



Hydraulic Pump Series F2

Fixed Displacement

*Catalog 9129 8203-02
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Conversion factors

1 kg	2.20 lb
1 N	0.225 lbf
1 Nm	0.738 lbf ft
1 l	0.264 US gallon
1 cm ³	0.061 cu in
1 mm	0.039 in
$\frac{9}{5}$ °C	1 °F

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Even though the brochure is revised and updated continuously, there is always a possibility of errors.

For more detailed information about the products, please contact VOAC Hydraulics Division.

Twin-flow pump series F2

Series F2 is a further development of the twin-flow version of series F1, the very first bent-axis truck pump on the market to feature two entirely independent flows.

With a suitable build-up of the hydraulic system, the main advantage with a twin-flow pump is that three different flows can be provided at the same engine speed.

The twin-flow pump makes it possible to further optimize the hydraulic system and offers:

- Less energy consumption
- Reduced risk of system overheating
- Lower weight
- Easier installation
- Standardized system solutions

The twin-flow pump makes it possible to operate two work functions that are independent of each other which leads to higher speed and an increased operating precision. Another requirement can be a large and a small flow, or two equal flows. All of these alternatives are possible with the twin-flow pump.

The pump can be utilized to provide one flow at high system pressure, and, as soon as the pressure has decreased sufficiently, add the flow from the other circuit. This eliminates the risk of exceeding the PTO power rating and, at the same time, provide an optimal driving function.

Typical twin-flow applications

- Large truck loaders
- Forestry cranes
- Hook loaders/lift dumpers
- Tipper/crane combinations
- Refuse collecting vehicles

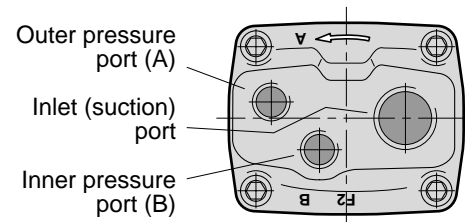
The pump shaft end and mounting flange meet the ISO standard and suits PTO direct mounting.

Suitable PTO:s for most European truck gearboxes are available from our sales offices and distributors.

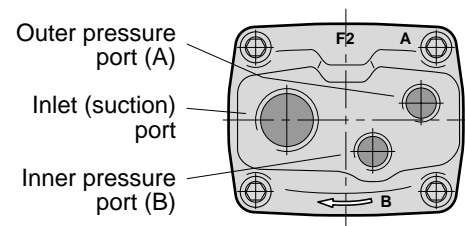
Specifications

Pump frame size	F2-53/53	F2-70/35
Displacement [cm ³ /rev]		
Port A	54	69
Port B	52	36
Max operating pressure [bar]	350	350
Shaft speed [rpm] (unloaded pump; low pressure)	2000	2000
Max selfpriming speed [rpm] (at 1.0 bar abs. inlet pressure)	1650	1650
Input power [kW]		
Max intermittent	100	100
Max continuous	75	75
Weight [kg]	19	19

'Left hand' and 'right hand' end caps



End cap for right hand rotating pump.



End cap for left hand rotating pump.

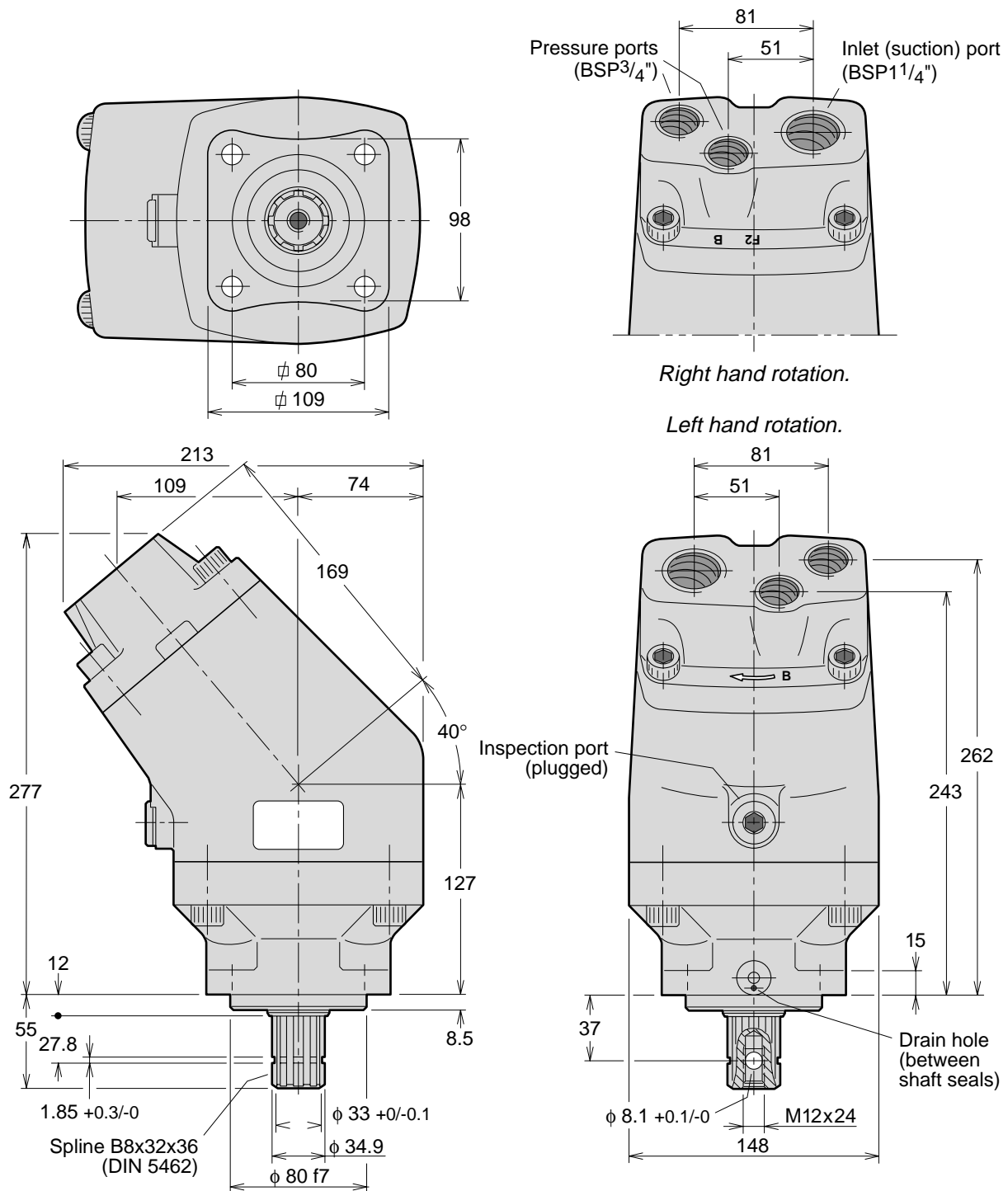
Flow vs. shaft speed (theoretical)

Pump speed [rpm]	900	1000	1100	1200	1300	1400	1500	1600
F2-53/53 flow [l/min]								
Port A	49	54	59	65	70	75	81	86
Port B	47	52	57	62	67	73	78	83
Total (ports A + B)	96	106	116	127	137	148	159	169
F2-70/35 flow [l/min]								
Port A	62	69	76	83	90	97	104	110
Port B	32	36	40	43	47	51	54	58
Total (ports A + B)	94	105	116	126	137	148	158	168

Shaft torque vs. pressure (theoretical)

Pressure [bar]	150	200	250	300	350
F2-53/53 torque [Nm]					
Port A	128	171	214	257	300
Port B	124	165	206	247	289
Total (ports A and B)	252	336	420	504	589
F2-70/35 torque [Nm]					
Port A	164	219	274	329	383
Port B	86	114	143	171	200
Total (ports A and B)	250	333	417	500	583

Installation dimensions



Ordering information

Example: **F2 - 53/53 - L**

Frame size [cm³/rev]

53/53

70/35

Direction of rotation

L Left hand

R Right hand

Standard versions

Designation	Ordering no.
F2-53/53-R	379 9980
F2-53/53-L	379 9990
F2-70/35-R	379 9960
F2-70/35-L	379 9970

NOTE:

- Before start-up, tighten the inspection port to 70–100 Nm.
- To change the direction of rotation, **the end cap must be replaced.**

Accessories

BPV-F2 electrical bypass valves

The BPV-F2 bypass valve (only suitable for series F2 pumps) facilitates controlling the two pump flows independently from each other.

The valve can be utilized for left hand and right hand pumps. It is installed directly on the pump port flange with two 'banjo' fittings which makes the assembly very compact requiring a minimum of piping.

The valve is controlled by two solenoids (24 or 12 VDC); refer to the schematic to the right.

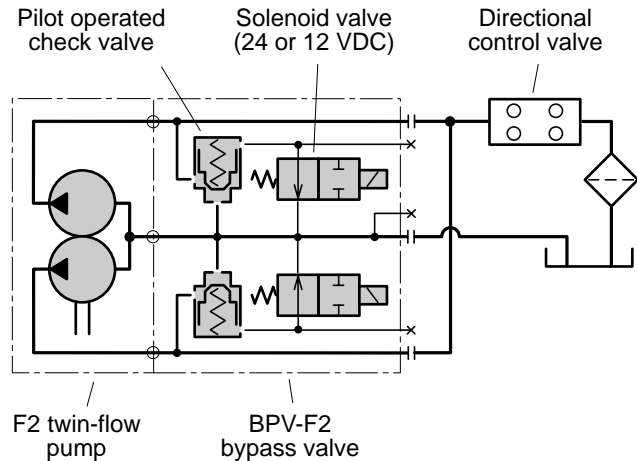
Ordering numbers:

- 379 4699 (24 VDC; standard)
- 379 8533 (12 VDC; optional)

NOTE: - The BPV-F2 valve must be operated in an open loop system (to secure a small cooling flow through the pump in the bypass mode).

- The valve functions only when system pressure is below 20 bar.

Additional information is provided in our 'Truck Accessories' bulletin (catalog no. 9129 8242-02; page 14).



MB-F2-H1 torque limiting valve

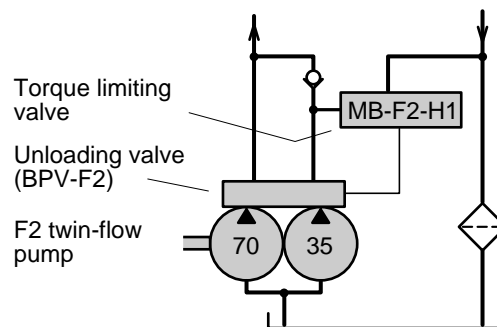
The MB-F2-H1 torque limiting valve protects the PTO output shaft (which drives the pump) from being overloaded.

When system pressure increases to the valve setting pressure, the flow from the pump port that is connected to the valve is being unloaded to the reservoir.

The valve is designed for operating pressures to 350 bar.

MB-F2-H1 ordering number: 378 0202.

Additional information is provided in our 'Truck Accessories' bulletin (catalog no. 9129 8242-02; page 11).



Application example: MB-F2-H1 valve block.

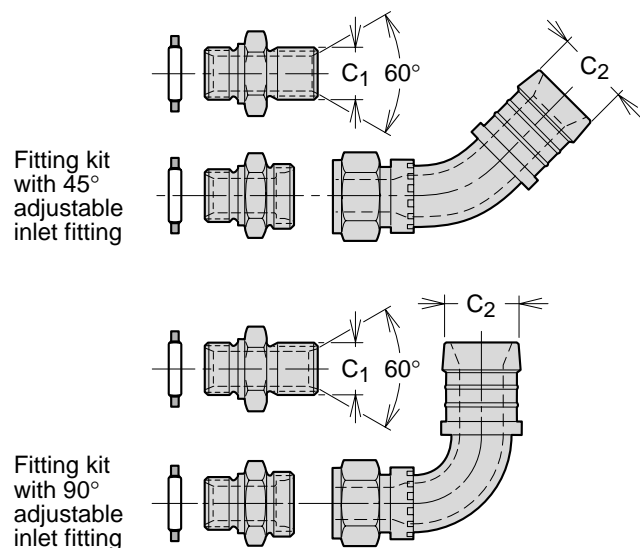
Fitting kits

Fitting kits with 45° and 90° inlet (suction) fitting are available; refer to the illustration to the right.

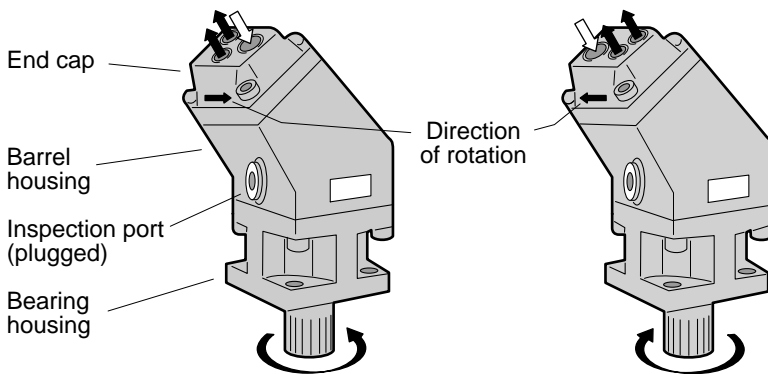
The fitting kits contain two pressure fittings, one inlet fitting and corresponding seal washers.

Additional information is provided in our 'Truck Accessories' bulletin (catalog no. 9129 8242-02; page 3).

Ordering no.	Kit	C1	C2
379 9914	45°	BSP 3/4"	2"
379 9561	45°	BSP 3/4"	2 1/2"
379 9917	90°	BSP 3/4"	2"

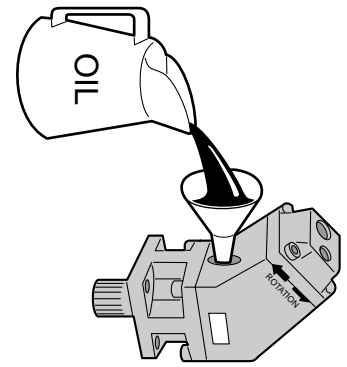


Installation and start-up



Right hand rotation.

Left hand rotation.



Before start-up, the housing must be filled with hydraulic fluid.

Direction of rotation

The above illustrations show flow vs. shaft rotation for left hand and right hand pump versions respectively.

The F2 twin flow pump is designed for left hand or right hand rotating PTO's. In order to change the direction of rotation of the pump, the pump end cap must be replaced.

Installation

The robust shaft bearings of the pump allows the F2 to be installed on a bracket (driven by a belt or cardan shaft) or directly on the PTO.

Fig. 2 shows three ways of installing a gear on the F2 shaft. On a non-geared PTO or a geared PTO with support bearings, the pump shaft is usually installed directly in the internally splined PTO output shaft.

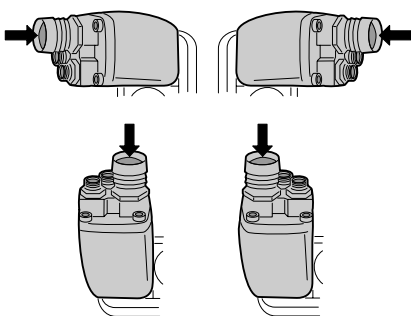


Fig. 1.

Hydraulic fluids

The F2 data shown in the specifications on page 4 are valid when operating on a high quality, mineral based fluid.

Hydraulic fluids type HLP (DIN 51524), ATF (automatic transmission fluids), and API type CD engine oils are suitable.

Fluid temperature

Main circuit: Max 75 °C.

Viscosity

Recommended viscosity: 20 to 30 mm²/s (cSt).

Operating viscosity limits: 10 - 400 mm²/s.

At start-up: Max 1000 mm²/s.

Drain line

F2 pumps don't need a drain line as they are internally drained.

Filtration

To obtain long F2 life, we recommend a filtration level of:

- 25 µm (absolute) in clean environment or at low pressures
 - 10 µm (absolute) in contaminated environment or at high pressures
- Filtration should meet ISO standard 4406, code 18/13.

Start-up

Make sure the entire hydraulic system is clean before filling it with a recommended fluid.

The pump must also be filled as the internal leakage does not provide sufficient lubrication at start-up.

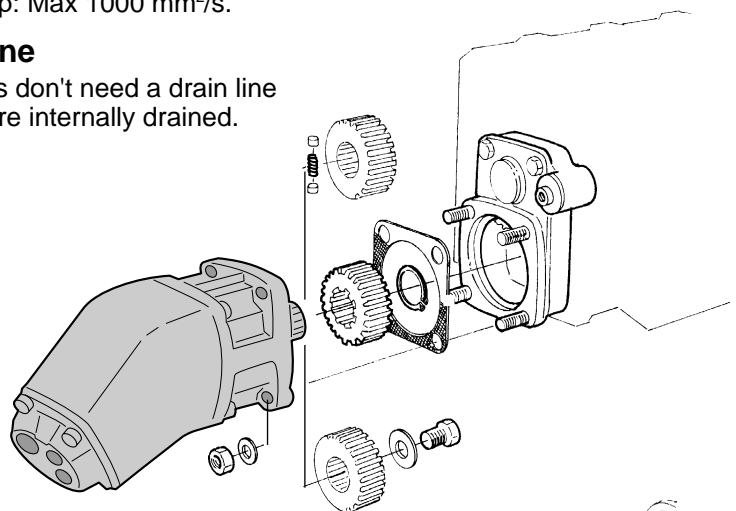


Fig. 2.

NOTE:

- The inlet (suction) port should always be above the pressure port when the pump is installed above the reservoir oil level (fig. 1).
- During operation, the pump must be filled with oil to at least 50%.

IMPORTANT

Force must **never** be used when installing a coupling, a sleeve or a gear on the F2 pump shaft.

The tool shown in fig. 3 facilitates the installation (our P/N 370 6851).

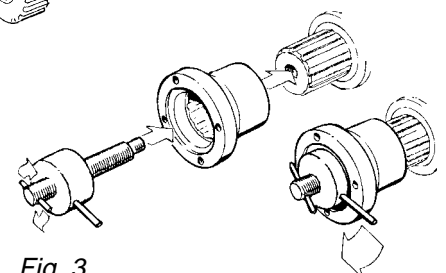


Fig. 3.

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