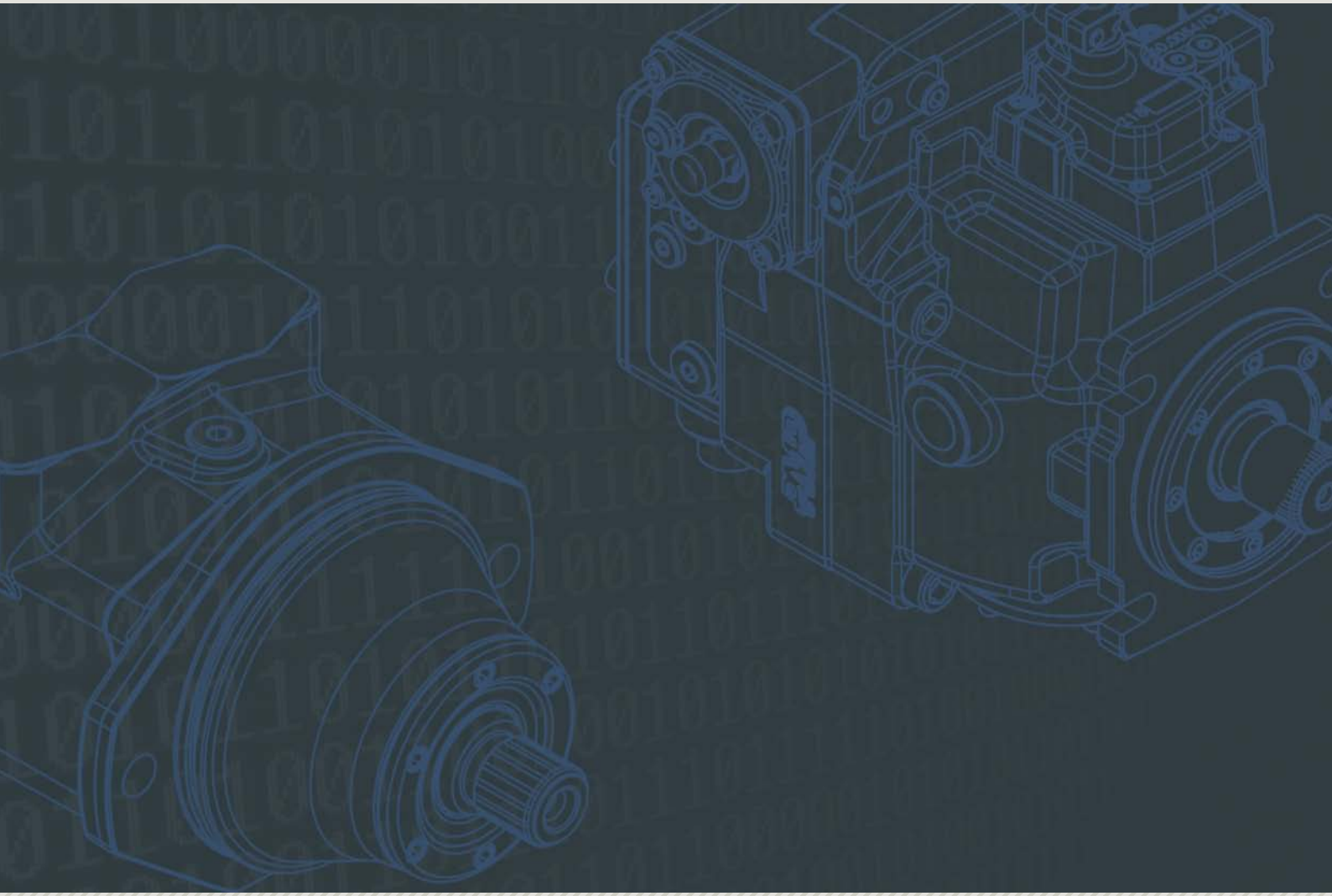
FLUID
POWER
Division

V3.5EN

TECHNICAL CATALOGUE



ITALY BOSNIA-HERZEGOVINA USA CHINA INDIA BRAZIL

PMP
INDUSTRIES

Iso certificate

Products described in this publication are manufactured in an EN ISO9001:2008 certified plant.

TÜV NORD

CERTIFICATE

Management system as per
EN ISO 9001 : 2008

In accordance with TÜV NORD CERT procedures, it is hereby certified that

PMP PRO-MEC S.p.A.
Via dell'Industria, 2
33030 Coseano (UD)
Italy

applies a management system in line with the above standard for the following scope

Design and manufacture of industrial transmission system.

Certificate Registration No. 44 100 097170
Audit Report No. IT-14128/2015

Valid from 2015-12-12
Valid until 2018-09-14
Initial certification 2002

Certification Body
at TÜV NORD CERT GmbH

Bologna, 2015-12-12

This certification was conducted in accordance with the TÜV NORD CERT auditing and certification procedures and is subject to regular surveillance audits.

TÜV NORD CERT GmbH Langemarckstraße 20 45141 Essen www.tuev-nord-cert.com

DAkkS Deutsche Akkreditierungsstelle D-ZM-12007-01-01

Disclaimer

This publication supersedes and replaces any previous issue. PMP Industries reserves the right to modify the information contained in this catalogue without any prior notice. Drawings and technical data are for reference only, for further details contact please the Sales Department.
Unless expressly authorized, reproduction in whole or part is prohibited.

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.

Warning!

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

Main Index

Introduction

The PMP Industries group manufactures a wide range of gearboxes and transmission systems for different applications which includes construction machinery, electric vehicles, wind turbine and several other applications.

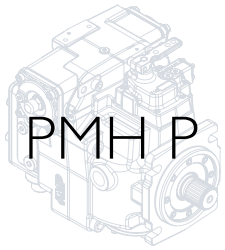
The **Fluid Power division** is specialized in the production of pumps and motors for Heavy Duty application

The **Power Transmission division** is a world leader for concrete mixers gearboxes, gearboxes for electric vehicles and towing tractors, wheel and track drives for construction machinery, etc.

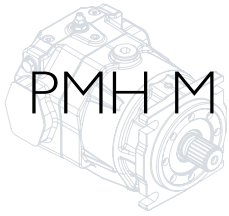
For further information about PMP Industries S.p.A. please visit **www.pmp-industries.com**

Product lines

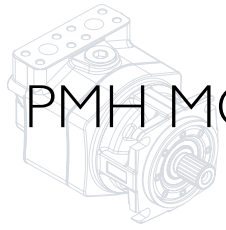
PMP hydraulics pumps and motors are divided in the following product lines which defines the main range of application. The use of the products outside the normal field of application is normally not advised; in any case it is recommendable to contact PMP technical department.



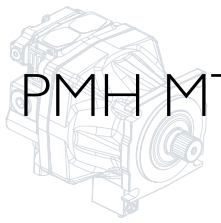
PMH P — Axial Piston Pumps



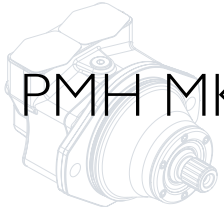
PMH M — Axial Piston Motors



PMH MCF — Axial Piston Motors



PMH MT — Axial Piston Motors for Swing Drives



PMH MKF — Plug-in Type Fixed Motors

Each unit is supplied with an identification, see Fig. 1.

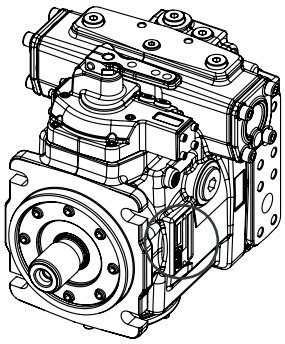
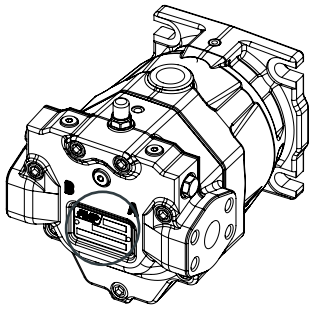
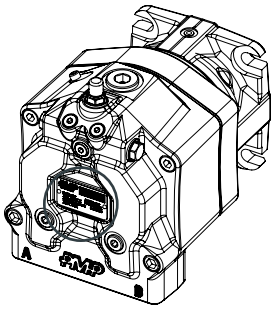
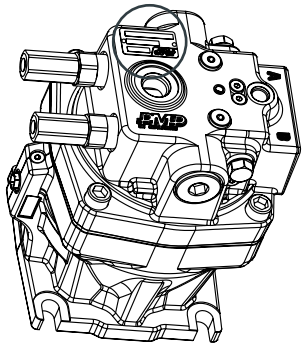
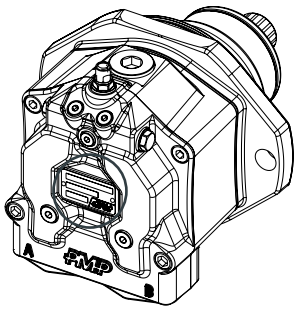
Fig. 1

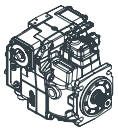
The identification label contains the following fields:

- **Bar code**: it contains the serial number;
- **Part number**: it is the code identification of the unit;
- **Serial number**: it is the production serial number of the unit;
- **Customer code/model**: it normally contains the model of the unit. Based on customer's request this field can be used to indicate the customer's code for the unit.;

Data indicated in the label must be sent to PMP in order to identify the unit without doubts.

Position of the identification label

		
PMH P	PMH M	PMH MCF
		
PMH MT	PMH MKF	



1) ORDER CODE

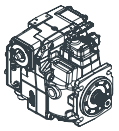
1	2	3	4	5	6	7	8	9	10	11	12
P				**V**	**C4**						

1	PRODUCT GROUP AND FAMILY					
P	Axial piston pump for closed loop circuit					
2	DISPLACEMENT					
35	35,4 cm^3 (@18°)					
55	55,0 cm^3 (@18°)					
55B*	55,0 cm^3 (@18°)					
72	72,1 cm^3 (@18°)					
72B*	72,1 cm^3 (@18°)					
90	89,2 cm^3 (@18°)					
110	110,0 cm^3(@18°)					
3	DIRECTION OF ROTATION	P35	P55	P72	P90	P110
R	Right, i.e. clockwise (CW) view from shaft end	A	A	A	A	A
L	Left, i.e. counterclockwise (CCW) view from shaft end	A	A	A	A	A
4	CONTROL DEVICE	P35	P55	P72	P90	P110
0	Without control, fixed displacement	R	R	R	R	R
MS	Manual servo control	A	A	A	A	A
MZ	Manual servo control with neutral pos. switch	A	A	A	A	A
MY1	Manual servo control with N.P. switch & 12V emergency stop	R	-	-	A	A
MY2	Manual servo control with N.P. switch & 24V emergency stop	R	-	-	A	A
MT	Manual servo for traction	A	-	-	A	A
MZT	Manual servo for traction control with neutral pos. switch	A	A	A	-	-
MX	Manual servo for traction with neutral pos. switch &BBS	A	A	A	-	-
RE1	Remote electric control 12V solenoid	-	-	-	A	A
RE2	Remote electric control 24V solenoid	-	-	-	A	A
E1	Electric ON/OFF control 12V solenoid	A	A	A	A	A
E2	Electric ON/OFF control 24V solenoid	A	A	A	A	A
EP1	Electric proportional control 12V solenoid	A	A	A	A	A
EP2	Electric proportional control 24V solenoid	A	A	A	A	A
HP	Hydraulic proportional pilot pressure related	A	A	A	A	A
HD	Hydraulic proportional pilot pressure related (direct acting)	R	A	A	A	A
EV1	Electric volumetric control 12V solenoid	-	A	A	A	A
EV2	Electric volumetric control 24V solenoid	-	A	A	A	A
5	SHAFT SEAL	P35	P55	P72	P90	P110
V	Viton	A		A	A	A

* P55B and P72B are special simplified version of P55 and of P72. They are available only with MS or MY control, for typical application on transit concrete mixers.

1	2	3	4	5	6	7	8	9	10	11	12
P				**V**	**C4**						

6	MOUNTING FLANGE	P35	P55	P72	P90	P110
B2	SAE J 744 – SAE B two bolts	A	-	-	-	-
C4	SAE J 744 – SAE C four bolts		A	A	A	A
S4	Special flange 4-holes for tandem coupling	-	A	R	-	-
7	SHAFT END	P35	P55	P72	P90	P110
13N	ANSI B92.1A – 1976 – 7/8" 13T 16/32 DP	A	-	-	-	-
14N	ANSI B92.1A – 1976 – 1 1/4" 14T 12/24 DP	-	A	R	R	R
15N	ANSI B92.1A – 1976 – 1" 15T 16/32 DP	R	-	-	-	-
21N	ANSI B92.1A – 1976 – 1 3/8" 21T 16/32 DP	-	A	A	R	R
21F	ANSI B92.1A – 1976 – 1 3/8" 21T 16/32 DP with coupling flange	-	R	R	R	R
21F1	ANSI B92.1A – 1976 – 1 1/2" 21T 16/32 DP SPECIAL coupling flange	-	R	R	-	-
23N	ANSI B92.1A – 1976 – 1 1/2" 23T 16/32 DP	-	-	-	A	A
23F	ANSI B92.1A – 1976 – 1 1/2" 23T 16/32 DP with coupling flange	-	-	-	A	A
23F1	ANSI B92.1A – 1976 – 1 1/2" 23T 16/32 DP SPECIAL coupling flange	-	-	-	A	A
C15	Tapered 1.5" shaft	-	-	R	R	R
T1	Tandem [hub for ANSI B92.1A – 1976 – 1 1/4" 19T 16/32 DP] for coupling with a P90 front pump or a P110 front pump	-	R	R	-	-
T2	Tandem [hub for ANSI B92.1A – 1976 – 24T 32/64 DP]	R	A	-	-	-
T3	Tandem [hub for ANSI B92.1A – 1976 – 30T 32/64 DP]	-	-	R	-	-
8	THROUGH DRIVE	P35	P55	P72	P90	P110
0	No through drive	A	A	A	A	A
A1	Flange SAE A (SAE J 744) / Splined hub 9T-16/32 (ANSI B92.1A)	A	A	A	A	A
A3	Flange SAE A (SAE J 744) / Splined hub 11T-16/32 (ANSI B92.1A)	R	R	R	R	R
B1	Flange SAE B (SAE J 744) / Splined hub 13T-16/32 (ANSI B92.1A)	R	A	A	A	A
T1	Tandem [Fl. SAE C (SAE J 744)/ Spl. shaft 19T-16/32 (ANSI B92.1A)]	-	-	R	R	R
T2	Tandem [Special flange 4-holes / Spl. shaft 24T-32/64 (ANSI B92.1A)]	-	R	R	-	-
T3	Tandem [Special flange 4-holes / Spl. shaft 30T-32/64 (ANSI B92.1A)]	-	-	R	-	-
9	CHARGE PUMP	P35	P55	P72	P90	P110
CP0	Gerotor charge pump 13 cm^3	A	-	-		
CP1	Gerotor charge pump 20 cm^3	R	A	A	R	R
CP2	Gerotor charge pump 28 cm^3 (for tandem configuration)	-	R	R	A	A
10	RELIEF VALVE SETTING	P35	P55	P72	P90	P110
420	420 bar	A	A	A	A	A
380	380 bar	A	A	A	A	A
350	350 bar	A	A	A	A	A
330	330 bar	A	A	A	A	A
300	300 bar	A	A	A	A	A
280	280 bar	A	A	A	A	A
250	250 bar	A	A	A	A	A



1	2	3	4	5	6	7	8	9	10	11	12
P				**V**	**C4**						

220	220 bar	A	-	-	-	-
210	210 bar	A	A	A	A	A
200	200 bar	A	A	A	A	A
150	150 bar	A	A	A	A	A
11	CHARGE PRESSURE RELIEF VALVE SETTING	P35	P55	P72	P90	P110
	at 2000 rpm and 0 displacement					
A	28 bar	A	A	A	A	A
B	25 bar	R	R	R	R	R
C	20 bar	R	R	R	R	R
12	SPECIAL FEATURES	P35	P55	P72	P90	P110
B	With by-pass valve	R	A	R	R	R
Cxx	With cut-off valve preset at relief setting value -xx bar Standard setting: 20bar	A	A	A	A	A
Fxx	With flushing valve (xx l/min if not standard) Standard setting: 7 l/min (available settings 7 or 11 or 15 l/min)	R	A	R	R	R
D	With dead-man valve	R	A	R	R	R
EF	External filtration of pressure line of charge pump (filter not included)	R	R	R	R	R
IFC	Internal filtration of pressure line of charge pump (filter assembled on pump) with clogging indicator switch	R	R	R	R	R
IFV	Internal filtration of pressure line of charge pump (filter assembled on pump) with visual indicator	R	R	R	R	R
IFT	Internal filtration of pressure line of charge pump (filter assembled on pump) with both clogging indicator switch and visual indicator	R	R	R	R	R
K	Destroked maximum displacement	R	A	R	R	R
R	Adjustable maximum displacement	R	A	R	R	R
Px	Mounted with auxiliary pump	R	R	R	R	R

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

EXAMPLE											
1	2	3	4	5	6	7	8	9	10	11	12
P	**90**	**R**	**MS**	**V**	**C4**	**23N**	**0**	**CP2**	**420**	**A**	**/ ...**

2) MAIN FEATURES

2.1) General Information

PMH P is a variable displacement, swash plate axial piston pump and it is used in hydraulic closed loops. The pump was developed for use on hydraulic transmissions, where high speeds and high torques are demanded. The displacement can be varied by changing the inclination of the pump swash plate using a suitable proportional regulator. The direction of flow can be changed with the variation of the swash plate inclination respect to a neutral point.

The construction features help to minimize the losses due to leakage and considerably reduces the frictions. The small sizes allow easy installations and the technical solutions chosen optimize modulation of requested flow for a smooth and quiet operation.
The PMH P pumps is equipped with two high pressure relief valves to protect the circuit from overloads and with anti-cavitation integrated system.

2.2) Technical Data

2.2.1) Operating Parameters

Model			P35	P55	P72	P90	P110
Displacement	V	cm^3	35	55	72	90	110
Maximum speed	n_{max}	rpm	4.500	4.300	4.100	4.000	3.800
Minimum speed	n_{min}	rpm	560	500	500	500	500
Maximum flow	q_{max}	l/min	142	237	295	340	400
Nominal pressure	p_{nom}	bar	400	400	400	400	400
Maximum pressure	p_{max}	bar	450	450	450	450	450
Maximum power	P_{max}	kW	95	130	156	180	210
Theoretical max torque	C_{max}	Nm	223	350	480	570	700
Weight	M	Kg	39	42	56	68	68

2.2.2) Hydraulic Fluid

Recommended Hydraulic Fluid	Mineal Oil High Viscosity Index		
Operating viscosity*	ν	cSt	16 ÷ 36
Maximum viscosity Short term at cold start	ν_{max}	cSt	≤1600
Minimum viscosity at maximum temperature	ν_{min}	cSt	≥7
Maximum working temperature of the fluid	T_{max}	°C	90

**Referred to the circuit temperature-closed circuit*

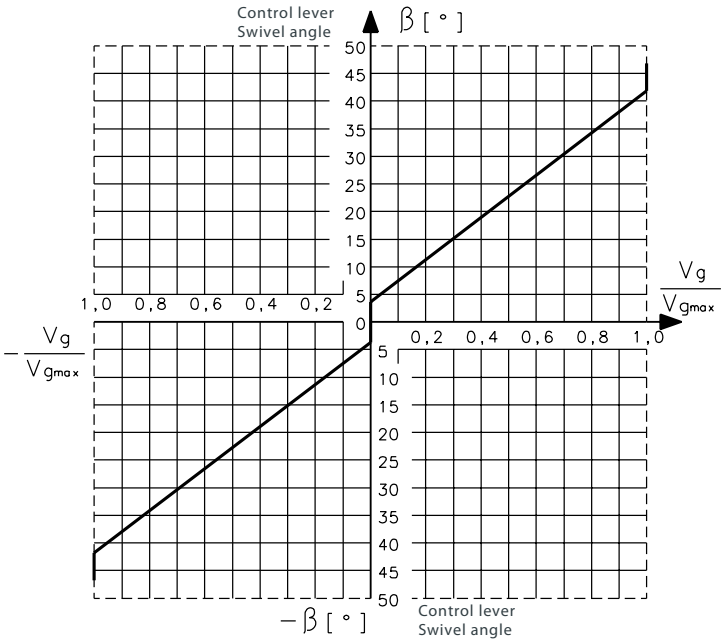
2.2.3) Filtration

It is recommended for an efficient and lasting working life, a solid particle contamination level of 18/16/13 in 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 in according to ISO4406

2.3) Controls

2.3.1) Manual controls (MS, MZ, MY1, MY2)

With the manual proportional control (**MS**) the displacement of the pump is directly proportional to the angle of the lever. The pump is fitted with a resetting device which automatically reset the lever to central position if no control takes place. The figure shows the relation between angle and displacement.

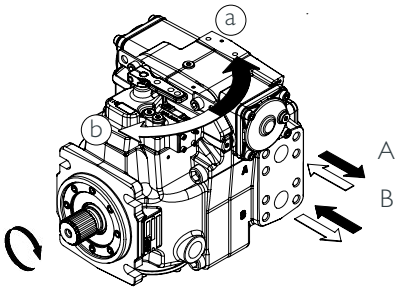


Characteristic points of operations	
Start of control at β	3,7°
End of control at β	41,7° (max displacement Vg_{max})
Mechanical stop for β	± 46,8°

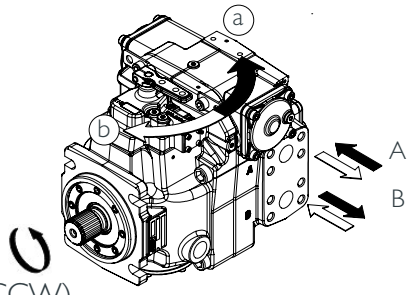
NOTE: the displacement control valve spool can get stuck due to contamination (fluid contamination or abrasion contamination from transmission components). This can result in pump flow different from operator request. Please check if the application require any safety devices (i.e. emergency stop) in order to put the transmission driven output in a safe condition.

R, L Direction of rotation – direction of the flow

		lever direction	flow direction through the pump
Direction of rotation	**R** (CW)	a	B in to A out
		b	A in to B out
	L (CCW)	a	A in to B out
		b	B in to A out

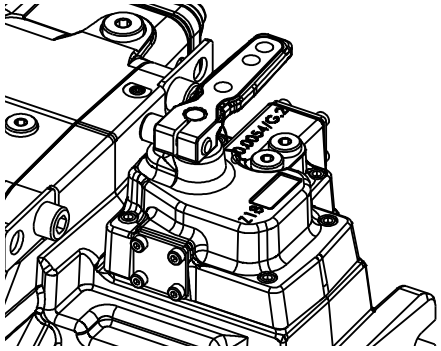


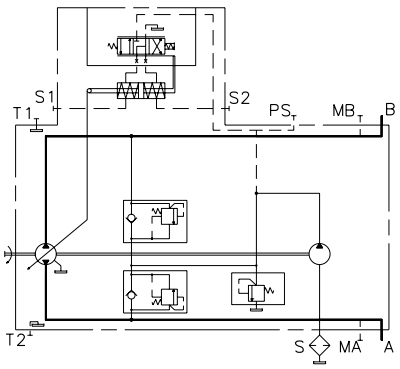
R (CW)



L (CCW)

MS, Manual proportional control

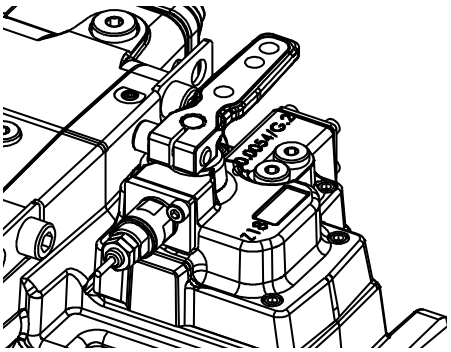


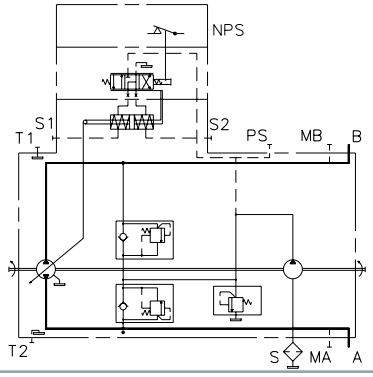


A, B	high pressure ports
S	charge pump inlet
T1, T2	case drains ports
MA, MB, PS	gauge port for system & charge pressure
S1, S2	servo piston gauge ports

MZ, Manual servo control with neutral position switch

Same configuration as MS control but with an additional switch which is closed when the lever is in neutral position. The switch opens when the lever is moved out of the neutral position. The switch provides a monitoring function for drive units which shall not be started unless the pump is in neutral, i.e. diesel engines.

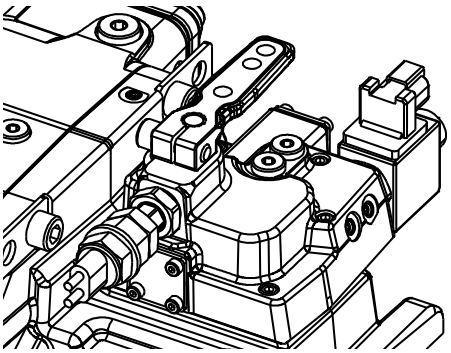


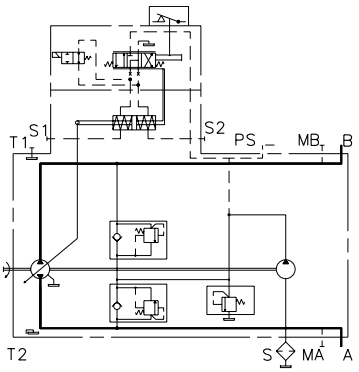


A, B	high pressure ports
S	charge pump inlet
T1, T2	case drains ports
MA, MB, PS	gauge port for system & charge pressure
S1, S2	servo piston gauge ports

MY1, Manual servo control with N.P. switch & 12V emergency stop
MY2, Manual servo control with N.P. switch & 24V emergency stop

Same configuration as MZ control with the addition of a two position solenoid valve for electric pump de-stroke. This valve provide stop or emergency function when needed (i.e. drum stop or emergency stop of a concrete mixer drum).



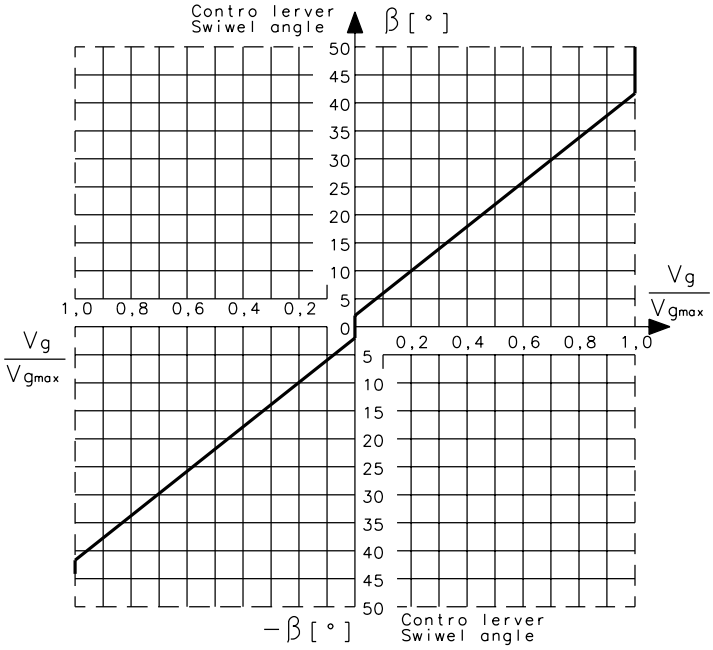


A, B	high pressure ports
S	charge pump inlet
T1, T2	case drains ports
MA, MB, PS	gauge port for system & charge pressure
S1, S2	servo piston gauge ports

2.3.2) Manual controls for traction (MT, MZT, MX)

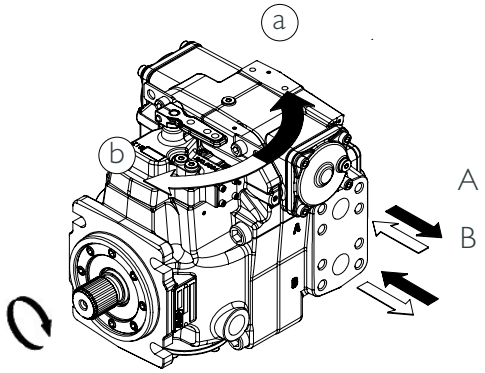
Same configuration of MS but with an open center spool. It is specifically designed for traction control on mobile vehicles.

Characteristic points of operations	
Start of control at β	2°
End of control at β	40,6° (max displacement Vg_{max})
Mechanical stop for β	± 46,8°

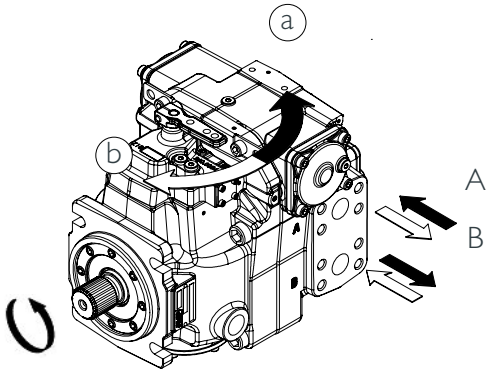


R, L Direction of rotation – direction of the flow

		lever direction	flow direction through the pump
Direction of rotation	**R** (CW)	a	B in to A out
		b	A in to B out
	L (CCW)	a	A in to B out
		b	B in to A out

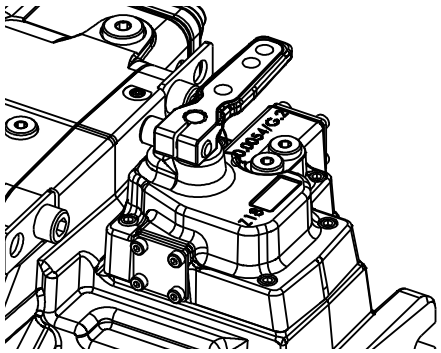


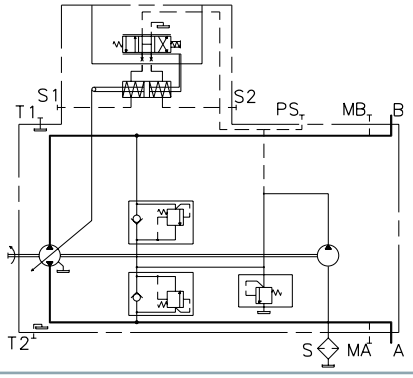
R (CW)



L (CCW)

MT, Manual servo for traction

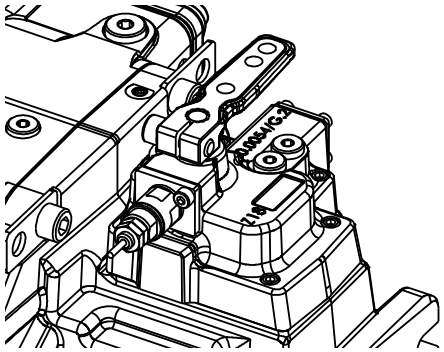


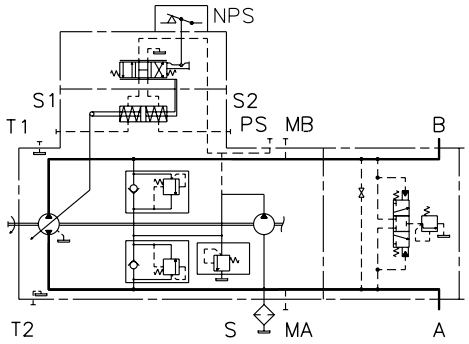


A, B	high pressure ports
S	charge pump inlet
T1, T2	case drains ports
MA, MB, PS	gauge port for system & charge pressure
S1, S2	servo piston gauge ports
H1, H2	control pressure ports

MZT, Manual servo control with neutral position switch (traction)

Same configuration as MT control but with an additional switch which is closed when the lever is in neutral position. The switch opens when the lever is moved out of the neutral position. The switch provides a monitoring function for drive units which shall not be started unless the pump is in neutral, i.e. diesel engines.

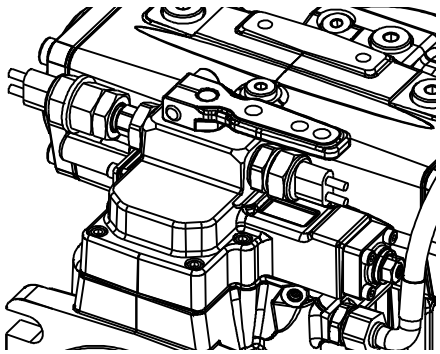


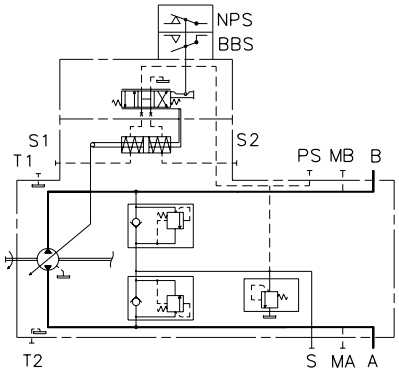


A, B	high pressure ports
S	charge pump inlet
T1, T2	case drains ports
MA, MB, PS	gauge port for system & charge pressure
S1, S2	servo piston gauge ports

MX, Manual servo for traction with neutral pos. switch & BB

A variant of MZT is the MX control, with an additional switch (BBS, i.e. back bell switch). The switch gets closed when the lever rotate in one of the two directions. It can be used for instance to activate a sound alarm when the vehicle travels backward.

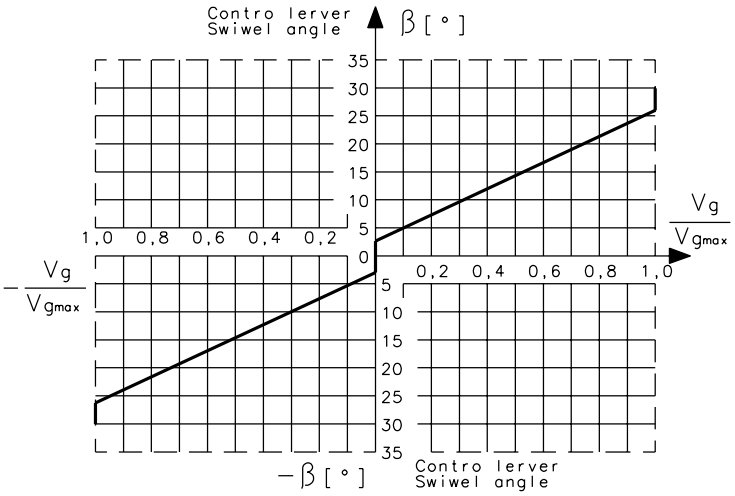




A, B	high pressure ports
S	charge pump inlet
T1, T2	case drains ports
MA, MB, PS	gauge port for system & charge pressure
S1, S2	servo piston gauge ports

2.3.3) RE, Remote electric control 12/24V solenoid

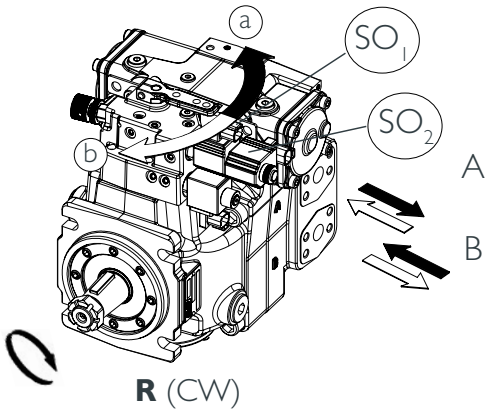
The remote electric control is a combined MS control with an integral hydraulic piston which is actuated by an integrated three position valve. The pumps is stroked or destroked by energizing either of the valve solenoids; when the solenoid is de-energized the pump stays at the last displacement reached by the pump. An additional solenoid is provided to implement the Stop function.



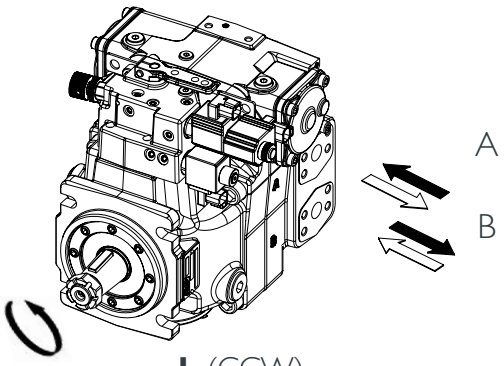
Characteristic points of operations	
Start of control at β	2,7°
End of control at β	26,5° (max displacement Vg_{max})
Mechanical stop for β	± 30°

R, L Direction of rotation – direction of the flow

		lever	solenoid	flow direction through the pump
Direction of rotation	**R** (CW)	a	SO_1	B in to A out
		b	SO_2	A in to B out
	L (CCW)	a	SO_1	A in to B out
		b	SO_2	B in to A out

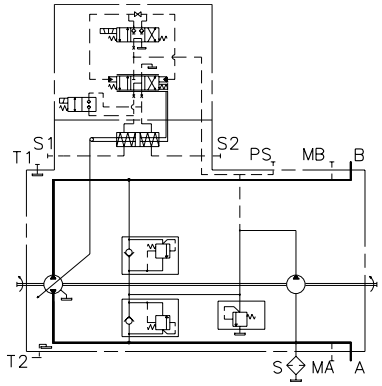


R (CW)



L (CCW)

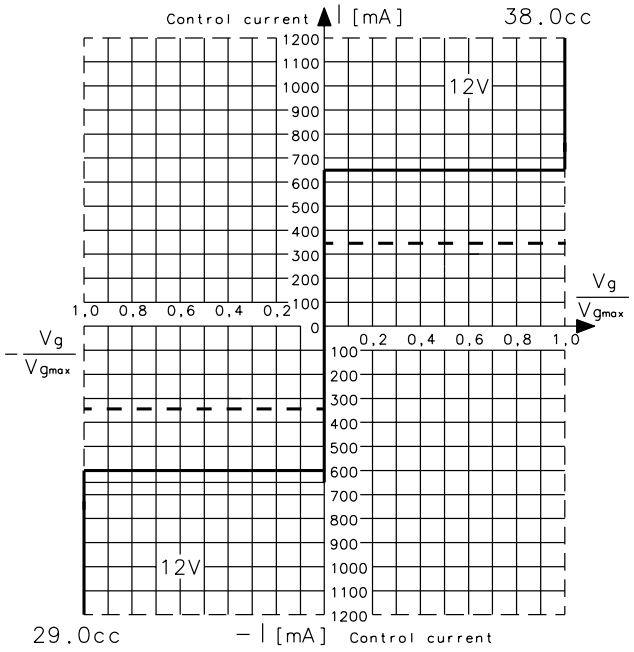
Hydraulic scheme



A, B	high pressure ports
S	charge pump inlet
T1, T2	case drains ports
MA, MB, PS	gauge port for system & charge pressure
S1, S2	servo piston gauge ports

2.3.4) E, Electric ON/OFF control 12 /24V solenoid

When the solenoids are energized the pump swivels to maximum displacement in one of the two flow directions. The pump is fitted with a resetting device which automatically reset the control spool to central position if no control takes place. The figure shows the relation between electric current and displacement.

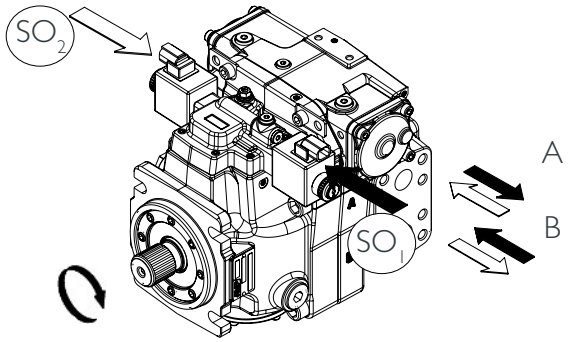


Solenoid technical data	**E 1**	**E 2**
Voltage	12 (±20%)	24 (±20%)
Current of Control		
Switching current	650 mA	330 mA

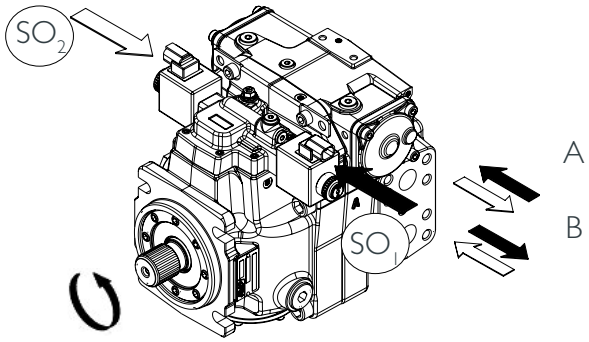
Standard solenoids include a manual pin-type override.

R, L Direction of rotation – direction of the flow

		solenoid	flow direction through the pump
Direction of rotation	**R** (CW)	SO_1	B in to A out
		SO_2	A in to B out
	L (CCW)	SO_1	A in to B out
		SO_2	B in to A out

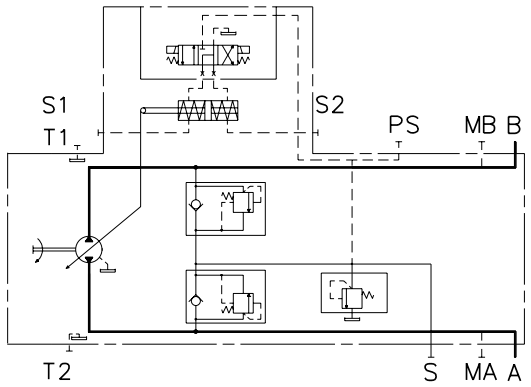


R (CW)



L (CCW)

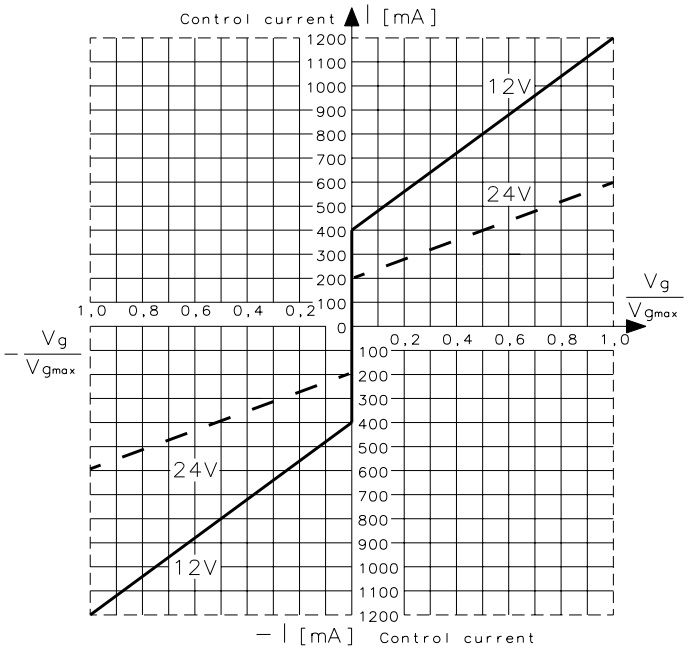
Hydraulic scheme



A, B	high pressure ports
S	charge pump inlet
T1, T2	case drains ports
MA, MB, PS	gauge port for system & charge pressure
S1, S2	servo piston gauge ports

2.3.5) EP, Electric Proportional control

With the electric proportional control (**EP**) the displacement of the pump is directly proportional to the input current applied to one of the two solenoids. The pump is fitted with a resetting device which automatically reset the control spool to central position if no control takes place.The figure shows the relation between electric current and displacement.

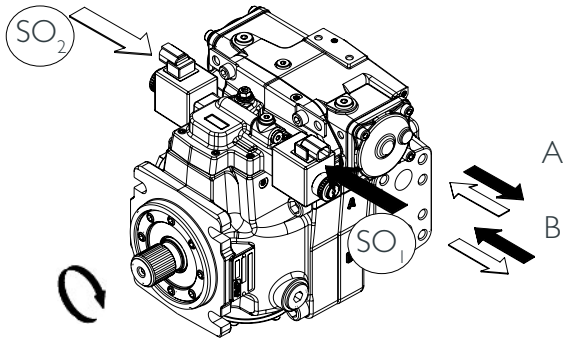


Solenoid technical data	**EP 1**	**EP 2**
Voltage	12 (±20%)	24 (±20%)
Current of Control		
Start at control at V_{g0}	400 mA	200 mA
End of control at V_{gmax}	1200 mA	600 mA

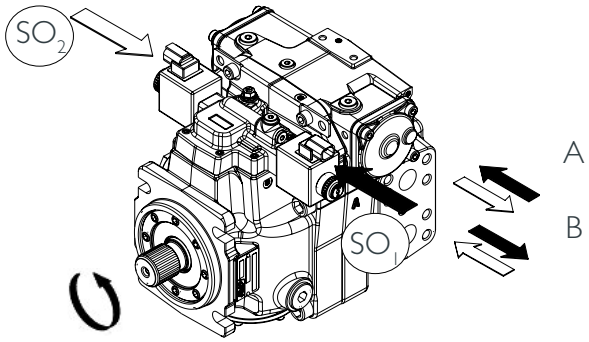
Note: the displacement control valve spool can get stuck due to contamination (fluid contamination or abrasion contamination from transmission components). This can result in pump flow different from operator request. Please check if the application require any safety devices (i.e. emergency stop) in order to put the transmission driven output in a safe condition.

R, L Direction of rotation – direction of the flow

		solenoid	flow direction through the pump
Direction of rotation	**R** (CW)	SO_1	B in to A out
		SO_2	A in to B out
	L (CCW)	SO_1	A in to B out
		SO_2	B in to A out

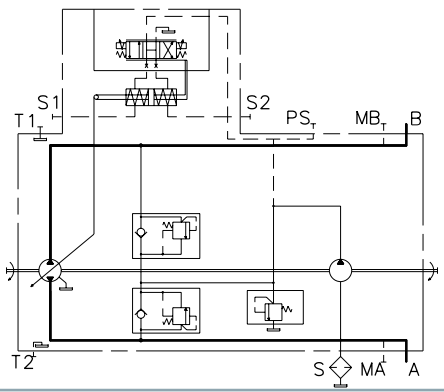


R (CW)



L (CCW)

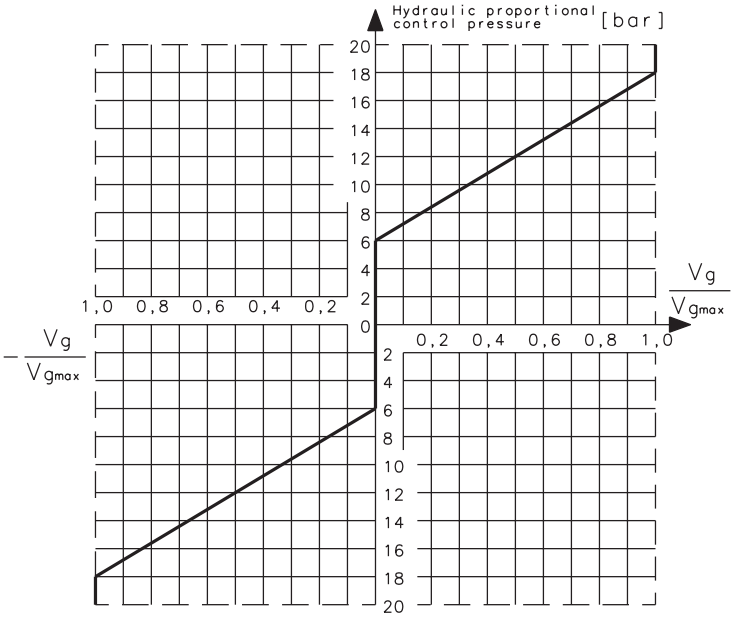
Hydraulic scheme



A, B	high pressure ports
S	charge pump inlet
T1, T2	case drains ports
MA, MB, PS	gauge port for system & charge pressure
S1, S2	servo piston gauge ports

2.3.6) HP, Hydraulic Proportional Control

With the hydraulic proportional control (HP) the displacement of the pump is directly proportional to the pilot pressure applied to one of the two control pressure ports. The feedback link between swashplate and control ensures the costance of the displacement despite pressure and speed working condition. The pump is fitted with a resetting device which automatically reset the control spool to central position if no control takes place. The figure shows the relation between pressure and displacement.

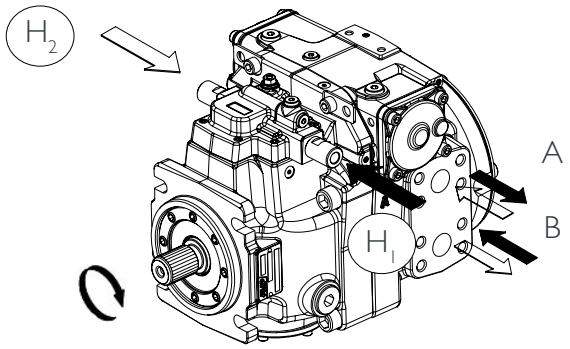


Control pressure	
Start at control at V_{g0}	6 bar
End of control at V_{gmax}	18 bar

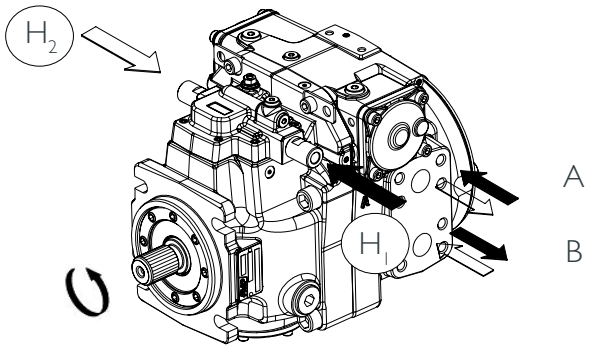
Note: the displacement control valve spool can get stuck due to contamination (fluid contamination or abrasion contamination from transmission components). This can result in pump flow different from operator request. Please check if the application require any safety devices (i.e. emergency stop) in order to put the transmission driven output in a safe condition.

R, L Direction of rotation – direction of the flow

		Control Pressure Port	flow direction through the pump
Direction of rotation	**R** (CW)	H1	B in to A out
		H2	A in to B out
	L (CCW)	H1	A in to B out
		H2	B in to A out

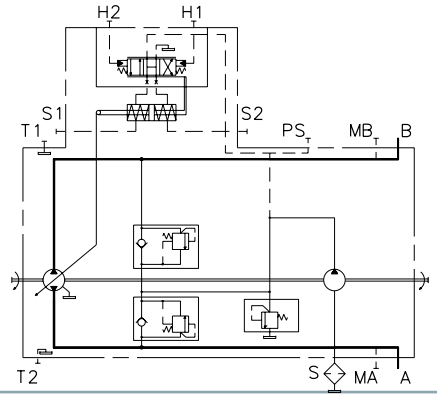


R (CW)



L (CCW)

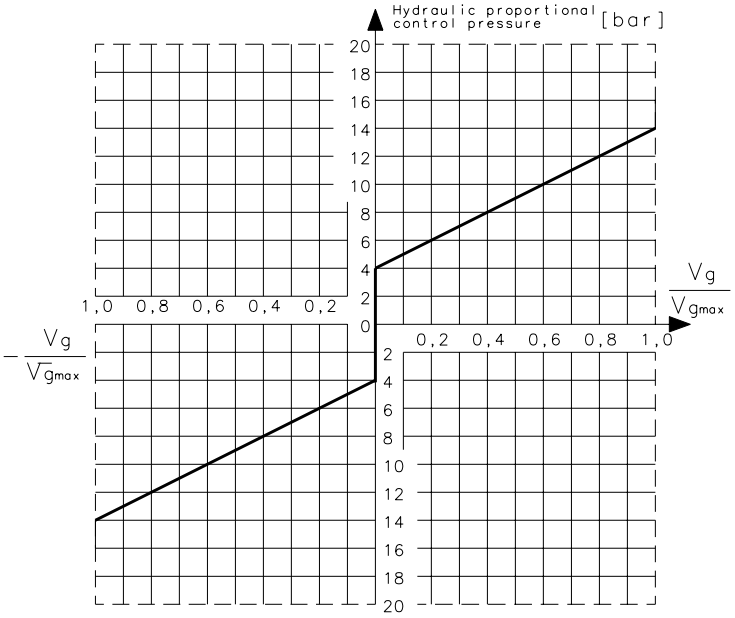
Hydraulic scheme



A, B	high pressure ports
S	charge pump inlet
T1, T2	case drains ports
MA, MB, PS	gauge port for system & charge pressure
S1, S2	servo piston gauge ports

2.3.7) HD, Hydraulic Direct Control

HD, Hydraulic Proportional Direct control With the hydraulic proportional direct control (HD, without feedback) the displacement of the pump is directly proportional to the pilot pressure applied directly to one of the two sides of the servo-piston, but is also influenced by load and pump speed. The pump is fitted with a resetting device which automatically reset the swashplate to central position if no control takes place. The figure shows the relation between pressure and displacement.

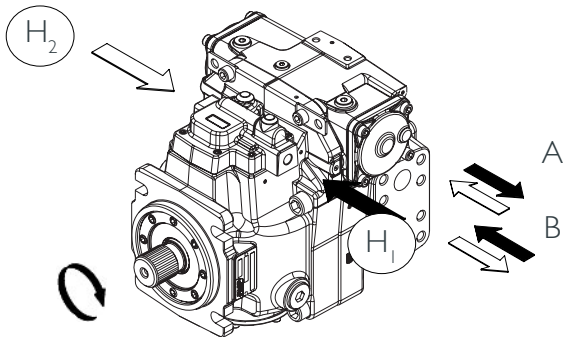


Control pressure	
Start at control at V_{g0}	4 bar
End of control at V_{gmax}	14 bar

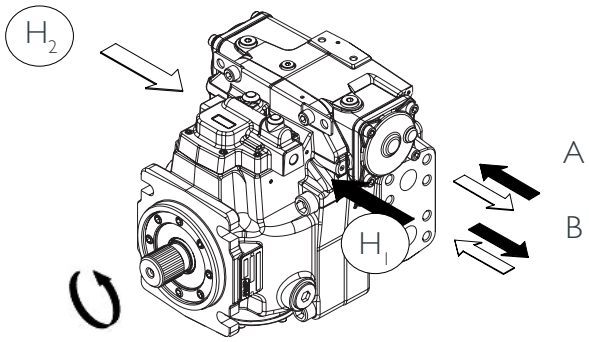
Note: the displacement control valve spool can get stuck due to contamination (fluid contamination or abrasion contamination from transmission components). This can result in pump flow different from operator request. Please check if the application require any safety devices (i.e. emergency stop) in order to put the transmission driven output in a safe condition.

R, L Direction of rotation – direction of the flow

		Control Pressure Port	flow direction through the pump
Direction of rotation	**R** (CW)	H1	B in to A out
		H2	A in to B out
	L (CCW)	H1	A in to B out
		H2	B in to A out

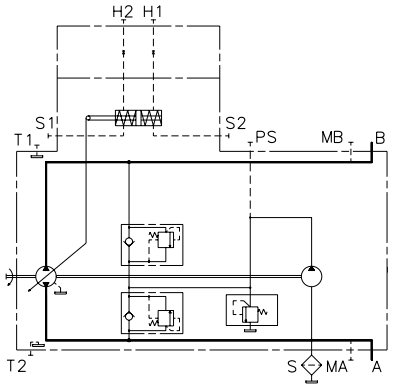


R (CW)



L (CCW)

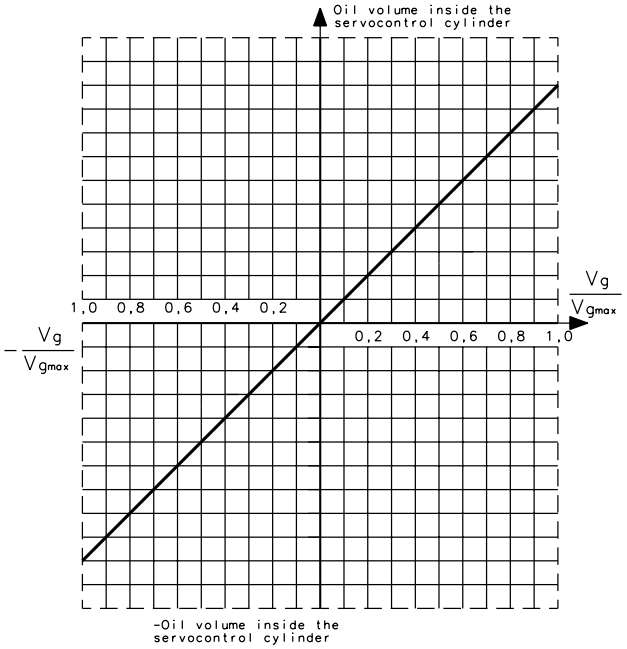
Hydraulic scheme



A, B	high pressure ports
S	charge pump inlet
T1, T2	case drains ports
MA, MB, PS	gauge port for system & charge pressure
S1, S2	servo piston gauge ports
H1, H2	control pressure port

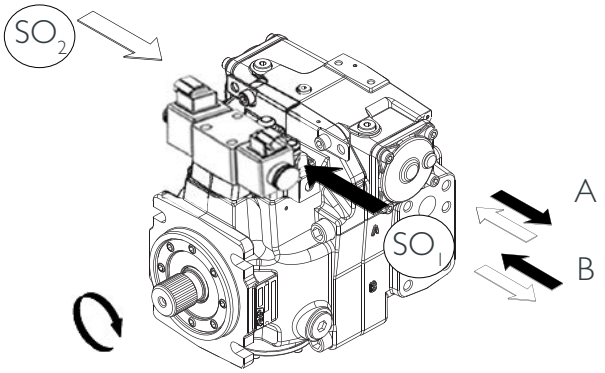
2.3.8) EV, Electric volumetric control 12V/24V solenoid

The electric volumetric control is a control with a four way three position directional valve feeding directly the servopiston of the swashplate without the feedback lever. The pumps is stroked or destroked by energizing either of the valve solenoids; when the solenoid is de-energized the pump stays at the last displacement reached by the pump.

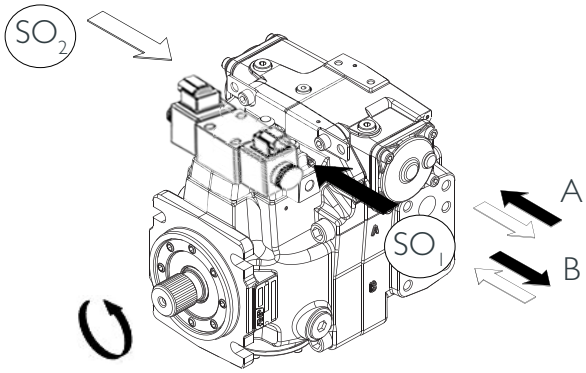


R, L Direction of rotation – direction of the flow

		solenoid	flow direction through the pump
Direction of rotation	**R** (CW)	SO_1	B in to A out
		SO_2	A in to B out
	L (CCW)	SO_1	A in to B out
		SO_2	B in to A out

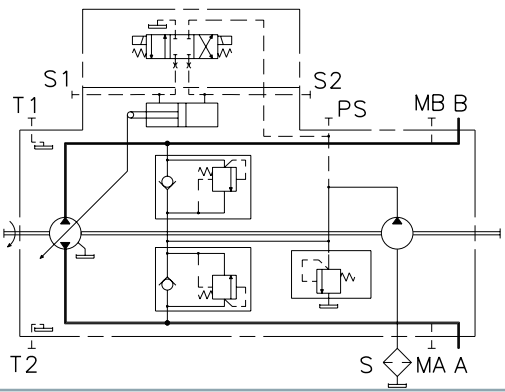


R (CW)

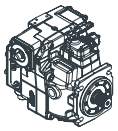


L (CCW)

Hydraulic scheme



A, B	high pressure ports
S	charge pump inlet
T1, T2	case drains ports
MA, MB, PS	gauge port for system & charge pressure
S1, S2	servo piston gauge ports



2.3.9) Installation details

MS, MZ, MT, MX, MY, RE manual proportional control

Control lever can be assembled in any position allowed by the 12-sided hole of the lever. Lever must be tightened to the control swivel at 35 Nm.
Maximum requested torque to move the lever at its end of stroke is 260 cNm.
A mechanical stop must be provided to prevent damages to the control valve due to excess of torque applied on the lever.

NSS Neutral sensor switch
The switch is normally closed (with lever in zero displacement position) and is encapsulated with wire leads Packard Weather Pack connector.
Mating connector: 12010973.

BBS Back bell switch:
The switch is normally open (it closes with lever in one of the two displacement side) and is encapsulated with wire leads Packard Metri Pack connector.
Mating connector: 15300027.

MY and RE solenoids:
The connector of the solenoid is DEUTSCH DT04-2P-EP04, contact pin 0460-202-16141. Mating connector : DEUTSCH DT06-2S-EP04.
Refer to EP coils for other characteristics. No PWM is required to energize these coils.
Solenoid nominal power is 18W (both 12V and 24V solenoids) for MY emergency and for RE pause resume function.
Solenoid nominal power is 22W for RE displacement control (both 12V and 24V).

EP, Electric Proportional control & E, Electric ON/OFF control

The connector of the solenoid is DEUTSCH DT04-2P-EP04, contact pin 0460-202-16141. Mating connector : DEUTSCH DT06-2S-EP04 consisting of:

- Case DT06-2S-EP04
- Wedge W2S
- Contact-socket 0462-201-16141

The solenoid and the connector allow a protection IP67 and IP69K according to DIN/EN 60529, when mounted with the proper sealing (the solenoid) and the proper mating plug (the connector).
Coil windings utilize Class H magnet wire (180 °C temperature rise above an ambient of 25°C). Maximum ambient temperature for solenoids: +50°C.
For EP control only: PWM frequency range: 100 Hz.
Solenoid nominal power 23W (both 12V and 24V solenoids).

HP, Hydraulic Proportional control (with feedback)

The HP control por ts dimension is G1/4" ISO1179 standard.
Tighten the connecting nipple at 25 Nm.
Do not pressurize control por t H1 & H2 over 20 bar.

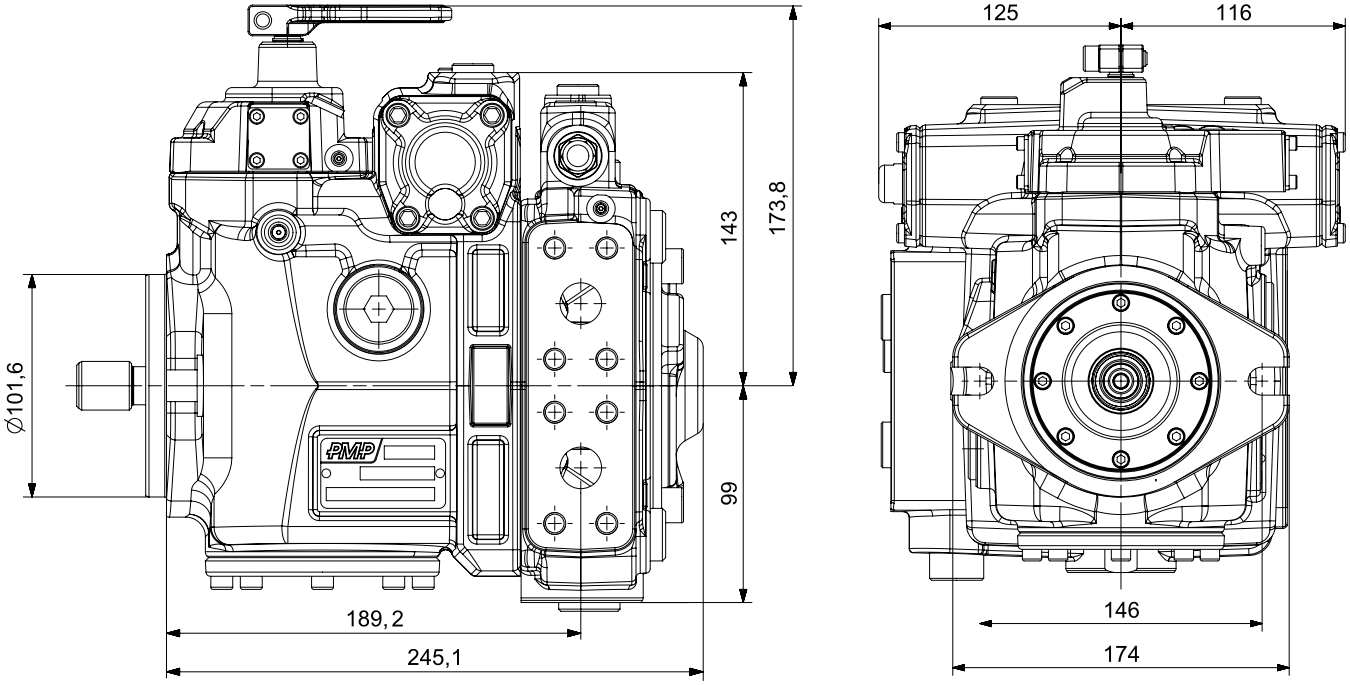
HD, Hydraulic Direct control (proportional without feedback)

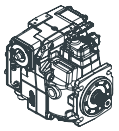
The HP control por ts dimension is G1/4" ISO1179 standard.
Tighten the connecting nipple at 25 Nm.
Do not pressurize control por t H1 & H2 over 35 bar.

2.4) Sizes

2.4.1) 35

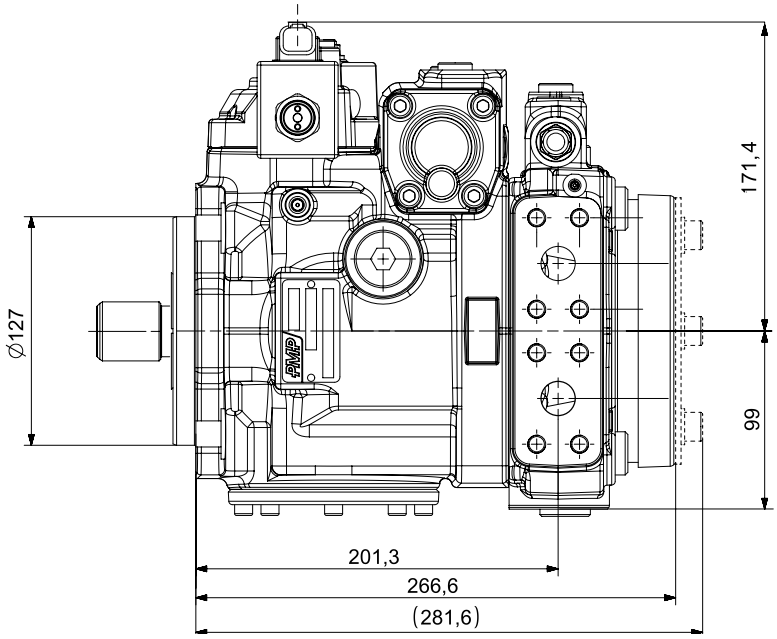
MS, manual control

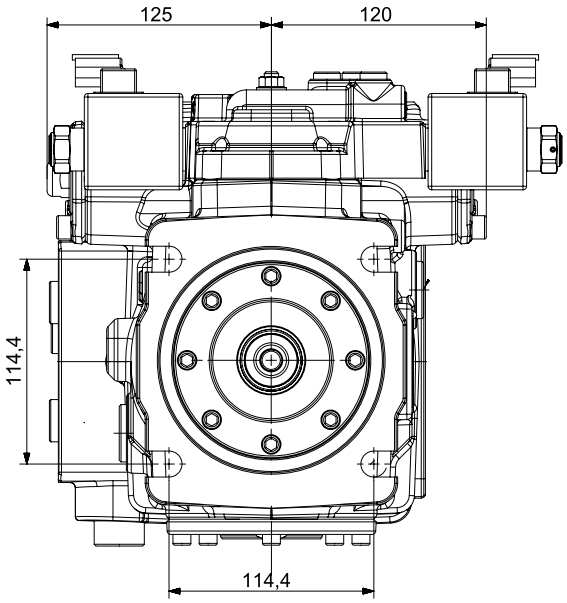




2.4.2) 55

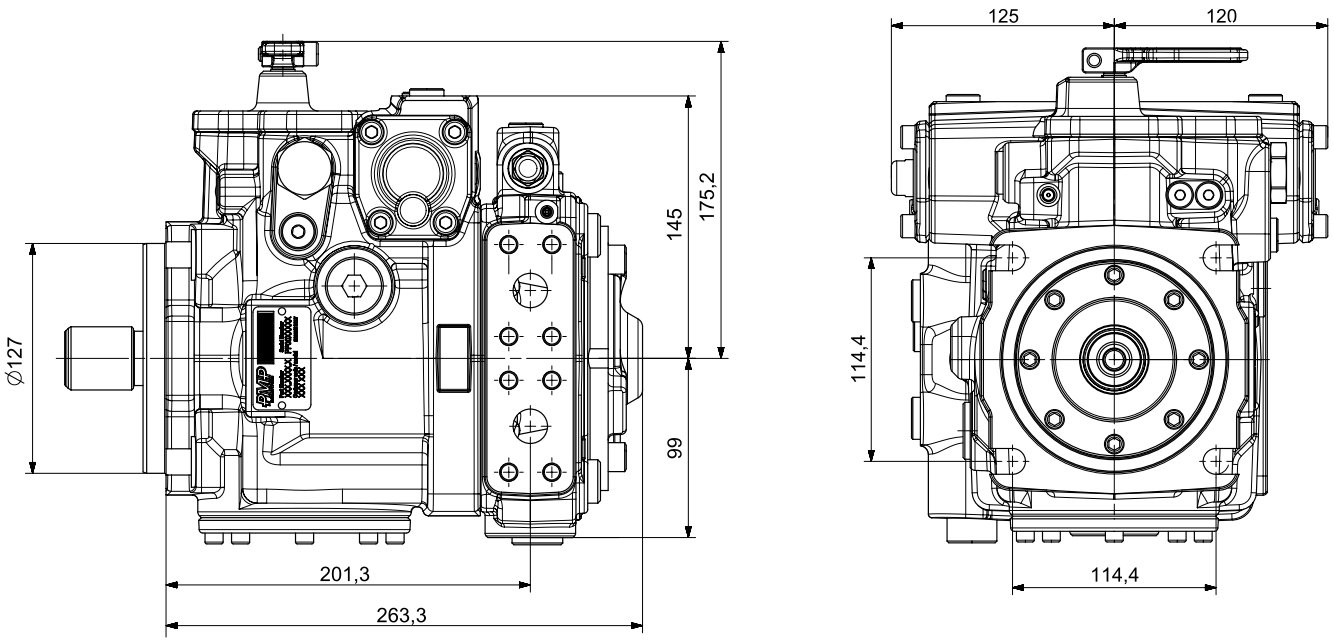
EP, electric proportional control





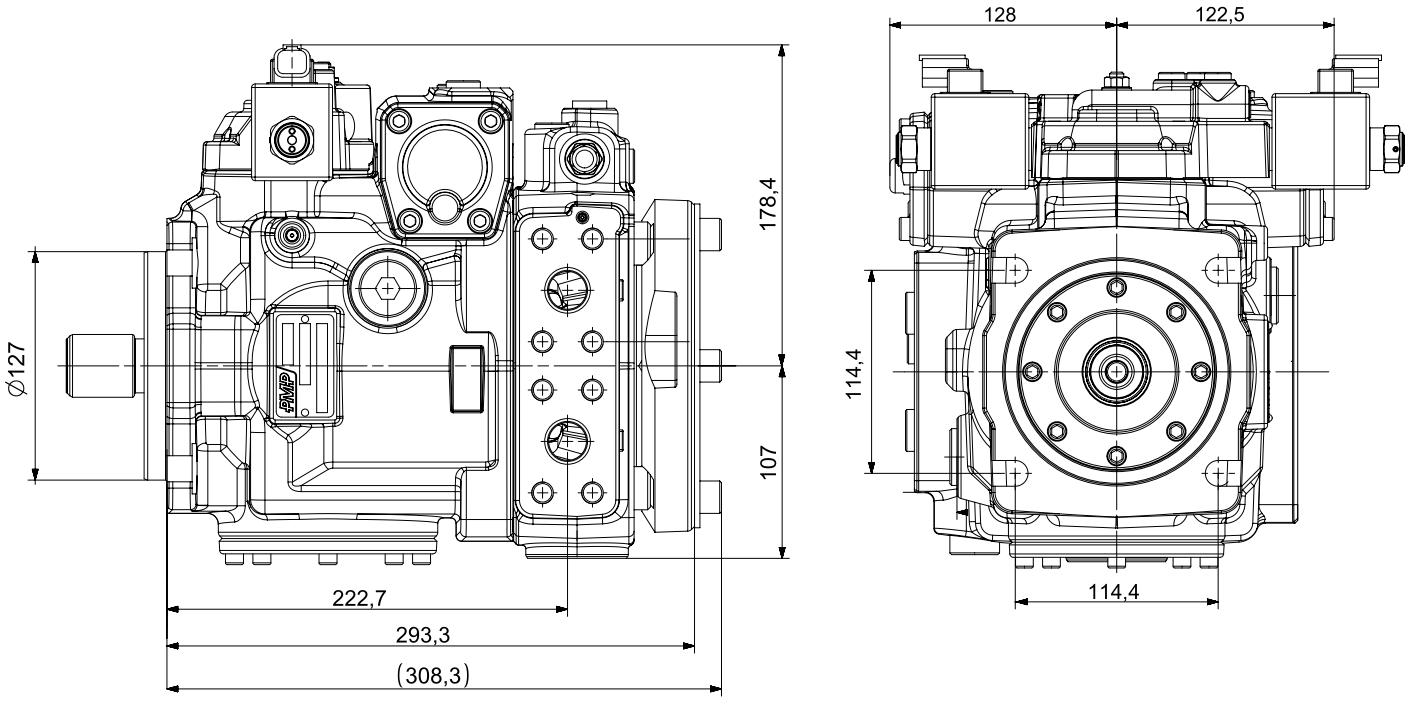
2.4.3) 55B

P55B is a special simplified version of P55, available only with MS or MY control, for typical application on transit concrete mixers.



2.4.4) 72

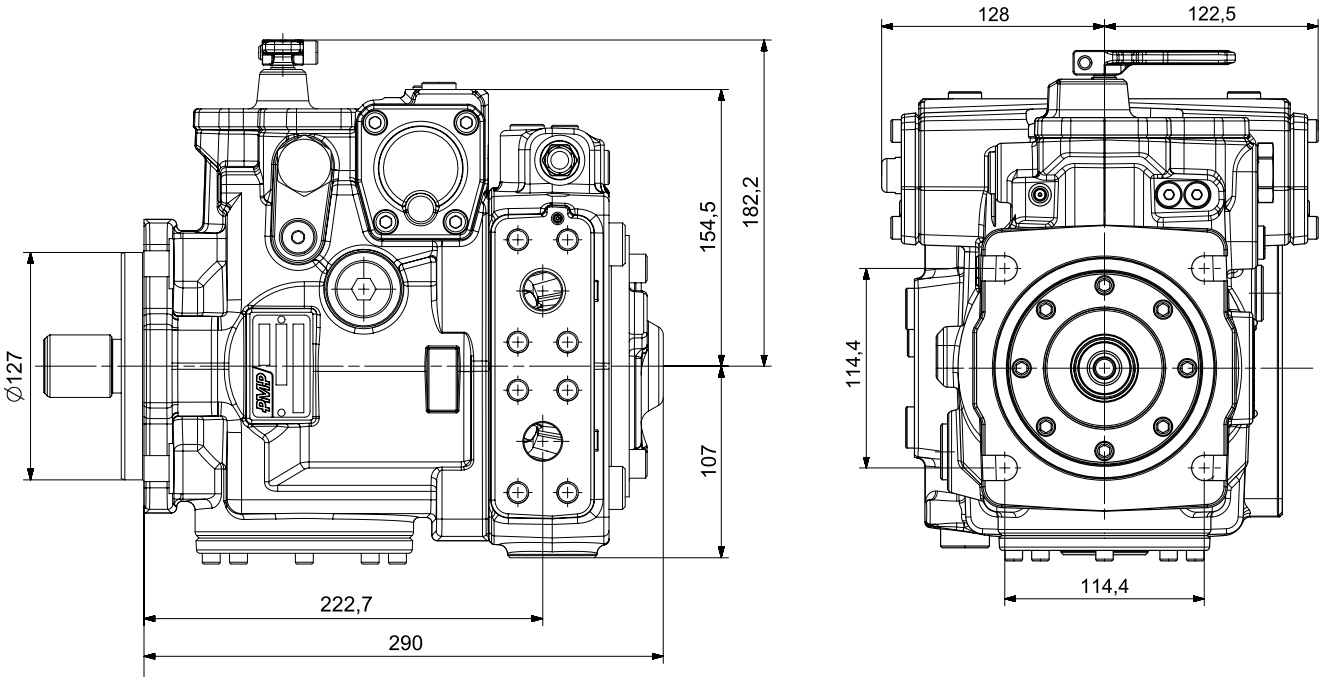
EP, electric proportional control



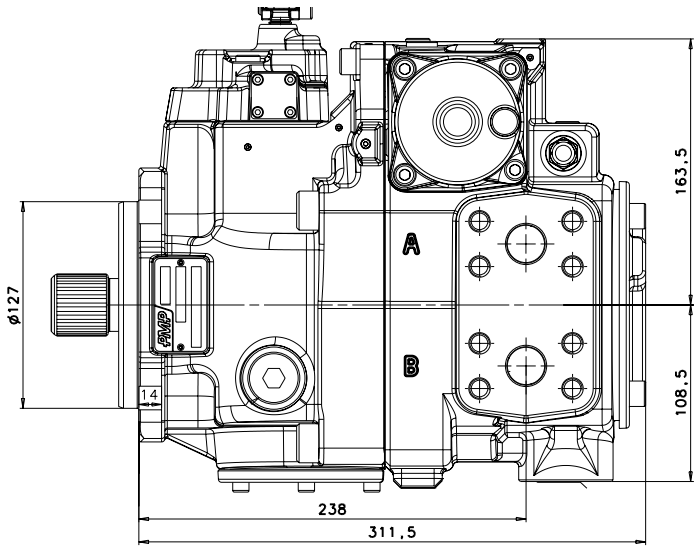
2.4.5) 72B

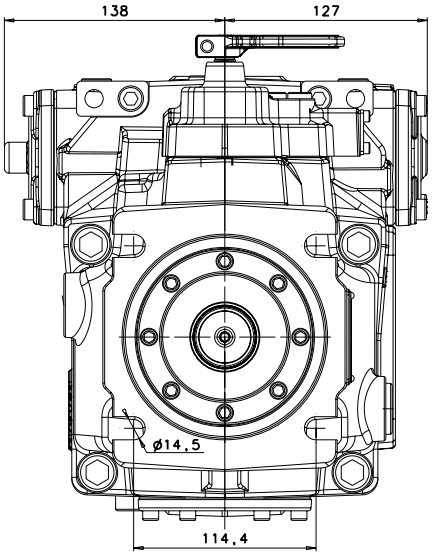
P72B is a special simplified version of P72, available only with MS or MY control, for typical application on transit concrete mixers.

EP, electric proportional control

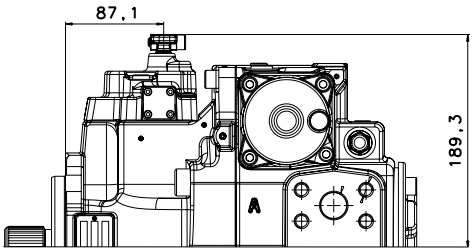


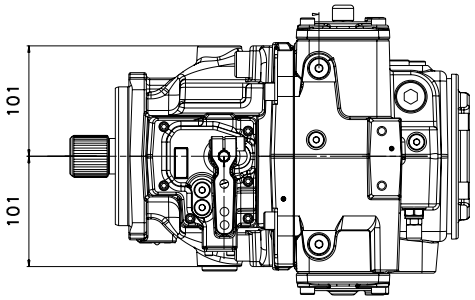
2.4.6) 90 / 110



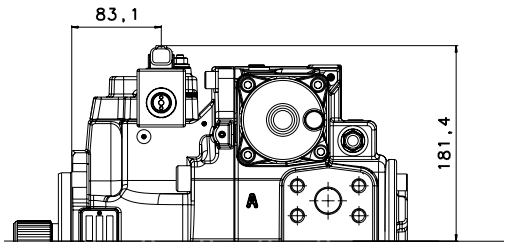


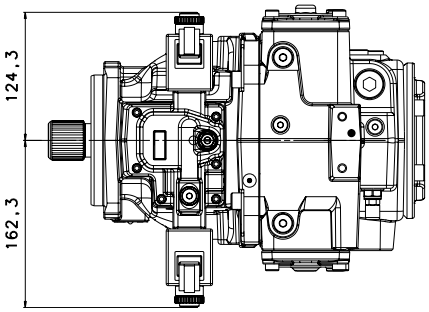
MS, manual control



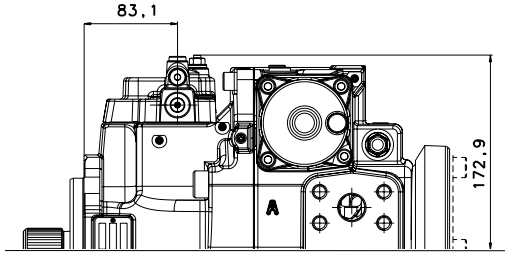


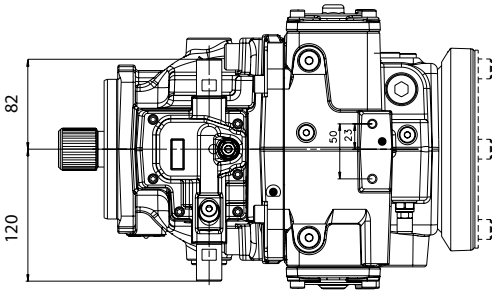
EP, electric proportional control



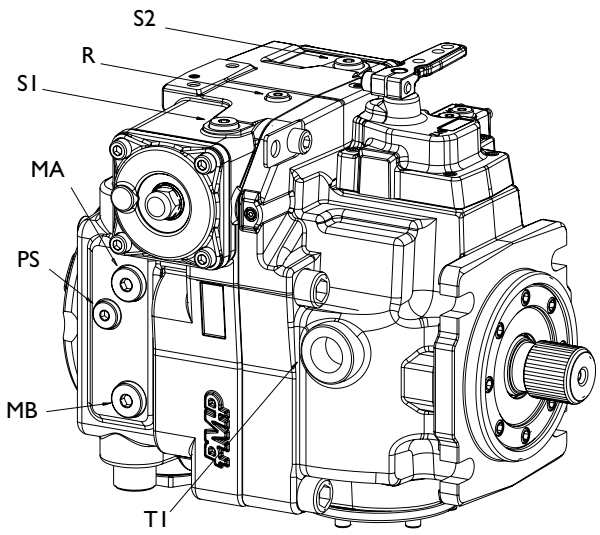


HP, hydraulic proportional control



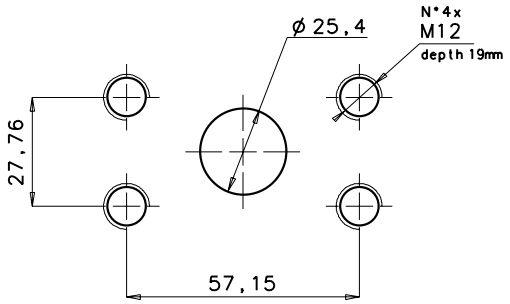


Ports



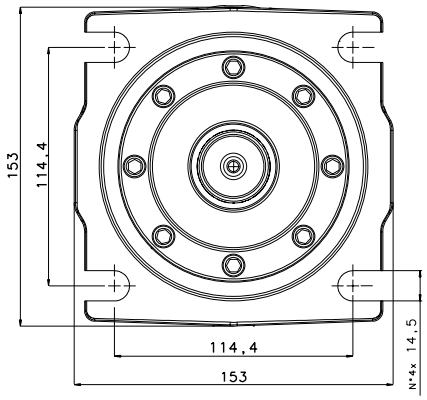
A,B	High pressure ports	SAE J518 code 62	1"
S	Charge pump inlet	ISO1179	
T1,T2	Case drain ports	ISO1179	3/4"
MA, MB	Gauge ports for system pressure	ISO1179	3/8"
PS	Gauge port for charge pressure	ISO1179	1/4"
R	Air bleed plug	ISO1179	1/8"
S1,S2	Servo piston pressure gauge port	ISO1179	1/4"

Details X - Port A/B

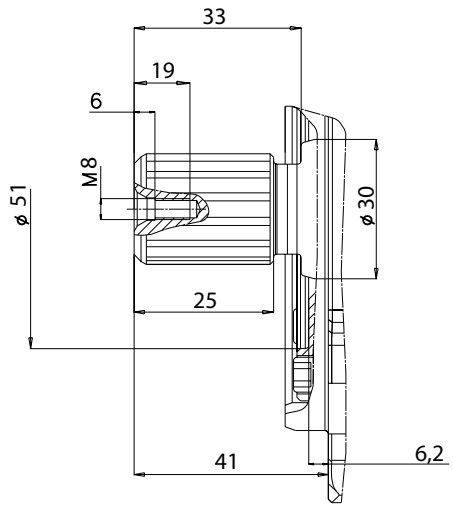


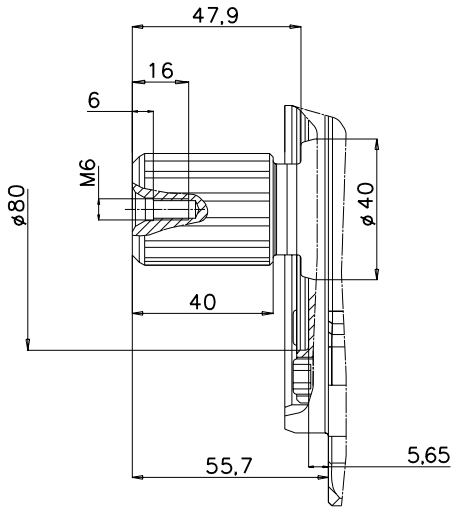
Mounting Flange

C4	SAEJ744 - Flange SAE C - 4 bolts

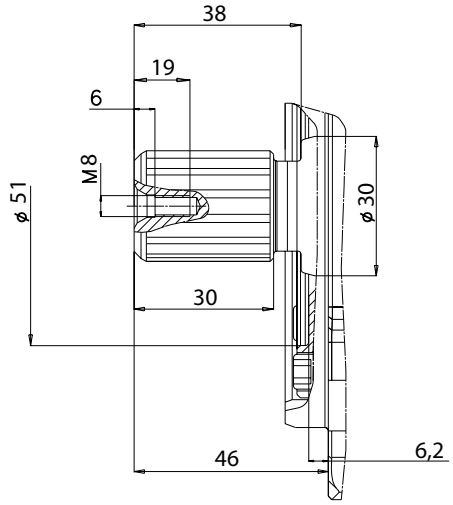


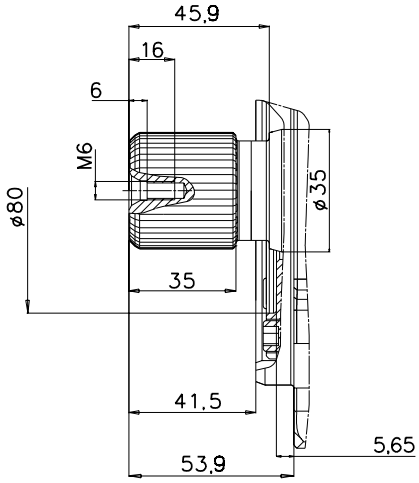
Shaft End			
13N	ANSI B92.1A – 1976 – 7/8" 13T 16/32 DP	**14N**	ANSI B92.1A – 1976 – 1 1/4" 14T 12/24 DP



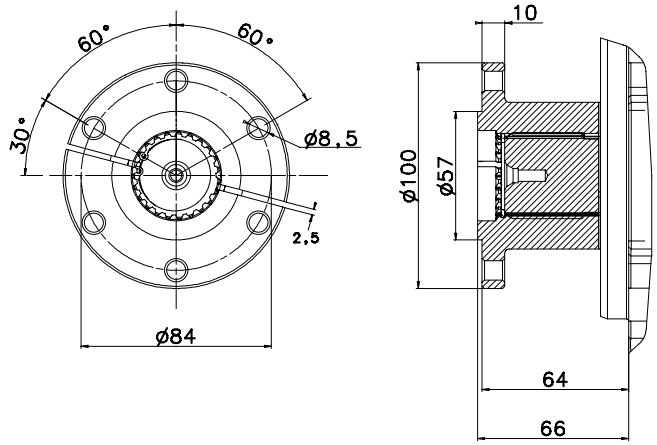


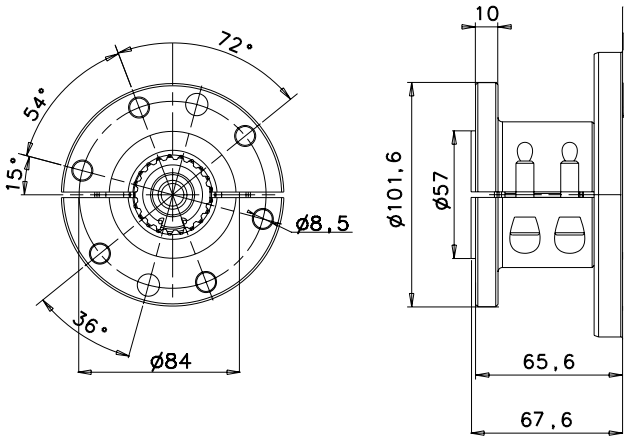
15N	ANSI B92.1A – 1976 – 1" 15T 16/32 DP	**21N**	ANSI B92.1A-1976-1 3/8" 21T 16/32 DP





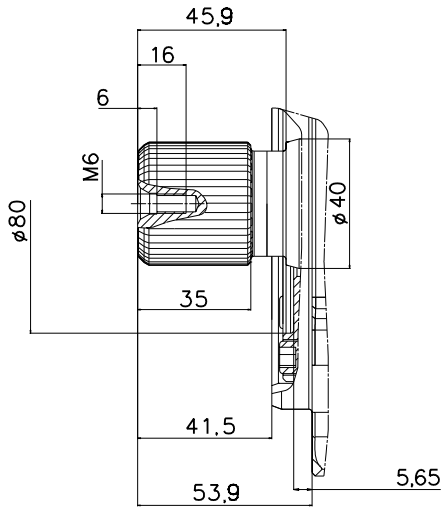
21F	ANSI B92.1A-1976-1 3/8" 21T 16/32 DP with coupling flange	**21F1**	ANSI B92.1A – 1976 – 1 1/2" 21T 16/32 DP SPECIAL coupling flange

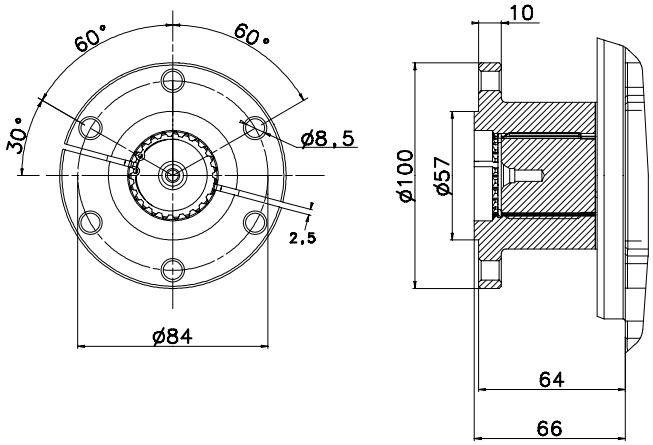




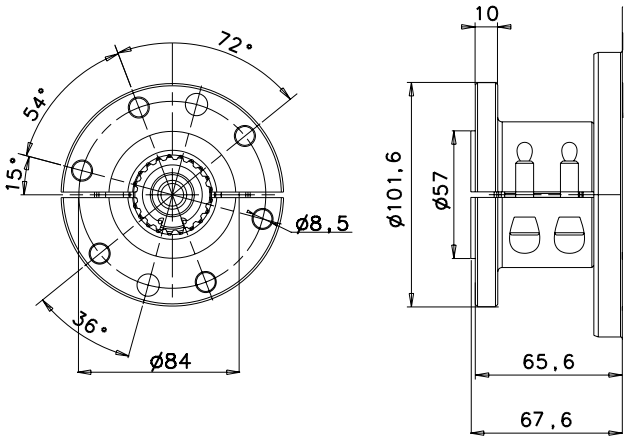
Shaft End

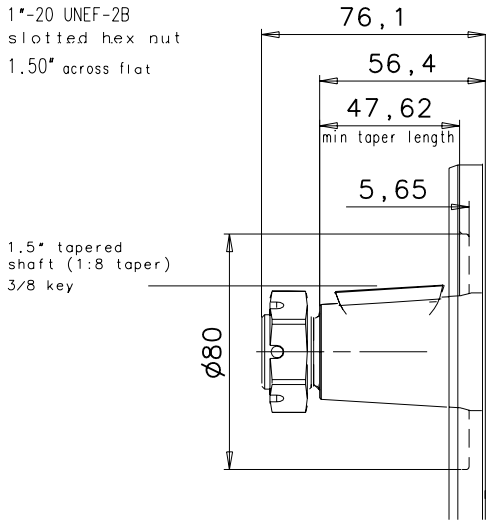
23N	ANSI B92.1A – 1976 – 1 1/2" 23T 16/32 DP	**23F**	ANSI B92.1A – 1976 – 1 1/2" 23T 16/32 DP with coupling flange





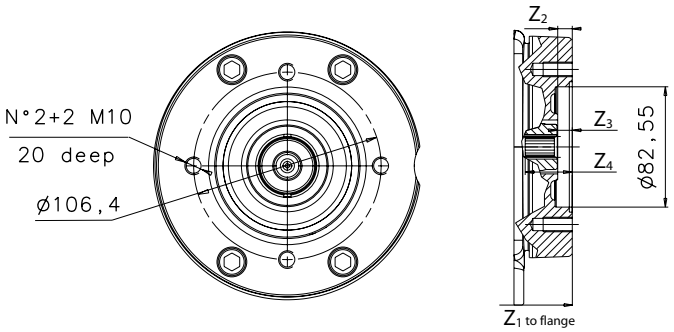
23F1	ANSI B92.1A – 1976 – 1 1/2" 23T 16/32 DP SPECIAL coupling flange	**C15**	Tapered 1.5" shaft





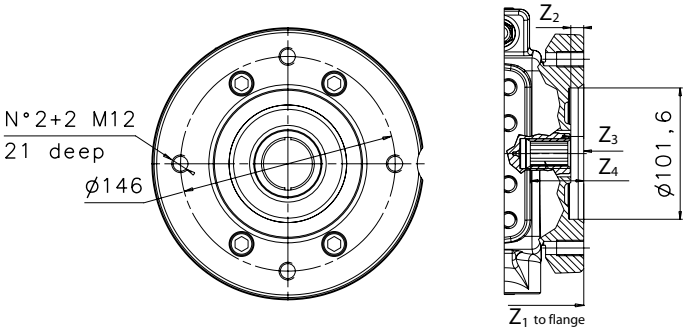
2.5) Through drive dimensions

Flange	Splined hub
A1 - SAEJ744 82-2	ANSI B92.1A-1976 16/32 9T



	Z_1	Z_2	Z_3	Z_4
P55	272,6	10	10,3	32,3
P72	292,3	10	10,3	32,3
P90/110	324,8	10	10,3	32,3

Flange	Splined hub
B1 - SAEJ744 101-2	ANSI B92.1A-1976 16/32 13T

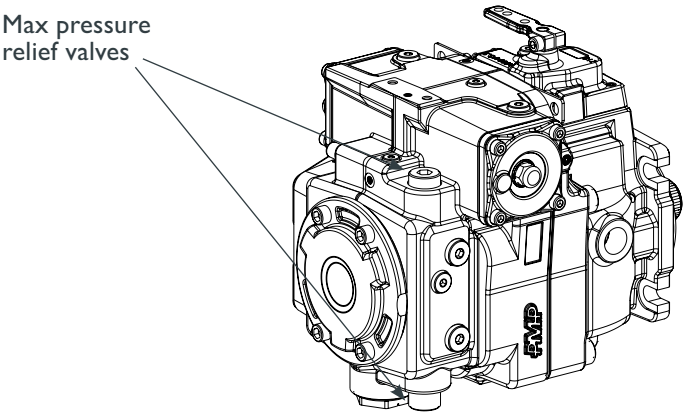


	Z_1	Z_2	Z_3	Z_4
P55	272,6	10	10,3	41,3
P72	292,3	10	10,3	41,3
P90/110	324,8	10	10,3	41,3

2.6) High pressure relief valves

The PMH P is equipped with two relief pressure valves that prevent excessive pressures in the high pressure loop. On a possible peak of pressure, the valve reacts quickly, opens its shutter and limits the pressure at the calibration value. Valves also features anti-cavitation function to compensate the exchanged flow and losses due to leakage.

Relief valve setting	
420	420 bar
350	350 bar
300	300 bar
250	250 bar
other settings on requests	



2.7) Tightening torques

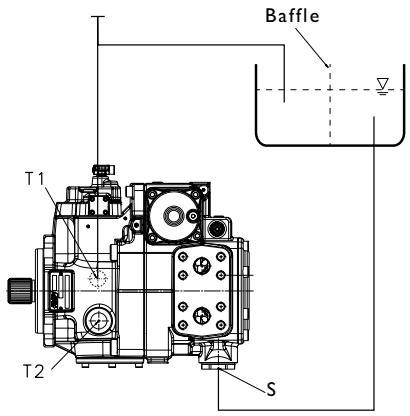
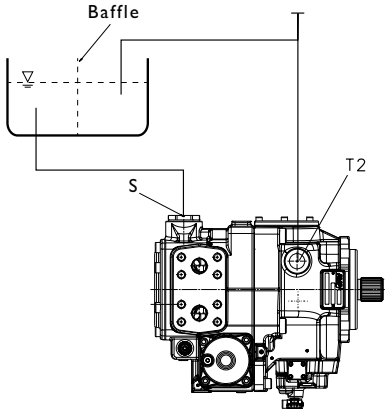
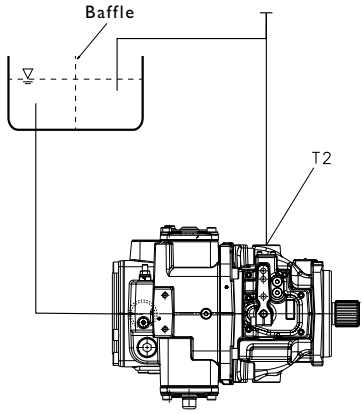
In the following table the you can see the tightening torques for the ports of the pump.

Port		Thread	Torque [Nm]
S	ISO1179	1 ¼"	210
T1, T2	ISO1179	3/4"	65
MA, MB	ISO1179	3/8"	35
PS, S1, S2, HA, HB	ISO1179	1/4"	25

3) INSTALLATION INSTRUCTIONS

The PMH P pump can be installed in the following position respect to the level of the tank of the hydraulic fluid.

3.1) Below tank installation

	Pump Orientation	Notes
Horizontal shaft Control upwards High Pressure ports (A, B) on side		The case drain line must be always connected with the drain port positioned in the highest position
Horizontal shaft Control downwards High Pressure ports (A, B) on side		The case drain line must be always connected with drain port positioned in the highest position
Horizontal shaft Controls on side Pressure ports (A, B) on top		The case drain line must be always connected with drain port positioned in the highest position

3.2) Start-up procedure

3.2.1) Preliminary indications

In order to avoid an unwanted movement of the User, don't start the Prime Mover (engine) and don't connect the control linkage (lever) until expressly requested by the following procedure.

Use only Mineral Oil with high viscosity index, that can guarantee a viscosity of 16-36 cSt at working temperature. For short periods a viscosity of 7 cSt at high temperature and of 1600 cSt at cold start are allowable. For other types of oil please contact PMP After Sales Department. Do not use water containing hydraulic oils (HFA, HFB & HFC).

Check that hydraulic fluid level (during the commissioning, the operation and after long storing period) is always adequate: case interior, suction line, service line have to be and remain filled with the correct hydraulic fluid to avoid unit malfunctions or damage.

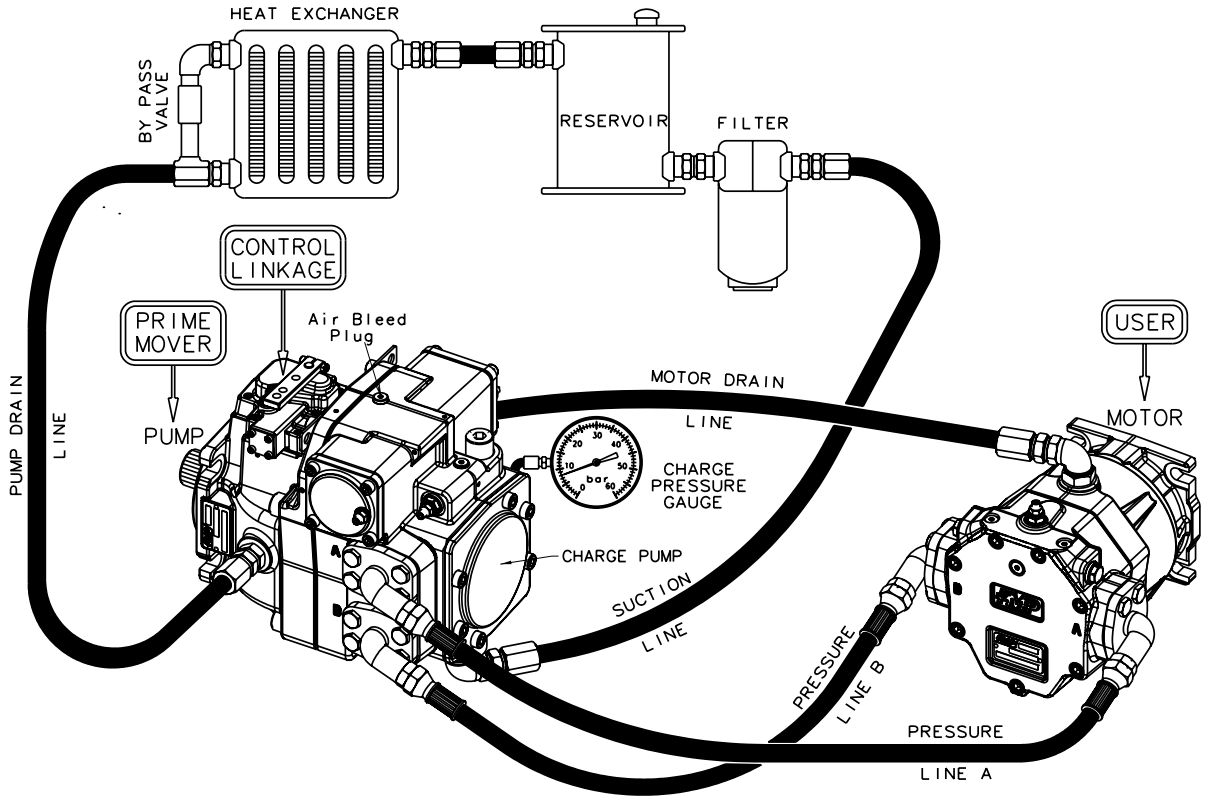
The tank must be fit with the right heat exchanger in order to keep the oil temperature between 60 °C (140°F) and 90°C (194°F). Temperature limits are –25°C (-13°F) for cold start and 90°C (194°F) for peak temperature; these limit conditions can be maintained only for very short periods. In any case the above viscosities must be fulfilled.

After the tank a filter must be placed (preferably with a clogging sensor), in order to guarantee the right oil cleanliness (b10≥2): for an efficient and lasting working life, a cleanliness of 18/16/13 according to ISO 4406 must be guaranteed. In any case not below 20/18/15 according to ISO 4406.

Pump must be installed below the tank; the tank must be provided with a breather. The absolute pressure at charge pump inlet must be always above 0.8 bar.

The hydraulic circuit must be dimensioned in order to have no more than 3 bar continuous pressure and max 6 bar intermittent in the pump and motor case.

3.2.2) Hydraulic circuit



3.2.3) Start

During installation and start-up it is very important to keep maximum cleanliness, especially at the hydraulic connections, to avoid any dirt to get into the pump and motor.

1. Attach the pump to the Prime Mover (engine) and the motor to the User, and tighten the bolts.

2. Connect the A/B pressure line and tighten the bolts.

3. Fill with fresh and filtered oil the pump case and the motor case, using the drain ports in the highest position; fill the oil till it reaches the same hole used for filling.

4. Connect the drain lines according to the sketch above and tighten the bolts.

5. Connect the cooler/tank/filter unit at the suction line and tighten the bolts.

6. Fill the tank with fresh and filtered oil.

7. Loosen the suction line where it is connected to the pump.Wait for the oil to fill the hose and then tighten again.

8. Check all the connections on the hoses, insuring they are well tightened.

9. Remove the PS plug on the side of the charge pump in order to check the charge pressure (see Charge Pressure Gauge on the picture of previous page).

10. Fill with fresh oil the charge pump.

11. Install a pressure gauge (0-60 bar / 0-870 PSI) on the PS port (see Charge Pressure Gauge on the picture of previous page).

12. Check if the User is free to move.

13. Connect the control to the control system of the machine.

- MS / MZ / MY / MT / MX / RE: tighten the control lever screw at 35 Nm
- E1,2 / EP1,2 / EV1,2 / RE1,2 / MY / Dead Man: connect Deutsch with cables
- HP / HD: connect the control lines and tighten the nipples.

14. Start the Prime Mover (Engine) at 700-1000 rpm for around 40 sec (for internal combustion engine) or 20 sec (for electric motor) and check if the charge pump gives pressure, by looking at the Charge Pressure Gauge. It is possible to unscrew the "Air Bleed Plug", without removing it, in order to make the air blood easier; when oil appears, tighten the plug.

15. Increase Prime Mover (Engine) speed at 2000 rpm: while keeping the control lever at 0 position (0 displacement) check if the charge pressure gauge shows charge pump pressure setting ± 1 bar (± 15 psi).

16. If the pressure is not stable or it is stable at a very different value from charge pump pressure setting ± 1 bar (± 15 psi) there could be air inside the circuit: stop the engine, check hoses and connections and start engine again for 40 sec (or 20 sec for electric motor); if after 2-3 trials the problem is still there please contact technical assistance.

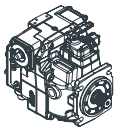
17. If the pressure is stable at charge pump pressure setting ± 1 bar (± 15 psi), set the engine speed at its normal working speed. If the engine speed is not in the range 1500÷3000 rpm contact the technical support.

18. Move the control lever slowly away from the 0 position, first at half stroke and then at full stroke in both directions for two or three times: pay attention since this will start moving the Motor and the User will have to be ready to work in safe conditions.
In case of MY control or Dead Man option ensure the relative solenoid is energized otherwise no pressure will reach the control and the servo piston.

19. When the hydraulic motor is running the charge pressure should go down by 3-5 bar (40-70 psi) difference; if this is not happening please contact technical assistance.

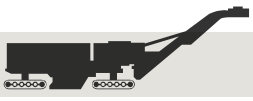
20. Stop the Prime Mover (Engine), remove the pressure gauge from PS port and put back the plug and tighten it.

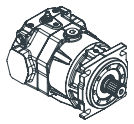
21. Check oil level on the tank and refill if necessary.
22. Check the oil tank is fully closed.
23. Check there is no leakage in the circuit.
24. The hydraulic system is ready to work.



PMP INDUSTRIES





1) ORDER CODE

1	2	3	4	5	6	7
M		**V**	**C4**	**21N**	**RO**	

1	PRODUCT GROUP AND FAMILY			
M	Axial piston motor for closed loop circuit			
2	DISPLACEMENT			
72	72,1 cm^3 (@18°)			
90	89,2 cm^3 (@18°)			
110	110,0 cm^3(@18°)			
3	SHAFT SEAL	M72	M90	M110
V	Viton	A	A	A
4	MOUNTING FLANGE	M72	M90	M110
C4	SAE J 744 – SAE C four bolts	A	A	A
5	SHAFT END	M72	M90	M110
14N	ANSI B92.1A – 1976 – 1 1/4" 14T 12/24 DP	R	R	R
21N	ANSI B92.1A – 1976 – 1 3/8" 21T 16/32 DP	A	A	A
23N	ANSI B92.1A – 1976 – 1 1/2" 23T 16/32 DP	-	R	R
6	SERVICE LINE PORT	M72	M90	M110
RO	Radial opposite side	A	A	A
7	FLUSHING VALVE RELIEF SETTINGS	M72	M90	M110
0	Without flushing valve	R	R	R
F20	20 bar	A	A	A
F18	18 bar	R	R	R
F16	16 bar	R	R	R

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

EXAMPLE						
1	2	3	4	5	6	7
M	**90**	**V**	**C4**	**21N**	**RO**	**F20**

2) MAIN FEATURES

2.1) General Information

The PMH M is a fixed displacement motor with axial pistons, swash plate design and can be used in closed 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 installations.
The PMH M motor is equipped with flushing valve integrated on the motor casing which allows the temperature control, especially in heavy duty applications.

2.2) Technical Data

2.2.1) Operating Parameters

Model			M72	M90	M110
Displacement	V	cm^3	72	90	110
Maximum speed	n_{max}	rpm	4.100	4.000	3.800
Maximum flow	q_{max}	l/min	295	340	400
Nominal pressure	p_{nom}	bar	400	400	400
Maximum pressure	p_{max}	bar	450	450	450
Maximum power	P_{max}	kW	156	180	210
Theoretical max torque	C_{max}	Nm	480	570	700
Weight	M	Kg	28	34	34

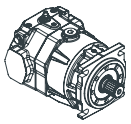
2.2.2) Hydraulic Fluid

Recommended Hydraulic Fluid	Mineal Oil High Viscosity Index		
Operating viscosity*	ν	cSt	16 ÷ 36
Maximum viscosity Short term at cold start	ν_{max}	cSt	≤1600
Minimum viscosity at maximum temperature	ν_{min}	cSt	≥7
Maximum working temperature of the fluid	T_{max}	°C	90

**Referred to the circuit temperature-closed circuit*

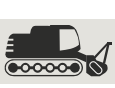
2.2.3) Filtration

It is recommended for an efficient and lasting working life, a solid particle contamination level of 18/16/13 in 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 in according to ISO4406.



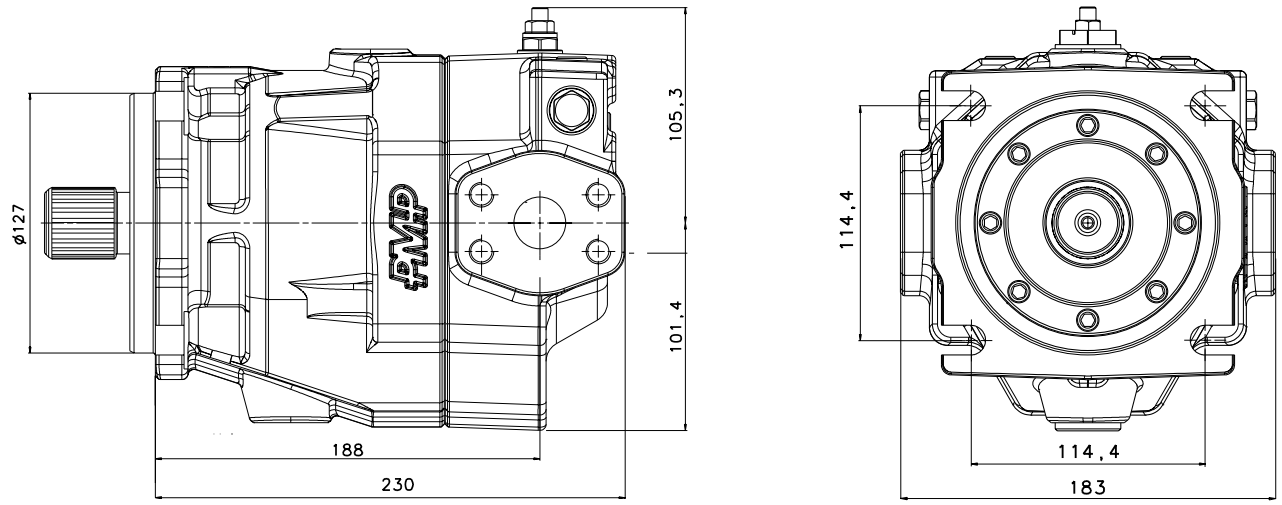
PMP INDUSTRIES



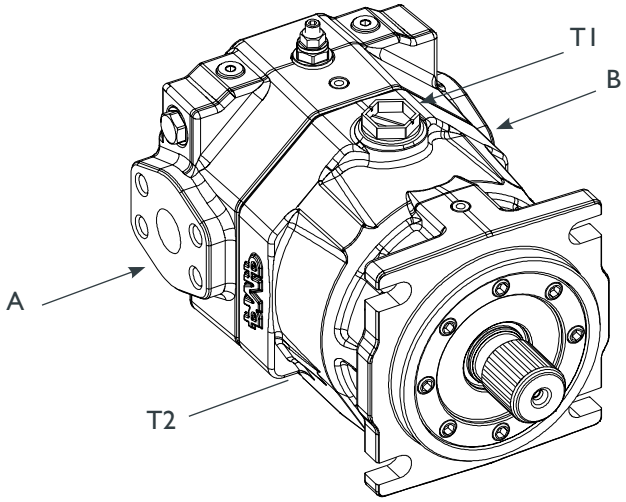



2.3) Sizes

2.3.1) 72

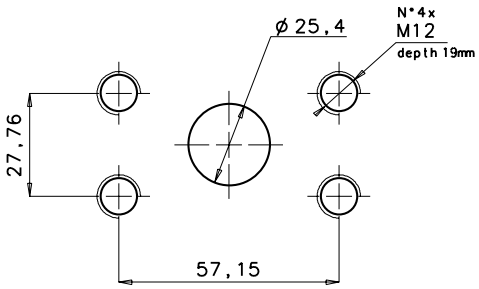


Ports



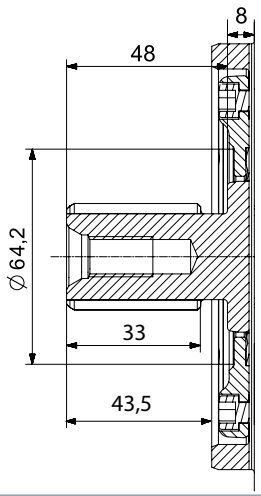
Port	Description	Standard	Size
A,B	High pressure ports	SAE J518-62	1"
T1,T2	Case drain ports	ISO1179	3/4"

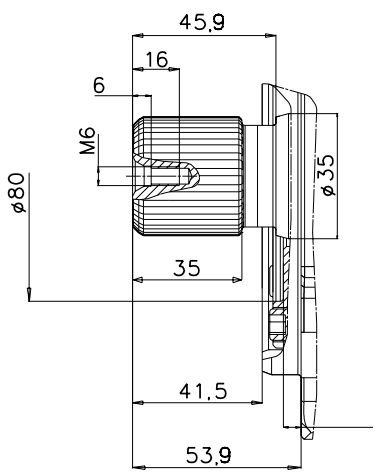
Details X - Port A/B



Shaft End

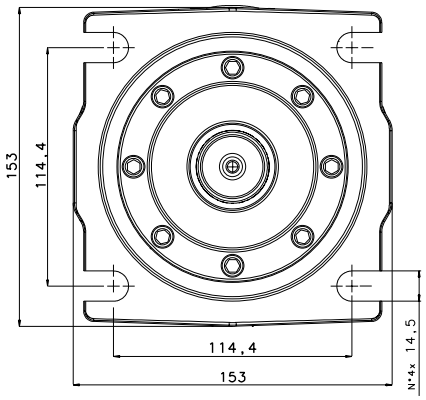
14N	ANSI B92.1A – 1976 – 1 1/4" 14T 12/24 DP
21N	ANSI B92.1A-1976-1 3/8" 21T 16/32 DP



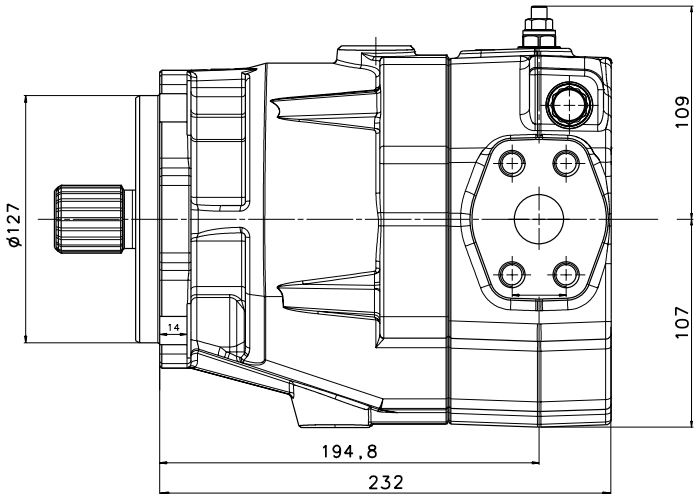


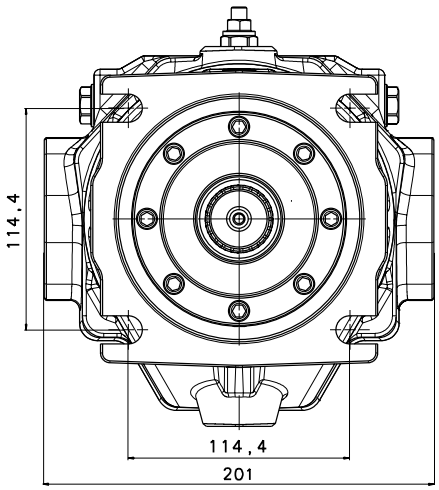
Mounting Flange

C4	SAEJ744 - Flange SAE C - 4 bolts

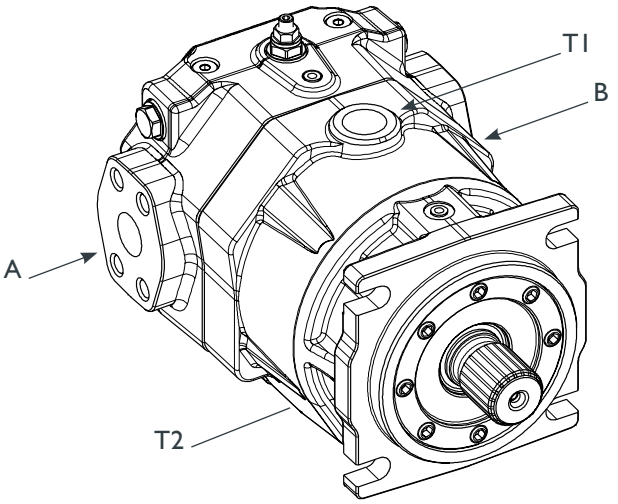


2.3.2) 90 / 110



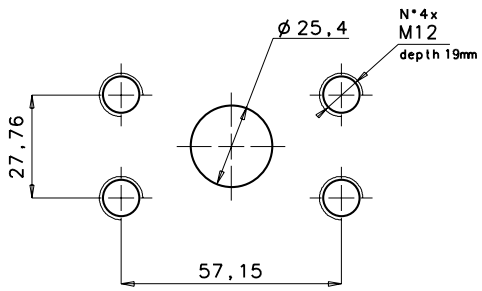


Ports



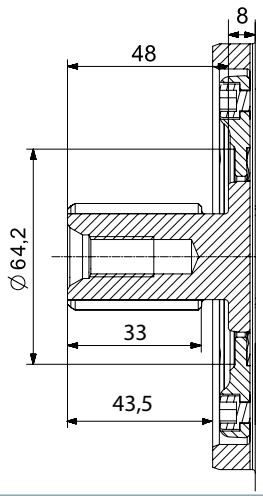
Port	Description	Standard	Size
A,B	High pressure ports	SAE J518-62	1"
T1,T2	Case drain ports	ISO1179	3/4"

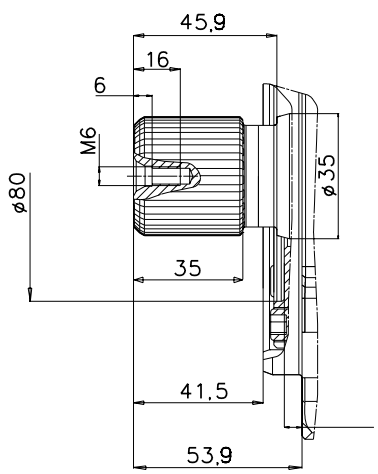
Details X - Port A/B



Shaft End

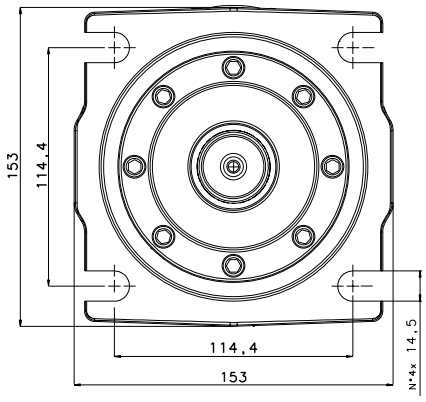
14N	ANSI B92.1A – 1976 – 1 1/4" 14T 12/24 DP	**21N**	ANSI B92.1A-1976-1 3/8" 21T 16/32 DP





Mounting Flange

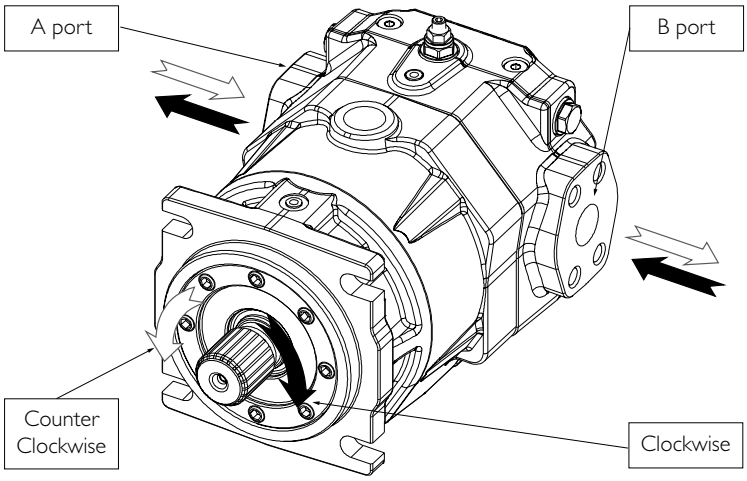
C4	SAEJ744 - Flange SAE C - 4 bolts

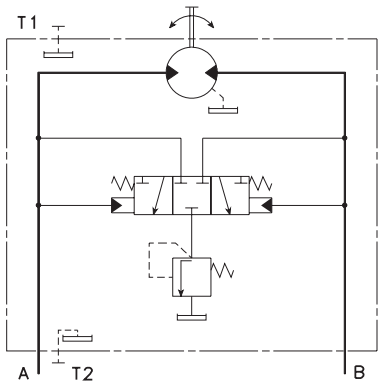


2.4) Direction of rotation – direction of the flow

Ports

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

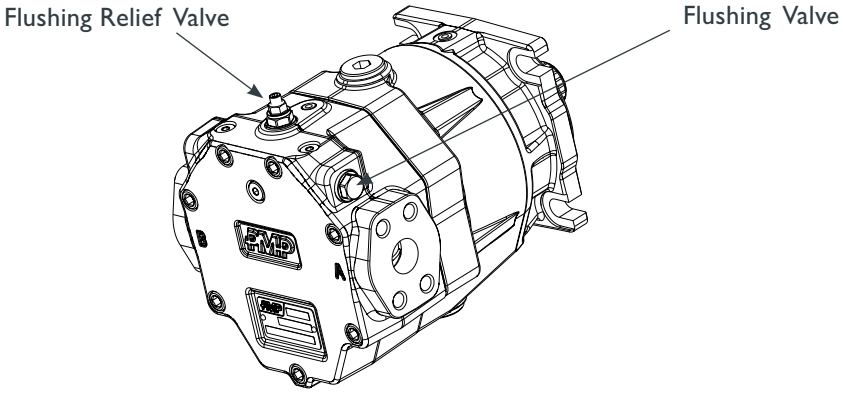


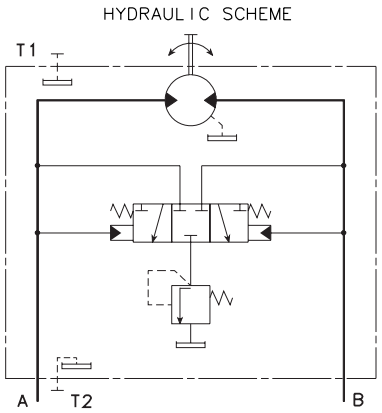
Hydraulic scheme	
	

A, B	High pressure ports
T1, T2	Case Drains ports

2.5) Flushing Valve

The PMH M 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 anti-cavitation valve on the pump. The use of this valve allows dispose of excessive heat.



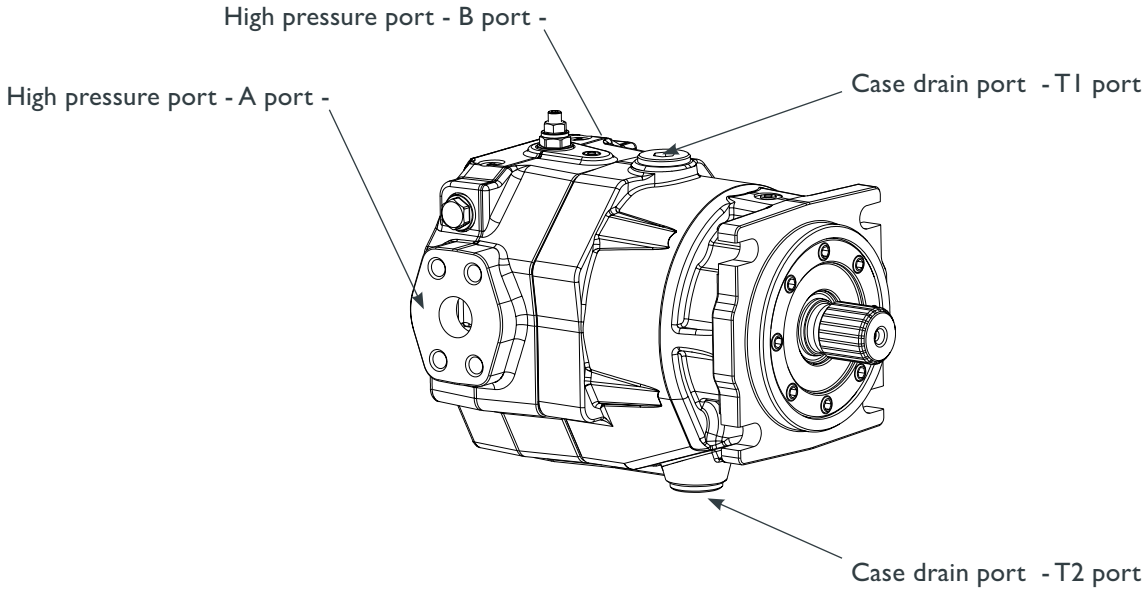


3) INSTALLATION INSTRUCTIONS

3.1) Introduction

In the following pages are described the standards of installation of the PMH M motor. Compliance of the standards set has decisive effect on the life of the unit.

In the following illustration can identify the links for a correct installation.

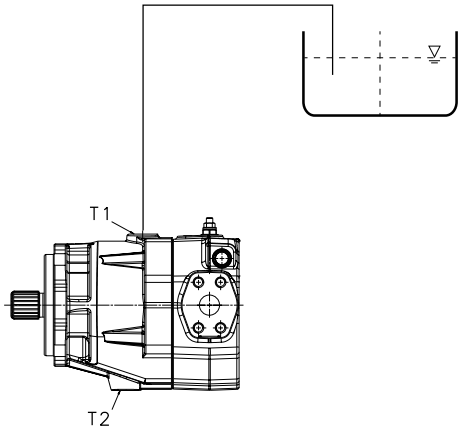
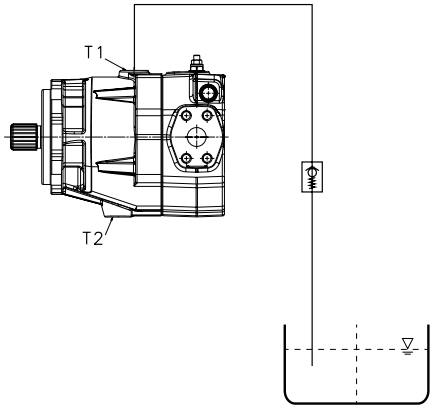


A standard requirement is that the motor must be filled with pre filtered hydraulic oil. The case must be filled with oil both in operation and during the break.

The motor must be connected to the tank through the drain line. Lack of compliance with that condition can damage the unit irreparably.

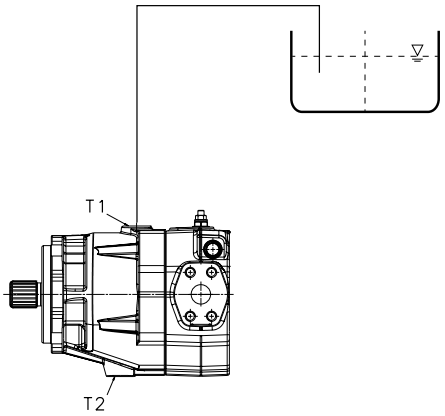
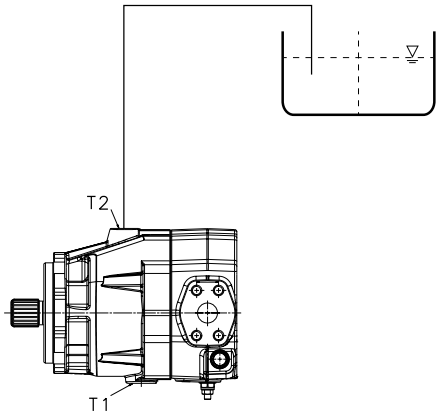
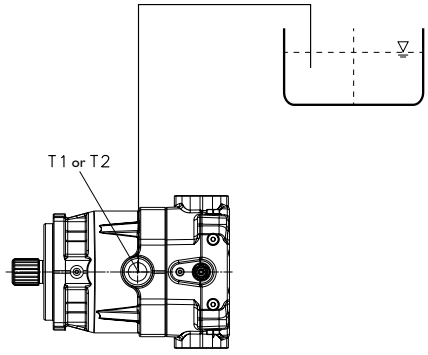
3.2) Installation position

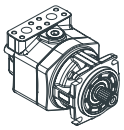
The case drain line must be always connected with the highest port. The motor can be installed in the following positions respect to the level of the tank of the hydraulic fluid:

	Motor Orientation	Notes
Under the tank		Standard Positioning
Over the tank		You must provide a check valve on the case drain line to prevent the emptying of the line

3.3) Motor orientation

The motor can be oriented in the following positions

	Motor Orientation	Notes
Horizontal shaft High Pressure ports (A, B) on side		The case drain line must be always connected with the highest port (T1)
Horizontal shaft High Pressure ports (A, B) on side		The case drain line must be always connected with the highest port (T2)
Horizontal shaft and High Pressure ports (A, B) on top and on bottom		The case drain line must be always connected with the highest port (T1 or T2)



1) ORDER CODE

1	2	3	4	5	6	7	8
MCF		**V**	**C4**	**RS**	**21N**		

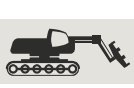
1	PRODUCT GROUP AND FAMILY						
MCF	Axial piston motor						
2	DISPLACEMENT						
30	30,2 cm^3 (@15,5°)						
35	35,0 cm^3 (@18°)						
55	55,0 cm^3 (@18°)						
72	72,1 cm^3 (@18°)						
90	89,2 cm^3 (@18°)						
110	110,0 cm^3(@18°)						
3	SHAFT SEAL	MCF 30	MCF 35	MCF 55	MCF 72	MCF 90	MCF 110
V	Viton	A	A	A	A	A	A
4	MOUNTING FLANGE	MCF 30	MCF 35	MCF 55	MCF 72	MCF 90	MCF 110
B2	SAE J 744 – SAE B two bolts	A	A	-	-	-	-
C4	SAE J 744 – SAE C four bolts	-	-	A	A	A	A
125L	ISO3109-2 long version	-	A	-	-	-	-
5	SERVICE LINE PORT	MCF 30	MCF 35	MCF 55	MCF 72	MCF 90	MCF 110
RS	Radial same side	A	A	A	A	A	A
6	SHAFT END	MCF 30	MCF 35	MCF 55	MCF 72	MCF 90	MCF 110
13N	ANSI B92.1A – 1976 – 7/8" 13T 16/32 DP	A	A	-	-	-	-
21N	ANSI B92.1A – 1976 – 1 3/8" 21T 16/32 DP	-	-	A	A	A	A
23N	ANSI B92.1A – 1976 – 1 1/2" 23T 16/32 DP	-	-	R	R	R	R
S30	Straight Ø30x48 80mm long with parallel key	A	A	-	-	-	-
S40	Straight Ø40x48 80mm long with parallel key	-	-	A	-	-	-
7	FLUSHING VALVE	MCF 30	MCF 35	MCF 55	MCF 72	MCF 90	MCF 110
0	Without flushing valve	R	R	R	R	R	R
FF07	7 l/min with low pressure side at 25 bar	A	A	A	A	R	R
FF11	11 l/min with low pressure side at 25 bar	R	R	R	R	A	A
FF15	15 l/min with low pressure side at 25 bar	R	R	R	R	R	R
8	SPEED SENSOR	MCF 30	MCF 55	MCF 55	MCF 72	MCF 90	MCF 110
0	Without speed sensor predisposition	A	A	A	A	A	A
SP1	With speed sensor predisposition	R	R	R	R	R	R
SM1	With speed sensor mounted, 2-channel type with Weather-Pack 4 pin connector	A	A	A	A	A	A
SM2	With speed sensor mounted, 2-channel type with Deutsch DT04-4P connector	A	A	A	A	A	A

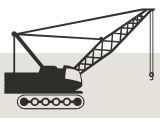
1	2	3	4	5	6	7	8
MCF		**V**	**C4**	**RS**	**21N**		

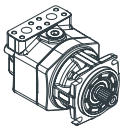
9	SPECIAL HARDWARE	MCF 30	MCF 55	MCF 55	MCF 72	MCF 90	MCF 110
-	Standard	A	A	A	A	A	A
CW	Clockwise only with integrated check valve	A	A	-	-	-	-
CCW	Counterclockwise only with integrated check valve 1	R	R	-	-	-	-

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

1	2	3	4	5	6	7	8	9
MCF	**55**	**V**	**C4**	**RS**	**21N**	**FF07**	**0**	**000**





2) MAIN FEATURES

2.1) General Information

The PMH MCF are an evolution of the PMH M motors with more features including radial ports and possibility of mounting speed sensors. The construction features help to minimize the losses due to leakage and considerably reduces the frictions.

The small sizes allow easy installations. The PMH MCF motor can be equipped with flushing valve integrated on the motor casing which allows the temperature control, especially in heavy duty applications.

2.2) Technical Data

2.2.1) Operating Parameters

Model			MCF35	MCF47	MCF55	MCF63	MCF72	MCF90	MCF110
Displacement	V	cm^3	35	47	55	63	72	90	110
Maximum speed	n_{max}	rpm	4.500	4.300	4.300	4.100	4.100	4.000	3.800
Maximum flow	q_{max}	l/min	159	202	237	258	295	340	400
Nominal pressure	p_{nom}	bar	400	400	400	400	400	400	400
Maximum pressure	p_{max}	bar	450	450	450	450	450	450	450
Maximum power	P_{max}	kW	85	108	130	138	156	180	210
Theoretical max torque	C_{max}	Nm	225	299	350	401	480	570	700
Weight	M	Kg	18	23	25	29	30	33	34

2.2.2) Hydraulic Fluid

Recommended Hydraulic Fluid	Mineal Oil High Viscosity Index		
Operating viscosity*	ν	cSt	16 ÷ 36
Maximum viscosity Short term at cold start	ν_{max}	cSt	≤1600
Minimum viscosity at maximum temperature	ν_{min}	cSt	≥7
Maximum working temperature of the fluid	T_{max}	°C	90

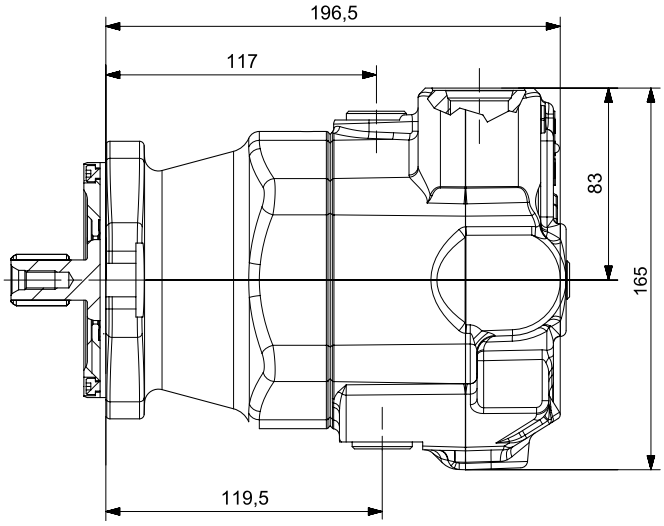
Referred to the circuit temperature-closed circuit

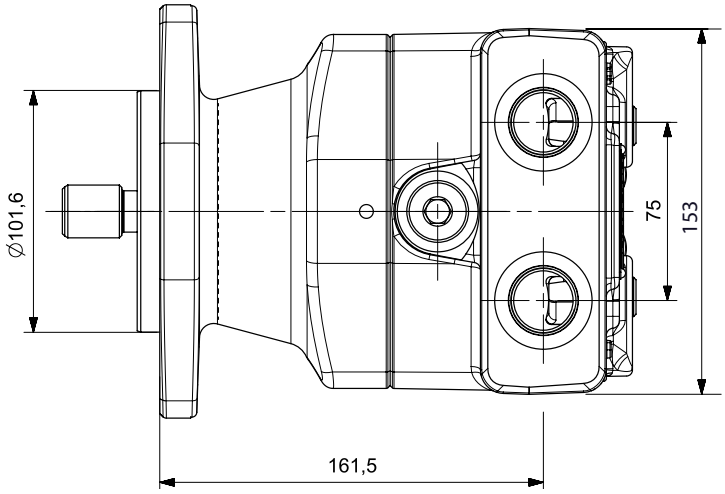
2.2.3) Filtration

It is recommended for an efficient and lasting working life, a solid particle contamination level of 18/16/13 in 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 in according to ISO4406.

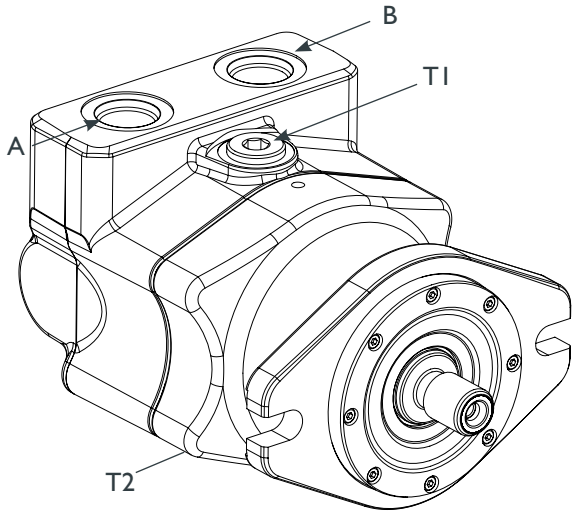
2.3) Sizes

2.3.1) 30 / 35



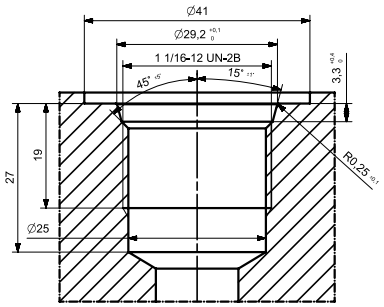


Ports



Port	Description	Standard	Size
A,B	High pressure ports	SAE J1926-1	1 1/16-12 UNF
T1,T2	Case drain ports	SAE J1926-1	7/8-14 UNF

Details X - Port A/B

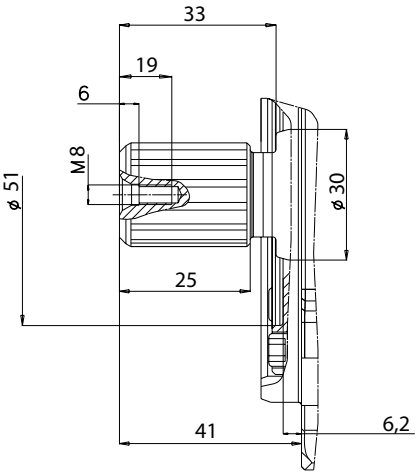


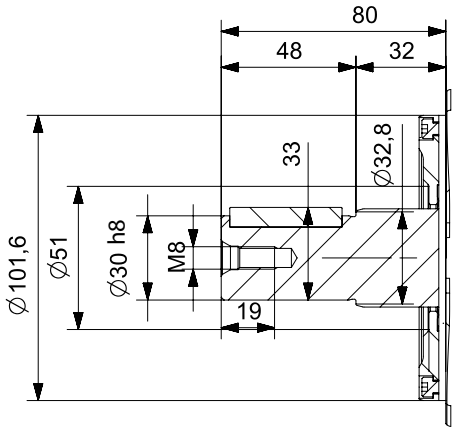
Shaft End

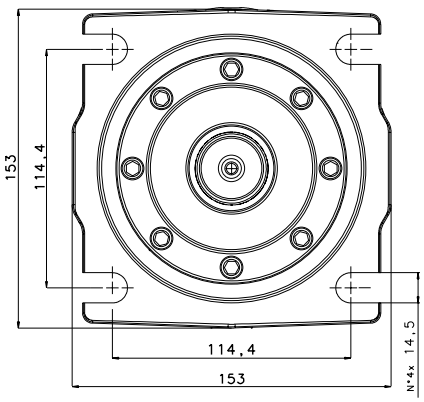
13N	ANSI B92.1A – 1976 – 7/8" 13T 16/32 DP	**S30**	Straight Ø30x48 80mm long with parallel key

Mounting Flange

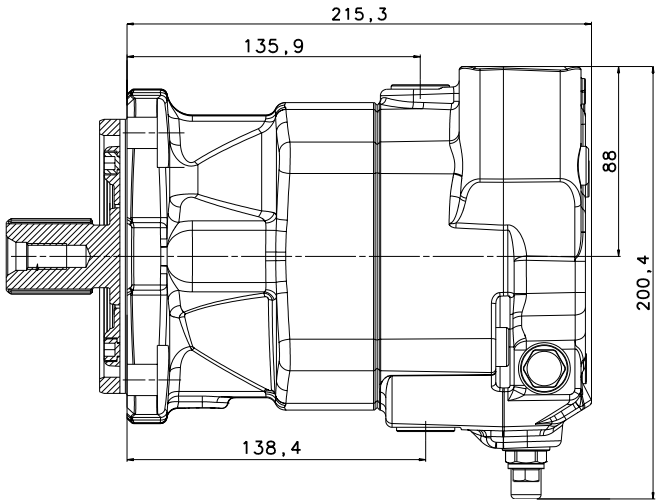
C4	SAEJ744 - Flange SAE C - 4 bolts

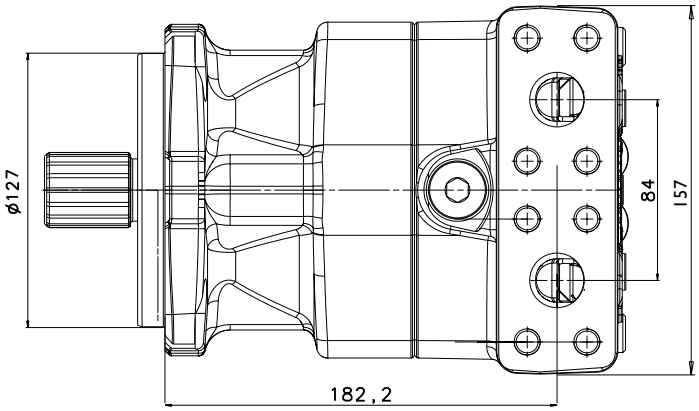




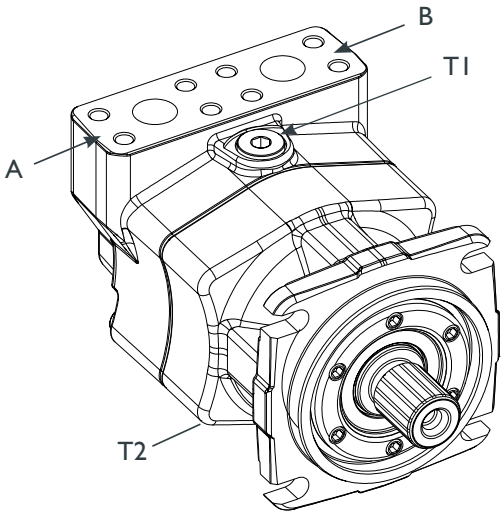


2.3.2) 55



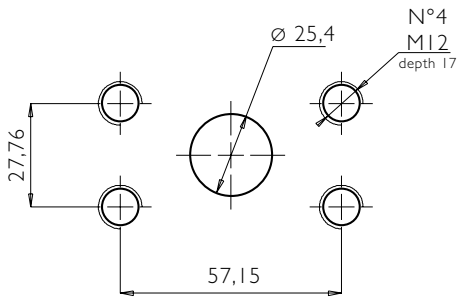


Ports



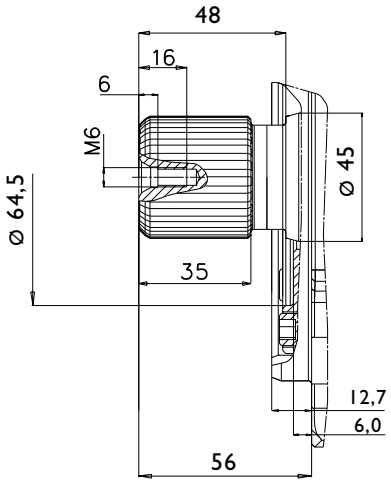
Port	Description	Standard	Size
A,B	High pressure ports	SAE J518-62	3/4"
T1,T2	Case drain ports	ISO 6149	M22 x 1,5

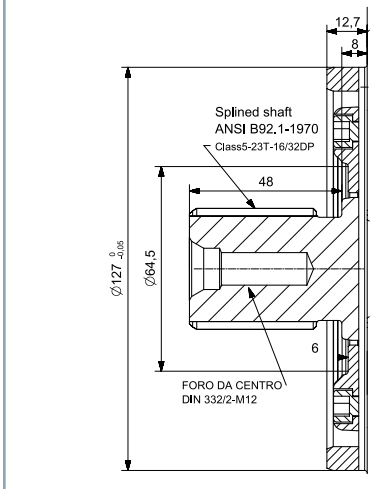
Details X - Port A/B



Shaft End

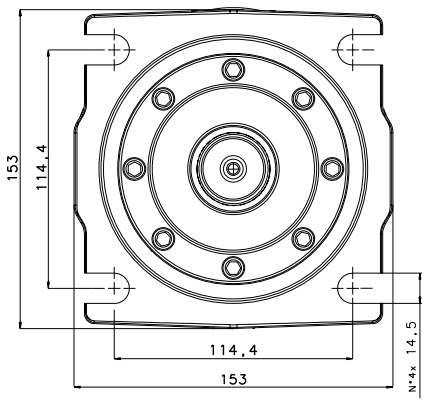
21N	ANSI B92.1A-1976-1 3/8" 21T 16/32 DP	**23N**	ANSI B92.1A – 1976 – 1 1/2" 23T 16/32 DP



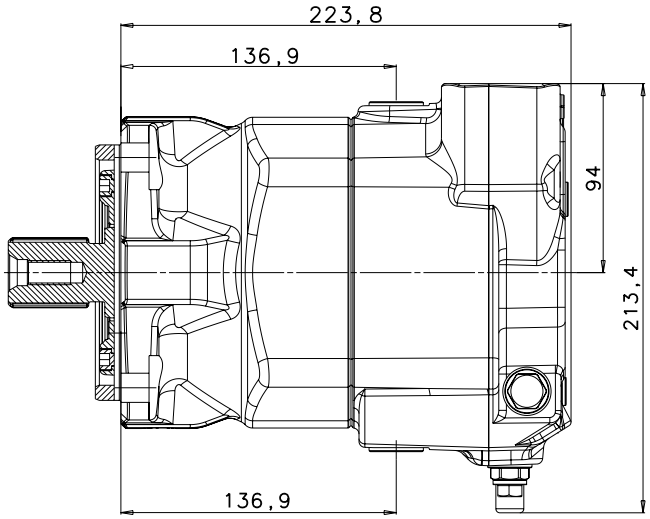


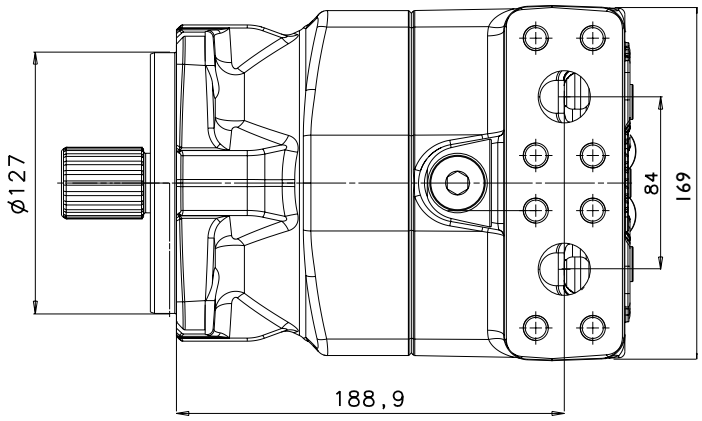
Mounting Flange

C4	SAEJ744 - Flange SAE C - 4 bolts

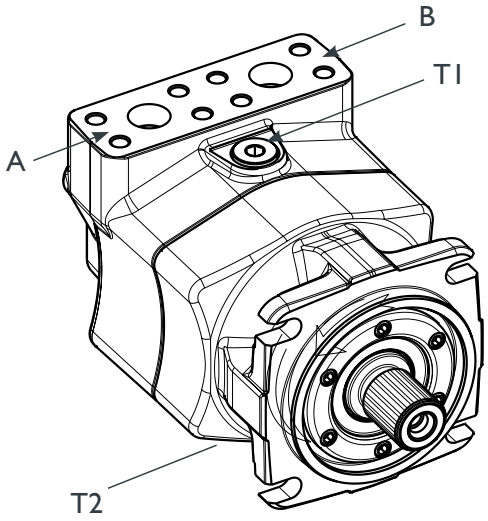


2.3.3) 72



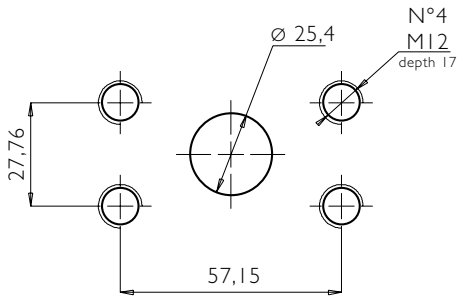


Ports



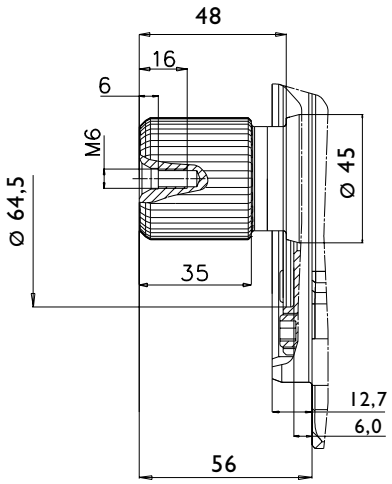
Port	Description	Standard	Size
A,B	High pressure ports	SAE J518-62	3/4"
T1,T2	Case drain ports	ISO 6149	M22 x 1,5

Details X - Port A/B

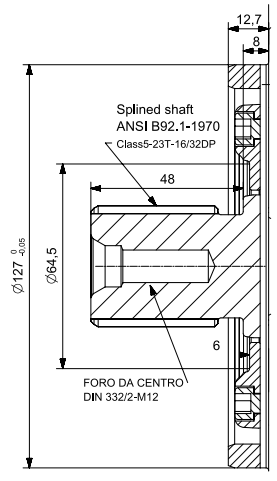


Shaft End

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

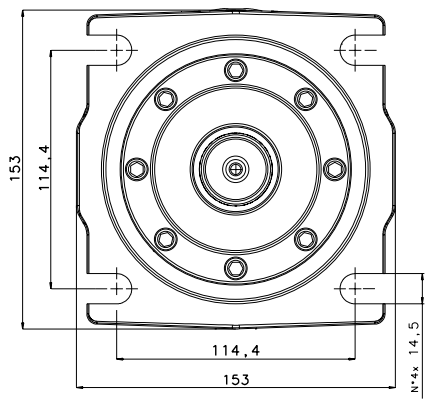


23N ANSI B92.1A – 1976 – 1 1/2" 23T 16/32 DP

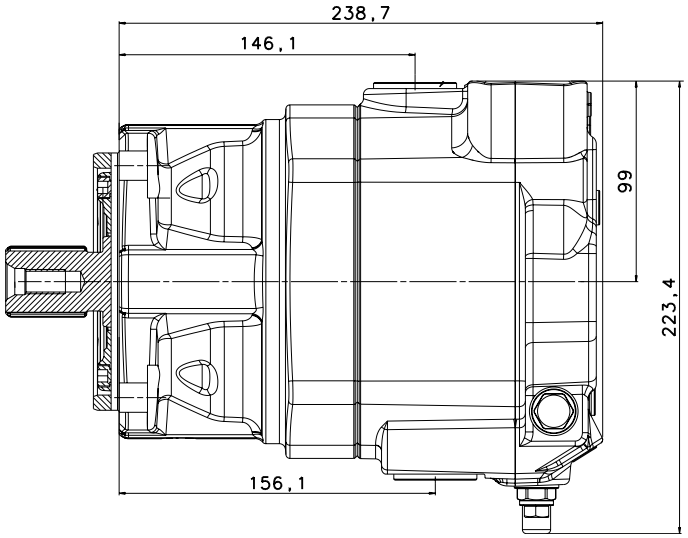


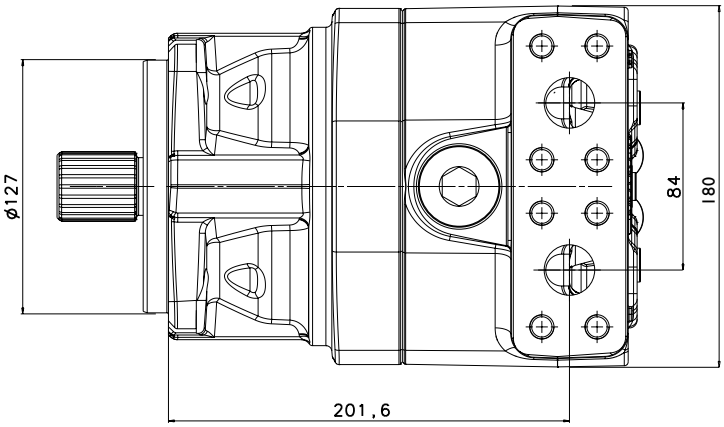
Mounting Flange

C4 SAEJ744 - Flange SAE C - 4 bolts

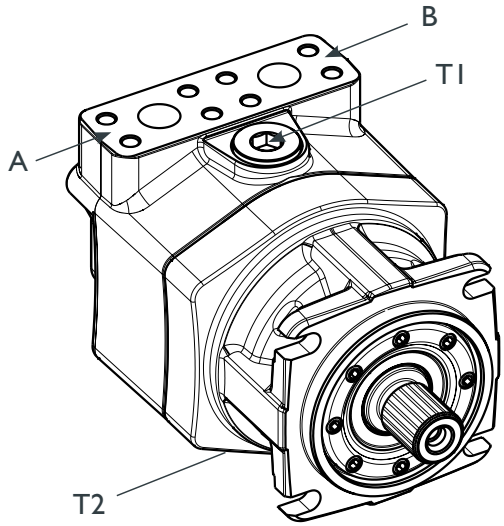


2.3.4) 90 / 110



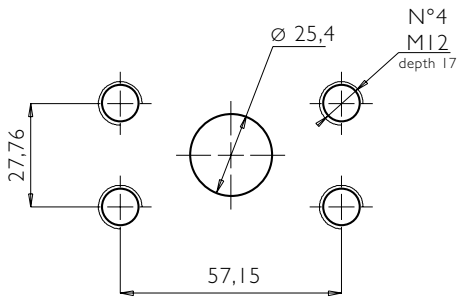


Ports



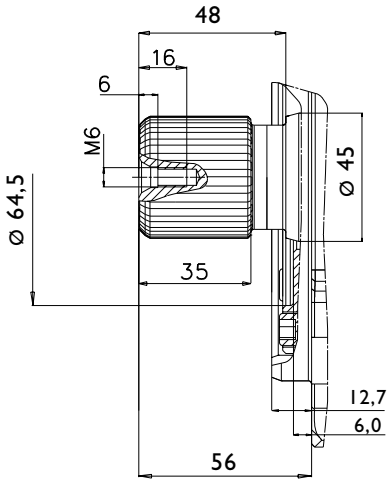
Port	Description	Standard	Size
A,B	High pressure ports	SAE J518-62	3/4"
T1,T2	Case drain ports	ISO 6149	M22 x 1,5

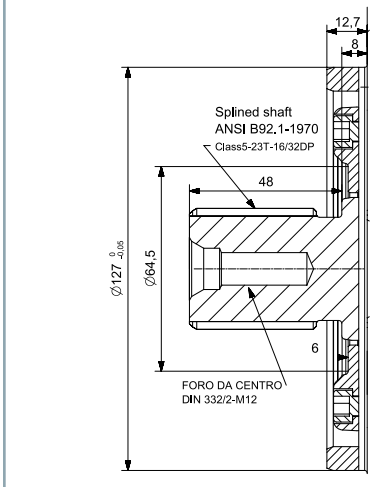
Details X - Port A/B



Shaft End

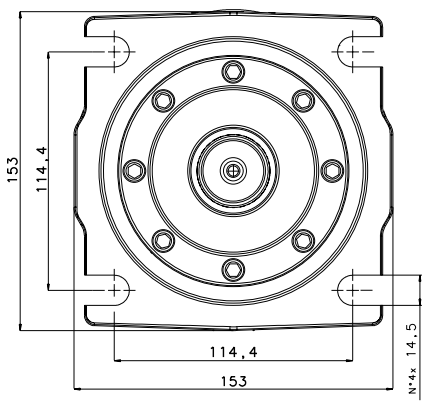
21N	ANSI B92.1A-1976-1 3/8" 21T 16/32 DP	**23N**	ANSI B92.1A – 1976 – 1 1/2" 23T 16/32 DP





Mounting Flange

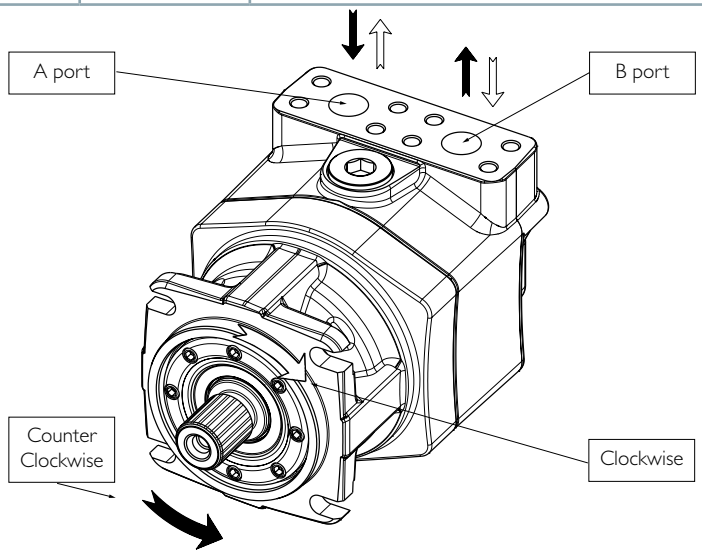
C4	SAEJ744 - Flange SAE C - 4 bolts

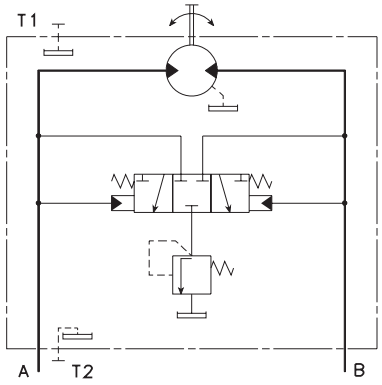


2.4) Direction of rotation – direction of the flow

Ports

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

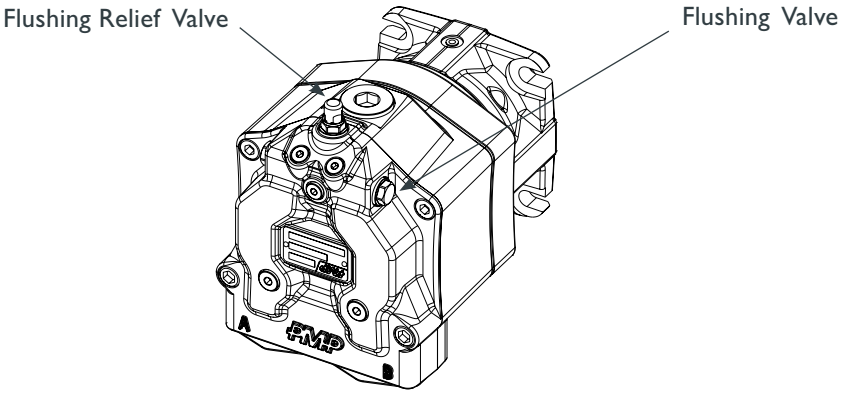


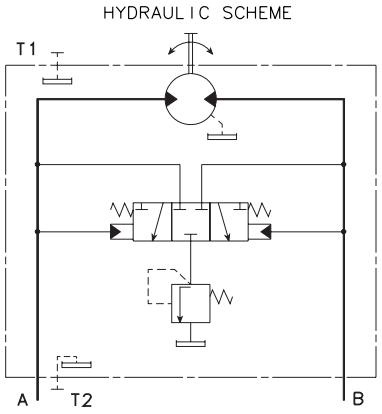
Hydraulic scheme	
	

A, B	High pressure ports
T1, T2	Case Drains ports

2.5) Flushing Valve

The PMH MCF is optionally 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 anti-cavitation valve on the pump. The use of this valve allows dispose of excessive heat.





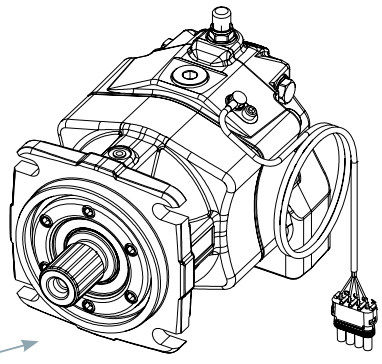
2.6) Speed Sensor

Sensor Output: two speed signals in quadrature

Supply Voltage	(Vs) 8 to 32 Vdc	(Functional range)
Supply Current	(Is) 50 mA	(incl. internal Pull-up resitor)
Supply Over-Voltage rating	33 V	
Operating Temperature	-40 to 257 °F	
Humidity	EN60088-2-30: +25/55°C 90% RD	
Output Type	Push-Pull	
Output Voltage Low	< 2V	
Sensor Output Frequency	0 Hz to 15 kHz	
Cable length	aprox 1.0m	

Each output signal provides pulses per revolution according to the following table:

Size	Pulses per revolution
30 / 35 cc	48
55 cc	55
72 cc	58
90 / 110 cc	66



Standard plug (other type on request)

Pin A	red	Power Supply
Pin B	black	Common
Pin C		Output signal
Pin D		Output signal

Connector : Packard Electric Weather Pack. Mates with 12010974 and 120089040 male terminal.

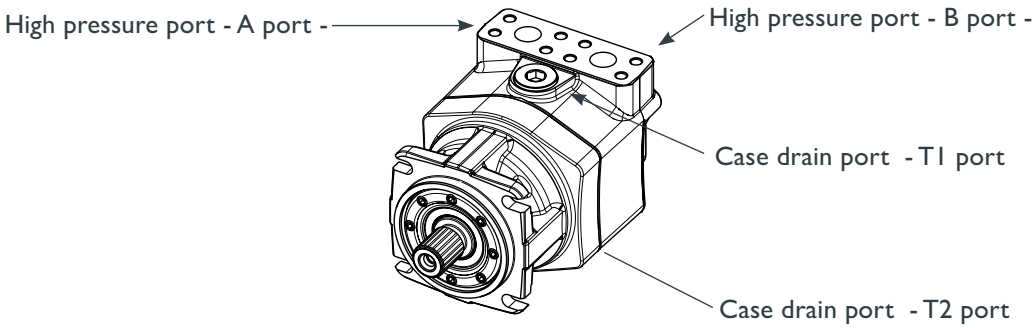
Other plug on request

3) INSTALLATION INSTRUCTIONS

3.1) Introduction

In the following pages are described the standards of installation of the PMH MCF motor. Compliance of the standards set has decisive effect on the life of the unit.

In the following illustration can identify the links for a correct installation.

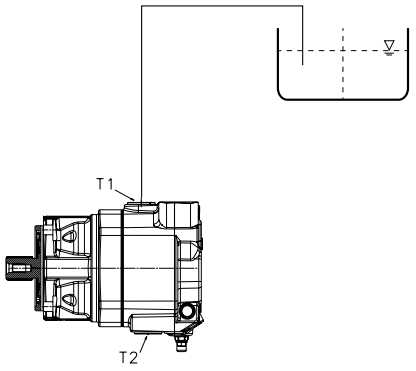
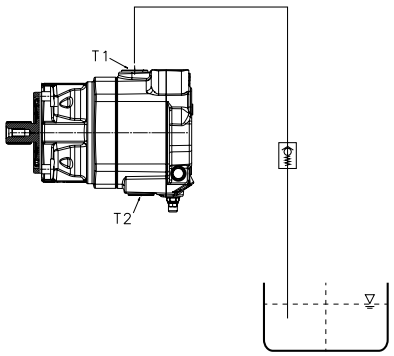


A standard requirement is that the motor must be filled with pre filtered hydraulic oil. The case must be filled with oil both in operation and during the break.

The motor must be connected to the tank through the drain line. Lack of compliance with that condition can damage the unit irreparably.

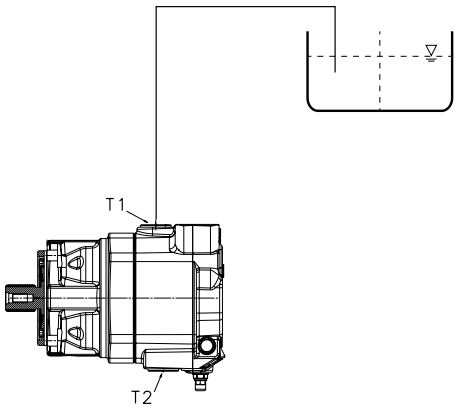
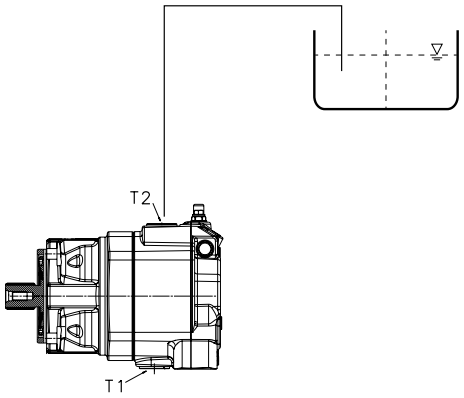
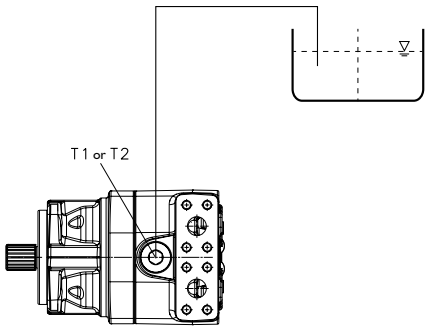
3.2) Installation position

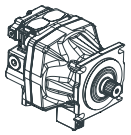
The case drain line must be always connected with the highest port. The motor can be installed in the following positions respect to the level of the tank of the hydraulic fluid:

	Motor Orientation	Notes
Under the tank		Standard Positioning
Over the tank		You must provide a check valve on the case drain line to prevent the emptying of the line

3.3) Motor orientation

The motor can be oriented in the following positions

	Motor Orientation	Notes
Horizontal shaft High Pressure ports (A, B) upwards		The case drain line must be always connected with the highest port (T1)
Horizontal shaft High Pressure ports (A, B) downwards		The case drain line must be always connected with the highest port (T2)
Horizontal shaft and High Pressure ports (A, B) lateral		The case drain line must be always connected with the highest port (T1 or T2)

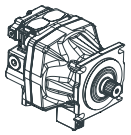


PMP INDUSTRIES

1) ORDER CODE

1	2	3	4	5	6	7	8 - 9 - 10	11	12 - 13
MT		**V**							

1	PRODUCT GROUP AND FAMILY			
MT	Axial piston motor for swing drives			
2	DISPLACEMENT			
55	55,0 cm^3 (@18°)			
130	130,1 cm^3 (@18°)			
180	181,2 cm^3(@19°)			
3	SHAFT SEAL	MT55	MT130	MT180
V	Viton	A	A	A
4	MOUNTING FLANGE	MT55	MT130	MT180
F1	SAE J744 – SAE BB 4 holes (D101.6 – P.C.D.127)	A	-	-
F2	SAE J744 – SAE C 4 holes (D127 – P.C.D.161.9)	-	-	-
F3	Flange D160 – P.C.D.224	-	A	A
5	SHAFT END	MT55	MT130	MT180
A25	ANSI B92.1 15T 16/32 (m1.5875; D25.4)	A	-	-
A31	ANSI B92.1 14T 12/24 (m2.1167; D31.75)	-	R	-
J34	JIS D2001 19T (m1.667; D34.7)	-	A	R
J44	JIS D2001 16T (m2.5; D44.5)	-	R	A
6	BRAKING TORQUE	MT55	MT130	MT180
0	Without brake	R	R	R
268	268 Nm braking torque	R	-	-
306	306 Nm braking torque	A	-	-
383	383 Nm braking torque	A	-	-
633	633 Nm braking torque	-	A	-
724	724 Nm braking torque	-	R	-
814	814 Nm braking torque	-	R	-
905	905 Nm braking torque	-	R	-
1000	1000 Nm braking torque	-	-	A
1110	1110 Nm braking torque	-	-	R
7	RELIEF VALVE SETTINGS	MT55	MT130	MT180
0	Without relief valve	-	R	R
320	320 bar - shockless valve	R	R	R
280	280 bar - shockless valve	A	A	A
240	240 bar - shockless valve	A	A	A
P280	Piloted dual step valve, 280 bar max setting	R	R	-
8	BRAKE OPENING VALVE	MT55	MT130	MT180
D	With hydraulic delay valve	A	A	A
E	With electronic valve	A	A	A
0	Without brake valve	A	A	A
9	SMOOTHNESS VALVE	MT55	MT130	MT180
S	With Smoothness valve	A	A	A
0	Without Smoothness valve	A	A	A



1	2	3	4	5	6	7	8 - 9 - 10	11	12 - 13
MT		**V**							

10	FLUSHING VALVE	MT55	MT130	MT180
0	Without flushing valve	A	A	A
F	With flushing valve	R	R	R
11	**SPEED SENSOR**	**MT55**	**MT130**	**MT180**
V	With speed sensor	A	A	-
0	Without speed sensor	A	A	A
12	**A & B SYSTEM PORT**	**MT55**	**MT130**	**MT180**
SM	SAE flanged with Metric thread	R	A	A
JG	Gas threaded JIS 2351 standard	R	R	R
SN	UNF/UN threaded SAE J1926-1 standard	A	R	R
IM	Metric threaded ISO 6149 standard	R	R	R
SU	SAE flanged with UN thread	R	R	R
13	**DRAIN AND AUXILIARY PORTS**	**MT55**	**MT130**	**MT180**
J	Gas threaded JIS 2351 standard	R	A	A
S	UNF/UN threaded SAE J1926-1 standard	A	R	R
I	Metric threaded ISO 6149 standard	R	R	R

EXAMPLE									
1	2	3	4	5	6	7	8-9-10	11	12 - 13
MT		**V**							

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

2) MAIN FEATURES

2.1) General Information

The PMH MT is a fixed displacement motor with axial pistons, swash plate design specifically designed for the swing drive of hydraulic excavators.

The PMH M motor is equipped with with

- hydraulic negative brake
- anticavitation valves
- shockless valves
- smoothness valve for anti swing-back function

2.2) Technical Data

2.2.1) Operating Parameters

Model			MT55	MT130	MT180
Displacement	V	cm^3	55	130	180
Maximum speed	n_{max}	rpm	2.500	2.000	1.700
Maximum flow	q_{max}	l/min	140	260	305
Maximum pressure	p_{max}	bar	400	400	400
Weight	M	Kg	30	59	73

2.2.2) Hydraulic Fluid

Recommended Hydraulic Fluid	Mineal Oil High Viscosity Index		
Operating viscosity*	ν	cSt	16 ÷ 36
Maximum viscosity Short term at cold start	ν_{max}	cSt	≤1600
Minimum viscosity at maximum temperature	ν_{min}	cSt	≥7
Maximum working temperature of the fluid	T_{max}	°C	90

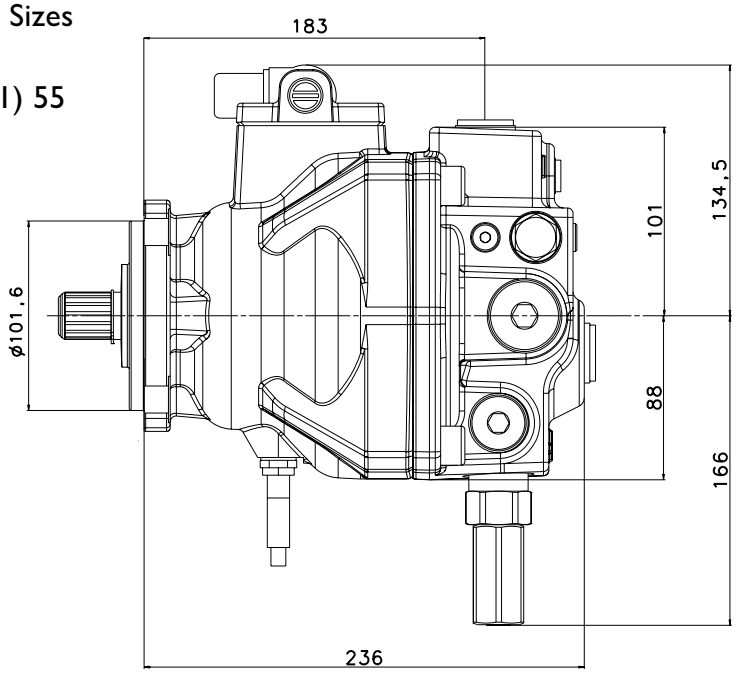
**Referred to the circuit temperature-closed circuit*

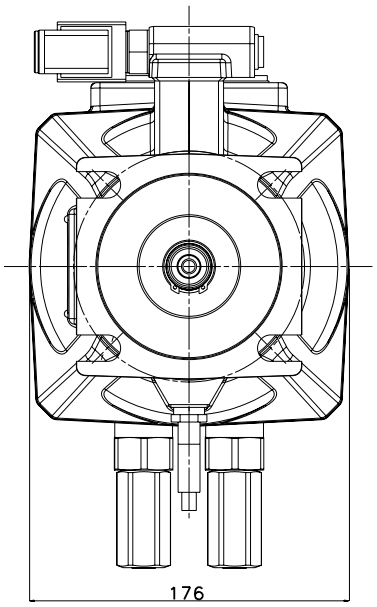
2.2.3) Filtration

It is recommended for an efficient and lasting working life, a solid particle contamination level of 18/16/13 in 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 in according to ISO4406.

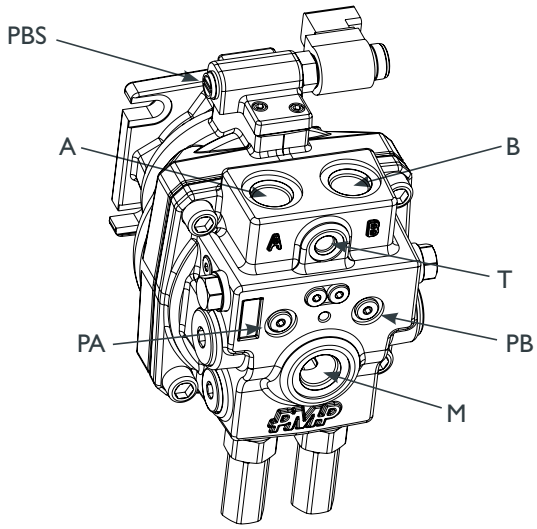
2.3) Sizes

2.3.1) 55





Ports

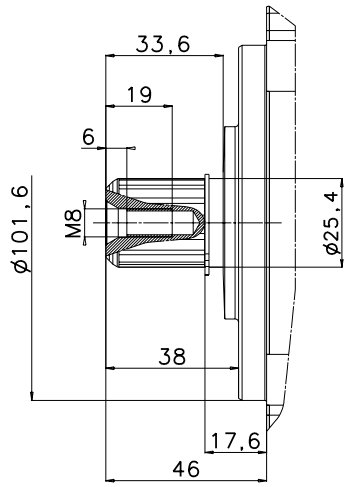


Port	Description	Standard	Size
A,B	High pressure ports	SAE J1926	1" 1/16-12 UN
T	Case drain port	SAE J1926	9/16-18 UNF
M	Make up port	SAE J1926	1" 1/16-12 UN
PA, PB	System pressure gauge ports	SAE J1926	1/2-20 UNF
PBS	Brake release supply port	SAE J1926	9/16-18 UNF

Other ports standard available as per ordering code

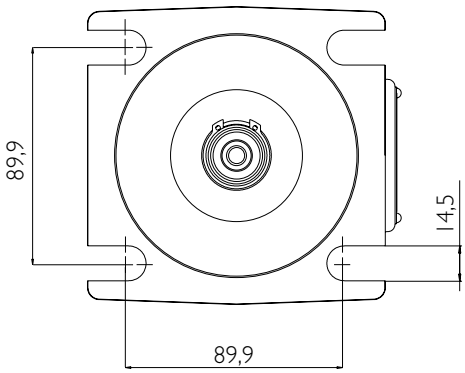
Shaft End

A25 ANSI B92.1 15T 16/32 (m1.5875; D25.4)

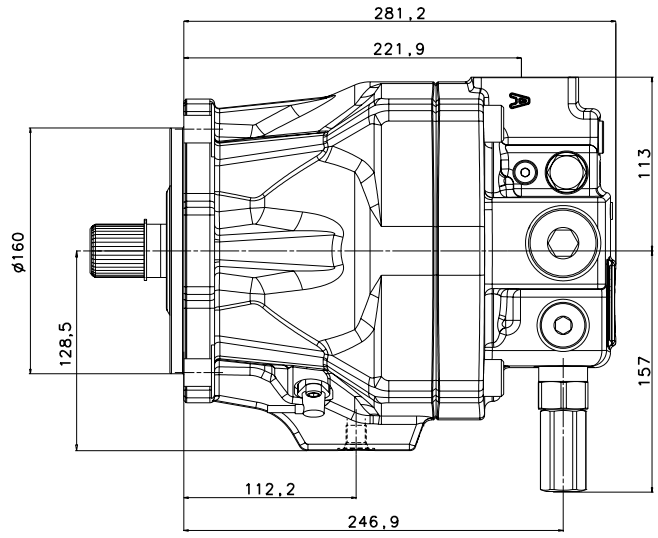


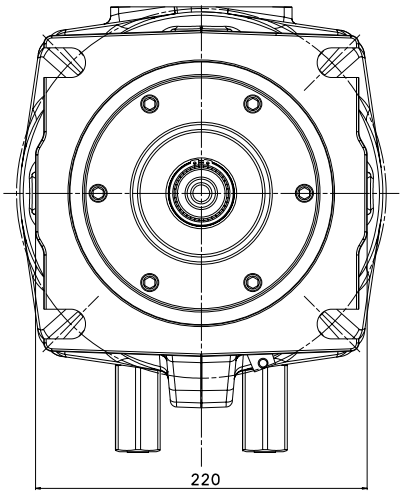
Mounting Flange

F1 SAE J744 – SAE B 4 holes

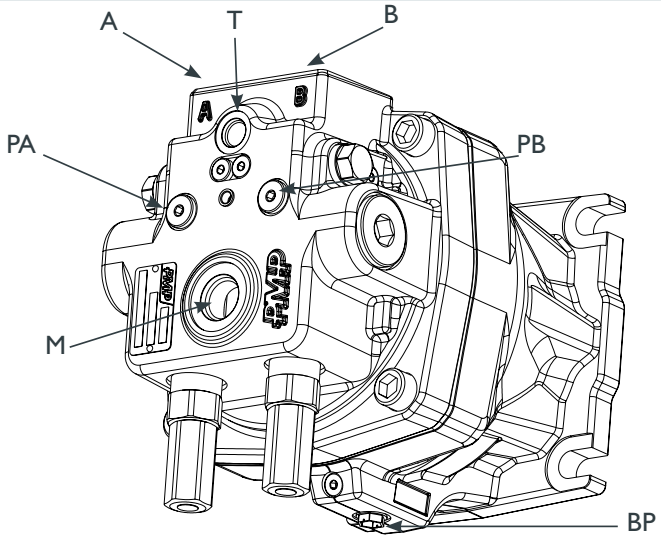


2.3.2) 130





Ports

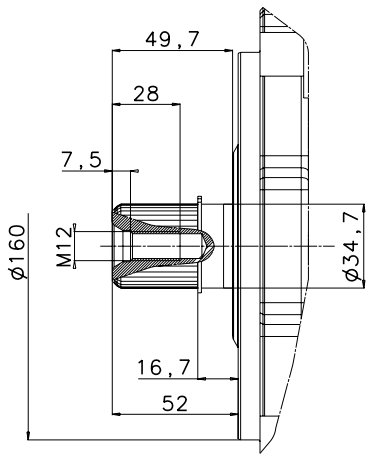


Port	Description	Standard	Size
A,B	High pressure ports	SAEJ518-61	3/4"
T	Case drain port	JIS B2351	G 3/8"
M	Make up port	JIS B2351	G 3/4"
PA, PB	System pressure gauge ports	JIS B2351	G 1/4"
BP	Brake release port	JIS B2351	G 1/4"

Other ports standard available as per ordering code

Shaft End

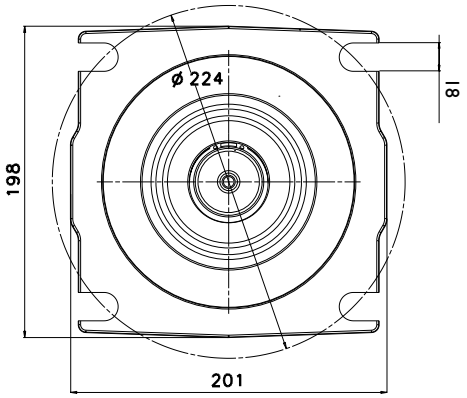
J34	JIS D2001 19T (m1.667; D34.7)



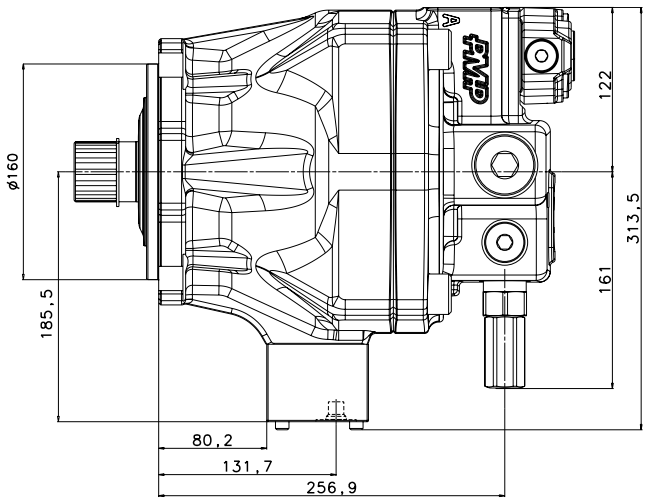
Other shaft end standard available as per ordering code

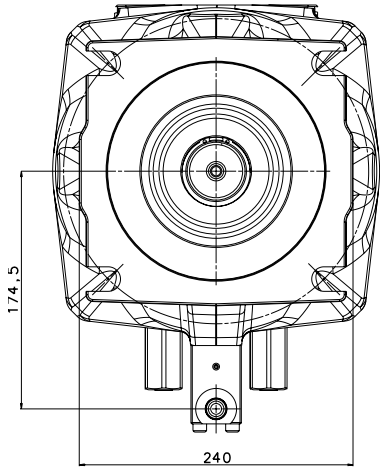
Mounting Flange

F3	Flange D160 – P.C.D.224

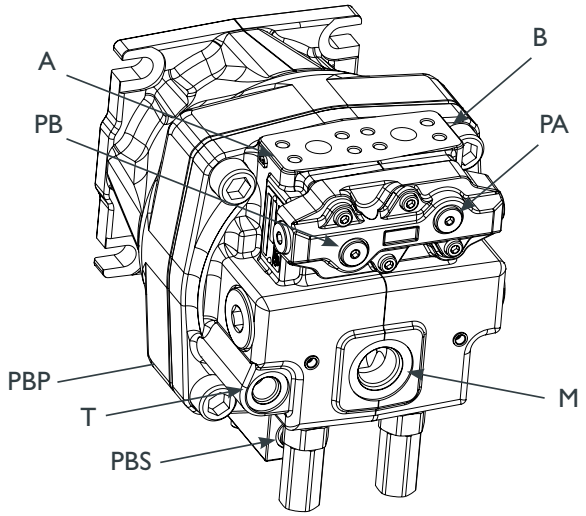


2.3.3) 180





Ports

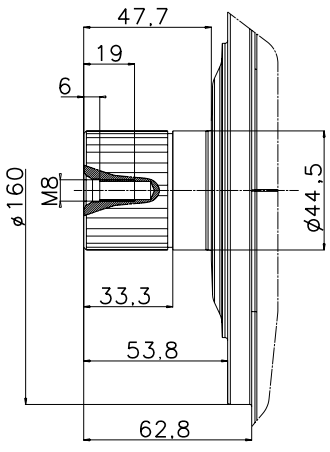


Port	Description	Standard	Size
A,B	High pressure ports	SAEJ518-61	3/4"
T	Case drain port	JIS B2351	G 1/2"
M	Make up port	JIS B2351	G1"
PA, PB	System pressure gauge ports	JIS B2351	G 1/4"
PBS	Brake release supply port	JIS B2351	G 1/4"
PBP	Brake pilot port	JIS B2351	G 1/4"

Other ports standard available as per ordering code

Shaft End

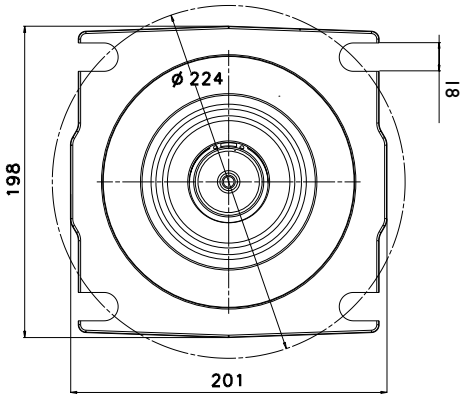
J44	JIS D2001 16T (m2.5; D44.5)



Other shaft end standard available as per ordering code

Mounting Flange

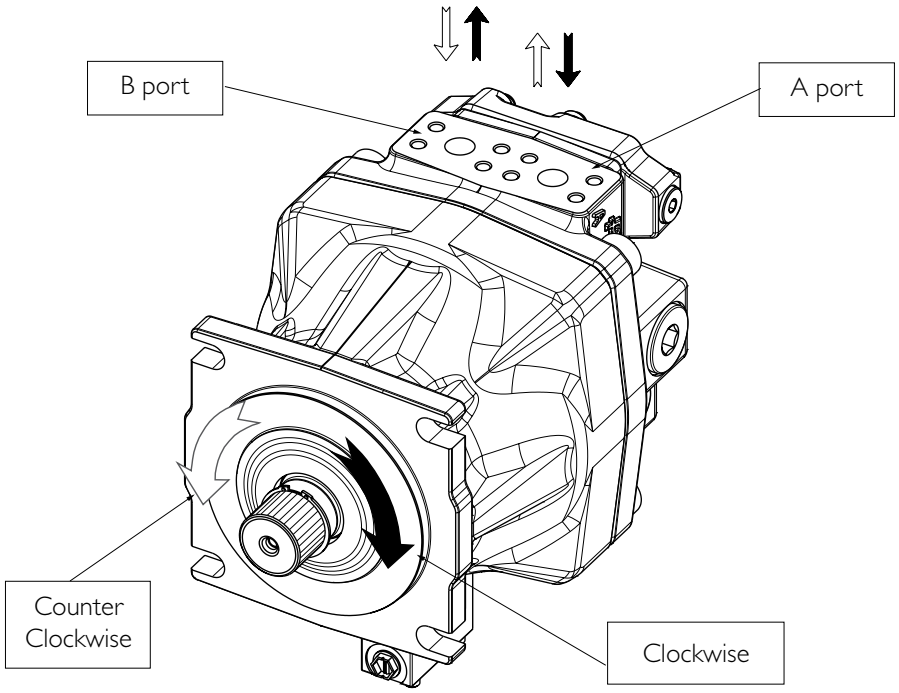
F3	Flange D160 – P.C.D.224

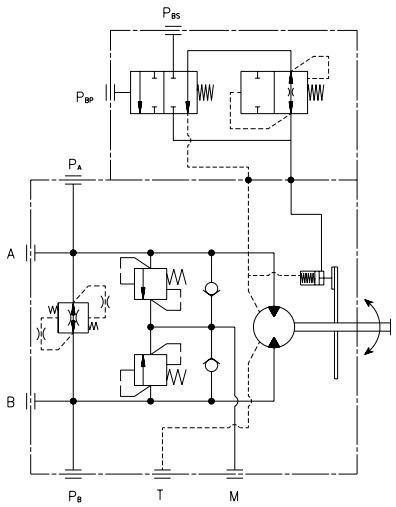


2.4) Direction of rotation – direction of the flow

Ports

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

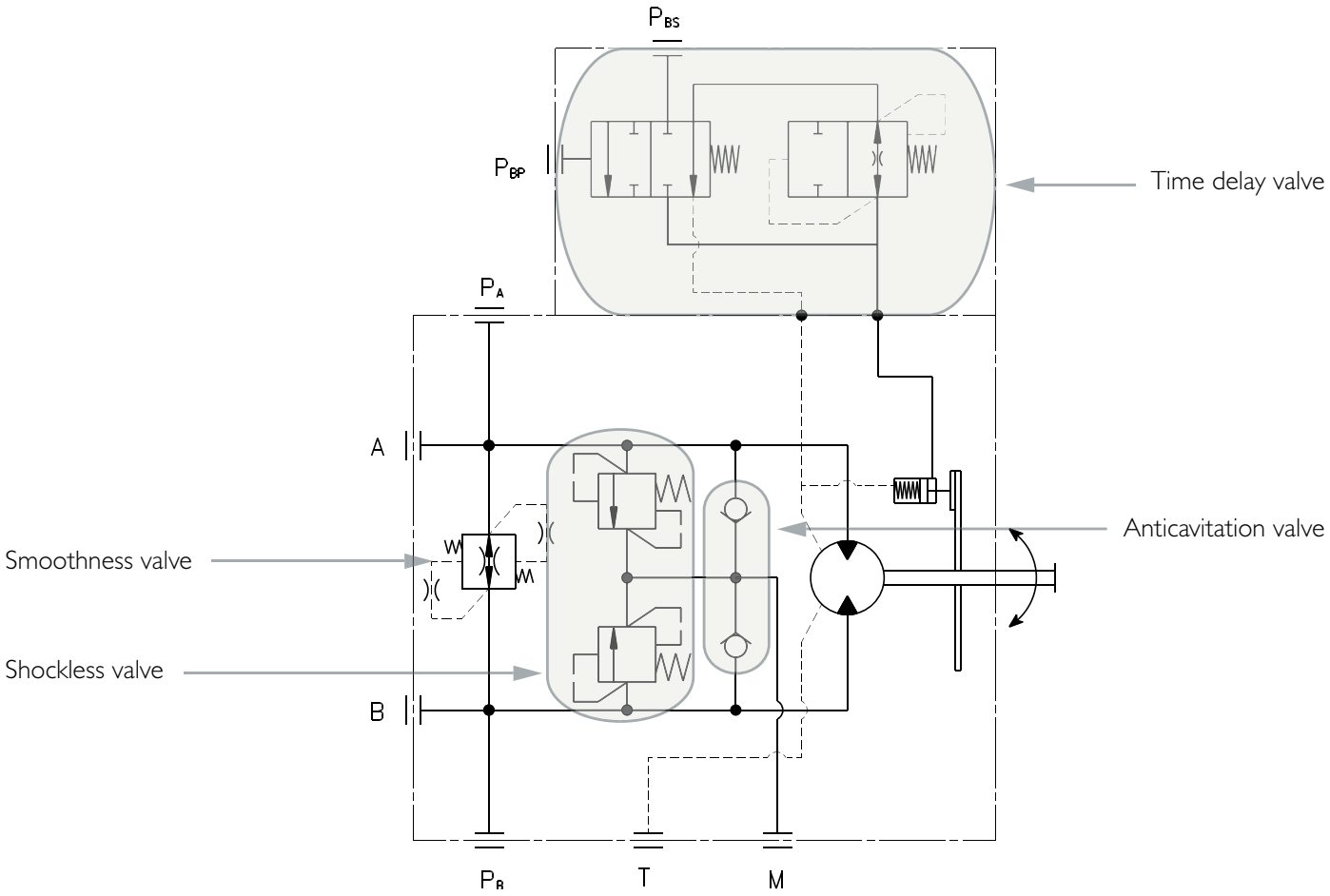


Typical hydraulic scheme	
	

A, B	Motor ports
T	Case Drains ports
M	Make up port
P_A P_B	Check pressure ports
P_{BS}	Brake release supply port
P_{BP}	Brake pilot port

2.5) Typical motor valves configuration

The MT motors are equipped with the following valves as indicated in the below hydraulics scheme.



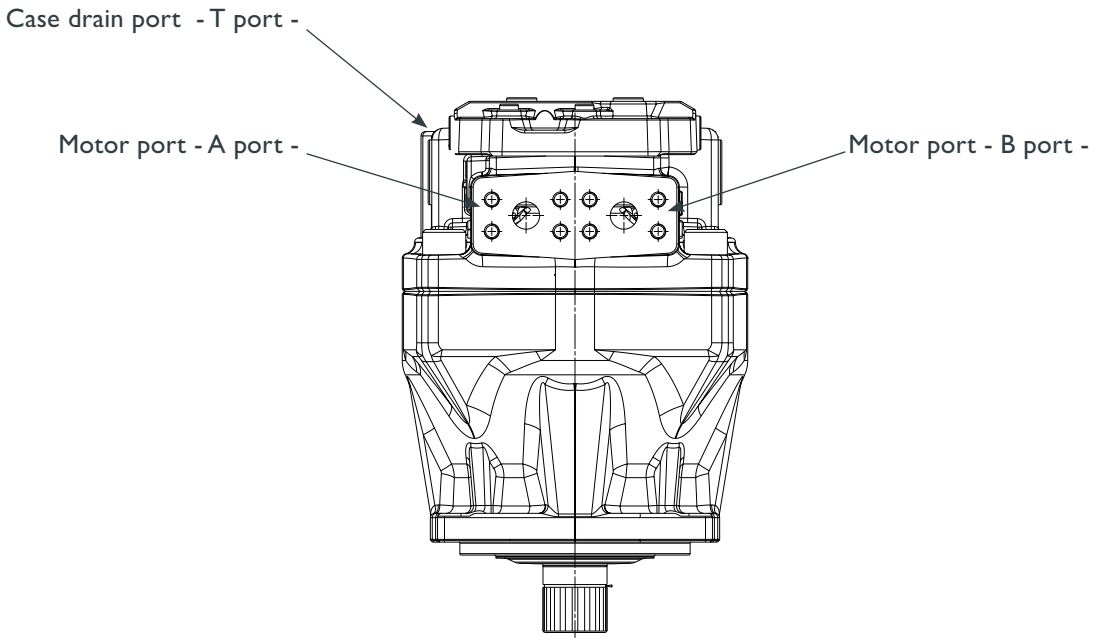
- Time delay valve: it ensures a standard 5-8 s delay of brake engagement after pressure signal P_{BP} is zeroed; on special request can be replaced with electric pilot valve
- Smoothness valve: it's a special valve to avoid swing back of the excavator at the end of braking action
- Shockless valve: they ensure a progressive and smooth braking deceleration
- Anticavitation valve: to ensure oil filling of the low pressure side with oil supplied from make-up port M

3) INSTALLATION INSTRUCTIONS

3.1) Motor

The standards of installation of the PMH MT motor are described in the following pages. Compliance of the standards set has decisive effect on the life of the unit.

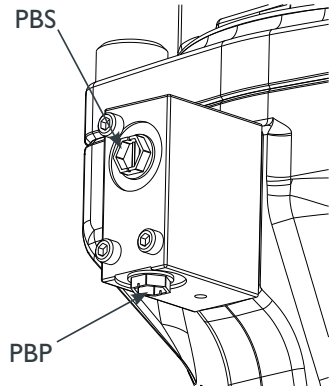
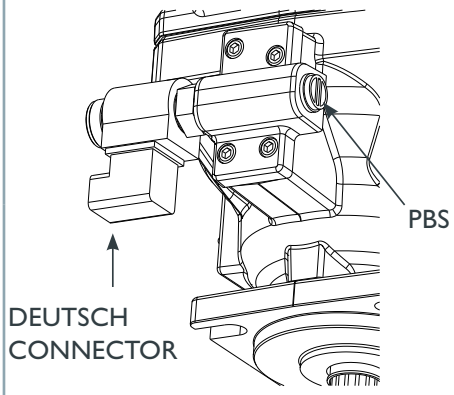
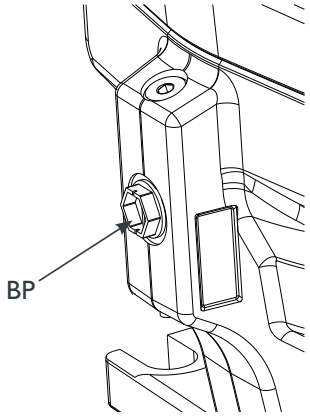
Links for a correct installation can be identified in the following illustration,



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.

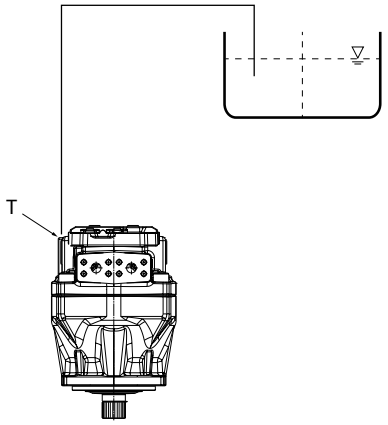
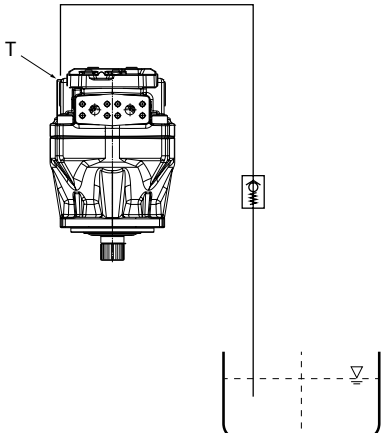
The motor must be connected to the tank through the drain line. Lack of compliance with that condition can damage the unit irreparably.

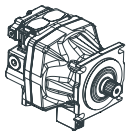
3.2) Brake opening valve connections

Option D With hydraulic delay valve		PBS -Brake release supply port Constantly fed with opening pressure
		PBP -Brake pilot port Pressurized to disengage the parking brake
Option E With electronic valve		Deutsch connector (12 / 24 V) Energized to disengage parking brake
		PBS -Brake release supply port Constantly fed with opening pressure
Option 0 Without brake valve		BP - Brake release port Pressurized to disengage the parking brake

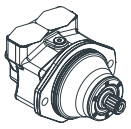
3.3) Installation position

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

	Motor Orientation	Notes
Under the tank		Standard Positioning
Over the tank		You must provide a check valve on the case drain line to prevent the emptying of the line



PMP INDUSTRIES



1) ORDER CODE

1	2	3	4	5	6	7	8	9
MKF		**V**		**RS**				

1	PRODUCT GROUP AND FAMILY
MKF	Fixed displacement axial piston motor – plug-in frame
2	DISPLACEMENT
47	47,2 cm^3 (@15,5°)
55	55,0 cm^3 (@18°)
63	63,2 cm^3 (@15,9°)
72	72,1 cm^3 (@18°)
90	89,2 cm^3 (@18°)
110	110,0 cm^3 (@18°)
130	130,1 cm^3 (@18°)
180	176,1 cm^3 (@18.5°)

3	SHAFT SEAL	47	55	63	72	90	110	130	180
V	Viton	A	A	A	A	A	A	A	A
4	MOUNTING FLANGE	47	55	63	72	90	110	130	180
A2	Standard two bolts plug-in flange	A	A	A	A	A	A	A	A
B2	Special two bolts plug-in flange	A	A	-	-	-	-	-	-
5	SERVICE LINE PORT	47	55	63	72	90	110	130	180
RS	Radial same side	A	A	A	A	A	A	A	A
6	SHAFT END (*)	47	55	63	72	90	110	130	180
D30	DIN5480 side fit W30 x 2 x 30 x 4 x 9g	A	A	A	A	R	R	R	R
D35	DIN5480 side fit W35 x 2 x 30 x 16 x 9g	A	A	A	A	A	R	R	R
D40	DIN5480 side fit W40 x 2 x 30 x 18 x 9g	-	-	-	-	A	A	A	R
D45	DIN5480 side fit W45 x 2 x 30 x 21 x 9g	-	-	-	-	-	A	A	A
D50	DIN5480 side fit W50 x 2 x 30 x 24 x 9g	-	-	-	-	-	-	-	A
7	FLUSHING VALVE RELIEF SETTING	47	55	63	72	90	110	130	180
0	Without flushing valve	R	R	R	R	R	R	R	R
FF07	7 l/min with low pressure side at 25 bar	A	A	A	A	R	R	R	R
FF11	11 l/min with low pressure side at 25 bar	R	R	R	R	A	A	R	R
FF15	15 l/min with low pressure side at 25 bar	R	R	R	R	R	R	A	A

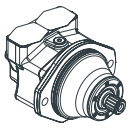
PMH MKF Plug-in Type Fixed Motors

1	2	3	4	5	6	7	8	9
MKF		**V**		**RS**				

8	SPEED SENSOR *(other options available on request)*	47	55	63	72	90	110	130	180
0	Without speed sensor predisposition	A	A	A	A	A	A	A	A
SP1	With speed sensor predisposition	A	A	A	A	A	A	A	A
SM1	With speed sensor mounted, 2-channel type with Weather-Pack 4 pin connector	R	R	R	R	R	R	R	R
SM2	With speed sensor mounted, 2-channel type with Deutsch DT04-4Pconnector	A	A	A	A	A	A	A	A
9	RELIEF VALVES SETTING	47	55	63	72	90	110	130	180
350	350 bar	-	-	-	-	-	-	-	A

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

EXAMPLE								
1	2	3	4	5	6	7	8	9
MKF	**55**	**V**	**A2**	**RS**	**D35**	**FF07**	**SP1**	**-**



2) MAIN FEATURES

2.1) General Information

The PMH MKF is a fixed displacement motor with axial pistons, inclined swash plate design for closed loop systems. MKF motors were developed for use on hydraulic transmissions, where high speeds and high torques are requested. The MKF design and construction minimize losses due to leakage and reduces considerably internal frictions. The small dimensions allow easy installation. PMH MKF motors are equipped with integrated flushing valve which improves thermal performance especially in heavy duty applications.

2.2) Technical Data

2.2.1) Operating Parameters

Model			MKF							
			47	55	63	72	90	110	130	180
Displacement	V	cm^3	47	55	63	72	90	110	130	176
Maximum speed	n_{max}	rpm	4.300	4.300	4.100	4.100	4.000	3.800	3.400	2.900
Maximum flow	q_{max}	l/min	202	236	258	295	360	418	442	510
Nominal pressure	p_{nom}	bar	400	400	400	400	400	400	400	400
Maximum pressure	p_{max}	bar	450	450	450	450	450	450	450	450
Maximum power	P_{max}	kW	108	127	139	159	187	223	236	272
Theoretical max torque	C_{max}	Nm	300	350	405	460	570	700	828	1.100
Weight	M	Kg	25	25	27	28	36	36	42	55

2.2.2) Hydraulic Fluid

Recommended Hydraulic Fluid	Mineral Oil High Viscosity Index		
Operating viscosity*	ν	cSt	16 ÷ 36
Maximum viscosity Short term at cold start	ν_{max}	cSt	≤1600
Minimum viscosity at maximum temperature	ν_{min}	cSt	≥7
Maximum working temperature of the fluid	T_{max}	°C	90

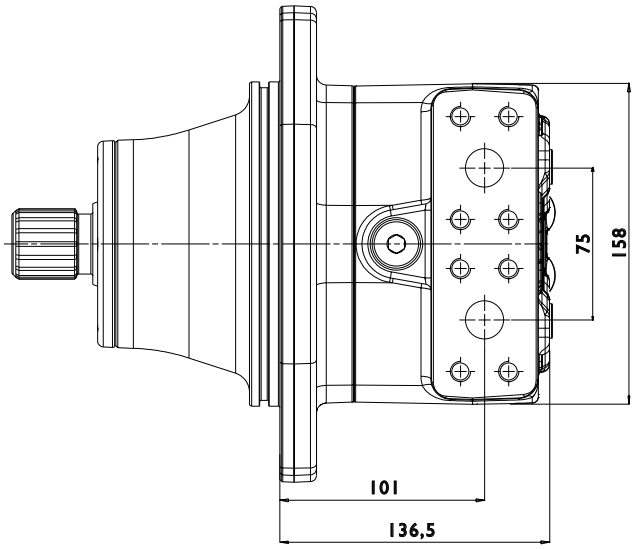
**Referred to the circuit temperature-closed circuit*

2.2.3) Filtration

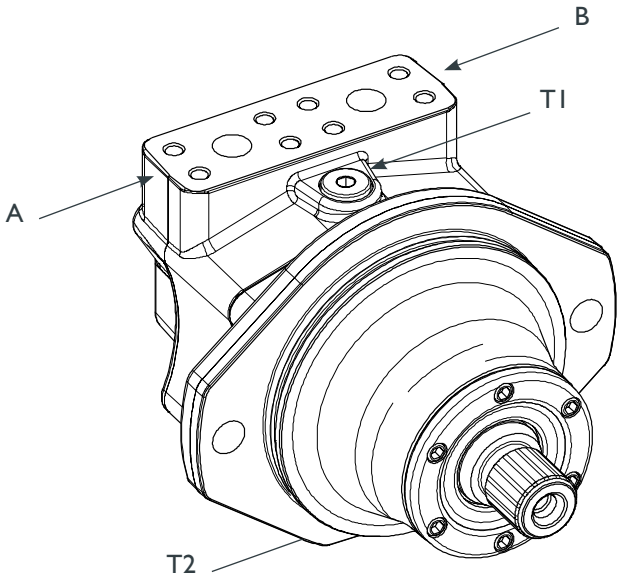
It is recommended for an efficient and lasting working life, a solid particle contamination level of 18/16/13 in according to ISO 4406. To ensure said level of contamination is not exceeded, filter should be chosen accordingly, with filtration grade of $\beta 10 \geq 2$. In any case the contamination level must not be below 20/18/15 in according to ISO4406.

2.3) Sizes

2.3.1) 47 / 55

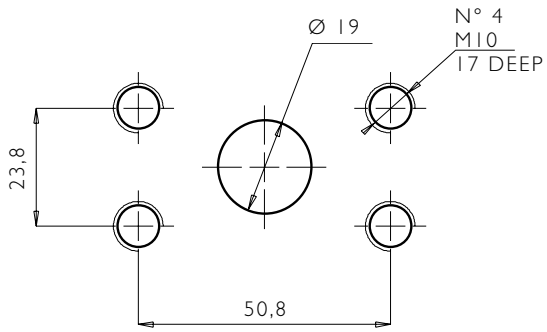


Ports

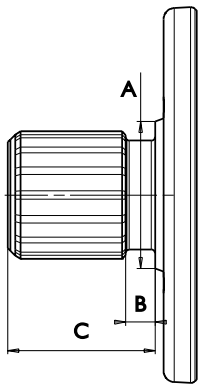


Port	Description	Size
A,B	High pressure ports	SAE 3/4'' - code 62
T1,T2	Case drain ports	M22 x 1.5 - ISO 6149

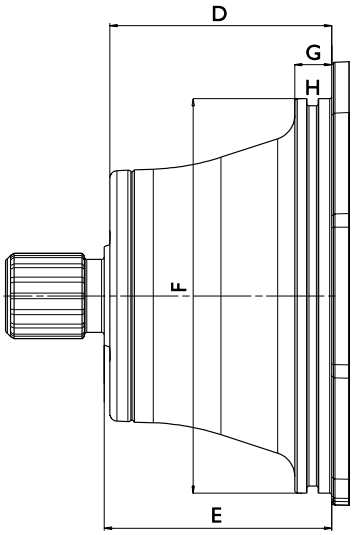
Details X - Port A/B

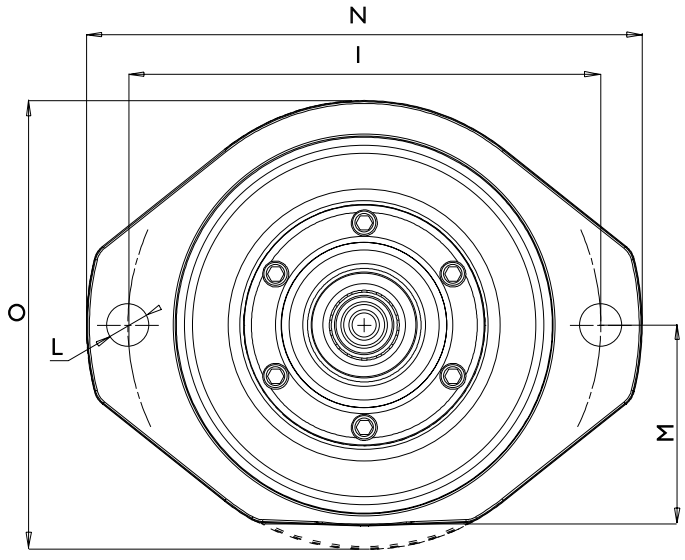


Shaft End				
		A	B	C
D30	DIN5480 side fit W30x2x30x14x9g	Ø40	8	35
D35	DIN5480 side fit W35x2x30x16x9g	Ø40	8	40

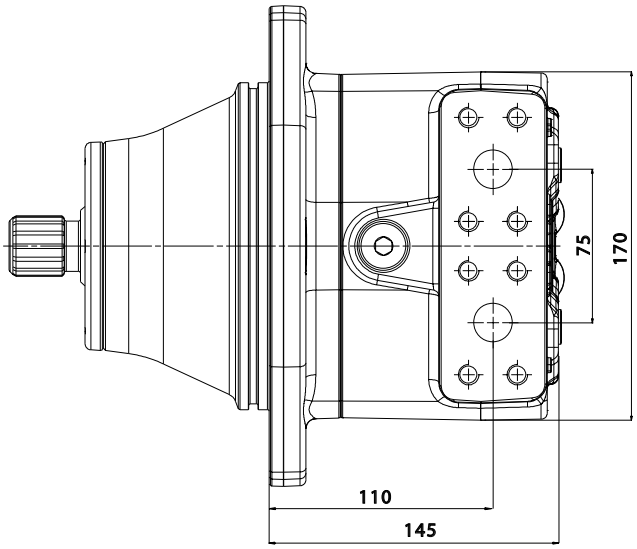


Mounting Flange											
		D	E	F	G	H (groove for)	I	L	M	N	O
A2	Standard two bolts plug-in flange	90,0	92,3	Ø160	15	OR 4600 3,53x152	200	Ø18	85	235	Ø190
B2	Special two bolts plug-in flange	81,5	88,8	Ø135	15	OR 4500 3,53x126,6	160	Ø14	71	180	Ø154

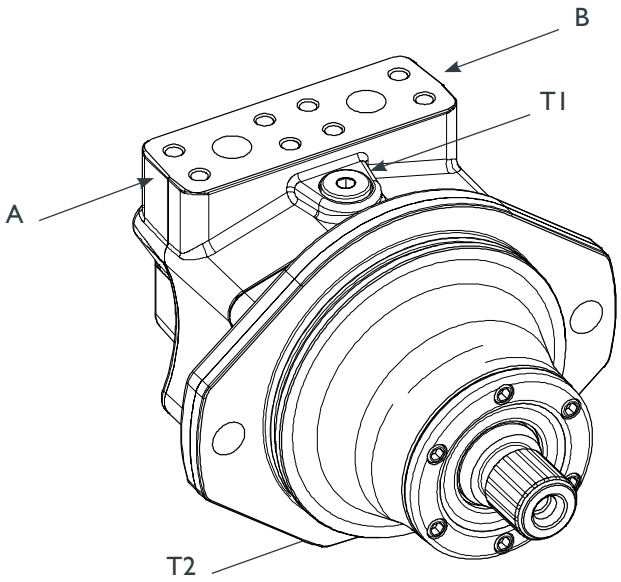




2.3.2) 63 / 72

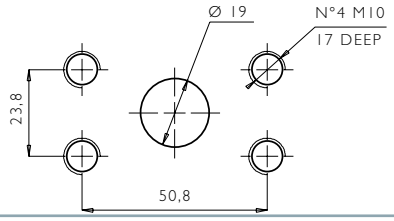


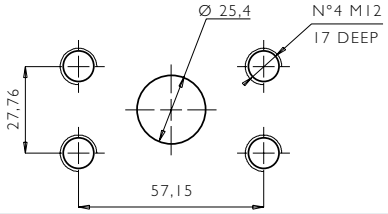
Ports

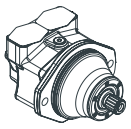


Port	Description	Size
PMH MKF 63		
A,B	High pressure ports	SAE 3/4" - code 62
T1,T2	Case drain ports	M22 x 1.5 - ISO 6149
PMH MKF 72		
A,B	High pressure ports	SAE 1" - code 62
T1,T2	Case drain ports	M22 x 1.5 - ISO 6149

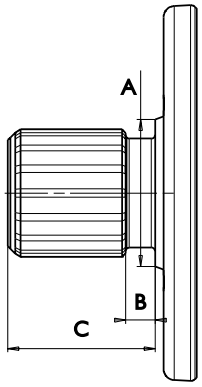
Details X - Port A/B



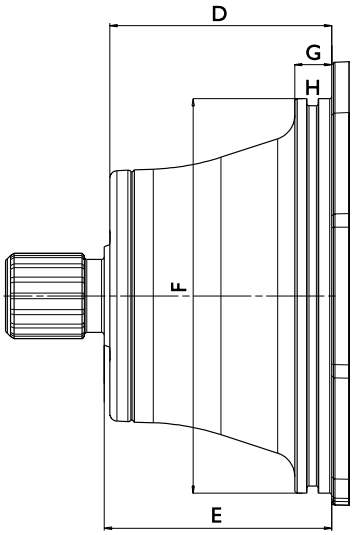


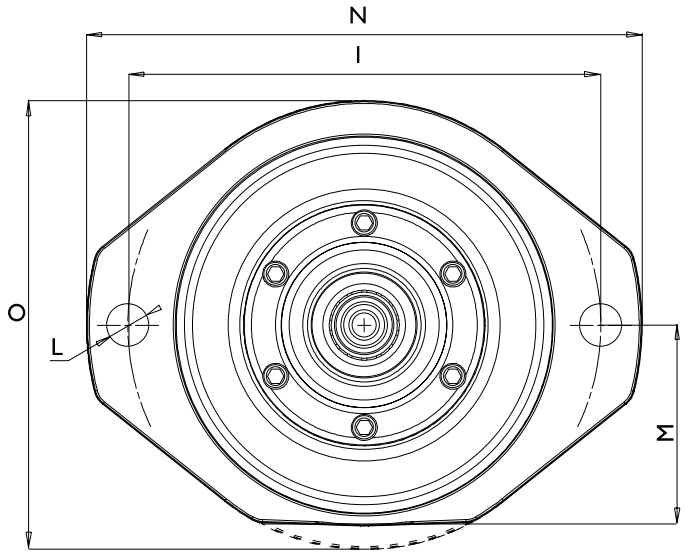


Shaft End				
		A	B	C
D30	DIN5480 side fit W30x2x30x14x9g	Ø40	8	35
D35	DIN5480 side fit W35x2x30x16x9g	Ø40	8	40

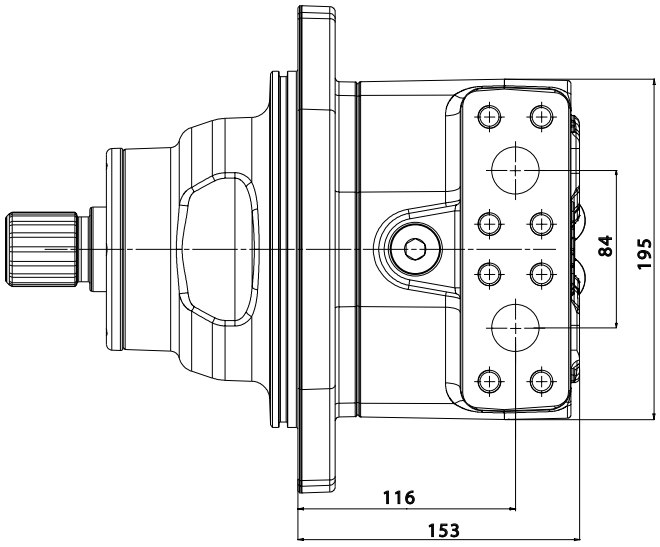


Mounting Flange											
		D	E	F	G	H (groove for)	I	L	M	N	O
A2	Standard two bolts plug-in flange	90,0	92,3	Ø160	15	OR 4600 3,53x152	200	Ø18	85	235	Ø190

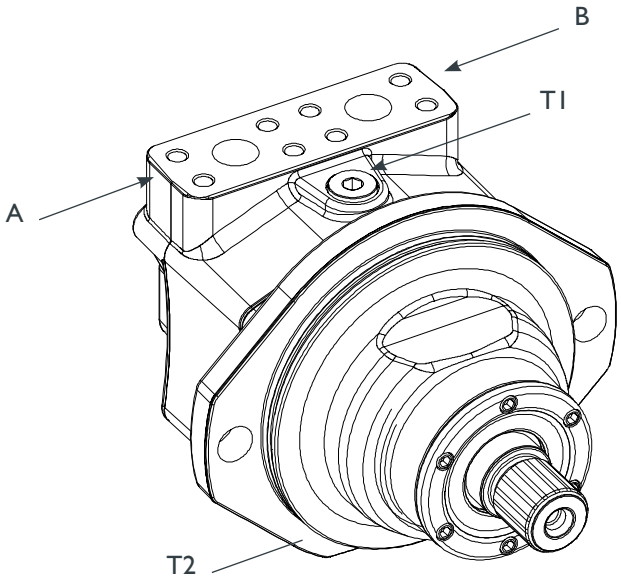




2.3.3) 90

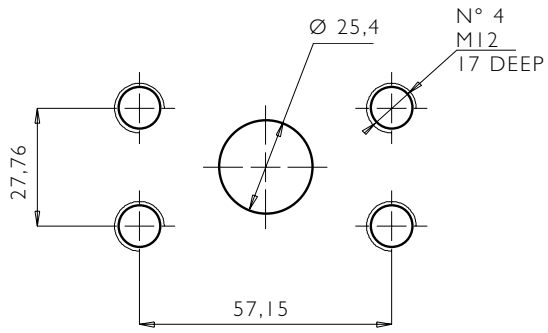


Ports

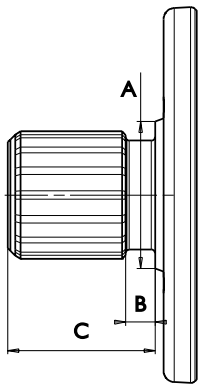


Port	Description	Size
A,B	High pressure ports	SAE 1" - code 62
T1,T2	Case drain ports	M33 x 2 - ISO 6149

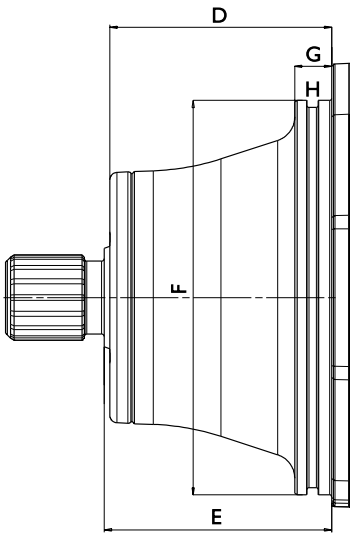
Details X - Port A/B

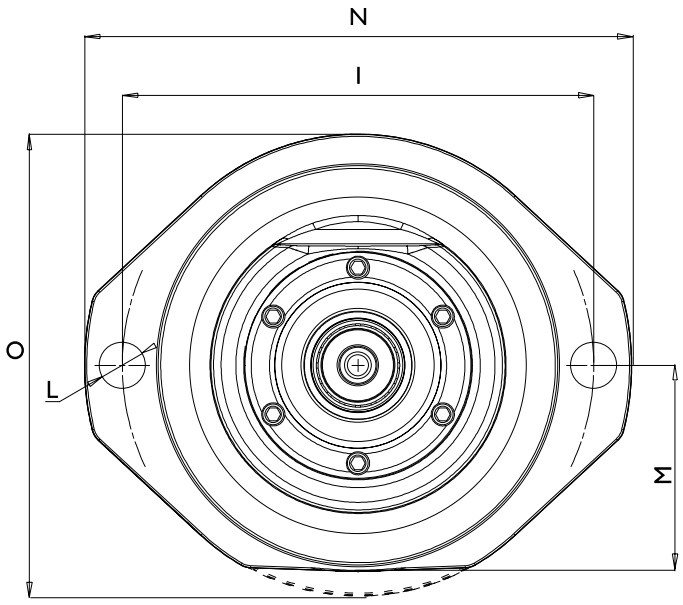


Shaft End				
		A	B	C
D35	DIN5480 side fit W35x2x30x16x9g	Ø45	8	40
D40	DIN5480 side fit W40x2x30x18x9g	Ø45	8	45

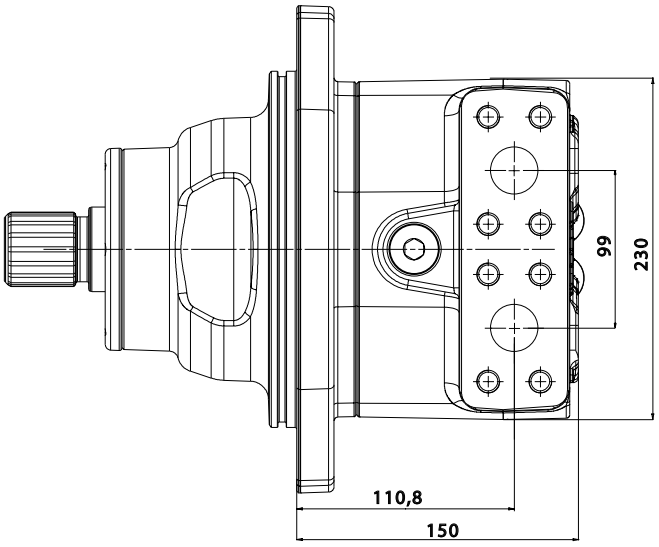


Mounting Flange											
		D	E	F	G	H (groove for)	I	L	M	N	O
A2	Standard two bolts plug-in flange	106,0	110,8	Ø190	15	OR 4725 3,53x183,8	224	Ø22	98	260	Ø220

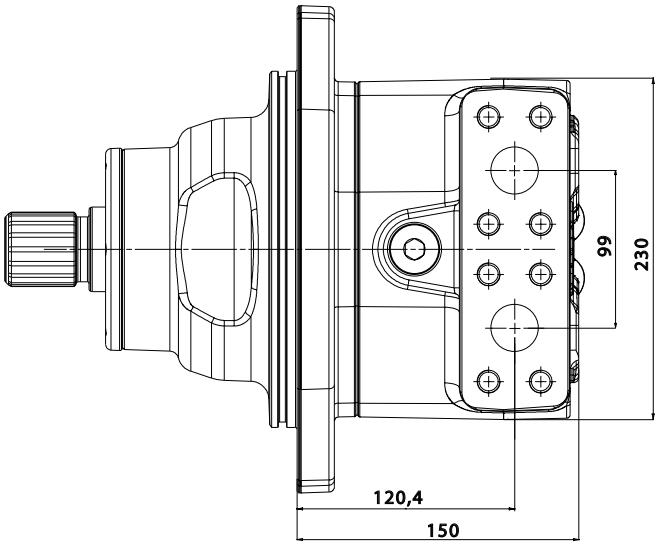




2.3.4) 110 / 130

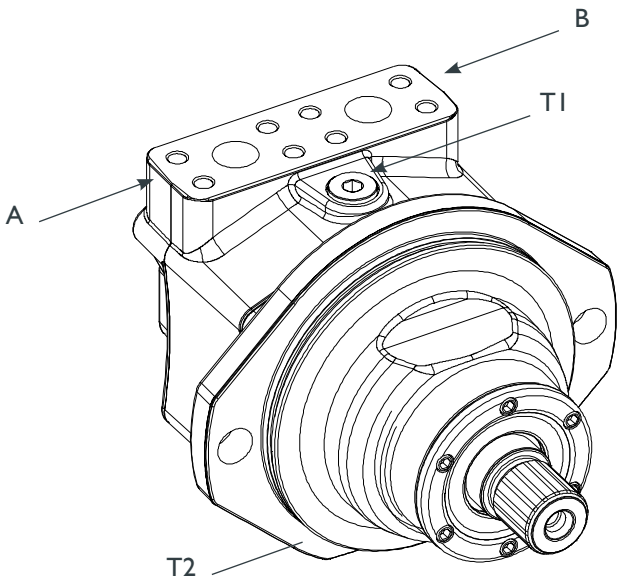


MKF 110



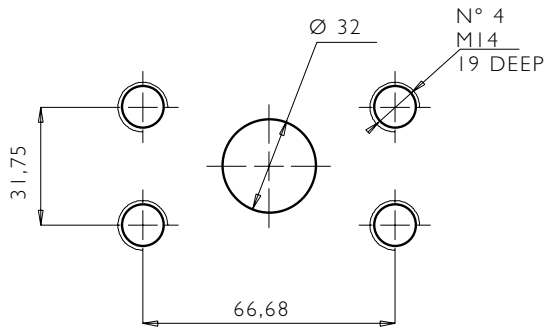
MKF 130

Ports

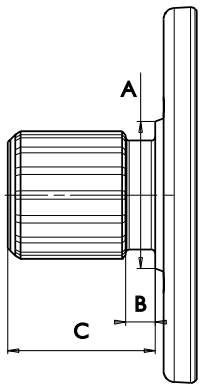


Port	Description	Size
A,B	High pressure ports	SAE 1" 1/4 - code 62
T1,T2	Case drain ports	M33 x 2 - ISO 6149

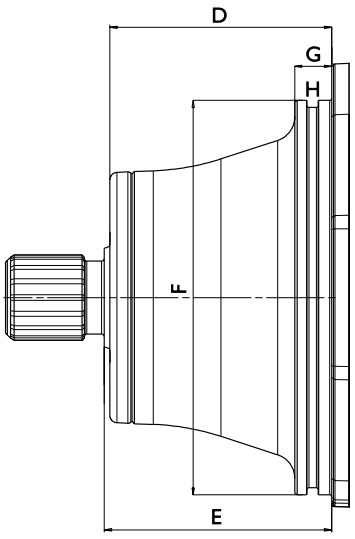
Details X - Port A/B

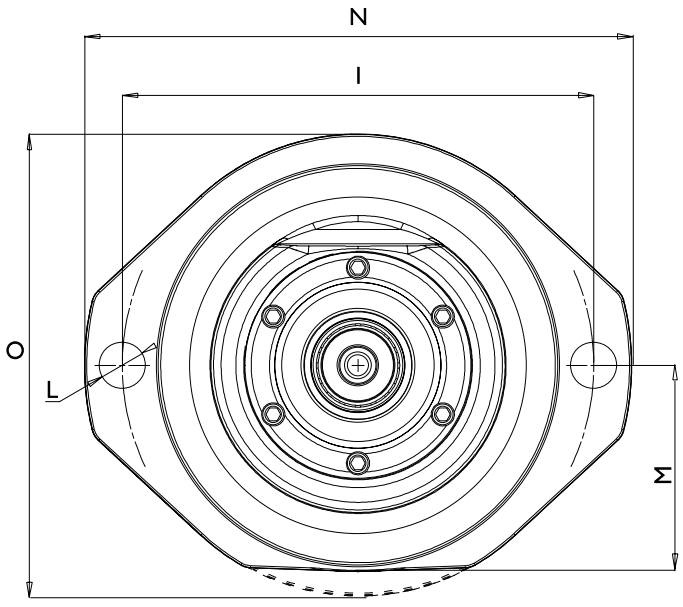


Shaft End				
		A	B	C
D40	DIN5480 side fit W40x2x30x18x9g	Ø 50	8	45
D45	DIN5480 side fit W45x2x30x21x9g	Ø 50	8	50

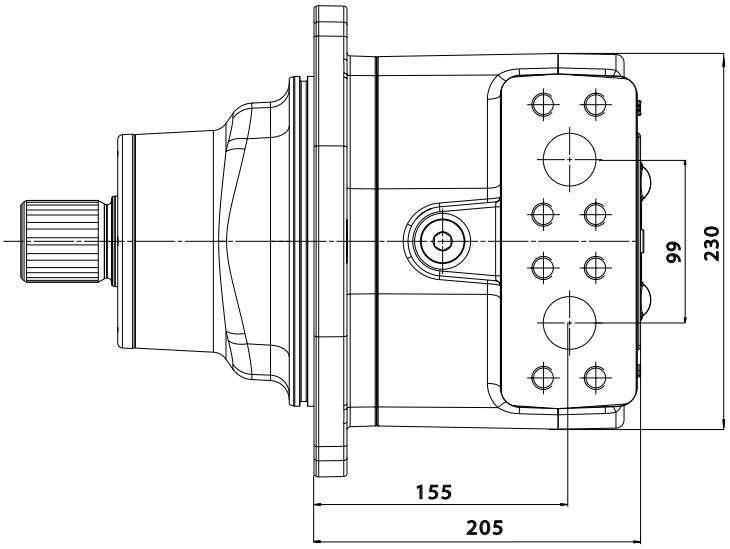


Mounting Flange											
		D	E	F	G	H (groove for)	I	L	M	N	O
A2	Standard two bolts plug-in flange	119	122,8	Ø200	15	OR 4750 3,53x190,1	250	Ø22	103	296	232

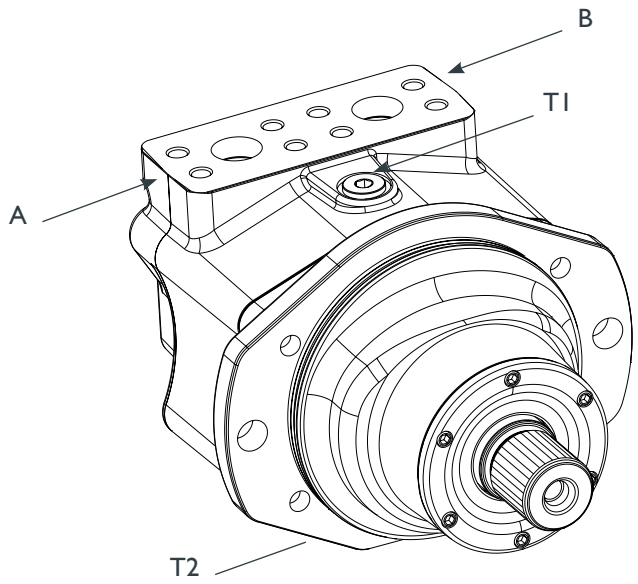




2.3.5) 180

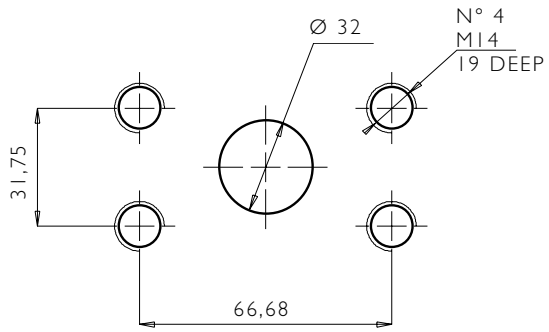


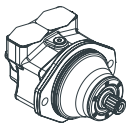
Ports



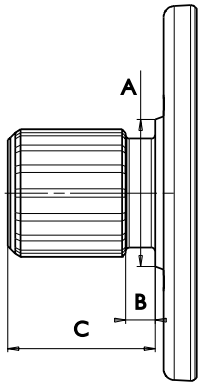
Port	Description	Size
A,B	High pressure ports	SAE 1" 1/4 - code 62
T1,T2	Case drain ports	M33 x 2 - ISO 6149

Details X - Port A/B

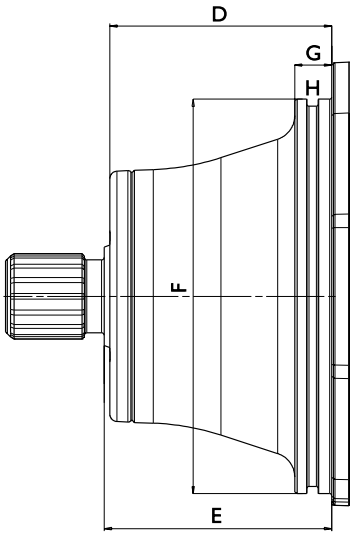


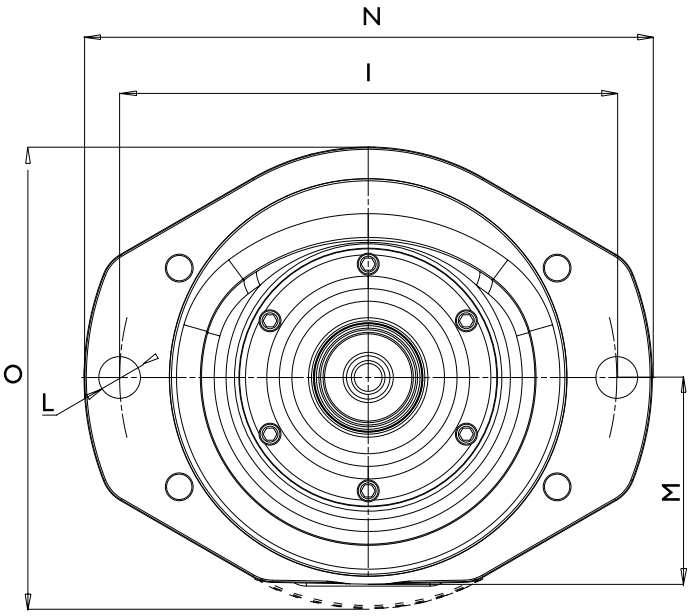


Shaft End				
		A	B	C
D45	DIN5480 side fit W45x2x30x21x9g	Ø55	8	50
D50	DIN5480 side fit W50x2x30x24x9g	Ø55	8	55



Mounting Flange											
		D	E	F	G	H (groove for)	I	L	M	N	O
A2	Standard two bolts plug-in flange	119	122,8	Ø200	15	OR 4750 3,53x190,1	250	Ø22	104	286	Ø232

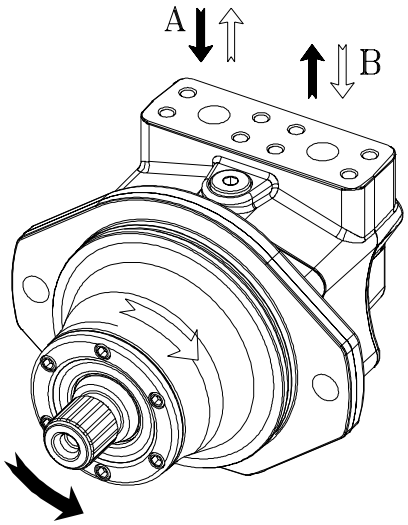


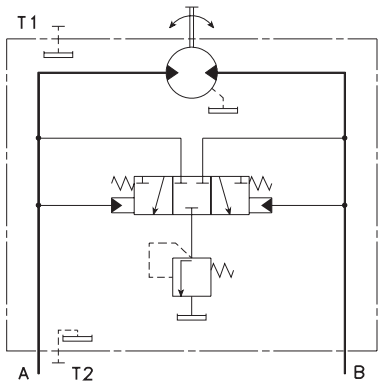


2.4) Direction of rotation - direction of the flow

Ports

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

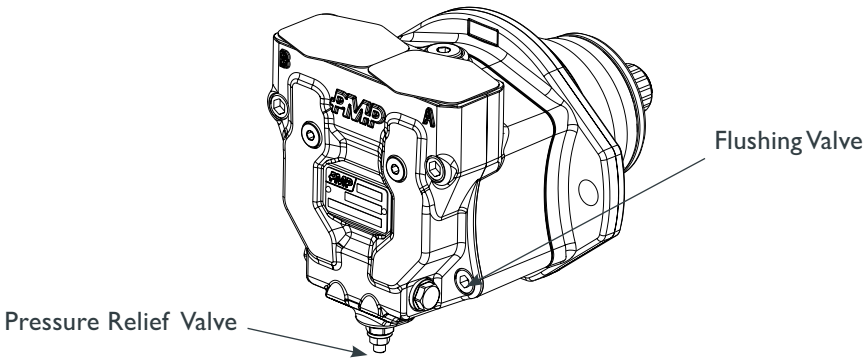


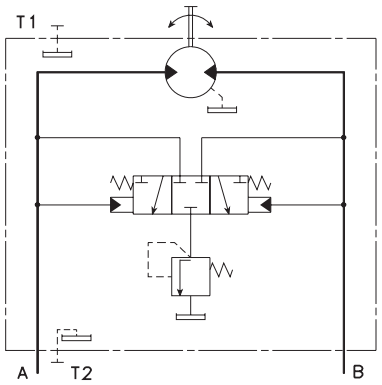
Hydraulic scheme	
	

A, B	High pressure ports
T1, T2	Case Drain Ports

2.5) Flushing Valve

The PMH MKF 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 successively through the discharge port, to a heat exchanger. This flow is restored by the anti-cavitation valve on the pump. The use of this valve allows dispose of excessive heat.



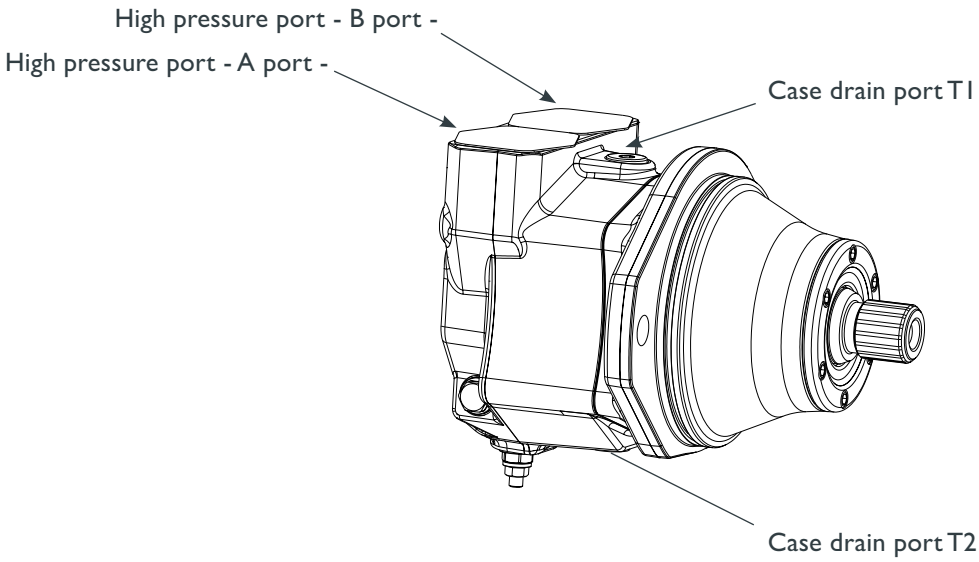


3) INSTALLATION INSTRUCTIONS

3.1) Introduction

In the following pages are treated the standards of installation of the PMH MKF motor. Compliance of the standards set has decisive effect on the life of the unit.

In 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.

3.2) Speed Sensor

Sensor Output: two speed signals in quadrature

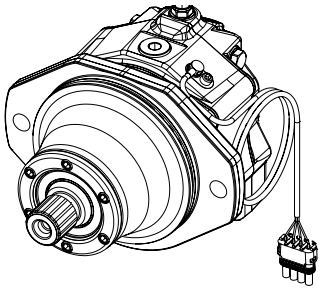
Supply Voltage	(Vs) 8 to 32 Vdc	(Functional range)
Supply Current	(Is) 50 mA	(incl. internal Pull-up resitor)
Supply Over-Voltage rating	33 V	
Operating Temperature	-40 to 257 °F	
Humidity	EN60088-2-30: +25/55°C 90% RD	
Output Type	Push-Pull	
Output Voltage Low	< 2V	
Sensor Output Frequency	0 Hz to 15 kHz	
Cable length	aprox 1.0m	

Each output signal provides pulses per revolution according to the following table:

Size	Pulses per revolution
55 cc	55
72 cc	58
90 / 110 cc	66

Standard plug (other type on request)

Pin A	red	Power Supply
Pin B	black	Common
Pin C		Output signal
Pin D		Output signal

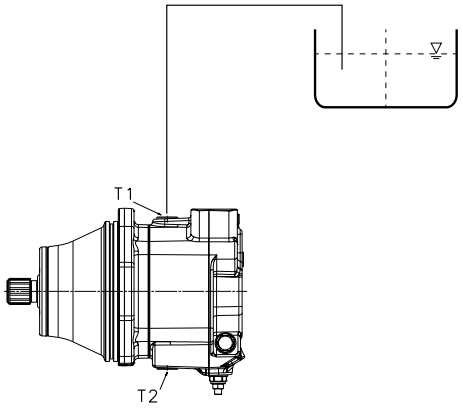
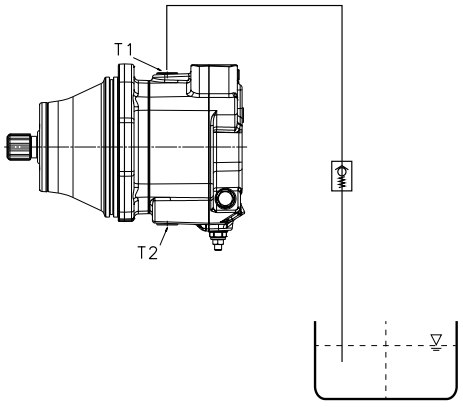


Connector : Packard Electric Weather Pack. Mates with 12010974 and 120089040 male terminal.

Other plug on request

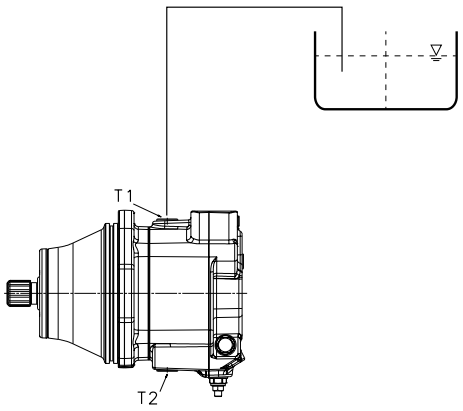
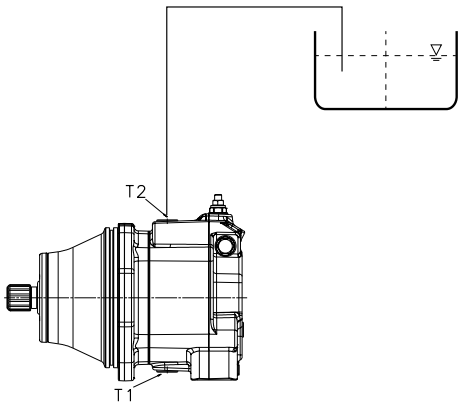
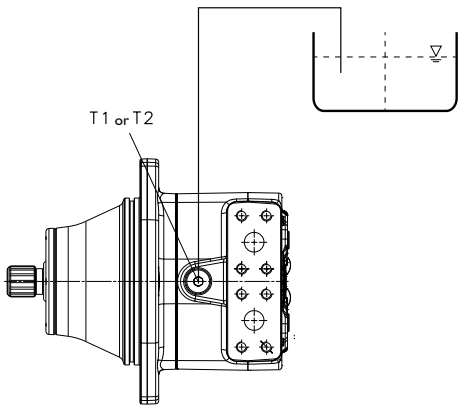
3.3) Installation position

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 Orientation	Notes
Under the tank		Standard Positioning
Over the tank		You must provide a check valve on the case drain line to prevent the emptying of the line

3.4) Motor orientation

The motor can be oriented in the following positions

	Motor Orientation	Notes
w shaft High Pressure ports (A, B) on top		The case drain line must be always connected with the highest port (T1)
Horizontal shaft High Pressure ports (A, B) on bottom		The case drain line must be always connected with the highest port (T2)
Horizontal shaft and High Pressure ports (A, B) on side		The case drain line must be always connected with the highest port (T1 or T2)

Notes

Notes

Contacts

WESTERN EUROPE	e-mail: sales.eu@pmp-industries.com T. +39 0432 863 611
NORTH and CENTRAL AMERICA	e-mail: sales.usa@pmp-industries.com T. +1 513 563 3028
SOUTH AMERICA	e-mail: sales.sa@pmp-industries.com T. +39 0432 863 625
CHINA and SOUTH EAST ASIA	e-mail: sales.cn@pmp-industries.com T. +86 512 8270 6688
INDIAN SUBCONTINENT	e-mail: sales.ind@pmp-industries.com T. +91 954 565 9221
RUSSIA and EASTERN EUROPE	e-mail: sales.ru@pmp-industries.com T. +39 0432 863 670
REST OF THE WORLD	e-mail: sales@pmp-industries.com T. +39 0432 863 611

www.pmp-industries.com

ITALY BOSNIA-HERZEGOVINA USA CHINA INDIA BRAZIL

POWER TRANSMISSION Division

FLUID POWER Division

STEEL WORKS Division

ENVIRONMENTAL DEDUSTING Division

PMP INDUSTRIES

www.pmp-industries.com