PW
PUMPS

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PW85 – PW96. HYDRAULIC PUMPS.

PW085/PW096 is a compact unit able to be directy mounted on the main internal combustion engine, LPG or Diesel, or on a power take-off.

Variable displacement, axial piston pump, with swashplate system, for closed loop hydrostatic transmissions.

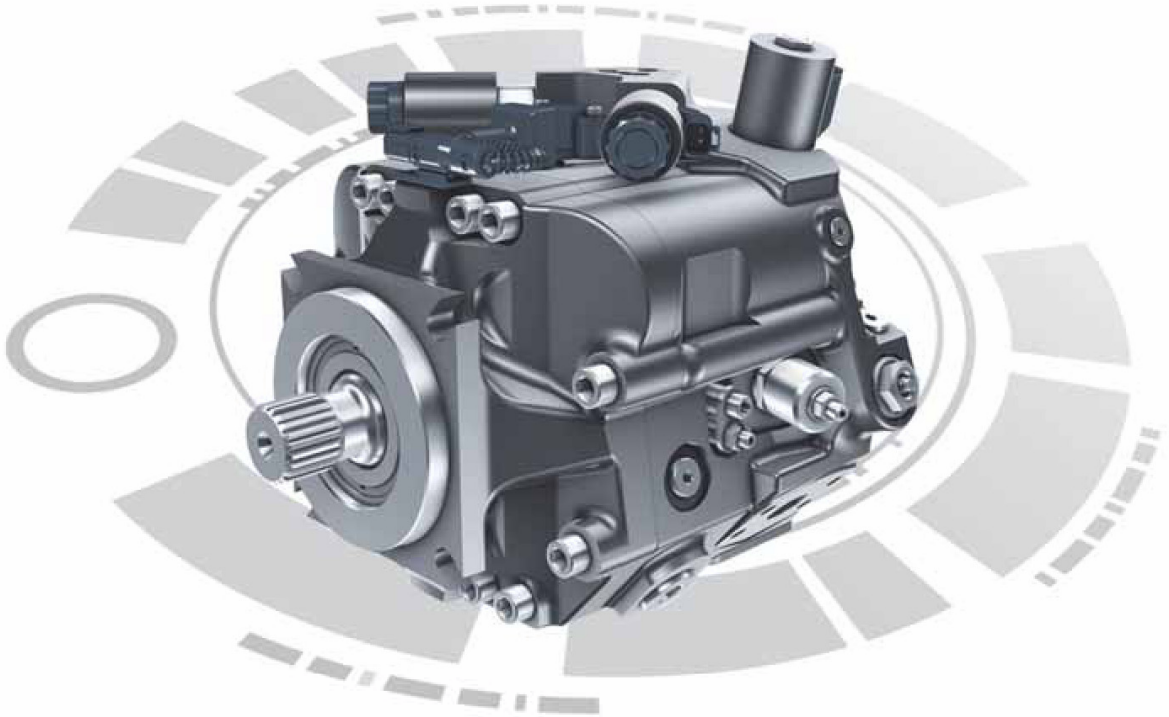
It provides a continuously variable flow rate between zero and maximum in forward and reverse direction. Flow rate is proportional to rotation speed and swashplate angle.

It is featured with a charge pump to keep the circuit pressurised. This avoids risk of cavitations and ensures a good performance of the transmission.

It is equipped with high pressure relief valves and control pressure cut-off valve.

It is available in single or tandem version.

As options PW085/PW096 can be featured with exchange valve, filter on charge pressure line and safety devices to ensure safe operation of the machine.



		PW085	PW096
Displacement	cm^3/rev *[$in^3/rev.$]*	85,2 *[5.20]*	96,4 *[5.88]*
Theoretical Flow at rated speed	L/min *[GPM]*	170 *[44.91]*	192 *[50.72]*
Mass moment of inertia of rotating components	$kg.m^2$ *[$slug.ft^2$]*	0,0127 *[0.0091]*	0,0125 *[0.0089]*
Pump torque at $v_{g\ max}$ and Δp	Nm *[in.lbf]* Δp = bar *[PSI]*	582 *[5151]* Δp = 430 *[6237]*	580 *[5133]* Δp = 380 *[5511]*
Theoretical Power at $v_{g\ max}$, max. continuous speed and Δp	kW *[hp]* Δp = bar *[PSI]*	223 *[299]* Δp = 430 *[6237]*	Δp = 380 *[5511]*
Mounting flange		SAE - C	
Control		Solenoid control with feedback sensor and control pressure cut-off valve	
Mass	kg *[lb]*	71 *[157]*	
Rotation		Clockwise or Counterclockwise	

CONTENT

MODEL CODE

Size

Displacement cm³/rev *[in³/rev]*	
85,2 *[5.20]*	**085**
96,4 *[5.88]*	**096**

D

Direction of rotation	
Clockwise (CW)	**R**
Counterclockwise (CCW)	**L**

M

Mounting flange and shaft	
SAE-C; splined shaft; z = 21; 16/32 D.P.	**2**
SAE-C; splined shaft; z = 23; 16/32 D.P.	**3**
SAE-C; splined shaft; z = 13; 8/16 D.P.	**5**
SAE-C; splined shaft; z = 14; 12/24 D.P. *	**6**

* Not recommended for front pump in tandem configuration.

C

Controls	
Solenoid control 12 V with feedback sensor and control pressure cut-off valve	**A**
Solenoid control 24 V with feedback sensor and control pressure cut-off valve	**B**

H1

High pressure relief valve (A) ** bar (± 15) *[PSI (± 218)]*	
320 *[4641]*	**A**
350 *[5076]*	**B**
380 *[5511]*	**C**
400 *[5802]*	**D**
420 *[6092]*	**E**
450 *[6527]**	**F**
480 *[6962]**	**G**

* not available for PW096

O

Ports mm *[inch]*				
(P) inlet	(S1) servo	(S2) servo	(T)	
w/o	w/o	w/o	N/A	**0**
0,8 *[0.031]*	0,8 *[0.031]*	0,8 *[0.031]*	N/A	**1**
w/o	1,5 *[0.059]*	1,5 *[0.059]*	N/A	**2**
w/o	0,8 *[0.031]*	0,8 *[0.031]*	N/A	**3**

H2

High pressure relief valve (B) ** bar (± 15) *[PSI (± 218)]*	
320 *[4641]*	A
350 *[5076]*	B
380 *[5511]*	C
400 *[5802]*	D
420 *[6092]*	E
450 *[6527]* *	F
480 *[6962]* *	G

* not available for PW096

G

Charge pump displacement cm^3/rev *[in^3/rev]*	
17 *[1.04]*	2
22 *[1.34]*	3

L

Charge pressure relief valve ** bar (± 0,5) *[PSI (± 7.25)]*	
18 *[261]*	A
19 *[276]*	B
20 *[290]*	C
21 *[305]*	D
22 *[319]*	E
23 *[334]*	F
24 *[348]*	G
25 *[363]*	H
26 *[377]*	J
27 *[392]*	K
28 *[406]*	L
29 *[421]*	M
30 *[435]*	N

A

Auxiliary mounting pad	
Without auxiliary mounting pad	0
SAE-A; z = 9; 16/32 D.P.	1
SAE-B; z = 13; 16/32 D.P.	2
SAE-BB; z = 15; 16/32 D.P.	3
SAE-C; z = 14; 12/24 D.P.	4
SAE-C; z = 21; 16/32 D.P.	5

F

Filtration	
Suction filtration (no filter)	0
Integral filter (filtration after charge pump) + filtration bypass	A
Integral filter (filtration after charge pump) + pollution indicator + filtration bypass	B
Remote filtration	C

S

Options	
Without option	0
T4 speed sensor (without rotation direction)	2
Predisposition for speed sensor	8
Bypass of orifices in SA control	B
Without control pressure cut-off valve	C
Special paint or no paint	D
Exchange valve	H
2 bolt bearing flange mounting *	M
Customized identification plate	P
Pressure sensors on A&B lines	R
Temperature sensor	T

In case of request for a combination of several options, please contact your Poclain Hydraulics application engineer for further information.

*

This option is only available for splined shaft Z = 23, 16/32 D.P.

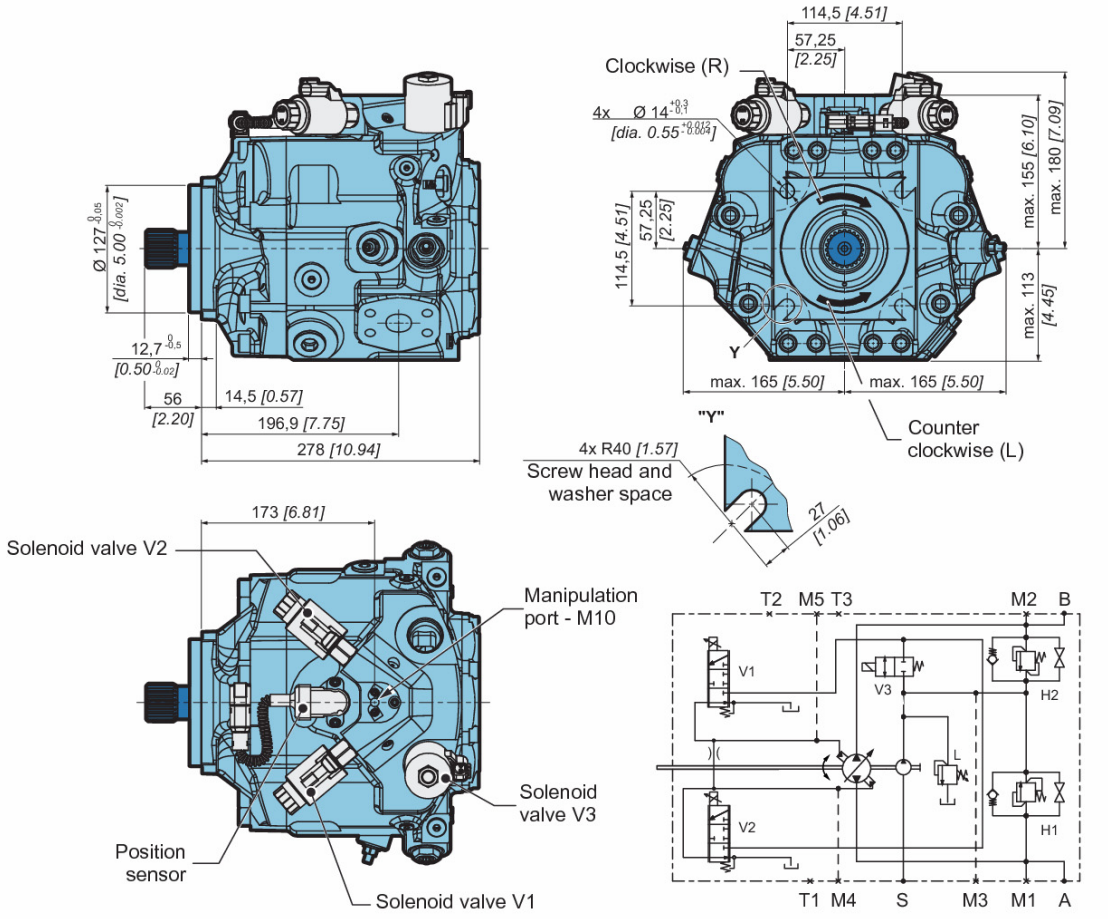
**

Consult setings of HPRVs and CPRV with your Poclain Hydraulics application engineer in order to avoid that maximum pressure is exceeded.

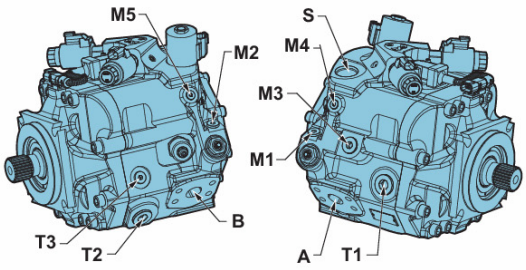
TECHNICAL SPECIFICATIONS

Main dimensions

P W	0 8 5 / 0 9 6	D	M	C	O	H1	H2	G	L	A	F	S
		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐☐☐☐☐



Port characteristics



Port	Function	Size	Norm
A, B	Main port	PN400 DN25 4xM12	ISO 6162-2
S	Charge inlet	1 5/16-12 UN-2B	ISO 11926-1
M1/M2	A-B ports pressure gauge	13G - G1/4	ISO 1179-1
M3	Charge pressure	7/8-14 UNF-2B	ISO 11926-1
M4/M5	Gauge control pressure	7/16-20 UNF-2B	ISO 11926-1
T1/T2	Gauge case drain	1 1/6-12-UN-2B	ISO 11926-1
T3	Drain temperature port	13G - G1/4	ISO 1179-1

OPERATING PARAMETERS

Operating parameters

			PW085	PW096
Speed ratings	Minimum	min^{-1}(rpm)	500	
	Nominal		2000	
	Max. continuous		3650	
	Max. intermittent		3850	
Maximum pressure (port A or B)		bar *[PSI]*	450 *[6527]*	400 *[5802]*
Maximum peak pressure (port A or B)			500 *[7252]*	450 *[6527]*
Charge pressure (port M3)			30 *[435]*	
Minimum pressure at charge inlet (port S)			0,7 *[10.2]*	
Case drain (port T1 or T2)			5 *[72.5]*	
Pressure in piloting chamber (port M4 or M5)			30 *[435]*	

Charge pressure

A charge flow is required to maintain a positive pressure in the low pressure loop of a closed loop hydrostatic transmission. Charge pressure ensures proper lubrication and rotating group operation. It is recommended to maintain the charge pressure at a minimum of 6 bar *[87 PSI]* above case pressure. For more details, refer to charge pump paragraph, page 19.

Case pressure

Case pressure must be maintained within the limits shown in the table "Operating parameters". Ensure that housing is always filled with hydraulic fluid and especially during start-up of the machine.

Pressure ratings

Maximum peak pressure
It is the maximum allowable pressure. A self-propelled machine can reach the maximum peak pressure value no more than 1-2% of that work cycle.

Work cycle
A fundamental factor for ensuring correct hydrostatic transmission sizing is the machine work cycle (pressure-time ratio, seasonality, pressure vs. percentage of time at max. displacement, machine type). Part service life depends on the correct choice in relation to the work cycle.

Overloads
It is mandatory to protect parts against any possible overloads.

Speed ratings

The table "Operating parameters" gives minimum and maximum rated speeds.

Maximum speed is the highest operating speed allowed. Over speeding reduces pump life time, can lead to loss of hydrostatic power and braking capacity. Never exceed the maximum speed limit under any operating conditions.

Nominal speed is the speed offering the maximal efficiency.

Theoretical output

Theoretical output flow is a function of pump displacement and speed. It is relevant to size the rest of the circuit. Theoretical flow does not take into account losses due to leakage or variations in displacement.

Poclain Hydraulics recommandations for fluid

Poclain hydraulics recommends the use of hydraulic fluids defined by the ISO 12380 and ISO 6743-4 standards.
For temperate climates, the following types are recommended.
- HM 46 or HM 68 for fixed installations.
- HV 46 or HV 68 for mobile installations.
- HEES 46 for mobile installations.

These specifications correspond to category 91H of the CETOP standard, parts 1, 2 and 3 of the DIN 51524 standard, and grades VG32, VG 46 and VG68 of the ISO 6743-4 standards.

It is also possible to use ATF, HD, HFB, HFC or HFD type hydraulic fluid upon Poclain Hydraulics specific approval of the components' operating conditions.

Standardized designations for the fluids
- **HM :** Mineral fluids having specific antioxidant, anticorrosion and antiwear properties (HLP equivalent to DIN 51524 parts 1 and 2).
- **HV :** HM mineral fluids providing improved temperature and viscosity properties (DIN 51524 part 3).
- **HEES :**Biodegradable fluids based on organic esters.

It is also possible to use a fluid that meets the biodegradability criteria and is compatible in the event of accidental food contact. The BIOHYDRAN FG 46 fluid designed by the company Total has undergone testing of its properties and performance on our test benches. Since this type of fluid has not yet been categorized, it is the responsibility of machine manufacturers to validate its compatibility with all of the components used in order to guarantee that the intended functions will be fulfilled and this for the desired life time of all equipment items.

For biodegradable fluids, consult your Poclain Hydraulics' application engineer

During operation, the temperature of the oil must be between 0 °C *[32 °F]* and 80 °C *[176 °F]*; the minimum and maximum temperatures may be exceeded momentarily by ± 20 °C *[± 68 °F]* for a duration of less than 30 minutes. For all applications outside these limits, please consult with your Poclain Hydraulics' application engineer.

Fluid and filtration

To prevent premature wear, it is imperative that only clean fluid enter the hydrostatic transmission circuit. A filter capable of controlling the fluid cleanliness to ISO 4406 class 22/18/13 (SAE J1165) or better under normal operating conditions is recommended.

The filter may be located either on the inlet (suction filtration) or discharge (charge pressure filtration) side of the charge pump. The selection of a filter depends on a number of factors including the contaminant ingression rate, the generation of contaminants in the system, the required fluid cleanliness, and the desired maintenance interval. Filters are selected to meet the above requirements using rating parameters of efficiency and capacity.

Filter efficiency may be measured with a Beta ratio[1] (β_X). For simple suction-filtered closed circuit transmissions and open circuit transmissions with return line filtration, a filter with a β-ratio within the range of $\beta_{35-45} = 75$ ($\beta_{10} \geq 2$) or better has been found to be satisfactory. For some open circuit systems, and closed circuits with cylinders being supplied from the same reservoir, a considerably higher filter efficiency is recommended. This also applies to systems with gears or clutches using a common reservoir. For these systems a charge pressure or return filtration system with a filter β-ratio in the range of $\beta_{15-20} = 75$ ($\beta_{10} \geq 10$) or better is typically required.

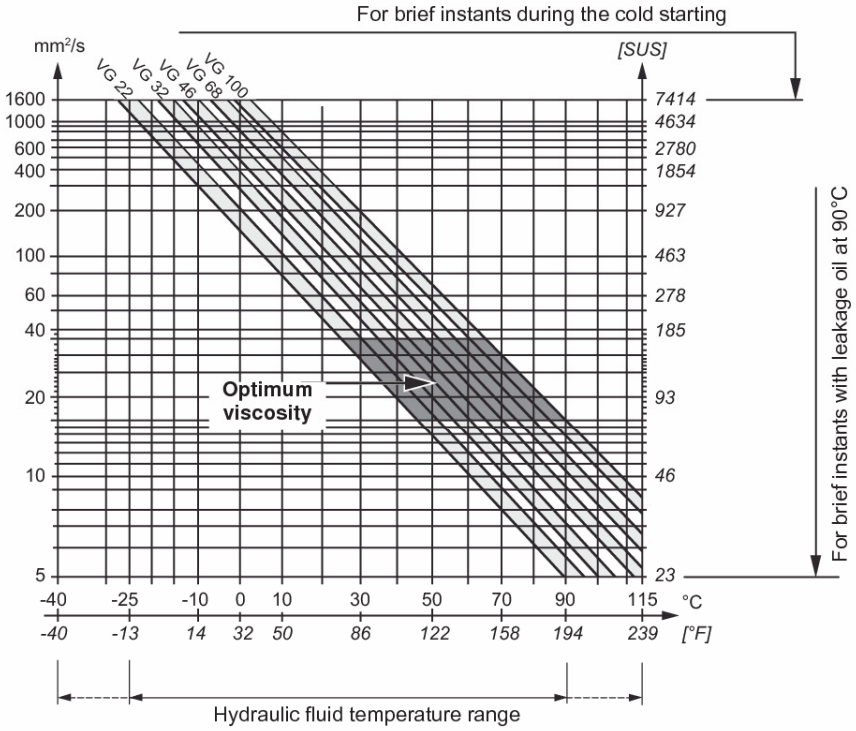
Because each system is unique, only a thorough testing and evaluation program can fully validate the filtration system.

[1] Filter β_x-ratio is a measure of filter efficiency defined by ISO 4572. It is defined as the ratio of the number of particles greater than a given diameter ("x" in microns) upstream of the filter to the number of these particles.

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 from 16 to 36 mm^2/s *[from 74.1 to 166.8 SUS]* referred to the closed loop temperature.

Working conditions: the following limits of viscosity apply
√min = 5 mm^2/s *[23 SUS]* short-duration at a max. permissible leakage oil temperature of 90° C *[194 °F]*
√max = 1000 mm^2/s *[4 634 SUS]* short-duration, on cold start.



Ensure fluid temperature and viscosity limits are concurrently satisfied.

SYSTEM DESIGN PARAMETERS

Consult your Poclain Hydraulics application engineer to validate your design parameters before using the pump in your application.

Sizing equations

The following equations are helpful when sizing hydraulic pumps. Generally, the sizing process is initiated by an evaluation of the machine system to determine the required motor speed and torque to perform the necessary work function. First, the motor is sized to transmit the maximum required torque. The pump is then selected as a flow source to achieve the maximum motor speed.

SI units	**Output flow Q**	$= \frac{V_g.n.\eta_v}{1000}$			(l/min)
	Input torque M	$= \frac{V_g.\Delta_p}{20.\pi.\eta_m}$			(N.m)
	Input power P	$= \frac{M.\ n.\pi}{30\ 000}$	$= \frac{Q.\Delta_p}{600.\eta_t}$		(kW)
US units	**Output flow Q**	$= \frac{V_g.n.\eta_v}{231}$			*[GPM]*
	Input torque M	$= \frac{V_g.\Delta_p}{2.\pi.\eta_m}$			*[lbf.in]*
	Input power P	$= \frac{M.n.\pi}{198\ 000}$	$= \frac{Q.\Delta_p}{1714.\eta_t}$		*[hp]*

V_g=Displacement per revolution cm^3/tr *[in^3/rev]*
$\Delta p = p_o - p_i$ (system pressure) bar *[PSI]*
n = Speed min^{-1} *[rpm]*
η_v = Volumetric efficiency
η_m = Mechanical efficiency
η_t = Overall efficiency ($\eta v.\eta m$)

Redundant braking system requirement

Unintended vehicle or machine movement hazard.
The loss of hydrostatic drive line power, in any mode of operation (forward, neutral, or reverse) may cause the system to lose hydrostatic braking capacity. You must provide a braking system, redundant to the hydrostatic transmission, sufficient to stop and hold the vehicle or machine in the event of hydrostatic drive power loss.

Reservoir

The reservoir provides clean fluid, dissipates heat, and removes entrained air from the hydraulic fluid. It allows for fluid volume changes associated with fluid expansion and cylinder differential volumes. Minimum reservoir capacity depends on the volume needed to perform these functions. Typically, a capacity of one half of the charge pump flow (per minute) is satisfactory for a closed reservoir. Open circuit systems sharing a common reservoir require greater fluid capacity.

Locate the reservoir outlet (suction line) near the bottom, allowing clearance for settling foreign particles. Use a 100 - 125 µm screen covering the outlet port.

Place the reservoir inlet (return lines) below the lowest expected fluid level, as far away from the outlet as possible.

Use a baffle (or baffles) between the reservoir inlet and outlet ports to promote de-aeration and reduce fluid surging.

Case drain usage for tandem pump

A case drain line must be connected to one of the case outlets (T1 or T2) to return internal leakage to the system reservoir. The higher of the two case outlets should be used to promote complete filling of the case. Since the case drain fluid is typically the hottest fluid in the system, it is advantageous to return this flow through heat exchanger.

Bearing life and external shaft loading

Bearing life:

Bearing life is a function of speed, pressure , swashplate angle and external loads. Oil type and viscosity impact bearing life.

	Bearing life (B_{10} hours)	
	Standard 4-bolt flange	2-bolt flange (option M)
PW085	34 000	26 500
PW096	23 000	17 700

Normal bearing life in B_{10} hours is shown in the above table. Figures have been calculated under the following operating conditions: Continuous differential pressure of 320 bar *[4 641 PSI]*, 2000 rpm shaft speed, maximum displacement, without any external shaft side load. The data is based on a 50% forward, 50% reverse duty cycle, standard charge pump size, and standard charge pressure.

Shaft Loads:

PW085/PW096 pumps are designed with bearings that can accept external radial and thrust loads. The external radial shaft load limits depend on the load position, orientation, and operating conditions of the unit.

The maximum permissible radial load (Re), is based on the **maximum external moment (Me)**, and the **distance (L)** from the mounting flange to the load. It may be determined using the table and formula below. Thrust (axial) load limits are also shown.

Re = Me / L

All external shaft loads affect bearing life. In applications with external shaft loads, minimize the impact by positioning the load at 0° or 180° as shown in the figure.

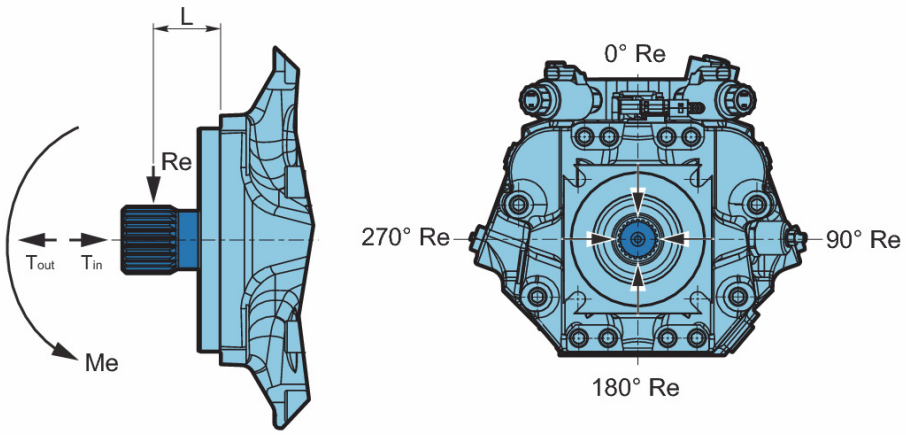
Contact your Poclain Hydraulics representative for an evaluation of unit bearing life if:

- Continuously applied external loads exceed 25 % of the maximum allowable radial load Re.
- The pump swashplate is positioned on one side of center all or most of the time.
- The unit bearing life (B_{10}) is critical.

Radial load position

	External moment (Me) N.m *[in.lbf]*	Maximum shaft thrust in (T_{in}) N *[lbf]*	Maximum shaft thrust out (T_{out}) N *[lbf]*
PW085 PW096	120 *[1062]*	4000 *[899]*	2400 *[540]*

at 200 bar *[2901 PSI]* and 2000 rpm



For an accurate calculation, consult your Poclain Hydraulics application engineer.

Hydraulic unit life

Hydraulic unit life is the life expectancy of the hydraulic components. It depends on speed and system pressure.High pressure, generated by high load, reduces hydraulic unit life.

Design the hydraulic system according to the expected machine duty cycle. Take in consideration the expected percentages of time at various loads and speeds. Ask your Poclain Hydraulics representative to calculate an appropriate pressure based your hydraulic system design. If duty cycle data is not available, input power and pump displacement are used to calculate system pressure.

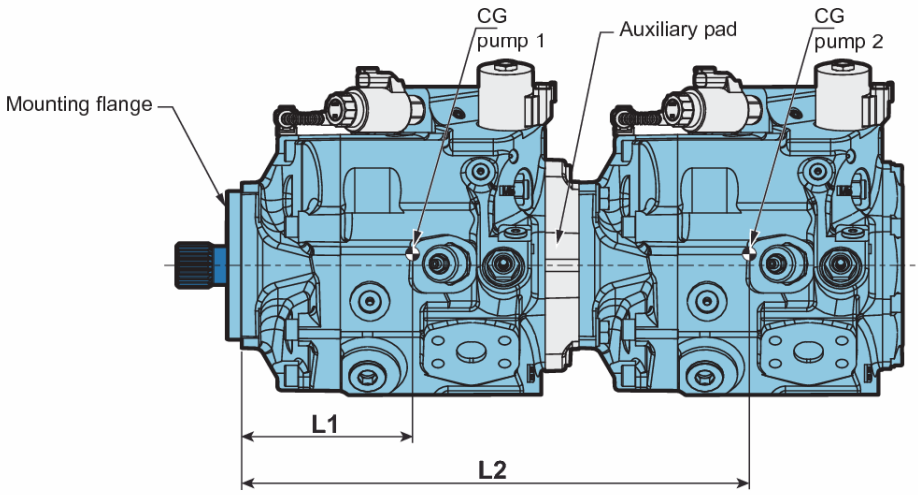
All pressure limits are absolute pressures.

PW085 / PW096 pumps will meet satisfactory life expectancy if applied within the parameters specified in this technical documentation. For more detailed information see Operating Parameters on 9.

Mounting flange loads

Adding tandem mounted pumps, and/or tandem auxillary pump(s), subjecting pumps to shock loads may generate excessive loads on the front mounting flange. The overhung load moment for multiple pump mounting can be estimated as shown in the figure bellow

Overhung load example



Estimating overhung load moments

W = Weight of pump (kg)
L = Distance from mounting flange to pump center of gravity (CG)

$M_R = G_R (W_1L_1 + W_2L_2 + ... + W_nL_n)$
$M_S = G_S (W_1L_1 + W_2L_2 + ... + W_nL_n)$

Where:
- M_R = Rated load moment (N.m)
- M_S = Shock load moment (N.m)
- G_R* = Rated (vibratory) acceleration (m/sec²) = 10*g
- G_S* = Maximum shock acceleration (m/sec²) = 20*g

*Calculations is carried out by multiplying the gravity (g = 9.81 m/sec²) with a given factor.

Allowable overhung load moment are shown in the table below**.** Exceeding these values requires additional pump support.

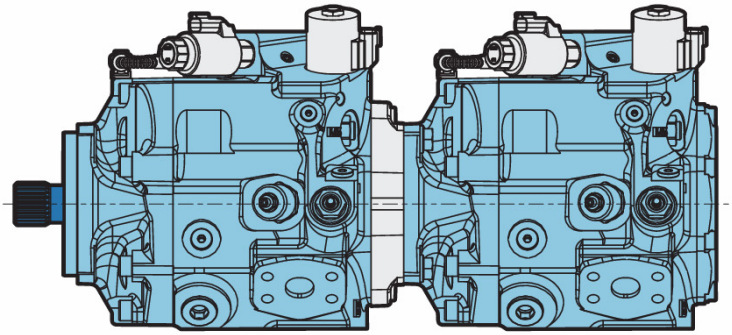
	Rated moment (M_R) N.m *[in.lbf]*	Shock load moment (M_S) N.m *[in.lbf]*
4-bolt mounting flange	4200 *[37 173]*	8400 *[74 346]*
2-bolt mounting flange (option M)	1400 *[12 391]*	4000 *[35 403]*

For an accurate calculation, consult your Poclain Hydraulics application engineer.

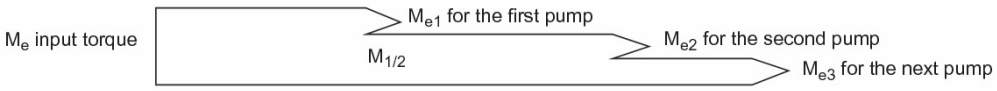
Tandem pumps

For tandem definition ensure that:

- maximum shaft and coupling torques will not be exceeded, see section “Mounting flange and shafts”, page 23 and “Auxiliary mounting pad”, pages 24 to 26.
- maximum overhung load moment will not be exceeded otherwise use of additional pump support will be needed, see the page 15 for allowable moment values.



Front axial pump **Rear axial pump**



Contact your Poclain Hydraulics application engineer for specific tandem configurations.

FEATURES

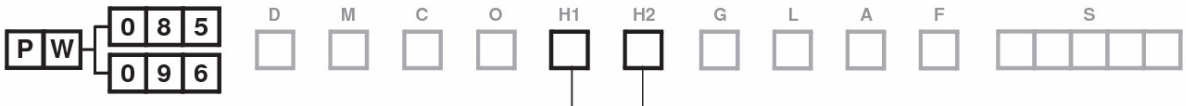
High pressure relief valves

The high pressure relief valves maintain circuit pressure in the proper range. The check valves allow charge flow to replenish the low pressure loop of the circuit. The high pressure relief valves ensure a high pressure protection of the high pressure loop of the circuit.

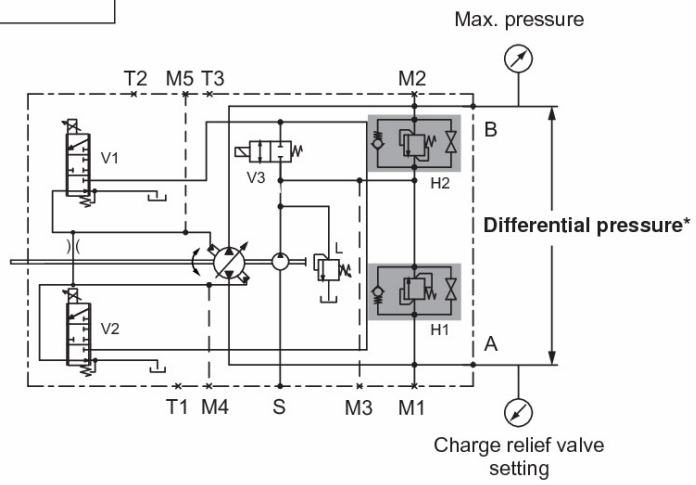
High pressure relief valves are available in a range of settings with tolerance ± 15 bar *[218 PSI]*.

Bypass of A and B ports is integrated in high pressure relief valves. The bypass connect the ports A-B and must be used only in emergency case and only for short movement.

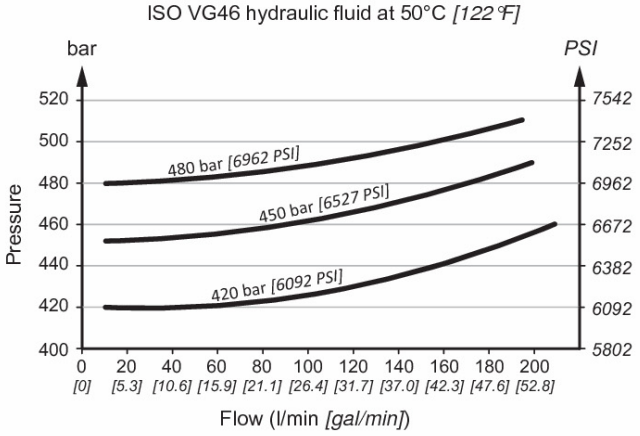
High pressure relief valves are intended for transient overpressure protection and are not intended for continuous pressure control. Flow over relief valves for extended periods of time may result in severe heat build up. High flows over relief valves may result in pressure levels exceeding the nominal valve setting and potential damage to system components.

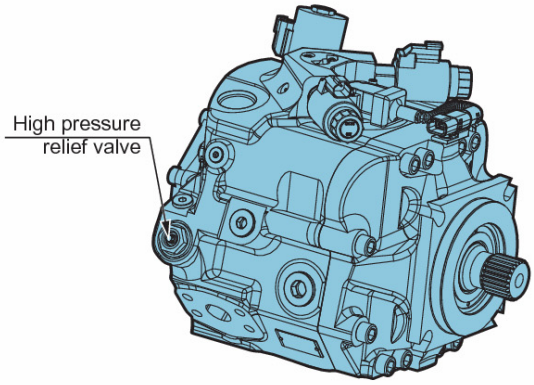


High pressure relief valve available setting bar *[PSI]*			
PW085	PW096		
320 *[4 641]*		A	A
350 *[5 076]*		B	B
380 *[5 511]*		C	C
400 *[5 802]*		D	D
420 *[6 092]*		E	E
450 *[6 527]*	-	F	F
480 *[6 962]*	-	G	G



*** Differential pressure = High pressure relief valve setting (Max. pressure = HPRV setting + CPRV setting)**





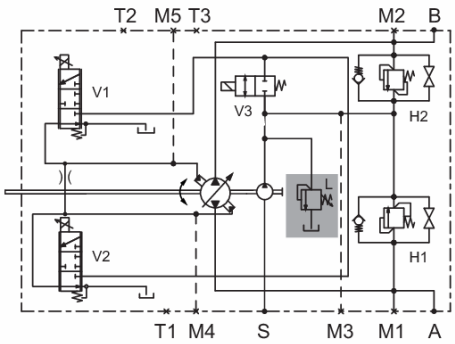
Charge pressure relief valve

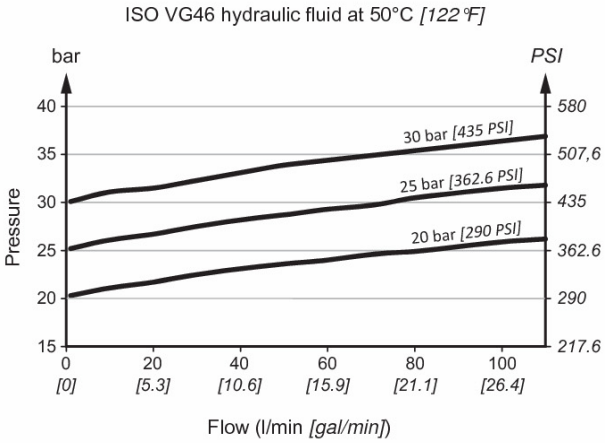
The charge pressure relief valve provides a relief outlet for charge circuit. This valve is used to set the charge pressure of the circuit. Flow through the valve is ported to case.

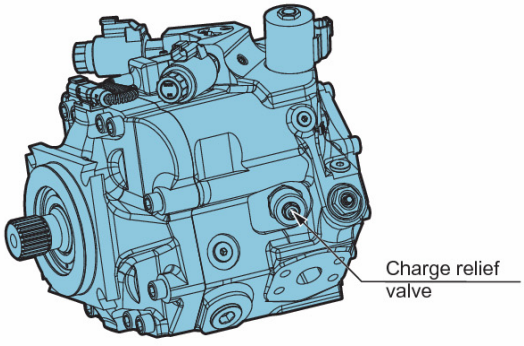
The nominal charge relief setting is referenced to case pressure.

Incorrect charge pressure settings may result in the inability to build required system pressure and/or inadequate loop flushing flows. Ensure correct charge pressure under all conditions of operation to maintain pump control performance.

Charge relief valve available settings bar *[PSI]*	
18 *[261]*	A
19 *[276]*	B
20 *[290]*	C
21 *[305]*	D
22 *[319]*	E
23 *[334]*	F
24 *[348]*	G
25 *[363]*	H
26 *[377]*	J
27 *[392]*	K
28 *[406]*	L
29 *[421]*	M
30 *[435]*	N

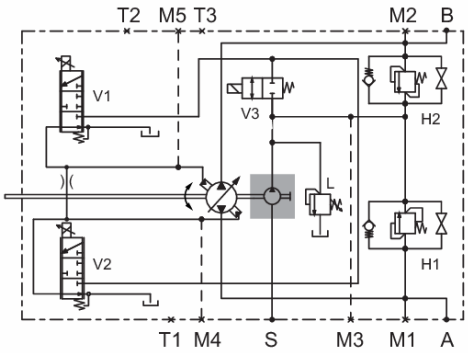






Charge pump

Charge flow is required on all PW085 / PW096 pumps used in closed circuit installations. The charge pump provides flow to make up internal leakage, maintain a positive pressure in the main circuit, provide flow for cooling and filtration, replace any leakage losses from external valving or auxiliary systems, and to provide flow and pressure for the control system.
Many factors influence the charge flow requirements. These factors include system pressure, pump speed, pump swashplate angle, type of fluid, temperature, size of heat exchanger, length and size of hydraulic lines, control response characteristics, auxiliary flow requirements, hydrostatic motor type, etc.
Unusual application conditions may require a more detailed review of charge pump sizing. Charge pressure must be maintained at a specified level under all operating conditions to prevent damage to the transmission. Poclain Hydraulics recommends testing under actual operating conditions to verify this.



Charge pump sizing/selection

In most applications a general guideline is that the charge pump displacement should be at least 20% of the main pump displacement.

Charge pump	Displacement cm³/rev *[in³/rev]*	
Optional	17 *[1.04]*	**2**
Standard	22 *[1.34]*	**3**

Contact your Poclain Hydraulics application engineer for more information.

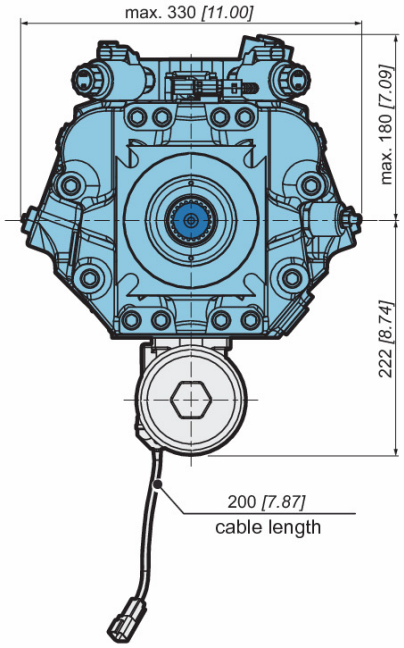
Filtration

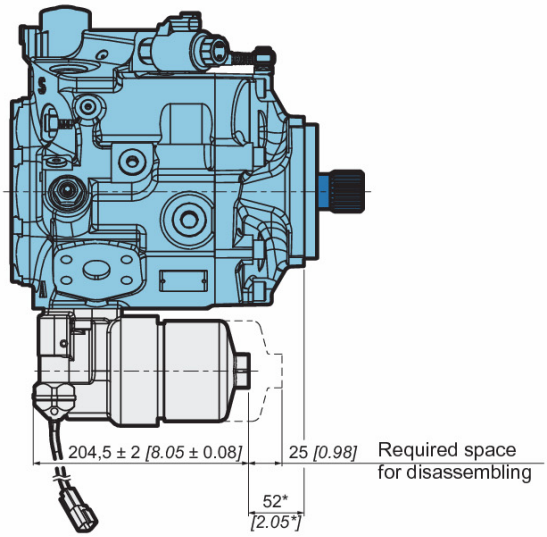
P W	0 8 5 / 0 9 6	D	M	C	O	H1	H2	G	L	A	F	S

0 **Suction filtration**

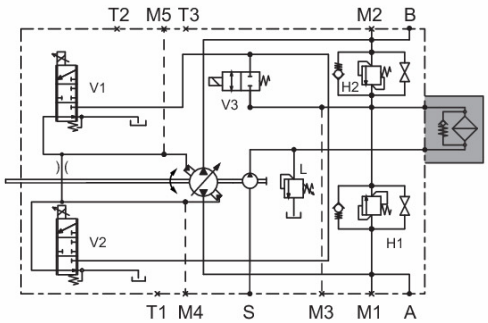
The suction filter is placed in the circuit between the reservoir and the inlet to the charge pump. The use of a filter contamination monitor is recommended.

A **Integral filter**





* 38 [1.50] for 2-bolt bearing flange (option M)

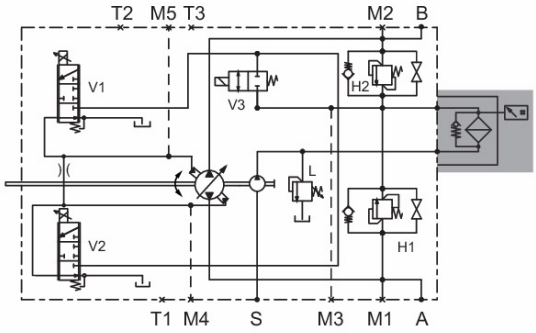


Filter characteristic	
Max. operating pressure	40 bar [580 PSI]
Operating temperature	-30°C~ 100°C [-22°F ~ 212°F]
Connector	Deutsch DT04-2P
Protection	IP67

Filtration

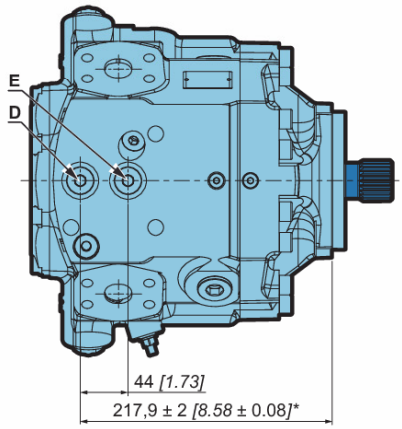
B **Integral filter with pollution indicator**

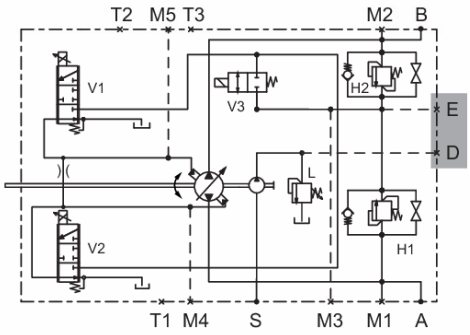
Integral filter can be equipped with pollution indicator for early warning that the filter needs to be cleaned or replaced.



C **Remote pressure filtration**

The pressure filter can be mounted remotely for easy servicing. A 100-125 µm mesh screen, located in the reservoir or the charge inlet line, is recommended when using charge pressure filtration. The remote pressure filter has to be capable to withstand charge pressure.





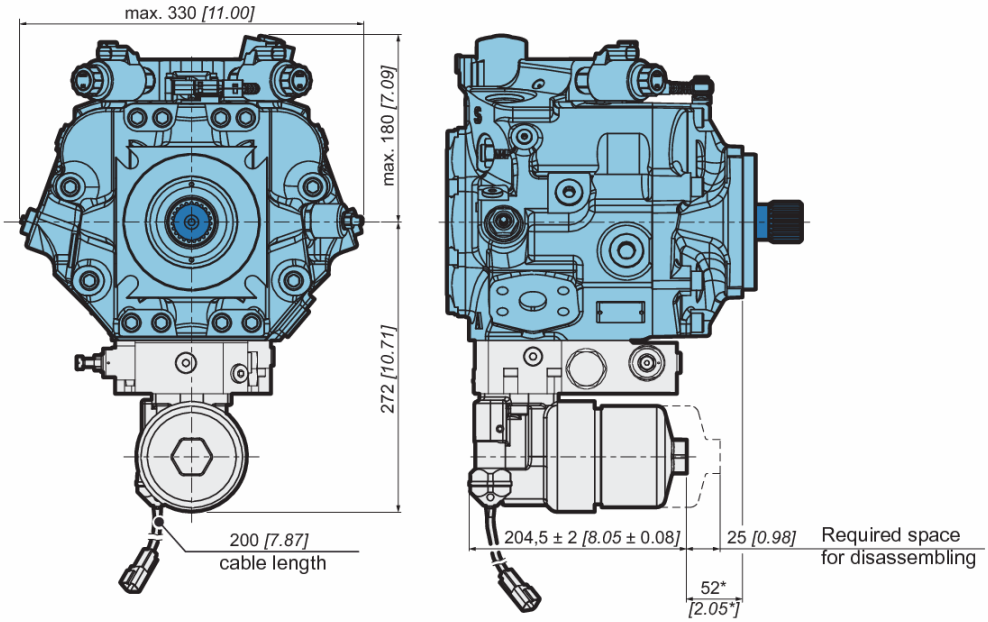
* 203,9 ±2 *[8.03 ± 0.08]* for 2-bolt bearing flange (option M)

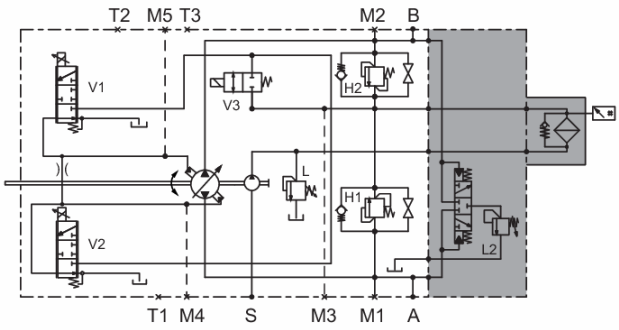
Port	Function	Size	Norm
D	Charge filtration port - filter input	7/8-14 UNF-2B	ISO 11926-1
E	Charge filtration port - filter output		

Filtration

PW	0 8 5 / 0 9 6	D	M	C	O	H1	H2	G	L	A	F	S
		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	H ☐☐☐☐

A	Integral filter with exchange valve
B	Integral filter with pollution indicator and with exchange valve

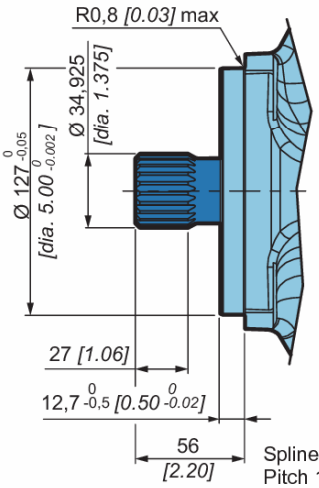




Mounting flange and shafts

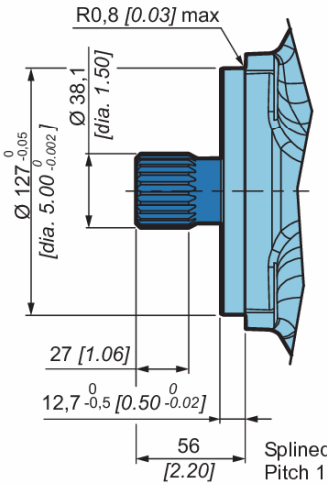
SAE-C; splined shaft

2 **21 teeth; Shaft torque: 820 Nm *[7 258 in.lbf]***
(without radial force)



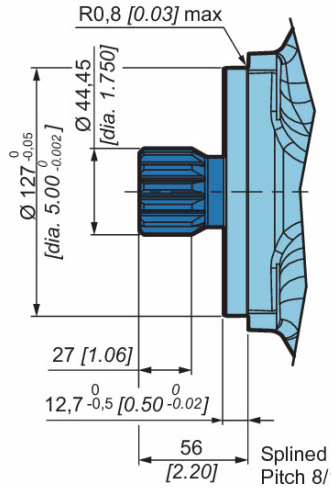
Splined ANSI B92.1-1996
Pitch 16/32" DP
Pressure angle 30°
Tolerance class: 5
Flat root side fit

3 **23 teeth; Shaft torque: 1000 Nm *[8 851 in.lbf]***
(without radial force)



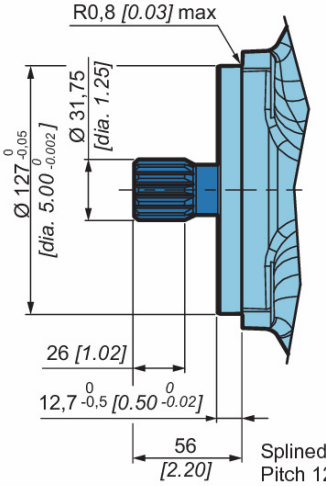
Splined ANSI B92.1-1996
Pitch 16/32" DP
Pressure angle 30°
Tolerance class: 5
Flat root side fit

5 **13 teeth; Shaft torque: 1500 Nm *[13 276 in.lbf]***
(without radial force)



Splined ANSI B92.1-1996
Pitch 8/16" DP
Pressure angle 30°
Tolerance class: 5
Flat root side fit

6 **14 teeth; Shaft torque: 600 Nm *[5 310 in.lbf]***
(without radial force)



Splined ANSI B92.1-1996
Pitch 12/24" DP
Pressure angle 30°
Tolerance class: 5
Flat root side fit

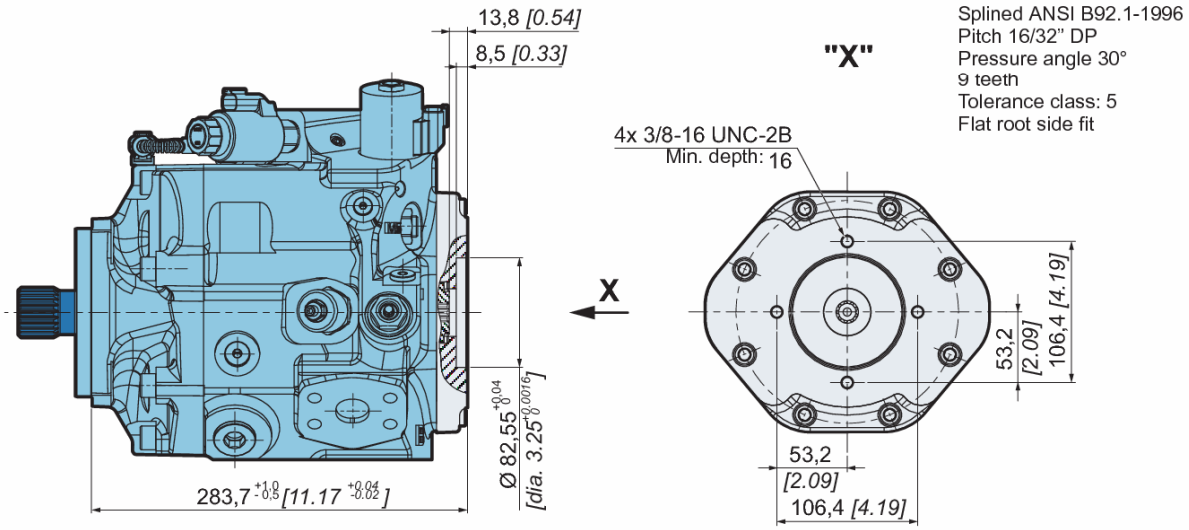
Auxiliary mounting pad

P W | 0 8 5 / 0 9 6 | D | M | C | O | H1 | H2 | G | L | A | F | S

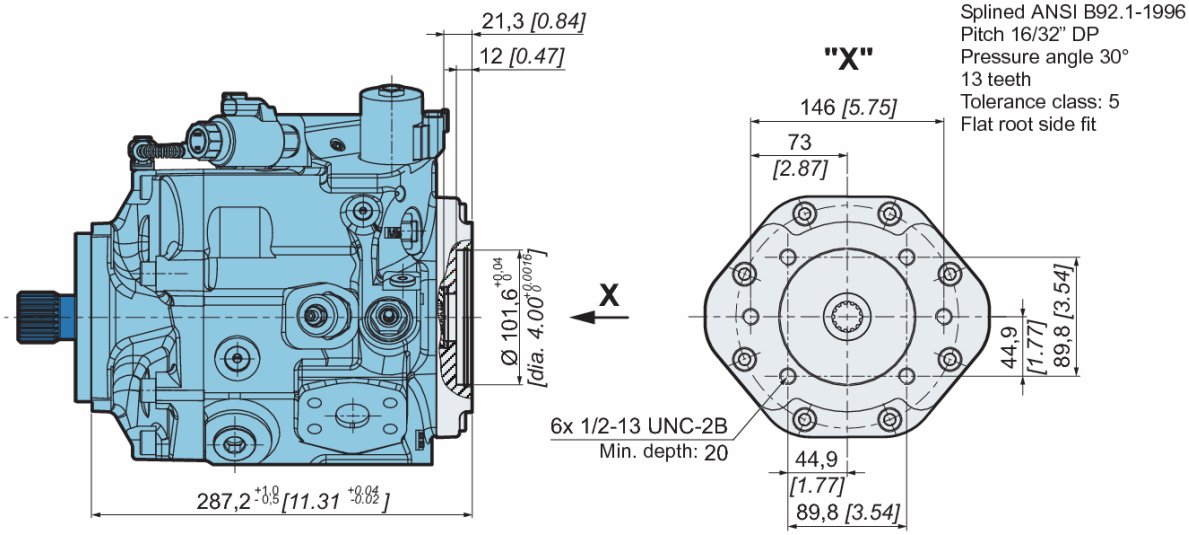
0 **Without auxiliary mounting pad**

See chapter "Technical specifications", for pump layout.

1 **SAE-A; Coupling torque: 113 Nm *[1000 in.lbf];*** minimum active spline lenght: 10 mm *[0.39 inch]*

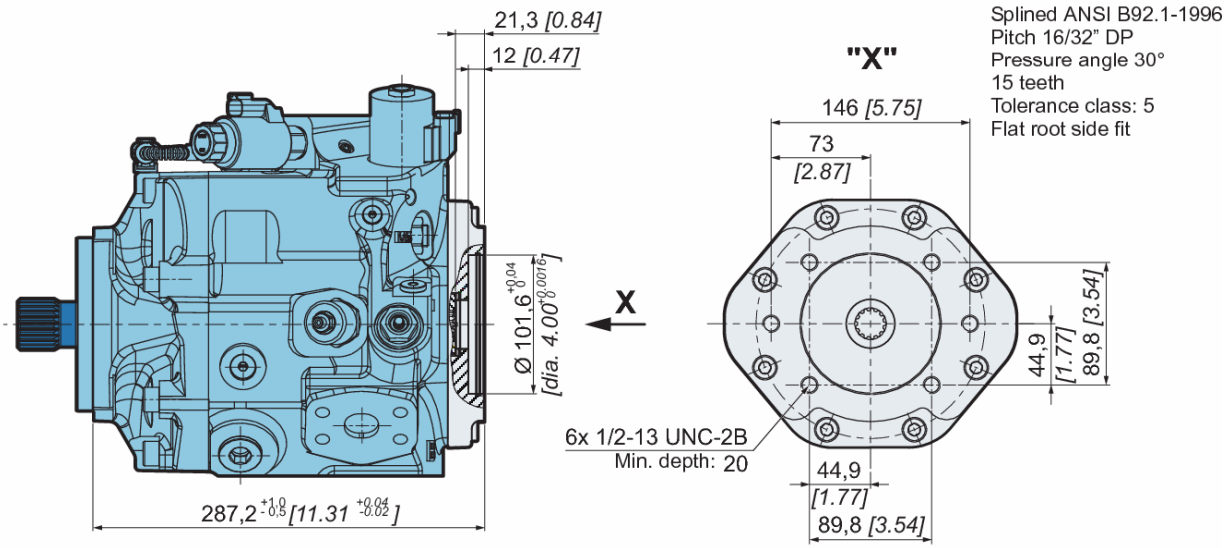


2 **SAE-B; Coupling torque: 283 Nm *[2505 in.lbf];*** minimum active spline lenght: 12 mm *[0.47 inch]*

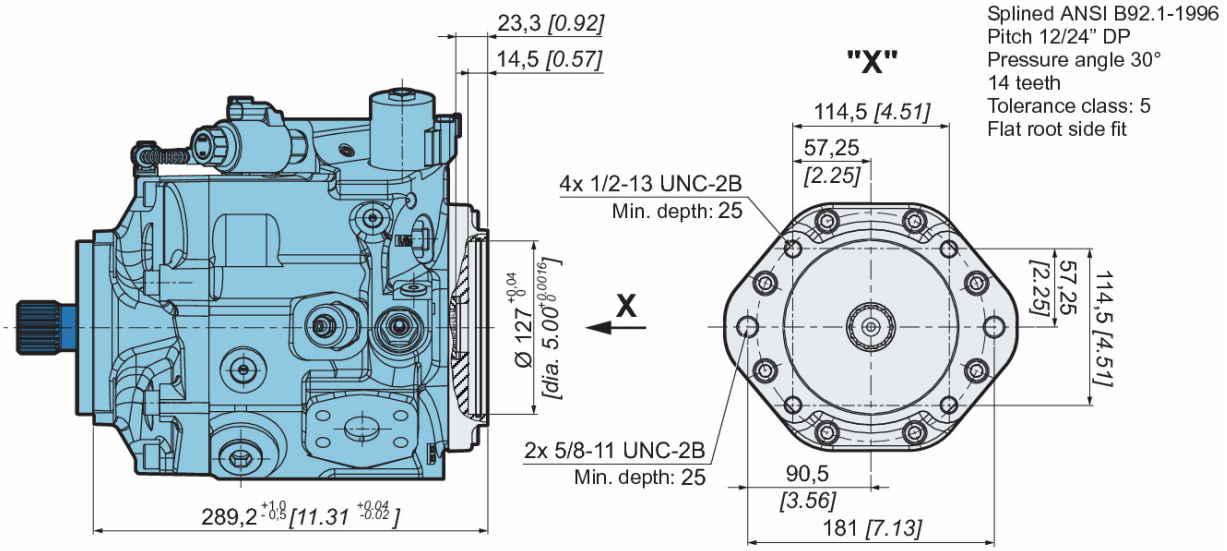


Auxiliary mounting pad

3 **SAE-BB; Coupling torque: 407Nm *[3602 in.lbf];*** minimum active spline lenght: 13 mm *[0.51 inch]*



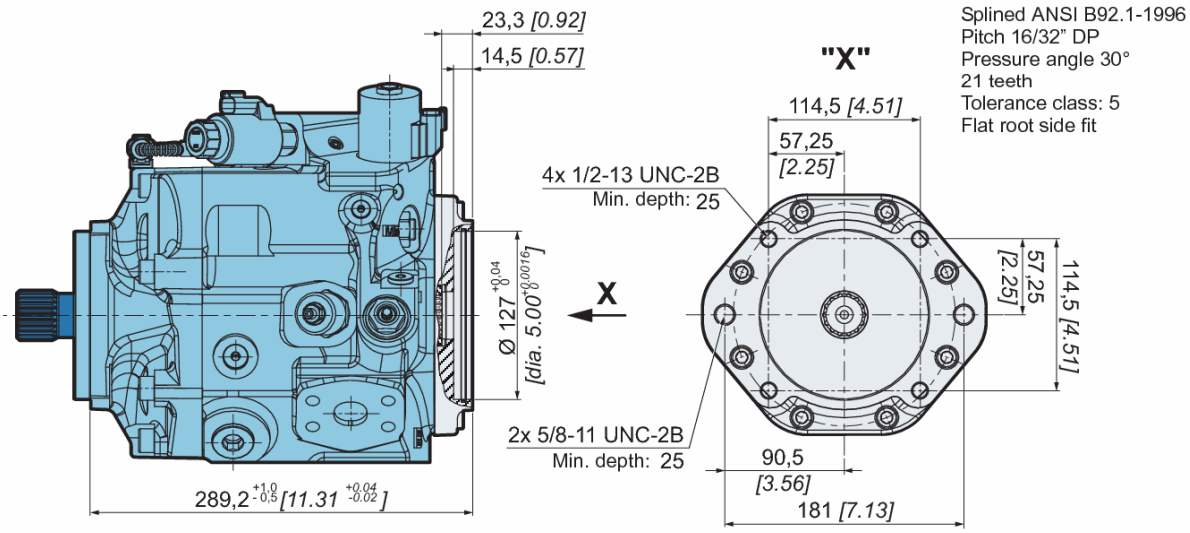
4 **SAE-C; Coupling torque: 701 Nm *[6204 in.lbf];*** minimum active spline lenght: 14,5 mm *[0.57 inch]*



Auxiliary mounting pad

P W	0 8 5 0 9 6	D	M	C	O	H1	H2	G	L	A	F	S
		☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐

5 **SAE-C; Coupling torque: 918 Nm *[8125 in.lbf];*** minimum active spline lenght: 15 mm *[0.59 inch]*



CONTROLS

Solenoid control with feedback sensor and cut-off valve

Features:

Proportional electronic control driven by Poclain Hydraulics electronic boxes:

- Our electronic control boxes control the displacement and the direction of the flow while monitoring permanently the functioning parameters of the engine and of the complete hydraulic system.
- Two contamination resistant (IP69K) solenoid valves controls the displacement and the direction of the flow.
- A sensor linked to the swash plate monitors permanently the actual displacement setting.

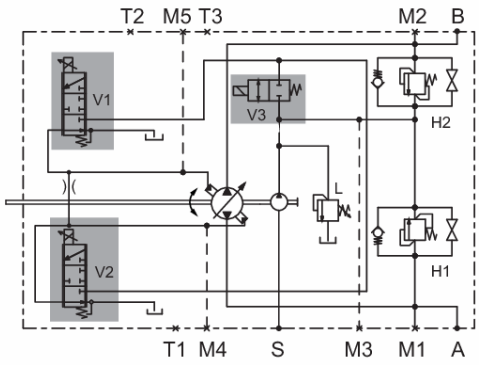
Control pressure cut-off valve:

- Ensures the safe return of pump to neutral position in case of electronic failure or control valves pollution.
- Ensures that machine will not move until proper activation of the pump control.

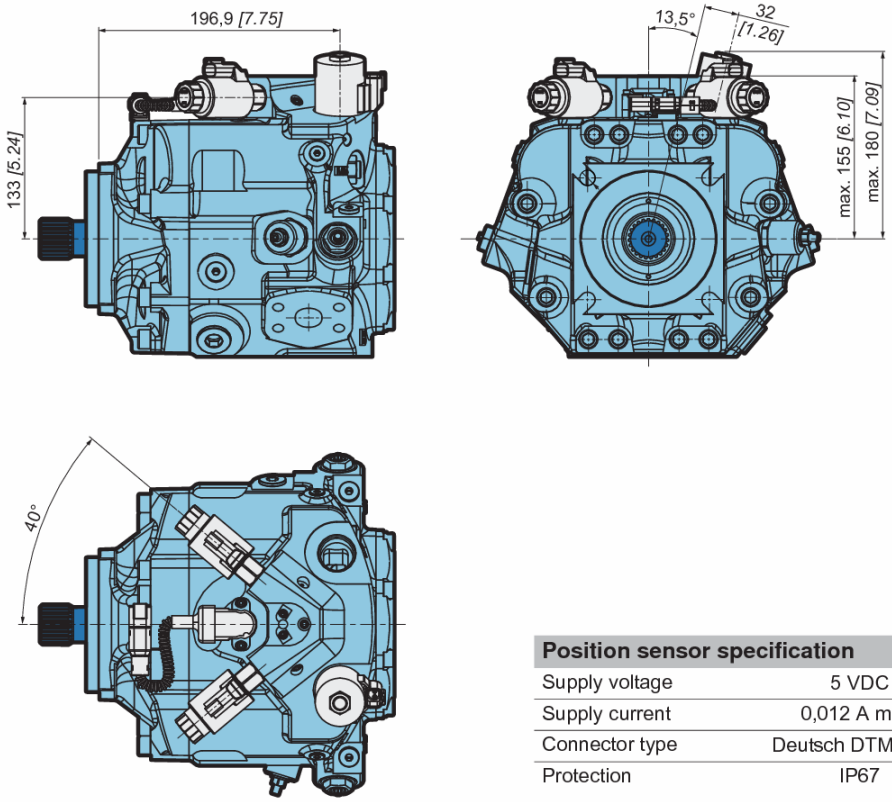
For some special application where the pump is not used as main drive (e.g. assist drive) the cut-off valve is not mandatory, see chapter Options, "Without control pressure cut-off valve", page 32.

	Shaft rotation			
	Clockwise		Counter clockwise	
Actuated solenoid	V1	V2	V1	V2
Servo cylinder	M5	M4	M5	M4
Port A flow	inlet	outlet	outlet	inlet
Port B flow	outlet	inlet	inlet	outlet

Controls	
Solenoid control 12 V with feedback sensor and control pressure cut-off valve	A
Solenoid control 24 V with feedback sensor and control pressure cut-off valve	B



Solenoid control with feedback sensor and cut-off valve



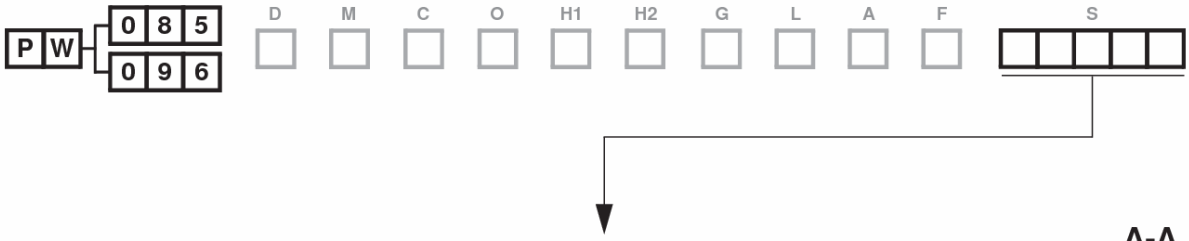
Position sensor specification	
Supply voltage	5 VDC
Supply current	0,012 A max.
Connector type	Deutsch DTM04-3P
Protection	IP67

Solenoids specification		
Operating voltage	12 VDC ± 10%	24 VDC ± 10%
Resistance at 50°C *[122 °F]*	9,4 Ω	37,2 Ω
Resistance at 20°C *[68 °F]*	6,4 Ω	26,2 Ω
Rated current	1,15 A	0,59 A
Connector type	Deutsch DT04-2P	
Power	22 W	
Protection	IP69K	
Mass	0,24 kg *[0.53 lb]*	

Cut-off valves specification		
Operating voltage	12 VDC	24 VDC
Resistance at 20°C *[68 °F]*	7,1 Ω	28,5 Ω
Initial current draw	1,7 A	0,8 A
Connector type	Deutsch DT04-2P	
Power	20,5 W	18,2 W
Protection	IP69K	
Mass	0,41 kg *[0.90 lb]*	

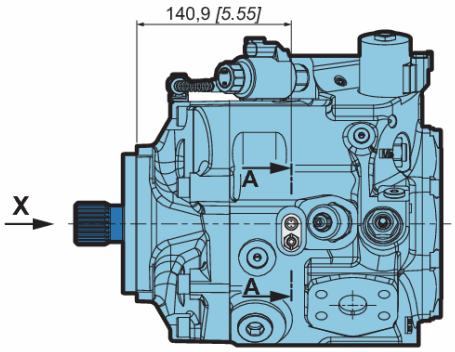
OPTIONS

Installed speed sensor or predisposition

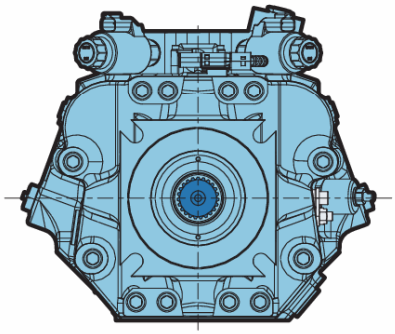


T4 speed sensor (without rotation direction) **2**

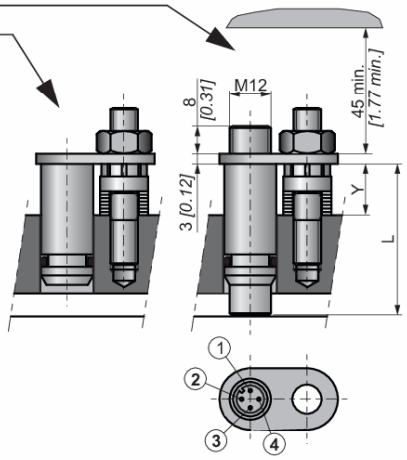
Predisposition for speed sensor **8**



"X"



A-A



Max. length Y = 15,2 [0.60]

Standard number of pulses per revolution = 9

To install the sensor, see the "Installation guide" brochure No. 801478197L.

T4 speed sensor specification

Commercial name	T4 SENSOR 12-44
Part number	A22082C
Lenght L	44 [1.73]
Function	Detect movements : rotation speed
Compatibility	Electronic transmission management

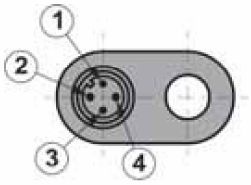
Installed speed sensor or predisposition

Features	
Supply voltage	8 - 30 V
Output type	- 1 push-pull square frequency signal - Maximum load current: 20 mA - Voltage at low state: < 1.5 V - Voltage at high state: > (power supply voltage - 3.5 V)
Maximum range	1.15 mm *[0.045"]*
Current consumption	20 mA max.
Frequency range	0 to 15 kHz
Operating temperature	- 40°C to + 125°C *[- 40°F to 257°F]*
Material	Stainless steel
Protection rating	IP68 (sensitive side) / IP67 (connector side)
Electrical protection	Reverse polarity

Signals are not protected against short circuit to ground or supply.

Connection of the speed sensor

Remove the plastic plug on the connector.



Function	Pin number
Power supply	1
Not present	2
Ground	3
Square frequency signal	4

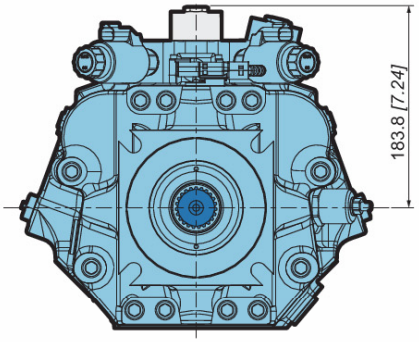
For the connection of connectors, please refer to the connection table and the general cabling plan contained in the installation brochure for your transmission.

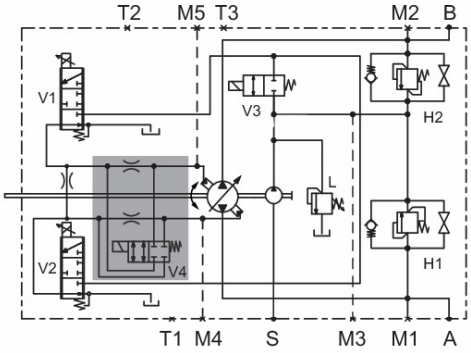
Electrical connections	90°	180°
Commercial name	ELEC-CABLE-M12-90°-5000	ELEC-CABLE-M12-180°-5000
Part number	A04999J	A07468S

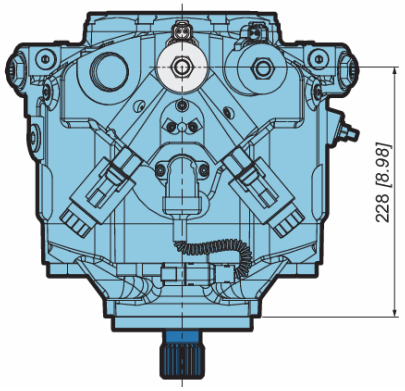
Bypass of orifices in SA control

Ports mm *[inch]*				
(P) inlet	(S1) servo	(S2) servo	(T)	
0,8 *[0.031]*	0,8 *[0.031]*	0,8 *[0.031]*	N/A	**1**
w/o	1,5 *[0.059]*	1,5 *[0.059]*	N/A	**2**
w/o	0,8 *[0.031]*	0,8 *[0.031]*	N/A	**3**

- Pump control optional function.
- Ensures fast pump response in normal working modes and in the same time ensures slow (safe) pump return to neutral position when it´s required or in case of electronic failure.
- Size of orifices has to be defined based on the application.







Special paint or no paint

P W	0 8 5 / 0 9 6	D	M	C	O	H1	H2	G	L	A	F	S
		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	D

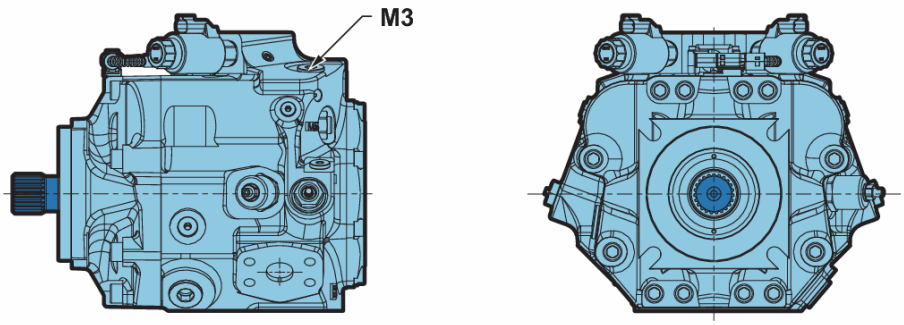
The pumps are delivered with Poclain Hydraulics black primer (RAL 9005) as standard.

Consult your Poclain Hydraulics application engineer for other colors of primer or topcoat.

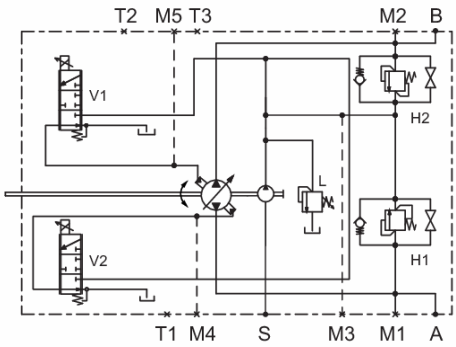
Without control pressure cut-off valve

P W	0 8 5 / 0 9 6	D	M	C	O	H1	H2	G	L	A	F	S
		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	C

Control pressure cut-off valve is not mandatory for some specific applications where the pump is not used as main drive (e.g. assist drive).



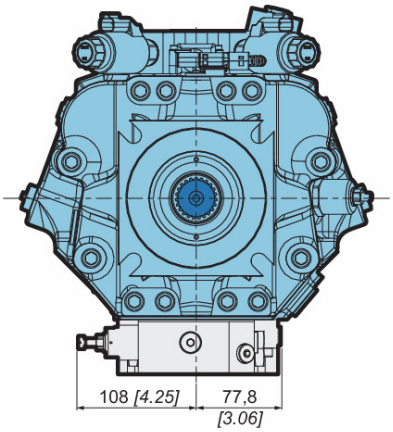
Port	Function	Size	Norm
M3	Charge pressure	7/8-14 UNF-2B	ISO 11926-1

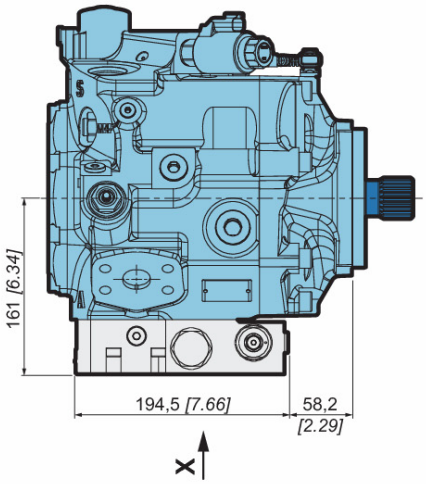


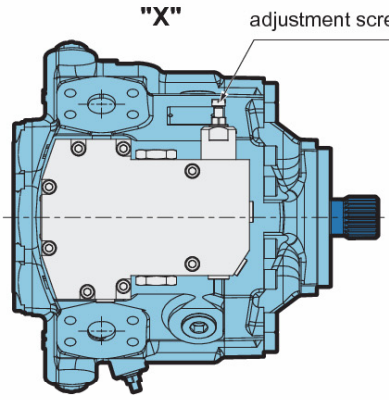
Exchange valve

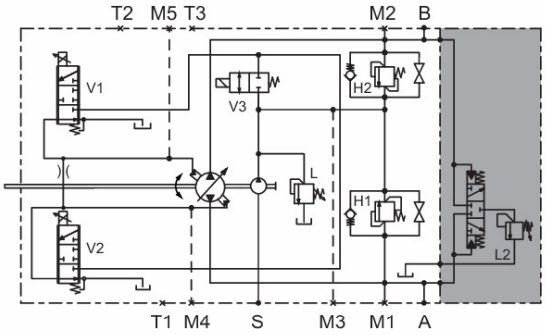
PW 0 8 5 / 0 9 6	D	M	C	O	H1	H2	G	L	A	F	S	H

Inside the pump cover, a purge valve can be fitted with discharge inside the pump casing by means of a calibrated hole. The exchange valve is useful in case the temperature of the oil in the closed circuit is too high.





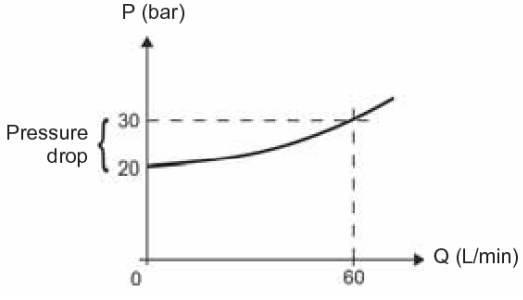




Setting of exchange valve should be approximately 3~5 bar *[44~73 PSI]* lower than for charge relief valve (see chapter "Charge pressure relief valve", page 18). Consult with your Poclain Hydraulics application engineer for precise setting.

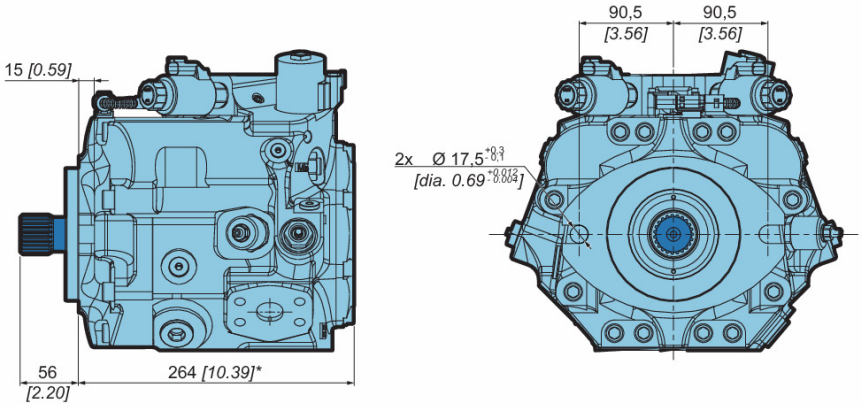
Specification	
Exchange valve adjustment range	12 to 30 bar *[174 to 435 PSI]*
Exchange flow (10 bar *[145 PSI]* ΔP)	60 L/min *[15.85 gal/min]*
Exchange direction	Forward and/or reverse

Example: relief valve set at 20 bar



2 bolt bearing flange mounting

PW 085 096 | D | M | C | O | H1 | H2 | G | L | A | F | S = M



All length dimensions of pump body with different auxiliary mounting pads are shorter compare to standard 4-bolt flange of 14 mm *[0.55 inch]*.

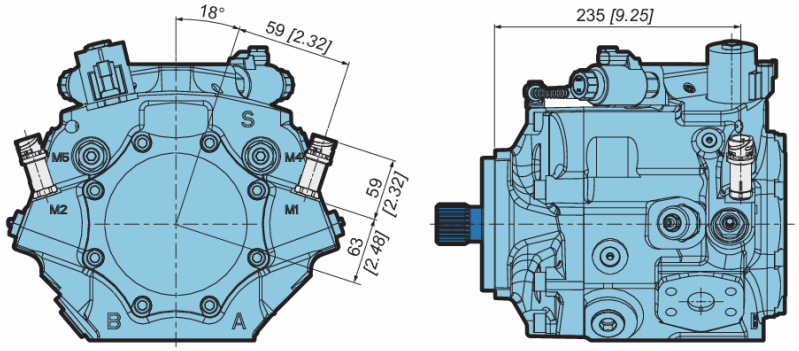
Bearing life and maximum overhung moment is significantly lower compare to 4 bolt flange, see page 14 for Bearing life (B_{10} hours) and page 15 for allowable moment values.

This option is only available for splined shaft Z = 23, 16/32 D.P.

Pressure sensors on A&B lines

PW 085 096 | D | M | C | O | H1 | H2 | G | L | A | F | S = R

The pump can be equipped with 600 bar *[8702 PSI]* pressure sensors.

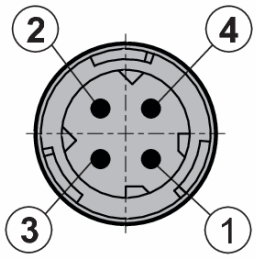


Pressure sensor specification

Commercial name	PRES-SENSOR-600B-G1/4-DIN
Part number	A53472W
Compatibility	Electronic transmission management

Pressure sensors on A&B lines

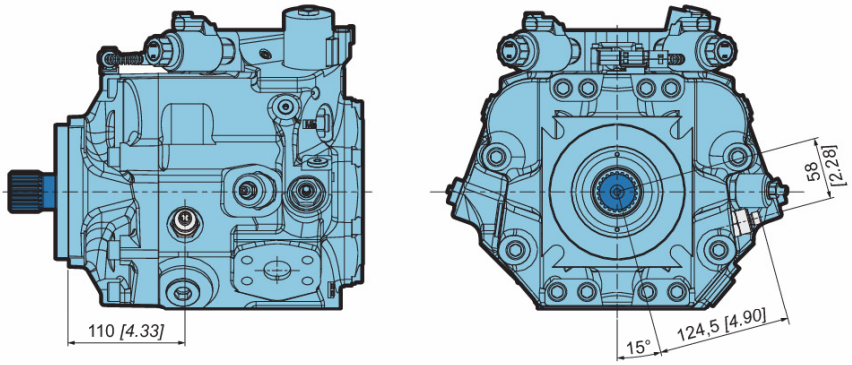
Features	
Supply voltage	5 V ± 0,5 V
Output signal	0,5 V ~ 4,5 V ratiometric
Pressure range	600 bar *[8702 PSI]*
Over pressure safety	1200 bar *[17404 PSI]*
Pressure connection with VITON rectangular seal	G 1/4" (DIN 3852-E)
Response time	< 5 ms
Accuracy	< 1%
Using temperature range	Medium - 40 °C to 125 °C *[- 40 °F to 257 °F]*
	Ambient - 40 °C to 100 °C *[- 40 °F to 212 °F]*
	Storage - 40 °C to 120 °C *[- 40 °F to 248 °F]*
Ingress protection	IP69K (IEC 60529)
CE conformity	EN 61326
Overvoltage and reverse polarity protection	± 30 V
Shock resistance	500 g according to DIN EN 837
Vibration resistance	20 g according to IEC 68-2
Electrical connection	DIN 72585, 4 pins



1: +5 VDC
2: Ground
3: Output signal
4: Not used

Temperature sensor

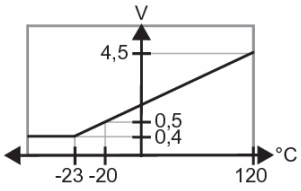
The pump can be equipped with analog temperature sensor.



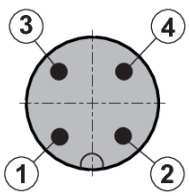
Temperature sensor specification

Commercial name	TEMP-SENSOR-ANALOG-G1/4-M12
Part number	A22147X
Compatibility	Electronic transmission management
Fonction	Measure the temperature of the hydraulic circuit

Features	
Power supply	5V ± 0.5 V
Output signal	0.5 V to 4.5 V radiometric Saturation at 0.4 V for temperatures < -23°C *[-9.4 °F]*
Response time	5 s
Accuracy	±1.5% FS from -20°C *[-4 °F]* to 0°C *[32 °F]* ±1% FS from 0°C *[32 °F]* to 120°C *[248 °F]*
Permissible pressure	750 bar *[10 877 PSI]*
Using temperature range	-20 to +120°C *[-4 to +248 °F]*
Housing material	Inox 304
Ingress protection	IP67
Electrical protection	- Over voltage: 30 V - Reverse polarity, - Short circuit.
Shock resistance	1m 3 axes
Vibration resistance	20 g



Electrical connection	90°	180°
Commercial name	ELEC-CABLE-M12-90°-5000	ELEC-CABLE-M12-180°-5000
Part No.	A04999J	A07468S



1: nc
2:+5 V
3: Output signal 0,5 ~ 4,5 V
4: 0 V (Ground)