



HYDRAULIC COMPONENTS
HYDROSTATIC TRANSMISSIONS
GEARBOXES - ACCESSORIES

Certified Company ISO 9001 - 14001



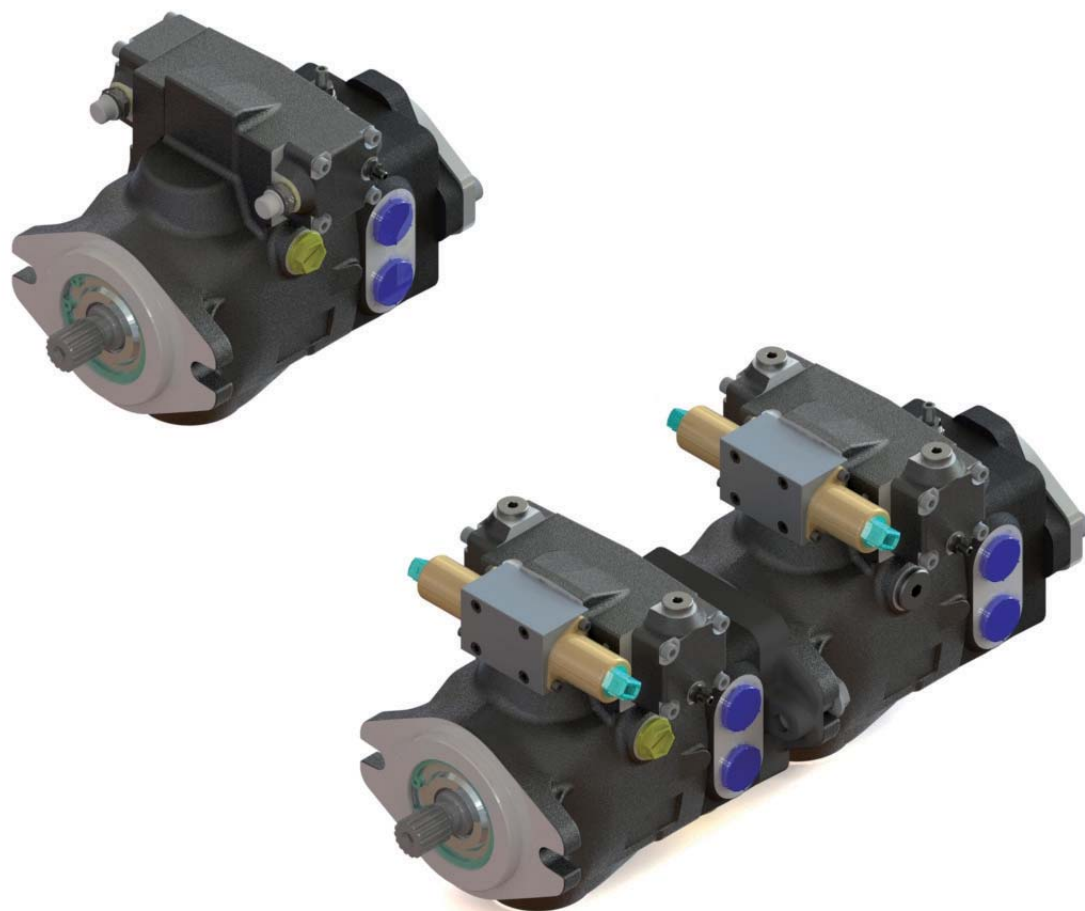
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HT 16 / M / 2003 / 0516 / E

THE PRODUCTION LINE OF HANSA-TMP

Variable Displacement Closed Loop System Axial Piston Pump

TPV 4300



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GENERAL INFORMATION

- The new TPV-TPVT 4300 are variable displacement axial piston pumps with swash-plate system, for closed loop hydrostatic transmissions, that offer the best power to weight ratio because of new innovative design and production technologies.
- The flow rate is proportional to the rotation speed and is continuously variable according to the angle of the swash-plate from "0" to maximum displacement.
- The TPV-TPVT 4300 is equipped with a boost pump, "gerotor" type of new design and high efficiency to keep the circuit pressurised, to compensate the oil leakages of the hydrostatic transmission, to avoid cavitation of the piston pump and to supply low pressure oil flow to the remote controls of the pumps and of the hydraulic transmission (max 3 MPa).
- Different types of hydraulic or electro-proportional controls are available for remote regulation of the pump displacement by means of hydraulic or electric joysticks.
The mounting flange is according to SAE-B 2 bolt, the through-drive is according SAE-A 2 bolt.
Different other optionals are available for the TPV-TPVT 4300.
- The piston pumps are to be considered as individual components for the purposes of Directive 98/37/EC, therefore have been built to be integrated into a circuit or to be assembled with other components to form a machine or system. They can be operated only after they have been installed in the machine/system which they are intended for.
- The TPV-TPVT 4300 pumps must be used to create, manage and regulate oil flow in a closed loop system. Any other use should be considered improper.
- The pumps are built according to the technology normally used for this type of product. There is the risk of injury or damage to personnel during their installation and use if you do not respect the normal safety instructions or if used by untrained personnel.

TECHNICAL SPECIFICATIONS

The housing and the distributor of the pumps TPV-TPVT 4300 are made in cast iron.

The flow rate is proportional to the rotation speed and the displacement is continuously variable. It increases as the swash-plate angle moves from "0" to maximum position.

If the swash-plate is positioned out of the neutral position, the flow respectively follows one of the two directions.

Typical applications

- construction equipments
- green mowers
- zero turn machines
- agricultural machines
- utility vehicles
- forest vehicles
- logistic machines

Key features

- compact design
- integrated optionals
- high power to weight ratio
- low noise integrated boost pump

PUMP MODEL		TPV 32	TPV 38	TPV 45	TPV 50
Theoretical max. displacement	cm ³ /n	32	38	45	50
Flow rating ⁽¹⁾	l/min	115	137	162	180
Power rating ⁽¹⁾	kW	48	57	67,5	75
Boost pump displacement	cm ³ /n	14			
Rated pressure	MPa	28			
Max. pressure	MPa	32			
Boost pressure ⁽²⁾	MPa	1,5-2,6			
Absolute suction pressure ⁽³⁾	MPa	> = 0,08			
Cold start absolute suction pressure	MPa	> = 0,05			
Max. case pressure	MPa	0,15			
Moment of inertia	kgm ²	0,0029			
Minimum speed	n/min	700			
Rated speed	n/min	3.600			
Max. speed	n/min	3.900			
Max. fluid temperature	°C	80			
Fluid viscosity	cSt	15-35			
Fluid contamination		19/17/14 ISO 4406 (NAS 8)			
Mass (single pump with hydr-servo)	kg	24			
Mass (tandem pump with hydr-servo)	kg	49,5			

(1) $[V_{max} - \eta_{max}]$

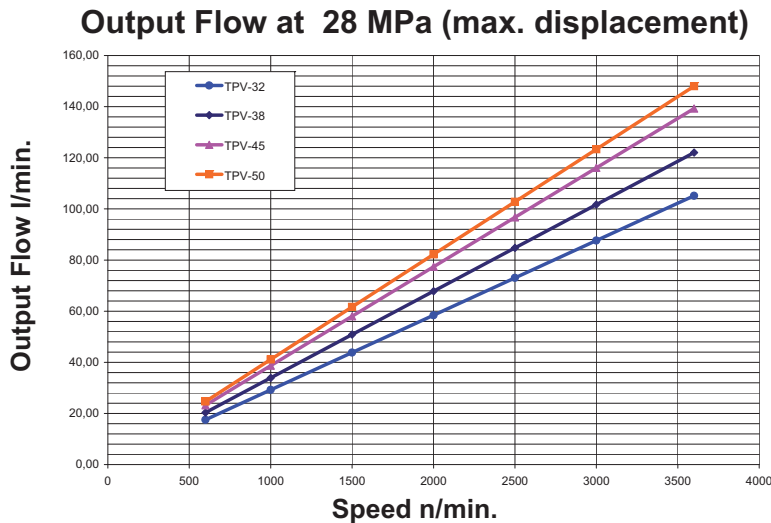
(2) 1.500 n/min

(3) $v \leq 30 \text{mm}^2/\text{s}$

SYSTEM DESIGN PARAMETERS

HYDRAULIC MEASURE	USEFUL FORMULAS	CONVERSION FACTORS
Flow rate: Q = (l/min)	$Q = V [cm^3/n] \times \eta_v \times n \times 10^{-3}$	1 l/min = 0,2641 US Gal/min
Pressure: P = (MPa)		1 MPa = 145 PSI
Displacement: V = (cm ³ /n)		
Torque: M = (Nm)	$M = \frac{\Delta p [MPa] \times V [cm^3/n]}{6.283 \times \eta_m}$	1 Nm = 8,851 in lbs
Power: P = (kW)	$P = \frac{\Delta p [MPa] \times V [cm^3/n] \times n}{60 \times 1000 \times \eta_t}$	1 KW = 1,36 HP
Shaft speed: n = n/min		
Hydraulic efficiency: = η_v		
Mechanical efficiency: = η_m		
Overall efficiency: = η_t		
		1 mm = 0,0394 in
		1 kg = 2,205 lbs
		1 N = 0,2248 lbs

PERFORMANCE DIAGRAM



Performance diagrams

- The diagrams show the data of maximum speed and maximum continues pressure.
- Data may vary depending on pump displacement.

Pressure

- Continuous pressure: is the average pressure for continuous work, which must not be exceeded, to ensure a correct and long lasting service of the pump.
- Maximum pressure: is the maximum allowable pressure for short periods and must never be exceeded.

Speed

- Continuous work speed: is the maximum

recommended speed for continuous operation of the pump under full load.

- Maximum speed: is the maximum permissible speed for the pump for short periods and not fully loaded. The use of the pump with this speed can reduce the life and cause a loss of power or of the hydrostatic braking capacity.

Caution

Any damage caused to the pump can reduce or eliminate the hydrostatic braking capacity. It is therefore necessary to provide an auxiliary braking system capable of stopping and supporting the weight of the complete machine, in the event of loss of hydrostatic power.

INSTALLATION INSTRUCTIONS

Standards for the installation, start up and maintenance

- When mounting the pump above the minimum level of the tank, distance of the highest point of the pump over the oil level **MUST NOT** exceed 250 mm.
- To reduce the noise level typical of all piston pumps we recommend:
 - use hoses instead of pipes
 - limit to a minimum the length of eventual pipes
 - fix rigid pipe sections with special supports equipped with rubber vibration dampening devices
 - use pipes and hoses with a diameter according to the speed values below:

Suction line = $0,6 \div 1,2$ m / s

Drain = $1,5 \div 3,6$ m / s

Pressurized lines = max 6 m / s

- To calculate the speed of the oil in the lines refer to the formula below:

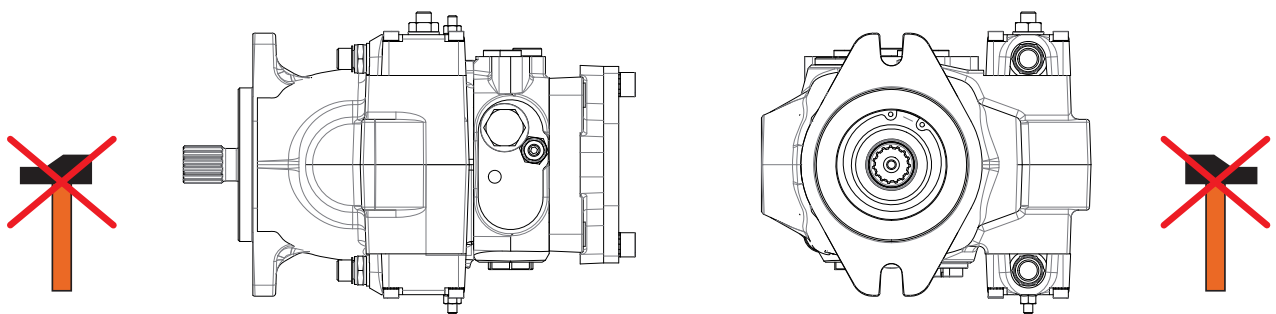
$$V = Q * 21,22 / D$$

V = speed (m/s)

Q = flow rate (l/min)

D = internal pipe/hose diameter (mm)

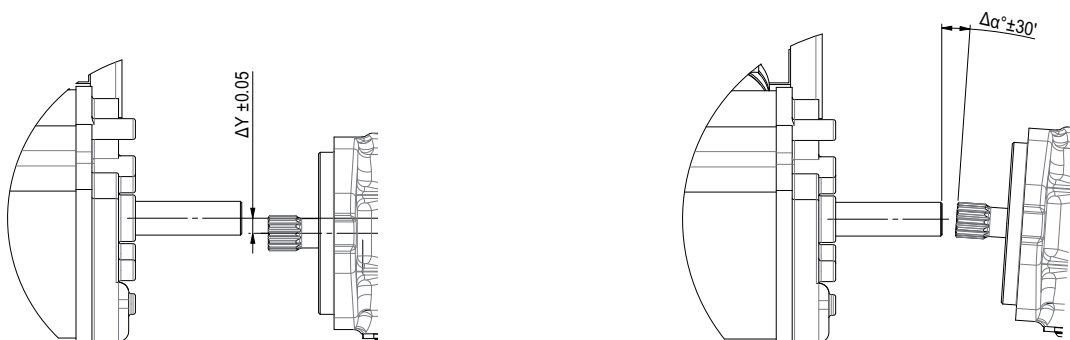
- In any case **NEVER** use pipes/hoses or fittings with diameter smaller than that of the corresponding ports on the pump. This indication is **ABSOLUTELY OBLIGATORY** for the drain line to avoid to pressurize the pump housing and extrude the lip seal of the pump shaft.
- During mounting cure the alignment of the pump, concentric with the drive shaft sleeve to prevent overloading of the bearing. See page 10.
- For the hydraulic system, we recommend using pipes/hoses washed internally with hydraulic oil or, even better, with solvent.
- Special care must be taken when cleaning the inside of the tank (painting is recommended after sand blasting).
- To improve the functionality of the boost pump, it is recommended to place it below minimum tank level.
- The pumps can be installed in any direction and position.
For further information contact our Technical Department.



(continued)

INSTALLATION INSTRUCTIONS**Shaft Coupling**

To connect the pump shaft to the engine flywheel or electric motor shaft use a flexible



coupling. The alignment must be within the tolerances indicated in the figures above. For an optimal function of the pump the shaft should not be subjected to radial or axial loads. During the installation or removal, do not force the coupling of the pump shaft, but always use the threaded hole on the shaft.

Start up

- Before starting fill the tank and the other components with new filtered oil. You should run a flushing of the complete hydraulic system (see Use and Maintenance Manual). Check that the low pressure value is correct (refer to the Use and Maintenance Manual).
- Restore the oil level in the tank.

Maintenance

- The first oil change should be made after 500 hours of operation. Later change the oil every 2000 hours.
- The first replacement of the filter cartridge has to be made after 50 hours for a preliminary circuit cleaning. Then after further 500 hours.
- These frequencies have to be reduced in the case where the indicator shows the clogging of the filter cartridge and in case of operation in environments with a high level

of contamination.


CAUTION

- Always work with the utmost attention to the moving parts; do not use loose or fluttering clothing.
- Do not approach rotating wheels, tracks, chains or shafts if not properly protected, or when they may start moving without notice.
- Do not loosen or disconnect fittings and pipes/hoses while the engine is running.
- Avoid oil leaks in order to prevent environmental pollution.

Load capacity of rear shaft (through drive shaft)

- The rear shaft is not able to carry radial loads.

HYDRAULIC FLUID

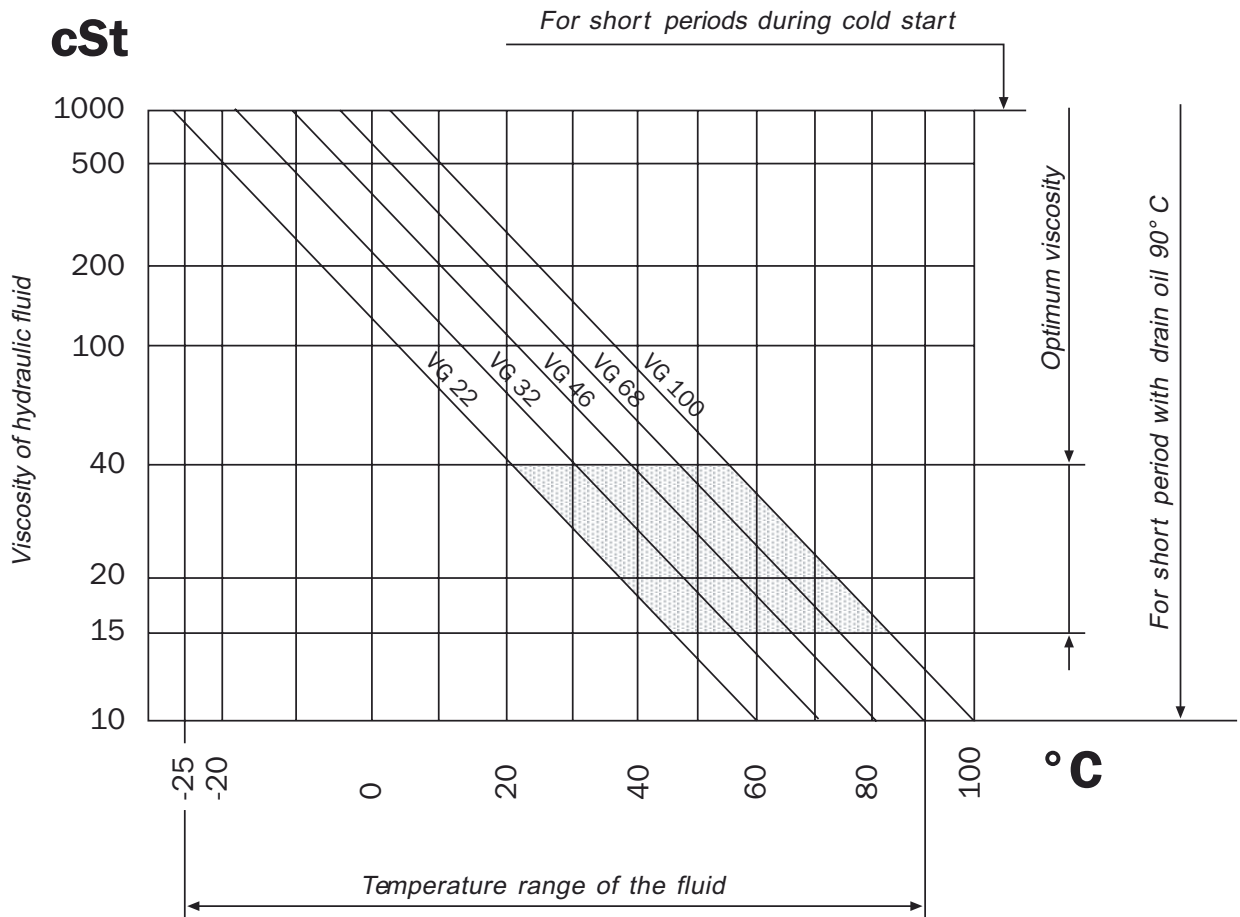
Viscosity

The maximum duration and the maximum efficiency are related to the optimum range of viscosity.
Optimal operating viscosity 15 ÷ 40 cSt referred to the temperature of the closed circuit.

and with the maximum temperature of the drain oil at 90 °C.
Max. viscosity = 1000 cSt for a few seconds, only during cold starting.

Working conditions

For working conditions apply the following limits:
Minimum viscosity = 10 cSt for short moments



HANSA - TMP cannot be held responsible concerning non compliance of these instructions and observance of safety regulations, although not covered by this document.

HYDRAULIC FLUID FILTRATION

The contaminating particles suspended in the hydraulic fluid cause the wear of the hydraulic mechanisms moving parts.

On hydraulic pumps these parts operate with very small dimensional tolerances.

In order to prolong the parts life, it is recommended to use a filter that maintains the hydraulic fluid contamination class at max.

8 according to NAS 1638

5 according to SAE, ASTM, AIA

19/17/14 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:

$$\beta_{(x)} 20 \div 30 \geq 75$$

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 pump performances; as a consequence, it is important to observe a max. contamination level of:

7 according to NAS 1638

4 according to SAE, ASTM, AIA

18/16/13 according to ISO 4406

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

Suction filters

The suction filters must have a clogging indicator and bypass. The max. pressure drop of the filtration element must not exceed 0,04 absolute MPa (0,08 absolute MPa with cold start).

Filter assembling

The suction filter is mounted in the suction line. Check that the pressure before the boost pump is 0,08 absolute MPa, measured on the

pump suction port (0,05 MPa for cold starting).

TPV 4300

VARIABLE DISPLACEMENT AXIAL PISTON PUMP



ORDER CODE _____

4300 0	TPV 1	32 2	CR 3	SS5 4	F2.1 5	SHI 6	OA 7	15 8	14 9	SA 10	000 11	SB 12
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Pag.

4300	0 - Pump series = TPV pump 4300	
TPV	1 - Pump model = Closed loop circuit pump	
	2 - Pump displacement pump 32 = 32 cm ³ /n 38 = 38 cm ³ /n 45 = 45 cm ³ /n 50 = 50 cm ³ /n	
CR	3 - Pump rotation = Clockwise Rotation (right)	
SS5	4 - Shaft (mounting side) = Splined shaft Z15 - 16/32 D.P	17
F2.1	5 - Mounting side flange = SAE B 2 holes - pilot diam. 101,6 mm.	17
SHI	6 - Control devices = Hydraulic servo control	18
SEI1.3	= Electro-proportional servo control 12V DC (AMP junior timer connector)	20
SEI2.3	= Electro-proportional servo control 24V DC (AMP junior timer connector)	20
SEI1.3D	= Electro-proportional servo control 12V DC (Deutsch connector)	23
SEI2.3D	= Electro-proportional servo control 24V DC (Deutsch connector)	23
OA	7 - Control devices position = Position A	
OB	= Position B (for SEI... versions available on request, please, contact our technical department for details)	
	8 - Relief valve settings 15 = 15 MPa 18 = 18 MPa 20 = 20 MPa 25 = 25 MPa 30 = 30 MPa 35 = 35 MPa	
00	9 - Boost pump = Without boost pump	
14	= Standard boost pump 14 cm ³ /n - pressure 2 MPa (1000 n/min)	
14XX	= Boost pump 14 cm ³ /n - pressure 2 ÷ 3 MPa (1000 n/min) available on request, please contact our technical department for details	
SA	10 - Rear pump connection options = SAE A 4 holes mounting flange (female shaft)	26
SB	= SAE B 2 holes mounting flange (female shaft)	26
C-SA	= Closed (without rear fitting)	27
000	11- Auxiliary gear pump displacements = Without pump	
	Group 2 SAE A 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 230 = 30,0 cm ³ /n 240 = 40,0 cm ³ /n	

(continued)

ORDER CODE _____

Group 3 SAE B

315 = 15,0 cm ³ /n	318 = 18,0 cm ³ /n	321 = 21 cm ³ /n	327 = 27,0 cm ³ /n
332 = 32,0 cm ³ /n	338 = 38,0 cm ³ /n	343 = 43,0 cm ³ /n	347 = 47,0 cm ³ /n
351 = 51,0 cm ³ /n	354 = 54,0 cm ³ /n	361 = 61,0 cm ³ /n	364 = 64,0 cm ³ /n
370 = 70,0 cm ³ /n	374 = 74,0 cm ³ /n	390 = 90,0 cm ³ /n	

12 - Optional

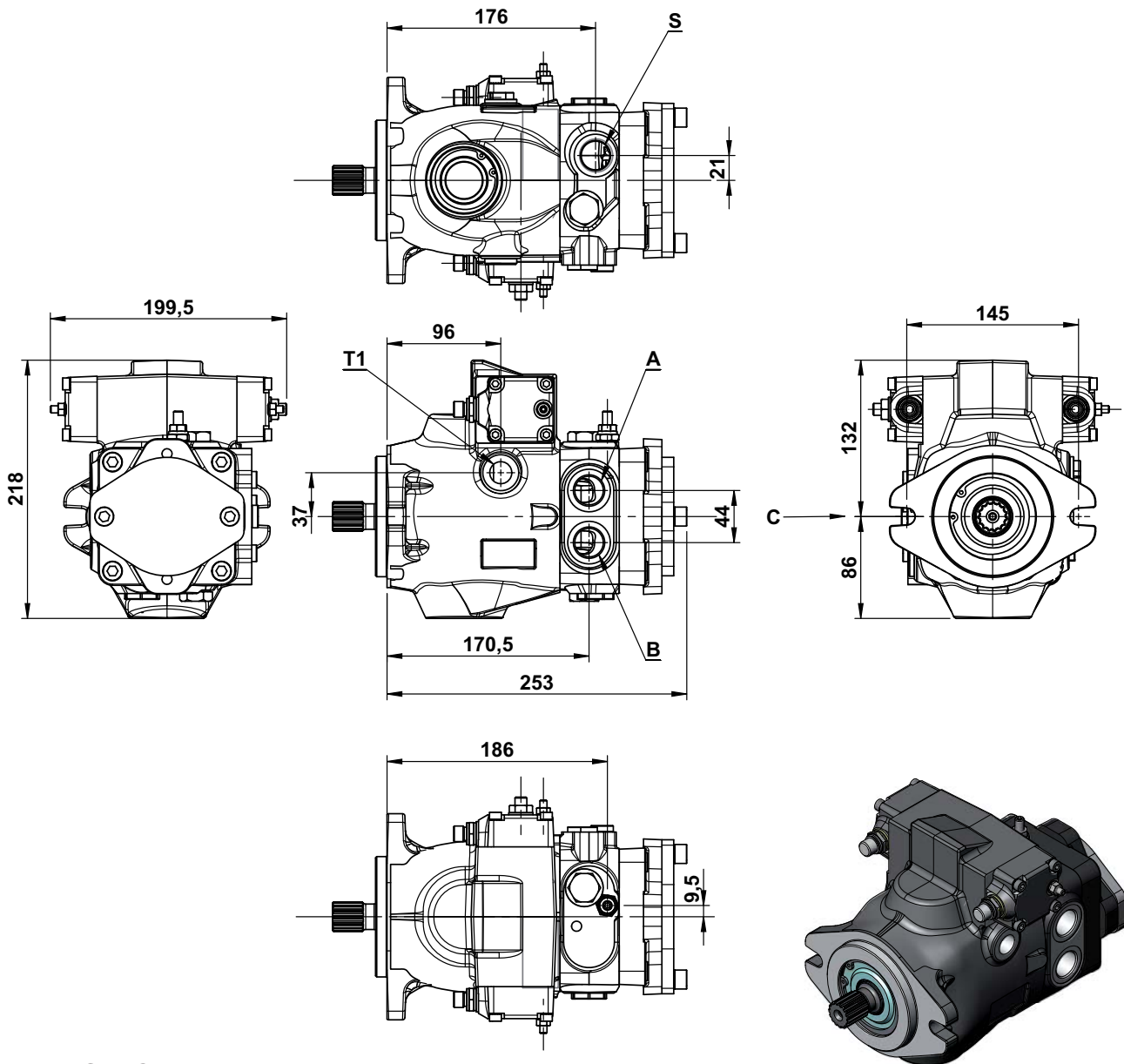
00	= Without optional	
SB	= Screw by-pass (Standard)	28
MOB1	= Man on board solenoid valve 12V DC	29
MOB2	= Man on board solenoid valve 24V DC	29
G/J/M/-	= Port threads and restrictor diameter	

	Servo control type	Port threads	Symbol
STANDARD	SEI	Plugged	-
	SHI	1/4" BSPP	G
ON REQUEST	SHI	JIC (7/16" - 20)	J
	SHI	METRIC (M12x1,5)	M

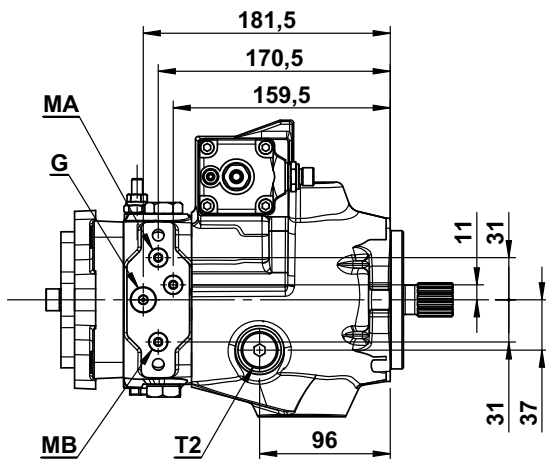
Restrictor diameter (SHI/SEI)	
-	Without restrictor
06	Restrictor orifice ø 0,6 mm
08	Restrictor orifice ø 0,8 mm
10	Restrictor orifice ø 1,0 mm
12	Restrictor orifice ø 1,2 mm
16	Restrictor orifice ø 1,6 mm
20	Restrictor orifice ø 2,0 mm

Example G/08 = 1/4" BSPP port threads and Ø 0,8 mm restrictor (SHI)
 Example -/08 = Ø 0,8 mm restrictor (SEI)

GENERAL DIMENSIONS/PUMP PORTS



VIEW FROM C



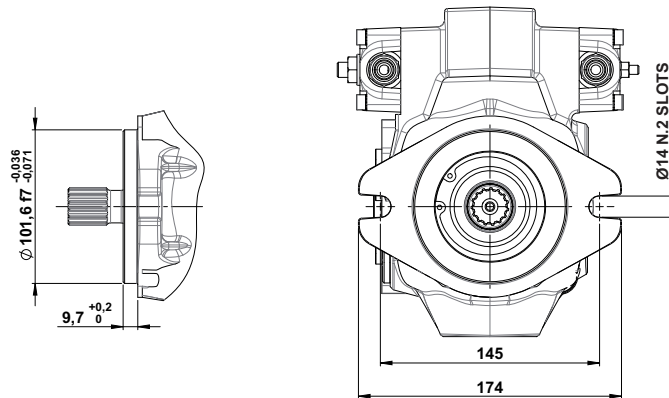
PORTS		
A - B	Main pressure ports	3/4" BSPP
T1 - T2	Drain	1/2" BSPP
S	Suction	3/4" BSPP
G	Boost pump pressure gauge port	1/4" BSPP
MA - MB	Pressure gauge ports	1/8" BSPP



SHAFT OPTION AND MOUNTING FLANGE

F2

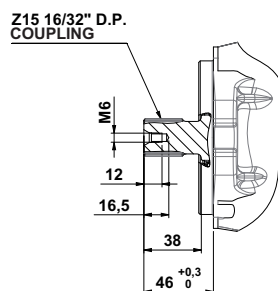
FLANGE SAE B - 2 BOLT



SS5

SPLINED SHAFT SAE-BB Z = 15

Max. torque = 450 Nm



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



SHI

HYDRAULIC SERVO CONTROL

The pump displacement variation is obtained by adjusting the pressure on P1 and P2 servo control ports by means of a hydraulic proportional joystick (with integrated pressure reducing valves).

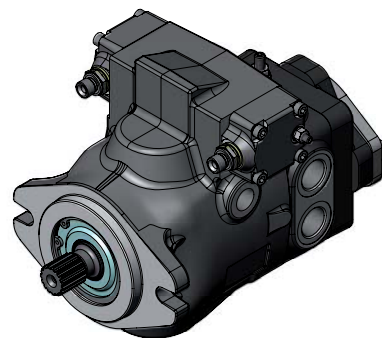
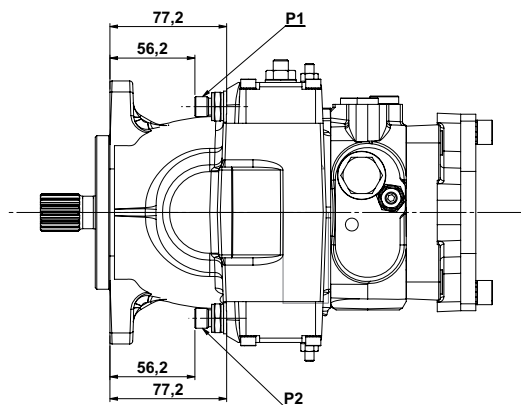
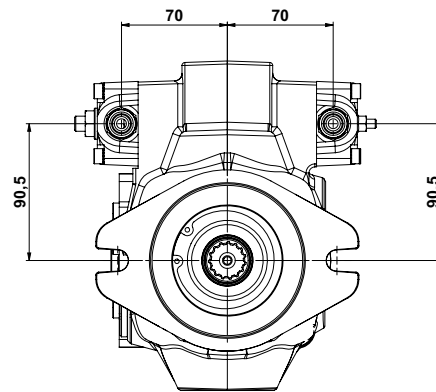
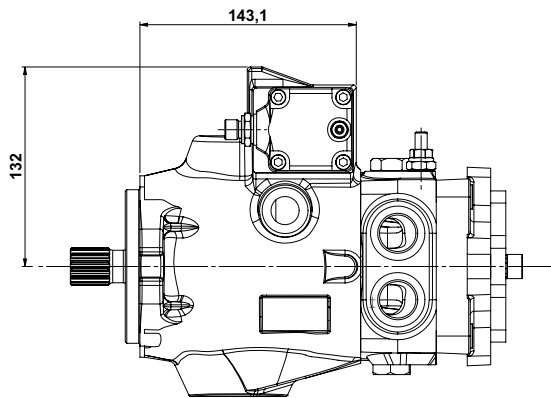
The servo control supply can be obtained by taking pressure from the boost pump (G port), see pag. 19.

The servo control return time can be adjusted by inserting a restrictor on the joystick supply

line (0,5 ÷ 1,2 mm).

The servo control operation curve, in both directions, goes from 0,4 to 1,8 MPa (tolerance $\pm 5\%$).

The adjusting curve of the hydraulic joystick has to be a little wider (0,3 ÷ 1,9 MPa).

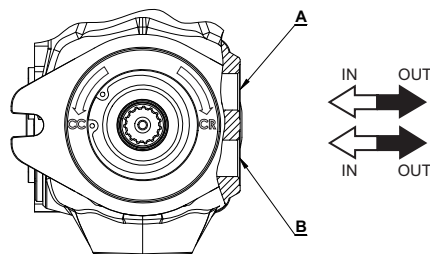
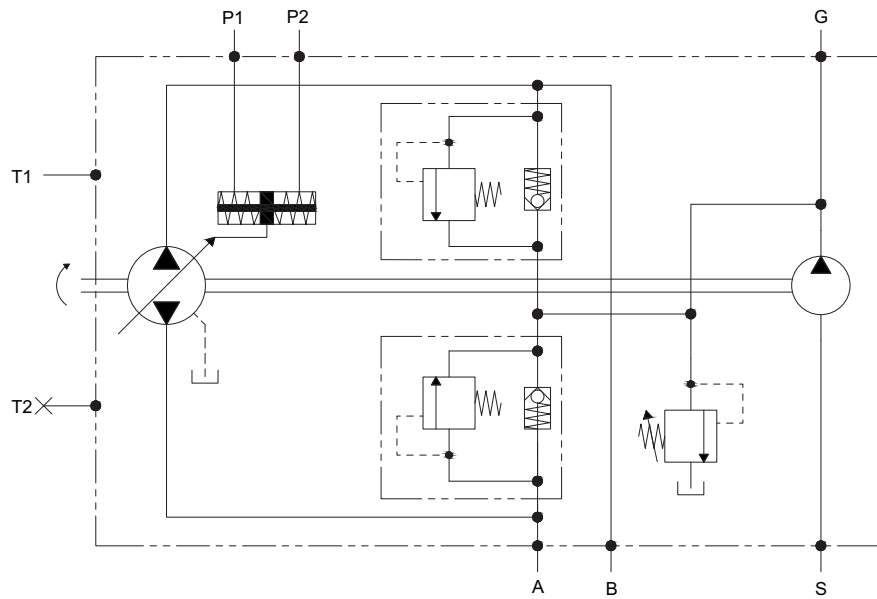


(continued)

SHI

HYDRAULIC SERVO CONTROL

HYDRAULIC DIAGRAM



FLOW DIRECTION	PUMP		
	Port	OUT	IN
Clockwise (CR)	P ₁	B	A
	P ₂	A	B
Counter clockwise (CC)	P ₁	A	B
	P ₂	B	A

SEI 1.3 (12V DC)

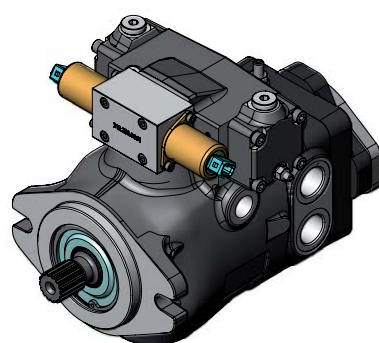
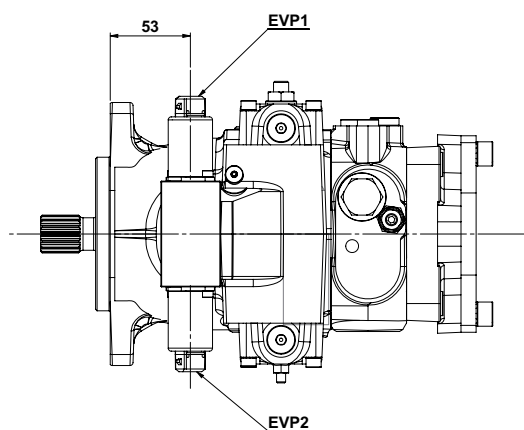
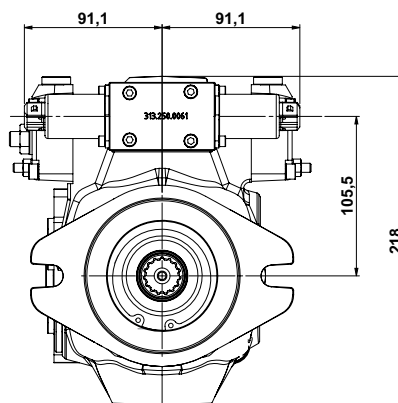
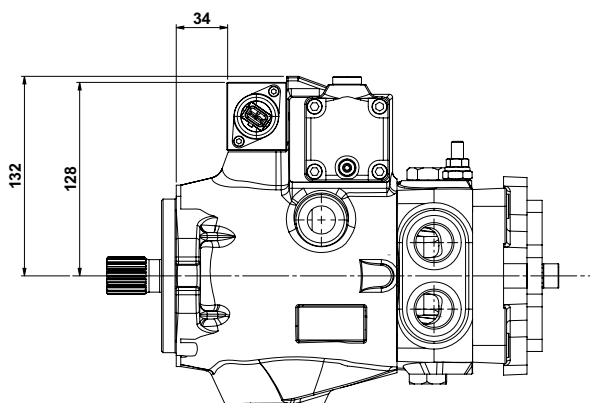
SEI 2.3 (24V DC)

ELECTRO-PROPORTIONAL SERVO CONTROL

(AMP junior timer connector)

The pump displacement variation is obtained by an electric signal that goes from:

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



(continued)

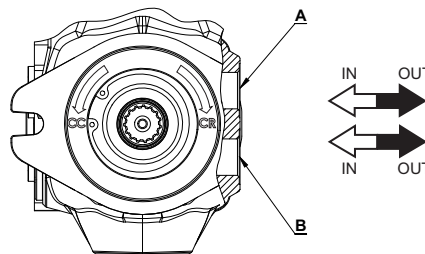
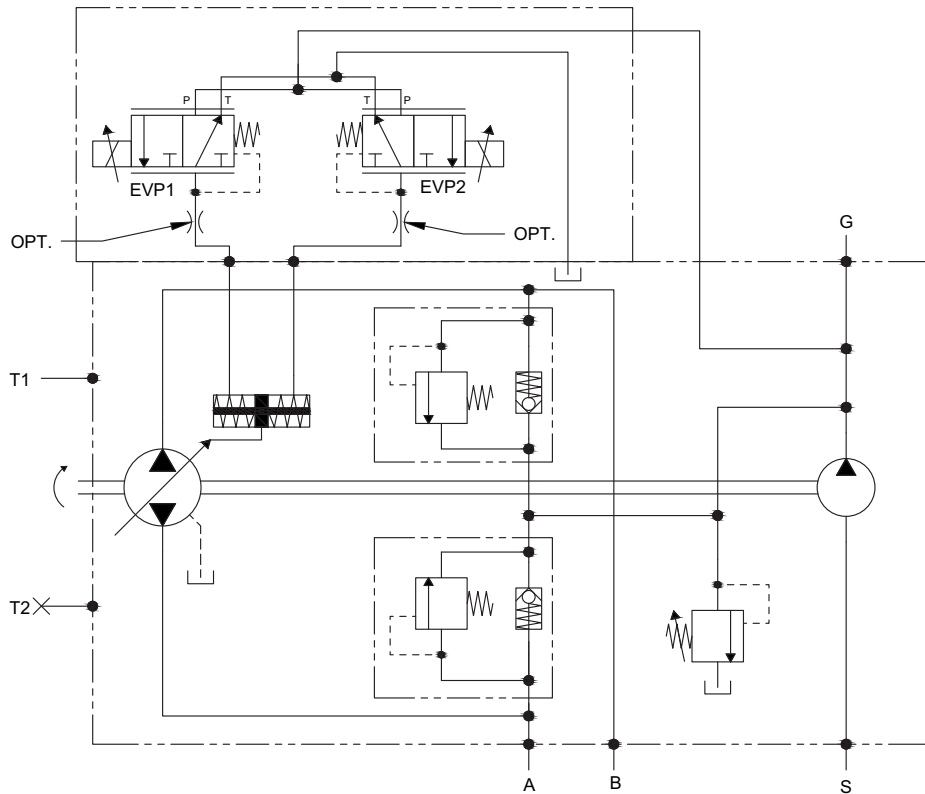
SEI 1.3 (12V DC)

SEI 2.3 (24V DC)

ELECTRO-PROPORTIONAL SERVO CONTROL

(AMP junior timer connector)

HYDRAULIC DIAGRAM



FLOW DIRECTION		PUMP	
Rotation	EVP	OUT	IN
Clockwise (CR)	EVP1 EVP2	B A	A B
Counter clockwise (CC)	EVP1 EVP2	A B	B A

(continued)

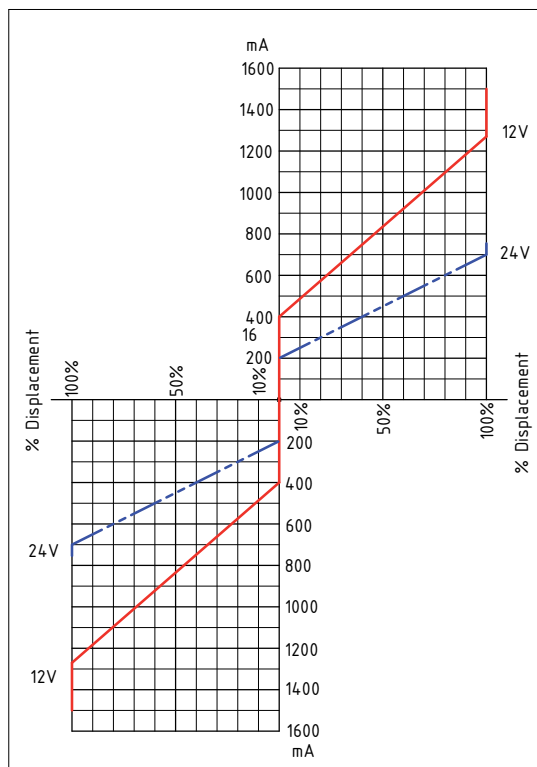
SEI 1.3 (12V DC)

SEI 2.3 (24V DC)

ELECTRO-PROPORTIONAL SERVO CONTROL

(AMP junior timer connector)

CURRENT-DISPLACEMENT GRAPHIC



SOLENOID VALVE ELECTRICAL FEATURES		
Voltage	12 V DC	24 V DC
Electric current	1500 mA	750 mA
Load resistance	4,72 Ω ± 5%	20,8 Ω ± 5%
Type of control	Current control PWM 100 Hz (suggested)	
Type of connection	AMP Junior Timer	
Protection class	Until IP6K6 / IPX9K	

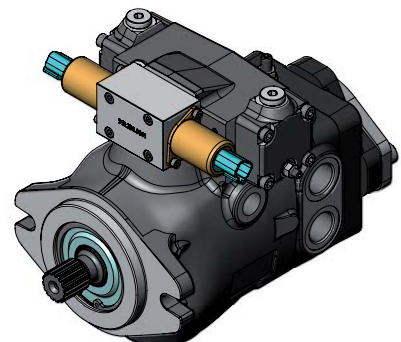
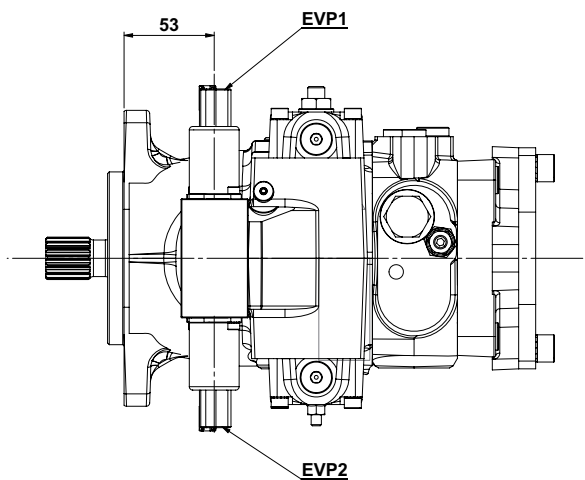
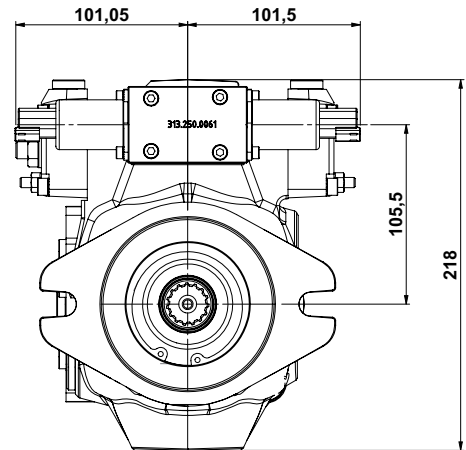
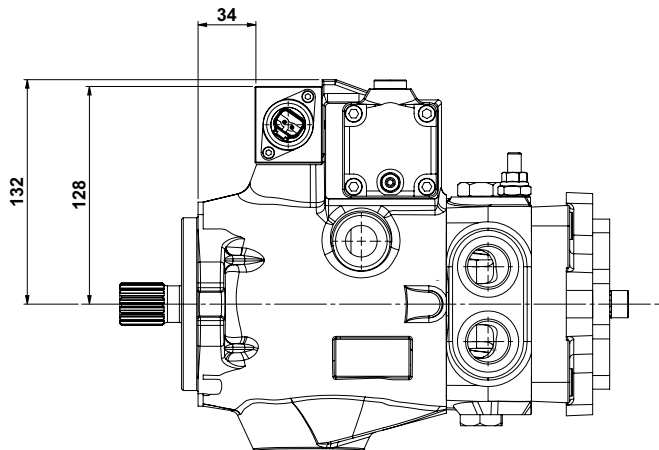
SOLENOID VALVE HYDRAULIC FEATURES	
Max. pressure (P, T)	pP= 5 MPa, pT= 3 MPa
Hysteresis (w/PWM)	<0,07 MPa (pA=2,0)
	<0,1 MPa (pA=2,5)
	<0,15 MPa (pA=3,5)
Filtration ratio	125 µm
Oil contamination level	Min. filtration ratio: 20/18/15
	According ISO 4406
	Hydraulic oil DIN 51524
Min./max. oil temperature	From -20 to +90°C

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

ELECTRO-PROPORTIONAL SERVO CONTROL
(Deutsch connector)

The pump displacement variation is obtained by an electric signal that goes from:

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



(continued)

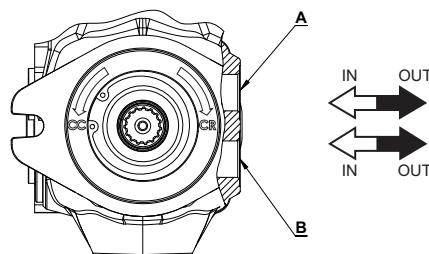
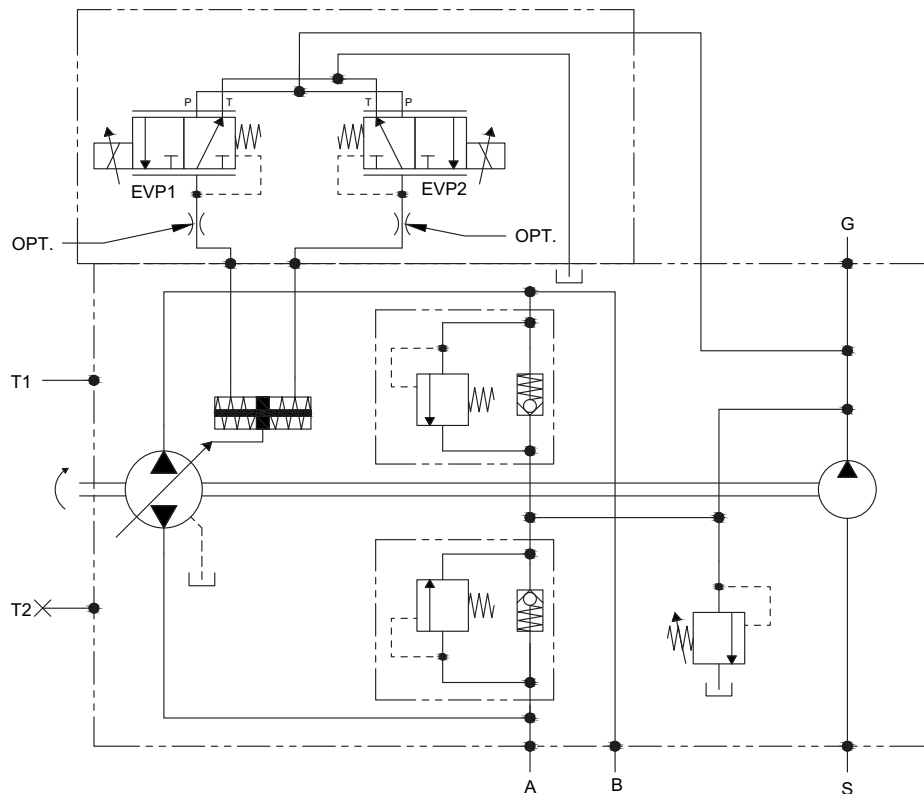
SEI 1.3D (12V DC)


SEI 2.3D (24V DC)

ELECTRO-PROPORTIONAL SERVO CONTROL

(Deutsch connector)

HYDRAULIC DIAGRAM



FLOW DIRECTION	PUMP		
Rotation	 EVP	OUT	IN
Clockwise (CR)	EVP1 EVP2	B A	A B
Counter clockwise (CC)	EVP1 EVP2	A B	B A

(continued)

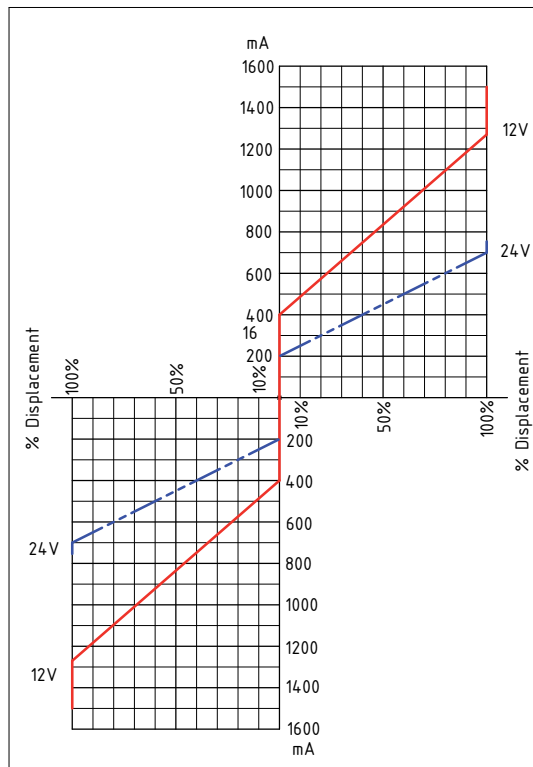
SEI 1.3D (12V DC)

SEI 2.3D (24V DC)

ELECTRO-PROPORTIONAL SERVO CONTROL

(Deutsch connector)

CURRENT-DISPLACEMENT GRAPHIC



SOLENOID VALVE ELECTRICAL FEATURES		
Voltage	12 V DC	24 V DC
Electric current	1500 mA	750 mA
Load resistance	4,72 Ω ± 5%	20,8 Ω ± 5%
Type of control	Current control PWM 100 Hz (suggested)	
Type of connection	DEUTSCH DT 04-2P	
Protection class	Until IP6K6 / IPX9K	

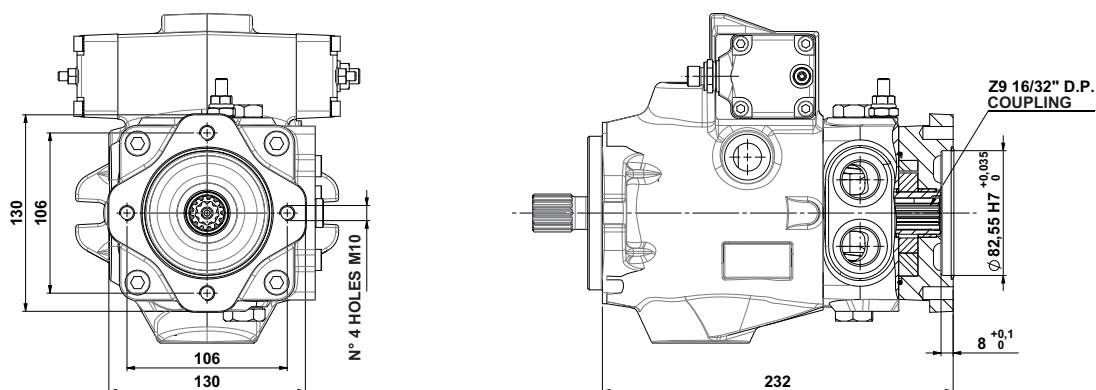
SOLENOID VALVE HYDRAULIC FEATURES	
Max. pressure (P, T)	pP= 5 MPa, pT= 3 MPa
Hysteresis (w/PWM)	<0,07 MPa (pA=2,0)
	<0,1 MPa (pA=2,5)
	<0,15 MPa (pA=3,5)
Filtration ratio	125 µm
Oil contamination level	Min. filtration ratio: 20/18/15
	According ISO 4406
	Hydraulic oil DIN 51524
Min./max. oil temperature	From -20 to +90°C

REAR PUMP MOUNTING FLANGES

SA

SAE A - 4 HOLES

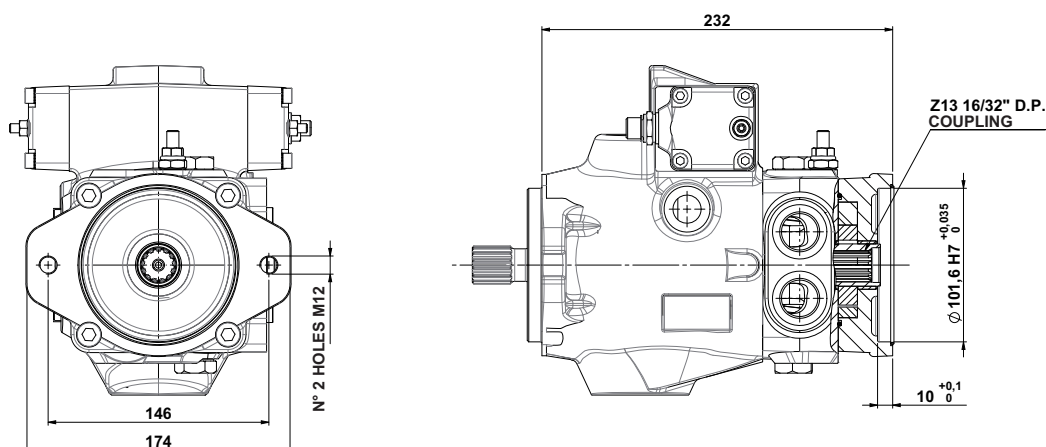
Max. torque = 120 Nm



SB

SAE B - 2 HOLES

Max. torque = 300 Nm

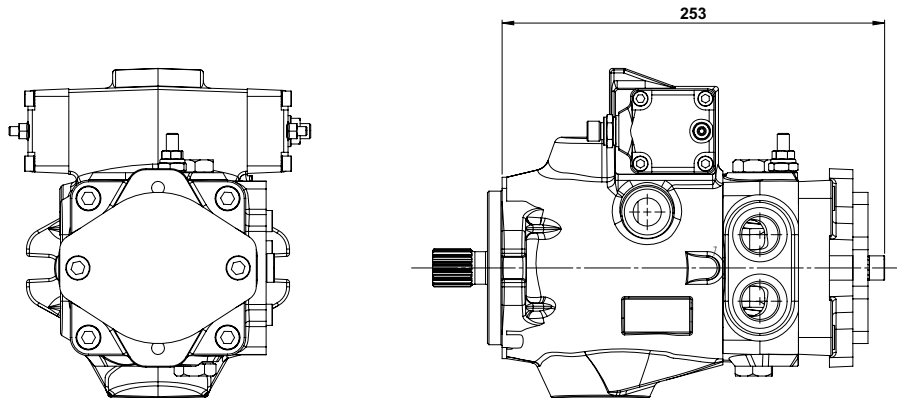


(continued)

REAR PUMP MOUNTING FLANGES

C

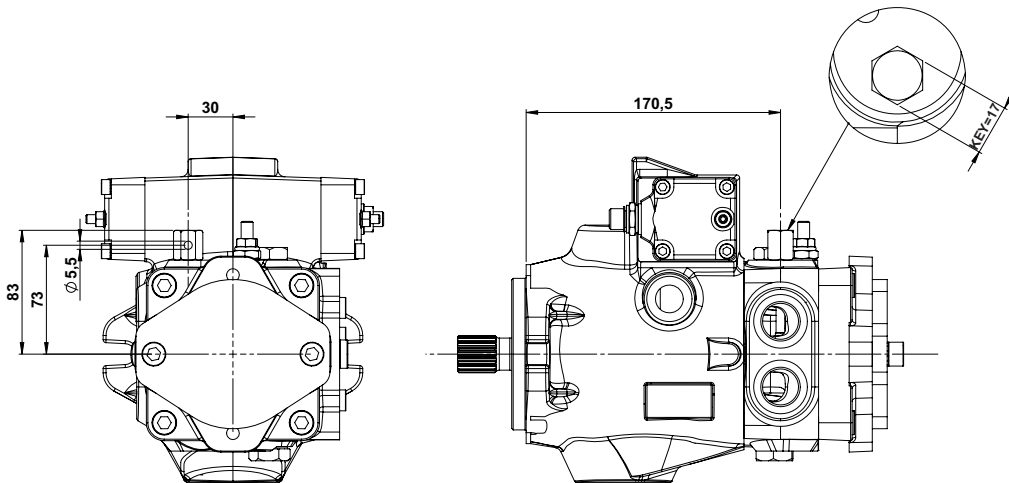
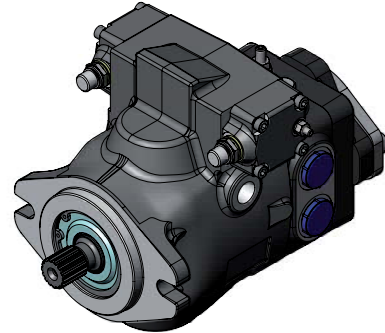
CLOSED COVER WITHOUT REAR FITTING



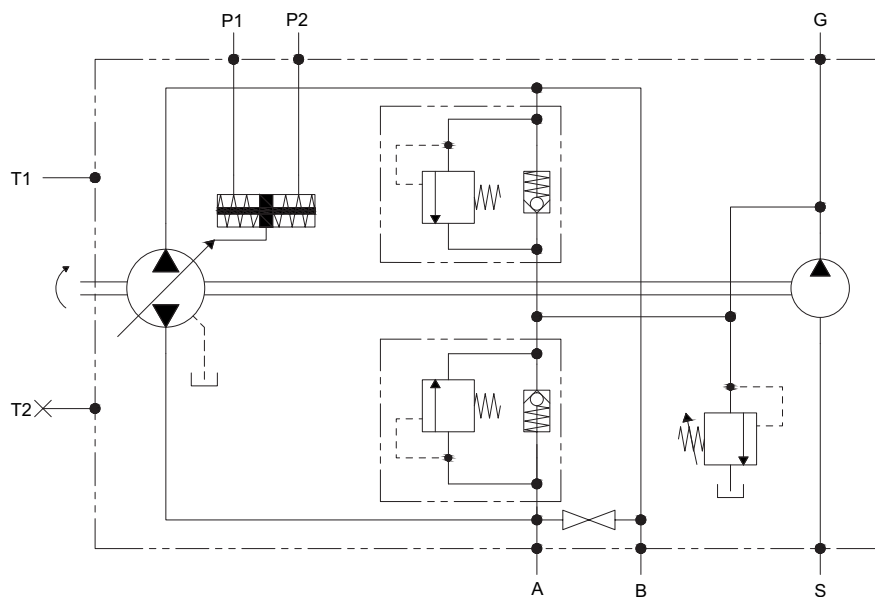
OPTIONAL SB

SCREW BY-PASS

To by pass the oil flow from one direction to the other, with the pump not running or in emergency condition, a by pass screw can be actuated to connect the 2 lines of the hydraulic system. The orifice is completely open after 4 counter-clockwise rotations of the screw.



HYDRAULIC DIAGRAM



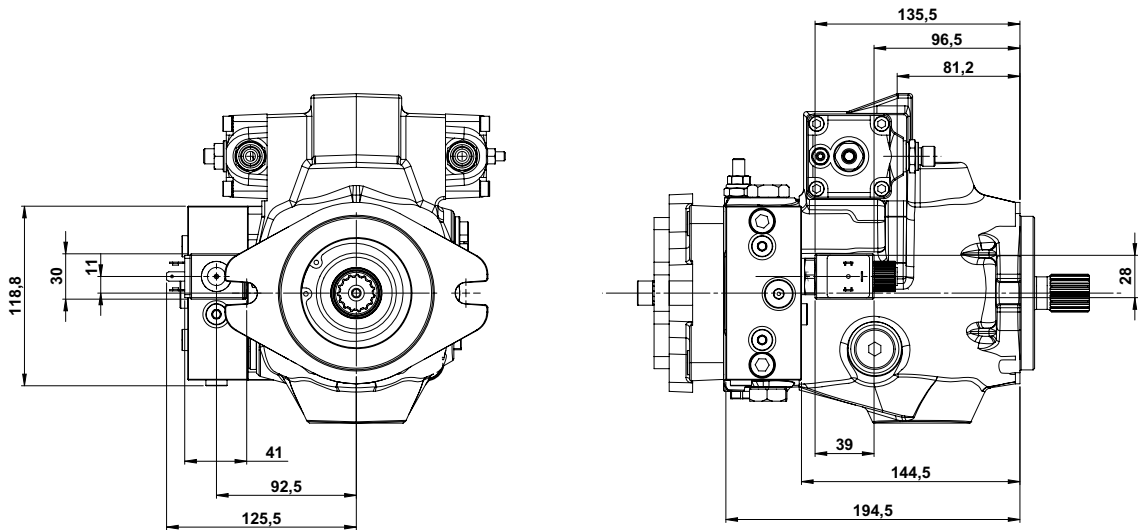
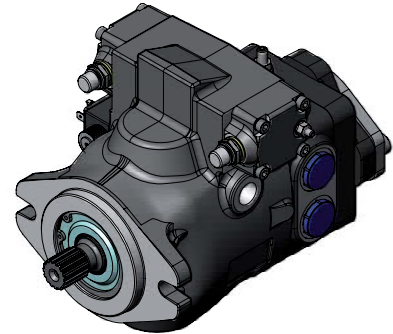
OPTIONAL MOB

MAN ON BOARD

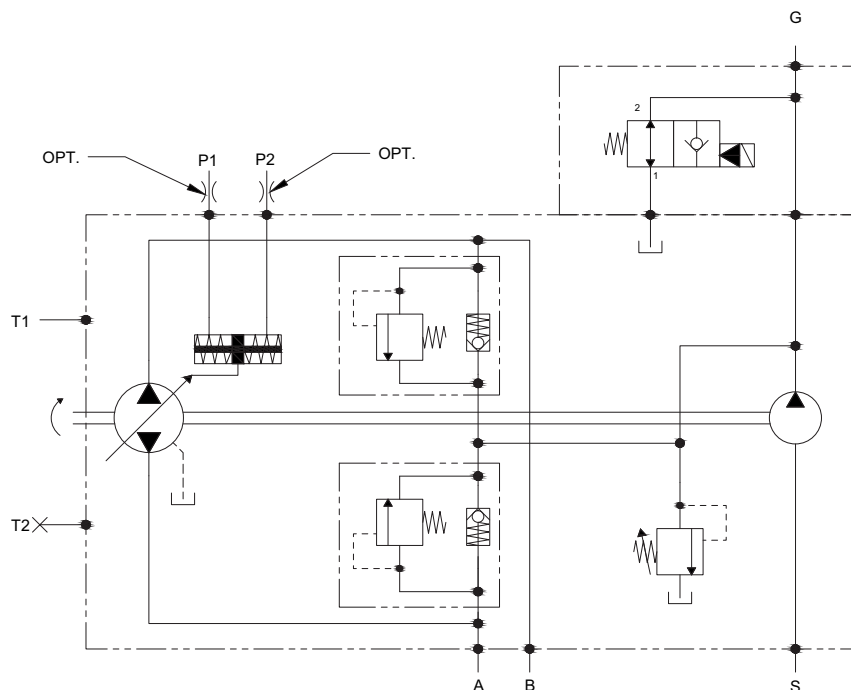
A normally open solenoid valve cuts the oil flow when not activated.

The valve allows oil flow to feed the hydraulic system only if activated (the operator is seated).

The solenoid valve is available for 12V or 24V DC voltage.



HYDRAULIC DIAGRAM



(continued)

OPTIONAL MOB

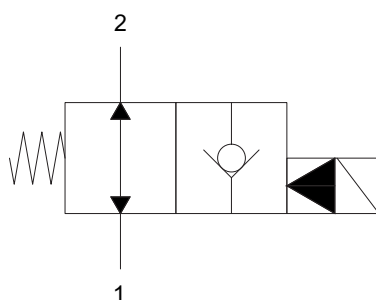
MAN ON BOARD

TECHNICAL FEATURES

MOB VALVE - Hydraulic characteristics	
Max. operating pressure	30 MPa
Max. flow	40 lt/min.
Internal leakage	max. 5 drops/min. at 30 MPa
Response time	energized 20 ms
De-energized	30 ms
Temperature range	from -20°C to 90°C

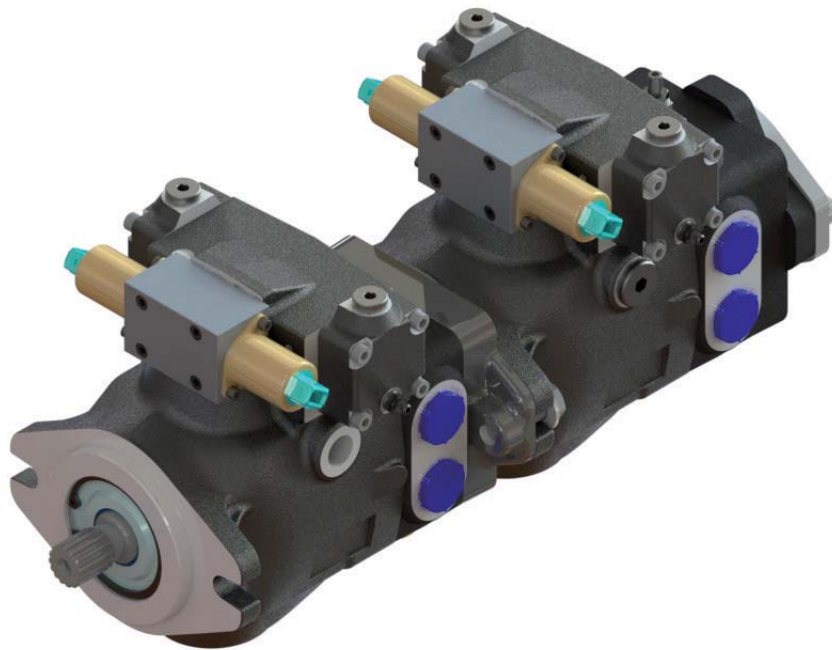


MOB VALVE - Electrical characteristics	
Power	18 W
Various voltage options available	(AC/DC)
Wire insulation	Class H
Duty factor	ED 100%
Supply power tolerance	+ 10%, - 15% (DC)
Ambient temperature	from -30°C to 60°C
Several connector options available	



TPVT 4300

VARIABLE DISPLACEMENT AXIAL PISTON TANDEM PUMP



ORDER CODE _____

4300	TPVT	32	32	CR	SS5	F2.1	SHI	SHI	OA	OA	15	15	14	SA	000	SB
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Pag.

4300	0 - Pump series = TPV pump 4300															
TPVT	1 - pump model = Closed loop circuit tandem pump															
	2 - Pump displacement primary pump 32 = 32 cm ³ /n 38 = 38 cm ³ /n 45 = 45 cm ³ /n 50 = 50 cm ³ /n															
	3 - Pump displacement secondary pump 32 = 32 cm ³ /n 38 = 38 cm ³ /n 45 = 45 cm ³ /n 50 = 50 cm ³ /n															
CR	4 - Pump rotation = Clockwise Rotation (right)															
SS5	5 - Shaft (mounting side) = Splined shaft Z15 - 16/32 D.P															
F2.1	6 - Mounting side flange = SAE B 2 holes - pilot diam. 101,6 mm.															
SHI	7 - Control devices position of primary pump = Hydraulic servo control															36
SEI1.3	= Electro-proportional servo control 12V DC (AMP junior timer connector)															37
SEI2.3	= Electro-proportional servo control 24V DC (AMP junior timer connector)															37
SEI1.3D	= Electro-proportional servo control 12V DC (Deutsch connector)															40
SEI2.3D	= Electro-proportional servo control 24V DC (Deutsch connector)															40
SHI	8 - Control devices position of secondary pump = Hydraulic servo control															36
SEI1.3	= Electro-proportional servo control 12V DC (AMP junior timer connector)															37
SEI2.3	= Electro-proportional servo control 24V DC (AMP junior timer connector)															37
SEI1.3D	= Electro-proportional servo control 12V DC (Deutsch connector)															40
SEI2.3D	= Electro-proportional servo control 24V DC (Deutsch connector)															40
OA	9 - Control devices position of primary pump = Position A															
OB	= Position B (for SEI... versions available on request, please, contact our technical department for details)															
OA	10 - Control devices position of secondary pump = Position A															
OB	= Position B (for SEI... versions available on request, please, contact our technical department for details)															
	11 - Primary pump relief valve settings 15 = 15 MPa 18 = 18 MPa 20 = 20 MPa 25 = 25 MPa 30 = 30 MPa 35 = 35 MPa															
	12 - Secondary pump relief valve settings 15 = 15 MPa 18 = 18 MPa 20 = 20 MPa 25 = 25 MPa 30 = 30 MPa 35 = 35 MPa															

(continued)

ORDER CODE _____

- 13 - Boost pump**
00 = Without boost pump
14 = Standard boost pump 14 cm³/n - pressure 2 MPa (1000 n/min) for tandem pump
14XX = Boost pump 14 cm³/n - pressure 2 ÷ 3 MPa (1000 n/min) available on request, please contact our technical department for details

- 14 - Rear pump connection options**
SA = SAE A 4 holes mounting flange (female shaft) **43**
SB = SAE B 2 holes mounting flange (female shaft) **43**
C-SA = Closed (without rear fitting) **44**

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

Group 2 SAE A

- | | | | |
|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| 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 | 230 = 30,0 cm ³ /n | 240 = 40,0 cm ³ /n | |

Group 3 SAE B

- | | | | |
|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| 315 = 15,0 cm ³ /n | 318 = 18,0 cm ³ /n | 321 = 21 cm ³ /n | 327 = 27,0 cm ³ /n |
| 332 = 32,0 cm ³ /n | 338 = 38,0 cm ³ /n | 343 = 43,0 cm ³ /n | 347 = 47,0 cm ³ /n |
| 351 = 51,0 cm ³ /n | 354 = 54,0 cm ³ /n | 361 = 61,0 cm ³ /n | 364 = 64,0 cm ³ /n |
| 370 = 70,0 cm ³ /n | 374 = 74,0 cm ³ /n | 390 = 90,0 cm ³ /n | |

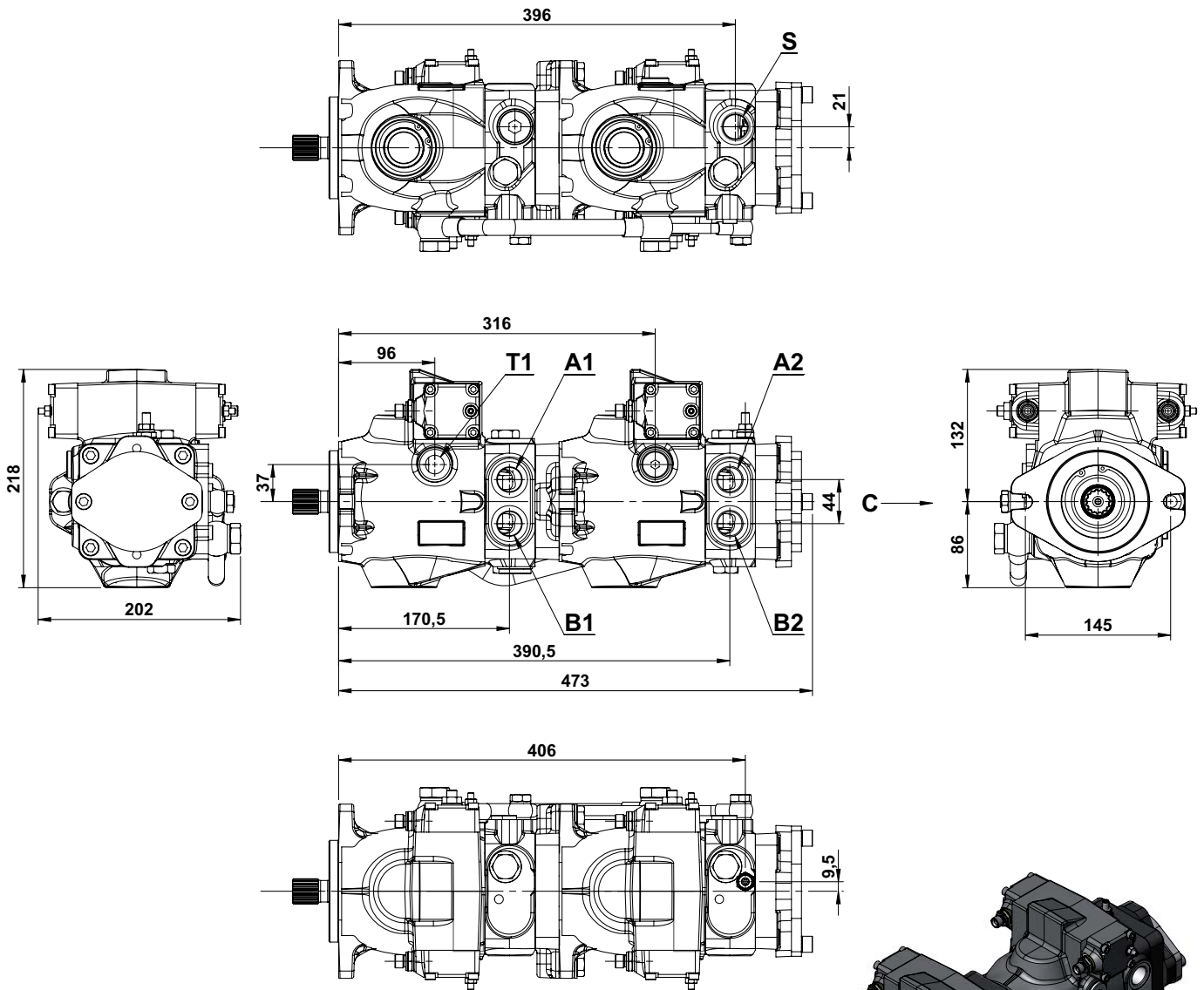
- 16 - Optional**
00 = Without optional
SB = Screw by-pass (Standard) **45**
MOB1 = Man on board solenoid valve 12V DC **46**
MOB2 = Man on board solenoid valve 24V DC **46**
G/J/M/- = Port threads and restrictor diameter

	Servo control type	Port threads	Symbol
STANDARD	SEI	Plugged	-
	SHI	1/4" BSPP	G
ON REQUEST	SHI	JIC (7/16" - 20)	J
	SHI	METRIC (M12x1,5)	M

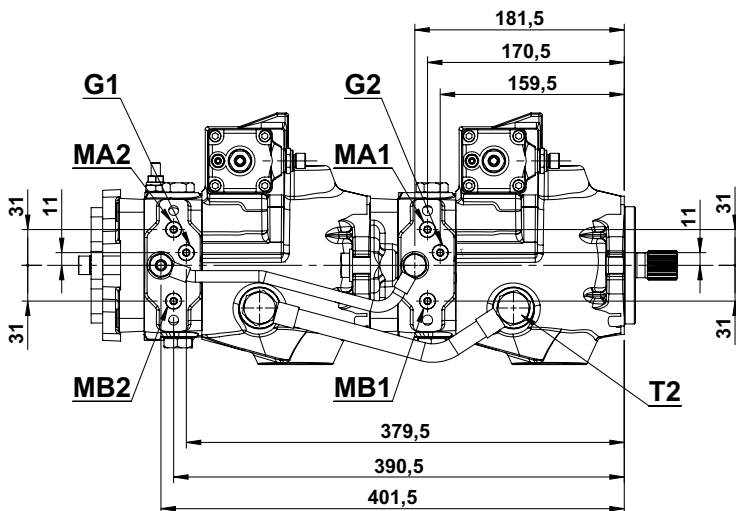
Example G/08 = 1/4" BSPP port threads and Ø 0,8 mm restrictor (SHI)
 Example -/08 = Ø 0,8 mm restrictor (SEI)

Restrictor diameter (SHI/SEI)	
-	Without restrictor
06	Restrictor orifice ø 0,6 mm
08	Restrictor orifice ø 0,8 mm
10	Restrictor orifice ø 1,0 mm
12	Restrictor orifice ø 1,2 mm
16	Restrictor orifice ø 1,6 mm
20	Restrictor orifice ø 2,0 mm

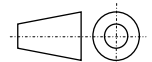
GENERAL DIMENSIONS/TANDEM PUMP PORTS



VIEW FROM C



PORTS		
A1 - B1	Main pressure ports 1	3/4" BSPP
A2 - B2	Main pressure ports 2	3/4" BSPP
T1 - T2	Drain	1/2" BSPP
S	Suction	3/4" BSPP
G1 - G2	Boost pumps pressure gauge ports	1/8" BSPP
MA1- MB1/ MA2 - MB2	Pressure gauge ports	1/8" BSPP



SHI

HYDRAULIC SERVO CONTROL

The pump displacement variation is obtained by adjusting the pressure on P1, P2, P3 and P4 servo control ports by means of a hydraulic proportional joystick (with integrated pressure reducing valves).

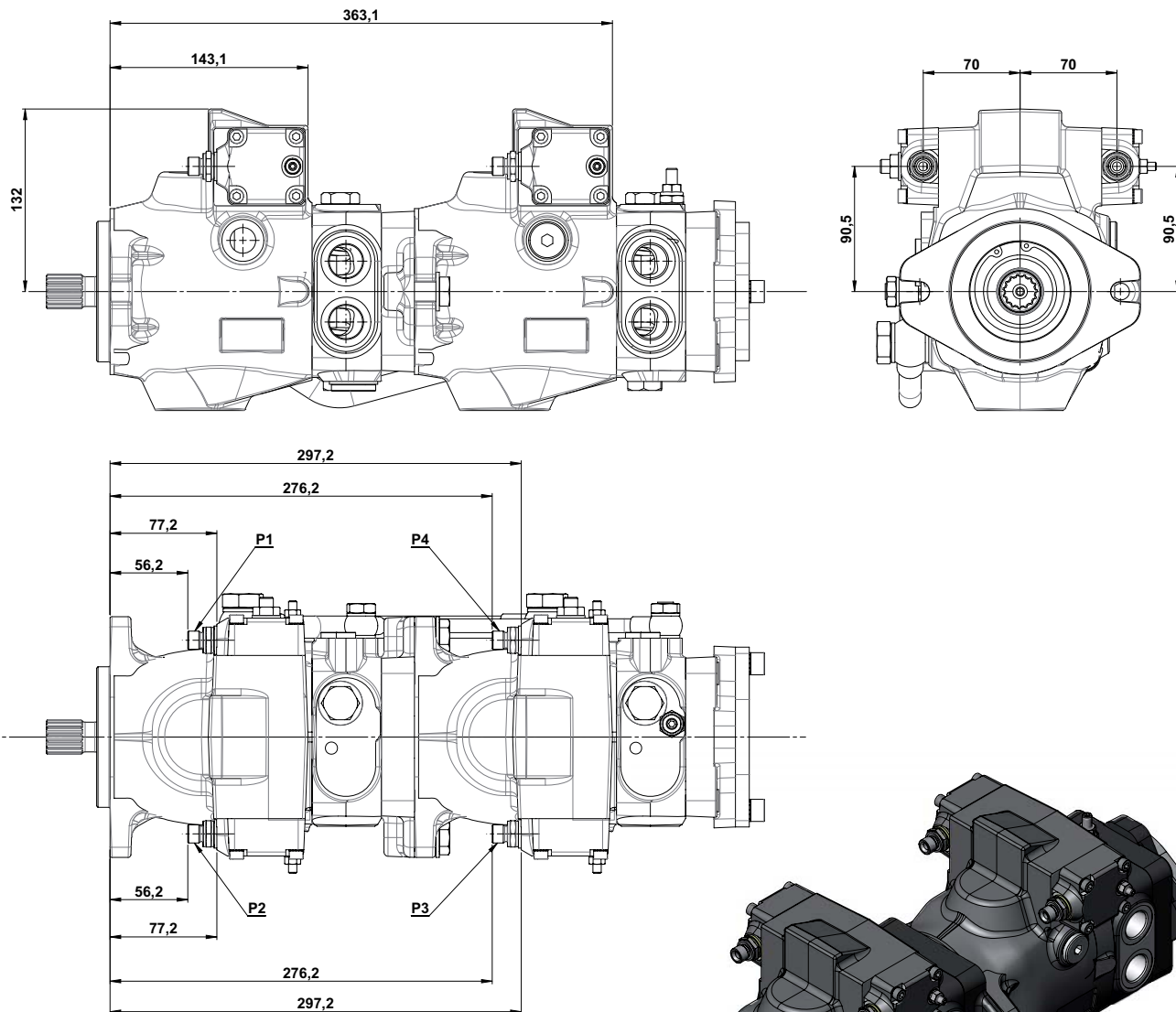
The servo control oil supply can be obtained by taking pressure from the boost pump (G1 - G2 ports), see pag. 34.

The servo control return time can be adjusted

by inserting a restrictor on the joystick supply line (0,5 ÷ 1,2 mm).

The servo control operation curve, in both directions, goes from 0,4 to 1,8 MPa (tolerance $\pm 5\%$).

The adjusting curve of the hydraulic joystick has to be a little wider (0,3 ÷ 1,9 MPa).

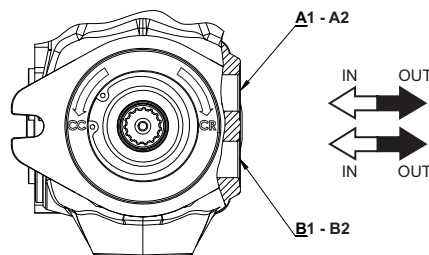
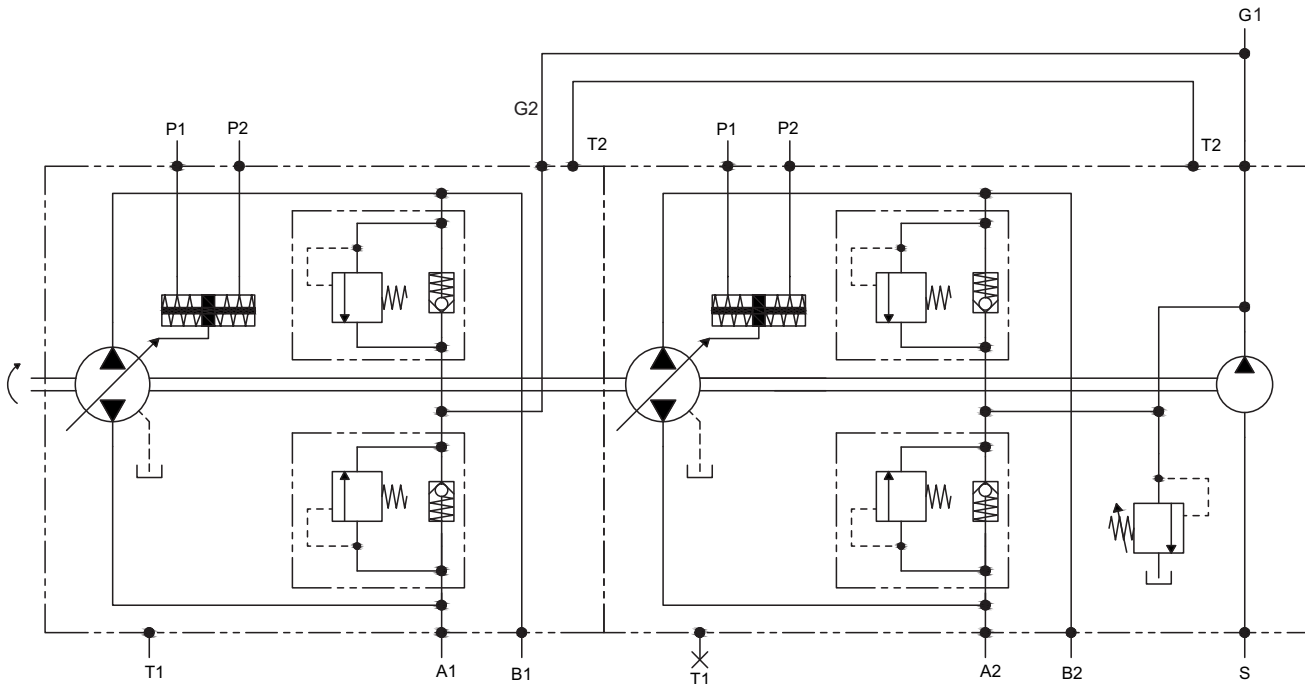


(continued)

SHI

HYDRAULIC SERVO CONTROL

HYDRAULIC DIAGRAM



FLOW DIRECTION	PRIMARY PUMP			SECONDARY PUMP		
	Port	OUT	IN	Port	OUT	IN
Clockwise (CR)	P ₁	B ₁	A ₁	P ₃	B ₂	A ₂
	P ₂	A ₁	B ₁	P ₄	A ₂	B ₂
Counter clockwise (CC)	P ₁	A ₁	B ₁	P ₃	A ₂	B ₂
	P ₂	B ₁	A ₁	P ₄	B ₂	A ₂

SEI 1.3 (12V DC)

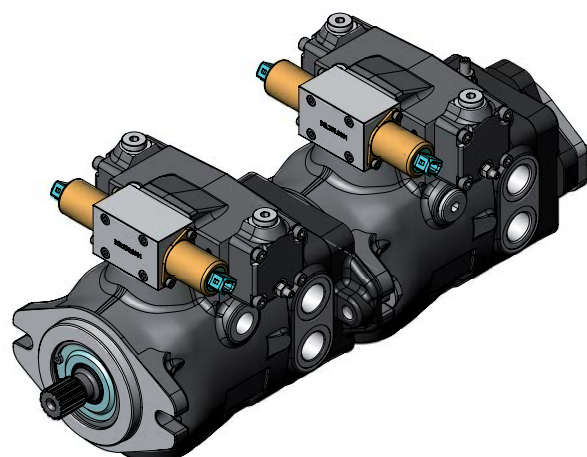
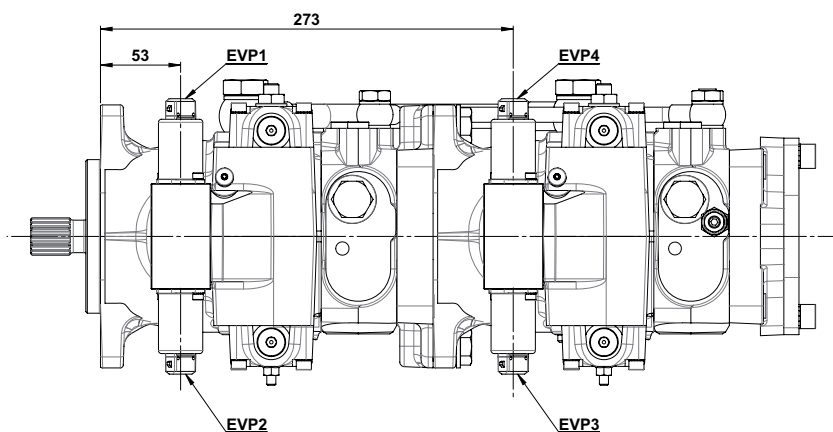
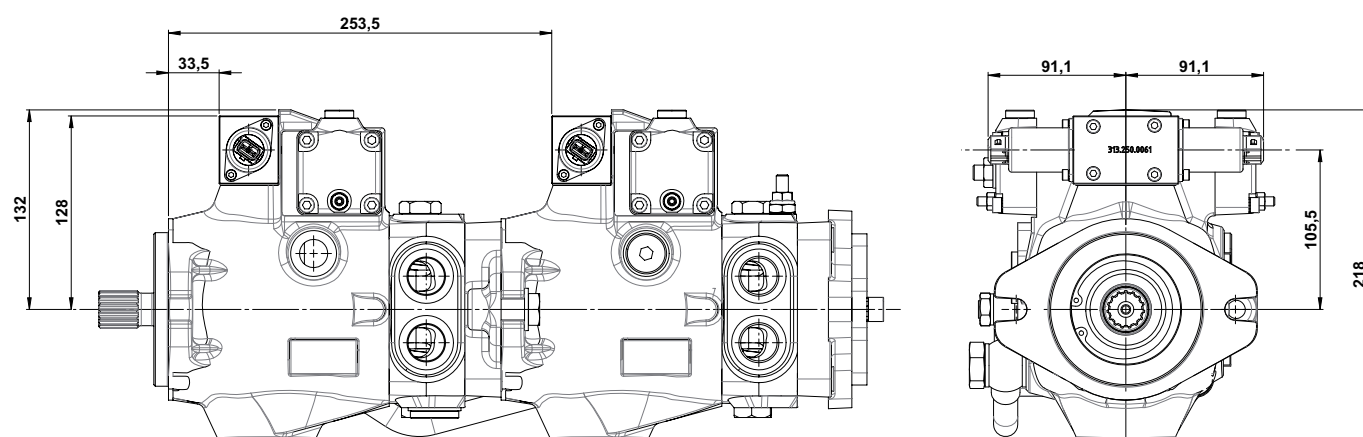
SEI 2.3 (24V DC)

ELECTRO-PROPORTIONAL SERVO CONTROL

(AMP junior timer connector)

The pump displacement variation is obtained by an electric signal that goes from:

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



(continued)

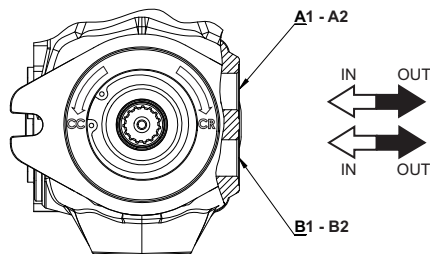
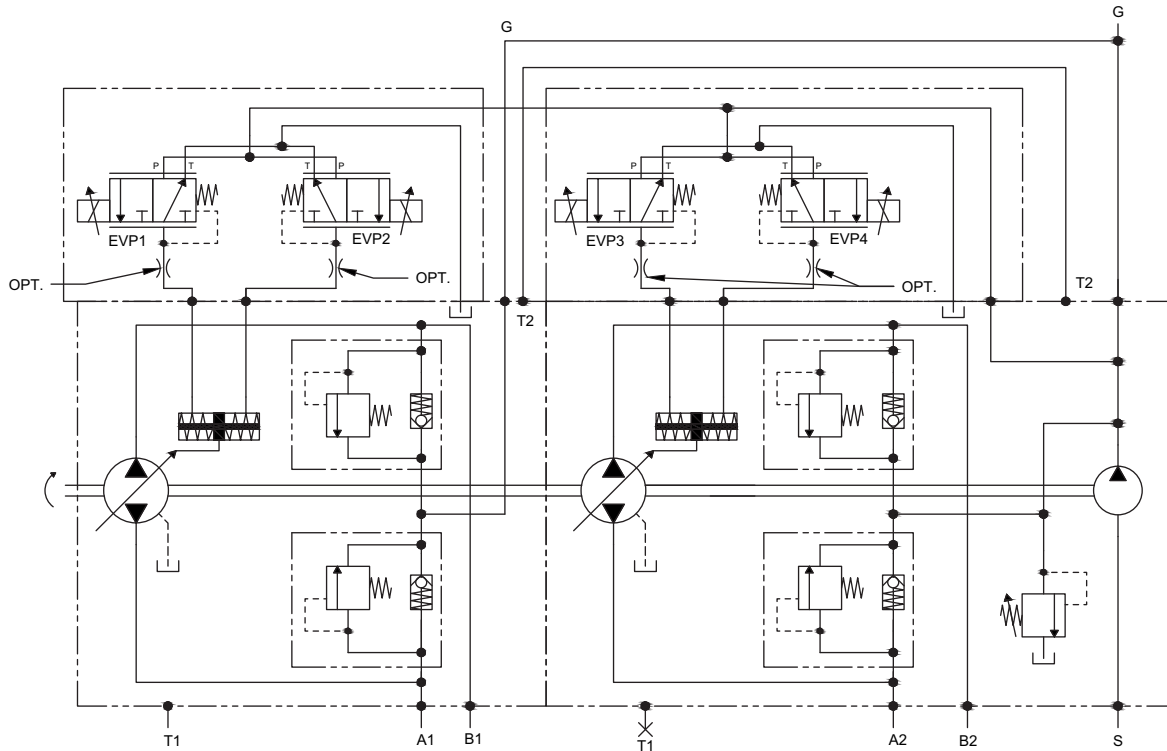
SEI 1.3 (12V DC)



SEI 2.3 (24V DC)

ELECTRO-PROPORTIONAL SERVO CONTROL

(AMP junior timer connector)

HYDRAULIC DIAGRAM



FLOW DIRECTION	PRIMARY PUMP			SECONDARY PUMP		
	 EVP	OUT	IN	 EVP	OUT	IN
Clockwise (CR)	EVP1 EVP2	B ₁ A ₁	A ₁ B ₁	EVP3 EVP4	B ₂ A ₂	A ₂ B ₂
Counter clockwise (CC)	EVP1 EVP2	A ₁ B ₁	B ₁ A ₁	EVP3 EVP4	A ₂ B ₂	B ₂ A ₂

(continued)

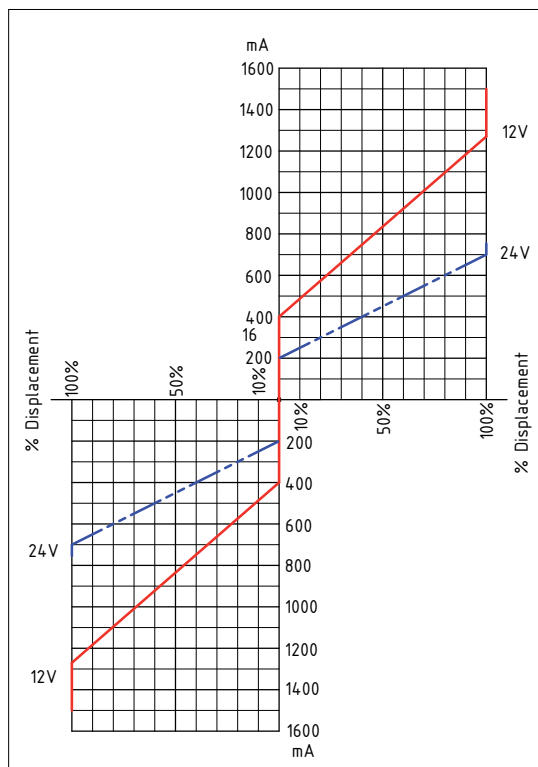
SEI 1.3 (12V DC)

SEI 2.3 (24V DC)

ELECTRO-PROPORTIONAL SERVO CONTROL

(AMP junior timer connector)

CURRENT-DISPLACEMENT GRAPHIC



SOLENOID VALVE ELECTRICAL FEATURES		
Voltage	12 V DC	24 V DC
Electric current	1500 mA	750 mA
Load resistance	4,72 Ω ± 5%	20,8 Ω ± 5%
Type of control	Current control PWM 100 Hz (suggested)	
Type of connection	AMP Junior Timer	
Protection class	Until IP6K6 / IPX9K	

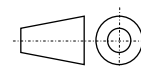
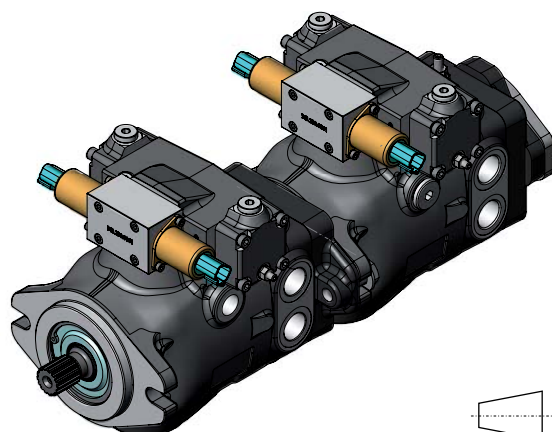
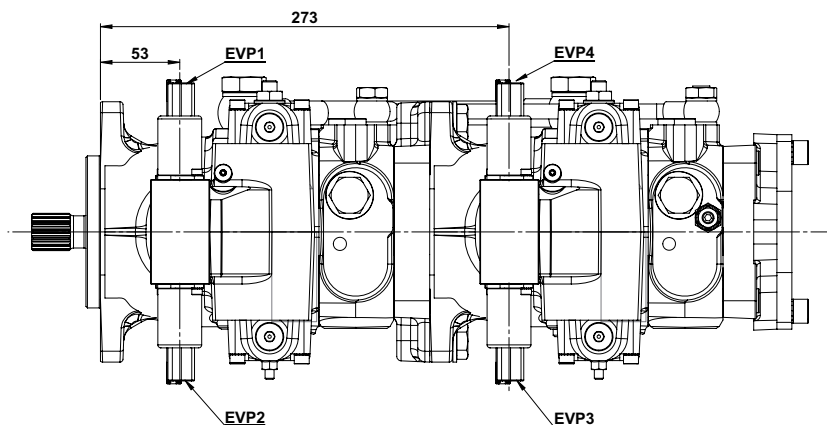
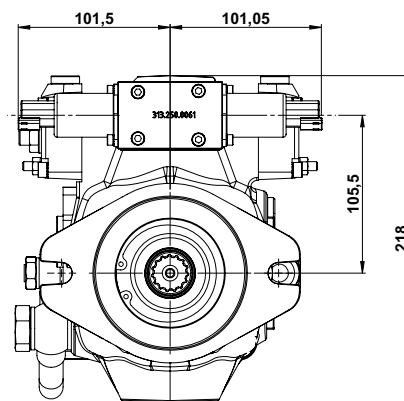
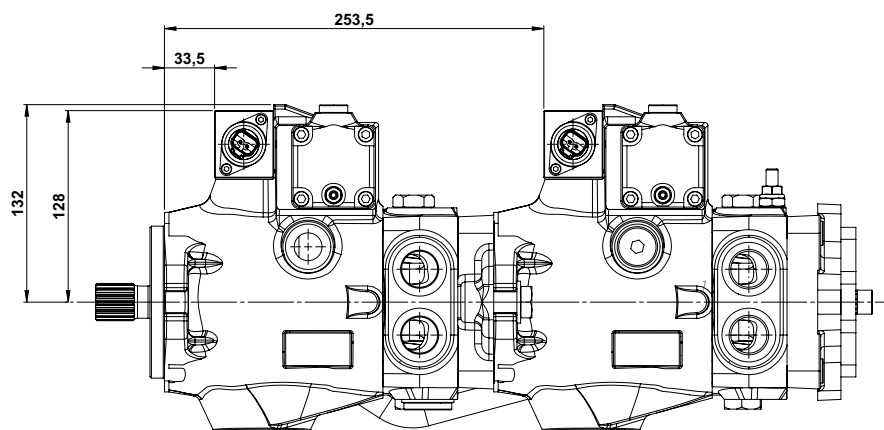
SOLENOID VALVE HYDRAULIC FEATURES	
Max. pressure (P, T)	pP= 5 MPa, pT= 3 MPa
Hysteresis (w/PWM)	<0,07 MPa (pA=2,0)
	<0,1 MPa (pA=2,5)
	<0,15 MPa (pA=3,5)
Filtration ratio	125 μm
Oil contamination level	Min. filtration ratio: 20/18/15
	According ISO 4406
	Hydraulic oil DIN 51524
Min./max. oil temperature	From -20 to +90°C

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

ELECTRO-PROPORTIONAL SERVO CONTROL
(Deutsch connector)

The pump displacement variation is obtained by an electric signal that goes from:

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



(continued)

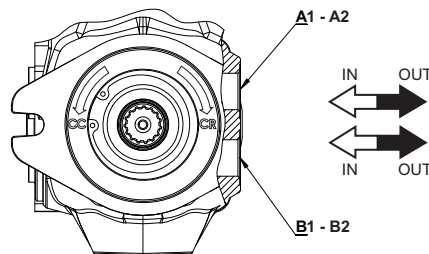
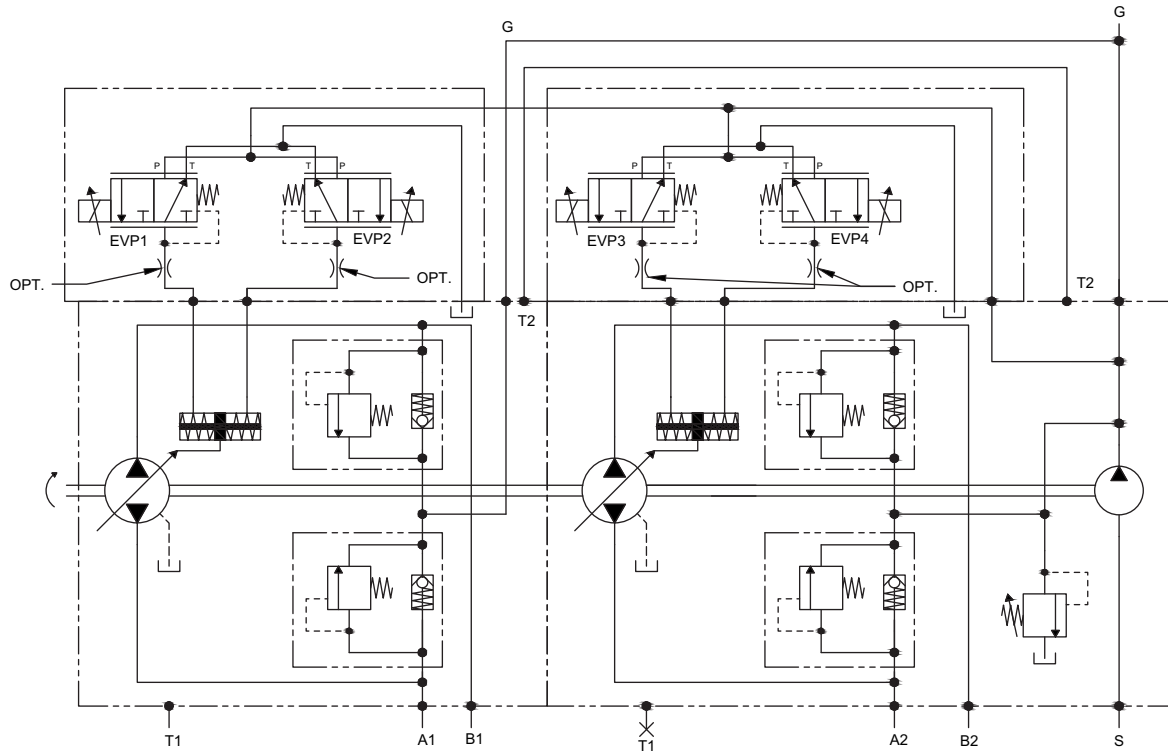
SEI 1.3D (12V DC)



SEI 2.3D (24V DC)

ELECTRO-PROPORTIONAL SERVO CONTROL

(Deutsch connector)

HYDRAULIC DIAGRAM



FLOW DIRECTION	PRIMARY PUMP			SECONDARY PUMP		
	 EVP	OUT	IN	 EVP	OUT	IN
Clockwise (CR)	EVP1 EVP2	B ₁ A ₁	A ₁ B ₁	EVP3 EVP4	B ₂ A ₂	A ₂ B ₂
Counter clockwise (CC)	EVP1 EVP2	A ₁ B ₁	B ₁ A ₁	EVP3 EVP4	A ₂ B ₂	B ₂ A ₂

(continued)

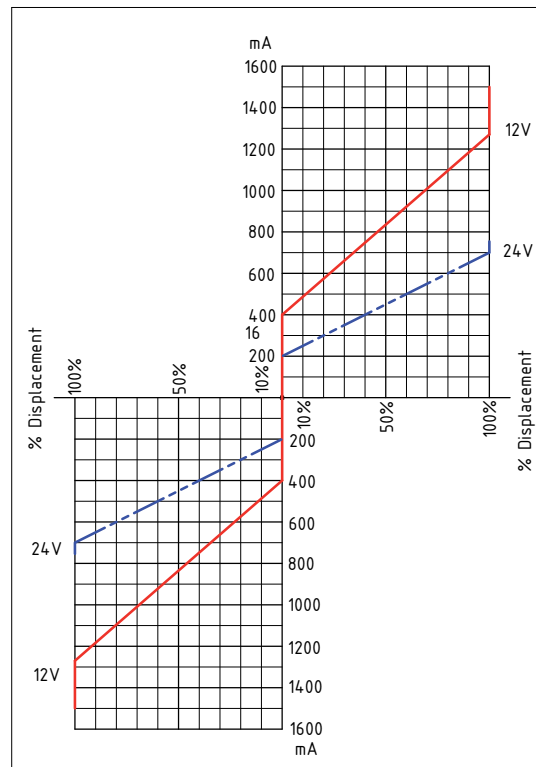
SEI 1.3D (12V DC)

SEI 2.3D (24V DC)

ELECTRO-PROPORTIONAL SERVO CONTROL

(Deutsch connector)

(CURRENT-DISPLACEMENT GRAPHIC)



SOLENOID VALVE ELECTRICAL FEATURES		
Voltage	12 V DC	24 V DC
Electric current	1500 mA	750 mA
Load resistance	4,72 Ω ± 5%	20,8 Ω ± 5%
Type of control	Current control PWM 100 Hz (suggested)	
Type of connection	DEUTSCH DT 04-2P	
Protection class	Until IP6K6 / IPX9K	

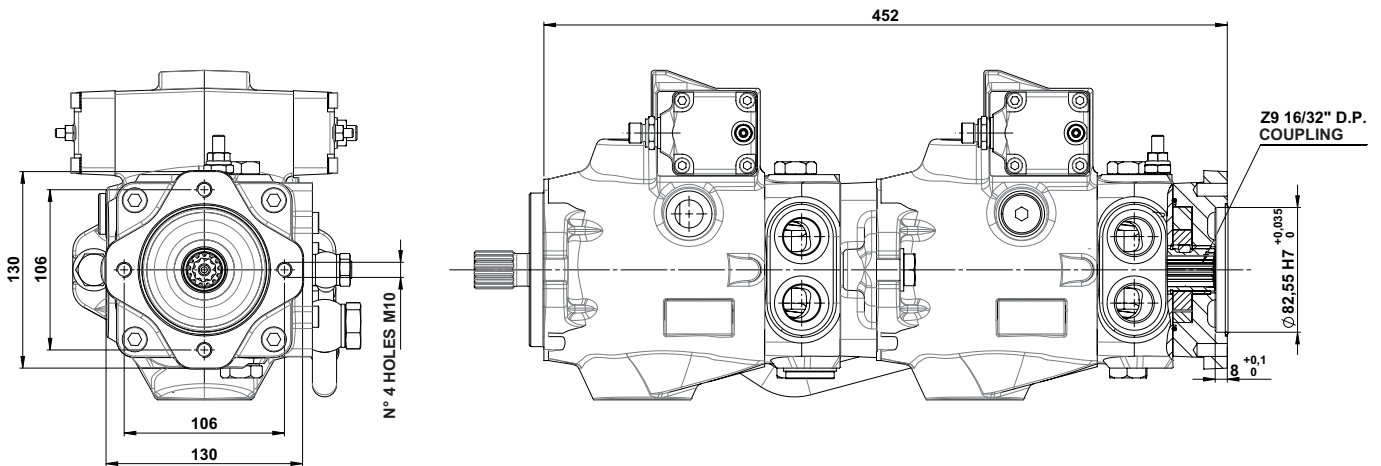
SOLENOID VALVE HYDRAULIC FEATURES	
Max. pressure (P, T)	pP= 5 MPa, pT= 3 MPa
Hysteresis (w/PWM)	<0,07 MPa (pA=2,0)
	<0,1 MPa (pA=2,5)
	<0,15 MPa (pA=3,5)
Filtration ratio	125 μm
Oil contamination level	Min. filtration ratio: 20/18/15
	According ISO 4406
	Hydraulic oil DIN 51524
Min./max. oil temperature	From -20 to +90°C

REAR PUMP MOUNTING FLANGES

SA

SAE A - 4 HOLES

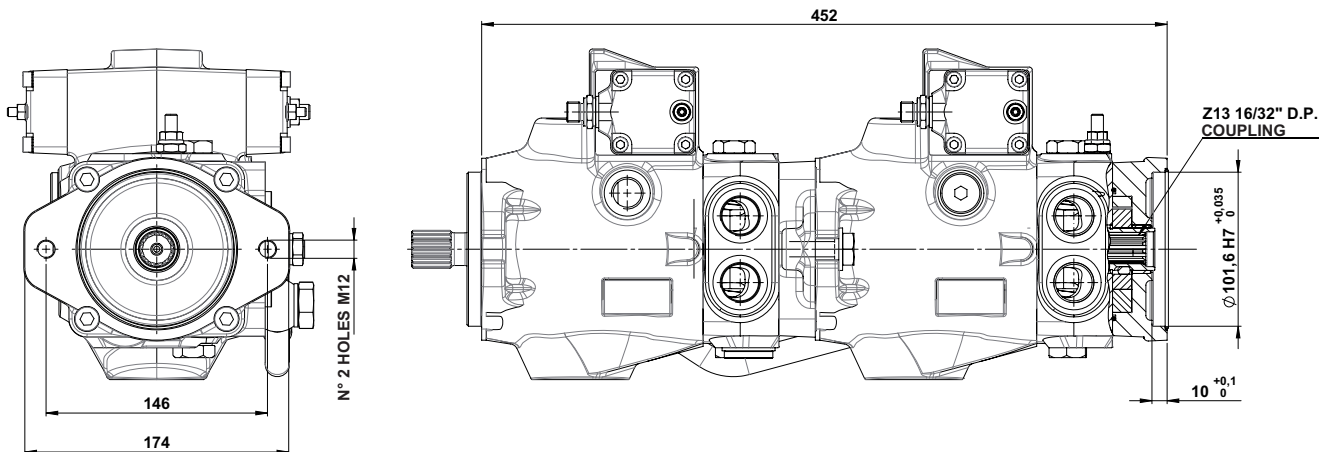
Max. torque = 120 Nm



SB

SAE B - 2 HOLES

Max. torque = 300 Nm

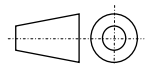
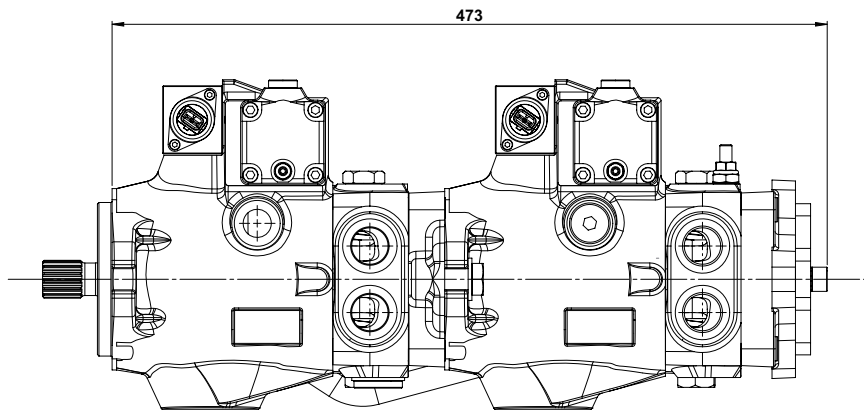
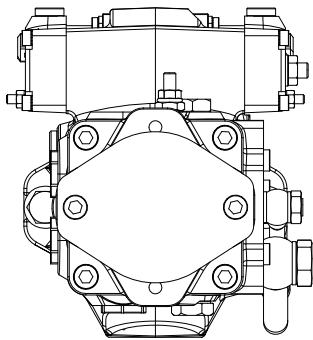


(continued)

REAR PUMP MOUNTING FLANGES

C

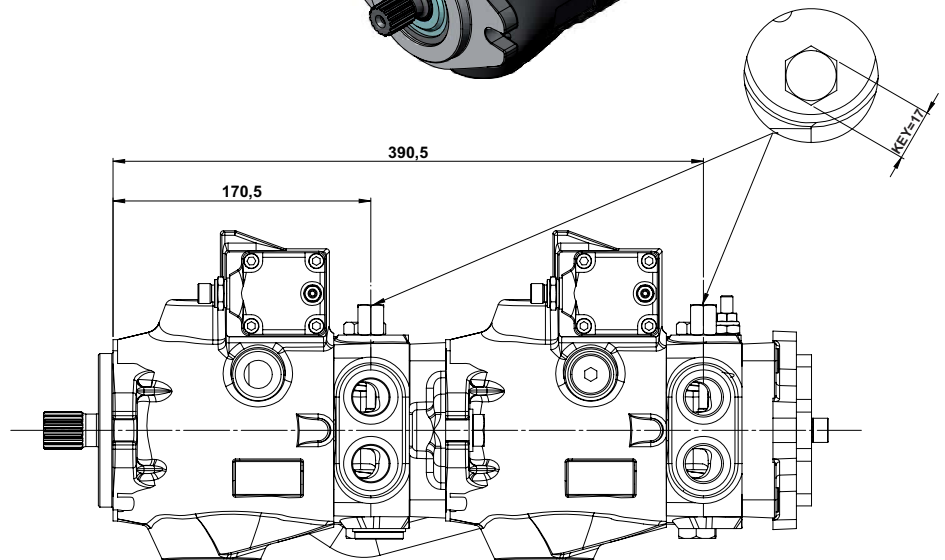
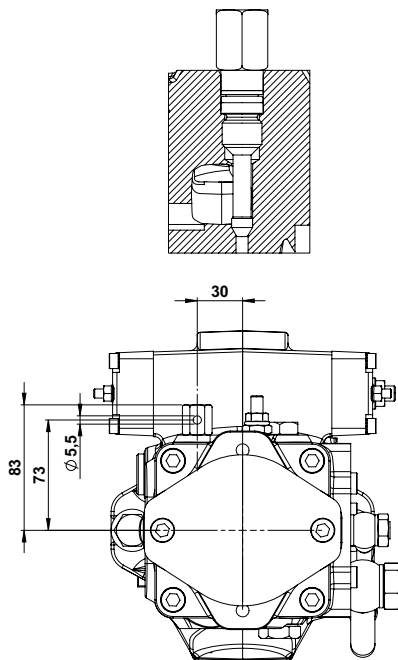
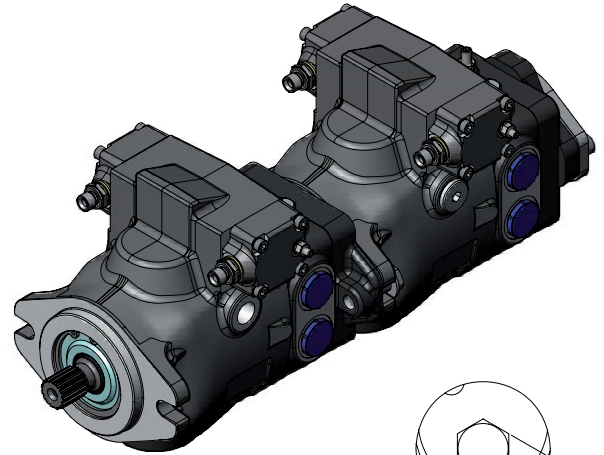
CLOSED COVER WITHOUT REAR FITTING



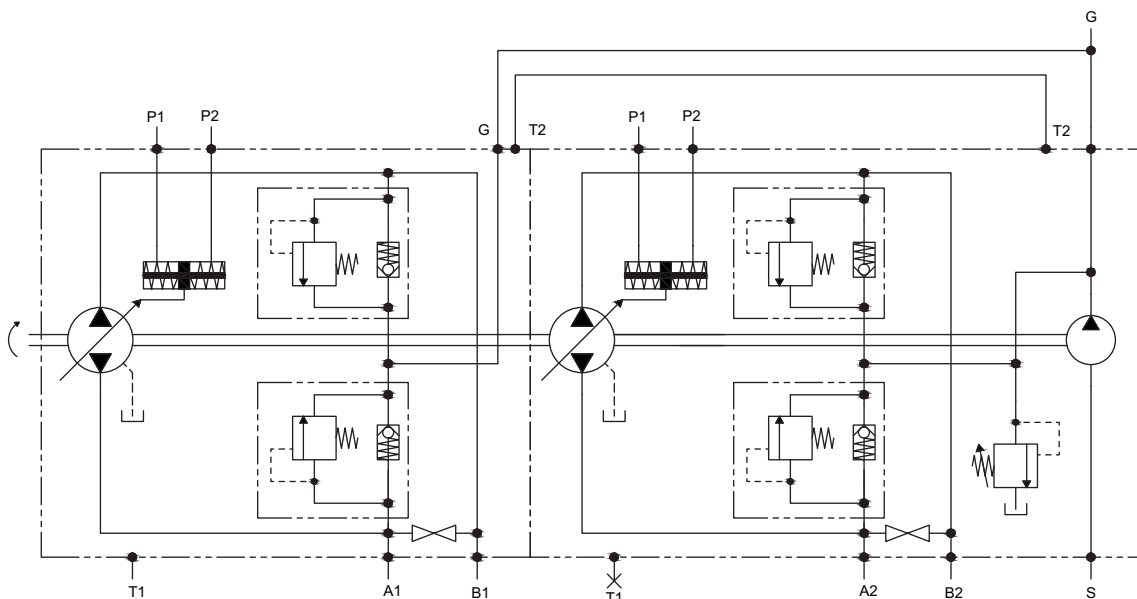
OPTIONAL SB

SCREW BY-PASS

To by pass the oil flow from one direction to the other, with the pump not running or in emergency condition, a by pass screw can be actuated to connect the 2 lines of the hydraulic system. The orifice is completely open after 4 counter-clockwise rotations of the screw.



HYDRAULIC DIAGRAM



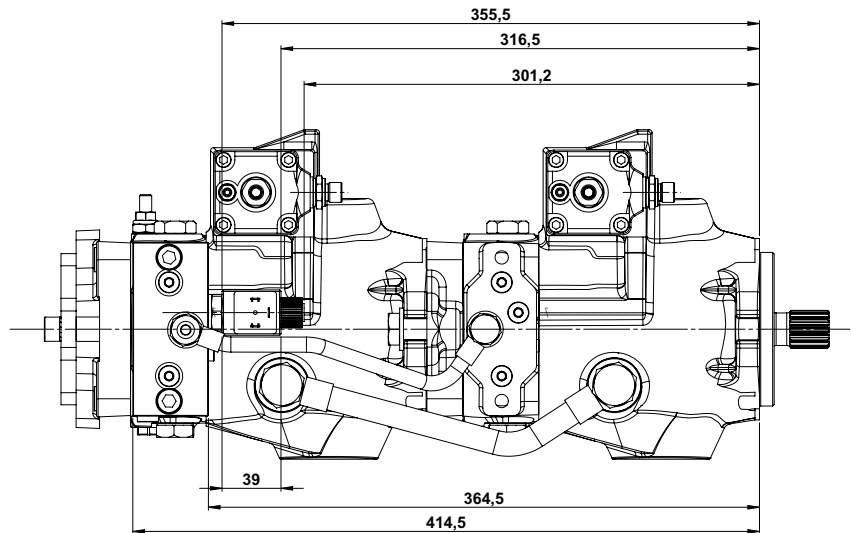
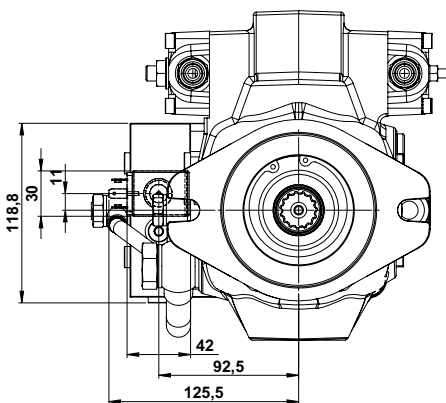
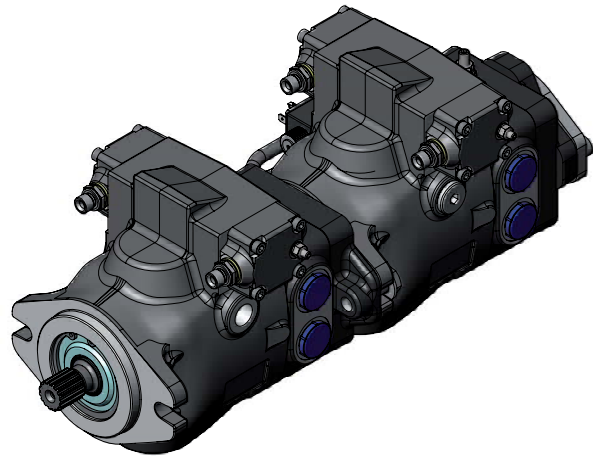
OPTIONAL MOB

MAN ON BOARD

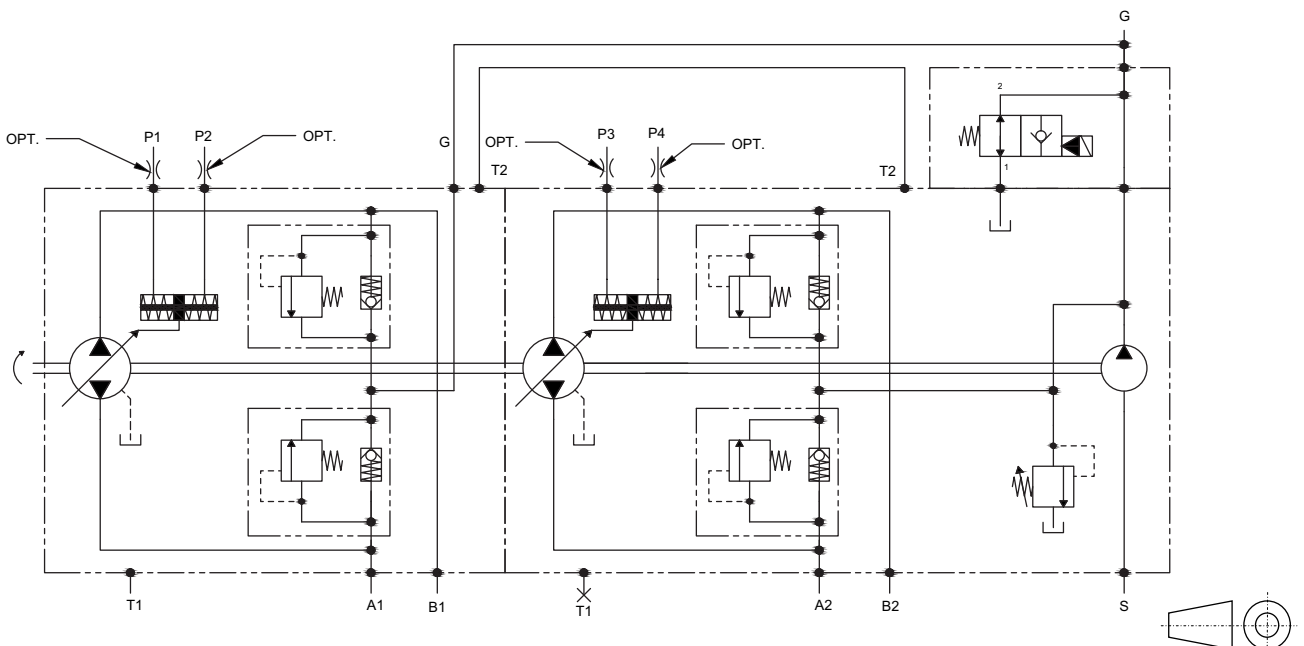
A normally open solenoid valve cuts the oil flow when not activated.

The valve allows oil flow to feed the hydraulic system only if activated (the operator is seated).

The solenoid valve is available for 12V or 24V DC voltage.



HYDRAULIC DIAGRAM



(continued)

OPTIONAL MOB

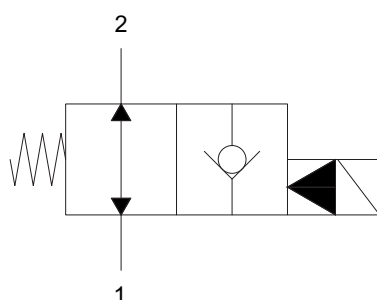
MAN ON BOARD

TECHNICAL FEATURES

MOB VALVE - Hydraulic characteristics	
Max. operating pressure	30 MPa
Max. flow	40 lt/min.
Internal leakage	max. 5 drops/min. at 30 MPa
Response time	energized 20 ms
De-energized	30 ms
Temperature range	from -20°C to 90°C



MOB VALVE - Electrical characteristics	
Power	18 W
Various voltage options available	(AC/DC)
Wire insulation	Class H
Duty factor	ED 100%
Supply power tolerance	+ 10%, - 15% (DC)
Ambient temperature	from -30°C to 60°C
Several connector options available	



TROUBLE SHOOTING

TROUBLES	CAUSE	REMEDY
High noise level	Too high rotation speed of the pump.	Reduce pump rotation speed.
	Wrong rotation direction.	Check the rotation direction of the pump.
	Obstruction in suction line - air in the suction line - wrong oil viscosity - diameter of suction line too small.	Check oil type and viscosity. Check internal diameter of suction line. Remove restrictions. Check oil level of reservoir. Eliminate air intake.
	Not correct connection of the pump. Not correct diameter of pipes / hoses.	Check the pump connections and the pipe / hose diameters according to notes.
	Vibrations of relief valves .	Check the inlet suction line - Check and replace relief valves.
	Internal parts worn out.	Check and replace.
	Wrong pump connection to the prime mover.	Check connection and rotation of direction.
Low flow rate	Too low rotation speed of the pump.	Increase the pump rotation speed.
	Obstructions in the suction line - wrong viscosity.	Check oil type and viscosity. Check internal diameter of suction line. Remove restrictions. Check oil level of reservoir. Eliminate air intake.
	Low remote control pressure.	Check and adjust.
	High internal leakage.	Check the case drain flow.
Instable or low pressure	Low rotation speed of the pump.	Increase speed of the pump.
	Obstruction of suction line - air in the suction line - wrong oil viscosity - diameter of suction line too small.	Check oil type and viscosity. Check internal diameter of suction line. Remove restrictions. Check oil level of reservoir. Eliminate air intake.
	Vibration of relief valves.	Check the inlet suction line. Check and replace relief valves.
Over heating	Internal parts worn out.	Check and replace.
	High oil temperature at suction inlet.	Check the cooling system.
	Wrong setting of relief valves.	Check - adjust the setting of relief valves.

ACCESSORIES

Hydraulic Gear Pump German Standard **SAE A**
Hydraulic Gear Pump German Standard **SAE B**

For more detailed information ask for catalogue HT 15 F 20.....

Hydraulic Remote Servo Controls



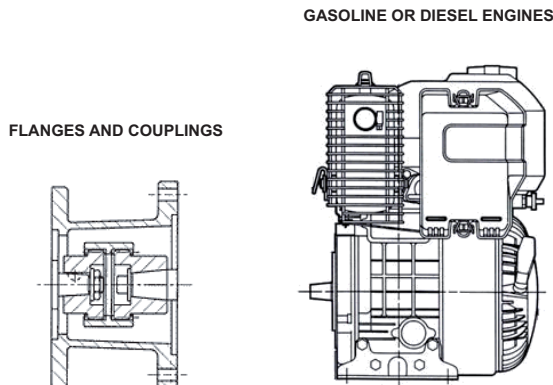
For more detailed information ask for catalogue HT 73 B 10.....

Electric Remote Servo Controls



For more detailed information ask for catalogue HT 73 B 20.....

Flanges and Couplings for Gasoline and Diesel engines



For more detailed information ask our technical departement

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

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

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

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

The data in this catalogue refer to the standard product.

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



HYDRAULIC COMPONENTS
HYDROSTATIC TRANSMISSIONS
GEARBOXES - ACCESSORIES

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