POWER CYLINDERS
HEAVY DUTY – MEDIUM PRESSURE

GENERAL INFORMATION

Power Cylinders are used for producing linear motions over specified limited lengths.

The heavy duty, medium pressure power cylinder are suitable for pneumatic applications for pressure upto 10 bar and hydraulic applications for pressure upto 25 bar for cylinders of bores upto 100 mm and 16 bar for higher bores, both for non-shock applications.

They are available in 9 bore sizes from 25 mm to 375 mm.

The standard type cylinders are offered as double acting cylinders and single acting cylinders.

Double Acting Cylinders

The double acting cylinders are used where work is to be performed by the cylinders in both directions. They are provided with cushioning arrangement as standard to dampen the impact when piston reaches the end covers at the end of the stroke.

The double acting cylinders are available in 20 standard strokes from 10 to 1200 mm. Longer strokes and non-standard strokes can be supplied against special order.

In case of substantial push force on long stroke cylinders, the piston rod should be checked for buckling (Product List no. 50.201).

The standard double acting cylinders are covered by Product Lists nos. 3.101 to 3.113.

Single Acting Cylinders

The single acting cylinders are used where work is to be performed in one direction only. The return stroke is effected by a built-in spring. This spring is basically intended to return the piston only and should not be relied on the moving external loads.

The advantage of using single acting cylinders is that their air consumption for a full cycle is only half that of the double acting cylinders.

These cylinders are covered by Product Lists nos. 3.151 to 3.161.

Variations of Standard Type Cylinders

The heavy duty, medium pressure cylinders can be also supplied as Through Piston Rod Cylinders, Tandem Cylinders, Cylinders with Adjustable Stroke, Cylinders with Hydraulic Speed Control and Impact Cylinders (See Product Lists in groups 3.2 to 3.6).

Mounting Attachments

The selection of mounting attachments makes the power cylinders suitable for foot-, flange-, pivot- or trunnion mounting. The mounting attachments are normally supplied loose and can easily be fitted onto the cylinder.

The mounting attachments are covered by Product Lists in group 3.9.

POWER CYLINDERS
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GENERAL INFORMATION (cont'd)

Piston Rod Adaptors

We offer a standard range of Piston Rod Adaptors to facilitate the connection of the cylinders to the part to be moved. The selection includes Piston Rod Nuts, Forks, Eyes and Self-Aligning Couplings.
These Adaptors are covered by Product Lists in group 6.1.

Standard Seal Kits

Kits containing a complete replacement set of U-Cups and O-Rings for each size and type of cylinder are available.

Explanation of Difference between old 'P' series of Cylinders and new 'M' series as per IS:10143

1. Our 'P' series of cylinders were designed before Indian and International Standard Specifications for power cylinders were available. At that time there were no standards for mounting dimensions, bores, strokes and designations for accessories.

   Our new 'M' series of cylinders follow IS:10143-1982 (in line with ISO: 6431).

   This explains the difference in terminology used for mounting attachments, etc. as well as standard bore and stroke sizes, between the 'P' series and the new 'M' series.

   2. The 'P' series of cylinders have its tie rods extended at the front or the rear end for direct mounting or for fitting of mounting attachments.

   The new 'M' series of cylinders follow the latest trend and feature sockets in the end covers with female thread. These cylinders can be mounted directly by means of screws, or by means of various mounting attachments.

   The mounting attachments offered by us include mounting screws.

3. We are gradually taking up the manufacture of the 'M' series cylinders as per IS:10143 and shall eventually phase out the 'P' series. Certain bores are still not available in the 'M' series and in these cases we are quoting for cylinders of 'P' series.

Push and Pull Forces

The push and pull forces given in the product lists for the individual cylinders are theoretical or static thrusts developed by the pressure on spring return force. It is advisable to select a cylinder having 15% to 25% higher rating to allow for internal friction, other mechanical losses in the system and loss of line pressure.

POWER CYLINDERS
HEAVY DUTY – MEDIUM PRESSURE – DOUBLE ACTING

NOMINAL BORE 25 MM

APPLICATION : Refer Product List no. 3.100
CONSTRUCTION : Double acting, acetal buffers at both ends
SIZE : Nominal bore 25 mm. Actual bore 25 mm H11
FLUIDS : Air and inert gases
PRESSURE : 10 bar max for air
FORCE DEVELOPED (approx) : 49 kgf (Out) and 38 kgf (In) at 10 bar
24 kgf (Out) and 19 kgf (In) at 5 bar

CONSUMPTION per 100 mm Single Stroke : Air - 0.3 litres of free air (for inlet pressure 5 bar)

MATERIALS :

Cylinder Barrel	:	Steel or Brass Tube
Piston Rod	:	High Tensile Steel, 60 kgf/mm^2
End Covers	:	Aluminium Alloy or Cast Iron
Seals	:	Synthetic Oil-resistant Rubber

SURFACE FINISH : Bore of Cylinder Barrel : Ra 0.4 microns

SURFACE TREATMENT :

Piston Rod	:	Hardchrome plating (15 microns)
End Covers and Cylinder Barrel outside	:	Stove-enamelling

DIMENSIONS : Refer Data Sheet no. PP 05006

Stroke mm	Cat. No.	Stock Code	Weight kg
25	PP 96851	K	0.59
50	PP 96852	K	0.66
75	PP 96853	K	0.73
100	PP 96854	K	0.80
150	PP 96855	K	0.90
200	PP 96856	K	1.1
250	PP 96857	K	1.2
300	PP 96858	K	1.4
350	PP 96859	K	1.5
400	PP 96860	K	1.6
450	PP 96873	K	1.8
500	PP 96861	K	1.9
550	PP 96854	S	
600	PP 96862	S	2.2
650	PP 96875	S	
700	PP 96863	S	2.5
800	PP 96864	S	2.8
1000	PP 96866	S	3.3

Non-standard Stroke : Non-standard strokes can be supplied at extra cost.

SPARE SEAL KIT : Cat. No. SO 95001 (for all strokes). Refer cross section ZZ 05023.

EXAMPLE OF ORDERING SPECIFICATIONS : Power Cylinder, heavy duty, medium pressure, double acting, bore 25 mm, stroke 200 mm, cat. no. PP 96856

POWER CYLINDERS
HEAVY DUTY – MEDIUM PRESSURE – DOUBLE ACTING

NOMINAL BORE 40 MM

APPLICATION	:	Refer Product List no. 3.100
CONSTRUCTION	:	Double acting, pneumatically cushioned at both ends.
SIZE	:	Nominal bore 40 mm. Actual bore 40 mm H11
FLUIDS	:	Oil, air and inert gases
PRESSURE	:	25 bar max. for oil; (for 'non-shock' applications) 10 bar max. for air
FORCE DEVELOPED (approx)	:	314 kgf (Out) and 265 kgf (In) at 25 bar (oil) 125 kgf (Out) and 106 kgf (In) at 10 bar 62 kgf (Out) and 53 kgf (In) at 5 bar
CONSUMPTION Per 100 mm Single Stroke	:	Oil - 0.14 litres Air - 0.8 litres of free air (for inlet pressure 5 bar)
MATERIALS	:	Cylinder Barrel : Steel or Brass Tube Piston Rod : High Tensile Steel, 60 kgf/mm^2 End Covers : Close-grained Cast Iron Seals : Synthetic Oil-resistant Rubber
SURFACE FINISH	:	Bore of Cylinder Barrel : Ra 0.4 microns
SURFACE TREATMENT	:	Piston Rod : Hardchrome plating (15 microns) End Covers and Cylinder Barrel outside : Stove-enamelling
DIMENSIONS	:	Refer Data Sheet no. PP 05006

Stroke mm	Cat. No.	Stock Code	Weight kg
25	PP 96640	K	1.3
50	PP 96641	K	1.5
75	PP 96642	K	1.6
100	PP 96632	K	1.8
150	PP 96633	K	2.0
200	PP 96634	K	2.3
250	PP 96643	K	2.6
300	PP 96635	K	2.6
350	PP 96653	K	3.1
400	PP 96636	K	3.3
450	PP 96654	K	3.6
500	PP 96637	K	3.8
550	PP 96656	S	
600	PP 96638	S	4.3
650	PP 96658	S	
700	PP 96650	S	4.8
800	PP 96644	S	5.3
1000	PP 96639	S	6.3

Non-standard Stroke	:	Non-standard strokes can be supplied at extra cost.
SPARE SEAL KIT	:	Cat. No. SO 95002 (for all strokes). Refer cross section ZZ 05023.
NOTE	:	When cylinders are to be used for hydraulic applications and cushioning is required, the cat.no. should have suffix 'H' (i.e. PP 96634H). If cushioning is not required, the standard cylinders can be used with cushioning screw fully open.
EXAMPLE OF ORDERING SPECIFICATIONS	:	Power Cylinder, heavy duty, medium pressure, double acting, bore 40 mm, stroke 200 mm, cat. no. PP 96634

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POWER CYLINDERS
HEAVY DUTY – MEDIUM PRESSURE – DOUBLE ACTING

NOMINAL BORE 70 MM

APPLICATION : Refer Product List no. 3.100

CONSTRUCTION : Double acting, pneumatically cushioned at both ends.

SIZE : Nominal bore 70 mm. Actual bore 70 mm H11

FLUIDS : Oil, air and inert gases

PRESSURE : 25 bar max. for oil; (for 'non-shock' applications)
10 bar max. for air

FORCE DEVELOPED (approx) : 962 kgf (Out) and 885 kgf (In) at 25 bar (oil)
385 kgf (Out) and 354 kgf (In) at 10 bar
192 kgf (Out) and 177 kgf (In) at 5 bar

CONSUMPTION Per 100 mm Single Stroke : Oil - 0.39 litres
Air - 2.3 litres of free air (for inlet pressure 5 bar)

MATERIALS :

Cylinder Barrel	:	Steel Tube, 30 kgf/mm^2
Piston Rod	:	High Tensile Steel, 60 kgf/mm^2
End Covers	:	Close-grained Cast Iron
Seals	:	Synthetic Oil-resistant Rubber

SURFACE FINISH : Bore of Cylinder Barrel : Ra 0.4 microns

SURFACE TREATMENT :

Bore of Cylinder Barrel	:	Hardchrome plating (15 microns)
Piston Rod	:	Hardchrome plating (15 microns)
End Covers and Cylinder Barrel outside	:	Stove-enamelling

DIMENSIONS : Refer Data Sheet no. PP 05006

Stroke mm	Cat. No.	Stock Code	Weight kg
25	PP 96231	K	3.8
50	PP 96232	K	4.0
75	PP 96233	K	4.3
100	PP 96222	K	4.5
150	PP 96223	K	4.9
200	PP 96224	K	5.3
250	PP 96230	K	5.8
300	PP 96225	K	6.2
350	PP 96237	K	6.6
400	PP 96226	K	7.0
450	PP 96238	K	7.4
500	PP 96227	K	7.8
550	PP 96224	S	8.2
600	PP 96228	S	8.7
650	PP 96245	S	
700	PP 96239	S	9.5
800	PP 96234	S	10.4
1000	PP 96229	S	12.1

Other strokes available on request

SPARE SEAL KIT : Cat. No. SO 95003 (for all strokes). Refer cross section ZZ 05023.

NOTE ***1)** These cylinders were earlier designated as 65 NB. All dimensions remain the same except for the size of the ports which have been increased from G 1/4 to G 3/8 to provide higher velocities.

2) When cylinders are to be used for hydraulic applications and cushioning is required, the cat.no. should have suffix 'H' (i.e. PP 96224H). If cushioning is not required, the standard cylinders can be used with cushioning screw fully open.

EXAMPLE OF ORDERING SPECIFICATIONS : Power Cylinder, heavy duty, medium pressure, double acting, bore 70 mm, stroke 200 mm, cat. no. PP 96224

POWER CYLINDERS
HEAVY DUTY – MEDIUM PRESSURE – DOUBLE ACTING

NOMINAL BORE 100 MM

APPLICATION : Refer Product List no. 3.100
CONSTRUCTION : Double acting, pneumatically cushioned at both ends.
SIZE : Nominal bore 100 mm. Actual bore 106 mm H11
FLUIDS : Oil, air and inert gases
PRESSURE : 25 bar max. for oil; (for 'non-shock' applications)
10 bar max. for air
FORCE DEVELOPED : 2200 kgf (Out) and 2000 kgf (In) at 25 bar (oil)
(approx) 880 kgf (Out) and 830 kgf (In) at 10 bar
440 kgf (Out) and 415 kgf (In) at 5 bar
CONSUMPTION : Oil - 0.9 litres
Per 100 mm
Single Stroke Air - 5.4 litres of free air (for inlet pressure 5 bar)
MATERIALS : Cylinder Barrel : Steel Tube, 30 kgf/mm^2
Piston Rod : High Tensile Steel, 60 kgf/mm^2
End Covers : Close-grained Cast Iron
Seals : Synthetic Oil-resistant Rubber
SURFACE FINISH : Bore of Cylinder Barrel : Ra 0.4 microns
SURFACE TREATMENT : Bore of Cylinder Barrel : Hardchrome plating (15 microns)
Piston Rod : Hardchrome plating (15 microns)
End Covers and Cylinder Barrel outside : Stove-enamelling
DIMENSIONS : Refer Data Sheet no. PP 05006

Stroke mm	Cat. No.	Stock Code	Weight kg
25	PP 96393	K	8.2
50	PP 96394	K	8.6
75	PP 96395	K	8.9
100	PP 96382	K	9.3
150	PP 96383	K	10.3
200	PP 96384	K	10.7
250	PP 96392	K	11.4
300	PP 96385	K	12.2
350	PP 96397	K	12.9
400	PP 96386	K	13.6
450	PP 96398	K	14.0
500	PP 96387	K	15.0
550	PP 96404	S	15.7
600	PP 96388	S	16.5
650	PP 96405	S	
700	PP 96399	S	17.9
800	PP 96396	S	19.3
1000	PP 96389	S	22.0

Non-Standard Stroke : Non-standard strokes can be

SPARE SEAL KIT : Cat. No. SO 95004 (for all strokes). Refer cross section ZZ 05023.

NOTE : When cylinders are to be used for hydraulic applications and cushioning is required, the cat.no. should have suffix 'H' (i.e. PP 96384H). If cushioning is not required, the standard cylinders can be used with cushioning screw fully open.

EXAMPLE OF ORDERING SPECIFICATIONS : Power Cylinder, heavy duty, medium pressure, double acting, bore 100 mm, stroke 200 mm, cat. no. PP 96384

POWER CYLINDERS
HEAVY DUTY – MEDIUM PRESSURE – DOUBLE ACTING

NOMINAL BORE 150 MM

APPLICATION : Refer Product List no. 3.100

CONSTRUCTION : Double acting, pneumatically cushioned at both ends.

SIZE : Nominal bore 150 mm. Actual bore 153 mm H11

FLUIDS : Oil, air and inert gases

PRESSURE : 16 bar max. for oil; (for 'non-shock' applications)
10 bar max. for air

FORCE DEVELOPED (approx) : 2930 kgf (Out) and 2750 kgf (In) at 16 bar (oil)
1830 kgf (Out) and 1750 kgf (In) at 10 bar
815 kgf (Out) and 875 kgf (In) at 5 bar

CONSUMPTION Per 100 mm Single Stroke : Oil - 1.84 litres
Air - 11 litres of free air (for inlet pressure 5 bar)

MATERIALS :

Cylinder Barrel	:	Steel Tube, 30 kgf/mm^2
Piston Rod	:	High Tensile Steel, 60 kgf/mm^2
End Covers	:	Close-grained Cast Iron
Seals	:	Synthetic Oil-resistant Rubber

SURFACE FINISH :

Bore of Cylinder Barrel	:	Ra 0.4 microns

SURFACE TREATMENT :

Bore of Cylinder Barrel	:	Hardchrome plating (15 microns)
Piston Rod	:	Hardchrome plating (15 microns)
End Covers and Cylinder Barrel outside	:	Stove-enamelling

DIMENSIONS : Refer Data Sheet no. PP 05006

Stroke mm	Cat. No.	Stock Code	Weight kg
25	PP 96046	K	16
50	PP 96047	K	17
75	PP 96048	K	18
100	PP 96032	K	19
150	PP 96033	K	21
200	PP 96034	K	22
250	PP 96045	K	24
300	PP 96035	K	25
350	PP 96040	K	27
400	PP 96036	K	28
450	PP 96050	K	29
500	PP 96037	K	31
550	PP 96054	S	32
600	PP 96038	S	34
650	PP 96055	S	
700	PP 96041	S	37
800	PP 96049	S	40
1000	PP 96039	S	46

Non-Standard Stroke : Non-standard strokes can be supplied at extra cost.

SPARE SEAL KIT : Cat. No. SO 95005 (for all strokes). Refer cross section ZZ 05023.

NOTE : When cylinders are to be used for hydraulic applications and cushioning is required, the cat.no. should have suffix 'H' (i.e. PP 96034H). If cushioning is not required, the standard cylinders can be used with cushioning screw fully open.

EXAMPLE OF ORDERING SPECIFICATIONS : Power Cylinder, heavy duty, medium pressure, double acting, bore 150 mm, stroke 200 mm, cat. no. PP 96034

POWER CYLINDERS
HEAVY DUTY – MEDIUM PRESSURE – DOUBLE ACTING

NOMINAL BORE 250 MM

APPLICATION : Refer Product List no. 3.100
CONSTRUCTION : Double acting, pneumatically cushioned at both ends.
SIZE : Nominal bore 250 mm. Actual bore 252 mm H11
FLUIDS : Oil, air and inert gases
PRESSURE : 16 bar max. for oil; (for 'non-shock' applications)
10 bar max. for air
FORCE DEVELOPED (approx) : 8000 kgf (Out) and 7680 kgf (In) at 16 bar (oil)
5000 kgf (Out) and 4800 kgf (In) at 10 bar
2500 kgf (Out) and 2400 kgf (In) at 5 bar
CONSUMPTION Per 100 mm Single Stroke : Oil - 5 litres
Air - 30 litres of free air (for inlet pressure 5 bar)
MATERIALS :

Cylinder Barrel	:	Steel Tube, 30 kgf/mm^2
Piston Rod	:	High Tensile Steel, 60 kgf/mm^2
End Covers	:	Close-grained Cast Iron
Seals	:	Synthetic Oil-resistant Rubber

SURFACE FINISH : Bore of Cylinder Barrel : Ra 0.4 microns
SURFACE TREATMENT :

Bore of Cylinder Barrel	:	Hardchrome plating (15 microns)
Piston Rod	:	Hardchrome plating (15 microns)
End Covers and Cylinder Barrel outside	:	Stove-enamelling

DIMENSIONS : Refer Data Sheet no. PP 05006

Stroke mm	Cat. No.	Stock Code	Weight kg
25	PP 96631	K	60
50	PP 96600	K	62
75	PP 96601	K	64
100	PP 96621	K	66
150	PP 96622	K	70
200	PP 96623	K	74
250	PP 96602	K	78
300	PP 96624	K	82
350	PP 96605	K	86
400	PP 96625	K	90
450	PP 96606	K	94
500	PP 96626	K	98
550	PP 96611	S	102
600	PP 96627	S	106
650	PP 96612	S	
700	PP 96604	S	114
800	PP 96603	S	122
1000	PP 96628	S	138

Non-Standard Stroke : Non-standard strokes can be supplied at extra cost.

SPARE SEAL KIT : Cat. No. SO 95006 (for all strokes). Refer cross section ZZ 05023.

NOTE : When cylinders are to be used for hydraulic applications and cushioning is required, the cat.no. should have suffix 'H' (i.e. PP 96623H). If cushioning is not required, the standard cylinders can be used with cushioning screw fully open.

EXAMPLE OF ORDERING SPECIFICATIONS : Power Cylinder, heavy duty, medium pressure, double acting, bore 250 mm, stroke 200 mm, cat. no. PP 96623

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POWER CYLINDERS
HEAVY DUTY – MEDIUM PRESSURE – SINGLE ACTING

NOMINAL BORE 25 MM

APPLICATION : Refer Product List no. 3.100.

CONSTRUCTION : Single acting, spring return, non-cushioned.

SIZE : Nominal bore 25 mm. Actual bore 25 mm H11.

FLUIDS : Oil, air and inert gases.

PRESSURE : 10 bar max.

FORCE DEVELOPED : For cylinders spring returned to 'IN' position :

Spring Return Force : 1.5 kgf in 'IN' position for 100 mm stroke cylinder. For other strokes and intermediate position, force is higher. Refer Data Sheet PP 05027.

Push Force : 46 kgf at 10 bar
21 kgf at 5 bar

For cylinders spring returned to 'OUT' position :

Spring Return Force : 2.5 kgf in 'OUT' position for 50 mm stroke cylinder. For other strokes and intermediate positions, force is higher. Refer Data Sheet PP 05218

Pull Force : 31 kgf at 10 bar
11 kgf at 5 bar

CONSUMPTION : Oil - 0.05 litres
Per 100 mm Single Stroke
Air - 0.3 litres of free air (for inlet pressure 5 bar).

MATERIALS :
Cylinder Barrel : Steel or Brass Tube
Piston Rod : High Tensile Steel, 60 kgf/mm^2
End Covers : Aluminium Alloy of Cast Iron
Seals : Synthetic Oil-resistant Rubber

SURFACE FINISH : Bore of Cylinder Barrel: Ra 0.4 microns

SURFACE TREATMENT :
Piston Rod : Hardchrome plating (15 microns)
End Covers and Cylinder Barrel Outside : Stove-enamelling

DIMENSIONS : Refer Data Sheets nos PP 05095 and PP 05203

Stroke mm	Cat.No.	Spring Return Force – kgf	Stock Code	Weight kg
SPRING RETURNED TO 'IN' POSITION				
25	PP 96959	2.5	S	0.59
50	PP 96960	2.0	S	0.66
75	PP 96961	1.5	S	0.73
100	PP 96962	1.0	S	0.80

SPARE SEAL KIT : Cat.No. SO 95007 (for all strokes). Refer cross section ZZ 05028.

SPRING RETURNED TO 'OUT' POSITION				
25	PP 96993	5.0	S	0.55
50	PP 96994	2.5	S	0.62

SPARE SEAL KIT : Cat.No. SO 95080 (for all strokes)

EXAMPLE OF ORDERING SPECIFICATIONS : Power Cylinder, heavy duty, medium pressure, single acting, spring return to 'IN' position, bore 25 mm, stroke 50 mm, cat.no. PP 96960

POWER CYLINDERS
HEAVY DUTY – MEDIUM PRESSURE – SINGLE ACTING

NOMINAL BORE 40 MM

APPLICATION : Refer Product List no. 3.100.

CONSTRUCTION : Single acting, spring return, non-cushioned.

SIZE : Nominal bore 40 mm. Actual bore 40 mm H11.

FLUIDS : Oil, air and inert gases.

PRESSURE : 10 bar max.

FORCE DEVELOPED : For cylinders spring returned to 'IN' position :

Spring Return Force : 2.5 kgf in 'IN' position for 100 mm stroke cylinder. For other strokes and intermediate position, force is higher. Refer Data Sheet PP 05027

Push Force : 120 kgf at 10 bar
60 kgf at 5 bar

For cylinders spring returned to 'OUT' position :

Spring Return Force : 4.5 kgf in 'OUT' position for 50 mm stroke cylinder. For other strokes and intermediate positions, force is higher. Refer Data Sheet PP 05218

Pull Force : 91 kgf at 10 bar
38 kgf at 5 bar

CONSUMPTION Per 100 mm Single Stroke : Oil - 0.05 litres
Air - 0.3 litres of free air (for inlet pressure 5 bar).

MATERIALS :
Cylinder Barrel : Steel or Brass Tube
Piston Rod : High Tensile Steel, 60 kgf/mm^2
End Covers : Aluminium Alloy or Cast Iron
Seals : Synthetic Oil-resistant Rubber

SURFACE FINISH : Bore of Cylinder Barrel: Ra 0.4 microns

SURFACE TREATMENT :
Piston Rod : Hardchrome plating (15 microns)
End Covers and Cylinder Barrel Outside : Stove-enamelling

DIMENSIONS : Refer Data Sheets nos PP 05095 and PP 05203

Stroke mm	Cat.No.	Spring Return Force – kgf	Stock Code	Weight kg
SPRING RETURNED TO 'IN' POSITION				
25	PP 96351	7.0	S	1.4
50	PP 96352	6.1	S	1.6
75	PP 96353	5.0	S	1.8
100	PP 96354	3.7	S	2.0
150	PP 96355	1.5	S	2.3

SPARE SEAL KIT : Cat.No. SO 95008 (for all strokes). Refer cross section ZZ 05028.

SPRING RETURNED TO 'OUT' POSITION				
25	PP 96121	8.5	S	1.3
50	PP 96122	4.5	S	1.5

SPARE SEAL KIT : Cat.No. SO 95081 (for all strokes)

EXAMPLE OF ORDERING SPECIFICATIONS : Power Cylinder, heavy duty, medium pressure, single acting, spring return to 'IN' position, bore 40 mm, stroke 50 mm, cat.no. PP 96352

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POWER CYLINDERS
HEAVY DUTY – MEDIUM PRESSURE – SINGLE ACTING

NOMINAL BORE 70 MM *

APPLICATION : Refer Product List no. 3.100.

CONSTRUCTION : Single acting, spring return, non-cushioned.

SIZE : Nominal bore 70 mm. Actual bore 70 mm H11.

FLUIDS : Oil, air and inert gases.

PRESSURE : 10 bar max.

FORCE DEVELOPED : For cylinders spring returned to 'IN' position :

Spring Return Force : 12 kgf in 'IN' position for 150 mm stroke Cylinder. For other strokes and intermediate Position, force is higher. Contact factory for details..

Push Force : 367 kgf at 10 bar
174 kgf at 5 bar

For cylinders spring returned to 'OUT' position :

Spring Return Force : 11 kgf in 'OUT' position for 75 mm stroke Cylinder. For other strokes and intermediate Positions, force is higher. Contact factory for details.

Pull Force : 338 kgf at 10 bar
171 kgf at 5 bar

CONSUMPTION Per 100 mm Single Stroke : Oil - 0.39 litres
Air - 2.3 litres of free air (for inlet pressure 5 bar).

MATERIALS :
Cylinder Barrel : Steel Tube, 30 kgf/mm^2
Piston Rod : High Tensile Steel, 60 kgf/mm^2
End Covers : Close-grained Cast Iron
Seals : Synthetic Oil-resistant Rubber

SURFACE FINISH : Bore of Cylinder Barrel: Ra 0.4 microns

SURFACE TREATMENT :
Bore of Cylinder Barrel: Hardchrome plating (15 microns)
Piston Rod : Hardchrome plating (15 microns)
End Covers and Cylinder Barrel Outside : Stove-enamelling

DIMENSIONS : Refer Data Sheets nos PP 05095 and PP 05203

Stroke mm	Cat.No.	Spring Return Force – kgf	Stock Code	Weight kg
SPRING RETURNED TO 'IN' POSITION				
25	PP 96831	18	S	3.6
50	PP 96832	15	S	3.8
75	PP 96835	12	S	4.1
100	PP 96833	10	S	4.3
150	PP 96834	7	S	4.7
200	PP 96841		S	

SPARE SEAL KIT : Cat.No. SO 95009 (for all strokes). Refer cross section ZZ 05028.

SPRING RETURNED TO 'IN' POSITION				
25	PP 96995	13	S	4.2
50	PP 96996	12	S	4.4
75	PP 96997	11	S	4.7

SPARE SEAL KIT : Cat.No. SO 95082 (for all strokes)

NOTE : * These cylinders were earlier designated as 65 NB. All dimensions remain the same except for the size of the ports which have been increased from G 1/4 to G 3/8 to provide higher velocities.

EXAMPLE OF ORDERING SPECIFICATIONS : Power Cylinder, heavy duty, medium pressure, single acting, spring return to 'IN' position, bore 70 mm, stroke 50 mm, cat.no. PP 96832

ORNCAL

POWER CYLINDERS
HEAVY DUTY – MEDIUM PRESSURE – SINGLE ACTING

NOMINAL BORE 100 MM

APPLICATION : Refer Product List no. 3.100.

CONSTRUCTION : Single acting, spring return, non-cushioned.

SIZE : Nominal bore 100 mm. Actual bore 106 mm H11.

FLUIDS : Oil, air and inert gases.

PRESSURE : 10 bar max.

FORCE DEVELOPED : Cylinders spring returned to 'IN' position :

Spring Return Force : 22 kgf in 'IN' position for 200 mm stroke cylinder. For other strokes and intermediate position, force is higher. Refer Data Sheet PP 05026

Push Force : 830 kgf at 10 bar
390 kgf at 5 bar

CONSUMPTION : Oil - 0.9 litres
Per 100 mm Single Stroke
Air - 5.4 litres of free air (for inlet pressure 5 bar).

MATERIALS :
Cylinder Barrel : Steel Tube, 30 kgf/mm^2
Piston Rod : High Tensile Steel, 60 kgf/mm^2
End Covers : Close-grained Cast Iron
Seals : Synthetic Oil-resistant Rubber

SURFACE FINISH : Bore of Cylinder Barrel: Ra 0.4 microns

SURFACE TREATMENT :
Bore of Cylinder Barrel: Hardchrome plating (15 microns)
Piston Rod : Hardchrome plating (15 microns)
End Covers and Cylinder Barrel Outside : Stove-enamelling

DIMENSIONS : Refer Data Sheets nos PP 05095

Stroke mm	Cat.No.	Spring Return Force – kgf	Stock Code	Weight kg
25	PP 96201	37.0	S	8.7
50	PP 96202	34.0	S	9.1
100	PP 96203	27.0	S	9.8
150	PP 96204	20.0	S	10.5
200	PP 96205	15.0	S	11.2

SPARE SEAL KIT : Cat.No. SO 95010 (for all strokes). Refer cross section ZZ 05028.

EXAMPLE OF ORDERING SPECIFICATIONS : Power Cylinder, heavy duty, medium pressure, single acting, spring return, bore 100 mm, stroke 50 mm, cat.no. PP 96202

ORNCAL

POWER CYLINDERS
HEAVY DUTY – MEDIUM PRESSURE – SINGLE ACTING

NOMINAL 150 MM

APPLICATION : Refer Product List no. 3.100.

CONSTRUCTION : Single acting, spring return, non-cushioned.

SIZE : Nominal bore 150 mm. Actual bore 153 mm H11.

FLUIDS : Oil, air and inert gases.

PRESSURE : 10 bar max.

FORCE DEVELOPED : Cylinders spring returned to 'IN' position :

Spring Return Force : 41 kgf in 'IN' position for 250 mm stroke cylinder. For other strokes and intermediate position, force is higher. Refer Data Sheet PP 05026

Push Force : 1740 kgf at 10 bar
825 kgf at 5 bar

CONSUMPTION : Oil - 1.84 litres
Per 100 mm Single Stroke
Air - 11 litres of free air (for inlet pressure 5 bar).

MATERIALS :
Cylinder Barrel : Steel Tube, 30 kgf/mm^2
Piston Rod : High Tensile Steel, 60 kgf/mm^2
End Covers : Close-grained Cast Iron
Seals : Synthetic Oil-resistant Rubber

SURFACE FINISH : Bore of Cylinder Barrel: Ra 0.4 microns

SURFACE TREATMENT :
Bore of Cylinder Barrel: Hardchrome plating (15 microns)
Piston Rod : Hardchrome plating (15 microns)
End Covers and Cylinder Barrel Outside : Stove-enamelling

DIMENSIONS : Refer Data Sheets nos PP 05095

Stroke mm	Cat.No.	Spring Return Force – kgf	Stock Code	Weight kg
25	PP 96001	70.0	S	19.3
50	PP 96002	66.0	S	20.0
100	PP 96003	58.0	S	21.0
150	PP 96004	50.0	S	23.0
200	PP 96005	40.0	S	25.0
250	PP 96006	32.0	S	27.0

SPARE SEAL KIT : Cat.No. SO 95011 (for all strokes). Refer cross section ZZ 05028.

EXAMPLE OF ORDERING SPECIFICATIONS : Power Cylinder, heavy duty, medium pressure, single acting, spring return, bore 150 mm, stroke 50 mm, cat.no. PP 96002

ORNCAL

POWER CYLINDERS
HEAVY DUTY – MEDIUM PRESSURE – SINGLE ACTING

NOMINAL 250 MM

APPLICATION : Refer Product List no. 3.100.

CONSTRUCTION : Single acting, spring return, non-cushioned.

SIZE : Nominal bore 250 mm. Actual bore 252 mm H11.

FLUIDS : Oil, air and inert gases.

PRESSURE : 10 bar max.

FORCE DEVELOPED : Cylinders spring returned to 'IN' position :

Spring Return Force : 48 kgf in 'IN' position for 100 mm stroke cylinder. For other strokes and intermediate position, force is higher. Refer Data Sheet PP 05026

Push Force : 4935 kgf at 10 bar
2435 kgf at 5 bar

CONSUMPTION : Oil - 5 litres
Per 100 mm Single Stroke
Air - 30 litres of free air (for inlet pressure 5 bar).

MATERIALS :
Cylinder Barrel : Steel Tube, 30 kgf/mm^2
Piston Rod : High Tensile Steel, 60 kgf/mm^2
End Covers : Close-grained Cast Iron
Seals : Synthetic Oil-resistant Rubber

SURFACE FINISH : Bore of Cylinder Barrel: Ra 0.4 microns

SURFACE TREATMENT :
Bore of Cylinder Barrel: Hardchrome plating (15 microns)
Piston Rod : Hardchrome plating (15 microns)
End Covers and Cylinder Barrel Outside : Stove-enamelling

DIMENSIONS : Refer Data Sheets nos PP 05095

Stroke mm	Cat.No.	Spring Return Force – kgf	Stock Code	Weight kg
25	PP 96021	70.0	S	19.3
50	PP 96022	66.0	S	20.0
100	PP 96024	58.0	S	21.0
150	PP 96025	50.0	S	23.0
200	PP 96026	40.0	S	25.0
250	PP 96027	32.0	S	27.0

SPARE SEAL KIT : Cat.No. SO 95012 (for all strokes). Refer cross section ZZ 05028.

EXAMPLE OF ORDERING SPECIFICATIONS : Power Cylinder, heavy duty, medium pressure, single acting, spring return, bore 250 mm, stroke 50 mm, cat.no. PP 96002

POWER CYLINDERS
HEAVY DUTY – MEDIUM PRESSURE
THROUGH PISTON ROD – DOUBLE ACTING

NOMINAL BORE 25 MM

APPLICATION	:	Refer Product List no. 3.100
CONSTRUCTION	:	Double acting, acetal buffers at both ends
SIZE	:	Nominal bore 25 mm. Actual bore 25 mm H11
FLUIDS	:	Air and inert gases
PRESSURE	:	10 bar max for air
FORCE DEVELOPED (approx)	:	38 kgf at 10 bar
CONSUMPTION per 100 mm Single Stroke	:	Air - 0.3 litres of free air (for inlet pressure 5 bar)
MATERIALS	:	Cylinder Barrel : Steel or Brass Tube Piston Rod : High Tensile Steel, 60 kgf/mm^2 End Covers : Aluminium Alloy or Cast Iron Seals : Synthetic Oil-resistant Rubber
SURFACE FINISH	:	Bore of Cylinder Barrel : Ra 0.4 microns
SURFACE TREATMENT	:	Bore of Cylinder Barrel : Hardchrome plating (15 microns) Piston Rod : Hardchrome plating (15 micron End Covers and Cylinder Barrel outside : Stove-enamelling
DIMENSIONS	:	Refer Data Sheet no. PP 05043

Stroke mm	Cat. No.	Stock Code
10	PP 97897	S
25	PP 97885	S
50	PP 97886	S
75	PP 97887	S
100	PP 97888	S
150	PP 97889	S
200	PP 97890	S
250	PP 97891	S
300	PP 97892	S
350	PP 97893	S
400	PP 97894	S
450	PP 97898	S
500	PP 97895	N
550	PP 97896	N
600	PP 97899	N
700	PP 97900	N
800	PP 97901	N
900	PP 97902	N
1000	PP 97903	N
1200	PP 97904	N

Non-standard Stroke	:	Non-standard strokes can be supplied at extra cost.
SPARE SEAL KIT	:	Cat. No. SO 95013 (for all strokes).Refer cross section ZZ 05031.
EXAMPLE OF ORDERING SPECIFICATIONS	:	Power Cylinder, heavy duty, medium pressure, through piston rod, double acting, bore 25 mm, stroke 200 mm, cat. no. PP 97890

POWER CYLINDERS
HEAVY DUTY – MEDIUM PRESSURE
THROUGH PISTON ROD – DOUBLE ACTING

NOMINAL BORE 40 MM

APPLICATION	:	Refer Product List no. 3.100
CONSTRUCTION	:	Double acting, acetal buffers at both ends
SIZE	:	Nominal bore 40 mm. Actual bore 40 mm H11
FLUIDS	:	Oil, air and inert gases
PRESSURE	:	25 bar max for oil (for 'non-shock' applications). 10 bar max. for air
FORCE DEVELOPED (approx)	:	265 kgf at 25 bar (oil) 106 kgf at 10 bar
CONSUMPTION Per 100 mm Single Stroke	:	Oil - 0.11 litres Air - 0.66 litres of free air (for inlet pressure 5 bar)
MATERIALS	:	Cylinder Barrel : Steel or Brass Tube Piston Rod : High Tensile Steel, 60 kgf/mm^2 End Covers : Close-grained Cast Iron Seals : Synthetic Oil-resistant Rubber
SURFACE FINISH	:	Bore of Cylinder Barrel : Ra 0.4 microns
SURFACE TREATMENT	:	Bore of Cylinder Barrel : Hardchrome plating (15 microns) (for steel only) Piston Rod : Hardchrome plating (15 micron End Covers and Cylinder Barrel outside : Stove-enamelling
DIMENSIONS	:	Refer Data Sheet no. PP 05043

Stroke mm	Cat. No.	Stock Code
25	PP 97301	S
50	PP 97302	S
75	PP 97303	S
100	PP 97304	S
150	PP 97305	S
200	PP 97306	S
250	PP 97307	S
300	PP 97308	S
350	PP 97316	S
400	PP 97309	S
450	PP 97317	S
500	PP 97310	S
600	PP 97311	N
700	PP 97318	N
800	PP 97312	N
1000	PP 97313	N

Non-standard Stroke	:	Non-standard strokes can be supplied at extra cost.
SPARE SEAL KIT	:	Cat. No. SO 95014 (for all strokes). Refer cross section ZZ 05031.
NOTE	:	When cylinders are to be used for hydraulic applications and cushioning is required, the cat.no. should have suffix 'H' (i.e. PP 97306H). If cushioning is not required, the standard cylinder can be used with cushioning screw fully open.
EXAMPLE OF ORDERING SPECIFICATIONS	:	Power Cylinder, heavy duty, medium pressure, through piston rod, double acting, bore 40 mm, stroke 200 mm, cat. no. PP 97306

POWER CYLINDERS
HEAVY DUTY – MEDIUM PRESSURE
THROUGH PISTON ROD – DOUBLE ACTING

NOMINAL BORE 70 MM *

APPLICATION : Refer Product List no. 3.100

CONSTRUCTION : Double acting, pneumatically cushioned at both ends.

SIZE : Nominal bore 70 mm. Actual bore 70 mm H11

FLUIDS : Oil, air and inert gases

PRESSURE : 25 bar max. for oil
10 bar max. for air

FORCE DEVELOPED (approx) : 885 kgf at 25 bar (oil)
354 kgf at 10 bar
177 kgf at 5 bar

CONSUMPTION Per 100 mm Single Stroke : Oil - 0.36 litres
Air - 2.1 litres of free air (for inlet pressure 5 bar)

MATERIALS :

Cylinder Barrel	:	Steel Tube, 30 kgf/mm^2
Piston Rod	:	High Tensile Steel, 60 kgf/mm^2
End Covers	:	Close-grained Cast Iron
Seals	:	Synthetic Oil-resistant Rubber

SURFACE FINISH : Bore of Cylinder Barrel : Ra 0.4 microns

SURFACE TREATMENT :

Bore of Cylinder Barrel	:	Hardchrome plating (15 microns)
Piston Rod	:	Hardchrome plating (15 microns)
End Covers and Cylinder Barrel outside	:	Stove-enamelling

DIMENSIONS : Refer Data Sheet no. PP 05043

Stroke mm	Cat. No.	Stock Code
25	PP 97351	S
50	PP 67352	S
75	PP 97353	S
100	PP 97354	S
150	PP 97355	S
200	PP 97356	S
250	PP 97357	S
300	PP 97358	S
350	PP 97359	S
400	PP 97360	S
450	PP 97361	S
500	PP 97362	S
600	PP 97363	N
700	PP 97364	N
800	PP 97365	N
1000	PP 97367	N

Other strokes available on request

SPARE SEAL KIT : Cat. No. SO 95015 (for all strokes). Refer cross section ZZ 05031.

NOTE ***1)** These cylinders were earlier designated as 65 NB. All dimensions remain the same except for the size of the ports which have been increased from G 1/4 to G 3/8 to provide higher velocities.

2) When cylinders are to be used for hydraulic applications and cushioning is required, the cat.no. should have suffix 'H' (i.e. PP 97356H). If cushioning is not required, the standard cylinders can be used with cushioning screw fully open.

EXAMPLE OF ORDERING SPECIFICATIONS : Power Cylinder, heavy duty, medium pressure, through piston rod, double acting, bore 70 mm, stroke 200 mm, cat. no. PP 97356

POWER CYLINDERS
HEAVY DUTY – MEDIUM PRESSURE
THROUGH PISTON ROD – DOUBLE ACTING

NOMINAL BORE 100 MM

APPLICATION : Refer Product List no. 3.100

CONSTRUCTION : Double acting, pneumatically cushioned at both ends.

SIZE : Nominal bore 100 mm. Actual bore 106 mm H11

FLUIDS : Oil, air and inert gases

PRESSURE : 25 bar max. for oil
10 bar max. for air

FORCE DEVELOPED (approx) : 2000 kgf at 16 bar (oil)
830 kgf at 10 bar
415 kgf at 5 bar

CONSUMPTION Per 100 mm Single Stroke : Oil - 0.82 litres
Air - 4.9 litres of free air (for inlet pressure 5 bar)

MATERIALS :

Cylinder Barrel	:	Steel Tube, 30 kgf/mm^2
Piston Rod	:	High Tensile Steel, 60 kgf/mm^2
End Covers	:	Close-grained Cast Iron
Seals	:	Synthetic Oil-resistant Rubber

SURFACE FINISH : Bore of Cylinder Barrel : Ra 0.4 microns

SURFACE TREATMENT :

Bore of Cylinder Barrel	:	Hardchrome plating (15 microns)
Piston Rod	:	Hardchrome plating (15 microns)
End Covers and Cylinder Barrel outside	:	Stove-enamelling

DIMENSIONS : Refer Data Sheet no. PP 05043

Stroke mm	Cat. No.	Stock Code	Weight kg
25	PP 97401	S	9.2
50	PP 97402	S	9.7
75	PP 97403	S	10.2
100	PP 97404	S	10.7
150	PP 97405	S	11.7
200	PP 97406	S	12.6
250	PP 97407	S	13.6
300	PP 97408	S	14.5
350	PP 97409	S	15.5
400	PP 97410	S	16.4
450	PP 97411	S	17.4
500	PP 97412	S	18.3
600	PP 97413	N	20.0
700	PP 97414	N	21.0
800	PP 97415	N	22.0
1000	PP 97417	N	26.0

Non-standard stroke : Non-standard strokes can be supplied at extra cost.

SPARE SEAL KIT : Cat. No. SO 95016 (for all strokes). Refer cross section ZZ 05031.

NOTE : When cylinders are to be used for hydraulic applications and cushioning is required, the cat.no. should have suffix 'H' (i.e. PP 97406H). If cushioning is not required, the standard cylinder can be used with cushioning screw fully open.

EXAMPLE OF ORDERING SPECIFICATIONS : Power Cylinder, heavy duty, medium pressure, through piston rod, double acting, bore 100 mm, stroke 200 mm, cat. no. PP 97406

POWER CYLINDERS
HEAVY DUTY – MEDIUM PRESSURE
THROUGH PISTON ROD – DOUBLE ACTING

NOMINAL BORE 150 MM

APPLICATION : Refer Product List no. 3.100

CONSTRUCTION : Double acting, pneumatically cushioned at both ends.

SIZE : Nominal bore 100 mm. Actual bore 153 mm H11

FLUIDS : Oil, air and inert gases

PRESSURE : 16 bar max. for oil
10 bar max. for air

FORCE DEVELOPED (approx) : 2730 kgf at 16 bar (oil)
1750 kgf at 10 bar
875 kgf at 5 bar

CONSUMPTION Per 100 mm Single Stroke : Oil - 1.76 litres
Air - 10.6 litres of free air (for inlet pressure 5 bar)

MATERIALS :

Cylinder Barrel	:	Steel Tube, 30 kgf/mm^2
Piston Rod	:	High Tensile Steel, 60 kgf/mm^2
End Covers	:	Close-grained Cast Iron
Seals	:	Synthetic Oil-resistant Rubber

SURFACE FINISH : Bore of Cylinder Barrel : Ra 0.4 microns

SURFACE TREATMENT :

Bore of Cylinder Barrel	:	Hardchrome plating (15 microns)
Piston Rod	:	Hardchrome plating (15 microns)
End Covers and Cylinder Barrel outside	:	Stove-enamelling

DIMENSIONS : Refer Data Sheet no. PP 05043

Stroke mm	Cat. No.	Stock Code
25	PP 97451	S
50	PP 97452	S
75	PP 97453	S
100	PP 97454	S
150	PP 97455	S
200	PP 97456	S
250	PP 97457	S
300	PP 97458	S
350	PP 97466	S
400	PP 97459	S
450	PP 97467	S
500	PP 97460	S
600	PP 97461	N
700	PP 97469	N
800	PP 97462	N
1000	PP 97463	N

Non-standard stroke : Non-standard strokes can be supplied at extra cost.

SPARE SEAL KIT : Cat. No. SO 95017 (for all strokes). Refer cross section ZZ 05031.

NOTE : When cylinders are to be used for hydraulic applications and cushioning is required, the cat.no. should have suffix 'H' (i.e. PP 97406H). If cushioning is not required, the standard cylinder can be used with cushioning screw fully open.

EXAMPLE OF ORDERING SPECIFICATIONS : Power Cylinder, heavy duty, medium pressure, through piston rod, double acting, bore 150 mm, stroke 200 mm, cat. no. PP 97456

ORNCAL

POWER CYLINDERS
HEAVY DUTY – MEDIUM PRESSURE
THROUGH PISTON ROD – DOUBLE ACTING

NOMINAL BORE 250 MM

APPLICATION : Refer Product List no. 3.100

CONSTRUCTION : Double acting, pneumatically cushioned at both ends.

SIZE : Nominal bore 250 mm. Actual bore 252 mm H11

FLUIDS : Oil, air and inert gases

PRESSURE : 16 bar max. for oil
10 bar max. for air

FORCE DEVELOPED (approx) : 7680 kgf at 16 bar (oil)
4800 kgf at 10 bar
2400 kgf at 5 bar

CONSUMPTION Per 100 mm Single Stroke : Oil - 4.8 litres
Air - 29 litres of free air (for inlet pressure 5 bar)

MATERIALS :

Cylinder Barrel	:	Steel Tube, 30 kgf/mm^2
Piston Rod	:	High Tensile Steel, 60 kgf/mm^2
End Covers	:	Close-grained Cast Iron
Seals	:	Synthetic Oil-resistant Rubber

SURFACE FINISH : Bore of Cylinder Barrel : Ra 0.4 microns

SURFACE TREATMENT :

Bore of Cylinder Barrel	:	Hardchrome plating (15 microns)
Piston Rod	:	Hardchrome plating (15 microns)
End Covers and Cylinder Barrel outside	:	Stove-enamelling

DIMENSIONS : Refer Data Sheet no. PP 05043

Stroke mm	Cat. No.	Stock Code
25	PP 97501	S
50	PP 97502	S
75	PP 97503	S
100	PP 97504	S
150	PP 97505	S
200	PP 97506	S
250	PP 97507	S
300	PP 97508	S
350	PP 97509	S
400	PP 97510	S
450	PP 97511	S
500	PP 97512	S
600	PP 97514	N
700	PP 97515	N
800	PP 97516	N
1000	PP 97518	N

Non-standard stroke : Non-standard strokes can be supplied at extra cost.

SPARE SEAL KIT : Cat. No. SO 95018 (for all strokes). Refer cross section ZZ 05031.

EXAMPLE OF ORDERING SPECIFICATIONS : Power Cylinder, heavy duty, medium pressure, through piston rod, double acting, bore 250 mm, stroke 200 mm, cat. no. PP 97506

ORNCAL

POWER CYLINDERS
HEAVY DUTY – MEDIUM PRESSURE
TANDEM TYPE – DOUBLE ACTING

NOMINAL BORE 40 MM

APPLICATION	:	Refer Product List no. 3.100
CONSTRUCTION	:	Double acting, pneumatically cushioned at both ends.
SIZE	:	Nominal bore 40 mm. Actual bore 40 mm H11
FLUIDS	:	Oil, air and inert gases
PRESSURE	:	25 bar max. for oil (for 'non-shock' applications) 10 bar max. for air
FORCE DEVELOPED (approx)	:	580 kgf (OUT) and 530 kgf (IN) at 25 bar (oil) 230 kgf (OUT) and 210 kgf (IN) at 10 bar 115 kgf (OUT) and 105 kgf (IN) at 5 bar
CONSUMPTION Per 100 mm Single Stroke	:	Oil - 0.23 litres Air - 1.6 litres of free air (for inlet pressure 5 bar)
MATERIALS	:	Cylinder Barrel : Steel or Brass Tube Piston Rod : High Tensile Steel, 60 kgf/mm^2 End Covers : Close-grained Cast Iron Seals : Synthetic Oil-resistant Rubber
SURFACE FINISH	:	Bore of Cylinder Barrel : Ra 0.4 microns
SURFACE TREATMENT	:	Bore of Cylinder Barrel : Hardchrome plating (15 microns) (for Steel only) Piston Rod : Hardchrome plating (15 microns) End Covers and Cylinder Barrel outside : Stove-enamelling
DIMENSIONS	:	Refer Data Sheet no. PP 05124

Stroke mm	**Cat. No.**	Stock Code
25	PP 97101	S
50	PP 97102	S
75	PP 97103	S
100	PP 97104	S
150	PP 97105	S
200	PP 97106	S
250	PP 97107	S
300	PP 97108	S
350	PP 97109	S
400	PP 97110	S
450	PP 97111	S
500	PP 97112	S
550	PP 97113	S
600	PP 97114	N
700	PP 97115	N
800	PP 97116	N
900	PP 97117	N
1000	PP 97118	N

Non-standard stroke	:	Non-standard strokes can be supplied at extra cost.
SPARE SEAL KIT	:	Cat. No. SO 95019 (for all strokes)
EXAMPLE OF ORDERING SPECIFICATIONS	:	Power Cylinder, heavy duty, medium pressure, tandem type, double acting, bore 40 mm, stroke 200 mm, cat. no. PP 97106

POWER CYLINDERS
HEAVY DUTY – MEDIUM PRESSURE
TANDEM TYPE – DOUBLE ACTING

NOMINAL BORE 70 MM *

APPLICATION : Refer Product List no. 3.100
CONSTRUCTION : Double acting, pneumatically cushioned at both ends.
SIZE : Nominal bore 70 mm. Actual bore 70 mm H11
FLUIDS : Oil, air and inert gases
PRESSURE : 25 bar max. for oil
10 bar max. for air
FORCE DEVELOPED : 1847 kgf (OUT) and 1770 kgf (IN) at 25 bar (oil)
(approx) 739 kgf (OUT) and 708 kgf (IN) at 10 bar
369 kgf (OUT) and 354 kgf (IN) at 5 bar
CONSUMPTION : Oil - 0.74 litres
Per 100 mm Air - 4.4 litres of free air (for inlet pressure 5 bar)
Single Stroke
MATERIALS : Cylinder Barrel : Steel Tube, 30 kgf/mm^2
Piston Rod : High Tensile Steel, 60 kgf/mm^2
End Covers : Close-grained Cast Iron
Seals : Synthetic Oil-resistant Rubber
SURFACE FINISH : Bore of Cylinder Barrel : Ra 0.4 microns
SURFACE TREATMENT : Bore of Cylinder Barrel : Hardchrome plating (15 microns)
Piston Rod : Hardchrome plating (15 microns)
End Covers and Cylinder Barrel outside : Stove-enamelling
DIMENSIONS : Refer Data Sheet no. PP 05124

Stroke mm	Cat. No.	Stock Code
25	PP 97126	S
50	PP 97127	S
75	PP 97128	S
100	PP 97129	S
150	PP 97130	S
200	PP 97131	S
250	PP 97132	S
300	PP 97133	S
350	PP 97134	S
400	PP 97135	S
450	PP 97136	S
500	PP 97137	S
550	PP 97138	S
600	PP 97139	N
700	PP 97140	N
800	PP 97141	N
900	PP 97142	N
1000	PP 97143	N

Other strokes available on request

SPARE SEAL KIT : Cat. No. SO 95015 (for all strokes)

NOTE ***1)** These cylinders were earlier designated as 65 NB. All dimensions remain the same except for the size of the ports which have been increased from G 1/4 to G 3/8 to provide higher velocities.

2) When cylinders are to be used for hydraulic applications and cushioning is required, the cat.no. should have suffix 'H' (i.e. PP 97131H). If cushioning is not required, the standard cylinders can be used with cushioning screw fully open.

EXAMPLE OF ORDERING : Power Cylinder, heavy duty, medium pressure, tandem type,
SPECIFICATIONS double acting, bore 70 mm, stroke 200 mm, cat. no. PP 97131

POWER CYLINDERS
HEAVY DUTY – MEDIUM PRESSURE
TANDEM TYPE – DOUBLE ACTING

NOMINAL BORE 100 MM

APPLICATION	:	Refer Product List no. 3.100
CONSTRUCTION	:	Double acting, pneumatically cushioned at both ends.
SIZE	:	Nominal bore 100 mm. Actual bore 106 mm H11
FLUIDS	:	Oil, air and inert gases
PRESSURE	:	25 bar max. for oil (for 'non-shock' applications) 10 bar max. for air
FORCE DEVELOPED (approx)	:	4200 kgf (OUT) and 4000 kgf (IN) at 25 bar (oil) 1710 kgf (OUT) and 1660 kgf (IN) at 10 bar 855 kgf (OUT) and 830 kgf (IN) at 5 bar
CONSUMPTION Per 100 mm Single Stroke	:	Oil - 1.8 litres Air - 10.8 litres of free air (for inlet pressure 5 bar)
MATERIALS	:	Cylinder Barrel : Steel Tube, 30 kgf/mm^2 Piston Rod : High Tensile Steel, 60 kgf/mm^2 End Covers : Close-grained Cast Iron Seals : Synthetic Oil-resistant Rubber
SURFACE FINISH	:	Bore of Cylinder Barrel : Ra 0.4 microns
SURFACE TREATMENT	:	Bore of Cylinder Barrel : Hardchrome plating (15 microns) Piston Rod : Hardchrome plating (15 microns) End Covers and Cylinder Barrel outside : Stove-enamelling
DIMENSIONS	:	Refer Data Sheet no. PP 05124

Stroke mm	**Cat. No.**	Stock Code
25	PP 97226	S
50	PP 97227	S
75	PP 97228	S
100	PP 97229	S
150	PP 97230	S
200	PP 97231	S
250	PP 97232	S
300	PP 97233	S
350	PP 97234	S
400	PP 97235	S
450	PP 97236	S
500	PP 97237	S
550	PP 97238	S
600	PP 97239	N
700	PP 97240	N
800	PP 97241	N
900	PP 97242	N
1000	PP 97243	N

Non-standard stroke	:	Non-standard strokes can be supplied at extra cost.
SPARE SEAL KIT	:	Cat. No. SO 95021 (for all strokes)
EXAMPLE OF ORDERING SPECIFICATIONS	:	Power Cylinder, heavy duty, medium pressure, tandem type, double acting, bore 100 mm, stroke 200 mm, cat. no. PP 97231

POWER CYLINDERS
HEAVY DUTY – MEDIUM PRESSURE
TANDEM TYPE – DOUBLE ACTING

NOMINAL BORE 150 MM

APPLICATION	:	Refer Product List no. 3.100
CONSTRUCTION	:	Double acting, cushioned at both ends.
SIZE	:	Nominal bore 150 mm. Actual bore 153 mm H11
FLUIDS	:	Oil, air and inert gases
PRESSURE	:	16 bar max. for oil (for 'non-shock' applications) 10 bar max. for air
FORCE DEVELOPED (approx)	:	5680 kgf (OUT) and 5500 kgf (IN) at 16 bar (oil) 3580 kgf (OUT) and 3500 kgf (IN) at 10 bar 1790 kgf (OUT) and 1750 kgf (IN) at 5 bar
CONSUMPTION Per 100 mm Single Stroke	:	Oil - 3.68 litres Air - 22 litres of free air (for inlet pressure 5 bar)
MATERIALS	:	Cylinder Barrel : Steel Tube, 30 kgf/mm^2 Piston Rod : High Tensile Steel, 60 kgf/mm^2 End Covers : Close-grained Cast Iron Seals : Synthetic Oil-resistant Rubber
SURFACE FINISH	:	Bore of Cylinder Barrel : Ra 0.4 microns
SURFACE TREATMENT	:	Bore of Cylinder Barrel : Hardchrome plating (15 microns) Piston Rod : Hardchrome plating (15 microns) End Covers and Cylinder Barrel outside : Stove-enamelling
DIMENSIONS	:	Refer Data Sheet no. PP 05124

Stroke mm	**Cat. No.**	Stock Code
25	PP97766	S
50	PP 97767	S
75	PP 97768	S
100	PP 97769	S
150	PP 97770	S
200	PP 97771	S
250	PP 97772	S
300	PP 97773	S
350	PP 97774	S
400	PP 97775	S
450	PP 97776	S
500	PP 97777	S
550	PP 97778	S
600	PP 97779	N
700	PP 97780	N
800	PP 97781	N
900	PP 97782	N
1000	PP 97783	N

Non-standard stroke	:	Non-standard strokes can be supplied at extra cost.
SPARE SEAL KIT	:	Cat. No. SO 95022 (for all strokes)
EXAMPLE OF ORDERING SPECIFICATIONS	:	Power Cylinder, heavy duty, medium pressure, tandem type, double acting, bore 150 mm, stroke 200 mm, cat. no. PP 97771

POWER CYLINDERS
HEAVY DUTY – MEDIUM PRESSURE
TANDEM TYPE – DOUBLE ACTING

NOMINAL BORE 250 MM

APPLICATION	:	Refer Product List no. 3.100
CONSTRUCTION	:	Double acting, cushioned at both ends.
SIZE	:	Nominal bore 250 mm. Actual bore 252 mm H11
FLUIDS	:	Oil, air and inert gases
PRESSURE	:	16 bar max. for oil (for 'non-shock' applications) 10 bar max. for air
FORCE DEVELOPED (approx)	:	15680 kgf (OUT) and 15360 kgf (IN) at 25 bar (oil) 9800 kgf (OUT) and 9600 kgf (IN) at 10 bar 4900 kgf (OUT) and 4800 kgf (IN) at 5 bar
CONSUMPTION Per 100 mm Single Stroke	:	Oil - 10 litres Air - 60 litres of free air (for inlet pressure 5 bar)
MATERIALS	:	Cylinder Barrel : Steel Tube, 30 kgf/mm^2 Piston Rod : High Tensile Steel, 60 kgf/mm^2 End Covers : Close-grained Cast Iron Seals : Synthetic Oil-resistant Rubber
SURFACE FINISH	:	Bore of Cylinder Barrel : Ra 0.4 microns
SURFACE TREATMENT	:	Bore of Cylinder Barrel : Hardchrome plating (15 microns) Piston Rod : Hardchrome plating (15 microns) End Covers and Cylinder Barrel outside : Stove-enamelling
DIMENSIONS	:	Refer Data Sheet no. PP 05124

Stroke mm	**Cat. No.**	Stock Code
25	PP 97784	S
50	PP 97785	S
75	PP 97786	S
100	PP 97787	S
150	PP 97788	S
200	PP 97789	S
250	PP 97790	S
300	PP 97791	S
350	PP 97792	S
400	PP 97793	S
450	PP 97794	S
500	PP 97795	S
550	PP 97796	S
600	PP 97797	S
700	PP 97798	N
800	PP 97799	N
900	PP 97800	N
1000	PP 97801	N

Non-standard stroke	:	Non-standard strokes can be supplied at extra cost.
SPARE SEAL KIT	:	Cat. No. SO 95023 (for all strokes)
EXAMPLE OF ORDERING SPECIFICATIONS	:	Power Cylinder, heavy duty, medium pressure, tandem type, double acting, bore 250 mm, stroke 200 mm, cat. no. PP 97789

POWER CYLINDERS
HEAVY DUTY – MEDIUM PRESSURE
TANDEM TYPE – SINGLE ACTING

NOMINAL BORE 40 MM

APPLICATION : Refer Product List no. 3.100.

CONSTRUCTION : Single acting, spring return, non-cushioned.

SIZE : Nominal bore 40 mm. Actual bore 40 mm H11.

FLUIDS : Oil, air and inert gases.

PRESSURE : 10 bar max.

FORCE DEVELOPED : Cylinders spring returned to 'IN' position :

- Spring Return Force : 2.5 kgf in 'IN' position for 100 mm stroke cylinder. For other strokes and intermediate positions, force is higher. Contact factory for details.
- Push Force : 330 kgf at 10 bar
  165 kgf at 5 bar

CONSUMPTION : Per 100 mm Single stroke
Oil - 0.28 litres
Air - 1.6 litres of free air (for inlet pressure 5 bar).

MATERIALS :

Cylinder Barrel	: Steel or Brass Tube
Piston Rod	: High Tensile Steel, 60 kgf/mm^2
End Covers	: Close-grained Cast Iron
Seals	: Synthetic Oil-resistant Rubber

SURFACE FINISH : Bore of Cylinder Barrel : Ra 0.4 microns

SURFACE TREATMENT :

Piston Rod	: Hardchrome plating (15 microns)
End Covers and Cylinder Barrel outside	: Stove-enamelling

DIMENSIONS : Refer Data Sheet no. PP 05138

Stroke mm	Cat. No.	Stock Code
25	PP 97851	S
50	PP 97852	S
75	PP 97853	S
100	PP 97854	S
150	PP 97855	S

SPARE SEAL KIT : Cat. No. SO 95024 (for all strokes)

EXAMPLE OF ORDERING SPECIFICATIONS : Power Cylinder, heavy duty, medium pressure, tandem type, single acting, spring return to 'IN' position, bore 40 mm, stroke 50 mm, cat.no. PP 97852

POWER CYLINDERS
HEAVY DUTY – MEDIUM PRESSURE
TANDEM TYPE – SINGLE ACTING

NOMINAL BORE 70 MM *

APPLICATION : Refer Product List no. 3.100.

CONSTRUCTION : Single acting, spring return, non-cushioned.

SIZE : Nominal bore 70 mm. Actual bore 70 mm H11.

FLUIDS : Oil, air and inert gases.

PRESSURE : 10 bar max.

FORCE DEVELOPED : Cylinders spring returned to 'IN' position :

- Spring Return Force : 12 kgf in 'IN' position for 150 mm stroke cylinder. For other strokes and intermediate positions, force is higher. Contact factory for details.
- Push Force : 721 kgf at 10 bar
  351 kgf at 5 bar

CONSUMPTION : Oil - 0.74 litres
Per 100 mm Single stroke — Air - 4.4 litres of free air (for inlet pressure 5 bar).

MATERIALS :

Cylinder Barrel	: Steel Tube, 30 kgf/mm^2
Piston Rod	: High Tensile Steel, 60 kgf/mm^2
End Covers	: Close-grained Cast Iron
Seals	: Synthetic Oil-resistant Rubber

SURFACE FINISH : Bore of Cylinder Barrel : Ra 0.4 microns

SURFACE TREATMENT :

Bore of Cylinder Barrel	: Hardchrome plating (15 microns)
Piston Rod	: Hardchrome plating (15 microns)
End Covers and Cylinder Barrel outside	: Stove-enamelling

DIMENSIONS : Refer Data Sheet no. PP 05138

Stroke mm	Cat. No.	Stock Code
25	PP 97841	S
50	PP 97842	S
75	PP 97843	S
100	PP 97844	S
150	PP 97845	S

SPARE SEAL KIT : Cat. No. SO 95025 (for all strokes)

NOTE * : These cylinders were earlier designated as 65 NB. All dimensions Remain the same except for the size of the ports which have been Increased from G 1/4 to G 3/8 to provide higher velocities.

EXAMPLE OF ORDERING SPECIFICATIONS : Power Cylinder, heavy duty, medium pressure, tandem type, single acting, spring return to 'IN' position, bore 70 mm, stroke 50 mm, cat.no. PP 97842

POWER CYLINDERS
HEAVY DUTY – MEDIUM PRESSURE
TANDEM TYPE – SINGLE ACTING

NOMINAL BORE 100 MM

APPLICATION : Refer Product List no. 3.100.

CONSTRUCTION : Single acting, spring return, non-cushioned.

SIZE : Nominal bore 100 mm. Actual bore 106 mm H11.

FLUIDS : Oil, air and inert gases.

PRESSURE : 10 bar max.

FORCE DEVELOPED : Cylinders spring returned to 'IN' position :

- Spring Return Force : 22 kgf in 'IN' position for 200 mm stroke cylinder. For other strokes and intermediate positions, force is higher. Contact factory for details.
- Push Force : 1660 kgf at 10 bar
  805 kgf at 5 bar

CONSUMPTION : Per 100 mm Single stroke
Oil - 1.8 litres
Air - 10.8 litres of free air (for inlet pressure 5 bar).

MATERIALS :

Cylinder Barrel	: Steel Tube, 30 kgf/mm^2
Piston Rod	: High Tensile Steel, 60 kgf/mm^2
End Covers	: Close-grained Cast Iron
Seals	: Synthetic Oil-resistant Rubber

SURFACE FINISH : Bore of Cylinder Barrel : Ra 0.4 microns

SURFACE TREATMENT :

Bore of Cylinder Barrel	: Hardchrome plating (15 microns)
Piston Rod	: Hardchrome plating (15 microns)
End Covers and Cylinder Barrel outside	: Stove-enamelling

DIMENSIONS : Refer Data Sheet no. PP 05138

Stroke mm	Cat. No.	Stock Code
25	PP 96931	S
50	PP 96932	S
100	PP 96933	S
150	PP 96934	S
200	PP 96935	S

SPARE SEAL KIT : Cat. No. SO 95026 (for all strokes)

EXAMPLE OF ORDERING SPECIFICATIONS : Power Cylinder, heavy duty, medium pressure, tandem type, single acting, spring return to 'IN' position, bore 100 mm, stroke 50 mm, cat.no. PP 96932

POWER CYLINDERS
HEAVY DUTY – MEDIUM PRESSURE
TANDEM TYPE – SINGLE ACTING

NOMINAL BORE 150 MM

APPLICATION : Refer Product List no. 3.100.

CONSTRUCTION : Single acting, spring return, non-cushioned.

SIZE : Nominal bore 150 mm. Actual bore 153 mm H11.

FLUIDS : Oil, air and inert gases.

PRESSURE : 10 bar max.

FORCE DEVELOPED : Cylinders spring returned to 'IN' position :

- Spring Return Force : 41 kgf in 'IN' position for 250 mm stroke cylinder. For other strokes and intermediate positions, force is higher. Contact factory for details.
- Push Force : 3490 kgf at 10 bar
  1700 kgf at 5 bar

CONSUMPTION : Per 100 mm Single stroke
Oil - 3.68 litres
Air - 22 litres of free air (for inlet pressure 5 bar).

MATERIALS :

Cylinder Barrel	: Steel Tube, 30 kgf/mm^2
Piston Rod	: High Tensile Steel, 60 kgf/mm^2
End Covers	: Close-grained Cast Iron
Seals	: Synthetic Oil-resistant Rubber

SURFACE FINISH : Bore of Cylinder Barrel : Ra 0.4 microns

SURFACE TREATMENT :

Bore of Cylinder Barrel	: Hardchrome plating (15 microns)
Piston Rod	: Hardchrome plating (15 microns)
End Covers and Cylinder Barrel outside	: Stove-enamelling

DIMENSIONS : Refer Data Sheet no. PP 05138

Stroke mm	Cat. No.	Stock Code
25	PP 96969	S
50	PP 96970	S
100	PP 96972	S
150	PP 96973	S
200	PP 96974	S
250	PP 96975	S

SPARE SEAL KIT : Cat. No. SO 95027 (for all strokes)

EXAMPLE OF ORDERING SPECIFICATIONS : Power Cylinder, heavy duty, medium pressure, tandem type, single acting, spring return to 'IN' position, bore 150 mm, stroke 50 mm, cat.no. PP 96970

POWER CYLINDERS
HEAVY DUTY – MEDIUM PRESSURE
TANDEM TYPE – SINGLE ACTING

NOMINAL BORE 250 MM

APPLICATION : Refer Product List no. 3.100.

CONSTRUCTION : Single acting, spring return, non-cushioned.

SIZE : Nominal bore 250 mm. Actual bore 252 mm H11.

FLUIDS : Oil, air and inert gases.

PRESSURE : 10 bar max.

FORCE DEVELOPED : Cylinders spring returned to 'IN' position :

- Spring Return Force : 48 kgf in 'IN' position for 100 mm stroke cylinder. For other strokes and intermediate positions, force is higher. Contact factory for details.
- Push Force : 9735 kgf at 10 bar
  4835 kgf at 5 bar

CONSUMPTION : Per 100 mm Single stroke
Oil - 10 litres
Air - 60 litres of free air (for inlet pressure 5 bar).

MATERIALS :

Cylinder Barrel	: Steel Tube, 30 kgf/mm^2
Piston Rod	: High Tensile Steel, 60 kgf/mm^2
End Covers	: Close-grained Cast Iron
Seals	: Synthetic Oil-resistant Rubber

SURFACE FINISH : Bore of Cylinder Barrel : Ra 0.4 microns

SURFACE TREATMENT :

Bore of Cylinder Barrel	: Hardchrome plating (15 microns)
Piston Rod	: Hardchrome plating (15 microns)
End Covers and Cylinder Barrel outside	: Stove-enamelling

DIMENSIONS : Refer Data Sheet no. PP 05138

Stroke mm	Cat. No.	Stock Code
25	PP 96921	S
50	PP 96922	S
100	PP 96923	S
150	PP 96924	S
200	PP 96925	S
250	PP 96926	S

SPARE SEAL KIT : Cat. No. SO 95028 (for all strokes)

EXAMPLE OF ORDERING SPECIFICATIONS : Power Cylinder, heavy duty, medium pressure, tandem type, single acting, spring return to 'IN' position, bore 250 mm, stroke 50 mm, cat.no. PP 96922

POWER CYLINDERS
HEAVY DUTY – MEDIUM PRESSURE
ADJUSTABLE STROKE – DOUBLE ACTING

STROKE ADJUSTABLE IN 'IN'POSITION

GENERAL INFORMATION

STROKE ADJUSTMENT

These cylinders are provided with an internal stop piston the position of which can be adjusted by means of a screw at the rear end of the cylinder.

The stroke is adjustable by limiting the return movement of the piston by adjusting the position of the stop piston.

FLUID CONSUMPTION

The fluid supply to the rear end of the cylinder takes place through a bore in the adjustment screw and the stop piston whereby only the 'active' volume of the cylinder is pressurized. In case the cylinder is operated on compressed air, the air consumption is limited along with reduction of stroke which means that the cylinder consumes only the same amount of air as a standard cylinder of fixed stroke equal to the set stroke of the adjustable stroke cylinder. In addition to saving in air consumption the cylinder will respond as fast as a normal fixed stroke cylinder as the time for pressurizing and exhausting any idle volume behind the piston is saved.

CUSHIONING

The cylinders are cushioned at both ends. The cushioning at the front end is adjustable from outside as for standard cylinders whereas the cushioning for the rear end (return stroke) is adjustable by a cushioning adjustment screw fitted in the stop piston. This cushioning screw is pre-set at the factory but the setting can be adjusted by removing the rear end cover of the cylinder along with the stop piston by which the cushioning screw becomes accessible.

POWER CYLINDERS
HEAVY DUTY – MEDIUM PRESSURE
ADJUSTABLE STROKE – DOUBLE ACTING

STROKE ADJUSTABLE IN 'IN'POSITION

NOMINAL BORE 100 MM

APPLICATION : Refer Product List no. 3.400

CONSTRUCTION, SIZE FLUIDS, PRESSURE, FORCE, CONSUMPTION, MATERIALS, SURFACE FINISH, etc. : Refer Product List no. 3.107 for standard cylinders.

DIMENSIONS : Refer Data Sheet no. PP 05146

SPECIFICATIONS APPLICABLE TO BASIC CYLINDERS (WITH STROKE ADJUSTMENT '0')

Total Stroke mm	Basic Cat. No.	Stock Code
25	PP 97627	S
50	PP 97628	S
75	PP 97629	S
100	PP 97612	S
150	PP 97613	S
200	PP 97614	S
250	PP 97615	S
300	PP 97616	S
350	PP 97630	S
400	PP 97617	S
450	PP 97631	S
500	PP 97618	S

SPECIFICATIONS FOR STROKE ADJUSTMENT ;

Stroke Adjustment From Rear End mm	Suffix to Cat. No.
25 max	A
50 max	B
100 max	C
150 max	D
200 max	E
300 max	F
400 max	G
500 max	H

SPARE SEAL KIT : Cat.no. SO 95031 (for all strokes). Refer cross section ZZ 05025.

EXAMPLE OF ORDERING SPECIFICATIONS : Power Cylinder, heavy duty, medium pressure, double acting, bore 100 mm, stroke adjustable in 'IN' position from 200 mm to 300 mm, Cat.no. PP 97616C

POWER CYLINDERS
HEAVY DUTY – MEDIUM PRESSURE
ADJUSTABLE STROKE – DOUBLE ACTING

STROKE ADJUSTABLE IN 'IN'POSITION

NOMINAL BORE 150 MM

APPLICATION : Refer Product List no. 3.400

CONSTRUCTION, SIZE FLUIDS, PRESSURE, FORCE, CONSUMPTION, MATERIALS, SURFACE FINISH, etc. : Refer Product List no. 3.109 for standard cylinders.

DIMENSIONS : Refer Data Sheet no. PP 05146

SPECIFICATIONS APPLICABLE TO BASIC CYLINDERS (WITH STROKE ADJUSTMENT '0')

Total Stroke mm	Basic Cat. No.	Stock Code
25	PP 97921	S
50	PP 97922	S
75	PP 97923	S
100	PP 97924	S
150	PP 97925	S
200	PP 97926	S
250	PP 97927	S
300	PP 97928	S
350	PP 97929	S
400	PP 97930	S
450	PP 97931	S
500	PP 97932	S

SPECIFICATIONS FOR STROKE ADJUSTMENT ;

Stroke Adjustment From Rear End mm	Suffix to Cat. No.
25 max	A
50 max	B
100 max	C
150 max	D
200 max	E
300 max	F
400 max	G
500 max	H

SPARE SEAL KIT : Cat.no. SO 95032 (for all strokes). Refer cross section ZZ 05025.

EXAMPLE OF ORDERING SPECIFICATIONS : Power Cylinder, heavy duty, medium pressure, double acting, bore 100 mm, stroke adjustable in 'IN' position from 200 mm to 300 mm, Cat.no. PP 97932E

POWER CYLINDERS
HEAVY DUTY – MEDIUM PRESSURE
MOUNTING ATTACHMENTS

FOOT MOUNTING BRACKETS

APPLICATION : The foot mounting brackets may be used when the cylinder is to be bolted to a base plate or other plain surface. They are supplied in sets of two and are to be fitted on the cylinder by removing the nuts of the two lower tie rods, inserting the brackets and tightening the nuts again.

It is recommended to fit dowel pins for rigid location of the brackets on the mounting surface.

MATERIAL : Steel, 40 kgf/mm^2

SURFACE TREATMENT : Stove-enamelling

DIMENSIONS : Refer data sheet no. PP 05010

Nominal Bore of Power Cylinder mm	Cat. No.	Stock Code	Weight kg
25	PP 70034	K	0.02 per set
40	PP 70007	K	0.1 per set
70	PP 70008	K	0.3 per set
100	PP 70009	K	0.8 per set
150	PP 70010	K	1.4 per set
250	PP 70011	K	4.7 per set
375	PP 70036	S	

EXAMPLE OF ORDERING SPECIFICATIONS : Foot Mounting Brackets, for heavy duty, medium pressure cylinder of bore 25 mm, cat.no. PP 70034, set of two

POWER CYLINDERS
HEAVY DUTY – MEDIUM PRESSURE
MOUNTING ATTACHMENTS

FLANGE MOUNTING PLATES AND FLATS

APPLICATION : Flange mounting plates or flats are designed for fitting the cylinder at the front or rear on a surface perpendicular to the cylinder axis. The plates and flats are precision machined to ensure correct alignment. They are provided with tapped holes for receiving the four tie rods of the cylinder, and they are fitted by removing the nuts and screwing the tie rods directly into these tapped holes.

The plates or flats can be fitted on the front or rear end of the cylinder.

Flange Mounting Plates are supplied for cylinders upto 70 mm bore and Flange Mounting Flats (in sets of two) for larger bores.

MATERIAL : Steel, 40 kgf/mm^2

SURFACE TREATMENT : Stove-enamelling

DIMENSIONS : Refer data sheet no. PP 05012

Nominal Bore of Power Cylinder mm	Plate or Flats	Cat. No.	Stock Code	Weight kg
25	Plate	PP 70033	K	0.1 each
40	Plate	PP 70002	K	0.3 each
70	Plate	PP 70003	K	0.9 each
100	Flats	PP 70004	K	1.2 per set
150	Flats	PP 70005	K	3.5 per set
250	Flats	PP 70006	K	15.0 per set
375	Flats	PP 70037	S	

EXAMPLE OF ORDERING SPECIFICATIONS : Flange Mounting Flats, for heavy duty, medium pressure cylinders of bore 100 mm, set of two, cat.no. PP 70004

POWER CYLINDERS
HEAVY DUTY – MEDIUM PRESSURE
MOUNTING ATTACHMENTS

PIVOT MOUNTING PLATES

APPLICATION : The pivot mounting plates are used when a hinge type mounting of the cylinder is called for. They are supplied in sets of two and are to be fitted on the cylinder by removing the nuts of the four tie rods, inserting the plates and tightening the nuts again.

They can be fitted on the rear end for all cylinders, and also on the front end for cylinders of 100 mm bore upwards.

MATERIAL : Cast Iron / Aluminium

SURFACE TREATMENT : Stove-enamelling

DIMENSIONS : Refer data sheet no. PP 05010

Nominal Bore of Power Cylinder mm	Cat. No.	Stock Code	Weight kg
25	PP 80134	K	0.02 per set
40	PP 80109	K	0.12 per set
70	PP 80019	K	0.4 per set
100	PP 80018	K	0.9 per set
150	PP 80017	K	1.6 per set
250	PP 80079	K	6.8 per set
375	PP 80130	S	

EXAMPLE OF ORDERING SPECIFICATIONS : Pivot Mounting Plates, for heavy duty, medium pressure cylinder of bore 150 mm, cat. no. PP 80017, set of two

PIVOT MOUNTING BRACKETS

APPLICATION : The pivot mounting brackets can be used in conjunction with the pivot mounting plates mentioned above for fitting the cylinder on a wall or plain surface perpendicular to the cylinder to perform an angular movement of 20^0 approx.

MATERIAL : Cast Iron

SURFACE TREATMENT : Stove-enamelling

DIMENSIONS : Refer data sheet no. PP 05011

Nominal Bore of Power Cylinder mm	Cat.No.	Stock Code	Weight kg
25	PP 80144	K	0.16 each
40	PP 80089	K	0.43 each
70	PP 80090	K	1.1 each
100	PP 80091	K	1.9 each
150	PP 80092	K	3.7 each
250	PP 80093	S	8.5 each
375	PP 80131	S	

EXAMPLE OF ORDERING SPECIFICATIONS : Pivot Mounting Bracket, for heavy duty, medium pressure cylinder of bore 150 mm, cat.no. PP 80092

POWER CYLINDERS
HEAVY DUTY – MEDIUM PRESSURE
MOUNTING ATTACHMENTS

INTERMEDIATE TRUNNION MOUNTINGS

APPLICATION : The intermediate trunnion mountings are recommended in application demanding an angular movement of the cylinder with the pivot centre between the two end covers. The mountings are clamped around the cylinder on the tie rods by means of twelve socket head high tensile screws to ensure positive location. They can be fitted in any position between the end covers.

MATERIAL : Malleable Cast Iron

SURFACE TREATMENT : Stove-enamelling

DIMENSIONS : Refer data sheet no. PP 05013

Nominal Bore of Power Cylinder mm	Cat. No.	Stock Code	Weight kg
25	PP 90063	K	0.34
40	PP 90010	K	1.1
70	PP 90011	K	3.1
100	PP 90012	K	6.0
150	PP 90013	K	9.3
250	PP 90014	K	30.0
375	PP 90066	S	

EXAMPLE OF ORDERING SPECIFICATIONS : Intermediate Trunnion Mounting, for heavy duty, medium pressure cylinder of bore 40 mm, cat. no. PP 90010

BRACKETS FOR INTERMEDIATE TRUNNION MOUNTINGS

APPLICATION : These brackets are to be used in conjunction with the intermediate trunnion mountings mentioned above. They are provided with holes for bolting to any even surface.

MATERIAL : Cast Iron, grade 25 (IS:210)

SURFACE TREATMENT : Stove-enamelling

DIMENSIONS : Refer data sheet no. PP 05013

Nominal Bore of Power Cylinder mm	Cat.No.	Stock Code	Weight kg
25	PP 80137	K	0.38 per set
40	PP 80101	K	0.9 per set
70	PP 80102	K	2.8 per set
100	PP 80103	K	4.4 per set
150	PP 80104	K	8.0 per set
250	PP 80105	S	26.0 per set
375	PP 80136	S	

EXAMPLE OF ORDERING SPECIFICATIONS : Brackets for Intermediate Trunnion Mounting for heavy duty, medium pressure cylinder of bore 40 mm, cat.no. PP 80101, set of two

POWER CYLINDERS
HEAVY DUTY – MEDIUM PRESSURE - DOUBLE ACTING

NOMINAL BORE 50 MM

(Dimensions as per IS:10143 and ISO:6431)

APPLICATION : Refer Product List no. 1.402

CONSTRUCTION : Double acting, pneumatically cushioned at both ends.

SIZE : Nominal bore 50 mm. Actual bore 50 mm H11

FLUIDS : Oil, air and inert gases

PRESSURE : 25 bar max. for oil (for 'non-shock' application)
10 bar max. for air

FORCE DEVELOPED (approx) : 485 kgf (OUT) and 405 kgf (IN) at 25 bar (oil)
196 kgf (OUT) and 164 kgf (IN) at 10 bar
98 kgf (OUT) and 82 kgf (IN) at 5 bar

CONSUMPTION Per 100 mm Single Stroke : Oil - 0.2 litres
Air - 1.2 litres of free air (for inlet pressure 5 bar)

MATERIALS :

Cylinder Barrel	:	Steel or Brass Tube
Piston Rod	:	High Tensile Steel, 60 kgf/mm^2
End Covers	:	Close-grained Cast Iron
Seals	:	Synthetic Oil-resistant Rubber

SURFACE FINISH :

Bore of Cylinder Barrel	:	Ra 0.4 microns

SURFACE TREATMENT :

Bore of Cylinder Barrel	:	Hardchrome plating (15 microns)
Piston Rod	:	Hardchrome plating (15 microns)
End Covers and Cylinder Barrel outside	:	Stove-enamelling

DIMENSIONS : Refer Data Sheet no. MD 05001

Stroke mm	Cat. No.	Stock Code
25	MD 29009	S
50	MD 29013	S
* 75	MD 29015	S
80	MD 29016	S
100	MD 29017	S
125	MD 29018	S
* 150	MD 29010	S
160	MD 29020	S
200	MD 29021	S
250	MD 29022	S
* 300	MD 29023	S
320	MD 29024	S
400	MD 29026	S
500	MD 29028	S
600	MD 29030	N
800	MD 29035	N
900	MD 29037	N
1000	MD 29039	N
1200	MD 29043	N

Strokes marked * are non-standard as per IS:10411
Other strokes available on request

SPARE SEAL KIT : Cat. No. MD 29090 (for all strokes)

NOTE : When cylinders are to be used for hydraulic applications and cushioning is required, the cat.no. should have suffix 'H' (i.e. MD 29021H). If cushioning is not required, the standard cylinders can be used with cushioning screw fully open.

EXAMPLE OF ORDERING SPECIFICATIONS : Power Cylinder, heavy duty, medium pressure, double acting, bore 50 mm, stroke 200 mm, cat. no. MD 29021

ORNCAL

POWER CYLINDERS
HEAVY DUTY – MEDIUM PRESSURE - DOUBLE ACTING

NOMINAL BORE 200 MM
(Dimensions as per IS:10143 and ISO:6431)

APPLICATION	:	Refer Product List no. 1.402
CONSTRUCTION	:	Double acting, pneumatically cushioned at both ends.
SIZE	:	Nominal bore 200 mm. Actual bore 208.5 mm H11
FLUIDS	:	Oil, air and inert gases
PRESSURE	:	16 bar max. for oil (for 'non-shock' application) 10 bar max. for air
FORCE DEVELOPED (approx)	:	5400 kgf (OUT) and 5150 kgf (IN) at 16 bar (oil) 3360 kgf (OUT) and 3200 kgf (IN) at 10 bar 1680 kgf (OUT) and 1600 kgf (IN) at 5 bar
CONSUMPTION Per 100 mm Single Stroke	:	Oil - 4.4 litres Air - 26 litres of free air (for inlet pressure 5 bar)
MATERIALS	:	Cylinder Barrel : Steel Tube, 30 kgf/mm^2 Piston Rod : High Tensile Steel, 60 kgf/mm^2 End Covers : Close-grained Cast Iron Seals : Synthetic Oil-resistant Rubber
SURFACE FINISH	:	Bore of Cylinder Barrel : Ra 0.4 microns
SURFACE TREATMENT	:	Bore of Cylinder Barrel : Hardchrome plating (15 microns) Piston Rod : Hardchrome plating (15 microns) End Covers and Cylinder Barrel outside : Stove-enamelling
DIMENSIONS	:	Refer Data Sheet no. MD 05001

Stroke mm	Cat. No.	Stock Code
25	MD 36009	S
50	MD 36013	S
* 75	MD 36015	S
80	MD 36016	S
100	MD 36017	S
125	MD 36018	S
* 150	MD 36019	S
160	MD 36020	S
200	MD 36021	S
250	MD 36022	S
* 300	MD 36023	S
320	MD 36024	S
400	MD 36026	S
500	MD 36028	S
600	MD 36030	N
800	MD 36035	N
900	MD 36037	N
1000	MD 36039	N
1200	MD 36043	N

Strokes marked * are non-standard as per IS:10411
Other strokes available on request

SPARE SEAL KIT : Cat. No. MD 36090 (for all strokes).Refer cross section ZZ 05024.

NOTE : When cylinders are to be used for hydraulic applications and cushioning is required, the cat.no. should have suffix 'H' (i.e. MD 36021H). If cushioning is not required, the standard cylinders can be used with cushioning screw fully open.

EXAMPLE OF ORDERING SPECIFICATIONS : Power Cylinder, heavy duty, medium pressure, double acting, bore 200 mm, stroke 200 mm, cat. no. MD 36021

ORNCAL

POWER CYLINDERS
HEAVY DUTY – MEDIUM PRESSURE - DOUBLE ACTING

NOMINAL BORE 250 MM
(Dimensions as per IS:10143 and ISO:6431)

APPLICATION : Refer Product List no. 1.402

CONSTRUCTION : Double acting, pneumatically cushioned at both ends.

SIZE : Nominal bore 250 mm. Actual bore 261 mm H11

FLUIDS : Oil, air and inert gases

PRESSURE : 16 bar max. for oil (for 'non-shock' application)
10 bar max. for air

FORCE DEVELOPED (approx) : 8500 kgf (OUT) and 8200 kgf (IN) at 16 bar (oil)
5300 kgf (OUT) and 5100 kgf (IN) at 10 bar
2650 kgf (OUT) and 2550 kgf (IN) at 5 bar

CONSUMPTION Per 100 mm Single Stroke : Oil - 5.3 litres
Air - 32 litres of free air (for inlet pressure 5 bar)

MATERIALS :

Cylinder Barrel	:	Steel Tube, 30 kgf/mm^2
Piston Rod	:	High Tensile Steel, 60 kgf/mm^2
End Covers	:	Close-grained Cast Iron
Seals	:	Synthetic Oil-resistant Rubber

SURFACE FINISH :

Bore of Cylinder Barrel	:	Ra 0.4 microns

SURFACE TREATMENT :

Bore of Cylinder Barrel	:	Hardchrome plating (15 microns)
Piston Rod	:	Hardchrome plating (15 microns)
End Covers and Cylinder Barrel outside	:	Stove-enamelling

DIMENSIONS : Refer Data Sheet no. MD 05001

Stroke mm	Cat. No.	Stock Code
25	MD 37009	S
50	MD 37013	S
* 75	MD 37015	S
80	MD 37016	S
100	MD 37017	S
125	MD 37018	S
* 150	MD 37019	S
160	MD 37020	S
200	MD 37021	S
250	MD 37022	S
* 300	MD 37023	S
320	MD 37024	S
400	MD 37026	S
500	MD 37028	S
600	MD 37030	N
800	MD 37035	N
900	MD 37037	N
1000	MD 37039	N
1200	MD 37043	N

Strokes marked * are non-standard as per IS:10411
Other strokes available on request

SPARE SEAL KIT : Cat. No. MD 37090 (for all strokes). Refer cross section ZZ 05024.

NOTE : When cylinders are to be used for hydraulic applications and cushioning is required, the cat.no. should have suffix 'H' (i.e. MD 37021H). If cushioning is not required, the standard cylinders can be used with cushioning screw fully open.

EXAMPLE OF ORDERING SPECIFICATIONS : Power Cylinder, heavy duty, medium pressure, double acting, bore 250 mm, stroke 200 mm, cat. no. MD 37021

HEAVY DUTY – MEDIUM PRESSURE
THROUGH PISTON ROD – DOUBLE ACTING

NOMINAL BORE 50 MM

(Dimensions as per IS:10143 and ISO:6431)

APPLICATION : Refer Product List no. 1.402

CONSTRUCTION : Double acting, pneumatically cushioned at both ends

SIZE : Nominal bore 50 mm. Actual bore 50 mm H11

FLUIDS : Oil, air and inert gases

PRESSURE : 25 bar max for oil (for 'non-shock' applications).
10 bar max. for air

FORCE DEVELOPED (approx) : 410 kgf at 10 bar (oil)
164 kgf at 10 bar
82 kgf at 5 bar

CONSUMPTION Per 100 mm Single Stroke : Oil - 0.17 litres
Air - 1.02 litres of free air (for inlet pressure 5 bar)

MATERIALS :

Cylinder Barrel	:	Steel or Brass Tube
Piston Rod	:	High Tensile Steel, 60 kgf/mm^2
End Covers	:	Close-grained Cast Iron
Seals	:	Synthetic Oil-resistant Rubber

SURFACE FINISH : Bore of Cylinder Barrel : Ra 0.4 microns

SURFACE TREATMENT :

Bore of Cylinder Barrel	:	Hardchrome plating (15 microns) (for steel only)
Piston Rod	:	Hardchrome plating (15 microns)
End Covers and Cylinder Barrel outside	:	Stove-enamelling

DIMENSIONS : Refer Data Sheet no. MR 05001

Stroke mm	Cat. No.	Stock Code
25	MR 29009	S
50	MR 29013	S
* 75	MR 29015	S
80	MR 29016	S
100	MR 29017	S
125	MR 29018	S
* 150	MR 29010	S
160	MR 29020	S
200	MR 29021	S
250	MR 29022	S
* 300	MR 29023	S
320	MR 29024	S
400	MR 29026	S
500	MR 29028	S
600	MR 29030	N
800	MR 29035	N
900	MR 29037	N
1000	MR 29039	N
1200	MR 29043	N

Strokes marked * are non-standard as per IS:10141

Other strokes available on request

SPARE SEAL KIT : Cat. No. MR 29090(for all strokes).Refer cross section ZZ 05030.

NOTE : When cylinders are to be used for hydraulic applications and cushioning is required, the cat.no. should have suffix 'H' (i.e. MR 29021H). If cushioning is not required, the standard cylinder can be used with cushioning screw fully open.

EXAMPLE OF ORDERING SPECIFICATIONS : Power Cylinder, heavy duty, medium pressure, through piston rod, double acting, bore 50 mm, stroke 200 mm, cat. no. MR 29021

POWER CYLINDERS
HEAVY DUTY – MEDIUM PRESSURE
THROUGH PISTON ROD – DOUBLE ACTING

NOMINAL BORE 200 MM

(Dimensions as per IS:10143 and ISO:6431)

APPLICATION : Refer Product List no. 1.402

CONSTRUCTION : Double acting, pneumatically cushioned at both ends

SIZE : Nominal bore 200 mm. Actual bore 208.5 mm H11

FLUIDS : Oil, air and inert gases

PRESSURE : 16 bar max for oil (for 'non-shock' applications).
10 bar max. for air

FORCE DEVELOPED (approx) : 5120 kgf at 16 bar (oil)
3200 kgf at 10 bar
1600 kgf at 5 bar

CONSUMPTION Per 100 mm Single Stroke : Oil - 3.25 litres
Air - 19.5 litres of free air (for inlet pressure 5 bar)

MATERIALS :

Cylinder Barrel	:	Steel Tube, 30 kgf/mm^2
Piston Rod	:	High Tensile Steel, 60 kgf/mm^2
End Covers	:	Close-grained Cast Iron
Seals	:	Synthetic Oil-resistant Rubber

SURFACE FINISH : Bore of Cylinder Barrel : Ra 0.4 microns

SURFACE TREATMENT :

Bore of Cylinder Barrel	:	Hardchrome plating (15 microns)
Piston Rod	:	Hardchrome plating (15 microns)
End Covers and Cylinder Barrel outside	:	Stove-enamelling

DIMENSIONS : Refer Data Sheet no. MR 05001

Stroke mm	Cat. No.	Stock Code
25	MR 36009	S
50	MR 36013	S
* 75	MR 36015	S
80	MR 36016	S
100	MR 36017	S
125	MR 36018	S
* 150	MR 36020	S
160	MR 36020	S
200	MR 36021	S
250	MR 36022	S
* 300	MR 36023	S
320	MR 36024	S
400	MR 36026	S
500	MR 36028	S
600	MR 36030	N
800	MR 36035	N
900	MR 36037	N
1000	MR 36039	N
1200	MR 36043	N

Strokes marked * are non-standard as per IS:10141
Other strokes available on request

SPARE SEAL KIT : Cat. No. MR 36090(for all strokes). Refer cross section ZZ 05030.

NOTE : When cylinders are to be used for hydraulic applications and cushioning is required, the cat.no. should have suffix 'H' (i.e. MR 36021H). If cushioning is not required, the standard cylinder can be used with cushioning screw fully open.

EXAMPLE OF ORDERING SPECIFICATIONS : Power Cylinder, heavy duty, medium pressure, through piston rod, double acting, bore 200 mm, stroke 200 mm, cat. no. MR 36021

POWER CYLINDERS
HEAVY DUTY – MEDIUM PRESSURE
THROUGH PISTON ROD – DOUBLE ACTING

NOMINAL BORE 250 MM

(Dimensions as per IS: 10143 and ISO: 6431)

APPLICATION : Refer Product List no. 1.402
CONSTRUCTION : Double acting, pneumatically cushioned at both ends
SIZE : Nominal bore 250 mm. Actual bore 261 mm H11
FLUIDS : Oil, air and inert gases
PRESSURE : 16 bar max for oil (for 'non-shock' applications).
10 bar max. for air
FORCE DEVELOPED : 8160 kgf at 16 bar (oil)
(approx) 5100 kgf at 10 bar
2550 kgf at 5 bar
CONSUMPTION : Oil - 5.15 litres
Per 100 mm Air - 31 litres of free air (for inlet pressure 5 bar)
Single Stroke
MATERIALS : Cylinder Barrel : Steel Tube, 30 KGF/MM^2
Piston Rod : High Tensile Steel, 60 kgf/mm^2
End Covers : Close-grained Cast Iron
Seals : Synthetic Oil-resistant Rubber
SURFACE FINISH : Bore of Cylinder Barrel : Ra 0.4 microns
SURFACE TREATMENT : Bore of Cylinder Barrel : Hardchrome plating (15 microns)
Piston Rod : Hardchrome plating (15 microns)
End Covers and Cylinder Barrel outside : Stove-enamelling
DIMENSIONS : Refer Data Sheet no. MR 05001

Stroke mm	Cat. No.	Stock Code
25	MR 37009	S
50	MR 37013	S
* 75	MR 37015	S
80	MR 37016	S
100	MR 37017	S
125	MR 37018	S
* 150	MR 37020	S
160	MR 37020	S
200	MR 37021	S
250	MR 37022	S
* 300	MR 37023	S
320	MR 37024	S
400	MR 37026	S
500	MR 37028	S
600	MR 37030	N
800	MR 37035	N
900	MR 37037	N
1000	MR 37039	N
1200	MR 37043	N

Strokes marked * are non-standard as per IS:10141
Other strokes available on request

SPARE SEAL KIT : Cat. No. MR 37090(for all strokes)
NOTE : When cylinders are to be used for hydraulic applications and cushioning is required, the cat.no. should have suffix 'H' (i.e. MR 37021H). If cushioning is not required, the standard cylinder can be used with cushioning screw fully open.
EXAMPLE OF ORDERING SPECIFICATIONS : Power Cylinder, heavy duty, medium pressure, through piston rod, double acting, bore 250 mm, stroke 200 mm, cat. no. MR 37021

POWER CYLINDERS
HEAVY DUTY – MEDIUM PRESSURE
TANDEM TYPE – DOUBLE ACTING

NOMINAL BORE 50 MM
(Dimensions as per IS: 10143 and ISO: 6431)

APPLICATION : Refer Product List no. 1.402

CONSTRUCTION : Double acting, pneumatically cushioned at both ends.

SIZE : Nominal bore 50 mm. Actual bore 50 mm H11

FLUIDS : Oil, air and inert gases

PRESSURE : 40 bar max. for oil; (for 'non-shock' applications)
10 bar max. for air

FORCE DEVELOPED (approx) : 576 kgf (OUT) and 525 kgf (IN) at 25 bar (oil)
360 kgf (OUT) and 328 kgf (IN) at 10 bar
180 kgf (OUT) and 164 kgf (IN) at 5 bar

CONSUMPTION Per 100 mm Single Stroke : Oil - 0.36 litres
Air - 2.2 litres of free air (for inlet pressure 5 bar)

MATERIALS :

Cylinder Barrel	:	Steel or Brass Tube
Piston Rod	:	High Tensile Steel, 60 kgf/mm^2
End Covers	:	Close-grained Cast Iron
Seals	:	Synthetic Oil-resistant Rubber

SURFACE FINISH : Bore of Cylinder Barrel : Ra 0.4 microns

SURFACE TREATMENT :

Bore of Cylinder Barrel	:	Hardchrome plating (15 microns)
Piston Rod	:	Hardchrome plating (15 microns)
End Covers and Cylinder Barrel outside	:	Stove-enamelling

DIMENSIONS : Refer Data Sheet no. MT 05001

Stroke mm	Cat. No.	Stock Code
25	MT 29009	S
50	MT 29013	S
* 75	MT 29015	S
80	MT 29016	S
100	MT 29017	S
125	MT 29018	S
* 150	MT 29010	S
160	MT 29020	S
200	MT 29021	S
250	MT 29022	S
* 300	MT 29023	S
320	MT 29024	S
400	MT 29026	S
500	MT 29028	S
600	MT 29030	N
800	MT 29035	N
900	MT 29037	N
1000	MT 29039	N

Strokes marked * are non-standard as per IS:10411
Other strokes available on request

SPARE SEAL KIT : Cat. No. MT 29090 (for all strokes)

NOTE : When cylinders are to be used for hydraulic applications and cushioning is required, the cat.no. should have suffix 'H' (i.e. MT 29021H). If cushioning is not required, the standard cylinders can be used with cushioning screw fully open.

EXAMPLE OF ORDERING SPECIFICATIONS : Power Cylinder, heavy duty, medium pressure, tandem type, double acting, bore 50 mm, stroke 200 mm, cat. no. MT 29021

POWER CYLINDERS
HEAVY DUTY – MEDIUM PRESSURE
TANDEM TYPE – DOUBLE ACTING

NOMINAL BORE 200 MM
(Dimensions as per IS: 10143 and ISO: 6431)

APPLICATION	:	Refer Product List no. 1.402
CONSTRUCTION	:	Double acting, pneumatically cushioned at both ends.
SIZE	:	Nominal bore 200 mm. Actual bore 208.5 mm H11
FLUIDS	:	Oil, air and inert gases
PRESSURE	:	10 bar max. for oil; (for 'non-shock' applications) 10 bar max. for air
FORCE DEVELOPED (approx)	:	6660 kgf (OUT) and 6500 kgf (IN) at 10 bar 3330 kgf (OUT) and 3250 kgf (IN) at 5 bar
CONSUMPTION Per 100 mm Single Stroke	:	Oil - 6.67 litres Air - 40 litres of free air (for inlet pressure 5 bar)
MATERIALS	:	Cylinder Barrel : Steel Tube, 30 kgf^2 Piston Rod : High Tensile Steel, 60 kgf/mm^2 End Covers : Close-grained Cast Iron Seals : Synthetic Oil-resistant Rubber
SURFACE FINISH	:	Bore of Cylinder Barrel : Ra 0.4 microns
SURFACE TREATMENT	:	Bore of Cylinder Barrel : Hardchrome plating (15 microns) Piston Rod : Hardchrome plating (15 microns) End Covers and Cylinder Barrel outside : Stove-enamelling
DIMENSIONS	:	Refer Data Sheet no. MT 05001

Stroke mm	**Cat. No.**	Stock Code
25	MT 36009	S
50	MT 36013	S
* 75	MT 36015	S
80	MT 36016	S
100	MT 36017	S
125	MT 36018	S
* 150	MT 36019	S
160	MT 36020	S
200	MT 36021	S
250	MT 36022	S
* 300	MT 36023	S
320	MT 36024	S
400	MT 36026	S
500	MT 36028	S
600	MT 36030	N
800	MT 36035	N
900	MT 36037	N
1000	MT 36039	N

Strokes marked * are non-standard as per IS:10411
Other strokes available on request

SPARE SEAL KIT	:	Cat. No. MT 36090 (for all strokes)
NOTE	:	When cylinders are to be used for hydraulic applications and cushioning is required, the cat.no. should have suffix 'H' (i.e. MT 36021H). If cushioning is not required, the standard cylinders can be used with cushioning screw fully open.
EXAMPLE OF ORDERING SPECIFICATIONS	:	Power Cylinder, heavy duty, medium pressure, tandem type, double acting, bore 200 mm, stroke 200 mm, cat. no. MT 36021

POWER CYLINDERS
HEAVY DUTY – MEDIUM PRESSURE
TANDEM TYPE – DOUBLE ACTING

NOMINAL BORE 250 MM
(Dimensions as per IS: 10143 and ISO: 6431)

APPLICATION	:	Refer Product List no. 1.402
CONSTRUCTION	:	Double acting, pneumatically cushioned at both ends.
SIZE	:	Nominal bore 250 mm. Actual bore 261 mm H11
FLUIDS	:	Oil, air and inert gases
PRESSURE	:	10 bar max. for oil; (for 'non-shock' applications) 10 bar max. for air
FORCE DEVELOPED (approx)	:	10480 kgf (OUT) and 10280 kgf (IN) at 10 bar 5240 kgf (OUT) and 5140 kgf (IN) at 5 bar
CONSUMPTION Per 100 mm Single Stroke	:	Oil - 10.5 litres Air - 63 litres of free air (for inlet pressure 5 bar)
MATERIALS	:	Cylinder Barrel : Steel Tube, 30 kgf/mm^2 Piston Rod : High Tensile Steel, 60 kgf/mm^2 End Covers : Close-grained Cast Iron Seals : Synthetic Oil-resistant Rubber
SURFACE FINISH	:	Bore of Cylinder Barrel : Ra 0.4 microns
SURFACE TREATMENT	:	Bore of Cylinder Barrel : Hardchrome plating (15 microns) Piston Rod : Hardchrome plating (15 microns) End Covers and Cylinder Barrel outside : Stove-enamelling
DIMENSIONS	:	Refer Data Sheet no. MT 05001

Stroke mm	**Cat. No.**	Stock Code
25	MT 37009	S
50	MT 37013	S
* 75	MT 37015	S
80	MT 37016	S
100	MT 37017	S
125	MT 37018	S
* 150	MT 37019	S
160	MT 37020	S
200	MT 37021	S
250	MT 37022	S
* 300	MT 37023	S
320	MT 37024	S
400	MT 37026	S
500	MT 37028	S
600	MT 37030	N
800	MT 37035	N
900	MT 37037	N
1000	MT 37039	N

Strokes marked * are non-standard as per IS:10411
Other strokes available on request

SPARE SEAL KIT	:	Cat. No. MT 37090 (for all strokes)
NOTE	:	When cylinders are to be used for hydraulic applications and cushioning is required, the cat.no. should have suffix 'H' (i.e. MT 37021H). If cushioning is not required, the standard cylinders can be used with cushioning screw fully open.
EXAMPLE OF ORDERING SPECIFICATIONS	:	Power Cylinder, heavy duty, medium pressure, tandem type, double acting, bore 250 mm, stroke 200 mm, cat. no. MT 37021

POWER CYLINDERS
PISTON ROD ADAPTORS

PISTON ROD NUTS

CONSTRUCTION : The piston rod nuts are lock nuts to suit the male threaded rod end of power cylinders

MATERIALS : Steel, 40 kgf/mm^2

SURFACE TREATMENT : Zincplating and chromate passivation.

DIMENSIONS : Refer data sheet no. PP 05125.

Thread to suit Piston Rod	Cat. No.	Stock Code	Weight kg
M5	SN 10018	K	0.001
M6	SN 10028	K	0.002
M8 x 1	SN 10054	K	0.007
M10 x 1.25	SN 10010	K	0.012
M12 x 1.25	SN 10084	K	0.016
M16 x 1.5	SN 10085	K	0.020
M20 x 1.5	SN 10003	K	0.035
M24 x 2	SN 10086	K	0.046
M36 x 3	SN 10089	K	0.180

EXAMPLE OF ORDERING SPECIFICATIONS : Nut, for Piston Rod, M8 x 1, cat.no. SN 10054

POWER CYLINDERS
PISTON ROD ADAPTORS

PISTON ROD FORKS

CONSTRUCTION : The piston rod forks are designed for mounting on the male threaded end of power cylinder piston rods. They are supplied with a pin locked by two circlips, and also with a lock nut for securing the fork to the piston rod.

STATIC SAFETY FACTOR : The permissible bearing load is normally determined by the static load capacity when there is static load or slight moving motion, so it is not necessary to take safety factor into account. However, especially in the case of steel-on-steel applications factor for the bearing load should typically be around 3.

MATERIALS : Steel, 40 kgf/mm^2

SURFACE TREATMENT :
- Fork Body - Stove-enamelling
- Pin - Zincplating and chromate passivation
- Circlips - Phosphating

DIMENSIONS : Refer data sheet no. PP 05085.

Female Thread To suit Piston Rod	Cat. No.	Static Load Capacity N	Stock Code	Weight kg
M4	PP 90343		S	
M6	PP 90344		S	
M8 x 1	PP 90015		K	0.05
M10 x 1.25	PP 90345	5000	K	0.06
M12 x 1.25	PP 90016	5000	K	0.2
M16 x 1.5	PP 90017	10000	K	0.4
M20 x 1.5	PP 90018	10000	K	0.6
M24 x 2	PP 90019	24000	K	1.7
M36 x 3	PP 90020	48000	K	2.6
M64 x 3	PP 90346		S	

EXAMPLE OF ORDERING SPECIFICATIONS : Piston Rod Fork, for M8 x 1, cat.no. PP 90015

Pressure 100 kPa	=	1 bar	=	1 kgf/cm^2	Torque 10 Nm	=	1 kgf.m
1 Mpa	=	10 bar	=	10 kgf/cm^2	Force 10N	=	1 kgf

ORNCAL

POWER CYLINDERS
PISTON ROD ADAPTORS

PISTON ROD EYES

CONSTRUCTION : The piston rod eyes are designed for mounting on the male threaded end of power cylinder piston rods. A lock nut is supplied for securing the eye to the piston rod.

STATIC SAFETY FACTORY : The permissible bearing load is normally determined by the static load capacity when there is static load or slight moving motion, so it is not necessary to take safety factor into account. However, especially in the case of steel-on-steel applications factor for the bearing load should typically be around 3.

MATERIAL : Steel, 40 kgf/mm^2

SURFACE TREATMENT : Body - Zincplating and chromate passivation (upto M6)

- Stove-enamelling (M8 onwards)

Lock Nuts - Zincplating and chromate passivation

DIMENSIONS : Refer data sheet no. PP 05086

Female Thread To suit Piston Rod	Cat. No.	Static Load Capacity N	Stock Code	Weight kg
M4	PP 90347		N	
M6	PP 90348		N	
M8 x 1	PP 90349		S	
M10 x 1.25	PP 90350	5000	S	0.09
M12 x 1.25	PP 90351	5000	S	0.12
M16 x 1.5	PP 90352	10000	S	0.35
M20 x 1.5	PP 90353	10000	S	0.60
M24 x 2	PP 90354	24000	S	0.64
M36 x 3	PP 90355	48000	N	
M64 x 3	PP 90356		N	

EXAMPLE OF ORDERING SPECIFICATIONS : Piston Rod Eye, for M8 x 1, cat.no. PP 90349

Pressure 100 kPa = 1 bar = 1 kgf/cm^2
1 Mpa = 10 bar = 10 kgf/cm^2

Torque 10 Nm = 1 kgf.m
Force 10N = 1 kgf

ORNCAL

POWER CYLINDERS
PISTON ROD ADAPTORS

SELF-ALIGNING COUPLINGS

CONSTRUCTION : The self-aligning coupling is used between the piston rod and the driven part (jig, tool, etc) to compensate for axial and angular variations.

The piston rod is rigidly guided in the power cylinder, and if the driven part is also guided in its own slides undue stresses may be induced in the system by slight misalignment unless very accurate machining and mounting is resorted to. The use of the self-aligning coupling has the following advantages :

- Eliminates expensive precision machining for mounting fixed or rigid cylinder on guide or slide applications.
- Increases cylinder efficiency by eliminating friction caused by misalignment.
- Ensures greater reliability by reducing cylinder and component wear.
- Simplifies alignment problems in the field.

CONSTRUCTION : The coupling incorporates a ball joint for angular movement. The ball joint is floating in its housing to allow radial displacement.

The couplings are supplied with a lock nut for securing the coupling to the piston rod.

MATERIAL : Steel, 40 kgf/mm2

SURFACE TREATMENT : Zincplating and chromate passivation.

DIMENSIONS : Refer data sheet no. PP 05087

Female Thread to suit Piston Rod	Angular Movement	Radial Movement mm	Cat. No.	Stock Code	Weight kg
M10 x 1.25	6^0	1	PP 95171	S	0.10
M12 x 1.25	6^0	1	PP 95162	K	0.17
M16 x 1.5	6^0	1.5	PP 95160	K	0.37
M20 x 1.5	6^0	1.5	PP 95161	K	0.7
M24 x 2	6^0	2	PP 95128	K	1.4
M36 x 3	6^0	2	PP 95163	S	4.5
M64 x 3	6^0	3	PP 95164	N	

EXAMPLE OF ORDERING SPECIFICATIONS : Self-Aligning Coupling, for M20 x 1.5, cat.no. PP 95161

GENERAL INFORMATION

APPLICATION

The pressure intensifiers (or Power Boosters) are designed to increase fluid pressure. They are generally used with compressed air at the inlet side and oil on the supply side. A unit with intensifying ratio 38 : 1 (our standard) will generate a hydraulic pressure of 190 bar when connected to normal shop air supply at 5 bar. Other ratios upto 100 : 1 can be supplied to order.

The pressure intensifiers are suitable for supplying oil under pressure for hydraulic clamping cylinders for jigs and fixtures, for small hydraulic press cylinders, for pressure testing and for several other industrial applications where a small volume of oil at high pressure is to be supplied at high speed and short response time.

CONSTRUCTION

The pressure intensifier consists essentially of a medium pressure power cylinder to receive the supply fluid (normally compressed air) coupled to a high pressure single acting cylinder to deliver the high pressure fluid (normally oil). For each stroke it will deliver a measured supply of oil.

Our programme includes intensifiers with single acting, spring return cylinders and intensifiers with double acting cylinders. The first type requires only about half the quantity of compressed air to operate and is consequently more economic in use. The length of the stroke is restricted due to spring design limitations.

Each intensifier is supplied fitted with an oil recuperator to make up for minor oil losses in operation.

If required, the oil recuperator can be removed and the intensifier connected to an auxiliary oil reservoir. The intensifier will automatically close the inlet port for the oil reservoir during the working stroke. A special advantage of this design is that oil of low pressure can pass the intensifier for fast, low pressure approach of a cylinder connected to the outlet. The low pressure may be applied by compressed air on top of the oil in the reservoir. When the cylinder piston has proceeded at high speed to the point where high force is required, the intensifier can be actuated to deliver the high pressure oil discharge.

ORACAL

PRESSURE INTENSIFIERS

SINGLE ACTING
NOMINAL BORE OF LOW PRESSURE SECTION 150 MM
INTENSIFYING RATIO 38:1

APPLICATION : Refer Product List no. 7.100.

CONSTRUCTION : Low Pressure Section : Single Acting, Spring Return
High Pressure Section : Single Acting

MOUNTING : Can be mounted on protruded threaded tie rods or by means of Foot Mounting Brackets, cat.no. PP 70010 (Refer Product List no. 3.901) **OR** Flange Mounting Flats, cat.no. PP 70005 (Refer Product List no. 3.902).

SIZE : Nominal Bore of Low Pressure Section : 150 mm
Actual Bore : 153 mm H11
Plunger Diameter in High Pressure Section : 25 mm

INTENSIFYING RATIO (THEORATICAL) : 38 : 1

FLUIDS : Oil, air and inert gases

PRESSURE : Inlet pressure : 10 bar max.
Outlet pressure : 380 bar max.

CONSUMPTION Per 100 mm stroke : Air - 11 litres of free air (for inlet pressure 5 bar)

MATERIALS : Cylinder Barrel : Steel tube, 30 kgf/mm^2
Plunger : High tensile steel, 60 kgf/mm^2
End Covers : Close-grained cast iron
Seals : Synthetic oil-resistant rubber

SURFACE FINISH : Bore of Cylinder Barrel : Ra 0.4 microns

SURFACE TREATMENT : Bore of Cylinder Barrel : Hardchrome plating (15 microns)
Plunger : Hardchrome plating (15 microns)
End Covers and Cylinder Barrel outside : Stove-enamelling

DIMENSIONS : Refer Data Sheet no. PP 05140

Stroke mm	Cat.No.	Volume of Oil Discharged Cm^3	Stock Code	Weight kg
100	PP 97831	35	S	22
200	PP 97832	84	S	
350	PP 97833	157	S	

SPARE SEAL KIT : Cat.No. SO 95046 (for all strokes). Refer cross section ZZ 05032.

EXAMPLE OF ORDERING SPECIFICATIONS : Pressure Intensifier, single acting, 150 mm bore, 200 mm stroke, 38 : 1, Cat.No. PP 97832

PRESSURE INTENSIFIERS

SINGLE ACTING
NOMINAL BORE OF LOW PRESSURE SECTION 250 MM
INTENSIFYING RATIO 38:1

APPLICATION : Refer Product List no. 7.100.

CONSTRUCTION : Low Pressure Section : Single Acting, Spring Return
High Pressure Section : Single Acting

MOUNTING : Can be mounted on protruded threaded tie rods or by means of Foot Mounting Brackets, cat.no. PP 70011 (Refer Product List no. 3.901) **OR** Flange Mounting Flats, cat.no. PP 70006 (Refer Product List no. 3.902).

SIZE : Nominal Bore of Low Pressure Section : 250 mm
Actual Bore : 252 mm H11
Plunger Diameter in High Pressure Section : 40 mm

INTENSIFYING RATIO (THEORATICAL) : 38 : 1

FLUIDS : Oil, air and inert gases

PRESSURE : Inlet pressure : 10 bar max.
Outlet pressure : 380 bar max.

CONSUMPTION Per 100 mm stroke : Air - 30 litres of free air (for inlet pressure 5 bar)

MATERIALS : Cylinder Barrel : Steel tube, 30 kgf/mm^2
Plunger : High tensile steel, 60 kgf/mm^2
End Covers : Close-grained cast iron
Seals : Synthetic oil-resistant rubber

SURFACE FINISH : Bore of Cylinder Barrel : Ra 0.4 microns

SURFACE TREATMENT : Bore of Cylinder Barrel : Hardchrome plating (15 microns)
Plunger : Hardchrome plating (15 microns)
End Covers and Cylinder Barrel outside : Stove-enamelling

DIMENSIONS : Refer Data Sheet no. PP 05075

Stroke mm	Cat.No.	Volume of Oil Discharged Cm^3	Stock Code	Weight kg
100	PP 96953	80	S	72
200	PP 96954	206	S	95
350	PP 96955	395	S	131
500	PP 96956	584	S	166

SPARE SEAL KIT : Cat.No. SO 95045 (for all strokes). Refer cross section ZZ 05032

EXAMPLE OF ORDERING SPECIFICATIONS : Pressure Intensifier, single acting, 250 mm bore, 200 mm stroke, 38 : 1, Cat.No. PP 96954

ORNCAL

PRESSURE INTENSIFIERS

DOUBLE ACTING
NOMINAL BORE OF LOW PRESSURE SECTION 150 MM
INTENSIFYING RATIO 38:1

APPLICATION : Refer Product List no. 7.100.

CONSTRUCTION : Low Pressure Section : Double Acting, Spring Return
High Pressure Section : Single Acting

MOUNTING : Can be mounted on protruded threaded tie rods or by means of Foot Mounting Brackets, cat.no. PP 70010 (Refer Product List no. 3.901) **OR** Flange Mounting Flats, cat.no. PP 70005 (Refer Product List no. 3.902).

SIZE : Nominal Bore of Low Pressure Section : 150 mm
Actual Bore : 153 mm H11
Plunger Diameter in High Pressure Section : 25 mm

INTENSIFYING RATIO (THEORATICAL) : 38 : 1

FLUIDS : Oil, air and inert gases

PRESSURE : Inlet pressure : 10 bar max.
Outlet pressure : 380 bar max.

CONSUMPTION per 100 mm Single Stroke : Air - 11 litres of free air (for inlet pressure 5 bar)

MATERIALS : Cylinder Barrel : Steel tube, 30 kgf/mm^2
Plunger : High tensile steel, 60 kgf/mm^2
End Covers : Close-grained cast iron
Seals : Synthetic oil-resistant rubber

SURFACE FINISH : Bore of Cylinder Barrel : Ra 0.4 microns

SURFACE TREATMENT : Bore of Cylinder Barrel : Hardchrome plating (15 microns)
Plunger : Hardchrome plating (15 microns)
End Covers and Cylinder Barrel outside : Stove-enamelling

DIMENSIONS : Refer Data Sheet no. PP 05134

Stroke mm	Cat.No.	Volume of Oil Discharged Cm^3	Stock Code	Weight kg
100	PP 97713	35	S	20
200	PP 97712	84	S	24
350	PP 97714	157	S	30
500	PP 97715	230	S	36

SPARE SEAL KIT : Cat.No. SO 95044 (for all strokes). Refer cross section ZZ 05033.

EXAMPLE OF ORDERING SPECIFICATIONS : Pressure Intensifier, double acting, 150 mm bore, 200 mm stroke, 38 : 1, Cat.No.. PP 97712

DRNCRL

PRESSURE INTENSIFIERS

DOUBLE ACTING
NOMINAL BORE OF LOW PRESSURE SECTION 250 MM
INTENSIFYING RATIO 38:1

APPLICATION : Refer Product List no. 7.100.

CONSTRUCTION : Low Pressure Section : Double Acting, Spring Return
High Pressure Section : Single Acting

MOUNTING : Can be mounted on protruded threaded tie rods or by means of Foot Mounting Brackets, cat.no. PP 70011 (Refer Product List no. 3.901) **OR** Flange Mounting Flats, cat.no. PP 70006 (Refer Product List no. 3.902).

SIZE : Nominal Bore of Low Pressure Section : 250 mm
Actual Bore : 252 mm H11
Plunger Diameter in High Pressure Section : 40 mm

INTENSIFYING RATIO (THEORATICAL) : 38 : 1

FLUIDS : Oil, air and inert gases

PRESSURE : Inlet pressure : 10 bar max.
Outlet pressure : 380 bar max.

CONSUMPTION per 100 mm Single Stroke : Air - 30 litres of free air (for inlet pressure 5 bar)

MATERIALS : Cylinder Barrel : Steel tube, 30 kgf/mm^2
Plunger : High tensile steel, 60 kgf/mm^2
End Covers : Close-grained cast iron
Seals : Synthetic oil-resistant rubber

SURFACE FINISH : Bore of Cylinder Barrel : Ra 0.4 microns

SURFACE TREATMENT : Bore of Cylinder Barrel : Hardchrome plating (15 microns)
Plunger : Hardchrome plating (15 microns)
End Covers and Cylinder Barrel outside : Stove-enamelling

DIMENSIONS : Refer Data Sheet no. PP 05139

Stroke mm	Cat.No.	Volume of Oil Discharged Cm^3	Stock Code	Weight kg
100	PP 97821	80	S	65
200	PP 97822	206	S	74
350	PP 97823	395	S	87
500	PP 97824	584	S	100
700	PP 97825	836	S	117

SPARE SEAL KIT : Cat.No. SO 95043 (for all strokes). Refer cross section ZZ 05033.

EXAMPLE OF ORDERING SPECIFICATIONS : Pressure Intensifier, double acting, 250 mm bore, 200 mm stroke, 38 : 1, Cat.No.. PP 97822

DIRECTIONAL CONTROL VALVES

GENERAL INFORMATION

1. DEFINITION

A directional control valve is a valve which diverts the passage of a fluid or which admits or blocks passage of a fluid.

2. FLOW CONFIGURATION

Directional control valves are designated as 2 port, 3 port, etc.

2.1 2 port Valve Directional valve provided with two main ports :
Inlet and outlet. They are used for the shut-off or opening of a fluid line.

2.2 3 port Valve Directional valve provided with three main ports :
Inlet, outlet and exhaust. Operation of single acting cylinders can be controlled by a 3 port valve which will allow the cylinder port to be connected to the supply line in one position of the valve, and to be connected to exhaust in the other position of the valve allowing discharge of the pressurized fluid from the cylinder during the return stroke

2.3 4 port Valve Directional valve provided with four main ports :

One inlet, two outlets and one exhaust. These valves can be used for operating of double acting cylinders as they provide supply of fluid to one end of the cylinder while at the same time allowing discharge of fluid from the other end. When the valve changes over, the connections are reversed, and the cylinder will move in opposite direction.

2.4 5 port Valve Directional valve provided with five main ports :

One inlet, two outlets and two exhausts. The function of this valve is similar to that mentioned above for the 4 port valve but it has two separate exhaust ports instead of one common exhaust port.

3. SYMBOLS

The graphical symbols for the valves as per IS:7513 are shown in the data sheets for the individual valves.

Te symbol of a directional control valve is composed of squares for each operational stage. The squares contain the flow paths for each stage.

The operational stage shown adjacent to an actuation or return mechanism results when the mechanism is activated.

The symbols do not intend to depict the physical location of ports and actuation/return mechanisms of the valves.

DIRECTIONAL CONTROL VALVES

GENERAL INFORMATION (cont'd)

4. PORT NUMBERING (Refer Data Sheet PP 05126)

The ports of the valves are numbered according to the following code :

Ports for power lines :

1	=	Inlet (supply port)
2 and 4	=	Outlet (to consumer)
3 and 5	=	Exhaust (discharge from consumer)

Ports for control signal lines :

10	=	Pilot port for signal that closes port 1
12	=	Pilot port for signal that connects ports 1 and 2
14	=	Pilot port for signal that connects ports 1 and 4

5. SPOOL AND POPPET VALVES

Our programme includes two types of directional control valves, i.e. spool type poppet type.

5.1 The advantages of the spool type are :

- Fully pressure balanced design. The force to move the spool is practically independent of the fluid pressure.
- Self cleaning due to wiping action of seals.
- Valves can be of 3 pos design with choice of open or closed centre position design.

  The standard valves have all ports closed in centre position of the spool. Valves with open exhausts and closed centre port (inlet) or open exhausts and open centre port are available to order.
- Bistable design is easily accomplished as the spool can rest in any of its end positions. ('Memory' function).

5.2 The poppet valves in turn have the following advantages :

- Short stroke allowing fast response.
- High flow capacity compared to size.

6. ACTUATION AND RETURN MECHANISMS

6.1 The valves are available with a selection of actuator and return mechanisms as detailed in the individual product lists. The valves can either be operated directly through a knob, hand lever, cam roller, etc. or remote controlled by pilot pressure signals or electric signals.

6.2 For remote control of valves with pilot pressure actuator we offer a wide range of compact pilot valves with G 1/16 ports and gland nuts for ready connection of 3/16" OD tube. The combination of our G 1/16 pilot valves and pilot pressure controlled power valves provides a most adaptable fluid power control system. Practically all conceivable control circuits can be built with these advanced units.

DIRECTIONAL CONTROL VALVES

GENERAL INFORMATION (cont'd)

7. DETERMINATION OF VALVE SIZE

7.1 The nominal dimensions of valves are designated by the size of their main connecting ports. The free flow area through the valve is equal to that of the nominal dimension. For example, a valve with ports G 1/4 has a port opening of 6 mm dia, and a flow area of 30 mm2 approx through the valve.

7.2 The flow capacity of each valve is given in the respective product list in litres of free air per minute consistent with the normal practice for rating of compressors. The figure is based on an inlet pressure of 7 bar and no back pressure at out let (i.e. free exhaust to atmosphere).

7.3 In case a valve is to be selected to provide a specified piston speed in a power cylinder, the table given in product list 50.203 will provide useful.

8. SUFFIX FOR FLOW CONFIGURATION (Refer Data Sheet PD 05007)

8.1 Spool valves, 3 positions, spring centred :

Suffix denoting Flow Configuration in Centre Position (Neutral)

Suffix to Cat.No.	Flow Configuration in Centre Position
-	All ports closed (Pressure held neutral)
A	Closed inlet and open exhaust (Pressure released neutral)
B	Open inlet and closed exhaust
C	All ports connected

8.2 Poppet valves, 2 positions :

Suffix denoting Flow Configuration in Normal Position (Un-actuated)

-	Closed inlet (NC)
D	Open inlet (NO)

9. SUFFIX FOR COIL VOLTAGE FOR SOLENOID VALVES

Suffix to Cat.No.	V AC	V DC
E	440	
F	380	
G	230	
H	110	
I	24	
K		440
L		380
M		230
N		110
P		24
Q		12

DIRECTIONAL CONTROL VALVES
SPOOL TYPE
PORT SIZE G 1/16, 3 PORTS

APPLICATION : Refer Product List no. 8.100.

TYPE : Standard duty, medium pressure.

CONSTRUCTION : Spool design, 2 pos; 3 ports

PORTS : Thread G 1/16 with gland nuts for 3/16" (5 mm) OD Tube

FLUIDS : Air, oil and inert gases.
(Valves with pilot pressure release for air only).

FLUID PRESSURE : 10 bar max.

FLOW CAPACITY : 250 litres of free air per min.
(Flow to atmosphere at inlet pressure 7 bar).

MATERIALS : Body : Plastic or aluminium
Spool : Brass

SURFACE TREATMENT : Stove-enamelling and zincplating with chromate passivation.

DIMENSIONS : Refer data sheets for individual valves.

Actuation Mechanism	Return Mechanism	No. of Pos	Cat.No.	Data Sheet No.	Stock Code	Weight kg
Plunger	Plunger	2	PC 95203	PC 05021	S	0.04
Plunger	Spring	2	PC 95013	PC 05007	K	0.04
Plunger	Pressure	2	PC 95190		S	0.05
Ball	Spring	2	PC 95202	PC 05012	K	0.05
Straight Lever	Spring	2	PC 95016		S	0.05
Roller Lever	Spring	2	PC 95014	PC 05002	K	0.05
One-Way Pawl	Spring	2	PC 95017	PC 05009	K	0.05
Finger Tip Lever	Spring	2	PC 95015	PC 05008	S	0.05
Push Button (Green)	Spring	2	PC 95011	PC 05005	K	0.06
Push Button (Red)	Spring	2	PC 95188	PC 05005	K	0.06
Push Button (Green)	Pressure	2	PC 95224	PC 05100	S	0.07
Push Button (Red)	Pressure	2	PC 95189	PC 05100	S	0.07
Palm Button (Red)	Spring	2	PC 95012	PC 05006	K	0.07
Palm Button	Pressure	2	PC 95341	PC 05101	S	0.07
Selector Knob (On-Off)	Selector Knob	2	PC 95018	PC 05013	K	0.06
Key Selector	Key Selector	2	PC 95267		S	0.11
Rod, Clockwise	Spring	2	PC 95328	PC 05051	S	1.4
Rod, Anti-Clockwise	Spring	2	PC 95334	PC 05048	S	1.4
Foot Treadle	Spring	2	PC 95220	PC 05050	K	0.95
Foot Treadle	Foot Treadle	2	PC 95221	PC 05097	K	0.95
Pressure	Spring	2	PC 95019	PC 05089	K	0.05
Pressure	Pressure	2	PC 95020	PC 05110	K	0.06
Low Pressure	Spring	2	PC 95023	PC 05095	K	0.10
Low Pressure	Pressure	2	PC 95264		S	0.11
Low Pressure	Low Pressure	2	PC 95024		S	0.14
Pressure Release	Spring	2	PC 95021		S	0.05
Pressure Release	Pressure Release	2	PC 95022		S	0.06

NOTE : Actuation/Return Pressure : Min 3.5 bar
Actuation/Return Low Pressure : Min 0.5 bar

EXAMPLE OF ORDERING SPECIFICATIONS : Directional Control Valve, 2 pos; 3 ports G 1/16 with Gland Nuts for 3/16" (5 mm) OD tube, Roller Lever Actuation, Spring Return, Cat.No. PC 95014

DIRECTIONAL CONTROL VALVES
SPOOL TYPE
PORT SIZE G 1/16, 5 PORTS

APPLICATION : Refer Product List no. 8.100.

TYPE : Standard duty, medium pressure.

CONSTRUCTION : Spool design, 3 pos; 5 ports

PORTS : Thread G 1/16 with gland nuts for 3/16" (5 mm) OD Tube

FLUIDS : Air, oil and inert gases.
(Valves with pilot pressure release for air only).

FLUID PRESSURE : 10 bar max.

FLOW CAPACITY : 250 litres of free air per min.
(Flow to atmosphere at inlet pressure 7 bar).

MATERIALS : Body : Plastic or aluminium
Spool : Brass

SURFACE TREATMENT : Stove-enamelling and zincplating with chromate passivation.

DIMENSIONS : Refer data sheets for individual valves.

Actuation Mechanism	Return Mechanism	No. of Pos	Cat.No.	Data Sheet No.	Stock Code	Weight kg
Plunger	Plunger	2	PC 95204	PC 05023	S	0.05
Plunger	Spring	2	PC 95174	PC 05104	K	0.05
Plunger	Pressure	2	PC 95191		S	0.06
Ball	Spring	2	PC 95274	PC 05105	K	0.06
Straight Lever	Spring	2	PC 95177		S	0.06
Roller Lever	Spring	2	PC 95175	PC 05099	K	0.06
One-Way Pawl	Spring	2	PC 95178	PC 05109	K	0.06
Finger Tip Lever	Spring	2	PC 95176	PC 05106	S	0.06
Push Button (Green)	Spring	2	PC 95172	PC 05020	K	0.07
Push Button (Red)	Spring	2	PC 95186	PC 05020	K	0.07
Push Button (Green)	Pressure	2	PC 95156	PC 05018	S	0.08
Push Button (Red)	Pressure	2	PC 95187	PC 05018	S	0.08
Palm Button (Red)	Spring	2	PC 95173	PC 05107	K	0.07
Palm Button	Pressure	2	PC 95357	PC 05102	S	0.08
Selector Knob (On-Off)	Selector Knob	2	PC 95179	PC 05098	K	0.07
Key Selector	Key Selector	2	PC 95175		S	0.12
Foot Treadle	Spring	2	PC 95261	PC 05049	K	0.95
Foot Treadle	Foot Treadle	2	PC 95262	PC 05096	K	0.95
Pressure	Spring	2	PC 95180	PC 05108	K	0.06
Pressure	Pressure	2	PC 95181	PC 05092	K	0.07
Low Pressure	Spring	2	PC 95184		S	0.11
Low Pressure	Pressure	2	PC 95265		S	0.12
Low Pressure	Low Pressure	2	PC 95186		S	0.15
Pressure Release	Spring	2	PC 95182		S	0.06
Pressure Release	Spring Centred	3	PC 95290		S	0.08
Pressure Release	Pressure Release	2	PC 95183		S	0.07

NOTE : Actuation/Return Pressure : Min 3.5 bar
Actuation/Return Low Pressure : Min 0.5 bar

EXAMPLE OF ORDERING SPECIFICATIONS : Directional Control Valve, 2 pos; 5 ports G 1/16 with Gland Nuts for 3/16" (5 mm) OD tube, Roller Lever Actuation, Spring Return, Cat.No. PC 95175

ORNCRL

DIRECTIONAL CONTROL VALVES
SPOOL TYPE
PORT SIZE G 1/8, 3 PORTS

APPLICATION : Refer Product List no. 8.100.

TYPE : Standard duty, medium pressure.

CONSTRUCTION : Spool design, 2 pos; 3 ports

PORTS : Thread G 1/8

FLUIDS : Air, oil and inert gases.
(Valves with pilot pressure release for air only).

FLUID PRESSURE : 10 bar max.

FLOW CAPACITY : 500 litres of free air per min.
(Flow to atmosphere at inlet pressure 7 bar).

MATERIALS : Body : Heat treated aluminium alloy
Spool : Brass

SURFACE TREATMENT : Body : Stove-enamelling
Other Parts : Zincplating with chromate passivation.

DIMENSIONS : Refer data sheets for individual valves.

Actuation Mechanism	Return Mechanism	No. of Pos	Cat.No.	Data Sheet No.	Stock Code	Weight kg
Plunger	Spring	2	PP 95047	PP 05046	K	0.11
Roller Lever	Spring	2	PP 95036	PP 05136	K	0.19
Hand Knob	Spring	2	PP 95125	PP 05060	K	0.13
Hand Knob	Hand Knob	2	PP 95067	PP 05191	K	0.13
Hand Knob	Hand Knob	3	PP 95201	PP 05047	S	0.13
Pressure	Spring	2	PP 95032	PP 05143	K	0.13
Pressure	Pressure	2	PP 95120	PP 05180	K	0.15
Low Pressure	Spring	2	PP 95031	PP 05201	S	0.5
Low Pressure	Low Pressure	2	PP 95034		S	0.9
Low Pressure	Pressure	2	PP 95175		S	0.6
Pressure Release	Spring	2	PP 95072		S	0.13
Pressure Release	Pressure Release	2	PP 95071		S	0.15
Pressure Release	Internal Pressure	2* N.O.	PP 95192	PP 05195	S	0.15
Pressure Release	Internal Pressure	2* N.C.	PC 95367	PP 05195	S	0.15

NOTE : Actuation/Return Pressure : Min 3.5 bar
Actuation/Return Low Pressure : Min 0.5 bar

***) N.O.** : Normally Open : (Inlet must always be made at port 1, here normally open)
N.C. : Normally Closed : (Inlet must always be made at port 1, here normally closed)

EXAMPLE OF ORDERING SPECIFICATIONS : Directional Control Valve, 2 pos; 3 ports G 1/8, Roller Lever Actuation, Spring Return, Cat.No. PP 95036

DIRECTIONAL CONTROL VALVES
SPOOL TYPE
PORT SIZE G 1/8, 5 PORTS

APPLICATION : Refer Product List no. 8.100.

TYPE : Standard duty, medium pressure.

CONSTRUCTION : Spool design, 2 pos and 3 pos; 5 ports

PORTS : Thread G 1/8

FLUIDS : Air, oil and inert gases.
(Valves with pilot pressure release for air only).

FLUID PRESSURE : 10 bar max.

FLOW CAPACITY : 500 litres of free air per min.
(Flow to atmosphere at inlet pressure 7 bar).

MATERIALS : Body : Heat treated aluminium alloy
Spool : Brass

SURFACE TREATMENT : Body : Stove-enamelling
Other Parts : Zincplating with chromate passivation.

DIMENSIONS : Refer data sheets for individual valves.

Actuation Mechanism	Return Mechanism	No. of Pos	Cat.No.	Data Sheet No.	Stock Code	Weight kg
Plunger	Spring	2	PP 95079	PP 05206	K	0.13
Roller Lever	Spring	2	PP 95078	PP 05181	K	0.22
Hand Knob	Spring	2	PP 95127	PP 05175	K	0.16
Hand Knob	Hand Knob	2	PP 95073	PP 05192	K	0.16
Hand Knob	Hand Knob	3	PP 95230		S	0.16
Pressure	Spring	2	PP 95081	PP 05055	K	0.16
Pressure	Spring Centred	3	PP 95082	PP 05176	S	0.11
Pressure	Pressure	2	PP 95035	PP 05179	K	0.18
Low Pressure	Spring	2	PP 95083		S	0.5
Low Pressure	Low Pressure	2	PP 95046		S	0.9
Low Pressure	Pressure	2	PP 95176	PP 05200	S	0.6
Pressure Release	Spring	2	PP 95085		S	0.16
Pressure Release	Spring Centred	3	PP 95086		S	0.2
Pressure Release	Pressure Release	2	PP 95084		S	0.18
Pressure Release	Internal Pressure	2	PP 95221	PP 05217	S	0.18

NOTE : Actuation/Return Pressure : Min 3.5 bar
Actuation/Return Low Pressure : Min 0.5 bar

EXAMPLE OF ORDERING SPECIFICATIONS : Directional Control Valve, 2 pos; 5 ports G 1/8, Roller Lever Actuation, Spring Return, Cat.No. PP 95078

DIRECTIONAL CONTROL VALVES
SPOOL TYPE
PORT SIZE G 1/4, 3 PORTS

APPLICATION : Refer Product List no. 8.100.

TYPE : Standard duty, medium pressure.

CONSTRUCTION : Spool design, 2 pos; 3 ports

PORTS : Thread G 1/4

FLUIDS : Air, oil and inert gases.
(Valves with pilot pressure release for air only).

FLUID PRESSURE : 10 bar max.

FLOW CAPACITY : 2000 litres of free air per min.
(Flow to atmosphere at inlet pressure 7 bar).

MATERIALS :
Body : Heat treated aluminium alloy
Spool : Steel, 40 kgf/mm^2

SURFACE TREATMENT :
Body : Stove-enamelling
Spool : Hardchrome plating, 10 microns
Other Parts : Zincplating with chromate passivation.

DIMENSIONS : Refer data sheets for individual valves.

Actuation Mechanism	Return Mechanism	No. of Pos	Cat.No.	Data Sheet No.	Stock Code	Weight kg
Plunger	Spring	2	PP 95092	PP 05182	K	0.7
Roller Plunger	Spring	2	PP 95010	PP 05215	K	0.7
Hand Lever	Spring	2	PP 95021	PC 05091	K	0.9
Hand Lever	Hand Lever	2	PP 95089	PC 05091	K	0.8
Hand Knob	Hand Knob	2	PP 95087	PP 05174	K	0.8
Hand Knob	Spring	2	PP 95088	PP 05219	K	0.8
Pressure	Spring	2	PP 95093	PP 05172	K	0.5
Pressure	Pressure	2	PP 95094	PP 05173	K	0.8
Low Pressure	Spring	2	PP 95095		S	1.3
Low Pressure	Pressure	2	PP 95097		S	1.3
Low Pressure	Low Pressure	2	PP 95096		S	1.7
Pressure Release	Spring	2	PP 95099		S	0.8
Pressure Release	Pressure Release	2	PP 95098		S	0.8
Pressure Release Normally Closed (N.C.)	Internal Pressure	2	PP 95226		S	0.8

NOTE :
Actuation/Return Pressure : Min 3.5 bar
Actuation/Return Low Pressure : Min 0.5 bar

EXAMPLE OF ORDERING SPECIFICATIONS : Directional Control Valve, 2 pos; 3 ports G 1/4, Hand Lever Actuation, Spring Return, Cat.No. PP 95021

DIRECTIONAL CONTROL VALVES
SPOOL TYPE
PORT SIZE G 1/4, 5 PORTS

APPLICATION : Refer Product List no. 8.100.

TYPE : Standard duty, medium pressure.

CONSTRUCTION : Spool design, 2 pos and 3 pos; 5 ports

PORTS : Thread G 1/4

FLUIDS : Air, oil and inert gases.
(Valves with pilot pressure release for air only).

FLUID PRESSURE : 10 bar max.

FLOW CAPACITY : 2000 litres of free air per min.
(Flow to atmosphere at inlet pressure 7 bar).

MATERIALS :
Body : Heat treated aluminium alloy
Spool : Steel, 40 kgf/mm^2

SURFACE TREATMENT :
Body : Stove-enamelling
Spool : Hardchrome plating, 10 microns
Other Parts : Zincplating with chromate passivation.

DIMENSIONS : Refer data sheets for individual valves.

Actuation Mechanism	Return Mechanism	No. of Pos	Cat.No.	Data Sheet No.	Stock Code	Weight kg
Plunger	Spring	2	PP 95006	PP 05220	K	0.8
Roller Plunger	Spring	2	PP 95106	PP 05216	K	0.8
Hand Lever	Spring	2	PP 95003	PC 05090	K	0.9
Hand Lever	Spring Centred	3	PP 95005	PC 05090	K	1.1
Hand Lever	Hand Lever	3	PP 95004	PC 05090	K	0.9
Hand Lever	Hand Lever	2	PP 95229	PC 05090	K	0.9
Hand Knob	Hand Knob	2	PP 95001	PP 05202	K	0.9
Hand Knob	Spring	2	PP 95002	PP 05197	K	0.9
Pedal	Spring	2	PP 95050	PP 05042	K	1.8
Pedal	Pressure	2	PP 95191	PP 05214	S	1.8
Pedal	Spring Return by Pedal Release	2	PP 95193	PP 05213	K	1.9
Pressure	Spring	2	PP 95007	PP 05036	K	0.9
Pressure	Spring Centred	3	PP 95107	PC 05066	K	1.0
Pressure	Pressure	2	PP 95008	PP 05029	K	0.9
Low Pressure	Spring	2	PP 95108		S	1.4
Low Pressure	Pressure	2	PP 95111		S	1.4
Low Pressure	Low Pressure	2	PP 95109		S	1.8
Pressure Release	Pressure Release	2	PP 95009		S	0.9
Pressure Release	Spring	2	PP 95112		S	0.9
Pressure Release	Spring Centred	3	PP 95113		S	1.0

NOTE :
Actuation/Return Pressure : Min 3.5 bar
Actuation/Return Low Pressure : Min 0.5 bar

EXAMPLE OF ORDERING SPECIFICATIONS : Directional Control Valve, 2 pos; 5 ports G 1/4, Hand Lever Actuation, Spring Return, Cat.No. PP 95003

DIRECTIONAL CONTROL VALVES
SPOOL TYPE
PORT SIZE G 1/2, 3 PORTS

APPLICATION : Refer Product List no. 8.100.

TYPE : Standard duty, medium pressure.

CONSTRUCTION : Spool design, 2 pos; 3 ports

PORTS : Thread G 1/2

FLUIDS : Air, oil and inert gases.
(Valves with pilot pressure release for air only).

FLUID PRESSURE : 10 bar max.

FLOW CAPACITY : 8000 litres of free air per min.
(Flow to atmosphere at inlet pressure 7 bar).

MATERIALS :
Body : Heat treated aluminium alloy
Spool : Steel, 40 kgf/mm^2

SURFACE TREATMENT :
Body : Stove-enamelling
Spool : Hardchrome plating, 10 microns
Other Parts : Zincplating with chromate passivation.

DIMENSIONS : Refer data sheets for individual valves.

Actuation Mechanism	Return Mechanism	No. of Pos	Cat.No.	Data Sheet No.	Stock Code	Weight kg
Plunger	Spring	2	PC 95111	PC 05076	K	1.2
Roller Plunger	Spring	2	PC 95382	PC 05072	K	1.2
Hand Lever	Spring	2	PC 95107	PC 05091	K	1.2
Hand Lever	Hand Lever	2	PC 95108	PC 05091	K	1.4
Pressure	Spring	2	PC 95113	PC 05036	K	1.0
Pressure	Pressure	2	PC 95114		K	0.9
Low Pressure	Spring	2	PC 95115	PC 05004	S	1.8
Low Pressure	Pressure	2	PC 95117		S	1.7
Low Pressure	Low Pressure	2	PC 95116		S	2.7
Pressure Release	Spring	2	PC 95119		K	1.0
Pressure Release	Pressure Release	2	PC 95118		K	1.0

NOTE :
Actuation/Return Pressure : Min 3.5 bar
Actuation/Return Low Pressure : Min 0.5 bar

EXAMPLE OF ORDERING SPECIFICATIONS : Directional Control Valve, 2 pos; 3 ports G 1/2, Hand Lever Actuation, Spring Return, Cat.No. PP 95107.

ORNCAL

DIRECTIONAL CONTROL VALVES
SPOOL TYPE
PORT SIZE G 1/2, 5 PORTS

APPLICATION : Refer Product List no. 8.100.

TYPE : Standard duty, medium pressure.

CONSTRUCTION : Spool design, 2 pos and 3 pos; 5 ports

PORTS : Thread G 1/2

FLUIDS : Air, oil and inert gases.
(Valves with pilot pressure release for air only).

FLUID PRESSURE : 10 bar max.

FLOW CAPACITY : 8000 litres of free air per min.
(Flow to atmosphere at inlet pressure 7 bar).

MATERIALS :
Body : Heat treated aluminium alloy
Spool : Steel, 40 kgf/mm^2

SURFACE TREATMENT :
Body : Stove-enamelling
Spool : Hardchrome plating, 10 microns
Other Parts : Zincplating with chromate passivation.

DIMENSIONS : Refer data sheets for individual valves.

Actuation Mechanism	Return Mechanism	No. of Pos	Cat.No.	Data Sheet No.	Stock Code	Weight kg
Plunger	Spring	2	PC 95132	PC 05077	K	1.4
Roller Plunger	Spring	2	PC 95406	PC 05083	K	1.4
Hand Lever	Spring	2	PC 95127	PC 05090	K	1.4
Hand Lever	Spring Centred	3	PC 95129	PC 05090	K	1.8
Hand Lever	Hand Lever	2	PC 95128	PC 05090	K	1.6
Pressure	Spring	2	PC 95134		K	1.6
Pressure	Spring Centred	3	PC 95136	PC 05067	K	1.5
Pressure	Pressure	2	PC 95135	PC 05076	K	1.2
Low Pressure	Spring	2	PC 95137	PC 05003	S	2.0
Low Pressure	Pressure	2	PC 95140		S	1.9
Low Pressure	Low Pressure	2	PC 95138		S	2.7
Pressure Release	Spring	2	PC 95142		K	1.3
Pressure Release	Spring Centred	3	PC 95143		K	1.7
Pressure Release	Pressure Release	2	PC 95141		K	1.3

NOTE :
Actuation/Return Pressure : Min 3.5 bar
Actuation/Return Low Pressure : Min 0.5 bar

EXAMPLE OF ORDERING SPECIFICATIONS : Directional Control Valve, 2 pos; 5 ports G 1/2, Hand Lever Actuation, Spring Return, Cat.No. PP 95127.

DIRECTIONAL CONTROL VALVES
SPOOL TYPE
PORT SIZE G 3/4, 3 PORTS

APPLICATION : Refer Product List no. 8.100.

TYPE : Standard duty, medium pressure.

CONSTRUCTION : Spool design, 2 pos; 3 ports

PORTS : Thread G 3/4

FLUIDS : Air, oil and inert gases.
(Valves with pilot pressure release for air only).

FLUID PRESSURE : 10 bar max.

FLOW CAPACITY : 16000 litres of free air per min.
(Flow to atmosphere at inlet pressure 7 bar).

MATERIALS :
Body : Heat treated aluminium alloy
Spool : Steel, 40 kgf/mm^2

SURFACE TREATMENT :
Body : Stove-enamelling
Spool : Hardchrome plating, 10 microns
Other Parts : Zincplating with chromate passivation.

DIMENSIONS : Refer data sheets for individual valves.

Actuation Mechanism	Return Mechanism	No. of Pos	Cat.No.	Data Sheet No.	Stock Code	Weight kg
Hand Lever	Spring	2	PC 95322	PP 05091	K	5.5
Hand Lever	Hand Lever	2	PC 95321	PP 05091	K	6.1
Pressure	Spring	2	PC 95324	PC 05081	K	
Pressure	Pressure	2	PC 95323	PC 05082		

NOTE : Actuation/Return Pressure : Min 3.5 bar

EXAMPLE OF ORDERING SPECIFICATIONS : Directional Control Valve, 2 pos; 3 ports G 3/4, Hand Lever Actuation, Spring Return, Cat.No. PP 95322.

DIRECTIONAL CONTROL VALVES
SPOOL TYPE
PORT SIZE G 3/4, 5 PORTS

APPLICATION : Refer Product List no. 8.100.

TYPE : Standard duty, medium pressure.

CONSTRUCTION : Spool design, 2 pos and 3 pos; 5 ports

PORTS : Thread G 3/4

FLUIDS : Air, oil and inert gases.
(Valves with pilot pressure release for air only).

FLUID PRESSURE : 10 bar max.

FLOW CAPACITY : 16000 litres of free air per min.
(Flow to atmosphere at inlet pressure 7 bar).

MATERIALS :
Body : Heat treated aluminium alloy
Spool : Steel, 40 kgf/mm^2

SURFACE TREATMENT :
Body : Stove-enamelling
Spool : Hardchrome plating, 10 microns
Other Parts : Zincplating with chromate passivation.

DIMENSIONS : Refer data sheets for individual valves.

Actuation Mechanism	Return Mechanism	No. of Pos	Cat.No.	Data Sheet No.	Stock Code	Weight kg
Hand Lever	Spring	2	PC 95313	PC 05090	K	7.5
Hand Lever	Spring Centred	3	PC 95312	PC 05090	K	6.1
Hand Lever	Hand Lever	3	PC 95268	PC 05090	K	7.5
Pressure	Spring	2	PC 95305	PC 05080	K	7.0
Pressure	Spring Centred	3	PC 95343	PC 05068	K	9.0
Pressure	Pressure	2	PC 95297	PC 05079	K	7.0

NOTE : Actuation/Return Pressure : Min 3.5 bar

EXAMPLE OF ORDERING SPECIFICATIONS : Directional Control Valve, 2 pos; 5 ports G 3/4, Hand Lever Actuation, Spring Return, Cat.No. PP 95322.

CANCAL

CONTROL VALVES

PRESSURE RELEASE VALVE ACTUATORS

APPLICATION : The pressure release valve actuators are used when low actuation forces and/or short actuation movements only are available to operate the valves. They are to be used in conjunction with directional control valves designed for actuation by release of pressure. They are generally meant for directional control valves with G 1/16 main ports but also can be used for larger valves when longer operation time is acceptable. Approx. response and re-setting time for various valve sizes are given below (in millisec).

Main Port Size	G 1/16	G 1/8	G 1/4
Response Time	15 msec	35 msec	50 msec
Re-setting Time	30 msec	60 msec	90 msec
Air Consumption	5 lit/min	5 lit/min	9 lit/min

The figures for response and re-setting time are for valves used with normally closed (NC) actuators. For normally open (NO) actuators the figures will be reversed. The table also gives the approx. air consumption of the valves in litres of free air per min. at an inlet pressure of 5 bar when continuously open.

CONSTRUCTION : The pressure release valve actuators are designed for mounting in the G 1/16 pilot ports of valves with pressure release actuation but they can also be mounted away from the valves by means of Bulkhead Union PP 90211 (Product List no. 10.505) and connected by 3/16" (5 mm) OD tube.

FLUIDS : Air and inert gases.

FLUID PRESSURE : 10 bar max.

FLOW CAPACITY : 55 litres of free air per min.
(Flow to atmosphere at inlet pressure 5 bar).

MATERIALS : Brass, steel, acetal resin and synthetic oil resistant rubber.

SURFACE TREATMENT : Zincplatng and chromate passivation.

DIMENSIONS AND ACTUATION FORCE : Refer data sheets for individual actuators.

CONTROL VALVES

PRESSURE RELEASE VALVE ACTUATORS

Description	Cat.No.	Data Sheet No.	Stock Code	Weight kg
Pressure Release Valve Actuator with :				
Plunger Actuation, NC	PC 95219	PC 05022	K	0.02
Plunger Actuation, NO	PC 95230	PC 05030	S	0.02
Straight Lever Actuation, NC	PC 95272	PC 05040	K	0.02
Extended Lever Actuation, NC	PC 95315	PC 05041	S	0.03
Roller Lever Actuation, NC	PC 95266	PC 05042	K	0.02
Finger Tip Lever Actuation, NC	PC 95273	PC 05043	S	0.03
Whisker Actuation, NC	PC 95226	PC 05044	K	0.01
Ultra Low Pilot Pressure Actuation (40 mm H_2O), NO	PC 95316	PC 05045	K	0.065

EXAMPLE OF ORDERING SPECIFICATIONS : Pressure Release Valve Actuator, Roller Lever Actuation, Spring Return, NC,
Cat.No. PC 95226

NOTES :

1) NC denotes Normally Closed
NO denotes Normally Open

2) When a Pressure Release Actuator of NC mode is fitted in the pilot port of a Directional Control Valve, the mode of the latter will change from NO to NC, or NC to NO as the case may be.

SUPPLEMENTARY VALVES
AND ALLIED PRODUCTS

FLOW CONTROL VALVES

APPLICATION : Flow control valves are mainly used for regulation of power cylinder piston speeds in which case they are mounted in the line between cylinder and main valve, often directly on the cylinder ports. They should be installed in such a way that the discharge flow from the cylinder is restricted whereas the inlet fluid from the valve has free flow. Speed regulation of both strokes of a double acting cylinder necessitates the use of two separate flow control valves.

CONSTRUCTION : The flow control valves have a built-in non-return valve that allows full flow in one direction. The controlled flow in the other direction is regulated by a metering screw.

ADJUSTMENT : The metering screw is adjustable by means of a serrated finger knob fitted on the valve. If the valve is to be pre-set and further adjustments are not normally required, the knob can be removed. After removal of the knob a lot will be revealed allowing the metering screw to be adjusted by a screw driver.

MOUNTING : The valves have two plain holes for base or bracket mounting, and two tapped holes on the top for panel mounting.

FLUIDS : Air, oil and inert gases.

FLUID PRESSURE : Air - 10 bar

OPENING PRESSURE FOR NON-RETURN VALVE : 0.2 bar

TEMPERATURE RANGE : -20^0 to 70^0C

MATERIALS :

Body	:	Hardened aluminium alloy
Metering Screw	:	Steel, 40 kgf/mm^2
Seals	:	Synthetic oil-resistant rubber

SURFACE TREATMENT :

Body	:	Stove-enamelling
Metering Screw	:	Zincplating and chromate passivation

DIMENSIONS : Refer data sheet no. PC 05011

Port Size	Flow Capacity	Cat.No.	Stock Code	Weight kg
G 1/16	250 litres	PC 95167	N	0.02
G 1/8	500 litres	PC 95168	K	0.03
G 1/4	2000 litres	PC 95169	K	0.07
G 1/2	8000 litres	PC 95170	K	0.25
G 3/4	16000 litres	PC 95171	N	0.5

NOTE : The flow capacity is given in litres of free air at an inlet pressure of 7 bar and no back pressure at outlet.

EXAMPLE OF ORDERING SPECIFICATIONS : flow Control Valve, ports G 1/4, Cat.No. PC 95169

SUPPLEMENTARY VALVES
AND ALLIED PRODUCTS

NON-RETURN VALVES

APPLICATION : The non-return valves are used where flow in one direction only is required, and flow in the opposite direction must be blocked. An example of their use is as a safety device to prevent loss of pressure in the event of air supply failure.

CONSTRUCTION : The non-return valve has a spring loaded poppet fitted with an O-Ring to provide leakproof sealing. The valve opens when the pressure difference exceeds the force of the spring.

FLUIDS : Air, oil and inert gases.

FLUID PRESSURE : 10 bar max.

MATERIALS :

Body and Poppet	: Hardened aluminium alloy
O-Ring	: Synthetic oil-resistant rubber
Spring	: Stainless steel

SURFACE TREATMENT : Body : Stove-enamelling

DIMENSIONS : Refer data sheet no. PC 05046

Port Size	Pressure Difference Required Bar	Cat.No.	Stock Code	Weight kg
G 1/16	0.3	PC 95025	K	0.02
G 1/8	0.3	PC 95211	K	0.025
G 1/4	0.3	PC 95008	K	0.06
G 1/2	0.3	PC 95212	K	0.15
G 3/4	0.3	PC 95213	K	0.23
G 1	0.3	Pc 95326	S	0.9

EXAMPLE OF ORDERING SPECIFICATIONS : Non-Return Valve, G 1/4, Cat.No. PC 95008

SHUTTLE VALVES
("OR" ELEMENTS)

APPLICATION : The shuttle valve allows application of two separate signals from different sources to a single consumer. An example of its use is a pilot actuated valve required to be operated from two pilot valves, e.g. two push button valves one mounted directly on the equipment and the other one at a distance for remote control. If a shuttle valve is not incorporated in such a circuit, the signal from one pilot valve would be exhausted through the other pilot valve and rendered ineffective.

CONSTRUCTION : The shuttle valve has two inlet ports and one outlet port. It contains a piston which will open the port on which pressure is applied connecting it to the outlet port while at the same time completely blocking the un-pressurized port located opposite.

The shuttle valve is also known as an "OR" element as it will emit a signal at the outlet port (port 3) when receiving a signal at input port 1 OR input port 2.

If simultaneous input signals are received, the piston remains in the original position until one input signal reaches a higher pressure then the other one.

FLUIDS : Air and inert gases.

FLUID PRESSURE : 1.5 – 10 bar.

MATERIALS :

Body	:	Hardened aluminium alloy
Piston	:	Acetal resin, Polyamide or Oil-resistant rubber
Seals	:	Synthetic oil-resistant rubber

SURFACE TREATMENT : Body : Stove-enamelling

DIMENSIONS : Refer data sheet no. PP 05052

Port Size	Flow Capacity	Cat.No.	Stock Code	Weight kg
G 1/16	250 litres	PC 95157	K	0.03
G 1/8	500 litres	PC 95158	K	0.04
G 1/4	2000 litres	PC 95159	K	0.09
G 1/2	8000 litres	PC 95160	K	0.15
G 3/4	16000 litres	PC 95161	S	0.22

Note : The flow capacity is given in litres of free air at an inlet pressure of 7 bar and no back pressure outlet.

EXAMPLE OF ORDERING SPECIFICATIONS : Shuttle Valve, G 1/16, Cat.No. PC 95157

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**SUPPLEMENTARY VALVES
AND ALLIED PRODUCTS**

TWIN PRESSURE VALVES
("AND" ELEMENTS)

APPLICATION : The twin pressure valve will give an output signal only on receipt of two signals simultaneously. It is used in pneumatic circuits where two pilot signals must be present before a pilot actuated valve should change over.

An example of its use is a system incorporating two clamping cylinders and a work cylinder in which the latter should operate only when both the clamping cylinders are actuated. In this system the twin pressure valve will receive signals from each of the clamping cylinders and supply a signal to the pilot actuated valve for the work cylinder only when both the clamping cylinders have been put on.

CONSTRUCTION : The twin pressure valve has two inlet ports and one outlet port. It contains a poppet which will block the port on which pressure is applied until a signal of same pressure is imposed on the other inlet port opposite.

The twin pressure valve is also known as an "AND" element as it will emit a signal at output port 3 only when receiving signals at input port 1 AND input port 2 simultaneously.

When signals of equal pressure are applied to the two inlet ports, the poppet will be floating between its seals, and both input signals are connected to the outlet port.

PORTS : Thread G 1/16 with gland nuts for 5 mm (3/16") OD tube.

FLUIDS : Air and inert gases.

FLUID PRESSURE : 1 - 10 bar.

FLOW CAPACITY : 250 litres of free air per min.
(Flow to atmosphere at inlet pressure 7 bar).

MATERIALS :

Body	:	Hardened aluminium alloy
Poppet	:	Acetal resin
Seals	:	Synthetic oil-resistant rubber

SURFACE TREATMENT : Body : Stove-enamelling

DIMENSIONS : Refer data sheet no. PC 05033

Port Size	Cat. No.	Stock Code	Weight kg
G 1/16	PC 95325	S	0.03

EXAMPLE OF ORDERING SPECIFICATIONS : Twin Pressure Valve, G 1/16, Cat.No. PC 95325

SUPPLEMENTARY VALVES
AND ALLIED PRODUCTS

SHUT-OFF VALVES

APPLICATION : The shut-off valves are used to cut off fluid supply and at the same time exhaust the connected system. It has the same function as a 3 port directional control valve.

It is normally used as a main shut-off valve for the air supply to a pneumatic system. A conventional 2 port shut-off valve will 'trap' the prevailing pressure in the system when closed which may cause unwanted operations to take place if the system valves are actuated after the air supply has been cut off. This may lead to accidents if a cylinder performs an unexpected movement when the operator assumes the system is disconnected. The shut-off valves covered by this product list will instantaneously connect the system to exhaust when the valve is closed and thereby render the system 'dead' and safe.

CONSTRUCTION : The shut-off valve is of the in-line type and is operated by a hand slide. Due to its simple design it is reliable and of low cost.

FLUIDS : Air and inert gases

FLUID PRESSURE : 0 - 10 bar

MATERIALS :
Body : Hardened aluminium alloy
Slide : Steel, 40 kgf/mm^2
Seals : Synthetic oil-resistant rubber

SURFACE TREATMENT :
Body : Black anodising
Slide : Zincplating and chromate passivation

DIMENSIONS : Refer data sheet no. PC 05065

Port Size	Flow Capacity	Cat.No.	Stock Code	Weight kg
G 1/16	250 litres	PC 95401	S	
G 1/8	500 litres	PC 95402	K	0.03
G 1/4	2000 litres	PC 95398	K	0.05
G 1/2	8000 litres	PC 95399	K	0.15
G 3/4	16000 litres	PC 95400	K	

Note : The flow capacity is given in litres of free air at an inlet pressure of 7 bar and no back pressure at outlet.

EXAMPLE OF ORDERING SPECIFICATIONS : Shut-off Valve, G 1/4, Cat.No. PC 95398

SUPPLEMENTARY VALVES
AND ALLIED PRODUCTS

RAPID EXHAUST VALVES

APPLICATION : The rapid exhaust valves are used to allow direct exhaust by unrestricted flow to atmosphere from a pressurized system.

They are successfully used for increasing piston speed of pneumatic cylinders upto 3 times by allowing rapid exhaust of the back pressure on the piston when mounted directly on the exhaust port. Another example of their use is for rapid closure of the pneumatic brake of a power press.

The smallest valve in the range (port size G 1/16) is generally used for reducing the response (re-setting) time for pressure actuated directional control valves by allowing faster exhaust for the pilot piston.

CONSTRUCTION : Valves of sizes G 1/16, G 1/8 and G 1/4 are provided with a rubber seal which will close the exhaust port when pressure is applied at the inlet port. When the pressure is released the seal will deflect and open up for exhaust directly to atmosphere. Features of this design are high sensitivity and fast response.

The valves of larger sizes, i.e. G 1/2 and above have a spring loaded piston precision guided in the body in place of the rubber seal provided in the smaller units. This design provides a rugged unit suitable for heavy duty with a long life even at high frequency operations.

The exhaust side of the rapid exhaust valves of sizes G 1/8 and above are furnished with standard ports with female thread. The exhaust port can be fitted with an exhaust silencer (Product List 8.635) if required to reduce the discharge noise.

The supply from the valves of size G 1/8 and above to the cylinder takes place through a plug with male thread and seal washer to suit standard ports. The plug can rotate freely in the body to allow mounting on the cylinder in any convenient position. The plug may also be inserted from the bottom side of the valve body thereby permitting mounting of the valve in reverse position, if required.

FLUIDS : Air and inert gases

FLUID PRESSURE : 1 - 10 bar

MATERIAL :

Body	:	Size G 1/16 Size G 1/8 up	: Brass Hardened aluminium alloy
Seal	:	Port size G 1/16. G 1/8 and G 1/4	: Synthetic oil-resistant rubber
Exhaust Nut			: Steel, 40 kgf/mm^2

SUPPLEMENTARY VALVES
AND ALLIED PRODUCTS

RAPID EXHAUST VALVES

APPLICATION	**:**	Piston	: Port size G 1/4 up	:	Polyamide, glass-reinforced
		Springs		:	Stainless steel
		O-Rings		:	Synthetic oil-resistant rubber
DIMENSIONS	**:**	Refer data sheet no. PP 05039			

Port Size	Closing Pressure Bar	Cat.No.	Stock Code	Weight kg
G 1/16	1	PC 95314	K	0.01
G 1/8	1	PC 95214	K	0.04
G 1/4	1	PC 95215	K	0.12
G 1/2	1	PC 95216	K	0.35
G 3/4	1	PC 95217	K	0.65

EXAMPLE OF ORDERING SPECIFICATIONS **:** Rapid Exhaust Valve, G 1/2, Cat.No. PC 95216

SUPPLEMENTARY VALVES
AND ALLIED PRODUCTS

TIMER

APPLICATION : The timer is applied to provide a time delay adjustable from 1 to 10 sec. In a pneumatic circuit. It is normally used together with a pilot pressure actuated valve to delay the pilot signal for changing over the valve.

CONSTRUCTION : The timer incorporates an adjustable volume in which pressure is gradually built up by metering the incoming air signal through a small fixed orifice. The pressure created in the volume will cause a piston to move at the end of the pre-set delay and connect the pilot signal to the supply port. The timer snaps open instantly to full flow without slow creeping or leakage.

The desired time is set by adjusting the volume by means of a serrated knob on top of the timer.

A special feature of the timer is the sharp edged metering orifice which is non-clogging and self-cleaning.

The timer maintains a high degree of accuracy and repeatability, and is unique with regard to the very low variation in timing with changes in supply pressure.

MOUNTING : The timer can be mounted directly on the pilot port of a pilot pressure actuated valve or can be panel mounted for which a mounting bracket is available.

CONNECTIONS : The inlet port is threaded G 1/16 and fitted with ferrule and gland nuts for 5 mm (3/16") OD tube. The supply takes place through a plug with male thread G 1/16 and a seal washer to suit standard pilot ports of valves.

FLUIDS : Air and inert gases.

FLUID PRESSURE : 3 to 10 bar.

FLOW CAPACITY : 250 litres of free air per min.
(Flow to atmosphere at inlet pressure 7 bar).

TIME ADJUSTMENT : 1 to 10 sec.

ACCURACY : Repeatability better than ± 1% at fixed pressure.

Change in timing less than ± 5% for ± 1 bar pressure variation.

TEMPERATURE RANGE : - 200 to 700C

MATERIALS :
Body : Hardened aluminium alloy / ABS Polymer
Seals : Synthetic oil-resistant rubber
Spring : Stainless steel

SURFACE TREATMENT : Body : Stove-enamelling

SUPPLEMENTARY VALVES
AND ALLIED PRODUCTS

TIMER

DIMENSIONS : Refer data sheet no. PC 05056

Description	Cat .No.	Stock Code	Weight kg
Timer, Delayed “ON”	PC 95195	K	0.17
Panel Mounting Bracket with screws	PC 90052	K	0.01

EXAMPLE OF ORDERING SPECIFICATIONS : Timer, Delayed “ON”, G 1/16, cat.no. PC 95195

Panel Mounting Bracket with screws, cat.no. PC 90052, fitted on above Timer

ORNCAL

**SUPPLEMENTARY VALVES
AND ALLIED PRODUCTS**

SIGNAL BREAKER

APPLICATION : The signal breaker is designed to eliminate the problem of locked-on or maintained signals in a pneumatic circuit. A signal produced early in an operation sequence may oppose another signal produced later and render it ineffective unless the signal breaker is incorporated.

The signal breaker is generally screwed directly into the pilot port of a pressure actuated valve. A signal received at the inlet port of the signal breaker will pass freely into the pilot chamber of the valve and cause the pilot piston to move and change over the valve. When the piston has completed its stroke and changed over the valve, a back pressure will build up. This back pressure is sensed by the signal breaker which will change over automatically and block the incoming signal while connecting the pilot port of the valve to exhaust. The valve is now free to re-set on receiving a signal on the opposite pilot actuator for return.

The signal breaker offers the users of air pilot systems greater versatility in circuit design and often simplifies a system substantially. As a simple example of its application can be mentioned a press forming blanks into desired shape. The blank will trip a pilot valve when correctly positioned in the die thus initiating the downward movement of the press ram. Ideally, when the ram reaches the end of its stroke the other pilot valve will be tripped causing the ram to retract. However, because the first pilot valve is still actuated by the blank resting against it, its companion pilot valve is rendered ineffective. To build around this problem would normally be a time consuming and expensive task involving mechanical trip pawls, etc. With a signal breaker the job can be done in a few minutes and at a minimal cost.

CONSTRUCTION : The signal breaker contains a spring loaded spool resting in open position. The back pressure built up when the pilot piston in the connected valve has completed its stroke, will act on the spool and due to its differential areas will cause it to move against the spring force when the pressure reaches 3 to 3.5 bar. The spool will now block the inlet signal and at the same time connect the pilot port of the valve to atmosphere for free exhaust. The incoming signal will lock the signal breaker in this position as long as it is maintained. When the incoming signal is removed, the signal breaker will exhaust and re-set.

PORTS : Inlet thread G 1/16 with gland nut for 5 mm (3/16”) OD tube.

Outlet thread G 1/16 male with seal washer (for screwing directly into pilot port of valve).

FLUIDS : Air and inert gases

SUPPLEMENTARY VALVES
AND ALLIED PRODUCTS

SIGNAL BREAKER

FLUID PRESSURE : 3 - 8 bar

FLOW CAPACITY : Inlet 70 litres and exhaust 300 litres of free air per min.
(Flow to atmosphere at pressure 7 bar).

MATERIALS :
Body : Brass
Springs : Stainless steel
Seals : Synthetic oil-resistant rubber

SURFACE TREATMENT : Zincplating and chromate passivation

DIMENSIONS : Refer data sheet no. PC 05058

Port Size	Cat. No.	Stock Code	Weight kg
G 1/16	PC 95339	K	0.02

EXAMPLE OF ORDERING SPECIFICATIONS : Signal Breaker, G 1/16, Cat.No. PC 95339

SUPPLEMENTARY VALVES
AND ALLIED PRODUCTS

EXHAUST SILENCERS

APPLICATION : The exhaust silencers effectively reduce the air exhaust noise from pneumatic cylinders, valves, clutches and other air actuated equipment. Operating on normal factory line pressure, their compact size allows installation in limited space.

The silencers may be screwed directly into the exhaust ports of the valves. An additional use of the silencer is as a filter on breather or vent ports.

A special design of the exhaust silencer is provided with a built-in flow control valve. These units are useful for achieving adjustment of cylinder speeds by regulating the flow of the exhaust air from the cylinder.

CONSTRUCTION : The exhaust silencers contain a cartridge of clog resistant filter screen. The noise reduction is accomplished by leading the air flow through this cartridge and dispersing the exhaust air radially through slots in the silencer body. This design reduces the noise level substantially with negligible flow impedance.

The exhaust silencers with built-in flow control valve contain a metering screw that regulates the air flow from closed to full flow.

FLUIDS : Air and inert gases.

FLUID PRESSURE : 10 bar max.

MATERIAL : Body : Steel, 40 kgf/mm^2

SURFACE TREATMENT : Zincplating and chromate passivation

DIMENSIONS : Refer data sheets nos PC 05038 and PC 05039

EXHAUST SILENCERS

Male Thread	Cat. No.	Stock Code	Weight kg
G 1/16	PC 95210	K	0.005
G 1/8	PC 95150	K	0.01
G 1/4	PC 95151	K	0.05
G 1/2	PC 95152	K	0.1
G 3/4	PC 95153	K	0.3
G 1	PC 95154	S	0.6

EXHAUST SILENCERS WITH BUILT-IN FLOW CONTROL VALVE

Male Thread	Cat. No.	Stock Code	Weight kg
G 1/16	PC 95209	K	0.01
G 1/8	PC 95196	K	0.03
G 1/4	PC 95197	K	0.09
G 1/2	PC 95198	K	0.2
G 3/4	PC 95199	K	0.5
G 1	PC 95200	N	0.5

EXAMPLE OF ORDERING SPECIFICATIONS : Exhaust Silencer with built-in flow control valve, G 1/8, Cat.No. PC 95196

ORNCAL

SUPPLEMENTARY VALVES AND ALLIED PRODUCTS

VACUUM HEAD AND SUCTION PADS

APPLICATION : The vacuum head provides a simple and inexpensive means of generating vacuum directly from the normal shop air supply in cases where only small volumes are required, e.g. for suction pads described below.

A vacuum of 0.5 bar is developed. The response time is swift and the vacuum can be switched on and off by conventional pneumatic control valves. This facilitates the incorporation of the heads in standard pneumatic circuits. By means of adaptors, suction pads of various sizes can be fitted onto the vacuum head providing adhesion forces from 0.8 to 10 kgf. Allowing a safety factor of 2, weights from 0.4 to 5 kg can be lifted.

Typical applications are lifting of small components for feeding into machines for second operation (e.g. aluminium capsules and other pressed parts), and lifting of light sheets, cartons, etc.

CONSTRUCTION : The vacuum head incorporates a small bore nozzle through which the inlet air is injected and passed across cavity in which a vacuum is generated due to the venturi effect. Te head operates on normal filtered shop air supply.

PORTS : The vacuum head has 3 ports G 1/16 with gland nuts for 3/16" OD tube. The inlet and exhaust ports are on the sides of the head and the vacuum is generated at the bottom port.

The gland nut in the bottom port can be replaced by an adaptor for holding a suction pad.

FLUIDS : Air and inert gases.

VACUUM DEVELOPED : 0.4 bar at supply pressure 4 bar.
0.5 bar at supply pressures 5 to 6 bar.

FLUID CONSUMPTION : 7 litres of free air per min (at inlet pressure 5 bar).

MATERIALS :

Body	:	Hardened aluminium alloy
Nozzles	:	Acetal Resin
Suction Cips	:	Synthetic oil-resistant rubber

SURFACE TREATMENT :

Body	:	Stove-enamelling

DIMENSIONS : Refer data sheet no. PC 05037

**SUPPLEMENTARY VALVES
AND ALLIED PRODUCTS**

VACUUM HEAD AND SUCTION PADS

Description	Lifting Force * kgf	Cat. No.	Stock Code	Weight g
Vacuum Head	-	PC 95320	K	17
Suction Pad with Adaptor, 15 mm dia	0.4	PC 95370	K	3
Suction Pad with Adaptor, 25 mm dia	1	PC 95371	K	6
Suction Pad with Adaptor, 40 mm dia	3	PC 95372	K	25
Suction Pad with Adaptor, 50 mm dia	5	PC 95373	K	40
Spares (Suction Pad only)				
Suction Pad, 15 mm dia		PC 50043	K	0.14
Suction Pad, 25 mm dia		PC 50040	K	0.5
Suction Pad, 40 mm dia		PC 50044	K	2.5
Suction Pad, 50 mm dia		PC 50045	K	5

***)** Safety factor 2 : 1

SUPPLEMENTARY VALVES AND ALLIED PRODUCTS

PRESSURE INDICATOR

APPLICATION : The pressure indicator is designed to show if a line is pressurized. It can be used in a pneumatic system to show if main supply is 'on' of 'off', and it is also ideally suited for indicating the position of a process, for example 'Filling On' and 'Filling Off' for a pneumatically operated filling valve, etc.

The wide range of operating pressure from 1 to 10 bar render the indicator suitable for low pressure circuits (1 – 2 bar) as well as normal 'shop pressure' systems (5 – 10 bar).

CONSTRUCTION : The pressure indicator contains a flag having a green section with the letters OFF and a red section with the letters ON. A disc on the face of the indicator has a cut-out in which either the green or the red section of the flag will be visible.

A spring holds the flag resting in the position showing the green section (OFF). A small piston will move the flag to display the red section (ON) when pressure is applied.

The unit is very compact and is designed for mounting in panels; its front dimensions are matching those of our standard push button valves, so as to provide a uniform and elegant appearance of control panels containing push button valves and pressure indicators side by side.

PORT : Thread G 1/16 with gland nut for 5 mm (3/16") OD tube.

FLUIDS : Air and inert gases.

FLUID PRESSURE : 1 - 10 bar.

MATERIALS :

Body and Piston	:	Hardened Aluminium Alloy
Spring	:	Stainless Steel
Seal	:	Synthetic Oil-resistant Rubber

SURFACE TREATMENT : Body : Anodizing

DIMENSIONS : Refer data sheet no. PC 05054

Port Size	Cat. No.	Stock Code	Weight kg
G 1/16	PC 95010	K	0.05

EXAMPLE OF ORDERING SPECIFICATIONS : Pressure Indicator, G 1/16, Cat.No. PC 95010

ORNCAL

SUPPLEMENTARY VALVES AND ALLIED PRODUCTS

ROTORSEALS

APPLICATION : The rotorseals allow fluid under pressure to be introduced into a rotating shaft or cylinder. Example is the supply of compressed air through the crankshaft to the pneumatic clutch of a power press.

CONSTRUCTION : The rotorseals are fitted with a micro-lapped and anti-friction treated floating sealing ring keyed in the body to prevent rotation. The sealing ring is spring loaded and seals against the hardened and micro-tapped shaft.

The shaft has a precision ground pilot behind the threaded portion to ensure that the rotorseal runs true with the shaft on which it is mounted. An O-Ring provides sealing at this point.

Ball bearings support the rotorseal shaft in the body.

The rotorseals are available of 'elbow' type and they are provided with the port perpendicular to the axis.

FLUIDS : Air, oil and insert gases.

FLUID PRESSURE : 25 bar max.

MATERIALS :

Body	: Close-grained cast iron
Shaft	: Steel, 40 kgf/mm^2
Sealing Insert	: OHNS steel, hardened to 60 Rc
Spring	: Stainless steel
Seal	: Special anti-friction treated cast alloy

SURFACE TREATMENT :

Body	: Stove-enamelling
Shaft	: Zincplating with yellow passivation

DIMENSIONS : Refer data sheet no. PP 05071

ROTORSEALS – ELBOW TYPE – SINGLE PASSAGE

Port Size	Male Thread	RPM max	Torque * kgf x cm	Cat. No.	Stock Code	Weight kg
G 1/4	G 1/4	2000	2	PP 95136	K	0.3
G 1/4	G 1/4, LH	2000	2	PP 95137	S	0.3
G 1/2	G 1/2	2000	3	PP 95134	K	0.7
G 1/2	G 1/2, LH	2000	3	PP 95135	S	0.7
G 3/4	G 3/4	2000	4	PP 95051	K	1.4
G 3/4	G 3/4, LH	2000	4	PP 95202	S	1.4
G 1	G 1	2000	6	PP 95148	K	2.5
G 1	G 1, LH	2000	6	PP 95149	S	2.5

***)** Torque rating at pressure 10 bar

EXAMPLE OF ORDERING SPECIFICATIONS : Rotorseal, elbow type, single passage, G 1/2 with G 1/2 LH male thread, Cat.No. PP 95135

FLUID LINE FITTINGS
AND ACCESSORIES

VINYL TUBES

APPLICATION : The vinyl tubes are highly flexible, tough and abrasion resistant. They are competitive in price and convenient for most pneumatic systems. They are originally crystal clear but tend to turn yellowish and harder in the course of time.

The tubes are supplied in coils of 30 metres or in cut lengths as per requirements.

If the tubes are to be fitted in our standard range of connectors it is required to use an insert to prevent this soft tube from collapsing when the ferrule is tightened. The inserts are covered by Product List no. 10.510.

FLUIDS : Air, oil, inert gases and most acids and alkalies.

FLUID PRESSURE : 10 bar max.

TEMPERATURE : 0^0 to 50^0C

OD mm		ID mm		Minimum Bending Radius mm	Cat. No.	Stock Code	Weight Per Metre Kg
4.8	(3/16”)	2.4	(3/32”)	15	XP 20314	K	0.018
6.4	(1/4”)	3.2	(1/8”)	20	XP 20301	K	0.06
9.5	(3/8”)	4.8	(3/16”)	30	XP 20303	K	0.07
12.7	(1/2”)	6.4	(1/4”)	40	XP 20304	K	0.12
19	(3/4”)	9.5	(3/8”)	60	XP 20305	K	0.3

NYLON TUBES

APPLICATION : The nylon tubes are flexible and supplied in natural colour. They retain their colour and flexibility and are very suitable for pneumatic and low pressure hydraulic systems. The tubes are supplied in coils of 30 metres approx. or in cut lengths as per requirements.

FLUIDS : Air, oil, inert gases and most acids and alkalies.

FLUID PRESSURE : 30 bar max. (Safety factor 2 : 1).

TEMPERATURE : 100^0C max.

OD Mm		ID mm		Minimum Bending Radius mm	Cat. No.	Stock Code	Weight Per Metre Kg
4.8	(3/16”)	2.4	(3/32”)	15	XP 20314	K	0.018
6.4	(1/4”)	3.2	(1/8”)	20	XP 20301	K	0.06
9.5	(3/8”)	4.8	(3/16”)	30	XP 20303	K	0.07
12.7	(1/2”)	6.4	(1/4”)	40	XP 20304	K	0.12

ORACAL

FLUID LINE FITTINGS AND ACCESSORIES

UNIONS – COMPRESSION TYPE

APPLICATION : The Unions can be used to join directly two tubes of same outside diameter. They are suitable for plastic, steel and non-ferrous tubes. They can also be used for plain rubber hoses and wire braided rubber hoses when these are fitted with stem connectors (Product List no. 10.545). Tubes of different outside diameters may be joined by means of a union and a stem connector. The bulkhead unions are similar to the plain unions but fitted with a nut rendering them suitable for mounting in a panel of thickness upto 5 mm. They are normally used for connecting the tubes inside a control panel with the tubes leading from the panel to the power cylinders, etc. controlled from the panel.

CONSTRUCTION : The unions are fitted with ferrules that clamp the tubes on the outside Diameter when the gland nuts are tightened.

Tube inserts are required if the unions are used with soft plastic tubes (e.g. vinyl tubes) to prevent them from collapsing when clamped. These inserts are covered by Product List no. 10.560.

FLUIDS : Air, oil and inert gases.

FLUID PRESSURE : 40 bar max.

MATERIALS : Hardened aluminium alloy (for 3/16" OD tube) and steel, 40 kgf/mm^2 (for 1/4" OD tube up).

SURFACE TREATMENT : Zincplating and chromate passivation for steel parts.

DIMENSIONS : Refer Data Sheets nos PP 05110 and PP 05123.

UNIONS

OD of Tube	Cat. No.	Stock Code	Weight kg
3/16"	PP 90283	K	0.01
1/4"	PP 90243	S	0.03
5/16"	PP 90247	N	
3/8"	PP 90244	K	0.04
1/2"	PP 90245	K	0.09
5/8"	PP 90248	S	
3/4"	PP 90246	K	

BULKHEAD UNIONS

OD of Tube	Hole Dia Reqd. in Panel mm	Cat. No.	Stock Code	Weight kg
3/16"	12.5	PP 90211	K	0.02
1/4"	12.5	PP 90220	S	0.04
5/16"	14.5	PP 90241	N	
3/8"	14.5	PP 90212	K	0.06
1/2"	18.5	PP 90219	K	0.10
5/8"	24.5	PP 90284	S	
3/4"	27.5	PP 90221	K	0.30

EXAMPLE OF ORDERING SPECIFICATIONS : Bulkhead Union, for 3/8" OD tube, Cat.No. PP 90212

**FLUID LINE FITTINGS
AND ACCESSORIES**

STRAIGHT CONNECTORS

APPLICATION : The straight connectors are used for joining tubes to the ports of power cylinders, valves, etc. They are suitable for plastic, steel and non-ferrous tubes. They can also be used for plain rubber hoses and wirebraided rubber hoses when tubes are fitted with stem connectors (Product List no. 10.545)

CONSTRUCTION : The straight connectors have male thread at one end with seal washer to provide leakproof joint in cylinder or valve ports. The other end has a ferrule that clamps the tube on the outside diameter when the gland nut is tightened.

Tubes inserts are required for use with soft plastic tubes (e.g. vinyl tubes) to prevent them from collapsing when clamped. These inserts are covered by Product List no. 10.560.

FLUIDS : Air, oil and inert gases.

FLUID PRESSURE : 10 bar

MATERIAL : Steel, 40 kgf/mm^2

SURFACE FINISH : Zincplating and chromate passivation

DIMENSIONS : Refer Data Sheet no. PP 05108

Male Thread	OD of Tube	Cat. No.	Stock Code	Weight kg
G 1/16	3/16”	PP 90166	K	0.01
G 1/16	1/4”	PP 90164	K	0.02
G 1/8	3/16”	PP 90165	K	0.02
G 1/8	1/4”	PP 90147	K	0.02
G 1/8	5/16”	PP 90148	S	0.02
G 1/8	3/8”	PP 90149	K	0.02
G 1/4	1/4”	PP 90163	S	0.03
G 1/4	5/16”	PP 90150	S	0.04
G 1/4	3/8”	PP 90151	K	0.04
G 1/4	1/2”	PP 90152	K	0.05
G 3/8	3/8”	PP 90154	S	0.04
G 1/2	3/8”	PP 90158	S	0.07
G 1/2	1/2”	PP 90159	K	0.08
G 1/2	3/4”	PP 90160	K	0.14
G 3/4	3/4”	PP 90161	K	0.17

EXAMPLE OF ORDERING SPECIFICATIONS : Straight Connector, to fit G 1/4 port and suitable for 3/8” OD tube, Cat.No. PP 90151

ORACAL

FLUID LINE FITTINGS AND ACCESSORIES

ELBOW, TEE, CROSS AND MANIFOLD CONNECTORS

APPLICATION : The elbow, tee, cross and manifold connectors are used for joining 2, 3, 4 or more tubes in the configurations indicated by the names of the connectors. They are suitable for plastic, steel and non-ferrous tubes. They can also be used for plain rubber hoses or wirebraided rubber hoses when these are fitted with stem connectors. (Product List no. 10.545).

The connectors are designed to join directly tubes of same diameter. One or more tubes of a diameter smaller than that for which the connector is designed can be joined by the use of stem connectors (Product List no. 10.545).

CONSTRUCTION : The units consist of a solid body provided with 2, 3, 4 or more ports of fine metric thread. The body is furnished with holes for mounting. Each port has a ferrule and a male gland nut for clamping of the tube.

FLUIDS : Air, oil and inert gases.

FLUID PRESSURE : 40 bar max.

MATERIALS : Hardened aluminium alloy (for 3/16" OD tube) and steel, 40 kgf/mm^2 (for 1/4" OD tube up).

SURFACE TREATMENT : Body : Stove-enamelling
Gland Nuts : Zincplating and chromate passivation

DIMENSIONS : Refer data sheets nos PP 05104, PP 05103, PP 05105 and PP 05112.

ELBOW CONNECTORS

OD of Tube	Cat. No.	Stock Code	Weight kg
3/16"	PP 90100	K	0.013
1/4"	PP 90101	S	0.08
5/16"	PP 90102	N	0.12
3/8"	PP 90103	K	0.16
1/2"	PP 90104	K	0.22
5/8"	PP 90432	S	
3/4"	PP 90105	S	0.4

TEE CONNECTORS

OD of Tube	Cat. No.	Stock Code	Weight kg
3/16"	PP 90107	K	0.02
1/4"	PP 90108	S	0.12
5/16"	PP 90109	N	0.18
3/8"	PP 90100	K	0.25
1/2"	PP 90111	K	0.4
5/8"	PP 90433	S	
3/4"	PP 90112	S	0.45

FLUID LINE FITTINGS AND ACCESSORIES

ELBOW, TEE, CROSS AND MANIFOLD CONNECTORS

CROSS CONNECTORS

OD of Tube	Cat. No.	Stock Code	Weight kg
3/16”	PP 90171	K	0.03
1/4”	PP 90172	S	0.17
5/16”	PP 90173	N	0.30
3/8”	PP 90174	K	0.28
1/2”	PP 90175	K	0.60
5/8”	PP 90334	S	
3/4”	PP 90176	S	1.10

MANIFOLD CONNECTORS

OD of Tube x No. of Connections	Cat. No.	Stock Code	Weight kg
3/8” x 1 plus 3/16” x 6	PC 90044	K	0.07
3/8” x 1 plus 3/16” x 10	PC 90011	K	0.27
1/2” x 1 plus 3/8” x 6	PC 90021	S	0.55
1/2” x 1 plus 3/8” x 10	PC 90022	S	0.90

EXAMP0LE OF ORDERING SPECIFICATIONS **:** Tee Connector, for 3/8” OD tube, Cat.No. PP 90110

FLUID LINE FITTINGS
AND ACCESSORIES

UNIVERSAL ELBOW AND TEE CONNECTORS

APPLICATION : The universal elbow connectors are useful for joining plastic, steel or non-ferrous tubes to ports of power cylinders, valves, etc. when it is more convenient that the tube joins the ports under a right angle rather than extending in the direction of the port as is the case when straight connectors are used.

The universal tee connector can be used in place of the elbow if there are additional connections to be made to the same line. An example is the connection of a row of valves to a common inlet. The tube is connected to one side of the tee to provide supply to the valve, and the line is continued through the other end of the tee to the next valve in the row.

CONSTRUCTION : The universal elbows and tees consist of a sleeve provided with a plug with seal washer to fit the standard ports of the cylinders, valves, etc. The plug can rotate independent of the sleeve in order that this may be kept in a convenient position for joining the tubes. The sleeve is furnished with male gland nuts and ferrules for clamping the tubes.

FLUIDS : Air, oil and inert gases.

FLUID PRESSURE : 10 bar max.

MATERIALS : Hardened aluminium alloy (for 3/16" OD tube) and steel 40 kgf/mm^2 (for 1/4" OD tube up).

SURFACE TREATMENT : Zincplating and chromate passivation for steel parts.

DIMENSIONS : Refer Data Sheets nos PP 05109 and PP 05111.

UNIVERSAL ELBOW CONNECTORS

Male Thread	OD of Tube	Cat. No.	Stock Code	Weight kg
G 1/16	3/16"	PP 90138	K	
G 1/8	1/4"	PP 90121	S	0.06
G 1/8	3/8"	PP 90123	K	0.06
G 1/4	3/8"	PP 90126	K	0.10
G 1/4	1/2"	PP 90127	K	0.14
G 1/2	1/2"	PP 90134	K	0.33
G 1/2	3/4"	PP 90135	K	0.44
G 3/4	3/4"	PP 90136	K	0.71

UNIVERSAL TEE CONNECTORS

Male Thread	OD of Tube	Cat. No.	Stock Code	Weight kg
G 1/16	3/16"	PP 90324	K	0.01
G 1/8	3/8"	PP 90309	K	0.08
G 1/4	3/8"	PP 90312	K	
G 1/4	1/2"	PP 90313	K	0.19
G 1/2	1/2"	PP 90320	K	0.49

EXAMPLE OF ORDERING SPECIFICATIONS : Universal Elbow Connector, to fit G 1/8 port and suitable for 3/8" OD tube, Cat. No. PP 90123

FLUID LINE FITTINGS AND ACCESSORIES

PLUGS AND REDUCERS

APPLICATION : The plugs are used to close ports, e.g. sealing of one of the exhaust ports in a 4 port directional control valve of this valve is to be converted into a 3 port valve.

The reducers are required if components with different male thread and port size are to be connected.

CONSTRUCTION : The plugs and reducers are provided with standard male/female thread and seal washers.

FLUIDS : Air, oil and inert gases.

FLUID PRESSURE : 10 bar max.

MATERIALS : Steel, 40 kgf/mm^2

SURFACE TREATMENT : Zincplating and chromate passivation

DIMENSIONS : Refer data sheets nos PP 05121 and PP 05122

PLUGS

Thread	Cat. No.	Stock Code	Weight kg
G 1/16	PP 90054	K	0.002
G 1/8	PP 90363	K	0.01
G 1/4	PP 90364	K	0.02
G 1/2	PP 90365	K	0.025
G 3/4	PP 90366	K	0.12
G 1	PP 90367	S	

REDUCERS

Male Thread	Female Thread	Cat. No.	Stock Code	Weight kg
G 1/8	G 1/16	PP 90454	S	0.007
G 1/4	G 1/8	PP 90455	K	0.011
G 3/8	G 1/4	PP 90456	K	0.055
G 1/2	G 1/4	PP 90457	K	0.052
G 1/2	G 3/8	PP 90470	S	0.030
G 3/4	G 1/2	PP 90458	K	0.065
G 1	G 3/4	PP 90459	K	
G 1/16	G 1/8	PP 90462	K	
G 1/8	G 1/4	PP 90463	K	0.014
G 1/4	G 3/8	PP 90464	K	0.045
G 1/4	G 1/2	PP 90465	K	0.070
G 1/2	G 3/4	PP 90466	K	0.095

EXAMPLE OF ORDERING SPECIFICATIONS : Reducer, G 3/8 male x G 1/16 female, Cat. No. PP 90456

FLUID LINE FITTINGS
AND ACCESSORIES

STEM CONNECTORS

APPLICATION : Stem connectors for rubber hoses can be directly screwed onto a standard plain rubber hose (Product List no. 10.315) whereby these can be connected to our standard range of compression type tube fittings (i.e. straight connectors, tees, etc).

Stem connectors for female swivel couplings are used for fitting on rubber hoses on female swivel end couplings (Product List no. 10.320 and 10.326) and thereby render them suitable for joining our standard tube fittings.

Stem connectors for tubes are used where a tube is to be joined to a standard compression type fitting for different diameter tubes. An example is the connection of a small pilot line to the main supply line. The can be accomplished by mounting a tee in the bigger mainline tube and connecting the smaller pilot tube to the third port of the tee through a stem connector.

CONSTRUCTION : A stem connector has a stem of outside diameter equal to that of one of our standard tubes, i.e. 3/16", 3/8", etc. The stem has a head of one of the following types :

1) A socket with coarse lefthand female threads that retains a plain rubber hose efficiently when the stem is screwed to the socket by righthand threads.
2) Male threads and conical seat suitable for the female swivel coupling of wirebraided and high pressure hoses.
3) A ferrule that clamps the tube on the outside diameter when the gland nut is tightened.

FLUIDS : Air, oil and inert gases.

FLUID PRESSURE : 40 bar max.

MATERIAL : Steel, 40 kgf/mm^2.

SURFACE TREATMENT : Zincplating with chromate passivation.

DIMENSIONS : Refer data sheets nos PP 05117, PP 05084 and PP 05116

STEM CONNECTORS FOR PLAIN RUBBER HOSES

Hose		Diameter of	Cat. No.	Stock
OD mm	ID mm	Stem mm		Code
12.5	5 (3/16")	6.5 (1/4")	PP 90449	N
14.5	6.5 (1/4")	9.5 (3/8")	PP 90450	N
17.5	10 (3/8")	9.5 (3/8")	PP 90451	N
23	12.5 (1/8")	12.7 (1/2")	PP 90452	N
30	20 (3/4")	19 (3/4")	PP 90453	N

FLUID LINE FITTINGS
AND ACCESSORIES

STEM CONNECTORS FOR RUBBER HOSE WITH FEMALE SWIVEL COUPLINGS

Male Thread	Diameter of Stem mm	Cat. No.	Stock Code	Weight kg
G 1/8	4.8 (3/16”)	PP 61756	K	0.005
G 1/8	9.5 (3/8”)	PP 61747	K	0.01
G 1/4	9.5 (3/8”)	PP 61823	K	0.01
G 3/8	12.7 (1/2”)	PP 61790	S	0.02
G 1/2	12.7 (1/2”)	PP 61824	K	0.03
G 3/4	12.7 (1/2”)	PP 61951	K	
G 3/4	19 (3/4”)	PP 61088	K	

STEM CONNECTORS FOR TUBES

OD of Tube mm	Diameter of Stem mm	Cat. No.	Stock Code	Weight kg
5 (3/16”)	6.5 (1/4”)	PP 90440	S	
5 (3/16”)	9.5 (3/8”)	PP 90295	K	0.005
5 (3/16”)	12.7 (1/2”)	PP 90357	K	0.015
5 (3/16”)	19 (3/4”)	PP 90386	K	
6.5 (1/4”)	9.5 (3/8”)	PP 90387	S	
6.5 (1/4”)	12.7 (1/2”)	PP 90441	S	
6.5 (1/4”)	19 (3/4”)	PP 90442		
8 (5/16”)	5 (3/16”)	PP 90446	N	
8 (5/16”)	9.5 (3/8”)	PP 90445	N	0.035
9.5 (3/8”)	12.7 (1/2”)	PP 90375	K	0.040
9.5 (3/8”)	19 (3/4”)	PP 90443	K	
12.7 (1/2”)	19 (3/4”)	PP 90444	S	

EXAMPLE OF ORDERING : Stem Connector, suitable for G 1/4 female swivel, stem dia 3/8”
SPECIFICATIONS Cat.No. PP 61823

FLUID LINE FITTINGS
AND ACCESSORIES

NIPPLES

APPLICATION : The nipples are used for joining the ports of two units, e.g. mounting a flow control valve on the port of a power cylinder.

They are also used for connecting rubber hoses with female swivel couplings to ports with female thread or for joining two hoses.

CONSTRUCTION : The nipples have male thread at both ends with seal washers to provide leakproof joints when fitted in ports of cylinders, valves, etc. They are also furnished with conical seats suitable for female swivel couplings.

FLUIDS : Air, oil and inert gases.

FLUID PRESSURE : 10 bar max.

MATERIALS : Steel, 40 kgf/mm^2

SURFACE TREATMENT : Zincplating and chromate passivation.

DIMENSIONS : refer data sheet no. PP 05099.

Size	Cat. No.	Stock Code	Weight kg
G 1/16	PP 90376	K	0.005
G 1/8	PP 90377	K	0.01
G 1/4	PP 90378	K	0.02
G 1/2	PP 90379	K	0.07
G 3/4	PP 90380	K	0.10
G 1	PP 90381	S	

EXAMPLE OF ORDERING SPECIFICATIONS : Nipple, G 1/8, Cat.No. PP 90377

**FLUID LINE FITTINGS
AND ACCESSORIES**

FERRULES AND INSERTS FOR CLAMPING OF TUBES

APPLICATION : The ferrules are suitable for clamping of tubes in our standard connectors, elbows, etc. They are designed for tubes made from steel, non-ferrous alloys and plastics. In case of soft plastic tubes (e.g. flexible vinyl and polyethylene) it is necessary to fit an insert in the tube to prevent it from collapsing when tightening the ferrule.

The ferrules produce leakproof joints upto 40 bar and the limiting factor is generally the strength of the tube.

MATERIALS :

Ferrules for 3/16" OD tube	:	Aluminium
Ferrules for other sizes	:	Steel, 40 kgf/mm^2
Inserts	:	Brass

SURFACE TREATMENT : Zincplating and chromate passivation

Description	Cat. No.	Stock Code	Standard Packing
Ferrule for 3/16" (5 mm) OD tube	PC 60033	K	100 pcs
Ferrule for 1/4" OD tube	PP 61396	S	50 pcs
Ferrule for 5/16" (8 mm) OD tube	PP 61397	S	50 pcs
Ferrule for 3/8" OD tube	PP 61398	K	50 pcs
Ferrule for 1/2" OD tube	PP 61399	K	50 pcs
Ferrule for 5/8" OD tube	PP 61400	S	10 pcs
Ferrule for 3/4" OD tube	PP 61401	K	10 pcs
Ferrule for 1" OD tube	PP 61402	S	10 pcs
Insert for soft plastic tube of 3/32" ID	PP 61792	K	100 pcs
Insert for soft plastic tube of 1/8" ID	PP 60907	S	50 pcs
Insert for soft plastic tube of 3/16" ID	PP 60802	K	50 pcs
Insert for soft plastic tube of 1/4" ID	PP 60803	K	50 pcs
Insert for soft plastic tube of 3/8" ID	PP 60804	K	10 pcs
Insert for soft plastic tube of 1/2" ID	PP 60805	K	10 pcs
Insert for soft plastic tube of 5/8" ID	PP 63556	K	10 pcs
Insert for soft plastic tube of 3/4" ID	PP 63587	S	10 pcs

NOTE : Quantity discounts mentioned in product list 1.201 do not apply to number of loose pieces but are to be based on quantity of complete standard packings.

EXAMPLE OF ORDERING SPECIFICATIONS : Ferule for 3/8" OD tube, Cat.No. PP 61398, packet of 50 pcs

FLUID LINE FITTINGS
AND ACCESSORIES

QUICK-ACTING COUPLINGS

ONE-WAY SHUT-OFF

APPLICATION : Refer Product List no. 10.100.

CONSTRUCTION : The quick-acting couplings consist of a socket and a plug. The socket has a spring loaded self-locking clamping arrangement for the plug which will be released by pressing the outer ring. The socket is provided with a built-in valve that automatically shuts off the fluid supply when the plug is disengaged.

All plugs fit all sockets of same nominal size.

FLUIDS : Air, oil and inert gases.

FLUID PRESSURE : 10 bar max.

MATERIALS :

Adaptor	:	Steel, 40 kgf/mm^2
Socket and Release Ring	:	Polyamide, glass filled
Seal	:	Synthetic Oil-resistant Rubber
Spring	:	Stainless Steel

SURFACE TREATMENT : Zincplating and chromate passivation for adaptor

DIMENSIONS : Refer Data Sheet no. PP 05107

SOCKETS

Nominal Size	Type *	Male Thread	OD of Tube	Cat. No.	Stock Code
6 mm	I	G 1/4	-	PP 95054	K
	I	G 1/2	-	PP 95056	K
	II	-	3/8”	PP 95062	K
	II	-	1/2”	PP 95121	K
	III (Panel Mounting)	-	3/8”	PP 95168	K
	III (Panel Mounting)	-	1/2”	PP 95158	S

FLUID LINE FITTINGS AND ACCESSORIES

SOCKETS (cont'd)

Nominal Size	Type *	Male Thread	OD of Tube	Cat. No.	Stock Code
	I	G 1/2	-	PP 95183	K
	I	G 3/4	-	PP 95184	K
	II	-	1/2"	PP 95185	K
12 mm	II	-	3/4"	PP 95186	S
	III (Panel Mounting)	-	1/2"	PP 95187	S
	III (Panel Mounting)	-	3/4"	PP 95188	S

PLUGS

Nominal Size	Type *	ID Hose	OD of Tube	Cat. No.	Stock Code
	IV	1/4"	-	PP 60026	K
	IV	5/16"	-	PP 60028	S
	IV	3/8"	-	PP 60029	K
	V	-	3/8"	PP 90034	K
6 mm	V	-	1/2"	PP 90035	K
	VI (Panel Mounting)	-	3/8"	PP 90084	K
	VI (Panel Mounting)	-	1/2"	PP 90435	S
	VI	3/8"	-	PP 62229	K
	IV	1/2"	-	PP 62230	K
	V	-	1/2"	PP 90436	K
12 mm	V	-	3/4"	PP 90437	S
	VI (Panel Mounting)	-	1/2"	PP 90438	S
	VI (Panel Mounting)	-	3/4"	PP 90439	S

TYPE * : Refer Data Sheet no. PP 05107

EXAMPLE OF ORDERING SPECIFICATIONS : Quick-Acting Coupling Socket, nominal size 6 mm, suitable for 3/8" OD tube, cat.no. PP 95062

Quick-Acting Plug, nominal size 6 mm, panel mounting, suitable for 3/8" OD tube, cat.no. PP 90084