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.

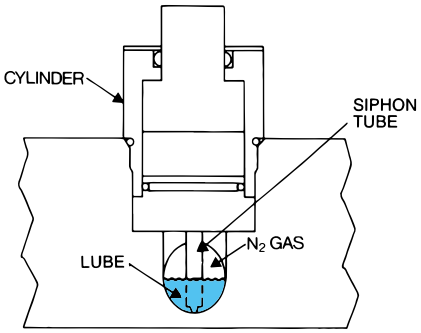
Consult a Hyson Products representative or the Engineered Products Department at 1-800-876-4976 for details on which system is best for a specific application.

Note: All dimensions are nominal unless tolerance is stated.

How it Works

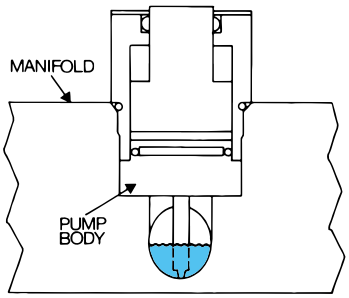
A reservoir of special lubricant rests in the manifold plate drilled volume holes. The pump body siphon tube is submerged in lubricant.

Die at Rest



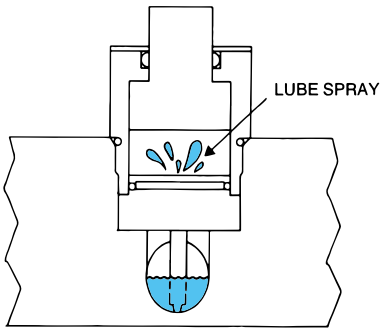
When the press closes, nitrogen is forced out of the cylinder and compressed into the manifold.

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.

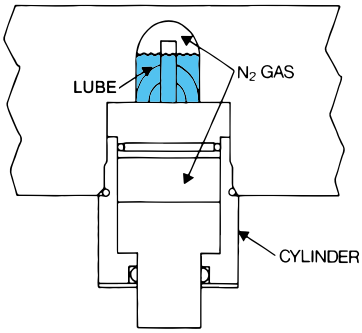
Press Opens



Inverted DYNE-A-LUBE Manifold

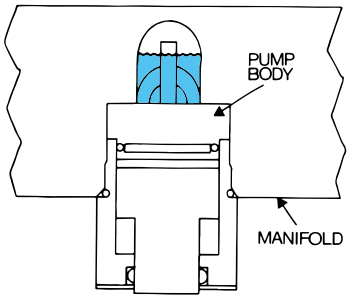
The special lubricant is stored in the manifold plate drilled volume holes.

Die at Rest



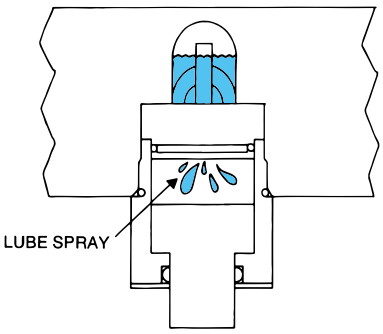
As the press closes, the lubricant and nitrogen are forced from the cylinder into the manifold.

Press Closes

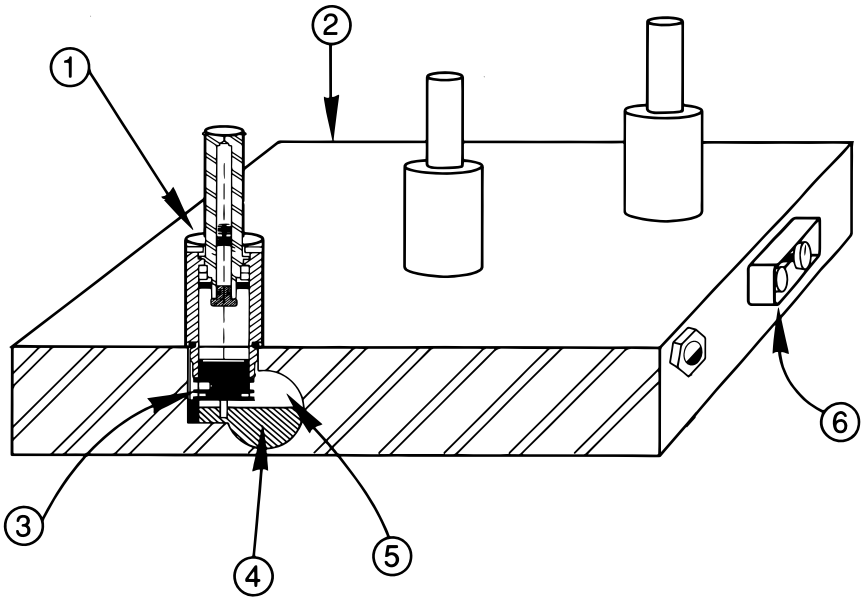


The pressure differential between the cylinder body and the manifold forces the nitrogen and lubricant through the pump body into the cylinder, lubricating and cooling the seal and cylinder body.

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.

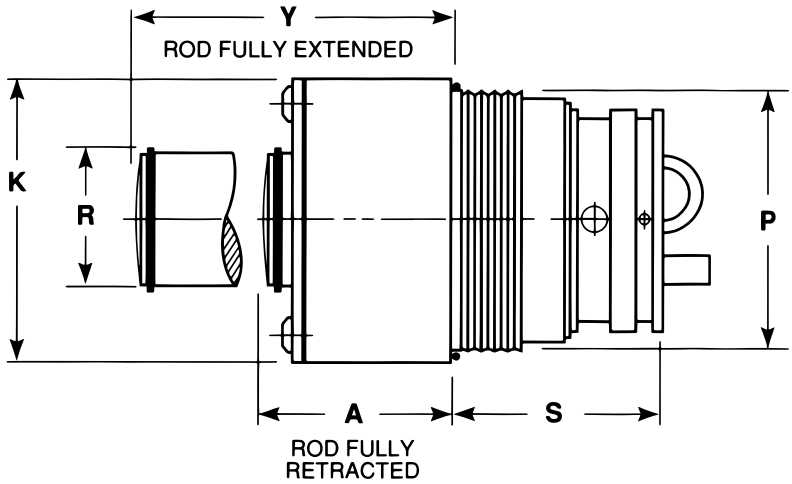
Note: The cylinders and cavity depths are different for lower and upper Dyne-A-Lube manifold systems.

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

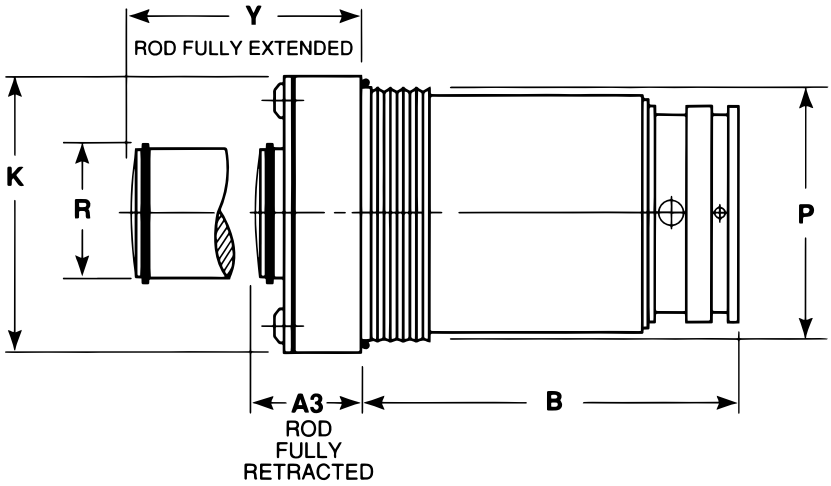
Maximum Stroke Lengths Available	
DL 0.5	3.5 in.
	89 mm
DL 1+	3.5 in.
	89 mm
DL 2.5	5.0 in.
	127 mm
DL 4	6.0
	152 mm
DL 6	6.0 in.
	152 mm

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

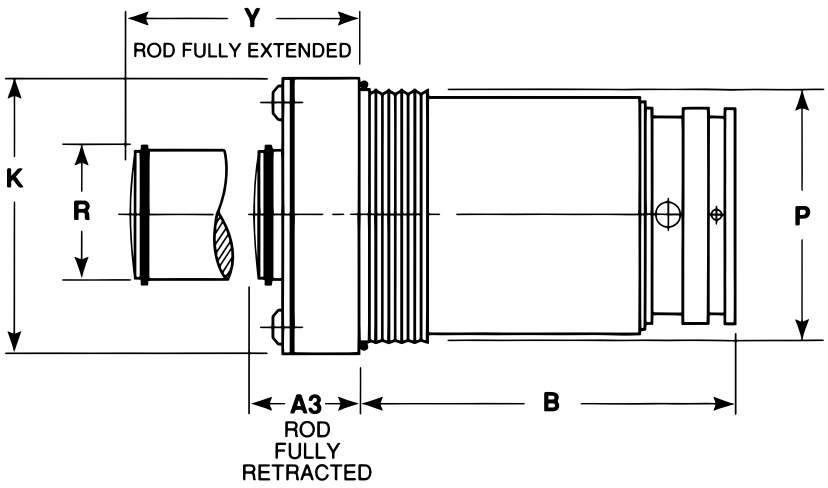
Maximum Stroke Lengths Available	
DLD 0.5	3.5 in.
	89 mm
DLD 1+	3.5 in.
	89 mm
DLD 2.5	5.0 in.
	127 mm
DLD 4	6.0
	152 mm
DLD 6	6.0 in.
	152 mm

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

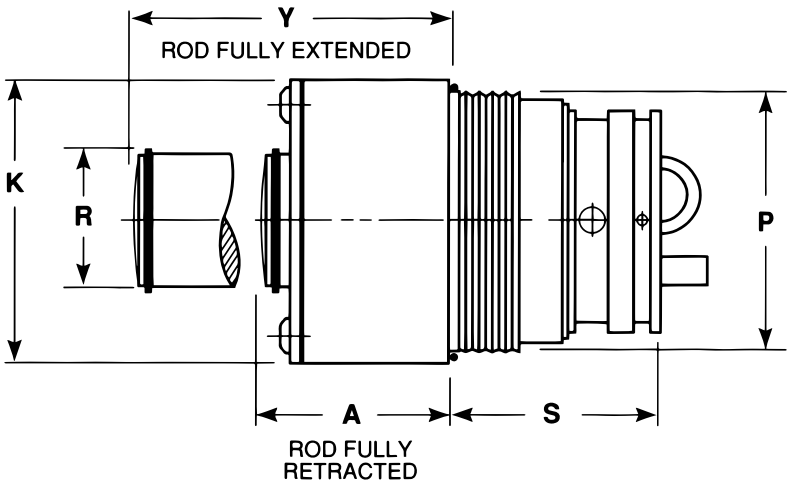
Maximum Stroke Lengths Available	
DLSB 0.5	3.5 in.
	89 mm
DLSB 1+	3.5 in.
	89 mm
DLSB 2.5	5.0 in.
	127 mm
DLSB 4	6.0
	152 mm

Note: All dimensions are nominal unless tolerance is stated.

DLU Cylinders

(for Upper Systems)

Force and Fixed Dimensions



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	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
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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

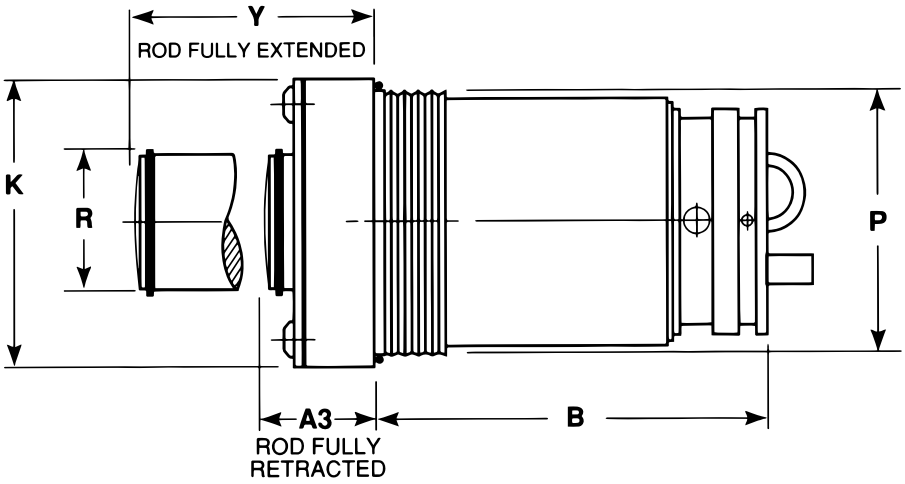
Maximum Stroke Lengths Available	
DLU 0.5	3.5 in.
	89 mm
DLU 1+	3.5 in.
	89 mm
DLU 2.5	5.0 in.
	127 mm
DLU 4	6.0
	152 mm
DLU 6	6.0 in.
	152 mm

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

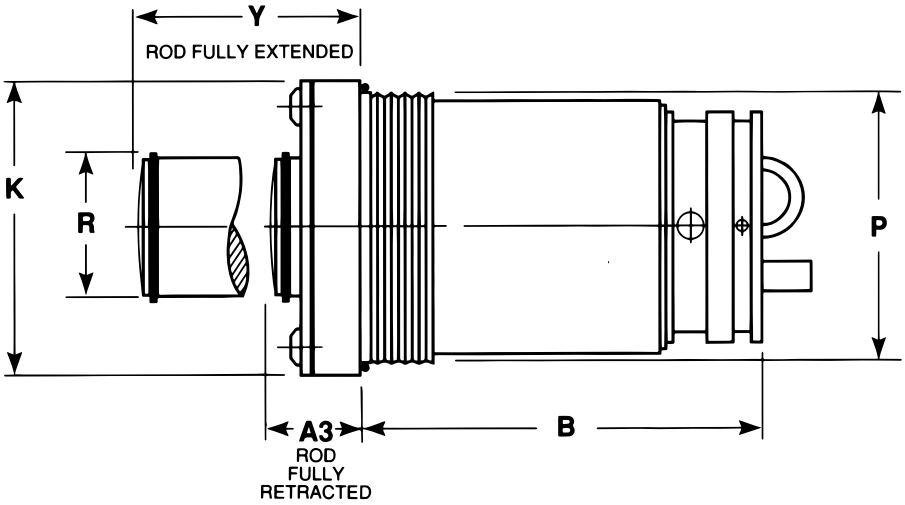
Maximum Stroke Lengths Available	
DLDU 0.5	3.5 in.
	89 mm
DLDU 1+	3.5 in.
	89 mm
DLDU 2.5	5.0 in.
	127 mm
DLDU 4	6.0
	152 mm
DDLU 6	6.0 in.
	152 mm

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)

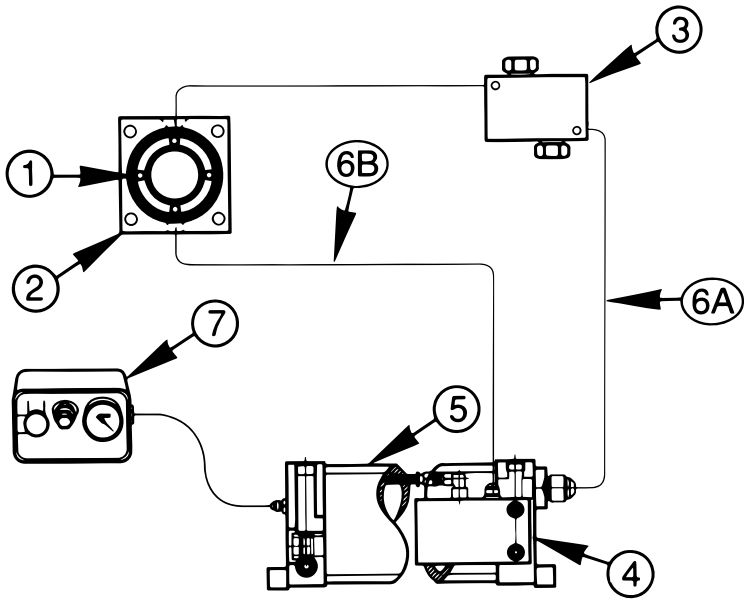
Variable Dimensions with Stroke

	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

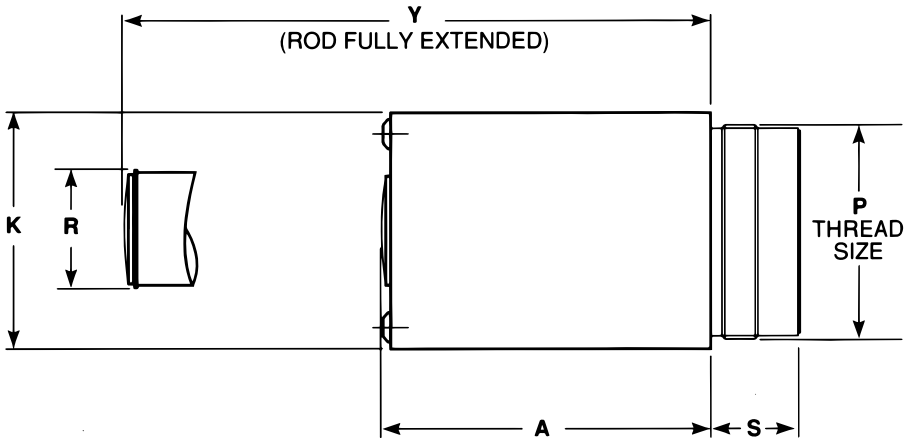
The lube control module serves two functions. The first is to control the flow of lubricant throughout the system. The second function is to monitor fluid levels. In most cases, the lube control module is attached to the tank. Refer to page 60.11.01 for details.

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

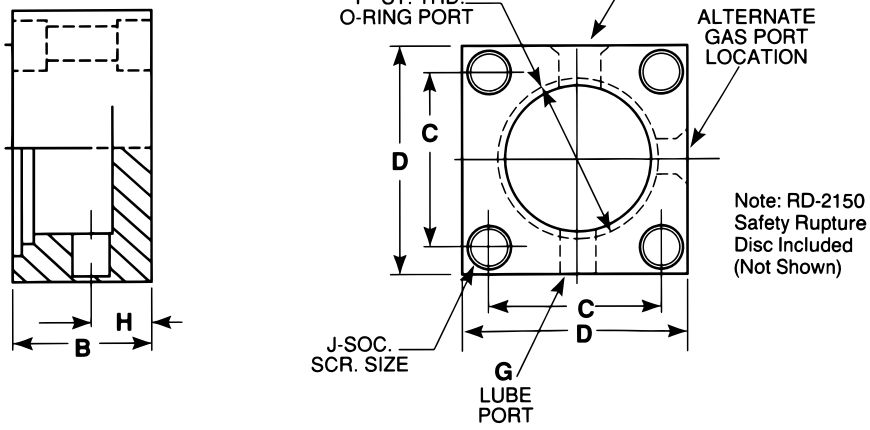
MINIMUM PLATE THICKNESS	
Model	Min. Plate Thickness
DLB 0.5	1.38 in.
	35 mm.
DLB 1+	1.38 in.
	35 mm.
DLB 2.5	1.50 in.
	38 mm.
DLB 4	2.00 in.
	51 mm.
DLB 6	2.00 in.
	51 mm.

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.



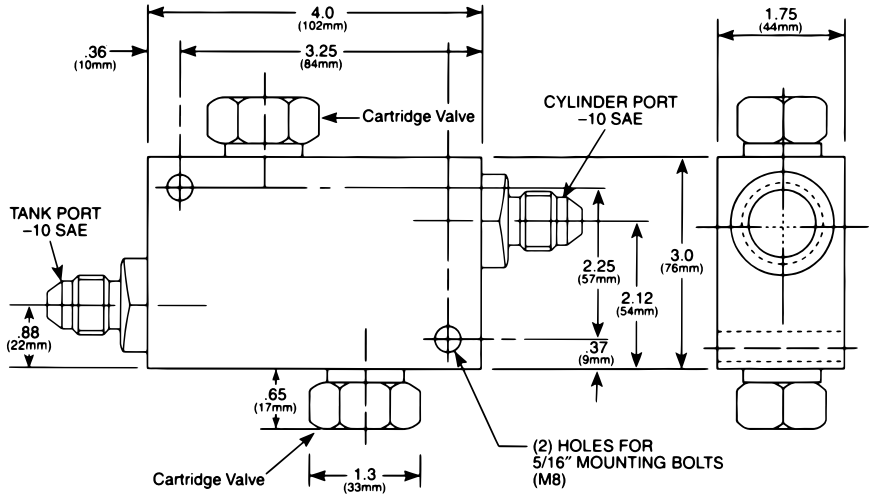
BASE SIZES FOR SINGLE HIGH SPEED DYNE-A-LUBE CYLINDERS								
Model	**B**	**H**	**C**	**D**	**Lube Port G**	**Gas Port E**	**P**	**J**
DLB 0.5	1.38 in.	0.50 in.	1.62 in.	2.25 in.	1/2 –-20	3/4 –-16	1-5/16 – 12	5/16 – 18
	35 mm.	13 mm.	41 mm.	57 mm.				M8
DLB 1+	1.38 in.	0.62 in.	2.12 in.	2.75 in.	1/2 –-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

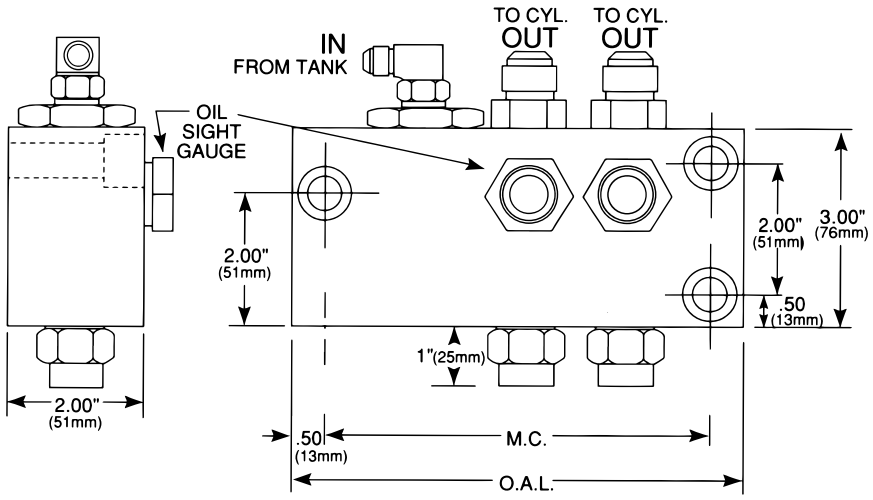
One nitrogen control module is usually required for each high speed Dyne-A-Lube cylinder. It is connected to the high speed system with hoses. The nitrogen control module should be mounted within 12 inches of the cylinder. Occasionally, the nitrogen control module can also be incorporated into a special 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.