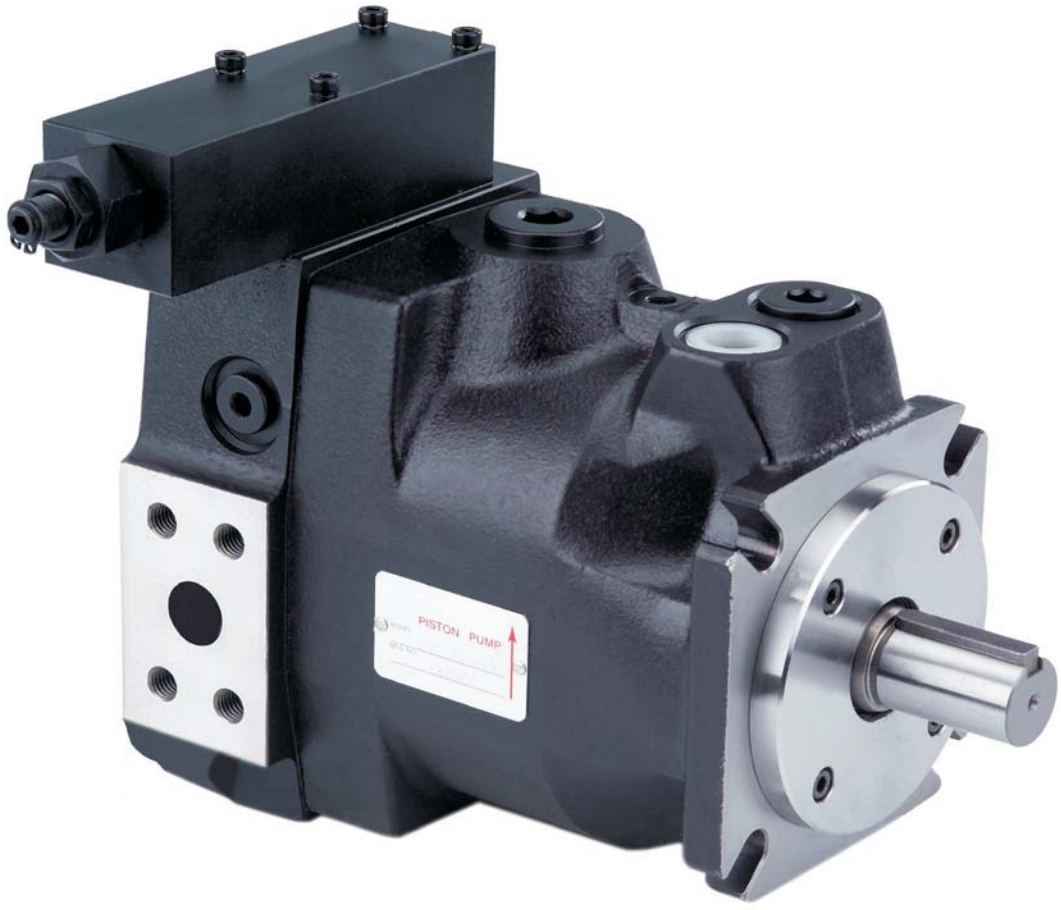
PONAR® wadowice

Variable Displacement
Open Loop Circuit Axial Piston Pumps

PV Series



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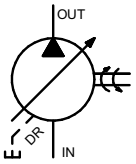
TECHNICAL INFORMATION



nominal pressure
350 bar
max. pressure
420 bar

1 - New type of swash plate and large servo piston with strong bias spring achieves fast response, reduce the noise due to active decompression of system at down stroke.
2 - Nine pistons and new precompression technology (precompression filter volume) result in unbeaten low outlet flow pulsation.
3 - Complete compensator program offers multiple controls.
4 - Rigid and FEM-optimized body design for lowest noise level.
5 - Thru drive for 100% nominal torque.
6 - Pump combinations (multiple pumps) of same size and model and mounting interface for basically all metric or SAE mounting interfaces.
7 - Wide application in automobile industrial, ships, forging machines, tire machines, injection molding machines, machine tools, special-purpose machine.

Quick Reference Data Chart

Size	Model	Pressure		Displacement		Pump Delivery (7 bar) 100 PSI				APPROX. Noise Levels			Speed		Weight
						1500 RPM		1800 RPM		Db(A) Full Flow and 1500 RPM					
		nominal pressure	max. pressure	cm^3/rev	In^3/rev	LPM	U.S. GPM	LPM	U.S. GPM	70 bar (1 KSI)	207 bar (3 KSI)	343 bar (5 KSI)	Max. RPM	Min. RPM	KG (LB)
1	PV016			16	0.98	24	6.3	28.8	7.6						
	PV020			20	1.2	30	7.9	36	9.5	56	60	68	2750		19 (42)
	PV023			23	1.4	34.5	9.1	41.4	10.9						
2	PV032	350	420	32	1.9	48	12.7	57.6	15.2						
	PV040			40	2.4	60	15.9	72	19						
	PV046			46	2.8	69	18.2	82.2	21.9	59	62	69	2400		30 (66)
	PV056	280	350	56	3.41	84	22.1	100.8	26.6						
	PV065	250	315	65	3.96	97.5	25.7	117	30.9						
3	PV063			63	3.8	94.5	25	113.4	30				2100		
	PV071	350	420	71	4.3	107	28.3	128.7	34				2100		
	PV080			80	4.8	120	31.7	144	38				2000		
	PV092			92	5.6	138	36.5	165.6	43.8	66	70	74	1900	300	60 (132)
	PV110	250	280	110	6.7	165	43.6	198	52.3				1900		
	PV125	250	280	125	7.6	187.5	49.5	225	59.4				1900		
4	PV140	350	420	140	8.5	210	55.5	252.1	66.6	70	74	76	2200		
	PV180			180	11	270	71.3	324	85.6	71	75	77			90 (198)
	PV210	300	350	210	12.8	315	83.1	378	99.8	73	77	79	2100		
5	PV270	350	420	270	16.5	405	107	486	128.4	77	79	89	1800		172 (379)

1 - Outlet port is on the top, the pipe pressure should be less than 2 bar.
2 - The usage of max. Pressure for each cycle never exceed 6 seconds.
Please see the General Installation Information for hydraulic oil cleanliness manual.
3 - We offers tandem pump or other types of pump connection. The mounting has Metric and SAE dimensions.

ORDER CODE

Order No.

PV	063	GA	3	R	M	1	A	0	N	
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪
Series	Size and Displacement	Compensator	Pressure adjusting	Rotation	Mounting	Threads	Thru drive & 2nd pump	Voltage	Seals	Design No.

E ④ Horse power

Series

①	PV	Axial piston pump variable displacement high pressure version	nominal pressure 350 bar	max. pressure 420 bar

Size and Displacement

	Code		016	020	023	032	040	046	056	065	063	071	080	092	110	125	140	180	210	270
②	Size		1			2					3						4			5
	Displ.	cm^3/rev	16	20	23	32	40	46	56	65	63	71	80	92	110	125	140	180	210	270
		In^3/rev	0.98	1.2	1.4	1.9	2.4	2.8	3.41	3.96	3.8	7.3	4.8	5.6	6.6	7.6	8.5	11	12.6	16.5

Compensator

③	A0	**Standard Pressure compensator**
	LN	None Pressure Compensator (fixed displacement) (pressure protection required)
	LS	Electrical 2-stages Pressure control (pressure protection required)
	LC	Fixed Displacement 2 stages Flow compensator (pressure protection required)
		Remote Type
	GM	Remote Pressure compensator with NG6 interface
	GA	Remote Pressure compensator +Relief valve
	GJ	Remote Pressure compensator + Proportional Pressure valve
		Electrical unloading Type
	GR	Remote Pressure compensator + Electrical unloading
	GB	Remote Pressure compensator + 2-stages pressure control
	GC	Remote Pressure compensator + electrical unloading + 2-stages Pressure control
		Load-sensing Type
	HM	Load-sensing compensator with NG6 interface
	HA	Load-sensing compensator + Relief valve
	HJ	Load-sensing compensator + Proportional Pressure valve
		Load-sensing + Electrical unloading Type
	HR	Load-sensing compensator + Electrical unloading
	HB	Load-sensing compensator + 2-stages Pressure control
	HC	Load-sensing compensator + Electrical unloading+ 2-stages Pressure control
		Proportional Pressure, flow Type
	HQ	Load-sensing compensator + Proportional Flow valve+ Relief valve
	HK	Load-sensing compensator + Proportional Pressure valve+ Proportional Flow valve
	BQ	None-stage Flow compensator (Cylinder)
		2-Valve Load-sensing Type
	VM	2-Valve load-sensing compensator with NG6 interface
	VA	2-Valve load-sensing compensator + Relief Valve
	VJ	2-Valve load-sensing compensator + Proportional Pressure valve
		2-Valve Proportional Pressure, flow Type
	VQ	2-Valve load-sensing compensator + Proportional Flow valve+ Relief Valve
	VK	2-Valve load-sensing compensator + Proportional Pres sure valve+ Proportional Flow valve
		Proportional compensation Type
	FV	2-Valve load-sensing compensator + High Reacted Proportional Flow Valve+ Flow Feed Back+ Relief Valve
	FG	2-Valve load-sensing compensator + High Reacted Proportional Flow Valve+ Proportional Pressure+ Flow& Pressure Feed Back

ORDER CODE (continued)

Order No.

PV	063	GA	3	R	M	1	A	0	N	
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪
Series	Size and Displacement	Compensator	Pressure adjusting	Rotation	Mounting	Threads	Thru drive & 2nd pump	Voltage	Seals	Design No.

E ④ Horse power

Compensator

③

	Horse power Type
PM	Horse Power Compensator with NG6 interface
PA	Horse Power Compensator + Relief Valve
PH	Horse Power Load-sensing Compensator + Relief valve
PQ	Horse Power Load-sensing Compensator + Proportional Flow valve+ Relief valve
PJ	Horse power compensator + proportional pressure control
PR	Horse power compensator + relief valve + electrical unloading
PS	Horse power compensator + proportional pressure valve + load-sensing compensator

④

Pressure adjustment

2	10~140 bar (145~2030 PSI)	3	40~210 bar (580~3045 PSI)	4	50~350 bar (1015~5075 PSI)

Horse power Horse Power compensator : Start with P control

Displacement	Horse power (P.3-34)							
PV016~PV023	A 3 KW	B 4 KW	C 5.5 KW	D 7.5 KW	E 11 KW			
PV032~PV046,56,65			C 5.5 KW	D 7.5 KW	E 11 KW	F 15 KW	G 18.5 KW	H 22 KW
PV063~PV092,110,125	E 11 KW	F 15 KW	G 18.5 KW	H 22 KW	I 30 KW	J 45 KW	K 45 KW	
PV140			G 18.5 KW	H 22 KW	I 30 KW	J 45 KW	K 45 KW	L 55 KW
PV180,210	H 22 KW	I 30 KW	J 37 KW	K 45 KW	L 55 KW	M 75 KW	N 90 KW	
PV270			J 37 KW	K 45 KW	L 55 KW	M 75 KW	N 90 KW	O 110 KW P 132 KW

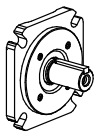
Rotation (From the shaft-side view)

⑤

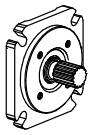
R	clockwise	L	counter clockwise

Mounting

⑥



M	Metric ISO 3019/2 cylind, key
N F	Inch ISO 3019/2 cylind, key



K	Metric ISO 3019/2 splined, DIN 5480
D G	Inch ISO 3019/2 splined, SAE

Threads

⑦

1	BSPP (G)	2	PT (RC)	3	UNF (SAE)	7	ISO 6149 (M)

Thru drive & 2nd pump

⑧

Displacement	code
PV016~PV270	A Single pump
	B Prepared for thru drive
PV016~PV023	C D E I J K
PV032~PV046,56,65	D E F I J K L
PV063~PV092,110,125	D E F G I J K L M
PV140~PV180,210	D E F G J K L M
PV270	D E F G H J K L M N

Dimensions			
C	SAE AA, Ø50.8 mm	I	Metric, Ø63 mm
D	SAE A, Ø82.55 mm	J	Metric, Ø80 mm
E	SAE B, Ø101.6 mm	K	Metric, Ø100 mm
F	SAE C, Ø127 mm	L	Metric, Ø125 mm
G	SAE D, Ø152.4 mm	M	Metric, Ø160 mm
H	SAE E, Ø165.1 mm	N	Metric, Ø200 mm

Other pumps are acceptable to order

Voltage

⑨

0	None	A	AC100V (50/60HZ)	B	AC110V (60HZ)	C	AC200V (50/60HZ)
D	AC220V (60HZ)	E	DC 12V	F	DC 24V		

Seals

⑩

N	NBR	V	VITON, FPM	E	Ethylen-propylene

ORDER CODE (continued)

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HC	Load-sensing compensator + Electrical unloading+ 2- stages Pressure control
	Proportional Pressure, Flow Type
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VJ	2-Valve load-sensing compensator + Proportional Pressure valve
	2-Valve Proportional Pressure, Flow Type
VQ	2-Valve load-sensing compensator + Proportional Flow valve+ Relief Valve
VK	2-Valve load-sensing compensator + Proportional Pressure valve+ Proportional Flow valve
	Proportional Compensator Type
FV	2-Valve load-sensing compensator + High Reacted Proportional Flow Valve+ Flow Feed Back+ Relief Valve
FG	2-Valve load-sensing compensator + High Reacted Proportional Flow Valve+ Proportional Pressure+ Flow& Pressure Feed Back
	Horse power Type
PM	Horse Power Compensator with NG6 interface
PA	Horse Power Compensator + Relief Valve
PH	Horse Power Load-sensing Compensator + Relief valve
PQ	Horse Power Load-sensing Compensator + Proportional Flow valve+ Relief valve
PJ	Horse power compensator + proportional pressure control
PR	Horse power compensator + relief valve + electrical unloading
PS	Horse power compensator + proportional pressure valve + load-sensing compensator

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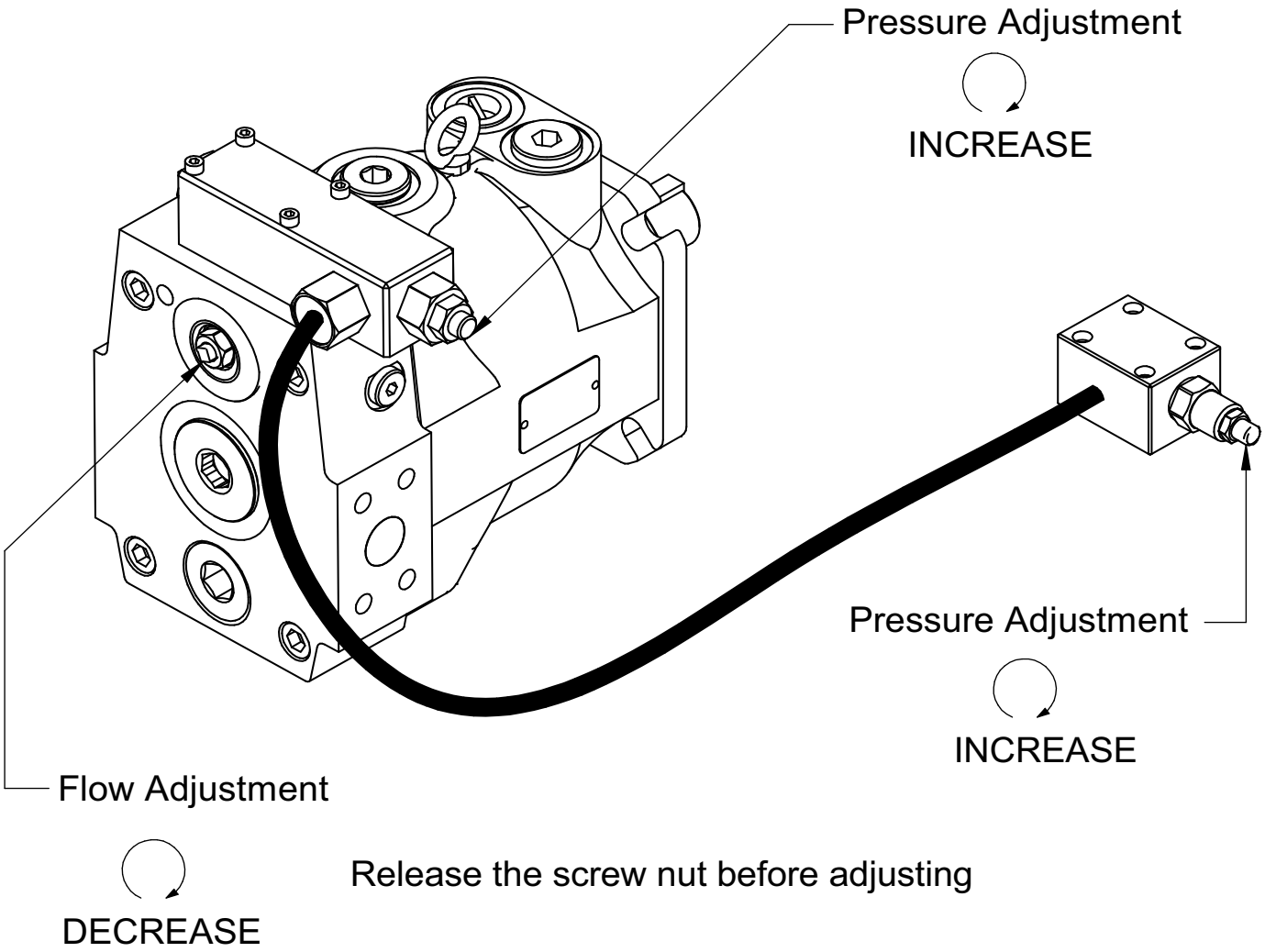
COMPENSATOR

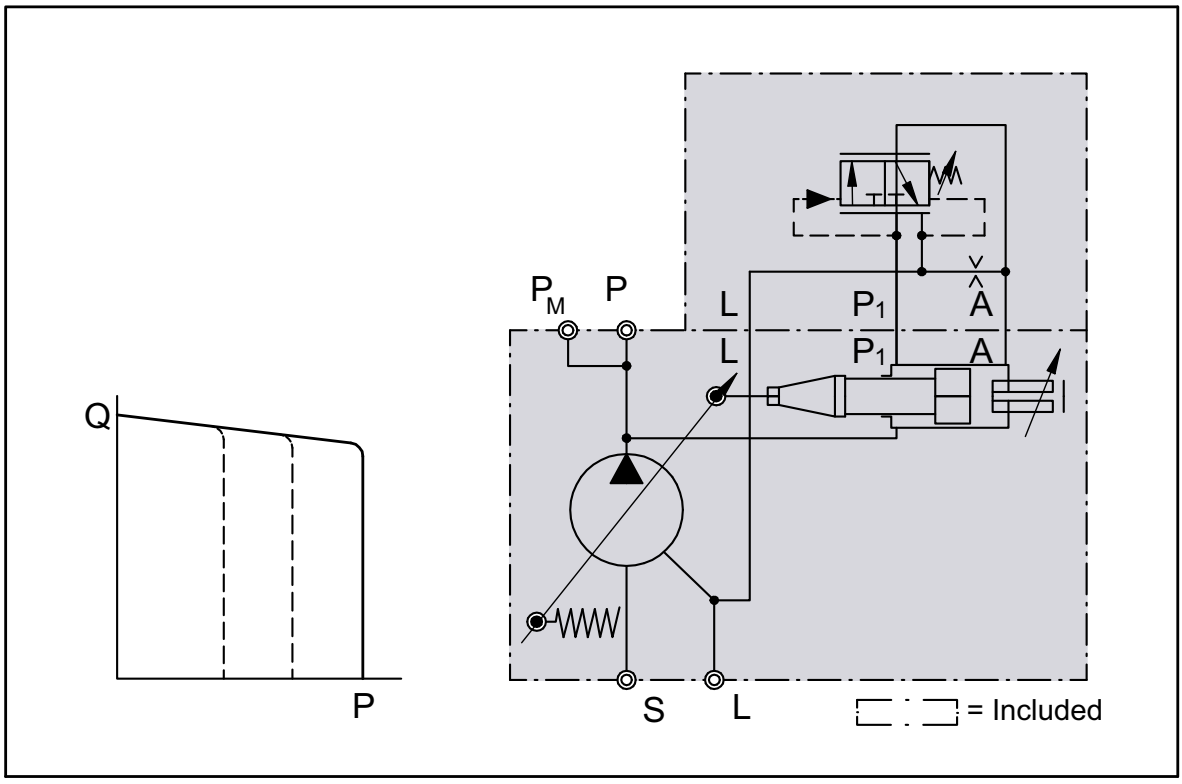
Pressure and Flow Adjustement

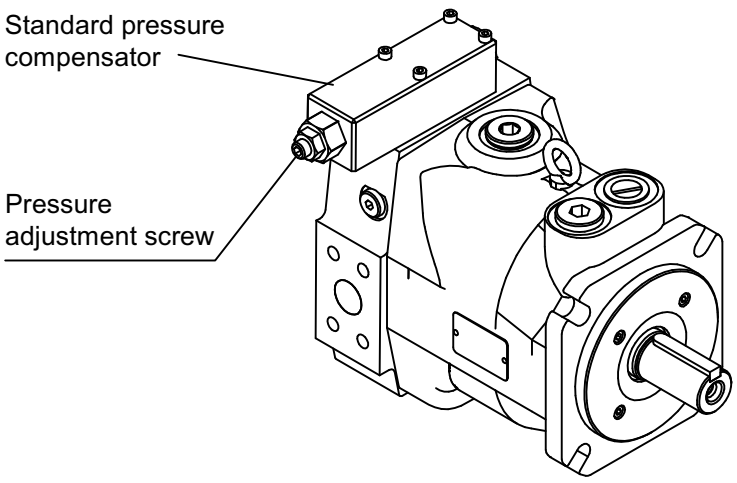


COMPENSATOR

A0 Standard Pressure Compensator

The **A0** standard pressure compensator adjusts the pump displacement according to the actual need of the system in order to keep the pressure constant.
As long as the system pressure at outlet port P is lower than the set pressure (set as spring preload of the compensator spring) the working port A of the compensator valve is connected to the case drain and the piston area is unloaded.
Bias spring and system pressure on the annulus area keep the pump at full displacement.
When the system pressure reaches the set pressure the compensator valve spol connects port P1 to A and builds up a pressure at the servo piston resulting in a downstroking of the pump.
The displacement of the pump is controlled in order to match the flow requirement of the system.



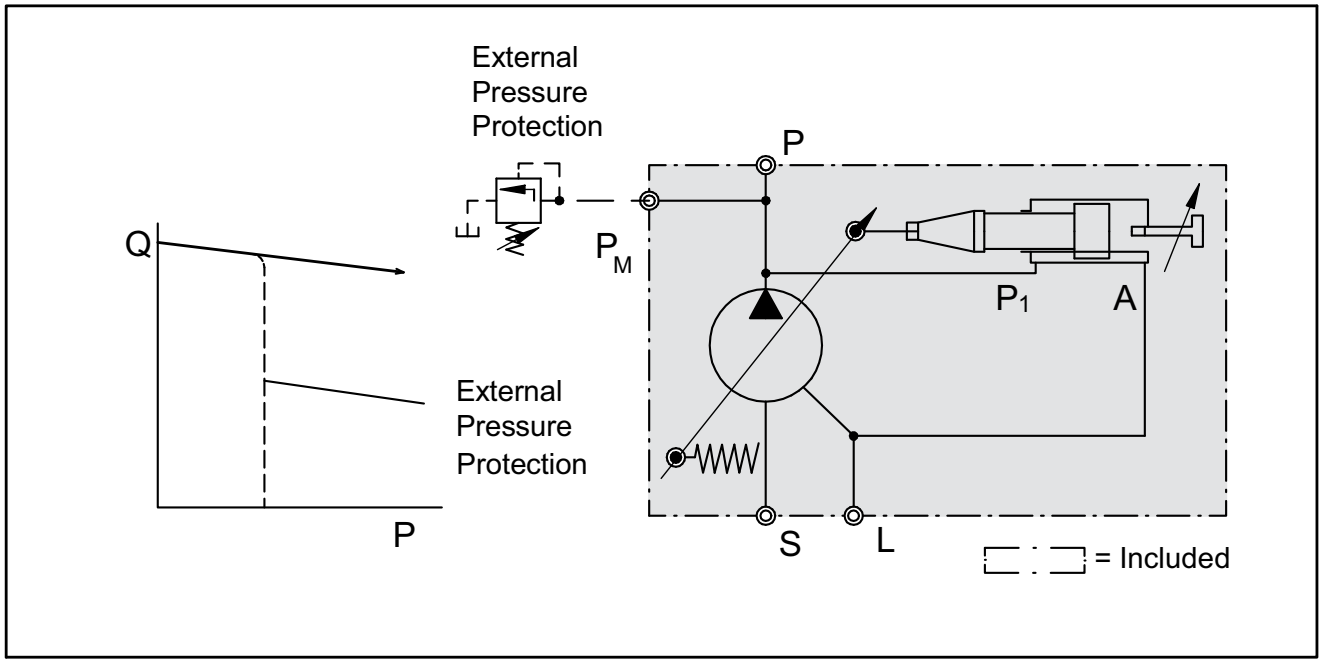


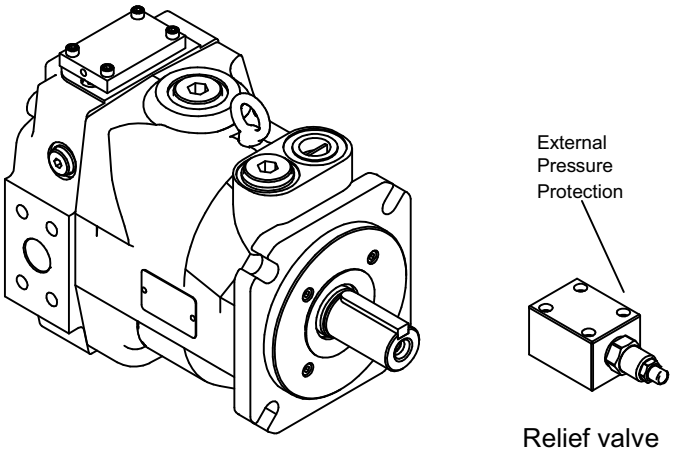
COMPENSATOR (continued)

LN None Pressure Compensator (fixed displacement - pressure protection required)

By using the system under stable displacement and pressure situation, standard pressure compensator can be omitted which helps cost down.

Notice:
External Pressure Protection is necessarily added at port PM to limit the pressure; otherwise the system pressure will be over high.



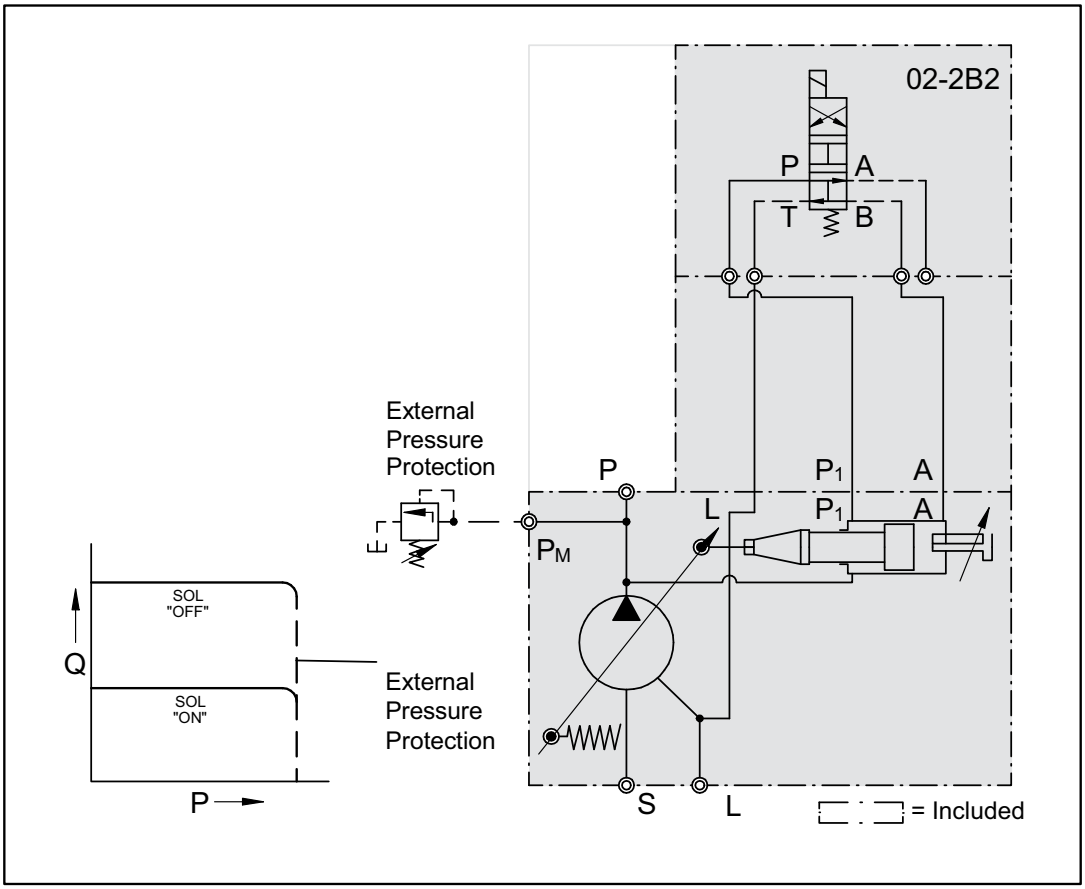


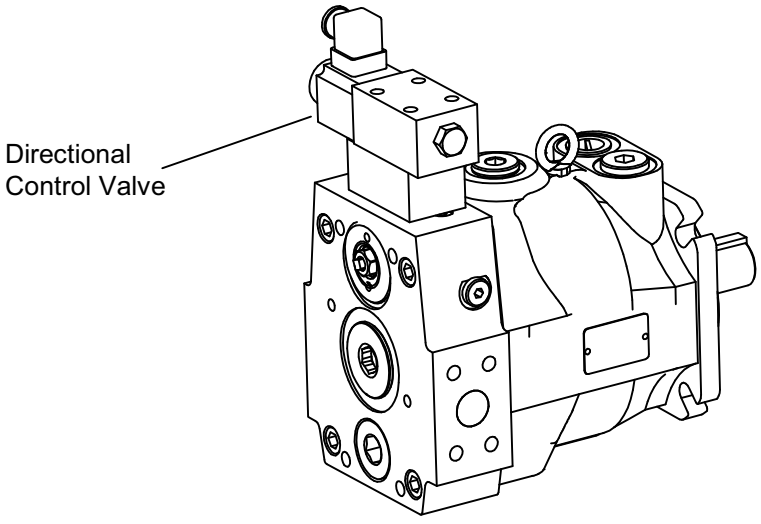
COMPENSATOR (continued)

LS Electrical Dual Flow Compensator (pressure protection required)

Control the hydraulic circuit change by switch Directional Control Valve.
LS control is applied to two-stage stroke and different speed system.

Notice:
External Pressure Protection is necessarily added at port PM to limit the pressure; otherwise the system pressure will be over high.



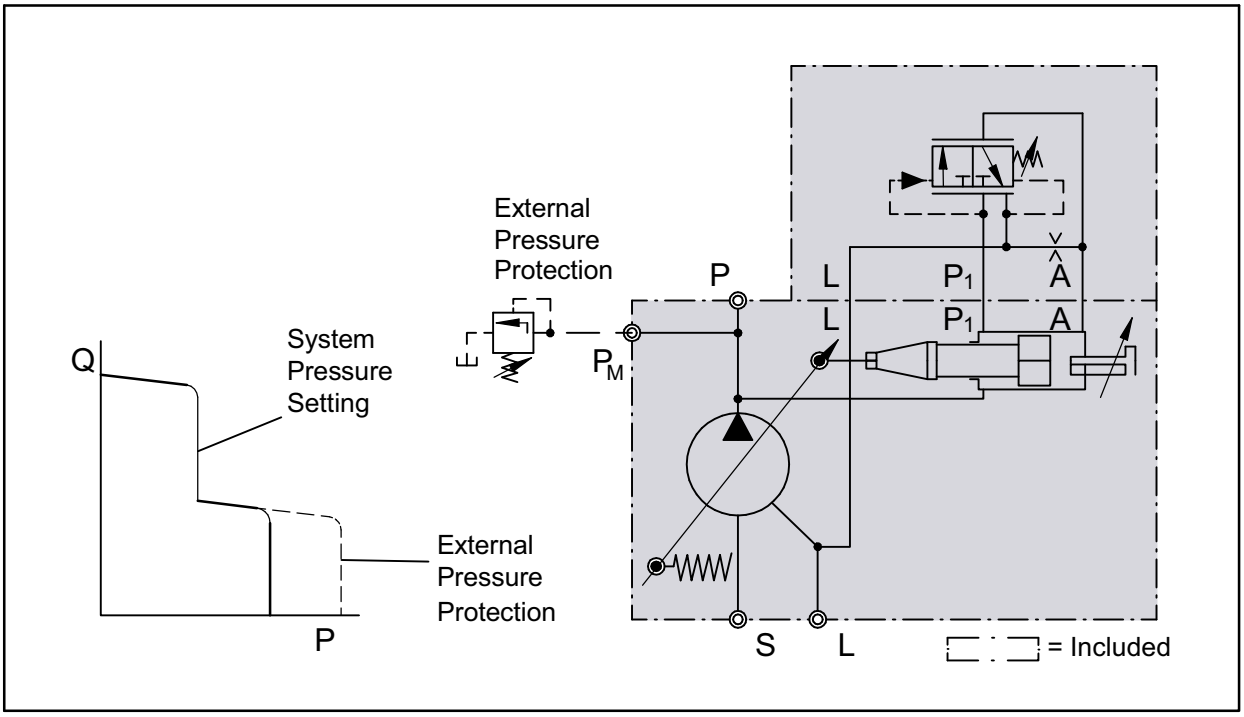


COMPENSATOR (continued)

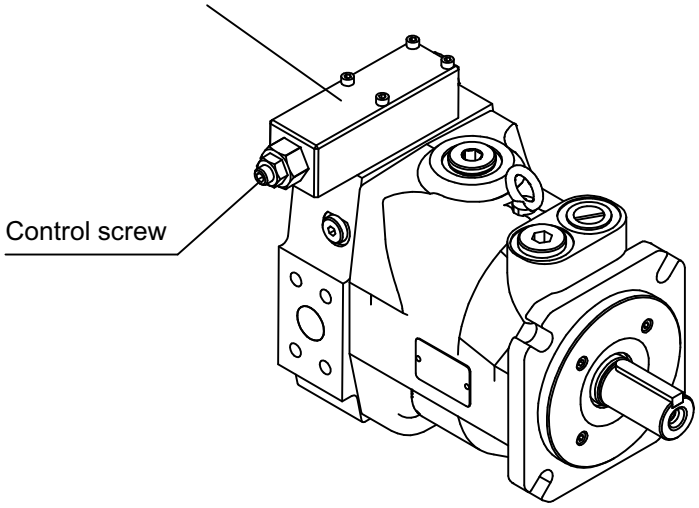
LC Fixed Displacement 2 stages Flow Compensator (pressure protection required)

Control the hydraulic circuit change by using the system pressure setting to achieve the switch of big and small flow.
LC control is applied to two-stage stroke and different speed system.

Notice:
External Pressure Protection is necessarily added at port PM to limit the pressure; otherwise the system pressure will be over high.



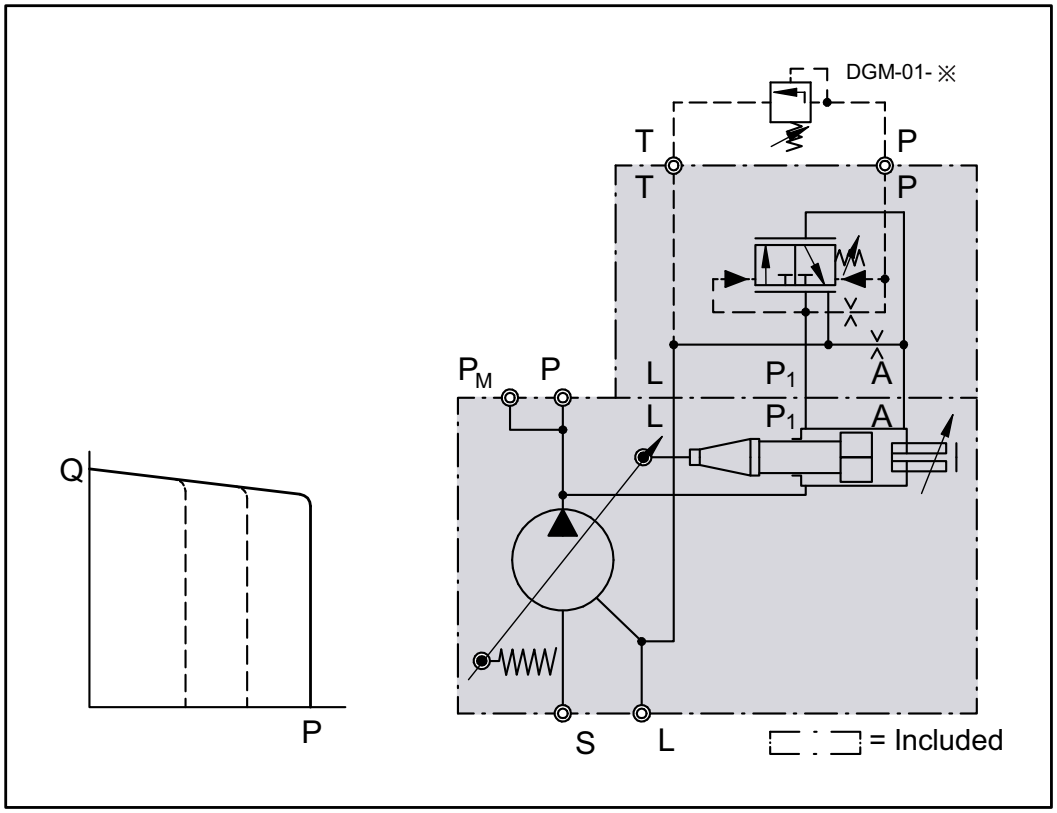
Fixed Displacement
2 stages Flow compensator
(pressure protection required)



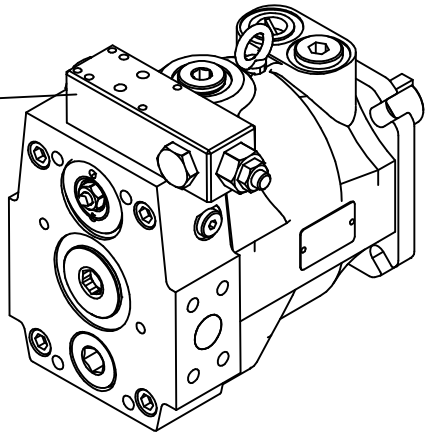
COMPENSATOR (continued)

GM Remote Pressure Compensator with NG6 interface

Version **GM** of the remote pressure compensator provides on its top side an interface NG6, DIN24340 (CETOP 03 at RP35H, NFPA D03) .
This interface allows a direct mounting of a pilot valve.
Beside manual or electrohydraulic operated valves, it is also possible to mount complete multiple pressure circuits directly on the compensator body.
We offers a variety of these compensator accessories ready to install.
All remote pressure compensator have a factory setting of 15 bar differential pressure.
With this setting, the controlled pressure at the pump outlet is higher than the pressure controlled by the pilot valve.



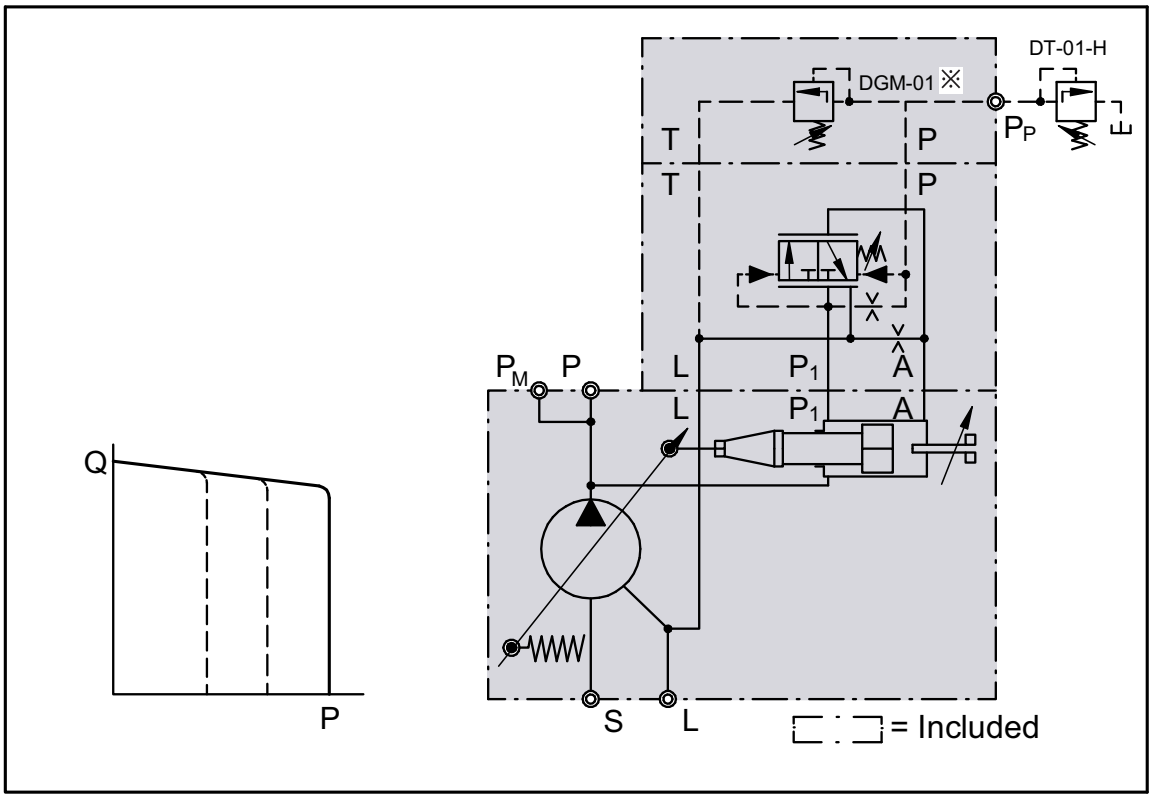
Remote Pressure compensator with NG6 interface

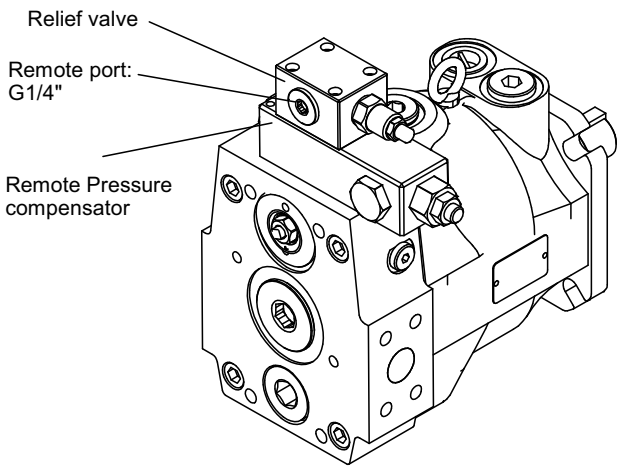


COMPENSATOR (continued)

GA Remote Pressure Compensator + Relief Valve

The pressure is set directly at the compensator spring, and the setting of remote pressure compensator can be achieved by any suitable pilot pressure valve connected to pilot port P_P.
The pilot valve can be installed remote from the pump in some distance.
That allows pressure setting, e.g. from the control panel of the machine.
The pilot flow supply is internal through the valve spool, and the pilot flow is 1~1.5 L/min.

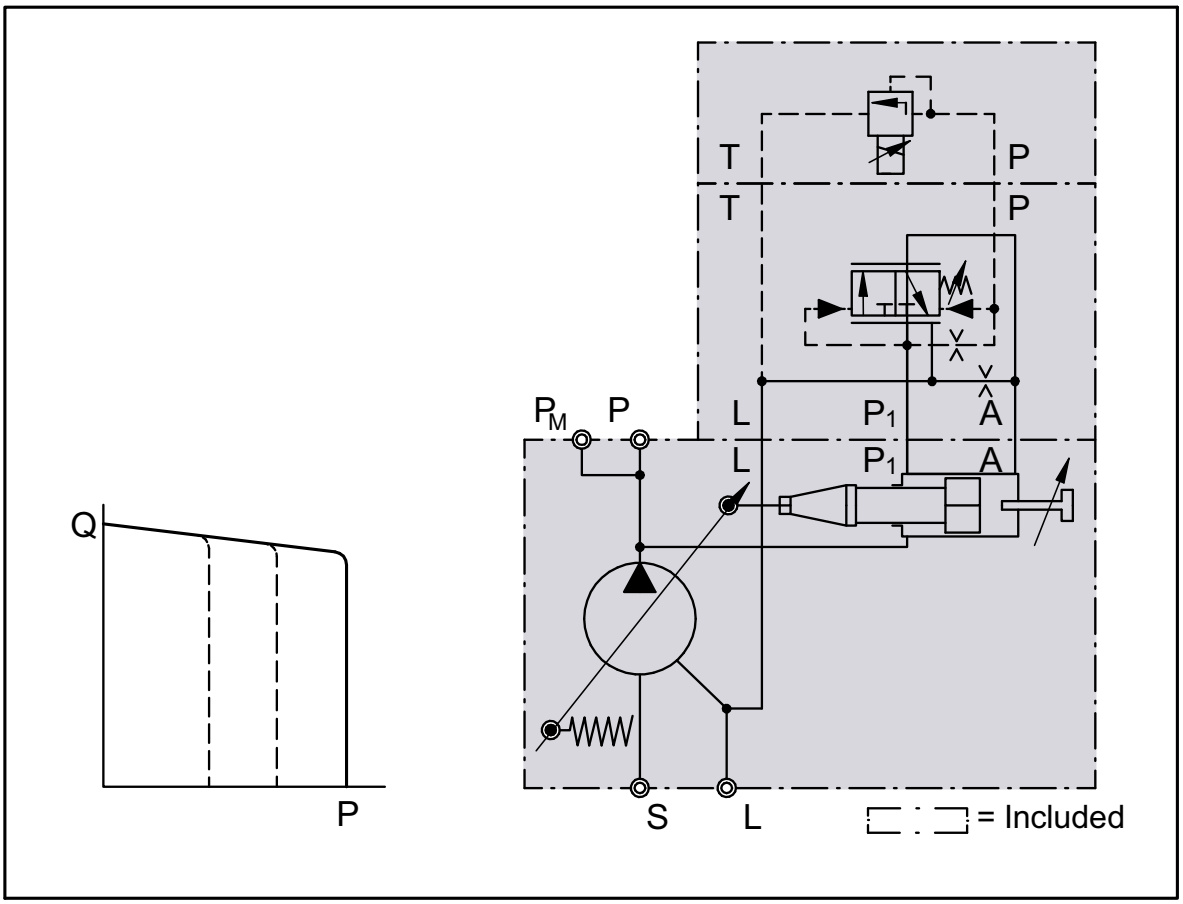


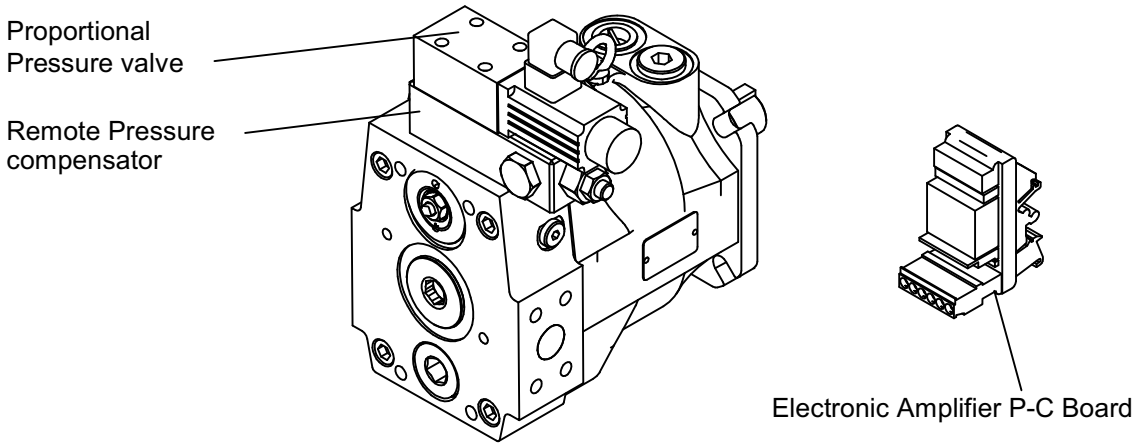


COMPENSATOR (continued)

GJ Remote Pressure Compensator + Proportional Pressure Valve

Fulfill the actual displacement and maintain the preset system pressure.
By adding proportional pressure valve, Electrical proportional pressure control is available.

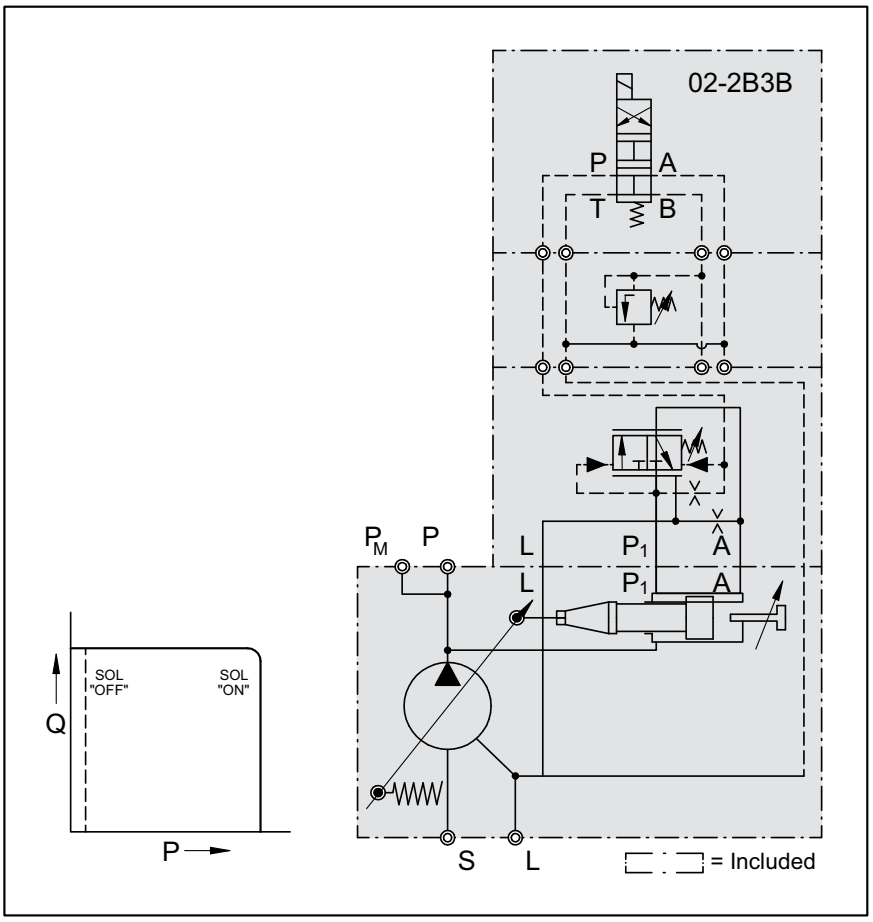


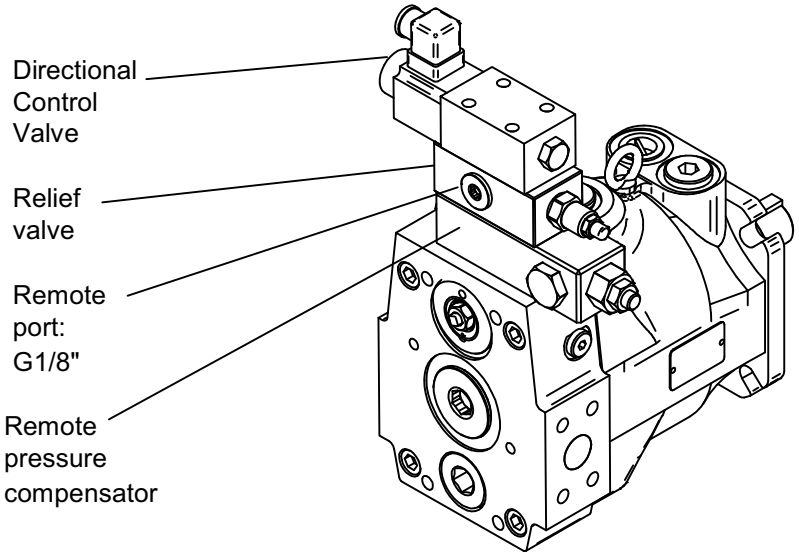


COMPENSATOR (continued)

GR Remote Pressure Compensator + Electrical Unloading

By adding a Relief Valve and a Directional Control Valve on the compensator makes the pump have both function.
GR control is for long unloading situation. When the system stops, oil temperature and noise maintain low level while being through the unloading.

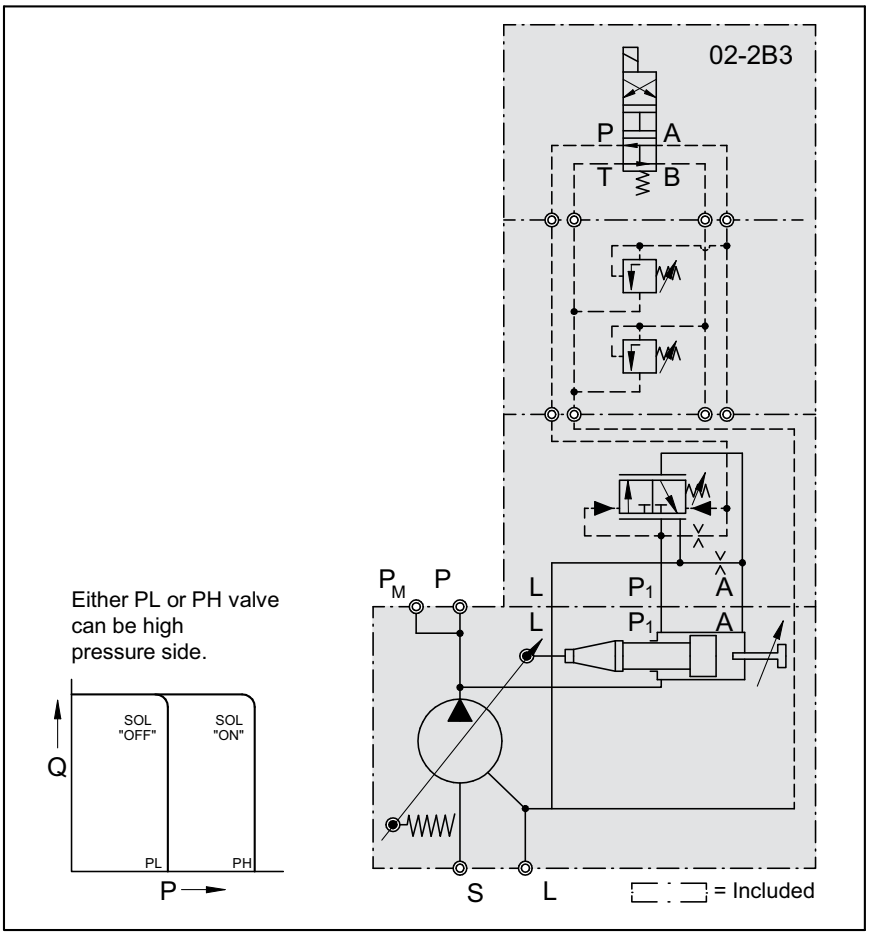


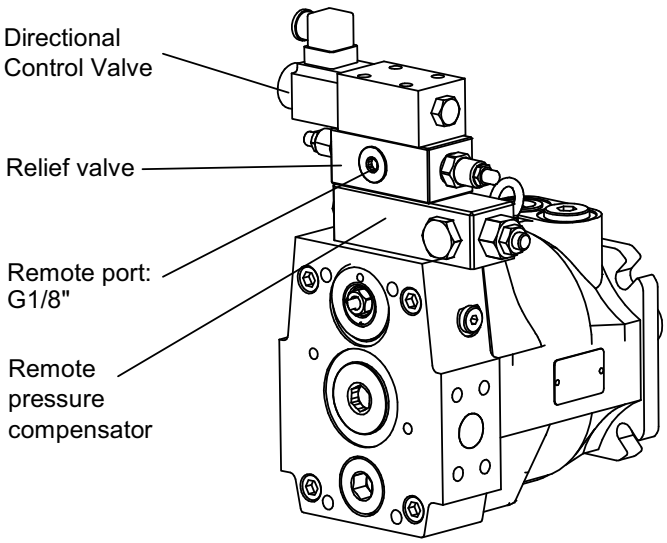


COMPENSATOR (continued)

GB Remote Pressure Compensator + 2-stage Pressure Control

By adding a Relief Valve and Directional Control Valve on the compensator makes it adjust two different stage limited pressure.
GB control is for two-stage working pressure under the constant cylinder speed.

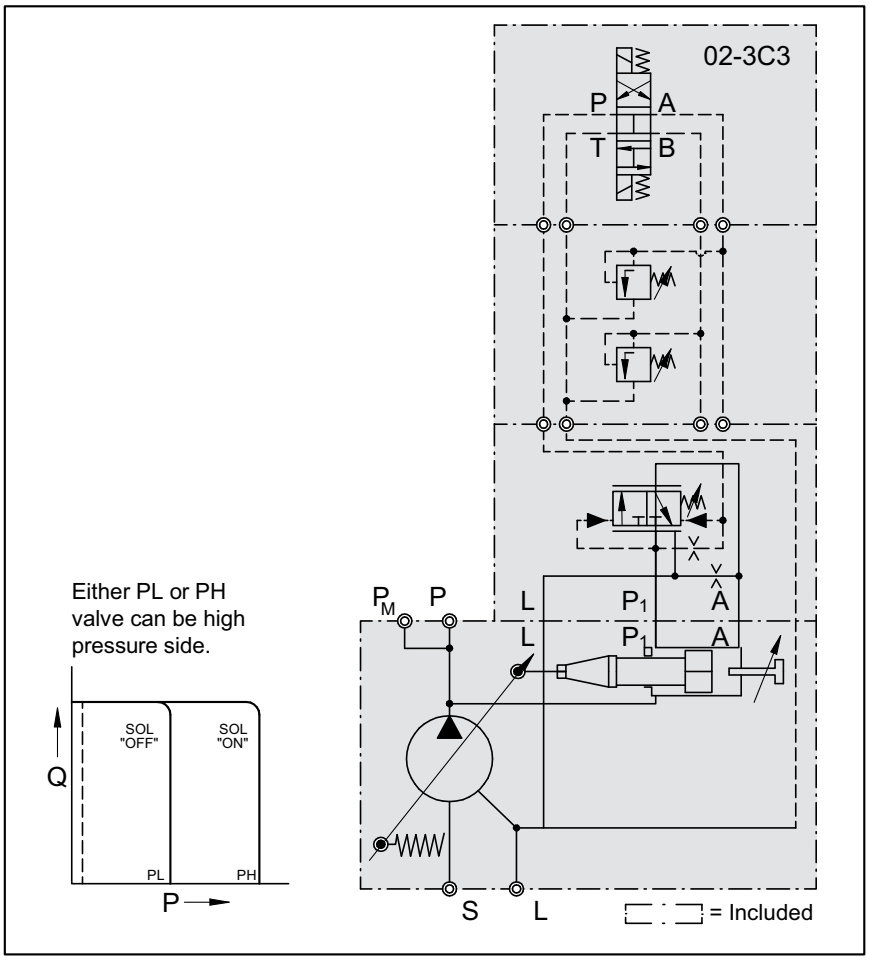


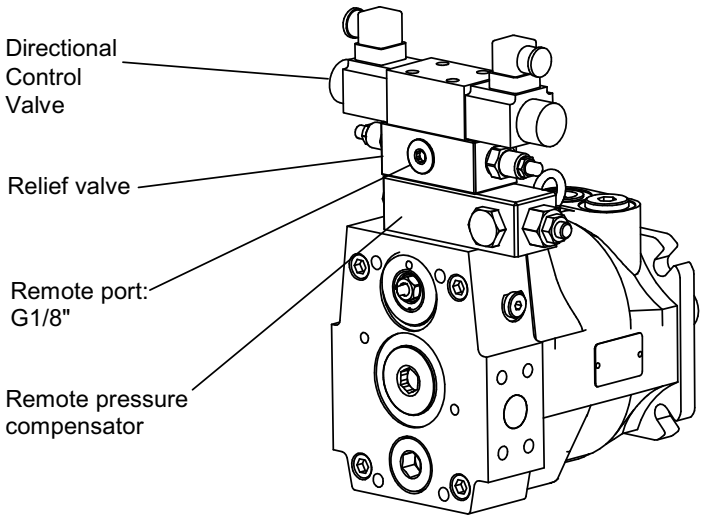


COMPENSATOR (continued)

GC Remote Pressure Compensator + Electrical Unloading + 2-stage Pressure Control

Control two different-stage limited pressure by adding Directional Control Valve, and unloading function.
When the system stops, oil temperature and noise maintain low level by unloading function.
Usable for stable cylinder speed, two-stage pressure, and long unloading situation.

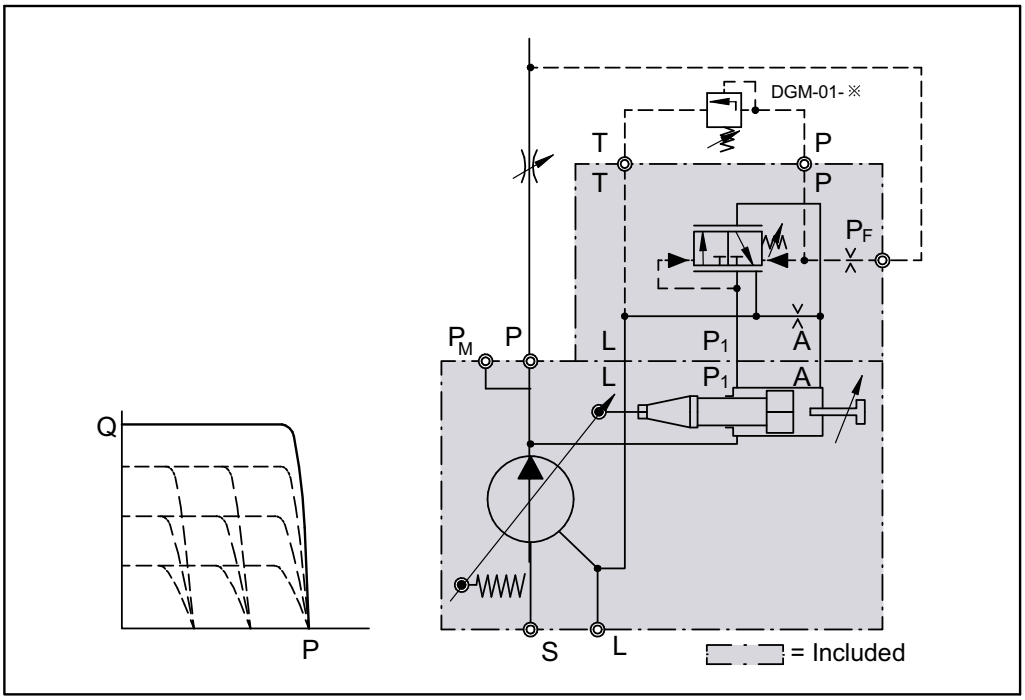


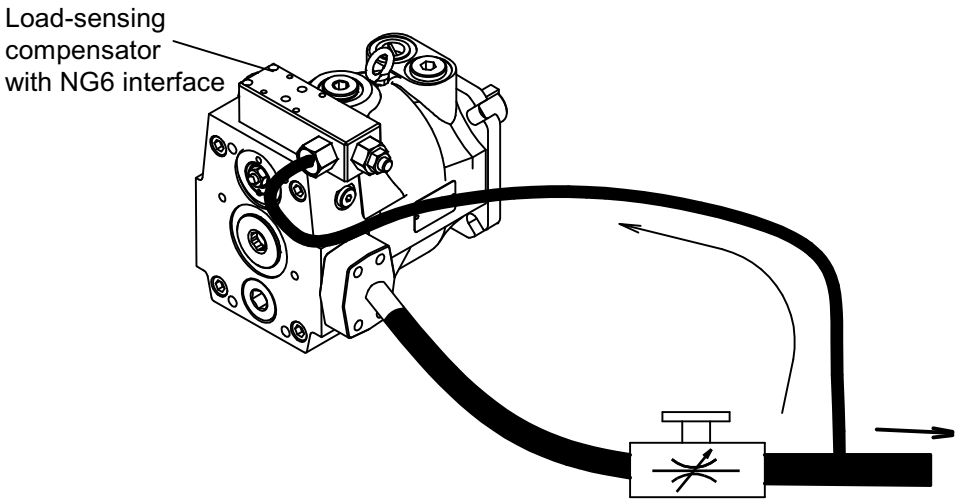


COMPENSATOR (continued)

HM Load-sensing Compensator with NG6 interface

Version **HM** of remote pressure compensator provides an interface NG6 on its top side.
The load-sensing compensator has an external pilot pressure supply.
Factory setting for the differential pressure is 10 bar.
The input signal to the compensator is the differential pressure at the main stream resistor.
A load-sensing compensator represents mainly a flow control for the pump output flow, because the compensator keeps the pressure drop at the main stream resistor constant.
A variable input speed or a varying load (-pressure) has consequently no influence on the output flow of the pump and the speed of the actuator.
By adding proportional pressure valve, Electrical proportional pressure control is available.

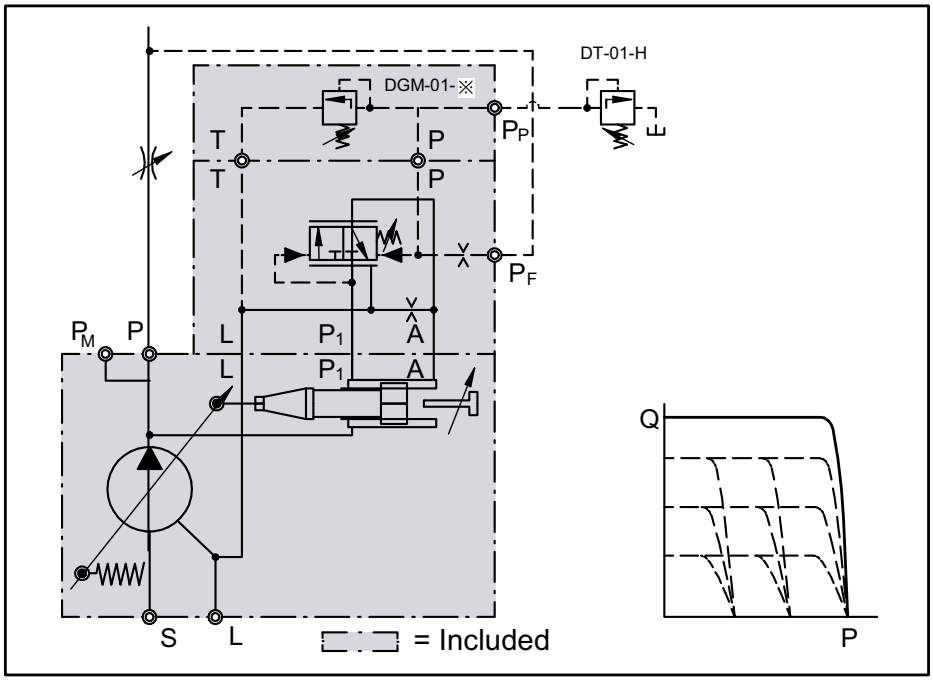


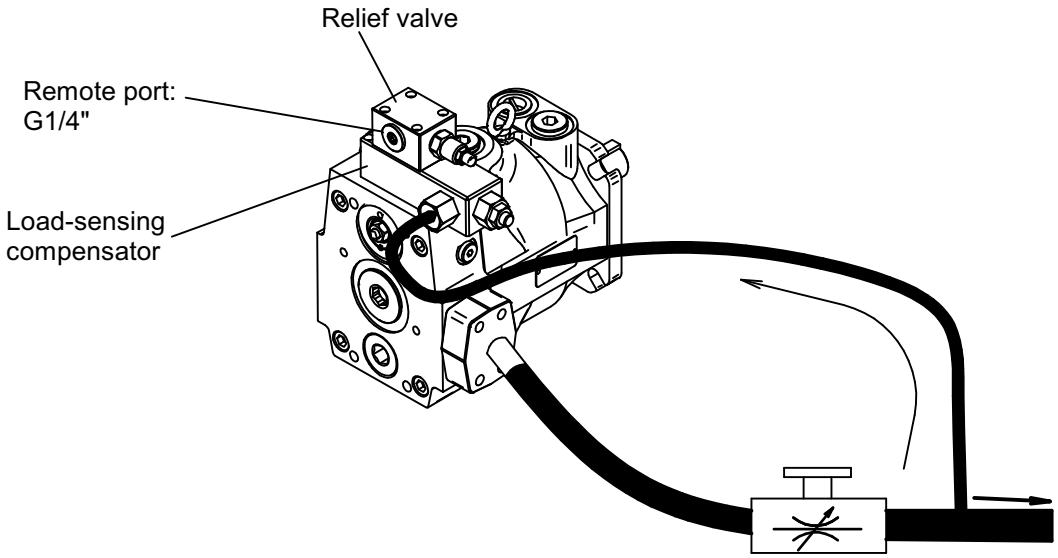


COMPENSATOR (continued)

HA Load-sensing Compensator + Relief Valve

The load-sensing compensator has an external pilot pressure supply.
Factory setting for the differential pressure is 10 bar. The input signal to the compensator is the differential pressure at the main stream resistor. A load-sensing compensator represents mainly a flow control for the pump output flow, because the compensator keeps the pressure drop at the main stream resistor constant. A variable input speed or a varying load (-pressure) has consequent no influence on the output flow of the pump and the speed of the actuator.
Relief valve has adjustment function.
The pilot valve can be installed remote form the pump in some distance. That allows pressure setting, e.g. form the control panel of the machine. The pilot flow supply is internal through the valve spool, and the pilot flow is 1-1.5 L/min.

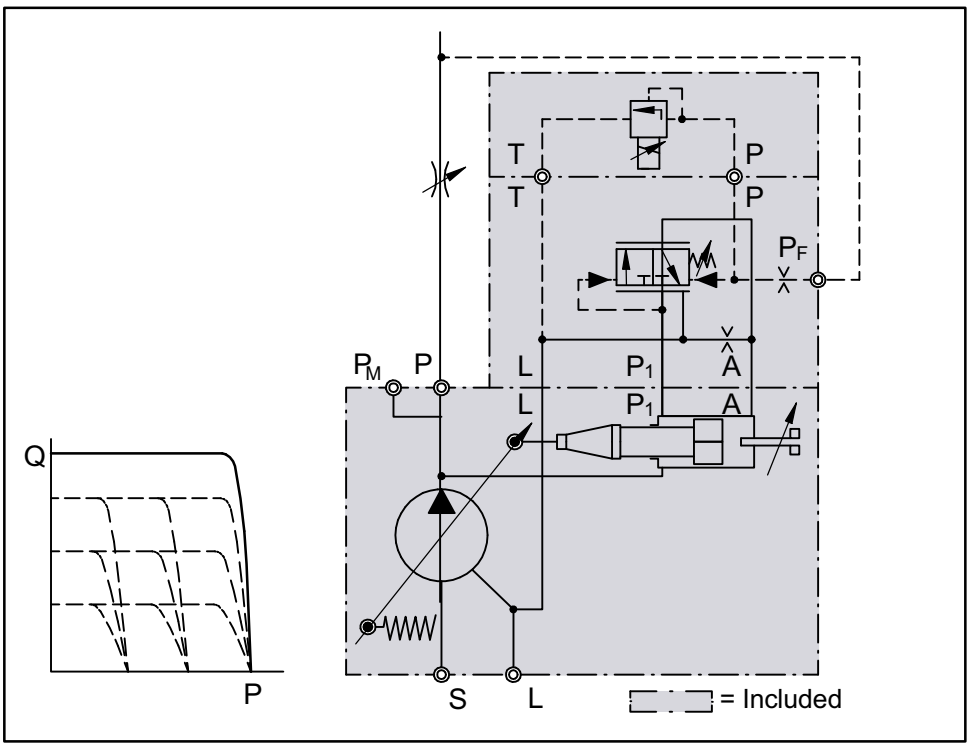


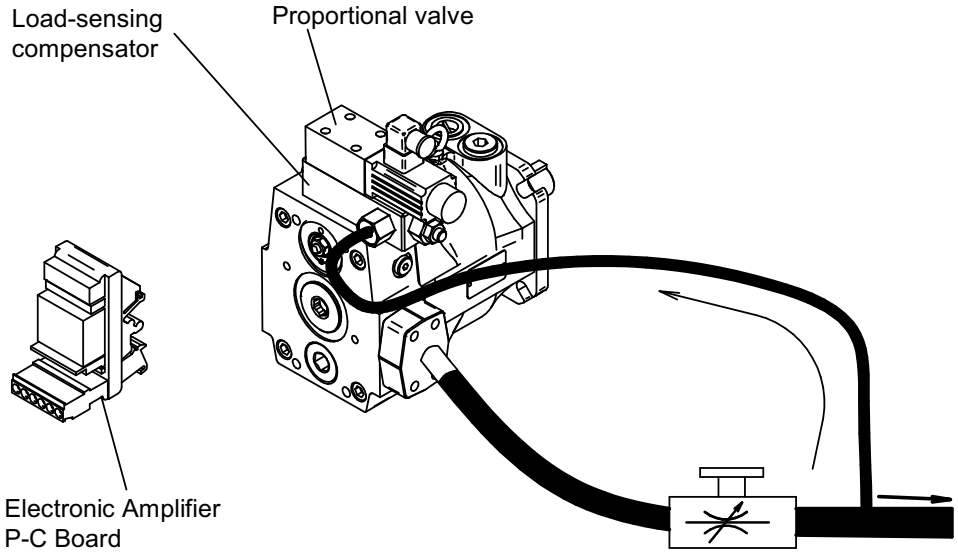


COMPENSATOR (continued)

HJ Load-sensing Compensator + Proportional Pressure Valve

The load-sensing compensator has an external pilot pressure supply.
Factory setting for the differential pressure is 10 bar.
The input signal to the compensator is the differential pressure at the main stream resistor.
A load-sensing compensator represents mainly a flow control for the pump output flow and the speed of the actuator.
Proportional pressure valve is for Electrical proportional pressure control.

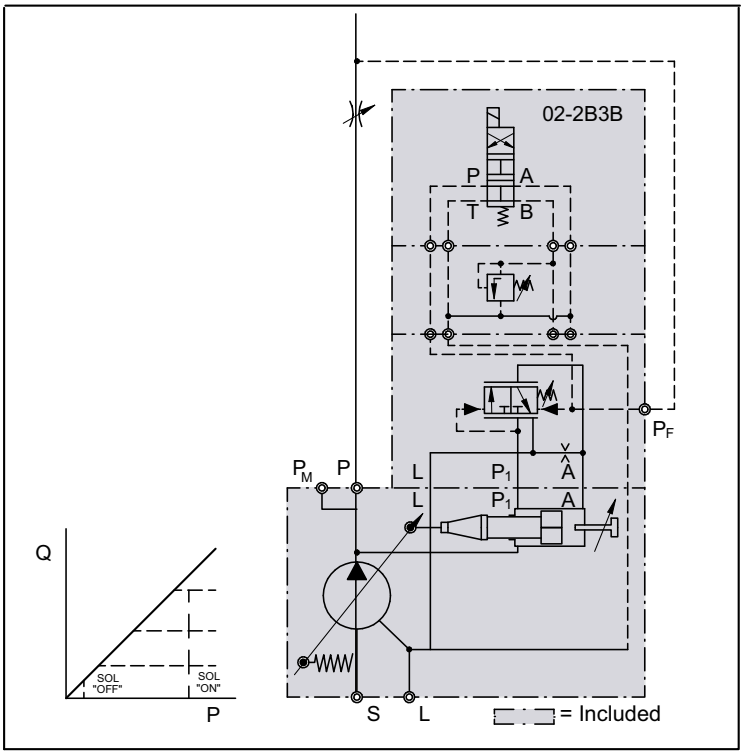


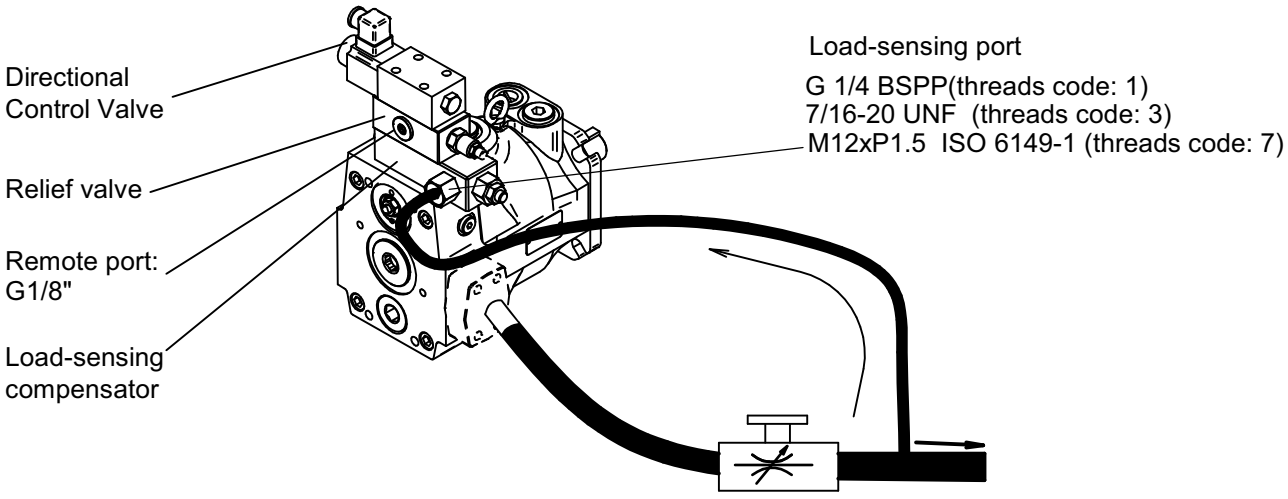


COMPENSATOR (continued)

HR Load-sensing Compensator + Electric Unloading

The load-sensing compensator has all external pilot pressure supply.
Factory setting for the differential pressure is 10 bar. The input signal to the compensator is the differential pressure at the main stream resistor. A load-sensing compensator represents mainly a flow control for the pump output flow, because the compensator keeps the pressure drop at the main stream resistor constant. A variable input speed or a varying (load -pressure) has consequently on the output flow of the pump and speed of the actuator.
By adding a pilot orifice (Φ 0.8mm) and a pressure pilot valve pressure compensation can be added to the flow control function. See the circuit diagram below.
By adding a relief valve and a directional control valve on the compensator makes the pump have both function. **HR** control is for long unloading situation. When the system stops, oil temperature and noise maintain low level while being through the unloading.

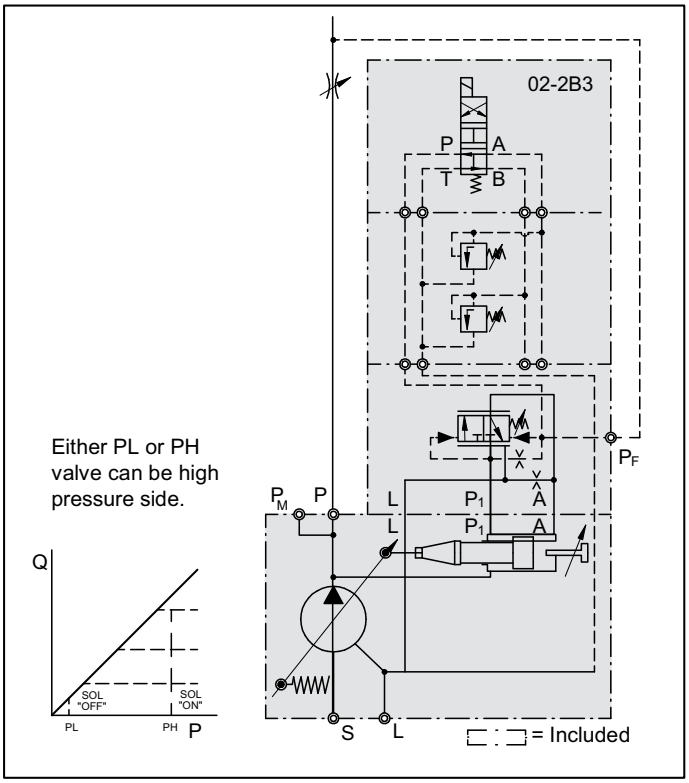


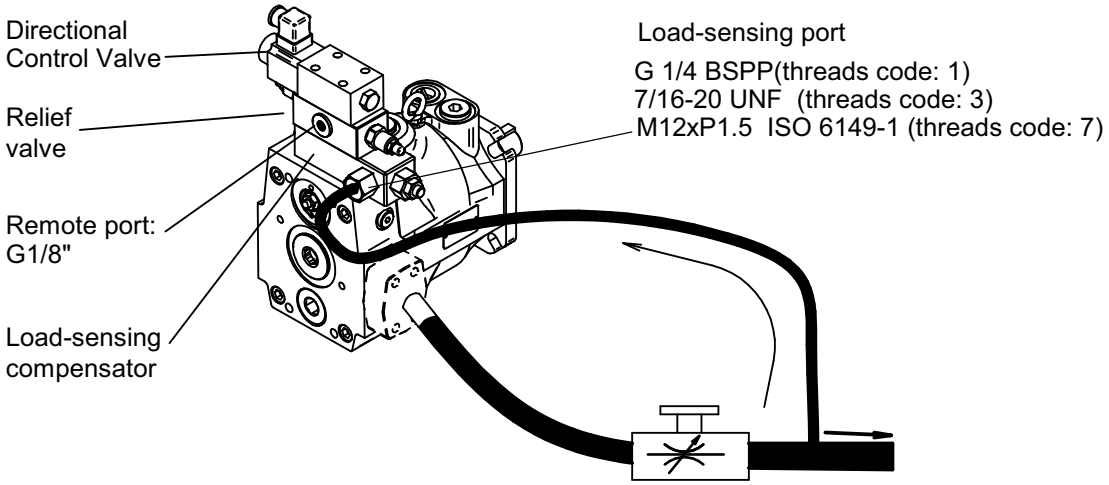


COMPENSATOR (continued)

HB Load-sensing Compensator + 2-stage Pressure Control

The load-sensing compensator has an external pilot pressure supply.
Factory setting for the differential pressure is 10 bar. The input signal to the compensator is the differential pressure at the main stream resistor. A load-sensing compensator represents mainly a flow control for the pump output flow, because the compensator keeps the pressure drop at the main stream resistor constant. A variable input speed or a varying (load -pressure) has consequently on the output flow of the pump and speed of the actuator.
By adding a pilot orifice (Φ0.8mm) and a pressure pilot valve pressure compensation can be added to the flow control function. See the circuit diagram below.
By adding a relief valve and directional control valve on the compensator makes it adjust two different stage limited pressure.
HB control is for two-stage working pressure under the constant cylinder.

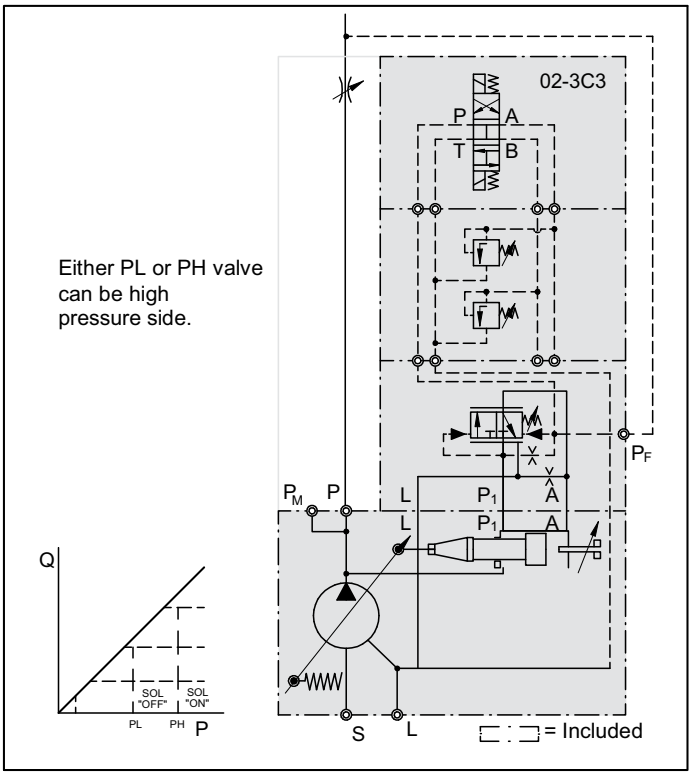


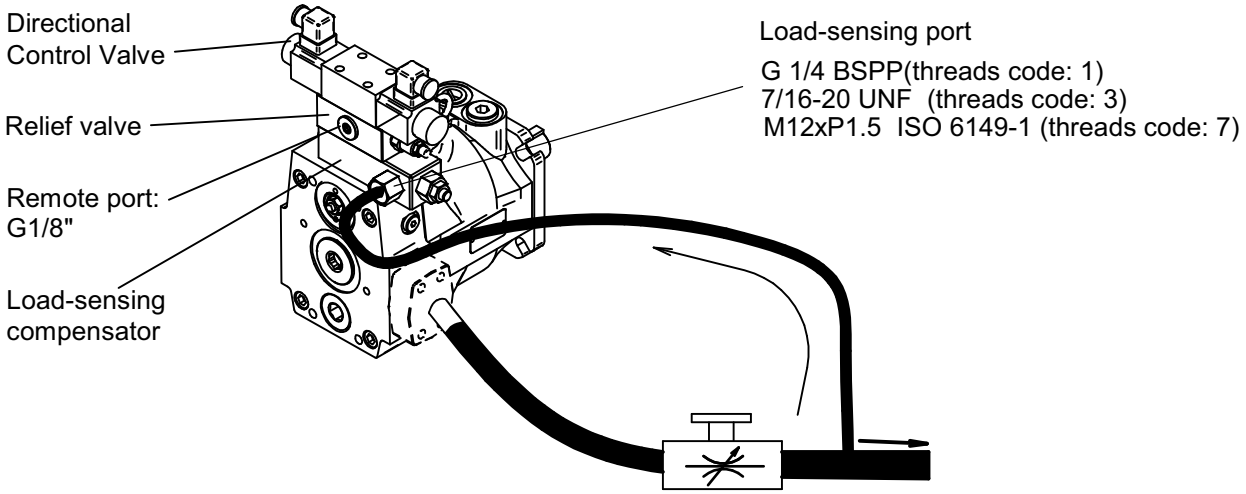


COMPENSATOR (continued)

HC Load-sensing Compensator + Electrical Unloading + 2-stage Pressure Control

The load-sensing compensator has an external pilot pressure supply.
Factory setting for the differential pressure is 10 bar. The input signal to the compensator is the differential pressure at the main stream resistor. A load-sensing compensator represents mainly a flow control for the pump output flow, because the compensator keeps the pressure drop at the main stream resistor constant. A variable input speed or a varying (load -pressure) has consequently on the output flow of the pump and speed of the actuator.
By adding a pilot orifice (Φ0.8mm) and a pressure pilot valve pressure compensation can be added to the flow control function. See the circuit diagram below.
By adding a relief valve and a directional control valve on the compensator makes the pump have both function. **HC** control is for long unloading situation. When the system stops, oil temperature and noise maintain low level while being through the unloading.

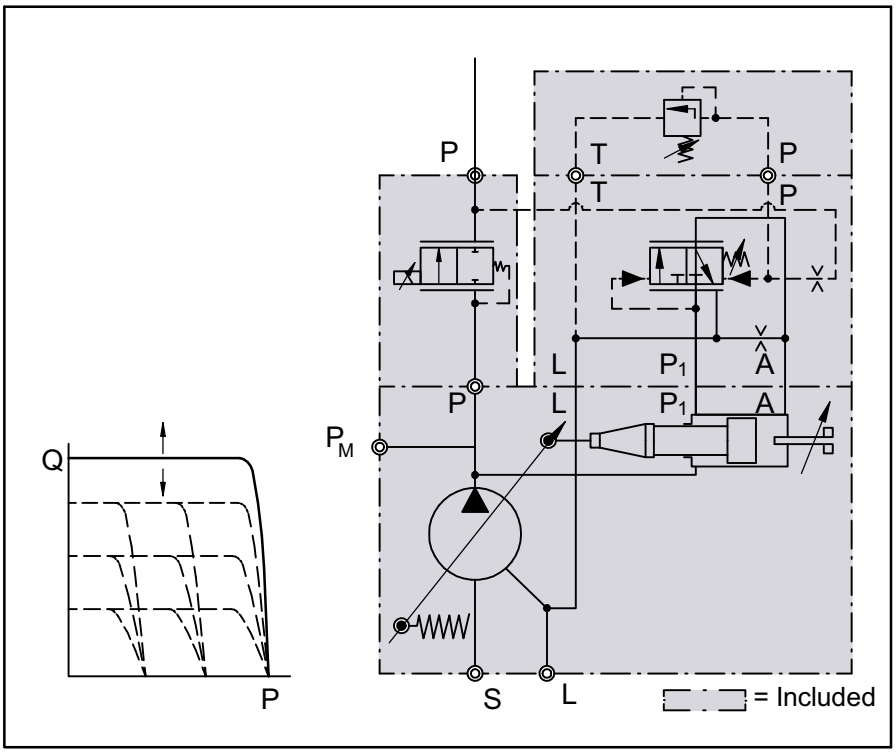


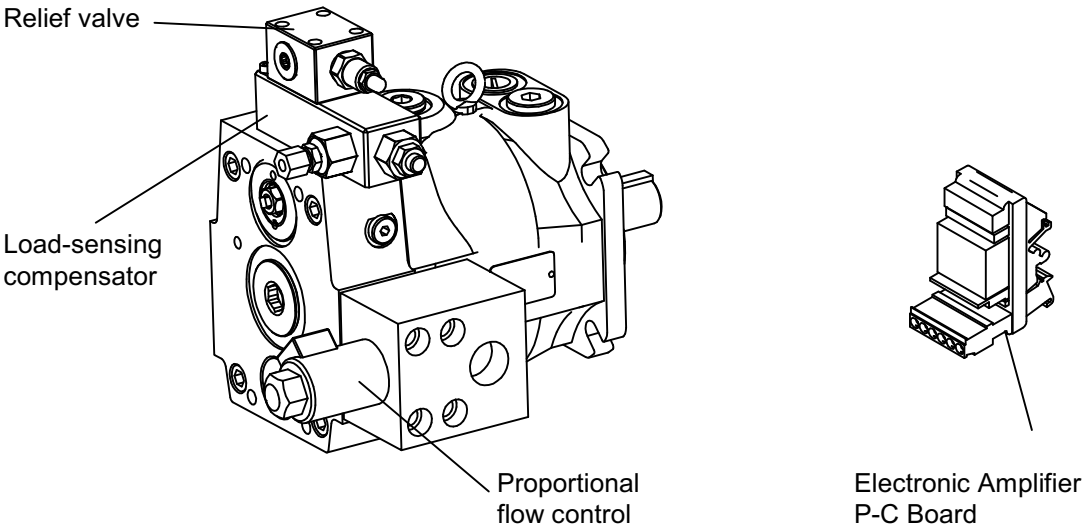


COMPENSATOR (continued)

HQ Load-sensing Compensator + Proportional Flow Valve + Relief Valve

The load-sensing compensator has an external pilot pressure supply.
Factory setting for the differential pressure is 10 bar.
The input signal to the compensator is the differential pressure at the main stream resistor.
A load-sensing compensator represents mainly a flow control for the pump output flow, because the compensator keeps the pressure drop at the main stream resistor constant.
By adding proportional flow valve, Electrical proportional flow control is available.

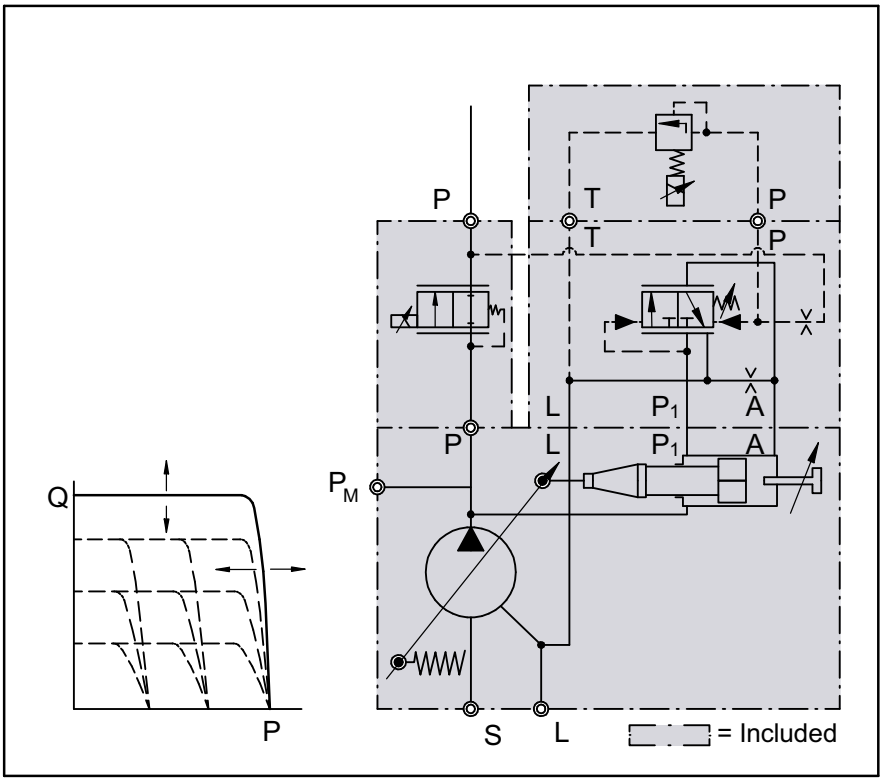


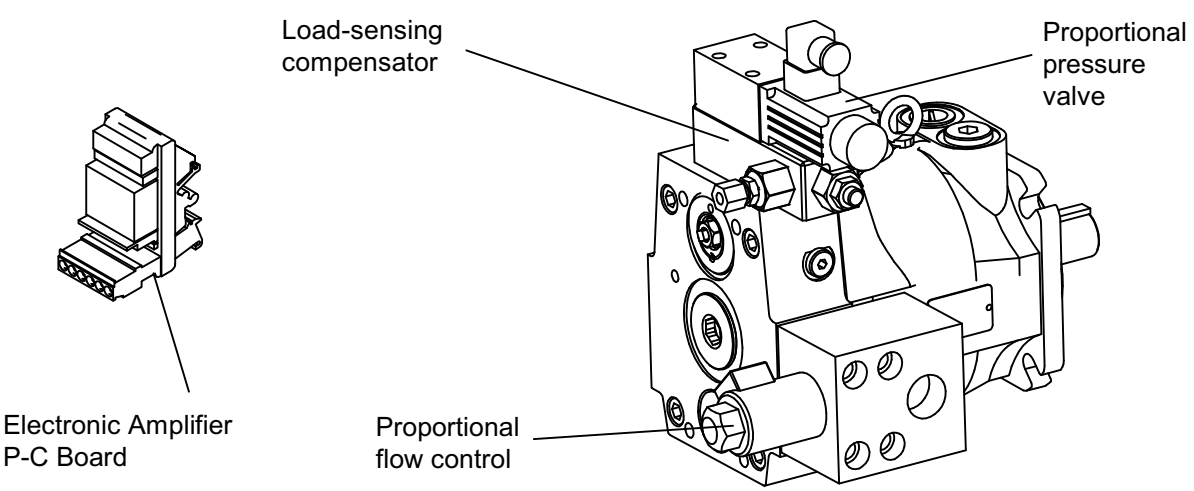


COMPENSATOR (continued)

HK Load-sensing Compensator + Proportional Pressure Valve +Proportional Flow Valve

HK is for saving energy. It offers the smallest pressure and flow according to the different requirement. The displacement is nearly zero when the system stands by, and the motor output is also nearly zero. When the system reaches setting pressure, the pump displacement will reduce by itself. It only needs to add the system required flow, and the pressure remains the same which control the oil temperature. Compared with vane pump, gear pump +PQ valve can save 30%-50% energy. The load-sensing compensator+ Proportional flow valve has all external pilot pressure supply. Factory setting for the differential pressure is 10 bar. The input signal to the compensator is the differential pressure at the main stream resistor.
A load-sensing compensator represents mainly a flow control for the pump output flow of the pump and the speed of the actuator. Proportional pressure valve is for electrical proportional pressure control.

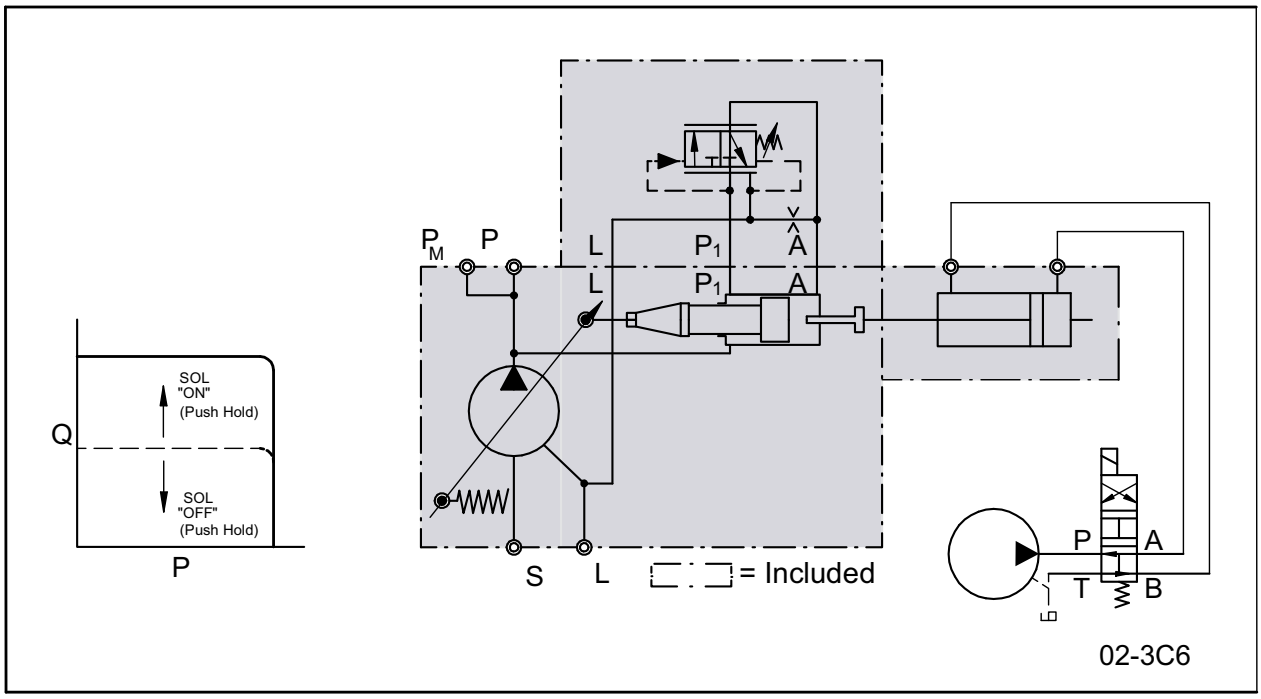


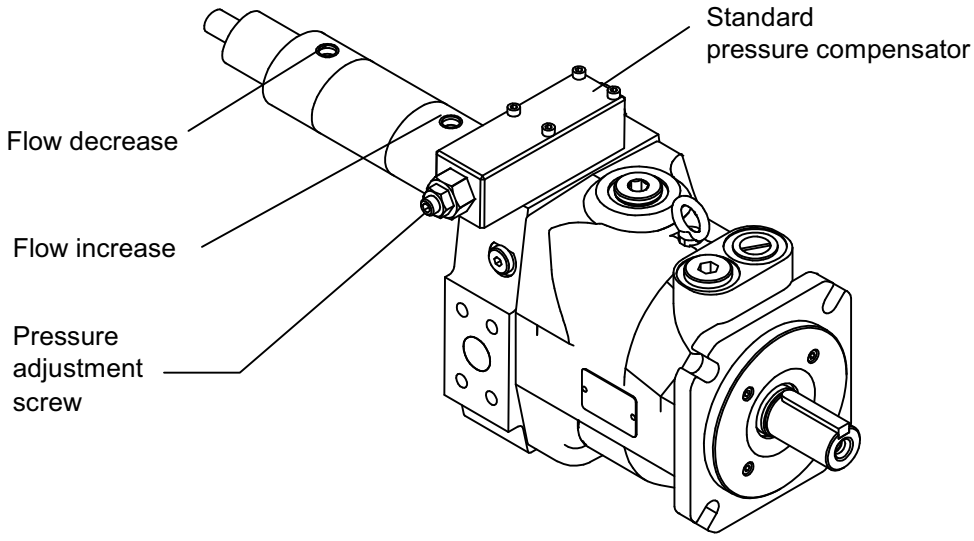


COMPENSATOR (continued)

BQ None-stage Flow Compensator (Cylinder)

Using added cylinder, external pilot pressure controls the forward and backward, and push the swash plate to change directions and make the single-stage pressure control.
Displacement can be zero to Max, and pressure remains on setting pressure.
Automatous flow control is much easier to repair, and cheaper than electrical proportional flow control.
External control is more automated by using solenoid valve or hydraulic directional valve.

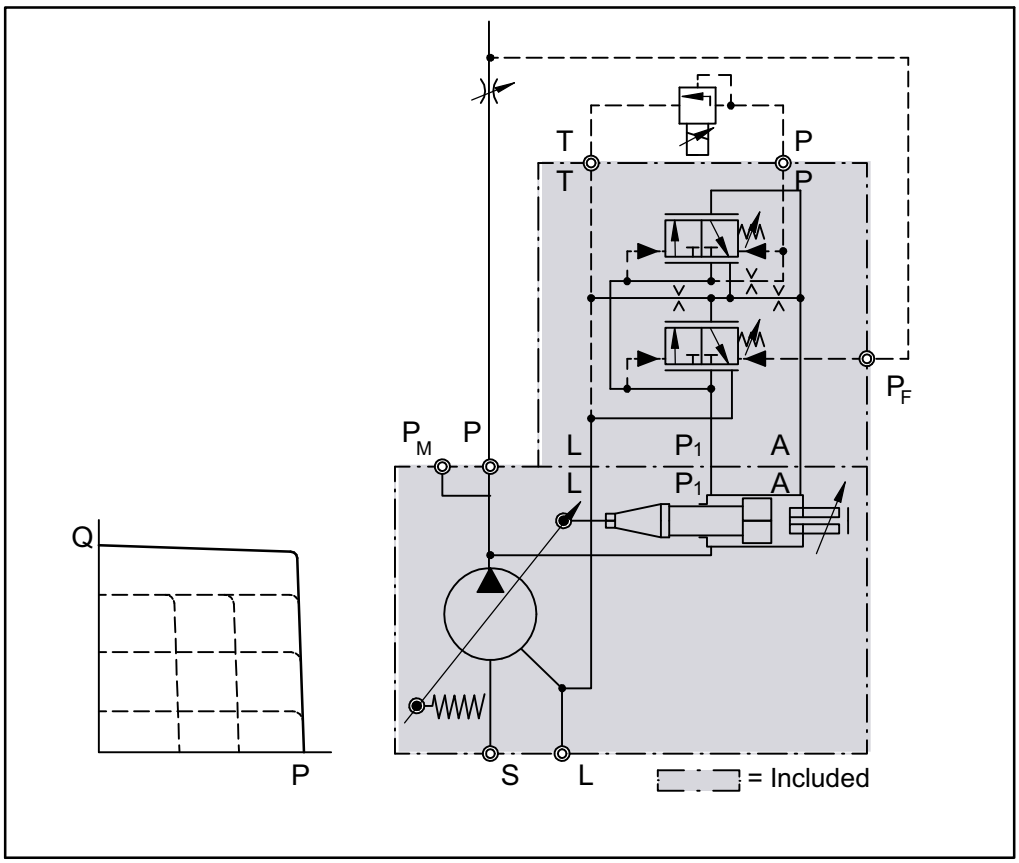




COMPENSATOR (continued)

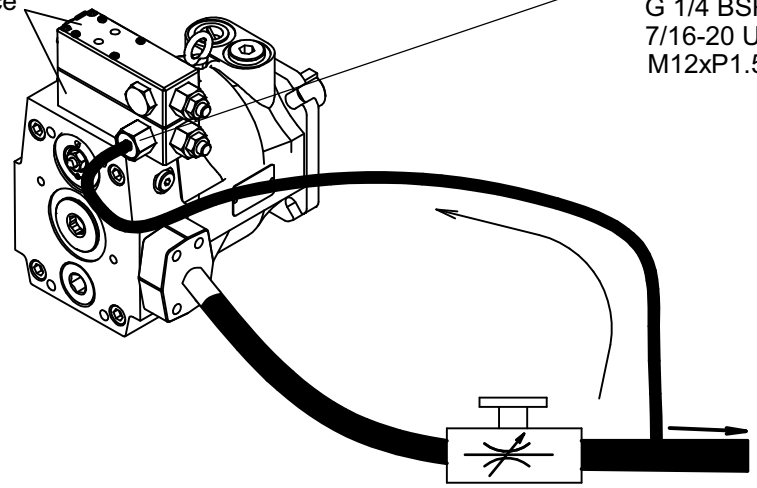
VM 2 Valves Load-sensing Compensator with NG6 interface

Two-valve load-sensing compensator with NG6 interface is an option for limiting pressure precisely. By eliminating the impact between pressure and flow, the pump should add two different valves to control flow and pressure.
Version **VM** provides on its top side an interface NG6 which has pressure-adjusted function.
If adding a proportional pressure control valve, Electrical Proportional Pressure control is available.



2-valve Load-sensing compensator
with NG6 interface

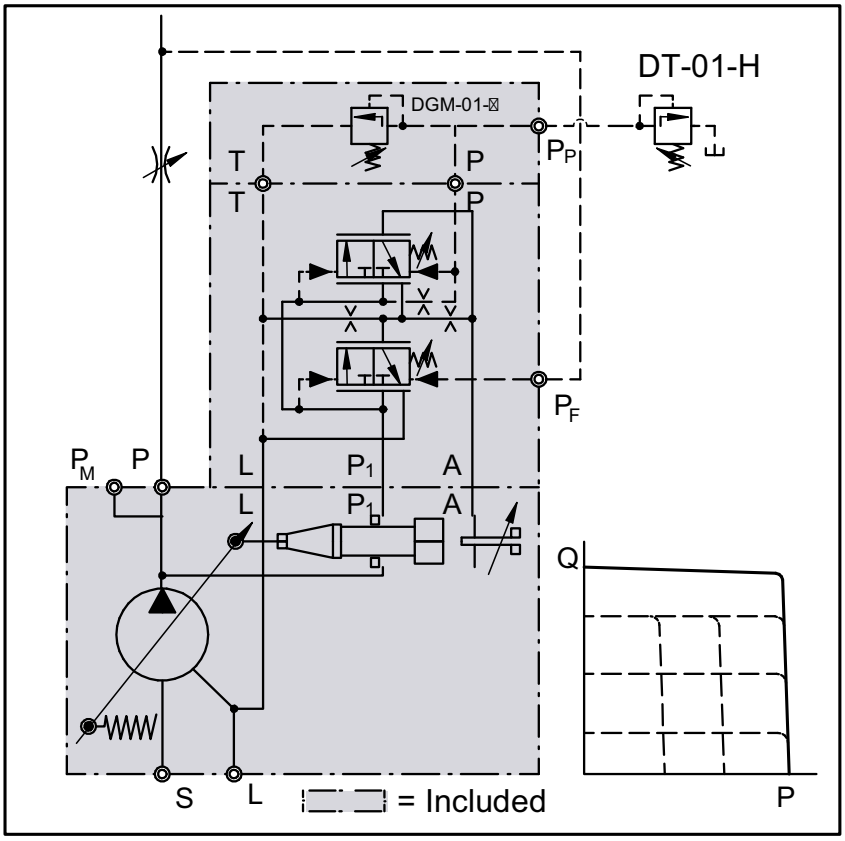
Load-sensing port
G 1/4 BSPP(threads code: 1)
7/16-20 UNF (threads code: 3)
M12xP1.5 ISO 6149-1 (threads code: 7)

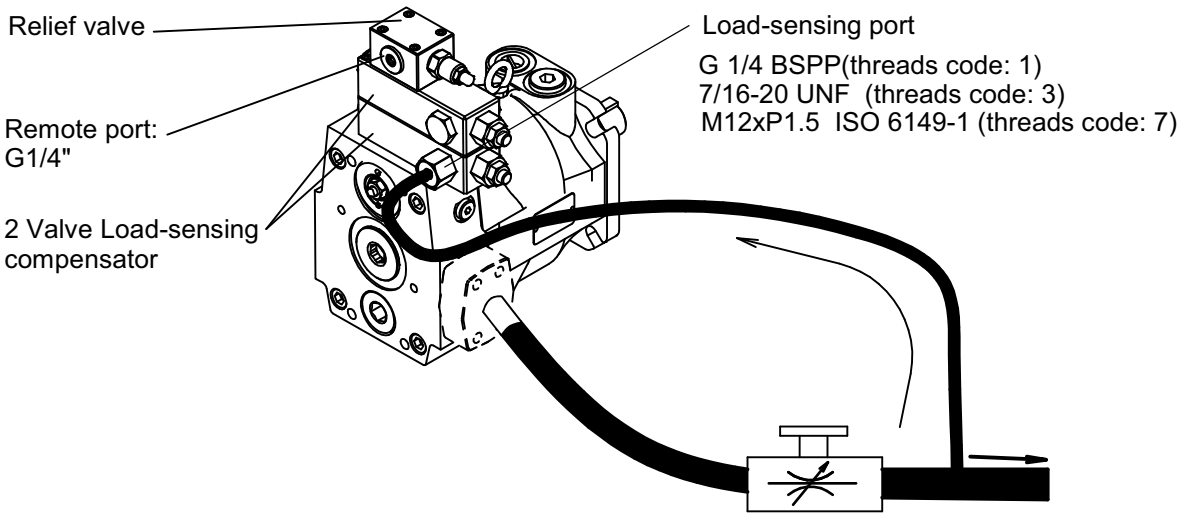


COMPENSATOR (continued)

VA 2 Valves Load-sensing Compensator + Relief Valve

Two-valve load-sensing compensator with NG6 interface is an option for limiting pressure precisely. By eliminating the impact between pressure and flow, the pump should add two different valves to control flow and pressure.
The pilot valve if free to be installed to remote in some distance.
That allows pressure setting e.g. from the control panel of the machine.
The pilot flow supply is internal through the valve spool, and the pilot flow is 1-1.5 L/min.

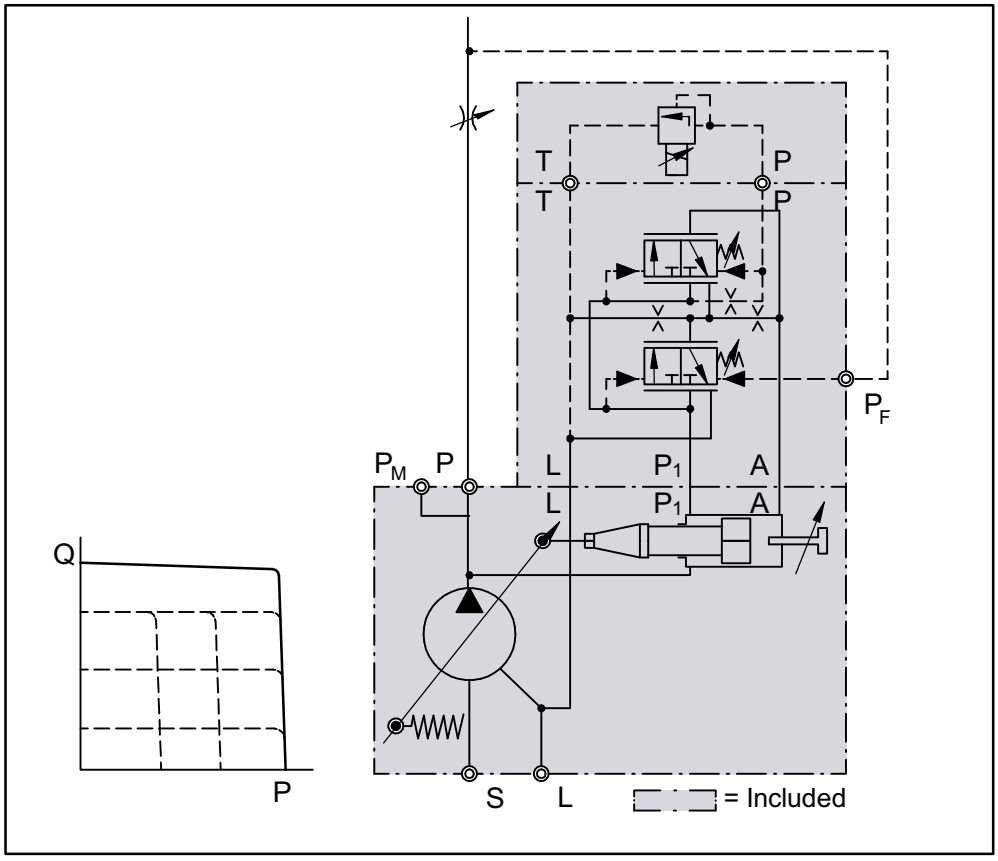


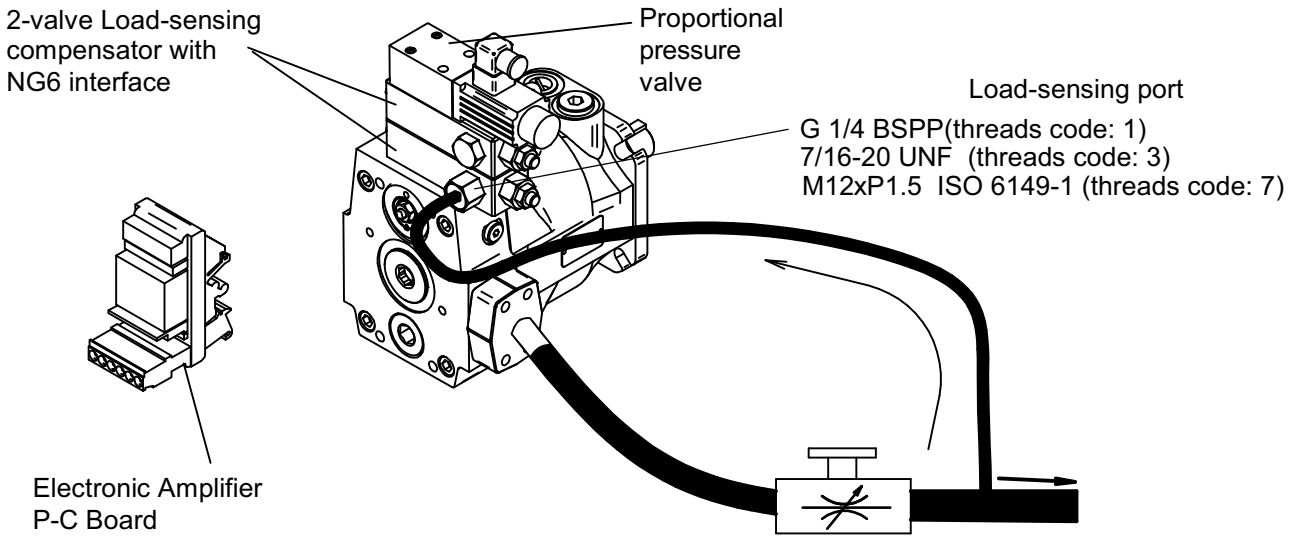


COMPENSATOR (continued)

VJ 2 Valves Load-sensing Compensator + Proportional Pressure Valve

Two-valve load-sensing compensator with NG6 interface is an option for limiting pressure precisely. By eliminating the impact between pressure and flow, the pump should add two different valves to control flow and pressure.
Electrical proportional and pressure control is available by adding a proportional pressure valve on the Load-sensing compensator

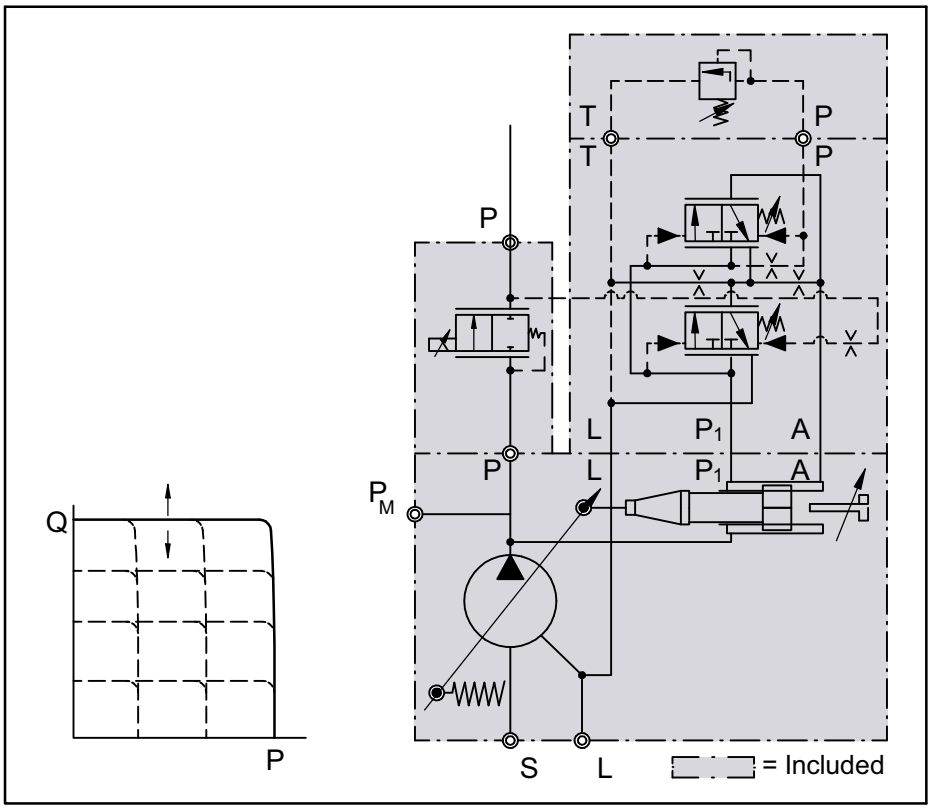


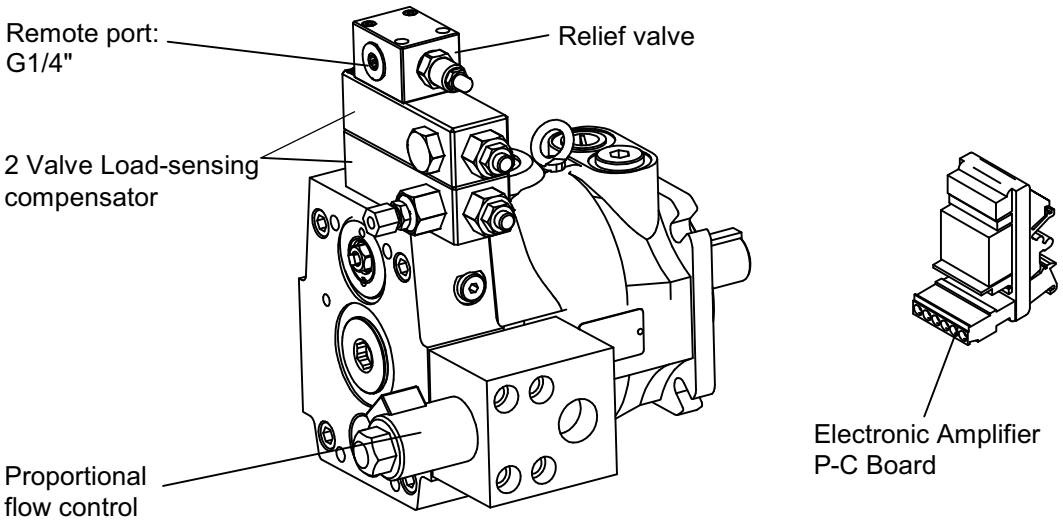


COMPENSATOR (continued)

VQ 2 Valves Load-sensing Compensator + Proportional Flow Valve + Relief Valve

Type **VQ** is an option for limiting pressure precisely. The load-sensing compensator has an external pilot pressure supply. Factory setting for the differential pressure is 10 bar.
The input signal to the compensator is the differential pressure at the main stream resistor.
A load-sensing compensator represents mainly a flow control for the pump output flow, because the compensator keeps the pressure drop at the main stream resistor constant. A variable input speed or a varying load (-pressure) consequently has no influence on the output flow of the pump and the speed of the actuator. Electrical proportional flow control is available by adding a proportional flow control valve.

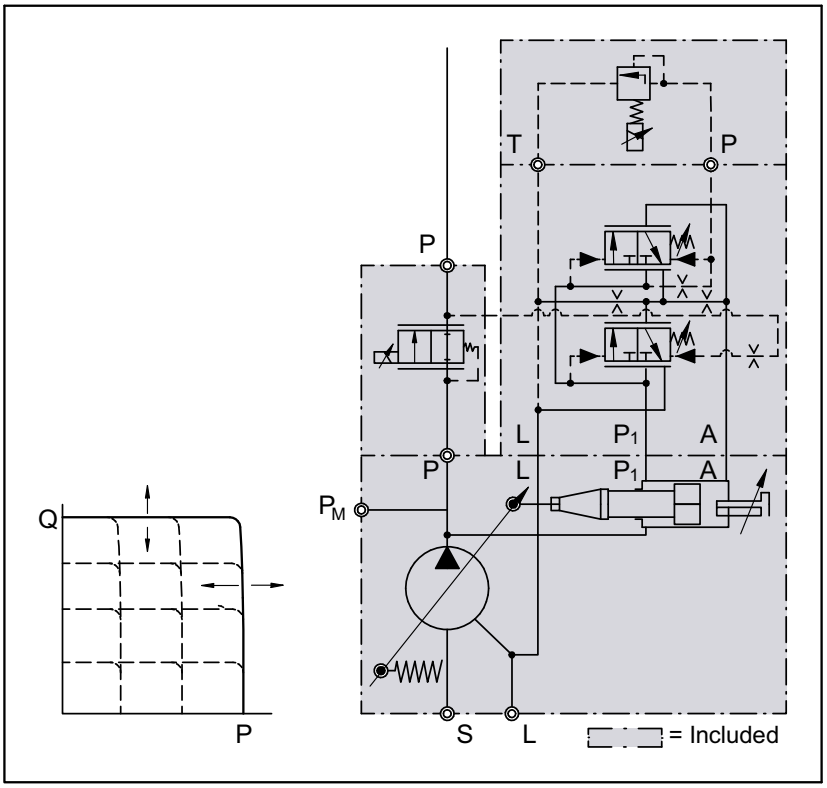


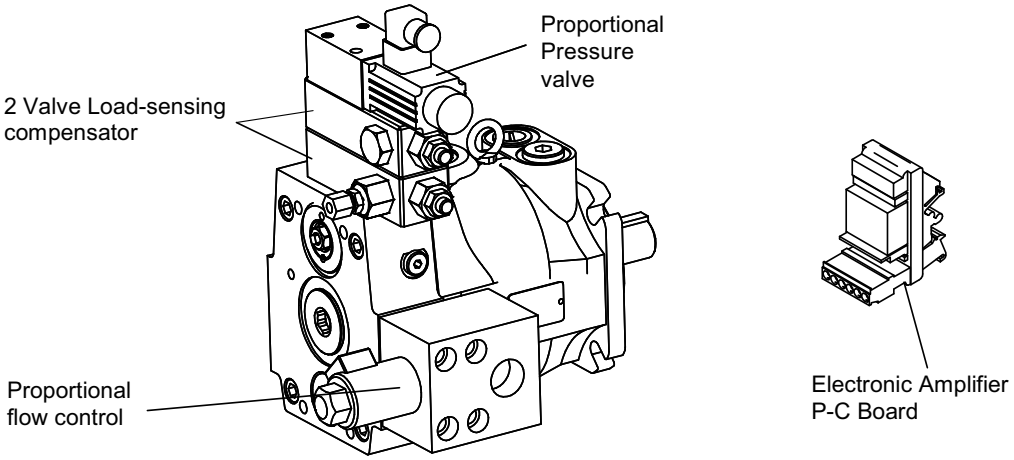


COMPENSATOR (continued)

VK 2 Valves Load-sensing Compensator + Proportional Pressure Valve + Proportional Flow Valve

VK control has the same characters as **HK** control for saving energy.
It offers the smallest pressure and flow according to the different request.
The displacement is nearly zero when the system stands by, and the motor output is also nearly zero. When the system reaches setting pressure, the pump displacement will reduce by itself.
It only needs to add the system required flow, and the pressure remains the same which control the oil temperature. Compared with vane pump, gear pump +PQ valve can save 30-50% energy. The load-sensing compensator+ Proportional flow valve has external pilot pressure supply. Factory setting for the differential pressure is 10 bar. The input signal to the compensator is the differential pressure at the main stream resistor. A load-sensing compensator represents mainly a flow control for the pump output flow of the pump and the speed of the actuator.
Proportional pressure valve is for electrical proportional pressure control.

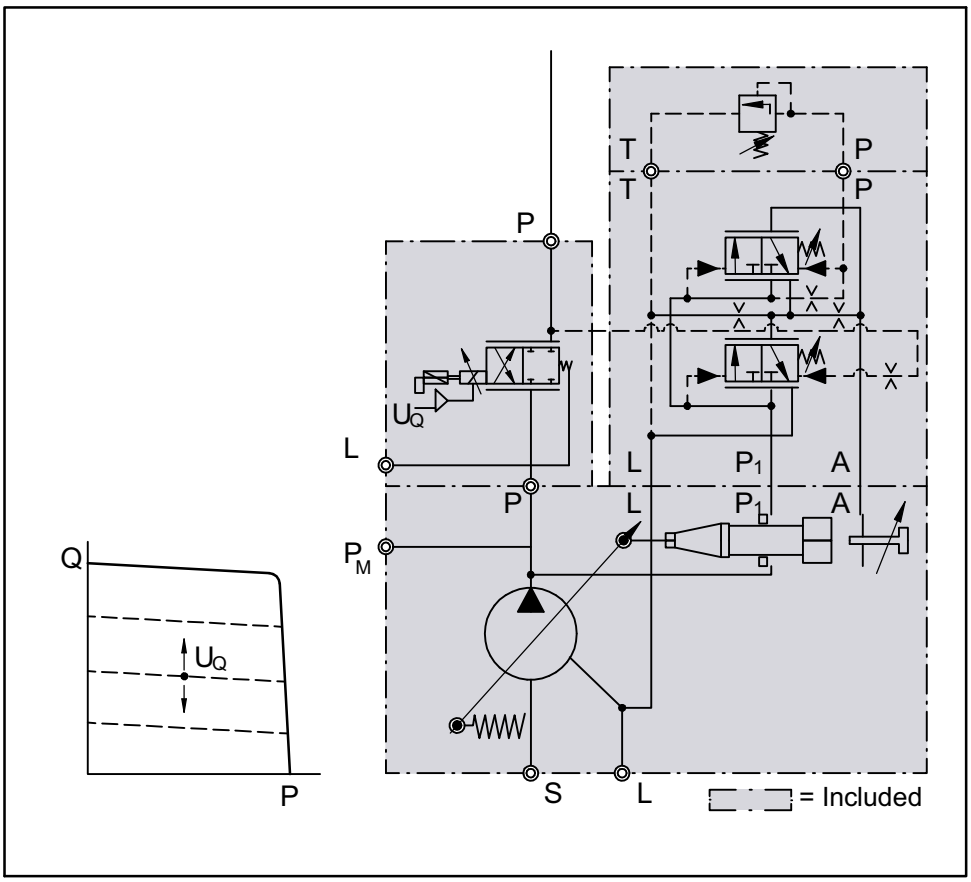


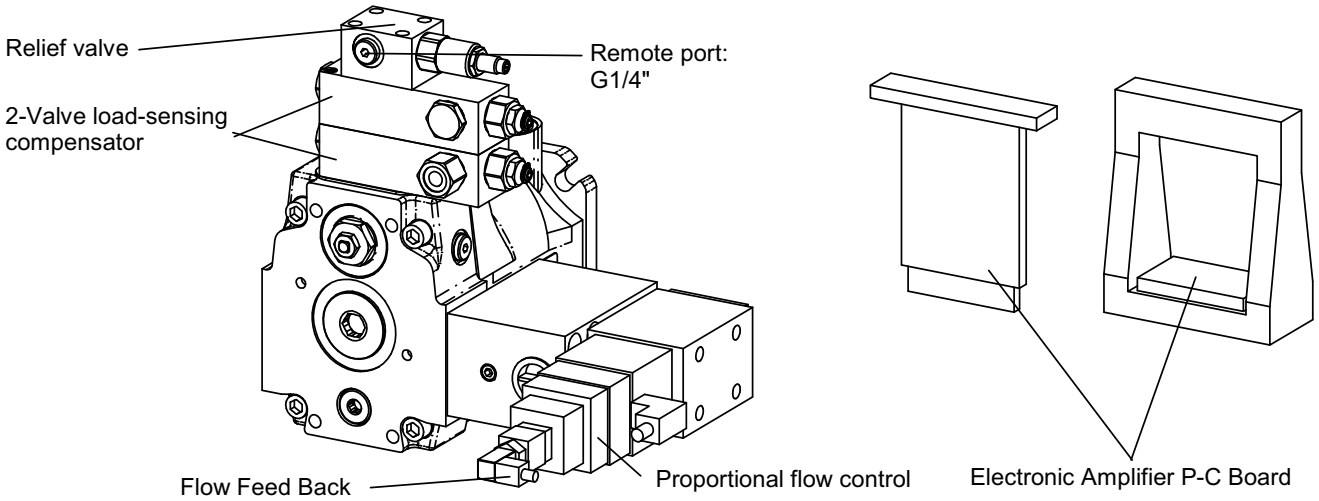


COMPENSATOR (continued)

FV 2 Valves Load-sensing Compensator + High Reacted Proportional Flow Valve + Flow Feed Back + Relief Valve

FV control is an option for limiting pressure precisely. By eliminating the impact between pressure and flow, the pump should add two different valves to control flow and pressure.
The electrical control permanently compares input command and actual displacement and powers the proportional flow solenoid of the control valve. A deviation from the commanded displacement leads to a modulation of the input current to the solenoid.
The control valve changes the control pressure until the correct displacement is adjusted.

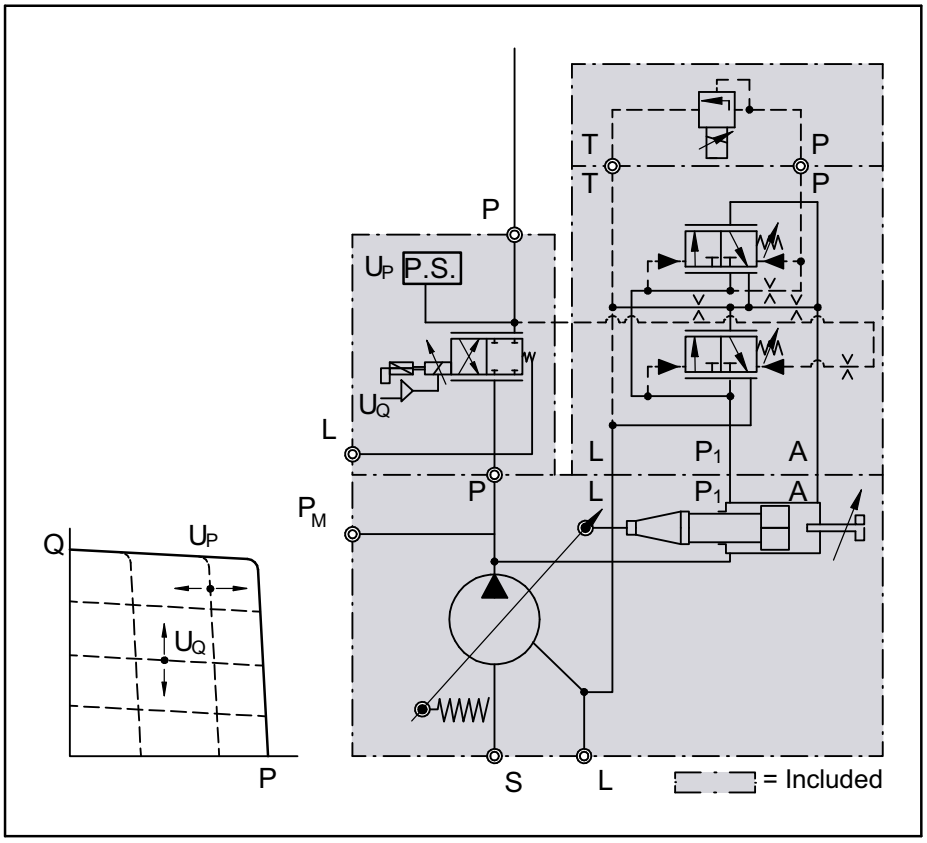


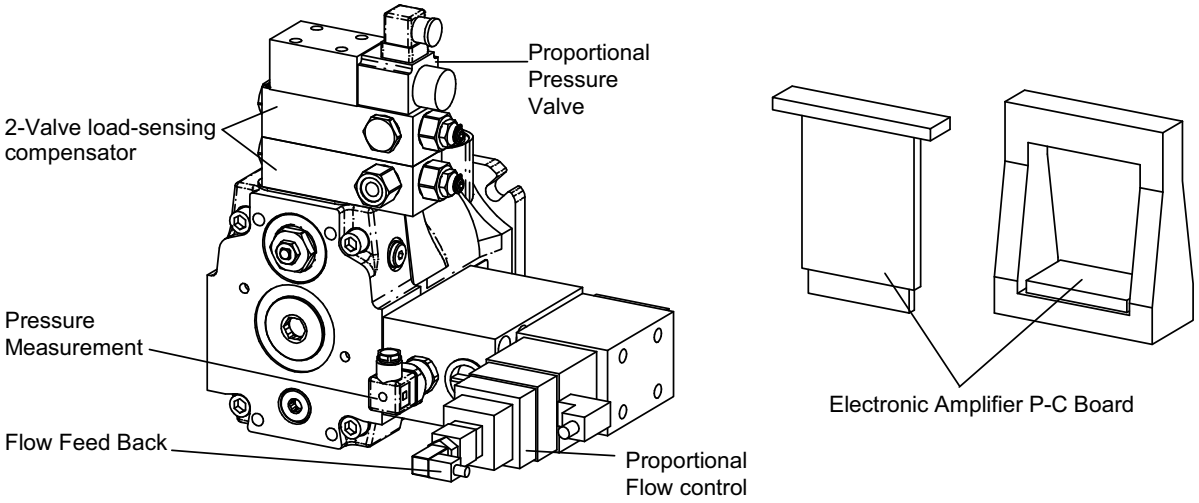


COMPENSATOR (continued)

FG 2 Valves Load-sensing Compensator + High Reacted Proportional Flow Valve + Proportional Pressure Valve + Flow & Pressure Feed Back

FG control is an option for limiting pressure precisely. By eliminating the impact between pressure and flow, the pump should add two different valves to control flow and pressure. By adding a proportional pressure valve, it would be Electrical Proportional Pressure Control. The electrical control permanently compares input command and actual displacement and powers the proportional flow solenoid of the control valve. A deviation from the commanded displacement leads to a modulation of the input current to the solenoid.
The control valve changes the control pressure until the correct displacement is adjusted. Adding a pressure sensor achieves pressure feedback control.

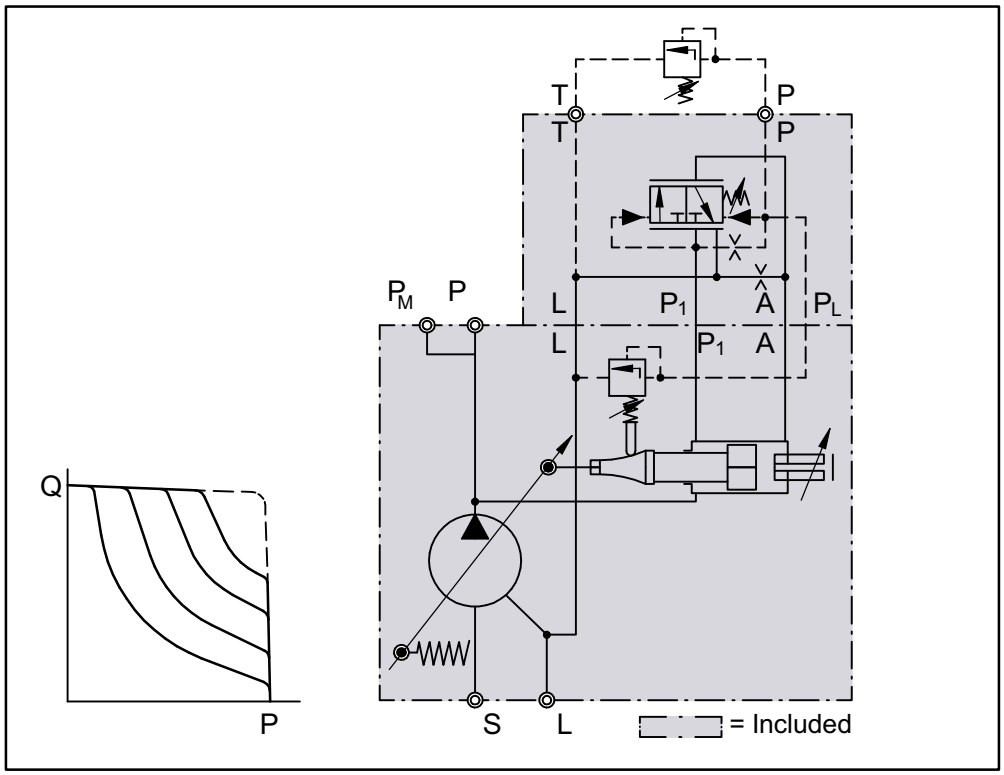


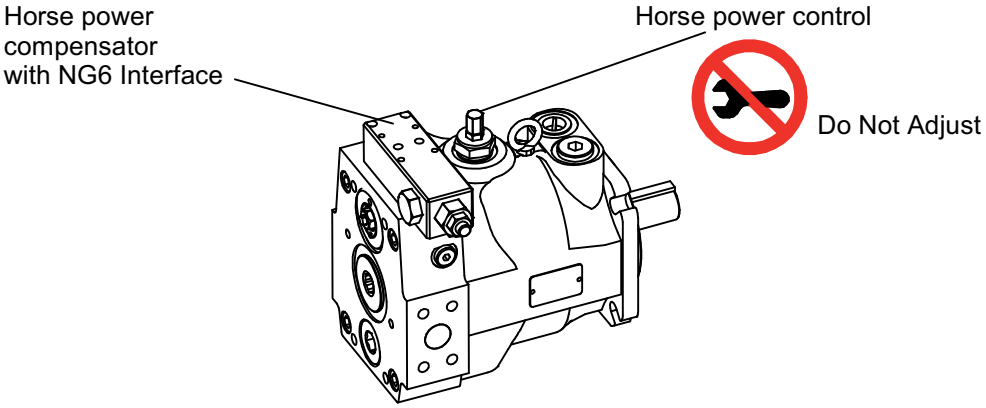


COMPENSATOR (continued)

PM Horse Power Compensator with NG6 interface

The hydraulic- mechanical horse power compensator consists of a modified remote pressure compensator or of a modified load-sensing compensator and a pilot valve.
This pilot valve is integrated into the pump and is adjusted by a cam sleeve.
The cam sleeve has a contour that is designed and machined for the individual displacement and the nominal horse power setting.
At a large displacement the opening pressure (given by the cam sleeve diameter) is lower than at small displacements. This makes the pump compensate along a constant horse power (torque) curve. Horse power is optional when order. Working pressure can be adjusted by adding pressure leading valve.
Adding the proportional pressure valve achieves the Electrical Proportional Pressure Control.

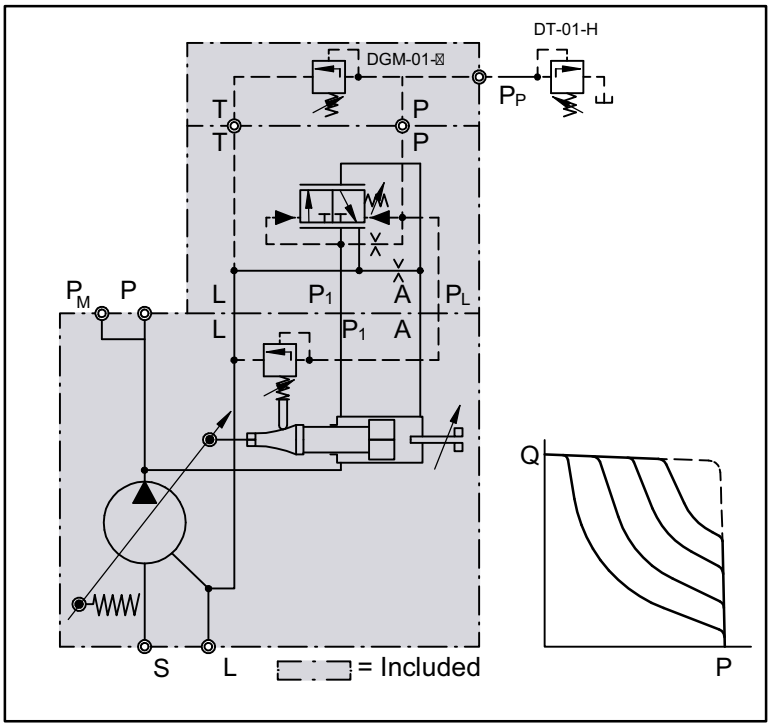


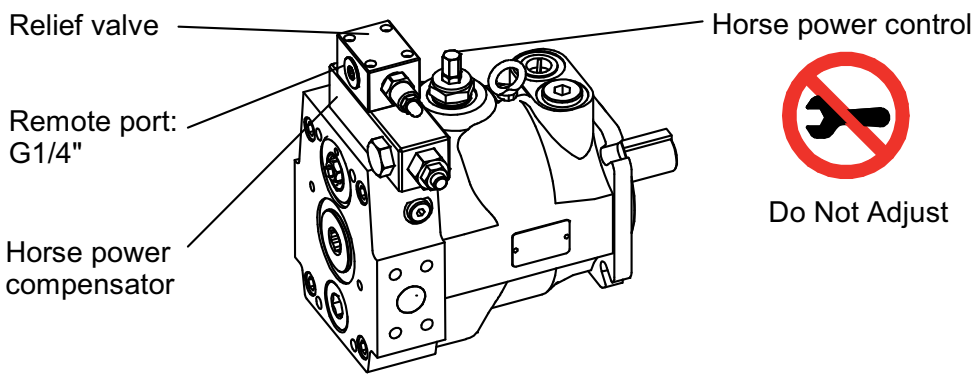


COMPENSATOR (continued)

PA Horse Power Compensator + Relief Valve

The hydraulic- mechanical horse power compensator consists of a modified remote pressure compensator or of a modified load-sensing compensator and a pilot valve.
This pilot valve is integrated into the pump and is adjusted by a cam sleeve.
The cam sleeve has a contour that is designed and machined for the individual displacement and the nominal horse power setting. At a large displacement the opening pressure (given by the cam sleeve diameter) is lower than at small displacements.
This makes the pump compensate along a constant horse power (torque) curve. Horse power is optional when order.
Working pressure can be adjusted by adding pressure leading valve. Adding the proportional pressure valve achieves the Electrical Proportional Pressure Control.
The pilot valve can be installed remote from the pump in some distance. That allows pressure setting e.g. from the control panel of the machine.
The pilot flow supply is internal through the valve spool and the pilot flow is 1-1.5 L/min.

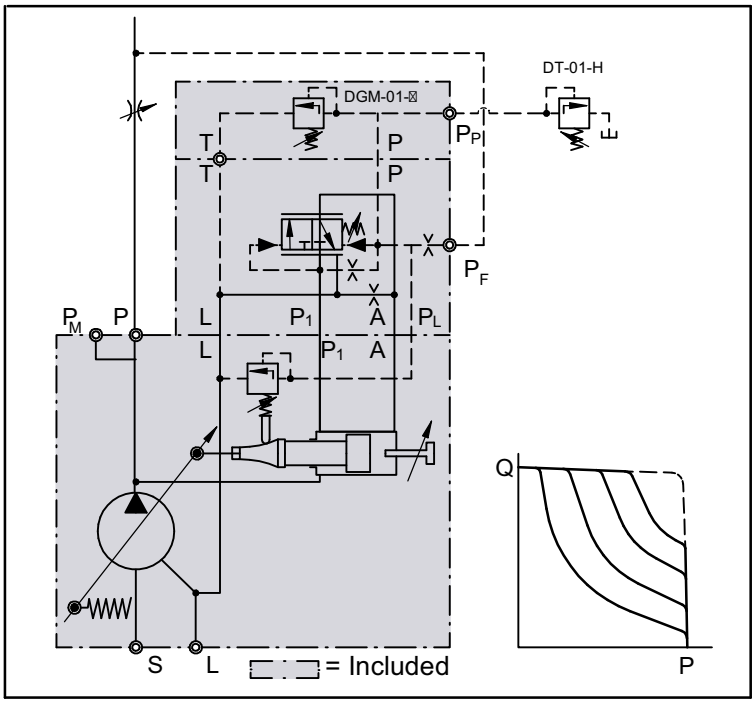


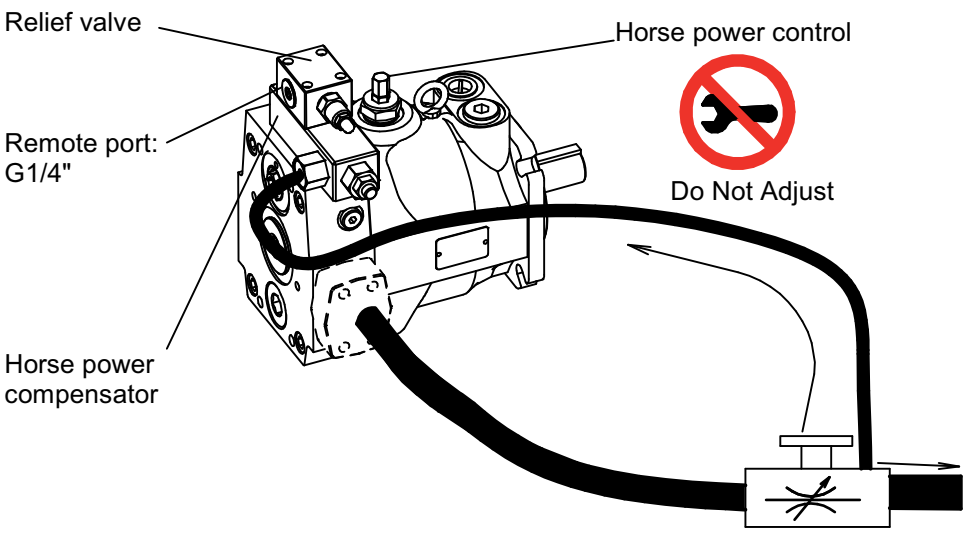


COMPENSATOR (continued)

PH Horse Power Load-sensing Compensator + Relief Valve

The hydraulic- mechanical horse power compensator consists of a modified remote pressure compensator or of a modified load-sensing compensator and a pilot valve.
This pilot valve is integrated into the pump and is adjusted by a cam sleeve. The cam sleeve has a contour that is designed and machined for the individual displacement and the nominal horse power setting. At a large displacement the opening pressure (given by the cam sleeve diameter) is lower than at small displacements. This makes the pump compensate along a constant horse power (torque) curve. Horse power is optional when order.
Working pressure can be adjusted by adding a leading valve on the compensator, and pump flow can also be adjusted on the first pipe by adding an external feedback on the P_F port as a control signal on the main stream.The pilot valve can be installed remote from the pump in some distance. That allows pressure setting, e.g. from the contral panel of the machine.
The pilot flow supply is internal through the valve spool, and the pilot flow is 1~1.5 L/min.

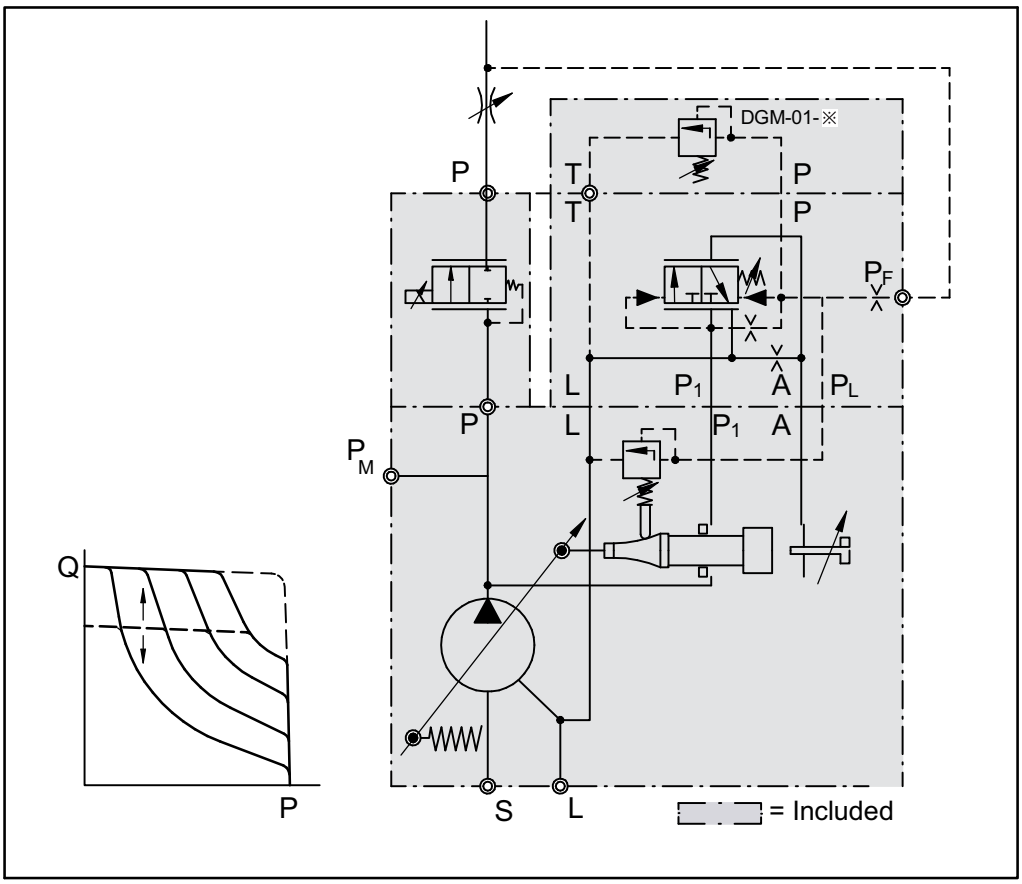


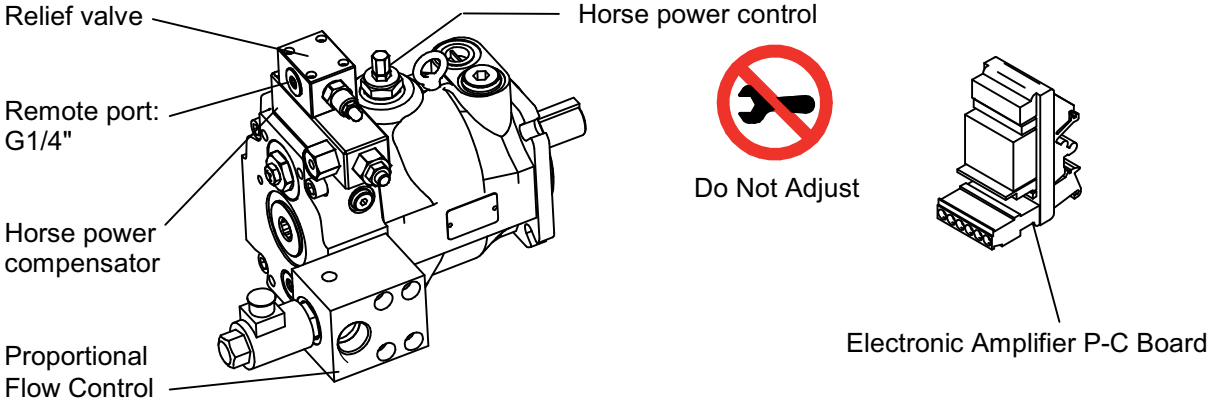


COMPENSATOR (continued)

PQ Horse Power Load-sensing Compensator + Proportional Flow Valve+ Relief valve

The hydraulic- mechanical horse power compensator consists of a modified remote pressure compensator or of a modified load-sensing compensator and a pilot valve. This pilot valve is integrated into the pump and is adjusted by a cam sleeve. The cam sleeve has a contour that is designed and machined for the individual displacement and the nominal horse power setting. At a large displacement the opening pressure (given by the cam sleeve diameter) is lower than at small displacements. This makes the pump compensate along a constant horse power (torque) curve. Pressure can be adjusted by adding a leading valve in the compensator, and pump flow can also be adjusted on the first pipe by adding an external feedback on the P_F port as a control signal on the main stream. Adding a proportional flow control valve on the P port achieves Electrical Proportional Flow Control.

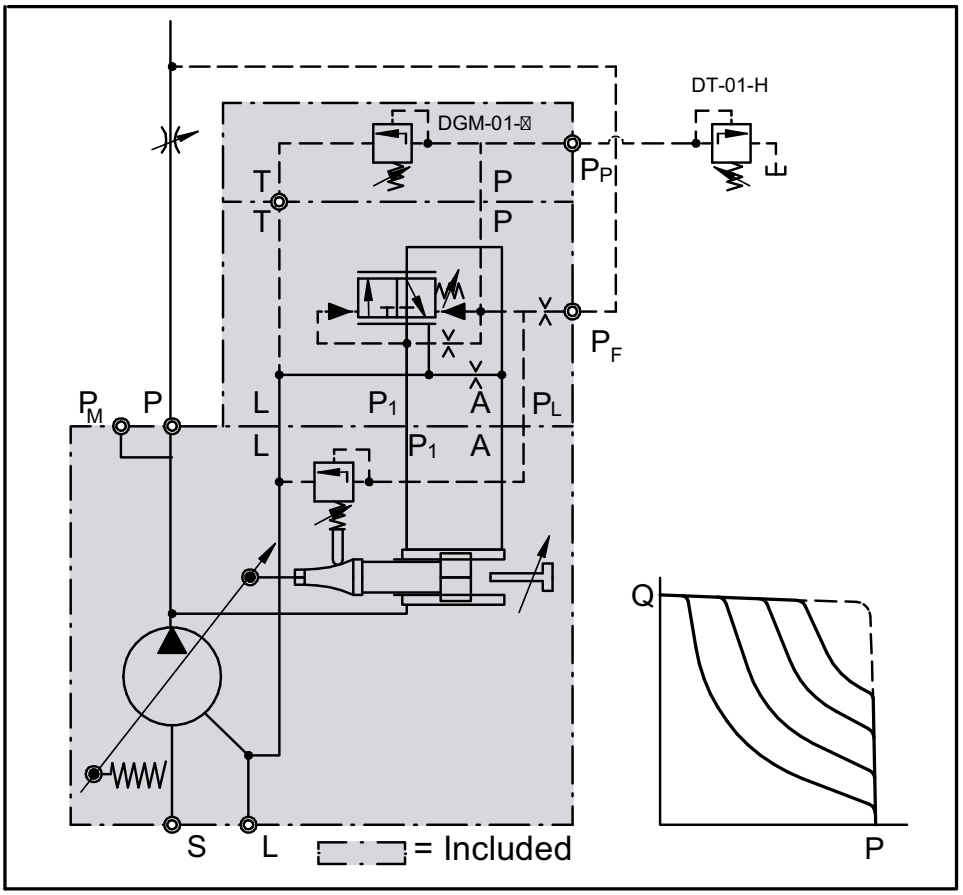


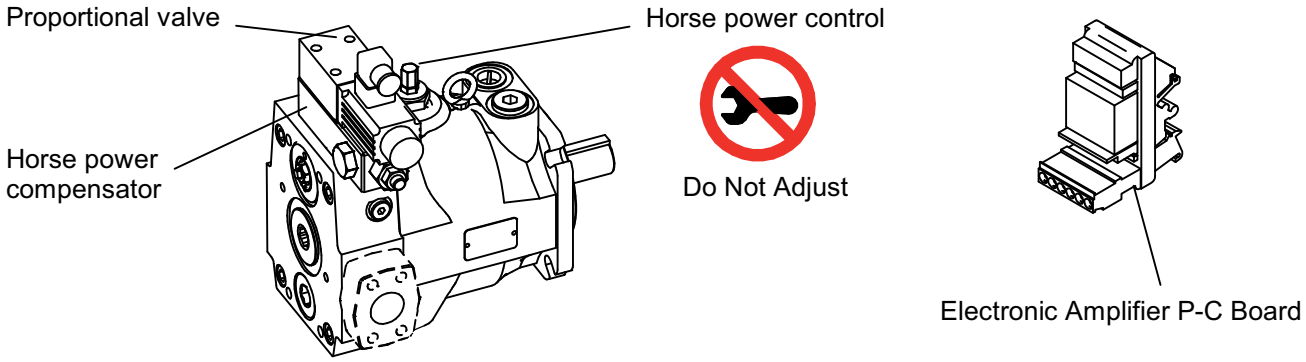


COMPENSATOR (continued)

PJ Horse Power Compensator + Proportional Pressure Valve

The hydraulic- mechanical horse power compensator consists of a modified remote pressure compensator or of a modified load-sensing compensator and a pilot valve. This pilot valve is integrated into the pump and is adjusted by a cam sleeve. The cam sleeve has a contour that is designed and machined for the individual displacement and the nominal horse power setting. At a large displacement the opening pressure (given by the cam sleeve diameter) is lower than at small displacements. This makes the pump compensate along a constant horse power (torque) curve.
Pressure-adjusted function is optional by adding a leading proportional pressure valve.

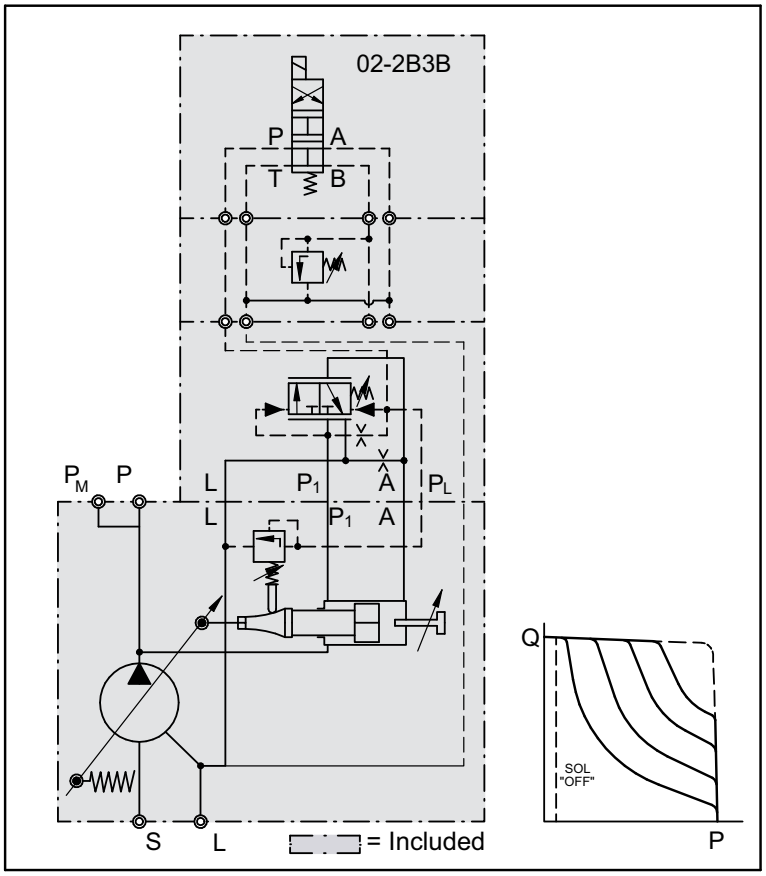


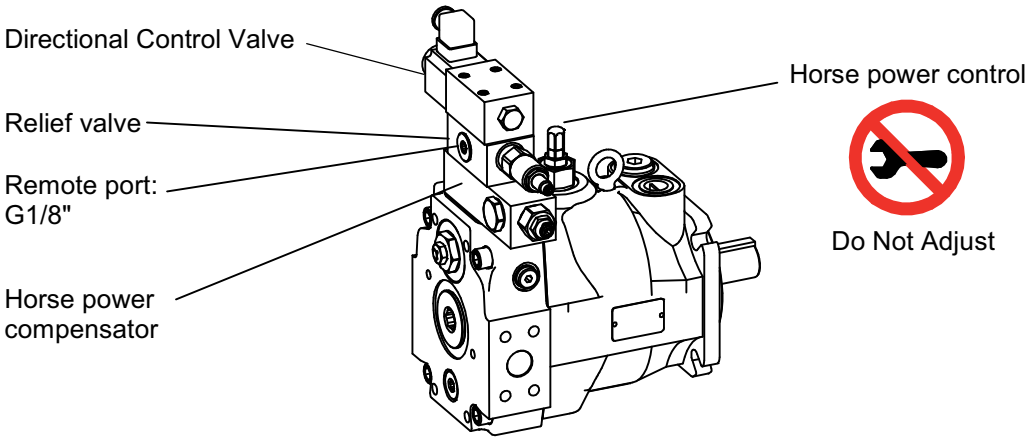


COMPENSATOR (continued)

PR Horse Power Compensator + Electrical Unloading

The hydraulic- mechanical horse power compensator consists of a modified remote pressure compensator or of a modified load-sensing compensator and a pilot valve. This pilot valve is integrated into the pump and is adjusted by a cam sleeve. The cam sleeve has a contour that is designed and machined for the individual displacement and the nominal horse power setting. At a large displacement the opening pressure (given by the cam sleeve diameter) is lower than at small displacements.
This makes the pump compensate along a constant horse power (torque) curve.
Electrical unloading function is optional by adding an electric directional control valve.
This control is suitable for long period of unloading. Oil temperature and noise remain low level through out the electrical unloading function when the system stops working.

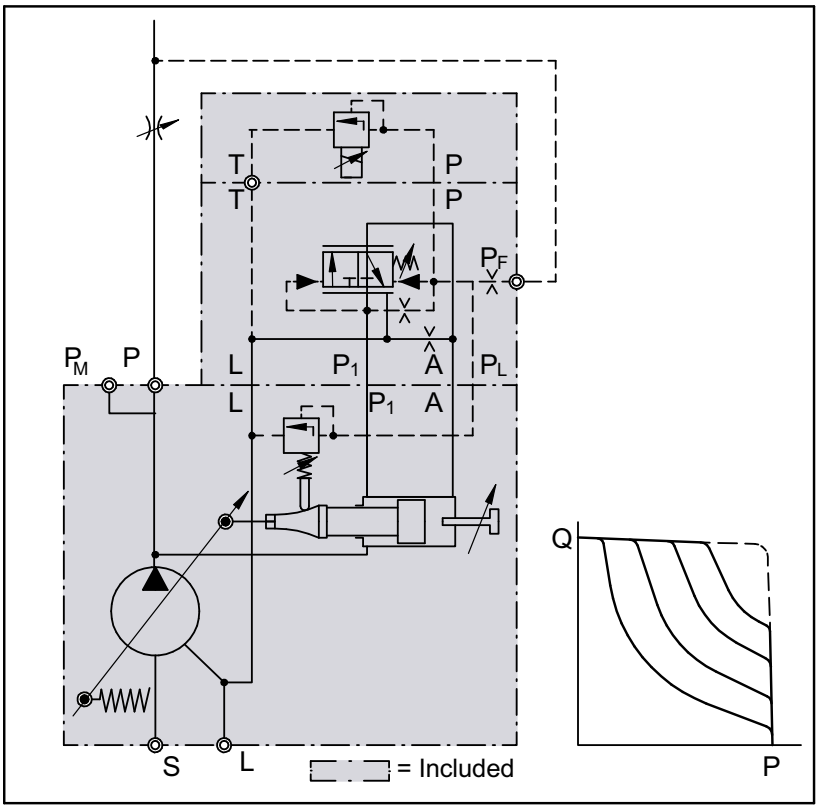


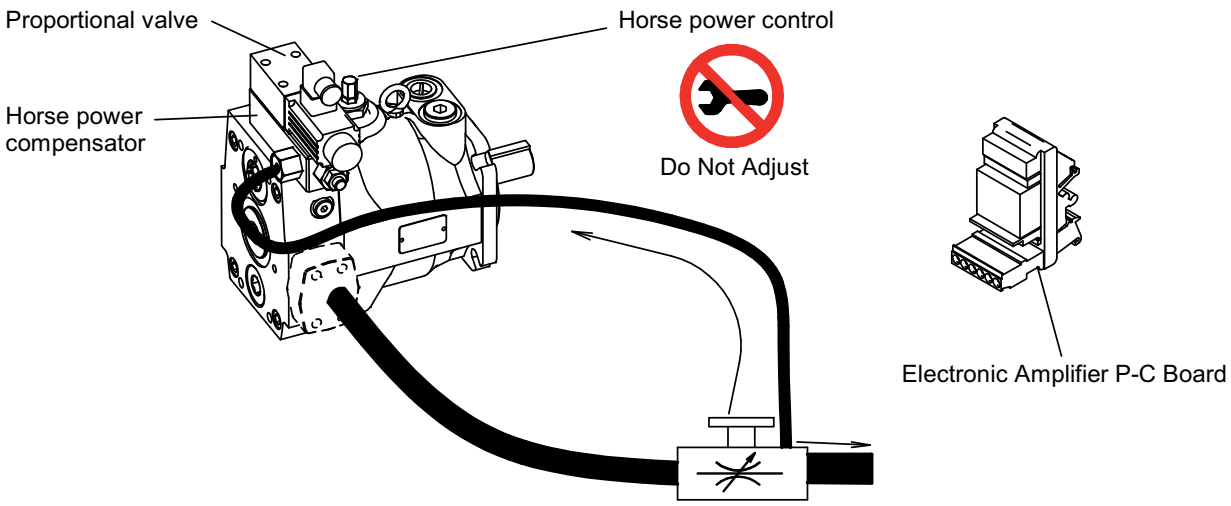


COMPENSATOR (continued)

PS Horse Power Load-sensing Compensator + Proportional Pressure Valve

The hydraulic- mechanical horse power compensator consists of a modified remote pressure compensator or of a modified load-sensing compensator and a pilot valve. This pilot valve is integrated into the pump and is adjusted by a cam sleeve. The cam sleeve has a contour that is designed and machined for the individual displacement and the nominal horse power setting. At a large displacement the opening pressure (given by the cam sleeve diameter) is lower than at small displacements. This makes the pump compensate along a constant horse power (torque) curve.
Electrical pressure-adjusted function is optional by adding a leading proportional pressure valve, and pump flow can also be adjusted on the first pipe by adding an external feedback on the P_F port as a control signal on the main stream.

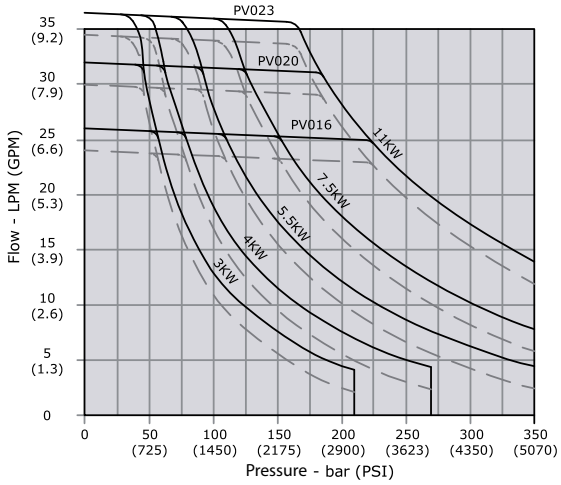




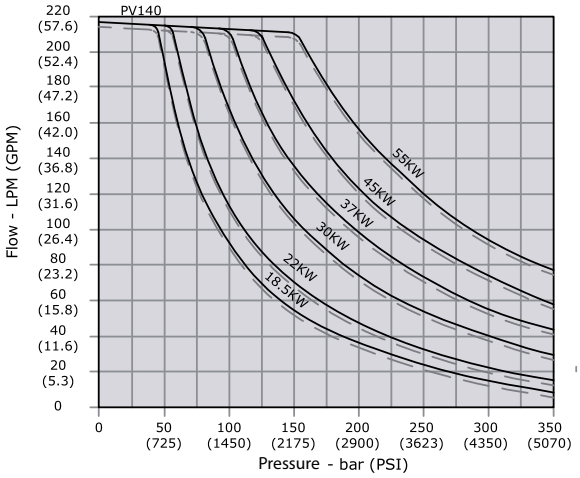
COMPENSATOR (continued)

Horse Power Compensator - diagrams

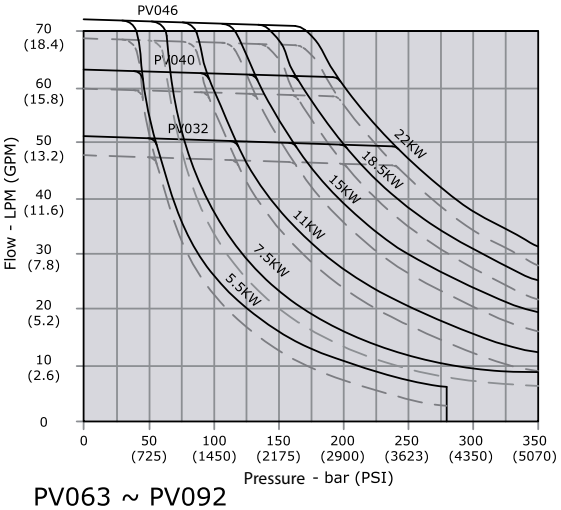
PV016 ~ PV023



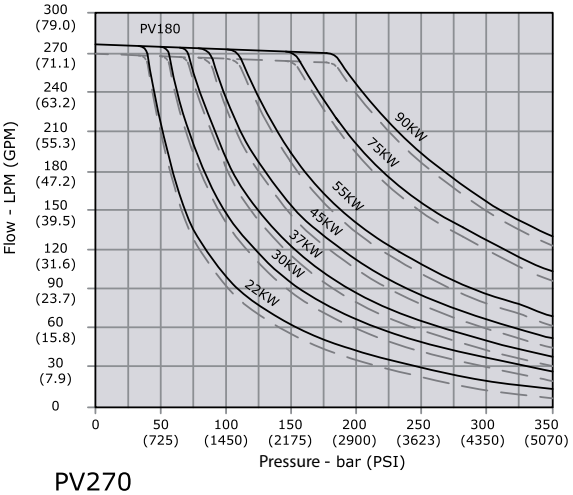
PV140



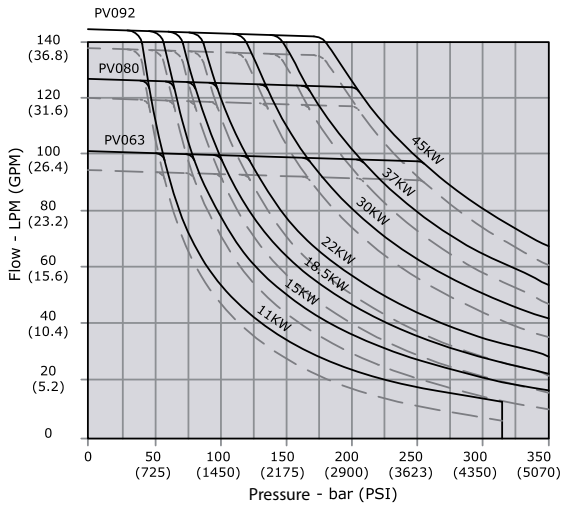
PV032 ~ PV046



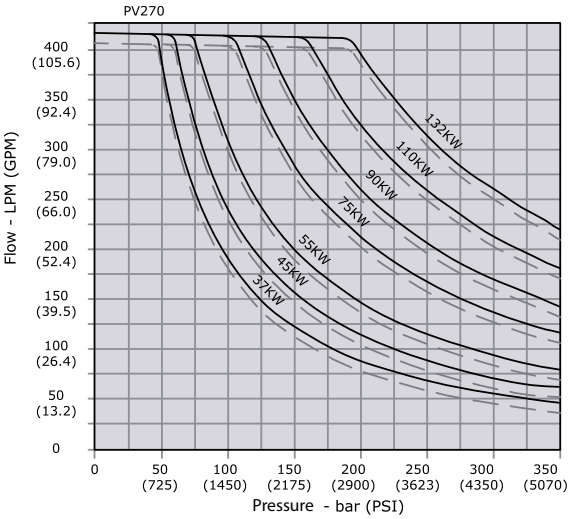
PV180



PV063 ~ PV092



PV270

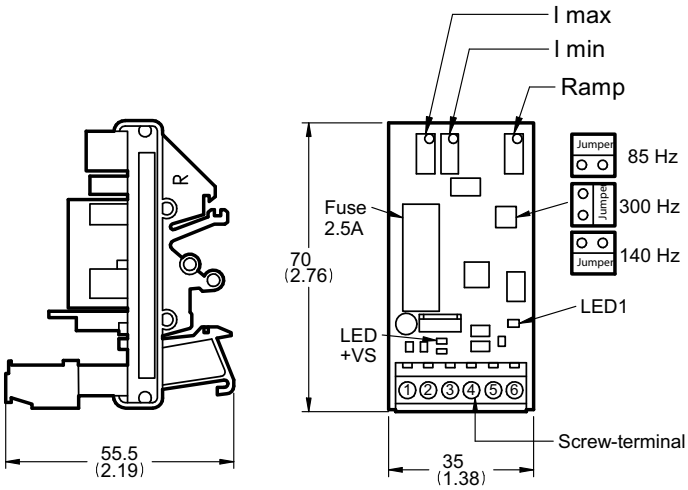


The diagrams are only valid for the following working conditions:
speed: n=1500 (— — —) and 1800 (————) rev/min
temperature: t=50℃
fluid: mineral oil HLP, ISO VG46
viscosity: v=46 mm2/s at 40℃

COMPENSATOR (continued)

PCB-2600 Proportional Amplifier

PCB-2600



UNIT:mm
(inch)

NOTICE

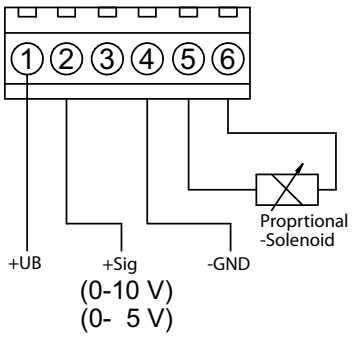
Do not remove the amplifier from the coil while the power is on.
This will cause a failure in the internal circuits of the amplifier, resulting in loss of output to the coil.

INSTRUCTIONS FOR SETTING
SUPPLY Green LED
RAMP Ramping up/down time adjustment. For long ramping times, turn potentiometers clockwise, for short ramping times, turn potentiometers counter-clockwise.
MAX/MIN I max / I min There are multi-course potentiometers for adjustment of min-max and also ramp time.
FREQUENCY ADJ. The dither frequency can be set with a Jumper to 85, 140, or 300 Hz.

TECHINCAL DATA		
Supply Voltage：	10-35	VDC
Max. Current：0-2600 mA adjustable for 12 and 24 VDC (Output is a PWM-DC)		
Min. Current：0-600 mA adjustable		
Ramp Adjustment：	0~5	Sec.
Dither Frequency：85, 140, 300 Hz to be set by jumper(Standard 140 Hz)		
Ambient Operating temperature	-15~140 °F -10~60 °C	
Weight：	0.05	Kg

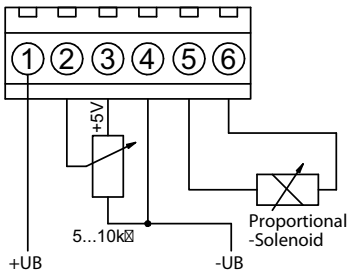
Connections

External Voltage Control

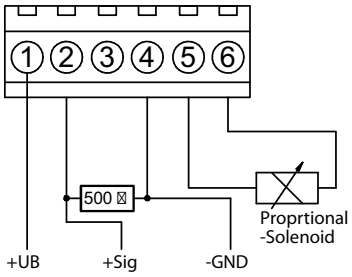


(0-10 V)
(0- 5 V)

Potentiometer Control

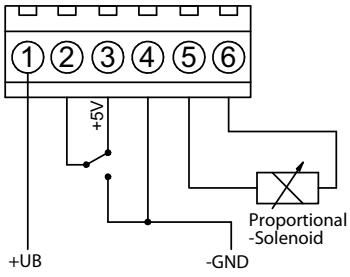


External Current Control



(0-20 mA)

Two Point Control



. Clamp Connections plug in connector

Pin 1 =+ UB; Supply voltage (10-35 VDC)
Pin 2 = control voltage (+ Sig)
Pin 3 = Auxiliary voltage (+ 5 VDC)
Pin 4 = Ground (GND)
Pin 5 = Solenoid (-)
Pin 6 = Solenoid (+)

. Potentiometer

Turn clockwise means increasing current or Extension of ramp time
App. 10 turns for complete range

.Fuse

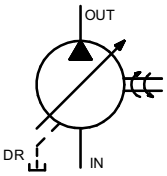
Standard 20 mm Glass fuse 2.5 A T

.LED's

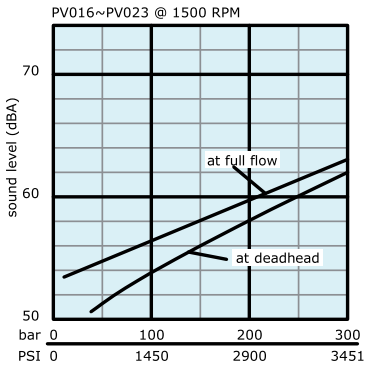
LED +VS (green) = lights, when voltage supply and fuse are in order
LED1 (red) = lights, if there is an output to the solenoid

Size 1 - PV 016, PV 020, PV 023

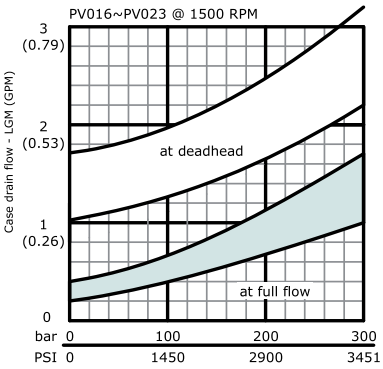
DIAGRAMS



Noise level

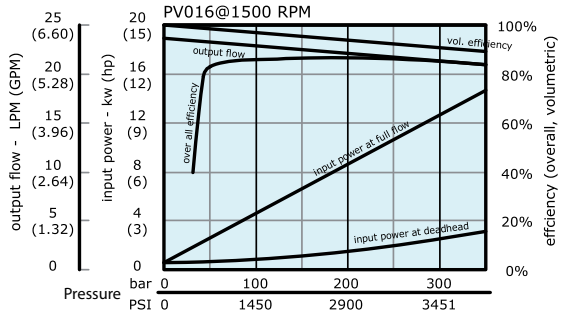


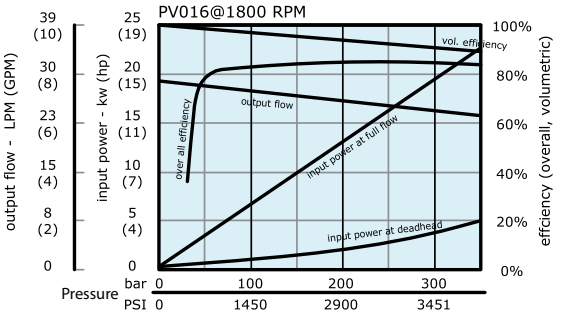
Case Drain

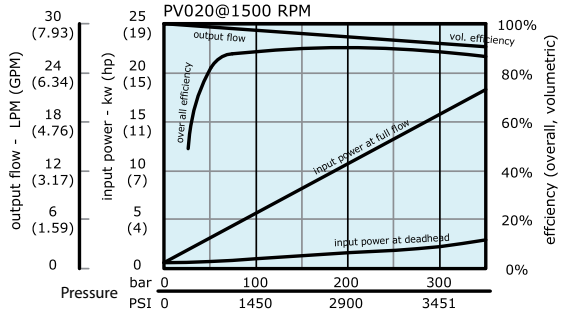


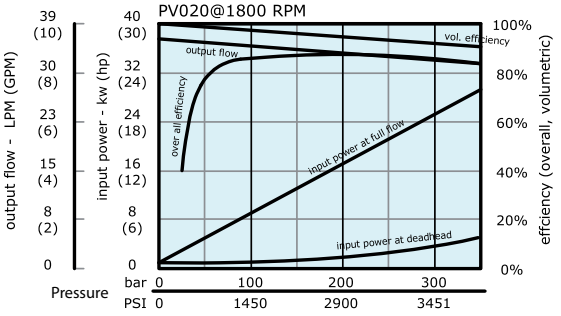
The efficiency and power graphs are measured at an input speed of n = 1500 RPM, a temperature of 40°C and a fluid viscosity of 46 mm2/s. Case drain flow and compensator control flow leave via the drain port of the pump.
To the values shown are to be added 1 to 1.2 l/min, if at pilot operated compensators (codes G*, H*, P*, horse power compensator and p/Qcontrol) the control flow of the pressure pilot valve also goes through the pump.
Please note: The values shown below are only valid for static operation. Under dynamic conditions and at rapid compensation of the pump the volume displaced by the servo piston also leaves the case drain port. This dynamic control flow can reach up to 40 l/min. Therefore the case drain line is to lead to the reservoir at full size and without restrictions as short and direct as possible.

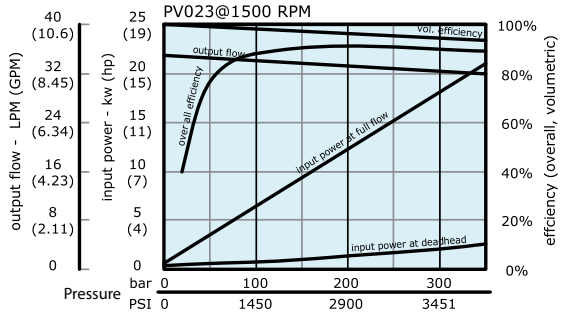
Efficiency

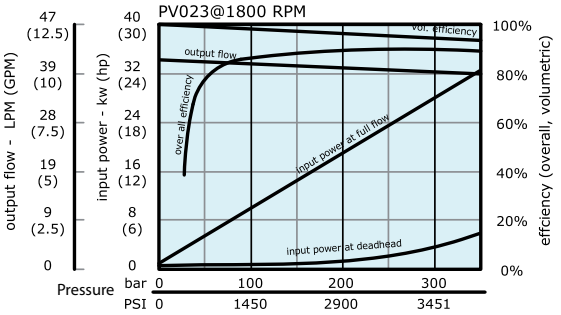








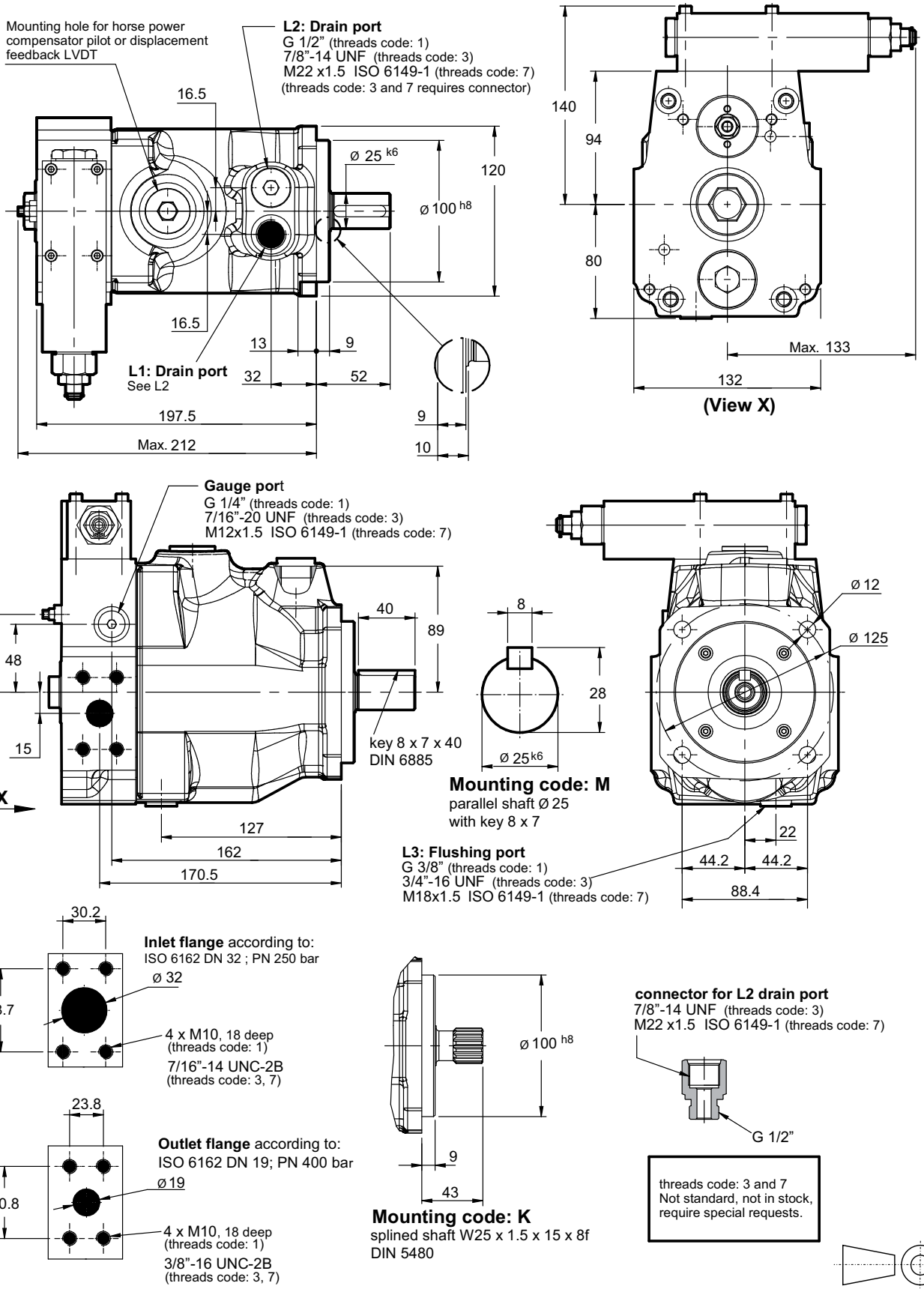




Size 1 - PV 016, PV 020, PV 023

Metric version

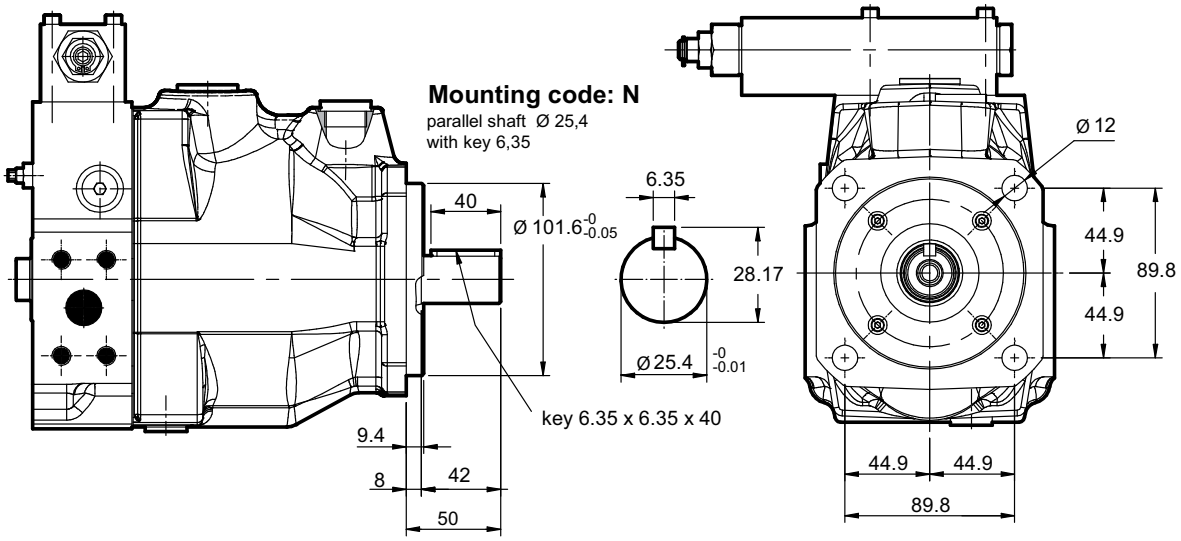
INSTALLATION DRAWINGS
MOUNTING : M, K

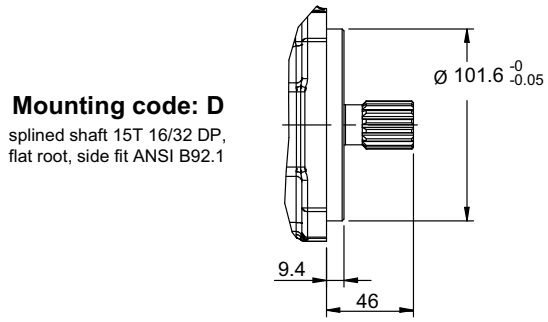


Size 1 - PV 016, PV 020, PV 023

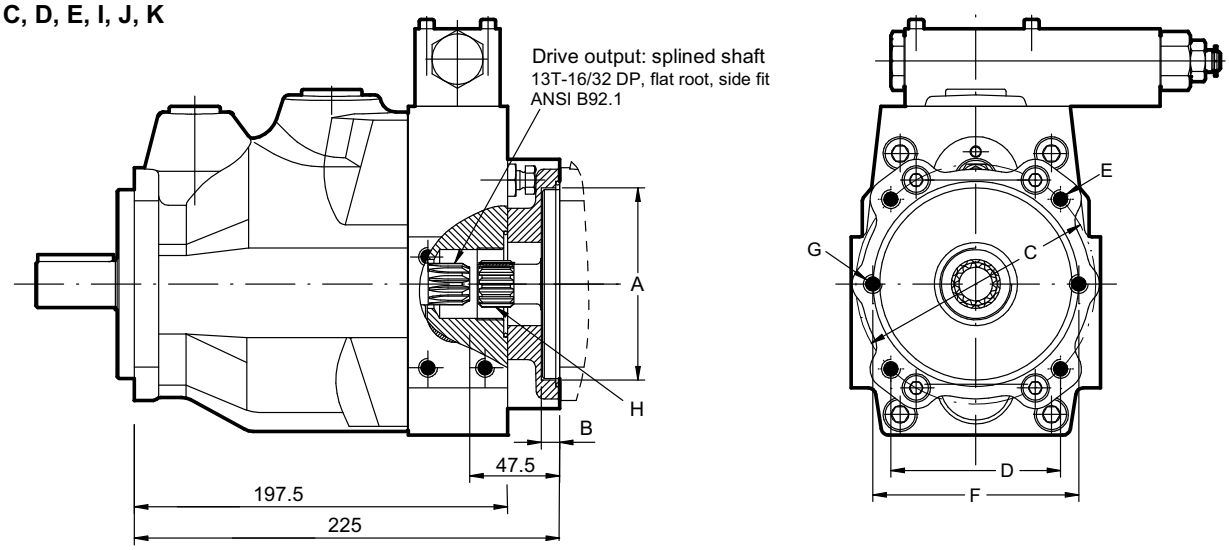
SAE version and thru drive

INSTALLATION DRAWINGS
MOUNTING : N, D





Thru drive:
C, D, E, I, J, K



Thru shaft adaptors are available with the following dimensions:							
Thru code	A	B	C	D	E	F	G
I	63	10	85	-	M8	100	M8
J	80	10	103	-	M8	109	M10
K	100	10.5	125	-	M10	not avail.	not avail.
C	50.8	10	-	-	-	82	M8
D	82.55	10	-	-	-	106	M10
E	101.6	10.5	-	89.8	M10	not avail.	not avail.

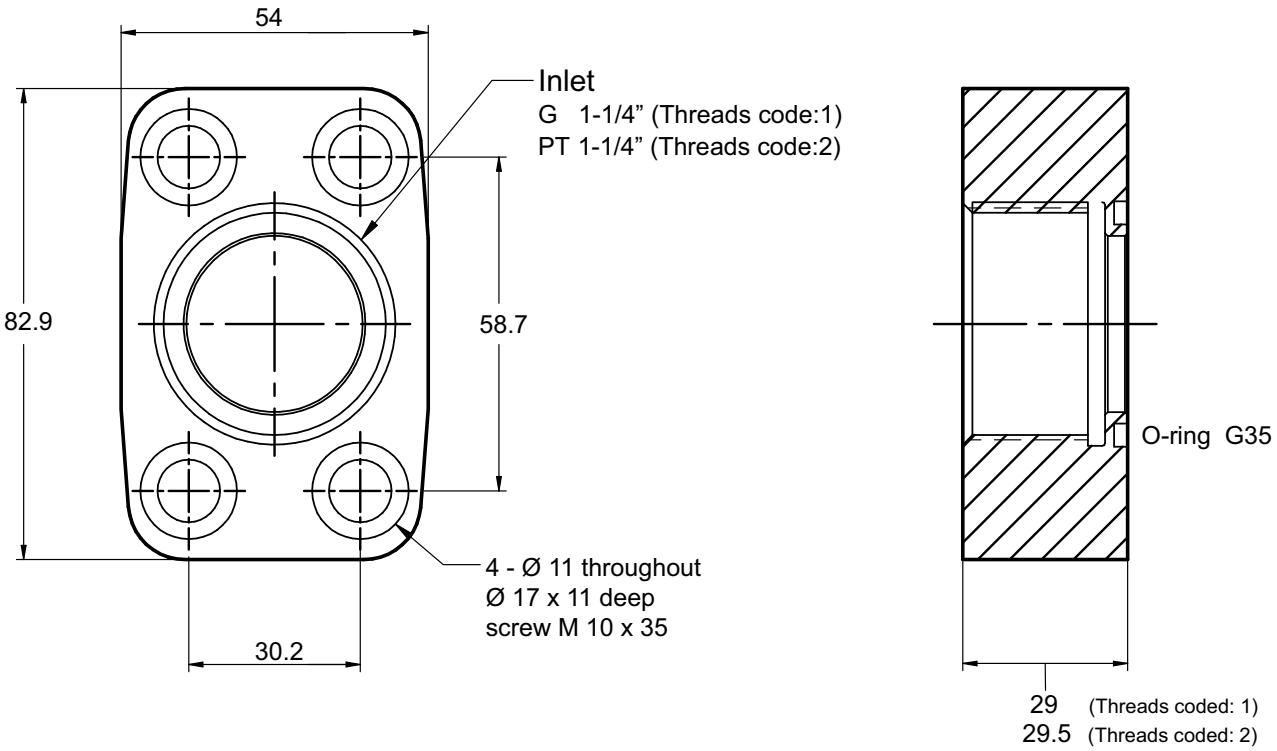
Thread codes are 3 and 7, the dimensions E and G are UNC-2B threads

threads code: 3 and 7 Not standard, not in stock, require special requests.

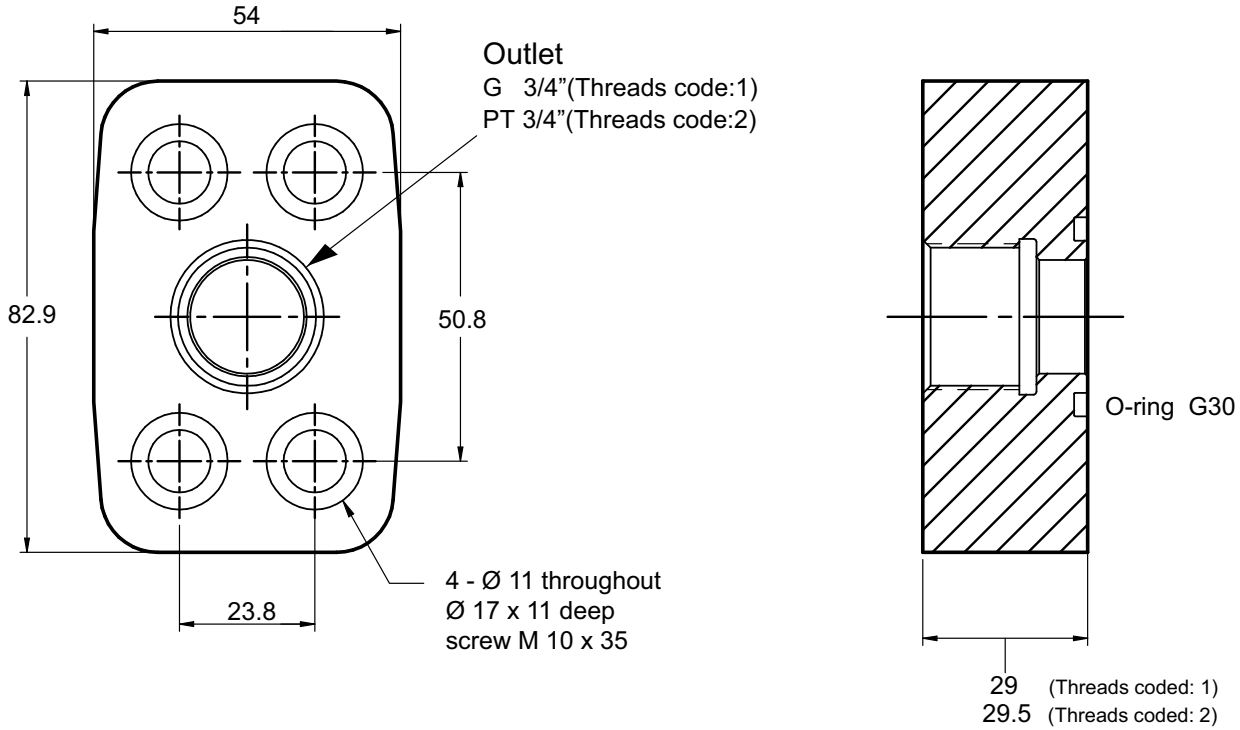
Size 1 - PV 016, PV 020, PV 023

INSTALLATION DRAWINGS
PORT FLANGES

Inlet Flange

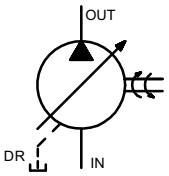


Outlet Flange

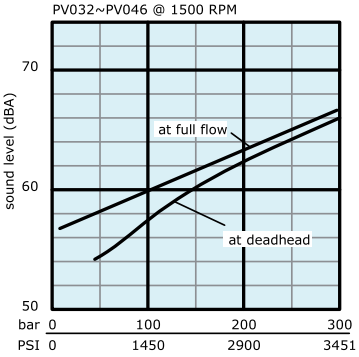


Size 2 - PV 032, PV 040, PV 046, PV 056, PV 065

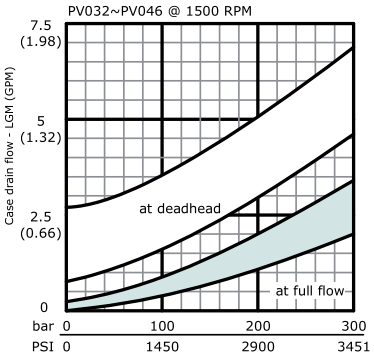
DIAGRAMS



Noise level

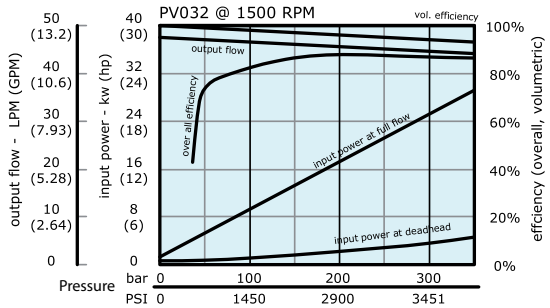


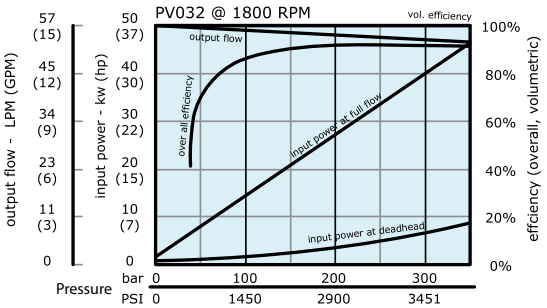
Case Drain

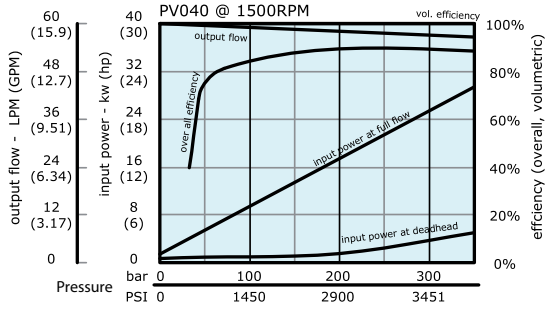


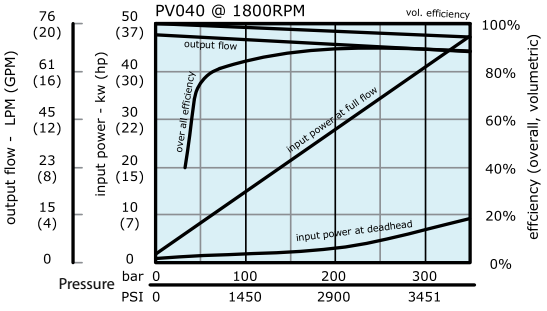
The efficiency and power graphs are measured at an input speed of n = 1500 RPM, a temperature of 40°C and a fluid viscosity of 46 mm2/s. Case drain flow and compensator control flow leave via the drain port of the pump.
To the values shown are to be added 1 to 1.2 l/min, if at pilot operated compensators (codes G*, H*, P*, horse power compensator and p/Qcontrol) the control flow of the pressure pilot valve also goes through the pump.
Please note: The values shown below are only valid for static operation. Under dynamic conditions and at rapid compensation of the pump the volume displaced by the servo piston also leaves the case drain port. This dynamic control flow can reach up to 60 l/min. Therefore the case drain line is to lead to the reservoir at full size and without restrictions as short and direct as possible.

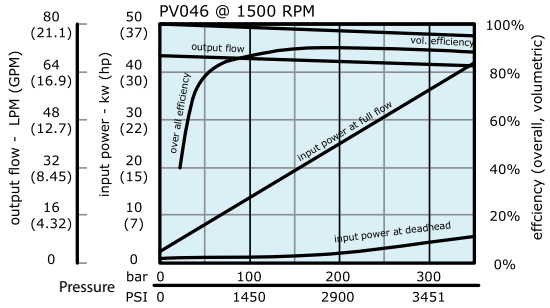
Efficiency

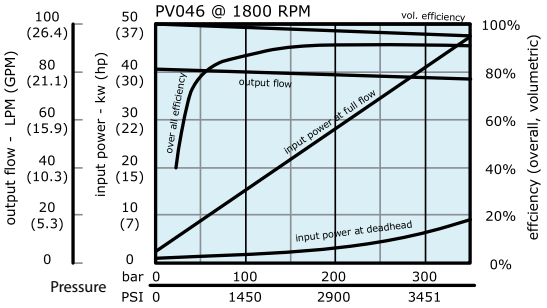








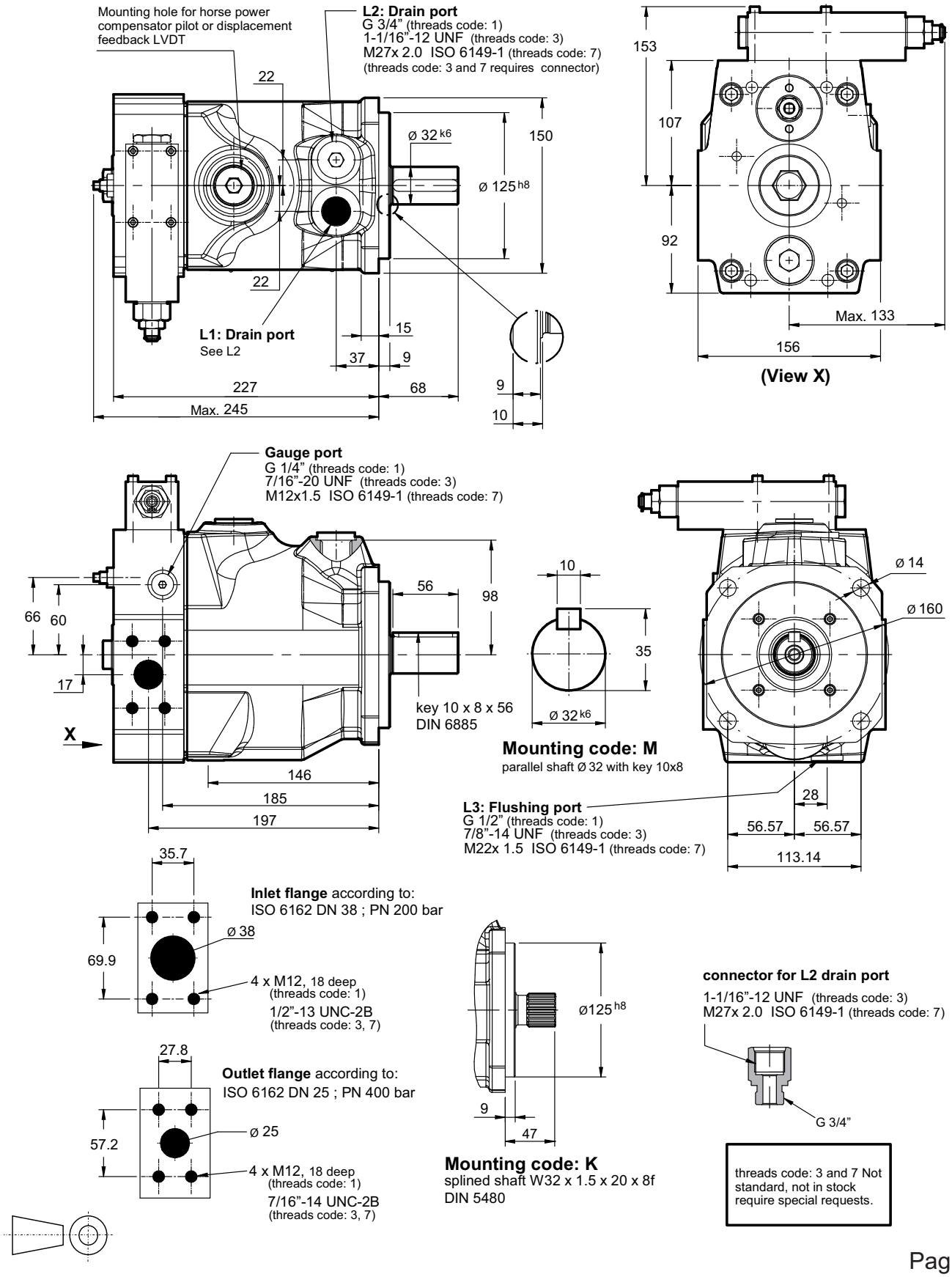




Size 2 - PV 032, PV 040, PV 046, PV 056, PV 065

Metric version

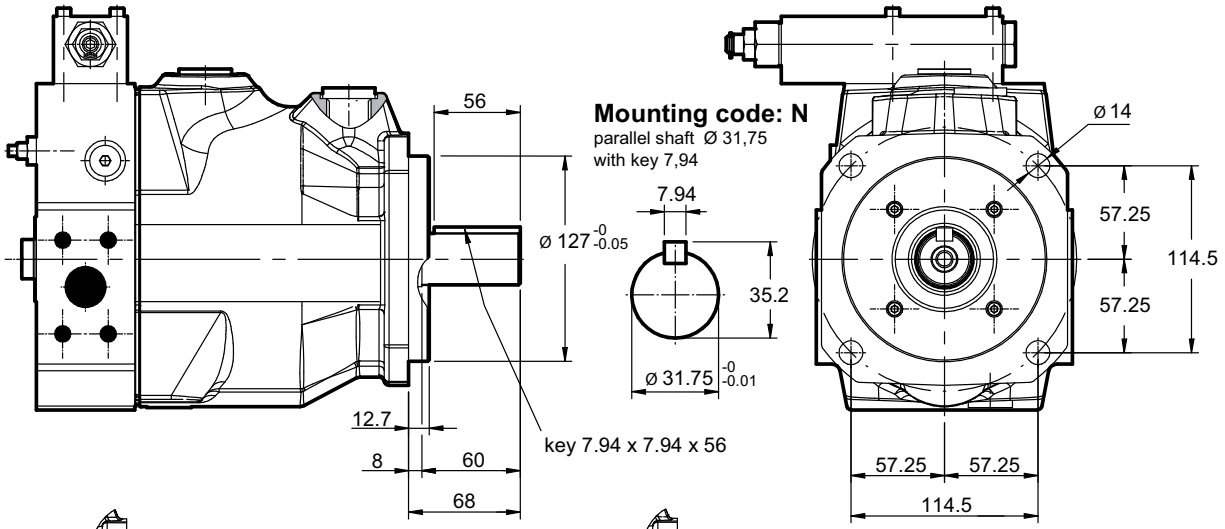
INSTALLATION DRAWINGS
MOUNTING : M, K

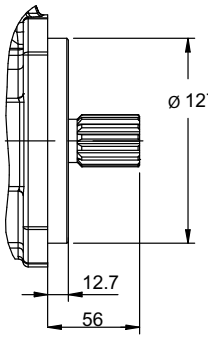


Size 2 - PV 032, PV 040, PV 046, PV 056, PV 065

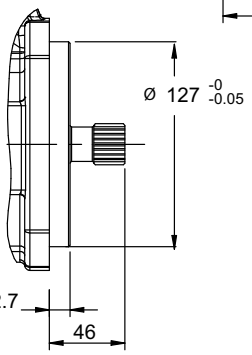
SAE version and thru drive

INSTALLATION DRAWINGS
MOUNTING : N, D, G





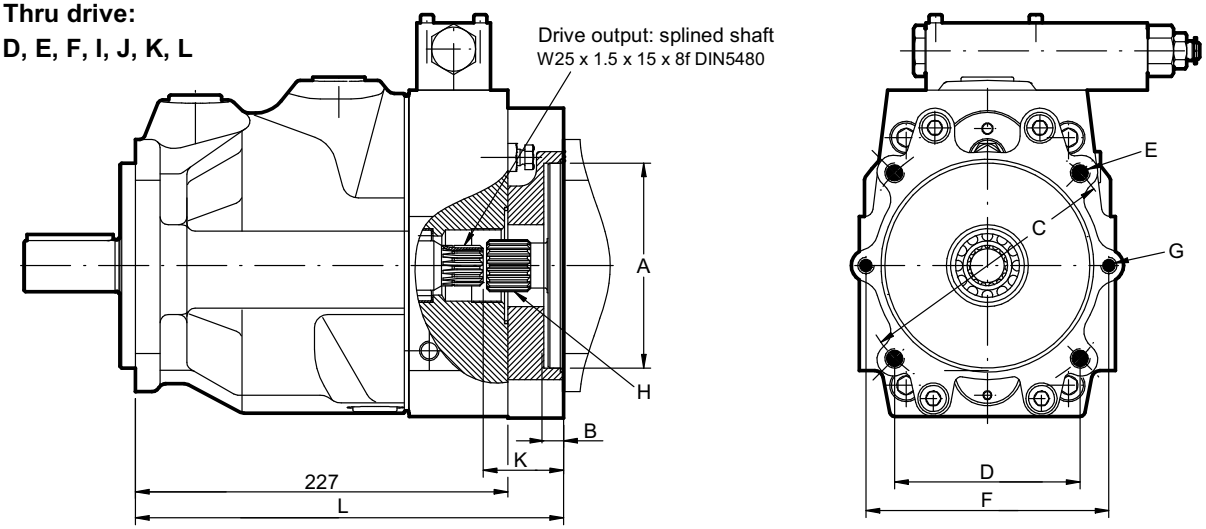
Mounting code: D
splined shaft 14T 12/24 DP,
flat root, side fit ANSI B92.1



Small torque; can not be used in conjunction with the thru drive

Mounting code: G
splined shaft 15T 16/32 DP,
flat root, side fit ANSI B92.1

Thru drive:
D, E, F, I, J, K, L



Thru shaft adaptors are available with the following dimensions:									
thru code	A	B	C	D	E	F	G	K	L
I	63	8.5	85	-	M8	100	M8	49	261
J	80	8.5	103	-	M8	109	M10	49	261
K	100	10.5	125	-	M10	140	M12	49	261
L	125	12	160	-	M12	not avail.	not avail.	49	261
D	82.55	8	-	-	-	106	M10	49	261
E	101.6	11	-	89.8	M10	146	M12	49	261
F	127	13.5	-	114.5	M12	not avail.	not avail.	64	276

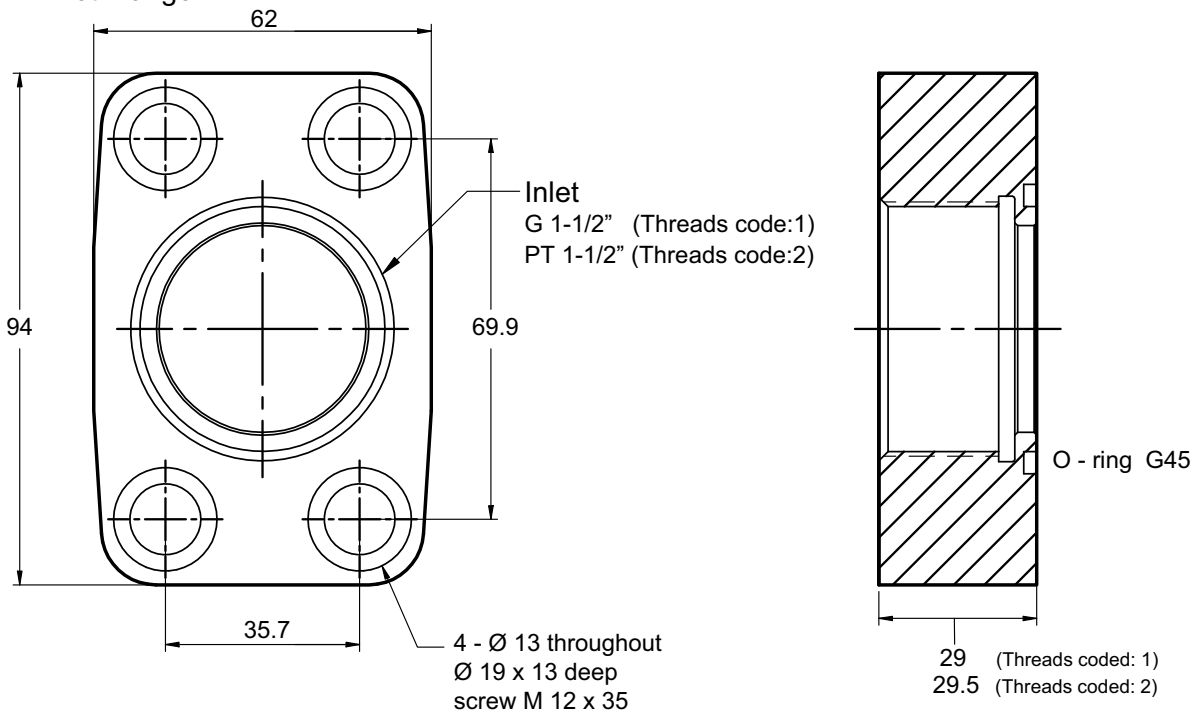
Thread codes are 3 and 7 the dimensions E and G are UNC-2B threads

threads code: 3 and 7 Not standard, not in stock require special requests.

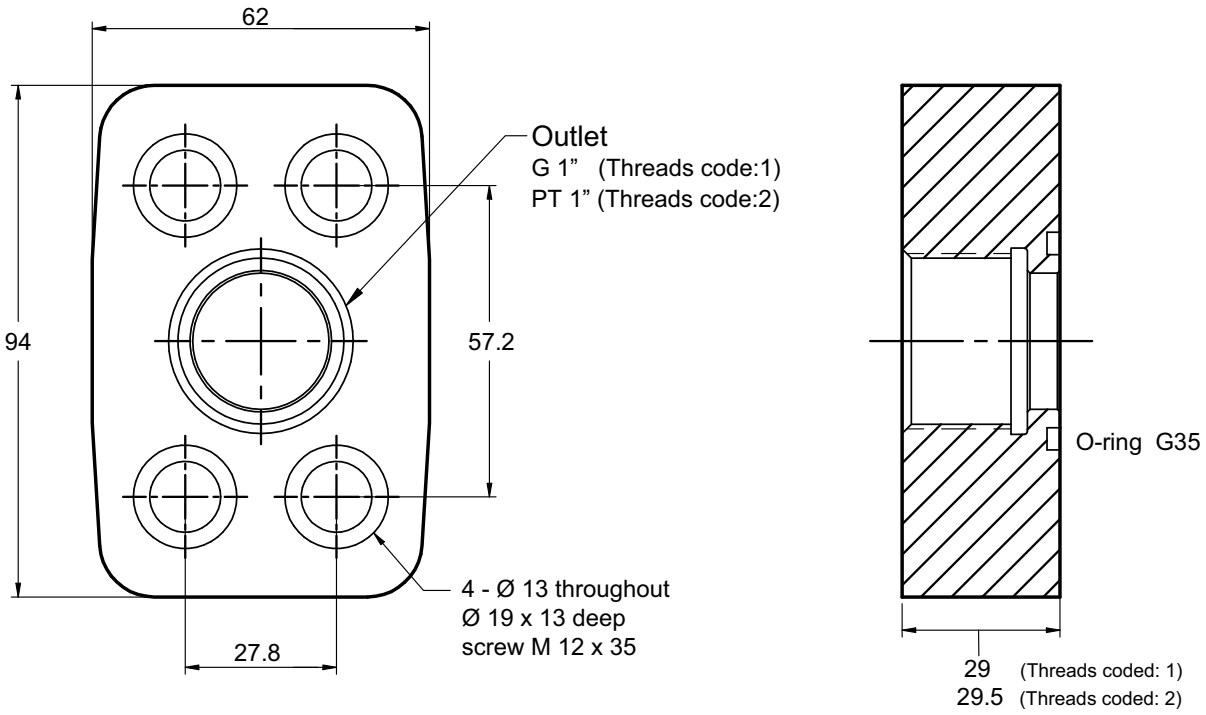
Size 2 - PV 032, PV 040, PV 046, PV 056, PV 065

INSTALLATION DRAWINGS
PORT FLANGES

Inlet Flange

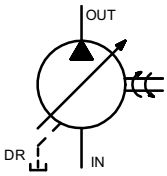


Outlet Flange

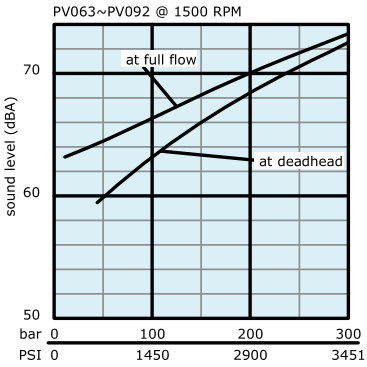


Size 3 - PV 063, PV 092, PV 110, PV 125

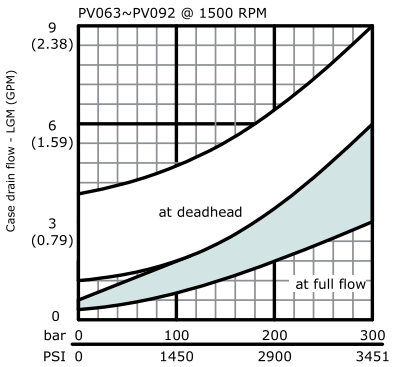
DIAGRAMS



Noise level

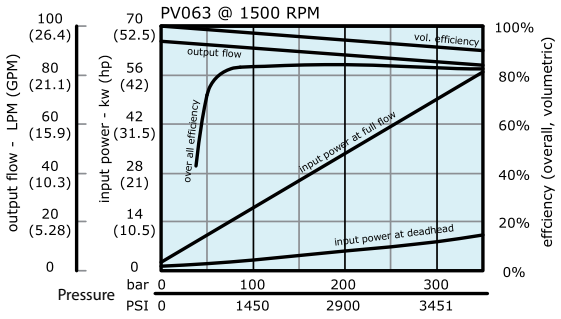


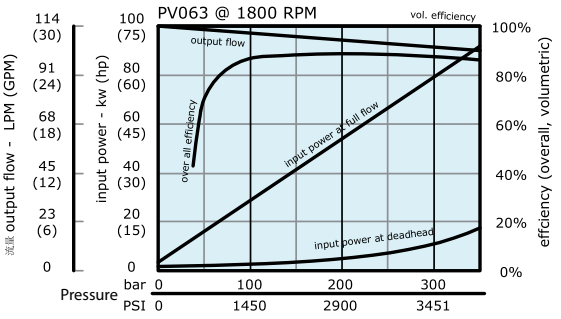
Case Drain

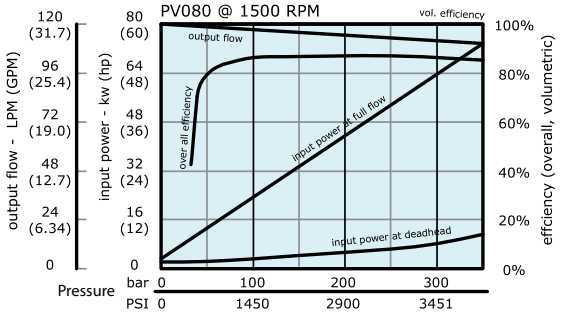


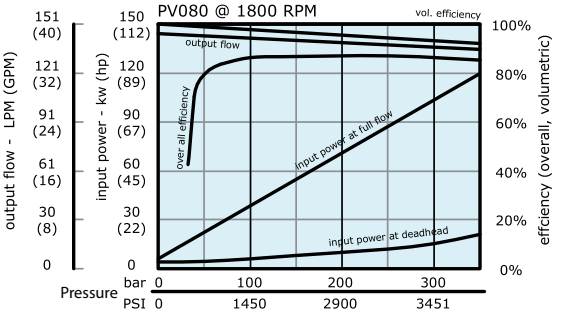
The efficiency and power graphs are measured at an input speed of n = 1500 RPM, a temperature of 40°C and a fluid viscosity of 46 mm2/s. Case drain flow and compensator control flow leave via the drain port of the pump. To the values shown are to be added 1 to 1.2 l/min , if at pilot operated compensators (codes G*, H*, P*, horse power compensator and p/Q+control) the control flow of the pressure pilot valve also goes through the pump. Please note: The values shown below are only valid for static operation. Under dynamic conditions and at rapid compensation of the pump the volume displaced by the servo piston also leaves the case drain port.
This dynamic control flow can reach up to 80 l/min.Therefore the case drain line is to lead to the reservoir at full size and without restrictions as short and direct as possible.

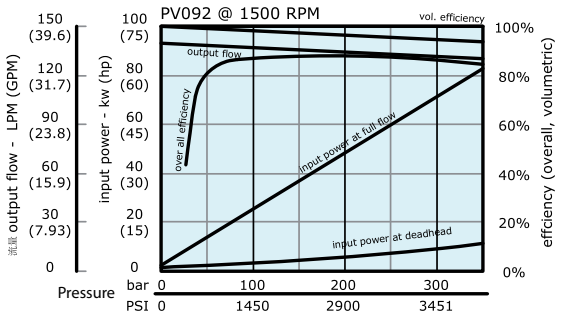
Efficiency

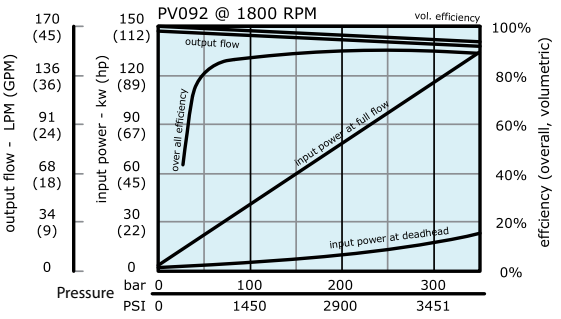








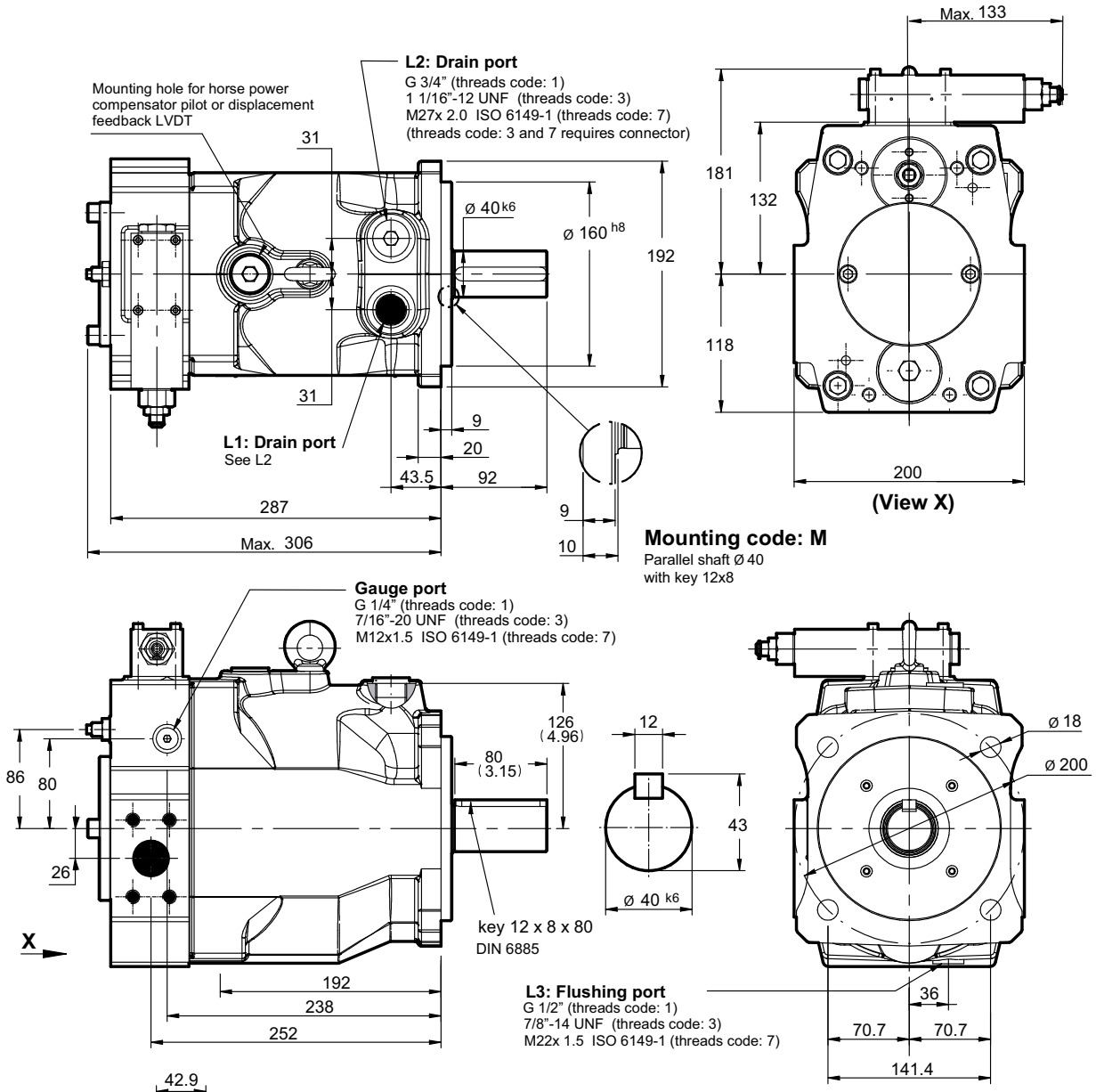




Size 3 - PV 063, PV 092, PV 110, PV 125

Metric version

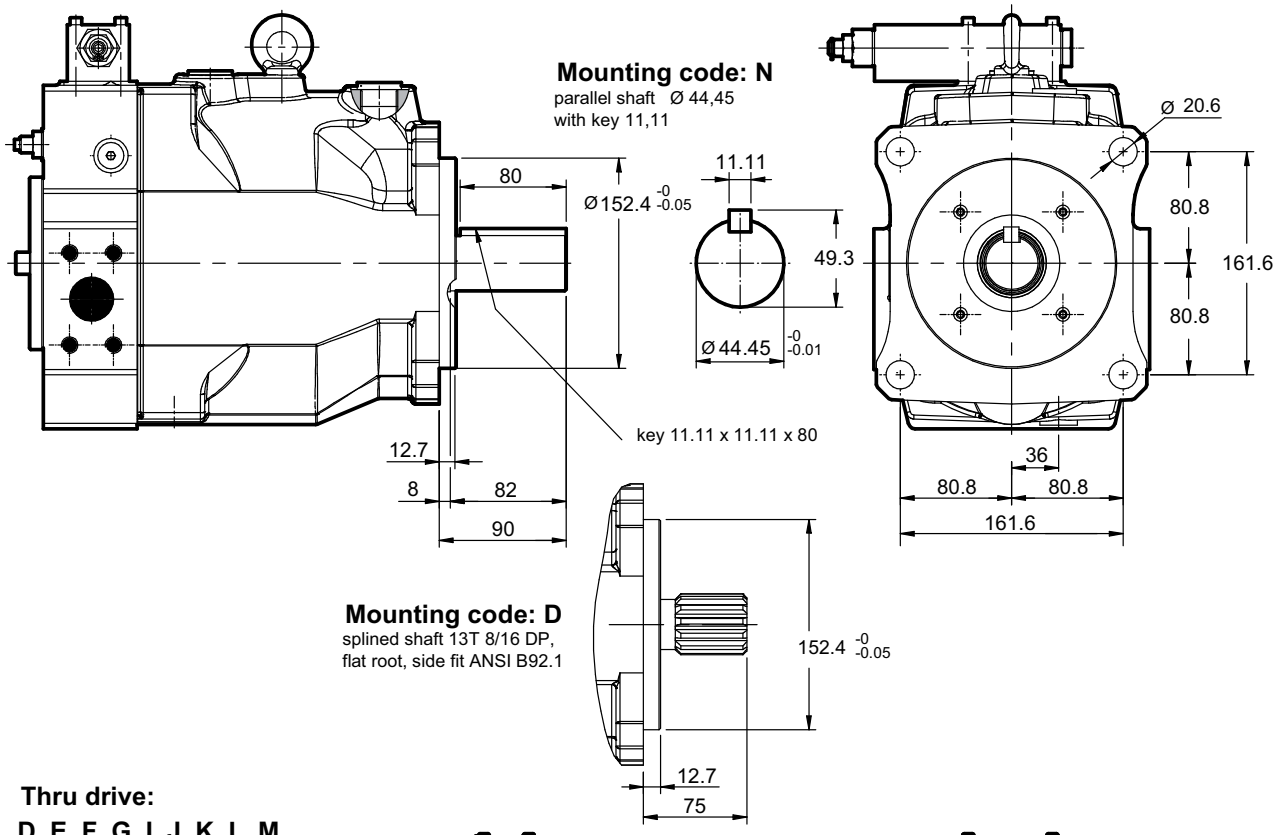
INSTALLATION DRAWINGS
MOUNTING : M, K



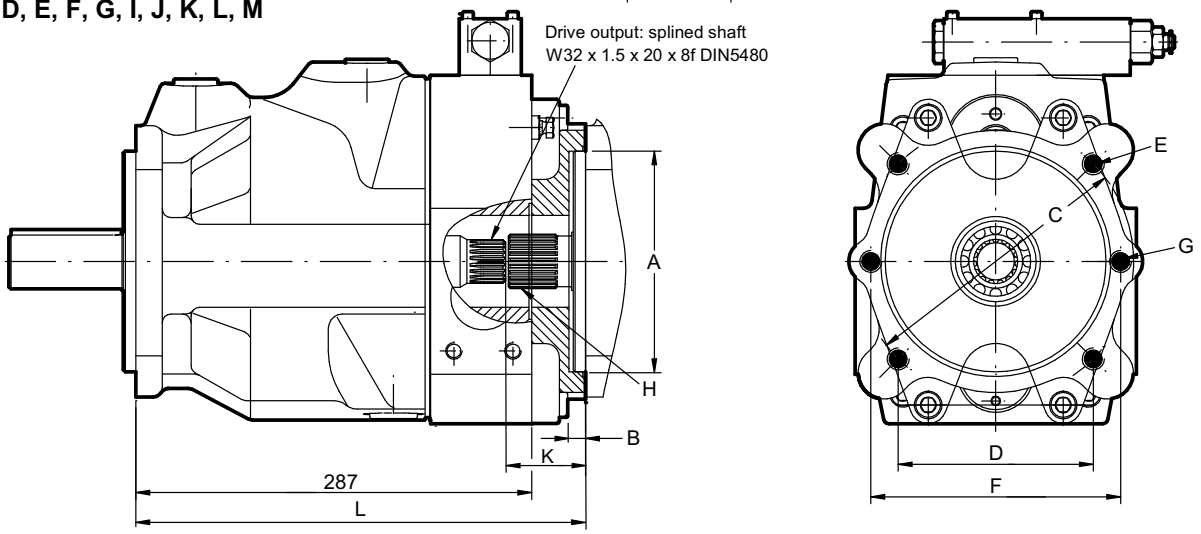
Size 3 - PV 063, PV 092, PV 110, PV 125

SAE version and thru drive

INSTALLATION DRAWINGS
MOUNTING : N, D



Thru drive:
D, E, F, G, I, J, K, L, M



Thru shaft adaptors are available with the following dimensions:									
Thru code	A	B	C	D	E	F	G	K	L
I	63	10	85	-	M8	100	M8	58	326
J	80	10	103	-	M8	109	M10	58	326
K	100	12	125	-	M10	140	M12	58	326
L	125	12	160	-	M12	180	M16	58	326
M	160	12	200	-	M16	not avail.	not avail.	58	326
D	82.55	10	-	-	-	106	M10	58	326
E	101.6	12	-	89.8	M10	146	M12	58	326
F	127	14	-	114.5	M12	181	M16	58	326
G	152.4	14	-	161.6	M16	not avail.	not avail.	78	346

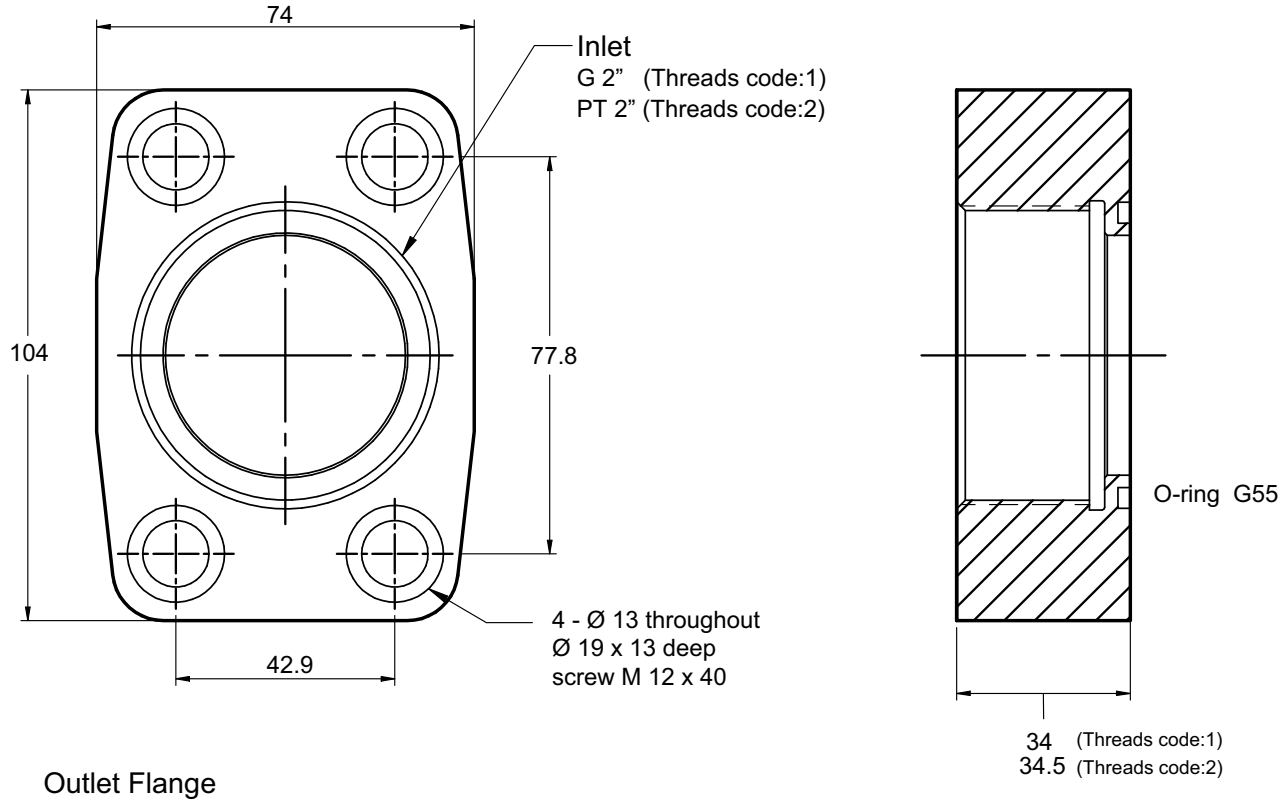
Thread codes are 3 and 7 the dimensions E and G are UNC-2B threads

threads code: 3 and 7 Not standard, not in stock require special requests.

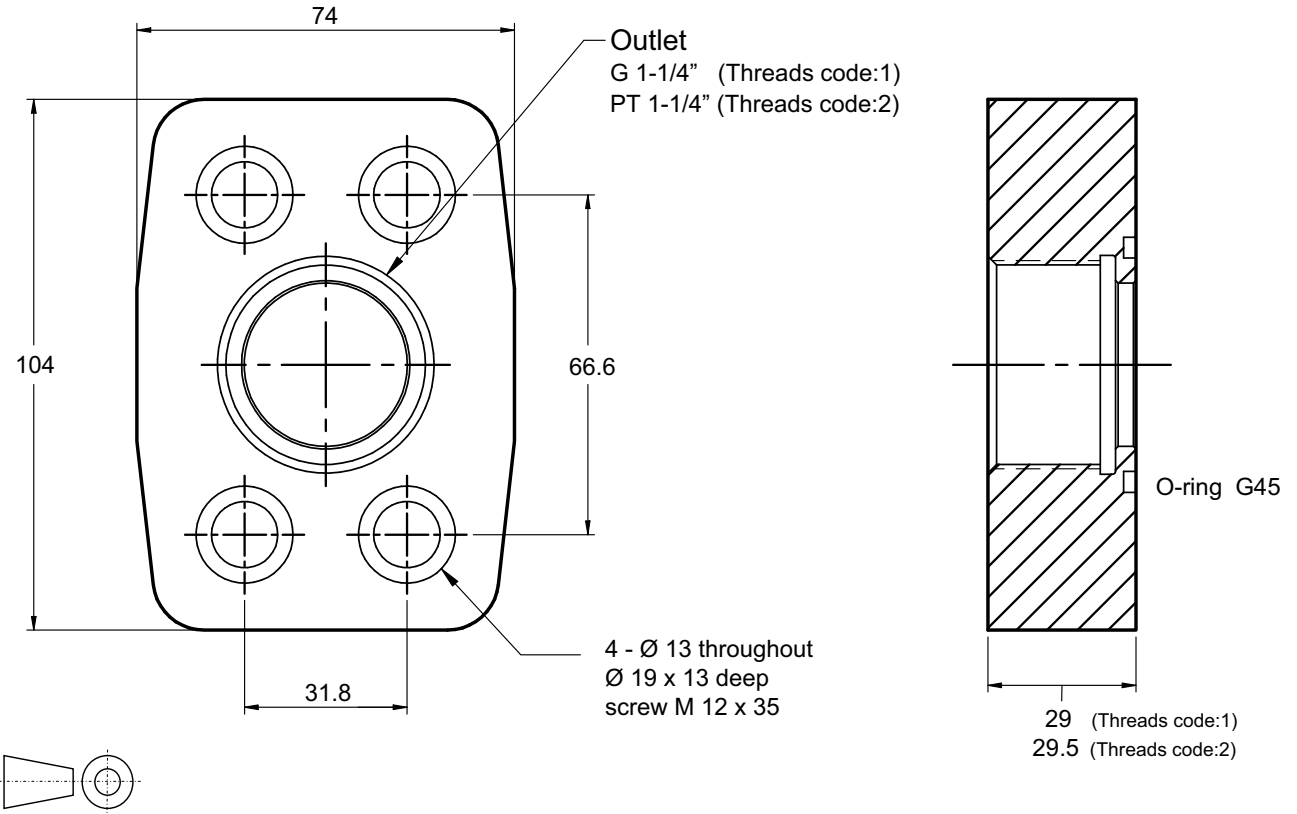
Size 3 - PV 063, PV 092, PV 110, PV 125

INSTALLATION DRAWINGS
PORT FLANGES

Inlet Flange

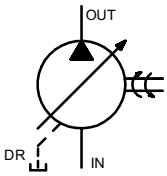


Outlet Flange

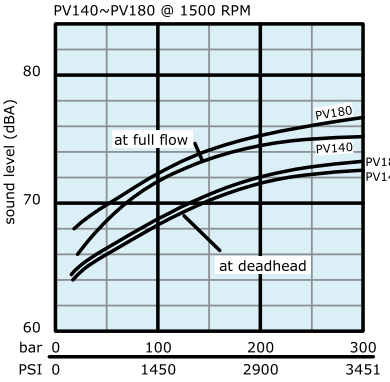


Size 4 - PV 140, PV 180

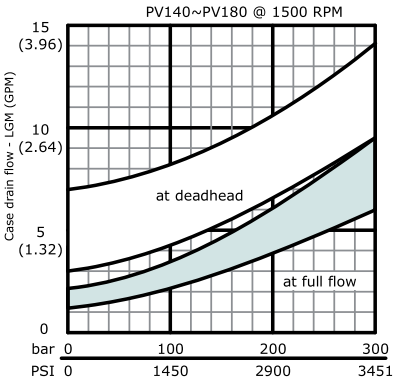
DIAGRAMS



Noise level

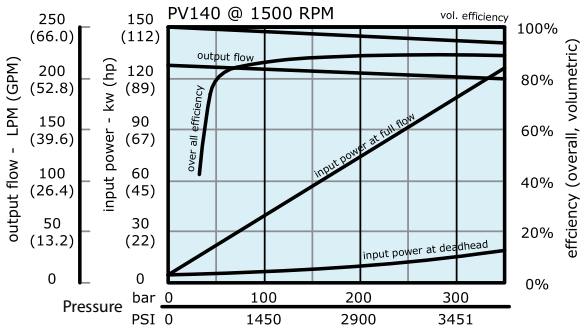


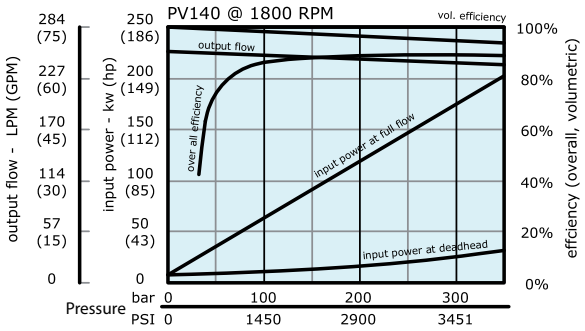
Case Drain

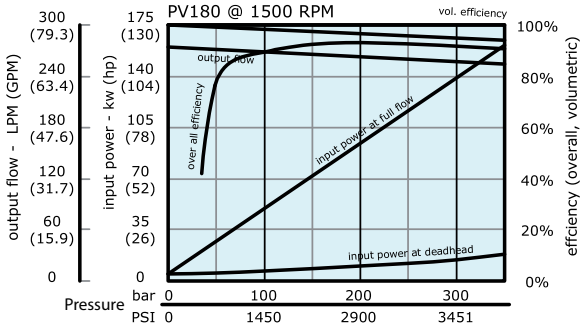


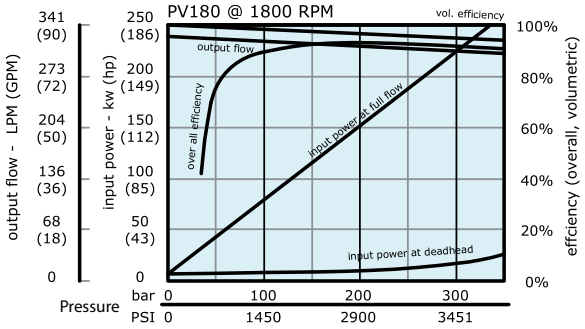
The efficiency and power graphs are measured at an input speed of n = 1500 RPM, a temperature of 40°C and a fluid viscosity of 46 mm2/s.
Case drain flow and compensator control flow leave via the drain port of the pump. To the values shown are to be added 1 to 1.2 l/min , if at pilot operated compensators (codes G*, H*, P*, horse power compensator and p/Q,control) the control flow of the pressure pilot valve also goes through the pump.
Please note: The values shown below are only valid for static operation. Under dynamic conditions and at rapid compensation of the pump the volume displaced by the servo piston also leaves the case drain port.
This dynamic control flow can reach up to 40 l/min. Therefore the case drain line is to lead to the reservoir at full size and without restrictions as short and direct as possible.

Efficiency



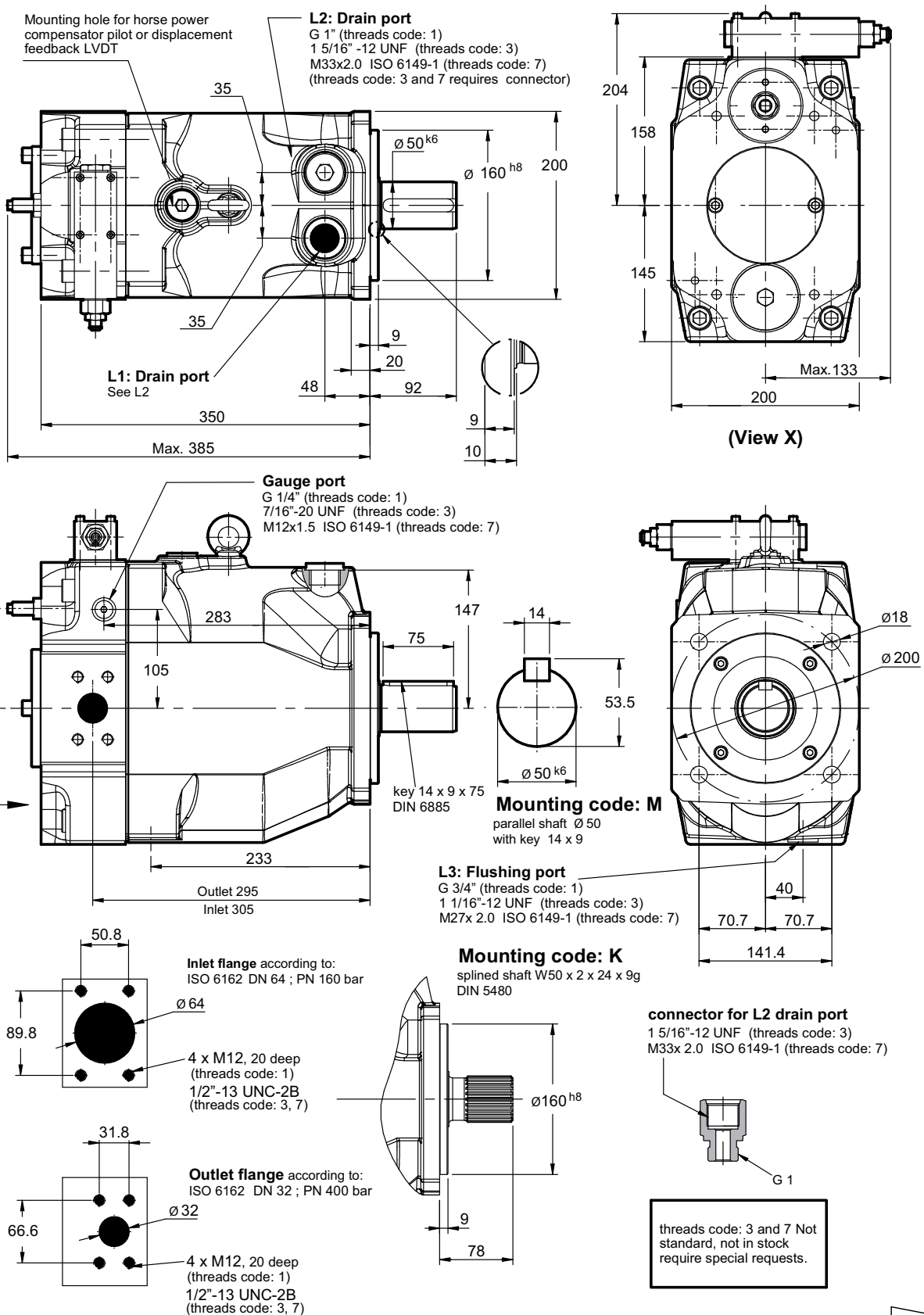






Size 4 - PV 140, PV 180
Metric version

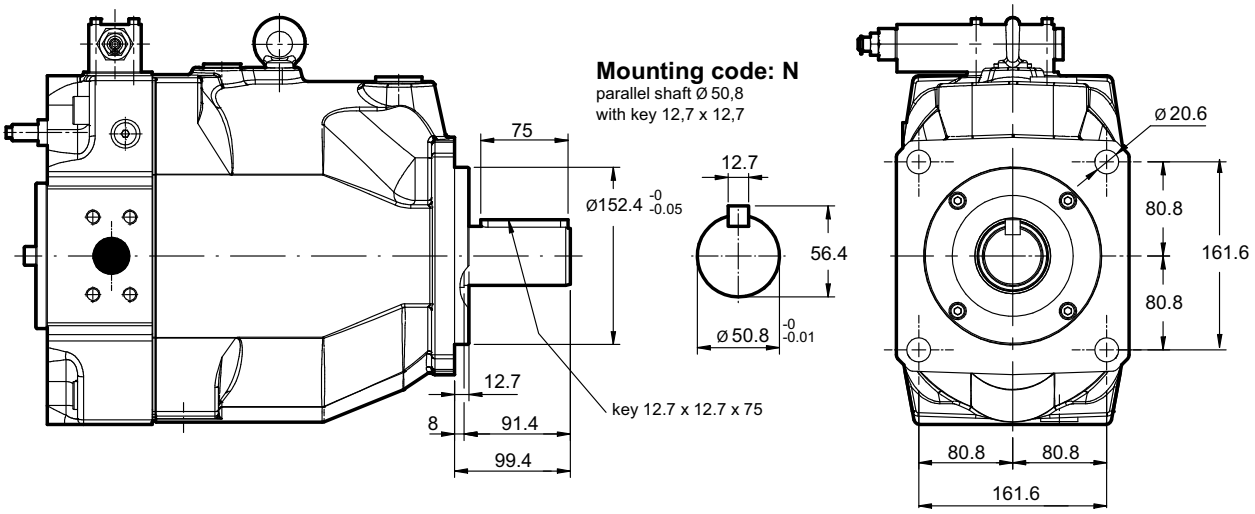
INSTALLATION DRAWINGS
MOUNTING : M, K

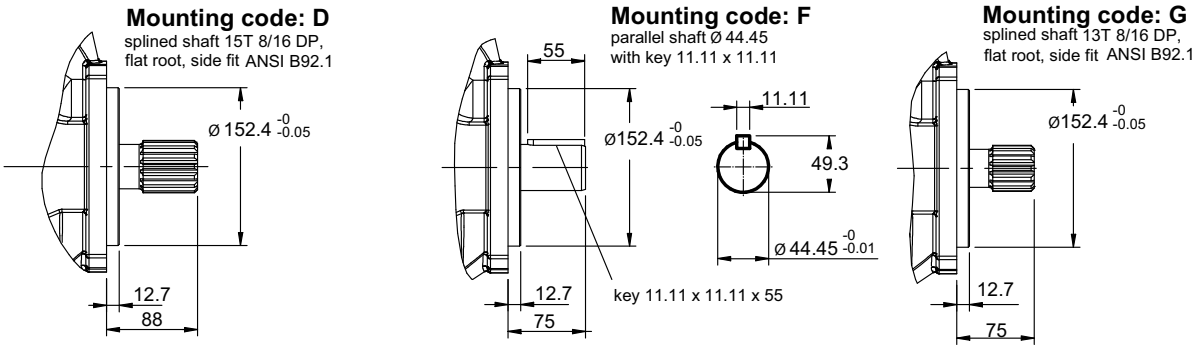


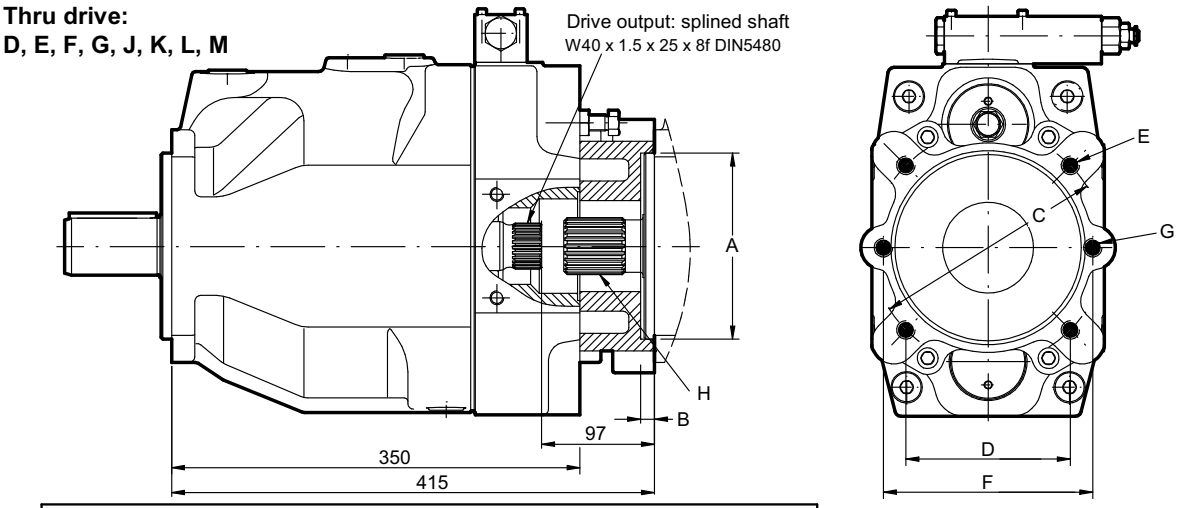
Size 4 - PV 140, PV 180

SAE version and thru drive

INSTALLATION DRAWINGS
MOUNTING : N, F, D, G







Thru shaft adaptors are available with the following dimensions:							
Thru code	A	B	C	D	E	F	G
J	80	10	103	-	M8	109	M10
K	100	12	125	-	M10	140	M12
L	125	12	160	-	M12	180	M16
M	160	12	200	-	M16	not avail.	not avail.
D	82.55	10	-	-	-	106	M10
E	101.6	12	-	89.8	M10	146	M12
F	127	14	-	114.5	M12	181	M16
G	152.4	14	-	161.6	M16	not avail.	

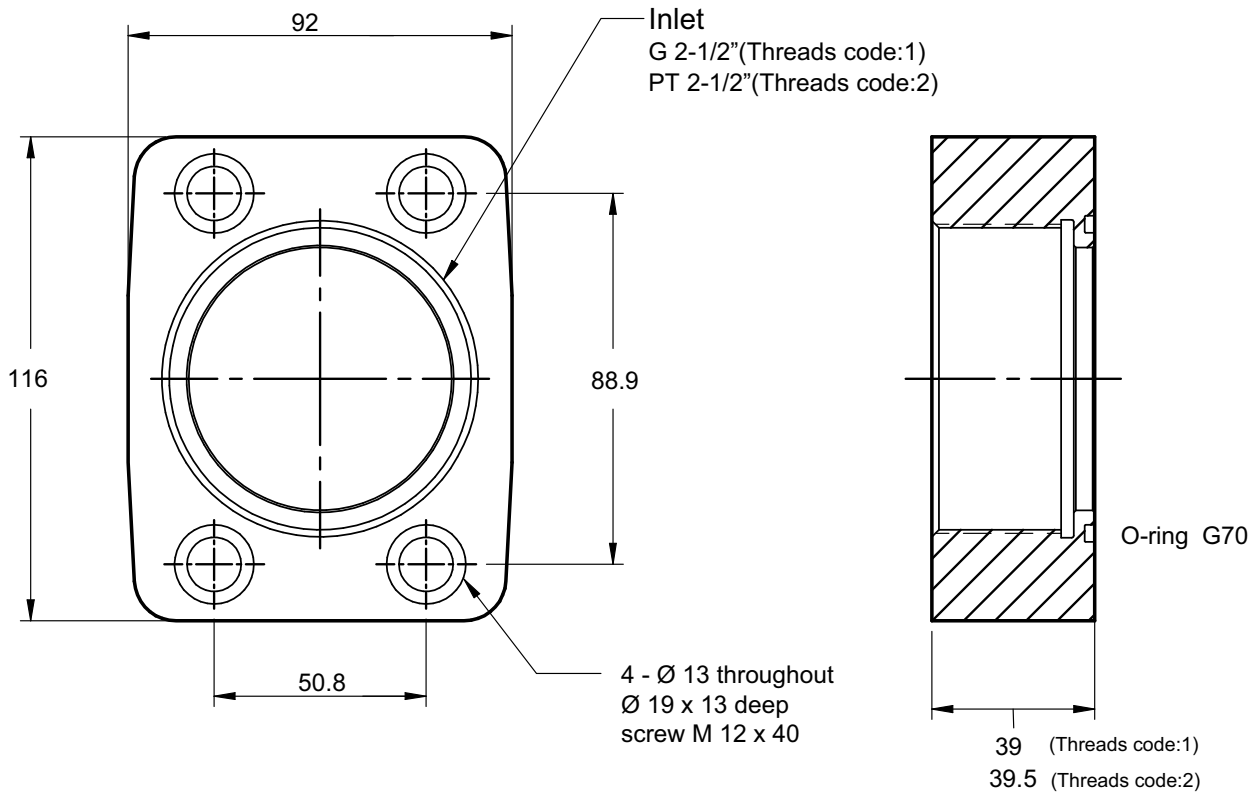
Thread codes are 3 and 7
the dimensions E and G are
UNC-2B threads

threads code: 3 and 7 Not standard, not in stock require special requests.

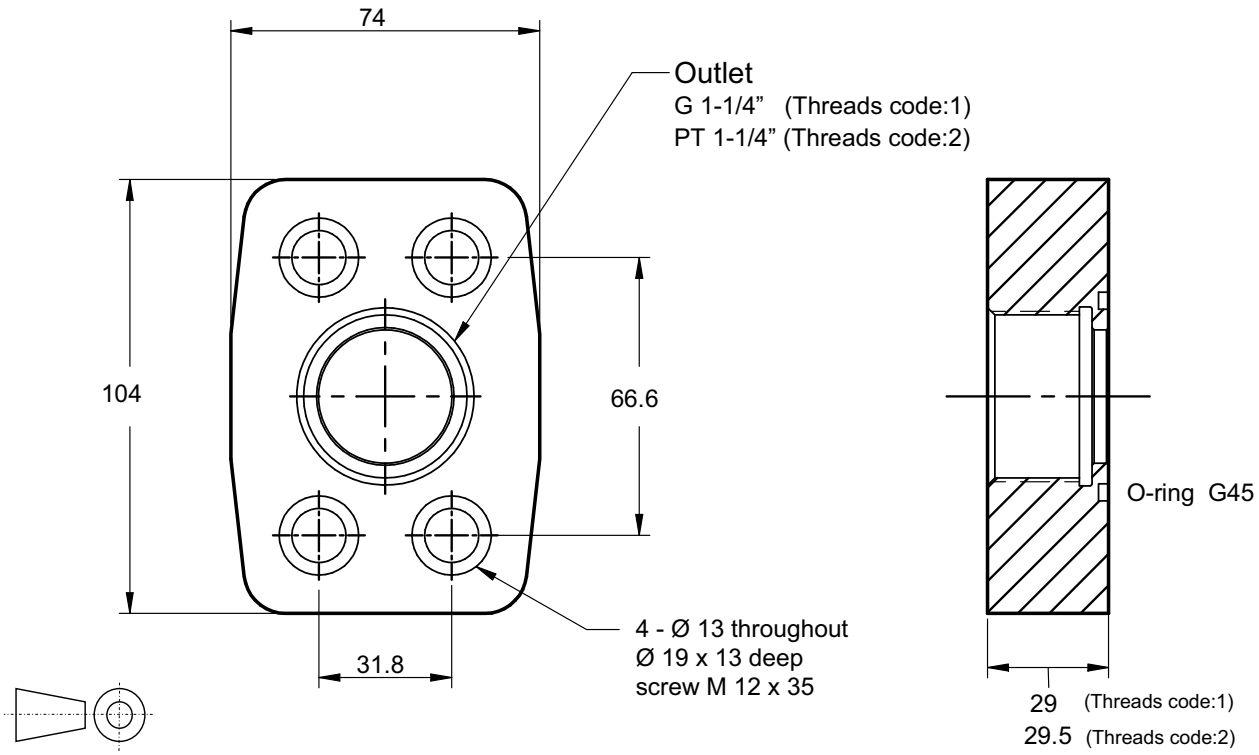
Size 4 - PV 140, PV 180

INSTALLATION DRAWINGS
PORT FLANGES

Inlet Flange

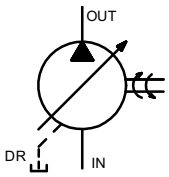


Outlet Flange

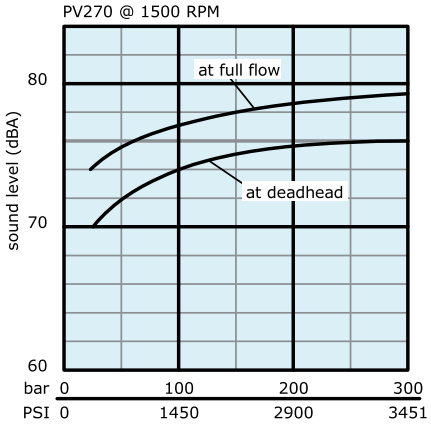


Size 5 - PV 270

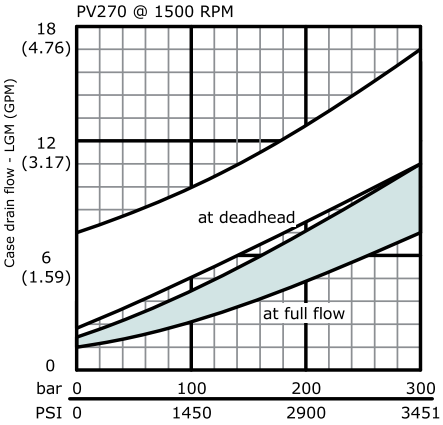
DIAGRAMS



Noise level

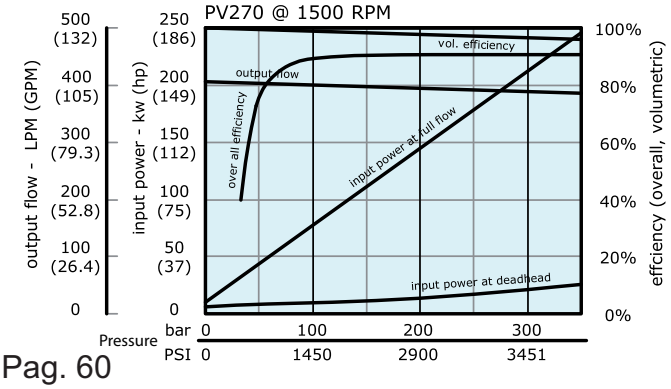


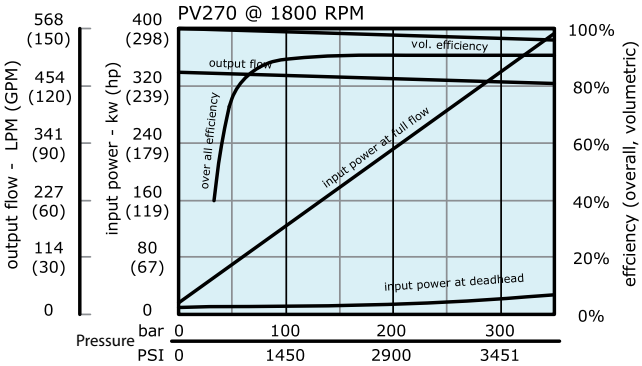
Case Drain



The efficiency and power graphs are measured at an input speed of n = 1500 RPM, at temperature of 40°C and a fluid viscosity of 46 mm²/s. Case drain flow and compensator control flow leave via the drain port of the pump. To the values shown are to be added 1 to 1.2 l/min , if at pilot operated compensators (codes G*, H*, P*, horse power compensator and p/Q+control) the control flow of the pressure pilot valve also goes through the pump. Please note: The values shown below are only valid for static operation. Under dynamic conditions and at rapid compensation of the pump the volume displaced by the servo piston also leaves the case drain port. This dynamiccontrol flow can reach up to 120 l/min. Therefore the case drain line is to lead to the reservoir at full size and without restrictions as short and direct as possible.

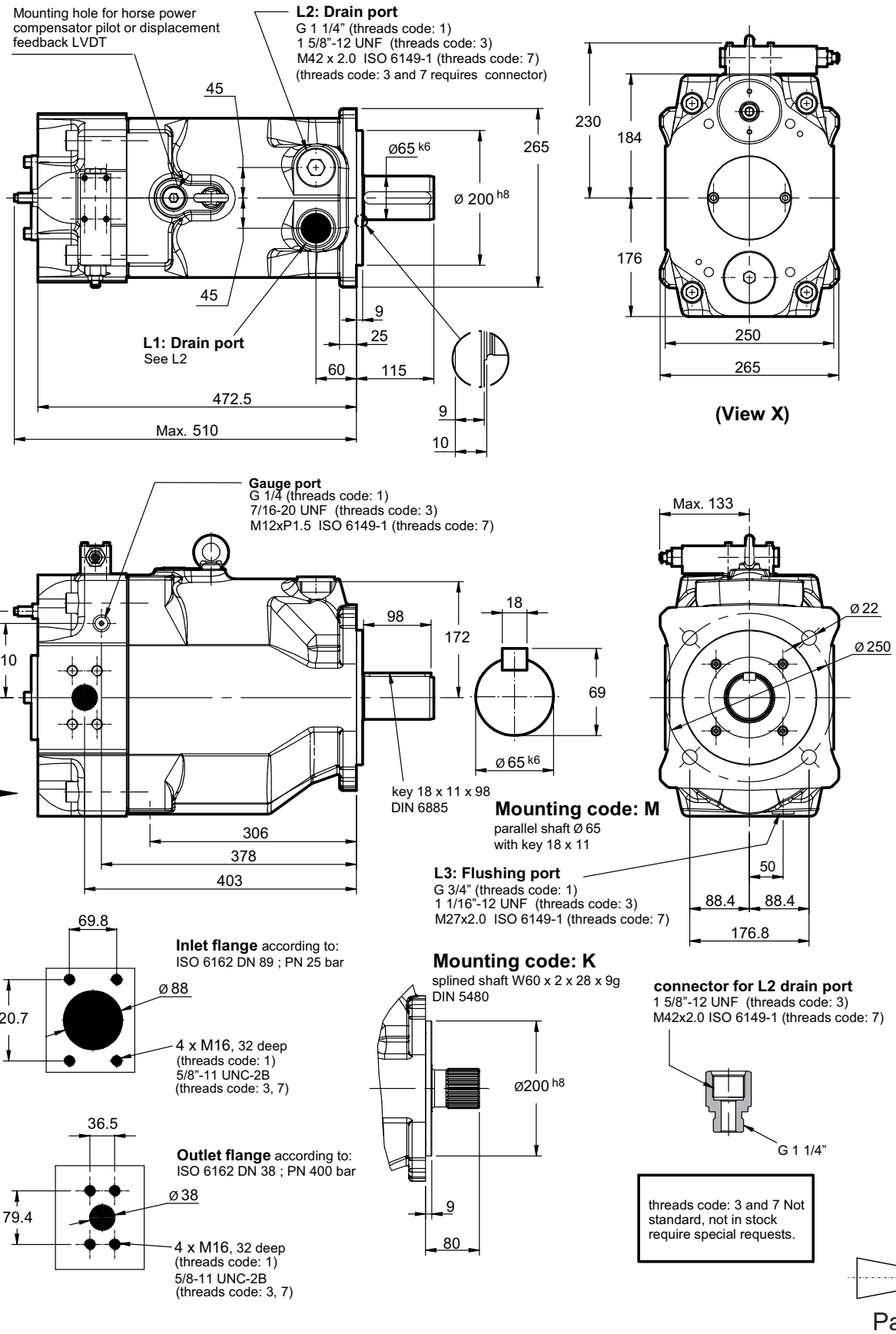
Efficiency





Size 5 - PV 270
Metric version

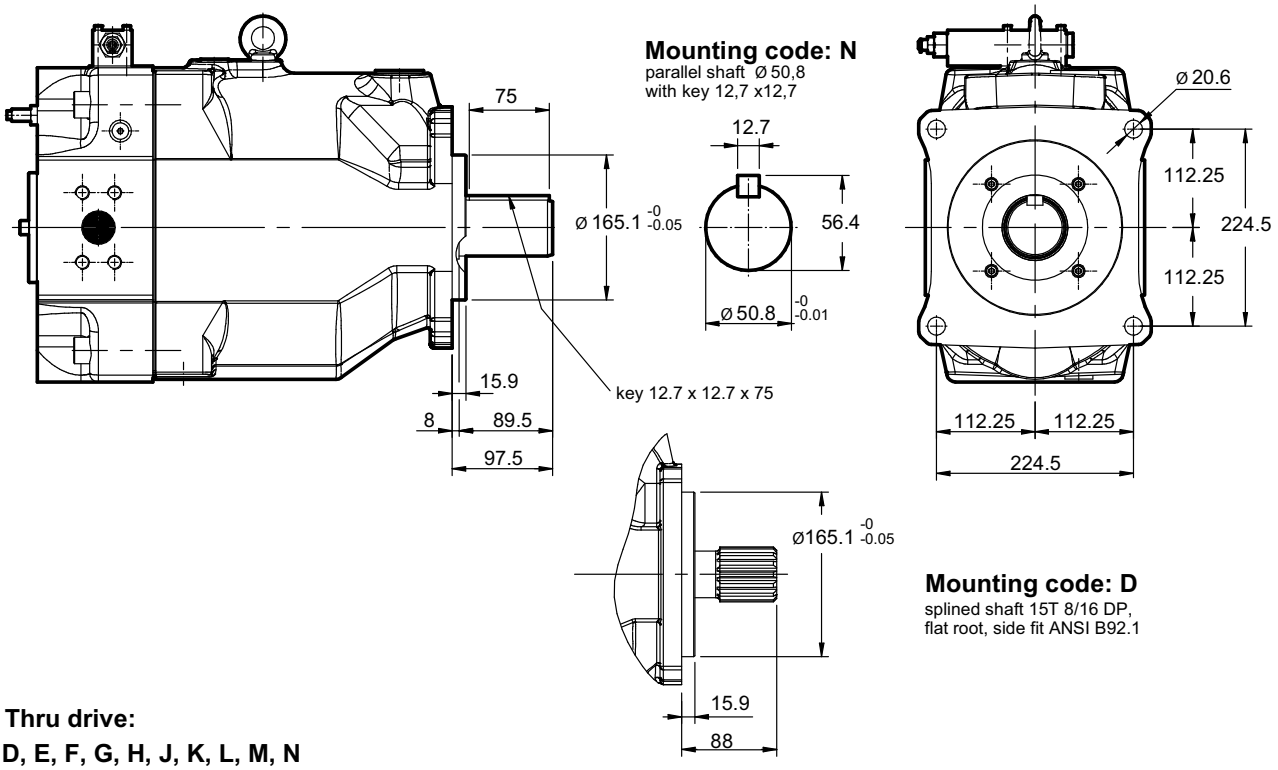
INSTALLATION DRAWINGS
MOUNTING : M, K



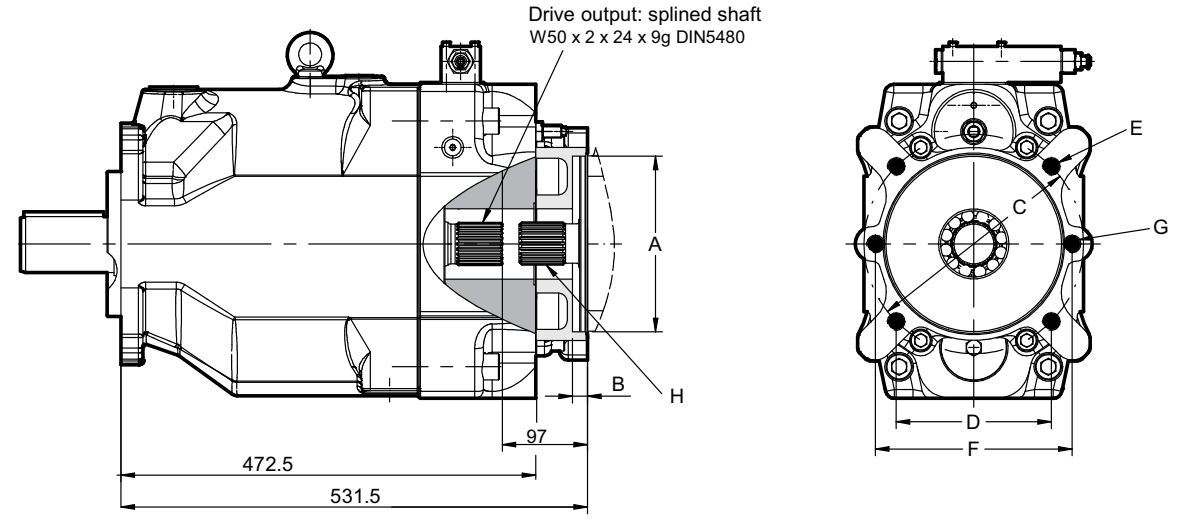
Size 5 - PV 270

SAE version and thru drive

INSTALLATION DRAWINGS
MOUNTING : N, D



Thru drive:
D, E, F, G, H, J, K, L, M, N



Thru shaft adaptors are available with the following dimensions:							
Thru code	A	B	C	D	E	F	G
J	80	8.5	103	-	M8	109	M10
K	100	10.5	125	-	M10	140	M12
L	125	10.5	160	-	M12	180	M16
M	160	13.5	200	-	M16	224	M20
N	200	13.5	250	-	M20	not avail.	not avail.
D	82.55	8	-	-	-	106	M10
E	101.6	11	-	89.8	M10	146	M12
F	127	13.5	-	114.5	M12	181	M16
G	152.4	13.5	-	161.6	M16	229	M20
H	165.1	17	-	224.5	M20	not avail.	not avail.

Thread codes are 3 and 7 the dimensions E and G are UNC-2B threads

threads code: 3 and 7 Not standard, not in stock require special requests.

GENERAL INSTALLATION INFORMATION

Fluid recommendations

Premium quality hydraulic mineral oil fluids are recommended, like H-LP oils to DIN 51524, part2.
The viscosity range should be 25 to 50 mm²/s (cSt) at 50º C. Operating temp. –10 to +70ºC.
For other fluids such as phosphoric acid esters or for other operating conditions, please consult our Tech. Dept. for assistance.

Seals

NBR (Nitrile) seals are used for operation with hydraulic fluids based on mineral oil.
For synthetic fluid, as perhaps phosphoric acid esters, Fluorocarbon seals are required.
Please consult our Tech. Dept. for assistance.

Filtration

For maximum pump and system component functionability and life, the system should be protected from contamination by effective filtration.
Fluid cleanliness should be in accordance with ISO classification ISO 4406.
The quality of filter elements should be in accordance with ISO standards.
(1) Minimum requirement for filtration rate ×(mm):
General hydraulic systems for satisfactory operation:
Class 19/15, to ISO 4406 X=25µm (β25 ≥ 75) to ISO 4572
(2) Hydraulic systems with maximum component life and functionability:
Class 16/13, to ISO 4406 X=10µm (β10 ≥ 75) to ISO 4572
It is recommended to use return line or pressure filters.
We can offers a wide range of these filters for all common applications and mounting styles.
The use of suction filters should be avoided, especially with fast response pumps.
Bypass filtration is a good choice for best filter efficiency.

Installation and mounting

Horizontal mounting:
Outlet port-side or top. Inlet port-side or bottom, drain port always uppermost.
Vertical mounting: Shaft pointing upwards.
Install pump and suction line in such way that the maximum inlet vacuum never exceeds 0.8 bar absolute. The inlet line should be as short and as straight as possible. A short suction line cut to 45º is recommended when the pump is mounted inside the reservoir, to improve the inlet conditions. All connections should be leak-free, otherwise the air in the suction line will cause cavitations, noise, and damage to the pump.

Shaft rotation and alignment

Pump and motor shafts must be aligned within 0.25mm T.I.R. maximum.
A floating coupling must be used.
Bell-housings and couplings can be ordered following the specific catalog.
Please follow the coupling manufacturer’s installation instructions.
Please consult our Tech. Dept for assistance. on radial load type drives.

Start up

Prior to start up, the pump case must be filled with hydraulic fluid (use the upper case drain port).
Initial start up should be at zero pressure with an open circuit to enable the pump to prime.
Pressure should only be increased once the pump has been fully primed.

Attention: Check motor rotation direction.

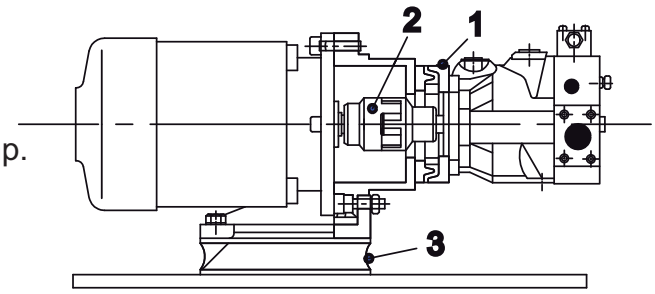
GENERAL INSTALLATION INFORMATION (continued)

Operating noise of pumps

The normal operating noise of a pump and constantly-operation noise of the entire hydraulic system is largely determined by where and how the pump is mounted and how it is connected to the down stream hydraulic system. Besides, size, style, and installation of hydraulic tube are the major influence on the overall noise emitted by a hydraulic system.

Noise reduction measures

Flexible elements help to prevent pump body vibration from being transmitted to other construction elements, where amplification may occur. Such elements can be:
Bell housing with elastic dampening flange with vulcanized labyrinth
(1) Floating and flexible coupling
(2) Damping rails
(3) Or silent blocks for mounting the electric motor or the foot mounting flange
(4) Flexible tube connections (compensators) or hoses on inlet, outlet, and drain port of the pump.
(5) Exclusive use of gas tight tube fittings for inlet connections to avoid ingression of air causing cavitations and excessive noise.



Drain line

The drain line must lead directly to the reservoir without restriction. The drain line must not be connected to any other return line. The end of the drain line must be below the lowest fluid level in the reservoir and as far away as possible from the pump inlet line. This ensures that the pump is not empty itself when it's not in operation and the hot aireated oil will not be recirculated.
For the same reason, when the pump is mounted inside the reservoir, the drain line should be arranged in such a way that a siphon is created. This ensures that the pump is always filled with fluid. The drain pressure must not exceed 1 bar. Drain line length should not exceed 2 meters. Minimum diameter should be selected according to the port size and a straight low pressure fitting with maximized bore should be used.

	PV016~PV023	PV032~PV046	PV063~PV092	PV140~PV180	PV270
Size of pipe joints	3/8(φ8.5 or more)	1/2(φ12 or more)	3/4(φ16 or more)	1(φ19 or more)	1-1/4(φ22 or more)
I.D. of pipes	φ12 more	φ15 more	φ19 more	φ25 more	φ32 more
Length of drain	Under 1m	Under 1m	Under 1m	Under 1m	Under 1m

GENERAL INSTALLATION INFORMATION (continued)

Thru Drive, Shaft load limitation

The max. Transferable torque in Nm for the different shafts options are:

Shaft code	PV16-23	PV32-46 PV56&65	PV63-125	PV140-180	PV270
N	300	550	1320	2000	2000
D	300	610	1218	2680	2680
F	-	-	-	1320	-
G	-	-	-	1640	-
M	300	570	1150	1900	2850
K	405	675	1400	2650	3980

Important notice

The max. allowable torque of the individual shaft must not be exceeded.
For 2-pump combinations, there is no problem because PV series offers 100% thru torque. For 3-pump combinations (or more), the limit torque will be reached or exceeded.
Therefor, it is necessary to calculate the torque factor and compare with the allowed torque limit factor in the table.

To make the necessary calculations easier and more user friendly it is not required to calculate actual torque requirements in Nm and compare them with the shaft limitations. The table on the right shows limit factors that include material specification,safety factors and conversion factors.

pump	shaft	torque limit factor
PV016-PV023	N	17700
	D	17700
	M	17700
	K	20130
PV32-46 PV56&65	N	32680
	D	36380
	M	33810
	K	40250
PV063-PV092	N	77280
	D	72450
	M	67620
	K	83720
PV140-PV180	N	118400
	D	158760
	F	78750
	G	97650
	M	113400
	K	157500
PV270	N	119000
	D	159700
	M	170100
	K	236250

The total torque factor is represented by the sum of the individual torque factors of all pumps in the complete pump combination.

The torque factor of each individual pump is calculated by multiplying the max.operating pressure p of the pump (bar)with the max.displacement Vg of the pump(cm^3/rev).