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

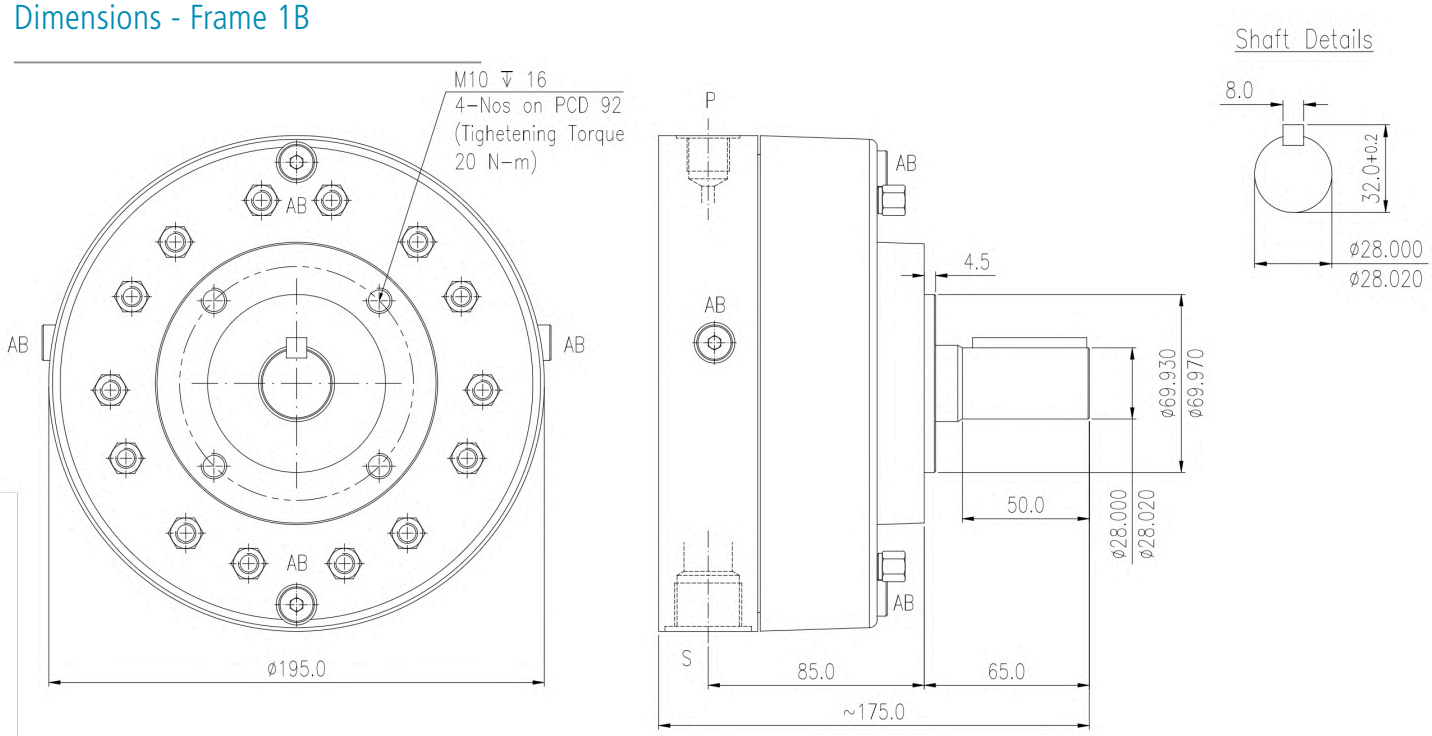
Radial piston pump type HP1/ B Frame is a single outlet constant flow hydraulic pump where the working pistons are arranged radially around a central drive shaft. The stroke of each piston is caused by an eccentric drive shaft. As the central shaft rotates, the eccentric mechanism forces the pistons 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.

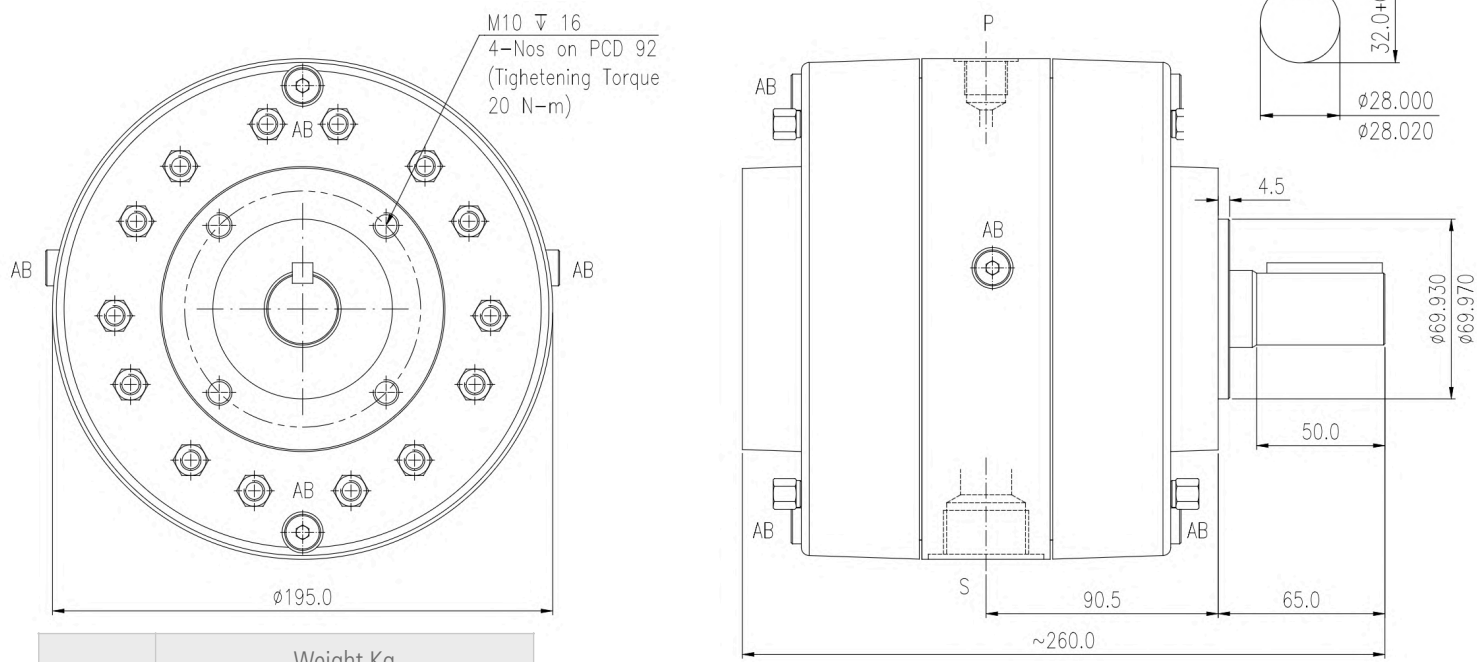
Dimensions - Frame 1B



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

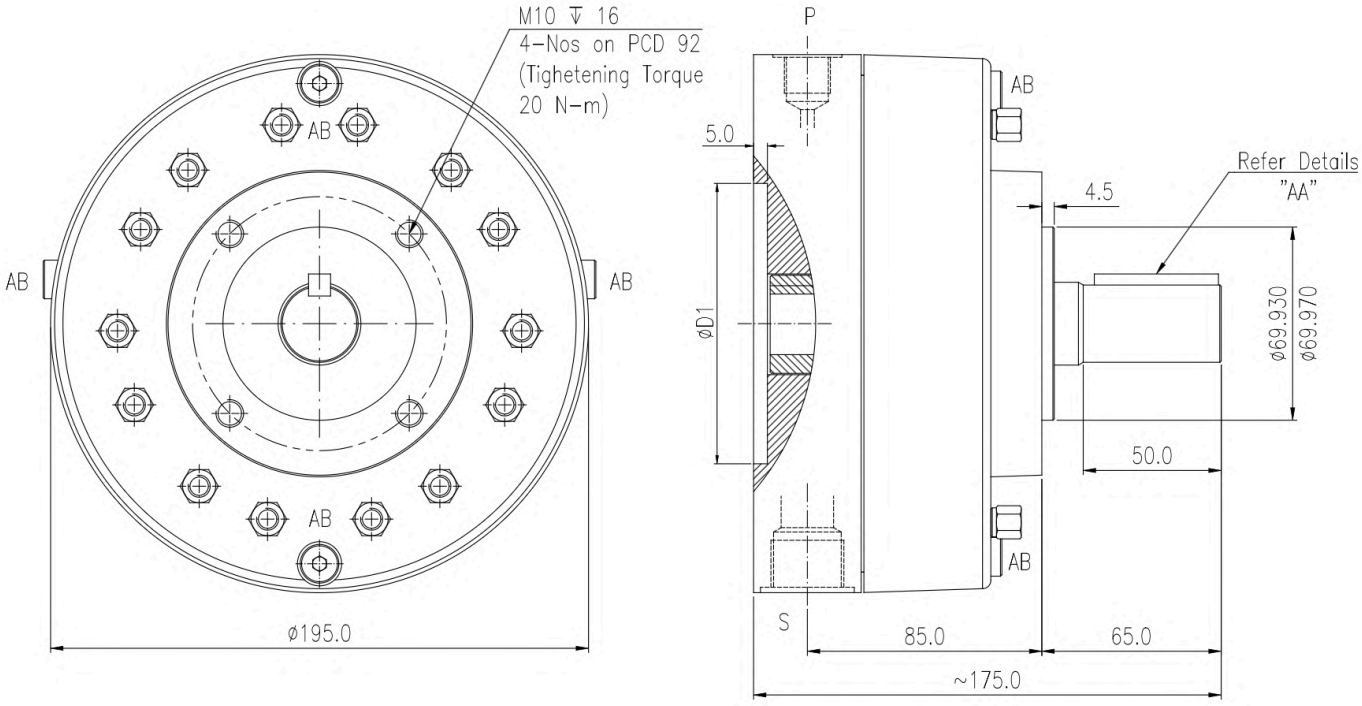
Dimensions - Frame 2B

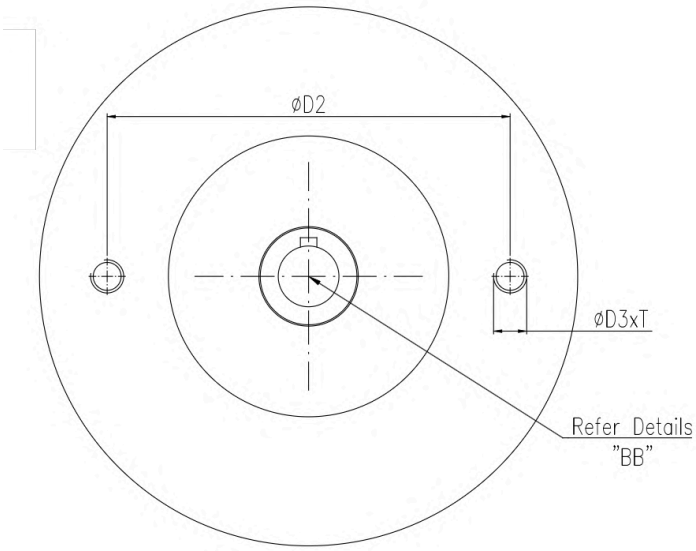


Pump Size	Weight Kg	
	Aluminium Body	Steel Body (default)
14PA	12.5	21.5
18PA	13.5	22.5

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)



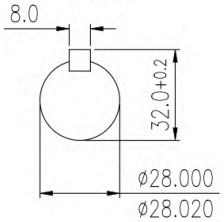


Pump Size	Extension Pump Shaft Details			
	øD1	øD2	øD3	T
Type 1	82.6	106.4	M10	16.0
Type 2	101.6	146.0	M12	20.0

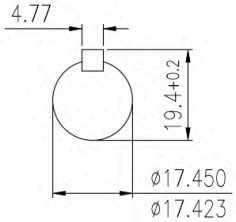
Pump Size	Weight Kg	
	Aluminium Body	Steel Body (default)
7PA	7.8	14.0
9PA	8.4	14.6

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

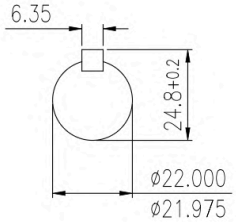
Shaft Details "AA"



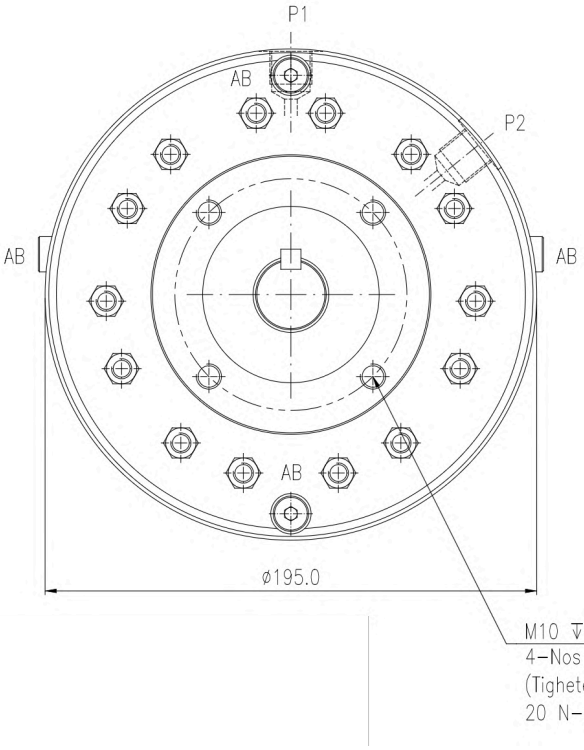
Shaft Details "BB" For Type 1

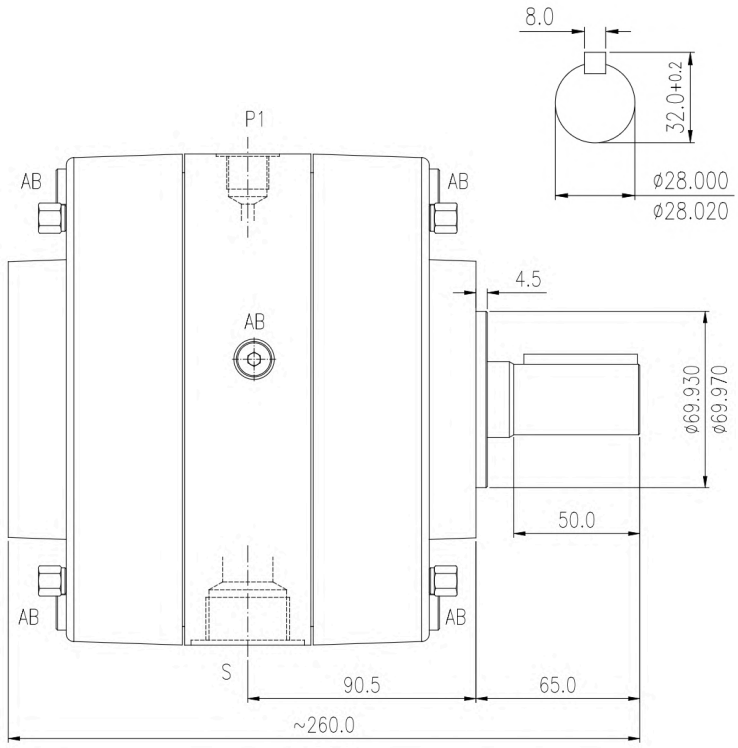


Shaft Details "BB" For Type 2



Dimensions - Frame 2B/ Dual Port (HP2)





Shaft Details

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

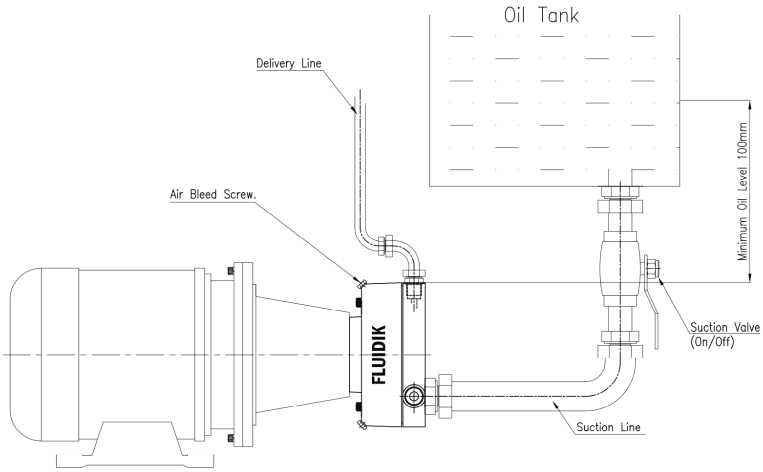
Tmax = 60000 x PkW / (2 x p x N)
T is the torque in N-m
PkW is the power required to drive the pump shaft in kW
N is the motor rpm

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

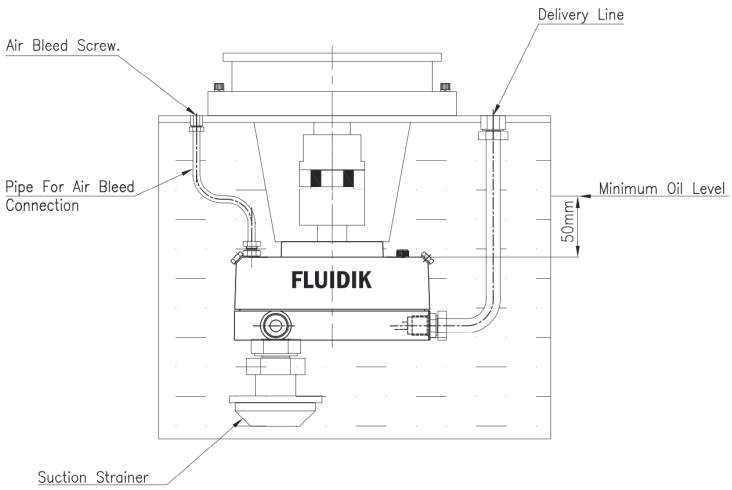
When the pumps are installed outside the tank, care should be taken to position them below the minimum oil level that may be expected during operation. A sufficient oil flow ensures that the pump casing is filled with oil and no air is pulled into the hydraulic system. It is recommended that an on-off 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.