RADIAL PISTON PUMP/ 700bar

Hydraulic radial piston pumps are commonly used in high pressure circuits for heavy-duty industrial applications. Their inherent design results in minimal mechanical wear and high volumetric efficiency, ensuring reliable long-term performance even under continuous heavy loads.

Bemco Fluidtechnik (FLUIDIK) offers a comprehensive range of high pressure radial piston pumps to meet diverse application requirements as detailed below,

Model Code	Type	No. of Ports	MOC	Max Pressure	Flow Range
HPO...	Open Casing	1	Steel/ Aluminium	700 bar	1.1...2.3 LPM
HP1-A...	A Frame	1	Steel/ Aluminium	700 bar	1.1...5.5 LPM
HP1/2-B	B Frame	1 or 2	Steel/ Aluminium	700 bar	2.7...14.2 LPM
RPX/ HPX	Multi-Port	Upto 9 ports	Steel/ Aluminium	700 bar	Max. 28 LPM
HPG2...	with Gear Pump	2	Steel/ Aluminium	700 bar	Max. 46.7 LPM
PA...	Pumping Element	-	-	700bar	0.39...1.54 LPM

KEY FEATURES & BENEFITS

FLUIDIK offers one of the widest range of radial pumps from open casing to multi-port type in steel of aluminium alloy construction for light weight requirement. Single port or multi-port options with customisable oil flow rate as per application requirements are also available. Additional options including a dual pump design with integrated gear pump for high-low circuit combination are also offered.

COMMON APPLICATIONS

- Hydraulic presses and metal forming equipment
- Plastic injection moulding machinery
- Machine tools and CNC equipment
- Oil and gas installations
- Off-highway and construction equipment
- Wind power systems
- Specialised test rigs and high-pressure hydraulics
- Marine and mining applications

Refer the following pages for detailed product information and contact us today to discuss your high-pressure hydraulic requirements and discover how FLUIDIK radial piston pumps can enhance your equipment performance.

RADIAL PISTON PUMP - OPEN CASING

Open Casing | Upto 2.3 LPM | Max 700 bar

Specification/ Technical Data

Max Pressure	700 bar
Flow Range	1.1…2.3 LPM+
Type	Open Casing
No. of Elements	3
Noise Level	< 85 dB
Body Material	Steel/ Aluminium++
Max RPM	1800
Delivery Port	1/4" BSP (F)
Media	Mineral Oil
Oil Temperature Range	+10 to 60°C
Oil Viscosity	ISO VG 46-100
Oil Cleanliness (ISO 4406)	20/18 /15
Installation	In Oil Tank
Weight (approx.)	3.75/ 5.0 Kg

Radial piston pump type HPO1 is a open casing constant flow hydraulic pump where the working pistons (3nos) are arranged radially around a central drive shaft. The stroke of each piston is caused by an eccentric drive shaft. As the central shaft rotates, the eccentric mechanism forces the pistons to move in and out of their cylinders. During the outward stroke, fluid is drawn into the pump chamber, and during the inward stroke, the fluid is pressurised and expelled. These pumps are known for their durability and high-pressure capabilities upto 700bar and are commonly used in industrial applications like hydraulic presses, moulding equipment, construction equipment and, hydraulic tools etc.

Use of open design pump makes it possible to reduce the size of power unit and these pumps are light weight and also economical when compared with other designs.

* Refer HPX/ RPX catalogue for multi-port pump options
\+ Refer Frame 1B and 2B catalogues for higher flow pumps
++ Consult factory for custom design pump options viz. extended shaft, light weight, tandem pump etc.

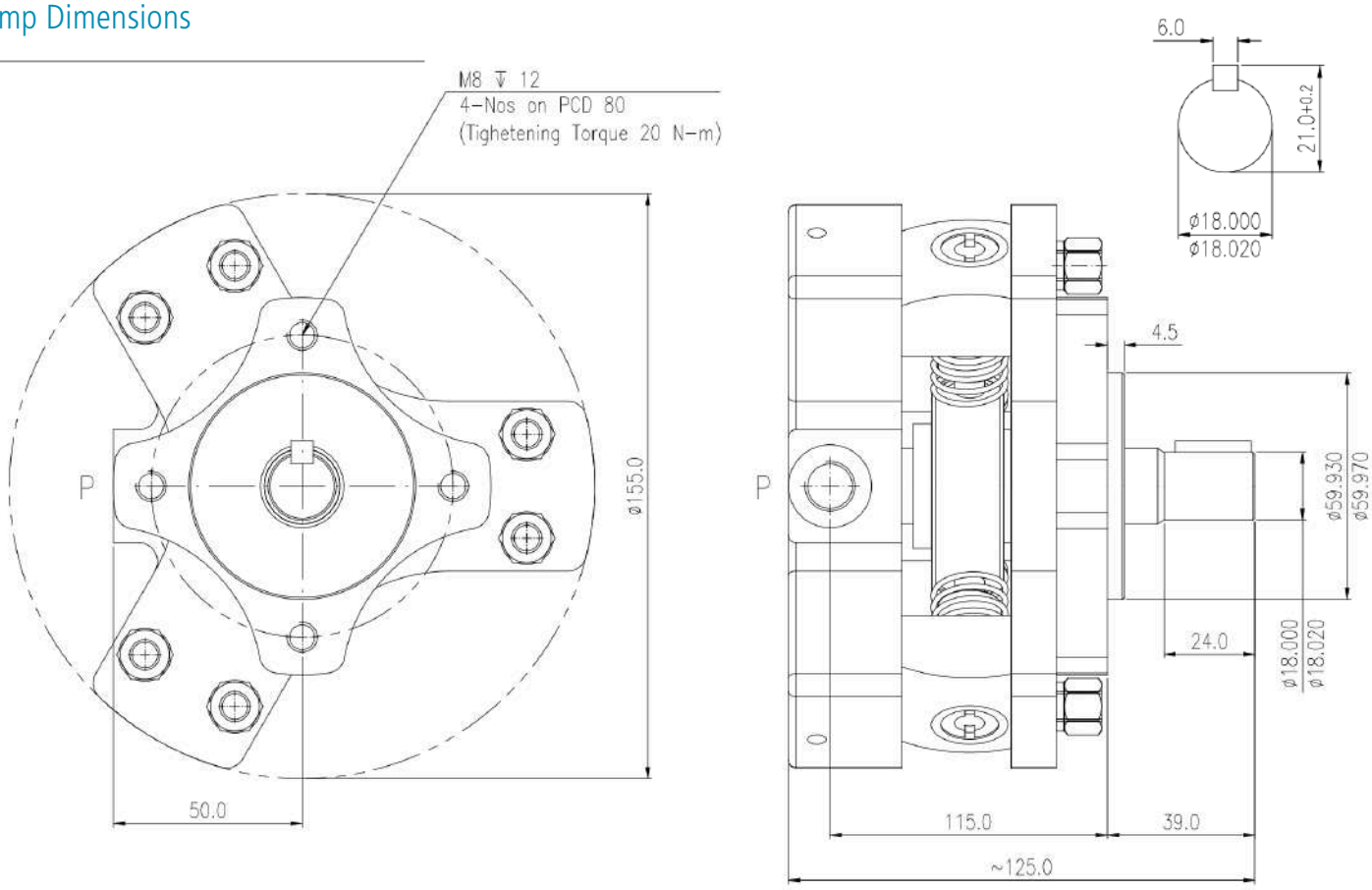
Ordering Information

Basic Code	Radial Piston Pump	HP
Type	Open Casing	O
Delivery Ports	1	1
Flow Rate	1.1…5.5 LPM	1.1…5.5
Working Pr. Bar	500-700 bar	500…700
Version		2x

Model	Geo. Disp. (cc/rev)	Flow LPM @1440RPM	Max Pr. Bar	Weight Kg	
				Aluminium	Steel
HPO1- HPA07	0.8	1.1	700	3.75	5.0
HPO1- HPA08	1.0	1.4	700		
HPO1- HPA09	1.3	1.9	550		
HPO1- HPA10	1.6	2.3	500		

Flow calculated at 1440RPM and at no-load condition
Consider pump efficiency under load when selecting suitable pump
Volumetric Efficiency 5% drop for every 100 bar

Pump Dimensions



Motor Sizing & Torque Calculation

Motor Sizing

PkW = Pbar x Qlpm / 540

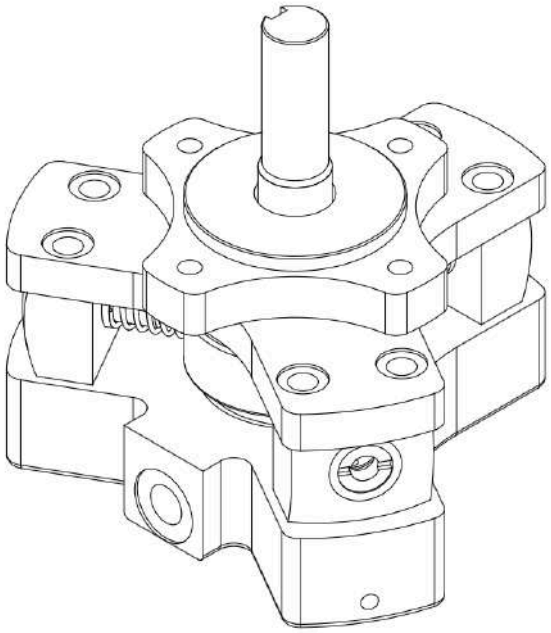
PkW is the power required to drive the pump shaft in kW

Pbar is the required system pressure in bar or kgf/cm2

Qlpm is the delivery flow from the pump in litres/minute (LPM)

Sample Calculation:

For a pump delivering 5.1lpm and system pressure of 315bar,
the required motor size will be,
PkW = (5.1 x 315) / 540 = 2.975 i.e. 3kW
(select next available size motor)



Torque Calculation

Tmax = 60000 x PkW / (2 x p x N)

T is the torque in N-m

PkW is the power required to drive the pump shaft in kW

N is the motor rpm

Sample Calculation:

For a 5.1lpm pump @ 315bar, PkW is 3kW.

Tmax = 60000 x 3 / (2 x 3.14 x 1450) = 19.7N-m

RADIAL PISTON PUMP - MAX 700 BAR

Frame 1A | 1.1 to 5.5 LPM | 700 bar

Specification/ Technical Data

Max Pressure	700 bar
Flow Range	1.1…5.5 LPM+
Pump Frame Size	1A
Type	With Casing
No. of Elements	3/ 5/ 7
Noise Level	< 85 dB
Body Material	Steel/ AL++
Suction Port	3/4"BSP (F)
Delivery Port	1/4" BSP (F)
Air Bleed Port	1/8" BSP
Media	Mineral Oil
Oil Temperature Range	+10 to 60°C
Oil Viscosity	ISO VG 46-100
Oil Cleanliness (ISO 4406)	20/18 /15
Orientation	Any
Weight (approx.)	5.8 - 11 Kg

* Refer HPX/ RPX catalogue for multi-port pump options
\+ Refer Frame 1B and 2B catalogues for higher flow pumps
++ Consult factory for custom design pump options viz. extended shaft, light weight, tandem pump etc.

Ordering Information

Basic Code	Radial Piston Pump	HP
Delivery Ports	1	1
Frame Size	1A	1A
Flow Rate	1.1…5.5 LPM	1.1…5.5
Working Pr. Bar	500-700 bar	500…700
Version		2x

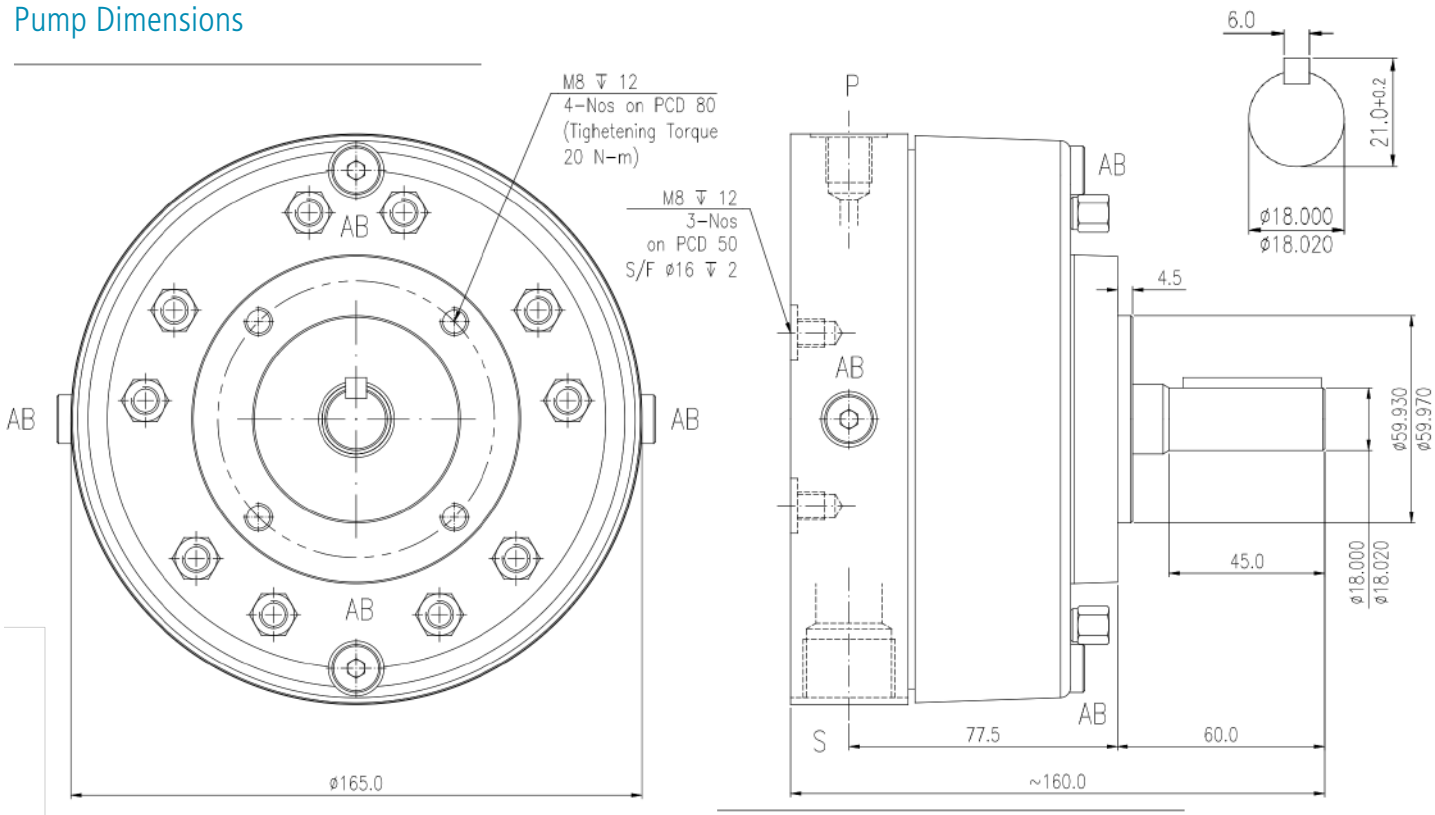
Radial piston pump type HP1 is a single outlet constant flow hydraulic pump where the working pistons are arranged radially around a central drive shaft. The stroke of each piston is caused by an eccentric drive shaft. As the central shaft rotates, the eccentric mechanism forces the pistons to move in and out of their cylinders. During the outward stroke, fluid is drawn into the pump chamber, and during the inward stroke, the fluid is pressurised and expelled. These pumps are designed to generate very high pressures, up to 700 bar.

HP1 pumps are also designed for robust construction, leading to a long service life even under demanding conditions. Common applications include hydraulic presses, metal forming equipment, plastic injection moulding, and various heavy-duty industrial and mobile machinery like construction equipment, marine hydraulics, and mining.

Model	Geo. Disp. (cc/rev)			Flow LPM@1440RPM			Max Pr. Bar
	3PA	5PA	7PA	3PA	5PA	7PA	
HP1- HPA07	0.8	1.3	1.8	1.1	1.9	2.7	700
HP1- HPA08	1.0	1.7	2.4	1.4	2.5	3.5	700
HP1- HPA09	1.3	2.2	3.1	1.9	3.2	4.5	550
HP1- HPA10	1.6	2.7	3.8	2.3	3.9	5.5	500

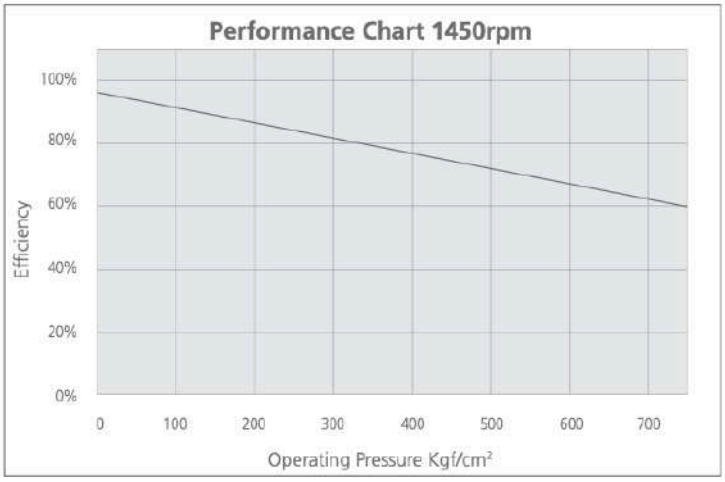
Flow calculated at 1440RPM and at no-load condition
Consider pump efficiency under load when selecting suitable pump

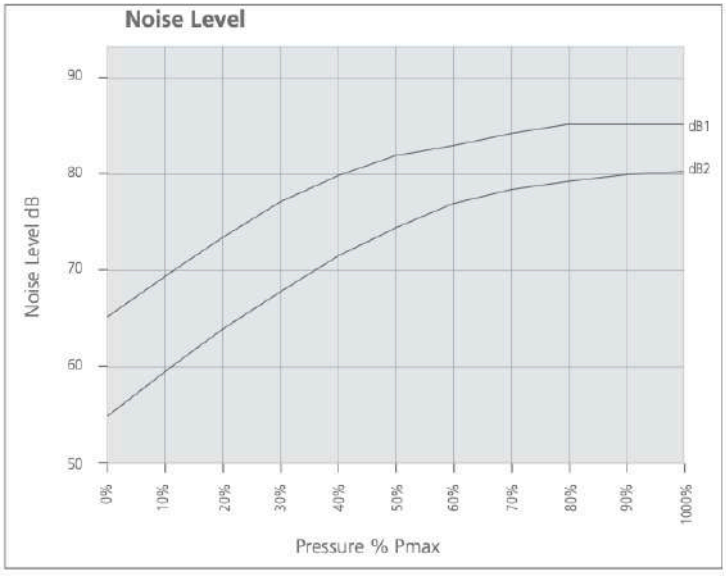
Pump Dimensions



Pump Size	Weight Kg	
	Aluminium Body	Steel Body
3PA	5.8	9.8
5PA	6.3	10.3
7PA	6.8	11.0

Performance Curves





Electric Motor Sizing

PkW = Pbar x Qlpm / 540
PkW is the power required to drive the pump shaft in kW
Pbar is the required system pressure in bar or kgf/cm2
Qlpm is the delivery flow from the pump in litres/minute (LPM)

Sample Calculation:
For a pump delivering 5.1lpm and system pressure of 315bar, the required motor size will be,
PkW = (5.1 x 315) / 540 = 2.975 i.e. 3kW
(select next available size motor)

Torque Calculation

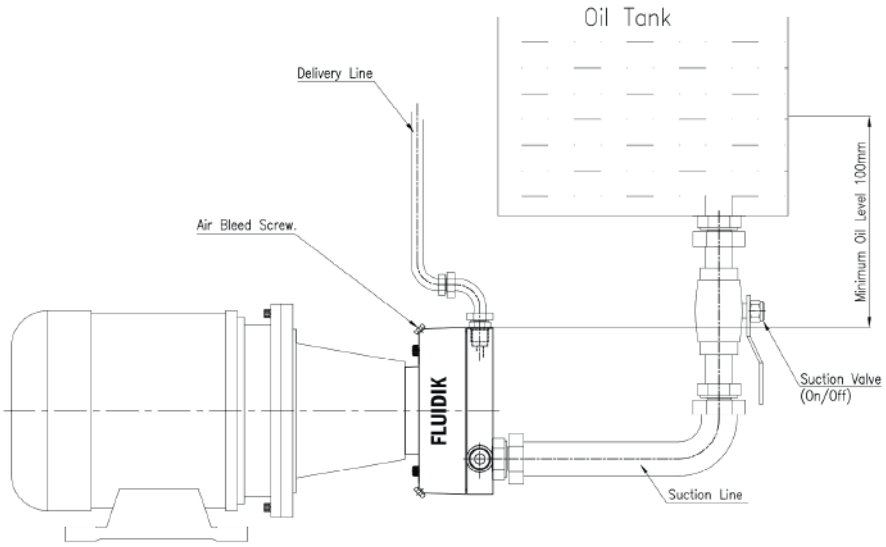
Tmax = 60000 x PkW / (2 x p x N)
T is the torque in N-m
PkW is the power required to drive the pump shaft in kW
N is the motor rpm

Sample Calculation:
For a 5.1lpm pump @ 315bar, PkW is 3kW.
Tmax = 60000 x 3 / (2 x 3.14 x 1450) = 19.7N-m

Installation Guidelines

Installation outside the Tank

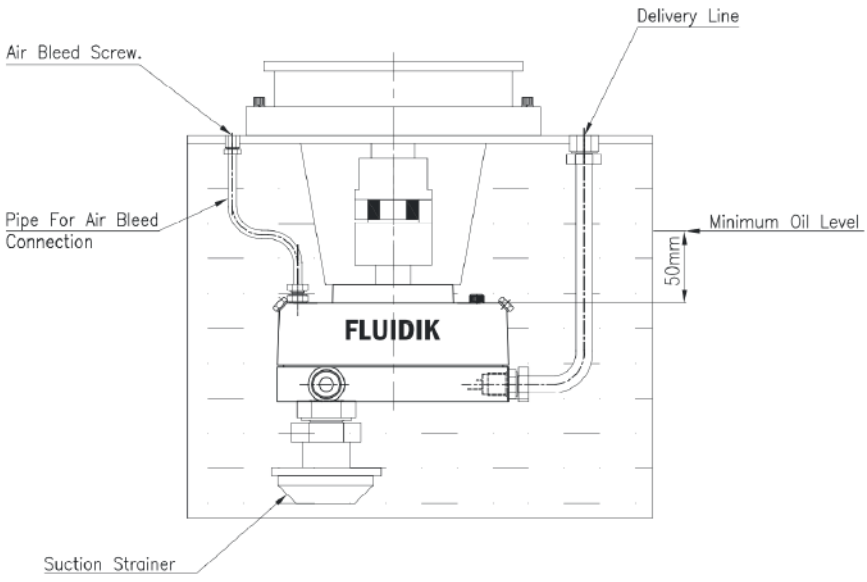
When the pumps are installed outside the tank, care should be taken to position them below the minimum oil level that may be expected during operation. A sufficient oil flow ensures that the pump casing is filled with oil and no air is pulled into the hydraulic system. It is recommended that an on-off valve viz. a ball valve be installed between the tank and the pump (on the suction line) for easy maintenance of pump without having to empty the oil tank/ reservoir.



Air bleeding or priming is required after every new installation or after an oil change or when the pump is operated after a prolonged break. For bleeding, loosen the bleeder screw on the top of the pump after filling the oil in the oil tank and leave it open until oil overflows through the port without air bubbles. Retighten the screw on the port and run the pump at idle circulation or at zero pressure setting. It is also recommended to run the complete hydraulic system for a 5-6 cycles under no load conditions to ensure no air is trapped in other components of the system including actuators, manifold blocks or hydro-motors.

Installation inside the Tank

The pumps must always be installed such that the suction port of the pump is below the expected minimum oil level during operation. The installation should also facilitate easy bleeding of pump without having to dis-assemble the hydraulic power-unit. The oil level may drop below the suction port height if the pump-motor assembly is not done correctly.



Air bleeding or priming is required after every new installation or after an oil change or when the pump is operated after a prolonged break. The air bleeding ensures free flow of oil to all the pumping elements inside the pump. For bleeding, remove the bleeder screw prior to oil filling and fill oil up to the required level. Allow the air bubbles to escape and wait for a few minutes if required. Re-install the bleeder screw and run the pump at idle circulation or at zero pressure setting. It is also recommended to run the complete hydraulic system for a 5-6 cycles under no load conditions to ensure no air is trapped in other components of the system including actuators, manifold blocks or hydro-motors. It is also recommended to make provision for air bleeding on the top cover of the hydraulic power-unit/ tank/ reservoir using a nipple hose line & bleeder screw as shown.

RADIAL PISTON PUMP - MAX 700 BAR/ FRAME 'B'

Frame B | 2.7 to 14.2 LPM | Max 700 bar

Specification/ Technical Data

Max Pressure	700 bar
Flow Range	2.7…14.2 LPM+
Pump Frame Size	1B/ 2B
Type	With Casing
No. of Elements	7/ 9/ 14/ 18
Noise Level	< 85 dB
Body Material	Steel/ AL++
Suction Port (S)	3/4" or 1" BSP (F)
Delivery Port (P)	3/8" BSP (F)
Air Bleed Port (AB)	1/8" BSP
Media	Mineral Oil
Oil Temperature Range	+10 to 60°C
Oil Viscosity	ISO VG 22-320
Oil Cleanliness (ISO 4406)	20/18 /15
Max RPM	1800
Weight (approx.)	7.7 to 22.5 Kg

* Refer HPX/ RPX catalogue for multi-port pump options
\+ Refer Frame 1A and HPO catalogues for intermittent pressure cycle pumps

Ordering Information

Basic Code	Radial Piston Pump	HP/ HPE
No. of Pr. ports	1 or 2 only in 2B	1
Frame Size	1B/ 2B	1B
Ext. Shaft@	Type 1/ 2 only for HPE	1
Elements	7PA07…18PA10	7PA07
Flow Rate/ port	2.7…14.2 LPM	2.7lpm
Working Pr. Bar	500-700 bar	700bar
Version		1x

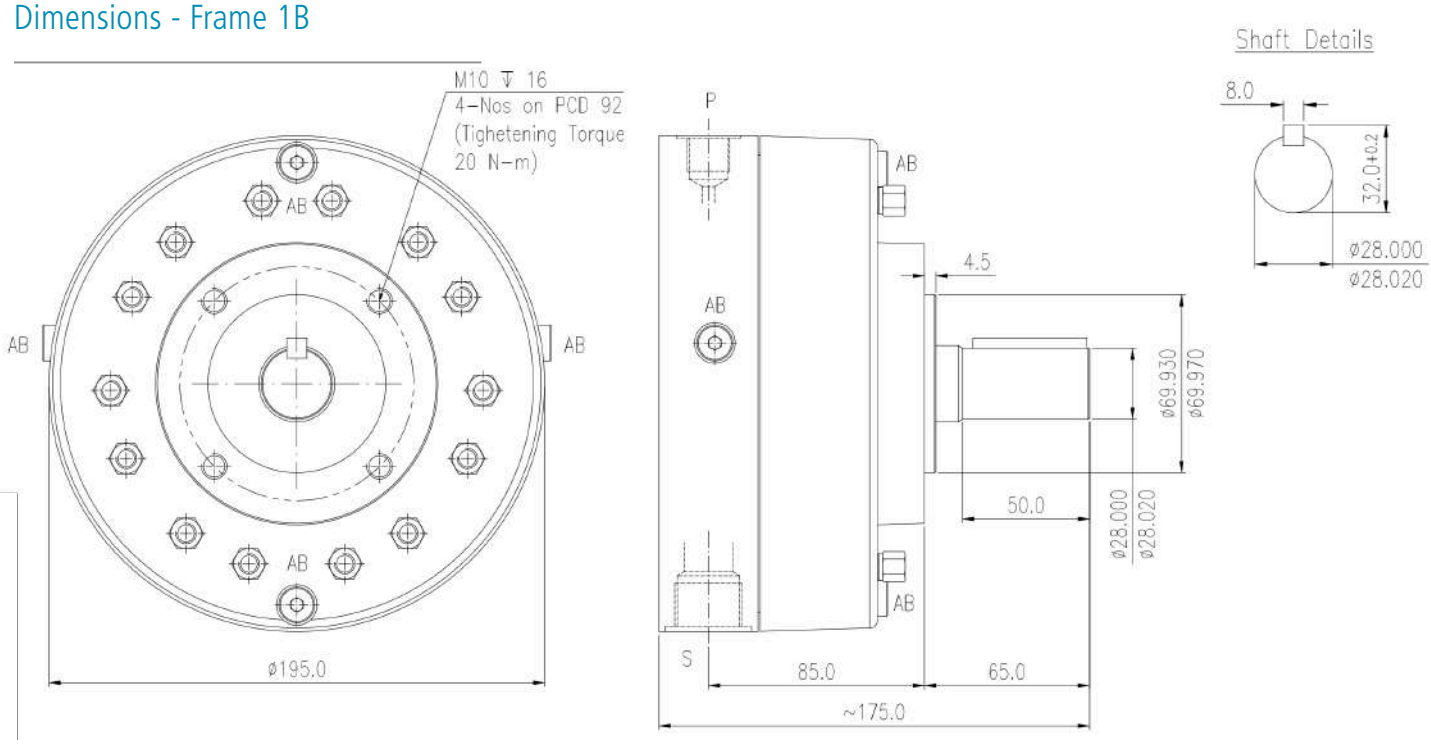
Radial piston pump type HP1/ B Frame is a single outlet constant flow hydraulic pump where the working pistons are arranged radially around a central drive shaft. The stroke of each piston is caused by an eccentric drive shaft. As the central shaft rotates, the eccentric mechanism forces the pistons to move in and out of their cylinders. During the outward stroke, fluid is drawn into the pump chamber, and during the inward stroke, the fluid is pressurised and expelled. These pumps are designed to generate very high pressures, up to 700 bar.

HP1/ B Frame pumps are also designed for robust construction, leading to a long service life even under demanding conditions. Common applications include hydraulic presses, metal forming equipment, plastic injection moulding, and various heavy-duty industrial and mobile machinery like construction equipment, marine hydraulics, and mining.

Model	Geo. Disp. (cc/rev)				Flow LPM@1440RPM				Max Pr. Bar
	7PA (1B)	9PA (1B)	14PA (2B)	18PA (2B)	7PA (1B)	9PA (1B)	14PA (2B)	18PA (2B)	
HP1- PA07	1.8	2.4	3.7	4.8	2.7	3.5	5.4	6.9	700
HP1- PA08	2.4	3.0	4.8	6.0	3.5	4.4	6.9	8.7	700
HP1- PA09	3.0	4.0	6.0	8.0	4.4	5.8	8.7	11.5	700
HP1- PA10	3.8	4.9	7.6	9.8	5.5	7.1	11.0	14.2	500

Flow calculated at 1440RPM and at no-load condition
Consider pump efficiency under load when selecting suitable pump
Volumetric efficiency 5% drop for every 100bar increase in pressure
@ Extension Pump version available only in Frame 1B size
Refer page 4 for 2-port high pressure pump
++ Consult factory for custom design pump options viz. extended shaft, light weight, tandem pump etc.

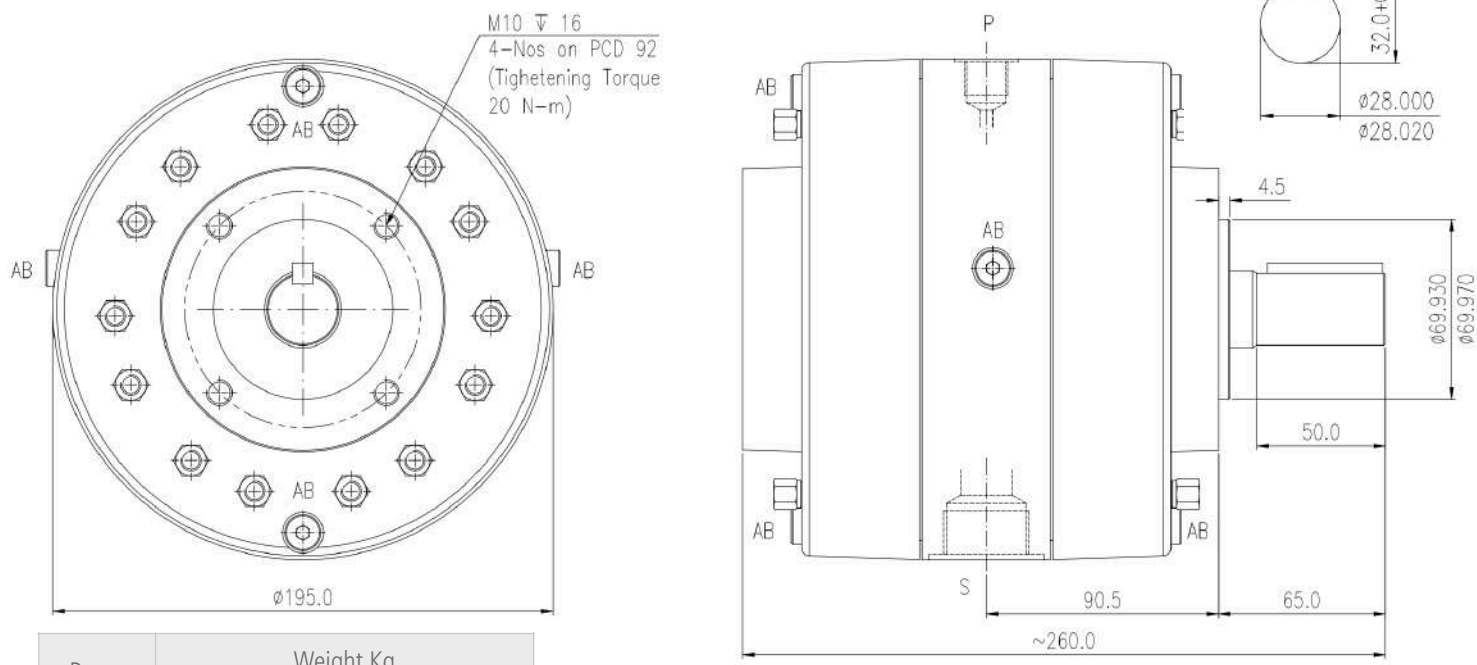
Dimensions - Frame 1B



Pump Size	Weight Kg	
	Aluminium Body	Steel Body (default)
7PA	7.7	13.9
9PA	8.3	14.5

Delivery Port (P): 3/8" BSP (F)
Suction Port (S): 3/4" BSP (F)
Air Bleed Port (AB): 1/8" BSP

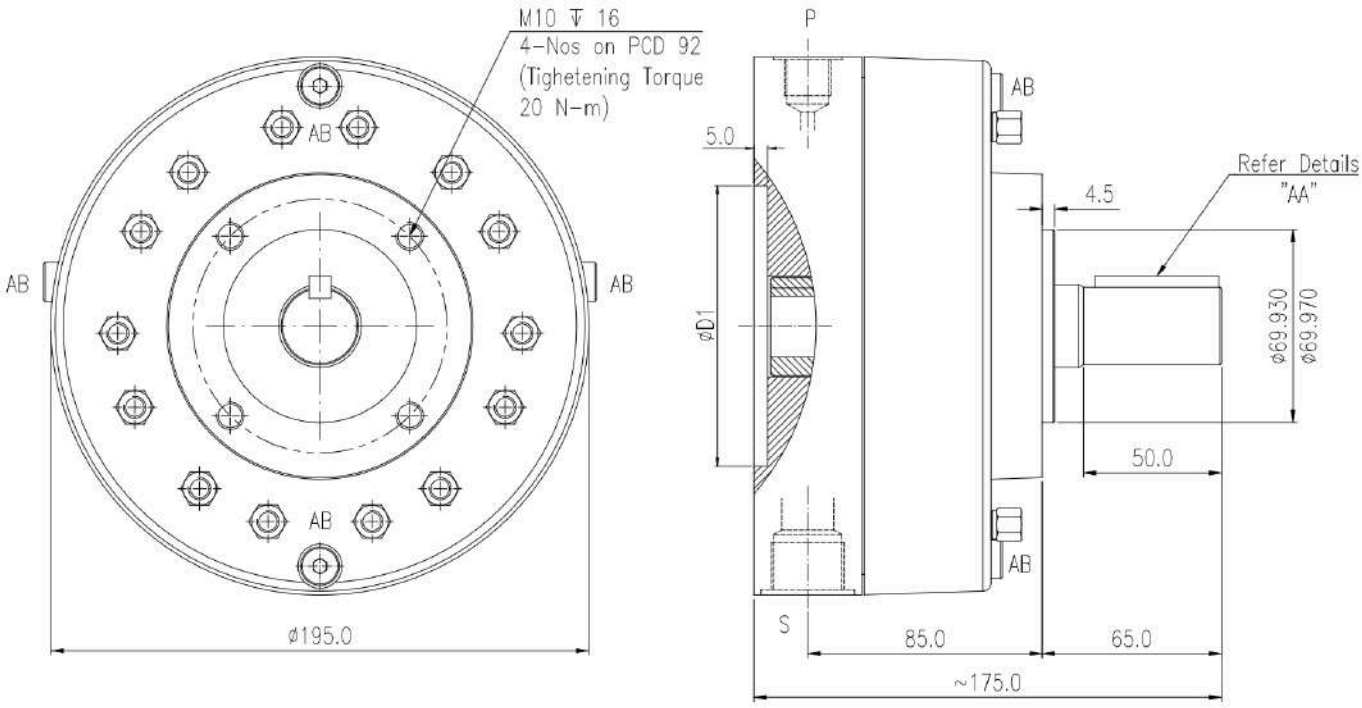
Dimensions - Frame 2B

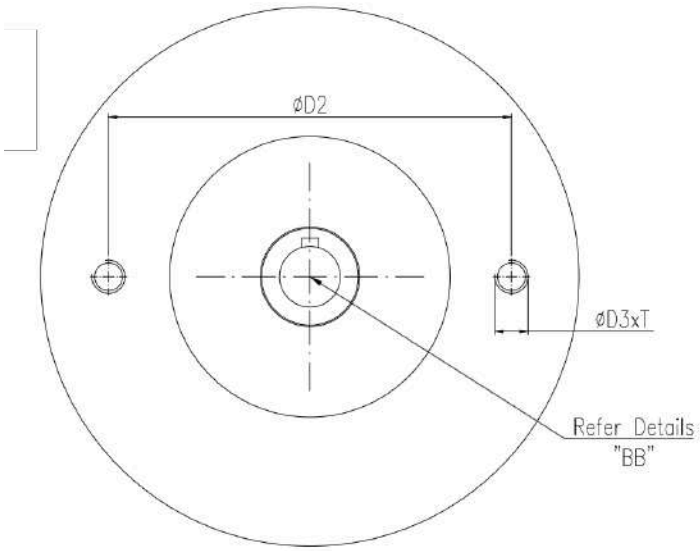


Pump Size	Weight Kg	
	Aluminium Body	Steel Body (default)
14PA	12.5	21.5
18PA	13.5	22.5

Delivery Port (P): 3/8" BSP (F)
Suction Port (S): 1" BSP (F)
Air Bleed Port (AB): 1/8" BSP
All dimensions in mm

Dimensions - Frame 1B/ Ext. Pump (HPE)



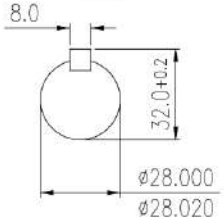


Pump Size	Extension Pump Shaft Details			
	øD1	øD2	øD3	T
Type 1	82.6	106.4	M10	16.0
Type 2	101.6	146.0	M12	20.0

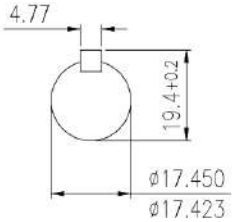
Pump Size	Weight Kg	
	Aluminium Body	Steel Body (default)
7PA	7.8	14.0
9PA	8.4	14.6

Delivery Port (P): 3/8" BSP (F)
Suction Port (S): 3/4" BSP (F)
Air Bleed Port (AB): 1/8" BSP
All dimensions in mm

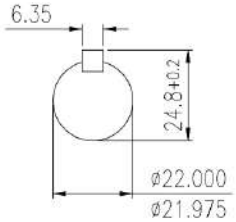
Shaft Details "AA"



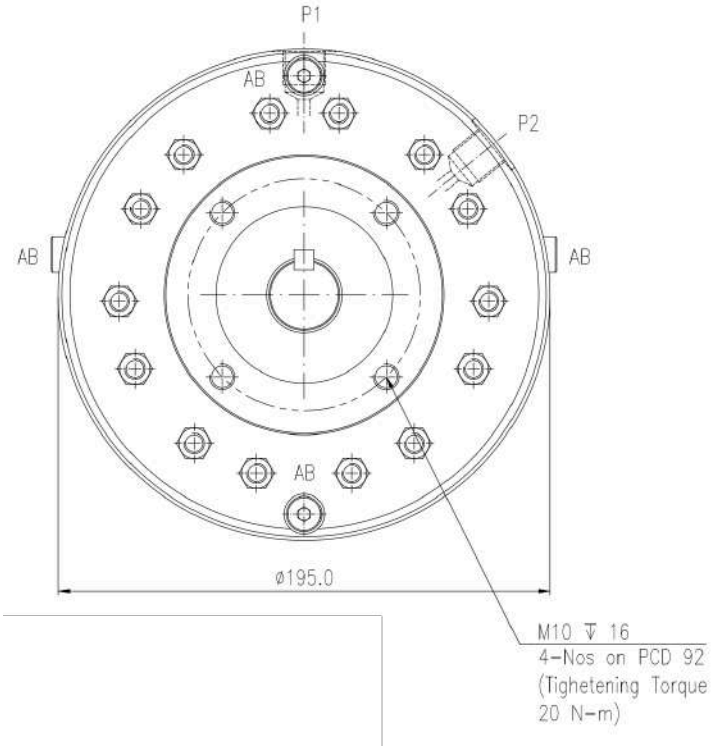
Shaft Details "BB" For Type 1

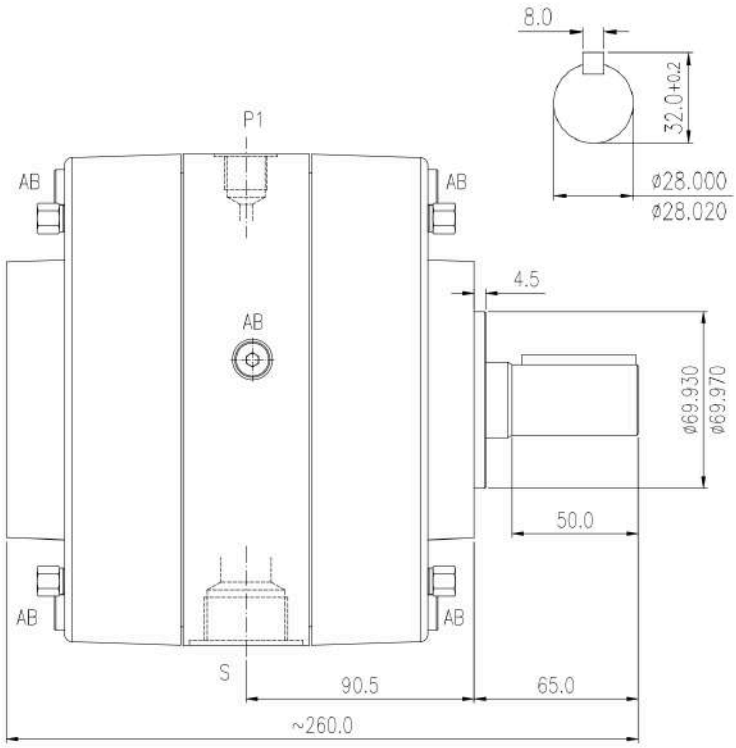


Shaft Details "BB" For Type 2



Dimensions - Frame 2B/ Dual Port (HP2)





Pump Size	Weight Kg	
	Aluminium Body	Steel Body (default)
7PA	12.5	21.5
9PA	13.5	22.5

Delivery Port (P): 3/8" BSP (F)
Suction Port (S): 1" BSP (F)
Air Bleed Port (AB): 1/8" BSP
All dimensions in mm

Model	Geo. Disp. (cc/rev)/ port		Flow LPM@1440RPM/ port		Total Flow LPM from pump		Max Pr. Bar
	7PA (2B)	9PA (2B)	7PA (2B)	9PA (2B)	14PA (2B)	18PA (2B)	
HP2- PA07	1.9	2.4	2.7	3.5	5.4	7.0	700
HP2- PA08	2.4	3.0	3.5	4.3	7.0	8.6	700
HP2- PA09	3.0	4.0	4.3	5.8	8.6	11.6	700
HP2- PA10	3.8	4.9	5.5	7.1	11.0	14.2	500

Pump model code
Example 1: HP2-2B-(7+7)PA07-(2.7+2.7)lpm/ 700bar
Example 2: HP2-2B-(9+9)PA10-(7.1+7.1)lpm/ 500bar
For 2-port pumps, motor calculation to be done considering total flow from pump
The flows from each port may be combined (like in hi-low circuit) or used independently (like in a multi-jack system).

Note:
Multi-port pumps can be custom designed to meet application requirements for pressures from 100 to 700 bar and 2 to 18 ports!
Hi-low pumps with gear and vane pumps are also possible within compact footprint.

Consult factory with flow per port and pressure per port to meet your application requirements.

Motor Sizing & Torque Calculations

Electric Motor Sizing

PkW = Pbar x Qlpm / 540
PkW is the power required to drive the pump shaft in kW
Pbar is the required system pressure in bar or kgf/cm2
Qlpm is the delivery flow from the pump in litres/minute (LPM)

Sample Calculation:
For a pump delivering 5.1lpm and system pressure of 315bar, the required motor size will be,
PkW = (5.1 x 315) / 540 = 2.975 i.e. 3kW
(select next available size motor)

Torque Calculation

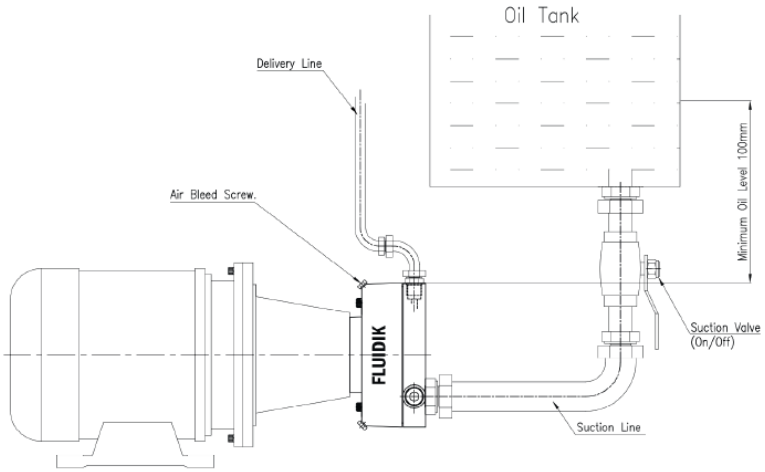
Tmax = 60000 x PkW / (2 x p x N)
T is the torque in N-m
PkW is the power required to drive the pump shaft in kW
N is the motor rpm

Sample Calculation:
For a 5.1lpm pump @ 315bar, PkW is 3kW.
Tmax = 60000 x 3 / (2 x 3.14 x 1450) = 19.7N-m

Installation Guidelines

Outside the Tank

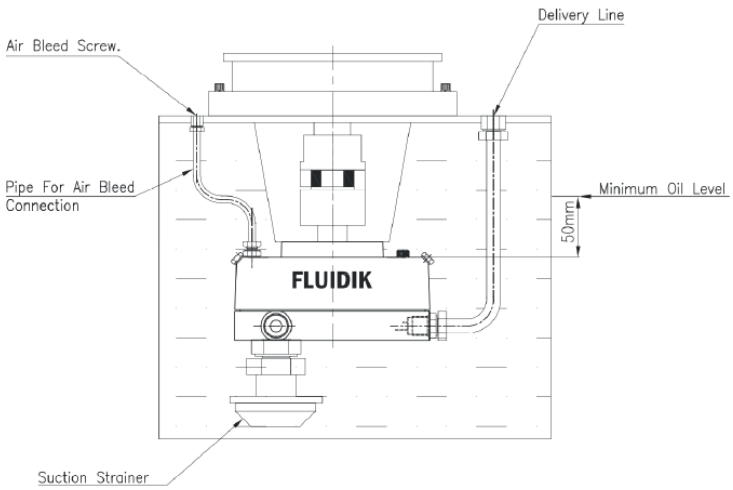
When the pumps are installed outside the tank, care should be taken to position them below the minimum oil level that may be expected during operation. A sufficient oil flow ensures that the pump casing is filled with oil and no air is pulled into the hydraulic system. It is recommended that an on-off valve viz. a ball valve be installed between the tank and the pump (on the suction line) for easy maintenance of pump without having to empty the oil tank/ reservoir.



Air bleeding or priming is required after every new installation or after an oil change or when the pump is operated after a prolonged break. For bleeding, loosen the bleeder screw on the top of the pump after filling the oil in the oil tank and leave it open until oil overflows through the port without air bubbles. Retighten the screw on the port and run the pump at idle circulation or at zero pressure setting. It is also recommended to run the complete hydraulic system for a 5-6 cycles under no load conditions to ensure no air is trapped in other components of the system including actuators, manifold blocks or hydro-motors.

Inside the Tank

The pumps must always be installed such that the suction port of the pump is below the expected minimum oil level during operation. The installation should also facilitate easy bleeding of pump without having to dis-assemble the hydraulic power-unit. The oil level may drop below the suction port height if the pump-motor assembly is not done correctly.



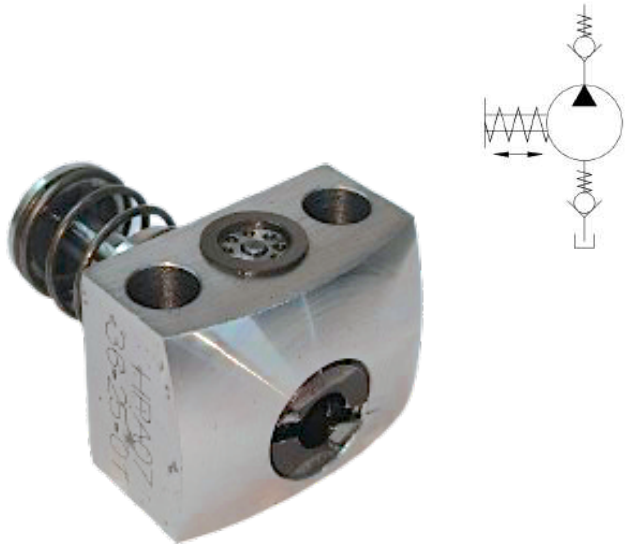
Air bleeding or priming is required after every new installation or after an oil change or when the pump is operated after a prolonged break. The air bleeding ensures free flow of oil to all the pumping elements inside the pump. For bleeding, remove the bleeder screw prior to oil filling and fill oil up to the required level. Allow the air bubbles to escape and wait for a few minutes if required. Re-install the bleeder screw and run the pump at idle circulation or at zero pressure setting. It is also recommended to run the complete hydraulic system for a 5-6 cycles under no load conditions to ensure no air is trapped in other components of the system including actuators, manifold blocks or hydro-motors. It is also recommended to make provision for air bleeding on the top cover of the hydraulic power-unit/ tank/ reservoir using a nipple hose line & bleeder screw as shown.

PUMPING ELEMENT

Fixed Delivery | up to 1.07cc/ stroke | 700 bar

Specification/ Technical Data

Max. Operating Pressure	700 bar
Flow Range	0.39…1.54 LPM
Type	Fixed Displacement
Operating Principle	Reciprocating Piston
Min - Max Stroke	300 - 2000 stk/ min
Suction & Delivery Valve	In-built
Body Material	Carbon Steel
Media	Mineral Oil
Oil Temperature Range	+10 to 60°C
Oil Viscosity	ISO VG 46-100
Oil Cleanliness (ISO 4406)	20/18 /15
Assembly	Oil Immersed
Weight (approx.)	0.28 Kg



Pumping elements PA are modules used for delivering fluid flow in radial piston pumps. The modules can be used as individual assemblies to build custom pumps or for replacement in FLUIDIK make pumps. The elements are available with various diameters and strokes, capable of delivering flows up to 1.07 cc/stroke and pressures up to 700 bar.

The elements are most commonly driven by electric motors through a rotating shaft, which is converted into reciprocating motion using an eccentrically mounted bearing. The radial piston pumps are not direction specific and may be used either in CW or CCW directions. These pumps are most popular for high-pressure applications, and their salient features include the ability to design custom flow requirements and multiple port configuration options.

Model	Displacement	Flow	Max Op. Pressure	Weight
PA07	0.27 cc/stroke	0.39 LPM	700 bar	0.28 Kg
PA08	0.35 cc/stroke	0.50 LPM	700 bar	
PA09	0.44 cc/stroke	0.63 LPM	700 bar	
PA10	0.55 cc/stroke	0.79 LPM	550 bar	
PA11	0.66 cc/stroke	0.95 LPM	450 bar	
PA12	0.79 cc/stroke	1.14 LPM	250 bar	
PA13	0.93 cc/stroke	1.34 LPM	200 bar	
PA14	1.07 cc/stroke	1.54 LPM	100 bar	

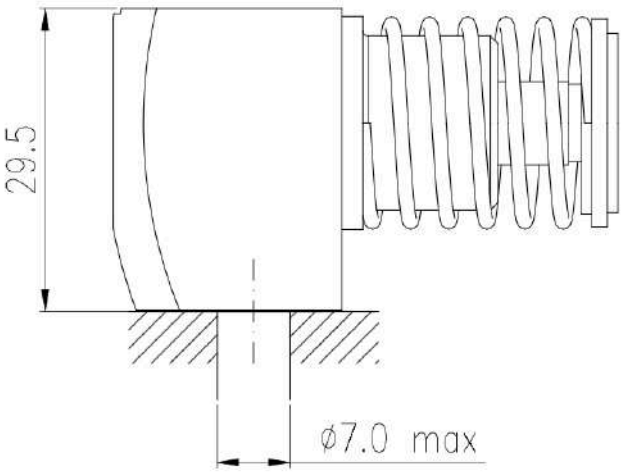
Geometric Displacement @ 7mm stroke
Flow in LPM @ 1440RPM

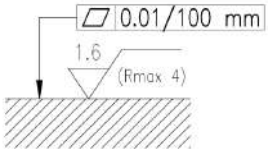
Refer radial piston pump catalogs for HP, RP, RPO and RPX for details on complete pump requirement.

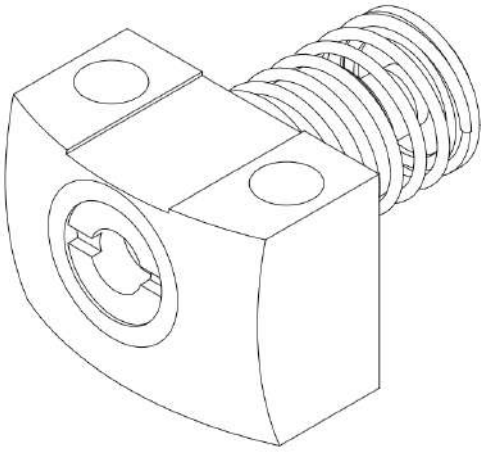
Ordering Information

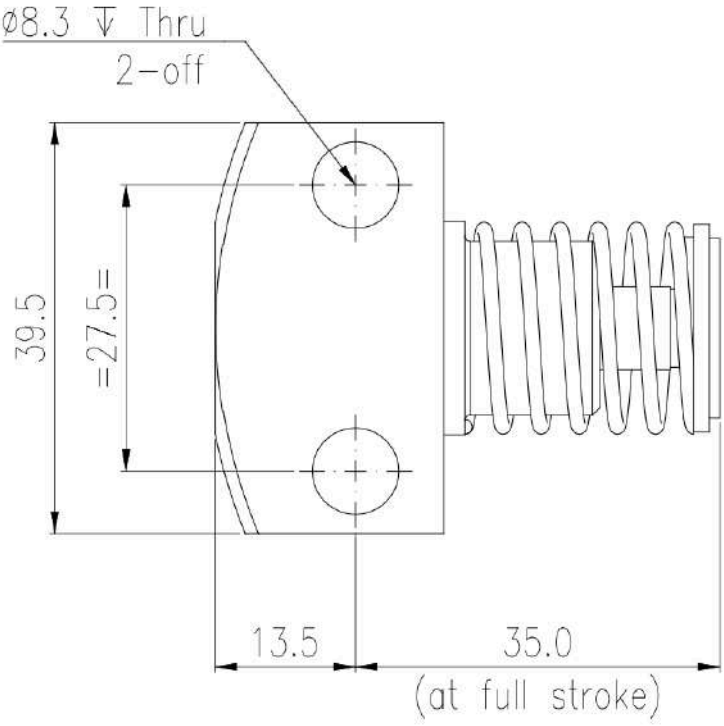
Basic Code	Pumping Element	PA
Size	07…14	07…14
Version		1x

Dimensions





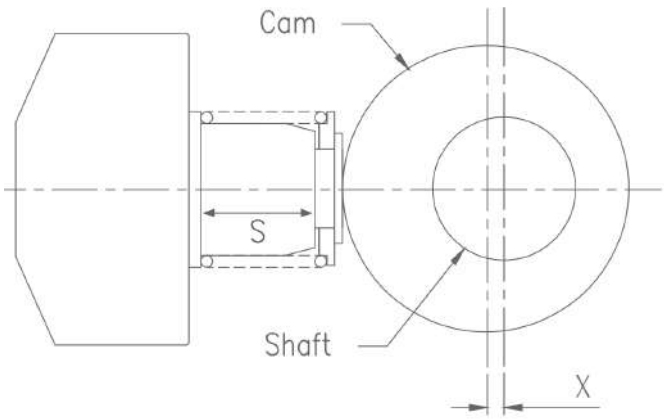




Note:

- Inlet port should be always below oil level to prevent air entrapment and ensure sufficient lubrication to piston and bearing components during operation
- Oil cleanliness will have a impact on the performance, life and efficiency of the pumping element.

Installation



Stroke (S) = 2X
Minimum Stroke = 5mm
Optimal Stroke = 7mm
V_g = cc/ stroke = 0.785 x D^2 x S where,
D is diameter of PA in cm (0.7 to 1.4cm)
S is Stroke in cm

All dimensions in mm

Spare List

SealKit	SSVPA1x

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