PREAC
FLUID POWER

TECHNICAL CATALOGUE

HYDRAULICS • HYDRO-PNEUMATICS • PNEUMATICS
CLAMPING DEVICES • WORK HOLDING SOLUTIONS

Year Established: 1972

Quality certification: ISO 9001-2015

Products manufactured: Hydraulic, Hydro-Pneumatic and Pneumatic Cylinders, Systems, Clamping Devices and Work Holding Solutions.

Segments Served: Machine Tool, Rubber & Plastics, Steel Making, Material Handling, Factory Automation, Renewable Energy, Offshore, Municipal and Agriculture equipment.

Business profile: With nearly five decades of experience in the field of Fluid Power, PREAC is a name synonymous with Quality & Reliability. Supported by the latest machinery and testing equipment, PREAC offers a wide range of standard and customized solutions for the discerning customer. The company today represents the highest standards in products and services, ever growing and ever improving its processes to place you right on the top.

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Hydraulic Swing Cylinders

Top Mounted, Double Acting

PREAC FLUID POWER

Description

- These cylinders are "Pull Type" cylinders where the piston rotates by 90° (in CW or CCW direction) during the swing stroke and then travels in a straight line during the clamping stroke. A solid, one piece construction ensures perfect alignment of internal components and maximum clamping rigidity

Features

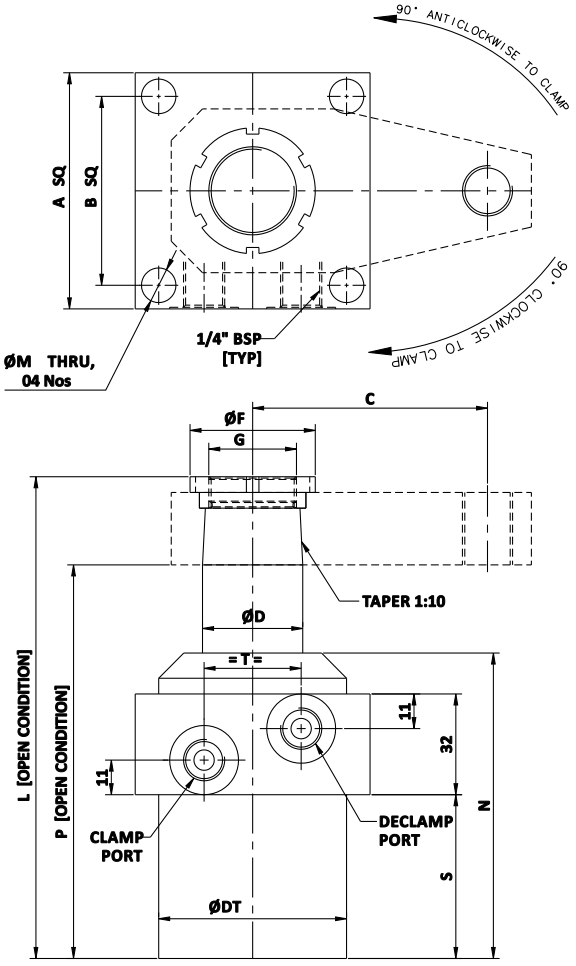
- Type : Double Acting
- Min. working pressure : 20 kg/cm^2
- Max. working pressure : 160 kg/cm^2
- Short swing stroke allows for compact design and maximum rigidity.
- Standard clamping stroke of 14 mm gives longer " working stroke ".

Application

- Hydraulic swing cylinders are used for clamping where it is necessary to keep the clamping area clear for unrestricted loading and unloading of work pieces.

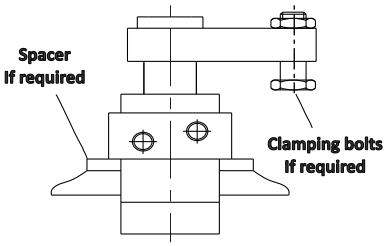
Important Notes

- Do not load the swing mechanism during tightening of the clamping strap.
- Clamp the job in the straight clamping stroke only.
- Adjust the oil flow rate such that total clamping time is more than one second.
- For seal kits, add prefix SK to Part no.
- For Clamping Strap details, refer 4.191



DIMENSIONAL DETAILS			
SIZE	4	5	6
A	75	85	105
B	60	65	80
C	75	100	120
DT	60	75	90
D	32	40	50
F	40	56	68
G	M28 x 1.5	M36 x 1.5	M46 x 2
M	11	11	17
L	153	184	184
N	97	116	116
P	125	144	144
S	52	67	67
T	15.5	15.5	18

Mounting Arrangement

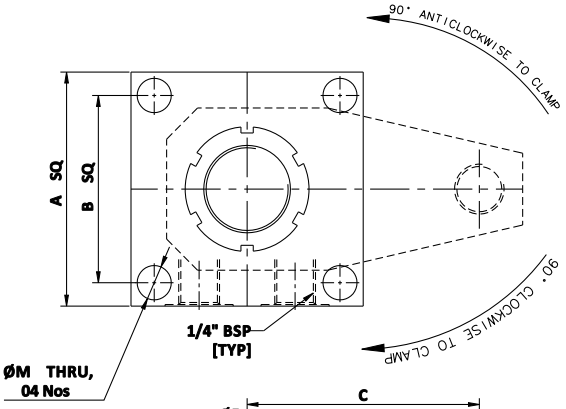


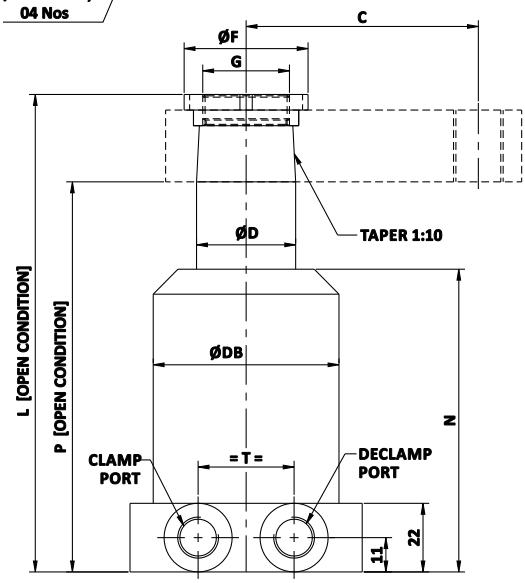
- All dimensions are in mm
- Overall dimensional tolerance ±0.5

SPECIFICATIONS									
SIZE	BORE (mm)	ROD (mm)	CLAMP STROKE (mm)	TOTAL STROKE (mm)	CLAMP FORCE at 160 kg/cm^2 (kgf)	CLAMP VOLUME (cc)	DECLAMP VOLUME (cc)	STANDARD PART No's (Without Clamping Strap)	
								COUNTER CLOCK WISE	CLOCK WISE
4	40	32	14	24	350	10.9	30.2	**4110-426**	**4110-429**
5	50	40	14	24	550	16.9	47.5	**4110-526**	**4110-529**
6	63	50	14	24	900	27.6	74.7	**4110-626**	**4110-629**

Hydraulic Swing Cylinders

Bottom Mounted, Double Acting





Description

- These cylinders are "Pull Type" cylinders where the piston rotates by 90° (in CW or CCW direction) during the swing stroke and then travels in a straight line during the clamping stroke. A solid, one piece construction ensures perfect alignment of internal components and maximum clamping rigidity

Features

- Type : Double Acting
- Min. working pressure : 20 kg/cm^2
- Max. working pressure : 160 kg/cm^2
- Short swing stroke allows for compact design and maximum rigidity.
- Standard clamping stroke of 14 mm gives longer " working stroke ".

Application

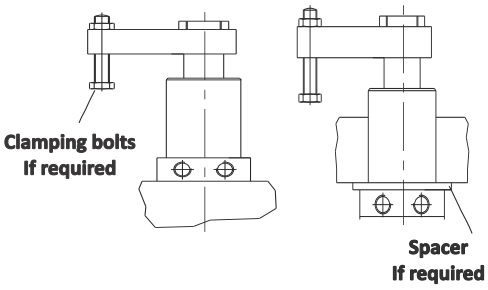
- Hydraulic swing cylinders are used for clamping where it is necessary to keep the clamping area clear for unrestricted loading and unloading of work pieces.

Important Notes

- Do not load the swing mechanism during tightening of the clamping strap.
- Clamp the job in the straight clamping stroke only.
- Adjust the oil flow rate such that total clamping time is more than one second.
- For seal kits, add prefix SK to Part no.
- For Clamping Strap details, refer 4.191

DIMENSIONAL DETAILS			
SIZE	4	5	6
A	75	85	105
B	60	65	80
C	75	100	120
DB	60	74	88
D	32	40	50
F	40	56	68
G	M28 x 1.5	M36 x 1.5	M46 x 2
M	11	11	17
L	153	184	184
N	97	116	116
P	125	144	144
T	15.5	15.5	18

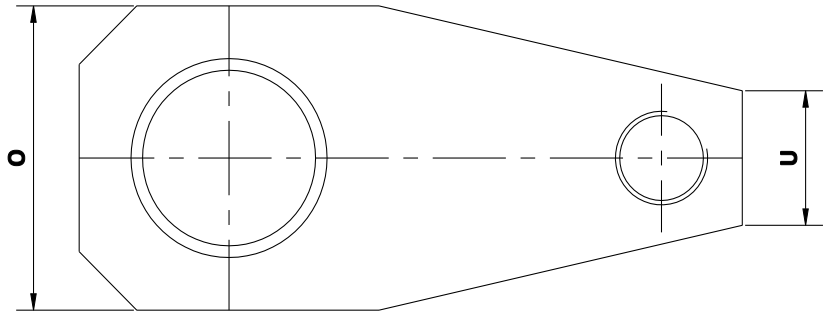
Mounting Arrangement

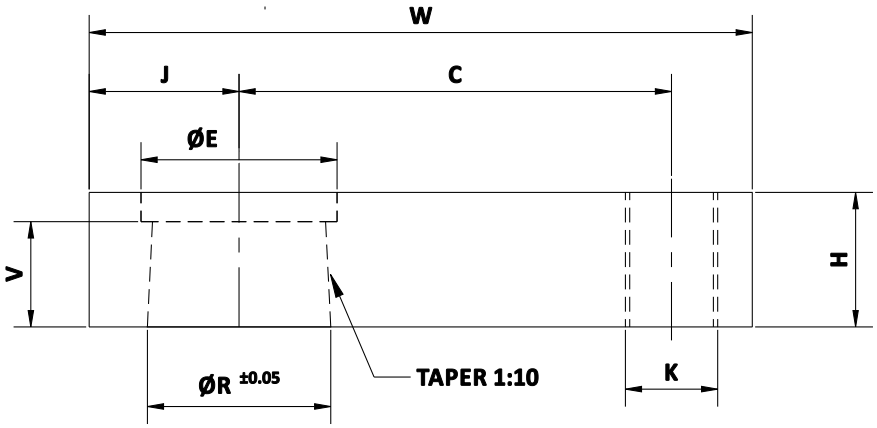


- All dimensions are in mm
- Overall dimensional tolerance ±0.5

SPECIFICATIONS									
SIZE	BORE (mm)	ROD (mm)	CLAMP STROKE (mm)	TOTAL STROKE (mm)	CLAMP FORCE at 160 kg/cm^2 (kgf)	CLAMP VOLUME (cc)	DECLAMP VOLUME (cc)	STANDARD PART No's (Without Clamping Strap)	
								COUNTER CLOCK WISE	CLOCK WISE
4	40	32	14	24	350	10.9	30.2	**4120-426**	**4120-429**
5	50	40	14	24	550	16.9	47.5	**4120-526**	**4120-529**
6	63	50	14	24	900	27.6	74.7	**4120-626**	**4120-629**

Clamping Strap
for Hydraulic Swing Cylinders





DIMENSIONAL DETAILS			
SIZE	4	5	6
W	115	144	178
C	75	100	120
J	26	30	40
H	23	34	34
V	18	28	28
E	34	45.5	56
R	31.8	39.8	49.8
K	M16	M16	M20
U	23	25	40
O	52	60	78
PART No.	**4191-452**	**4191-552**	**4191-652**

- **All dimensions are in mm**
- **Overall dimensional tolerance ±0.5 mm**

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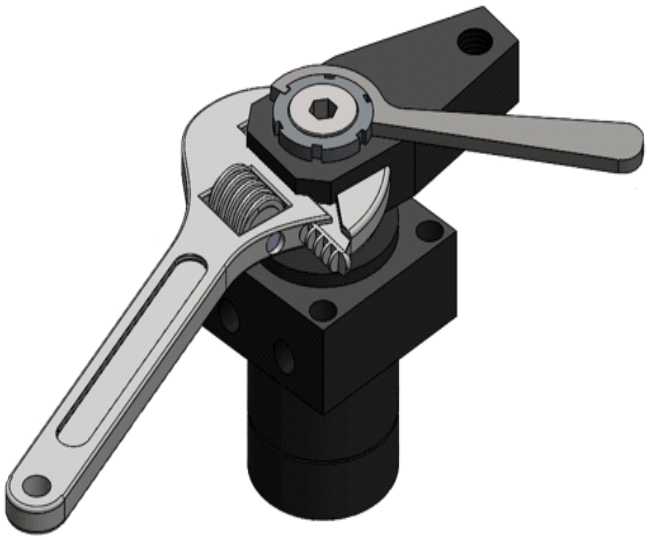
How to fix the Clamping Strap on a Swing Cylinder

If the Piston Rod is subjected to excessive torque or shock, it could damage the internal swing mechanism.

To prevent this:

During Installation:

1. Place the clamping strap on the piston rod in the required position and lock it by gently tapping it.
2. Tighten the locknut firmly by hand.
3. Bring the swing mechanism to the middle of the swing stroke, hold the strap in place using an adjustable spanner, as illustrated alongside, and tighten the lock nut with a C-spanner. **Ensure the strap does not rotate during tightening.**



During Removal:

1. Bring the swing mechanism to the middle of the swing stroke and follow the above procedure in reverse.
2. After removing the locknut, gently tap the strap to remove it from the piston rod.

By carrying out these steps carefully, the swing mechanism will continue to function satisfactorily.

Hydraulic Vertical Swing Cylinders

TYPE 1 - Double Acting

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Description

- This is a double acting cylinder where the job gets clamped in the piston push direction. During de-clamping, the strap is almost vertical, leaving the clamping area clear for easy loading and unloading of work pieces.
- The clamping strap is connected to the piston rod by a linkage mechanism.

Features

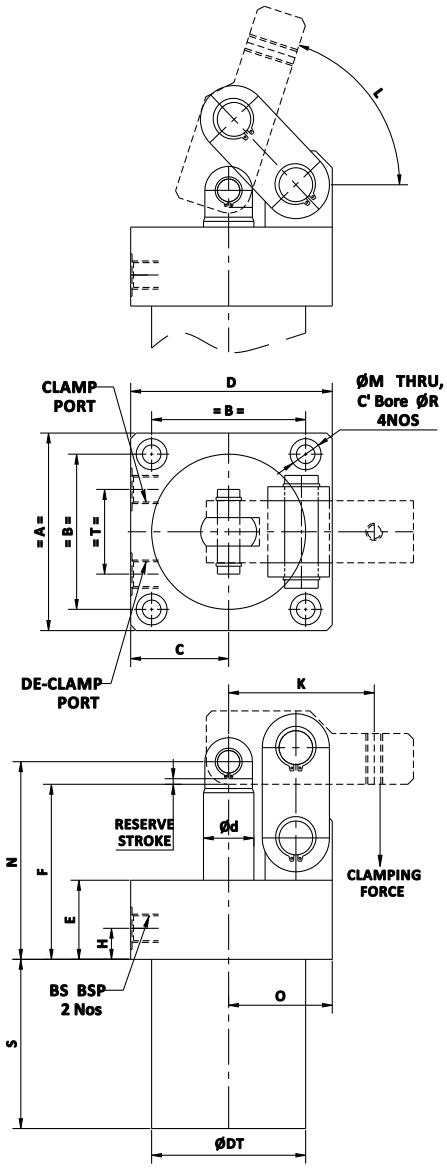
- Type : Double Acting
- Min. Working pressure : 15 kg/cm^2
- Max. Working pressure : 160 kg/cm^2
- Compact body, high rigidity.
- Suitable for high clamping forces.

Application

- Hydraulic swing cylinders are used for clamping where it is necessary to keep the clamping area clear for unrestricted loading and unloading of work pieces.

Important Notes

- Clamping Strap to be ordered separately. For details refer 4.192.
- For seal kits, add prefix SK to part no.



DIMENSIONAL DETAILS						
SIZE	2	3	4	5	6	7
A	51	70	82	88	112	134
B	40	55	63	70	85	100
C	35.5	35.5	41	44	56	67
D	61	72	87	89	128	134
d	14	18	22	30	36	45
E	26	28	30	35	36	48
F	51	62	69	81	97	114
T	22	30	33	36	42	48
H	12	11	12	14	14	19
K	48	52	68	74	113	116
L	72°	72°	75°	80°	75°	77°
N	57	70	79	94	113	134
S	47	60	72	80	102	110
DT	47.8	55	65	80	95	115
O	25.5	37	46	44	72	67
BS	1/8"	1/8"	1/4"	1/4"	3/8"	3/8"
M	5.5	6.6	9	9	13.5	14
R	9.5	11	14.5	14	20	20

- All dimensions are in mm
- Overall dimensional tolerance ±0.5 mm

SPECIFICATIONS								
SIZE	BORE (mm)	CLAMP STROKE (mm)	TOTAL STROKE (mm)	CLAMP FORCE at 160 kg/cm^2 (kgf)	CLAMP VOLUME (cc)	DECLAMP VOLUME (cc)	WEIGHT (kgs)	STANDARD PART No's (Without Clamping Strap) DOUBLE ACTING
2	25	22	24	390	12	8	1.5	**4170-221**
3	32	28	30	880	24	16	2.5	**4170-321**
4	40	33	36	1270	45	31	4	**4170-421**
5	50	37	40	1900	78.5	53	8	**4170-521**
6	63	52	55	2900	171	115	11	**4170-621**
7	80	57	60	4500	301	206	15	**4170-721**

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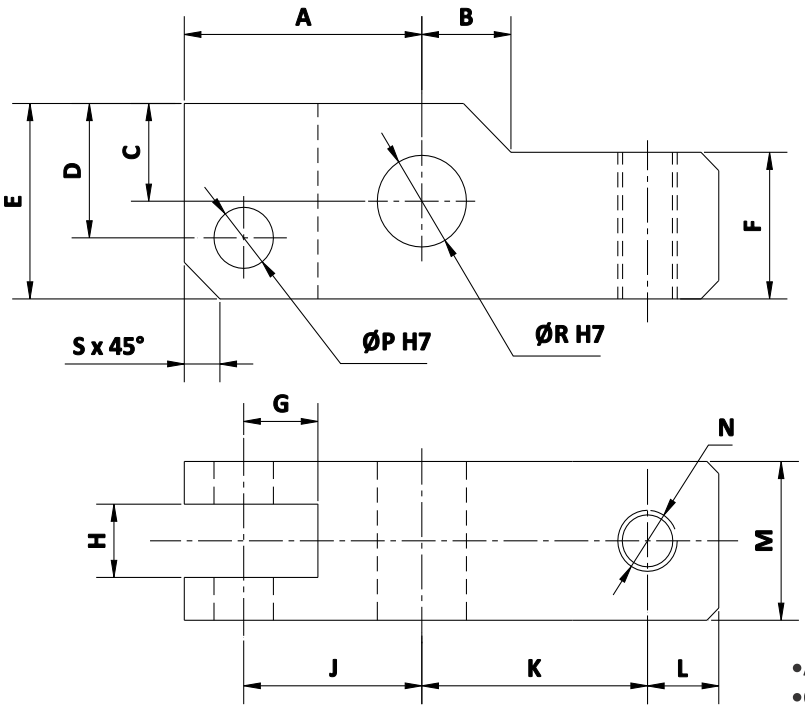
Clamping Strap
for Hydraulic Vertical Swing Cylinders (4170)



- All dimensions are in mm
- Overall dimensional tolerance ±0.5 mm

DIMENSIONAL DETAILS						
SIZE	2	3	4	5	6	7
A	24.3	32	40	48	64	68
B	16.5	13	15	–	20	–
C	6.5	13	16	13	24	21
D	10	18	22	13	32	21
E	16	26	32	26	48	42
F	8	18	24	26	38	42
G	12	11	12.5	16.5	20.5	25.5
H	6	10.1	12.1	16.5	20.1	25.5
J	18.5	24	30	32	48	48
K	29.5	28	38	42	65	68
L	6	14	12	12	13	12
M	11.8	22	26	32	38	42
N	M6	M6	M10	M12	M16	M16
P	6	8	10	13	16	20
R	6	12	15	13	22	20
S	4	5	6	8	10	12
PART NO.	**4192 – 252**	**4192 – 352**	**4192 – 452**	**4192 - 552**	**4192 – 652**	**4192 – 752**

Hydraulic Vertical Swing Cylinders

TYPE 2 - Double Acting (Manifold port)

Description

- This is a double acting cylinder where the job gets clamped in the piston push direction. During de-clamping, the strap is almost vertical, leaving the clamping area clear for easy loading and unloading of work pieces.
- The clamping strap is connected to the piston rod by a linkage mechanism.

Features

- Type: Double Acting with Manifold Port
- Min. Working pressure : 5 kg/cm^2
- Max. Working pressure : 70 kg/cm^2
- Compact body, high rigidity.

Application

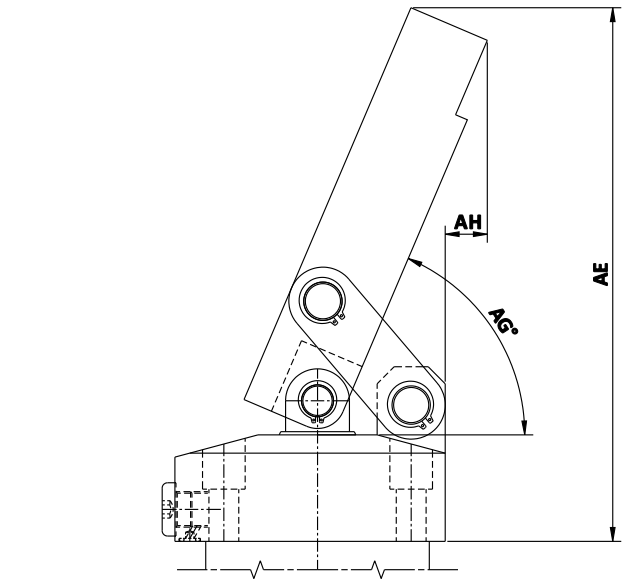
- Hydraulic swing cylinders are used for clamping where it is necessary to keep the clamping area clear for unrestricted loading and unloading of work pieces.

Important Notes

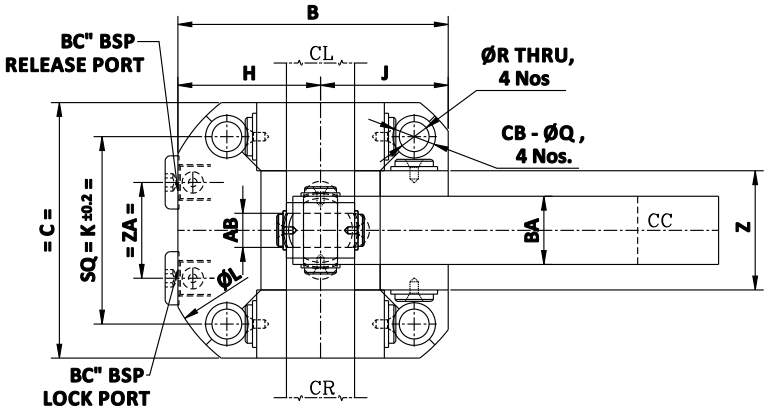
- Clamping Strap to be ordered separately. For details refer 4.193.
- For seal kits, add prefix SK to part no.

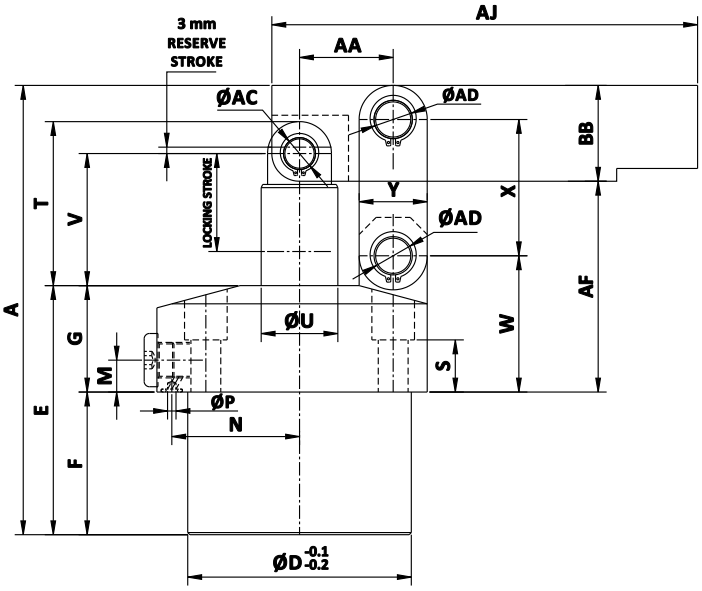
- All dimensions are in mm
- Overall dimensional tolerance ±0.5 mm

*** DIMENSIONS ON NEXT PAGE ***



UNCLAMPED CONDITION





CLAMPED CONDITION

* DIMENSIONS ON NEXT PAGE *

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Specifications for Hydraulic Vertical Swing Cylinders

TYPE 2 - Double Acting (Manifold port)

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DIMENSIONAL DETAILS								
SIZE	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
A	83.5	89.5	101	112.5	129.5	153	182	211
B	50	54	61	69	81	94.5	111	127
C	41	45	51	60	70	85	100	120
D	36	40	48	55	65	75	90	105
E	52.5	56	62	67	75.5	86	103	117
F	27.5	31	34	39	45.5	49	63	67
G	25	25	28	28	30	37	40	50
H	29.5	31.5	35.5	39	46	52	61	67
BC	1/8"	1/8"	1/8"	1/8"	1/4"	1/4"	1/4"	3/8"
J	20.5	22.5	25.5	30	35	42.5	50	60
K	31.5	34	40	47	55	63	75	88
L	68	73	83	88	106	116	136	152
M	9	9	11	11	12	12	12	15
N	23.5	26	30	33.5	39.5	45	52.5	60
P	3	3	3	3	3	3	3	4
Q	7.5	9.5	9.5	11	11	14	17.5	20
R	4.5	5.5	5.5	6.8	6.8	9	11	14
S	18	15	17.5	15	15.5	19.5	19	24.5
T	27	30.5	35	37.5	45	55	65.5	77
U	10	12	14	16	18	22	28	36
V	22.5	25	29	31.5	37	45	52	62
W	30	30.5	34.5	35.5	39	48	52.5	64
X	20	22	26	30	35.5	43.5	52.5	64
Y	10	12	13	16	19	25	28	32
Z	19	21	21	28	37	40	49	60
ZA	16	18	22	24	30	32	37	45
AA	14.5	16	18.5	21	24.5	30	36	44
AB	5	5	6	8	10	11	13	16
AC	5	5	6	6	8	10	12	15
AD	6	6	6	8	10	12	15	18
AE	96	100.6	114.5	120.3	137.4	151.1	192.8	250.6
AF	43	44.5	51	53.5	59	72	81	99
AG	68	68	71	70	68	69	68	67
AH	6.1	6.6	3.4	1.4	4.7	1.3	7.6	19.8
AJ	70	75	85	90	105	110	150	200
BA	10	12	12	16	19	22	25	32
BB	13	14	16	20	25	32	38	45
LOCK CYL AREA (cm^2)	3.14	4.9	7.06	9.6	15.9	23.8	33.2	44.2
FULL STROKE (mm)	18.5	20	23.5	26	29.5	35	41	49
LOCKING STROKE (mm)	15.5	17	20.5	23	26.5	32	38	46
RESERVE STROKE (mm)	3	3	3	3	3	3	3	3
CYL VOL @ LOCK (cm^3)	4.867	8.33	16.48	22.08	42.14	76.16	126.16	203.32
CYL VOL @ RELEASE (cm^3)	3.65	6.42	13.3	17.5	35.4	63.86	102.6	156.4
CLAMP FORCE (kg)	55	93	154	207	354	694	764	877
CLAMP ARM @ CENTRE	**4171-121-C**	**4171-221-C**	**4171-321-C**	**4171-421-C**	**4171-521-C**	**4171-621-C**	**4171-721-C**	**4171-821-C**
CLAMP ARM @ LEFT	**4171-121-L**	**4171-221-L**	**4171-321-L**	**4171-421-L**	**4171-521-L**	**4171-621-L**	**4171-721-L**	**4171-821-L**
CLAMP ARM @ RIGHT	**4171-121-R**	**4171-221-R**	**4171-321-R**	**4171-421-R**	**4171-521-R**	**4171-621-R**	**4171-721-R**	**4171-821-R**

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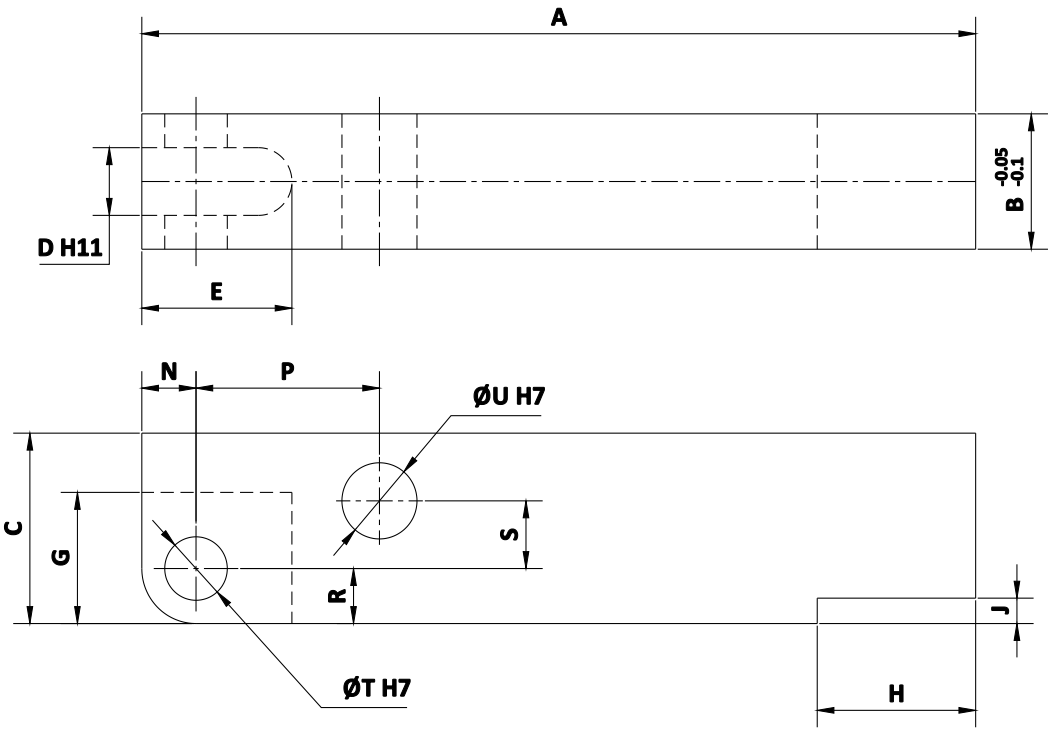
Clamping Strap
for Hydraulic Vertical Swing Cylinders (4171)



- All dimensions are in mm
- Overall dimensional tolerance ±0.5 mm

DIMENSIONAL DETAILS								
SIZE	1	2	3	4	5	6	7	8
A	70	75	85	90	105	110	150	200
B	10	12	12	16	19	22	25	32
C	13	14	16	20	25	32	38	45
D	5	5	6	8	10	11	13	16
E	13	14.5	16	17	22	26	31	36
G	10	12	13	17	18	22	26	31
H	10.5	13	13	17	22	25	31	38
J	3	3	3	4	5	5	6	6
N	4.5	5.5	6	6	8	10	11	13
P	14.5	16	18.5	21	24.5	30	36	44
R	4.5	5.5	6	6	8	10	11	13
S	2.5	2.5	3.5	6	7.5	9.5	13	16
T	5	5	6	6	8	10	12	15
U	6	6	6	8	10	12	15	18
PART NO	4193-152	4193-252	4193-352	4193-452	4193-552	4193-652	4193-752	4193-852

Pneumatic Swing Cylinder

Double Acting

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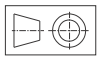
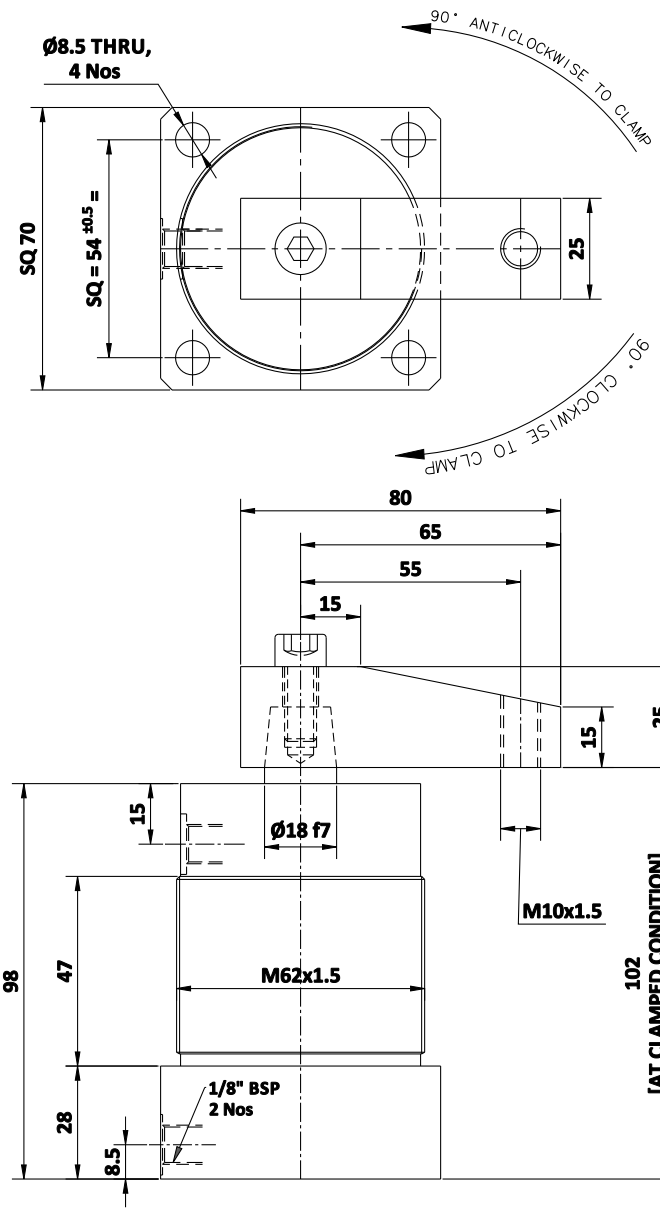




Description

- These cylinders are "Pull-Type" cylinders where the piston rotates by 90° (in CW or CCW direction) during the swing stroke and then travels in a straight line during the clamping stroke. A solid, one piece construction ensures perfect alignment of internal components and maximum clamping rigidity.

Features

- Type : Double Acting
- Min. working pressure : 5 kg/cm^2
- Max. working pressure : 15 kg/cm^2

Application

- Pneumatic swing cylinders are used for light clamping when it is necessary to keep the clamping area clear for unrestricted loading and unloading of work pieces.

Important Notes

- To avoid the damage of swing mechanism hold the clamping strap in a vice while tightening and loosening the clamping strap nut.
- Clamp the job in the straight clamp stroke only.
- Do not exceed standard strap length.
- To prevent damage to the swing mechanism due to impact, use flow control valves at both ports.
- For seal kits, add prefix SK to part no.

- All dimensions are in mm
- Overall dimensional tolerance ±0.5

SPECIFICATIONS							
SIZE	BORE (mm)	ROD (mm)	CLAMP STROKE (mm)	TOTAL STROKE (mm)	CLAMP FORCE at 5 kg/cm^2 (kgf)	STANDARD PART No's (Without Clamping Strap)	
						COUNTER CLOCK WISE	CLOCK WISE
5	50	18	14	28	85	4180-526	4180-529

Hydraulic Block Cylinders

Single / Double Acting

Description

- Hydraulic Block cylinders are very compact, heavy duty cylinders and can be mounted very easily and in many different ways.

Features

- Type : Single & Double Acting
- Min. working pressure : 5 kg/cm^2
- Max. working pressure : 200 kg/cm^2
- High size to force ratio compared to conventional cylinders.

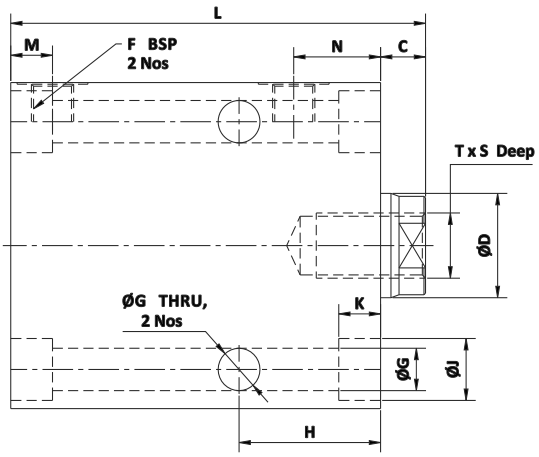
Application

- Suitable for short stroke clamping applications. Can also be used for positioning, supporting, lifting, pulling etc...

Important Notes

- For side mounting, positive stopper should be provided.
- For single acting cylinders, breather should be protected from cutting liquids and coolants
- For seal kits, add prefix SK to part no.

- All dimensions are in mm
- Overall dimensional tolerance ±0.5 mm



Mounting Arrangement

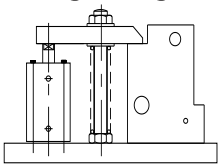


Fig 1

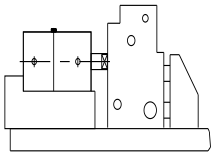


Fig 2

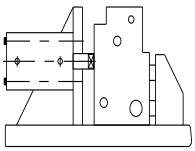


Fig 3

DIMENSIONAL DETAILS

SIZE	2	3	4	5	6	7	8	9
A	65	75	85	100	125	160	200	230
B	45	55	63	75	95	120	150	180
C	7	10	10	10	14	14	15	16
D	16	20	25	32	40	50	63	80
E	13	17	21	28	36	46	55	65
F	1/4"	1/4"	1/4"	1/4"	3/8"	3/8"	1/2"	1/2"
G	9	10.5	10.5	13	18	22	26	32
H	33	38	40	44	50	60	64	82
J	13	16	16	19	25	31	38	46
K	8	10	10	12	16	20	24	30
T	M10	M12	M16	M20	M27	M30	M42	M48
M	11	11	11	13	17	21	25	31
N	18	22	24	27	26	34	35	47
S	15	15	25	30	40	40	60	70
P	50	55	63	76	95	120	158	180
R	30	35	40	45	65	80	108	130

SPECIFICATIONS

SIZE	BORE (mm)	ROD (mm)	CLAMPING FORCE at 200 kg/cm^2 (kgf)	SINGLE ACTING		DOUBLE ACTING			L (mm)	STANDARD PART No's	
				STROKE (mm)	CLAMP VOLUME (cc)	STROKE (mm)	CLAMP VOLUME (cc)	DE-CLAMP VOLUME (cc)		SINGLE ACTING	DOUBLE ACTING
2	25	16	900	8	4	20	10	6	71	4210-211	4210-221
				20	10	50	24.5	14.5	101	4210-212	4210-222
3	32	20	1600	10	8	20	16	12.2	80	4210-311	4210-321
				20	16	50	40	24.5	110	4210-312	4210-322
4	40	25	2500	10	12.5	20	25	16	84	4210-411	4210-421
				20	25	50	62.5	38.2	114	4210-412	4210-422
5	50	32	3900	12	23.5	20	40	23	95	4210-511	4210-521
				20	39	50	98	58	125	4210-512	4210-522
6	63	40	6200	12	37	20	63	38	106	4210-611	4210-621
				25	77.5	50	155	93	136	4210-612	4210-622
7	80	50	10000	12	60	20	100	62	119	4210-711	4210-721
				25	160	50	251	153	149	4210-712	4210-722
8	100	63	15700	12	94	20	157	95	125	4210-811	4210-821
				32	251	50	392	237	155	4210-812	4210-822
9	125	80	24500	-	-	20	245	145	146	4210-911	4210-921
				-	-	50	613	362	176	4210-912	4210-922

Hydraulic Pull Cylinders

Single / Double Acting

PREAC FLUID POWER

Description

- Pull cylinders, similar in size and construction to Swing Cylinders, ensure perfect alignment of internal component and maximum clamping rigidity.

Features

- Type : Single & Double Acting
- Min. working pressure : 5 kg/cm^2
- Max. working pressure:200 kg/cm^2

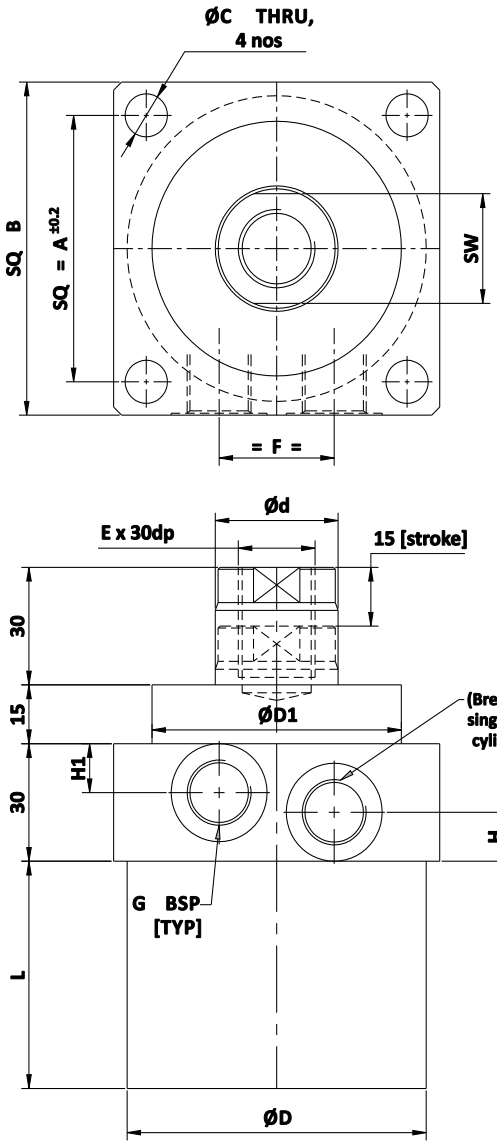
Application

- The simple arrangement ensures easy assembly for standard clamping applications.

Important Notes

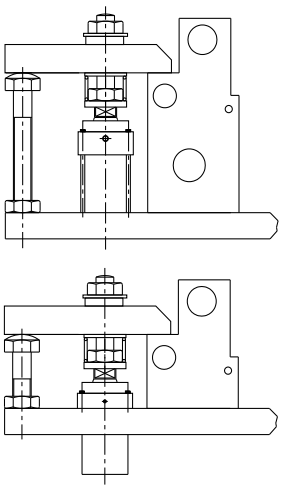
- For single acting cylinders breather should be protected from cutting liquids and coolant.
- For seal kits, add prefix SK to part no.

•All dimensions are in mm
•Overall dimensional tolerance ±0.5 mm



DIMENSIONAL DETAILS			
SIZE	4	5	6
A	45	55	68
B	60	67	85
C	7	9	11
D	52	62	78
D1	38	45	65
d	22	25	32
E	M12	M16	M20
F	21	22	30
G	1/4"	1/4"	3/8"
H	15	15	12.5
H1	10	10	12.5
L	50	50	58
SW	17	20	28

Mounting Arrangement



SPECIFICATIONS								
SIZE	BORE (mm)	STROKE (mm)	CLAMP FORCE at 200 kg/cm^2 (kgf)	OIL VOLUME CLAMP (cc)	OIL VOLUME DE-CLAMP (cc)	WEIGHT (kg)	STANDARD PART No's	
							SINGLE ACTING	DOUBLE ACTING
4	40	15	1750	13	19	1.5	**4311-411**	**4311-421**
5	50	15	2900	22	30	2.5	**4311-511**	**4311-521**
6	63	15	4600	35	47	3.5	**4311-611**	**4311-621**

Hydraulic Compact Cylinders

Double Acting

PREAC FLUID POWER

Description

- This cylinders are double acting, solid piston cylinders and are very compact in the axial direction.

Features

- Type : Double Acting
- Min. working pressure : 5 kg/cm^2
- Max. working pressure : 150 kg/cm^2

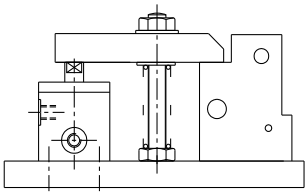
Application

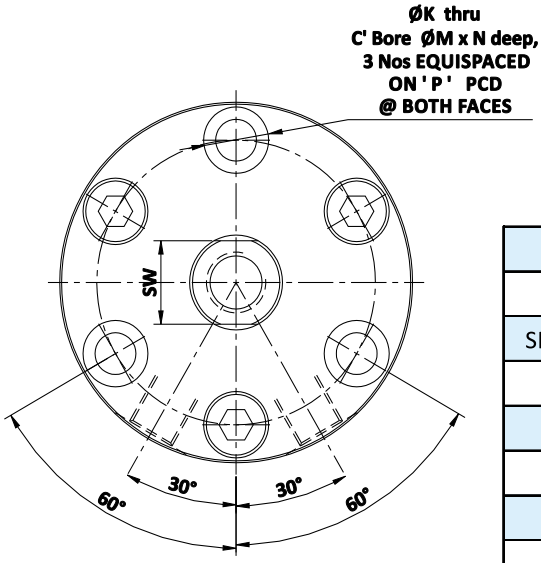
- These are used where the height is a constraint. The simple mounting arrangement makes the cylinders very easy to use.

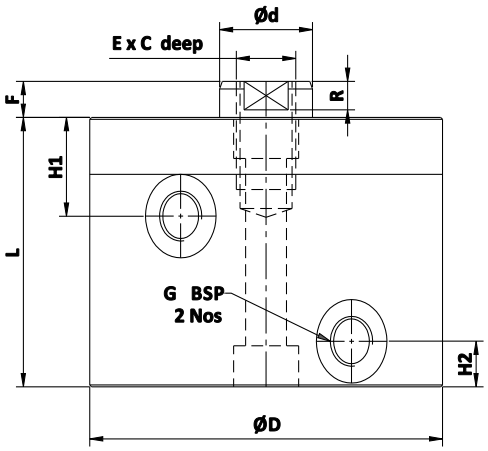
Important Notes

- Due to the compact design, port thread depth is short. Reduce the standard connector thread length to suit the port.
- For seal kits, add prefix SK to part no.

Mounting Arrangement







DIMENSIONAL DETAILS				
SIZE	1	3	4	5
E	M6	M10	M12	M16
C	10	18	20	25
F	5	5	6	6
d	12	16	20	25
D	45	65	76	95
G	1/8"	1/8"	1/4"	1/4"
SW	10	14	17	22
H1	15	17	22	26
H2	9	9	12	12
R	3.5	3.5	4	4
K	4.5	6.6	9	11
M	8	11	14	17.5
N	4.4	6.5	8.6	10.8
P	35	50	60	75

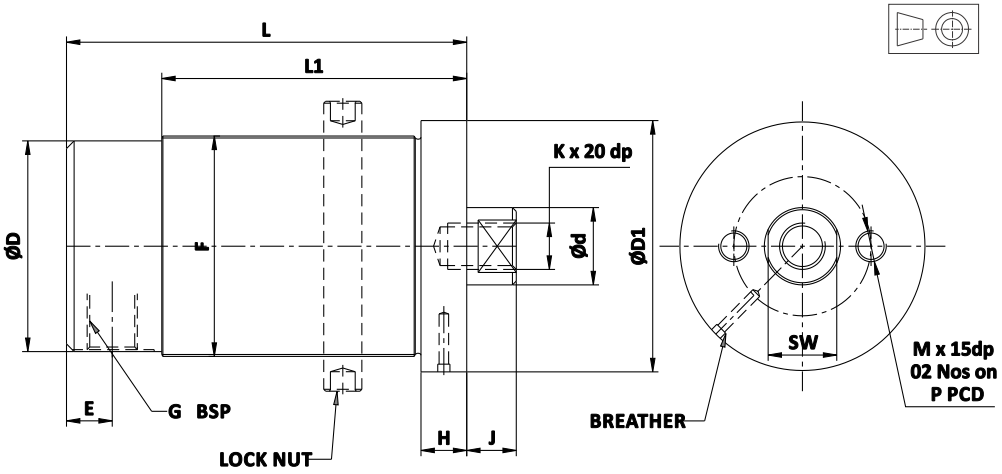
- All dimensions are in mm
- Overall dimensional tolerance ±0.5 mm

SPECIFICATIONS									
SIZE	BORE (mm)	STROKE (mm)	PUSH FORCE at 150 kg/cm^2 (kgf)	PULL FORCE at 150 kg/cm^2 (kgf)	OIL VOLUME PUSH (cc)	OIL VOLUME PULL (cc)	L (mm)	WEIGHT (kg)	STANDARD PART No's
1	20	10	470	300	3	2	36	0.6	**4360-121**
		25			8	5	51	0.6	**4360-122**
3	32	10	1200	900	8	6	42	1	**4360-321**
		25			20	15	57	1.5	**4360-322**
4	40	10	1900	1400	13	10	50	1.5	**4360-421**
		25			31	24	65	2	**4360-422**
5	50	10	2900	2200	20	15	56	2	**4360-521**
		25			49	37	71	3.5	**4360-522**

Hydraulic Threaded Body Cylinders

Single Acting, Spring Return

PREAC FLUID POWER



•All dimensions are in mm
•Overall dimensional tolerance ±0.5 mm

Description

- This is a compact, push type, single acting spring return cylinder where the threaded body allows for adjustable mounting. It also has fixed mounting holes at its base.

Features

- Type : Single Acting, Spring Return
- Min. working pressure : 10 kg/cm^2
- Max. working pressure : 200 kg/cm^2

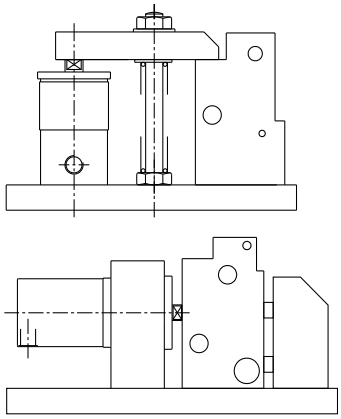
Application

- These can be used for direct clamping as well as for positioning and support. The threaded body also makes the cylinder easy to install.

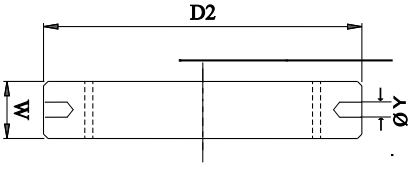
Important Notes

- Breather should be protected from cutting fluid and coolant.
- Heavy extensions to piston rod can influence return stroke of the cylinder.
- For seal kits, add prefix SK to part no.

Mounting Arrangement



LOCK NUT



SPECIFICATIONS							
SIZE	0	1	3	4	5	5	6
FORCE in kgf @ 200 kg/cm^2	300	500	1000	1800	3000	3000	5000
BORE DIA	16	20	32	40	50	50	63
D	21.8	27.5	43.5	54.5	67.5	67.5	83
d	10	12	16	20	25	25	36
D1	30	36	54	65	78	78	96
E	9	10	12	12	14	14	14
F	M24x2	M30x2	M46x2	M57x2	M70x2	M70x2	M86x2
G	1/8"	1/8"	1/4"	1/4"	3/8"	3/8"	3/8"
H	12	12	12	12	12	12	15
J	7	8	9	13	15	15	20
K	M6	M6	M10	M12	M16	M16	M16
M	-	M6	M6	M8	M10	M10	M12
P	-	20	30	36	48	48	56
SW	8	10	13	18	21	21	30
PART No.	**4411-011**	**4411-111**	**4411-311**	**4411-411**	**4411-511**	**4411-513**	**4411-611**
STROKE	15	10	10	10	10	50	25
L	78	70	72	77	81	160	110
L1	58	49	47	52	54	90	83
OIL VOL (cc)	3	3	7	13	20	100	84
WEIGHT kgs	0.25	0.5	1	1.5	2	3.5	4.8
PART No.	**-**	**4411-112**	**4411-312**	**4411-412**	**4451-512**	**4411-514**	**4411-612**
STROKE	-	25	25	25	25	100	50
L	-	98	102	105	110	260	160
L1	-	65	77	80	83	140	90
OIL VOL (cc)	-	8	18	31	50	200	166
WEIGHT kgs	-	0.7	1.25	2	3	5.2	6.5
LOCK NUT (ACCESSORIES)							
PART No.	**4411-009**	**4411-109**	**4411-309**	**4411-409**	**4411-509**	**4411-509**	**4411-609**
D2	36 HEX	46 HEX	Ø60	Ø75	Ø90	Ø90	Ø118
W	10	10	10	10	12	12	15
Y	6.5	6.5	6.5	6.5	8.5	8.5	10.5

Hydraulic Manifold Cylinders

Single Acting, Spring Return

PREAC FLUID POWER

Description

- These are push type, single acting spring return cylinders which can be fitted either in tapped holes in the fixture or in a manifold.

Features

- Type : Single Acting, Spring Return
- Min. working pressure : 10 kg/cm^2
- Max. working pressure : 200 kg/cm^2

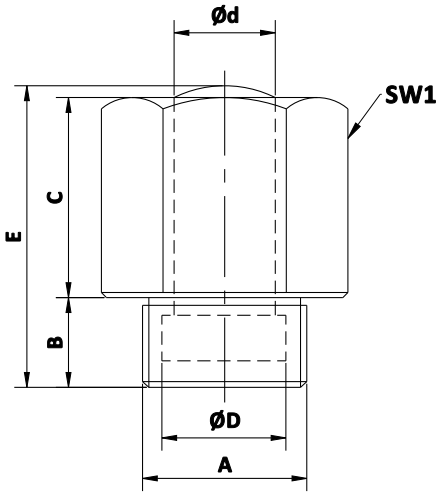
Application

- Suitable for mounting close together.
- Multiple piping can be eliminated.

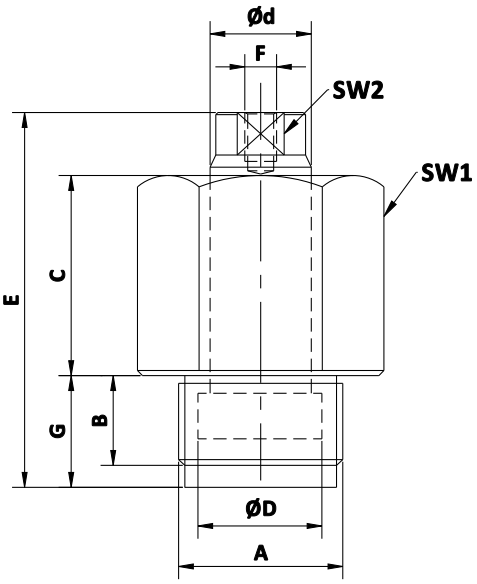
Important Notes

- Threaded body cylinders must not be loaded in retracted position.
- Breather should be protected from cutting liquids and coolants.
- For seal kits, add prefix SK to part no.

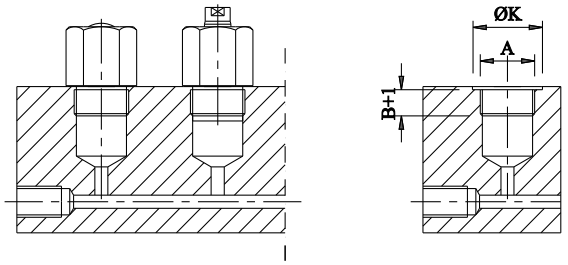
Type-A



Type-B



Mounting Arrangement



- All dimensions are in mm
- Overall dimensional tolerance ±0.5 mm

SPECIFICATIONS	TYPE - A					TYPE - B			
BORE DIA D	8	12	16	25	32	12	16	25	32
STROKE ±0.5mm	4	4	6	12	16	8	10	10	16
FORCE in kgf @ 200 kg/cm^2	100	225	400	982	1600	225	400	982	1600
Min. PRESSURE (bar)	10	10	10	10	10	10	10	10	10
OIL VOLUME (cc)	0.2	0.9	2	8	13	0.9	2	8	13
PISTON AREA sq. cm.	0.5	1.13	2	4.91	8	1.13	2	4.91	8
A	M16x1.5	M20x1.5	M24x1.5	M36x1.5	M42x1.5	M20x1.5	M24x1.5	M36x1.5	M42x1.5
B	12	12	14	21	25	12	15	20	25
C	14	14	21	33	40	25	34	35	40
d	4	8	10	16	20	8	10	16	20
E	27	27	37	56	67	46	58	66	75
F x depth	-----	-----	-----	-----	-----	M5x10	M6x12	M10x15	M12x15
G	-----	-----	-----	-----	-----	15	18	23	25
K	23	29	33	49	65	29	33	49	65
SW1 (HEX)	19	24	27	41	55	24	27	41	55
SW2 (A/F)	-----	-----	-----	-----	-----	7	8	13	17
STANDARD PART Nos	4430-011	4430-111	4430-211	4430-311	4430-411	4430-611	4430-711	4430-811	4430-911

Hydraulic Mini Threaded Cylinders

Single Acting, Spring Return

PREAC FLUID POWER

Description

- These cylinders can be threaded directly into the tapped holes of the fixture, down to hexagonal/ slotted section of cylinders body. Spacings between cylinders can be reduced when arranged in a row.

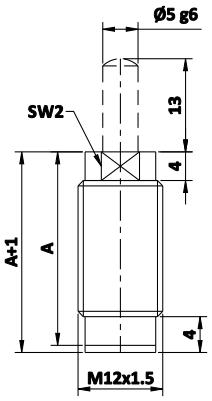
Features

- Type : Single Acting
- Max. working pressure : 200 kg/cm^2
- Since oil is supplied though drilled passages in the fixture, special seals are provided for self sealing.

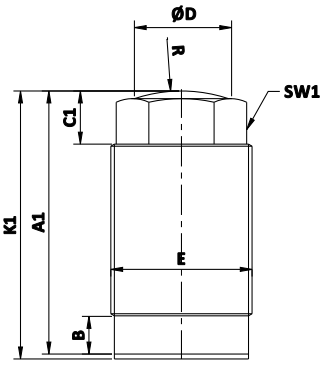
Application

- Used in multiple clamping fixture to hold small parts. These cylinders can be arranged in a clamping bar.

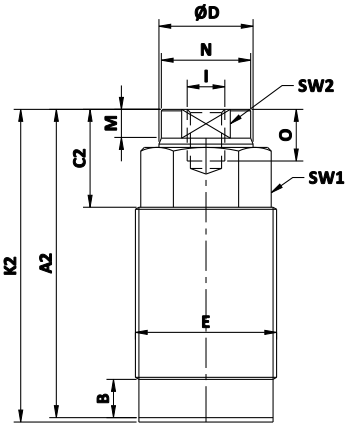
Type-A



Type-B



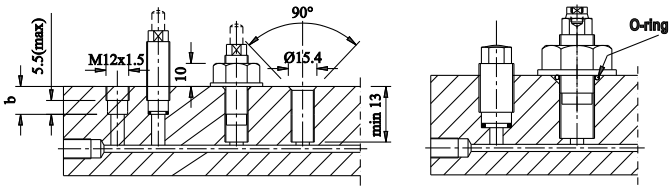
Type-C



Important Notes

- Threaded body cylinders must not be loaded in the retracted position.
- Cylinder should be protected from cutting liquids and coolants.

Mounting Arrangement



- All dimensions are in mm
- Overall dimensional tolerance ±0.5 mm

SPECIFICATIONS		TYPE-A			TYPE-B & TYPE-C				
BORE DIA D		8	8		12	16	20	25	32
STROKE ±0.5mm		5	10		10	12	15	16	20
FORCE IN kgf @ 200 kg/cm^2		100	100		220	400	628	980	1600
Min. PRESSURE (bar)		10	10		10	10	10	10	10
OIL VOLUME (cc)		0.25	0.5		1.13	2.4	4.65	7.86	16
PISTON AREA sq. cm.		0.5	0.5		1.13	2	3.1	4.91	8
A		27	40		-----	-----	-----	-----	-----
A1		-----	-----		37	45.5	55	58	85
A2		-----	-----		44	51.5	64.5	67	96
B		-----	-----		7	8	8	11	12
C1		-----	-----		7	10	11	13.5	17
C2		-----	-----		14	16	20.5	22.5	28
ØD		-----	-----		12	16	20	25	32
E		-----	-----		M22x1.5	M26x1.5	M30x1.5	M38x1.5	M48x1.5
K1		-----	-----		38	46.5	56	59.5	87
K2		-----	-----		45	52.5	65.5	68.5	98
ØI		-----	-----		11	15	19	23	30
M		-----	-----		5.5	5.5	6	7	9
N		-----	-----		M6	M6	M8	M8	M12
O		-----	-----		6	6	8	8	12
R		-----	-----		20	25	32	40	50
SW1 (HEX)		-----	-----		17	22	24	32	41
SW2 (A/F)		9	9		10	13	17	19	24
STANDARD PART Nos	WITHOUT EXTN	4451-111	4451-112	TYPE-B	4451-211	4451-311	4451-411	4451-511	4451-611
	WITH EXTN.	4451-121	4451-122	TYPE-C	4451-221	4451-321	4451-421	4451-521	4451-621

Hydraulic Work Support

Pneumatic Forwarding / Spring Forwarding

PREAC FLUID POWER

Description

- Hydraulic Work Supports are a replacement to the adjustable screw jack. This is not a force giving element but a resistance giving element.

Features

- Max. working pressure : 250 kg/cm²

Application

- Hydraulic work supports are used to provide a self-adjusting rest for the workpiece, ensuring matching operations. They compensate for work piece surface irregularities & prevent deflection and vibration under matching loads.

Types

Spring forwarding work support

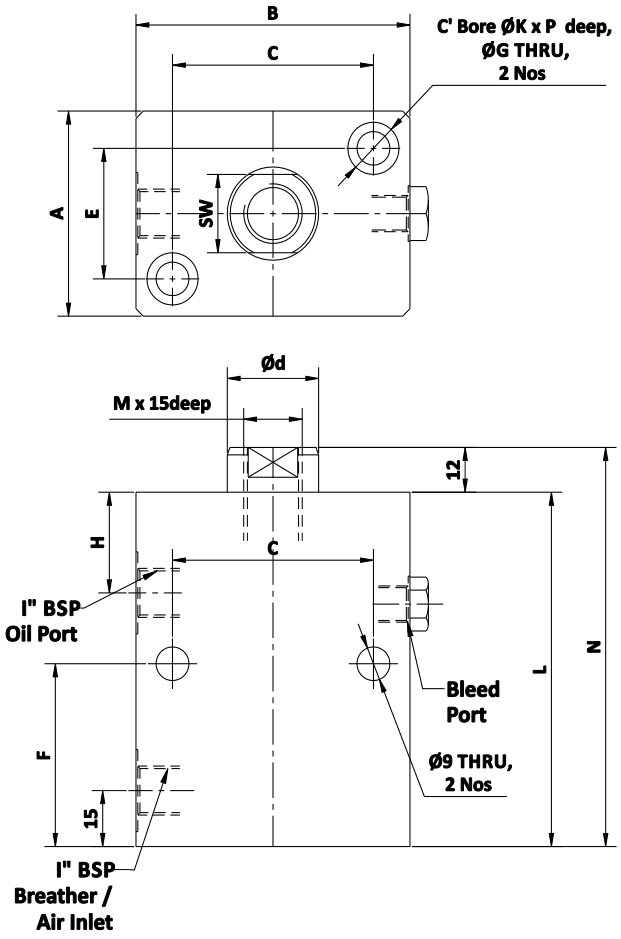
- The plunger in this type of work support is normally in the extended position due to the spring force. The plunger gets pressed either by the weight of a component or by hydraulic pressure, thereby locking it. The spring force can be adjusted with the help of a screw.

Pneumatic forwarding work support

- The plunger in this type of work support is normally in the retracted position due to the spring force. After applying Pneumatic pressure, the plunger moves forward to touch the component. Pneumatic pressure is regulated to control the plunger forwarding force. Hydraulic pressure is applied to lock the plunger.

Important Notes

- Breather should be protected from cutting liquids and coolants.
- For seal kits, add prefix SK to part no.



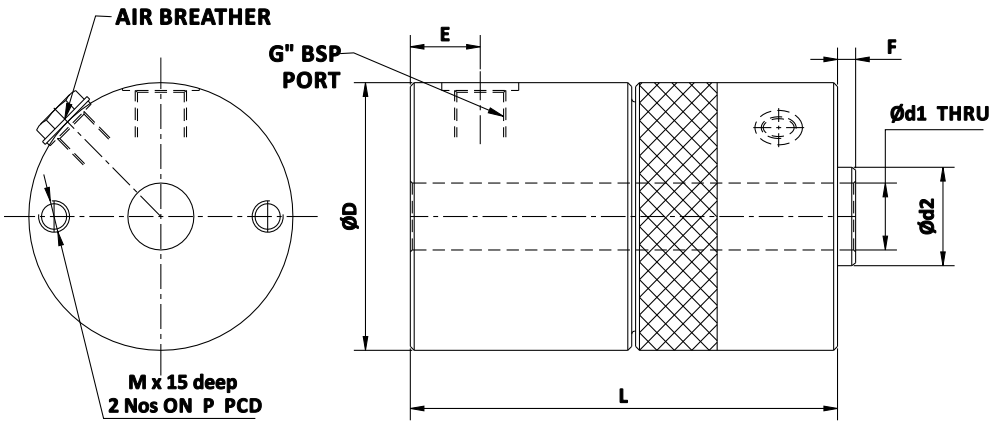
DIMENSIONAL DETAILS		
SIZE	3	4
A	55	75
B	75	100
C	55	75
D	25	40
E	35	45
F	49	54
G	10	13.5
H	27	32
I	1/4"	1/4"
M	M16	M20
K	14	19
L	95	105
P	10	14
SW	21	36
N	107	117

- All dimensions are in mm
- Overall dimensional tolerance ±0.5 mm

SPECIFICATIONS							
SIZE	STROKE (mm)	SUPPORT FORCE at 150 kg/cm² (kgf)	WEIGHT (kg)	STANDARD PART No's			
				PNEUMATIC FORWARDING		SPRING FORWARDING	
				Max. PLUNGER FORCE (kgs)	PART No.	Max. PLUNGER FORCE (kgs)	PART No.
3	15	500	3	10	**4510-311**	8	**4510-321**
4	15	1000	6	25	**4510-411**	8	**4510-421**

Hydraulic Hollow Piston Cylinders

Single Acting / Spring Return



Description

- This clamping device is a single acting, spring return, push type cylinder with a through hole in the piston rod.

Features

- Type: Single acting, spring return.
- Min. working pressure : 5 kg/cm^2
- Max. working pressure : 210 kg/cm^2

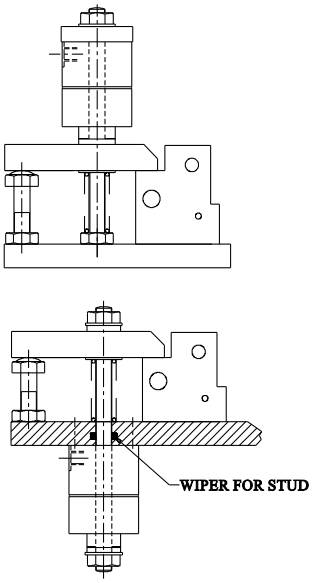
Advantages

- The cylinder can be mounted on the existing fixtures by attaching it to or inserting it over the stud. The stud length may be increased as required. The mounting arrangement can be made as shown in the figures to achieve maximum clamping efficiency.

Important Notes

- Breather should be protected from cutting liquids and coolants.
- For seal kits, add prefix SK to part no.

Mounting Arrangement



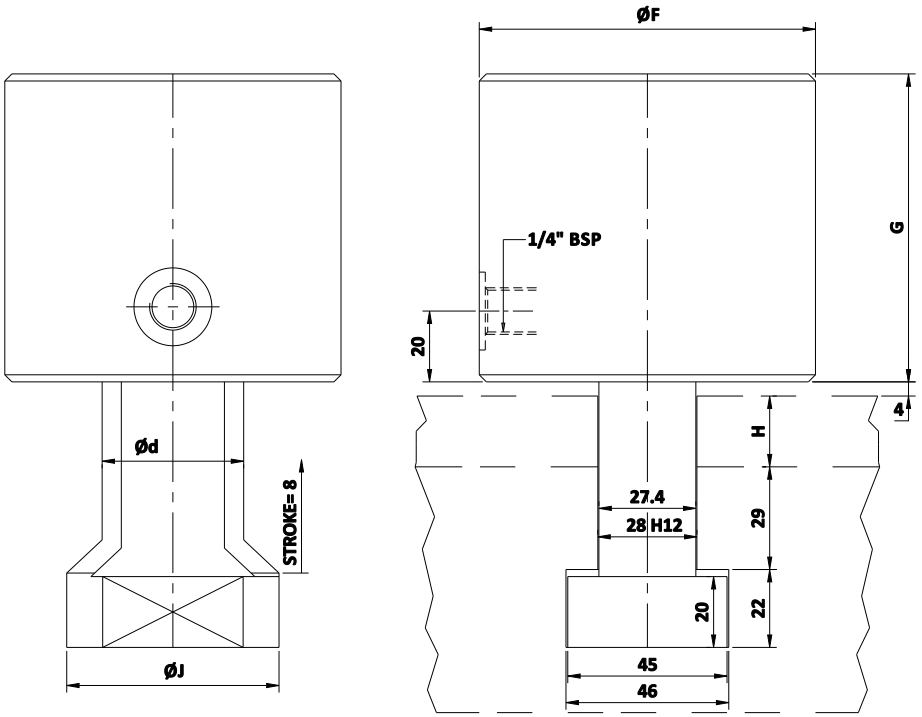
SPECIFICATIONS								
FORCE in kgf @ 150 kg/cm^2	1100	1300	2200	2200	3300	3300	5000	5000
D	61	56	68	68	78	78	98	98
d1	13	13	17	17	21	21	25	25
d2	25	25	25	25	32	32	40	40
E	28	21	12	21	18	18	18	18
F	2	2	2	2	3	3	3	3
G	1/4"	1/4"	1/4"	1/4"	3/8"	3/8"	3/8"	3/8"
M	M6	M6	M8	M8	M10	M10	M10	M10
P	40	40	55	55	60	60	60	60
L	85	103	80	110	82	110	90	110
PART No.	**4610-111**	**4610-211**	**4610-311**	**4610-312**	**4610-411**	**4610-412**	**4610-511**	**4610-512**
STROKE	10	25	10	25	10	25	10	25
L	85	103	80	110	82	110	90	110
OIL VOL (cc)	7.5	22	15	37	22	55	34	85
Min. SPRING FORCE (kgf)	23	17	63	24	64	42	85	70
WEIGHT kgs	1.5	1.5	2	2.5	2.5	3	3.6	5
PART No.	**-**	**4610-212**	**-**	**4610-313**	**-**	**4610-413**	**-**	**4610-513**
STROKE	-	50	-	50	-	50	-	50
L	-	160	-	160	-	160	-	160
OIL VOL (cc)	-	44	-	74	-	110	-	72
Min. SPRING FORCE (kgf)	-	20	-	30	-	42	-	72
WEIGHT kgs	-	2.3	-	4	-	4.5	-	6.5

- All dimensions are in mm
- Overall dimensional tolerance ±0.5 mm

Hydraulic Die Clamping Cylinders

Single Acting / Spring Forwarding - Pull Type

PREAC
FLUID POWER



Description

- Die clamping cylinders are pull type, spring forwarding cylinders. An integral 'T', suitable to 28mm 'T' Slot, is provided to the piston rod of the cylinder.

Application

- These cylinders are widely used for the quick change of Dies & Tools on Presses.
- Max. working pressure : 200 kg/cm^2

Operation

- For changing the tool, first the cylinder pressure is released and cylinders are moved away from the tool, either manually or by a pneumatic cylinder. After changing the tool, the cylinders are placed back at the clamping points and are pressurized.

Important Notes

- T slot dimensions are as per DIN650.
- Cylinder stroke is only 8mm. Clamping height of different tools must be the same with the tolerance of ±1 mm. Specify dimension 'H' (clamping height of the tool), while ordering the cylinder.
- For seal kits, add prefix SK to part no.

PART NO.	4650 – 411	4650 – 511	4650 – 611
Force	50 kN	75 kN	105 kN
G	87	87	92
F	95	105	125
J	60	74	78
d	40	40	45
Oil Volume	20.73 cc	30.16 cc	42.99 cc

- All dimensions are in mm
- Overall dimensional tolerance ±0.5 mm

Hydraulic Universal Clamping Cylinders

Double Acting

PREAC FLUID POWER

Description

- This is strictly a push type cylinder, which can be easily installed and consists of a solid body held in position by a locking ring.

Features

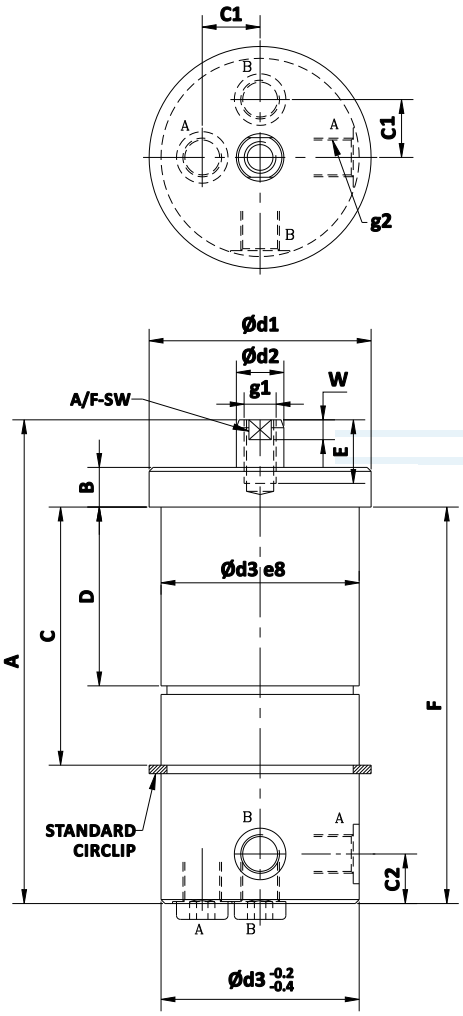
- Type : Double Acting
- Min. working pressure : 5 kg/cm^2
- Max. working pressure:210 kg/cm^2

Application

- These can be used as lifting and clamping cylinders in machine and fixture building. It can be inserted into the smooth through hole and fixed at different levels by means of a locking ring.
- Installation position: Any

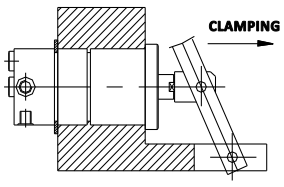
Important Notes

- The mounting dimensions on the matching component have to be strictly maintained.



DIMENSIONAL DETAILS					
SIZE	2	3	4	5	6
BORE DIA	25	32	40	50	63
ROD DIA d2	12	18	22	28	36
STROKE	32	40	50	64	64
A	122	133	147	167	186
B	10	10	12	12	15
C	65.1	70.1	80.1	80.1	100.1
D	45.1	45.1	50.1	50.1	60.1
E	12	16	18	20	20
F	100	110	120	136	150
C1	14.6	18	23	28	34
C2	12.5	12.5	10.5	10.5	13
d1	56	66	76	90	105
d3	50	58	68	80	95
g1	M8	M10	M12	M16	M20
g2	1/8"	1/4"	1/4"	1/4"	1/4"
SW	10	15	19	24	30
W	10	10	10	10	12

APPLICATION EXAMPLE



- All dimensions are in mm
- Overall dimensional tolerance ±0.5 mm

SPECIFICATIONS						
SIZE	STROKE (mm)	PUSH FORCE at 200 kg/cm^2 (kgf)	OIL VOLUME PUSH (cc)	OIL VOLUME PULL (cc)	WEIGHT (kg)	STANDARD PART No's
2	32	980	16	9.3	1.7	**4710-221**
3	40	1600	32	24	2.4	**4710-321**
4	50	2500	65	45	3.6	**4710-421**
5	64	3920	128	89.6	5.7	**4710-521**
6	64	6220	198.4	134.4	8.7	**4710-621**

Hydraulic Rotary Couplings

PREAC FLUID POWER

Description

- Rotary couplings supply pressurized oil to rotating and swivelling installations. They are mounted on the installation at the centre of rotation.

Features

- Min. working pressure : 10 kg/cm^2
- Max. working pressure : 210 kg/cm^2
- Nominal port orifice dia 5mm

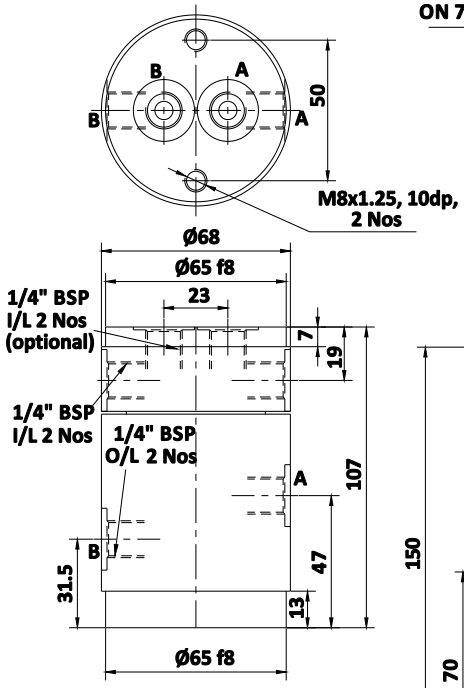
Operating conditions

- Use only hydraulic oil of viscosity class 22,32 & 46
- Temperature range : 10˚C to +90˚C

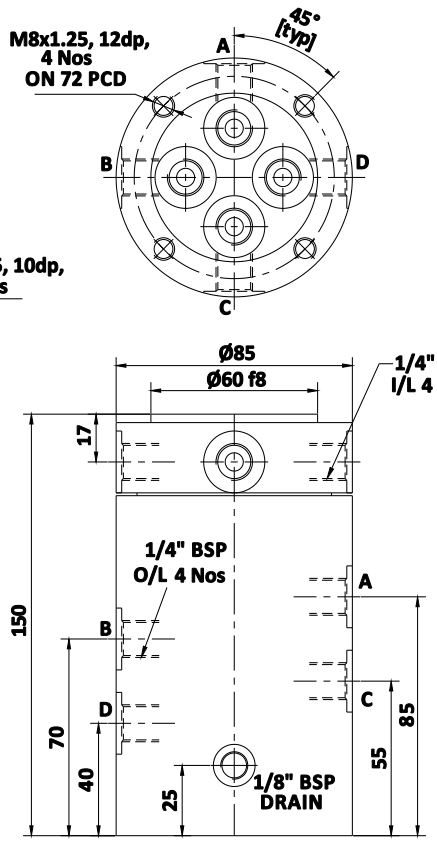
Notes

- Specially designed rotary couplings are available on request.

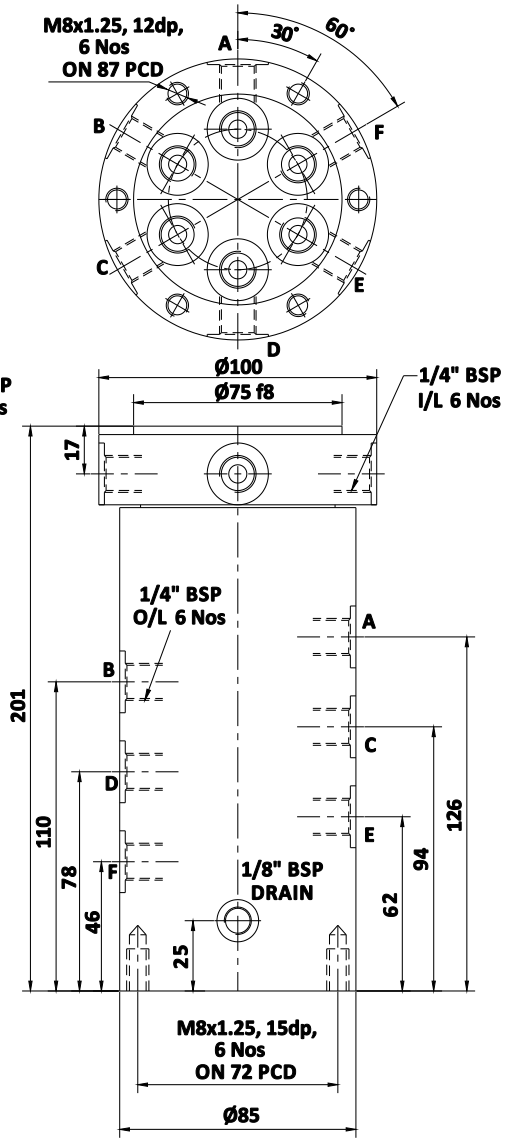
Two Passage Rotary Coupling



Four Passage Rotary Coupling



Six Passage Rotary Coupling



SPECIFICATIONS					
SIZE	No. OF PORTS		PORT SIZE	MAXIMUM RPM	STANDARD PART No's
	IN	OUT			
1	2	2	1/4" BSP	100	**5110-222**
2	4	4	1/4" BSP	50	**5110-244**
3	6	6	1/4" BSP	50	**5110-266**

- All dimensions are in mm
- Overall dimensional tolerance ±0.5 mm

Hydraulic Rotary Valves

for Single & Double Acting Cylinders

PREAC FLUID POWER

Description

- Rotary valves are used in rotary table arrangements where a number of fixtures have to be supplied with hydraulic pressure. These valves are meant for very low speeds of up to 5rpm. It is necessary that both loading and unloading takes place at the same position and that the fixtures are evenly distributed on the rotary table.

Features

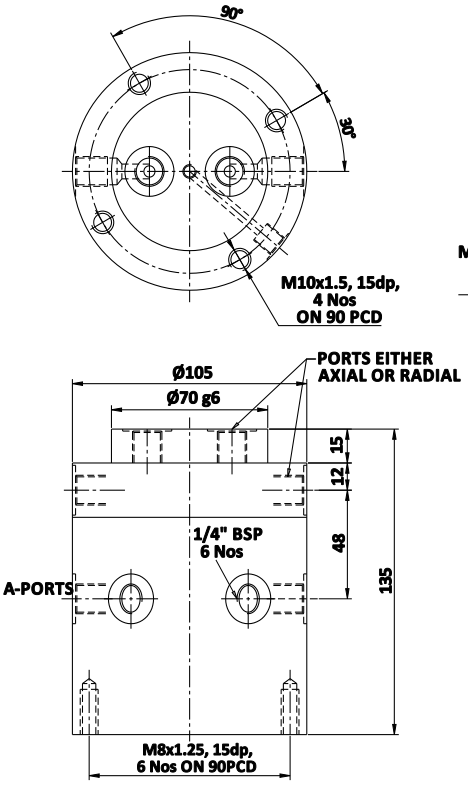
- Min. working pressure : 5 kg/cm^2
- Max. working pressure : 210 kg/cm^2
- Available for both Single and Double Acting applications.
- Nominal port orifice dia 5mm.

Important Notes

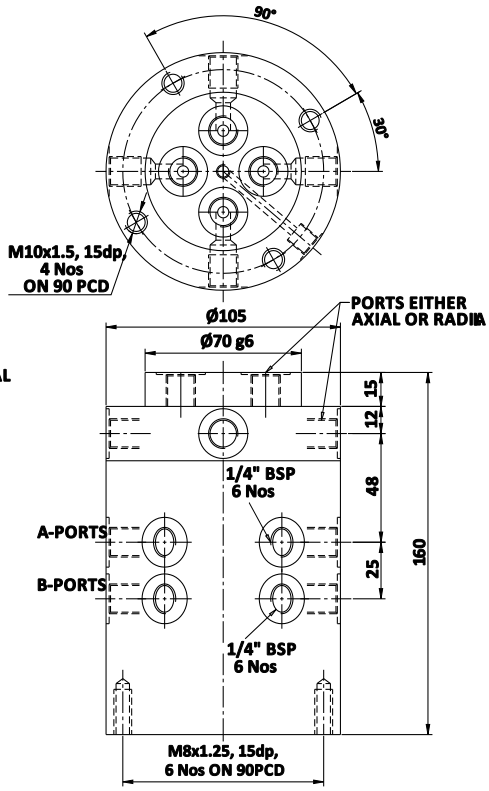
- Use only Hydraulic oil
- Use of anti-rotation key is recommended.
- Custom built Rotary Valves can also be supplied.
- External dimensions are the same for all variants.

- All dimensions are in mm
- Overall dimensional tolerance ±0.5 mm

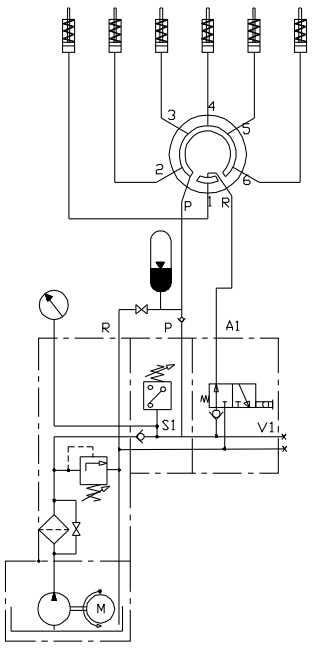
Rotary Valve
for Single Acting Six Station



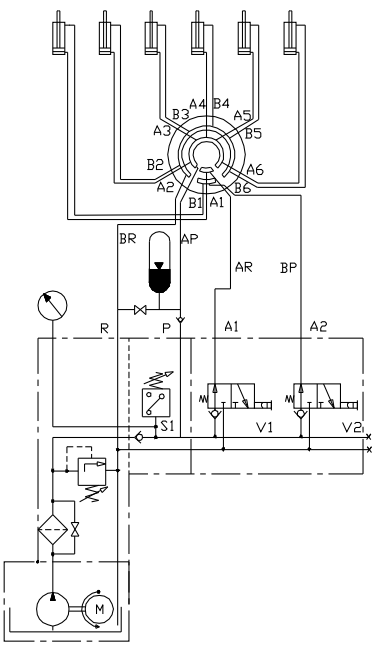
Rotary Valve
for Double Acting Six Station



Circuit example-6 stations- Single Acting



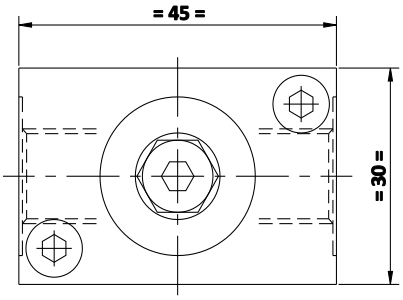
Circuit example-6 stations - Double Acting

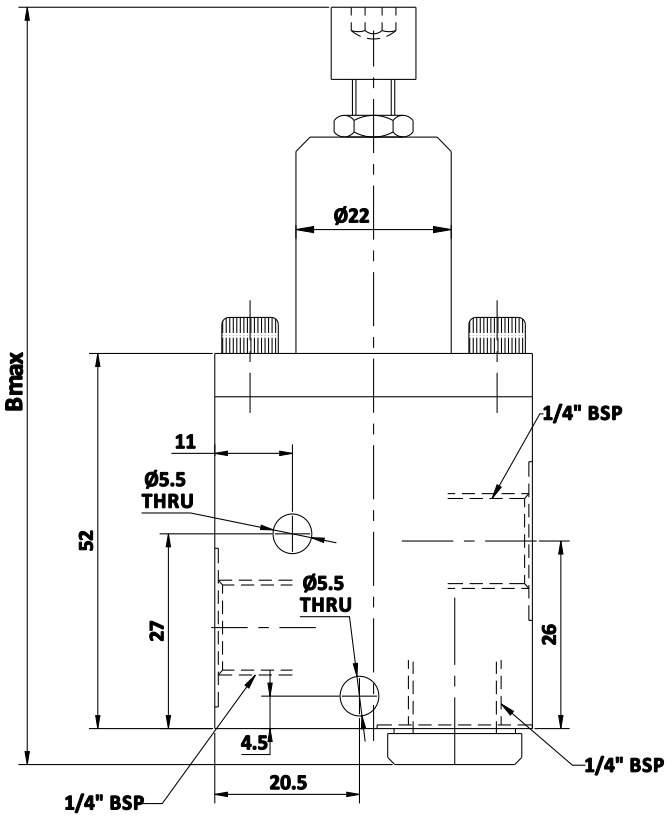


SPECIFICATIONS				
SIZE	No. OF STATIONS	MAXIMUM RPM	WEIGHT (kg)	STANDARD PART No's
1	4	5	1.5	5210-1414
				5210-1424
2	6	5	2.5	5210-1416
				5210-1426
3	8	5	3.5	5210-1418
				5210-1428

Hydraulic Sequence Valves

PREAC
FLUID POWER





Description

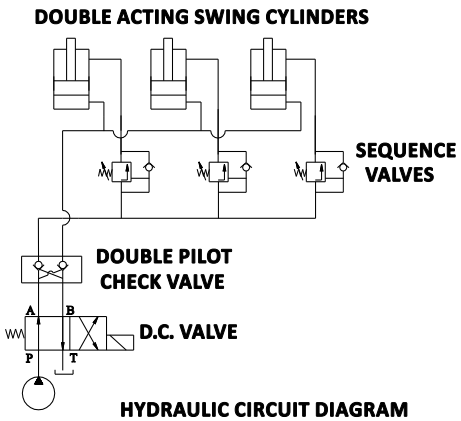
- Sequence valves are used in power work holding circuits for pressure dependent sequence control.

Features

- Min. working pressure : 10 kg/cm^2
- Max. working pressure : 210 kg/cm^2
- Pressure Adjustment range from 20 kg/cm^2
- Compact size allows direct mounting onto the clamping fixture.
- Requires only one pressure line from power unit to the fixture for single acting cylinders.

- All dimensions are in mm
- Overall dimensional tolerance ±0.5 mm

SPECIFICATIONS					
SIZE	RANGE OF ADJUSTMENT kg/cm^2	PORT SIZE	A	B	STANDARD PART No's
1	20-150	1/4" BSP	28	105	**5311-111**
2	100-200	1/4" BSP	28	135	**5311-112**



HYDRAULIC CIRCUIT DIAGRAM

SEQUENCE CONTROL FOR DOUBLE ACTING SWING CYLINDERS

Hydro-Pneumatic Intensifiers

Double Acting

PREAC
FLUID POWER

Description

- The Hydro-Pneumatic Intensifier consists of a double acting Pneumatic Cylinder and a high pressure hydraulic chamber. The Pneumatic Cylinder piston rod is forced into the hydraulic chamber resulting in high pressure oil displacement.

Principle

- In the static condition, (Pressure x Area) at air side is equal to (Pressure x Area) at oil side

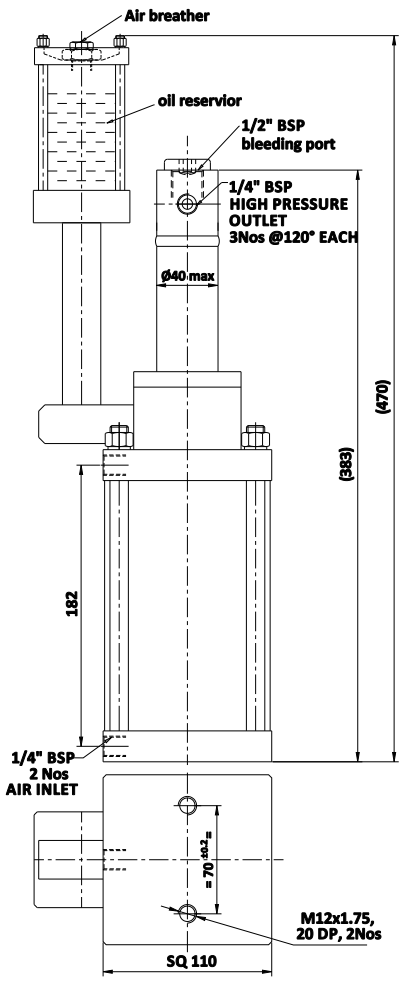
Operation

- When air is allowed into the positive chamber of the Pneumatic Cylinder, oil on the hydraulic side gets pressurized and is forced out. This oil operates the clamping cylinders. After changing the direction of air the pneumatic piston returns and the job gets declamped.

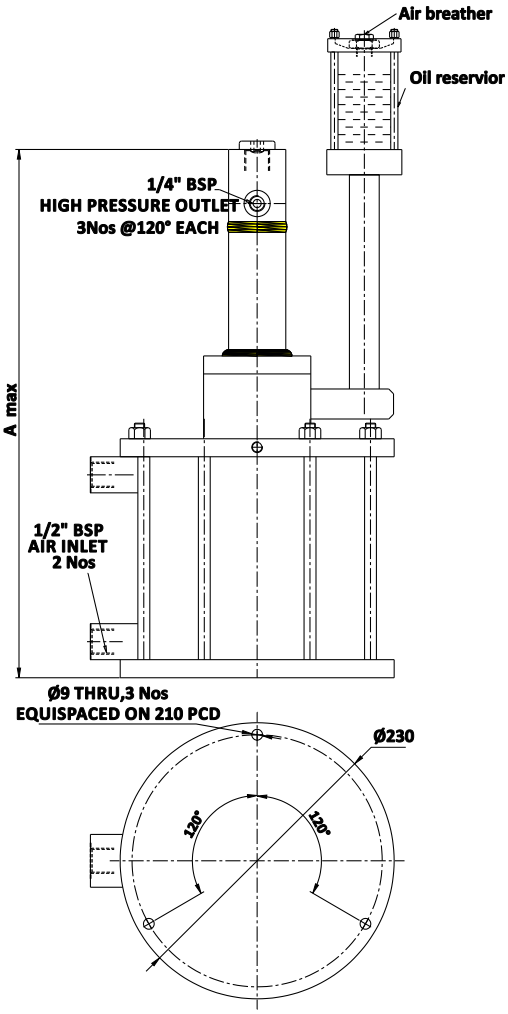
Important Notes

- Output pressure should not exceed 210 kg/cm^2
- This can be used to operate only single acting cylinders.
- For seal kits, add prefix SK to part no.

Type-1



Type-2



- All dimensions are in mm
- Overall dimensional tolerance ±0.5 mm

SPECIFICATIONS FOR TYPE-1			
Sl.No.	INTENSIFICATION RATIO	OIL OUTPUT (cc)	STANDARD PART No
1	1:32	26	**6110-103**

SPECIFICATIONS FOR TYPE-2				
Sl.No.	A	INTENSIFICATION RATIO	OIL OUTPUT (cc)	STANDARD PART No's
1	560	1:64	40	**6110-204**
2	560	1:40	75	**6110-208**
3	560	1:28	100	**6110-210**
4	875	1:40	150	**6110-215**
5	875	1:28	200	**6110-220**
6	875	1:15	400	**6110-240**

Hydraulic Intensifiers

Double Acting

PREAC FLUID POWER

Description

- A Hydraulic Intensifier is used to boost the low pressure output of a hydraulic power unit. The high pressure output of the intensifier is used in clamping devices.

Important Notes

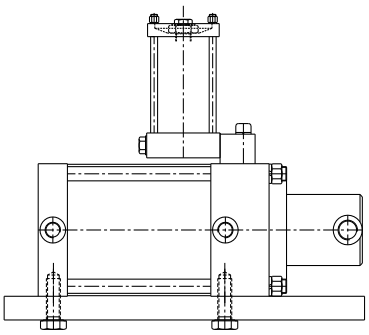
- The system should be designed to avoid creation of vacuum in the lines.
- Air should be thoroughly bled (removed) from the system before operation and at regular intervals.

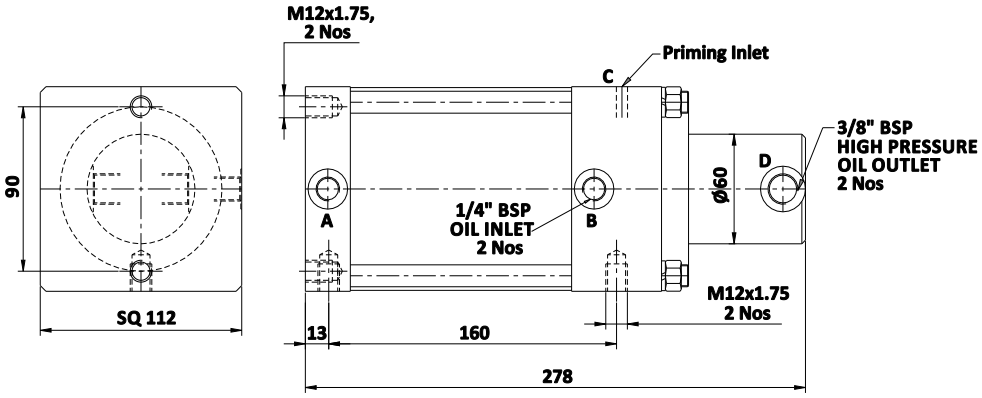
Features

- Type: Double Acting
- Max. Input pressure : 40 kg/cm^2
- Intensification ratio : 1:5

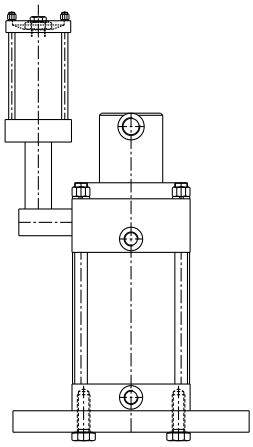
Mounting Arrangements

Horizontal Mounting

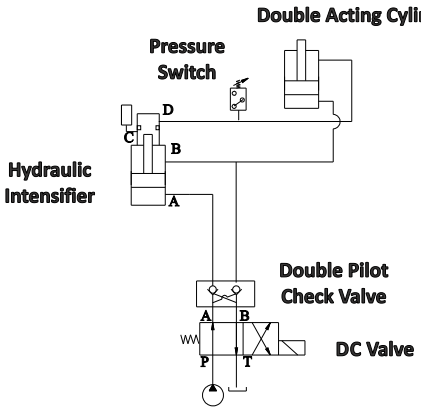




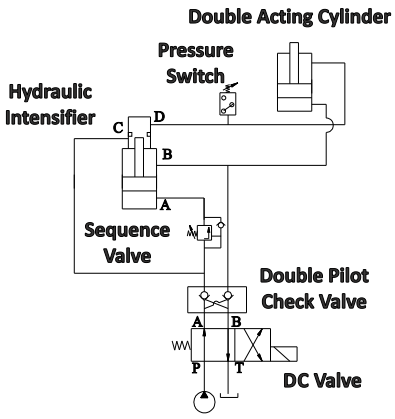
Vertical Mounting



Hydraulic Circuit-1
(Reqd. oil volume < Intensifier oil output)



Hydraulic Circuit-2
(Reqd. oil volume > Intensifier oil output)



SPECIFICATIONS					
Sl.No.	MAX. INPUT PRESSURE (kg/cm^2)	INTENSIFICATION RATIO	OIL OUTPUT (cc)	WEIGHT (kg)	STANDARD PART No's
1	40	1:5	80	15	6210-100 (Horizontal Mounting with Reservior)
2	40	1:5	80	15	6210-200 (Vertical Mounting with Reservior)
3	40	1:5	80	15	6210-300 (Universal Mounting without Reservior)

- All dimensions are in mm
- Overall dimensional tolerance ±0.5 mm

Data Sheet For Calculation

(For Clamping Devices)

PREAC
FLUID POWER

CYLINDER FORCE/ THRUST FORCE/ PULL FORCE/ CLAMPING FORCE
Oil Pressure (bar) x Plunger Effective Area (cm^2) = Force (kgf)

CYLINDER OIL CAPACITY
Effective Area (cm^2) x Stroke (cm) = Cylinder oil capacity (cm^3)

DESIGN FOR CALCULATING CLAMPING FORCE

$$\text{Rated Clamping Force (kgf)} = \frac{\text{Spindle H.P x Machine Efficiency x Factor of Safety x 75 x 60}}{\text{Cutting Speed (m/min)}}$$

Where: Machine Efficiency = 0.7 to 0.95
Factor of Safety = 1.5 to 2

Materials	Coefficient of Friction	
	Dry	Lubricated
CI on CI	0.3	0.2
CI on Steel	0.2	0.1
Steel on Steel	0.15	0.12

OR

$$\text{Rated Clamping Force (kgf)} = \frac{\text{Spindle Power (kW) x Machine Efficiency x Factor of Safety x 60}}{\text{Cutting Speed (m/min) x 9.81 x 1000}}$$

The minimum clamping force of all clamps should be equal to the rated clamping force of machine.

DESIGN FOR CALCULATING CLAMPING FORCE
Stud bolt size used in the existing fixtures with manual clamping is the best clue for selecting the clamping force. Material strength & grade of bolts is assumed to be class 8.8

Std size	M6	M8	M10	M12	M16	M20
Clamping Force in Kgf	402	732	1160	1686	3140	4900

HINT FOR SELECTION
- Selected cylinder capacity should exceed the force required to do job by 20% to 25%. This ensures longer cycle life without overloading & accommodates the friction loss.

GENERAL POINTS
- Check to see that working fluids are compatible to the cylinder/ element seals
- When ordering Seal Kits for any of the elements in this catalogue, add Prefix 'SK' to the respective model code of the element.

NOTE
- Any Special requirement of cylinder & clamping devices to suit customer's requirement will also be met. Technical specifications mentioned may be subjected to alteration due to continual improvements & development.

ISO 9001-2015 -CERTIFICATION

Certificate

Standard **ISO 9001:2015**

Certificate Registr. No. **01 100 1637156**

Certificate Holder: **Precision Engineering Accessories**

SB 109, 2nd Cross, 1st Stage, Peenya Industrial Estate,
Peenya, Bangalore – 560 058, Karnataka, India

Scope: Design, Development, Manufacture and Supply of Hydraulic, Hydro-Pneumatic and Pneumatic Cylinders, Systems,Clamping Devices and Work Holding Solutions

Proof has been furnished by means of an audit that the requirements of **ISO 9001:2015** are met.

Validity: The certificate is valid from **2019-07-09** until **2022-07-04**.
First certification 2013

2019-07-09

TÜV Rheinland Cert GmbH
Am Grauen Stein · 51105 Köln

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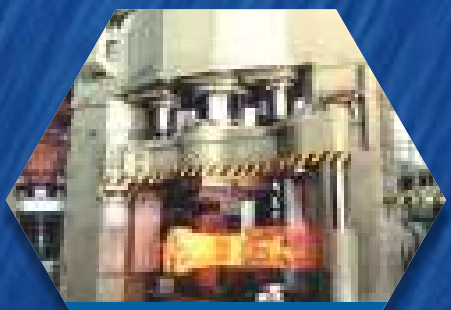

Metal Forming

Injection Moulding

Tractor & Farm Equipment

Metal Cutting

PREAC FLUID POWER

PRECISION ENGINEERING ACCESSORIES

SB-109, 2 nd Cross, 1 st Stage, Peenya Industrial Estate, Peenya, Bangalore - 560 058

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