Dutch Hydraulic Consultants

HANSA · TMP srl

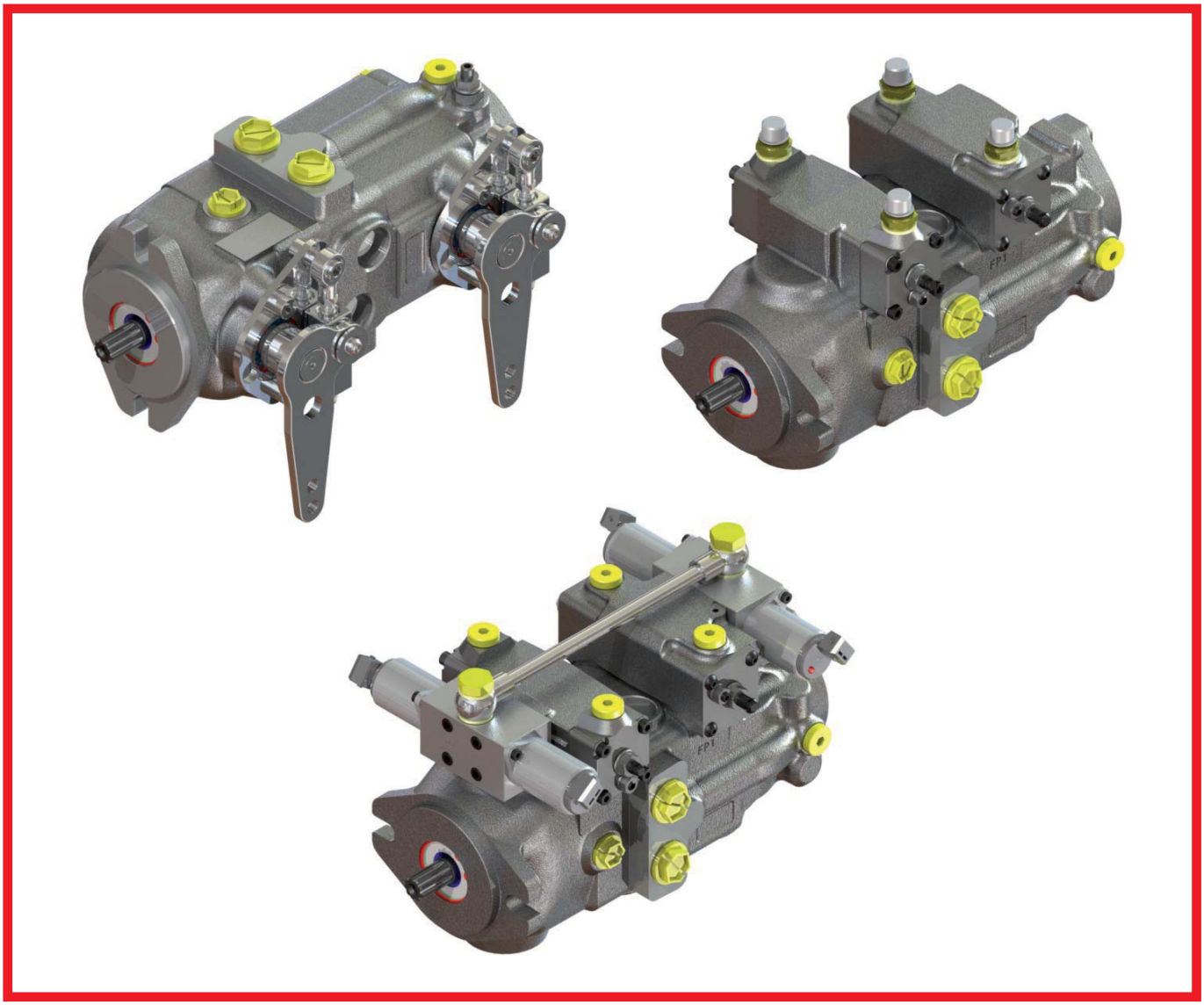
HYDRAULIC COMPONENTS
HYDROSTATIC TRANSMISSIONS
GEARBOXES - ACCESSORIES

HT 16 / M / 156 / 1214 / E

THE PRODUCTION LINE OF HANSA-TMP

Variable Displacement Closed Loop System
Axial Piston Compact Tandem Pump

TPV 1200 BTB



CONTENTS

GENERAL INFORMATION

TPV models are variable displacement axial piston pumps, with swashplate system, for closed loop hydrostatic transmissions.

- TPV 1200 BTB is a variable displacement, **Compact Tandem** axial piston pump, with swashplate system, for closed loop hydrostatic transmissions.

- Flow rate is proportional to rotation speed and displacement, and is continuously variable. It increases as the swashplate angle moves from “0” to maximum position. If the swashplate is positioned beyond the neutral point, the flow rate respectively follows one of the two directions.

- The new pump series **TPV 1200 BTB** is equipped with a charge pump which, by keeping the circuit pressurised, avoids the cavitation and assures a good performance of the transmission.

- The standard version is of mechanical type on which, by means of a lever, the change of flow in the two directions is obtained.

- This series of pumps can be with a hydraulic servo control or electric proportional control which allows the control of the pump by means of hydraulic or electric joysticks.

- Moreover the pump is fitted with relief valves and it is adapted for assembly of auxiliary gear pumps.

- The **Compact Tandem TPV 1200 BTB**, are available with splined or parallel shaft and can be supplied with options such as purge valve, screw by-pass valve and, for security, "man on board" valve.

TECHNICAL SPECIFICATIONS

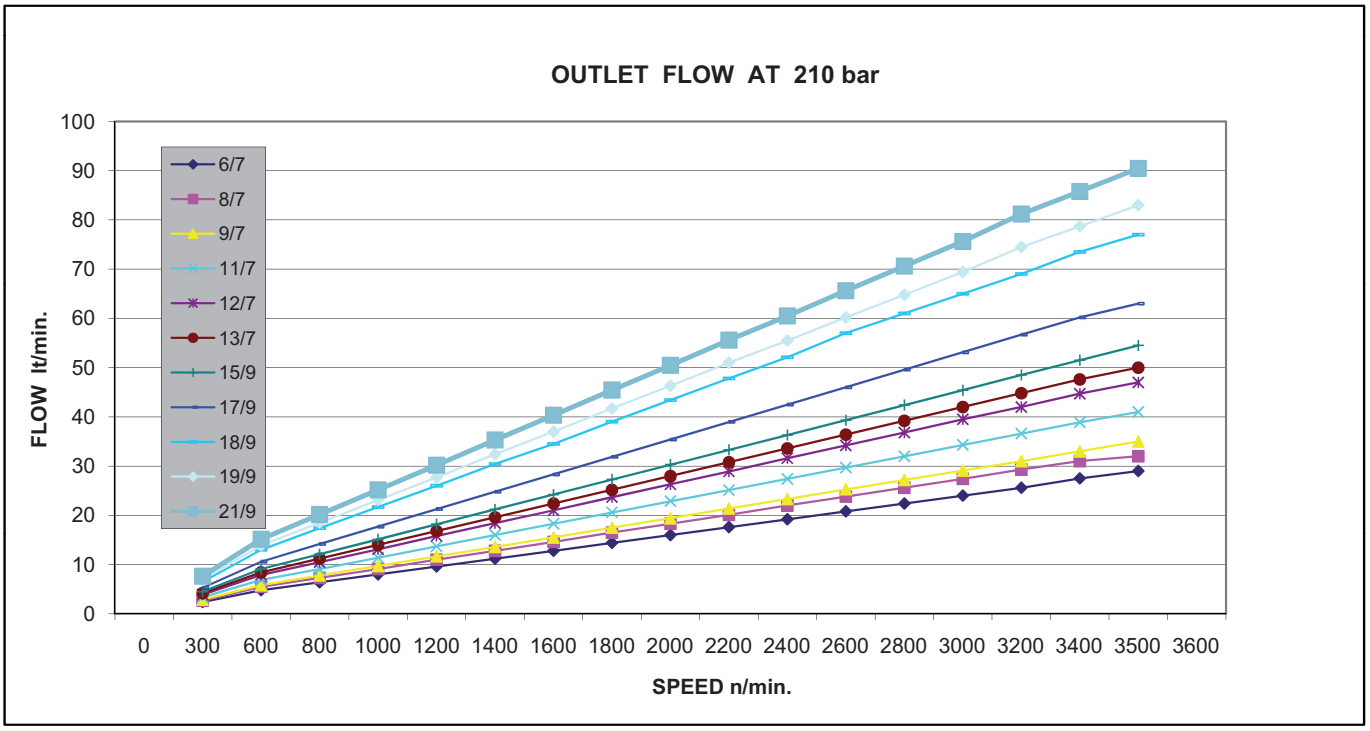
Pump model		TPV 6-7	TPV 8-7	TPV 9-7	TPV 11-7	TPV 12-7	TPV 13-7	TPV 15-9	TPV 17-9	TPV 18-9	TPV 19-9	TPV 21-9
Max. displacement	cm^3/n	7,4	8,9	9,6	11,2	12,8	13,6	15,00	17,1	18,2	19,4	21,15
Flow rating (1)	lt/min.	25,01	31,96	34,74	40,32	46,08	48,88	54,00	61,77	66,37	69,84	76,4
Power rating (1)	kW	8,75	11,18	12,15	14,11	16,12	17,11	18,9	21,61	23,23	24,44	31,73
Boost pump displacement	cm^3/n	5,4										
Rated pressure	bar	210									200	
Max. pressure	bar	300	300	300	300	300	300	280	280	270	250	
Max. relief valve setting	bar	300						280		270	250	
Standard boost pressure (2)	bar	4 (Mechanical Control) 20 (Hydraulic / Electric Servo Control)										
Suction pressure	bar (absolute)	>= 0,8										
Max. case pressure	bar	1,5										
Min. inlet shaft speed	n/min.	500										
Max. speed	n/min.	3600										
Max. oil temperature	°C	80										
Oil viscosity	$mm^2/sec.$	16-36										
Fluid contamination		18/15/12 according to ISO 4406										
Dry weight (3)	kg	17,4										

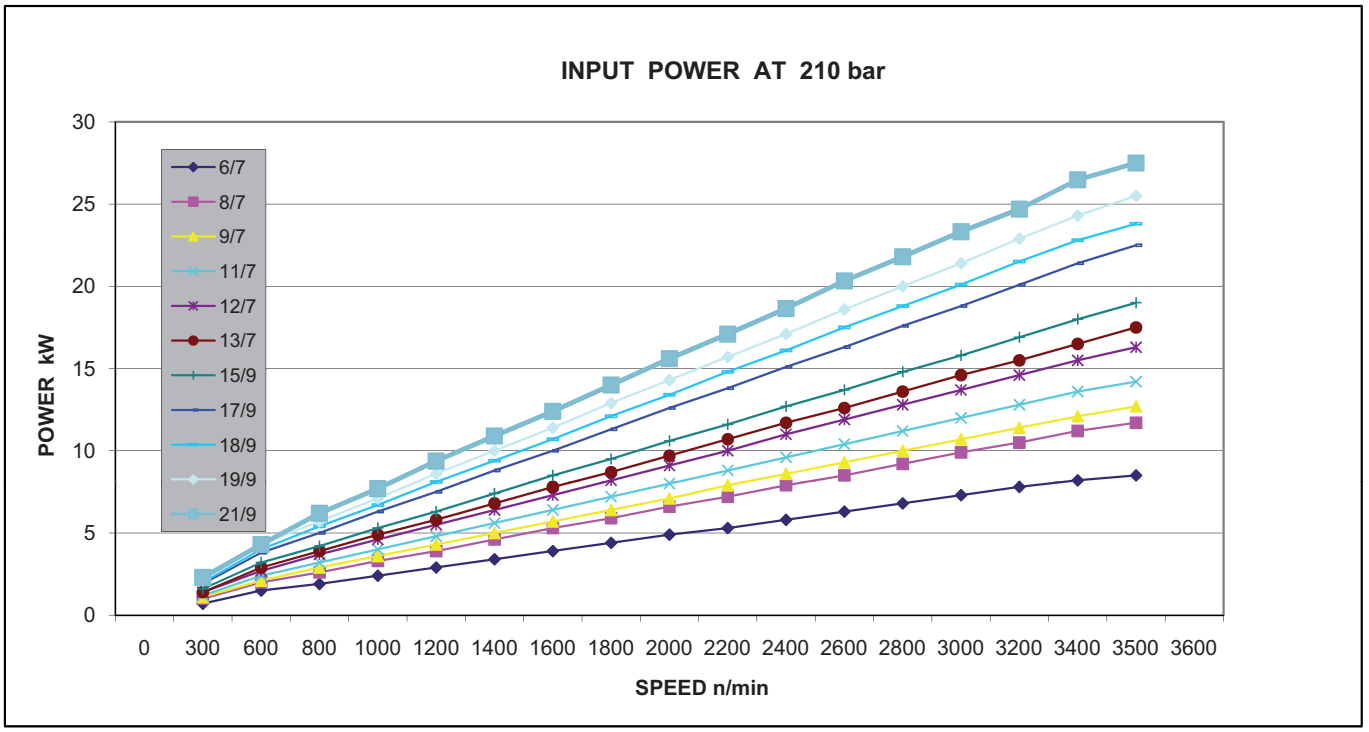
(1) 3600 n/min. 210 bar for single section

(2) 1000 n/min.

(3) Indicative values, weight varies depending on configuration and optionals

PERFORMANCE (Indicative values)

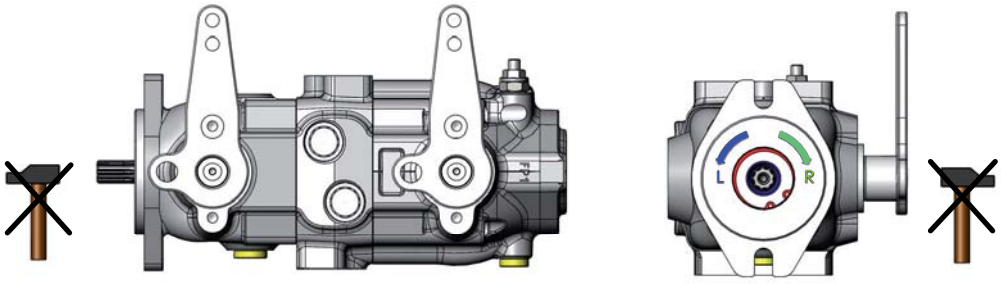




INSTALLATION INSTRUCTIONS

Installation rules, plant start up and maintenance

- During assembly check that pump is in line and concentric with the driveshaft sleeve to prevent overloading of the bearings.
- In the hydraulic system, preferably use pipings internally pre-cleaned with hydraulic oil or, even better, a solvent.
- The internal diameter of the pipes must be suitable for the oil velocity through them (see our Use and Maintenance Manual).
- Carefully clean reservoir (it is recommended to paint it).
  For a good performance of the transmission, the pump must be below the reservoir oil level.



First starting

- Before starting fill the system components with new and filtered oil. In addition fill the pre-cleaned reservoir with the same type of oil. Let the oil flow in the whole circuit (see our Use and Maintenance Manual). Verify that charge pressure is correct. Restore oil level inside reservoir.

Maintenance

- First oil change to be made after approximately 500 hours of operation, filter cartridge to be replaced the first time after 50 hours for preliminary circuit cleaning and then every 500 hours; subsequently change oil every 2000 hours.
- Such intervals should be reduced when the filter clogging indicator shows that the cartridge is clogged or when the system works in a heavily polluted environment.

WARNING

- When operating always pay maximum attention to moving machine parts; do not wear loose fitting clothing.
- Do not approach wheels, tracks, chain or shaft drives if they are moving and not properly protected, or if they could start moving suddenly and without any warning.
- Do not unscrew or disconnect connectors and pipes while the pump is operating. Avoid oil leaks in order to prevent environmental pollution.

HANSA-TMP relieves itself from all and any responsibilities concerning non compliance with these instructions and observance of safety rules in force, even if not provided for in this document.

HYDRAULIC FLUID

Viscosity range

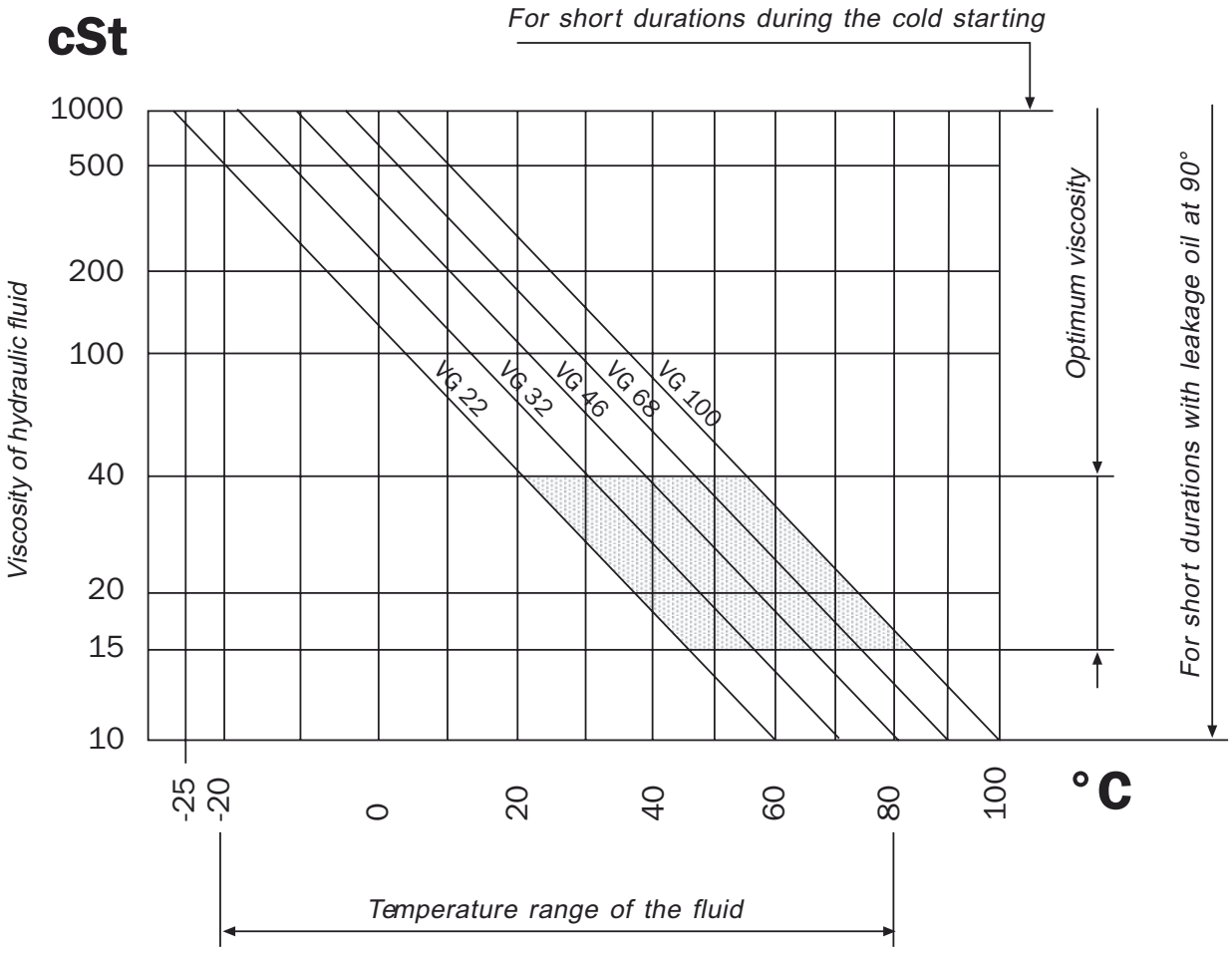
For both max. efficiency and life of the unit, the operative viscosity should be chosen within the optimum range of: √opt = optimum operating viscosity 16÷36 cSt (mm^2/s) referred to the closed loop temperature.

Working conditions:

The following limits of viscosity apply:

√min = 10 cSt short duration at a max. permissible leakage, oil temperature of 90°C.

√max = 1000 cSt short duration, on cold start.



HYDRAULIC FLUID FILTRATION

The contaminating particles suspended in the hydraulic fluid cause the hydraulic mechanisms moving part wear.
On hydraulic pumps these parts operate with very small dimensional tolerances.
In order to prolong the part life, it is recommended to use a filter that maintains the hydraulic fluid contamination class at a max.

9 according to NAS 1638
6 according to SAE, ASTM, AIA
18/15 according to ISO 4406

According to the type of application decided for the pump, it is necessary to use filtration elements with a filtration ratio of:

$$ß\ 20 \div 30 \geq 100$$

making sure that this ratio does not worsen together with the increasing of the filter cartridge differential pressure.
While the pump is working, its temperature increases (over 80° to 110°C) with negative effects on the results; as a consequence, it is important to observe a max. contamination level of:

8 according to NAS 1638
5 according to SAE, ASTM, AIA
17/14 according to ISO 4406

If these values cannot be observed, the component life will consequently be reduced and it is recommended to contact our Tech Dept.

Suction filters
The suction filters will have a clogging indicator and no bypass.
The max. pressure drop on the filtration element must not exceed 0,4 absolute bar (0,8 absolute bar with cold starting).

Filters assembling
Suction filter
The suction filter is mounted on the suction line. Check that the pressure before the charge pump is 0,8 absolute bar, measured on the pump suction port (0,5 for cold starting).

ORDER CODE

TPV	6-7	-	CR	SS2	F1	DM	DM	OA	OA	30	30	06	C	000	00
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

ORDER CODE (continued)

Pag.

10 - Secondary pump control devices position 24

OA = Position A (mechanical without lever or servo control)
OB = Position B (mechanical without lever or servo control)
LA = Position A - Lever to left
RA = Position A - Lever to right
LB = Position B - Lever to left
RB = Position B - Lever to right

11 - Primary pump relief valve pressure setting *
10 = 100 bar **15** = 150 bar **18** = 180 bar **20** = 200 bar **25** = 250 bar **30** = 300 bar

12 - Secondary pump relief valve pressure setting *
10 = 100 bar **15** = 150 bar **18** = 180 bar **20** = 200 bar **25** = 250 bar **30** = 300 bar

* The rated pressure value are changing with different speed.

13 - Charge pump
00 = Without charge pump
06 = Standard pump (5,4 cm^3/n)
Standard setting: 4 bar (mechanical control)
or 20 bar (hydraulic / electric servo control) at 1000 n/min.
06(xx) = Other pressure settings on request (between 4 and 30 bar, contact our Technical Department).

14 - Auxiliary rear pump mounting flange option 25
C = Closed cover (without rear fitting)
B1 = German standard pump group 1 mounting
B2 = German standard pump group 2 mounting

15 - Auxiliary gear pump displacement **
000 = Without pump

Group 1
109 = 0,9 cm^3/n **112** = 1,2 cm^3/n **117** = 1,7 cm^3/n **122** = 2,1 cm^3/n **126** = 2,6 cm^3/n
132 = 3,1 cm^3/n **138** = 3,6 cm^3/n **143** = 4,2 cm^3/n **149** = 4,9 cm^3/n **159** = 5,9 cm^3/n
165 = 6,5 cm^3/n **178** = 7,5 cm^3/n **198** = 9,8 cm^3/n

Group 2
204 = 4,2 cm^3/n **206** = 6,0 cm^3/n **209** = 8,4 cm^3/n **211** = 10,8 cm^3/n **214** = 14,4 cm^3/n
217 =16,8 cm^3/n **219** =19,2 cm^3/n **222** = 22,8 cm^3/n **226** = 26,2 cm^3/n

** Also available multiple gear pumps (for instance: 204+117).

16 - Optional
00 = Without optional
VS = Purge valve **(all versions)** 26
SB = Screw by-pass **(standard)** 27
FB = Conversion flange from SAE A to SAE B 27
ST = Conversion sleeve adapter 9 teeth to 13 teeth - 16/32 D.P. 27
FBST = Conversion flange from SAE A to SAE B + Sleeve 9 teeth to 13 teeth - 16/32 D.P. 27
V = Viton seals
MOB1 = Man on board 12V DC 28
MOB2 = Man on board 24V DC 28
G = Servo control special devices (see table below)

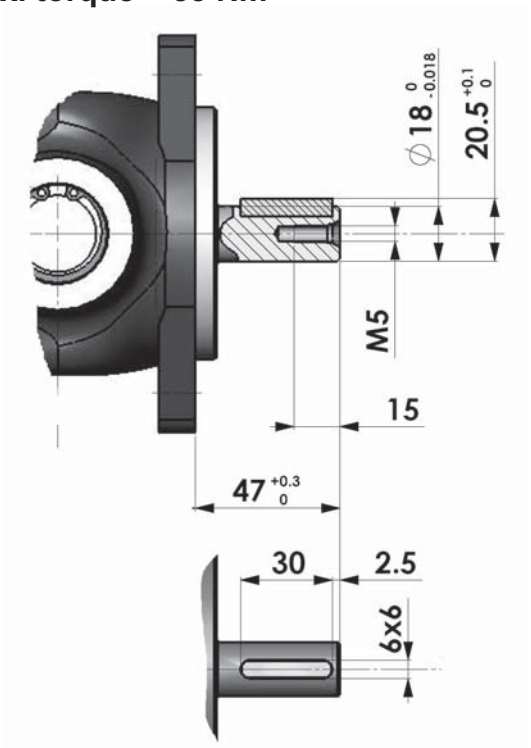
SHI and SEI Control Devices				
	Servo Control Fittings		Flow Restrictor	
STANDARD	G	1/4" BSPP	-	No Restrictor
ON REQUEST	J	JIC	06	Diameter hole restrictor ø 0,6 mm
	M	METRIC	08	Diameter hole restrictor ø 0,8 mm
			10	Diameter hole restrictor ø 1,0 mm
			12	Diameter hole restrictor ø 1,2 mm
			16	Diameter hole restrictor ø 1,6 mm
			20	Diameter hole restrictor ø 2,0 mm

MOUNTING FLANGE and SHAFT OPTIONS

SHAFT

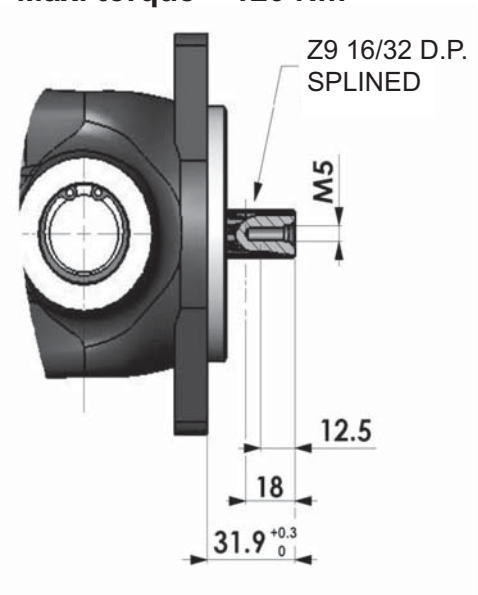
Parallel keyed shaft 18 mm. diam. PS3

Max. torque = 85 Nm



Splined shaft Z = 9 SS2

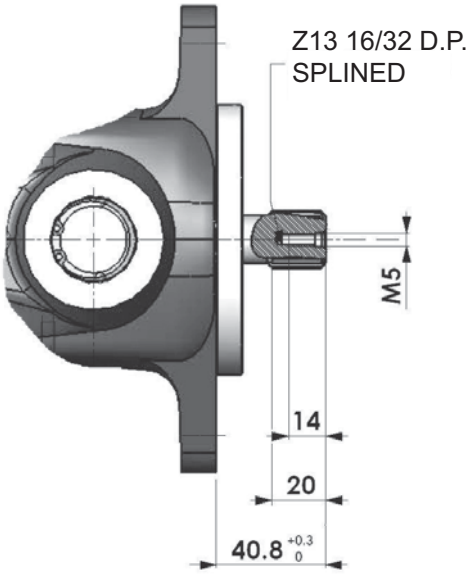
Max. torque = 120 Nm



Splined shaft Z = 13 SS3

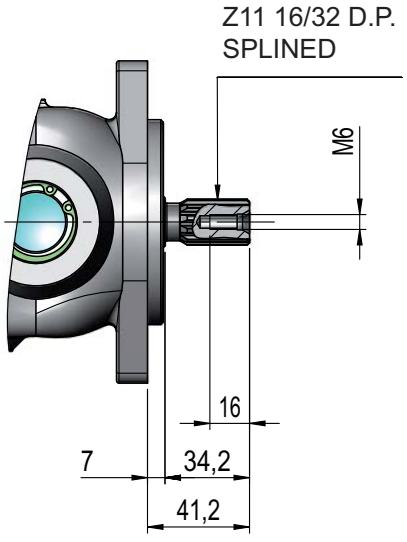
(Only available with servo-control SHI, SEI and SAE B flange)

Max. torque = 320 Nm



Splined shaft Z = 11 SS4

Max. torque = 160 Nm

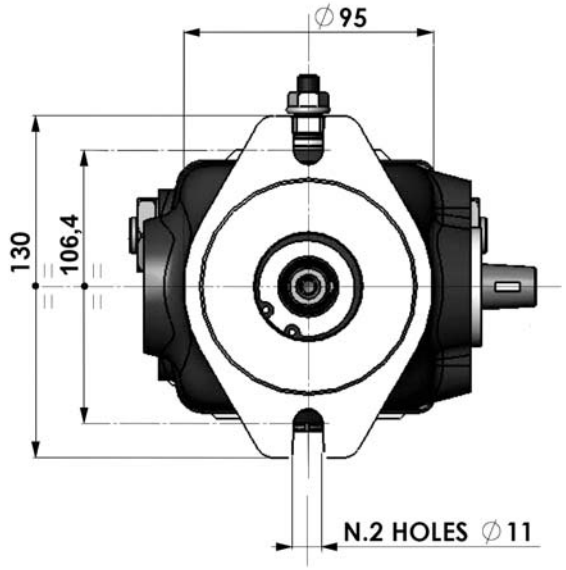


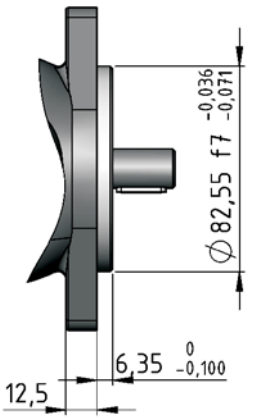
Attention: for the application of multiple pumps the total absorbed torque must not exceed the indicated value.

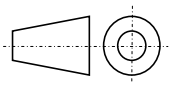
MOUNTING FLANGE and SHAFT OPTIONS

FLANGES

SAE A - 2 holes flange F1

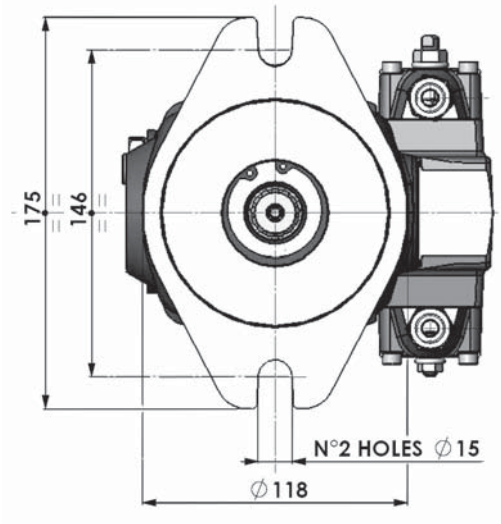


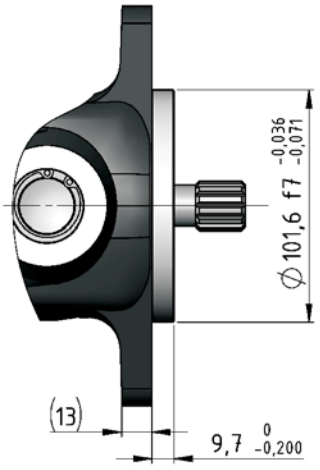




SAE B - 2 holes flange F2

(Only available with servo-control SHI, SEI and shaft SS3)



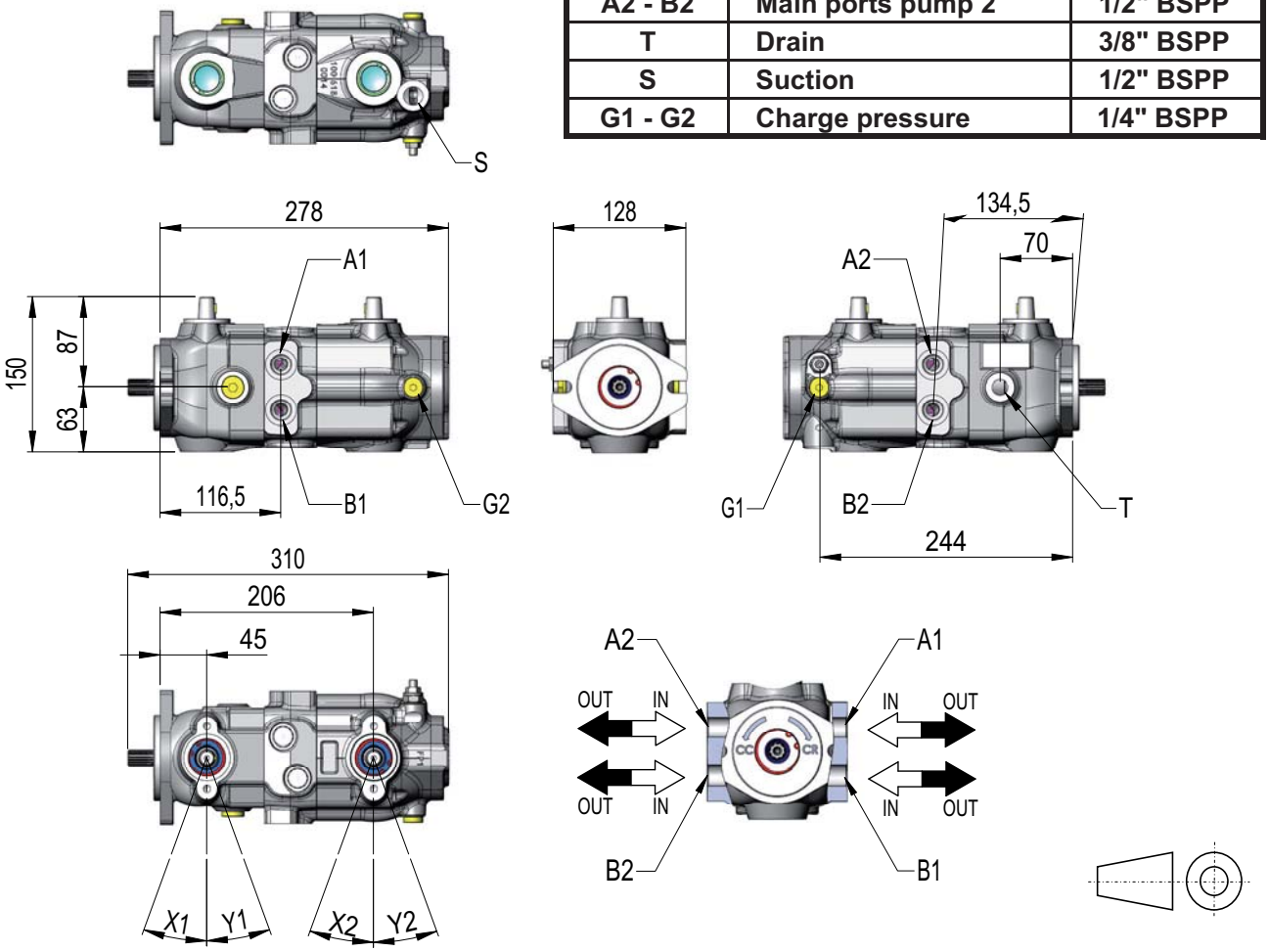


DIRECT MECHANICAL CONTROL DM

The variation in pump displacement is obtained by rotating the control shaft in a clockwise or counter-clockwise direction.
The control shaft is directly linked to the pump swashplate.
The angle is at 11° for displacement 6,6 cm^3/n and at 19° for 21,15 cm^3/n .

Installation Drawing

Pipe connection		
A1 - B1	Main ports pump 1	1/2" BSPP
A2 - B2	Main ports pump 2	1/2" BSPP
T	Drain	3/8" BSPP
S	Suction	1/2" BSPP
G1 - G2	Charge pressure	1/4" BSPP

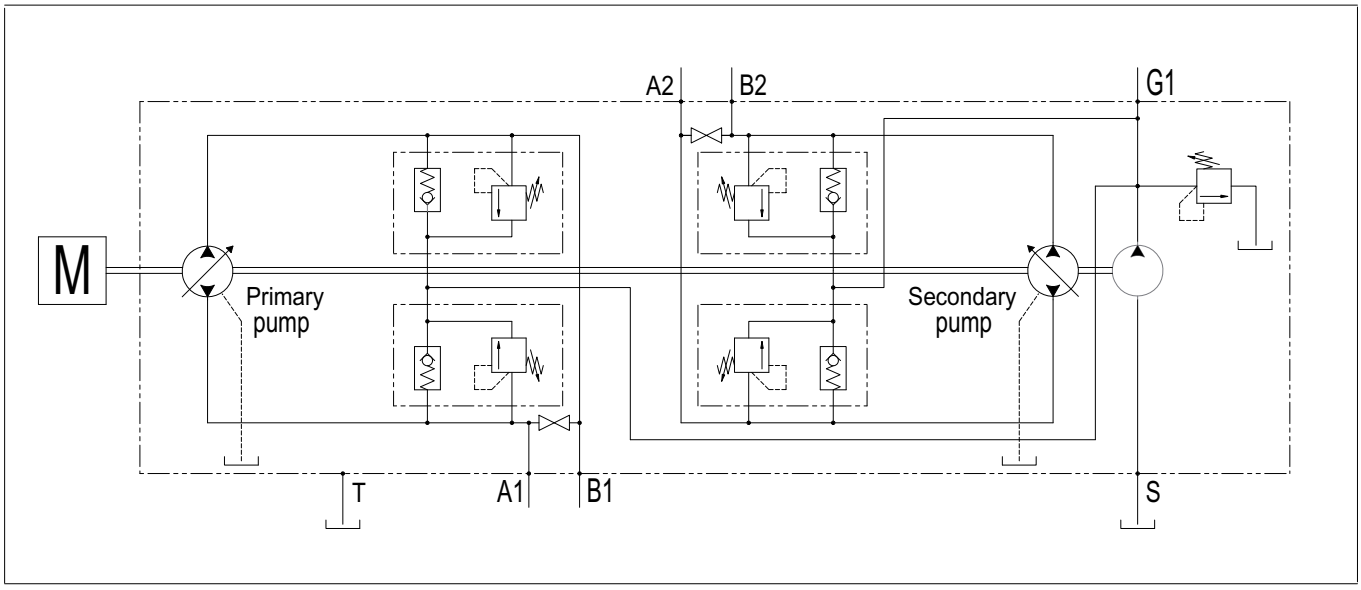


Flow Direction	Primary Pump			Secondary Pump		
Pump Rotation	Lever Position	Flow Out	Flow In	Lever Position	Flow Out	Flow In
Clockwise R	X_1 Y_1	B_1 A_1	A_1 B_1	X_2 Y_2	A_2 B_2	B_2 A_2
C. Clockwise L	X_1 Y_1	A_1 B_1	B_1 A_1	X_2 Y_2	B_2 A_2	A_2 B_2

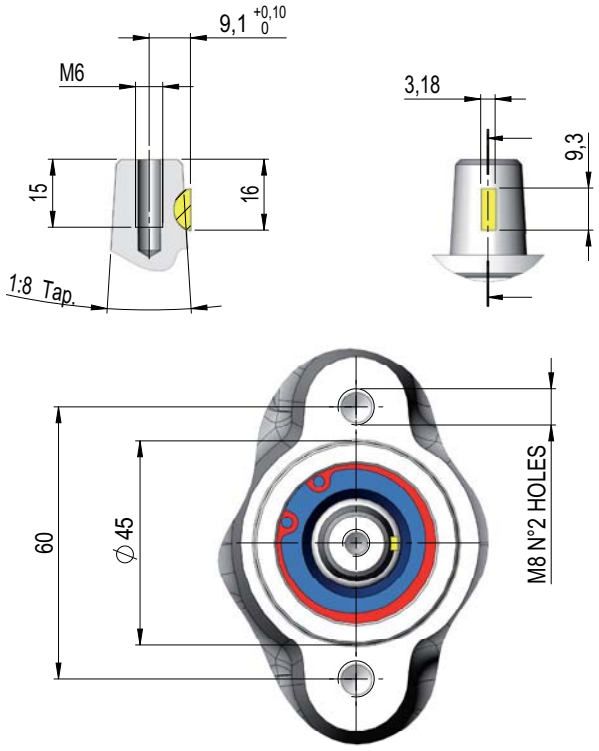
Lever Angle											
Pump Model	6 / 7	8 / 7	9 / 7	11 / 7	12 / 7	13 / 7	15 / 9	17 / 9	18 / 9	19 / 9	21 / 9
Lever Angle (X - Y)	10°	12°	13°	15°	17°	18°	15°	17°	18°	19°	19°

DIRECT MECHANICAL CONTROL DM

Hydraulic Diagram



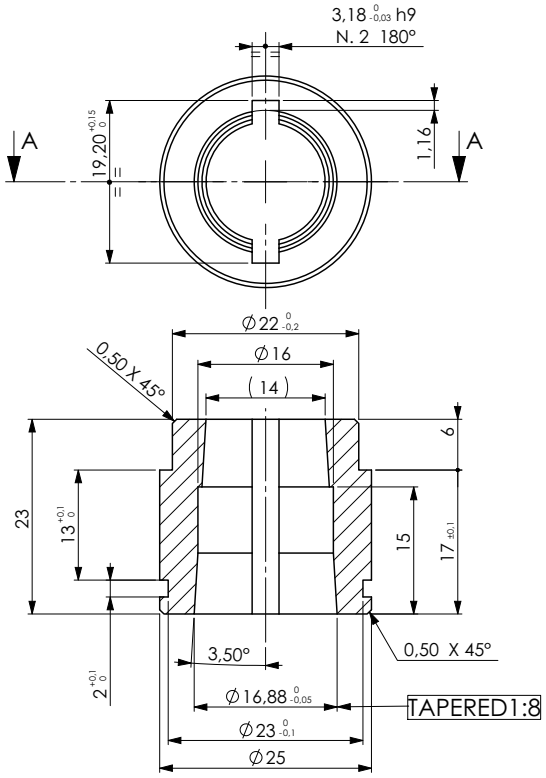
Control Shaft Detail



OPTIONAL

Tapered Bush **BC**

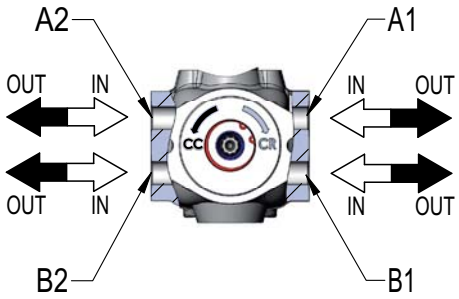
Tapered bush with woodruff key, external cylindric. Suitable for arrangement of specific control levers.

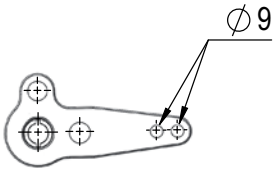


DIRECT MECHANICAL CONTROL LEVER LZ

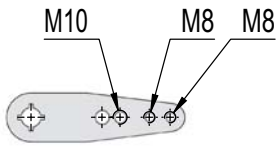
The variation in pump displacement is obtained by rotating the control shaft in a clockwise or counter-clockwise direction.
The lever shaft is directly linked to the pump swashplate by means of a tapered mounting, this reduces the noise due to vibrations.
The angle is at 11° for displacement 6,6 cm^3/n and at 19° for 21,15 cm^3/n .

Installation Drawing

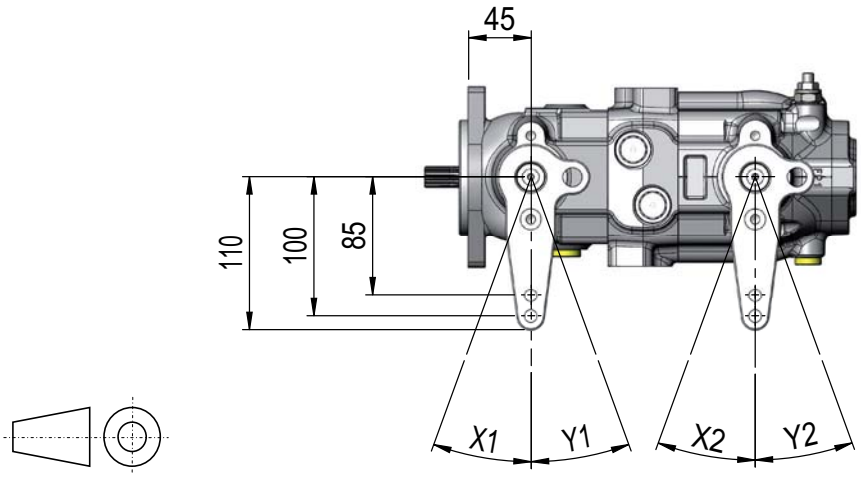


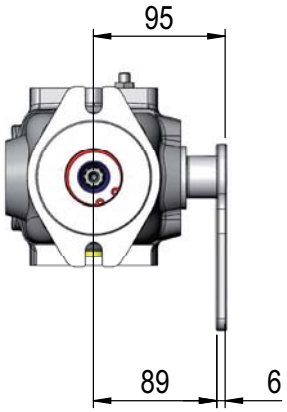


STANDARD LEVER



OLD VERSION LEVER



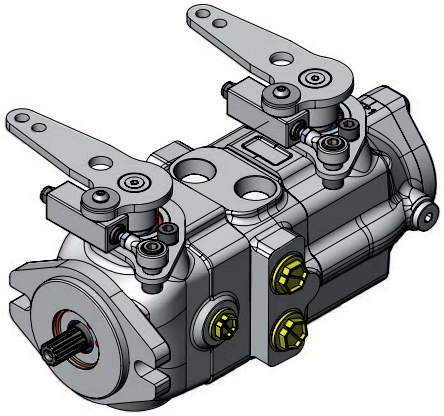


Flow Direction	Primary Pump			Secondary Pump		
Pump Rotation	Lever Position	Flow Out	Flow In	Lever Position	Flow Out	Flow In
Clockwise R	X_1 Y_1	B_1 A_1	A_1 B_1	X_2 Y_2	A_2 B_2	B_2 A_2
C. Clockwise L	X_1 Y_1	A_1 B_1	B_1 A_1	X_2 Y_2	B_2 A_2	A_2 B_2

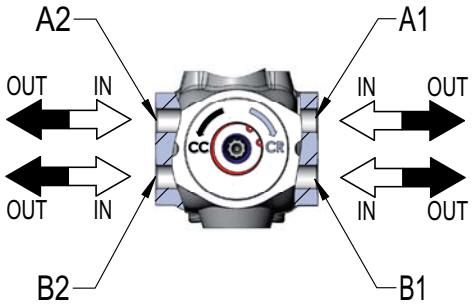
Lever Angle											
Pump Model	6 / 7	8 / 7	9 / 7	11 / 7	12 / 7	13 / 7	15 / 9	17 / 9	18 / 9	19 / 9	21 / 9
Lever Angle (X - Y)	10°	12°	13°	15°	17°	18°	15°	17°	18°	19°	19°

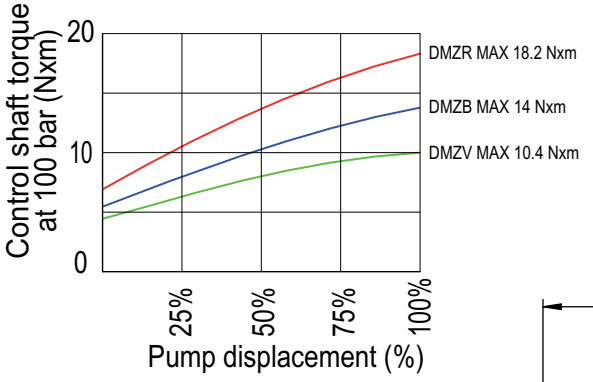
DIRECT MECHANICAL CONTROL LEVER (with Spring Return) DMZ

The variation in pump displacement is obtained by rotating the control shaft in a clockwise or counter-clockwise direction.
The lever shaft is directly linked to the pump swashplate by means of a tapered mounting, this reduces the noise due to vibrations.
The angle is at 11° for displacement 6,6 cm^3/n and at 19° for 21,15 cm^3/n.

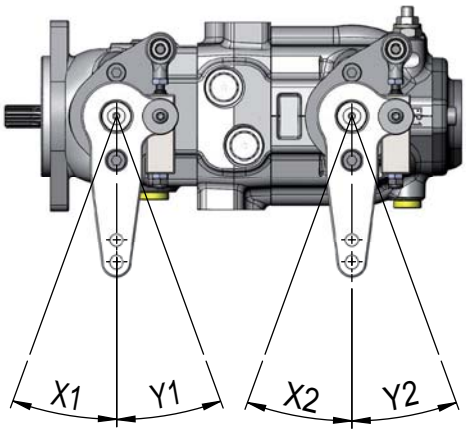


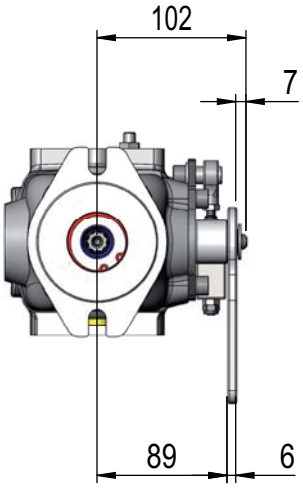
Installation Drawing

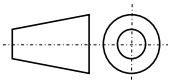




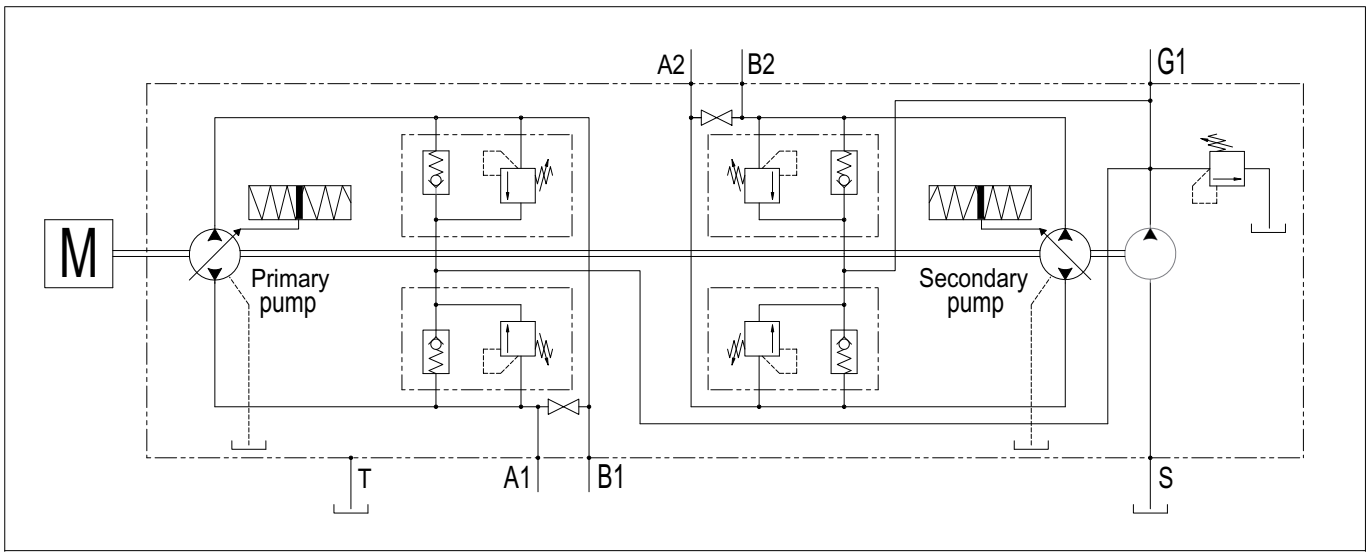
Regarding "flow direction" and "lever angle", please refer to pag. 16.





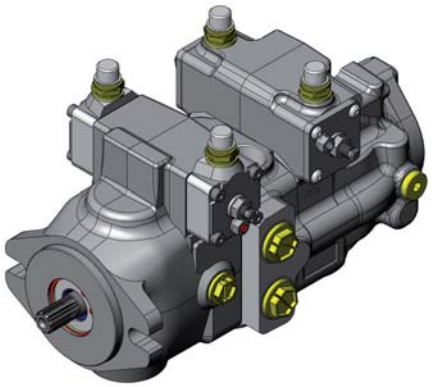


Hydraulic Diagram

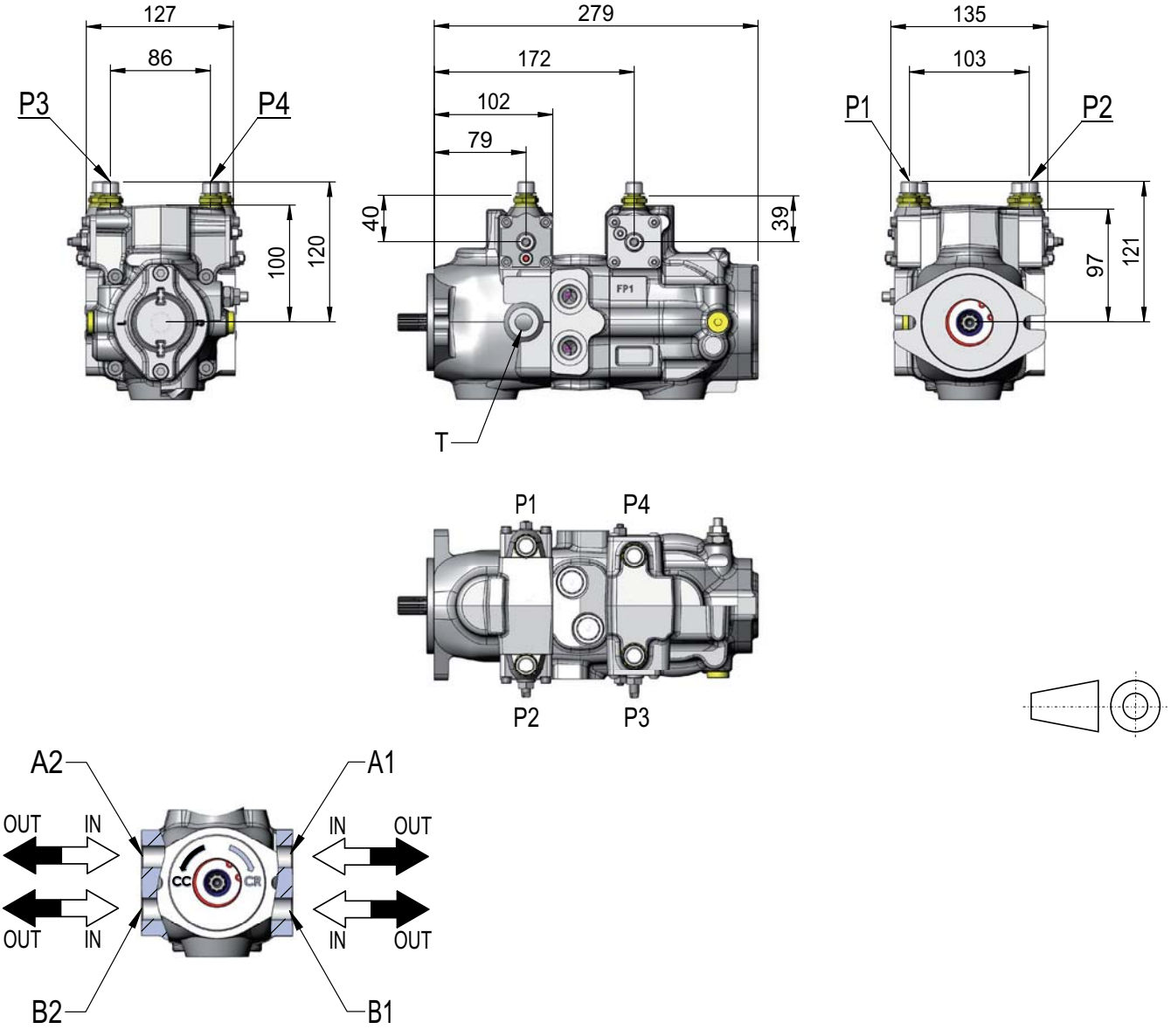


INTEGRATED REMOTE HYDRAULIC SERVO CONTROL SHI

The variation in pump displacement is obtained by adjusting the pressure on the P1-P2-P3-P4 servo control connections by means of a hydraulic proportional joystick (containing pressure reduction valves).
The joystick supply can be obtained by taking pressure from the auxiliary pump (G connection).
The servo control feedback time can be adjusted by inserting a restricter on the joystick supply line (0,5 ÷ 1,2 mm)
The servo control operation curve in both control directions goes from 4 to 18 bar (tolerance ± 5%).
The adjustment curve of the hydraulic control system has to be wider (4 ÷ 20 bar).

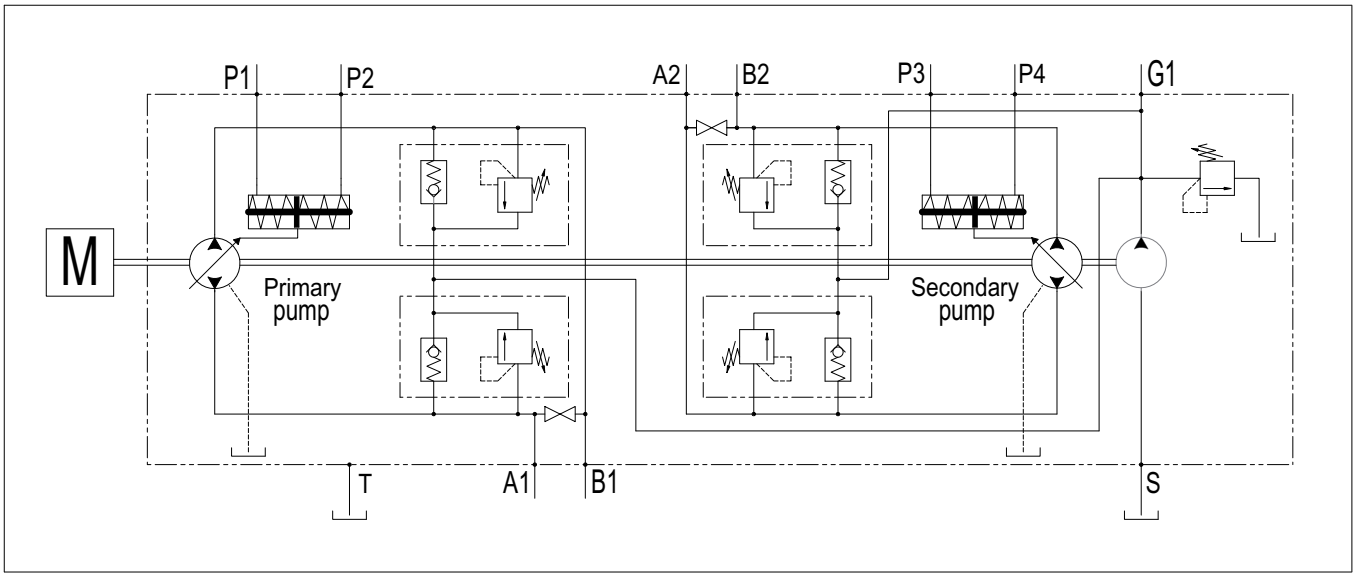


Installation Drawing



INTEGRATED REMOTE HYDRAULIC SERVO CONTROL SHI

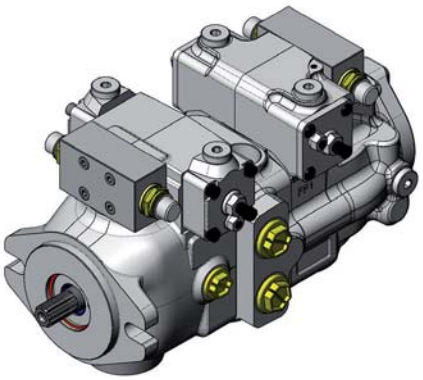
Hydraulic Diagram



Flow Direction	Primary Pump			Secondary Pump		
Pump Rotation	Pilot Pressure	Flow Out	Flow In	Pilot Pressure	Flow Out	Flow In
Clockwise R	P_1 P_2	B_1 A_1	A_1 B_1	P_3 P_4	A_2 B_2	B_2 A_2
C. Clockwise L	P_1 P_2	A_1 B_1	B_1 A_1	P_3 P_4	B_2 A_2	A_2 B_2

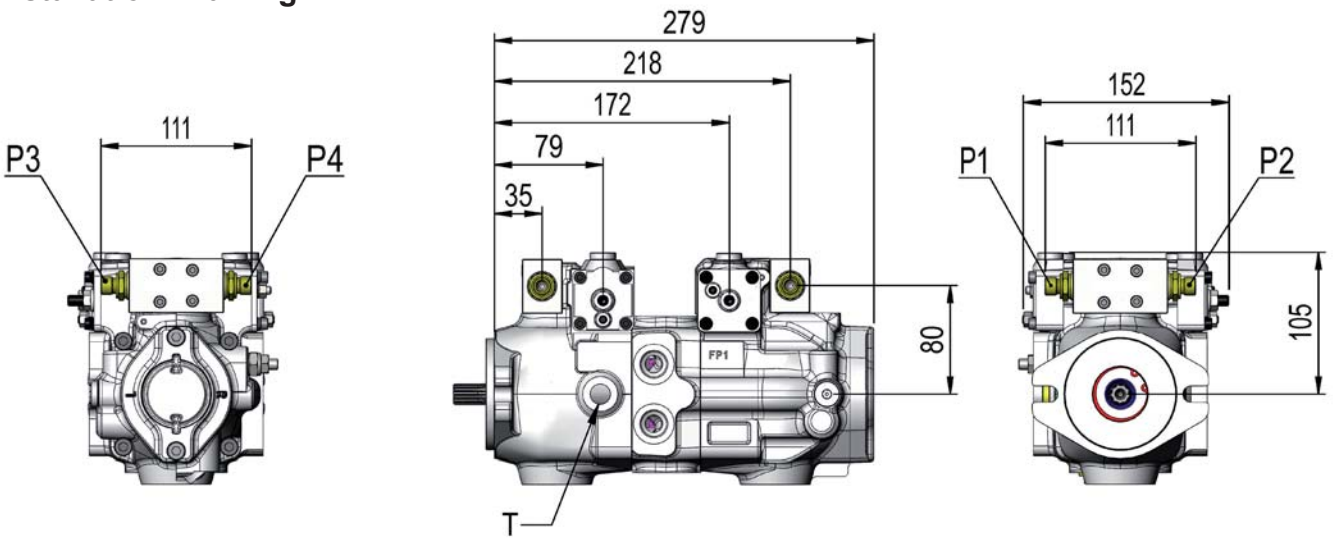
Pipe connection		
A1 - B1	Main ports pump 1	1/2" BSPP
A2 - B2	Main ports pump 2	1/2" BSPP
T	Drain	3/8" BSPP
S	Suction	1/2" BSPP
G1	Charge Pressure	1/4" BSPP
P1 - P2	Pilot pressure pump 1	1/4" BSPP
P3 - P4	Pilot pressure pump 2	1/4" BSPP

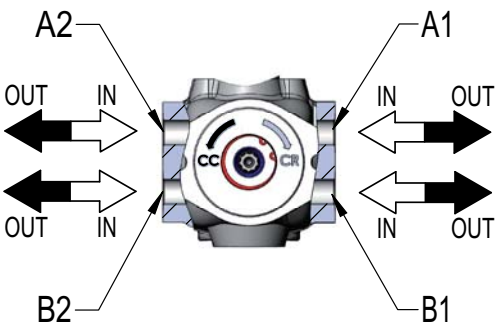
INTEGRATED REMOTE HYDRAULIC SERVO CONTROL (COMPACT VERSION) SHIC



The variation in pump displacement is obtained by adjusting the pressure on the P1-P2-P3-P4 servo control connections by means of a hydraulic proportional joystick (containing pressure reduction valves). The joystick supply can be obtained by taking pressure from the auxiliary pump (G connection). The servo control feedback time can be adjusted by inserting a restricter on the joystick supply line (0,5 ÷ 1,2 mm). The servo control operation curve in both control directions goes from 4 to 18 bar (tolerance ± 5%). The adjustment curve of the hydraulic control system has to be wider (4 ÷ 20 bar).

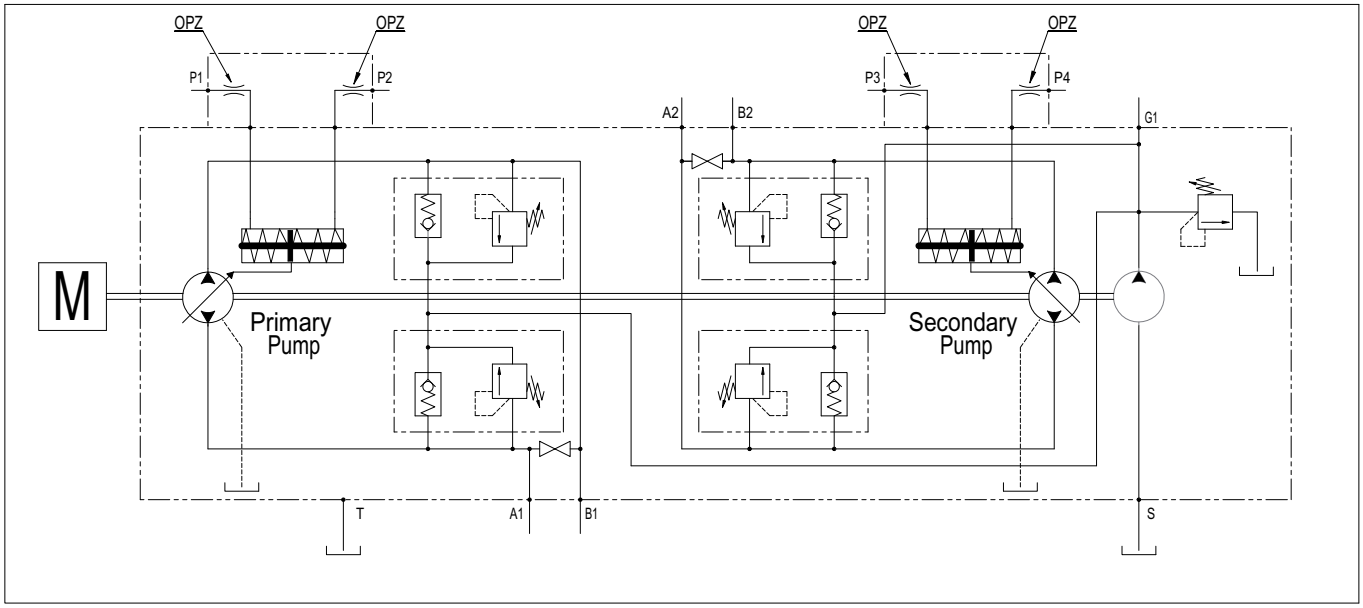
Installation Drawing





INTEGRATED REMOTE HYDRAULIC SERVO CONTROL (COMPACT VERSION) SHIC

Hydraulic Diagram

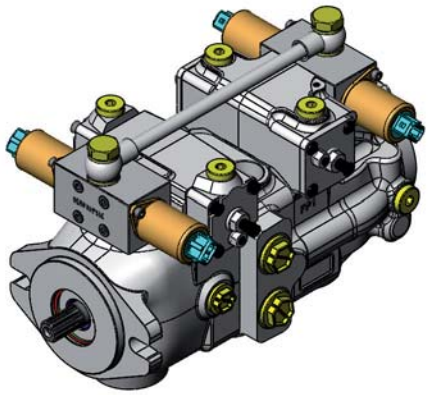


Flow Direction	Primary Pump			Secondary Pump		
Pump Rotation	Pilot Pressure	Flow Out	Flow In	Pilot Pressure	Flow Out	Flow In
Clockwise R	P_1 P_2	B_1 A_1	A_1 B_1	P_3 P_4	A_2 B_2	B_2 A_2
C. Clockwise L	P_1 P_2	A_1 B_1	B_1 A_1	P_3 P_4	B_2 A_2	A_2 B_2

Pipe connection		
A1 - B1	Main ports pump 1	1/2" BSPP
A2 - B2	Main ports pump 2	1/2" BSPP
T	Drain	3/8" BSPP
S	Suction	1/2" BSPP
G1	Charge Pressure	1/4" BSPP
P1 - P2	Pilot pressure pump 1	1/4" BSPP
P3 - P4	Pilot pressure pump 2	1/4" BSPP

ELECTRIC REMOTE PROPORTIONAL SERVO CONTROL SEI

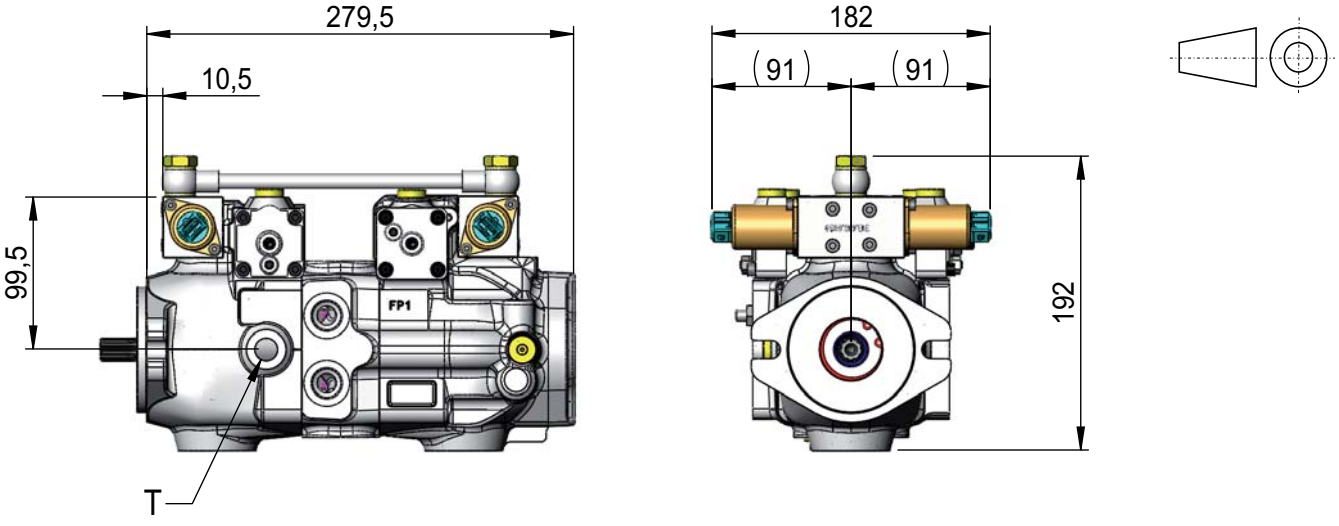
SEI 1.3 (12V DC)
SEI 2.3 (24V DC)

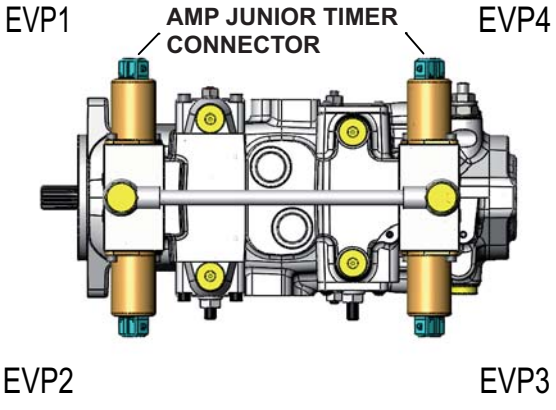


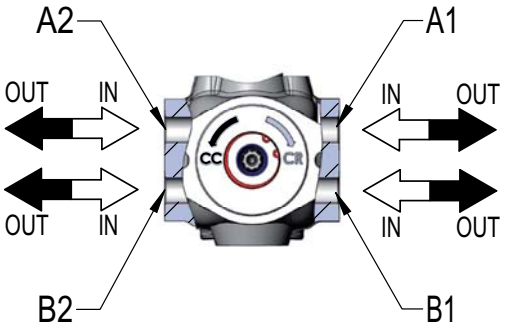
The pump displacement variation
is obtained by an electric signal, which varies:

- from 0 to 750 mA (supply voltage 24V DC)
- from 0 to 1500 mA (supply voltage 12V DC)

Installation Drawing



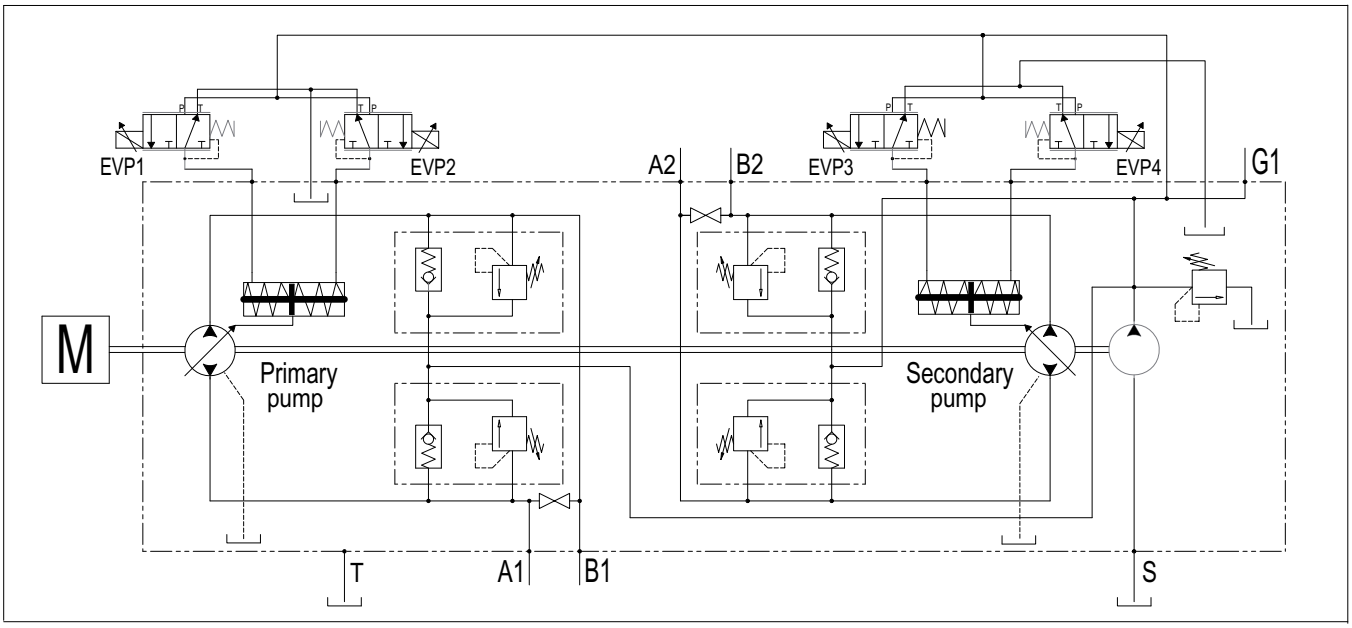




Flow Direction	Primary Pump			Secondary Pump		
Pump Rotation	EVP	Flow Out	Flow In	EVP	Flow Out	Flow In
Clockwise R	EVP1 EVP2	B_1 A_1	A_1 B_1	EVP3 EVP4	A_2 B_2	B_2 A_2
C. Clockwise L	EVP1 EVP2	A_1 B_1	B_1 A_1	EVP3 EVP4	B_2 A_2	A_2 B_2

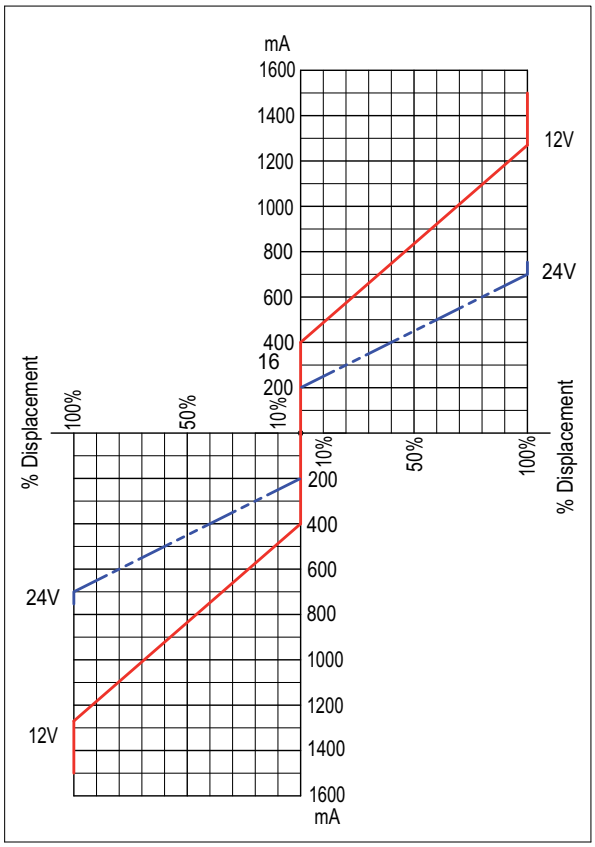
ELECTRIC REMOTE PROPORTIONAL SERVO CONTROL SEI

Hydraulic Diagram



Proportional Solenoid Technical Data

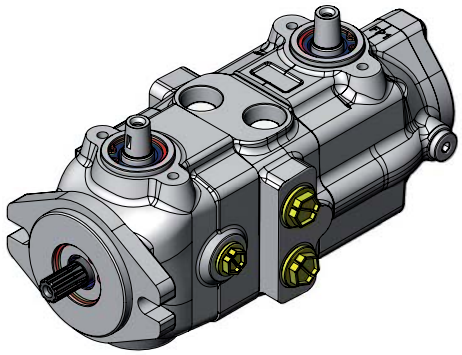
CURRENT-DISPLACEMENT GRAFIC



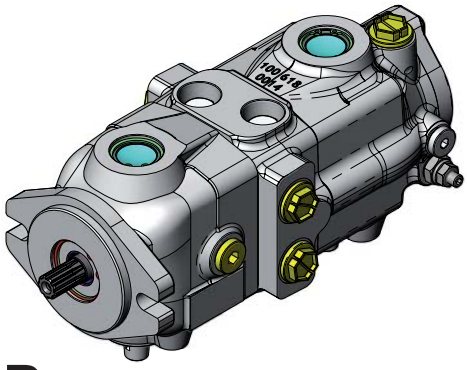
Hydraulic Data	
Max Pressure (P, T)	pP = 50 bar, pT = 30 bar
Hysteresis (w/ PWM)	< 0.7 bar (pA=20) < 1.0 bar (pA=25) < 1.5 bar (pA=35)
Filter Screen	125 µm
Contamination Level	Min Filtration: 20/18/15 According to ISO 4406
Fluid	Mineral Oil According to DIN 51524
Temperature Range Fluid	-40 to +105°C

Electrical Data		
Voltage	12V	24V
Current	1500 mA	750 mA
Resistance	4.72 Ω ± 5%	20.8 Ω ± 5%
Type of Control	Current Control PWM 100 Hz Recommended	
Connector	AMP Junior Timer	
Protection Class	Up to IP6K6 / IPX9K	

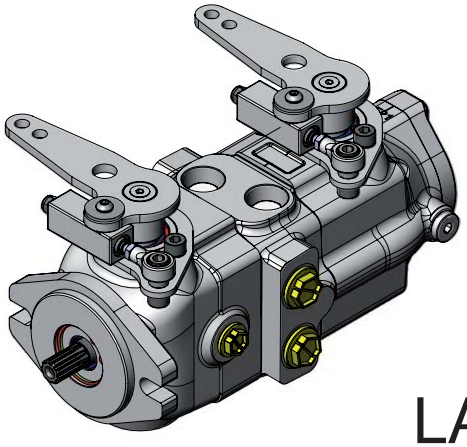
CONTROL DEVICE POSITION - Primary and Secondary Pump



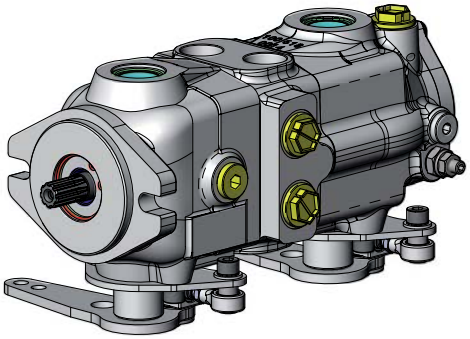
OA



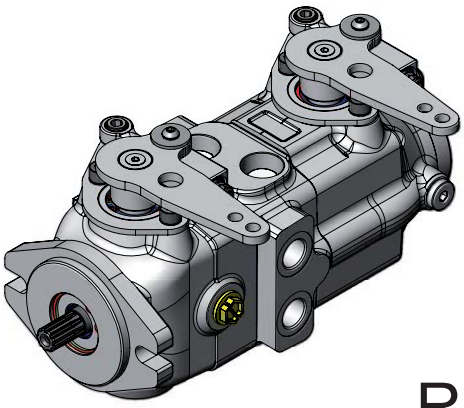
OB



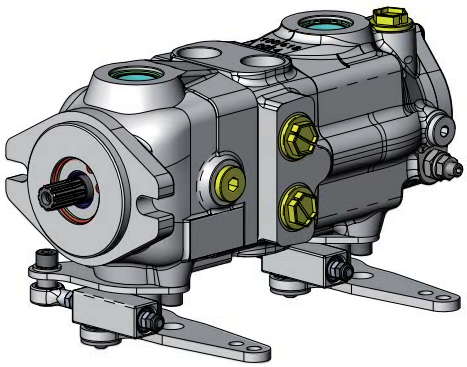
LA



LB



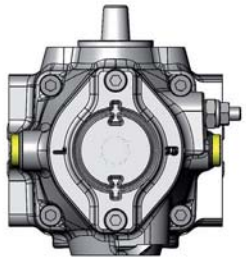
RA

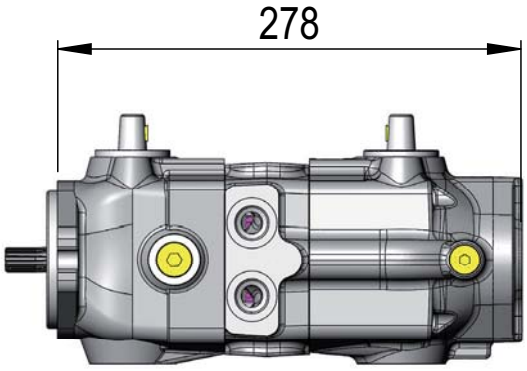


RB

REAR PUMP MOUNTING FLANGES

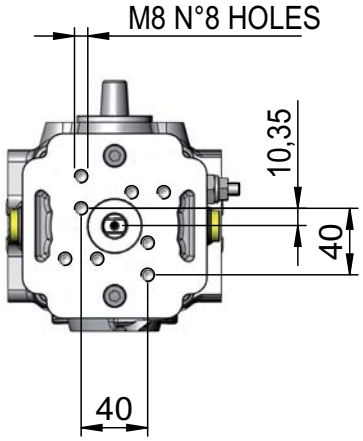
C - Closed Cover (without rear fitting)

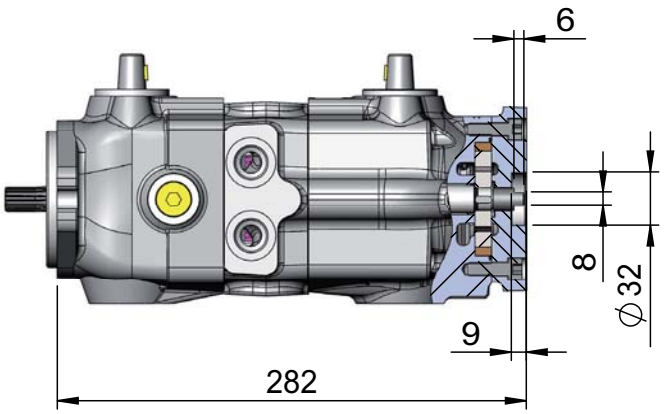




B1 - German Standard

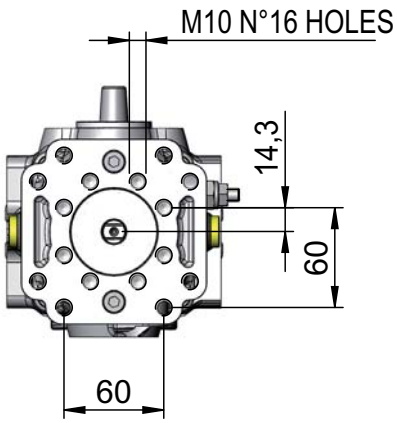
Four possible mounting positions (every 90°) **Max. torque = 70 Nm**

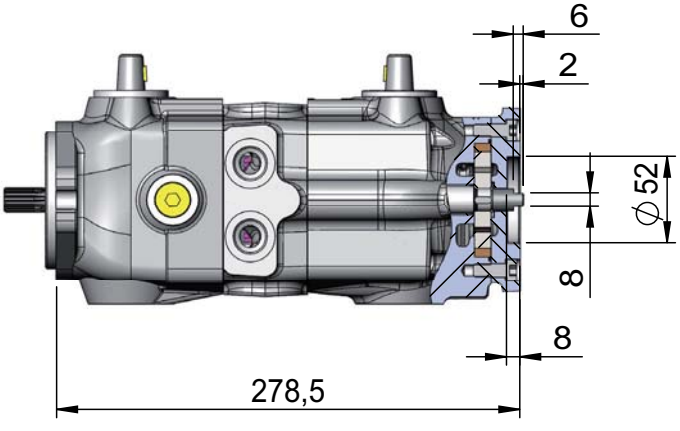


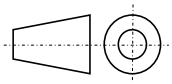


B2 - German Standard

Four possible mounting positions (every 90°) **Max. torque = 70 Nm**





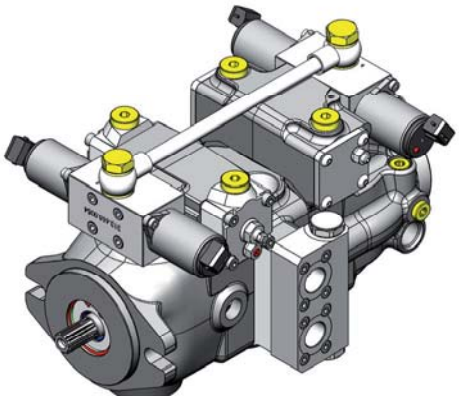


OPTIONAL

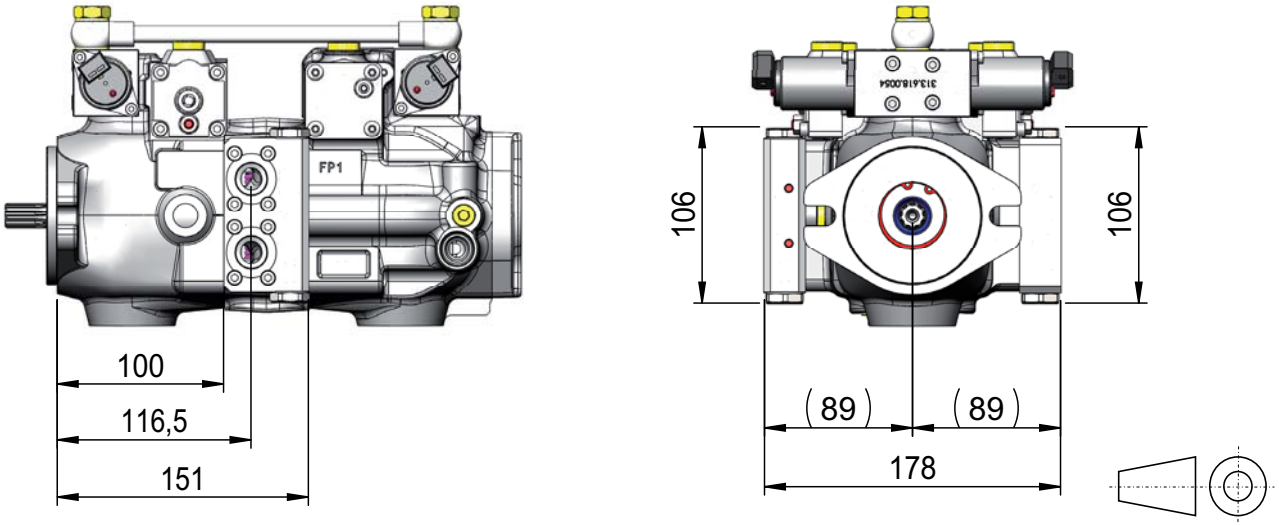
Purge Valve VS

All Version

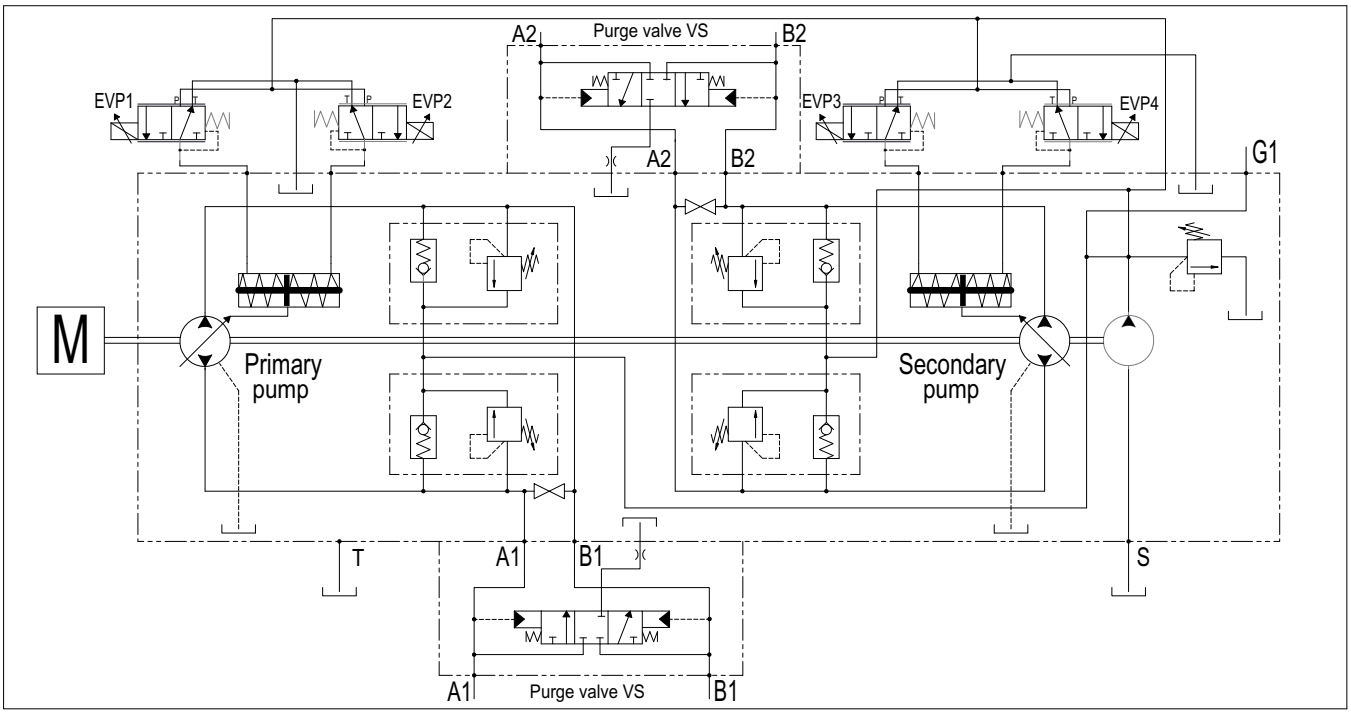
Subtracting warm oil from the closed circuit, the purge valve allows the flow of cool fluid from the charge system.
Oil flow for cooling = 4,5 lt/min. at 3000 n/min.



Installation Drawing



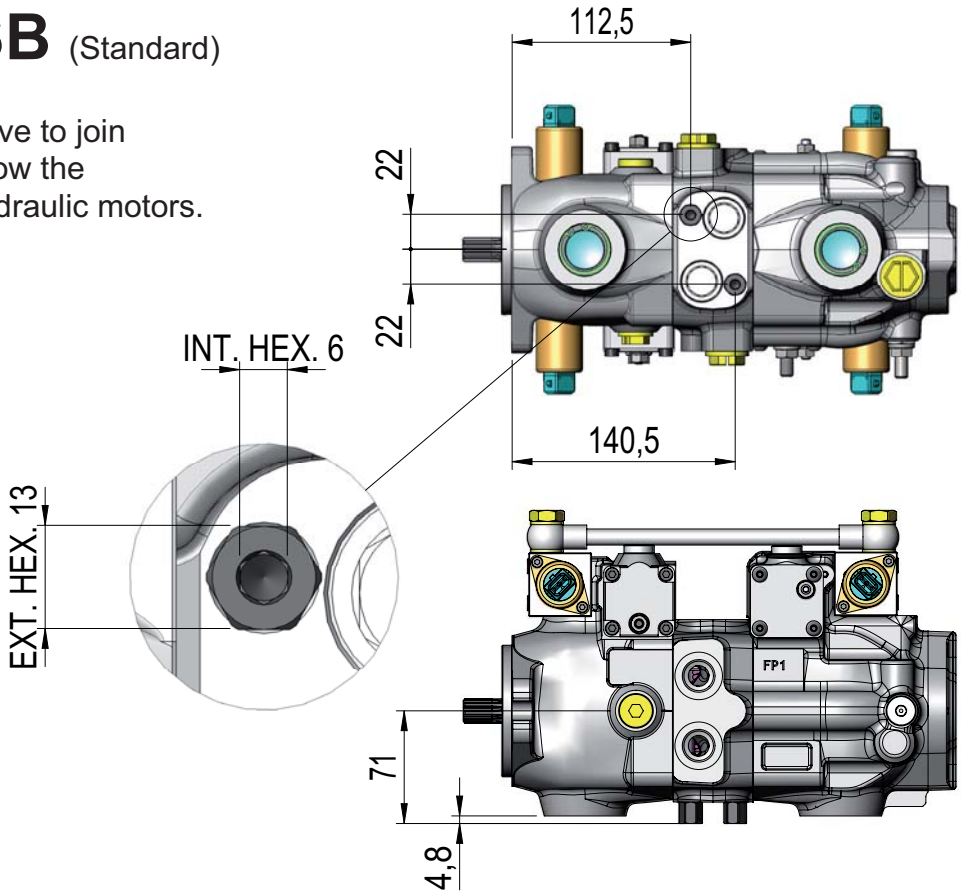
Hydraulic Diagram



OPTIONAL

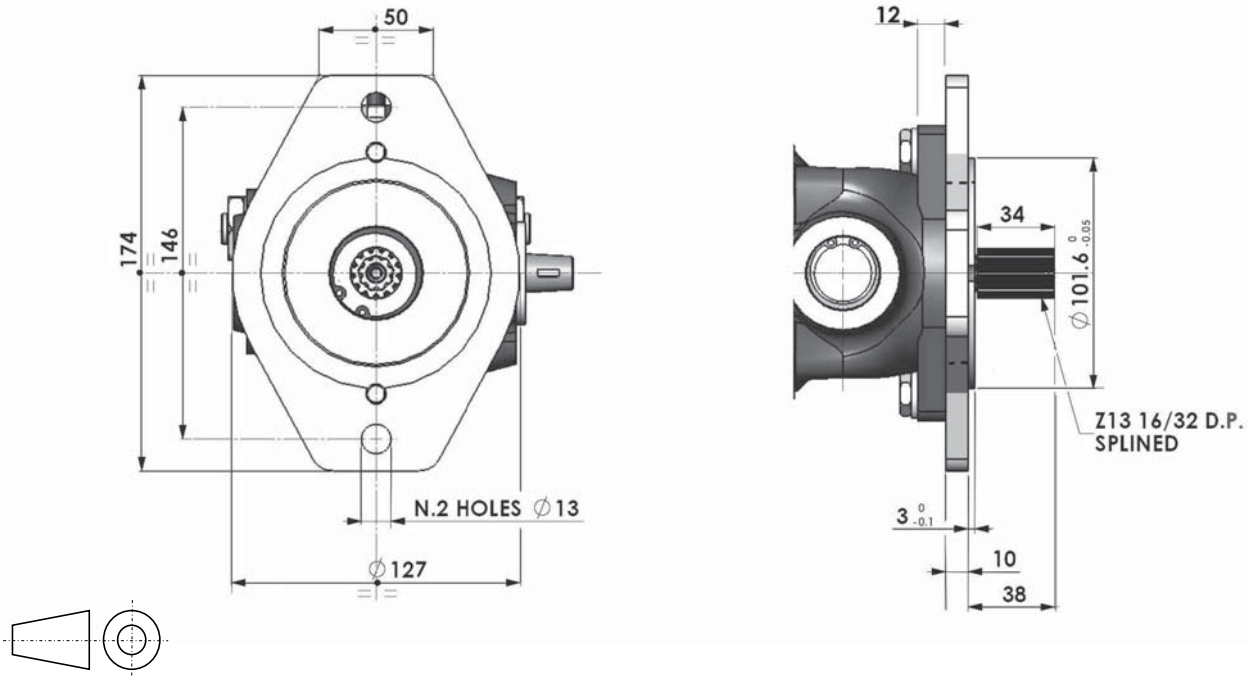
Screw By-Pass **SB** (Standard)

Internal screw drive valve to join the A and B ports to allow the free-wheeling of the hydraulic motors.



Adaptor flange from SAE A to SAE B **FB**

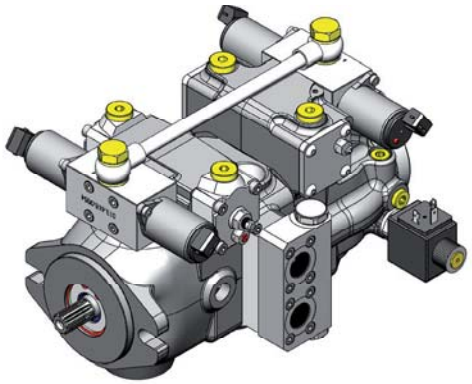
Adaptor coupling Z=9 / Z=13 - 16/32" DP **ST**



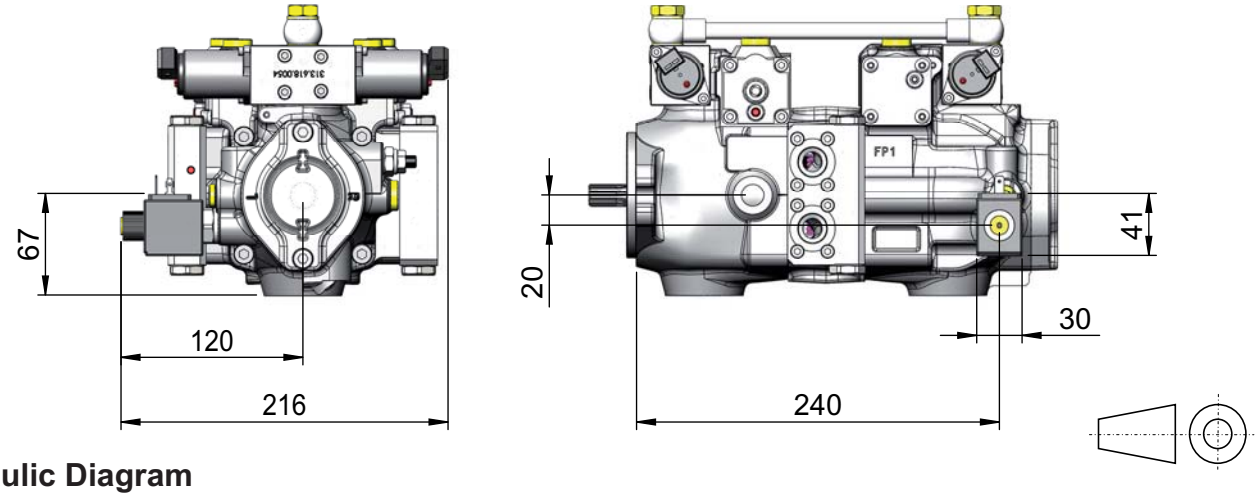
OPTIONAL

Man on board **MOB**

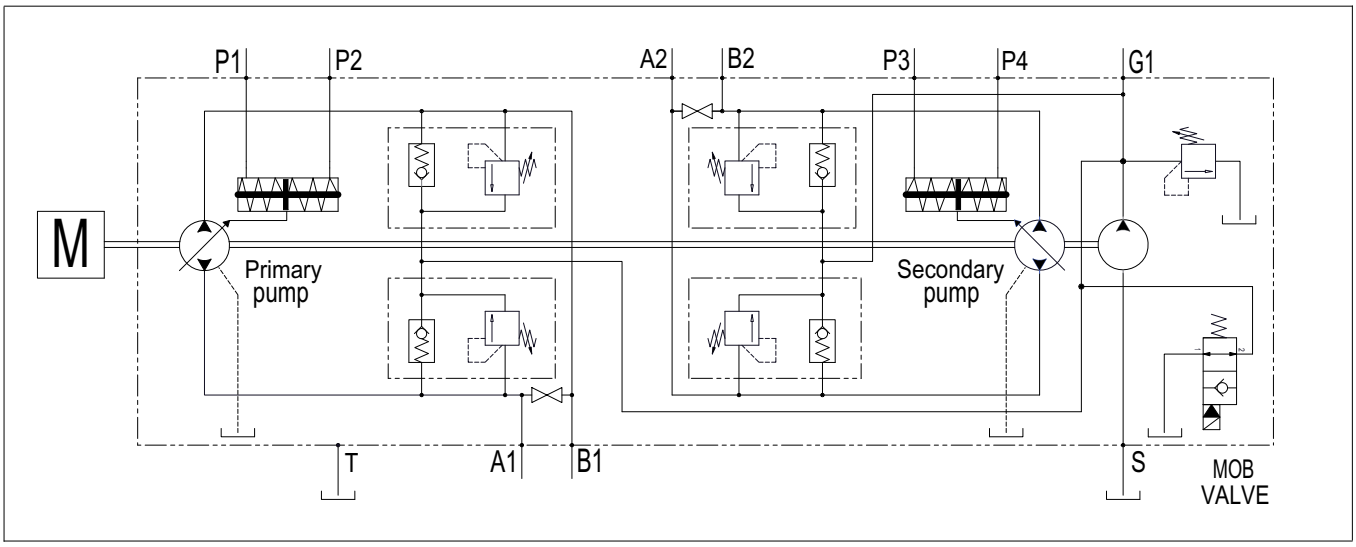
Only SHI - SEI Servo Control



Installation Drawing

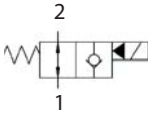


Hydraulic Diagram



MOB Valve - Hydraulic Technical Data

Maximum operating pressure: 300 bar
Maximum flow: 40 lt/min.
Internal leakage: max. 5 drop / min. at 300 bar
Response time: Energized 20 msec.
De-energized: 30 msec. (tipical 24 VDC coil)
Temperature: -30°C to 110°C

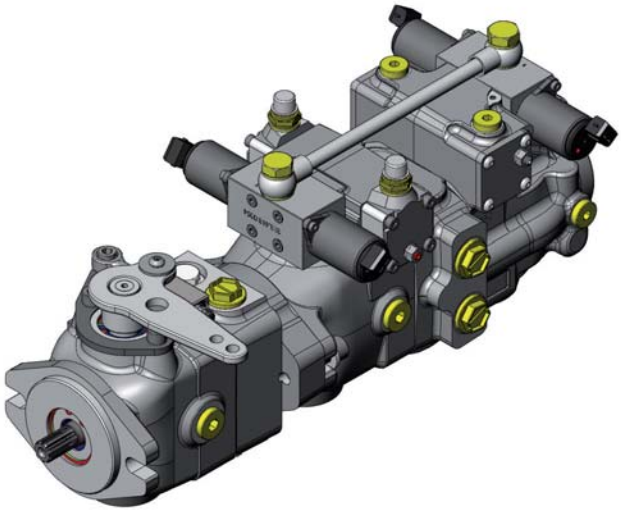


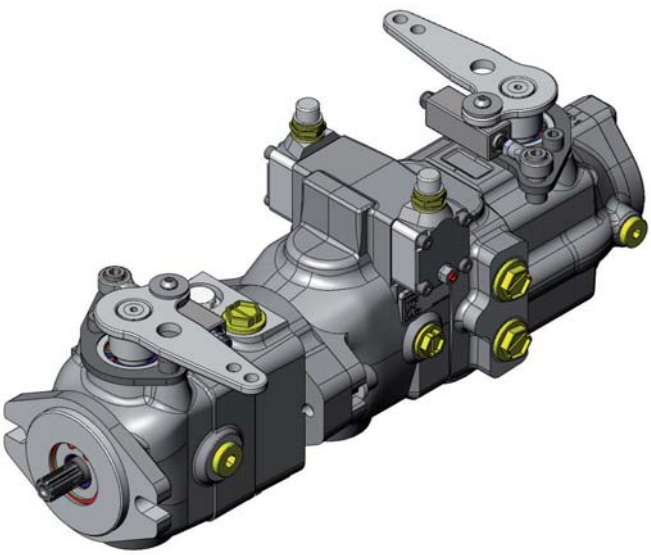
MOB Valve - Electric Technical Features

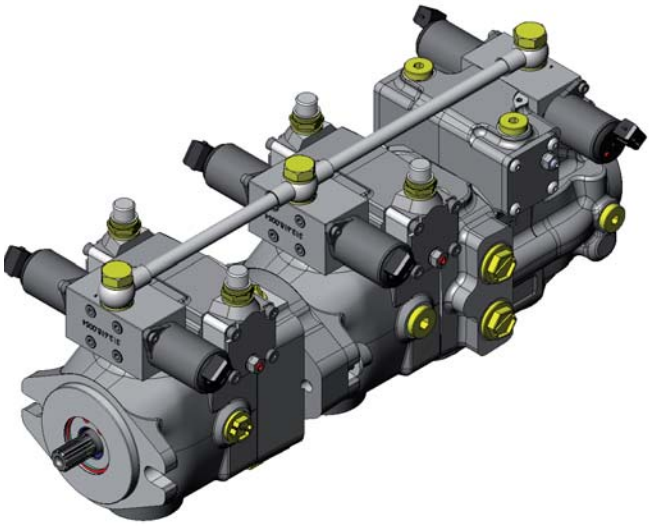
Power: 18 W
Various voltage option available (both AC/DC)
Wire insulation: Class H
Duty factor: ED 100%
Supply power tolerance: +10%, -5% (DC)
+10%, -5% (AC)
Temperature: -30°C to 60°C
Several connection option available

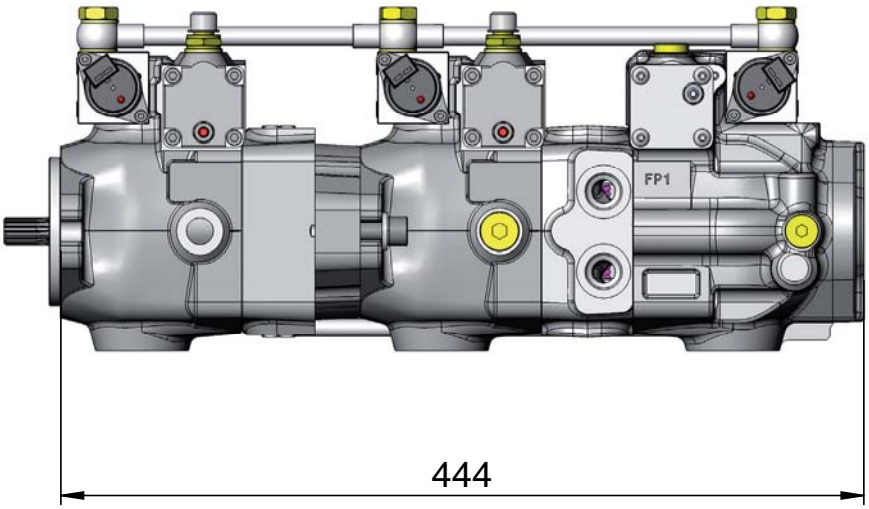
TRIPLE PUMP

Assembly example for TRIPLE PUMP









ACCESSORIES

Hydraulic Gear Pump German Standard B1
Hydraulic Gear Pump German Standard B2

For more detailed information ask for catalogue HT 15 F ...

Hydraulic Remote Servo Controls

For more detailed information ask for catalogue HT 73 B ...

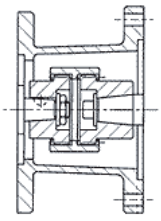
Electric Remote Servo Controls

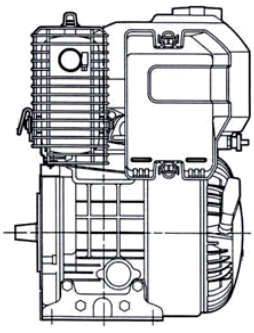
For more detailed information ask for catalogue HT 150 A ...

Flanges and Couplings for Gasoline and Diesel Engines

GASOLINE OR DIESEL ENGINES

FLANGES AND COUPLINGS





For more detailed information ask for specific catalogue

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

If the catalogue does not supply all the information required, please contact HANSA-TMP.
In order to provide a comprehensive reply to queries we may require specific data regarding the proposed application.

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

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

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