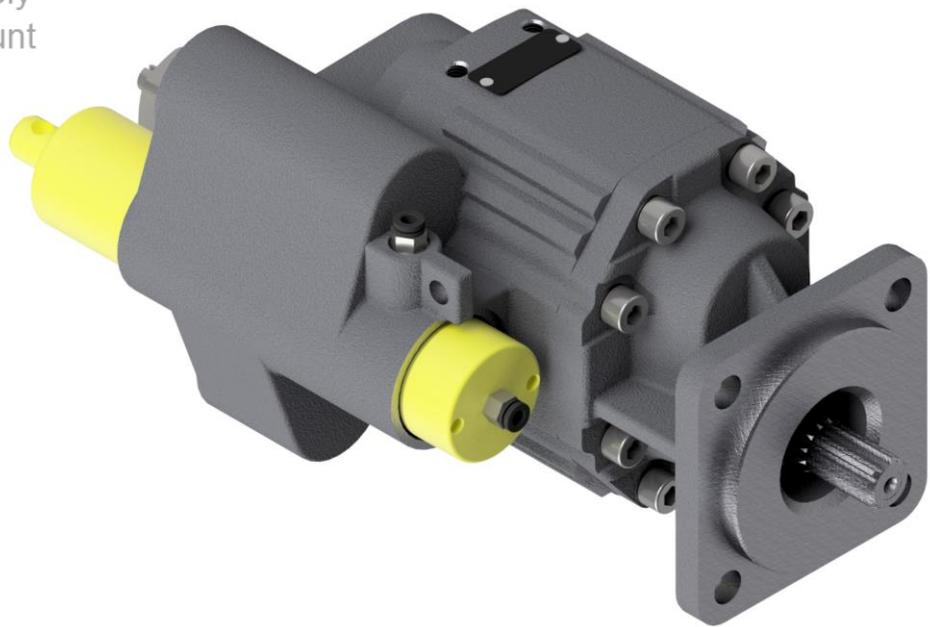

HYDRAULIC GEAR PUMPS WITH INTEGRATED VALVE

PV | PUMP VALVE

82 cm³/rev (5.0 in³/rev) to 102cm³/rev (6.2 in³/rev)



- Sensitive Valve
- Quick Relief
- Efficient Cylinder Protection
- Easy to Apply
- Fast to Mount



General information

PV Series is a hydraulic gear pump with integrated valve designed to use in open circuits. They are available from 82 to 102 cm³/rev (5.0 to 6.2 in³/rev) and with a maximum continuous pressure of 210 bar (3000 PSI). They can be assembled directly into the truck's power take off (PTO).

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PUMP VALVE

Ref. PV

Ordering code

Example

PV	B4	S	105	L	23	P	4
01	02	03	04	05	06	07	08

Series

01	Pump Valve	PV
----	------------	-----------

Mounting Flange & Shaft

02	B4	SAE B 4 Bolt - Splined, 13T 16/32 DP – SAE B	●
	B2	SAE B 2 Bolt - Splined, 13T 16/32 DP – SAE B	●
	B24	SAE B 2/4 Bolt - Splined, 13T 16/32 DP – SAE B	●
	4	ISO 7653-1985, type D direct coupling – Splined DIN 5462, B8x32x36	●
	4R	ISO 7653-1985, type D direct coupling – Splined DIN 5462, B8x32x36 (With Tapered Roller Bearings)	●
	4I	ISO 7653-1985, type D direct coupling – Splined DIN 5462, B8x32x36 (With Ø8 Bore on the Shaft)	●
	K4	4 Bolt Flange, 1" Round shaft with ¼" key	●

Porting Size

03	S	BSP threads DIN 228	●
	C	NPTF threads ¹	●
	O	SAE J514 straight ORB threads	○

Displacement

04	82 [22]	82 cm ³ /rev (5.0 in ³ /rev) [22 gpm]	●
	105 [27]	102 cm ³ /rev (6.2 in ³ /rev) [27 gpm]	●

Rotation Sense

05	L	Left hand (CCW)	●
	R	Right hand (CW)	●

Number of Lines

06	23	2 or 3 lines, with sleeve	●
----	-----------	---------------------------	---

Shifter Type

07	P	Pneumatic	●
----	----------	-----------	---

Relief Valve & Setting

08	4	Single Pressure – Std set @170-2500 (bar-PSI) – Max set @210-3000 (bar-PSI)	●
	5	Dual Pressure – Std set @170/210-2500/3000 (bar-PSI)	●

- Standard version ○ Available under request

Other combinations can be made, for more information please consult ABER.

¹ For NPTF threads, the tab correspondent to the displacement is indicated in gpm flow units at 1000 rpm.

Technical data

Displacement (output at 1000 rpm)	cm ³ /rev [gpm]	82 [21.7]	102 [27.0]
Standard relief valve pressure	bar [PSI]	170 [2500]	170 [2500]
Max. continuous pressure	bar [PSI]	210 [3000]	210 [3000]
Max. rotation speed ⁴	rpm	2000	2000
Min. rotation speed	rpm	500	500
Weight	kg [lbs]	23 [50,7]	24,3 [53,6]

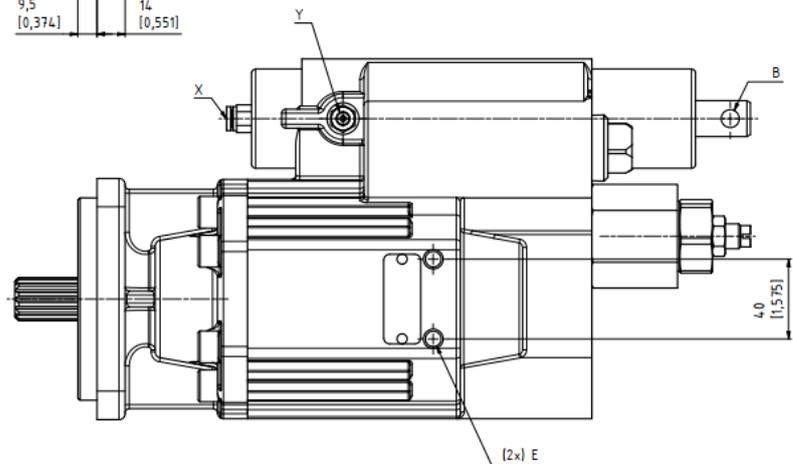
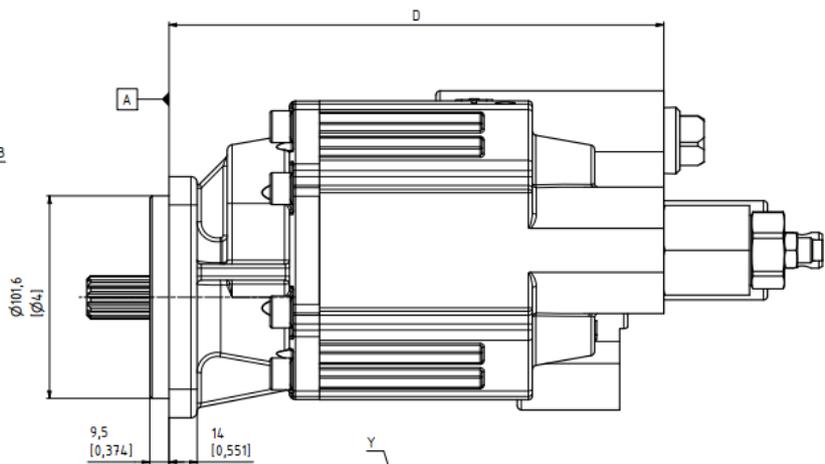
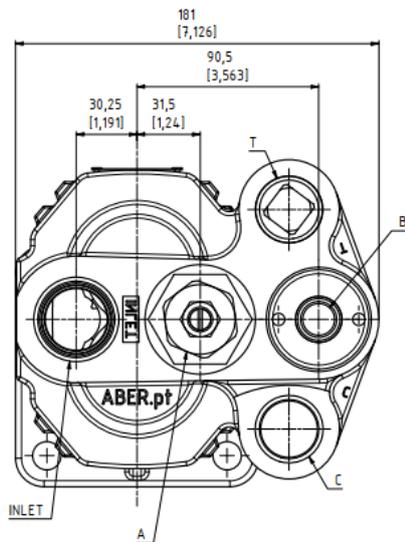
Data contained in this table is rounded, theoretical and without efficiency or tolerances.

⁴ These values are valid at an absolute pressure of 1 bar in suction port when operating with a mineral oil at a viscosity of 30 mm²/s (cSt).

Dimensions

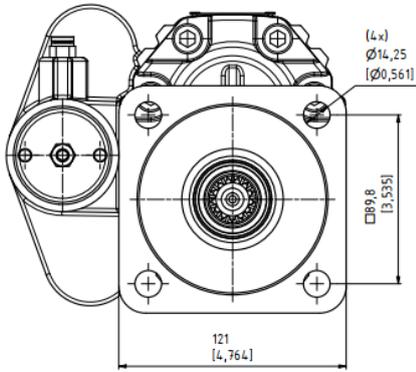
Dimensions in mm [inches]. Please consult tables presented in page 9.

SAE B Flange Dimensions

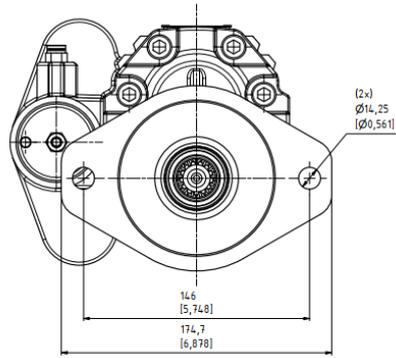


Mounting Flange & Shaft

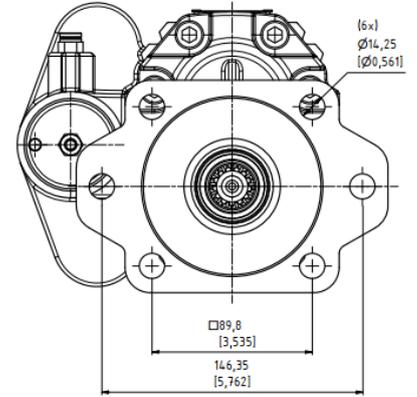
B4



B2

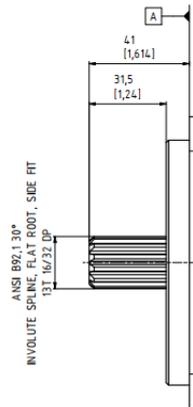


B24

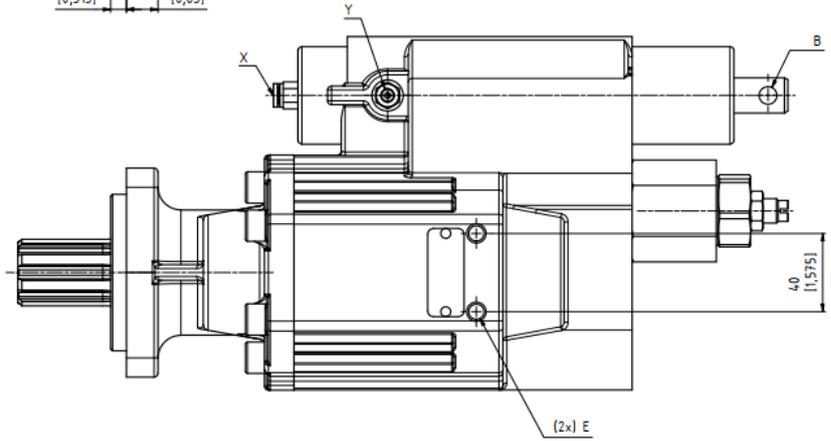
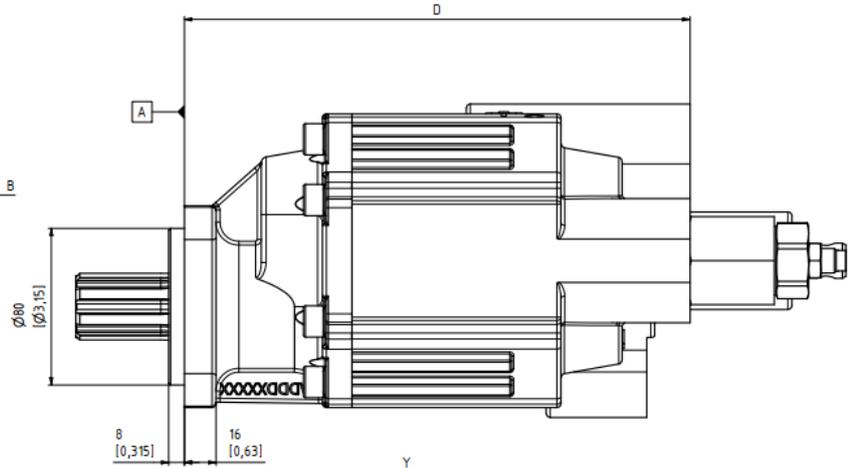
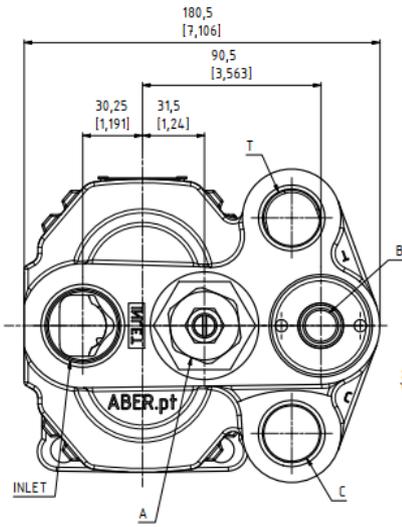


Shaft options

Splined, 13T 16/32 DP – SAE B

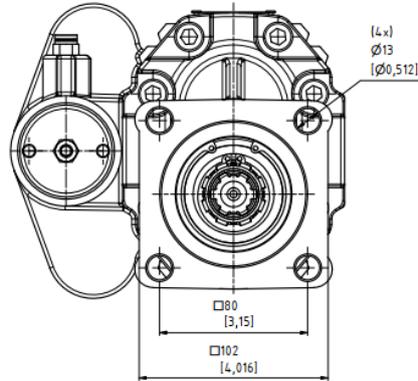


4 Bolt Flange Dimensions

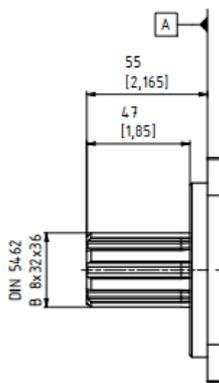


Mounting Flange & Shaft

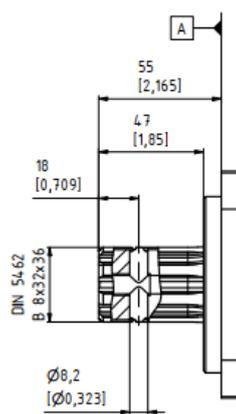
ISO 7653



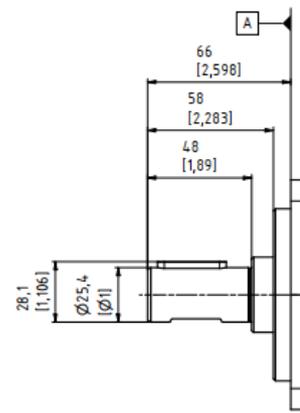
4 / 4R



4I

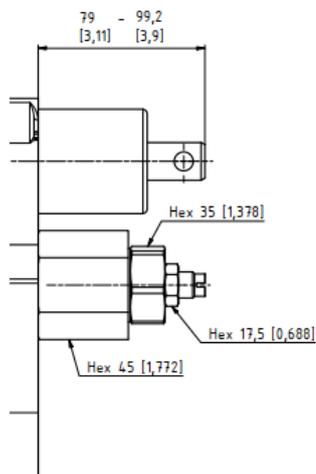


4K

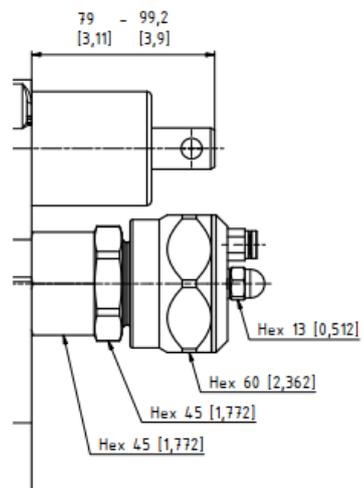


Relief Valve

Type 4 (Single Pressure)



Type 5 (Dual Pressure)



Features	A	Relief valve
	B	Pull stroke end

			Porting Size	
			S	C
Threads	C	Cylinder	1" BSP	1" NPTF
	INLET	Admission	1" 1/4 BSP	1" 1/4 NPTF
	T	Tank	1" BSP	1" NPTF
	E	Support Threads	N/A	3/8 – 16 UNC
	X	Air connection to descent 1/8" BSP	1/8" BSP	1/8" BSP
	Y	Air connection to ascent 1/8" BSP	1/8" BSP	1/8" BSP

		SAE B 13T shaft		ISO 7653 4 bolt	
		82	105	82	105
Dimensions, mm [in]	D	231,5 [9,114]	246,5 [9,705]	241,5 [9,508]	256,5 [10,098]



ABER recommends the use of a End of stroke. The End of stroke can be installed at the end of the shaft (Feature B) by means of using a cable that causes the pump valve to be placed in the neutral position (open center) when the cylinder reaches the end of its stroke, thus protecting the entire hydraulic installation.

Pump selection

To ensure that the PTO will not be overloaded and to get the correct flow requirements with the speed of the engine chosen, it is important to use a pump with the right capacity. Pump capacity (D), expressed in cm³/rev, can be calculated using the following expressions:

$$D = \frac{Q \times 1000}{N \times Z}$$

- D-Pump displacement [cm³/rev]
- Q-Flow required [l/min]
- N-Motor speed
- Z-Engine to PTO ratio (see PTO technical sheet)

In order not to overload the PTO's mechanical units, it is important to calculate the torque and power consumed by the pumps. Torque and power are calculated with the following formula:

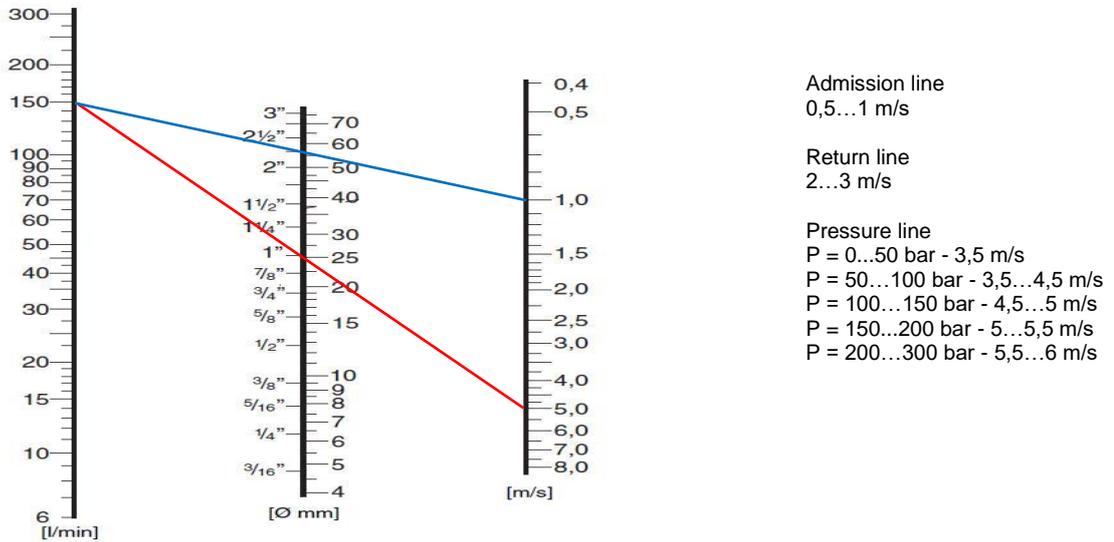
$$M = \frac{D \times P_b}{63} \quad P = \frac{D \times N \times Z \times P_b}{600 \times 0,90 \times 1000}$$

- M-Torque [Nm]
- P_b-Pressure [bar]
- P-Power [kW]
- N-Motor speed [rpm]
- Z-PTO ratio
- 0,90-Pump efficiency (can change from one pump to another)

i If the calculated load exceeds the maximum allowed for the PTO, a different combination should be selected. Make sure that the working speed of the pump does not exceed the max. allowed speed.

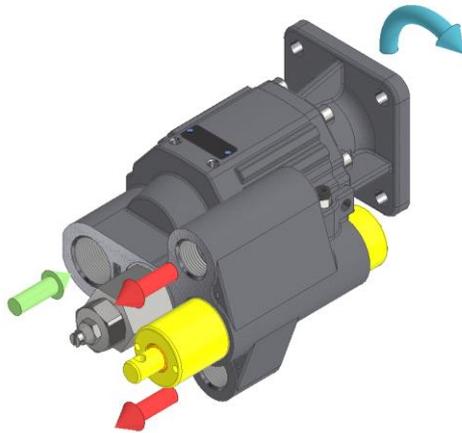
Hose selection

In order to avoid intense heat generation and cavitation phenomenon that causes noise and deterioration of the pump, ABER recommends the following speeds and dimensions of the hoses. Inlet pressure range must be always respected. All the hoses must be selected according to the pressures.



i The recommended speeds and dimensions specified may not be enough when the temperatures are too low, the tank is below the level of the pump, the inlet hose is long or there are many valves and fittings in the inlet hosing. In these cases we recommend increasing the diameter of the hoses and reducing the pump rotation speed.

Rotation sense



Left hand (CWW)

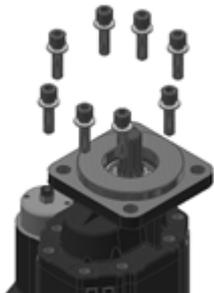


Right hand (CW)

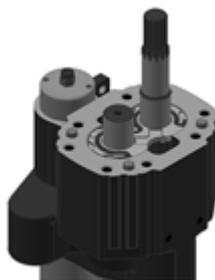
i Rotation sense is defined viewed from drive shaft. Pumps must be ordered CCW or CW.

Changing the rotation

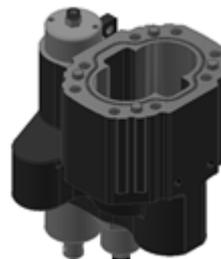
To change the rotation of the pump it is necessary to follow the next steps:



1st - Loosen and remove the top screws and washers.



2nd - Remove the cover. If the cover is stuck tap around the edge with a rubber mallet to disconnect the cover.



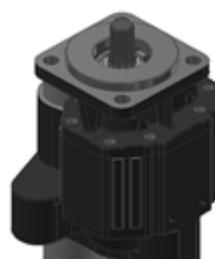
3rd - Remove the top plate and the gears. The rear plate should not be removed.



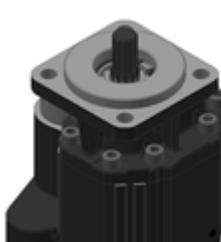
4th - Reassemble the gears in the opposite position and the plate in the same position. Grease these components.



5th - Be sure that the plate seal is assembled on the pressure side (P side). Be aware that the seal tips should not be damaged when inserting the plate.



6th - Assemble the cover.



7th - Tighten the top screws with 80 N.m (59 lbs.ft) torque.



8th - By hand, rotate the main shaft to ensure that the pump rotates freely. The pump is now ready for working with the original rotation reversed.

Torque tightness for plugs

1" BSP	75 N.m (55 lbs.ft)	1" NPTF	152 N.m (112 lbs.ft)
1 1/4" BSP	115 N.m (85 lbs.ft)	1 1/4" NPTF	209 N.m (154 lbs.ft)

i Be careful not to over-tighten threaded ports. Cracked castings at the threaded ports are not covered by warranty.

Tank

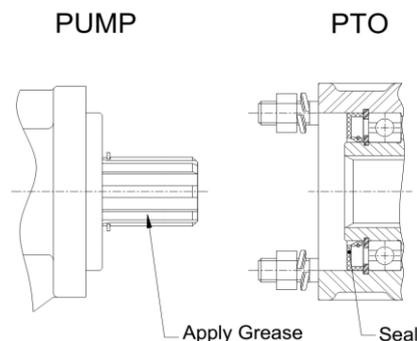
The oil tank is a very important component in the hydraulic system and for the pump. Generally, oil level inside the tank must be higher than the pump. It is also recommended that the suction and return lines are separated and have a long distance between them, to prevent the oil in the return line from entering immediately in the suction line. In order to prevent the overheating of the system it is recommended a minimum oil volume of:

Type of work	Tank volume (minimum)
Short working cycles	Equal to oil flow (l/min)
Long working cycles	1.5 times the oil flow (l/min)
Continuous operation	2 times the oil flow (l/min)

i Regardless of the tank volume, the max. oil temperatures or viscosities values shall not be exceeded.

Installation instructions

1. Check PTO direction of rotation and fit the pump according to PTO sense of rotation. Make sure that the assembly does not generate axial or radial load on the pump main shaft.
2. Grease spline shaft with heat-resistant grease before installation when the PTO contains an output shaft seal.



3. Connect the pump to the PTO (apply 80N.m-59lbs.ft torque in the tightening nuts). Elevated efforts or shocks are not recommended during the installation. The pump must be connected without making use of any type of tool that forces its assembly.
4. Remove all protection covers from the threaded holes (inlet/outlet/pneumatic). Apply the inlet and outlet fittings into the pump (query the tightening information from the fittings manufacturer). Connect the outlet and the inlet pipes to the accessories (always respect recommended hoses dimensions and thread dimensions). Be sure that all connections are robust and well-sealed.

i During the installation always leave the inlet port in a higher or equal level than the outlet port. This increases the pump's life.

Fluids

Quality:

High quality mineral oil ISO type HM VG 32-68 or DIN 51524-2 HLP

The designation 32, 46, 68, etc. denotes the viscosity of the oil at 40°C
(It is possible to use other fluids but only after consulting and getting authorization from ABER)

Viscosity ranges:

Recommended range: 10 to 100 cSt (mm²/s)

Limit: up to 750 mm²/s cSt (mm²/s)

When choosing the oil it is necessary to be aware of the low viscosity with the increase of the temperature. Therefore, we recommend that when you want to work above temperature, you should choose an oil with higher viscosity (thicker) in order to compensate the reduction of viscosity when the temperature increases.

Temperature:

Oil temperature range: -25°C to +80°C.

We advise you to use an oil cooler when you verify that the temperature is higher than these values.

Oil changing:

The oil must be replaced after 1000 working hours or at least once a year, so as filters elements.

Filtration

The filtration is extremely important and may influence or even determine the durability of the equipment. ABER recommends the use of a return filter and an air filter with an absolute filtration degree of 10µm if the pressure system is higher than 200 bar as according to the ISO 4406 class 18/15 and an absolute filtration degree of 25µm if the pressure system is lower than 200 bar, as according to the ISO 4406 class 17/14. The first filter to be applied into the system must be replaced as soon as it reaches the 50 working hours; after the first replacement, it must be replaced along with the oil or when uncommon pressures are verified in the return.



Be sure that the whole system is perfectly cleaned before filling it with oil. Never mix water or other liquids, different oil qualities, viscosities or brands with the oil in the system. Make sure that there is no gearbox contamination.

Relief valve & setting

In a hydraulic system a pressure relief valve is a safety device that prevents overpressure in the hydraulic circuit. When a relief valve is working properly, it protects all the system's components against overpressures.

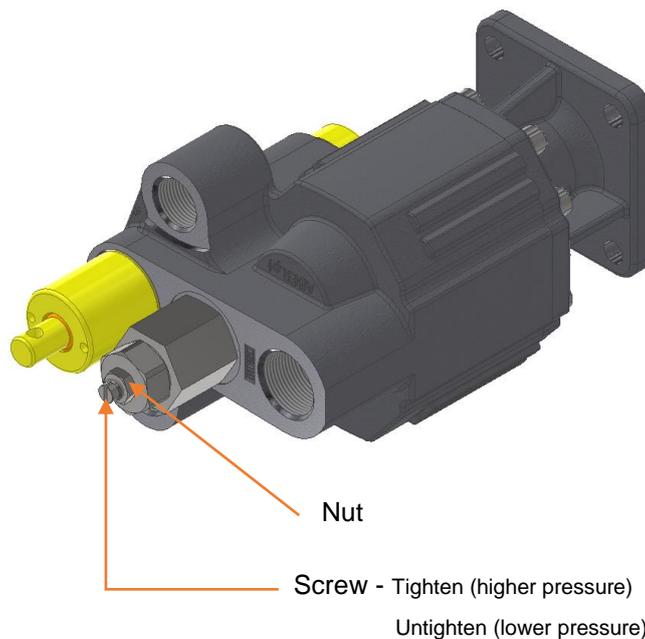
The pressure relief valve is set to a desired value, but it can be changed to other desired pressure values. For such, the following instructions should be followed:

ATTENTION

ABER shall not, under any circumstances be liable by the adjustment of the relief valve pressure and their sealing. This procedure is customer responsibility.

Single Pressure Relief Valve

1. Turn off the system and release all the pressure in the circuit. Put the air control in the descent position and install a pressure gauge in "C" line (please refer to technical sheet).
2. Unscrew the nut and tighten the bolt (higher pressure) / untighten (lower pressure) to the required pressure value.



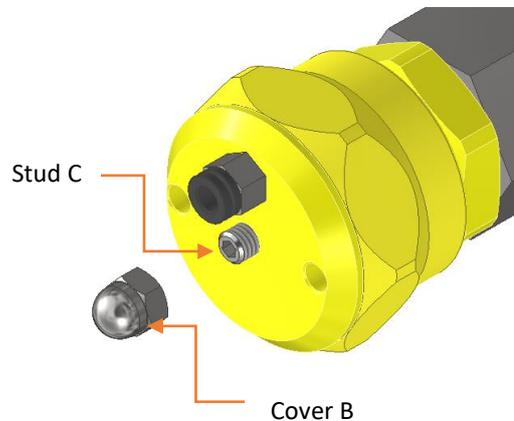
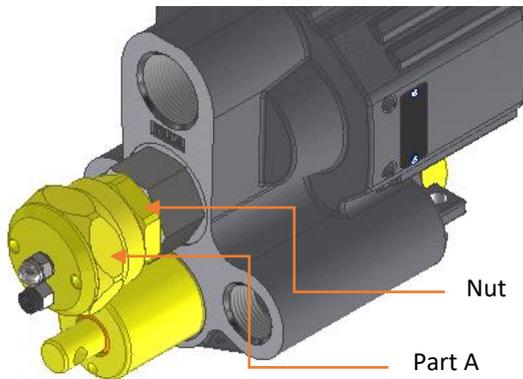
3. Tighten the nut, put the air control in the neutral position, turn on the system and test it with the air control in the upper position. Verify if the pressure gauge shows the correct pressure value required. If not repeat the previous steps.

ATTENTION

Do not exceed the maximum pressure of 3000 PSI (210bar)

4. Put the air control in the neutral position. Check if everything is well tightened. The system is ready to work with the new set pressure.

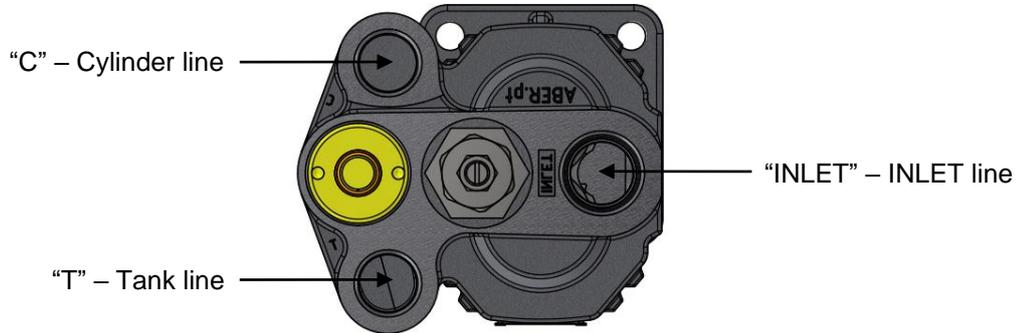
Dual Pressure Relief Valve



Turn off the system and release all the pressure in the circuit. Put the air control in the descent position and install a pressure gauge.

1. Pressure setting, **high** pressure:
 - a. Unscrew the Nut carefully keeping the Part A.
 - b. Screwing the Part A pressure increases, unscrewing pressure decreases.
 - c. After changing the Part A pressurize the actuator and check the pressure with a pressure gauge and if the pressure is ok move to point d), if not repeat the process from point a).
 - d. Depressurize the actuator, lock the Nut carefully keeping the Part A position.
 2. Pressure setting, **low** pressure:
 - a. Remove the cover B
 - b. Screwing the stud C the pressure increases, unscrewing decreases.
 - c. Check the pressure with a pressure gauge
 - d. Lock the cover B
 3. Tighten the nut and cover B, put the air control in the neutral position, turn on the system and test it with the air control in the upper position. Verify if the pressure gauge shows the correct pressure value required. If not repeat the previous steps.
- ATTENTION** Do not exceed the maximum pressure of 3000 PSI (210bar) and the minimum of 1300 psi (90bar)
4. Put the air control in the neutral position. Check if everything is well tightened. The system is ready to work with the new set pressure.

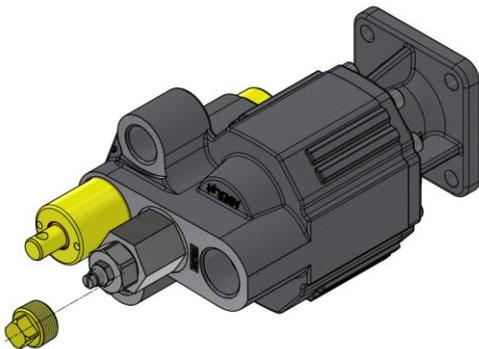
2 or 3 lines installation



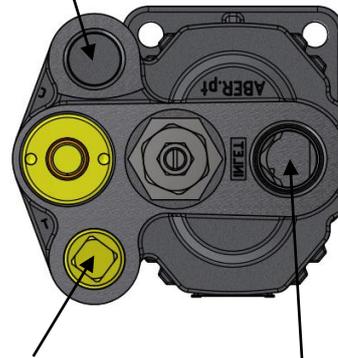
Two line installation

(Intermittent operation only)

One line to the cylinder, “C”
One line to the tank, “INLET”



“C”, cylinder line



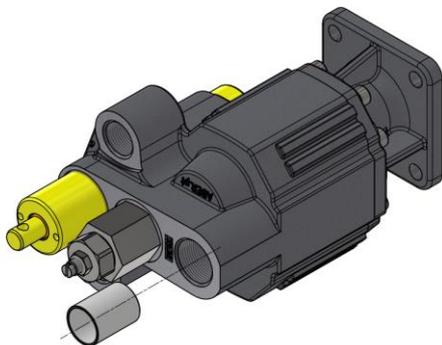
Plug the tank line, “T”

Do NOT install the sleeve in the inlet port, “INLET”

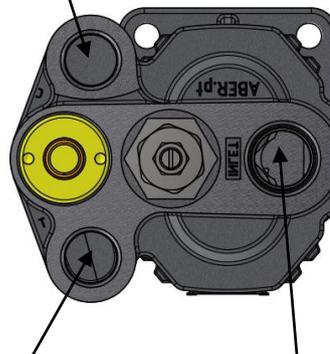
Three line installation

(Continuous and intermittent operation)

One line to the cylinder, “C”
One line to the tank, “INLET”
One line to the tank, “T”



“C”, cylinder line



Connect the return hose to the tank line connection, “T”

Install the sleeve in the inlet port, “INLET”

Diagrams

Diagram
Flow - Speed

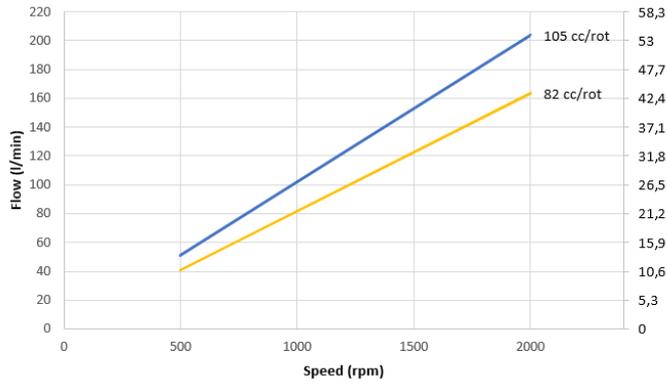
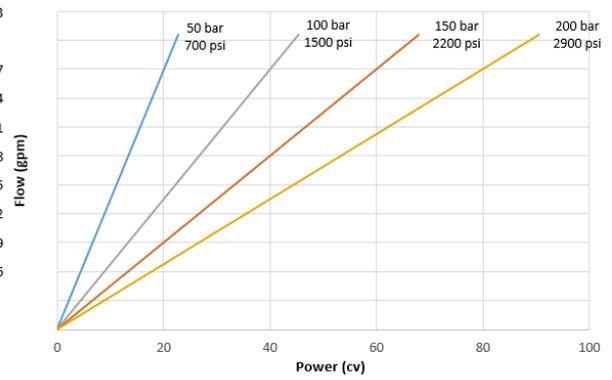
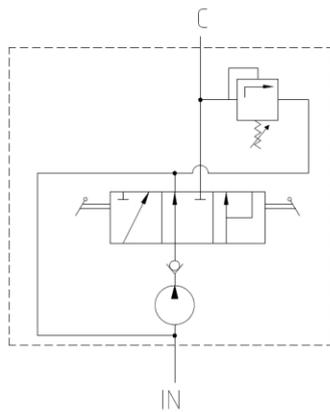


Diagram
Input Power - Flow - Pressure

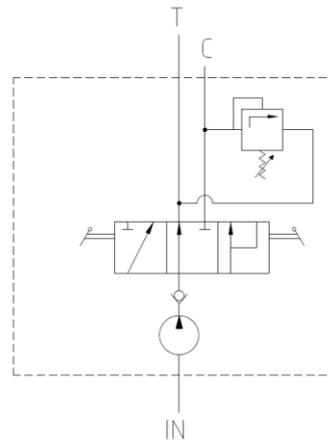


Hydraulic

Two line installation

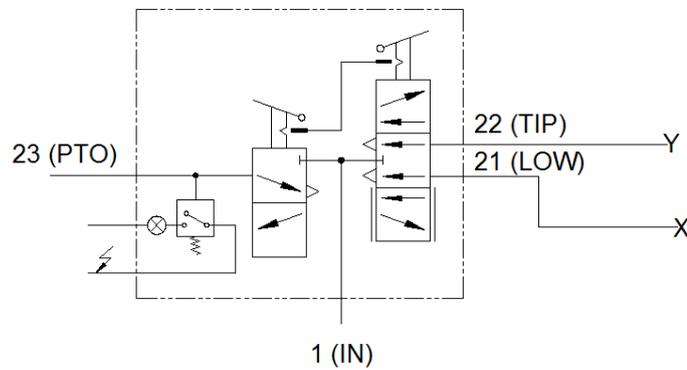


Three line installation



Pneumatic

(for ABER air controllers ref: ABCD73; ABCD83; ABCD93)



Faults / Causes / Remedies

Faults	Causes	Remedies
No oil flow	<ol style="list-style-type: none"> 1.Empty tank 2.Closed valve in inlet hose 3.Air in inlet hose 4.Wrong sense of rotation 5.Reversed hoses 6.No input power 7.Pump damaged 	<ol style="list-style-type: none"> 1.Fill tank with recommended fluid 2.Open valve 3.Put tank above the pump level 4.Change rotation sense 5.Reverse hoses 6.Replace power source or other damaged equipment 7.Replace pump
Equipment works with irregular movements	<ol style="list-style-type: none"> 1.Air in housing 2.Air leakage in inlet hose 3.Low oil level 4.Pump damaged 	<ol style="list-style-type: none"> 1.Fill housing with recommended fluid 2.Repair air leakage 3.Fill tank with recommended fluid 4. Replace pump
Valve spool switch sluggish	<ol style="list-style-type: none"> 1.Dirt in the system 2.Low pneumatic signal 3.Pump damaged 	<ol style="list-style-type: none"> 1.Disassemble and clean the system. Drain the system 2.Adjust pneumatic pressure signal 3.Replace pump
Valve spool sticks	<ol style="list-style-type: none"> 1.Dirt in the system 2.No pneumatic signal 3.Pump damaged 	<ol style="list-style-type: none"> 1.Disassemble and clean the system. Drain the system 2.Check the problem of the pneumatic signal (source and/or tube) 3.Replace pump
Pump is noisy	<ol style="list-style-type: none"> 1.Small diameter hose 2.Restriction in inlet hose 3.Very thick oil 4.Air in inlet hose 5.Pump damaged 	<ol style="list-style-type: none"> 1.Replace inlet hose for other with a larger diameter 2.Remove restrictions 3.Replace for recommended fluid 4.Put tank above the pump level, check air pressure in the tank 5.Replace pump
Oil is too hot	<ol style="list-style-type: none"> 1.Low oil level 2.Small tank 3.Dirty oil 4.Relief valve improperly set 5.Relief valve stuck in open position 6.Very thick oil 7.Too much flow 8.High output power 	<ol style="list-style-type: none"> 1.Fill tank with recommended fluid 2.Replace for a bigger tank 3.Replace oil and filter 4.Adjust for equipment specifications or replace if necessary 5.Clean and re-set for equipment specifications 6.Replace for an recommended fluid 7.Reduce speed or replace for a smaller displacement pump 8.Fit an oil cooler
Equipment works very slow compared with the usual	<ol style="list-style-type: none"> 1.Relief valve improperly set 2.Relief valve stuck in open position 3.Relief valve improperly set 4.Pump damaged 	<ol style="list-style-type: none"> 1.Adjust for equipment specifications or replace if necessary 2.Clean and re-set for equipment specifications 3.Adjust to equipment specifications or replace if necessary 4.Replace pump
Oil leakage	<ol style="list-style-type: none"> 1.From inlet/outlet lines 2.From shaft seal 3.From body sections 	<ol style="list-style-type: none"> 1.Tighten fittings and hoses, or replace if necessary 2.Replace shaft seal 3.Tighten bolts for specified torque, or replace damaged oring or body



When the pump is working, never touch or pull hoses or intermediate shaft when applied. When intermediate shaft is applied take into account that parts can be ejected. The application of the pumps must follow all the instructions hereby mentioned in order to assure the safety of all personal working with the equipment including its surroundings, assure a long life to the product and preserve the warranty of the brand. All applications that do not follow the hereby instruction are solely the users responsibility. If there should happen any malfunctioning, it is strictly forbidden the disassembly of the product except if it is being made by a qualified technician of the brand or if there is a special authorization to do that. If this specification should not be followed, all warranties might be lost.