

MANUFACTURING
THE PRODUCTION LINE OF HANSA-TMP

HT 16 / M / 703 / 1211 / E

Fixed Displacement Axial Piston Motor for Open and Closed Loop System

TMF 300



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GENERAL INFORMATION

The fixed-displacement axial piston motors TMF 300 with swash plate system may operate in either closed or open circuit.

Proper selection of materials and the use of steel cylinder blocks with inserted bushings guarantee the high performance of the TMF 300 motors, in terms of max. speed and working pressure.

The main features of TMF 300 motors include:

- Exceptionally high power/weight ratio
- Excellent volumetric and mechanical efficiency
- Long life
- Compact design
- Purge valve fitted as optional. (All dimensions remain unchanged).

The very small dimensions allow to fit the motor in restricted room or positions which are difficult with traditional mechanical transmission.

Installation Instructions

- During the assembly check that the motor is in line and concentric with the drive shaft sleeve to prevent overloading of the shaft bearings.
- Clean carefully all tanks and pipes internally before assembly.
- The pipe internal diameter must be suitable for the max. oil speed through the pipes.
- Fit the motor lower than oil level in tank.
- Heat exchanger must be provided in the machine design, to keep temperature level within the limit of 80°C.

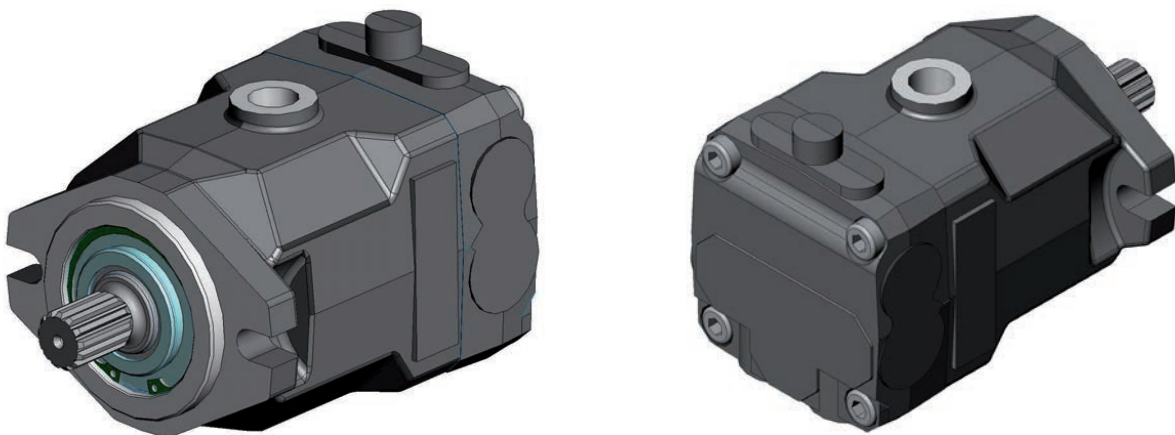
First Starting

- Before starting fill all the system components with new and filtered oil.
- Verify that the charge pressure is correct.
- Restore the tank oil level.

Maintenance

To guarantee long life, the motor must work with oil cleaned according ISO 4406 class 18/16/13 (NAS 8) or better.

- First oil change must be made after approximately 500 hours of operations, and then every 2000 hours.
- The filter cartridge must be replaced the first time after 50 hours and then every 500 hours; such time should be reduced when the filter clogging indicator shows that the cartridge is clogged or when the system works in a heavily polluted environment.



TECHNICAL SPECIFICATIONS

| Motor Model | | | TMF 21 | TMF 28 |
|-----------------------------|------------------------|-----------------------|-------------------------------------|---------------------|
| Displacement | V | cm ³ /min. | 21 | 28 |
| Theoric specific torque | M | Nm/bar | 0,33 | 0,44 |
| Flow rating ⁽¹⁾ | Q | l/min. | 75,6 | 100,8 |
| Power rating ⁽²⁾ | W | kW | 31,8 | 42 |
| Continuous pressure | P _{nom.} | bar | | 250 |
| Peak pressure | P _{max.} | bar | | 350 |
| Max. case pressure | P _{case} | bar | | 2 |
| Polar moment of inertia | J | Nm/sec ² | 15x10 ⁻¹ | 19x10 ⁻¹ |
| Minimum speed | n _{min.} | n/min. | | 700 |
| Max. cont. speed with load | n _{max-cont.} | n/min. | | 3.600 |
| Max. speed without load | n _{max-int.} | n/min. | | 4.000 |
| Max oil temperature | T | °C | | 80 |
| Oil viscosity | v | mm ² /sec. | | 15 - 60 |
| Fluid contamination | | | 18/16/13 according ISO 4406 (NAS 8) | |
| Mass | m | kg | 7,5 | 7,8 |
| Mounting flange | | | | SAE A |

Notes:

(1) $[V \times n_{max}]$

(2) 3.600 n/min. at 250 bar

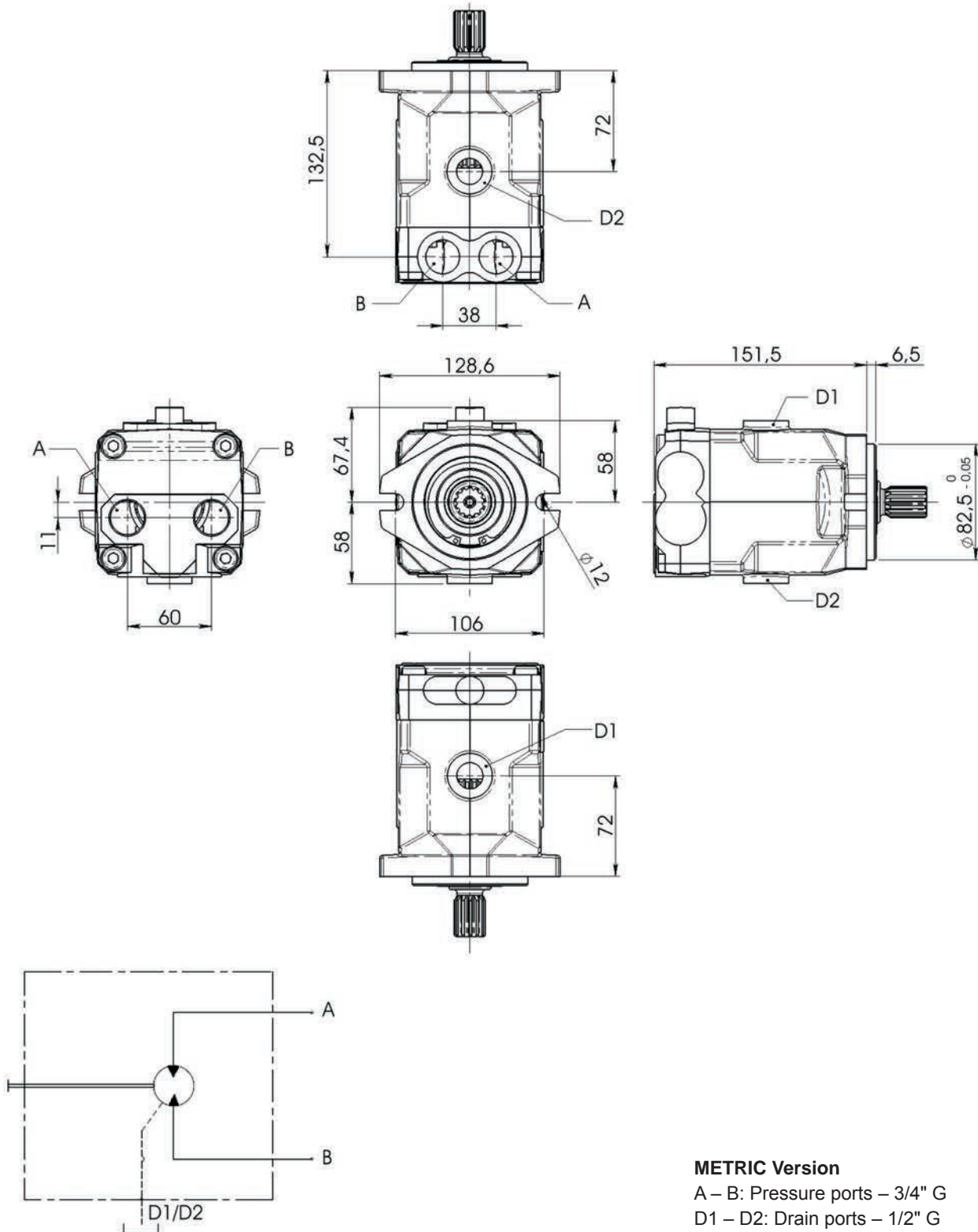
(3) The motor 21 and 28 use the same external housing

Peak operations must not exceed 1% of every minute.

A simultaneous max. pressure and speed are not recommended.

INSTALLATION DRAWING

Side Combined A - B Connection



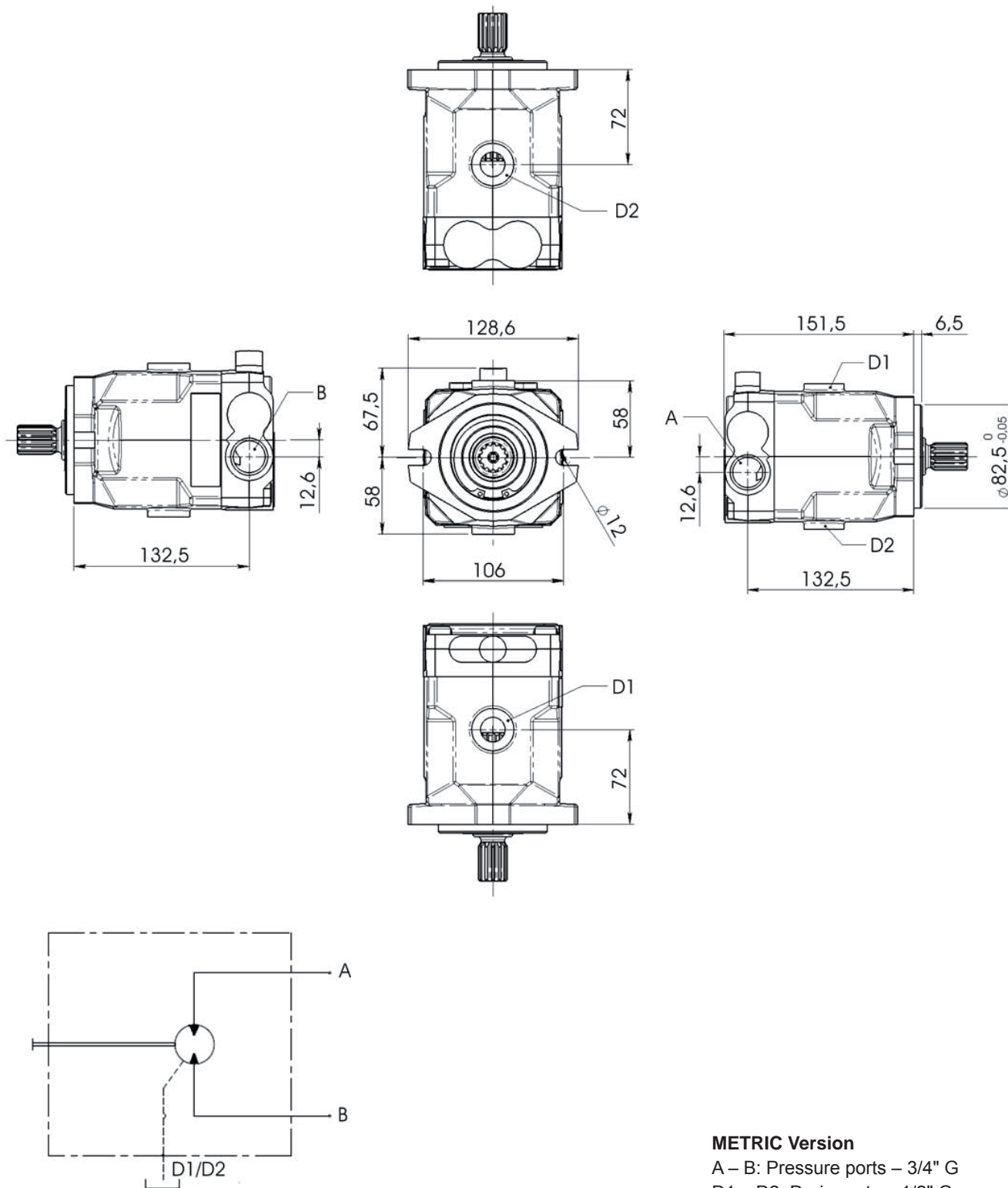
METRIC Version

A – B: Pressure ports – 3/4" G

D1 – D2: Drain ports – 1/2" G

INSTALLATION DRAWING

Opposite Lateral A - B Connection

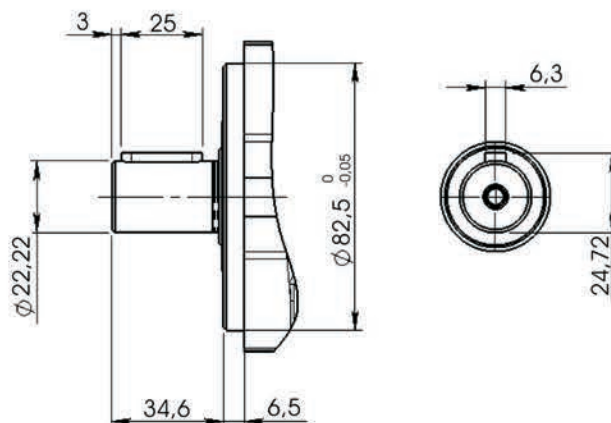


METRIC Version

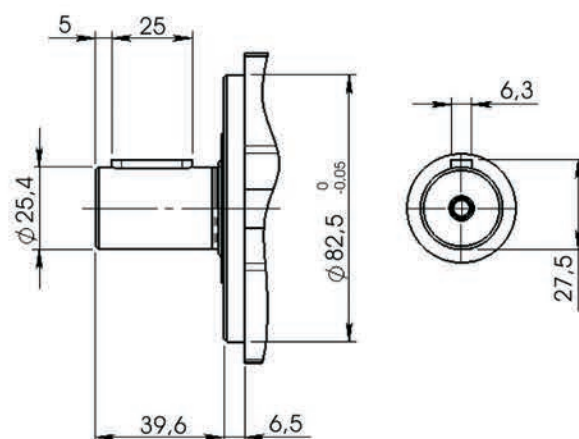
A – B: Pressure ports – 3/4" G
D1 – D2: Drain ports – 1/2" G

SHAFTS

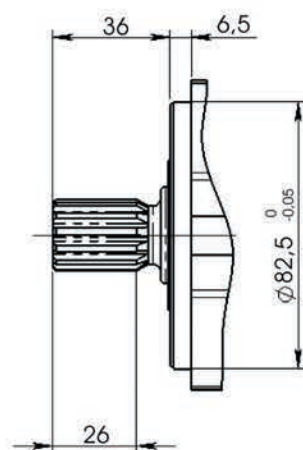
Type 1 - Parallel diam. 22,22



Type 2 - Parallel diam. 25,4



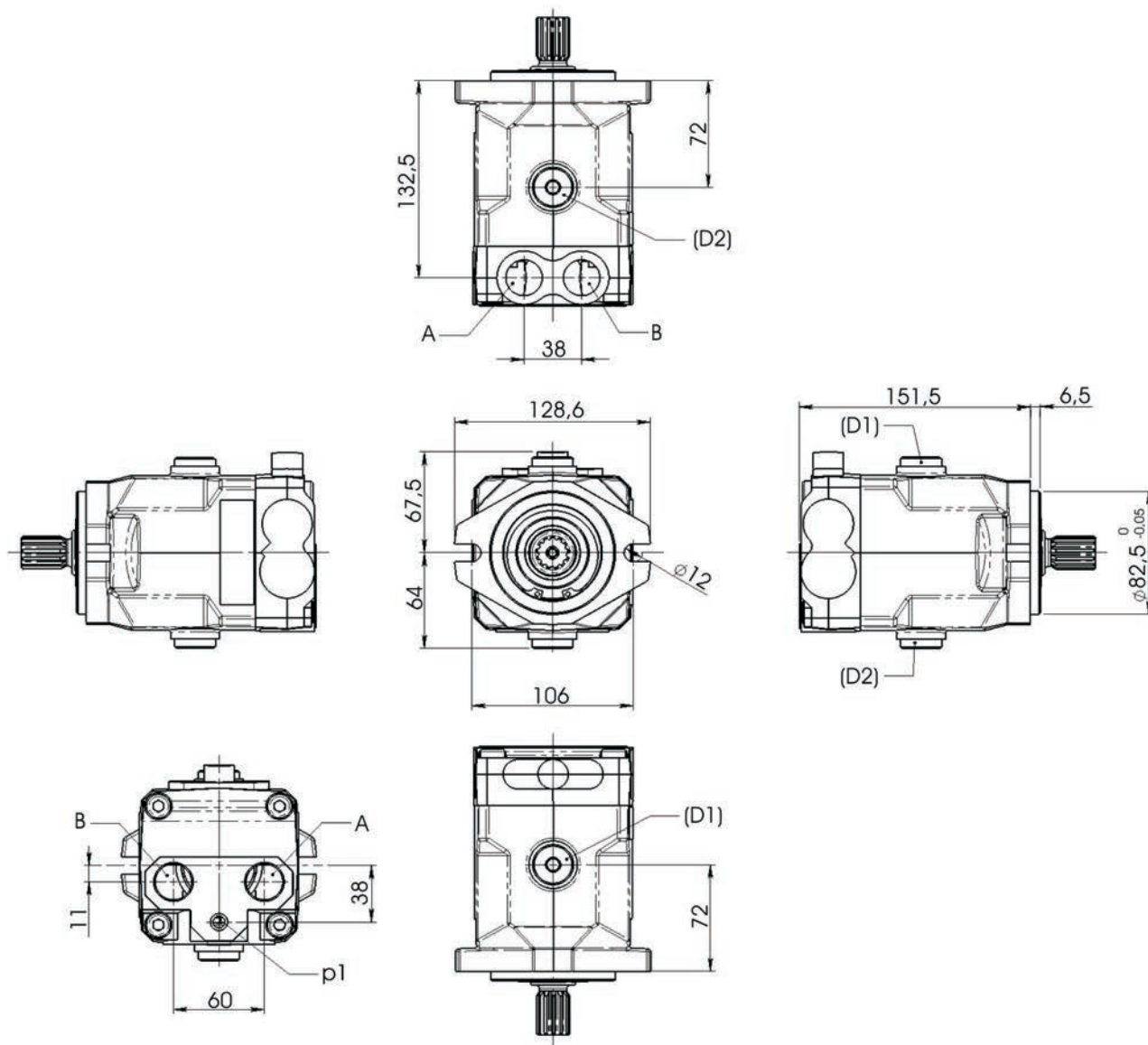
Type 5 - Splined Male 13T DP 16/32



ACCESSORIES

Rear Drain

P



METRIC Version

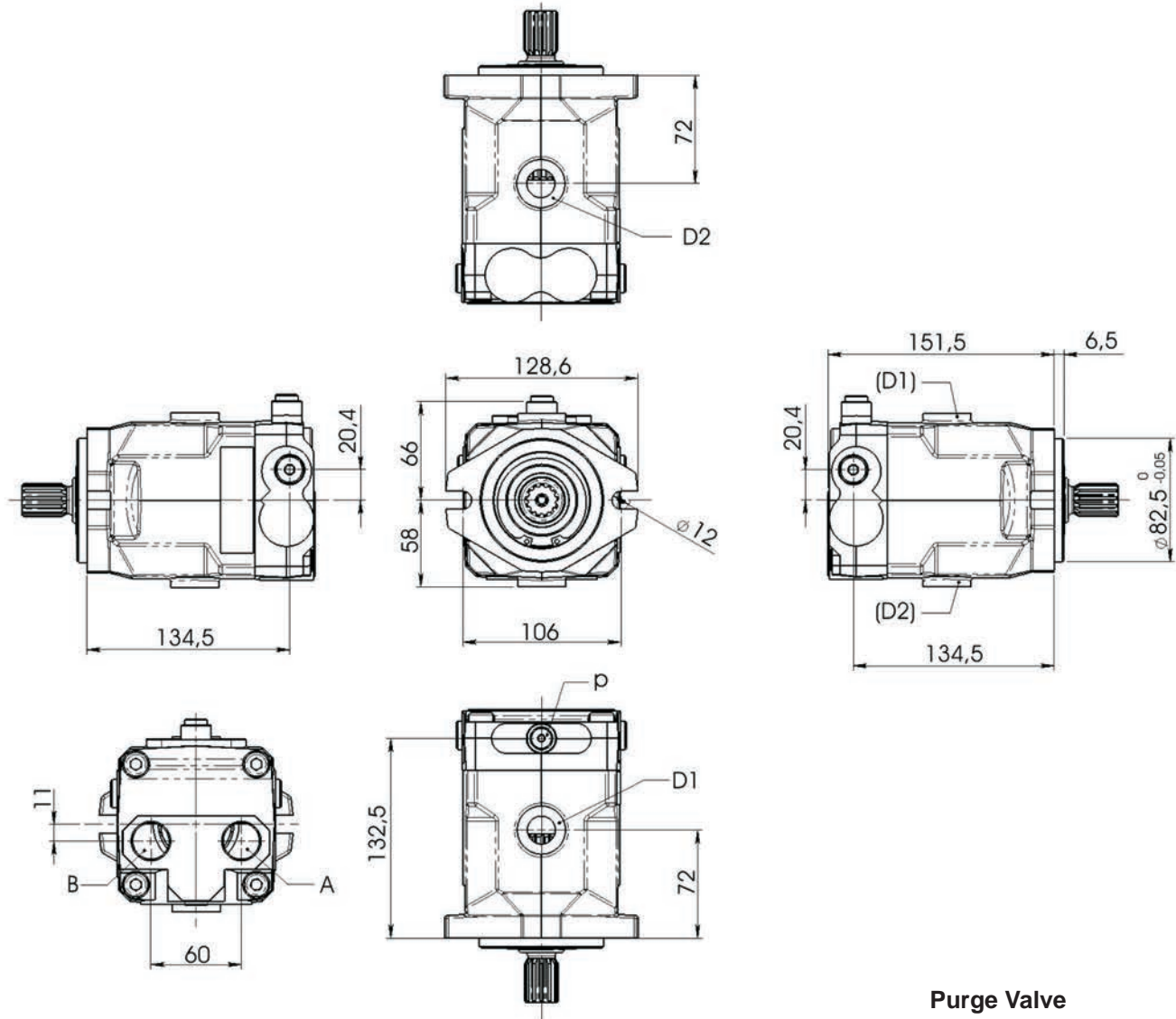
A – B: Pressure ports – 3/4" G

D1 – D2: Drain ports – 1/2" G

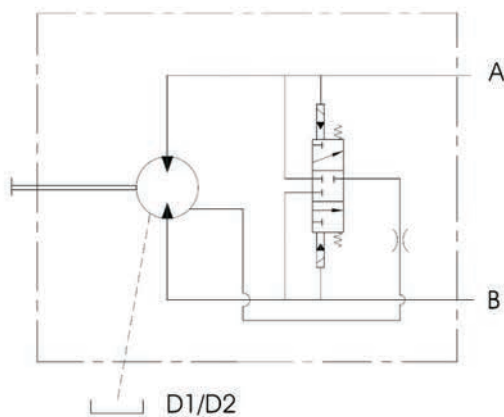
p1: Rear drain – 1/4" G

ACCESSORIES (continued)

Purge Valve



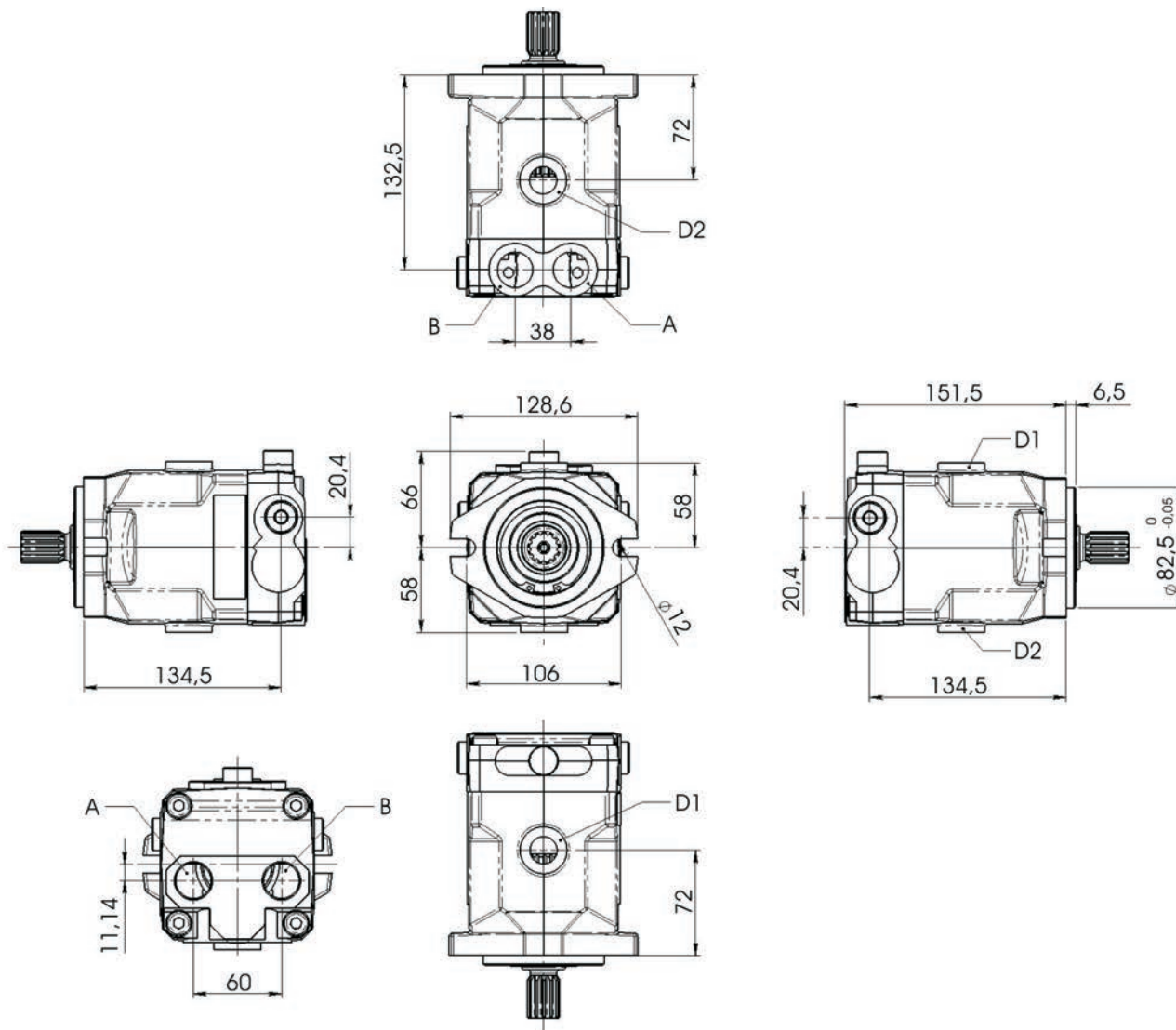
Purge Valve
Flow: 5 - 7 lt./min.



METRIC Version

A – B: Pressure ports – 3/4" G
D1 – D2: Drain ports – 1/2" G

ACCESSORIES (continued) Pressure Relief Valve



METRIC Version

A – B: Pressure ports – 3/4" G
D1 – D2: Drain ports – 1/2" G

ORDER CODE

| | | | | | | | |
|---------|----|---|---|---|---|---|---|
| TMF 300 | 21 | 1 | B | 1 | T | P | - |
| 1 | 2 | 3 | 4 | 2 | 6 | 7 | 8 |

Pag.

1 - Motor Series

TMF 300 = Fixed displacement motor TMF 300 Series

2 - Motor Displacement

- 21 = 21 cm³/n
- 28 = 28 cm³/n

5

3 - Main Ports

- 1 = Rear A and B connection
- 2 = Side combined A and B connection
- 3 = Opposite side A and B connection

4 - Rotation Direction

- B = Bidirectional (standard)

5 - Shafts

- 1 = Parallel diam. 22,2 with key
- 2 = Parallel diam. 25,4 with key
- 5 = Splined male 13 teeth 16/32 DP

8

6 - Port Version

- T = A and B ports thread - 3/4" BSPP

7 - Optional (omit if not requested)

- = Without optional
- P = Rear drain
- V = Purge valve

9

10

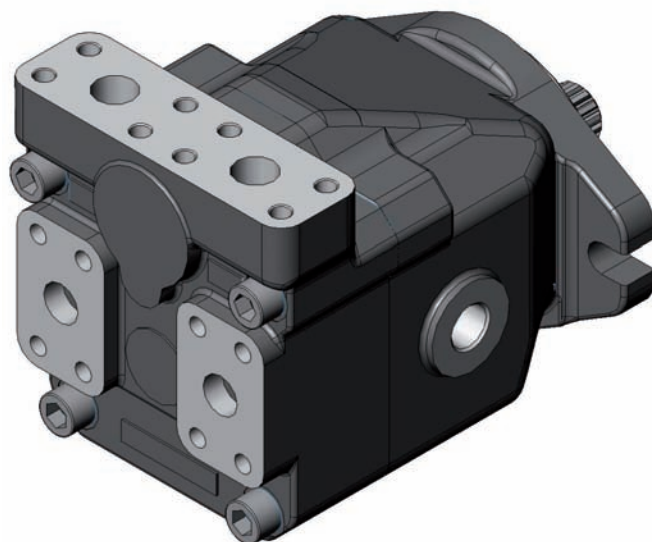
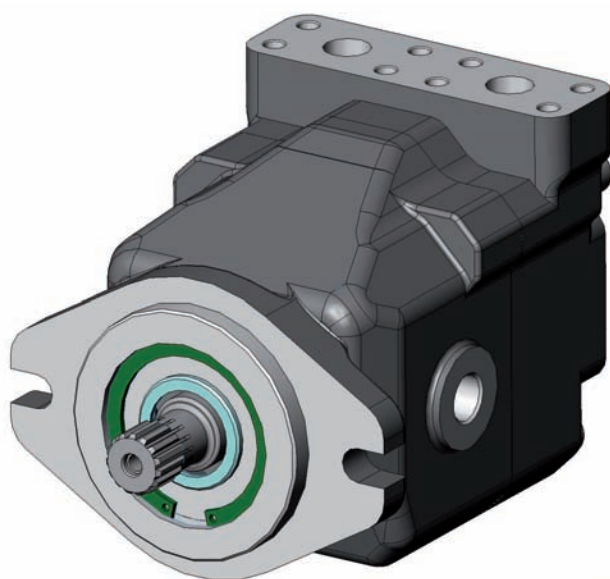
8 - Special versions (omit if not requested)



THE PRODUCTION LINE OF HANSA-TMP

**Fixed Displacement Axial Piston Motor
for Open and Closed Loop System**

TMF 500



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GENERAL INFORMATION

The fixed-displacement axial piston motors TMF 500 with swash plate system may operate in either closed or open circuit.

Proper selection of materials and the use of steel cylinder blocks with inserted bushings guarantee the high performance of the TMF 500 motors, in terms of max. speed and working pressure.

The main features of TMF 500 motors include:

- Exceptionally high power/weight ratio
- Excellent volumetric and mechanical efficiency
- Long life
- Compact design
- Purge valve fitted as optional. (All dimensions remain unchanged).

The very small dimensions allow to fit the motor in restricted room or positions which are difficult with traditional mechanical transmission.

Installation Instructions

- During the assembly check that the motor is in line and concentric with the drive shaft sleeve to prevent overloading of the shaft bearings.
- Clean carefully all tanks and pipes internally before assembly.
- The pipe internal diameter must be suitable for the max. oil speed through the pipes.
- Fit the motor lower than oil level in tank.
- Heat exchanger must be provided in the machine design, to keep temperature level within the limit of 80°C.

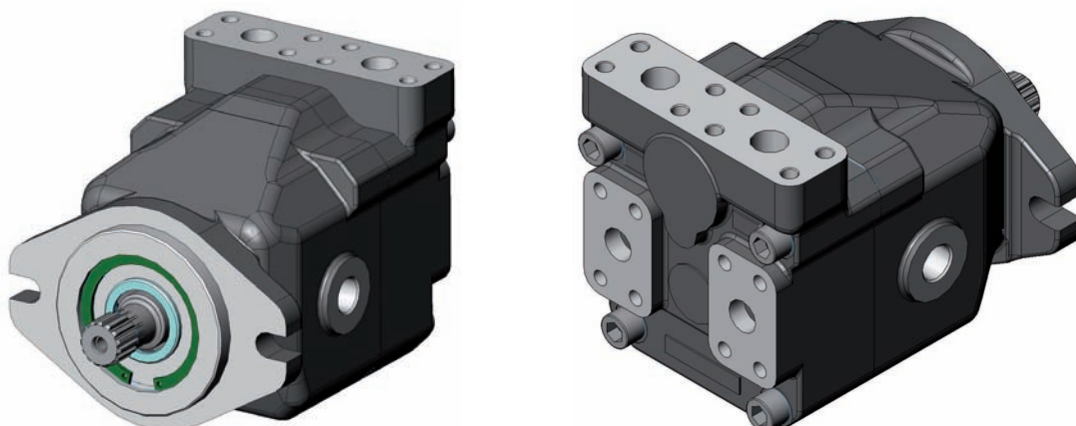
First Starting

- Before starting fill all the system components with new and filtered oil.
- Verify that the charge pressure is correct.
- Restore the tank oil level.

Maintenance

To guarantee long life, the motor must work with oil cleaned according ISO 4406 class 18/16/13 (NAS 8) or better.

- First oil change must be made after approximately 500 hours of operations, and then every 2000 hours.
- The filter cartridge must be replaced the first time after 50 hours and then every 500 hours; such time should be reduced when the filter clogging indicator shows that the cartridge is clogged or when the system works in a heavily polluted environment.



TECHNICAL SPECIFICATIONS

| Motor model | | | TMF 34 | TMF 46 | TMF 50 | TMF 64 |
|-----------------------------|------------------------|-----------------------|-------------------------------------|---------------------|---------------------|---------------------|
| Displacement | V | cm ³ /min. | 34 | 46 | 50 | 64 |
| Theoric specific torque | M | Nm/bar | 0,54 | 0,73 | 0,79 | 1,02 |
| Flow rating ⁽¹⁾ | Q | l/min. | 122 | 165 | 180 | 230 |
| Power rating ⁽²⁾ | W | kW | 50,8 | 68,5 | 75 | 95,8 |
| Continuous pressure | P _{nom.} | bar | | | 250 | |
| Peak pressure | P _{max.} | bar | | | 350 | |
| Max. case pressure | P _{case} | bar | | | 2 | |
| Polar moment of inertia | J | Nm/sec ² | 60x10 ⁻¹ | 60x10 ⁻¹ | 59x10 ⁻¹ | 59x10 ⁻¹ |
| Minimum speed | n _{min.} | n/min. | | | 700 | |
| Max. cont. speed with load | n _{max-cont.} | n/min. | | | 3.600 | |
| Max. speed without load | n _{max-int.} | n/min. | | | 4.000 | |
| Max oil temperature | T | °C | | | 80 | |
| Oil viscosity | v | mm ² /sec. | | | 15 - 60 | |
| Fluid contamination | | | 18/16/13 according ISO 4406 (NAS 8) | | | |
| Mass | m | kg | | | 18,43 | |
| Mounting flange | | | | | SAE B | |

Notes:

(1) [V x n_{max.}]

(2) 3.600 n/min. at 250 bar

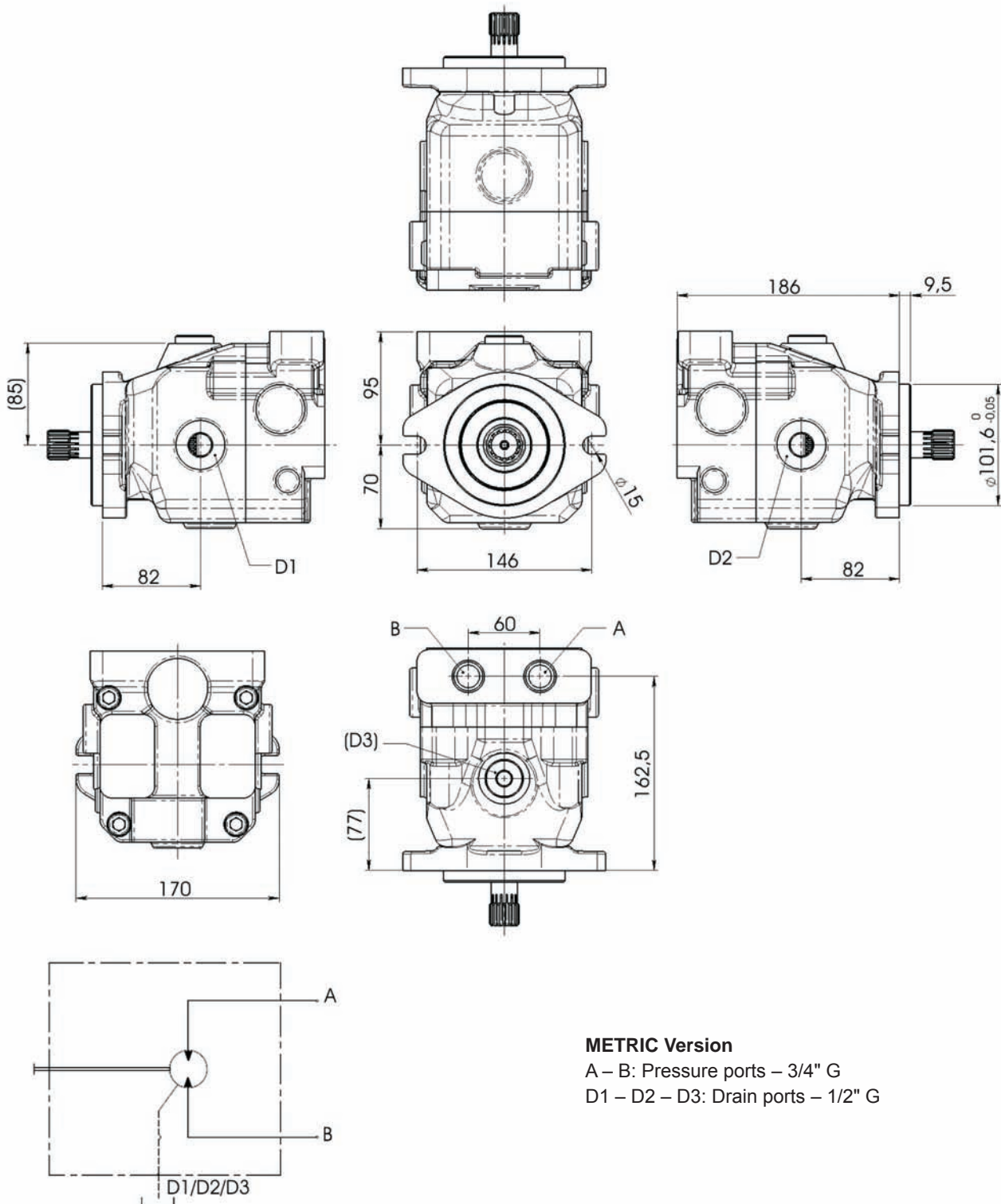
(3) The motor 34, 46, 50 and 64 use the same external housing

Peak operations must not exceed 1% of every minute.

A simultaneous max. pressure and speed are not recommended.

INSTALLATION DRAWING

Side Combined A - B Connection



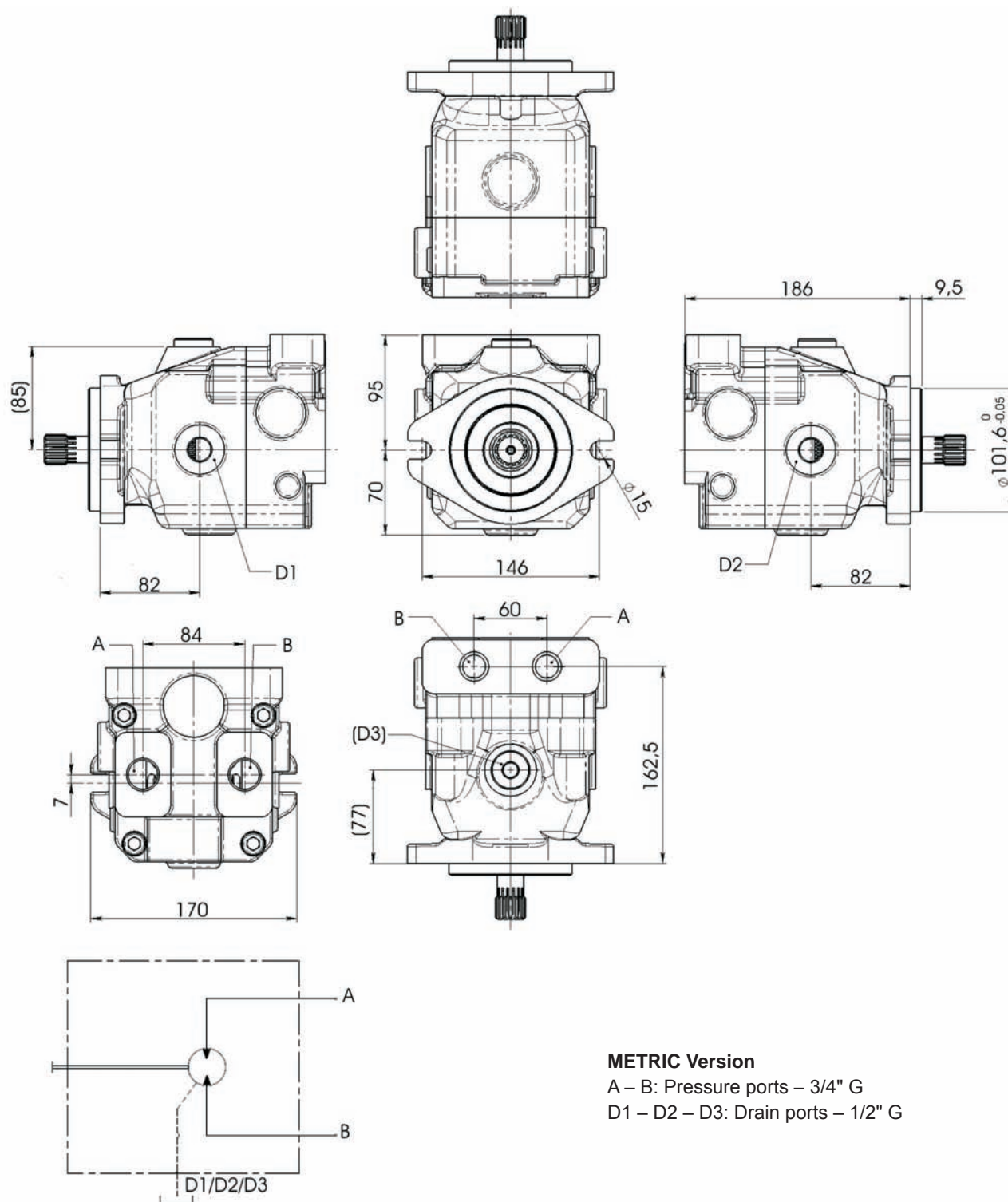
METRIC Version

A – B: Pressure ports – 3/4" G

D1 – D2 – D3: Drain ports – 1/2" G

INSTALLATION DRAWING

Rear A-B Connection



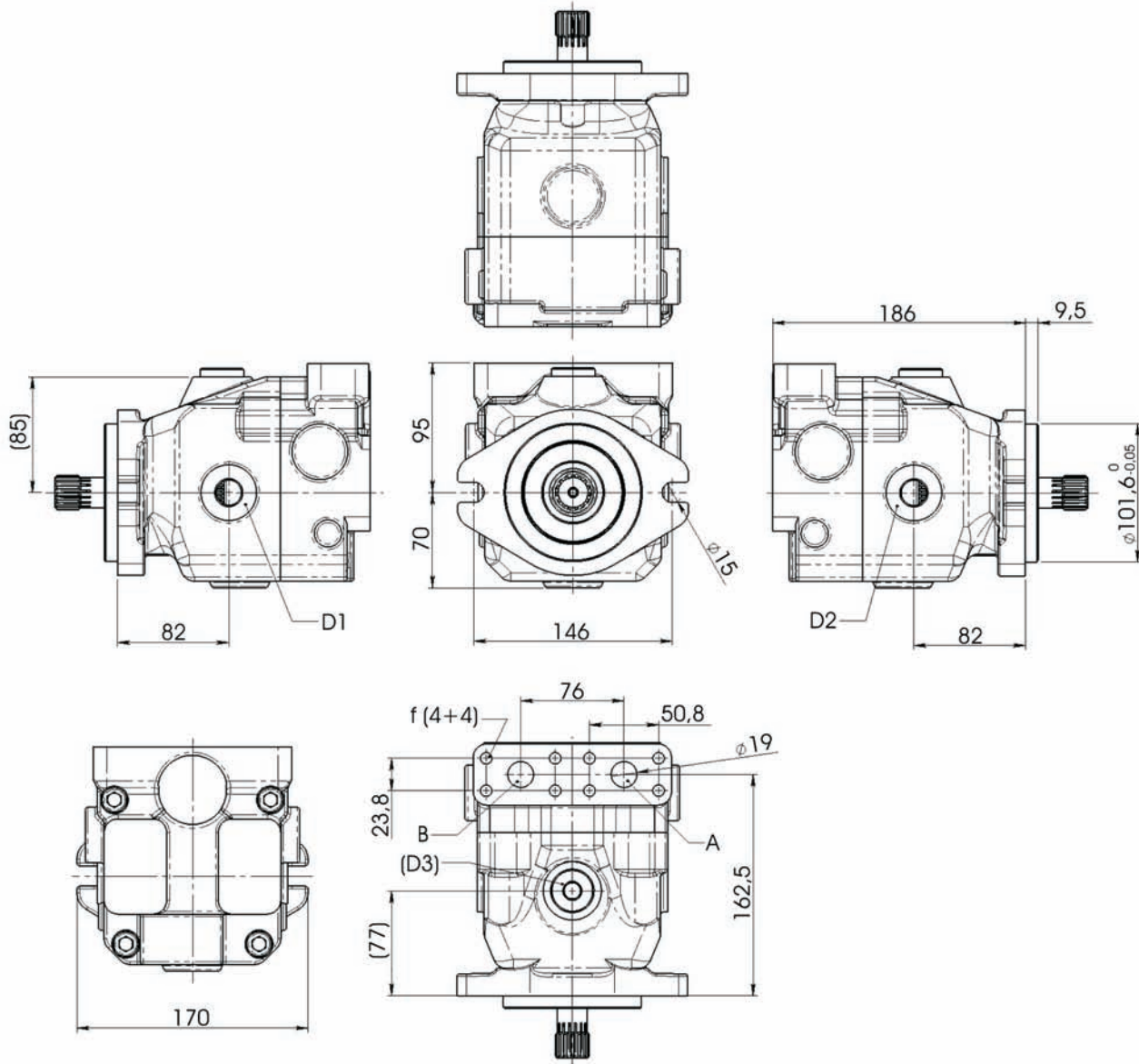
METRIC Version

A – B: Pressure ports – 3/4" G

D1 – D2 – D3: Drain ports – 1/2" G

INSTALLATION DRAWING

Side Combined A - B Connection - SAE 6000 - 3/4"

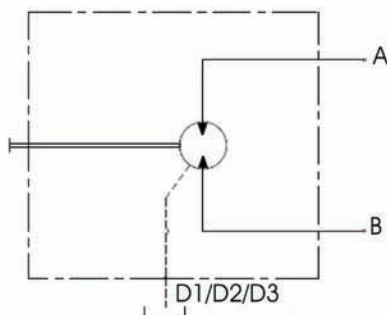


METRIC Version

A – B: Pressure ports – SAE flange 6000 – 3/4"

f: SAE flange fixing holes – M 10 depth 15 mm.

D1 – D2 – D3: Drain port – 1/2" G



SAE Version

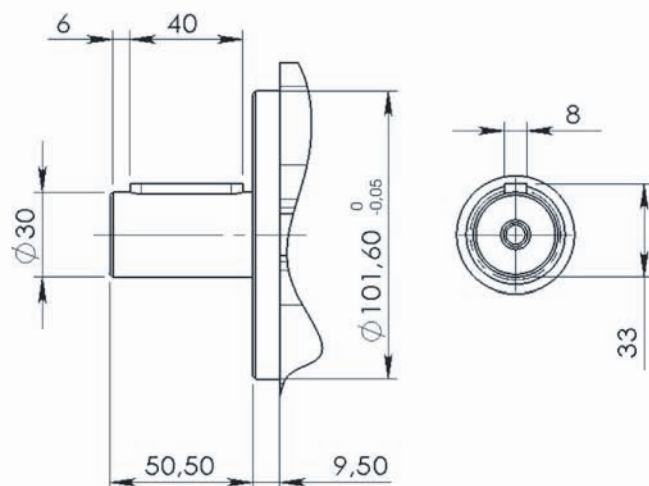
A – B: Pressure ports – SAE flange 6000 - 3/4"

f: SAE flange fixing holes – 3/8" – 16 UNC 2B depth 15 mm.

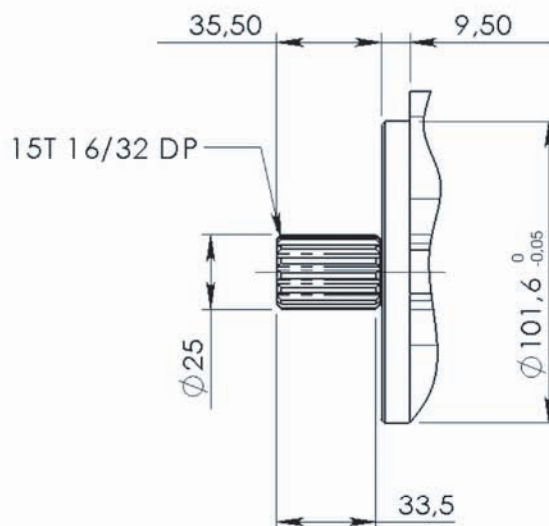
D1 – D2 – D3: Drain port – 1/2" G

INSTALLATION DRAWING SHAFTS

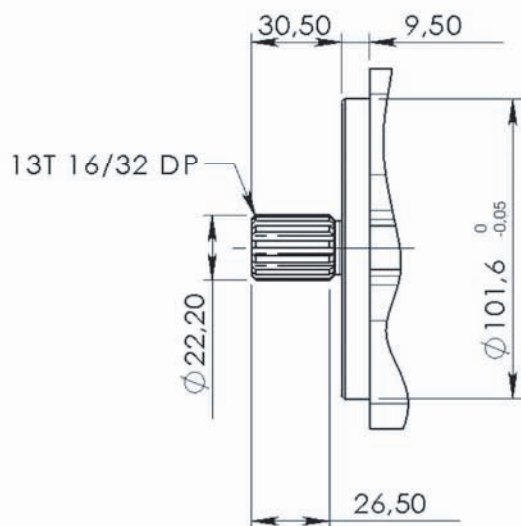
Type 1 - Parallel 30 mm. diam.



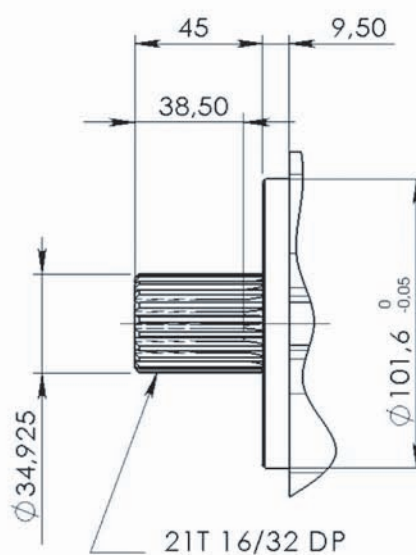
Type 3 - Splined Male 15 T - 16/32 DP



Type 5 - Splined Male 13T - 16/32 DP

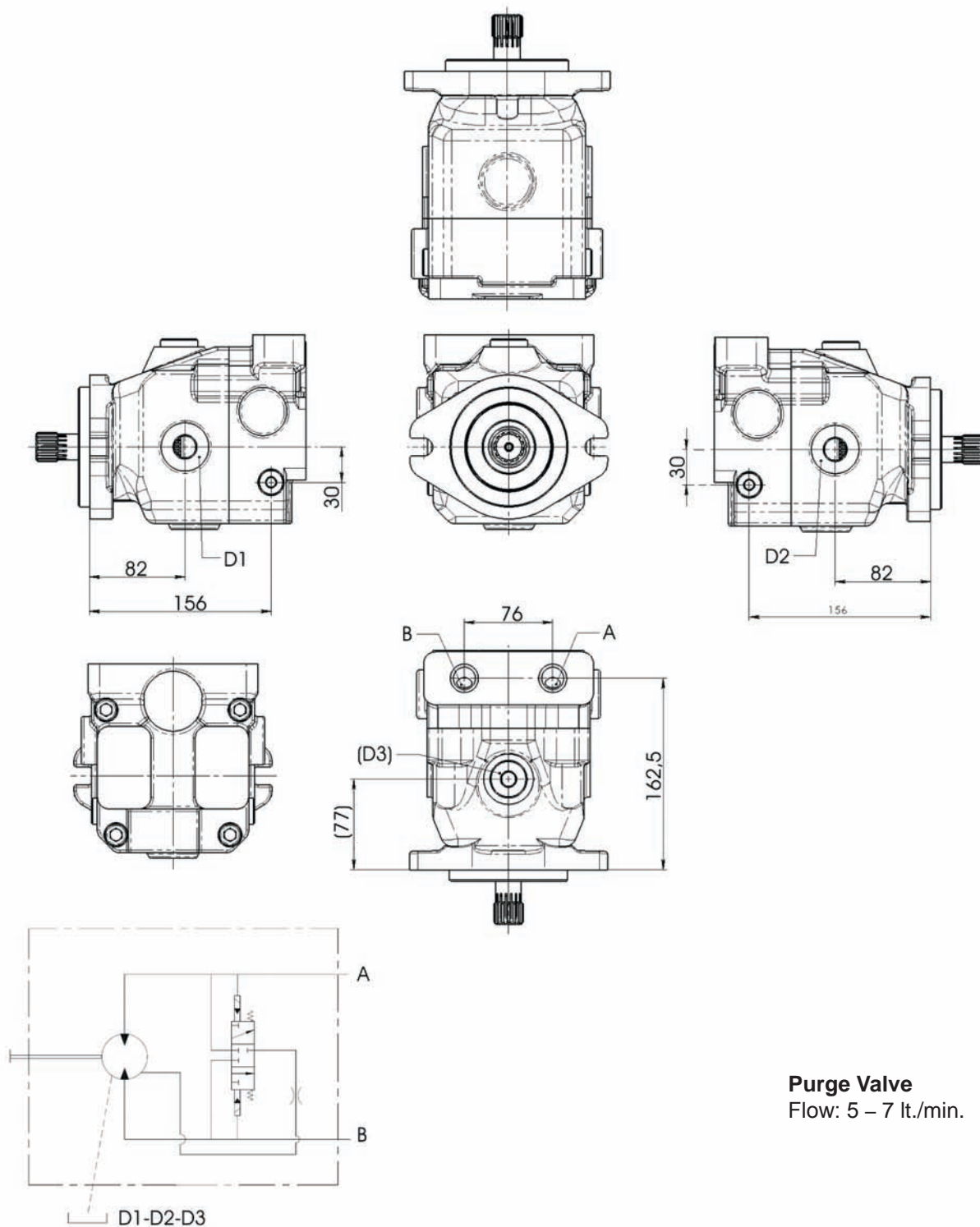


Type 7 - Splined Male 21T - 16/32 DP



ACCESSORIES

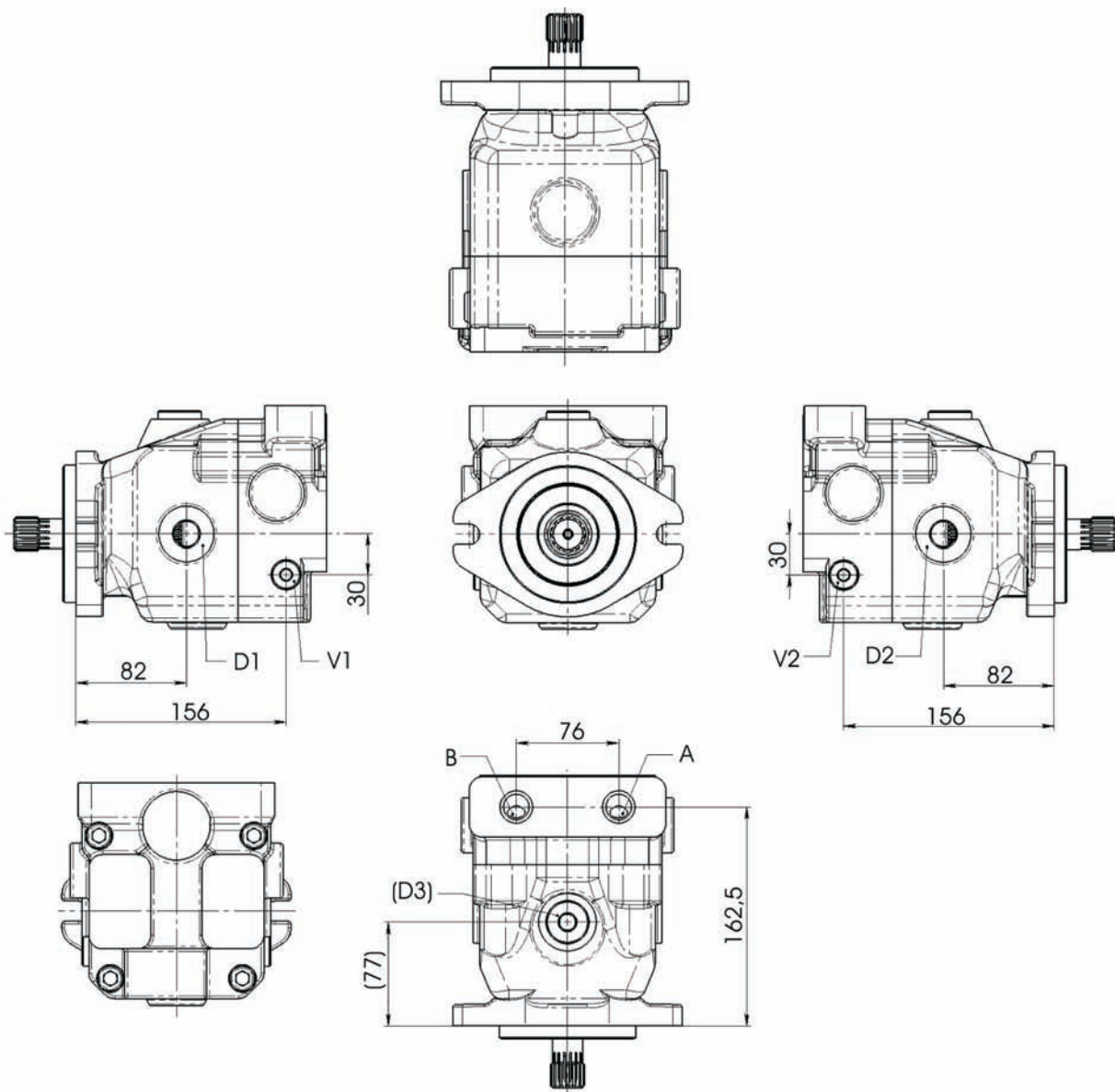
Purge Valve



Purge Valve
Flow: 5 – 7 lt./min.

ACCESSORIES (continued)

Pressure Relief Valve



ORDER CODE

| | | | | | | | |
|----------------|-----------|----------|----------|----------|----------|----------|----------|
| TMF 500 | 46 | 1 | B | 1 | T | P | - |
| 1 | 2 | 3 | 4 | 2 | 6 | 7 | 8 |

Pag.

1 - Motor Series

TMF 500 = Fixed displacement motor TMF 500 Series

2 - Motor Displacement

5

34 = 34 cm³/n

46 = 46 cm³/n

50 = 50 cm³/n

64 = 64 cm³/n

3 - Main Ports

1 = Rear A and B connection

2 = Side combined A and B connection

3 = Opposite side A and B connection

4 - Rotation Direction

B = Bidirectional (standard)

5 - Shafts

9

1 = Parallel 30 mm. diam. 30 with key

3 = Splined male 15 teeth 16/32 DP

5 = Splined male 13 teeth 16/32 DP

7 = Splined male 21 teeth 16/32 DP

6 - Port Version

G = SAE A (flange 6000 3/4")

U = SAE (UNF thread)

T = A and B ports thread - 3/4" BSPP

7 - Optional (omit if not requested)

- = Without optional

P = Rear drain

V = Purge valve

10

8 - Special versions (omit if not requested)



THE PRODUCTION LINE OF HANSA-TMP

**Fixed Displacement Axial Piston Motor
for Open and Closed Loop System**

TMF 900



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| Technical Manual..... | 9 - 11 |

MAIN FEATURES**General Information**

This is a fixed displacement motor with axial pistons, swash plate design and can be used in closed and open loop systems. The motor was developed for use on hydraulic transmissions, where high speeds and high torques are demanded.

The construction features help to minimize the losses due to leakage and considerably reduces the frictions. The small sizes allow easy installation.

The motor is equipped with flushing valve integrated on the motor casing which allows the temperature control, especially in heavy duty applications.

TECHNICAL SPECIFICATIONS**Operating Parameters**

| Model | | TMF 900 | 55 | 72 | 90 | 110 |
|------------------------|------------------|-----------------|-------|-------|-------|-------|
| Displacement | V | cm ³ | 55 | 72 | 90 | 110 |
| Maximum speed | n _{max} | rpm | 4.300 | 4.100 | 4.000 | 3.800 |
| Maximum flow | q _{max} | l/min. | 237 | 295 | 340 | 400 |
| Nominal pressure | p _{nom} | bar | 400 | 400 | 400 | 400 |
| Maximum pressure | p _{max} | bar | 450 | 450 | 450 | 450 |
| Maximum power | P _{max} | Kw | 130 | 156 | 180 | 210 |
| Theoretical max torque | C _{max} | Nm | 350 | 480 | 570 | 700 |

Hydraulic Fluid

| Recommended Hydraulic Fluid | Mineral Oil High Viscosity Index | | |
|--|----------------------------------|-----|-----------|
| Operating viscosity * | v | cSt | 16 ÷ 36 |
| Maximum viscosity short term at cold start | v _{max} | cSt | ≤1600 |
| Minimum viscosity at maximum temperature | v _{min} | cS | ≥7 |
| Maximum working temperature of the fluid | T _{max} | °C | 90 |
| Permissible temperature range of seals | ΔT | °C | -25 ÷ 120 |

*Referred to the circuit temperature-closed circuit

Filtration

It is recommended for an efficient and lasting working life, a solid particle contamination level of 18/16/13 according to ISO 4406. To ensure said level of contamination is not exceeded, filter should be chosen accordingly, with filtration grade of $\beta_{10} \geq 2$.

In any case the contamination level must not be below 20/18/15 according to ISO 4406.

Safety Regulation

This publication provides just an overview of the product and it is addressed to skilled personnel properly equipped to perform maintenance. During maintenance, assembly and disassembly activities use caution and proper safety equipment, in observance of the rules provided by safety laws.

ATTENTION

The motors are made with heavy parts: secure the parts and use proper lifting equipment.

ORDER CODE

| EXAMPLE | | | | | | |
|----------------|-----------|----------|-----------|------------|-----------|------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| TMF 900 | 90 | V | C4 | 2IN | RO | F18 |

| I | PRODUCT GROUP AND FAMILY |
|----------------|---------------------------------------|
| TMF 900 | Fixed displacement axial piston motor |

| 2 | DISPLACEMENT |
|------------|------------------------------|
| 55 | 55,0 cm ³ (@18°) |
| 72 | 72,1 cm ³ (@18°) |
| 90 | 89,2 cm ³ (@18°) |
| 110 | 110,0 cm ³ (@18°) |

| 3 | SHAFT SEAL | 55 | 72 | 90 | 110 |
|----------|------------|----|----|----|-----|
| V | Viton | A | A | A | A |

| 4 | MOUNTING FLANGE | 55 | 72 | 90 | 110 |
|-----------|------------------------------|----|----|----|-----|
| C4 | SAE J 744 - SAE C four bolts | A | A | A | A |

| 5 | SHAFT END | 55 | 72 | 90 | 110 |
|------------|---|----|----|----|-----|
| 2IN | ANSI B92.1A - 1976 - 1"3/8 - 21T - 16/32 DP | A | A | A | A |

| 6 | SERVICE LINE PORTS | 55 | 72 | 90 | 110 |
|-----------|----------------------|----|----|----|-----|
| RO | Radial opposite side | A | A | A | A |

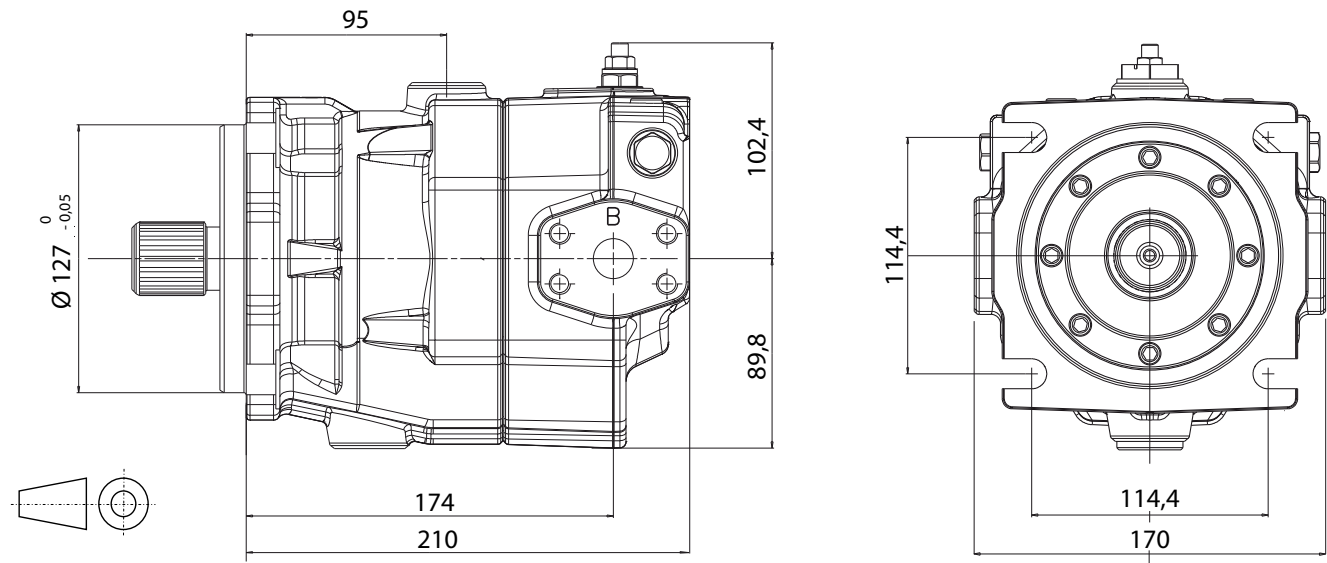
| 7 | FLUSHING VALVE SETTINGS | 55 | 72 | 90 | 110 |
|------------|-------------------------|----|----|----|-----|
| 0 | Without pressure valve | R | R | R | R |
| F20 | 20 bar | A | A | A | A |
| F18 | 18 bar | R | R | R | R |
| F16 | 16 bar | R | R | R | R |

| LEGEND | | | | | | | |
|----------|-----------------------|----------|-----------|----------|------------|---|---------------|
| A | available (preferred) | A | available | R | on request | - | not available |

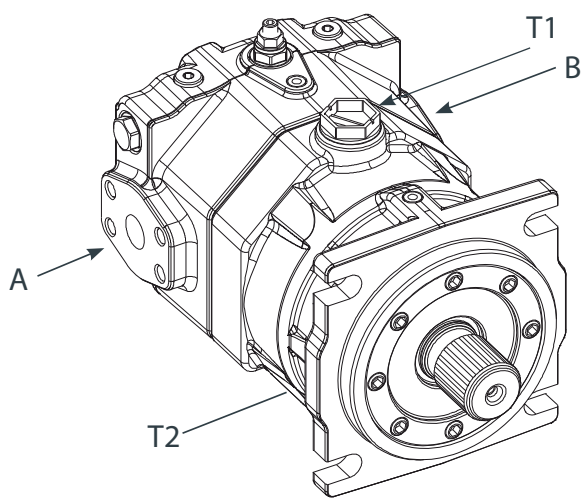


INSTALLATION DRAWINGS

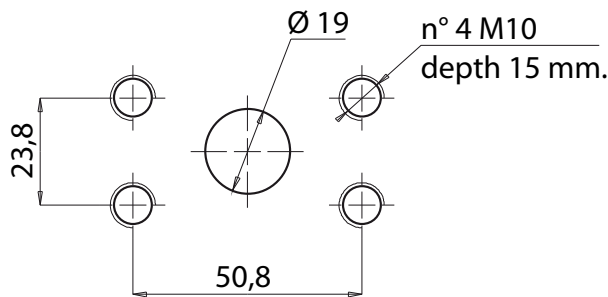
Size **55**



Ports



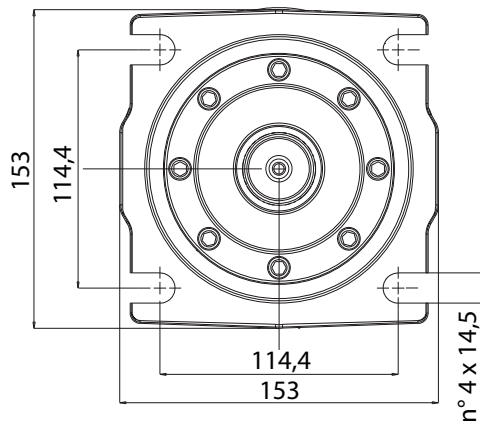
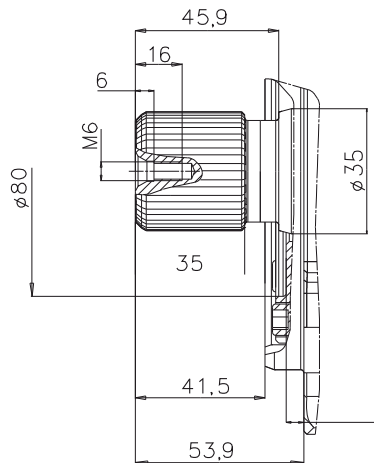
Detail Ports A-B SAE J 518 - 3/4"- Code 62



| Port | Description | Standards | Size |
|--------|---------------------|--------------------|----------|
| A,B | High pressure ports | SAE Flange J518-62 | 3/4" |
| T1, T2 | Case drain ports | ISO 1179 | 3/4" BSP |

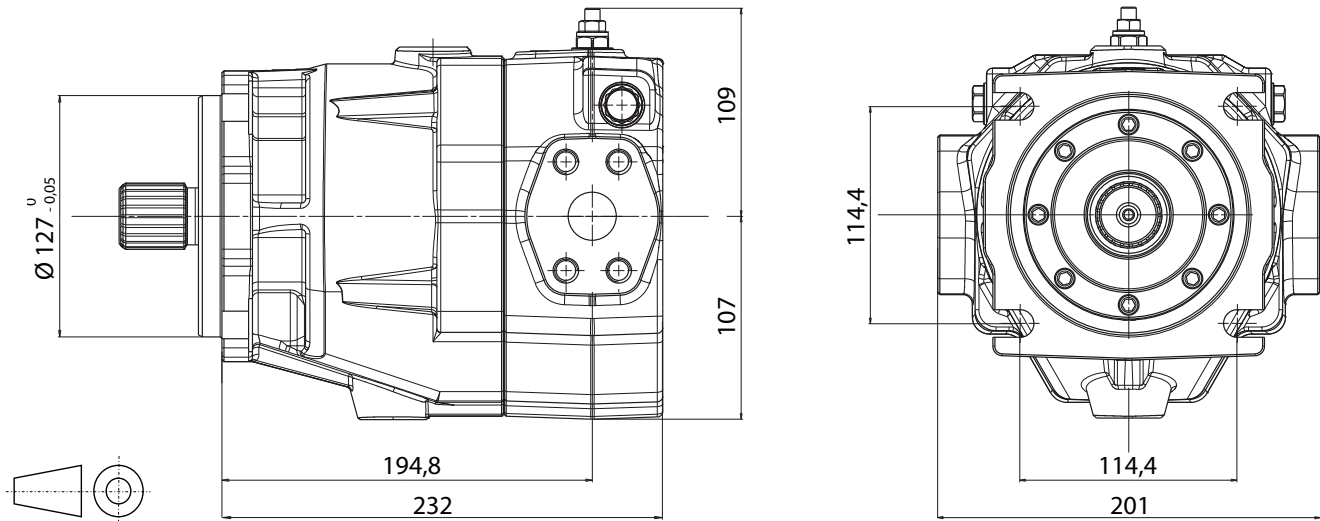
Shaft End **21 N**
ANSI B92.1A-1976 - 1"3/8 - 21 T - 16/32 DP

Mounting Flange **C4**
SAE J744 - Flange SAE C - 4 Bolts

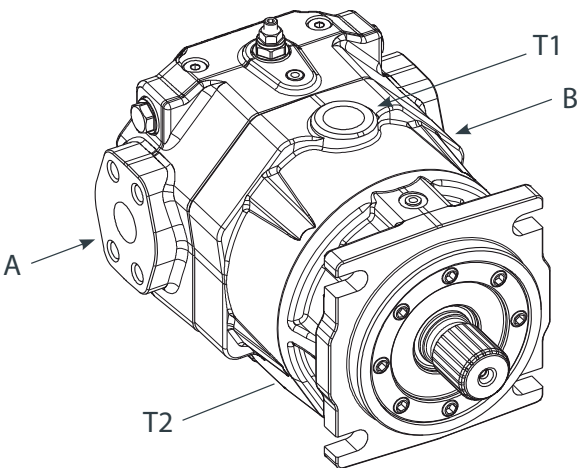


INSTALLATION DRAWINGS

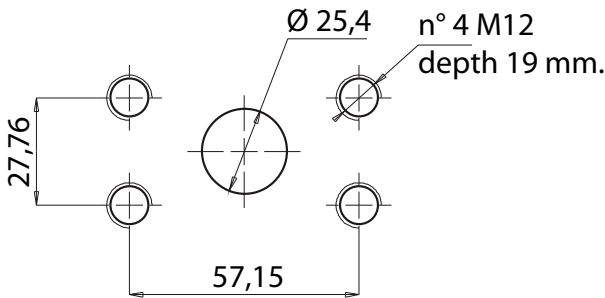
Size **90 - 110**



Ports

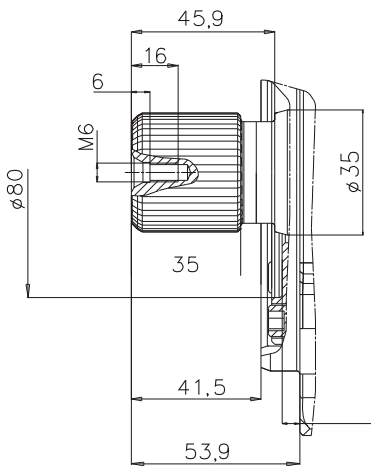


Detail Ports A-B SAE J 518 - 1"- Code 62

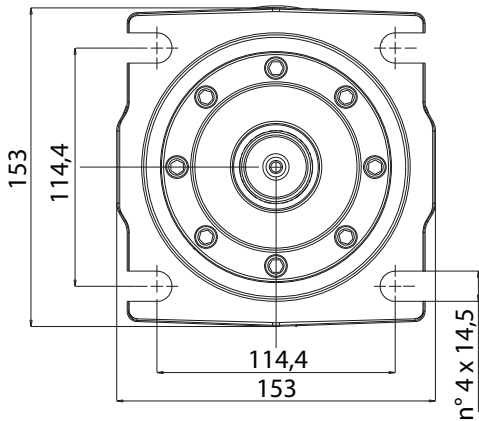


| Port | Description | Standards | Size |
|--------|---------------------|--------------------|----------|
| A,B | High pressure ports | SAE flange J518-62 | 1" |
| T1, T2 | Case drain ports | ISO 1179 | 3/4" BSP |

Shaft End **21 N**
ANSI B92.1A-1976 - 1"3/8 - 21 T - 16/32 DP



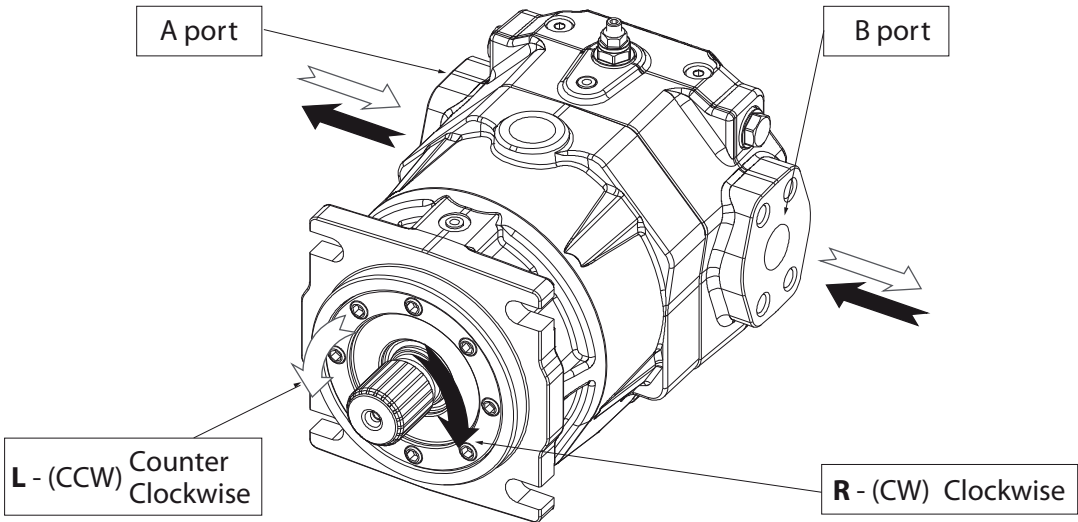
Mounting Flange **C4**
SAE J744 - Flange SAE C - 4 Bolts



DIRECTION of ROTATION - DIRECTION of the FLOW

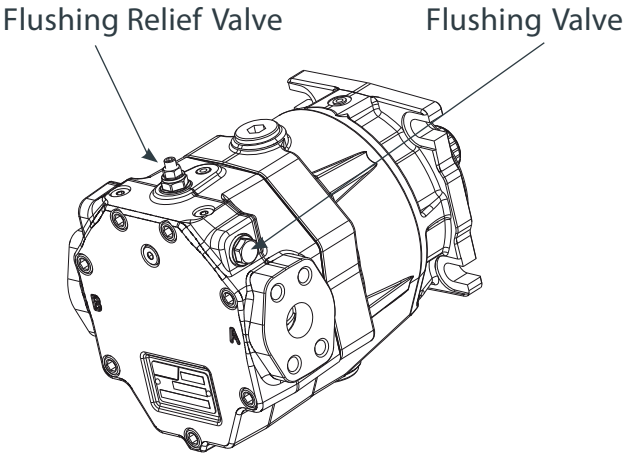
Ports

| Flow direction through the motor | | |
|----------------------------------|---------|---------------|
| Direction of rotation | R (CW) | B in to A out |
| | L (CCW) | A in to B out |

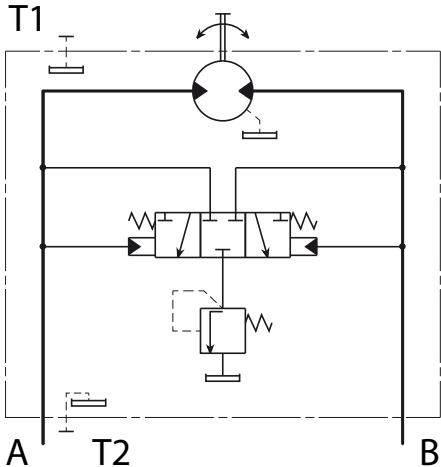


Flushing Valve

The motor is equipped with a flushing valve, integrated on the distributor of the motor that allows to direct a flow of oil from the low pressure channel inside the motor and later, through the discharge port, to a heat exchanger. This flow is restored by the anticavitation valve on the pump. The use of this valve allows dispose of excessive heat.



Hydraulic Diagram

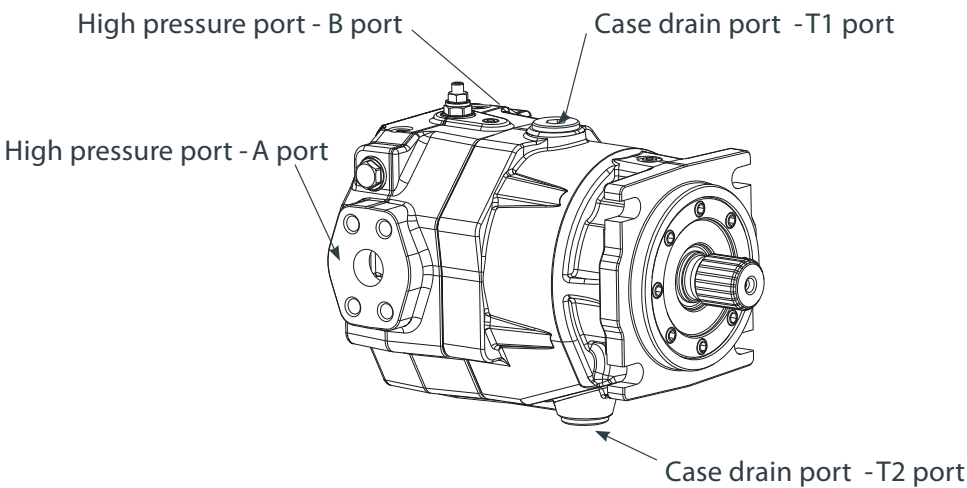


| | |
|--------|---------------------|
| A, B | High pressure ports |
| T1, T2 | Case Drain ports |

INSTALLATION INSTRUCTION

Introduction

In the following pages are described the standards of installation of the motor.
Compliance of the standards set has decisive effect on the life of the unit.
The following illustration can identify the links for a correct installation.
A standard requirement is that the motor must be filled with pre filtered hydraulic oil.
The case must be filled with oil both in operation and during the break.
The motor must be connected to the tank through the drain line.
Lack of compliance with that condition can damage the unit irreparably.



Installation Position

The case drain line must be always connected with the highest port.
The motor can be installed in the following positions respect to the level of the tank of the hydraulic fluid:

| | Motor O rientation | Notes |
|----------------|---|---|
| Under the tank | A diagram showing the motor oriented horizontally. A line from the T1 port goes up and then right into a tank. A line from the T2 port goes down and then right into the same tank. The tank is shown as a U-shape with a dashed line indicating the fluid level. The motor is positioned below the tank's fluid level. | Standard Positioning |
| Above the tank | A diagram showing the motor oriented horizontally, positioned above a tank. A line from the T1 port goes up and then right into the tank. A line from the T2 port goes down and then right into the tank. The tank is shown as a U-shape with a dashed line indicating the fluid level. The motor is positioned above the tank's fluid level. | You must provide a non return valve on the case drain line to prevent the emptying of the line. |

As HANSA-TMP has a very extensive range of products and some products have a variety of applications, the information supplied may often only apply to specific situations.

If the catalogue does not supply all the information required, please contact HANSA-TMP.

In order to provide a comprehensive reply to queries we may require specific data regarding the proposed application.

Whilst every reasonable endeavour has been made to ensure accuracy, this publication cannot be considered to represent part of any contract, whether expressed or implied.

The data in this catalogue refer to the standard product. The policy of HANSA-TMP consists of a continuous improvement of its products. It reserves the right to change the specifications of the different products whenever necessary and without giving prior information.



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