

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.



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.

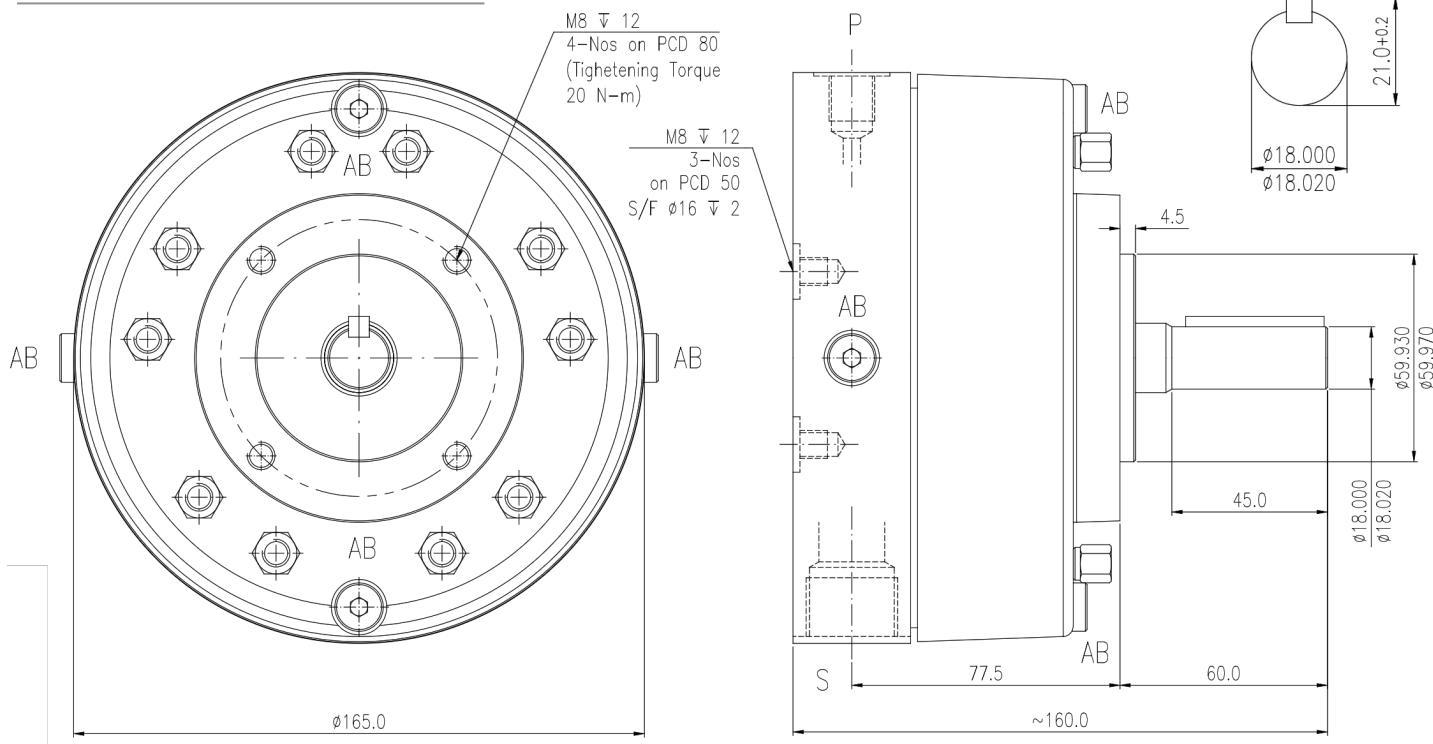
HP1 pumps are also designed for robust construction, leading to a long service life even under demanding conditions. Common applications include hydraulic presses, metal forming equipment, plastic injection moulding, and various heavy-duty industrial and mobile machinery like construction equipment,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

Electric Motor Sizing

$$PkW = Pbar \times Qlpm / 540$$

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,

$$PkW = (5.1 \times 315) / 540 = 2.975 \text{ i.e. } 3kW$$

(select next available size motor)

Torque Calculation

$$Tmax = 60000 \times PkW / (2 \times \rho \times N)$$

T is the torque in N-m

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

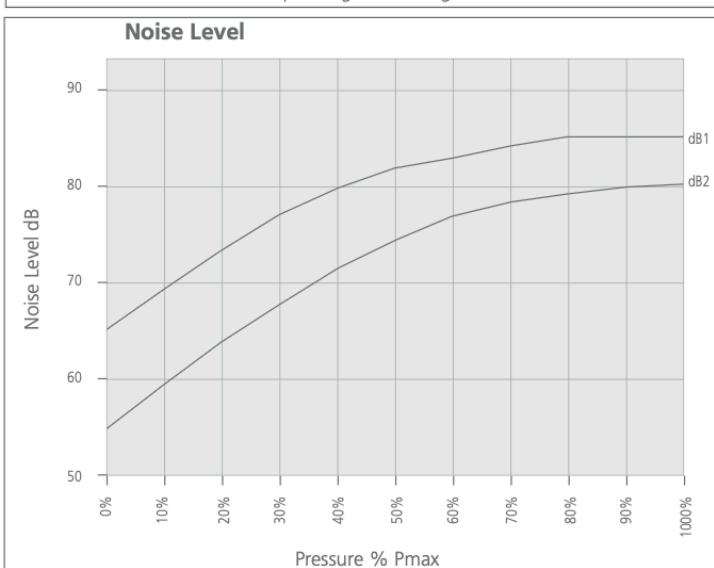
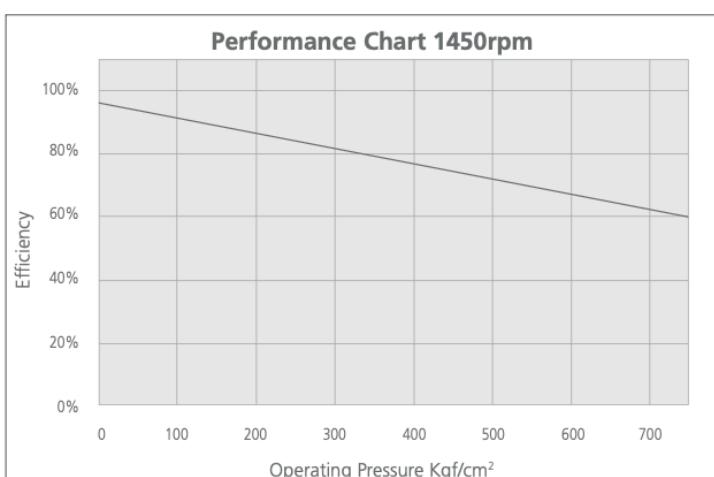
N is the motor rpm

Sample Calculation:

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

$$Tmax = 60000 \times 3 / (2 \times 3.14 \times 1450) = 19.7N\cdot m$$

Performance Curves



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 disassemble 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.

BEMCO FLUIDTECHNIK LLP, Khanapur Road, Udyambag, Belgaum - 590 008 KA IN +91 831 4263001 info@fluidik.co

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