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HYDRAULICS INC

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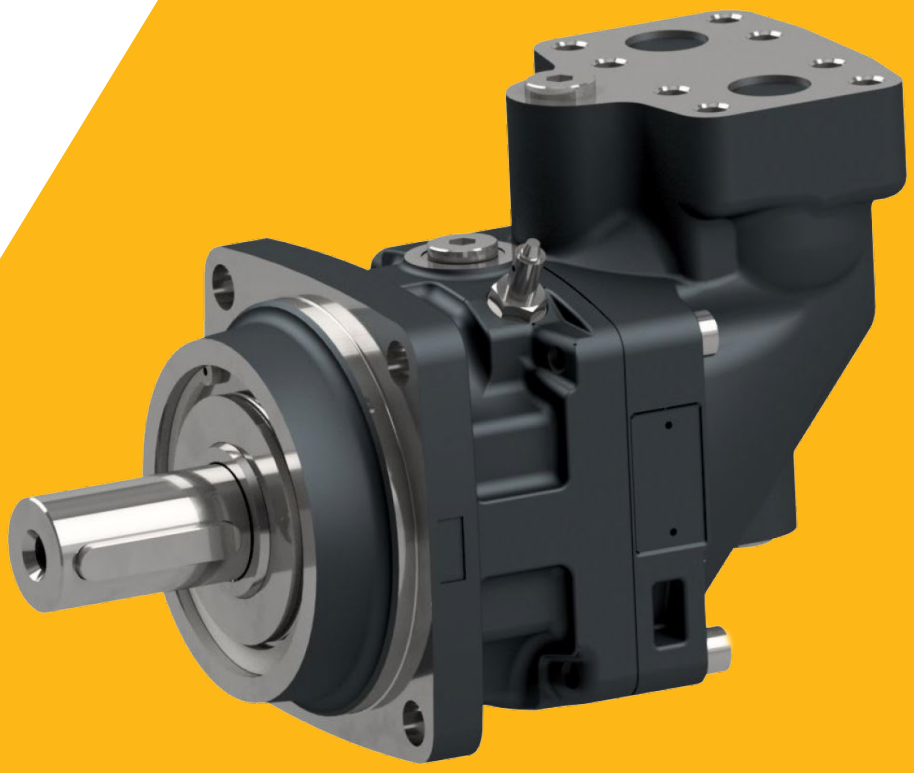
OEM AFTERMARKET PARTS

100% GENUINE
MADE IN SWEDEN

2025
DISTRIBUTOR OF THE YEAR



SERIES F12-250
HYDRAULIC MOTOR/PUMP

Fixed Displacement

Parker

INVENTORY STATUS

CHECK PRICING

Unit Availability	
Parts Availability	
Ability to Solve Problems	

FEATURES

F12-250 is a bent-axis, fixed displacement motor/pump. It can be used in numerous applications in both open and closed loop circuits.

- The laminated piston ring offers important advantages such as unbeatable efficiency and thermal shock resistance.
- High allowable speeds and operating pressures means high output power.
- The unique piston locking, timing gear and bearing set-up as well as the limited number of parts add up to a very robust design with long service life and, above all, proven reliability.
- The 40° angle between shaft and cylinder barrel allows for a very compact, lightweight motor/pump.
- Small envelop size and a high power-to-weight ratio.
- The motor version has highly engineered valve plates for high speed and low noise.
- The pump version has highly engineered valve plates for increased self priming speed and low noise, available with left and right hand rotation.
- Our unique timing gear design synchronizes shaft and cylinder barrel, making the F12 very tolerant to high ‘G’ forces and torsional vibrations.
- Heavy duty roller bearings permit substantial external axial and radial shaft loads.

SPECIFICATIONS

Displacement [cm³/rev]	242
[cu in/rev]	14.8
Operating pressure 3)	
max intermittent 1) [bar]	420
[psi]	6962
max continuous [bar]	350
[psi]	5076
Motor operating speed 3) [rpm]	
max intermittent 1)	3000
max continuous	2700
min continuous	50
Max pump selfpriming speed 2)	
L or R function; max [rpm]	1500
Motor input flow	
max intermittent 1) [l/min]	726
[gpm]	191.8
max continuous [l/min]	653
[gpm]	172.5
Drain temperature 3), max [°C]	115
min [°C]	-40
Theoretical torque at 100 bar [Nm]	384.1
[lbf ft]	283.5
Mass moment of inertia	
(x10⁻³) [kg m²]	46
(x10⁻²) [lbft²]	109.16
Weight [kg]	77
[lb]	170

1 Intermittent: max 6 seconds in any one minute.
2 Selfpriming speed valid at sea level.
3 See also installation information.

SELFPRIMING SPEED & REQUIRED INLET PRESSURE

When operating the F12 as a pump (with L or R valve plate) above the selfpriming speed, the inlet must be pressurized. Increased noise and deteriorating performance may otherwise be experienced.

The diagrams below show required pump inlet pressure vs. shaft speed.

The F12 motor (type M valve plate) sometimes operates as a pump e.g. when used in a propel transmission and the vehicle is going downhill.

Minimum required inlet pressure versus shaft speed is shown in the diagrams.

The inlet pressure can be charged by external pump, pressurized reservoir or using BLA Boost unit.

F12 Pump version

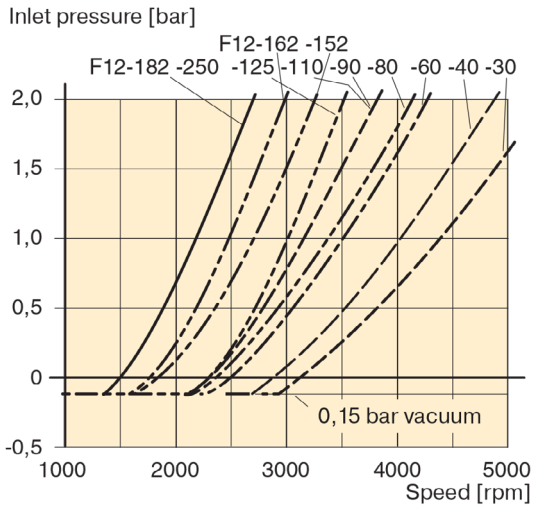


Diagram 2. Min. required pump (F12-L or -R) inlet press.

F12 Motor version

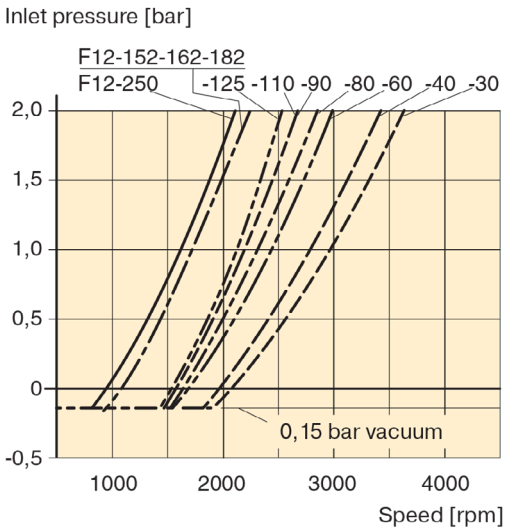


Diagram 3. Min. required motor (F12-M) inlet pressure.

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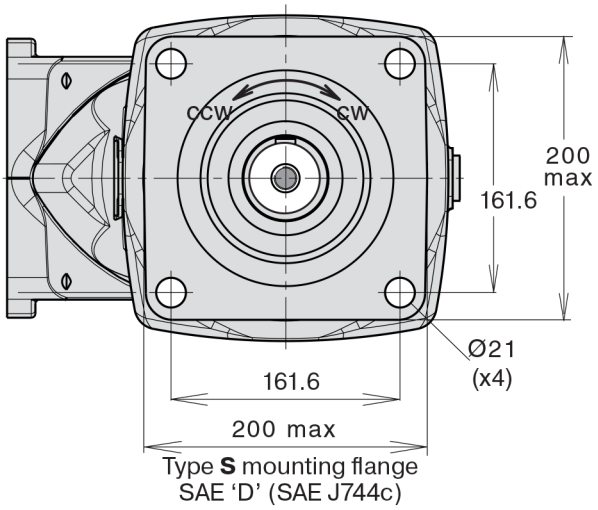
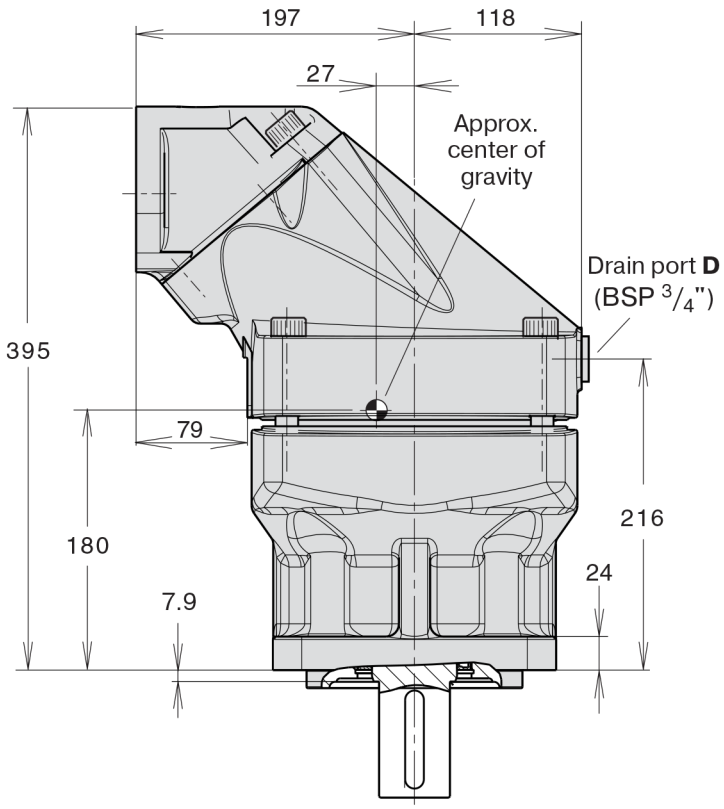
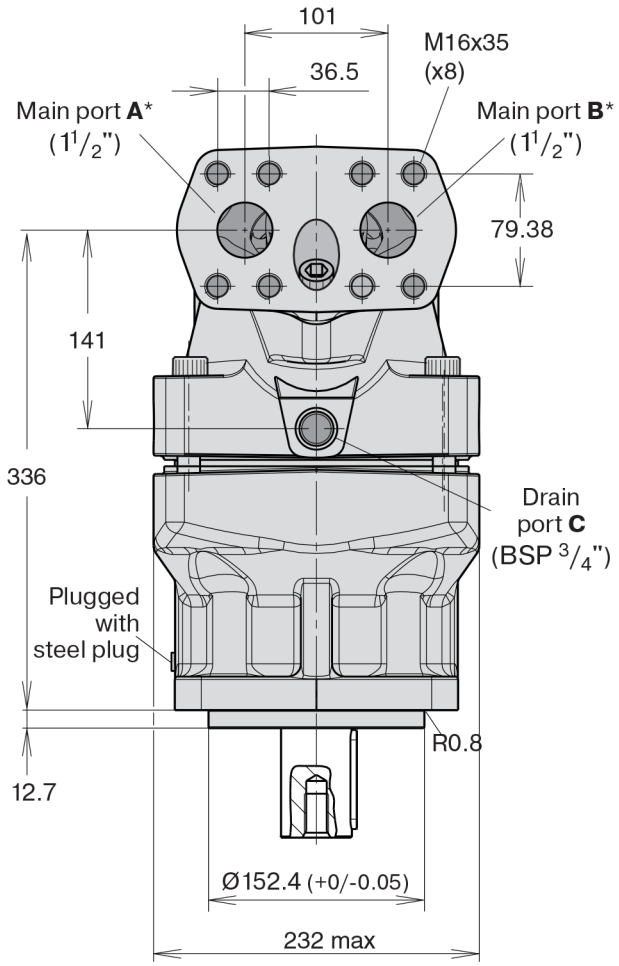


Type **S** mounting flange
SAE 'D' (SAE J744c)

F12-250 (SAE VERSION)

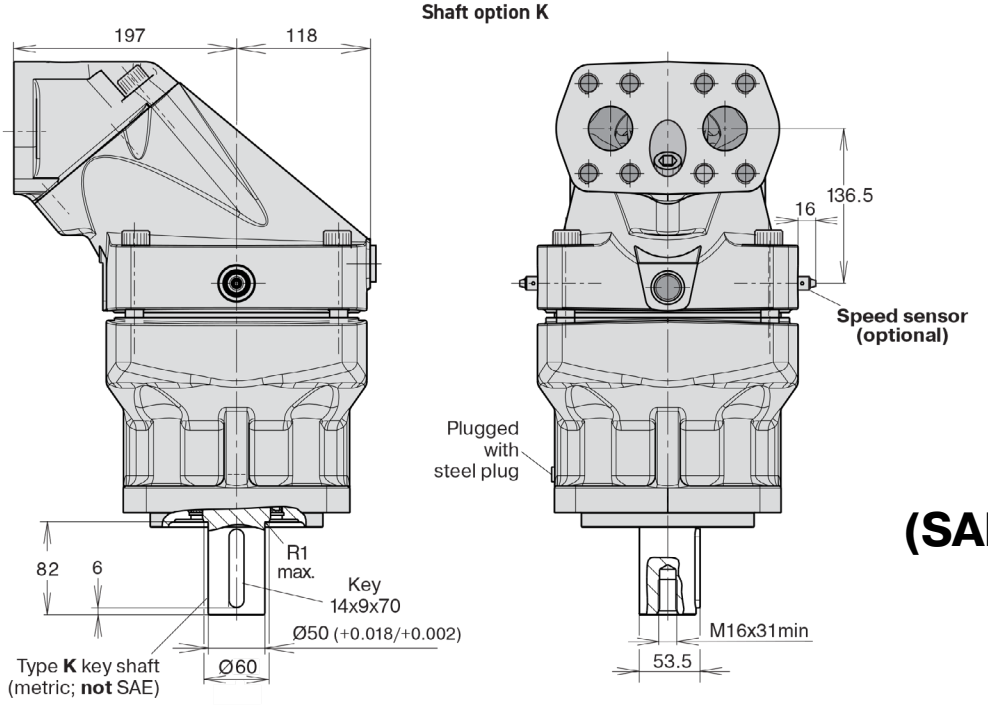
* 6000 psi flange (SAE J518c)



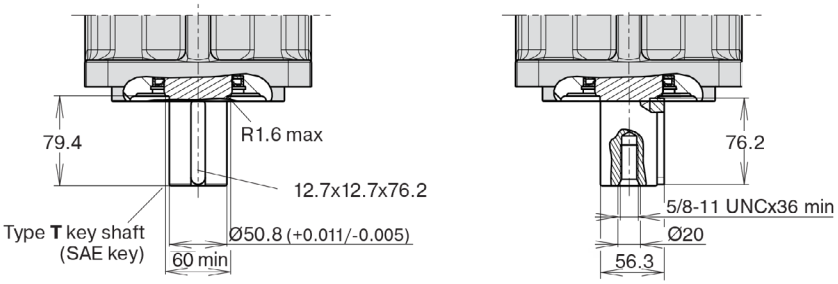


F12-250 OPTIONS (SAE VERSION)

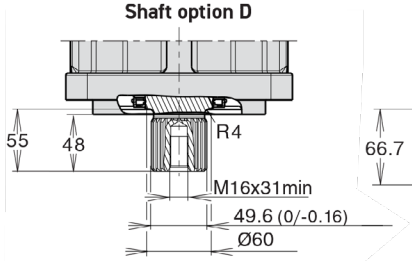
Shaft option K



Shaft option T

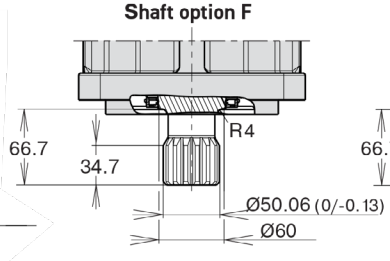


Shaft option D



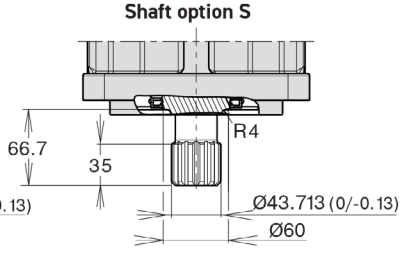
Type **D** spline shaft
W50x2x24x9g
DIN 5480 side fit

Shaft option F



Type **F** spline shaft
SAE J498b, class 1;
15T-8/16 DP;
fillet root, side fit

Shaft option S



Type **S** spline shaft
SAE J498b, class 1; 30° involute spline;
13T-8/16 DP;
flat root, side fit

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MV ANTI-CAVITATION VALVE / MAKE UP VALVE BLOCK

The make-up valve block for F12 motors is designed to prevent cavitation inside the motor by directing flow to inlet port from return side.

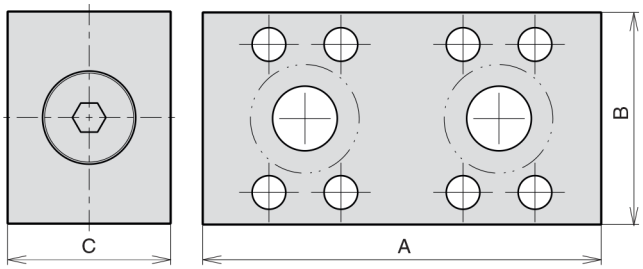
The manifold is uni-directional but can be installed in either motor direction.

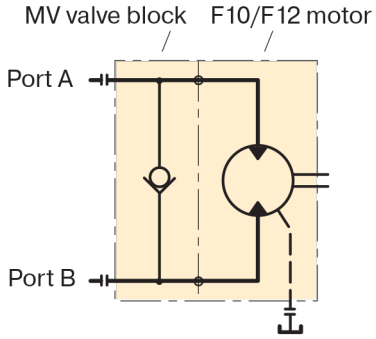
The valve block installs directly on the motor port flange, and is available in 2 sizes.

The valve block consists of one check valve for make-up function.

The make-up valve opens at a pressure of approx. 0,2 bar.

NOTE: The valve block includes main port O-rings (facing the motor) but no mounting screws.

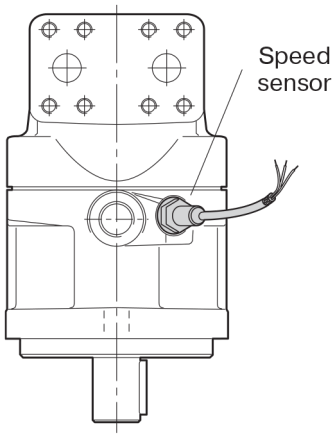




Size	For Motor	A	B	C	Order number
1"	F10-90, 107 and F12-80, -90	154	82	63	3720140
1½"	F12-152, -162, -182, -250	208.5	105	47	3784195

SPEED SENSOR KITS

The sensors are ferrostat differential (Hall-effect) On F12 the speed sensor is directed towards the ring gear.



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BLA BOOST UNITS

The BLA boost unit simplifies the building of closed or semiclosed hydrostatic transmissions.

- **Replaces conventional charge pump and corresponding valves in many applications**
- **Allows pump speeds above normal selfpriming speed**
- **Suitable for system flow rates to 400 l/min (106 US gpm)**
- **Includes filter**
- **Simple construction – no moving/wear parts**
- **Cost-effective installation**
- **Small tank size**
- **Helps in building a low-cost hydrostatic transmission.**

In a closed circuit hydrostatic transmission, a charge pump is normally included with the main pump, providing make-up fluid which replaces pump and motor volumetric losses. It also maintains sufficient pump inlet pressure to avoid cavitation.

The BLA boost unit replaces the charge pump in many applications, when the following conditions are met:
- The max-to-min pump flow ratio does not exceed 2:1
- System pressure changes gradually without frequent and pronounced pressure peaks
- The line length between pump and boost unit is relatively short.

There are two basic sizes of the BLA boost unit:
- BLA 4 (to 160 l/min (42 uS gpm) pump flow)
- BLA 6 (to 400 l/min (106 uS gpm) pump flow)

The main part of the unit is an aluminium housing with a built-in nozzle and an injector; refer to the cross section to the right.

When fluid flows from the motor outlet port through the unit and to the pump inlet port, the increased fluid velocity between the nozzle and injector creates a low pressure zone causing additional fluid to be drawn from tank into the main circuit.

Also, pressure increases after the injector, allowing the pump to be operated at speeds higher than the self-priming speed. The 'boost pressure' increases with flow.

The housing includes ports that should be connected to the pump and motor drain ports respectively.

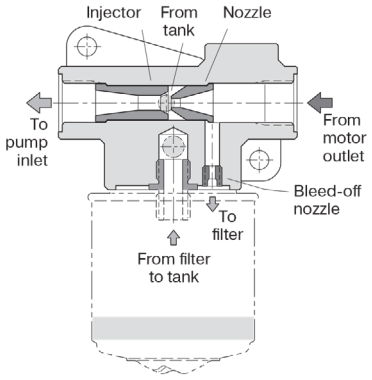
An additional bleed-off nozzle diverts approx. 10% of the main flow through the cartridge filter before being directed to the tank.

OIL COOLING

The BLA boost unit simplifies the building of closed or semiclosed hydrostatic transmissions.

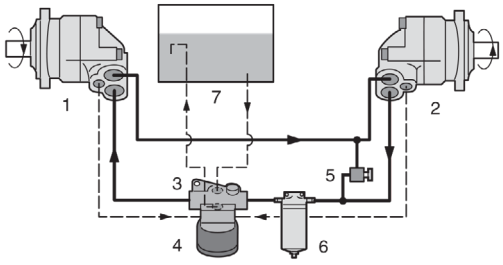
TYPICAL APPLICATIONS

- Fan drives
- Propeller drives
- Generator drives
- Pump drives



BLA boost unit cross section.

Boost unit installation



1. Pump
2. Motor
3. Boost unit (with injector and nozzle
4. Filter cartridge
5. Pressure relief valve
6. Full-flow filter (when required
7. Reservoir

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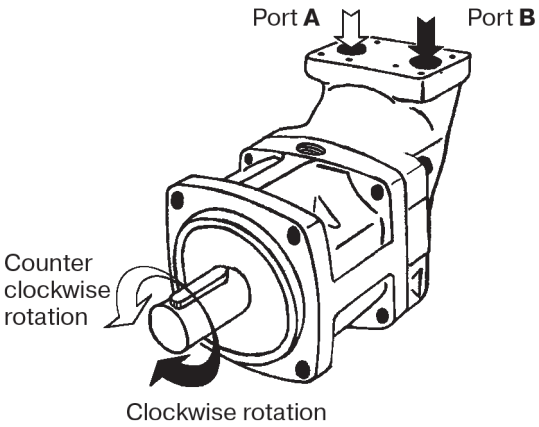
INSTALLATION INSTRUCTIONS

DIRECTION OF ROTATION

The motor versions are bi-directional. The pump versions are uni-directional, allowing higher selfpriming speeds.

The illustration to the right shows direction of flow versus shaft rotation. In a motor application, the shaft turns clockwise when port B (black arrow) is pressurized, and counter clockwise when port A (open arrow) is pressurized.

In a pump application where the shaft turns clock-wise, port B is the inlet port and should be connected to tank; when the shaft turns counter clockwise, port A is the inlet port.



HYDRAULIC FLUIDS

Ratings and performance data for series F12 are based on operating with good quality, contamination-free, petroleum-based fluids.
Hydraulic fluids type HLP (DIN 51524), automatic transmission fluids type A, or API CD engine oils can be used.
Fire resistant fluids (when used under modified operating conditions) and synthetic fluids may also be suitable.

NOTE:
When operating the F12 as a pump above the selfpriming speed (valid for both the pump and motor versions), the inlet must be sufficiently pressurized. Increased noise and deteriorating performance may otherwise be experienced.

OPERATING TEMPERATURE

The following temperatures should not be exceeded (type V FPM shaft seals):

Main circuit 80 °C / 176 °F

Drain circuit: 115 °C / 239 °F

NBR shaft seals (type N) can be used to 90 °C /194 °F drain fluid temperature.

NOTE: The temperature should be measured at the utilized drain port.

Continuous operation may require case flushing in order tomeet the viscosity and temperature limitations. The following table shows operating speeds, above which flushing is usually required, as well as suggested flow through the case.

Frame size	Speed [rpm]	Flow [l/min]	Flow [gpm]
F10-30, -37, F12-30	3500	4 – 8	1.0 - 2.1
F10-56, -80, F12-40, -60	3000	5 – 14	1.3 - 3.7
F10-90, -107, F12-80, -90	2500	8 – 16	2.1 - 4.2
F10-125, F12-110, -125	2300	9 – 18	2.4 - 4.8
F12-152, -162, -182	2200	10 – 20	2.6 - 5.2
F12-250	1800	12 – 22	3.2 - 5.8

IN SERIES OPERATION

When running the F12 in series at higher pressure levels, please contact us for further information.

CASE PRESSURE

The service life of the shaft seal ring is affected by the speed of the motor and the case drain pressure and it can decrease with an increase in the frequency of pressure peaks.

Note: Seal life can be shorter at unfavourable operating conditions (high temperature, low oil viscosity, contaminated oil).

The table below shows recommended case pressure as a function of shaft speed.

The case pressure must be equal to or greater than the external pressure on the shaft seal ring.

To secure correct case pressure and lubrication, a spring loaded check valve, 1– 3 bar, in the drain line is recommended.

Note: Contact us for information when operating at high speeds.

Shaft speed	[rpm]	1500	3000	4500	6000	max
F11-5, -6, -8, -10, -12, -14, -19	[bar]	0.5 - 10	0.5 - 7.0	1.0 - 5.0	2.0 - 5.0	3.0 - 5.0
	[psi]	7.3 - 145	7.3 - 102	14.5 - 72	29 - 72	43 - 72
F10-30, -37, -56, -80, -90, -107 F12-30, -40, -60, -80, -90	[bar]	0.5 - 8	0.5 - 6.0	1.0 - 4.5	2.0 - 4.0	-
	[psi]	7.3 - 116	7.3 - 87	14.5 - 65.3	29 - 58	-
F10-125, F12-110, -125, -152, -162, -182, -250	[bar]	0.5 - 6	1.0 - 4.0	2.0 - 4.0	-	-
	[psi]	7-3 - 87	14-5 - 58	29 - 58	-	-

REQUIRED INLET PRESSURE

The motor may operate as a pump under certain conditions.

When this occurs, a minimum pressure must be maintained at the inlet port; increased noise and gradually deteriorating performance due to cavitation may otherwise be experienced.

A 15 bar inlet pressure, measured at the motor inlet port, satisfies most operating conditions.

FILTRATION

To obtain the highest service life of the F12, the fluid cleanliness should meet or exceed ISO code 20/18/13 (ISO 4406). During normal operating conditions, a 10 µm (absolute) filter is recommended.

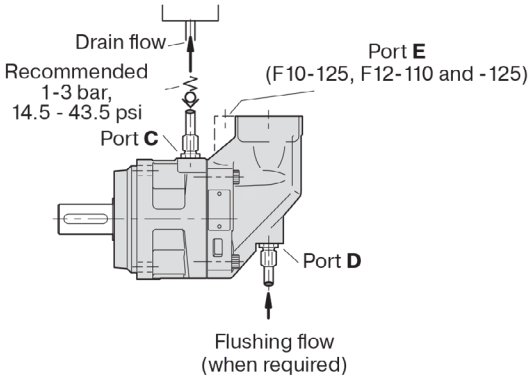
VISCOSITY

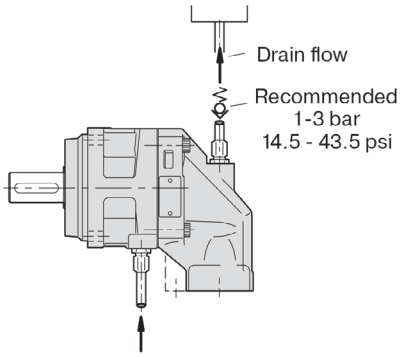
The ideal operating range is15 to 30 mm2/s [cSt]. At operating temperature, the viscosity (of the drain fluid) should be kept above 8 mm^2/s [cSt]. At start-up, the viscosity should not exceed 1000 mm2/s [cSt]

Case drain connections

Series F10/F11/F12 have two drain ports, **C** and **D**, while F10-125, F12- 110 and -125 have an additional port, **E**.

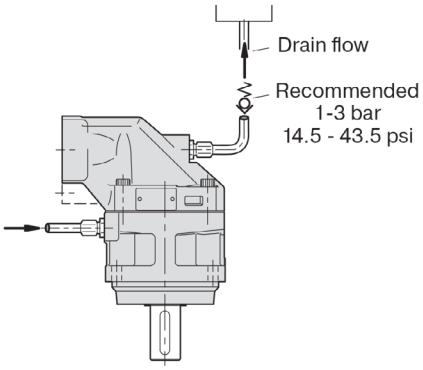
The uppermost drain port (such as port C in the illustration below) should always be utilized.

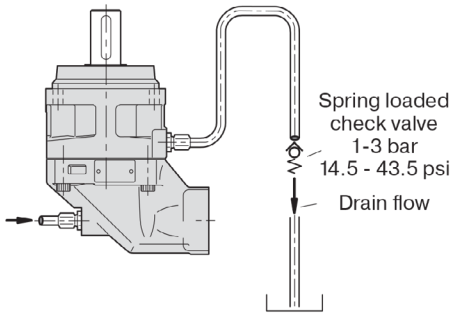


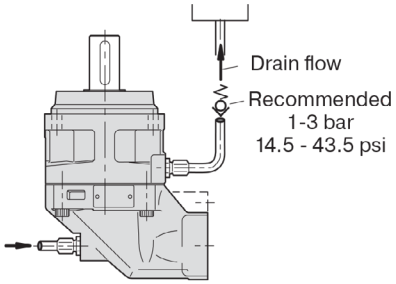


In mounting positions such as 'shaft up' (below) a spring loaded check valve should be installed in the drain line in order to insure a sufficiently high oil level in the case.

Preferably, the drain line should be connected directly to the reservoir.







BEFORE START-UP

Make sure the F12 case as well as the entire hydraulic system is filled with a recommended fluid.

The internal leakage, especially at low operating pressures, is not sufficient to provide lubrication at start-up.

NOTE:

To avoid cavitation and obtain a low noise level as well as reduced heat generation, tubes, hoses and fittings must be adequately dimensioned.

Preferably, the suction line flow speed should be 0.5 to 1 m/s (1.6 to 3.3 ft/s), and pressure line flow speeds 3 to 5 m/s (9.8 to 16.4 ft/s).