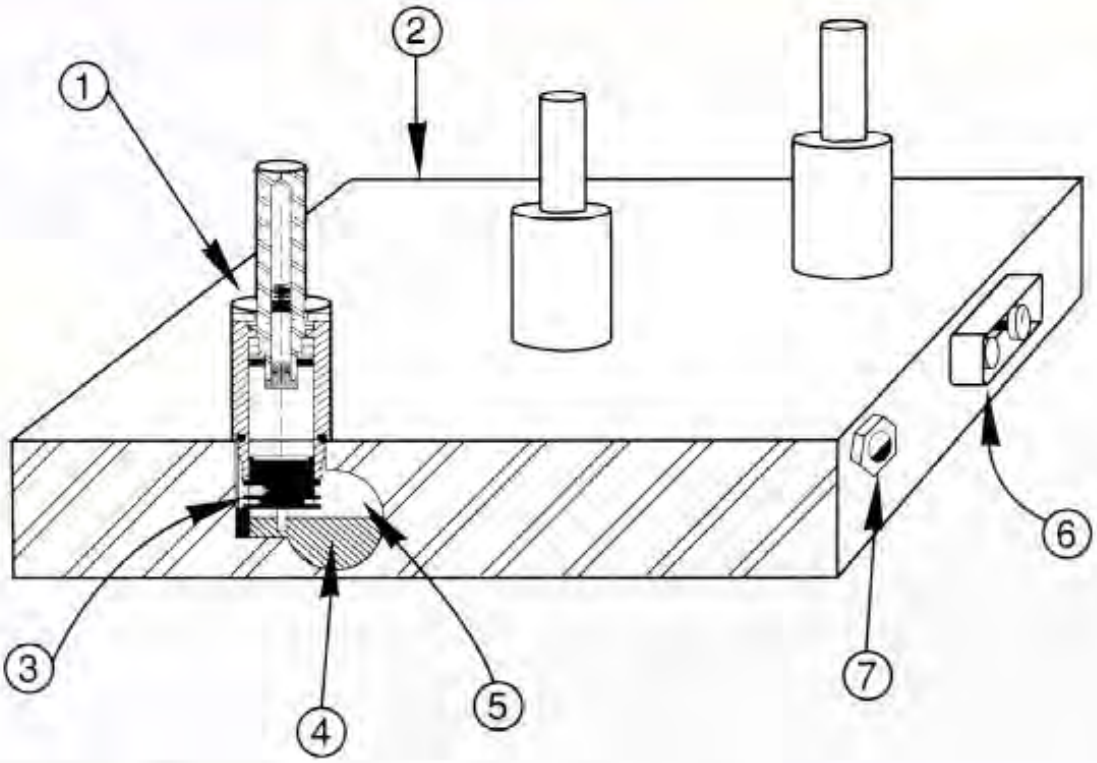
Press Closes



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





A high volume Dyne-A-Lube manifold system consists of seven 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 60.05.01 for cylinder types and specific dimensions.

2) Manifold Plate
The manifold plate is shape 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 60.05.01.

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 10.10.01 of the standard manifold section for details.

7) Sight Gauge
A sight gauge is installed on every manifold. It reveals the lubrication level in the manifold. Sight gauges are included with every Dyne-A-Lube manifold system.

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 lubricant volume must be calculated.

To calculate the total volume required for the Dyne-A-Lube manifold reservoir:

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 10.03.01 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 1/2 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:

Lubricant Volume (VL) = Volume in Pints (VP) x 29

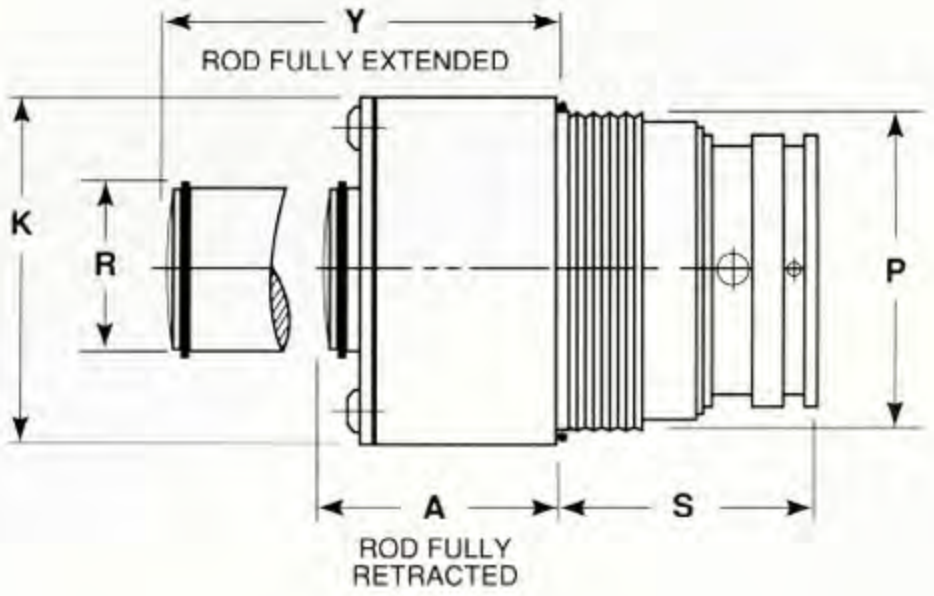
After total volume requirements are calculated, the volume hole drilling can be designed into the manifold.

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.



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.	1.81 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.	2.12 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.

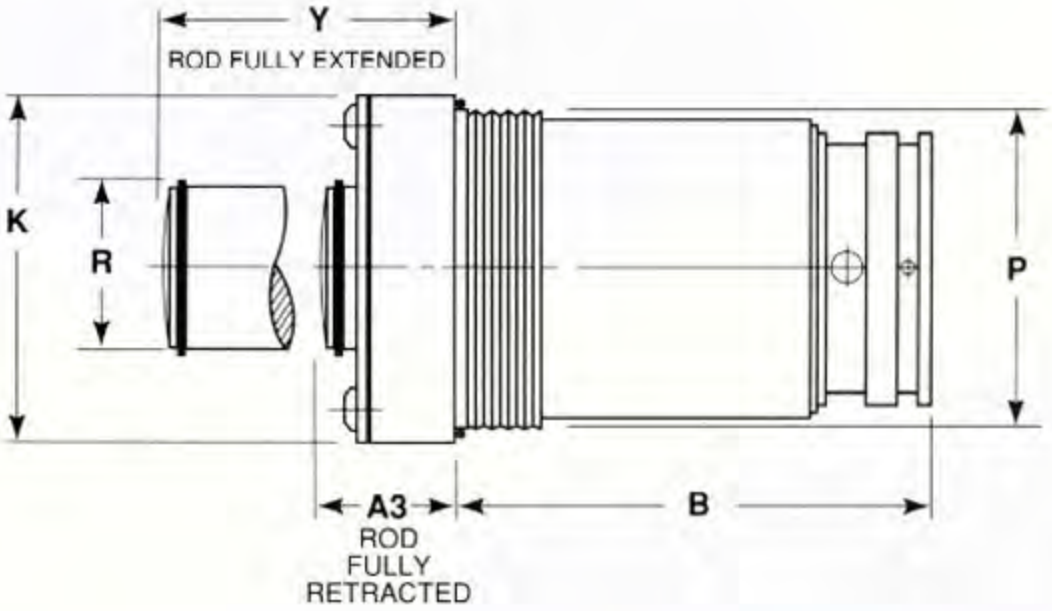
DL Standard Stroke Dimensions (for Lower Systems)

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.	4.66	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 in.
	152 mm.
DL 6	6.0 in.
	152 mm.

Note: All dimensions are nominal unless tolerance is stated.



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.

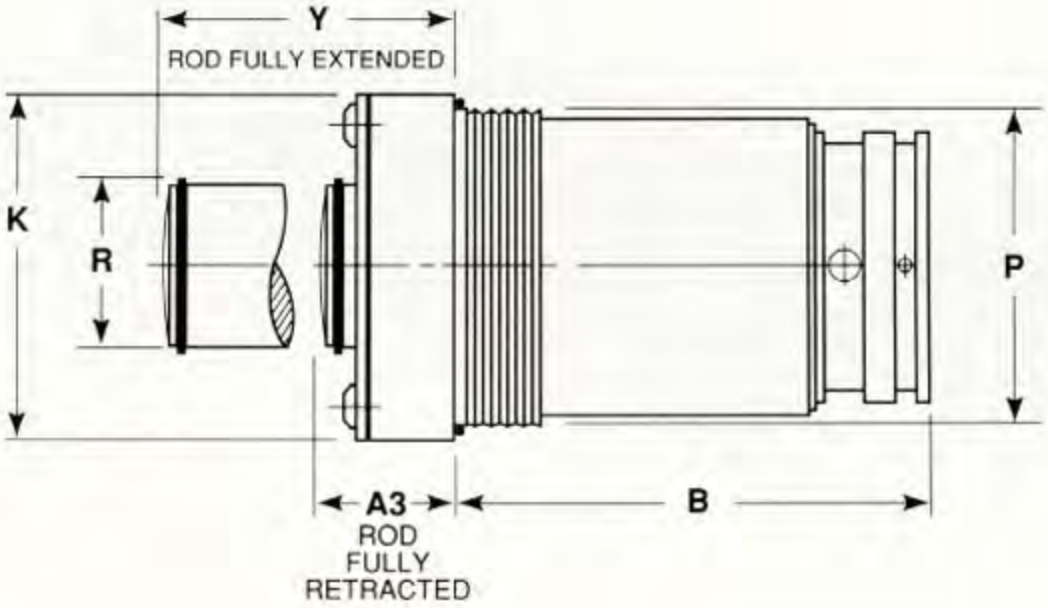
DLD Standard Stroke Dimensions (for Lower Systems)

Variable Dimensions with Stroke

Stroke	DLD 0.5		DLD 1 +		DLD 2.5		DLD 4		DLD 6	
	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	92	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	156	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 in.
	152 mm.
DLD 6	6.0 in.
	152 mm.

Note: All dimensions are nominal unless tolerance is stated.



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.

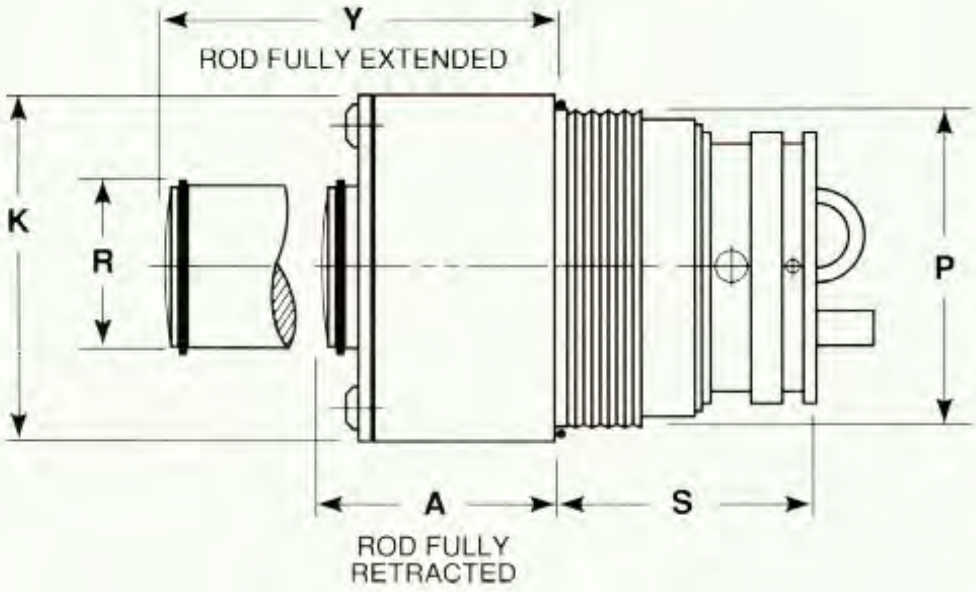
DLSB Standard Stroke Dimensions (for Lower Systems)

Variable Dimensions with Stroke

Stroke	DLSB 0.5		DLSB 1+		DLSB 2.5		DLSB 4	
	Y	B	Y	B	Y	B	Y	B
0.5 in.	1.16	2.50	1.16	2.61	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	1.66	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	3.16	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.	4.16	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	200
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 in.
	152 mm.

Note: All dimensions are nominal unless tolerance is stated.



Force and Fixed Dimensions

Model	Max. Force @ 1500 psi or 103 Bar	Piston Diameter	Effective Piston Area	K	P	R	S
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.

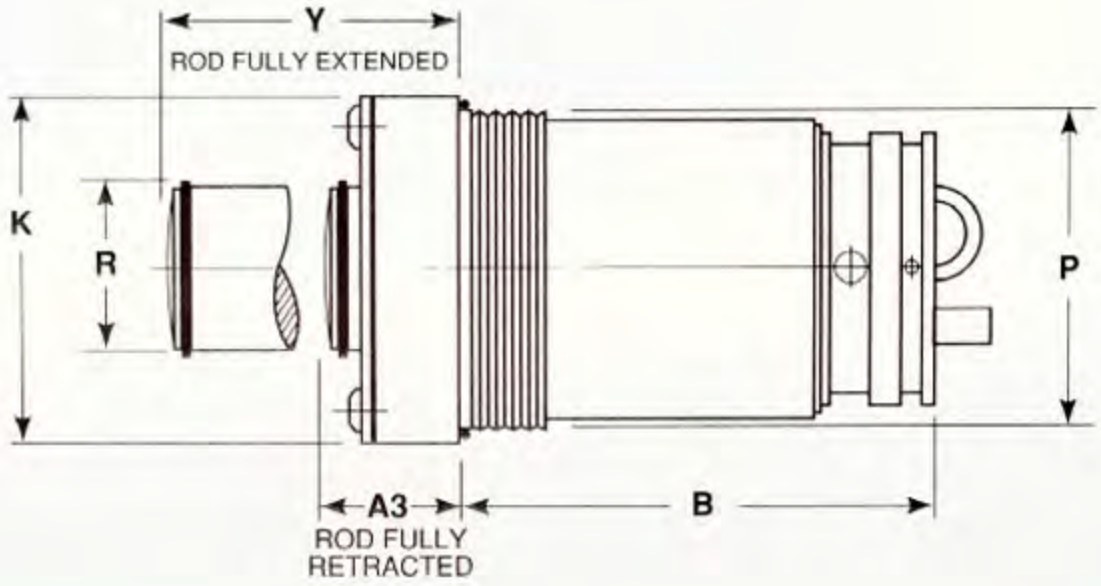
DLU Standard Stroke Dimensions (for Upper Systems)

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.	4.66	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 in.
	152 mm.
DLU 6	6.0 in.
	152 mm.

Note: All dimensions are nominal unless tolerance is stated.



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.

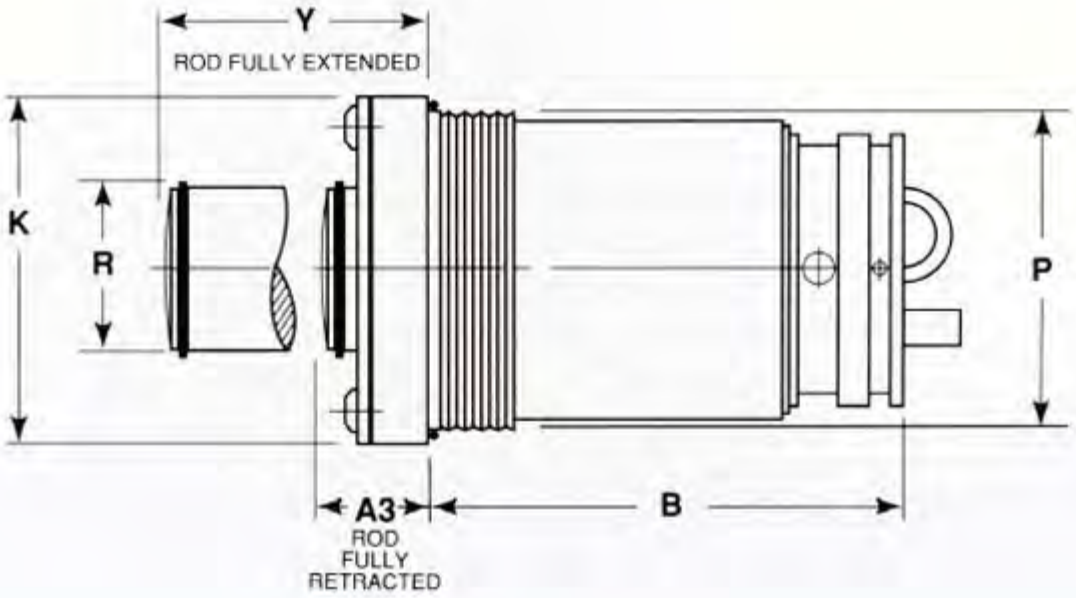
DLDU Standard Stroke Dimensions (for Upper Systems)

Variable Dimensions with Stroke

Stroke	DLDU 0.5		DLDU 1+		DLDU 2.5		DLDU 4		DLDU 6	
	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	92	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	156	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	
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 in.
	152 mm.
DLDU 6	6.0 in.
	152 mm.

Note: All dimensions are nominal unless tolerance is stated.



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.

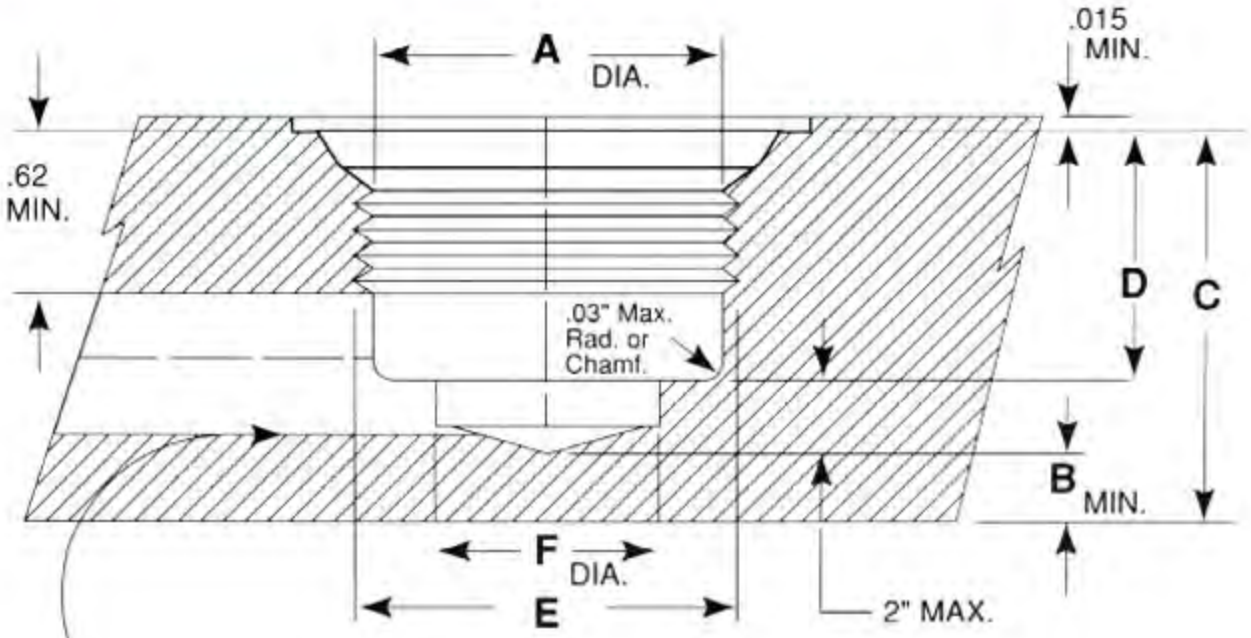
DLSBU Standard Stroke Dimensions (for Upper Systems)

Variable Dimensions with Stroke

Stroke	DLSBU 0.5		DLSBU 1+		DLSBU 2.5		DLSBU 4	
	Y	B	Y	B	Y	B	Y	B
0.5 in.	1.16	2.50	1.16	2.61	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	1.66	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	3.16	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.	4.16	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	200
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.

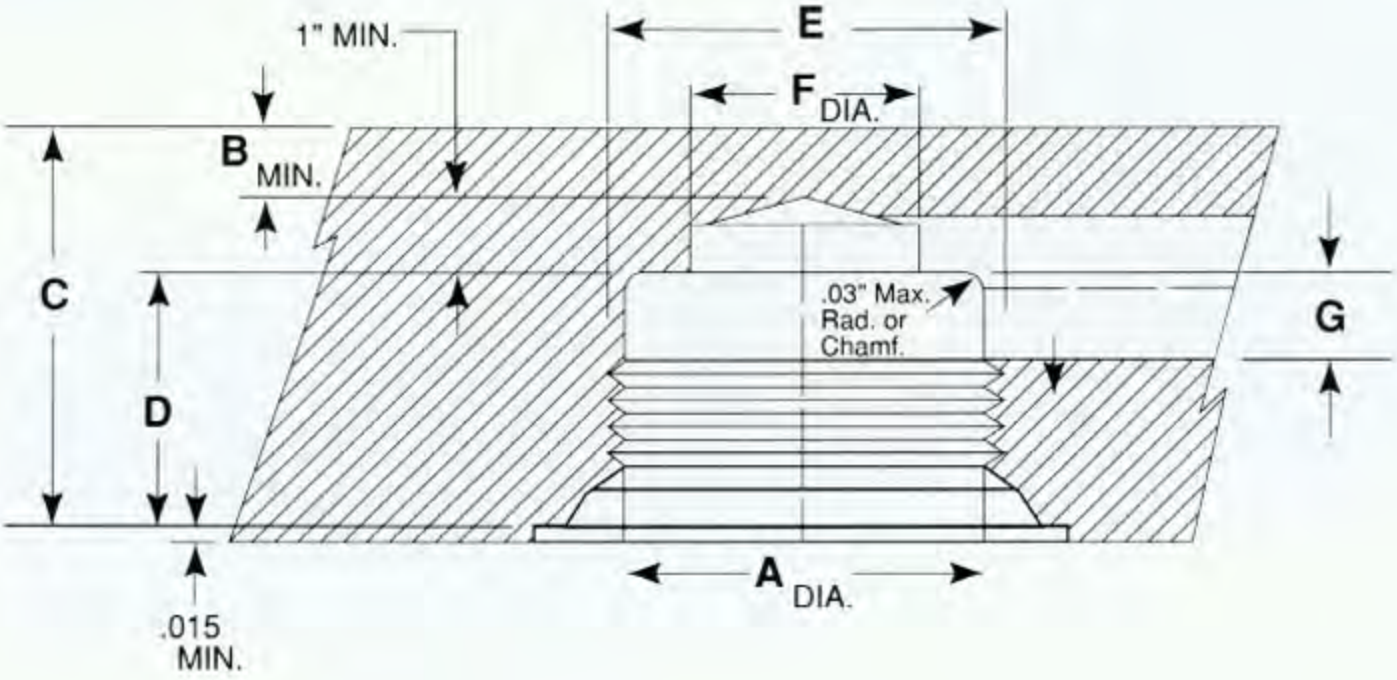


NOTE: BOTTOM WALL OF GUNDRILLING MUST BE WITHIN +/- 1/16" OF BOTTOM OF CYLINDER CAVITY OR CAVITY PRE-DRILL.

Fixed Cavity Dimensions for Standard Lower Cylinders						
Model	**A Dia.**	**B Min.**	**C Min.**	**D +/-.008 in. D +/-.20 mm.**	**E Thread**	**F Max. (Optional)**
DL 0.5	1.19 in.	0.24 in.	1.77 in.	1.530 in.	1-5/16-12	0.87 in.
	30 mm.	6 mm.	45 mm.	39 mm.		22 mm.
DL 1+	1.75 in.	0.31 in.	1.75 in.	1.375 in.	1-7/8-12	1.37 in.
	44 mm.	8 mm.	44 mm.	35 mm.		35 mm.
DL 2.5	2.38 in.	0.44 in.	2.25 in.	1.812 in.	2 1/2-12	1.75 in.
	60 mm.	11 mm.	57 mm.	46 mm.		44 mm.
DL 4	3.06 in.	0.63 in.	2.75 in.	2.125 in.	M 82x2 mm.	2.37 in.
	78 mm.	16 mm.	70 mm.	54 mm.		60 mm.
DL 6	3.75 in.	0.63 in.	2.75 in.	2.125 in.	M 100x2 mm.	3.00 in.
	95 mm.	16 mm.	70 mm.	54 mm.		76 mm.

Note: All dimensions are nominal unless tolerance is stated.

Cavity Dimensions for DLU Cylinders (for Upper Systems)



Fixed Cavity Dimensions for Upper Systems Cylinders							
Model	**A Dia.**	**B Min.**	**C Min.**	**D +/-.008 in. D +/-.20 mm.**	**E Thread**	**F**	**G**
DLU 0.5	1.19 in.	0.24 in.	2.78 in.	1.530 in.	1-5/16-12	0.87 in.	0.50 in.
	30 mm.	6 mm.	71 mm.	39 mm.		22 mm.	13 mm.
DLU 1+	1.75 in.	0.24 in.	2.61 in.	1.375 in.	1-7/8-12	1.37 in.	0.64 in.
	44 mm.	6 mm.	66 mm.	35 mm.		35 mm.	16 mm.
DLU 2.5	2.38 in.	0.30 in.	3.11 in.	1.812 in.	2 1/2-12	1.75 in.	0.66 in.
	60 mm.	8 mm.	79 mm.	46 mm.		44 mm.	17 mm.
DLU 4	3.06 in.	0.49 in.	3.61 in.	2.125 in.	M 82x2 mm.	2.37 in.	0.72 in.
	78 mm.	12 mm.	92 mm.	54 mm.		60 mm.	18 mm.
DLU 6	3.75 in.	0.49 in.	3.61 in.	2.125 in.	M 100x2 mm.	3.00 in.	0.72 in.
	95 mm.	12 mm.	92 mm.	54 mm.		76 mm.	18 mm.

Note: All dimensions are nominal unless tolerance is stated.

Dyne-A-Lube Pat. High Volume

Cavity Dimensions for DLD Cylinders (for Lower Systems)

NOTE: BOTTOM WALL OF GUNDRILLING MUST BE WITHIN +/- 1/16" OF BOTTOM OF CYLINDER CAVITY OR CAVITY PRE-DRILL.

Variable Dimensions By Stroke For Lower Deep Cavity Cylinders

	DLD 0.5		DLD 1+		DLD 2.5		DLD 4 — DLD 6	
Stroke	C Min.	D (+/-.008 in.) (+/-.20 mm.)	C Min.	D (+/-.008 in.) (+/-.20 mm.)	C Min.	D (+/-.008 in.) (+/-.20 mm.)	C Min.	D (+/-.008 in.) (+/-.20 mm.)
0.5 in.	1.77	1.53	1.93	1.62	2.50	2.06	3.00	2.37
13 mm.	45	39	49	41	64	52	76	60
1.0 in.	2.27	2.03	2.43	2.12	3.00	2.56	3.50	2.87
25 mm.	58	52	62	54	76	65	89	73
1.5 in.	2.77	2.53	2.93	2.62	3.50	3.06	4.00	3.37
38 mm.	70	64	74	67	89	78	102	86
2.0 in.	3.27	3.03	3.43	3.12	4.00	3.56	4.50	3.87
51 mm.	83	77	87	79	102	90	114	98
2.5 in.	3.77	3.53	3.93	3.62	4.50	4.06	5.00	4.37
64 mm.	96	90	100	92	114	103	127	111
3.0 in.	4.27	4.03	4.43	4.12	5.00	4.56	5.50	4.87
76 mm.	108	102	113	105	127	116	140	124
3.5 in.	4.77	4.53	4.93	4.62	5.50	5.06	6.00	5.37
89 mm.	121	115	125	117	140	129	152	136
4.0 in.	—	—	—	—	6.00	5.56	6.50	5.87
102 mm.	—	—	—	—	152	141	165	149
4.5 in.	—	—	—	—	6.50	6.06	7.00	6.37
114 mm.	—	—	—	—	165	154	178	162
5.0 in.	—	—	—	—	7.00	6.56	7.50	6.87
127 mm.	—	—	—	—	178	167	191	174
5.5 in.	—	—	—	—	—	—	8.00	7.37
140 mm.	—	—	—	—	—	—	203	187
6.0 in.	—	—	—	—	—	—	8.50	7.87
152 mm.	—	—	—	—	—	—	216	200

Fixed Cavity Dimensions For Lower Deep Cavity Cylinders

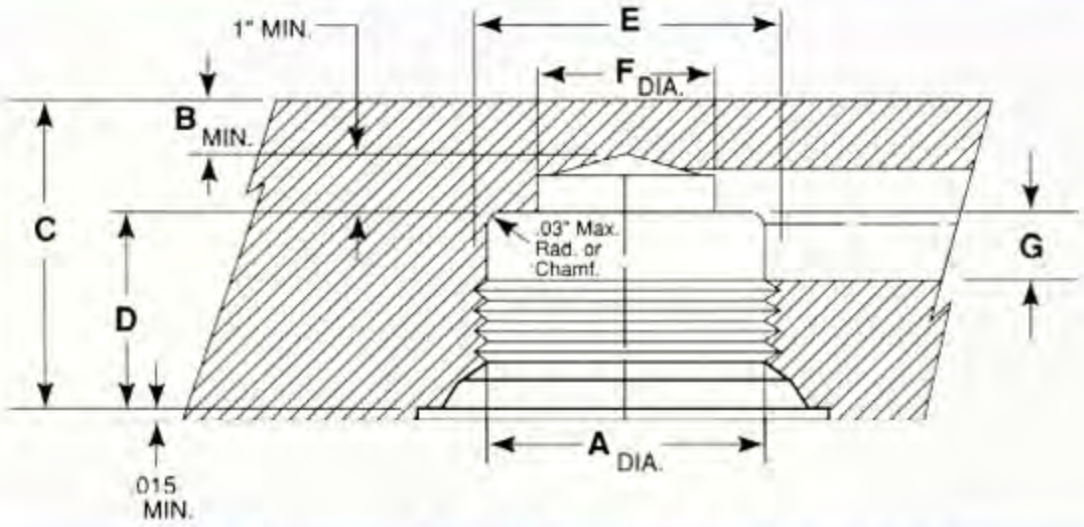
Model	A Dia.	B Min.	E Thread	F Max. (Optional)
DLD 0.5	1.19 in.	0.24 in.	1-5/16-12	0.87 in.
	30 mm.	6 mm.		22 mm.
DLD 1+	1.75 in.	0.31 in.	1-7/8-12	1.37 in.
	44 mm.	8 mm.		35 mm.
DLD 2.5	2.38 in.	0.44 in.	2-1/2-12	1.75 in.
	60 mm.	11 mm.		44 mm.

Fixed Cavity Dimensions For Lower Deep Cavity Cylinders

Model	A Dia.	B Min.	E Thread	F Max. (Optional)
DLD 4	3.06 in.	0.63 in.	M 82x2 mm.	2.37 in.
	78 mm.	16 mm.		60 mm.
DLD 6	3.75 in.	0.63 in.	M 100x2 mm.	3.00 in.
	95 mm.	16 mm.		76 mm.

Note: All dimensions are nominal unless tolerance is stated.

Cavity Dimensions for DLDU Cylinders (for Upper Systems)



Variable Dimensions By Stroke For Upper Deep Cavity Cylinders

Stroke	DLDU 0.5		DLDU 1+		DLDU 2.5		DLDU 4 — DLDU 6	
	C Min.	D (+/-.008 in.) (+/-.20 mm.)	C Min.	D (+/-.008 in.) (+/-.20 mm.)	C Min.	D (+/-.008 in.) (+/-.20 mm.)	C Min.	D (+/-.008 in.) (+/-.20 mm.)
0.5 in.	2.77	1.53	2.86	1.62	3.36	2.06	3.86	2.37
13 mm.	70	39	73	41	85	52	98	60
1.0 in.	3.27	2.03	3.36	2.12	3.86	2.56	4.36	2.87
25 mm.	83	52	85	54	98	65	111	73
1.5 in.	3.77	2.53	3.86	2.62	4.36	3.06	4.86	3.37
38 mm.	96	64	98	67	111	78	123	86
2.0 in.	4.27	3.03	4.36	3.12	4.86	3.56	5.36	3.87
51 mm.	108	77	111	79	123	90	136	98
2.5 in.	4.77	3.53	4.86	3.62	5.36	4.06	5.86	4.37
64 mm.	121	90	123	92	136	103	149	111
3.0 in.	5.27	4.03	5.36	4.12	5.86	4.56	6.36	4.87
76 mm.	134	102	136	105	149	116	162	124
3.5 in.	5.77	4.53	5.86	4.62	6.36	5.06	6.86	5.37
89 mm.	147	115	149	117	162	129	174	136
4.0 in.	—	—	—	—	6.86	5.56	7.36	5.87
102 mm.	—	—	—	—	174	141	187	149
4.5 in.	—	—	—	—	7.36	6.06	7.86	6.37
114 mm.	—	—	—	—	187	154	200	162
5.0 in.					7.86	6.56	8.36	6.87
127 mm.	—	—	—	—	200	167	212	174
5.5 in.	—	—	—	—	—	—	8.86	7.37
140 mm.	—	—	—	—	—	—	225	187
6.0 in.	—	—	—	—	—	—	9.36	7.87
152 mm.	—	—	—	—	—	—	238	200

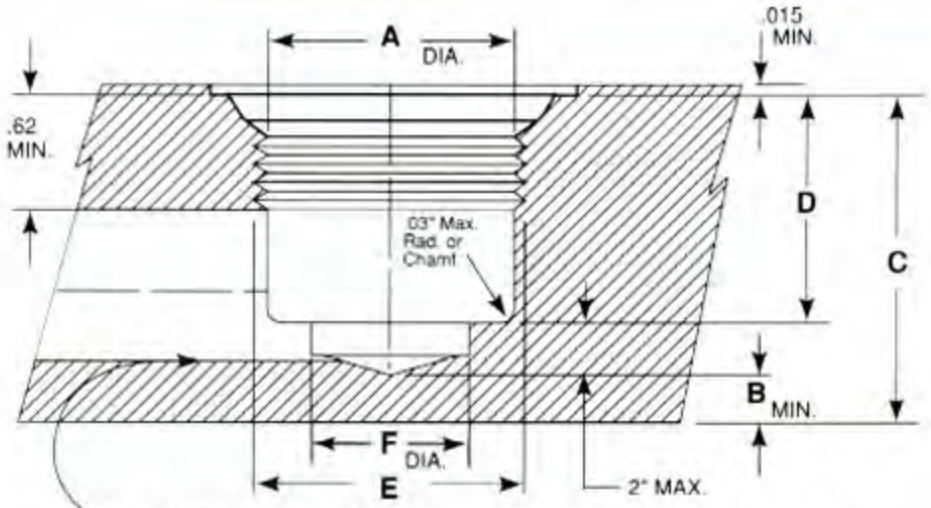
Fixed Cavity Dimensions For Upper Deep Cavity Cylinders

Model	A Dia.	B Min.	E Thread	F Max. (Optional)	G
DLDU 0.5	1.19 in.	0.24 in.	1-5/16-12	0.87 in.	0.5 in.
	30 mm.	6 mm.		22 mm.	13 mm.
DLDU 1+	1.75 in.	0.24 in.	1-7/8-12	1.37 in.	0.64 in.
	44 mm.	6 mm.		35 mm.	16 mm.
DLDU 2.5	2.38 in.	0.30 in.	2-1/2-12	1.75 in.	0.66 in.
	60 mm.	8 mm.		44 mm.	17 mm.

Fixed Cavity Dimensions For Upper Deep Cavity Cylinders

Model	A Dia.	B Min.	E Thread	F Max. (Optional)	G
DLDU 4	3.06 in.	0.49 in.	M 82x2 mm.	2.37 in.	0.72 in.
	78 mm.	12 mm.		60 mm.	18 mm.
DLDU 6	3.75 in.	0.49 in.	M 100x2 mm.	3.00 in.	0.72 in.
	95 mm.	12 mm.		76 mm.	18 mm.

Note: All dimensions are nominal unless tolerance is stated.



NOTE: BOTTOM WALL OF GUNDRILLING MUST BE WITHIN +/- 1/16" OF BOTTOM OF CYLINDER CAVITY OR CAVITY PRE-DRILL.

Variable Dimensions By Stroke For Short Body Lower Cylinders

Stroke	DLSB 0.5		DLSB 1+		DLSB 2.5		DLSB 4 — DLSB 6	
	C Min.	D (+/-.008 in.) (+/-.20 mm.)	C Min.	D (+/-.008 in.) (+/-.20 mm.)	C Min.	D (+/-.008 in.) (+/-.20 mm.)	C Min.	D (+/-.008 in.) (+/-.20 mm.)
0.5 in.	2.77	2.53	2.93	2.62	3.50	3.06	4.00	3.37
13 mm.	70	64	74	67	89	78	102	86
1.0 in.	3.27	3.03	3.43	3.12	4.00	3.56	4.50	3.87
25 mm.	83	77	87	79	102	90	114	98
1.5 in.	3.70	3.53	3.93	3.62	4.50	4.06	5.00	4.37
38 mm.	94	90	100	92	114	103	127	111
2.0 in.	4.27	4.03	4.43	4.12	5.00	4.56	5.50	4.87
51 mm.	108	102	113	105	127	116	140	124
2.5 in.	4.77	4.53	4.93	4.62	5.50	5.06	6.00	5.37
64 mm.	121	115	125	117	140	129	152	136
3.0 in.	5.27	5.03	5.43	5.12	6.00	5.56	6.50	5.87
76 mm.	134	128	138	130	152	141	165	149
3.5 in.	5.77	5.53	5.93	5.62	6.50	6.06	7.00	6.37
89 mm.	147	140	151	143	165	154	178	162
4.0 in.	—	—	—	—	7.00	6.56	7.50	6.87
102 mm.	—	—	—	—	178	167	191	174
4.5 in.	—	—	—	—	7.50	7.06	8.00	7.37
114 mm.	—	—	—	—	191	179	203	187
5.0 in.	—	—	—	—	8.00	7.56	8.50	7.87
127 mm.	—	—	—	—	203	192	216	200
5.5 in.	—	—	—	—	—	—	9.00	8.37
140 mm.	—	—	—	—	—	—	229	213
6.0 in.	—	—	—	—	—	—	9.50	8.87
152 mm.	—	—	—	—	—	—	241	225

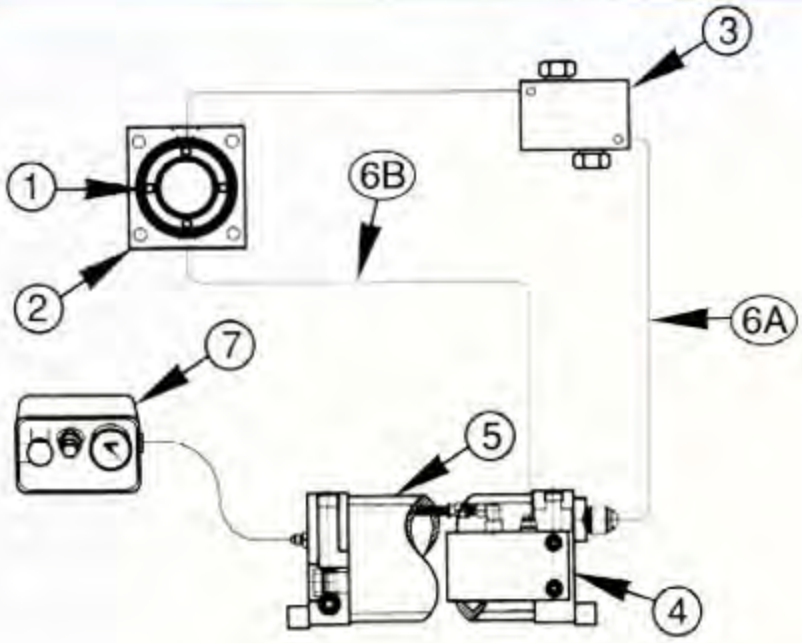
Fixed Cavity Dimensions For Extra Deep Lower Cylinders Cavities

Model	A Dia.	B Min.	E Thread	F Max. (Optional)
DLSB 0.5	1.19 in.	0.24 in.	1-5/16-12	0.87 in.
	30 mm.	6 mm.		22 mm.
DLSB 1+	1.75 in.	0.31 in.	1-7/8-12	1.37 in.
	44 mm.	8 mm.		35 mm.

Fixed Cavity Dimensions For Extra Deep Lower Cylinders Cavities

Model	A Dia.	B Min.	E Thread	F Max. (Optional)
DLSB 2.5	2.38 in.	0.44 in.	2-1/2-12	1.75 in.
	60 mm.	11 mm.		44 mm.
DLSB 4	3.06 in.	0.63 in.	M 82x2 mm.	2.37 in.
	78 mm.	12 mm.		60 mm.

Note: All dimensions are nominal unless tolerance is stated.



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.

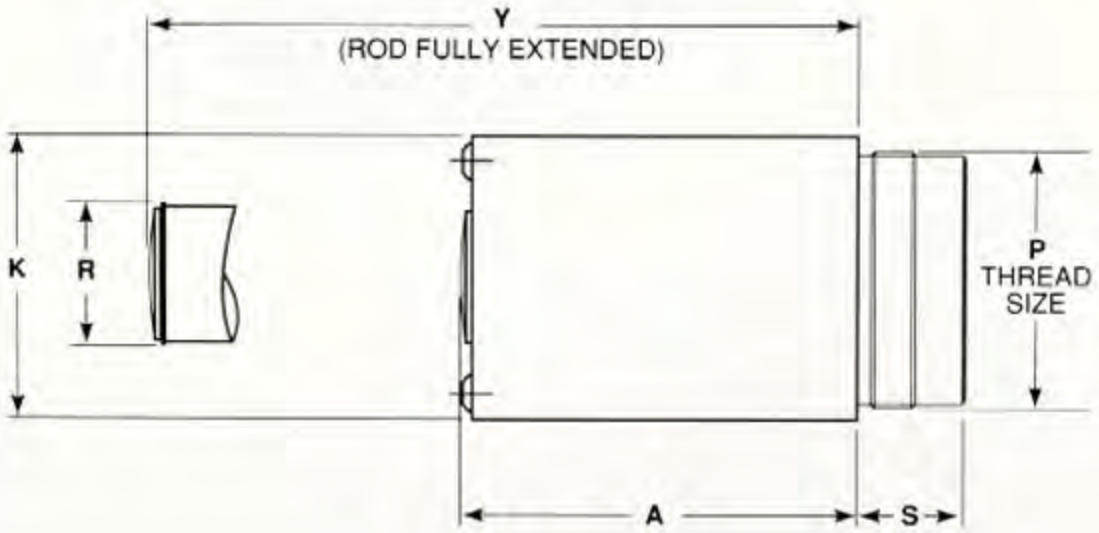
5) **Compression/Cooling Tank**
The compression tank serves two purposes. The first is to act as a reservoir for nitrogen gas and lubricant that is forced from the cylinders when they are stroked. The second purpose is to extract heat from the nitrogen gas and lubricant. Compression tanks come in a variety of sizes to suit specific applications. Volume requirements dictate compression/cooling tank size. Refer to page 60.12.01 for details.

6) **Hoses**
These hoses are used to interconnect all the components of the high speed Dyne-A-Lube hose and tank system. The hose aids in cooling the nitrogen gas and lubricant. The quantity, size and length of the hoses used will vary depending on several factors. These factors include the cylinder quantity, system speed, cylinder location, and the size and shape of the base. There are usually two hoses for each Dyne-A-Lube cylinder in a hose and tank system.

7) **Control Panel**
The control panel contains all of the necessary components for charging, exhausting and reading nitrogen pressure in the high speed Dyne-A-Lube system. The control panel is usually attached to the compression/cooling tank with a hose. Refer to page 20.07.01 of the standard hose and tank section for details.

Hyson Products will review all high speed Dyne-A-Lube designs for specific applications. The following pages are designed to give overall physical parameters of the high speed Dyne-A-Lube system. Hyson will provide the detailed engineering.

Contact Hyson Products at 1-800-876-4976 for specific application information.



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.	18 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.		1.86 in.	1.25 in.
		36,13 kN	67 mm.	34.9 sq. cm.	90 mm.	M 82x2 mm.	47 mm.	32 mm.
DLB 6	6 ton	11970 lbs.	3.19 in.	7.98 sq. in.	4.31 in.		2.51 in.	1.25 in.
		53,24 kN	81 mm.	51.5 sq. cm.	109 mm.	M 100x2 mm.	64 mm.	32 mm.

Note: All dimensions are nominal unless tolerance is stated.

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
19mm.	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
76 mm.	169	93	176	99
3.50 in.	7.66	4.16	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

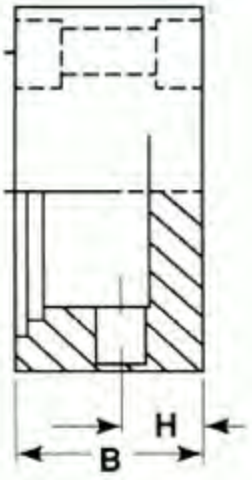
MINIMUM PLATE THICKNESS	
Model	Min. Plate Thickness
DLB 0.5	1.38 in.
	35 mm.
DLB 1+	1.38 in.
	35mm.
DLB 2.5	1.50 in.
	38 mm.
DLB 4	2.00 in.
	51 mm.
DLB 6	2.00 in.
	51 mm.

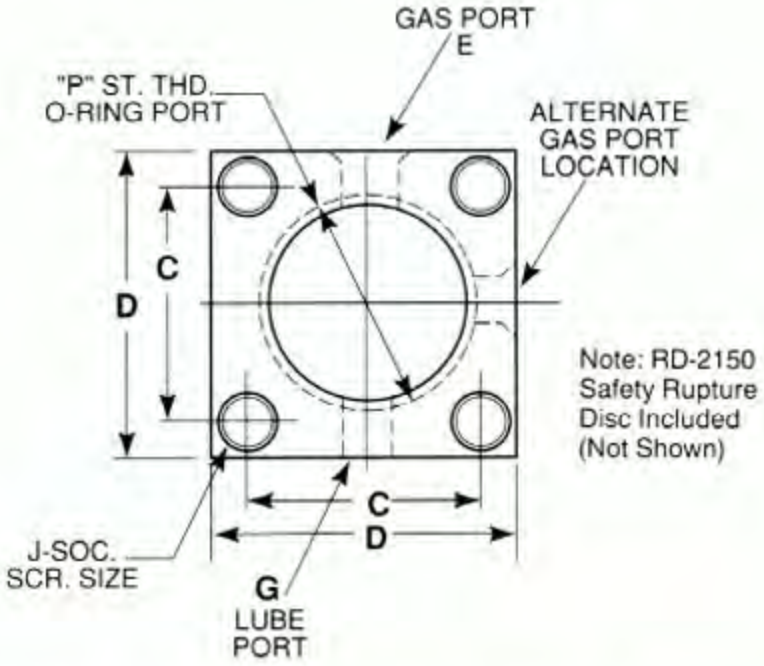
MAXIMUM STROKE LENGTHS AVAILABLE	
Model	Maximum Stroke
DLB 0.5	4.00 in.
	102 mm.
DLB 1+	4.00 in.
	102 mm.
DLB 2.5	6.00 in.
	152 mm.
DLB 4	7.00 in.
	178 mm.
DLB 6	8.00 in.
	203 mm.

Note: All dimensions are nominal unless tolerance is stated.

Dyne-A-Lube® High Speed
Cylinder Bases

The cylinder base is usually custom 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.





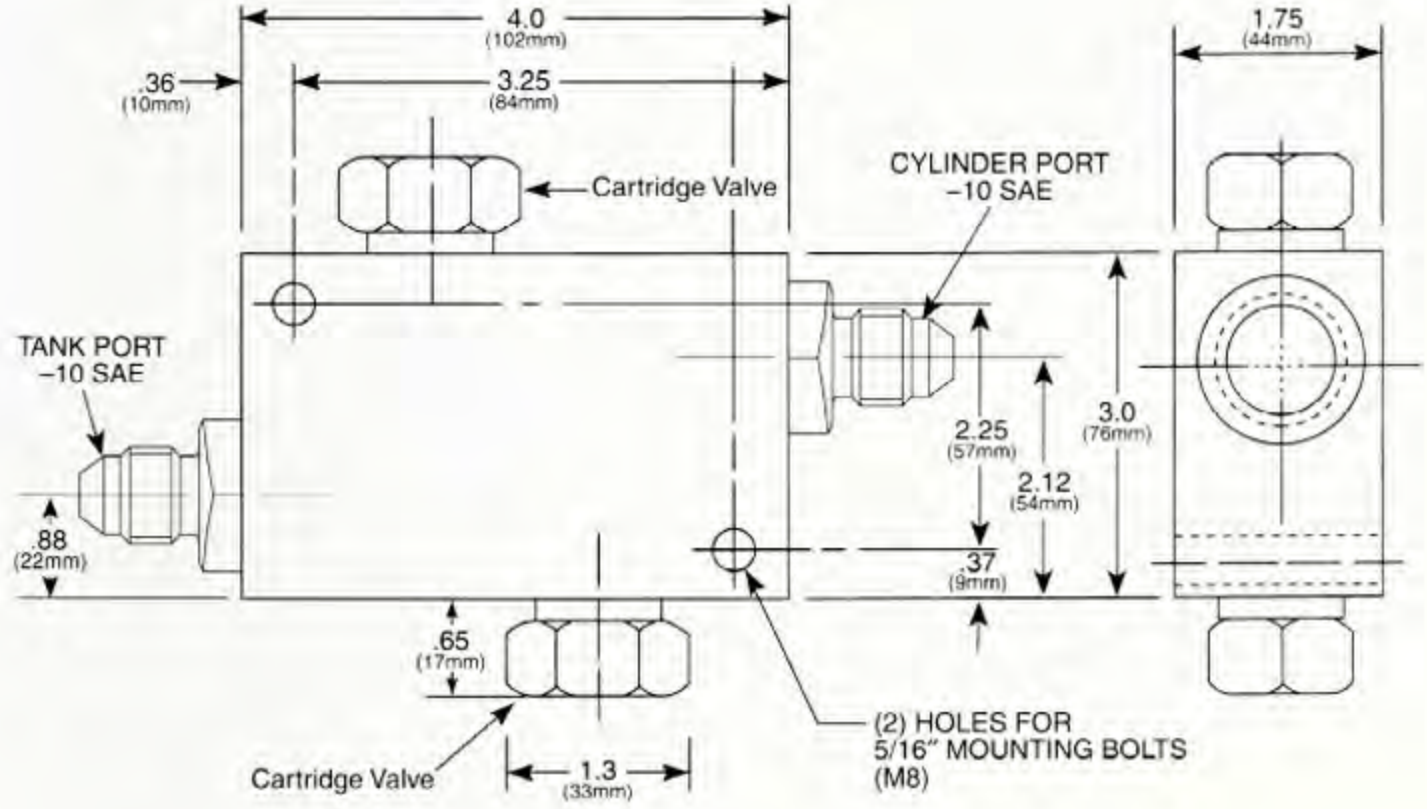
BASE SIZES FOR SINGLE HIGH SPEED DYNE-A-LUBE CYLINDERS

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	3/8-16
	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.

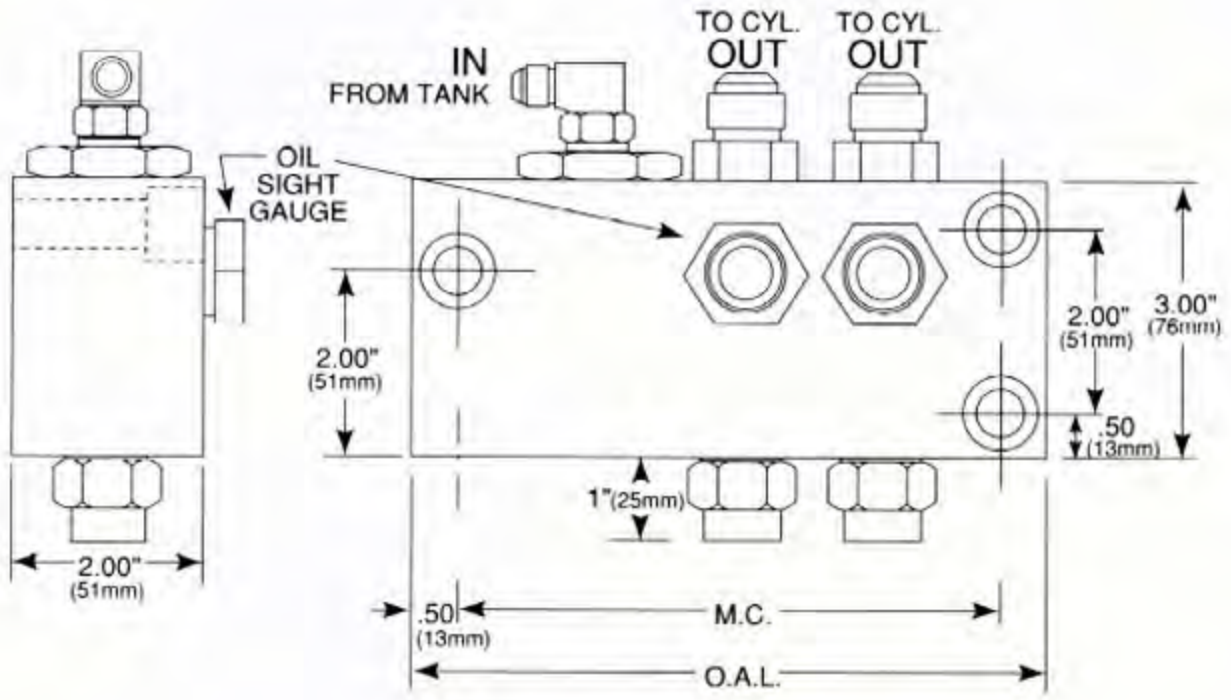
Note: All dimensions are nominal unless tolerance is stated.

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.

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 Centers (M.C.)
1 cyl. system	5.50 in.	4.50 in.
	140 mm.	114 mm.
2 cyl. system	7.00 in.	6.00 in.
	178 mm.	152 mm.
3 cyl. system	8.50 in.	7.50 mm.
	216 mm.	191 mm.
4 cyl. system	10.00 in.	9.00 in.
	254 mm.	229 mm.
(Note: 2 cyl. system is shown)		

Note: All dimensions are nominal unless tolerance is stated.

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 of 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:

$$\text{Volume In Pints (VP)} = \frac{\text{Volume of Nitrogen (VN)}}{145}$$

Note: Round up to the nearest 1/2 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:

Lubricant Volume (VL) = Volume in Pints (VP) x 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.