

HYDRAULIC CYLINDERS

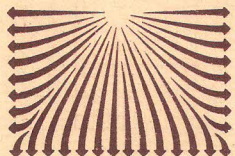
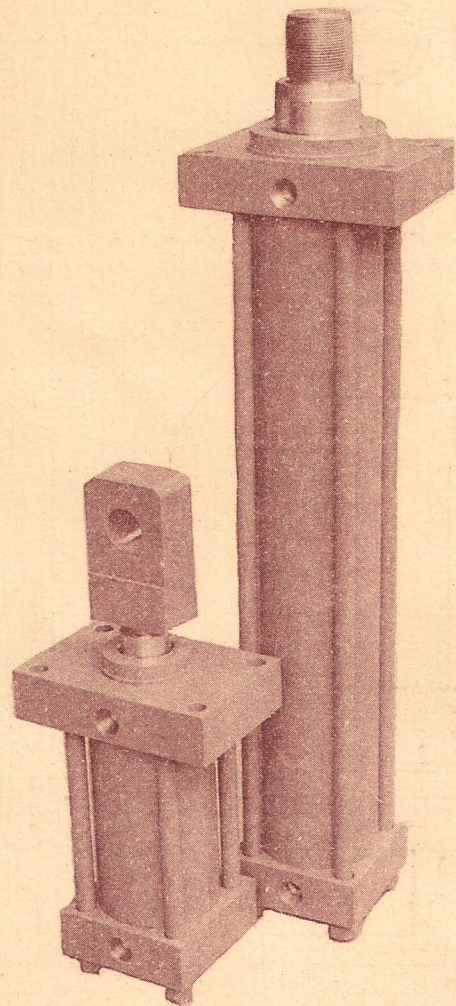
FOR INDUSTRIAL APPLICATIONS

CONFORMING TO ISO 6020/2 MOUNTING STYLES

SQUARE HEADED TIE ROD CONSTRUCTION

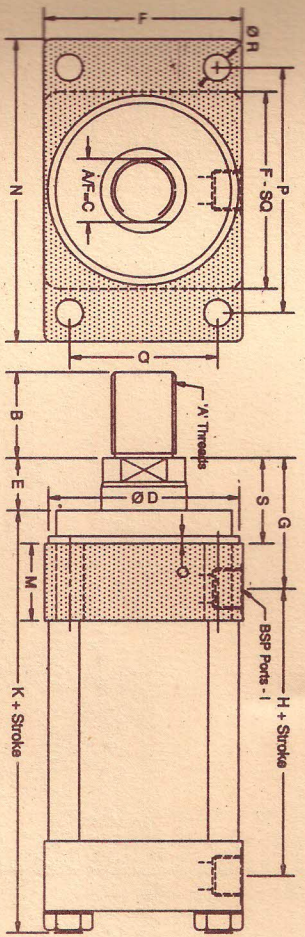
PRESSURE RATING 160 BAR

- Mounting interchangeability with ISO cylinders
- Bore size 40 mm up to 200 mm
- Rod size 18 mm up to 140 mm
- Option of three rod size per bore size
- Ten mounting styles
- Superior quality standard seals
- Suitable seals for various media
- Numerous optional features
- Rod and mounting selection guide

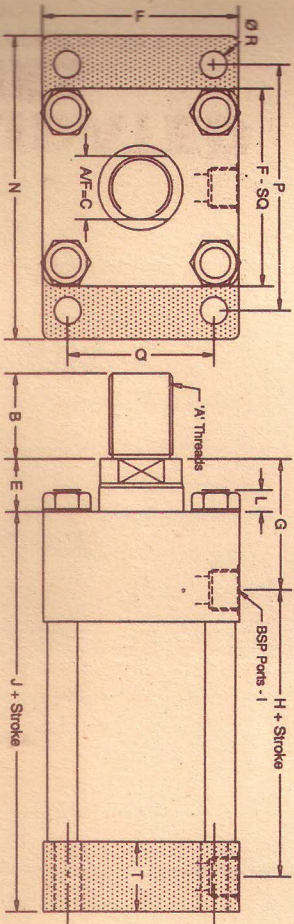


**CONSOLIDATED
MACHINES**

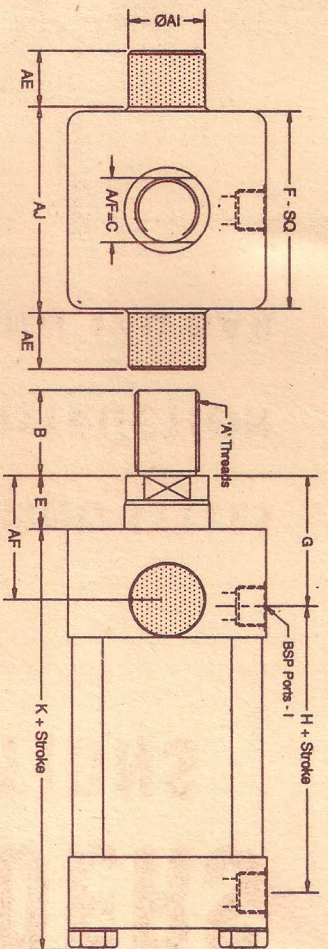
• HYDRAULICS • HYDRO-PNEUMATICS
• AUTOMATION CONTROLS



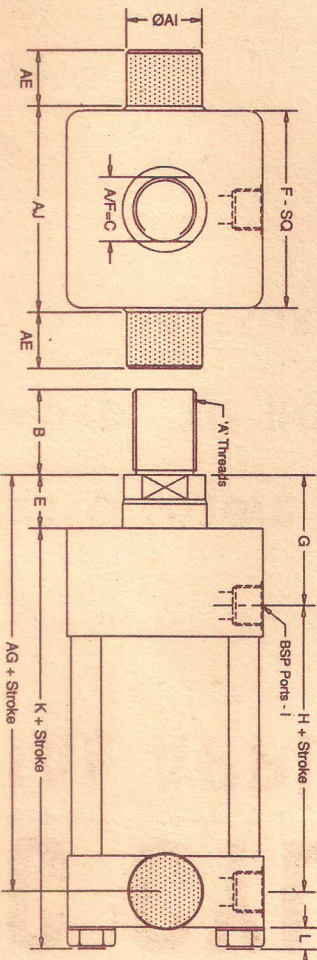
HEAD RECTANGULAR FLANGE
ISO STYLE - ME5



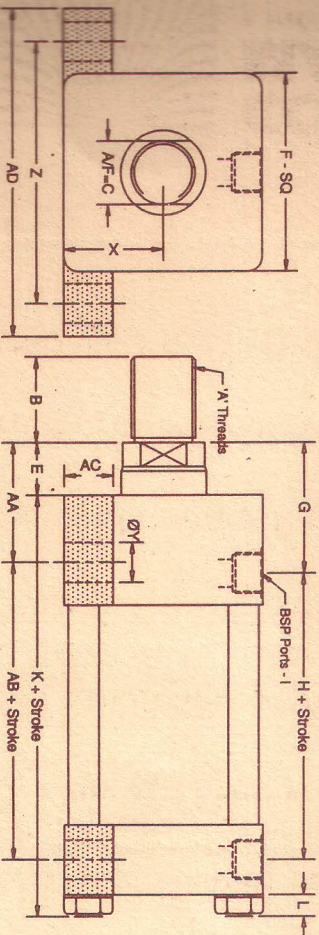
CAP RECTANGULAR FLANGE
ISO STYLE - ME6



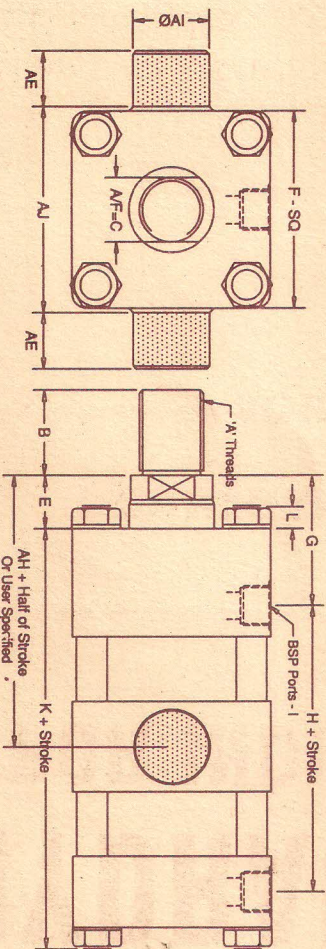
HEAD TRUNNION
ISO STYLE - MT1



CAP TRUNNION
ISO STYLE - MT2

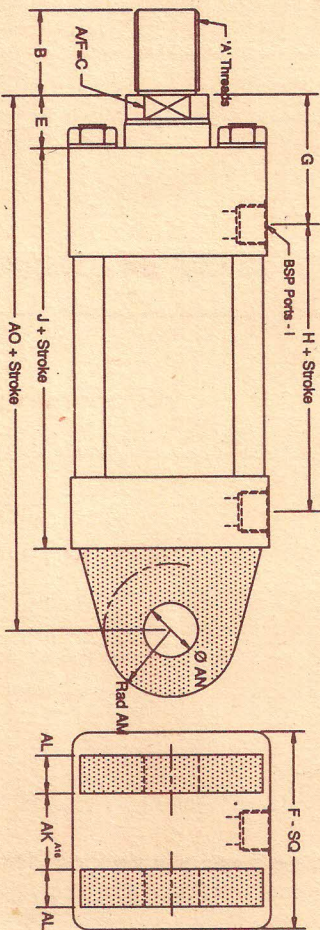


SIDE FOOT LUGS
ISO STYLE - MS2

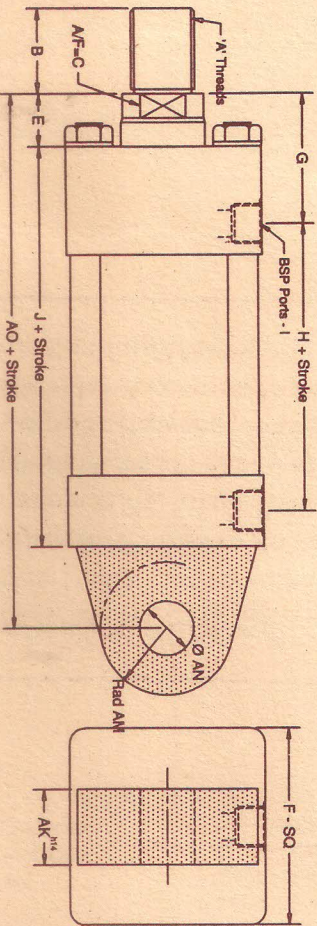


INTERMEDIATE TRUNNION
ISO STYLE - MT4

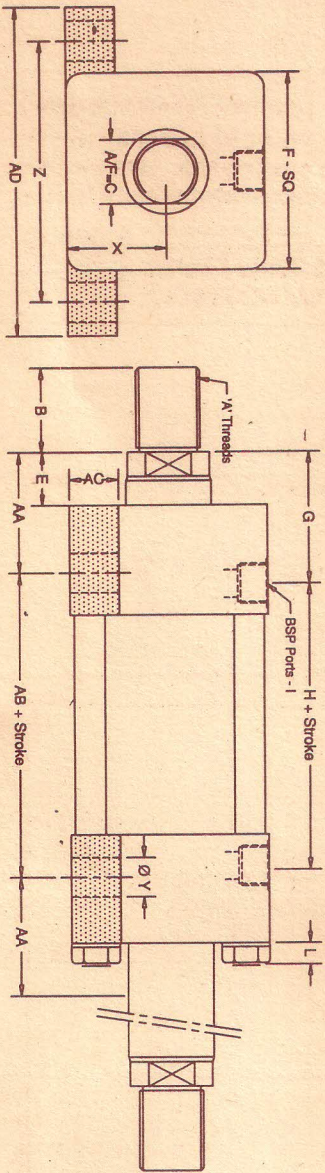
**CAP FIXED CLEVIS
 ISO STYLE MP1**



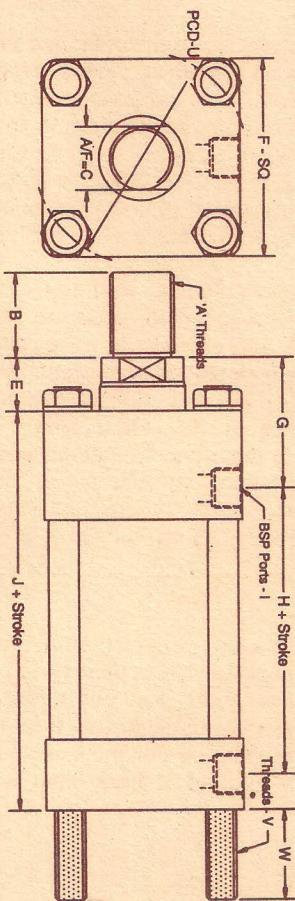
**CAP FIXED EYE
 ISO STYLE MP3**



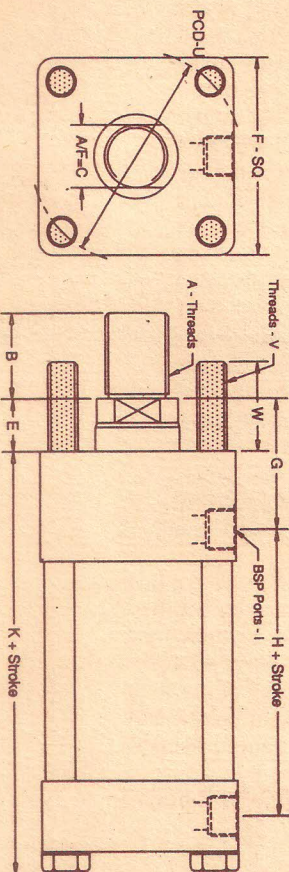
DOUBLE ENDED ROD CYLINDER



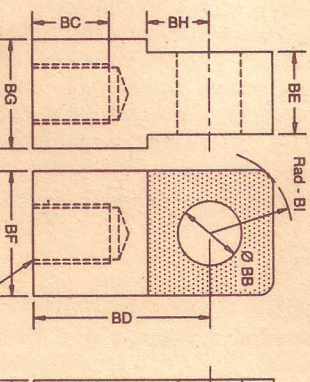
**CAP END TIERRods EXTENDED
 ISO STYLE MX2**



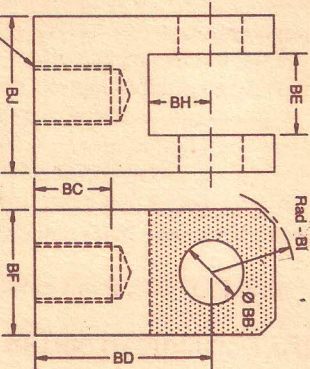
**HEAD END TIERRods EXTENDED
 ISO STYLE MX3**



PLAIN ROD EYE



ROD CLEVIS

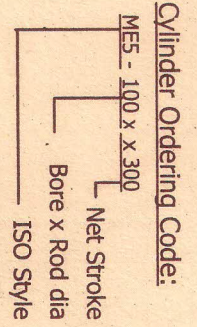


Bore x Rod	A	B	C	D
40 x 18	M14X1.5	18	15	62
40 x 28	M20X1.5	28	22	62
50 x 22	M16X1.5	22	18	74
50 x 28	M20X1.5	28	22	74
50 x 35	M27X2	36	30	74
63 x 28	M20X1.5	28	22	75
63 x 35	M27X2	36	30	88
63 x 45	M33X2	45	39	88
80 x 35	M27X2	36	30	82
80 x 45	M33X2	45	39	105
80 x 56	M42X2	56	48	105
100 x 45	M33X2	45	39	92
100 x 56	M42X2	56	48	125
100 x 70	M48X2	63	62	125
125 x 56	M42X2	56	48	105
125 x 70	M48X2	63	62	150
125 x 90	M64X3	85	80	150
160 x 70	M48X2	63	62	125
160 x 90	M64X3	85	80	170
160 x 110	M80X3	95	100	170
200 x 90	M64X3	85	80	150
200 x 110	M80X3	95	100	210
200 x 140	M100X3	112	128	210

Bore dia mm	BSP													TYPE: MTS1 MT2 MT4													TYPE: MP1 MP3												
	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB															
40	25	63	62	101	3/8	157	165	7	45	110	3	87	41	11	35	38	60	8x1.25	35	31	11	83	45	118															
50	25	75	67	102	1/2	163	173	10	45	130	4	105	52	14	41	38	73	10x1.5	46	37	14	102	54	115															
63	32	90	71	105	1/2	163	174	10	45	145	4	117	65	14	48	38	91	12x1.75	46	44	18	124	65	111															
80	31	115	77	111	3/4	179	193	13	50	180	4	149	83	18	51	45	115	16x2	59	57	18	149	68	120															
100	35	130	82	115	3/4	184	200	13	50	200	5	162	97	18	57	45	136	18x2.5	59	63	26	172	79	118															
125	35	165	86	142	1	222	241	18	58	250	5	208	126	22	57	58	173	22x2.5	81	82	26	210	79	149															
160	32	205	86	146	1	229	252	22	58	300	5	253	155	26	57	58	218	27x2	92	101	33	260	86	146															
200	32	245	98	168	1.25	272	300	24	76	360	5	300	190	33	57	76	269	33x2	115	122	39	311	92	174															

Bore dia mm	COMMON TO ALL TYPES													TYPE: MEG													TYPE: MX2 MX3													TYPE: MS2 AND DOUBLE-												
	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB																												
40	12.5	103	16	57	163	112	20	67	20	10	16	14	201	M14 X 1.5	14	18	38	20	25	25	19	17	42																													
50	19	127	20	64	169	118	25	80	30	15	25	20	220	M16 X 1.5	20	22	54	30	35	30	32	29	62																													
63	26	161	25	70	176	125	32	96	30	15	25	20	227	M20 X 1.5	20	28	60	30	40	30	32	29	62																													
80	26	186	32	76	188	133	40	121	40	20	34	28	249	M27 X 2	28	36	75	40	50	40	39	34	83																													
100	32	216	40	71	197	141	50	136	50	25	44	36	273	M33 X 2	36	45	99	50	70	50	54	50	103																													
125	32	254	50	75	228	157	63	171	60	30	53	45	314	M42 X 2	45	56	113	60	100	65	57	53	123																													
160	38	318	63	75	232	159	80	212	70	35	59	56	324	M48 X 2	56	63	126	70	112	90	63	59	143																													
200	44	381	80	85	266	181	100	253	80	40	76	70	386	M64 X 3	70	85	168	80	140	110	83	78	163																													

DIMENSIONS FOR ROD EYE / ROD CLEVIS																							
BA	BB	BC	BD	BE	BF	BG	BH	BI	BJ														
M14 X 1.5	14	18	38	20	25	25	19	17	42														
M16 X 1.5	20	22	54	30	35	30	32	29	62														
M20 X 1.5	20	28	60	30	40	30	32	29	62														
M27 X 2	28	36	75	40	50	40	39	34	83														
M33 X 2	36	45	99	50	70	50	54	50	103														
M42 X 2	45	56	113	60	100	65	57	53	123														
M48 X 2	56	63	126	70	112	90	63	59	143														
M64 X 3	70	85	168	80	140	110	83	78	163														
M80 X 3	80	100	210	110	180	120	105	110	230														
M100 X 3	100	120	270	140	220	150	135	136	290														



Specify Optional Features in Clear Text:

- * Port positions other than standard.
- * Piston Rod Ends other than standard.
- * Cushion on Head / Cap / Both - end
- * Air Bleed valves provision

- * Seals for high temp. or other medium
- * Gland drain provision
- * Rod end Bellows provision
- * Stop tube provision



METRIC HYDRAULIC CYLINDERS CONFORMING TO ISO 6020/2 MOUNTING STYLES
 SQUARE-HEADED TIE-ROD CONSTRUCTION
 SQUARE-HEADED TIE-ROD CONSTRUCTION

Loading Conditions ISO Styles	Mounting Types	Stroke Factor
Fixed and Rigidly Guided MX3 - MS2 - ME5		0.5
Pivoted and Rigidly Guided MX3 - MS2 - ME5		0.7
Fixed and Rigidly Guided MX2 - ME6		1.0
Pivoted and Rigidly Guided MT4		1.0
Pivoted and Rigidly Guided MX2 - ME6 - MT4		1.5
Pivoted & Rigidly Guided MX2 - ME6 - MT4		1.5
Supported but Not Rigidly Guided MX3 - MS2 - ME5		2.0
Pivoted & Rigidly Guided MP1 - MP3 - MT2		2.0
Pivoted & Supported but Not Rigidly Guided MT4		3.0

Piston Rod Size and Stop Tube Selection

When considering long stroke cylinders, the Piston Rod should be of sufficient diameter to provide necessary Column Strength and resist Bending or Buckling.

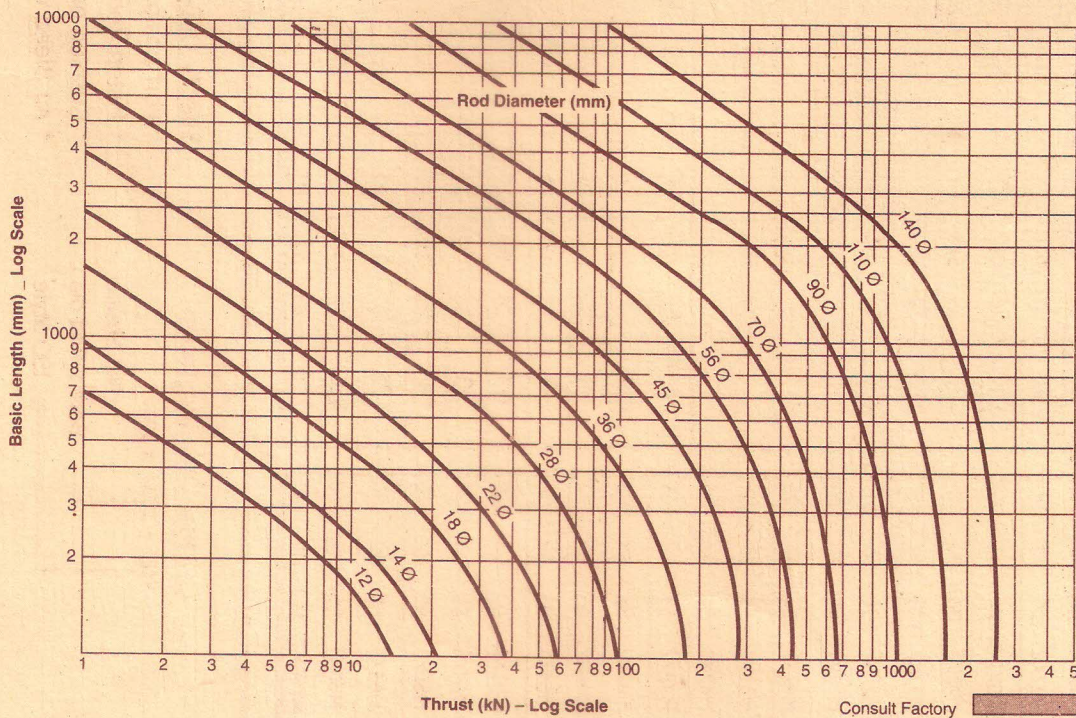
Bearing Stress should be maintained below acceptable levels to prevent premature wear of cylinder components. This depends on Piston Rod size and Stroke. Incorporating Stop Tubes in long stroke cylinders increases the Bearing separation, thereby reducing the Bearing Stress.

To select Piston Rod size and Stop Tube length, for Compressive Loads, follow steps as under.

1. Based on the type of Cylinder Mounting Style and the Rod-end Connection, determine the Stroke Factor from the table.
2. Basic Length = Actual Stroke X Stroke Factor.
3. In the Graph below, mark the Intersection of the Basic Length and Thrust.
4. The Piston Rod size is read from the diagonally curved lines 'Rod Diameter', just above the point of Intersection.
5. By extending the point to the Vertical Columns on the right will show the required Length of the Stop Tube. Note that the stop tube length differs in case of Pivoted and Fixed cylinders.

For Tensile loads, the Rod size is selected by specifying standard cylinder with standard rod diameter, using them at or below the rated pressures.

Piston Rod Selection Chart



METRIC HYDRAULIC CYLINDERS

Standard Features and Specifications.

- ISO 6020/2 mounting interchangeable
- 10 standard mounting styles
- Three rod sizes per bore
- Bore sizes – 40 mm to 200 mm
- Piston Rod – 18 mm to 140 mm
- Single and Double rod end designs
- Strokes – Any practical stroke length
- Working Pressure 160 bar, Intermittent peak – 210 bar
- Cushioning at either end
- Temp. range upto 100 deg C, dependant on seal type
- Seals suitable for other than hydraulic medium.

Design Features:

Piston Rods are made from EN8 steel, ground and hard chrome plated to impart good service life to gland seals.

Gland bearing is either SLYDERINGS Busak+Shamban (B&S) or graded cast iron, which is self lubricating.

Rod seals are B&S polyurethane, U cups with double lip.

Cylinder Body is made from seamless tubes, honed and hard chrome plated to impart good service life to piston seals.

Piston Seals are B&S, D-A-S compact double acting type, these are composite seals with wear rings on either sides and elastomeric sealing element in the center.

Cushioning is incorporated with needle valves provided on end caps, an optional feature.

Gland Drain is provided after the gland seal, to drain the accumulated fluid, Gland drain is desirable incase of long stroke cylinders and cylinders with constant pull applications. Optional feature.

Operating Pressure:

Min. Operating pressure is 5 bar, to overcome seal friction. These cylinders are designed to mounting dimensions specified in ISO 6020/2 for 160 bar and intermittent peak pressures not exceeding 210 bar.

Cylinder Mountings:

Besides proper sizing of cylinders, their ability to perform well and remain leak-free depends on their mounting arrangement. Incorrect installation or mounting style can result in side load, this generates excessive wear on seals and other components. Subsequently leakage starts and the cylinder fails. Side load also occurs when loads on the rod are unguided or misaligned with the axis of the cylinder.

In General mounting styles provide for:

1. Straight-line transfer of force that absorb the force on the center line of the stationary cylinder, as in case of Tierod extended and Flanged types. In this type the forces are distributed uniformly about the centerline, mounting bolts and tierods are subjected to simple forces. The cap flange are recommended for thrust loads whereas the Head Flange types are good for pull loads. Care should be taken such that the the mounting bolts of flanges are not exposed to full cylinder or transmission forces. Head end flange cylinders are provided with a pilot locating diameter for accurate location.
2. Straight line transfer of force that do not absorb the force on the center line, as in case of Foot-lugs style. These side-mounted cylinders produce a turning moment as they stroke the load. This moment tends to rotate the cylinder about its mounting bolts, if the cylinder is not well secured to the machine bed, this turning moment will side load the piston and gland. Such cylinders should be backed up with shear keys or dowel pins on both sides, but on one end only.
3. Pivot force transfer, as in case of Clevis or Trunnion type. These types can eliminate side loads in one plane, but careful alignment in the other plane is essential. Here it is recommended to use a Rodeye or Rod clevis on the piston rod. Axis of all pivots should be parallel such that no binding or side loading occurs. These cylinders can be used at full rated pressure, except on long stroke thrust applications larger rod diameter and stop tube may have to be considered to prevent buckling and side loading on the gland.

PRODUCT PROFILE

- Hydraulics** : Power Units, Controls and Portable Oil Filters
- Hydraulic Cylinders** : Hydraulic Cylinders as per ISO 6020 standards.
Custom built, large diameter Cylinders.
- Hydro-pneumatics** : Cylinders and Presses up to 125 KN
- Presses and SPM's** : Hydraulic Presses up to 1,000 KN,
SPM's for Automobile and Motor mfg industries
Pipe Bending Machines.



**CONSOLIDATED
MACHINES**
• HYDRAULICS • HYDRO-PNEUMATICS
• AUTOMATION CONTROLS

H-137, Ansa Industrial Estate, Sakivihar Rd,
Andheri East, Mumbai 400 072. India.
Tel : 91 (22) 852 0236 Fax : 91 (22) 852 2658
Email: hoshang@giasbm01.vsnl.net.in

Authorised Agent