



Axial Piston Pump

Series PV
Design 45
Variable Displacement

aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding

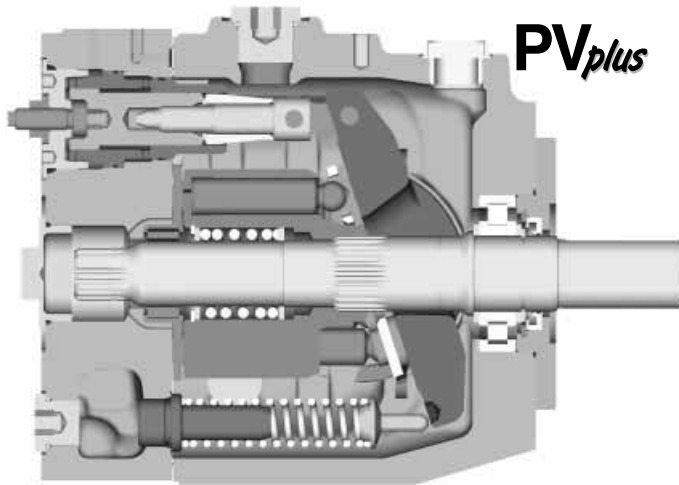


ENGINEERING YOUR SUCCESS.

Contents	Page
Introduction and general Information.....	3
Technical Data.....	3
Technical Features	3
Ordering Code Preferred Program	4
Noise Levels	8
Efficiency and Case Drain Flows.....	9
Dimensions.....	11
Mounting Kits.....	15
 Pump combinations	
Thru Drive, Shaft Load Limitations.....	16
 Compensators	
Compensator Dimensions.....	17
Pressure Compensators	21
Power Compensators.....	25
Electrohydraulic p/Q control	27
Electronic Module PQDXXA (digital).....	28
Control Module Programming	29
Accessories Compensator	30

With thru drive for single and multiple pumps

Swash plate type for open circuit



Technical Features

- Low noise level
- Fast response
(eg. PV046: upstroke <70ms, downstroke <40ms)
- Service-friendly
- High self-priming speed
- Compact design
- Thru drive for 100% nominal torque

Technical Data

Size		PV016	PV020	PV023	PV028	PV032	PV040	PV046
Max. Displacement	[cm ³ /rev.]	1	1	1	1	2	2	2
Output flow at 1500 min ⁻¹	[l/min]	16	20	23	28	32	40	46
Nominal pressure pN	[bar]	24	30	34,5	42	48	60	69
Nominaldruck pN	[bar]	350	350	350	350	350	350	350
Max. pressure pmax ¹⁾	[bar]	420	420	420	420	420	420	420
Max. Case drain pressure	[bar]	0,5	0,5	0,5	0,5	0,5	0,5	0,5
Min. Inlet pressure, abs.	[bar]	0,8	0,8	0,8	0,8	0,8	0,8	0,8
Max. Inlet pressure	[bar]	16	16	16	16	16	16	16
Input power at 1500 min ⁻¹ and 350 bar	[kW]	15,5	19,5	22,5	27,5	31	39	45
Max speed ²⁾	[min ⁻¹]	3000	3000	3000	3000	2800	2800	2800
Moment of inertia	[kgm ²]	0,0017	0,0017	0,0017	0,0017	0,0043	0,0043	0,0043
Weight	[kg]	19	19	19	19	30	30	30

1) Maximum 20% of the working cycle.

2) The maximum speed ratings are shown for an inlet pressure of 1 bar (absolute) and for a fluid viscosity of $\nu = 30 \text{ mm}^2/\text{s}$

General Information

Fluid recommendations

Premium quality hydraulic mineral fluid are recommended, like HLP oils to DIN 51522, part 2, Bruggervalue has to be 30 N/mm² minimum for general application and 50 N/mm² for heavily loaded hydraulic equipment and fast cycling machines and/or high dynamic loads, measured in accordance with DIN 51 347-2, see also Document HY30-3248/UK Parker Hydraulic Fluids.

Viscosity

The normal operating viscosity should range between 16 and 100 mm²/s (cSt). Max. start-up viscosity is 800 mm²/s (cSt).

Seals

NBR seals are used for operation with hydraulic fluids based on mineral oil. For synthetic fluids, such as phosphoric acid esters, Fluorocarbon seal are required.

Filtration

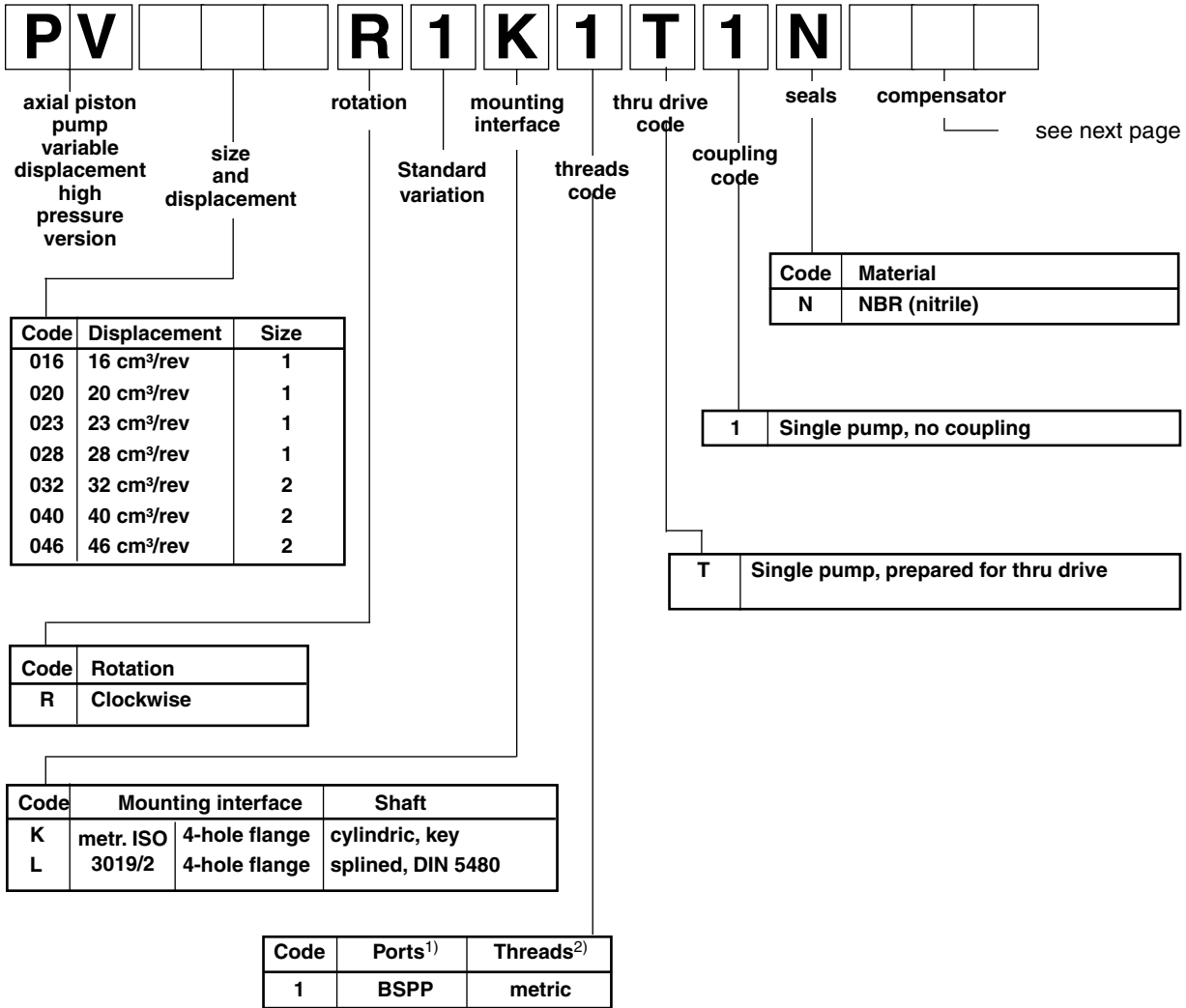
For maximum pump and system component functionality and life, the system should be protected from contamination by effective filtration.

Fluid cleanliness should be in accordance with ISO classification ISO 4406:1999. The quality of filter elements should be in accordance with ISO standards.

Minimum requirement for filtration rate x (mm); General hydraulic systems for satisfactory operation: Class 20/18/15, according to ISO 4406:1999

Hydraulic systems with maximised component life and functionality:

Class 18/16/13, according to ISO 4406:1999



1) refers to drain, gage and flushing port,
2) refers to all mounting threads

Mounting kits for flexible mounting of multiple pumps, see page 15.

Code			Compensator style
0	0	1	no compensator
compensator version			
M	M		standard pressure compensator, integrated pilot valve
M	R		remote pressure compensator, integrated pilot valve
M	F		flow (load sensing) compensator, integrated pilot valve
compensator variation			
		C	standard variation
		1	topside NG6 /CETOP 3 interface

Displacement		Code	Compensator style
power control			
016	032		nominal power at 1.500 rev/min
023	046		
		B	3 kW
		C	4 kW
		D	5,5 kW
		E	7,5 kW
		G	11 kW
		H	15 kW
		K	18,5 kW
		M	22 kW
		S	30 kW
Function			
		L	power control
		C	power control and load sensing
Compensator version			
		C	adjustable pressure compensation
		1	topside NG6 interface

Code			Compensator style
electro hydraulic control			
F	P	V	closed loop displacement control only, no pressure compensation
U	P		closed loop proportional displacement control with pressure compensation
compensator version			
		R	balanced pressure control, NG6 interface
		K	version UPR, with proportional pilot valve type PVACRE..35 mounted
		M	version UPK, with pressure sensor for closed loop pressure and power control

Note:

Compensator differential Δp is factory pre-set to:
 remote compensators, power control **15 ± 1 bar**
 load sensing comp. (not power control) **10 ± 1 bar**
 (codes ...MF*)



axial piston pump variable displacement high pressure version

size and displacement

rotation

variation

mounting interface

threads code

thru drive code

coupling code

seals

compensator

see next page →

Code	Displacement	Size
016	16 cm ³ /rev	1
020	20 cm ³ /rev	1
023	23 cm ³ /rev	1
028	28 cm ³ /rev	1
032	32 cm ³ /rev	2
040	40 cm ³ /rev	2
046	46 cm ³ /rev	2

Code	Seals
N	NBR
V	FPM
W	NBR with PTFE shaft seal
P	FPM with PTFE shaft seal

Code	Rotation ¹⁾
R	Clockwise
L	Counter clockwise

¹⁾ When looked on shaft

Code	Variation
1	Standard
9	Special adjustment ²⁾

²⁾ requires Kxxxx number

Code	Mounting interface	Shaft
D	SAE	Cylindric, key
E	ISO 3019/1	Splined, SAE
K	metr. ISO 3019/2	Cylindric, key
L		Splined, DIN 5480

Code	Port ³⁾	Threads ⁴⁾
1	BSPP	metric
3	UNF	UNC
7	ISO 6149	UNC
8	ISO 6149	metric

³⁾ Drain, gauge and flushing ports

⁴⁾ All mounting and connecting threads

1	Single pump, no coupling	
Code	Coupling for thru drive	as single part ⁵⁾
H	with coupling 25 x 1,5 x 15, DIN 5480	MK-PVBGxK01
J	with coupling 32 x 1,5 x 20, DIN 5480	MK-PVBGxK02
Y	SAE A 9T-16/32 DP	MK-PVBGxK11
A	SAE - 11T-16/32 DP	MK-PVBGxK12
B	SAE B 13T-16/32 DP	MK-PVBGxK13
C	SAE B-B 15T-16/32 DP	MK-PVBGxK14
D	SAE C 14T-12/24 DP	MK-PVBGxK15

Code	Thru drive option	
No adaptor for 2nd pump		
T	Single pump prepared for thru drive	
with adaptor for 2nd pump		as single part ⁵⁾
Y ⁶⁾	SAE AA, Ø 50.8 mm	MK-PVBGxYMN
A	SAE A, Ø 82.55 mm	MK-PVBGxAMN
B	SAE B, Ø 101.6 mm	MK-PVBGxBMN
C ⁷⁾	SAE C, Ø 127 mm	MK-PVBGxCMN
G	metric, Ø 63 mm	MK-PVBGxGMN
H	metric, Ø 80 mm	MK-PVBGxHMN
J	metric, Ø 100 mm	MK-PVBGxJMN
K ⁷⁾	metric, Ø 125 mm	MK-PVBGxKMN

See dimensions for details

⁵⁾ to be ordered separately as single part
x= Size, see page 15.

⁶⁾ only for PV016 - PV028

⁷⁾ only for PV032 and larger

Code			Compensator options
0	0	1	No compensator
1	0	0	With cover plate, no control function
Remote compensator options			
M	M		Standard pressure compensator
M	R		Remote pressure compensator
M	F		Load Sensing (flow) compensator
M	T		Two- valve- LS compensator with elbow manifold
Compensator variation			
		C	Standard variation, no interface top side for pilot valves ¹⁾
		1	NG6 interface top side for pilot valves
		W	With unloading function, 24VDC solenoid
		K	Prop.-pilot valve type PVACRE..35 mounted
		Z	Without integrated pilot valve, NG6 interface, for mounting of accessory code PVAC*
		P	MT1 with mounted pilot valve PVAC1P ²⁾

1) not for MT
2) only for MT

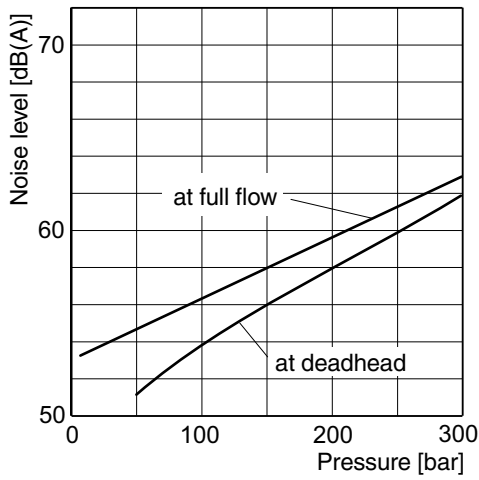
Displacem.		Code	Compensator option
Horse power compensator			
016	032		Nominal HP at 1.500 rpm
023	046		
			B 3 kW
			C 4 kW
			D 5,5 kW
			E 7,5 kW
			G 11 kW
			H 15 kW
			K 18,5 kW
			M 22 kW
			S 30 kW
Function			
			L Horse power compensator
			C Horse power compensator and Load Sensing
Compensator variation			
			C Adjustable pressure compensation
			1 NG 6 interface top side
			W Electrical unloading feature, 24 VDC
			K Prop.-pilot valve type PVACRE..35 mounted
			Z Without integrated pilot valve, NG6 interface, for mounting of accessory code PVAC*

Code			Compensator option
electro hydraulic compensator			
F	P	V	closed loop displacement control only, no pressure compensation
U	P		closed loop proportional displacement control with pressure compensation
compensator version			
		R	balanced pressure control, NG6 interface
		K	version UPR, with proportional pilot valve type PVACRE..35 mounted
		M	version UPK, with pressure sensor for closed loop pressure and power control

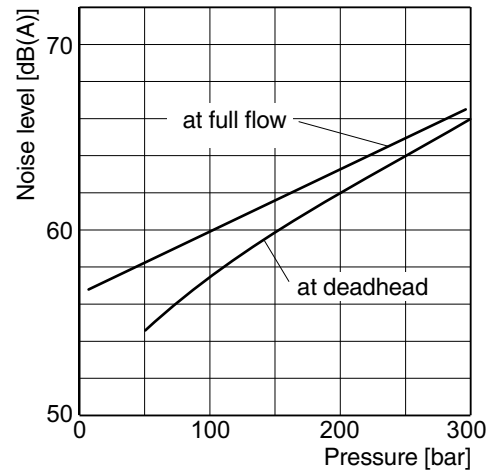
Note:

Compensator differential Δp is factory pre-set to:
 remote compensators, power control **15 ± 1 bar**
 load sensing comp. (not power control) **10 ± 1 bar**

PV016 - PV028



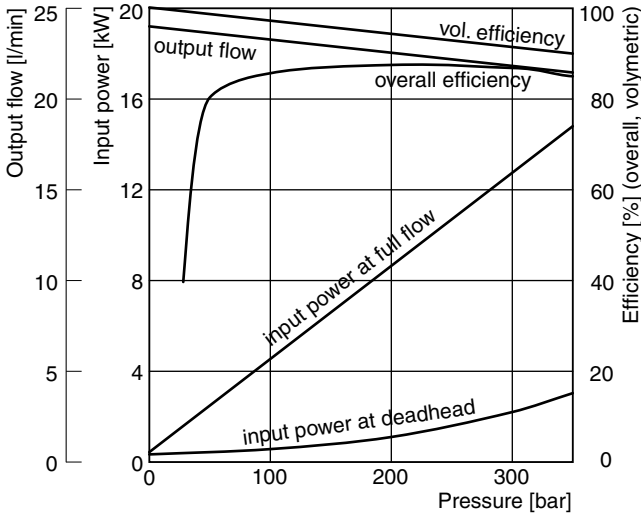
PV032 - PV046



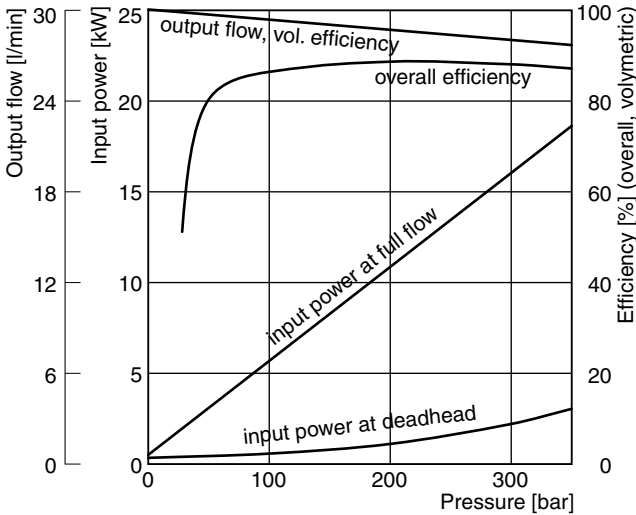
Typical sound level for single pumps, measured in anechoic chamber according to DIN 45 635, part 1 and 26. Microphone distance 1m; speed: $n = 1500$ rpm.

All data measured with mineral oil viscosity $30 \text{ mm}^2/\text{s}$ (cSt) at $50 \text{ }^\circ\text{C}$.

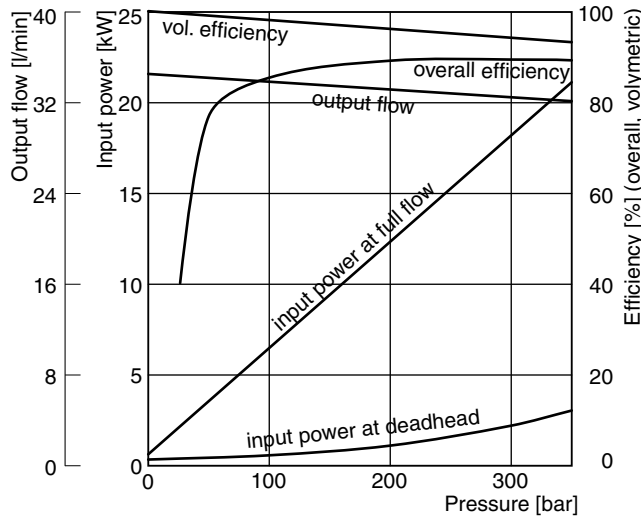
**Efficiency, power consumption
PV016**



PV020



PV023



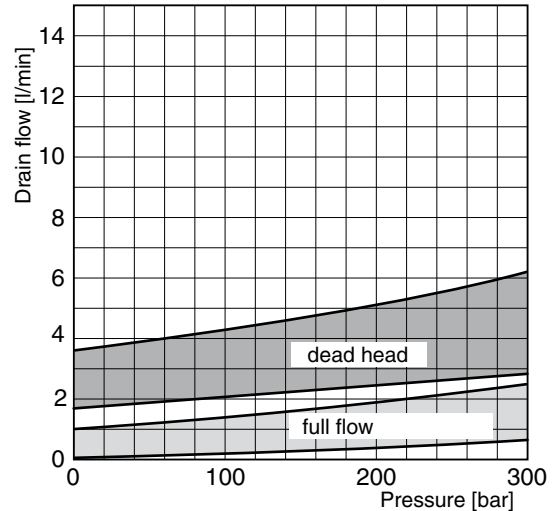
Efficiency and case drain flows PV016, PV020, PV023 and PV028

The efficiency and power graphs are measured at an input speed of $n = 1500$ rpm, a temperature of $50\text{ }^{\circ}\text{C}$ and a fluid viscosity of $30\text{ mm}^2/\text{s}$.

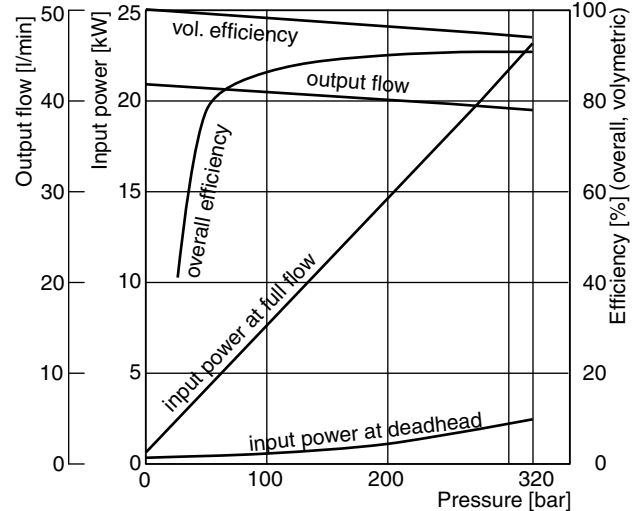
Case drain flow and compensator control flow leave via the drain port of the pump. To the values shown are to be added 1 to 1.2 l/min, if at pilot operated compensators the control flow of the pressure pilot valve also goes through the pump.

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.

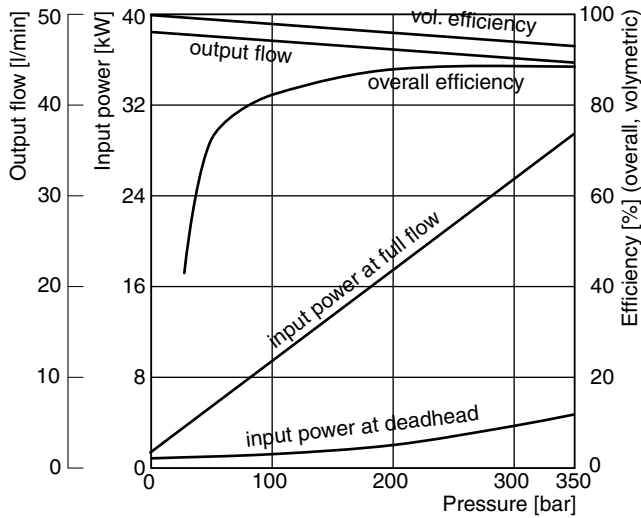
Case drain flow PV016-028 with pressure compensator (MMC)



PV028



**Efficiency, power consumption
PV032**



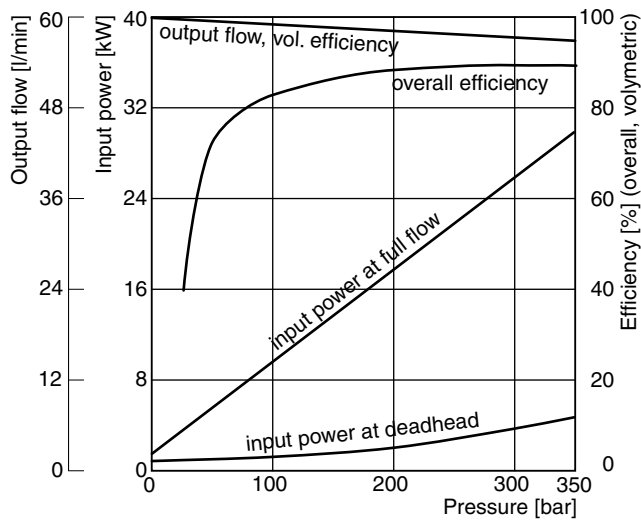
Efficiency and case drain flows PV032 to PV046

The efficiency and power graphs are measured at an input speed of $n = 1500$ rpm, a temperature of $50\text{ }^{\circ}\text{C}$ and a fluid viscosity of $30\text{ mm}^2/\text{s}$.

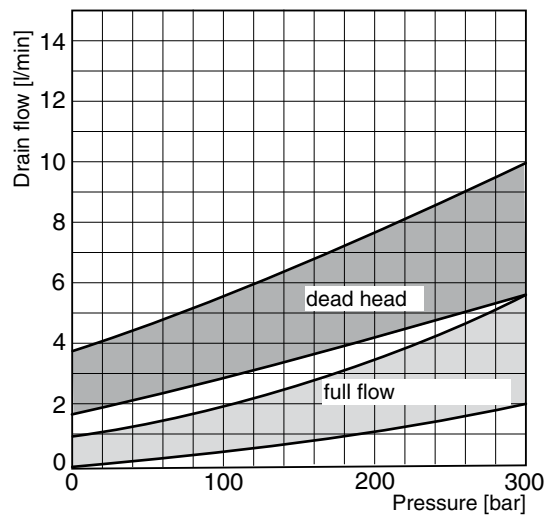
Case drain flow and compensator control flow leave via the drain port of the pump. To the values shown are to be added 1 to 1.2 l/min, if at pilot operated compensators the control flow of the pressure pilot valve also goes through the pump.

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.

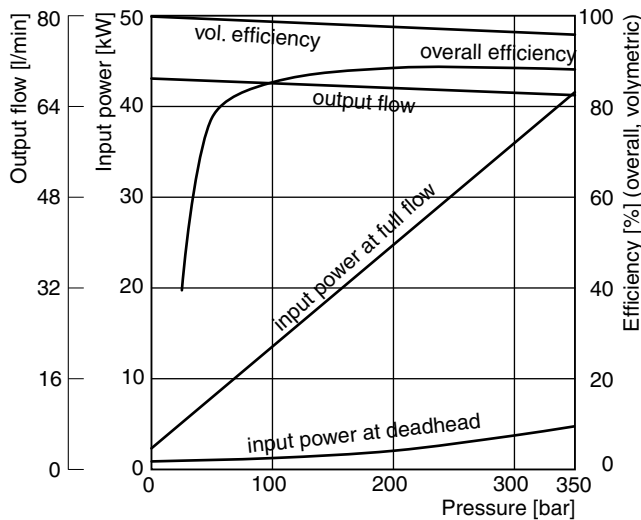
PV040



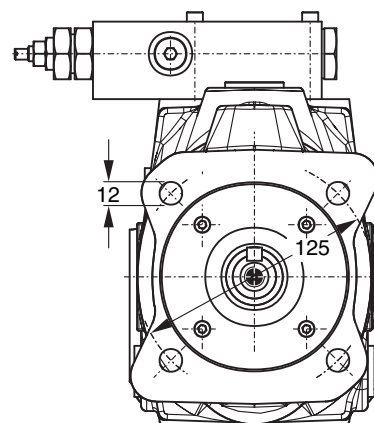
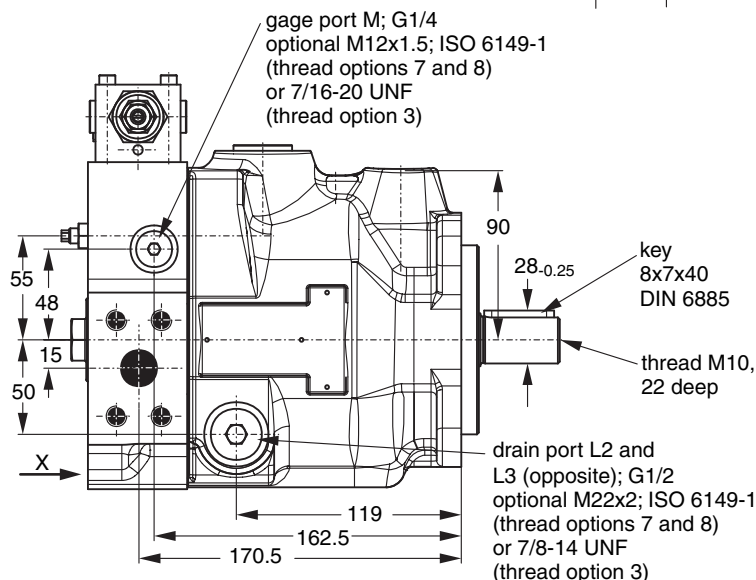
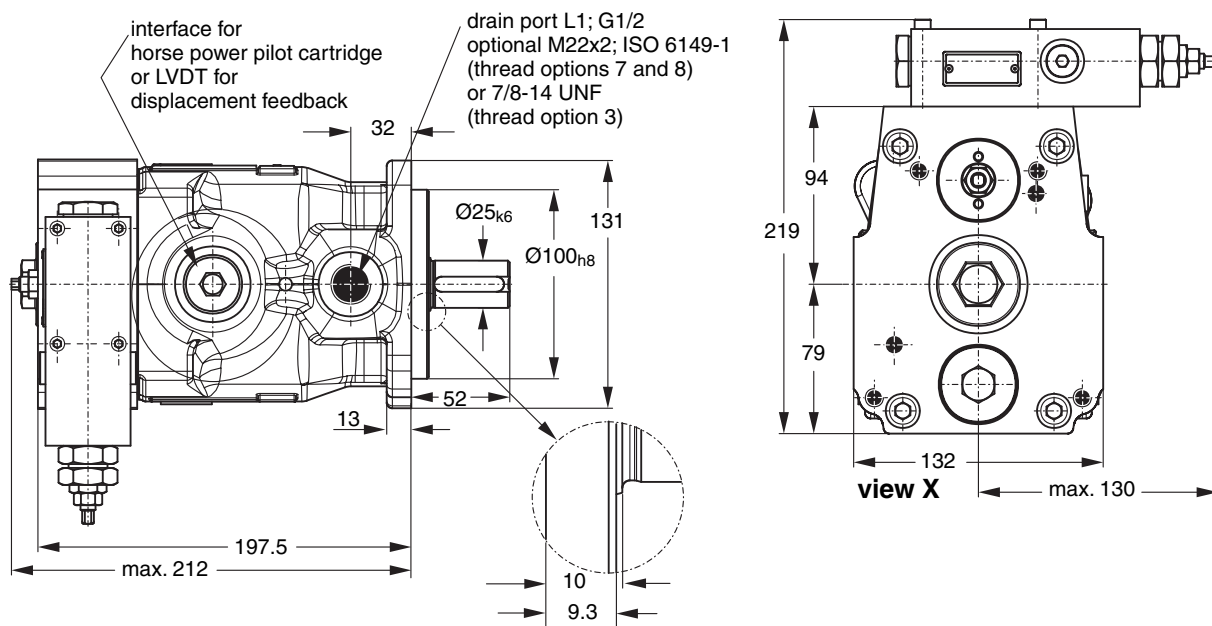
Case drain flow PV032-046 with pressure compensator (MMC)



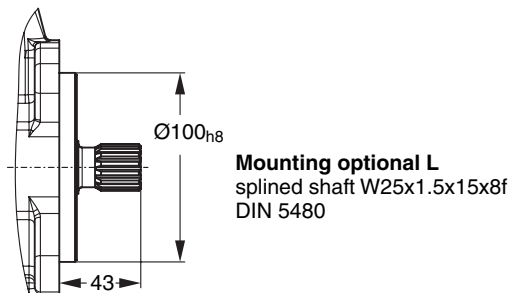
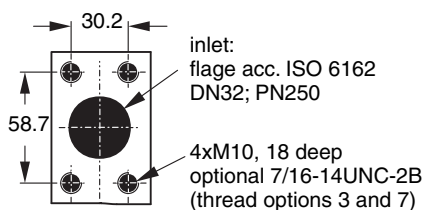
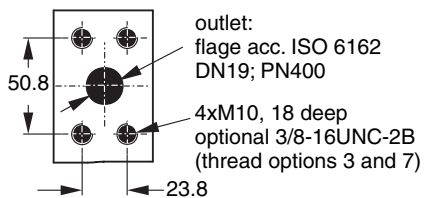
PV046



PV016 - 023, metric version

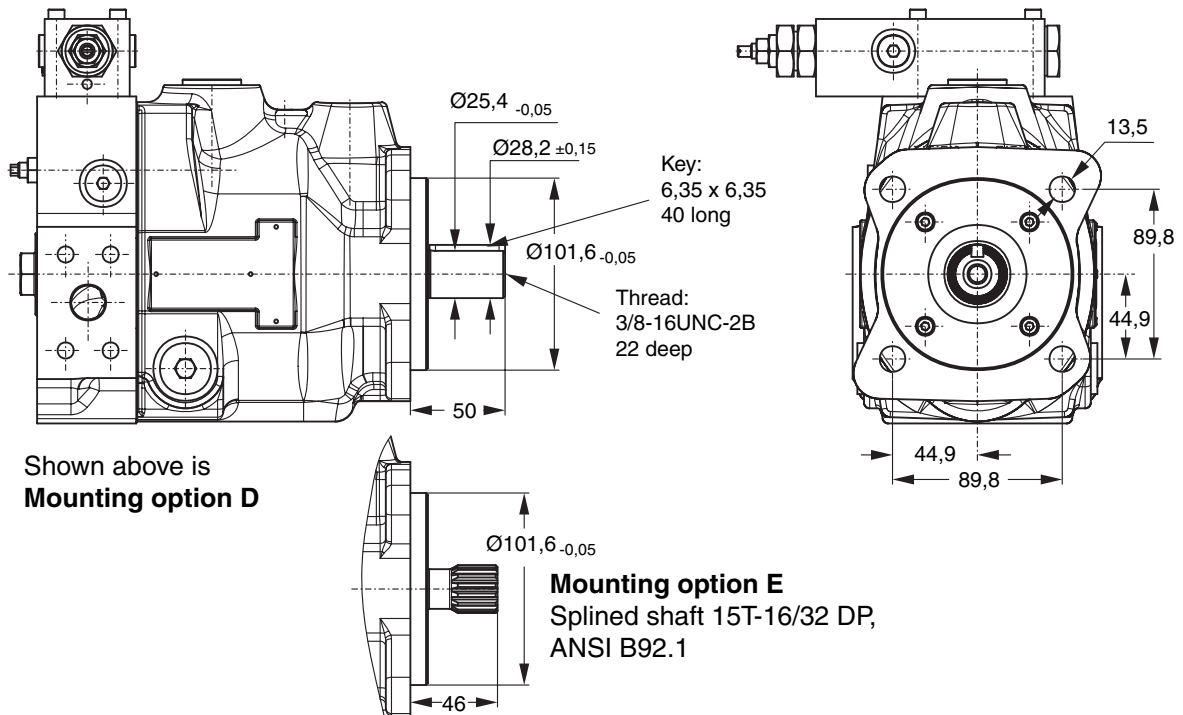


The pump shown above has mounting option **K** and thru drive option **T** (prepared for thru drive)

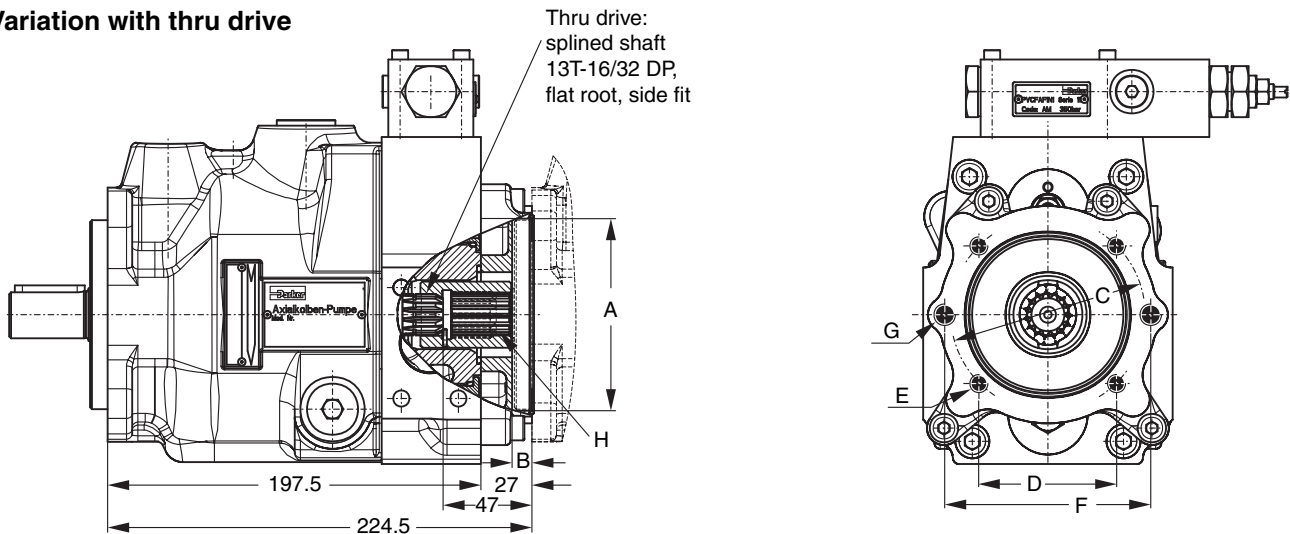


Shown is a clockwise rotating pump with standard pressure compensator. Counter clockwise rotating pumps have inlet, outlet and gauge port reversed.

PV016 - 028, SAE version

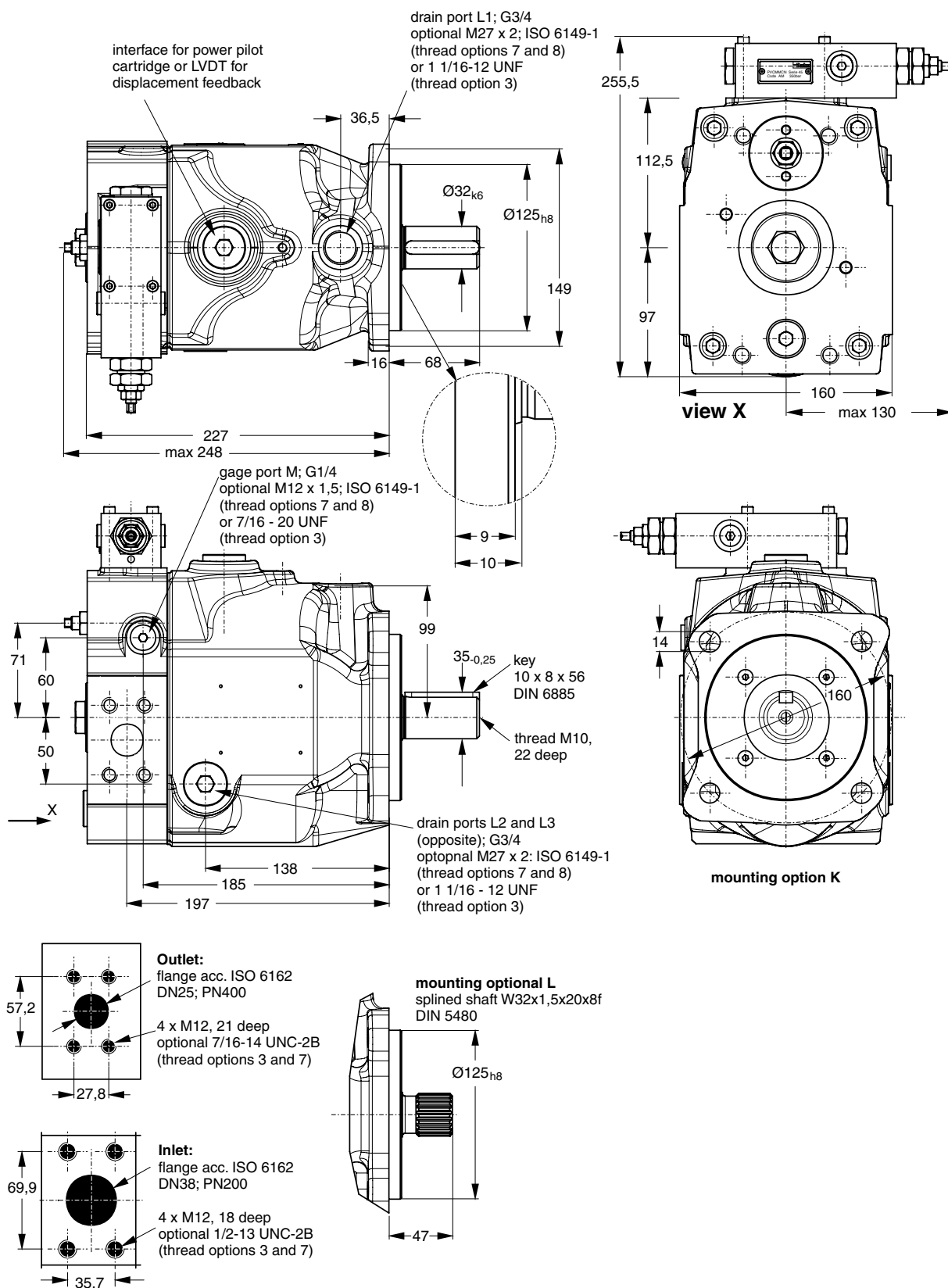


Variation with thru drive



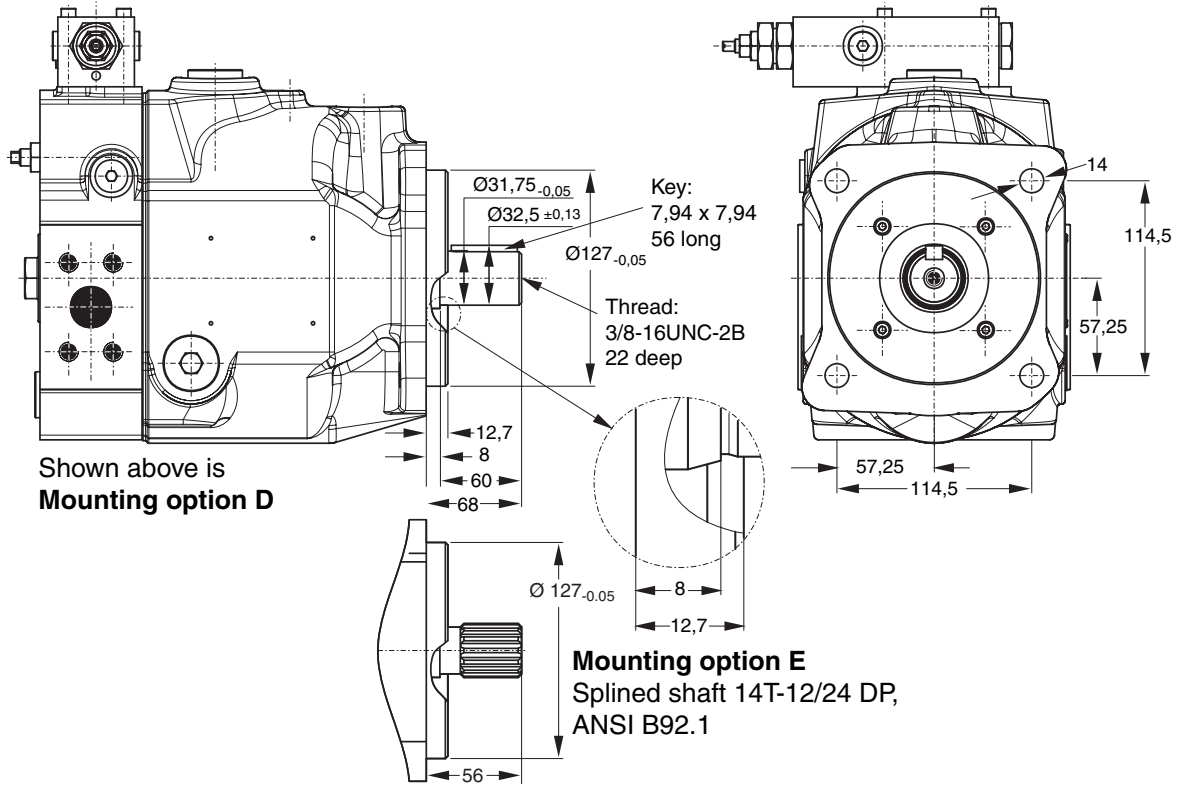
Thru drive adaptors are available with the following dimensions								
Drawing Dimension	A	B	C	D	E	F	G	Remark
Thru drive option								
Y	50,8	8	-	-	-	82	M8	SAE AA 2-Bolt
A	82,55	10	-	-	-	106	M10	SAE A 2-Bolt
B	101,6	10,5	127	89,8	M12	-	-	SAE B 4-Bolt
G	63	8,5	85	60,1	M8	100	M8	2/4-Bolt
H	80	8,5	103	72,8	M8	109	M10	2/4-Bolt
J	100	10,5	125	88,4	M10	-	-	4-Bolt

PV032 - 046, metric version

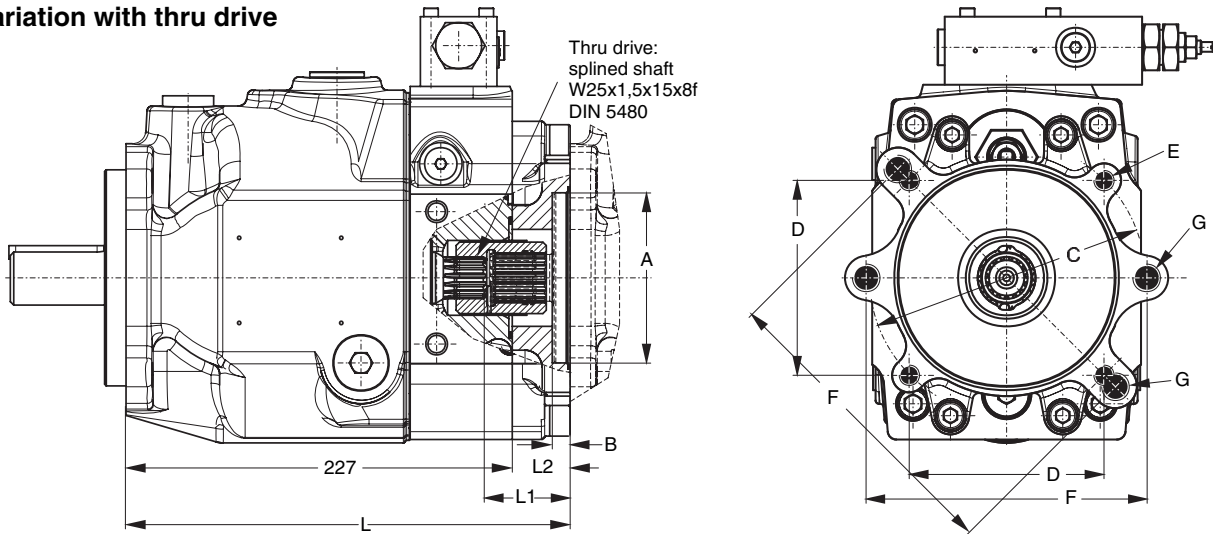


Shown is a clockwise rotating pump with standard pressure compensator.
 Counter clockwise rotating pumps have inlet, outlet and gauge port reversed.

PV032 - 046, SAE version



Variation with thru drive



Dimension H and available couplings see page 12.
 At threads options 3 and 7 the dimensions E and G are UNC - 2B threads.

Thru drive adaptors are available with the following dimensions

Drawing Dimension	A	B	C	D	E	F	G	Remark
Thru drive option								
A	82,55	8	-	-	-	106	M10	SAE A 2-Bolt
B	101,6	11	127	89,8	M12	146	M12	SAE B 2/4-Bolt
C	127	13,5	161,9	114,5	M12	-	-	SAE C 4-Bolt
G	63	8,5	85	60,1	M8	100	M8	2/4-Bolt
H	80	8,5	103	72,8	M8	109	M10	2/4-Bolt
J	100	10,5	125	88,4	M10	140	M12	2/4-Bolt
K	125	10,5	160	113,1	M12	-	-	4-Bolt

Mounting kits for multiple pumps, for second pump option

MK - PV BG

Mounting kit Axial piston pump series PV Size Second pump Thread Seals

Code	Pump size	Code	Second pump, SAE	Code	Seals
1	Pump size 1: PV016 - PV028	T	Prepared for thru drive option (plugged)	N	NBR
2	Pump size 2: PV032 - PV046	Y	SAE AA, diameter 50.8 mm	V	FPM
3	Pump size 3: PV063 - PV092	A	SAE A, diameter 82.55 mm		
4	Pump size 4: PV140 - PV180	B	SAE B, diameter 101.6 mm		
5	Pump size 5: PV270	C	SAE C, diameter 127 mm		
		D	SAE D, diameter 152.4 mm		
		E	SAE E, diameter 165.1 mm		
		Second pump, metric			
		G	Diameter 63 mm		
		H	Diameter 80 mm		
		J	Diameter 100 mm		
		K	Diameter 125 mm		
		L	Diameter 160 mm		
		M	Diameter 200 mm		

Code	Thread
M	Metric
S	SAE

Kit contains positions 30, 69, 84, 85 and 87, see drawing below.

Mounting kits for multiple pumps, couplings

MK - PV BG K

Mounting kit Axial piston pump series PV Size Coupling

Code	Pump size	Code	Coupling for metric, splined shaft DIN 5480
1	Pump size 1: PV016 - PV028	01	N25 x 1.5 x 15
2	Pump size 2: PV032 - PV046	02	N32 x 1.5 x 20
3	Pump size 3: PV063 - PV092	03	N40 x 1.5 x 25
4	Pump size 4: PV140 - PV180	04	N50 x 2 x 24
5	Pump size 5: PV270	05	N60 x 2 x 28
			Coupling for SAE splined shaft flat root, side fit
		11	SAE A, 9T 16/32
		12	SAE-, 11T 16/32
		13	SAE B, 13T 16/32
		14	SAE B-B, 15T 16/32
		15	SAE C, 14T 12/24
		16	SAE C-C, 17T 12/24
		17	SAE D+E, 13T 8/16
		18	SAE F, 15T 8/16
			Coupling + adaptor for keyed shaft
		20	Diameter 12 mm
		21	Diameter 16 mm
		22	Diameter 18 mm

Kit contains positions 91 (and 92 for keyed shaft).

front pump

second pump

SAE, splined keyed shaft (only up to Ø18, metric) metric splined

Max. transferable torque in [Nm] for different shafts options

Shaft code	PV016-028	PV032-046
D	300	550
E	300	610
K	300	570
L	405	675
Max. torque transmission cap. for rear mounted pump	140	275

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 (and more) the limit torque could be reached or exceeded.

Therefore it is necessary to calculate the torque factor and compare it with the allowed torque limit factor in the table.

Required: calculated torque factor
 < torque limit factor

Pump	Shaft	Torque limit factor
PV016-028	D	17700
	E	17700
	K	17700
	L	20130
PV032-046	D	32680
	E	36380
	K	33810
	L	40250

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.

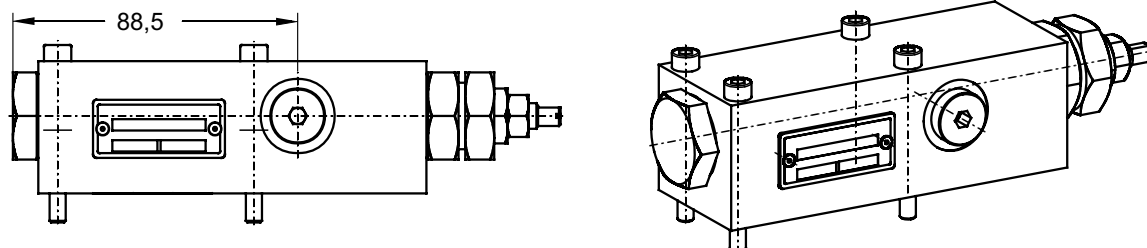
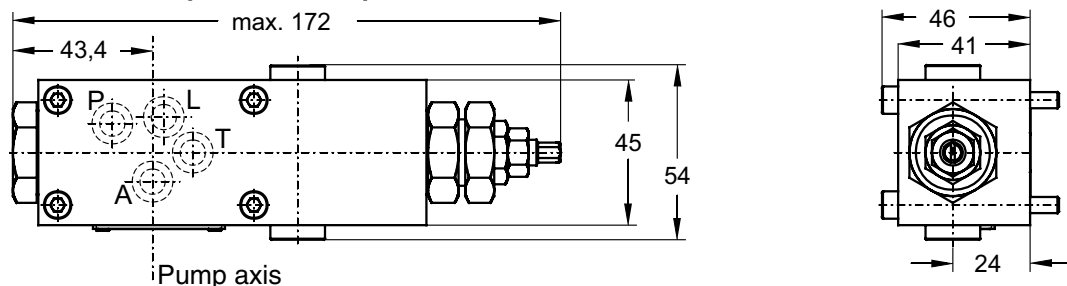
The **total torque factor** is represented by the sum of the individual torque factors of all pumps in the complete pump combination.

Total torque factor of the combination
 = sum of individual torque factors of all pumps

The **torque factor of each individual pump** is calculated by multiplying the max. operating pressure p of the pump (in bar) with the max. displacement Vg of the pump (in cm³/rev).

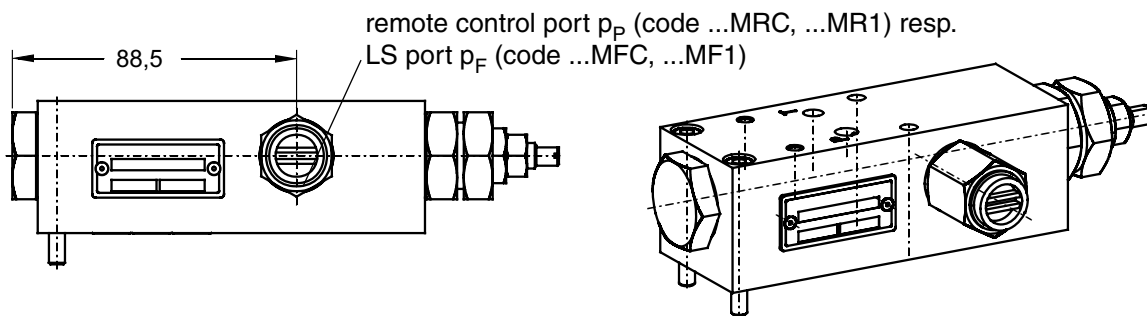
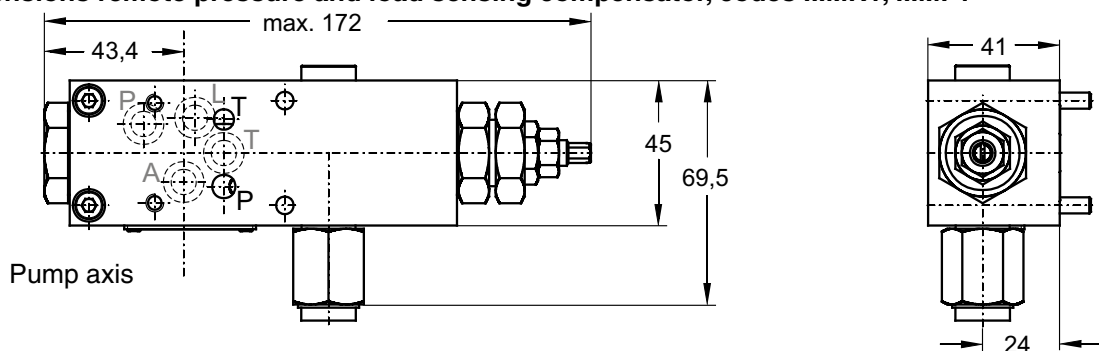
Torque factor of any pump
 = p x Vg

Dimensions standard pressure compensator, code MMC



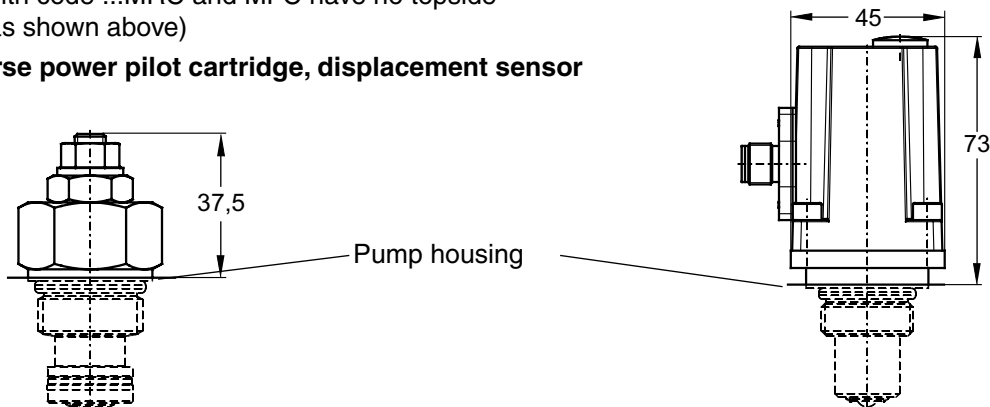
Compensators with code ...MM1 have a NG6 / Cetop 3 interface topside (as shown below)

Dimensions remote pressure and load sensing compensator, codes ...MR1, ...MF1

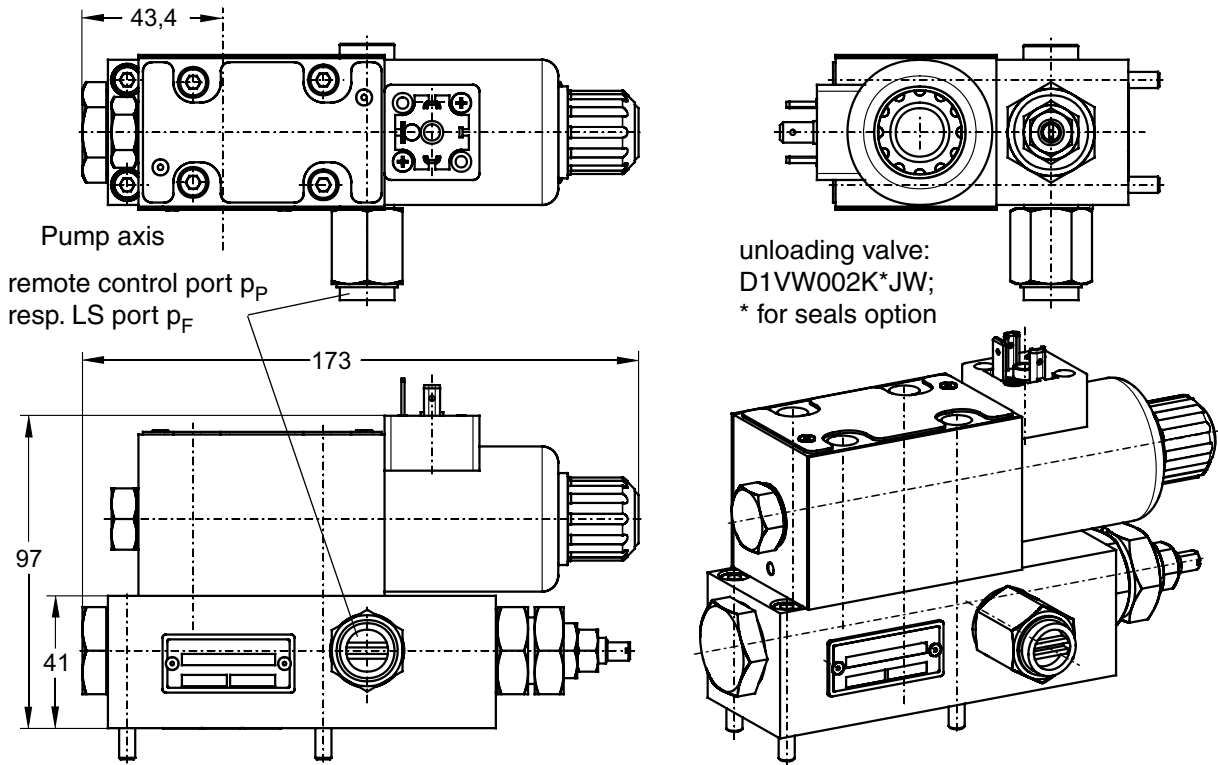


Compensators with code ...MRC and MFC have no topside valve interface (as shown above)

Dimensions horse power pilot cartridge, displacement sensor

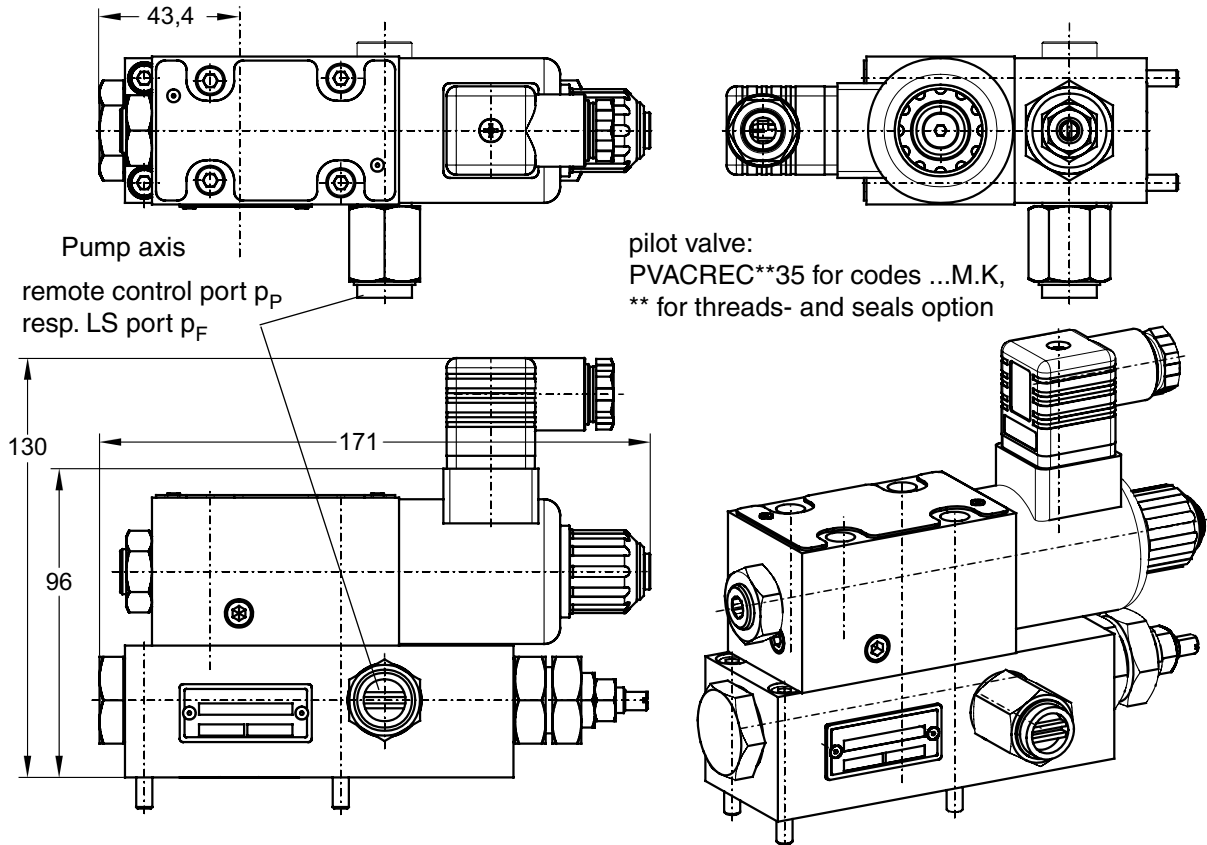


Dimensions for compensators with unloading valve, codes ...MMW, ...MRW, ...MFW



Compensators with code ...MMW have no remote control port.

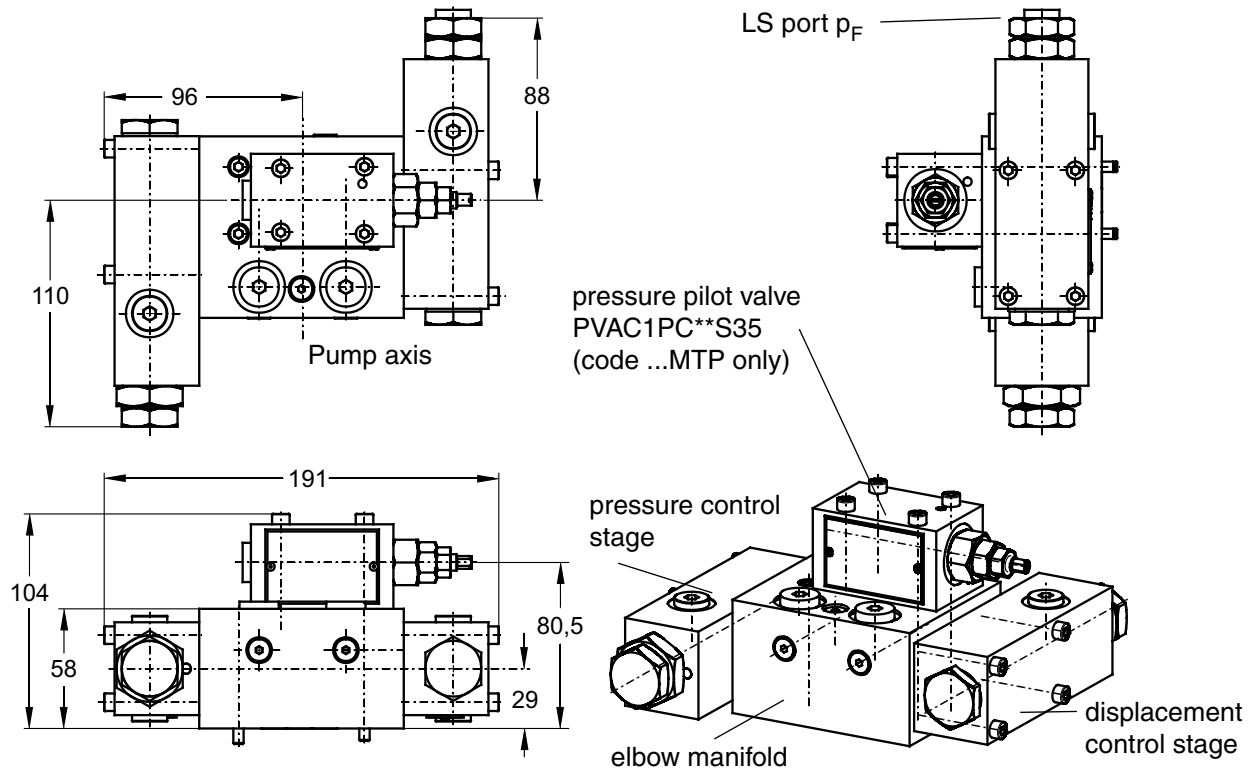
Dimensions for compensators with proportional pressure pilot valve, codes ...MMK, ...MRK, ...MFK



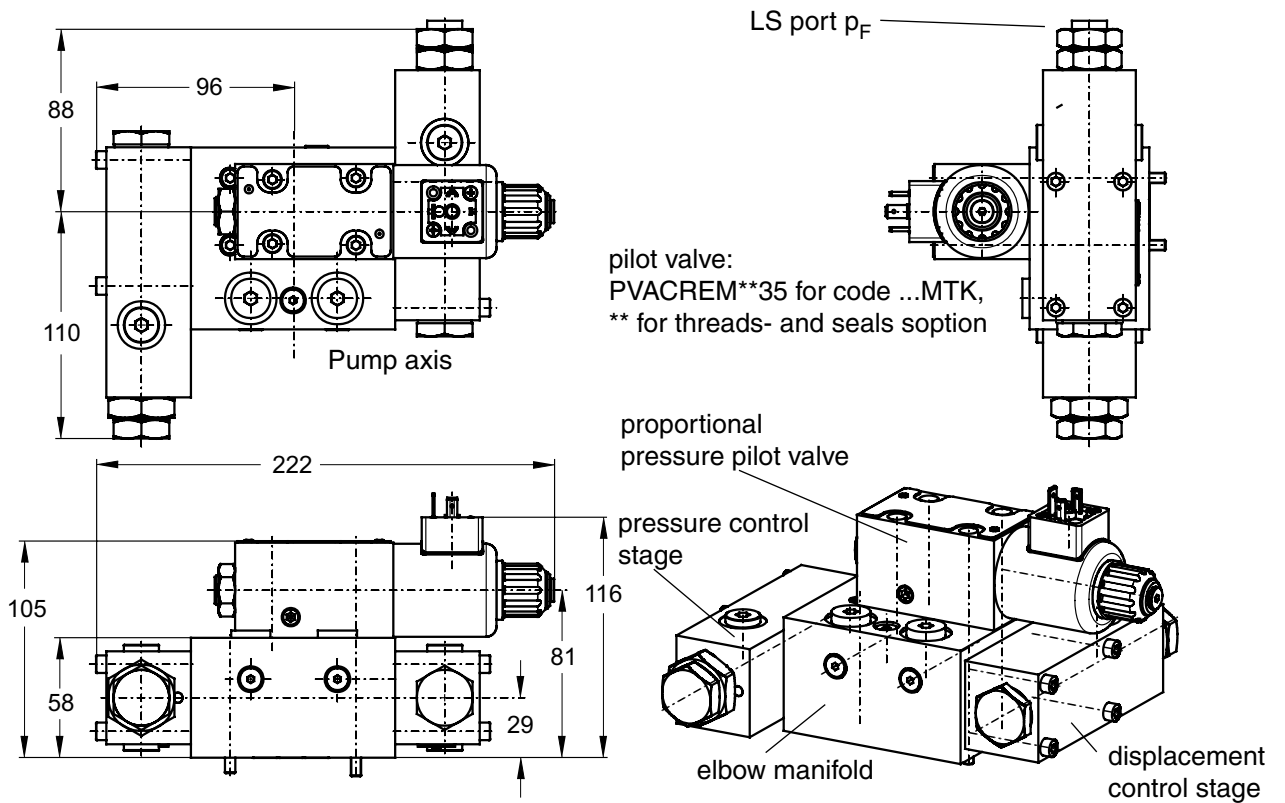
Compensators with code ...MMK have no remote control port.

Dimensions for horse power compensator *L* and *C* are identical to MR* and MF*.

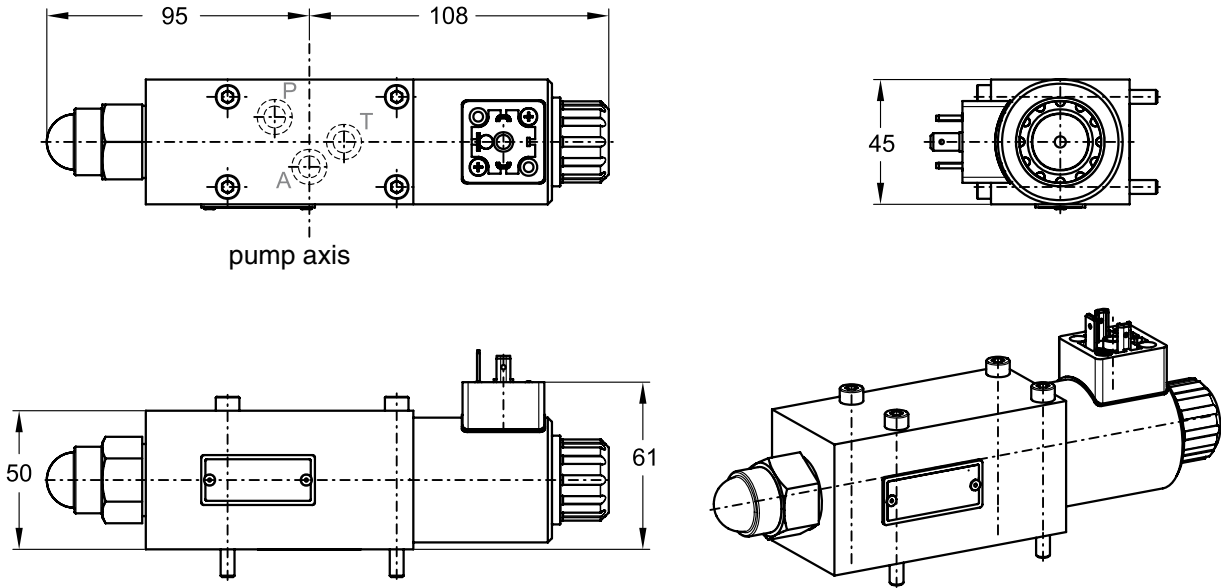
Dimensions two spool load sensing compensator, code ...MT1, ...MTP



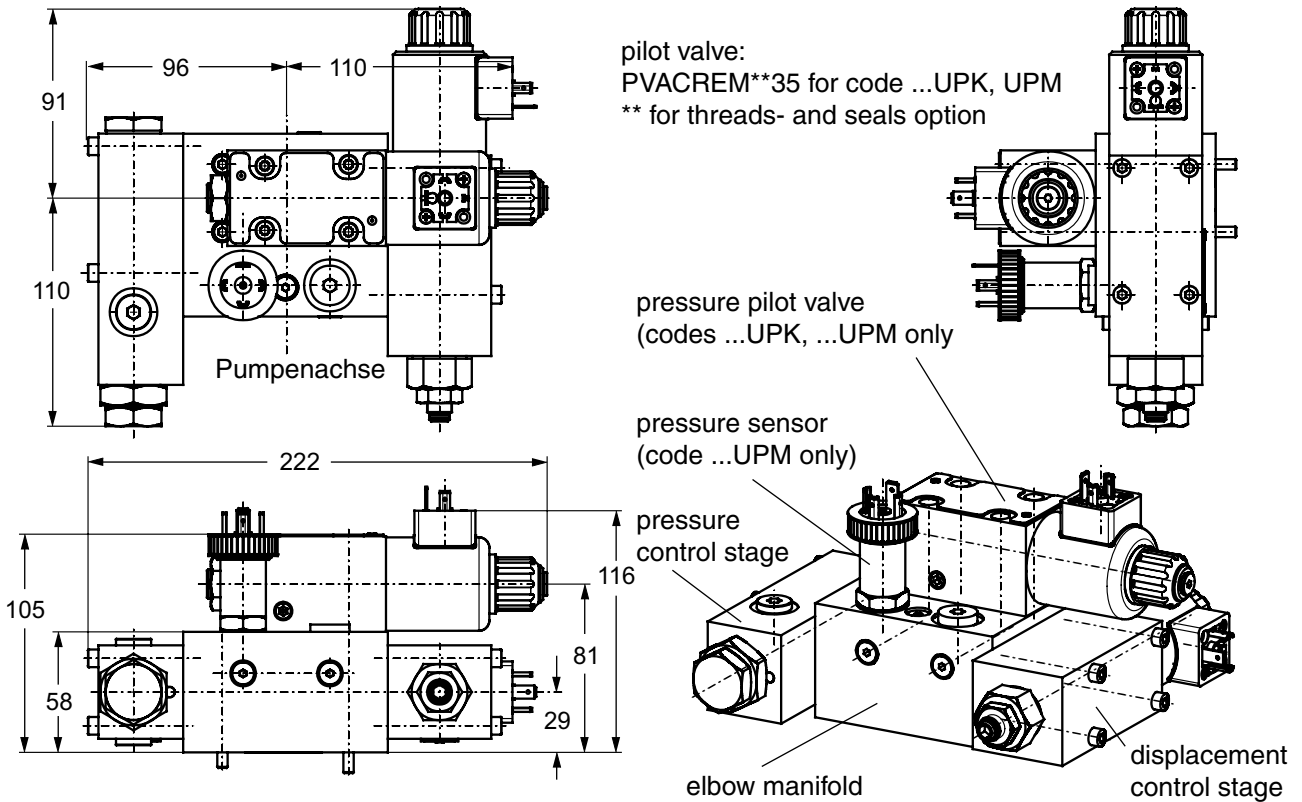
Dimensions two spool load sensing compensator with proportional pressure pilot valve, code ...MTK



Dimensions proportional displacement control, code ...FPV



Dimensions proportional p/Q-control, codes ...UPR, ...UPK, ...UPM

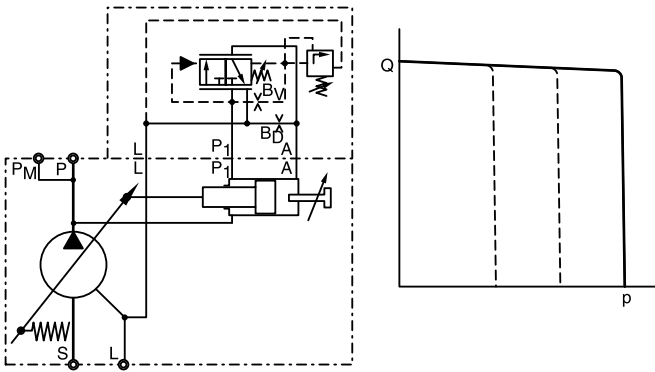


Standard pressure compensator, code MMC

The standard pressure compensator adjusts the pump displacement according to the actual need of the system in order to keep the pressure constant.

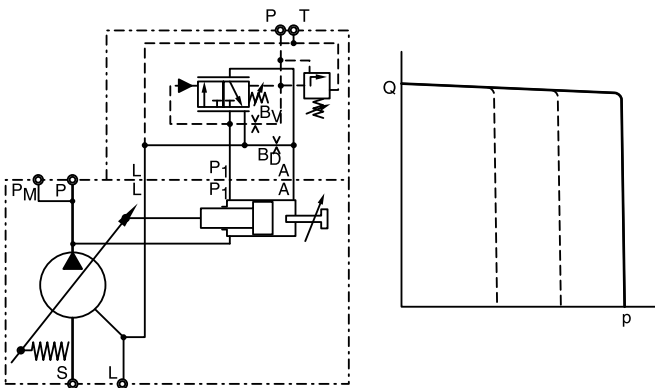
As long as the system pressure at outlet port P is lower than the set pressure (set as spring preload of the integrated pilot valve) the working port A of the compensator valve is connected to the case drain and the piston area is unloaded. Bias spring and system pressure on the annulus area keep the pump at full displacement.

When the system pressure reaches the set pressure of the pilot valve, pilot flow is built up and a differential pressure will occur at pilot orifice B_v. When this differential pressure reaches the factory setting of the compensator, the control spool connects port P₁ to A and builds up a pressure at the servo piston resulting in a down stroking of the pump. The displacement of the pump is controlled in order to match the flow requirement of the system.



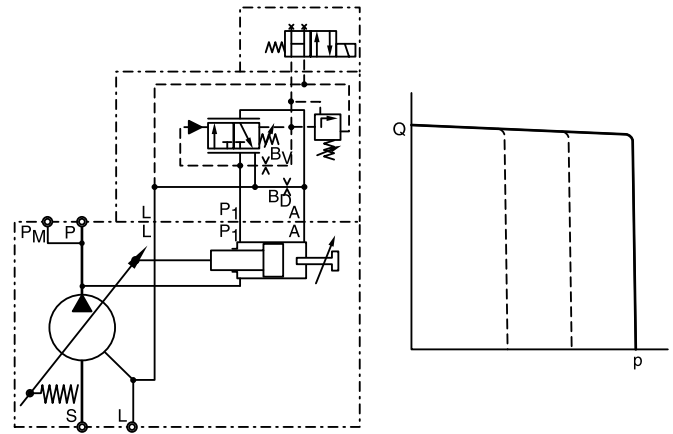
Standard pressure compensator with NG6 interface, code MM1

With code *MM1 the standard pressure compensator has on its top side a valve interface size NG 6 DIN 24 340 (CETOP 03 acc. RP35H, NFPA D03). This interface allows the mounting of accessories like multiple pressure selectors without the need of external piping and valve mounting.



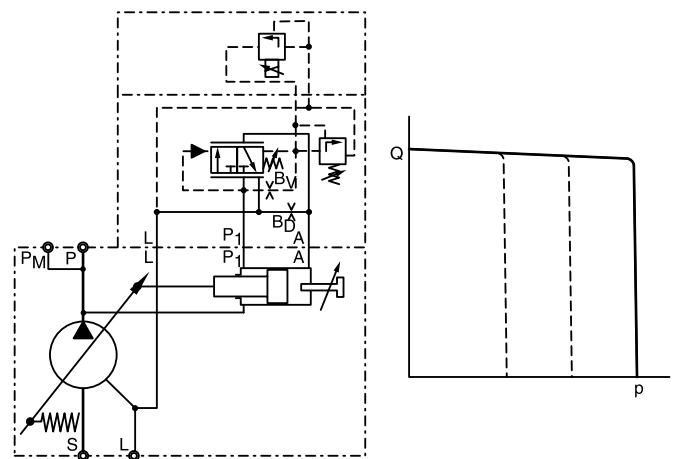
Standard pressure compensator with electrical unloading, code MMW

With code *MMW a solenoid operated directional control valve is mounted on the compensator top side. Solenoid supply voltage is 24 VDC, nominal current is 1.25 A. When the solenoid is idle, the pump compensates at a stand-by pressure of typical 15 bar. When the solenoid is energised, the pump compensates at a pressure, set at the integrated pilot valve.



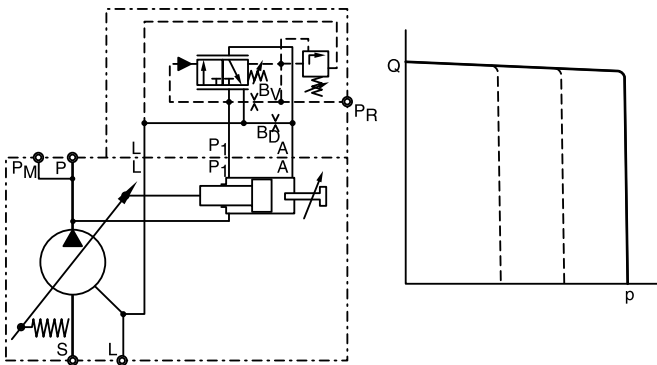
Standard pressure compensator with proportional pilot valve, code MMK

With code *MMK a proportional pilot valve type PVACRE..35 (see page 32) is mounted on the top side interface. This feature allows a variation of the pump compensating pressure between 20 and 350 bar by an electrical input signal.



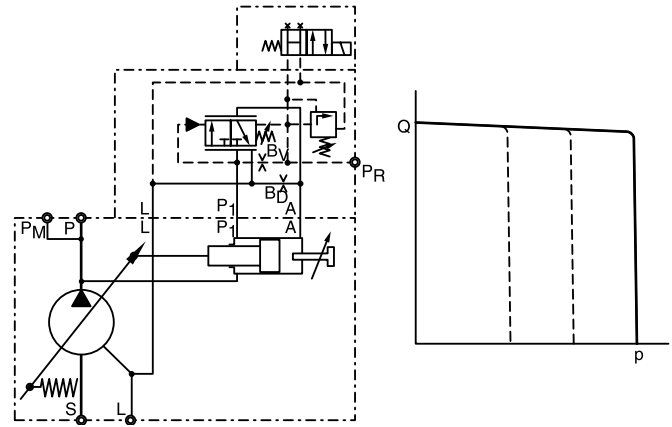
Remote pressure compensator, code MRC

The basic function of the remote pressure compensator code *MRC is equal to the function of the standard pressure compensator. The remote compensator offers an additional remote control port on the side of the compensator body. With a remote installed pilot valve, the setting of the pump compensating pressure can be adjusted from a location up to 15 meter apart from the pump. The thread of this remote port is defined in the thread option of the PV pump ordering code. For long distances between pump and remote control valve please consider temperature and response time influences.



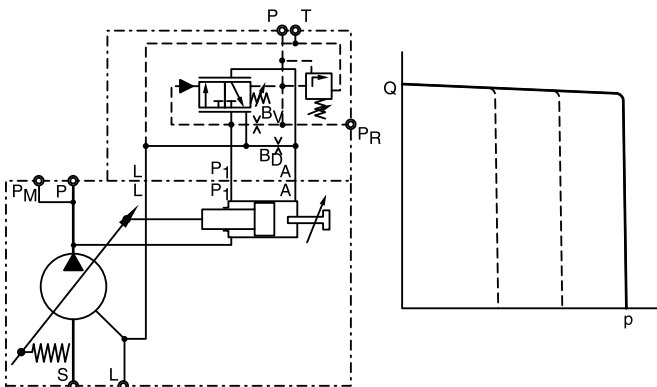
Remote pressure compensator with electrical unloading, code MRW

With code *MRW a solenoid operated directional control valve is mounted on the compensator top side. Solenoid supply voltage is 24 VDC, nominal current is 1.25 A. When the solenoid is idle, the pump compensates at a stand-by pressure of typical 15 bar. When the solenoid is energized, the pump compensates at a pressure, set at the integrated pilot valve.



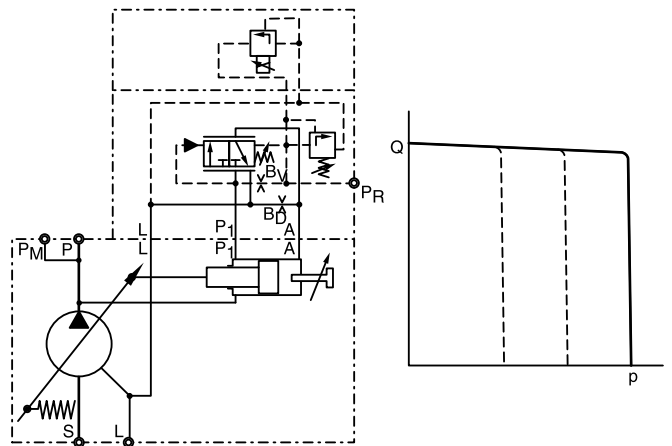
Remote pressure compensator with NG6 interface, code MR1

With code *MR1 the remote pressure compensator has on its top side a valve interface size NG 6 DIN 24 340 (CETOP 03 acc. RP35H, NFPA D03). This interface allows the mounting of accessories like multiple pressure selectors without the need of external piping and valve mounting.



Remote pressure compensator with proportional pilot valve, code MRK

With code *MRK a proportional pilot valve type PVACRE..35 (see page 32) is mounted on the top side interface. This feature allows a variation of the pump compensating pressure between P_R 20 and 350 bar by an electrical input signal..

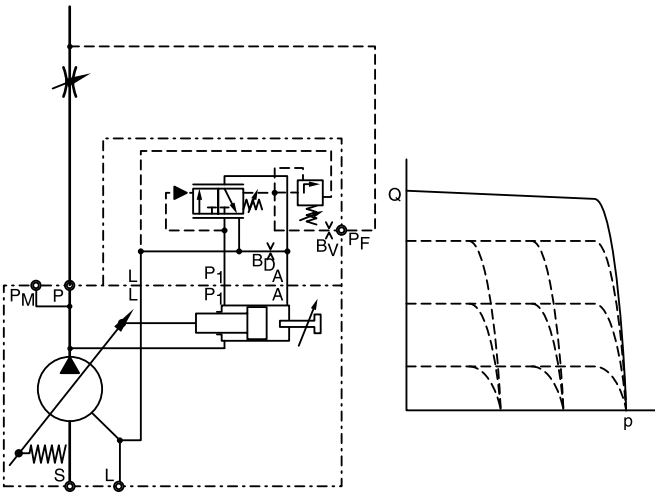


Load sensing compensator code MFC

The pilot pressure of the load sensing compensator is taken from a load sensing port in the hydraulic system. This port is located downstream of a throttle valve (manually or electronically operated). The pump compensator differential pressure is factory set to 10 bar.

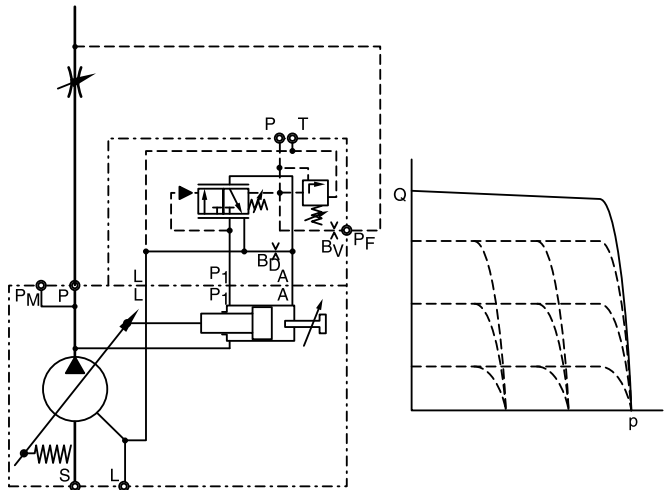
When the main stream throttle valve is set to a position, that creates the 10 bar pressure drop at a lower flow, than the pump nominal flow, the load sensing compensator will reduce the pump displacement accordingly to avoid power losses in the circuit. When the main stream throttle valve is closed, the pump will be compensated to stand-by operation at a pump outlet pressure of 10 bar.

If the system pressure exceeds the setting of the integrated pilot valve, the pilot valve will create an additional pressure drop at the pilot orifice BV. This will lead to a pressure compensation of the pump in order not to exceed the set pressure.



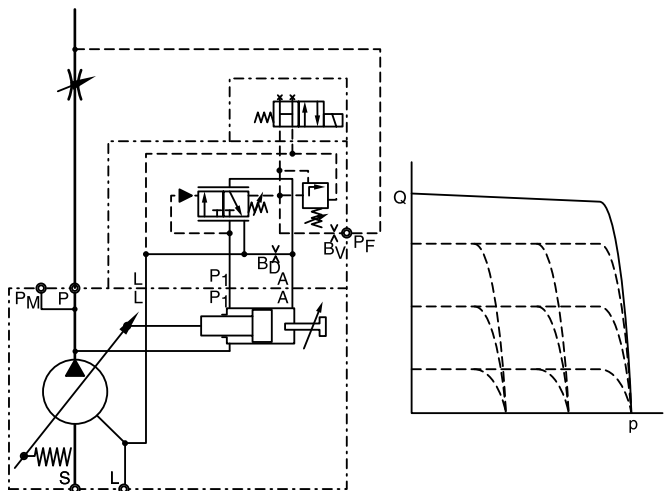
Load sensing compensator NG6 interface, code MF1

With code *MF1 the load sensing compensator has on its top side a valve interface size NG 6 DIN 24 340 (CETOP 03 acc. RP35H, NFPA D03). This interface allows the mounting of accessories like multiple pressure selectors without the need of external piping and valve mounting.



Load sensing compensator with electrical unloading, code MFW

With code *MFW a solenoid operated directional control valve is mounted on the compensator top side. Solenoid supply voltage is 24 VDC, nominal current is 1.25 A. When the solenoid is idle, the pump compensates at a stand-by pressure of typical 10 bar. When the solenoid is energized, the pump compensates at a pressure, set at the integrated pilot valve or according to the setting of the main stream throttle valve.



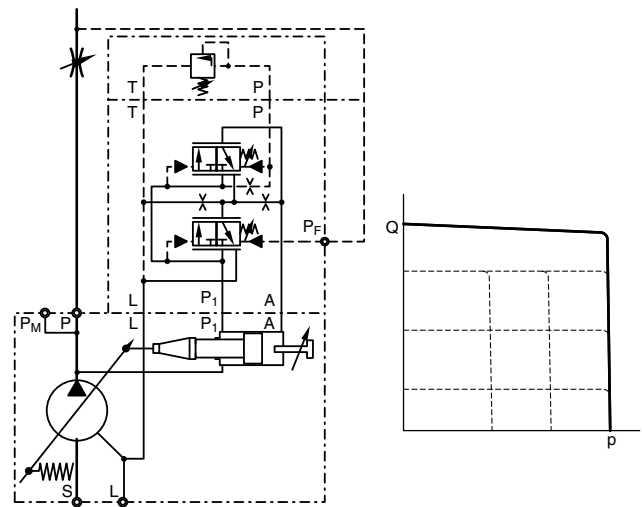
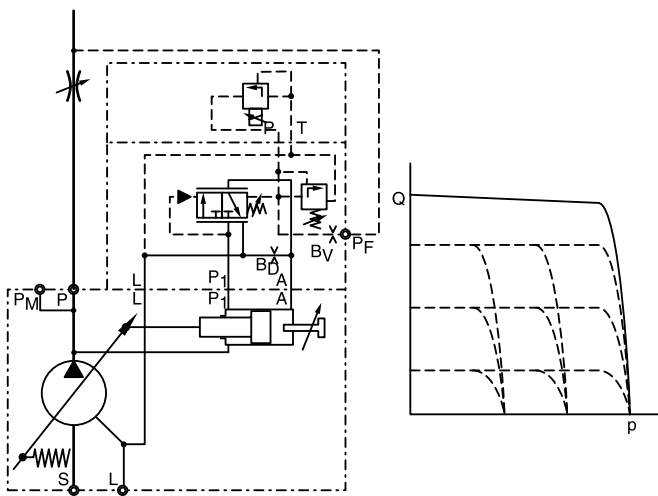
Load sensing compensator with proportional pilot valve, code MFK

With code *MFK a proportional pilot valve type PVACRE..35 (see page 32) is mounted on the top side interface. This feature allows a variation of the pump compensating pressure between 20 and 350 bar by an electrical input signal.

2-valve load-sensing compensator code MTP

If a more accurate pressure compensation is required, the 2-valve load-sensing compensator can be used. The circuit diagram of this version is shown below. Here the interaction of the two control functions is avoided by using two separate control valves for flow and pressure compensation.

Compensator type *MTP includes pilot valve PAVC1P* and in case of *MTK proportional pilot valve PVACRE...35 is mounted instead (see page 32). Compensator version *MT1 provides NG6- Interface on top, no pilot valve mounted.



Hydraulic-mechanical power compensator

The hydraulic-mechanical power compensator consists of a modified remote pressure compensator (Code *L*) or of a modified load-sensing compensator (Code *C*) 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 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 power (torque) curve.

For all nominal powers of standard electrical motors Parker offers a dedicated cam sleeve. The exchange of this cam sleeve (e.g.: to change power setting) can easily be done without disassembly of the pump.

On top of that an adjustment of the power setting can be done within certain limits by adjusting the preload of the pilot control cartridge spring. That allows an adjustment of a constant power setting for other than the nominal speeds (1500 min⁻¹) or for other powers.

Ordering code for the power option

The first digit designates the power setting:

Code B = 3.0 kW etc. up to

Code S = 30 kW

The second digit designates the pilot flow source:

Code L internal pilot pressure, pressure compensator function.

Code C external pilot pressure, combines power compensation with load-sensing compensation.

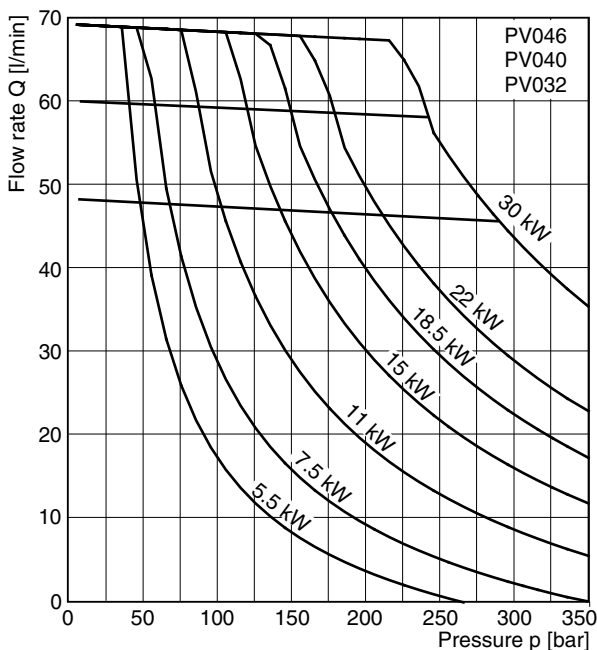
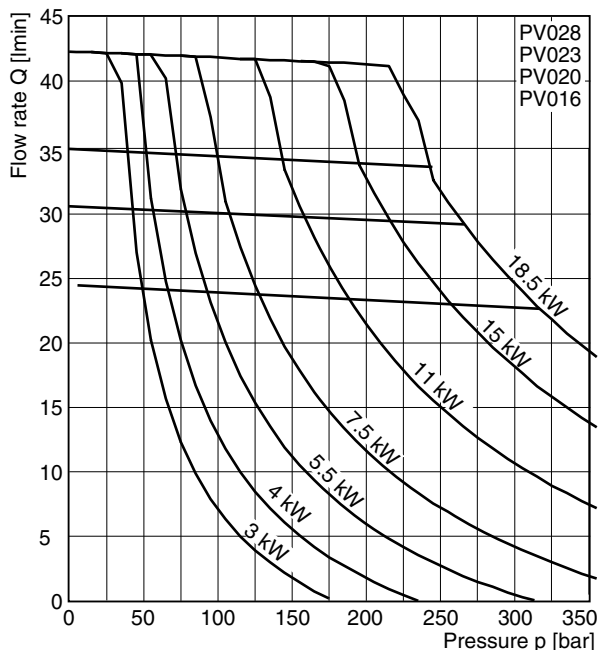
The third digit designates the possibility to adjust the overriding pressure compensation:

Code 1 comes with a top side NG6/D03 interface on the control valve to mount any suitable pilot valve or Parker pump accessories.

Code C includes a pilot valve for manual pressure adjustment. Max. setting: 350 bar.

The graphs below show typical power curves, collected during following conditions:

- Speed : n = 1500 rev/min
- Temperature : t = 50 °C
- Fluid : HLP, ISO VG46
- Viscosity : v = 46 mm²/s at 40 °C



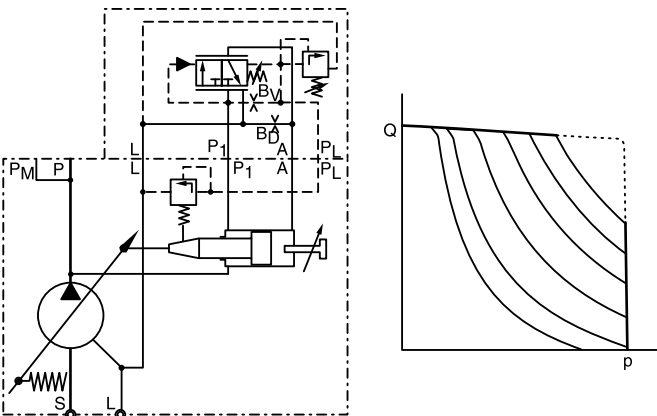
Power compensator code *LC

The control function of the power compensator is as described in the *MMC standard compensator section. The pump will start to compensate, when the pilot valve(s), integrated into compensator and pump, create a differential pressure of 15 bar at the pilot orifice BV.

In addition to the standard pressure compensator the power option has an additional pilot valve in the pump housing. The pressure setting of this valve is controlled by a power feedback sleeve connected to the servo piston. At full displacement, the pressure setting is low and the pump will start to compensate at a lower pressure. The more the pump compensates, the more the feedback sleeve is moved by the down stroking servo piston. According to the contour of this sleeve, the pressure setting of the power pilot valve is raised.

That gives a constant power requirement for the pump drive. At low pressures the pump can provide a high flow output, at high pressures the flow output has to be lowered, to avoid overloading of the drive motor.

The contour of the power feedback sleeve is designed, to match the desired constant power curve (see following page). For each nominal setting a different contour sleeve is available. The last ordering code digit (*) defines the required setting (see ordering code pages).



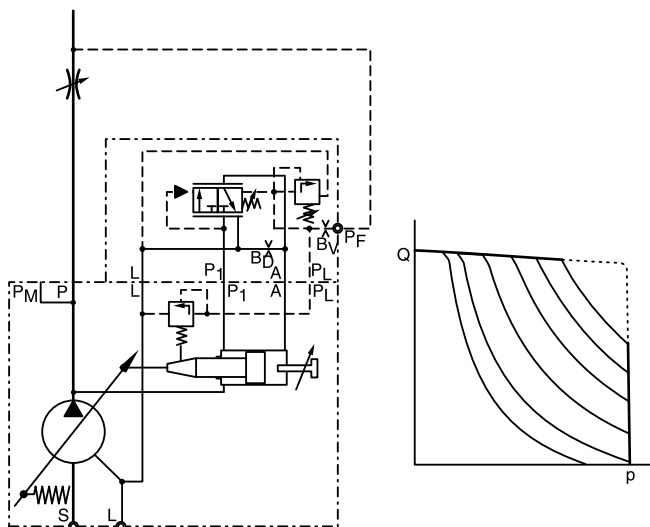
Power compensator code *CC

In code *CC, the power compensator has an additional load sensing port. As for the load sensing compensator, code *MFC the pilot pressure is not supplied internally, but from a load sensing port in the hydraulic system.

Please note: in this case the load sensing pressure differential is set to 15 bar in order to meet the constant power curve, which is laid out for a 15 bar pilot pressure differential.

With this feature the pump can be flow controlled by the main stream throttle valve, pressure controlled by the integrated pilot valve in the compensator and power controlled by the integrated pilot valve and contour sleeve in the pump housing.

Both power compensator versions: code ...LC* and code ...CC* can be ordered also with the top side interface for accessories (codes ...L1* resp. ...C1*).



Proportional displacement control, code FPV

The proportional displacement control allows the adjustment of the pumps output flow with an electrical input signal.

The actual displacement of the pump is monitored by an LVDT and compared with the commanded displacement in an electronic control module PQDXXA. The command is given as an electrical input signal (0 - 10 V or 0 resp. 4 - 20 mA) from the supervising machine control. The command can also be provided by a potentiometer. The electronic control module offers a stabilized 10 V source to supply the potentiometer.

The electronic module compares permanently the input command and the actual displacement by powering the proportional 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 then changes the control pressure (port A) until the correct displacement is adjusted.

Version FPV of the proportional control does not provide a pressure compensation. The hydraulic circuit must be protected by a pressure relief valve.

Proportional displacement control with overriding pressure control, codes UPR, UPK and UPM

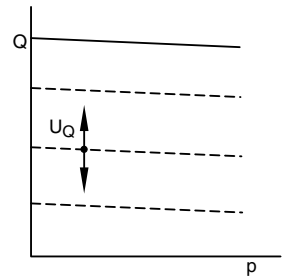
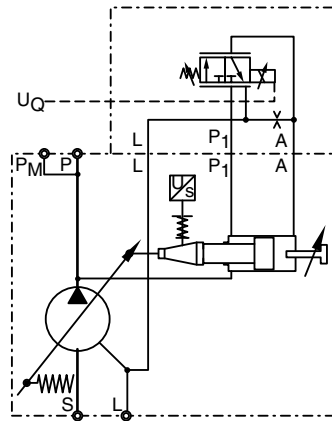
Compensator version ***UPR** provides electro- hydraulic displacement control and pressure stage mounted on elbow manifold. The elbow manifold provides NG6/D03 interface on top to mount a pressure pilot valve (not included in ***UPR**).

When using a proportional pressure pilot valve an electro-hydraulic p/Q control can be realized. The proportional pressure pilot valve PVACRE..35 is included in compensator version ***UPK**. By using the digital module PQDXXA-Z00 it is possible to control the displacement proportionally with overriding open loop proportional pressure control.

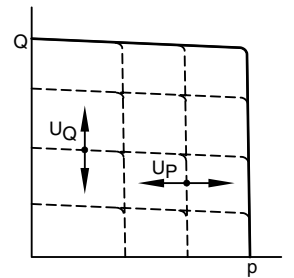
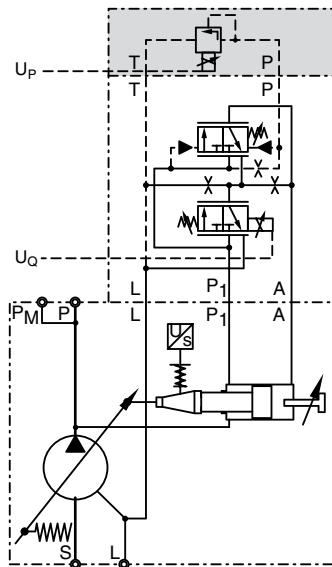
Compensator version ***UPM** is completed by a pressure transducer Parker SCP 8181 CE. In combination with control module PQDXXA-Z00 a closed loop pressure control of pump outlet pressure is available. The control module also offers an electronic power limiter in addition to closed loop pressure control with this compensator option.

Note:

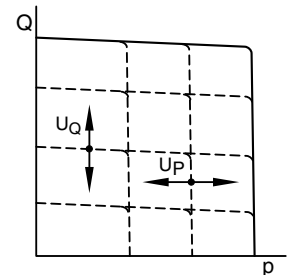
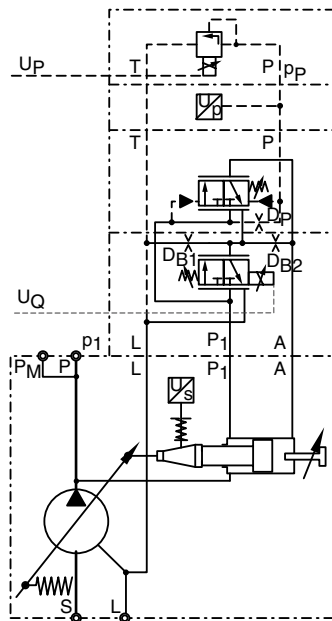
Minimum pump pressure (appr. 20 to 30 bar) depends on system and pilot valve used. Pump cannot fully downstroke if system pressure is below that level.



[dashed box] = included FPV



[dashed box] included UPR
[shaded area] additionally at UPK

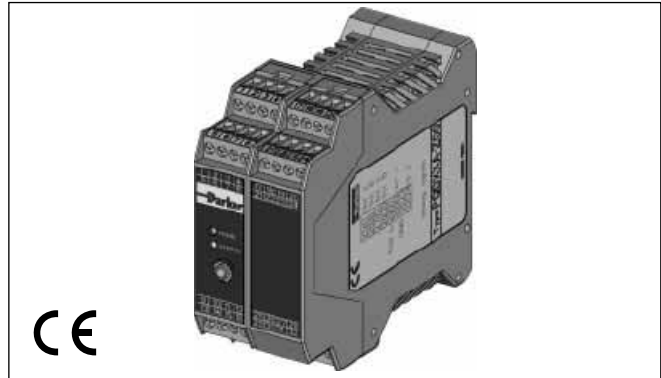


[dashed box] = included UPM

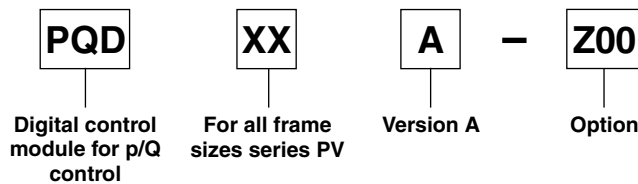
The digital control module code PQDXXA-Z00 is designed for rail mounting.

Features

- Digital control circuit
- Parameter setting via RS-232 interface
- All settings (ramps, MIN/MAX, control parameters) can be stored digitally and recalled from a PC to duplicate settings to other modules
- Ramp time up to 60 seconds
- Compatible to the relevant european EMC specifications
- Easy to use PC based setup software
- Covers all displacements from 16 to 270 cm³/rev
- Covers all functions: displacement control, displacement control with open loop pressure control, displacement control with closed loop pressure control and displacement control with closed loop pressure control and electronic power limitation.



Ordering code



Technical data

Mounting style		Snap-on mounting for EN50022 rail
Body material		Polycarbonate
Inflammation class		V2...V0 acc. UL 94
Mounting position		any
Env. temperature range	[°C]	-20...+55
Protection class		IP 20 acc. DIN 40 050
Weight	[g]	160
Duty ratio	[%]	100
Supply voltage	[V]	18...30VDC, ripple <5% eff.
Rush in current	[A]	22 for 0.2 ms
Current consumption	[A]	< 4 for p/Q control ; < 2 for Q-control
Resolution	[%]	0.025 (power 0.1)
Interface		RS232C, 9600 baud, 3.5 mm cinch
EMC		EN 50 081-2, EN 50 082-2
Connectors		Screw terminals 0.2...2.5 mm ² , plug in style
Cables	[mm ²]	1.5 (AWG 16) overall braid shield, for supply and solenoid connection 0.5 mm ² (AWG 20) overall braid shield, for sensor and command signal connections
Max. cable length	[m]	50

For programming the module via PC, an interface cable is needed, please order part number PQDXXA-KABEL separately.

Programming software

The programming of the p/Q control module is done in an easy to learn mode. To select the pump model and size and to set the control parameters the program ProPVplus must be started. This program runs under WINDOWS® 95 and higher.

The latest version of this software can be downloaded at the following internet address:

http://www.parker.com/euro_hcd

The software offers the following features:

A TERMINAL window to set or read out the control parameters of the module. Settings as well as comments entered in the terminal window can be stored also in RTF-format (opens e. g. under WORD or other text editors) A MONITOR window allows to display process variables in numerical format.

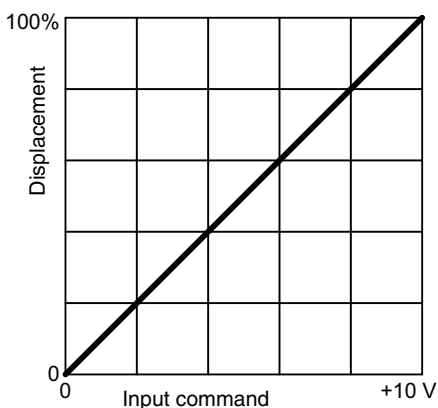
An **OSZILLOSKOP** window displays process variables as curves. The oscilloscope offers a start - stop function. The images can be saved and stored e. g. for import into other programs.

Features

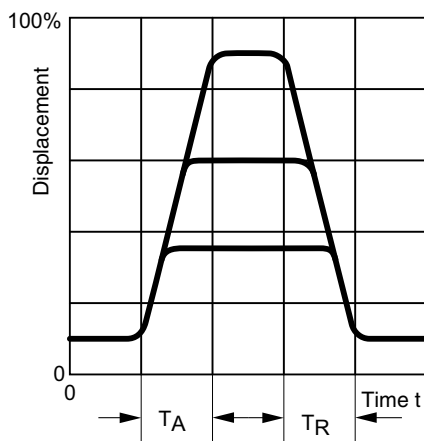
- Display and documentation of parameter sets
- Save and reload of optimized parameter sets
- Offers oscilloscope function for easy performance evaluation and optimization
- Pre-optimized parameter sets for all PVplus piston pump
- Parameter sets for all PVplus pumps are pre-installed in the modules

Diagrams

Typical static characteristic

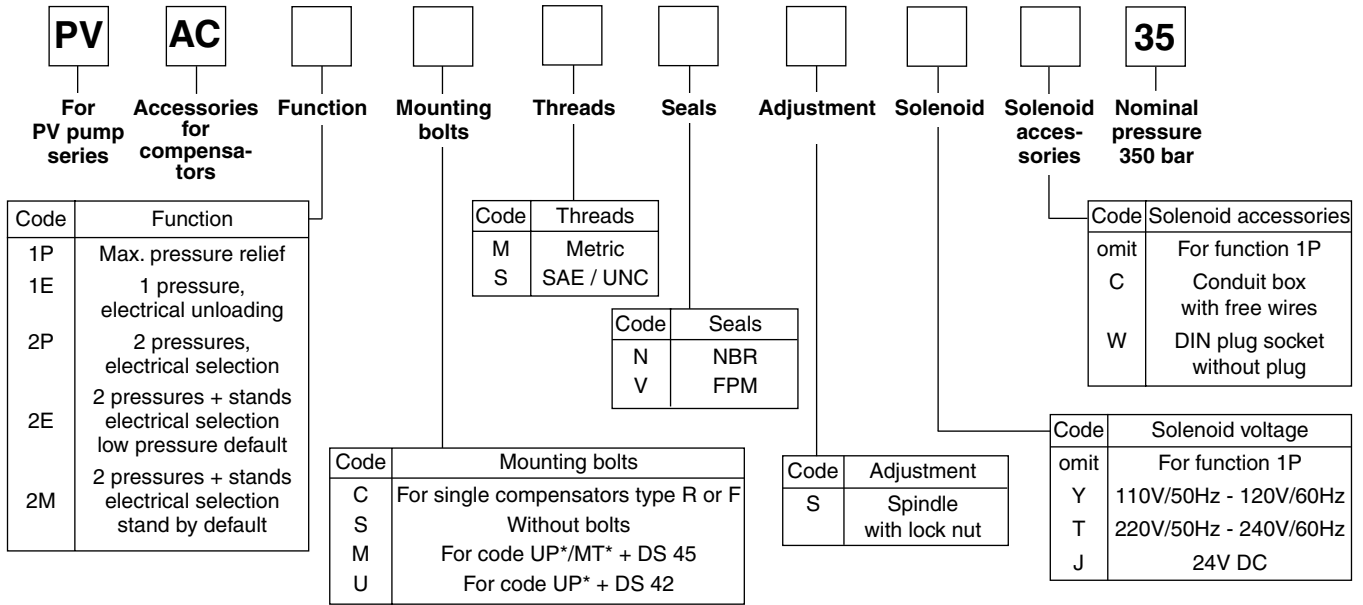


Typical dynamic characteristic



Response times

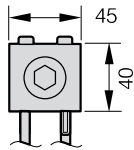
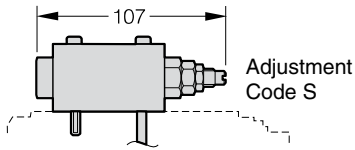
Size	T_A [ms]	T_R [ms]
PV023	50	50
PV046	70	70



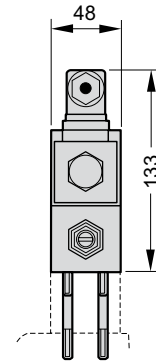
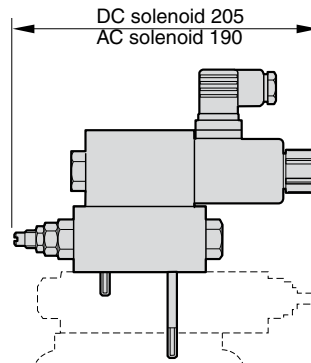
Compensator accessory only available on pump, not as single items (replacement kit see spare part list PVI-PVAC-UK).

Dimensions

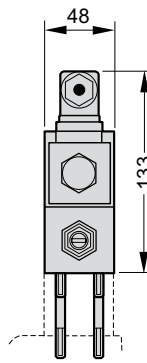
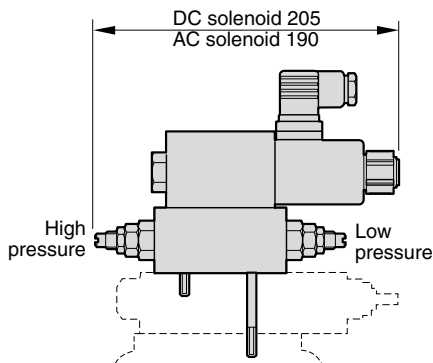
PVAC1P*



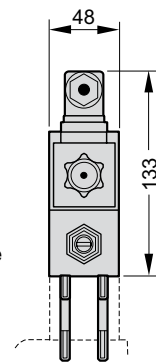
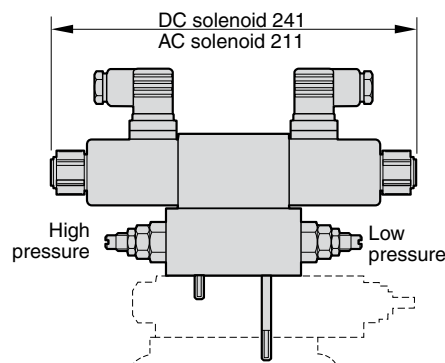
PVAC1E*



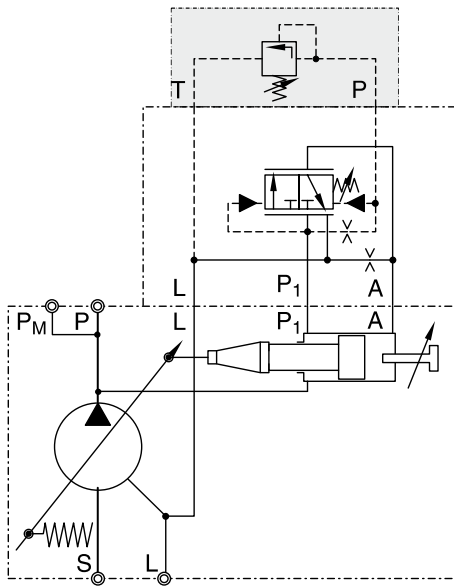
PVAC2P*



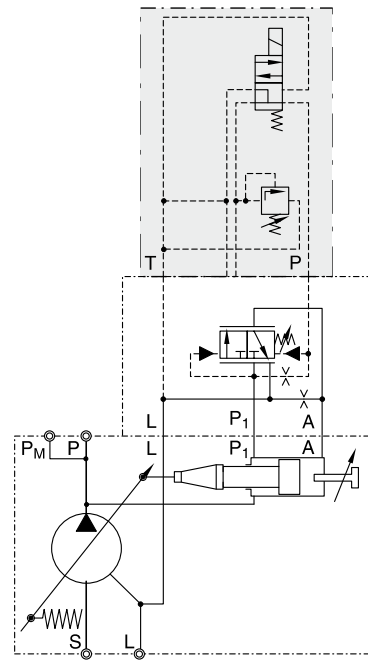
PVAC2M*/PVAC2E*



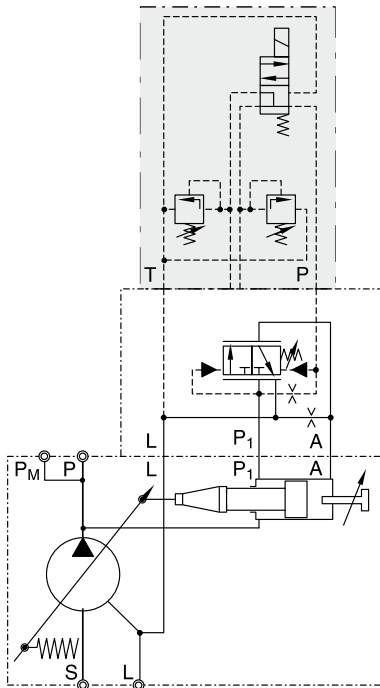
Schematics PVAC1P*



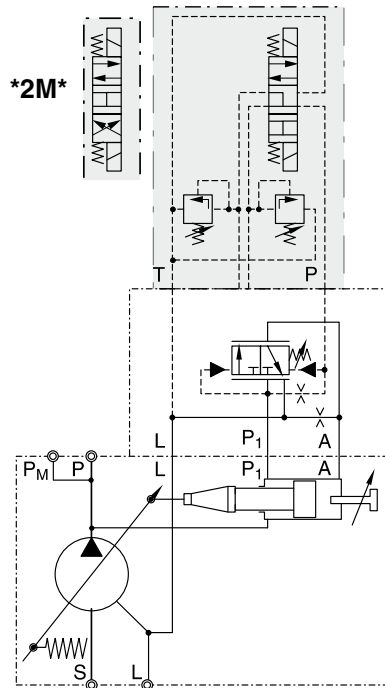
Schematics PVAC1E*



Schematics PVAC2P*



Schematics PVAC2M*/PVAC2E*



Ordering code proportional pressure control valve

PV	AC	RE				
Pump series PV	Accessories for controller	Prop. pressure valve	Mounting bolts	Thread option	Seal	Nominal pressure

Code	Mounting bolts/ ports
C	For single controller type *MR* or *MF*
T	For double valve contr. type *FT*
S	Without bolts
M	For code UP*/MT* + DS 45
U	For code UP* + DS 42

Code	Thread option
M	Metric
S	SAE / UNC

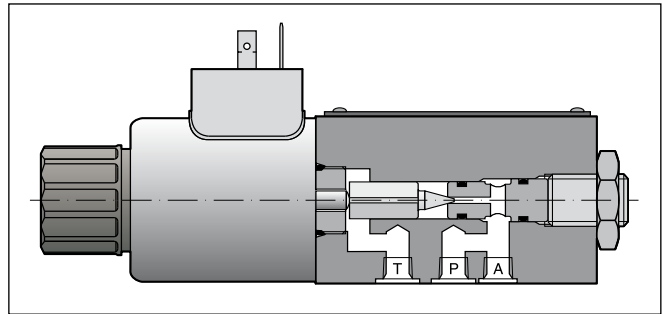
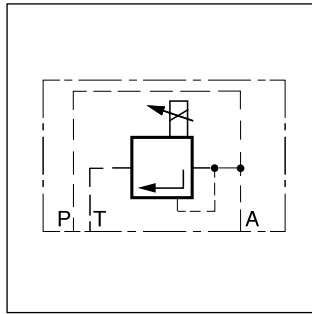
Code	Nominal pressure
35	350 bar
42	420 bar

Code	Seal
N	NBR
V	FPM

Proportional pressure control valve

Proportional pressure pilot valves of series PVACRE* (RE06...) are powered by external electronic modules

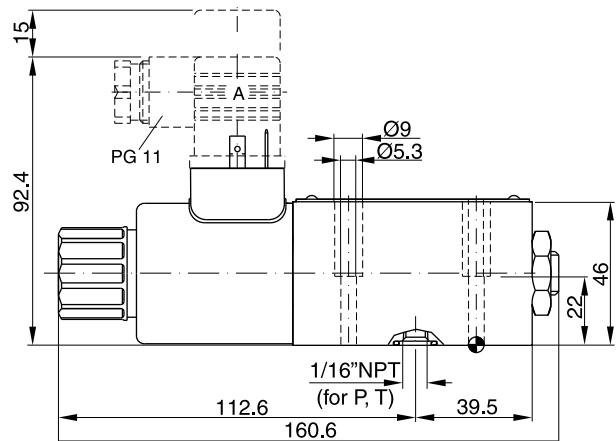
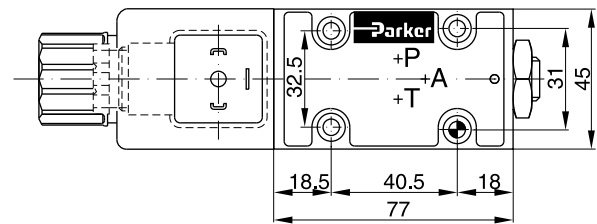
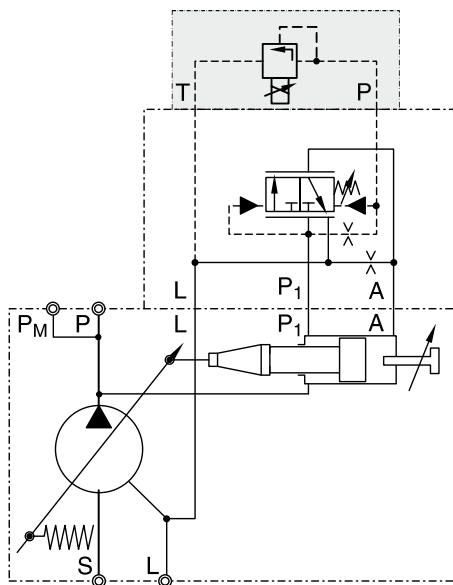
(see catalogue HY11-3500 for reference). They allow an infinite electronic adjustment of the pumps compensating pressure.



Schematic PVACRE*

Dimensions PVACRE*

Example for PVACRE* mounted





WARNING

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