Axial Piston Pump
Series PV

Variable Displacement

Catalogue HY11-3243/UK
August 2002

Note

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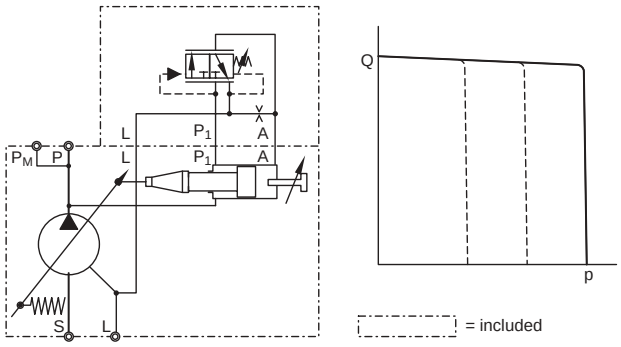
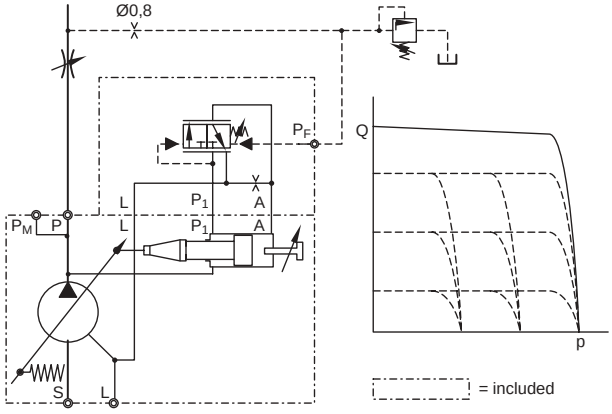
Pump with standard pressure compensator code F*S

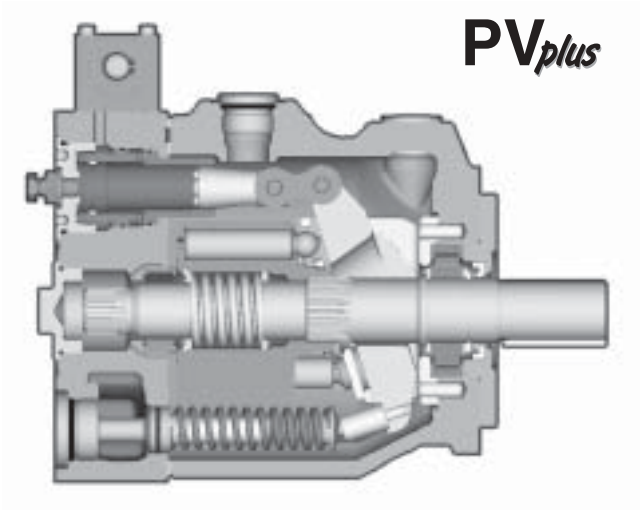


Pump with load-sensing compensator code FFC



With thru drive for single and multiple pumps

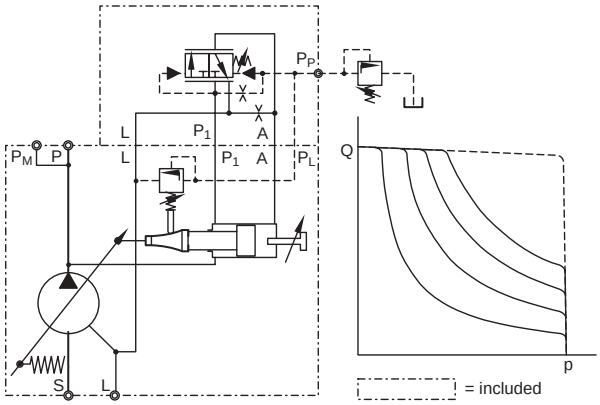
Swash plate type for open circuit



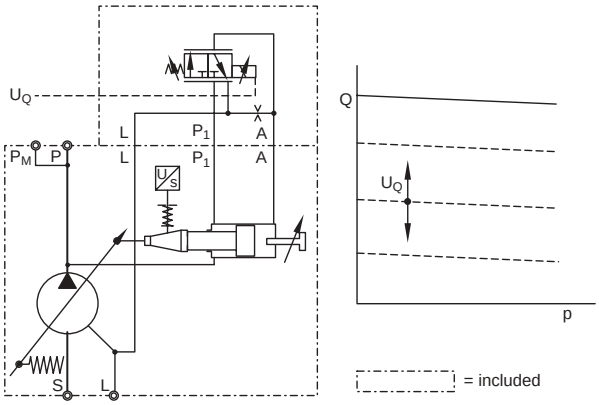
Technical Features

- Mounting interface according to VDMA-standards sheet 24560 part 1
- Standard: 4-hole flange ISO 3019/2 (metric). Optional: 4-hole flange ISO 3019/1 (SAE)
- Large servo piston with strong bias spring achieves fast response; e.g. for PV046
  upstroke < 70 ms ; downstroke < 40 ms
  Note: follow installation instructions!
- Reduced pressure peaks due to active decompression of system at downstroke
- Also at low system pressure reliable compensator operation. Lowest compensating pressure <10 bar
- Nine piston and new precompression technology (precompression filter volume) result in unbeaten low outlet flow pulsation
- Rigid and FEM-optimized body design for lowest noise level
- Complete compensator program
- Thru drive for 100% nominal torque
- Pump combinations (multiple pumps) of same size and model and mounting interface for basically all metric or SAE mounting interfaces

Pump with horse power compensator code *LB



Pump with electrohydr. displacement control code *PV



Technical data

Displacement	[cm^3/rev]	from 16 to 270
Operating pressures		
Outlet	[bar]	nominal pressure p_N 350
	[bar]	max. pressure $p_{max.}$ 420 [1]
	[bar]	drain port 2 [2]
	[bar]	Inlet min. 0.8 (absolute)
	[bar]	max. 16
Minimum speed	[min^{-1}]	300 min^{-1}
Mounting interface		4-hole flange ISO 3019/2
		optional ISO 3019/1, SAE
Installation		drain port as high as possible

[1] peak pressure only
[2] peak pressure only, special version up to 20bar available


Pump with standard pressure comp.

Pump with horse power comp.


Combination PV/PV


Combination PV/gear pump

Pump combinations
See pages 26–27

Selection table

Model	Max. displacement in cm^3/rev	Output flow in l/min at 1500 min^{-1}	Input horse power in kW at 1500 min^{-1} and 350 bar	Max speed [1] in min^{-1}	Weight in kg
PV016	16	24	15.5		
PV020	20	30	19.5	3000	19
PV023	23	34.5	22.5		
PV032	32	48	31		
PV040	40	60	39	2800	30
PV046	46	69	45		
PV063	63	94.5	61.5	2800	
PV080	80	120	78	2500	60
PV092	92	138	89.5	2300	
PV140	140	210	136	2400	90
PV180	180	270	175	2200	90
PV270	270	405	263	1800	172

[1] The maximum speed ratings are shown for an inlet pressure of 1 bar (absolute) and for a fluid viscosity of ν = 30 mm^2/s.

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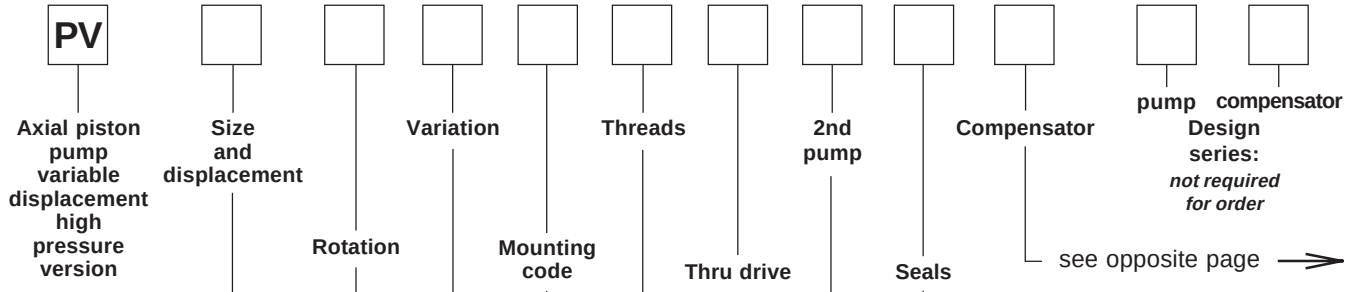


Code	Displacement
016	**16 cm³/U**
020	**20 cm³/U**
023	**23 cm³/U**
032	**32 cm³/U**
040	**40 cm³/U**
046	**46 cm³/U**
063	**63 cm³/U**
080	**80 cm³/U**
092	**92 cm³/U**
140	**140 cm³/U**
180	**180 cm³/U**
270	**270 cm³/U**

Code	Rotation [1]
R	**clockwise**
L	counter clockwise

[1] when looked on shaft

Code	Variation
1	**standard**
9	reduced displacement adjusted [2]

[2] for order specify displacement

Code	Mounting interface		Shaft
D	SAE ISO 3019/1	4-hole flange	cylindric, key
E		4-hole flange	splined, SAE
F[3]		4-hole flange	cylindric, key
G[3]		4-hole flange	splined, SAE
K	**metr. ISO 3019/2**	**4-hole flange**	**cylindric, key**
L		**4-hole flange**	**splined, DIN 5480**

[3] codes F and G only for PV140/180, see dimension sheet

Code	Port [4]	Threads[5]
1	**BSPP**	**metric**
3	UNF	UNC
4[6]	BSPP	metr. M14
7	ISO 6149	UNC
8	ISO 6149	metric[1]

[4] drain, gauge and flushing ports
[5] all mounting and connecting threads
[6] for PV063-PV180 only: pressure port 1 1/4" with 4 x M14 instead of 4 x M12

Code	Seals
N	**NBR**
V	FPM
E	EPR

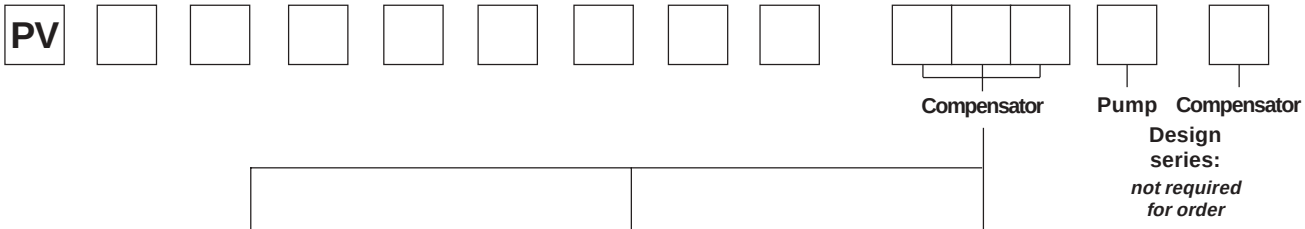
Code	2nd pump option[7]
1	**single pump, no 2nd pump and coupling**
2	PV140 or PV180 mounted
3	PV or PVM pump mounted
4	gear pump series PGP mounted
5	PAV/PAF up to 6.3 cm³/rev mounted
6	PAV10 or PAF8-10 mounted

[7] Specify 2nd pump with full model code

Code	Thru drive option no adaptor for 2nd pump
T	**single pump prepared for thru drive**
	with adaptor for 2nd pump
Y[8]	SAE AA, Ø 50.8mm
A	SAE A, Ø 82.55mm
B	SAE B, Ø 101.6mm
C[9]	SAE C, Ø 127mm
D[10]	SAE D, Ø 152.4mm
E[11]	SAE E, Ø 165.1mm
G[12]	metric, Ø 63mm
H	metric, Ø 80mm
J	metric, Ø 100mm
K[9]	metric, Ø 125mm
L[10]	metric, Ø 160mm
M[11]	metric, Ø 200mm

[8] only for PV016 - PV023
[9] only for PV032 and larger
[10] only for PV063 and larger
[11] only for PV270
[12] only for PV016 - PV092

Bold letters =
Short-term availability



Standard pressure compensator			
Code			Compensator option
0	**0**	**1**	**No compensator**
F	**D**	**S**	**10 - 140 bar, spindle + lock nut**
F	**H**	**S**	**40 - 210 bar, spindle + lock nut**
F	**W**	**S**	**70 - 350 bar, spindle + lock nut**
			Remote compensator options
F	**R**		**Remote pressure compensator**
F	S		Variation R, for quick unload valve
F	**F**		**Load-Sensing compensator**
F	T		Two valve load-sensing compensator
			Variations for remote compensator
		C	**external pressure pilot [13)]**
		1	**NG6/D03 interface top side**
		P	**Pilot valve PVAC1P*M* mounted**
		D	Proportional pilot valve type DSAE1007P07KLAF mounted
		L	Pilot valve with DIN lock mounted
		Z	Accessory mounted [14)]

Electrohydraulic compensator			
Code			Compensator option
			Pilot pressure supply
F			Standard (internal), no shuttle valve
W			With shuttle valve, comp. horizontal
			Function
	P		Proportional displacement control
			Variation
		V	Standard, no pressure compensation
		D	Proportional pilot valve DSAE1007P07KLAF mounted
		Z	Variation R, accessories mounted [14)]
		R	Remote pressure comp. NG6 interface
		G	Variation R, Pressure sensor and proportional pilot valve mounted for pressure resp. horse power control
		S	Remote pressure comp., NG6 interface top side, for quick unload valve
		T	Variation S, pressure sensor and proportional pilot valve mounted for pressure resp. horse power control
		P	Remote pressure comp., NG6 interface top side, for preload and quick unload manifold
		E	Variation P, pressure sensor and proportional pilot valve mounted for pressure resp. horse power control

Horse power compensator										
Code			Displacement						Compensator option	
			016 023	032 046	063 092	140	180	270	Nom. HP [kW] at 1500 min^{-1}	Nom. torque [Nm]
B			x						3	19.5
C			x						4	26
D			x	x					5.5	36
E			x	x					7.5	49
G			x	x	x				11	71
H			x	x	x				15	97
K				x	x	x			18.5	120
M				x	x	x	x		22	142
S					x	x	x		30	195
T					x	x	x	x	37	240
U					x	x	x	x	45	290
W						x	x	x	55	355
Y							x	x	75	485
Z							x	x	90	585
2								x	110	715
3								x	132	850
Function										
	L		x	x	x	x	x	x	Horse power compensator	
	C		x	x	x	x	x	x	Horse power compensator and load-sensing	
Variation										
		A	x	x	x	x	x	x	NG6 interface top side	
		B	x	x	x	x	x	x	no pressure compensation	
		C	x	x	x	x	x	x	adjustable pressure compensation	
		D	x	x	x	x	x	x	Proportional pilot valve DSAE1007P07KLAF mounted	
		Z	x	x	x	x	x	x	Accessories mounted [2)]	

[13)] not for two-valve-compensator

[14)] Accessories not included, please specify on order with full model code.

Bold letters =
Short-term availability

PI PVplus UK.PM6.5 RH

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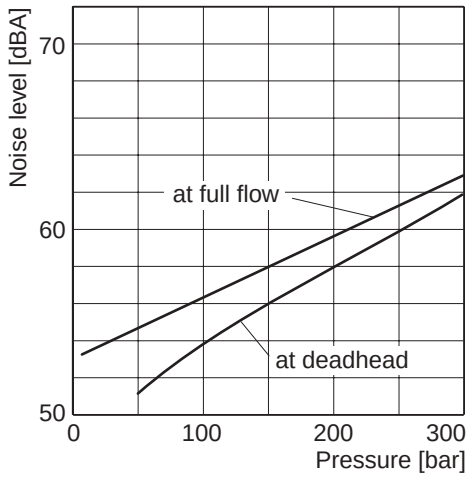
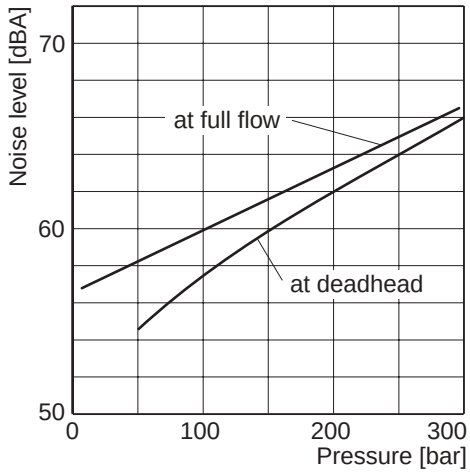
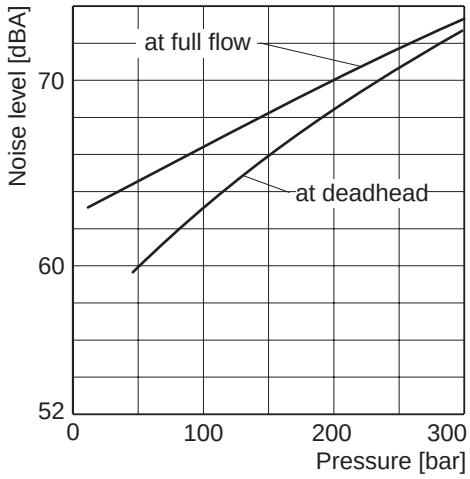
PV016 - PV023



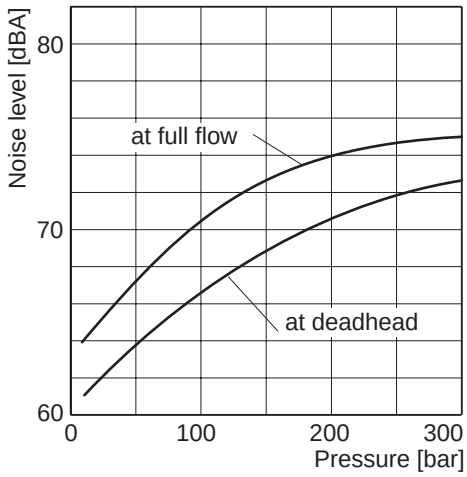
PV032 - PV046



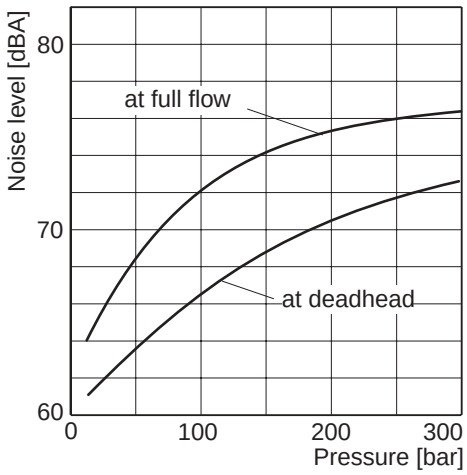
PV063 - PV092



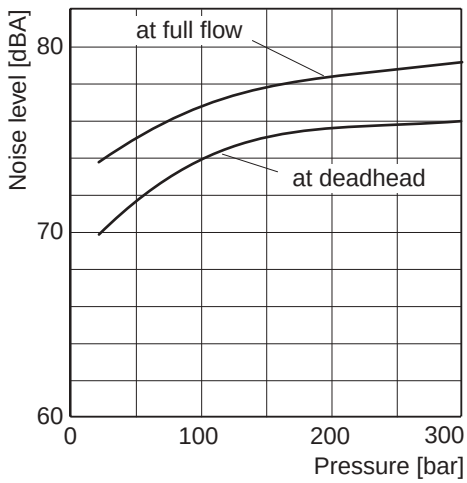
PV140



PV180



PV270



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

All data measured with mineral oil viscosity 30 mm²/s (cSt) at 50°C.

PI PVplus UK.PM6.5 RH

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Operating noise of pumps

The normal operating noise of a pump and consequently the operating noise of the entire hydraulic system is largely determined by **where** and **how** the pump is mounted and how it is connected to the downstream hydraulic system.

Also size, style and installation of the hydraulic tubing have a major influence on the overall noise emitted by a hydraulic system

Noise reduction measures

Talking about operating noise of a hydraulic pump, primary and secondary pump noise has to be taken into consideration

Primary pump noise is caused by vibrations of the pump body due to internal alternating forces stressing the body structure.

Flexible elements help to prevent pump body vibration being transmitted to other construction elements, where possible amplification may occur. Such elements can be:

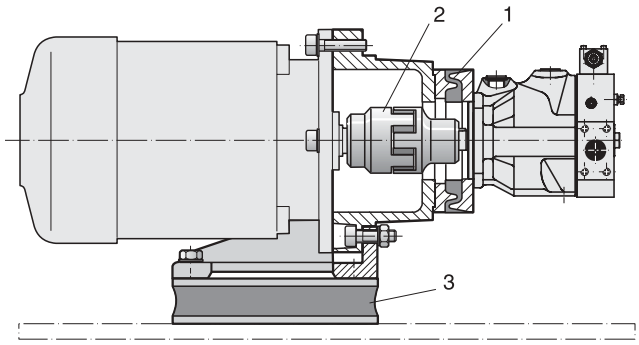
- Bell housing with elastic dampening flange with vulcanized labyrinth (1)
- Floating and flexible coupling (2)
- Damping rails (3) or silent blocks for mounting the electric motor or the foot mounting flange
- Flexible tube connections (compensators) or hoses on inlet, outlet and drain port of the pump.
- Exclusive use of gas tight tube fittings for inlet connections to avoid ingression of air causing cavitation and excessive noise.

Secondary pump noise is caused by vibration induced into all connected hydraulic components by the flow and pressure pulsation of the pump. This secondary noise adds typical 7 - 10 dBA to the noise of a pump measured in the sound chamber according to DIN 45 635 (see diagrams on opposite side). Therefore pipework, its mounting and the mounting of all hydraulic components like pressure filters and control elements has a major influence to the overall system noise level.

Pulsation reduction with precompression volume: The PV is equipped with a new technology for flow ripple reduction. This method reduces the pulsation at the pump outlet by **40 - 60 %**. That leads to a significant reduction of the overall system noise without additional cost and without additional components (silencers etc.). The typical reduction reaches **2 - 4 dBA**. That means: with a pump of the PV series the secondary noise adds only some 5 - 7 dBA to the pump noise instead of the usually found 7 - 10 dBA.

Figure 2 compares the measured pulsation of a system with 6 pumps of 180 cm³/rev each.

Last but not least the connection between pump and driving motor can be the cause of an unacceptably high noise emission. Even when the mounting space is limited there are suitable means and components to reduce the noise significantly.
The vibration of the pump body, created by high alternating forces in the rotating group and the pulsation of the output flow excite every part of the system connected to the pump mechanically or hydraulically.



1) Bell housing 2) Coupling 3) Damping rails

Figure 1: Components to avoid vibration transfer from the pump to the drive/installation and their position in the power unit (numbers refer to the text on the left)

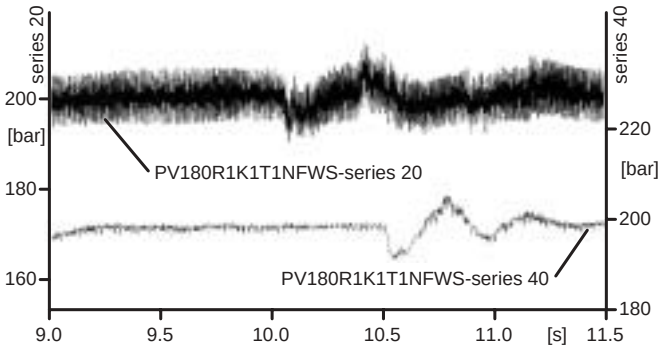


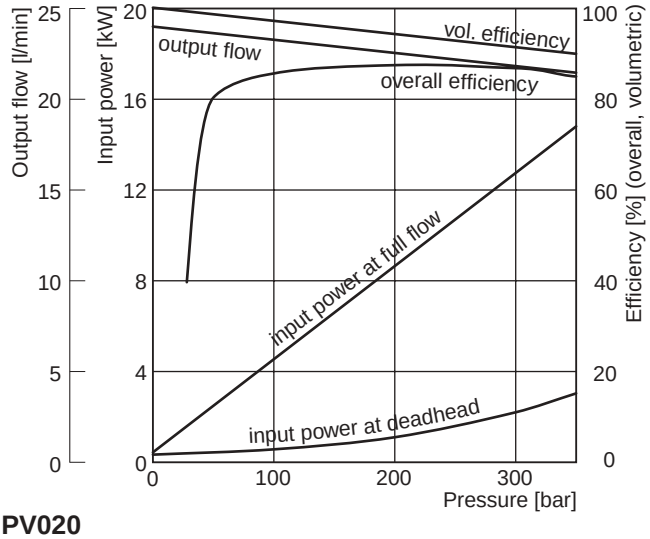
Figure 2: Comparison of the pressure pulsation in a system with 6 old PV pumps versus the same system with 6 PVplus pumps. The pulsation reduction effect of the precompression volume is evident.

Other measures

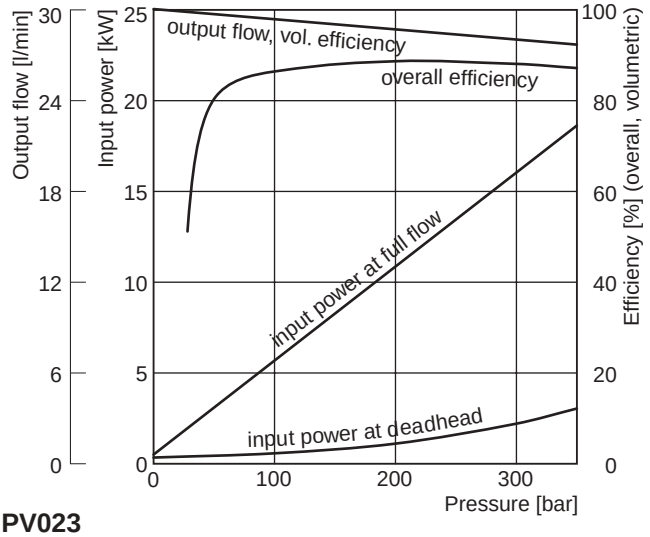
Small diameter tubes do not only cause high flow speeds, turbulences inside the tubes and cavitation in the pump, they also produce noise.

Only correctly sized connections of the largest possible diameter according to the port size of the pump should be used.

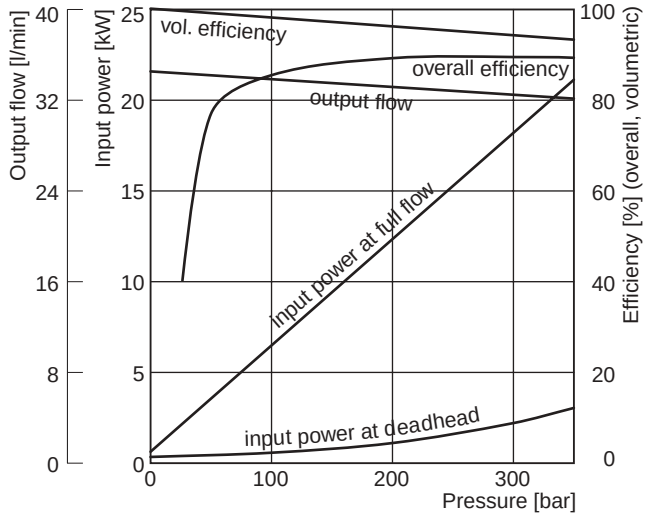
Efficiency, power consumption
PV016



PV020



PV023



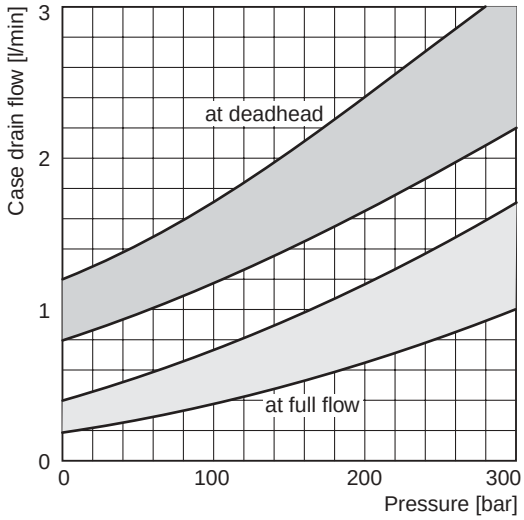
Efficiency and case drain flows PV016, PV020, PV023

The efficiency and power graphs are measured at an input speed of n = 1500 min^{-1}, a temperature of 50°C and a fluid viscosity of 30 mm^2/s.

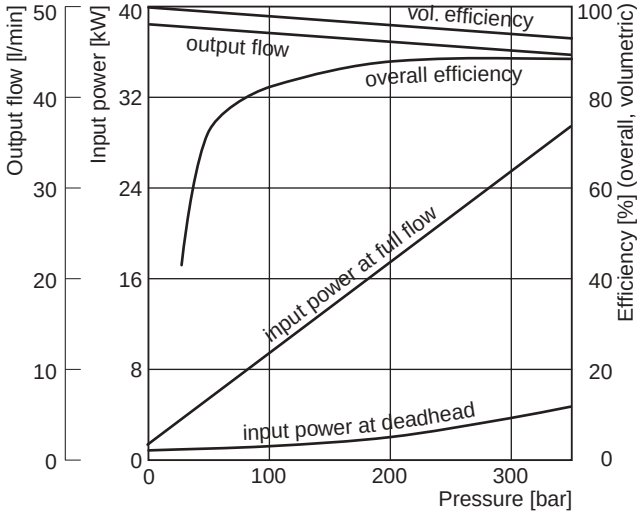
Case drain flow and compensator control flow leave via the drain port of the pump. To the values shown are to be added 1 to 1.2 l/min , if at pilot operated compensators (codes FR*, FF*, FT*, horse power compensator and p/Q-control) the control flow of the pressure pilot valve also goes through the pump.

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.

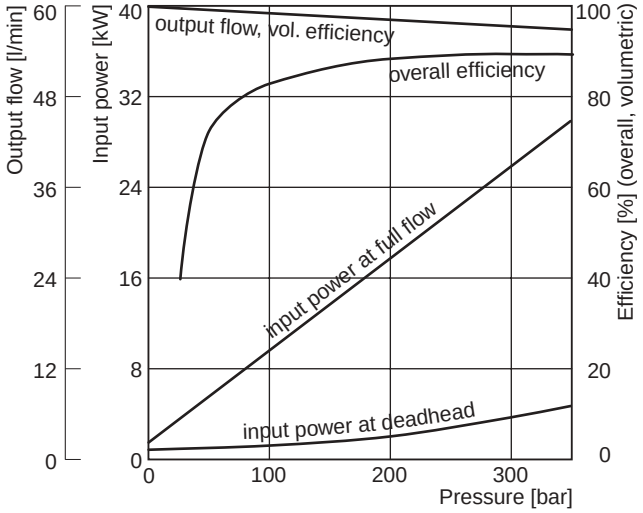
Case drain flows PV016-023



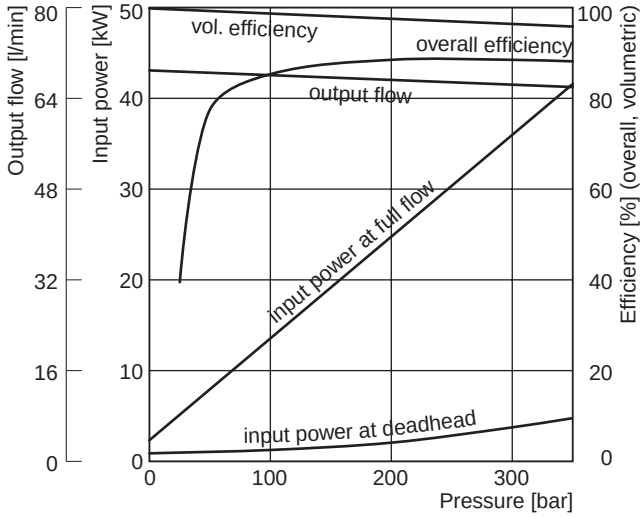
Efficiency, power consumption
PV032



PV040



PV046



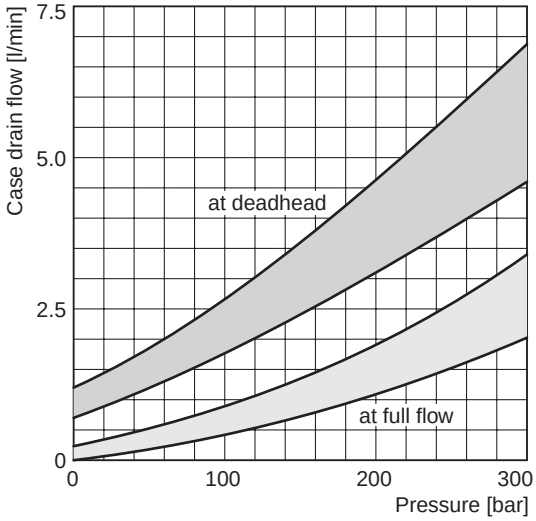
Efficiency and case drain flows PV032, PV040, PV046

The efficiency and power graphs are measured at an input speed of n = 1500 min^{-1}, a temperature of 50°C and a fluid viscosity of 30 mm^2/s.

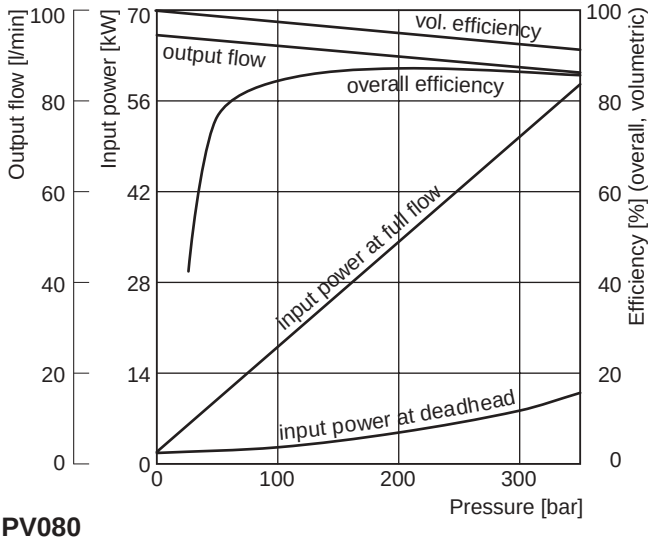
Case drain flow and compensator control flow leave via the drain port of the pump. To the values shown are to be added 1 to 1.2 l/min , if at pilot operated compensators (codes FR*, FF*, FT*, horse power compensator and p-Q-control) the control flow of the pressure pilot valve also goes through the pump.

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 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.

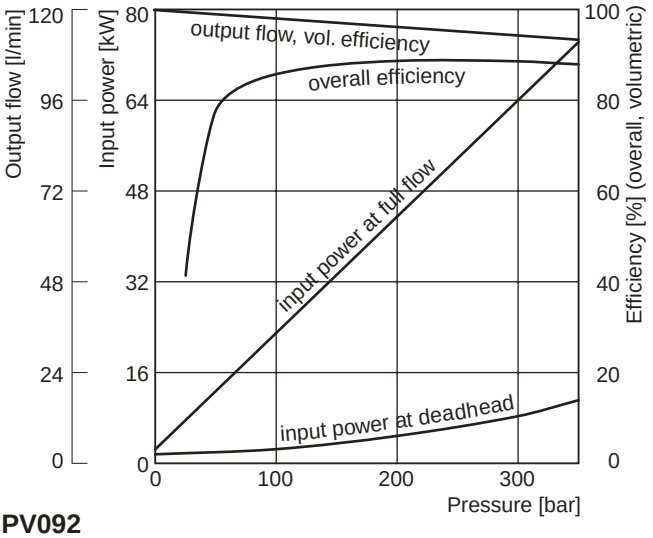
Case drain flows PV032-046



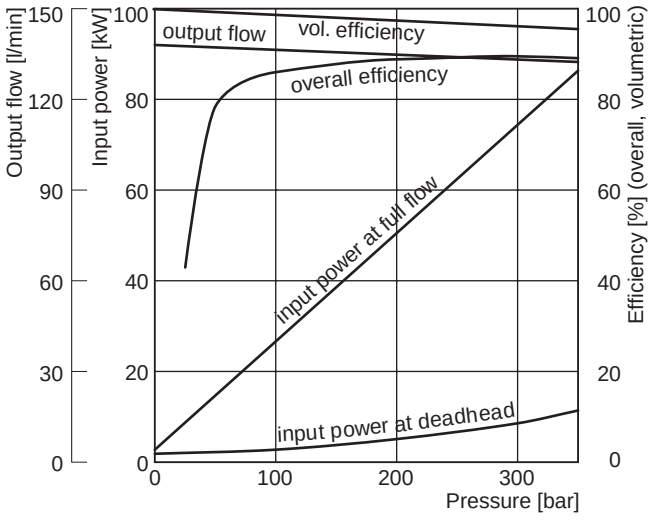
Efficiency, power consumption
PV063



PV080



PV092



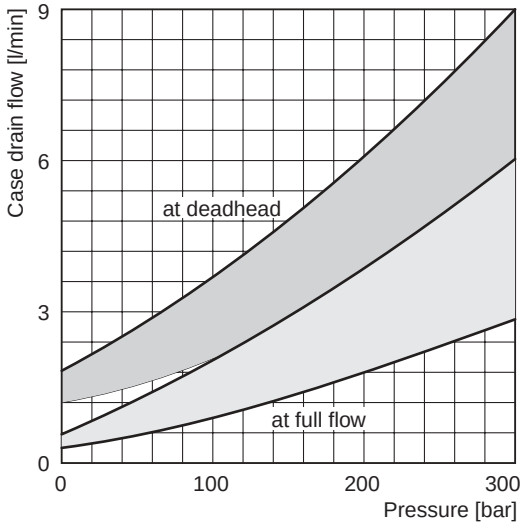
Efficiency and case drain flows PV063, PV080, PV092

The efficiency and power graphs are measured at an input speed of n = 1500 min^{-1}, a temperature of 50°C and a fluid viscosity of 30 mm^2/s.

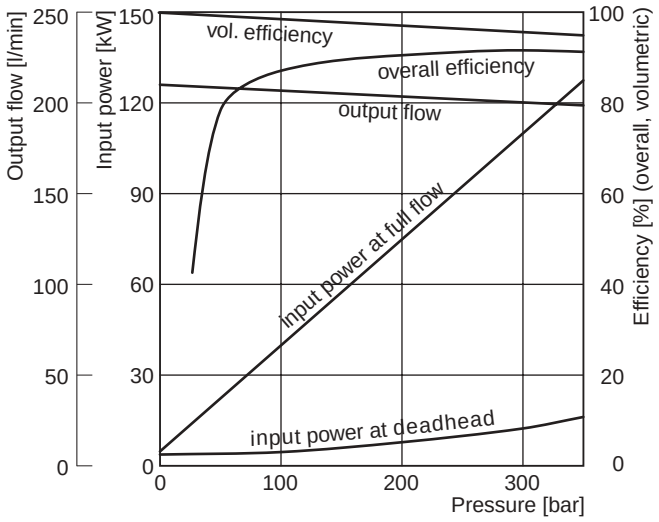
Case drain flow and compensator control flow leave via the drain port of the pump. To the values shown are to be added 1 to 1.2 l/min , if at pilot operated compensators (codes FR*, FF*, FT*, horse power compensator and p-Q-control) the control flow of the pressure pilot valve also goes through the pump.

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.

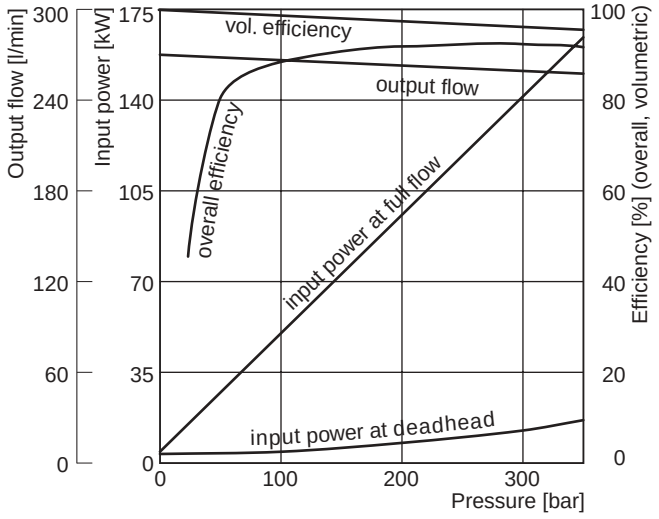
Case drain flows PV063-092



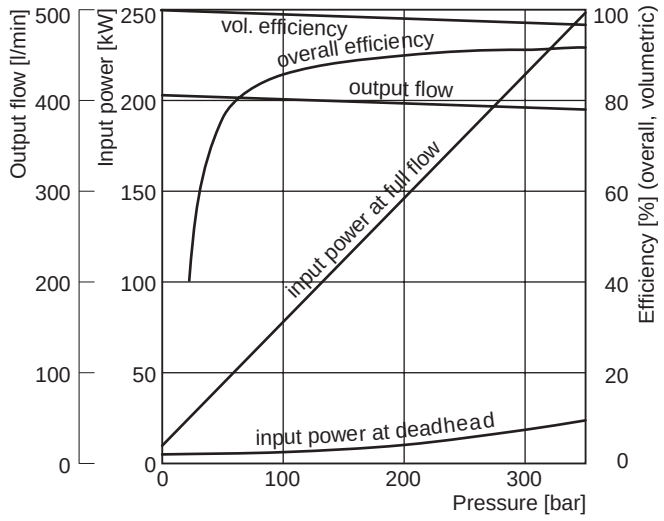
Efficiency, power consumption
PV140



PV180



PV270



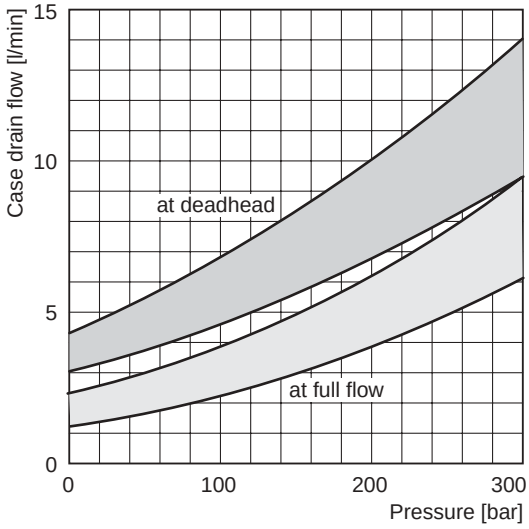
Efficiency and case drain flows PV140, PV180, PV270

The efficiency and power graphs are measured at an input speed of n = 1500 min^{-1}, a temperature of 50°C and a fluid viscosity of 30 mm^2/s.

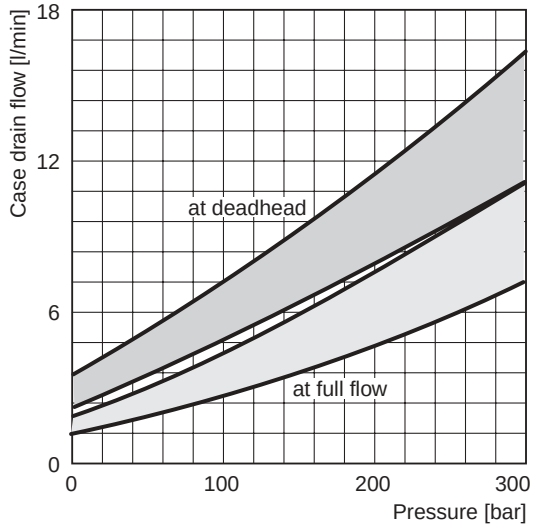
Case drain flow and compensator control flow leave via the drain port of the pump. To the values shown are to be added 1 to 1.2 l/min , if at pilot operated compensators (codes FR*, FF*, FT*, horse power compensator and p-Q-control) the control flow of the pressure pilot valve also goes through the pump.

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 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.

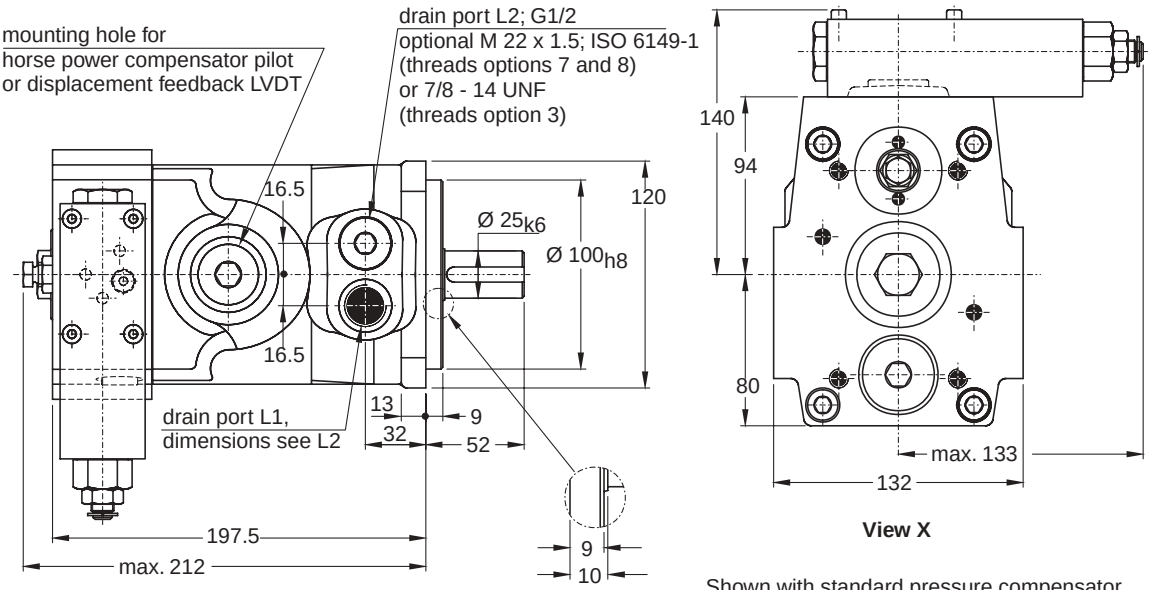
Case drain flows PV140-180



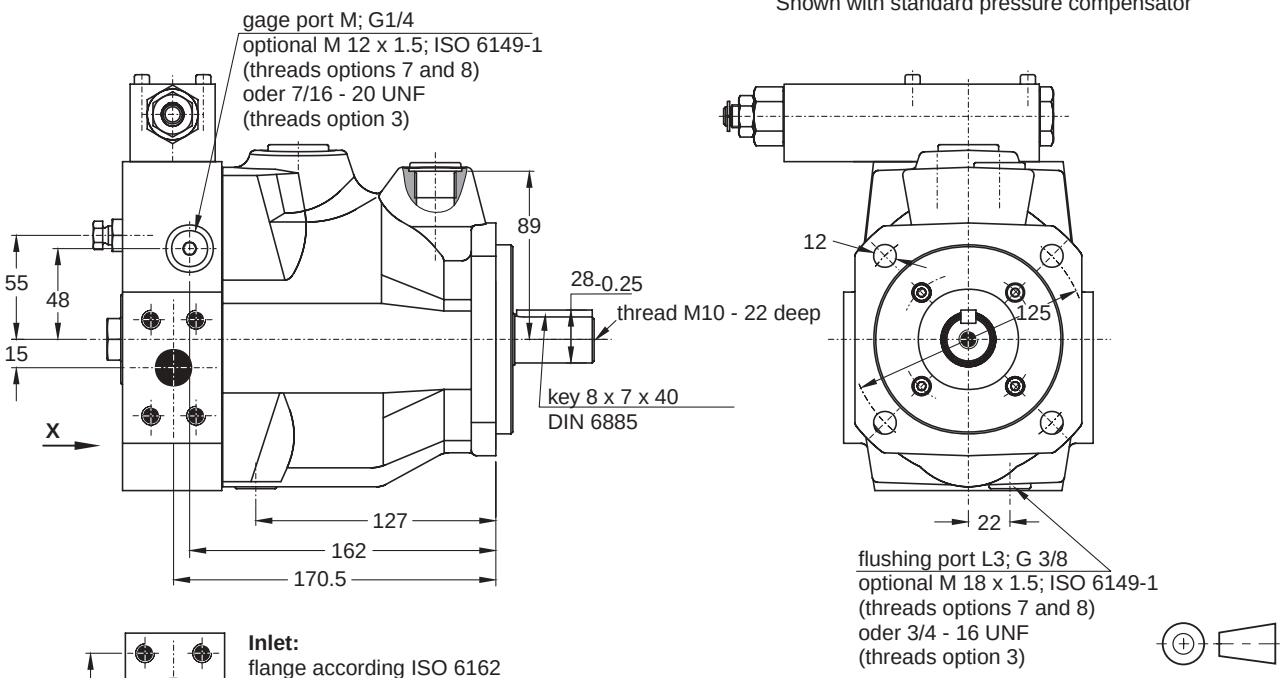
Case drain flows PV270

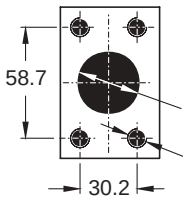


PV016 - 023, metric version



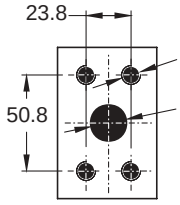
Shown with standard pressure compensator





Inlet:
flange according ISO 6162
DN 32; PN 250 bar
1 1/4”
32

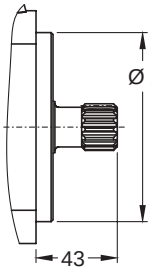
4 x M10, 18 deep
optional 7/16 - 14 UNC - 2B
(threads options 3 and 7)



4 x M10, 18 deep
optional 3/8 - 16 UNC - 2B
(threads options 3 and 7)

Outlet:
flange according ISO 6162
DN 19; PN 400 bar
3/4”

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



mounting option L
splined shaft W 25 x 1.5 x 15 x 8f DIN 5480

Shown is a clockwise rotating pump. Counter clockwise rotating pumps have inlet, outlet and gauge ports reversed.

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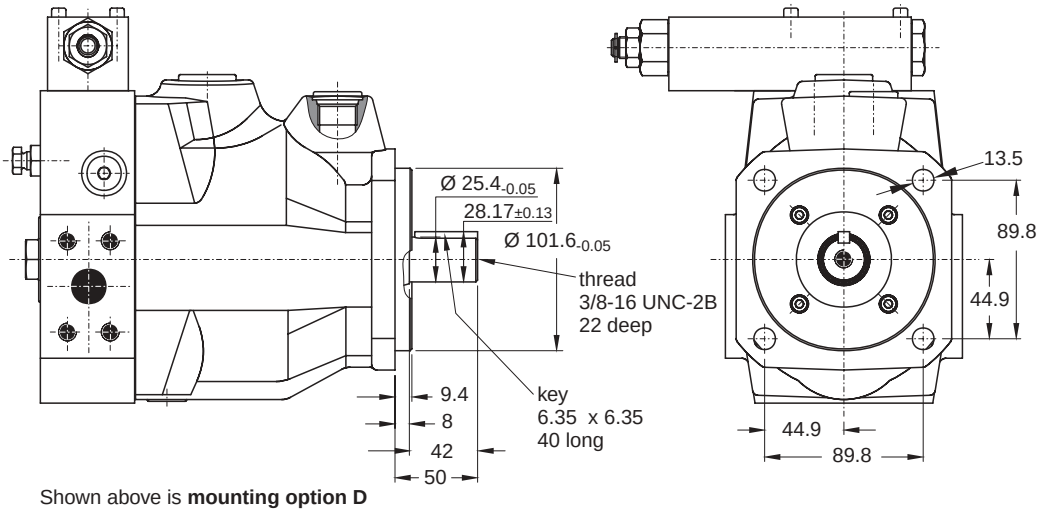
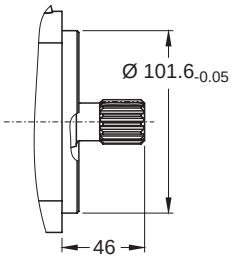
PV016 - 023, SAE version and thru drive

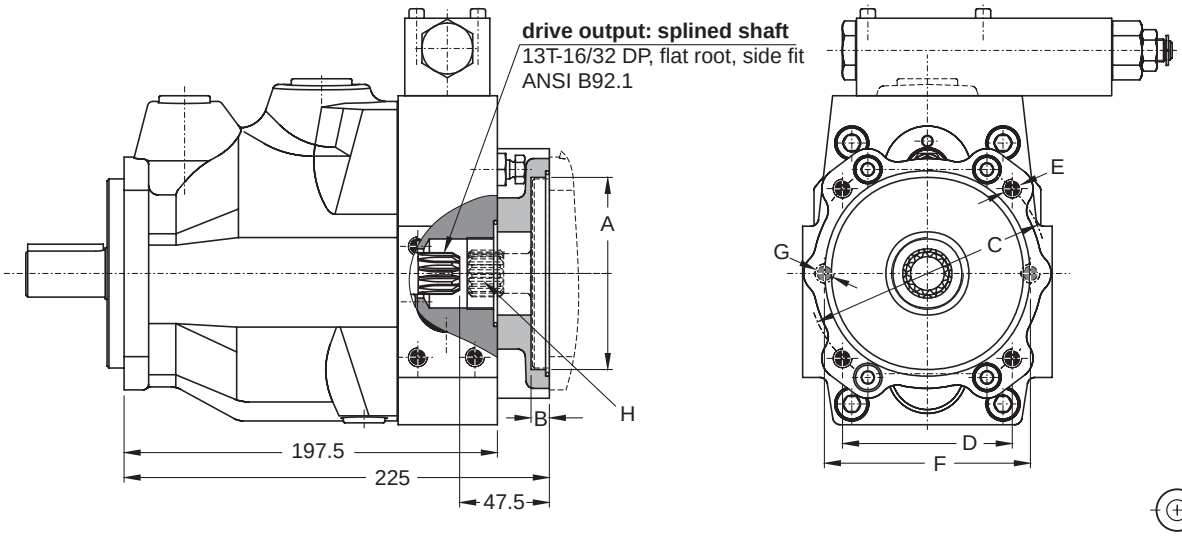


Shown above is **mounting option D**



mounting option E
splined shaft 15T 16/32 DP, flat root, side fit
ANSI B92.1

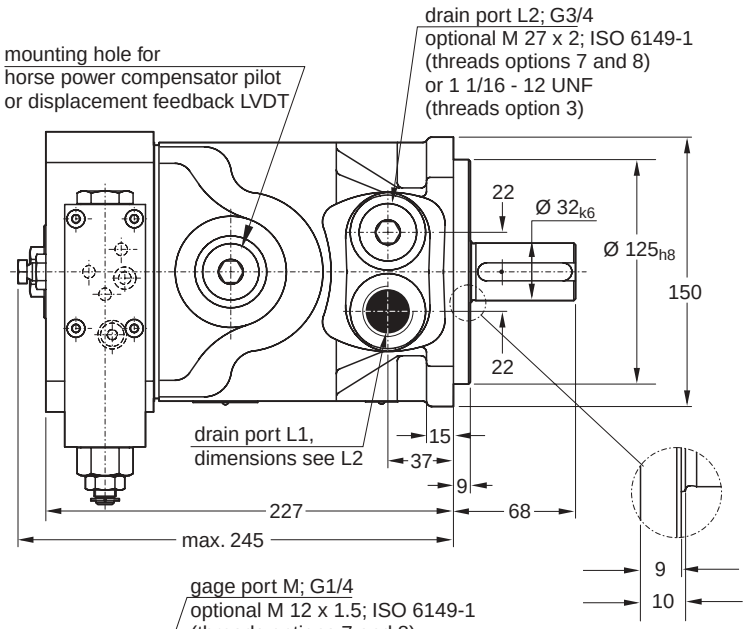
Variation with thru drive

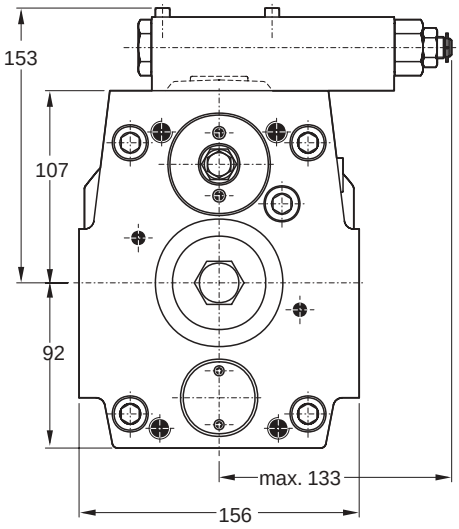


Thru shaft adaptors are available with the following dimensions:						
A	**B**	**C**	**D**	**E**	**F**	**G**
63	10	85	-	M8	100	M8
80	10	103	-	M8	109	M10
100	10.5	125	-	M10	-	-
50.8	10	-	-	-	82	M8
82.55	10	-	-	-	106	M10
101.6	10.5	-	89.8	M12	-	-

Dimension H and available couplings see page 24.
At threads options 3 and 7 the dimensions E and G are UNC - 2B threads.

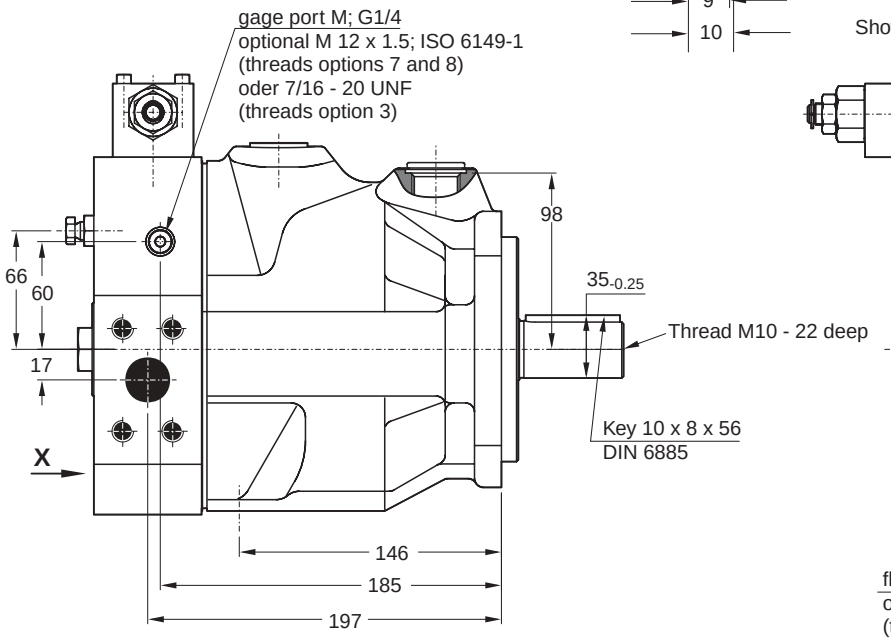
PV032 - 046, metric version

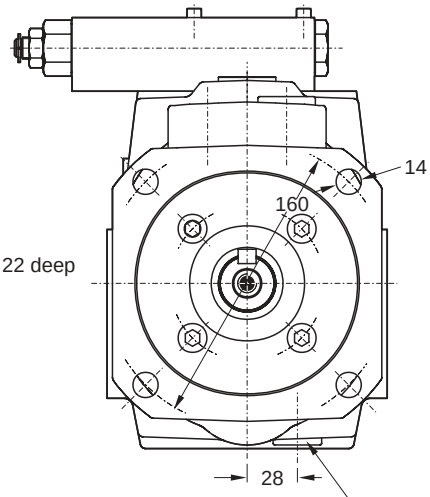


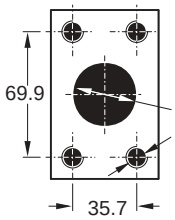


View X

Shown with standard pressure compensator

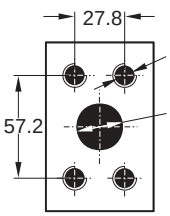






Inlet:
flange according ISO 6162
DN 38; PN 200 bar

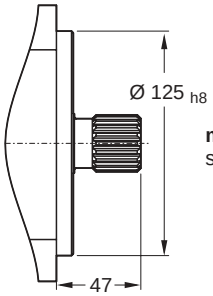
4 x M12, 18 deep
optional 1/2 - 13 UNC - 2B
(threads options 3 and 7)



4 x M12, 18 deep
optional 7/16 - 14 UNC - 2B
(threads options 3 and 7)

Outlet:
flange according ISO 6162
DN 25; PN 400 bar

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



mounting option L
splined shaft W 32 x 1.5 x 20 x 8f DIN 5480

Shown is a clockwise rotating pump. Counter clockwise rotating pumps have inlet, outlet and gauge ports reversed.

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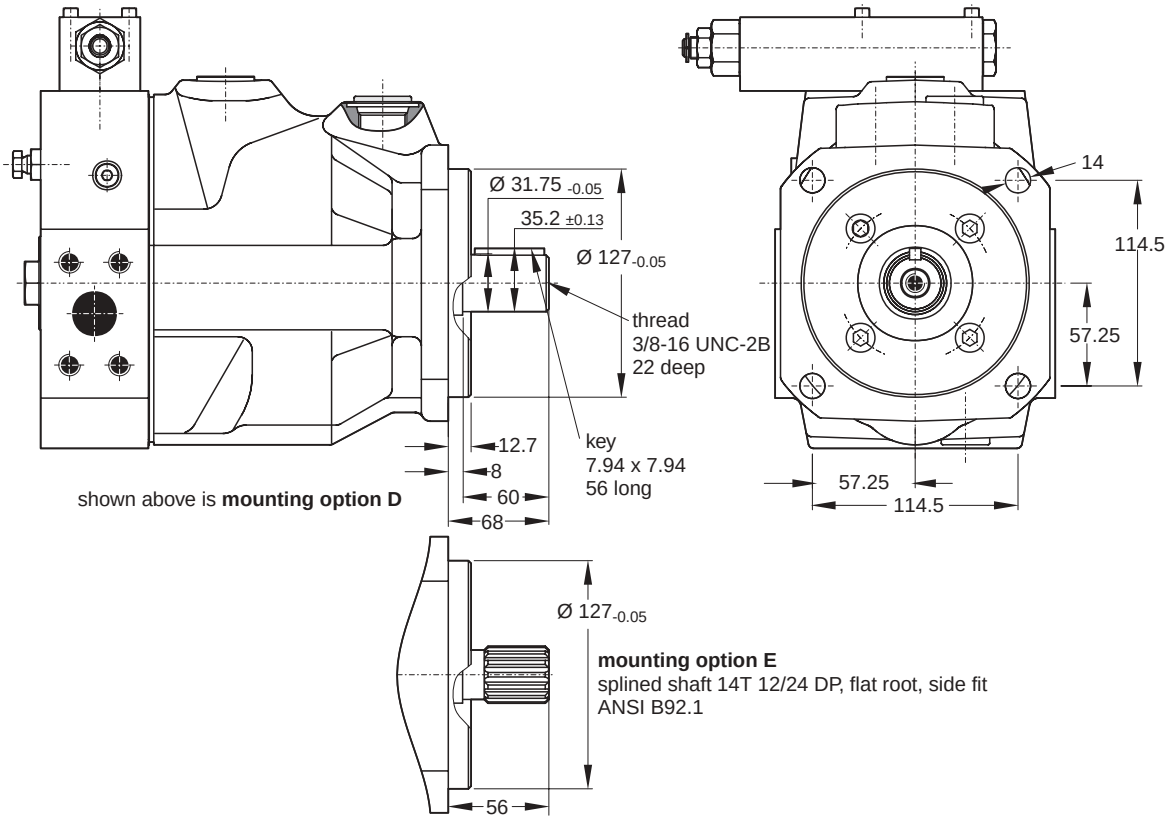
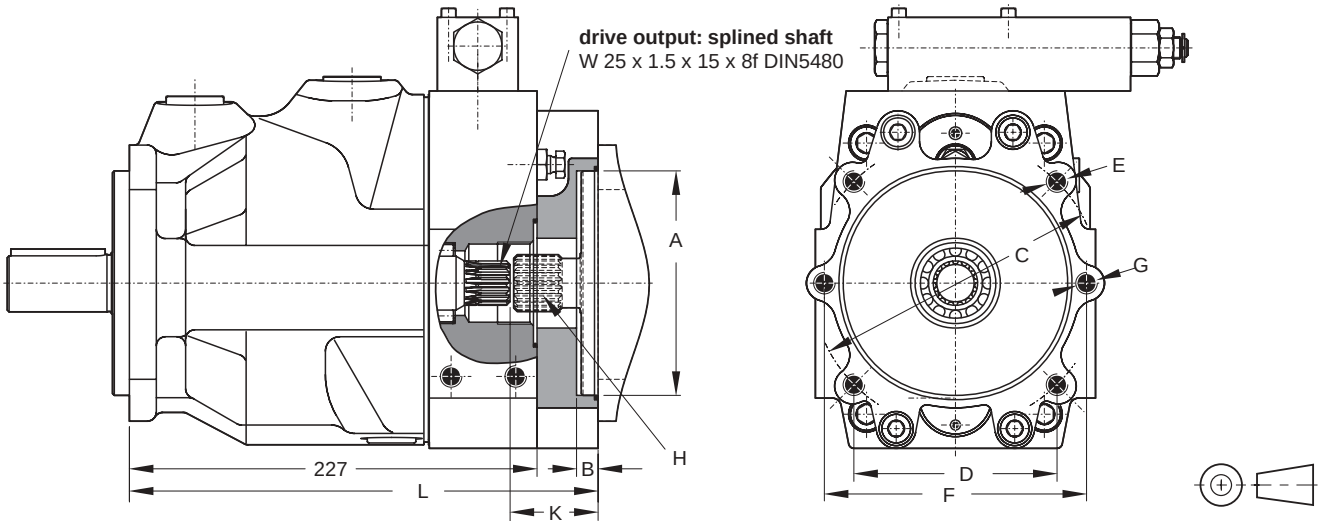
PV032 - 046, SAE version and thru drive version



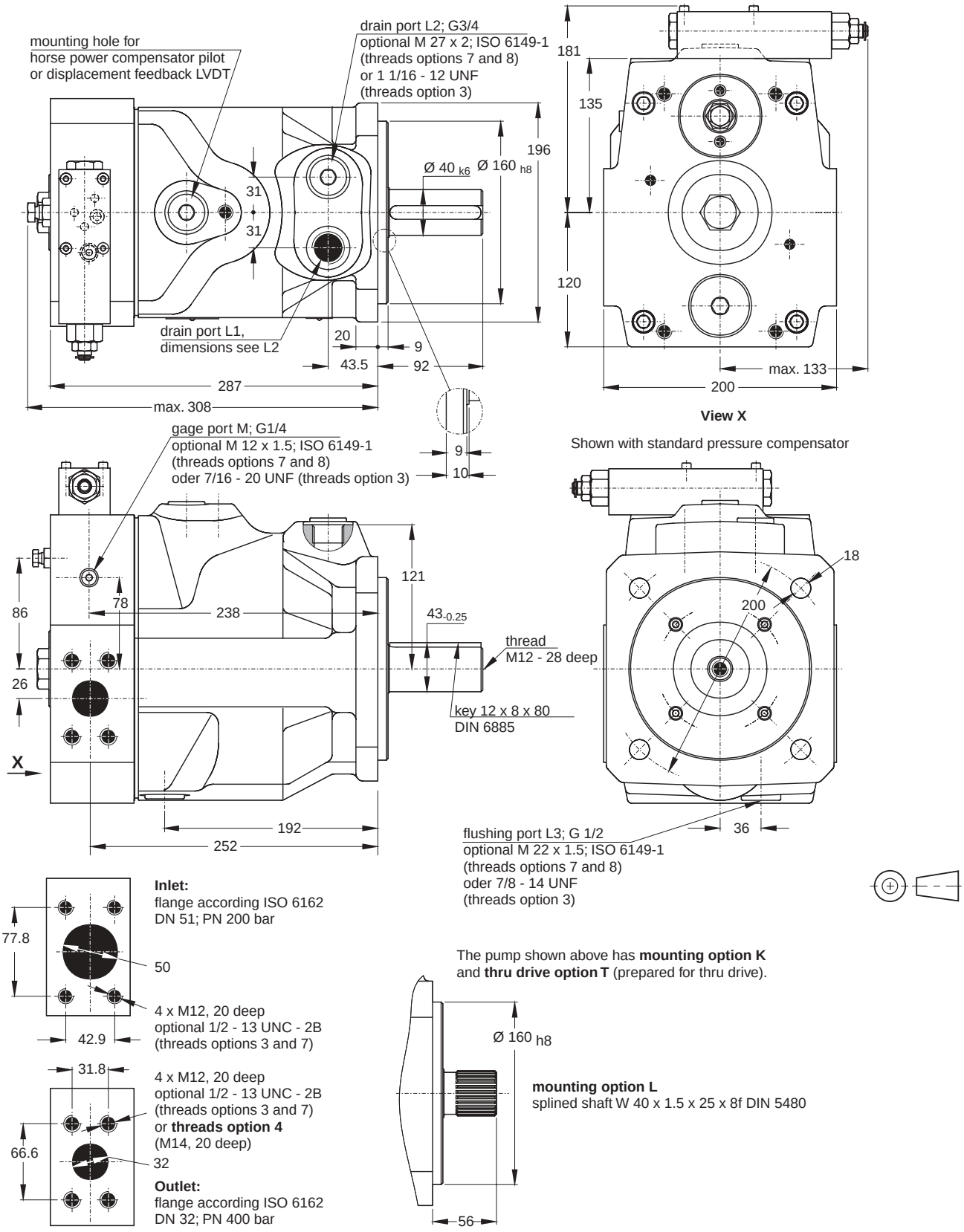
Variation with thru drive



Thru shaft adaptors are available with the following dimensions:								
A	**B**	**C**	**D**	**E**	**F**	**G**	**K**	**L**
63	8.5	85	-	M8	100	M8	49	261
80	8.5	103	-	M8	109	M10	49	261
100	10.5	125	-	M10	140	M12	49	261
125	12	160	-	M12	-	-	49	261
82.55	8	-	-	-	106	M10	49	261
101.6	11	-	89.8	M12	146	M12	49	261
127	13.5	-	114.5	M12	-	-	64	276

Dimension H and available couplings see page 24.
At threads options 3 and 7 the dimensions E and G are UNC - 2B threads.

PV063 - 092, metric version



Shown is a clockwise rotating pump. Counter clockwise rotating pumps have inlet, outlet and gauge ports reversed.

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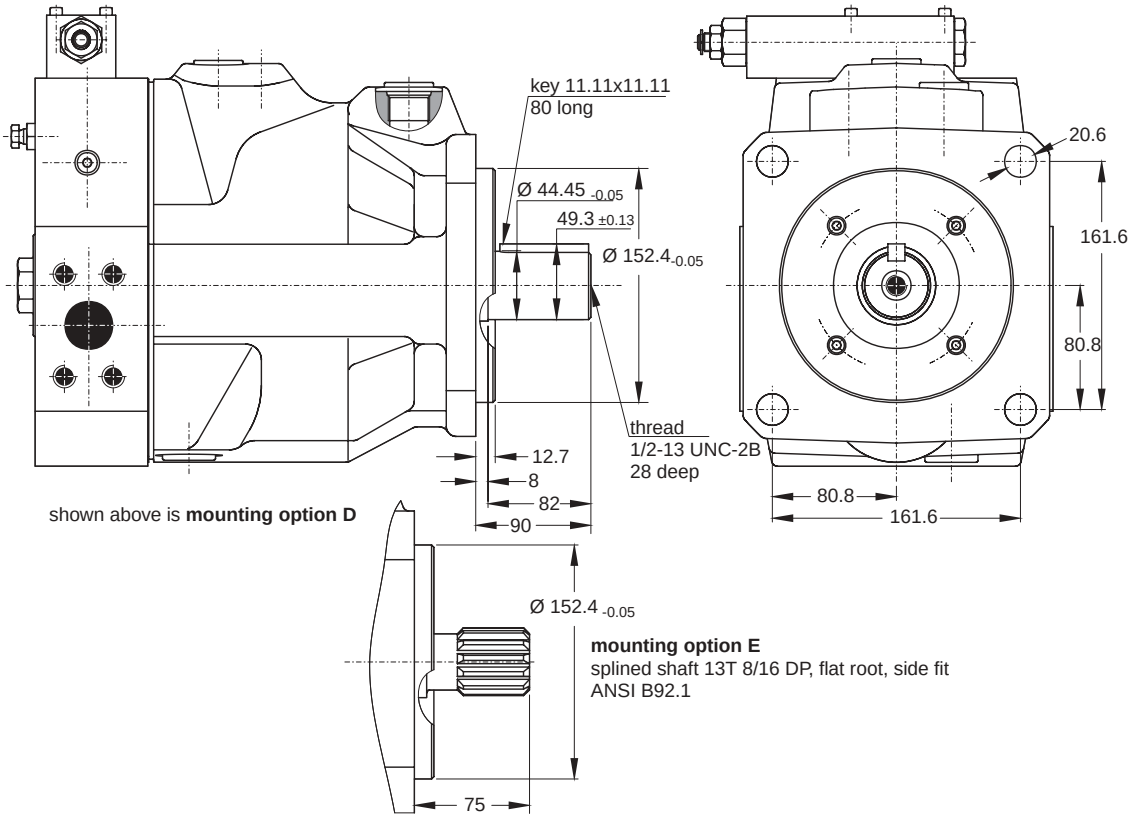
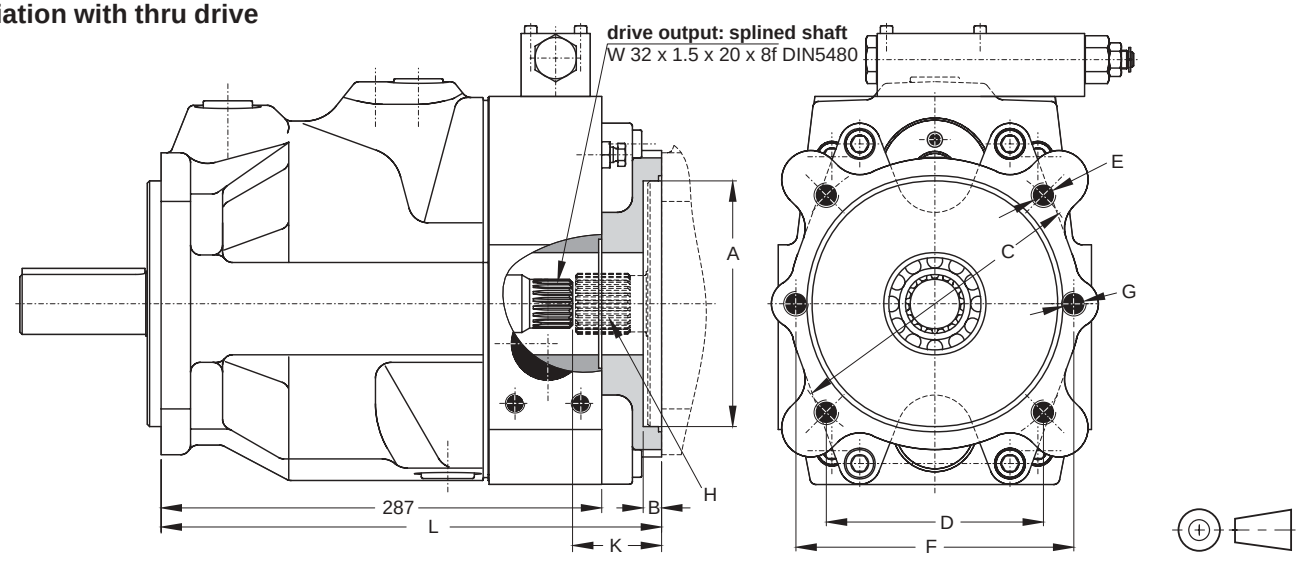
PV063 - 092, SAE version and thru drive version



Variation with thru drive



Thru shaft adaptors are available with the following dimensions:								
A	**B**	**C**	**D**	**E**	**F**	**G**	**K**	**L**
63	10	85	-	M8	100	M8	58	326
80	10	103	-	M8	109	M10	58	326
100	12	125	-	M10	140	M12	58	326
125	12	160	-	M12	180	M16	58	326
160	12	200	-	M16	-	-	58	326
82.55	10	-	-	-	106	M10	58	326
101.6	12	-	89.8	M12	146	M12	58	326
127	14	-	114.5	M12	181	M16	58	326
152.4	14	-	161.6	M16	-	-	78	346

Dimension H and available couplings see page 24.
At threads options 3 and 7 the dimensions E and G are UNC - 2B threads.

PI PVplus UK.PM6.5 RH

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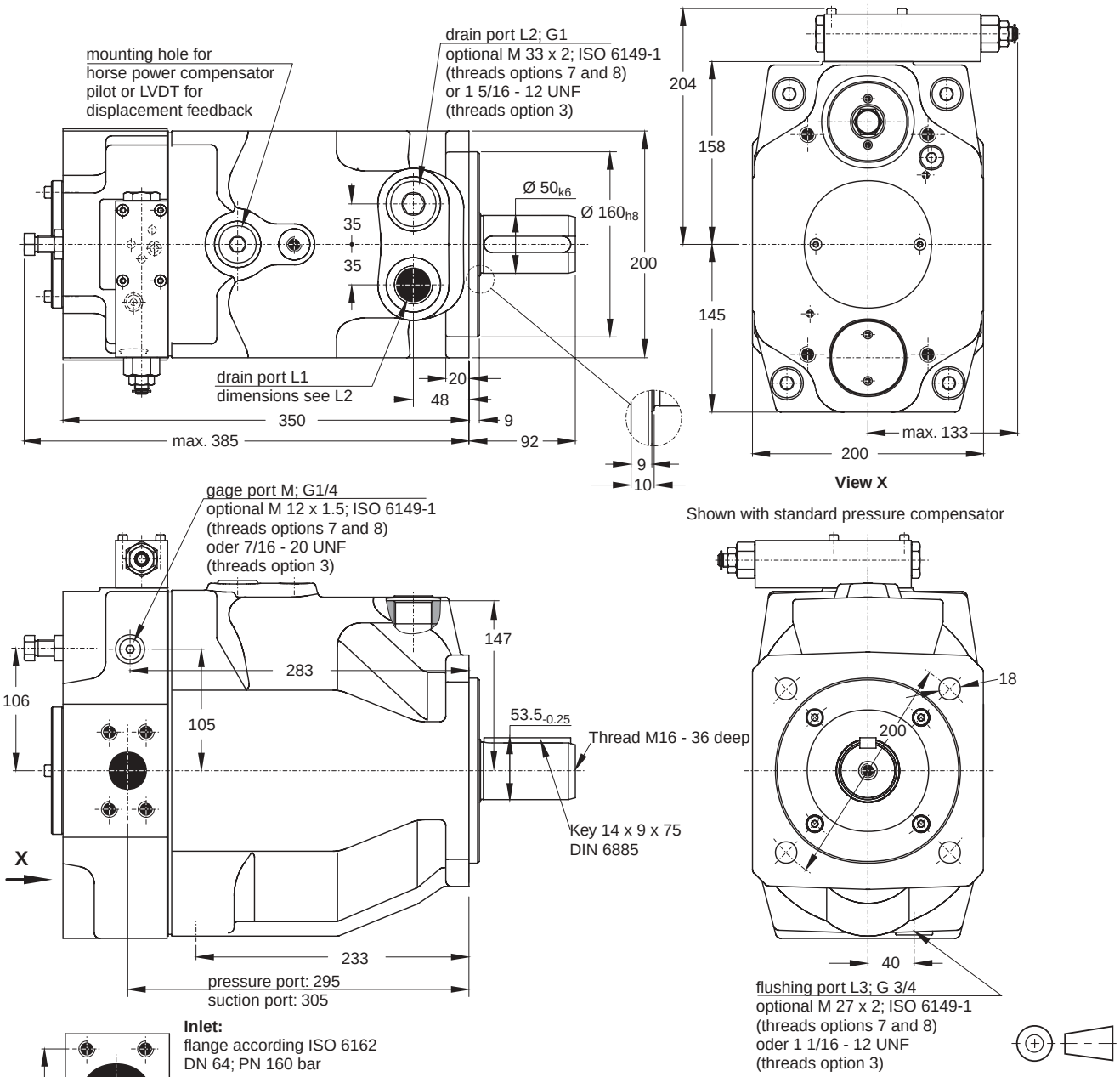
PV0140 - 180, metric version



Shown is a clockwise rotating pump. Counter clockwise rotating pumps have inlet, outlet and gauge ports reversed.

PI PVplus UK.PM6.5 RH

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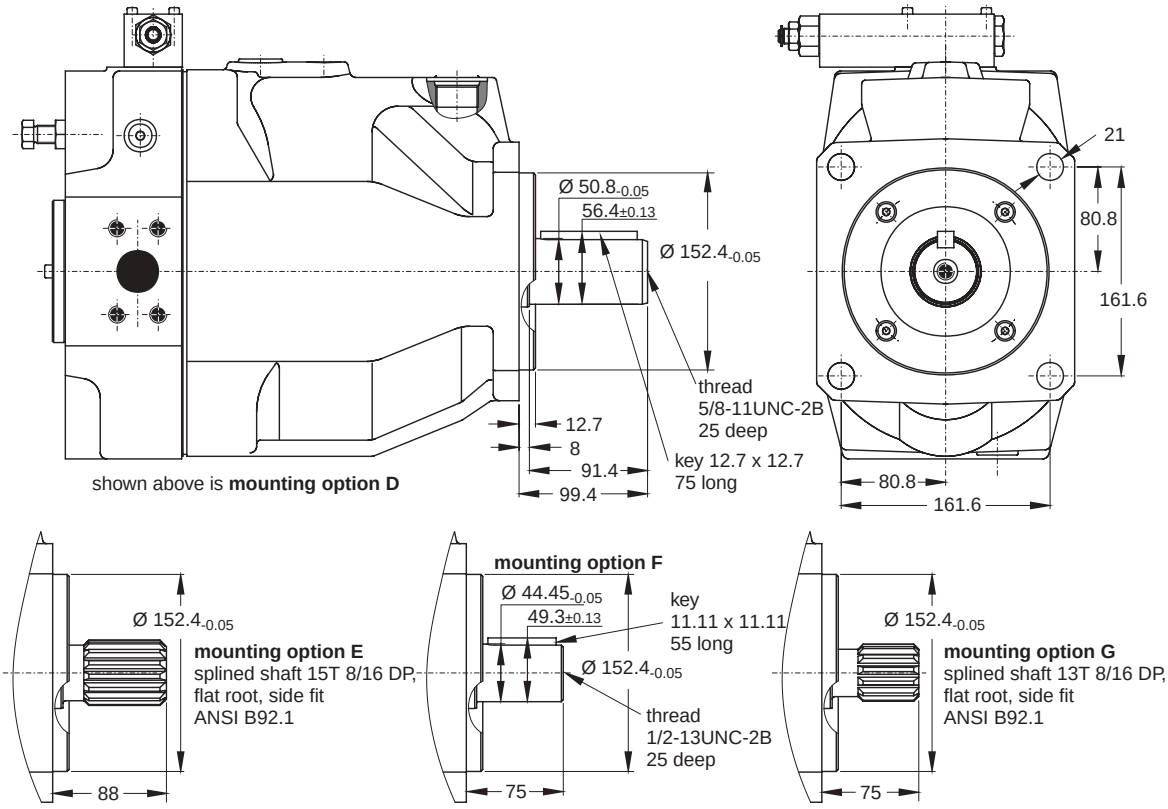
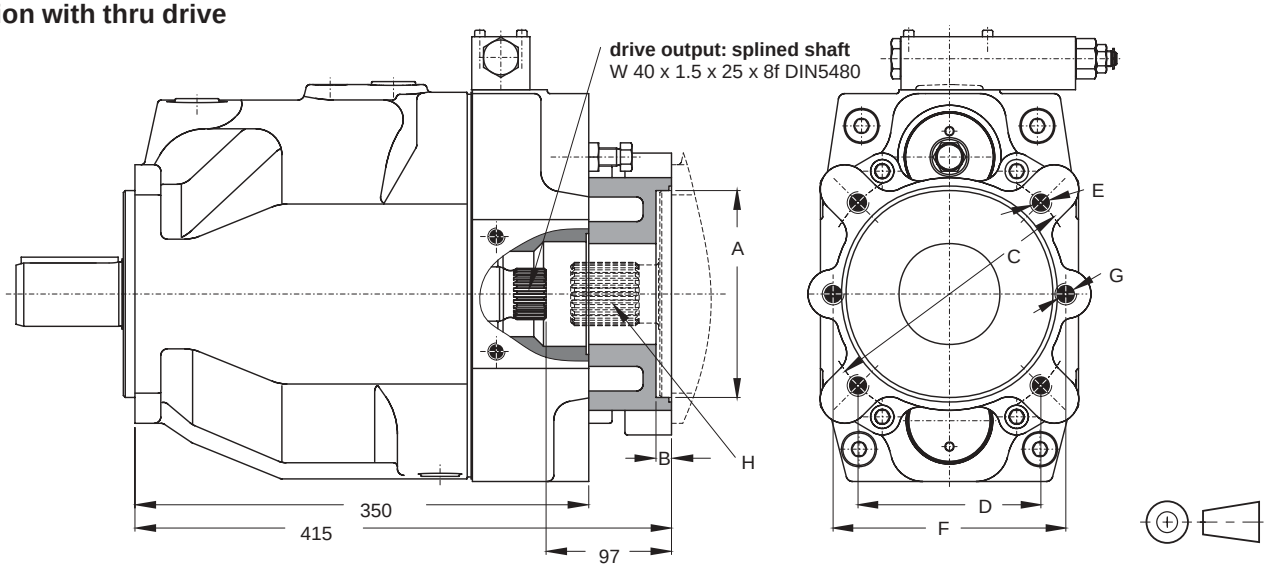
PV140 - 180, SAE version and thru drive version



Variation with thru drive



Thru shaft adaptors are available with the following dimensions:						
A	**B**	**C**	**D**	**E**	**F**	**G**
80	10	103	-	M8	109	M10
100	12	125	-	M10	140	M12
125	12	160	-	M12	180	M16
160	12	200	-	M16	-	-
82.55	10	-	-	-	106	M10
101.6	12	-	89.8	M12	146	M12
127	14	-	114.5	M12	181	M16
152.4	14	-	161.6	M16	-	-

Dimension H and available couplings see page 24.
At threads options 3 and 7 the dimensions E and G are UNC - 2B threads.

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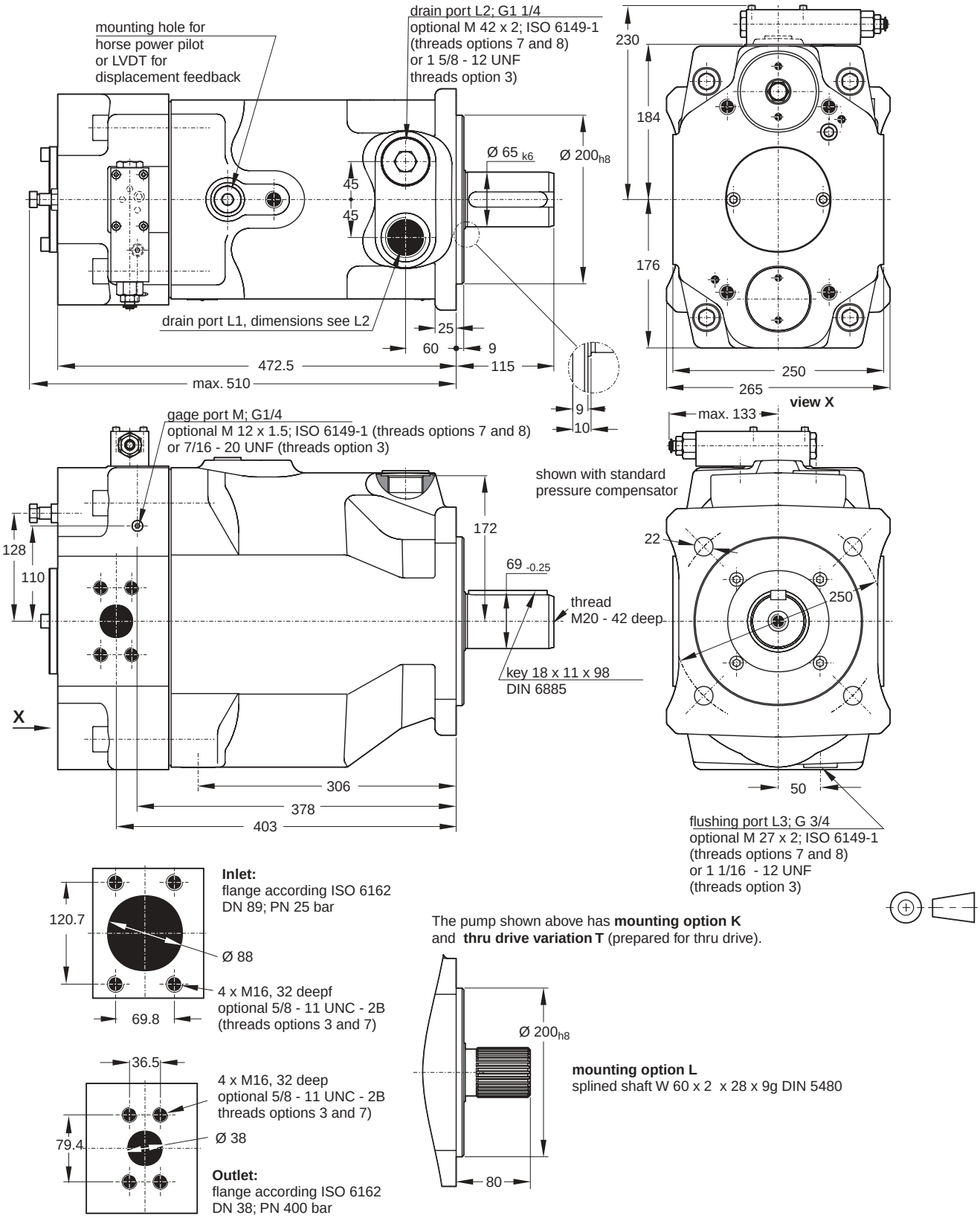
PV 270, metric version



Inlet:
flange according ISO 6162
DN 89; PN 25 bar

Outlet:
flange according ISO 6162
DN 38; PN 400 bar

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

mounting option L
splined shaft W 60 x 2 x 28 x 9g DIN 5480

Shown is a clockwise rotating pump. Counter clockwise rotating pumps have inlet, outlet and gauge ports reversed.

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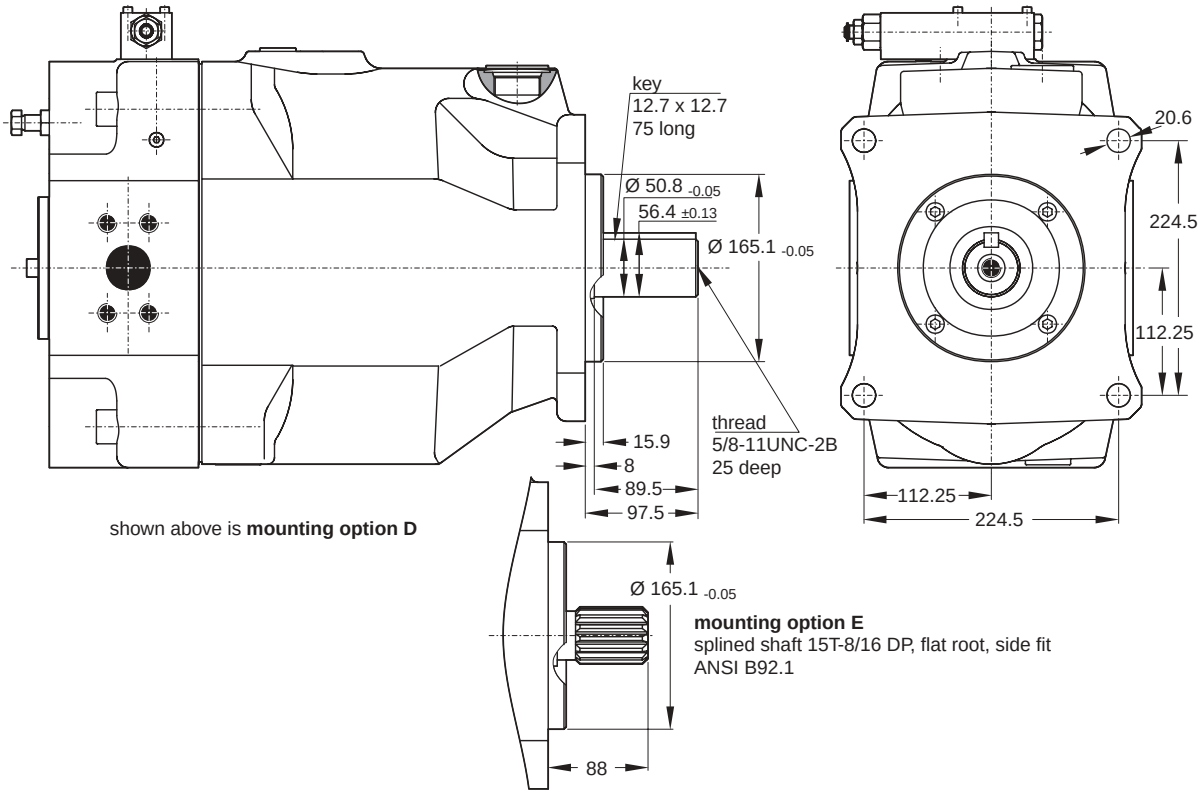
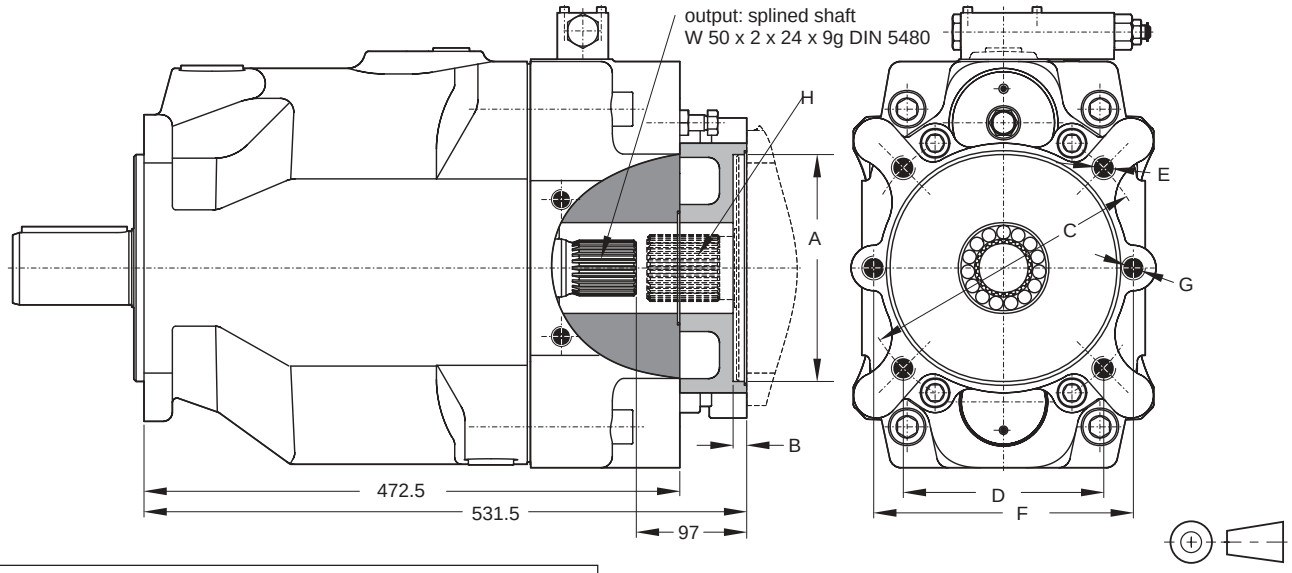
PV 270, SAE version and thru drive version



Variation with thru drive



Thru shaft adaptors are available with the following dimensions:						
A	**B**	**C**	**D**	**E**	**F**	**G**
80	8.5	103	-	M8	109	M10
100	10.5	125	-	M10	140	M12
125	10.5	160	-	M12	180	M16
160	13.5	200	-	M16	224	M20
200	13.5	250	-	M20	-	-
82.55	8	-	-	-	106	M10
101.6	11	-	89.8	M12	146	M12
127	13.5	-	114.5	M12	181	M16
152.4	13.5	-	161.6	M16	229	M20
165.1	17	-	224.5	M20	-	-

Dimension H and available couplings see page 24.
At threads options 3 and 7 the dimensions E and G are UNC - 2B threads.

Mounting kits for multiple pumps, for second pump option

MK – PV BG [ ] [ ] [ ] [ ] [ ]

Mounting kit | **Axial piston pump series PV** | **Size** | **Second pump** | **Thread** | **Seals** | **Design series** (see name plate)

Code	Pump size
1	Pump size 1: PV016 - PV023
2	Pump size 2: PV032 - PV046
3	Pump size 3: PV063 - PV092
4	Pump size 4: PV140 - PV180
5	Pump size 5: PV270

Code	Second pump, SAE
Y	SAE AA, diameter 50.8 mm
A	SAE A, diameter 82.55 mm
B	SAE B, diameter 101.6 mm
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	Seals
N	NBR
V	FPM
E	EPR

Code	Thread
M	metric
S	SAE

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

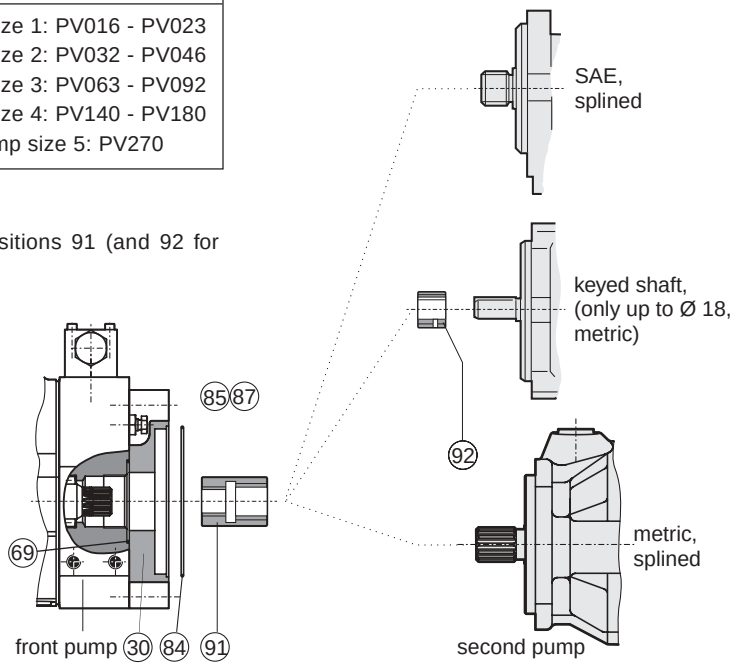
Mounting kits for multiple pumps, couplings

MK – PV BG [ ] [ ] [ ]

Mounting kit | **Axial piston pump series PV** | **Size** | **Coupling** | **Design series** (see name plate)

Code	Pump size
1	Pump size 1: PV016 - PV023
2	Pump size 2: PV032 - PV046
3	Pump size 3: PV063 - PV092
4	Pump size 4: PV140 - PV180
5	Pump size 5: PV270

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



Code	Coupling for metric, splined shaft DIN 5480
01	N25 x 1.5 x 15
02	N32 x 1.5 x 20
03	N40 x 1.5 x 25
04	N50 x 2 x 24
05	N60 x 2 x 28
	Coupling for SAE splined shaft flat root, side fit
11	9T 16/32
12	11T 16/32
13	13T 16/32
14	15T 16/32
15	14T 12/24
16	17T 12/24
17	13T 8/16
18	15T 8/16
	Coupling + adaptor for keyed shaft
20	Diameter 12 mm
21	Diameter 16 mm
22	Diameter 18 mm

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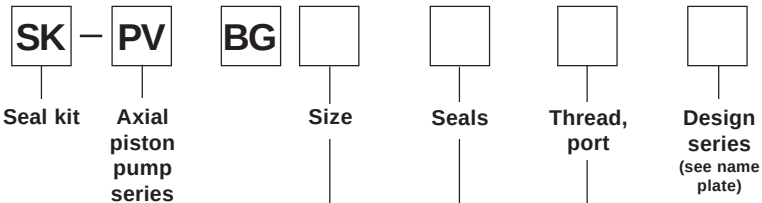
Seal kits

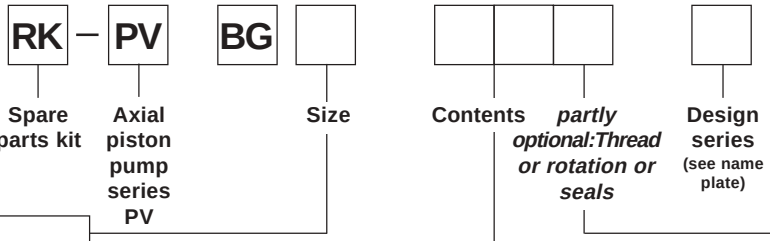


Code	Pump size
1	Pump size 1: PV016 - PV023
2	Pump size 2: PV032 - PV046
3	Pump size 3: PV063 - PV092
4	Pump size 4: PV140 - PV180
5	Pump size 5: PV270

Code	Seals
N	NBR
V	FPM
E	EPR

Code	Thread	Port
1	metric	BSPP
3	UNC	UNF
7	UNC	ISO 6149
8	metric	ISO 6149

Repair and spare parts kits

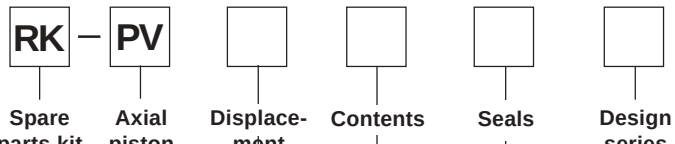


Code	Pump Size
1	Pump size 1: PV016 - PV023
2	Pump size 2: PV032 - PV046
3	Pump size 3: PV063 - PV092
4	Pump size 4: PV140 - PV180
5	Pump size 5: PV270

Code	Contents	Optional
VT	Connecting parts, kit	Thread
WP	Shaft with key	Thread
WZ	Splined shaft	Thread
SS	Valve plate	Rotation
SB	Bushing for servo piston	Seals
	Contents - fixed	
GLE	Trunnion bearing kit	
ROG	Rotating unit incl. piston set	
KOS	Piston set	
SRS	Swash plate	
WQS	Shaft with key, reinforced, only for size 4, only with SAE	
WFS	Splined shaft, reinforced, only for size 4, only with SAE	
RFE	Bias spring kit	
SKS	Servo piston kit	

Code	Thread
M	metric
S	SAE / UNC
	Rotation
R	clockwise
L	counter-clockw.
	Seals
N	NBR
V	FPM
E	EPR

Repair and spare parts kits for adjustable displacement limiter



Code	Displacement		
016	PV016	063	PV063
020	PV020	080	PV080
023	PV023	092	PV092
032	PV032	140	PV140
040	PV040	180	PV180
046	PV046	270	PV270

Code	Contents
HE	Displacement limiter adjustable

Code	Seals
N	NBR
V	FPM
E	EPR

For parts included, see spare parts list PVI-BG**x**-GB-**yy**; available upon request.
x stands for frame size 1 - 5
yy stands for design series

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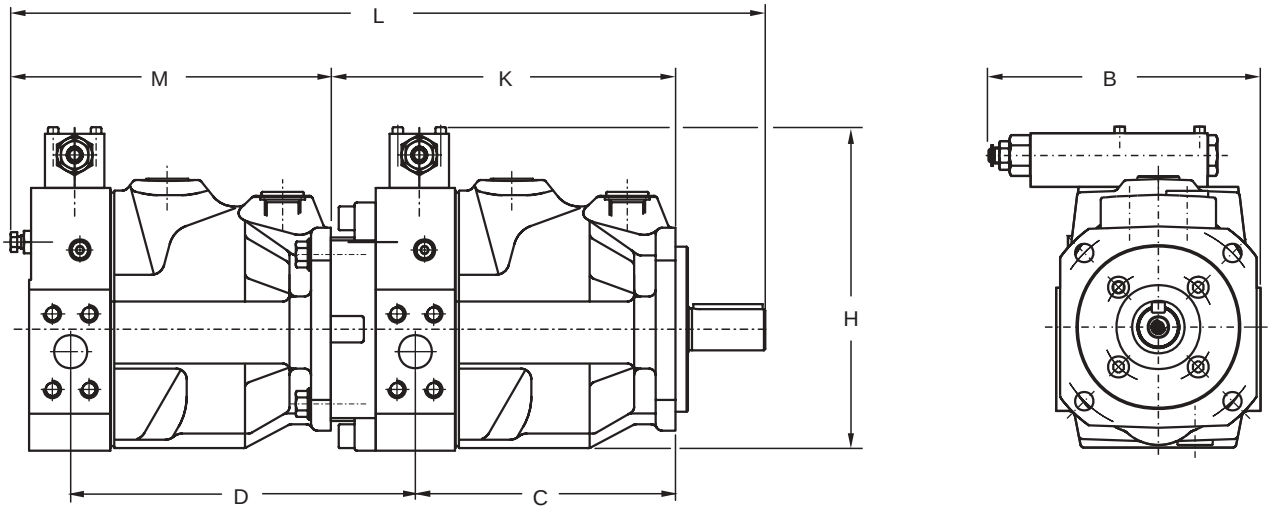
Hydraulic Controls Division
Kaarst, Germany

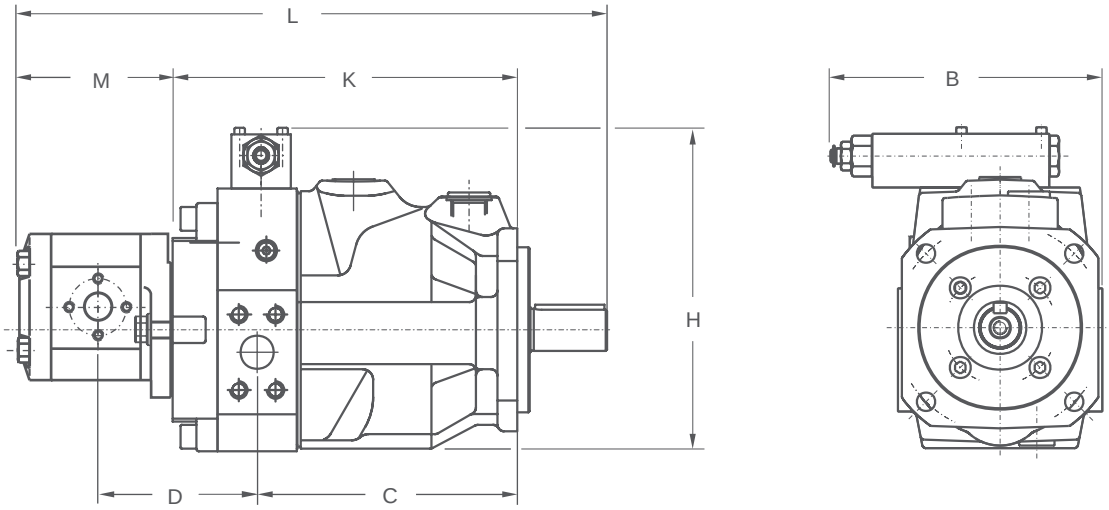
Combinations PV/PV, PV/PVM (metric version)



Main pump	Second pump	Interface main pump	L	B	C	D	H	K	M
PV016, 020 or 023	PV016, 020 or 023	100 B4 HW	489	196	170.5	225	220	225	212
PV032, 040 or 046	PV016, 020 or 023 PV032, 040 or 046	125 B4 HW	541 574	208 208	197 197	235.5 261	245 245	261 261	212 245
PV063, 080 or 092	PV016, 020 or 023 PV032, 040 or 046 PV063, 080 or 092	160 B4 HW	630 663 724	232 232 232	252 252 252	244.5 271 326	299 299 299	326 326 326	212 245 306
PV140 or 180	PV016, 020 or 023 PV032, 040 or 046 PV063, 080 or 092 PV140 or 180[1)]	160 B4 HW	719 752 813 878	230 230 230 230	305 305 305 305	280.5 307 362 415	349 349 349 349	415 415 415 415	212 245 306 385
PV270	PV016, 020 or 023 PV032, 040 or 046 PV063, 080 or 092 PV140 or 180 PV270[1)]	200 B4 HW	860 893 954 1033 1134	255 255 255 255 255	403 403 403 403 403	299 325.5 380.5 433.5 531.5	406 406 406 406 406	531.5 531.5 531.5 531.5 531.5	212 245 306 385 510

[1)] Combinations PV140/180 + PV140/180 and PV270 + PV270 only with splined shaft on main pump due to high torque.

Combinations PV/PGP



Main pump	Second pump	Interface main pump	L*	B	C	D*	H	K	M
PV016, 020 or 023	PGP511	100 B4 HW	420	196	170.5	124	220	225	99 -143
PV032, 040 or 046	PGP511	125 B4 HW	472	208	197	133.5	245	261	99 -143
	PGP517		506	208	197	152	245	261	132 -177
PV063, 080 or 092	PGP511	160 B4 HW	561	232	252	143.5	301	326	99 -143
	PGP517		595	232	252	162	301	326	132 -177
PV140 or 180	PGP511	160 B4 HW	650	230	305	179.5	349	415	99 -143
	PGP517		684	230	305	198	349	415	132 -177
PV270	PGP511	200 B4 HW	790.5	255	403	198	406	531.5	99 -143
	PGP517		824.5	255	403	216.5	406	531.5	132 -177

* maximum length with largest displacement of a gear pump frame size

Standard gear pumps for combination with PV

Model	Ordering code	Displacement [cm^3/U]	Flow [l/min at 1500min^{-1}]
PGP505	PGP505A0040CA1H2NJ4J4B1B1	4	6
	PGP505A0080CA1H2NJ4J4B1B1	8	12
PGP511	PGP511A0110CA1H2NL2L1B1B1	11	16.5
	PGP511A0140CA1H2NL2L1B1B1	14	21
	PGP511A0190CA1H2NL2L1B1B1	19	28.5
	PGP511A0220CA1H2NL2L2B1B1	22	33
	PGP511A0270CA1H2NL2L2B1B1	27	40.5
	PGP511A0330CA1H2NL2L2B1B1	33	49.5
PGP517	PGP517A0230CD1H3NL3L2B1B1	23	34.5
	PGP517A0280CD1H3NL3L2B1B1	28	42
	PGP517A0330CD1H3NL3L2B1B1	33	49.5
	PGP517A0380CD1H3NL3L2B1B1	38	57
	PGP517A0520CD1H3NL3L3B1B1	52	78
	PGP517A0700CD1H3NL3L3B1B1	70	105
PGP350	PGP350A197EVAB2025	83.6	125.4

For technical information see gearpump /-motor catalogue (on request: HY11-3252/UK)

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

Shaft Code	PV016-023	PV032-046	PV063-092	PV140-180	PV270
D	300	550	1320	2000	2000
E	300	610	1218	2680	2680
F	--	--	--	1320	--
G	--	--	--	1640	--
K	300	570	1150	1900	2850
L	405	675	1400	2650	3980
Max. torque transmission cap. for rear mount. pumps	140	275	560	1100	1650

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

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.

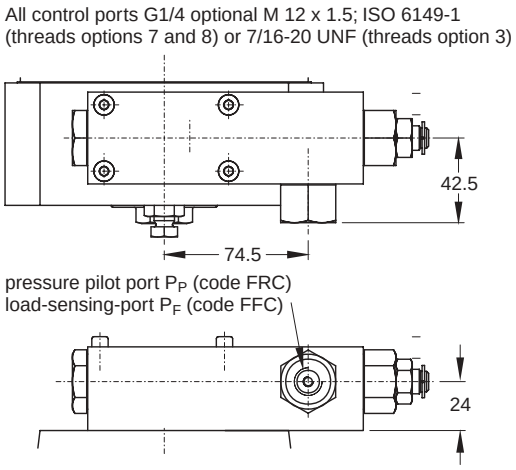
Total torque factor of the combination
= sum of individual torque factors of all pumps

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 cm^3/rev).

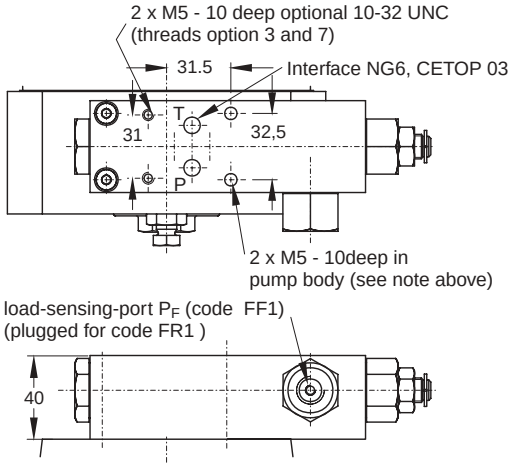
Torque factor of any pump
= p x Vg

Pump	Shaft	Torque limit factor
PV016-023	D	17700
	E	17700
	K	17700
	L	20130
PV032-046	D	32680
	E	36380
	K	33810
	L	40250
PV063-092	D	77280
	E	72450
	K	67620
	L	83720
PV140-180	D	118400
	E	158760
	F	78750
	G	97650
	K	113400
	L	157500
PV270	D	119000
	E	159700
	K	170100
	L	236250

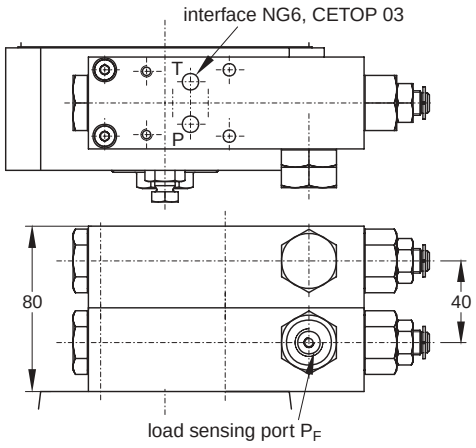
Remote pressure compensator, code FRC
Load sensing compensator, code FFC



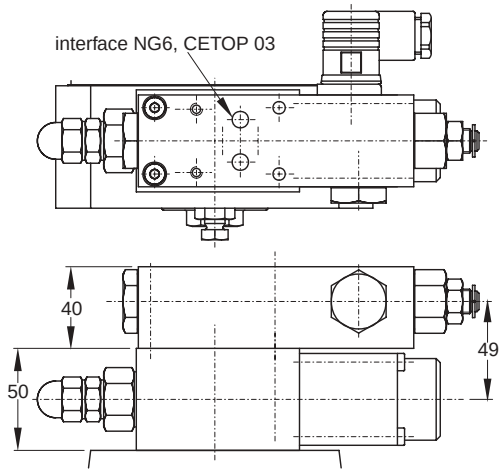
Remote pressure comp. with interface NG6, code FR1
Load sensing comp. with interface NG6, code FF1



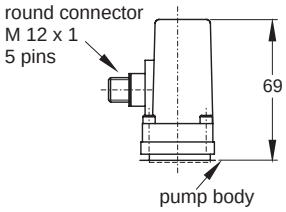
2-valve compensator, code FT1



Proportional p-Q-compensator, code FPR (for code FPV lower valve only without interface)



LVDT for proportional compensator



Pilot valve for horse power compensator

Seal kit, compensator

Seal kit — **Compensator for axial piston pump series PV** — **Seal**

Code	Seal
N	NBR
V	FPM
E	EPR

Seal kit includes all seals for all single compensator options and the seals for LVDT and horse power pilot valve. For 2-valve-compensators two seal kits are to be ordered.
Spare parts lists and ordering codes for replacement compensator valves see manual PVI-PVC-GB; available upon request

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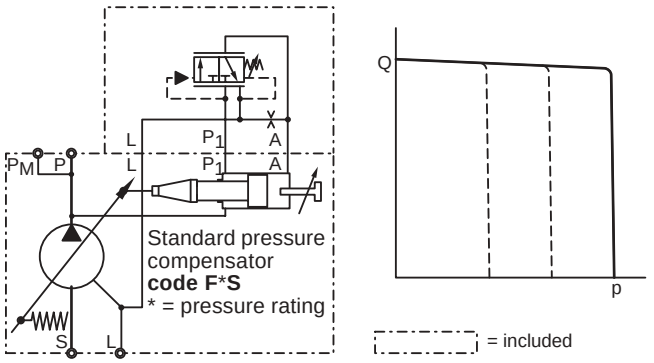
Parker Hannifin GmbH
Hydraulic Controls Division
Kaarst, Germany

Standard pressure compensator code F*S

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 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 spool 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.

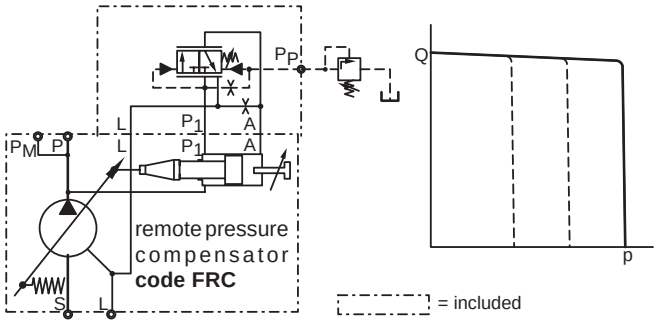


Remote pressure compensator code FRC

While at the standard pressure compensator the pressure is set directly at the compensator spring, the setting of the remote pressure compensator can be achieved by any suitable pilot pressure valve connected to pilot port P_P. The pilot flow supply is internal through the valve spool.

The pilot flow is 1 - 1.5 l/min. 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 remote pressure compensator typically responds faster and more precisely than the standard pressure compensator and is able to solve instability problems that may occur with a standard pressure compensator in critical applications.

The pressure pilot valve can also be electronically controlled (proportional pressure valve) or combined with a directional control valve for low pressure standby operation.

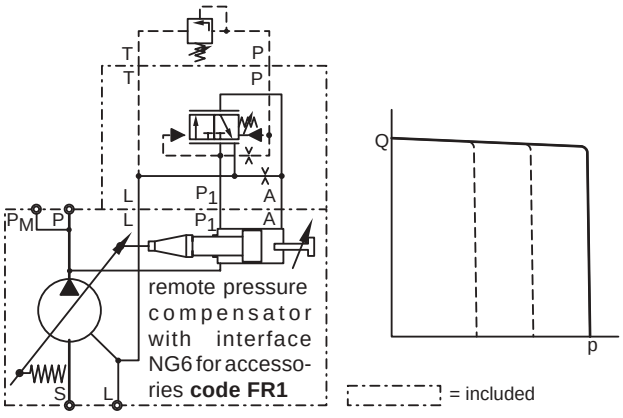


Remote pressure compensator code FR1

Version FR1 of the remote pressure compensator provides on its top side an interface NG6, DIN 24340 (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. Parker offers a variety of these compensator accessories ready to install. See pages 38 and 39 of this catalogue.

All remote pressure compensators 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.

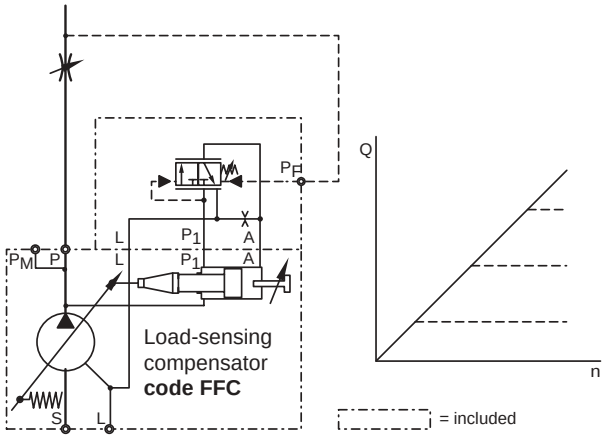


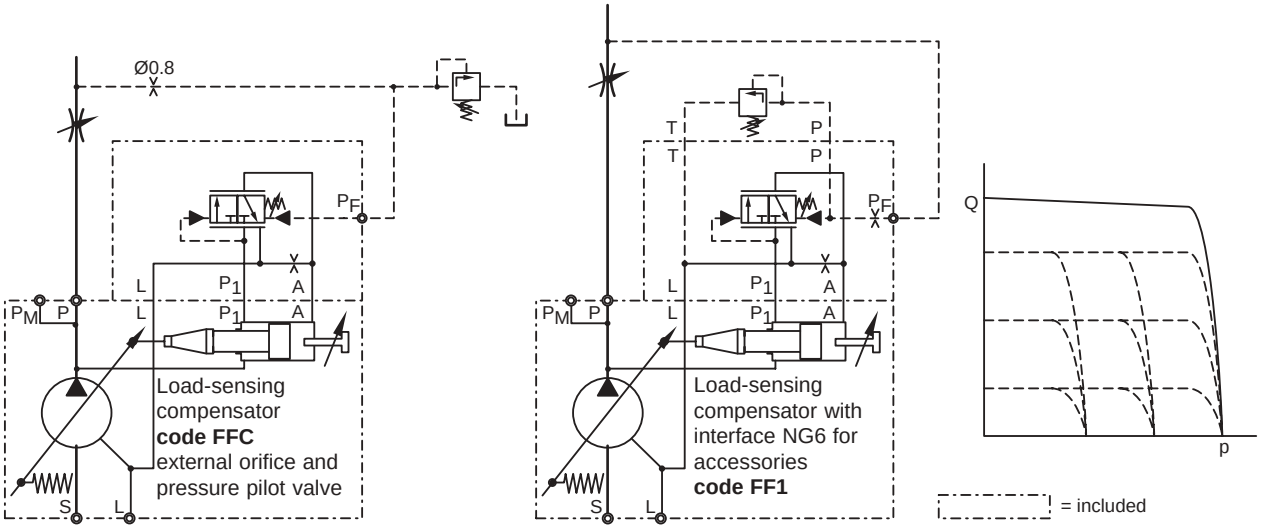
Load-sensing compensator code FFC

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 a 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 a pilot orifice (Ø 0.8mm) and a pressure pilot valve pressure compensation can be added to the flow control function. See the circuit diagram below, left.





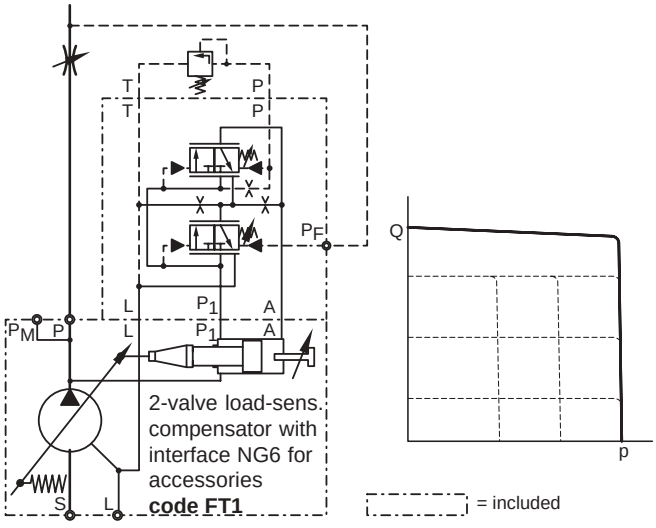
Shown above is **load sensing compensator code FF1** with an NG6 interface on top of the control valve. That allows direct mounting of a pilot valve for pressure compensation. This version includes the pilot orifice.

Due to the interaction of flow and pressure compensation this package has not the "ideal" control characteristic. The deviation is caused by the pilot valves characteristic.

If a more accurate pressure compensation is required, the **2-valve load-sensing compensator code FT1** can be used. The circuit diagram of this version is shown left.

Here the interaction of the two control functions is avoided by using two separate control valves for flow and pressure compensation.

The 2-valve compensator is equipped with an interface NG6 on the compensators top side.



Hydraulic-mechanical horse power compensator

The hydraulic-mechanical horse 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 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 (see diagrams on opposite page).

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

On top of that an adjustment of the horse 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 horse power setting for other than the nominal speeds (1500 min^{-1}) or for other horse powers.

Ordering code for the horse power option

The first digit designates the horse power setting:

Code B = 3.0 kW etc. up to
Code 3 = 132.0 kW

The second digit designates the pilot flow source:

Code L internal pilot pressure, remote pressure function.

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

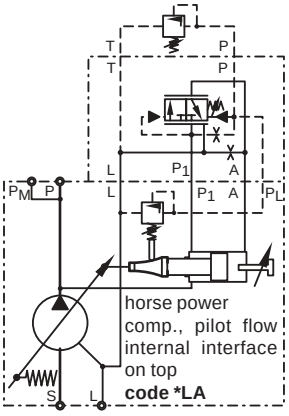
The third digit designates the possibility to adjust the overriding pressure compensation:

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

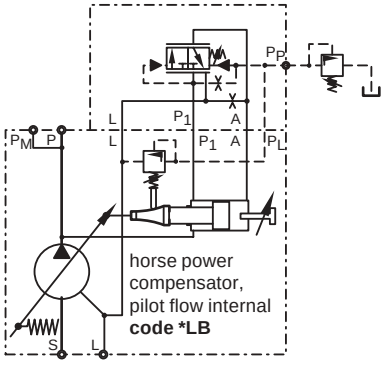
Code B has a threaded pilot port P_p (G1/4) to connect a remote pilot valve with piping.

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

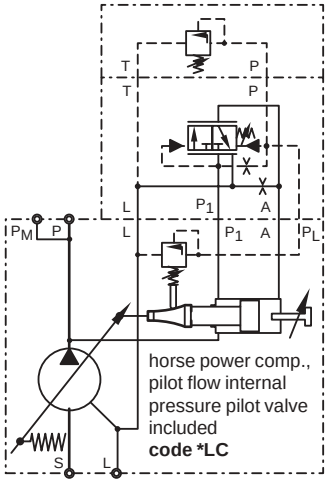
Page 33 shows typical control characteristics and the available horse power settings for the different pump sizes and displacements.



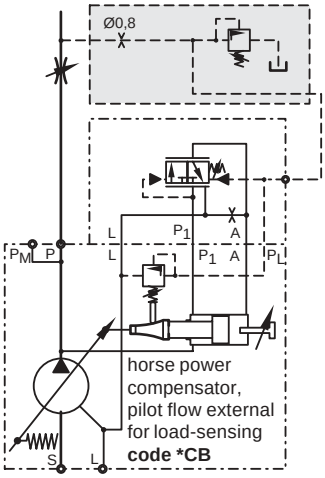
horse power comp., pilot flow internal interface on top
code *LA



horse power compensator, pilot flow internal
code *LB



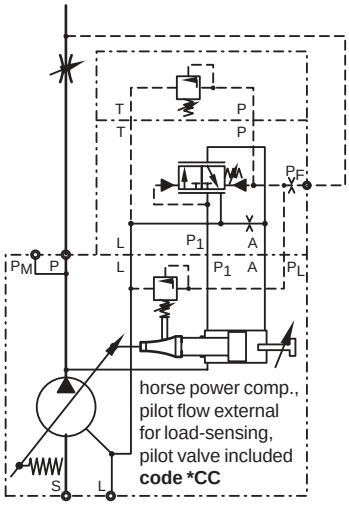
horse power comp., pilot flow internal pressure pilot valve included
code *LC



horse power compensator, pilot flow external for load-sensing
code *CB

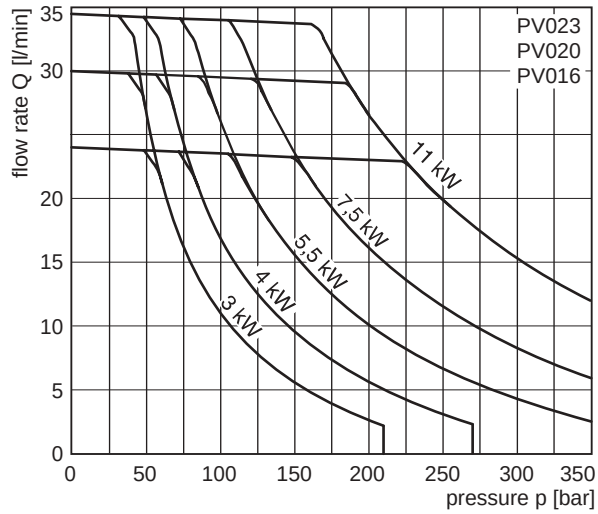
Note:
If version *CB
is required with an external pilot valve and Ø0.8 mm orifice, the orifice in port P_F has to be removed.

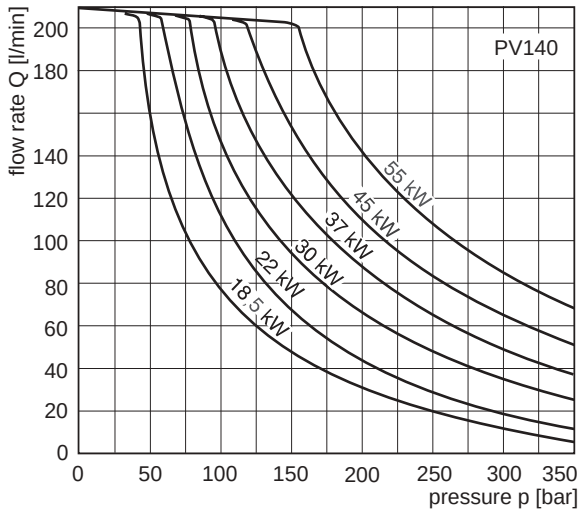
= included

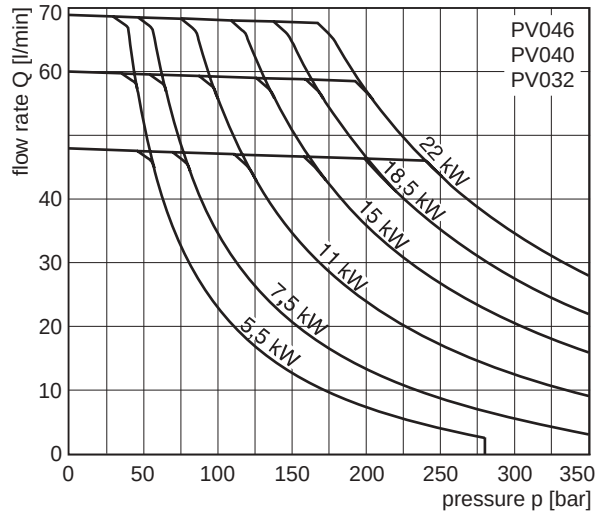


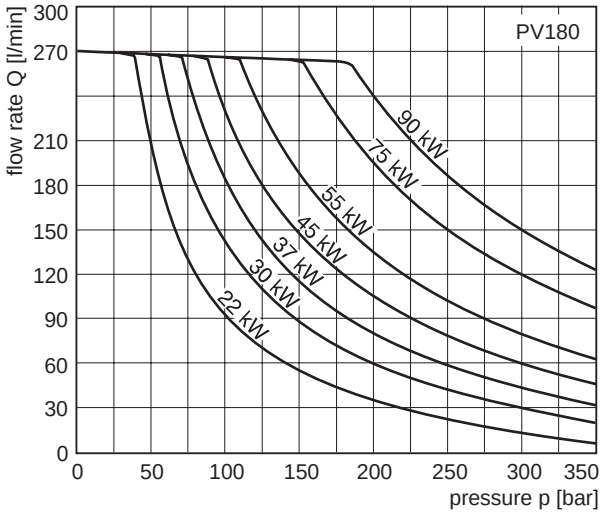
horse power comp., pilot flow external for load-sensing, pilot valve included
code *CC

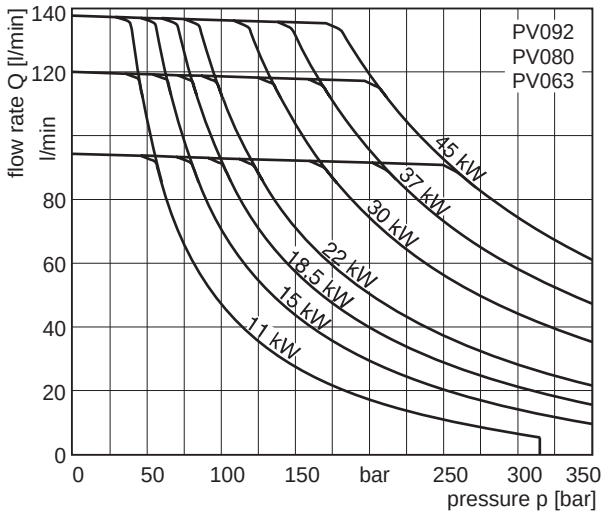
Characteristic curves, horse power compensators

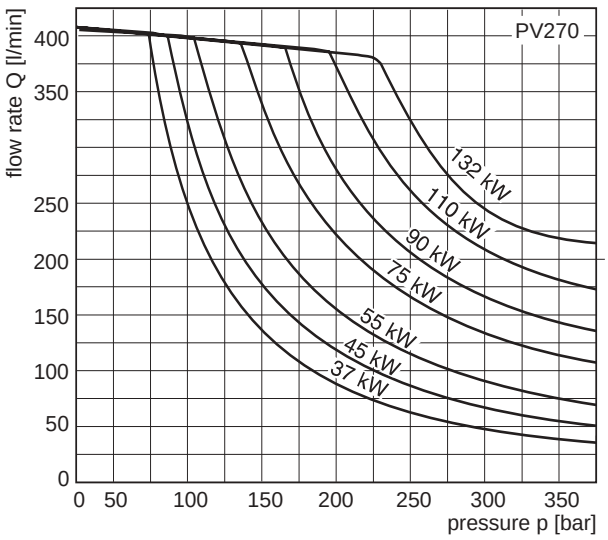












The diagrams shown are only valid for the following working conditions:

Speed : n = 1500 rev/min
Temperature : t = 50°C

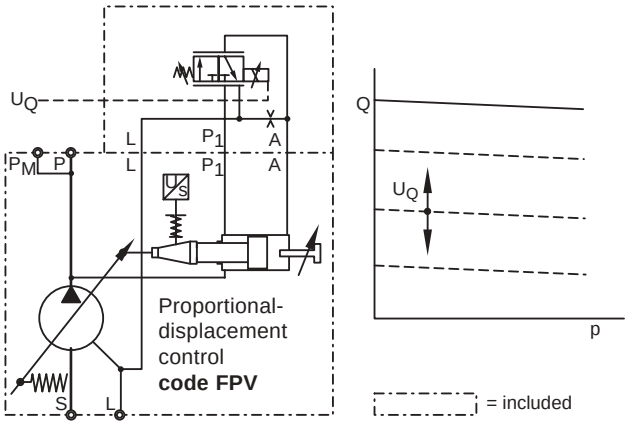
Fluid : HLP, ISO VG46
Viscosity : ν = 46 mm²/s at 40°C

PI PVplus UK.PM6.5 RH

Parker Hannifin GmbH
Hydraulic Controls Division
Kaarst, Germany

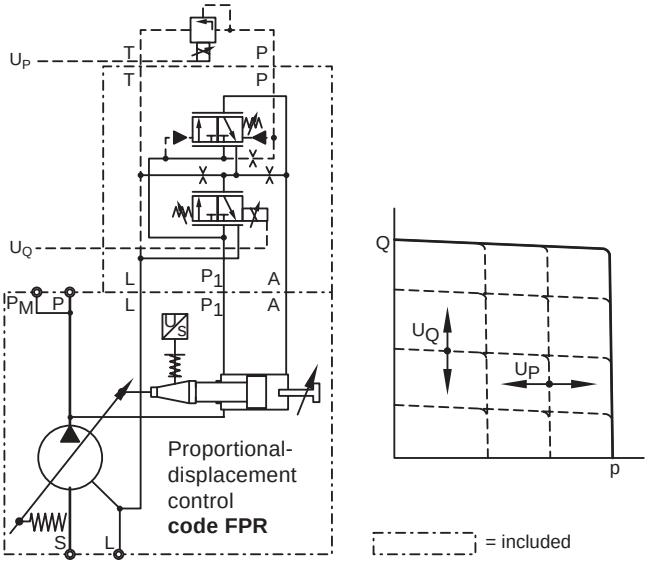
Proportional displacement control, code FPV

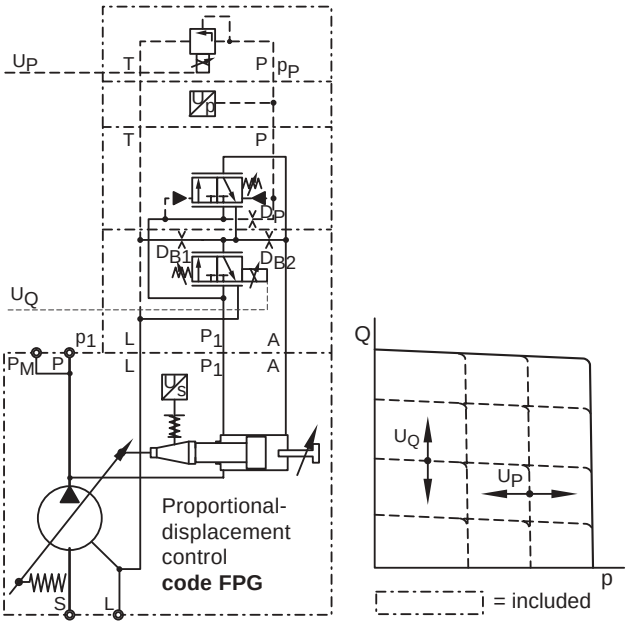
The proportional displacement control allows the adjustment of the pumps output flow with an electrical input signal.
The actual displacement of the pump is monitored by an LVDT and compared with the commanded displacement in an electronic control module PQ0*-F (see opposite side). The command is given as an electrical input signal (0 - 10V or 0 resp. 4 - 20mA) from the supervising machine control. The command can also be provided by a potentiometer. The electronic control module offers a stabilized 10V source to supply the potentiometer.
The electronic control compares permanently input command and actual displacement and powers 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 FPR, FPZ and FPG

In **version FPR** an additional pressure compensator valve can override the electrohydraulic displacement control. That adds pressure compensation to this control.
The compensator valve has an NG6/D03 interface on top to mount a pressure pilot valve. When using a proportional pressure pilot valve an electro-hydraulic p/Q control can be realized. The electronic driver modules are tuned for the valve type DSAE1007P07KLAF to give best performance.
The electronic control module PQ0*-P.. (see opposite page) contains, beside the displacement control unit, also the driver electronics for the a. m. proportional pressure valves.
Using **ordering code FPZ** and specifying the desired pilot valve/compensator accessory, a complete multiple pressure adjustment can be mounted in our factory (see compensator accessories, pages 38 and 39) and the complete unit will be tested and shipped together with the pump.
With **ordering code FPG** the proportional pressure pilot valve and a pressure transducer (Parker SCP 8181 CE) are included with the pump control. In combination with control module PQ0*-Q.. a closed loop pressure control of the pump outlet pressure is available. Module PQ0*-L.. offers an electronic horse power limiter in addition to the closed loop pressure control.
Parker variable displacement pumps have a large servo piston. That leads to a extremely robust and stable pump control. On the other hand that requires high control flows (up to > 100 l/min). Parker has therefore chosen the 2-valve-p/Q control concept, because in this case a hydraulic-mechanical compensator valve takes care of the pressure compensation of the pump. That allows a very fast pressure compensation and makes this the control unsensitive to fluid contamination. We see the 2-valve-concept as a contribution to system and pressure control safety.





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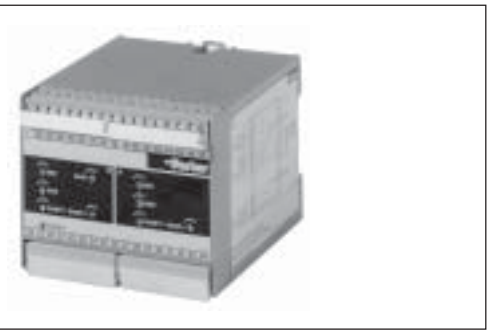
Kaarst, Germany

The electronic modules to power the displacement control and the pressure control are snap-on type modules. They can be mounted on installation rails according to EN 50022. A card holder is not required.
The modules have potentiometers to adjust up and down ramps (ramp time up to 5s) and a min. and max. adjustment for optimum resolution and sensitivity as required by the application.
They comply with the latest legal requirements and confirm to European law. They are EMC approved and carry the CE mark.



Electronic modul PQ0*-P00 to operate the p/Q control for PV pumps

CE

Ordering code electronic module

PQ	□	–	□	00	–	□
Pump amplifier	Pump variation		Module variation			Design series

Code	Pump variation
01	PV 016/020/023
02	PV 032/040/046
03	PV 063/080/092
04	PV 140/180
05	PV 270

Code	Variation
F	flow control only
P	flow control and pressure adjustment
Q	flow and pressure control
L	flow and pressure control with horse power limitation

NOTE!
The electronic modules are not included in the pump compensator. Please order separately.

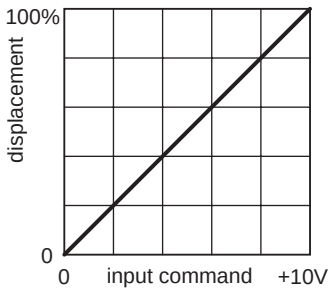
More technical information on these modules can be found in catalogue HY11-2500/UK, chapter 10, Electronics.

Technical data

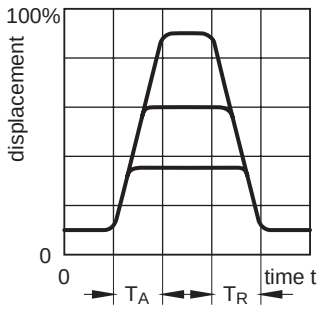
Minimum control pressure required (at internal pressure supply = minimum system pressure)	15 bar
Repeatability	± 0.75 %
Proportional flow compensator (solenoid):	
- nominal voltage	16 V
- environmental temperature	50 °C
- duty cycle	100 %
- protection class	IP54
- connector	ISO 4400
Inductive position feedback (LVDT):	
- supply voltage	18 to 36 VDC
- current requirement	<50 mA
- output voltage	3.5 to 11.5 VDC
- environmental temperature	0 to 50 °C
- load to output signal	> 5 kOhm (short circuit protected)
- connector	round connector M12x1.5pin

Diagrams

Typical static characteristic



Typical dynamic characteristic



Response times

Size	TA [ms]	TR [ms]
PV023	50	50
PV046	70	70
PV092	90	90
PV180	150	150
PV270	200	200

Proportional displacement control with shuttle valve subplate, code WP*

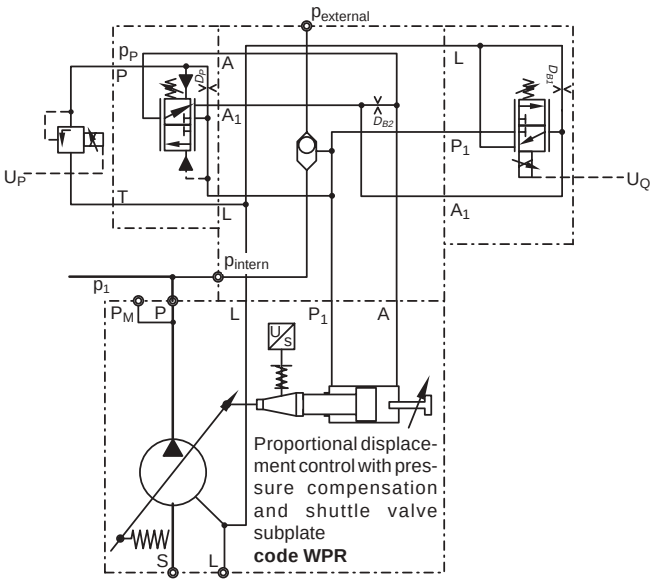
Because of the servo spring the proportional displacement control needs a minimum pump outlet pressure of 12 - 15 bar to adjust the pumps output flow according to an electrical input signal.

If the system does not provide enough back pressure - especially at low displacement and low load - there are two options: the shuttle valve subplate and the preload valve option.

If an external auxiliary pressure is available, the **control option WP*** is equipped with a shuttle valve circuit according to the diagram left. At a low pump outlet pressure the pump displacement adjustment circuit is supplied by the auxiliary pressure and allows adjustment of the pump to zero flow at zero pressure. If the pump outlet pressure exceeds the auxiliary pressure, the shuttle valve shifts to internal pressure supply.

Depending of the pump size and the response requirements an auxiliary power source of 20 - 30 bar and 20 - 40 l/min is recommended.

Note: pressure control is only available above the auxiliary pressure level and operation of the pump at zero flow and zero pressure requires extreme care to maintain lubrication of the rotating group.



Shuttle valve subplate for proportional displacement control

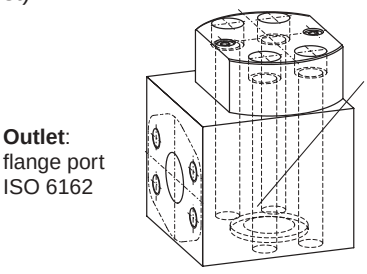
Preload valve for proportional displacement control, code PVAPVV*

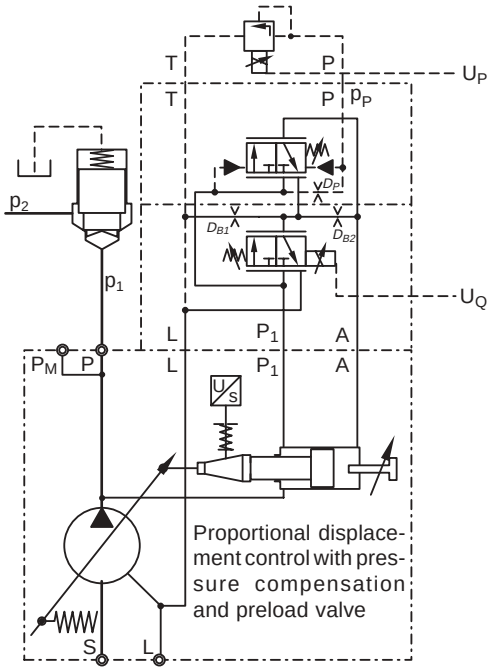
An alternative solution is the use of a direct operated preload valve. The preload valve is offered in a manifold for direct mounting to the pressure port of the pump.

The opening pressure of the valve is set to approx. 20 bar and at 30 bar load pressure the valve is fully open and does cause a pressure drop of less than 1 bar.

The ordering code for the preload valve is **PVAPVV***. The * stands for frame size of the pump, thread and port option and seal material option. For details see next page.

The design of the preload valve is shown below. For dimensions see **installation manual PVI-017-UK** (available upon request).





PI PVplus UK.PM6.5 RH

Parker Hannifin GmbH
Hydraulic Controls Division
Kaarst, Germany

Quick pressure relief manifold for proportional pump control, code PVAPSE*

When working with a proportional pressure control on variable displacement pumps, pressure decrease can be slow. When the pump strokes to deadhead, there is no active pressure relief. To achieve a response similar to a valve controlled system, the quick unload manifold can be mounted to the pump outlet.

This manifold includes a cartridge valve with a 4 bar spring preload. The pilot pressure supply for the compensator valve is passing this cartridge valve and creates a pressure drop across the poppet. At normal working conditions this pressure drop does not exceed 3 bar and the poppet stays closed. In a dynamic response situation the pressure drop can exceed 4 bar and the cartridge actively reuces the system pressure acoording to the setting of the proportional pilot valve.

As the pilot pressure supply is fed through this manifold the compensator spool needs to be without internal orifice. Ordering code for the proportional displacement and pressure control for combination with the quick unload manifold is **FPS for pressure compensation** and **FPT for closed loop pressure control** (pressure transducer and proportional pressure pilot valve included).

Preload and quick unload manifold, code PVAPVE*

The combination of the preload and the quick unload function into one manifold can be ordered under the code PVAPVE*. This manifold is also designed for direct pump outlet mounting.

To maintain a secure function under all conditions the pressure compensator requires an external sensing line connected to the system side of the preload valve (see diagram left).

The ordering code for this proportional displacement control option is **FPP for pressure compensation** and **FPE for closed loop pressure control**.

The ordering code for the function manifolds is shown below.

PVAP | ☐ | ☐ | ☐ | ☐

Accessories for axial piston pump, PV series, pressure port mounting — **Function** — **Frame size** — **Threads option** — **Seal**

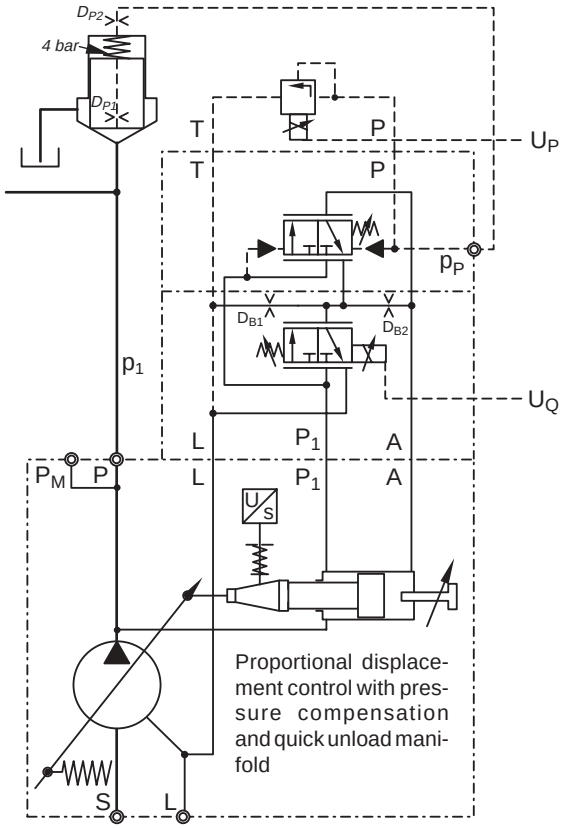
Code	Function
VV	preload manifold
SE	quick unload manifold
VE	preload and quick unload manifold

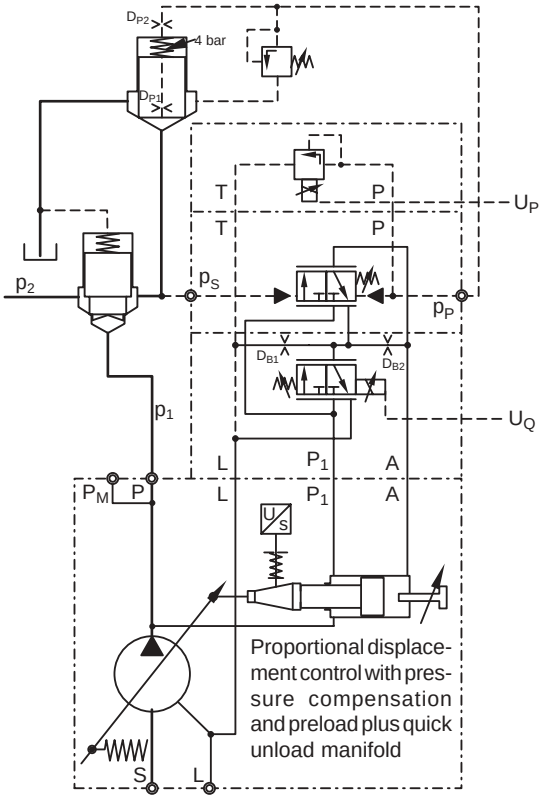
Code	Seal
N	NBR
V	FPM
E	EPR

Code	Size
1	PV016-023
2	PV032-046
3	PV063-092
4	PV140-180
5	PV270

Code	Ports[1]	Threads[2]
1	BSPP	metric
3	UNF	UNC
4[3]	BSPP	metr., M14
7	ISO 6149	UNC
8	ISO 6149	metric

[1] drain, gage and control ports
[2] mounting threads
[3] for PV063-PV180 only: pressure port 1 1/4" with M14 instead of M12





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Hydraulic Controls Division
Kaarst, Germany

Ordering Examples

Example 1

PV pump with fast response remote pressure control, relief valve with 2 pressure stages, electrical pressure selection, nitrile seals, spindle adjustment, 24 VDC solenoid, plug to DIN 46350 accessories **fitted:**

PV * * * * * * * * FR**Z; Z** = PVAC2PCMNSJP

Example 2

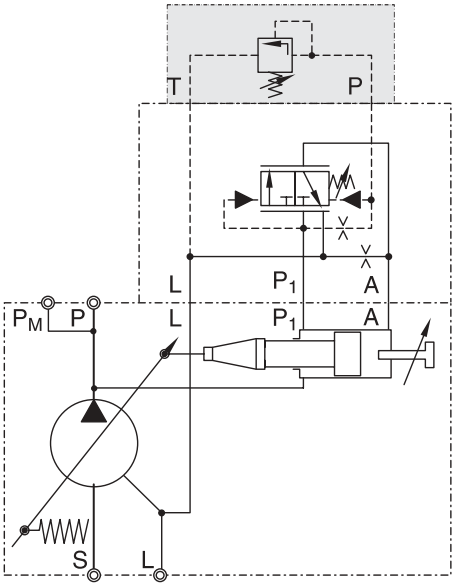
Same pump, accessories **not fitted:**

PV * * * * * * * * FR**1; 1** = PVAC2PCMNSJP

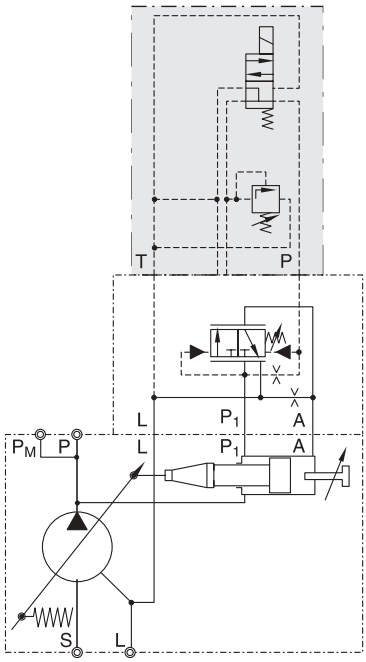
Example 3

Usable for horsepower control and proportional volume control, too.

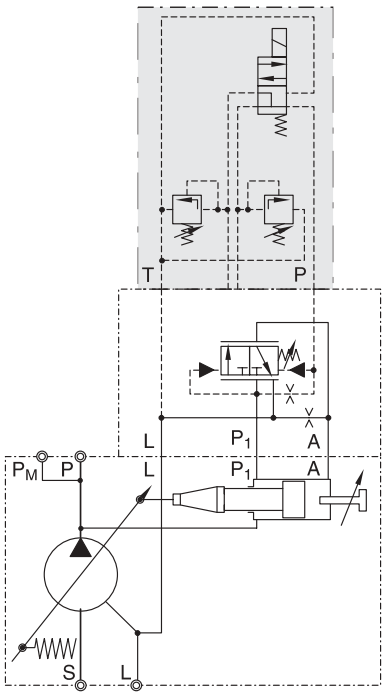
Schematic PVAC1P*



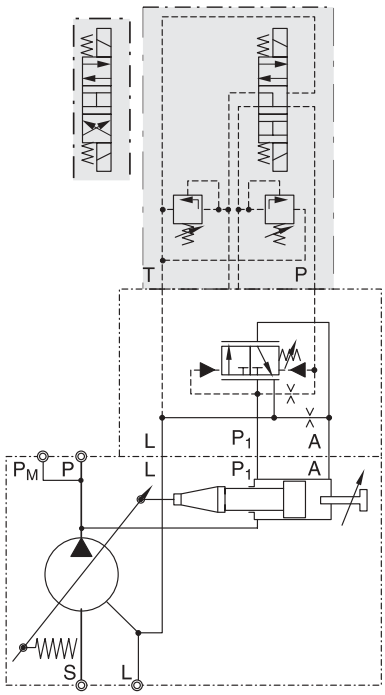
Schematic PVAC1E*



Schematic PVAC2P*



Schematic PVAC2E



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PV	AC			M					35	
For PV Pump Series	Accessories for Compensa-tors	Function	Mounting Bolts	Metric	Seals	Adjustment [1]	Solenoid	Solenoid Accessories	Nominal pressure 350bar [2]	Design Series not required for order

Code	Function
1P	Max. pressure relief
1E	1 pressure, electrical unloading
2P	2 pressures, electrical selection
2E	2 pressures + stands electrical selection low pressure default
2M	2 pressures + stands electrical selection stand by default
PP	Prop. relief valve with seal option E

Code	Seals
N	NBR
V	FPM
E	EPR

Code	Solenoid accessories
omit	For function 1P & PP
C	Conduit box with free wires
W	DIN plug socket without plug

Code	Mounting bolts
C	For single compensators type R or F
T	For 2-valve-compensator type T
S	without bolts

Code	Adjustment
S	Spindle with lock nut
L	DIN lock

[1] not with function PP

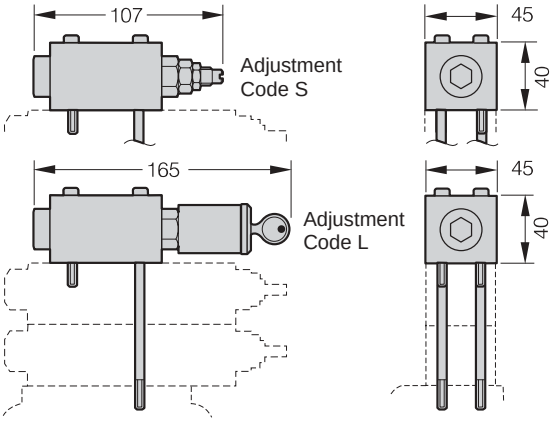
Code	Solenoid voltage
omit	For function 1P & PP
Y	110V/50Hz - 120V/60Hz
T	220V/50Hz - 240V/60Hz
J	24V DC

[2] other pressures on request

For spare parts and replacement kits see manual PVI-PVAC-UK; available upon request.
Please order plugs separately. See catalogue HY11-2500/UK, chapter 2, accessories.

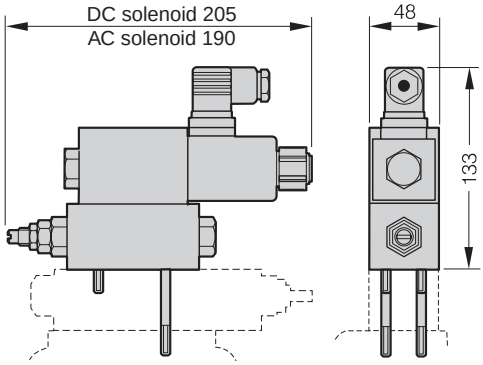
Dimensions

PVAC1P*



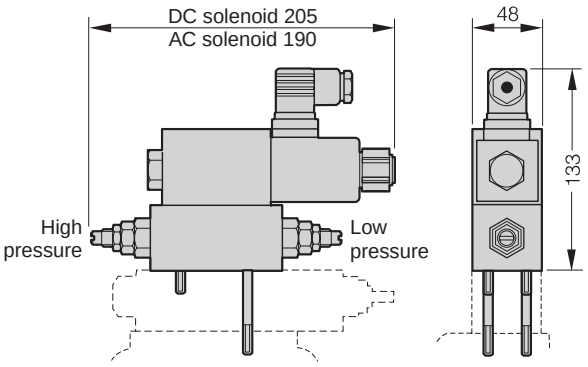
Pressure relief valve mounted on 2-valve pressure-flow compensator type T

PVAC1E*



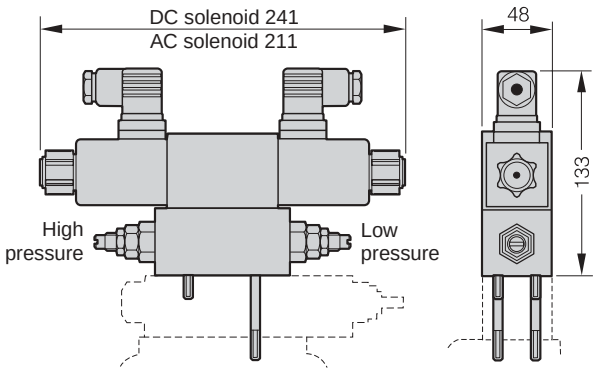
Pressure relief valve, electrical unloading, mounted on compensator type R or F

PVAC2P*



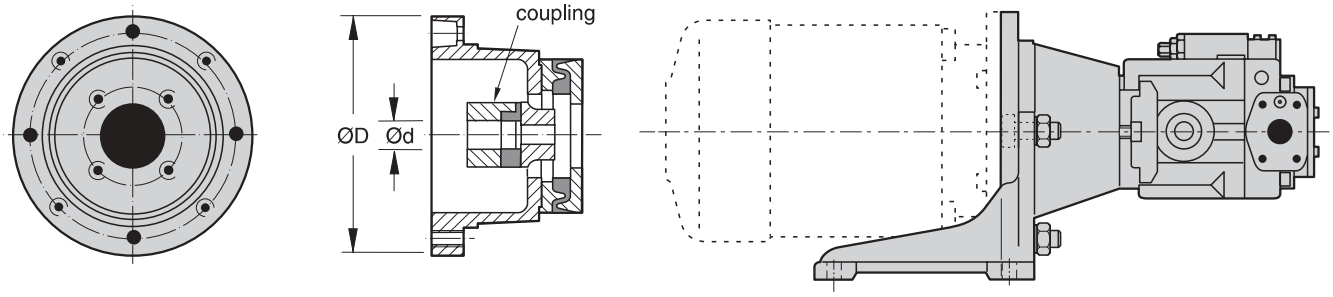
2-pressure relief valve, electrical selection, mounted on compensator type R or F

PVAC2E*/2M*



2-pressure relief valve, electrical selection and unloading, mounted on compensator type R or F

Bell housing, coupling and foot flange



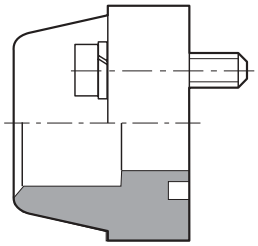
Can be purchased at:

Raja
Rahmer + Jansen GmbH
Vorthstr. 1
58775 Werdohl, Germany
Tel.: (+2392) 5090, fax: (+2392) 4966

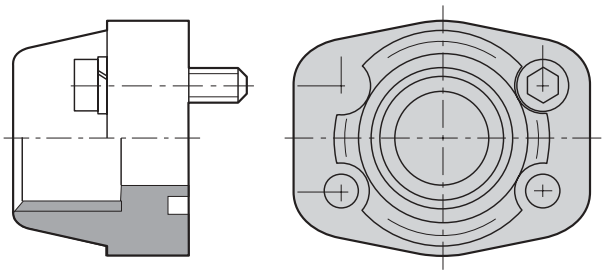
or

KTR
Kupplungstechnik GmbH
Rodder Damm
48432 Rheine, Germany
Tel.: (+5971) 798-0, fax: (+5971) 798443

Welding flange



Threaded flange



Can be purchased at:

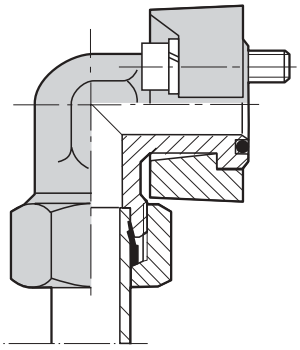
Parker Fluid Connectors, Tube Fittings Division
Am Metallwerk 9
33659 Bielefeld, Germany
Tel.: (+521) 4048-0, fax: (+521) 4048280

or

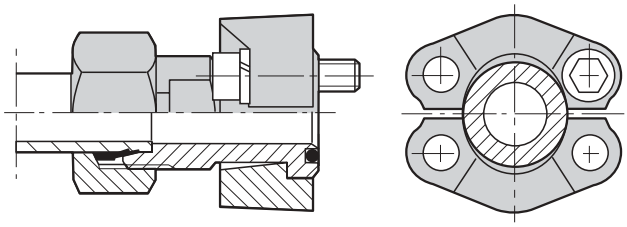
Havit Hydraulik GmbH & Co.
Münchner Str. 11
85123 Karlskron, Germany
Tel.: (+8450) 7031/7032, fax: (+8450) 7033

SAE-flange connections, pipe connection in accordance to DIN 2353

Elbow SAE-flange connection WFS



Straight SAE-flange connection GFS



Can be purchased at:

Parker Fluid Connectors, Tube Fittings Division
Am Metallwerk 9
33659 Bielefeld, Germany
Tel.: (+521) 4048-0, fax: (+521) 4048280

Fluid recommendations

Premium quality hydraulic mineral oil fluids are recommended, like H-LP oils to DIN 51524, part 2. The viscosity range should be 25 to 50 mm^2/s (cSt) at 50^0 C.

Normal operating viscosity range between 12 and 100 mm^2/s (cSt). Maximum start-up viscositiy is 320 mm^2/s (cSt). Operating temperature -10 to + 70^0 C.

For other fluids such as phosphoric acid esters or for other operating conditions consult your Parker representative for assistance.

Seals

NBR (nitrile) seals are used for operation with hydraulic fluids based on mineral oil. For synthetic fluids, as perhaps phosphoric acid esters, Fluorocarbon seals are required. Consult your Parker representative 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.

Minimum requirement for filtration rate x (mm):

General hydraulic systems for satisfactory operation:

Class 20/18/15, to ISO 4406

x = 25 mm ($ß_{25} \geq 75$) to ISO 4572

Hydraulic systems with maximised component life and functionability:

Class 18/16/13, to ISO 4406

x = 10 mm ($ß_{10} \geq 75$) to ISO 4572

It is recommended to use return line or pressure filters. Parker Filter Division 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 a 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 45^0 is recommended when the pump is mounted inside the reservoir, to improve the inlet conditions. All connections to be leak-free, as air in the suction line will cause cavitation, noise, and damage to the pump.

Drain port

Compensation may cause short-term (20 to 30 ms) flow increase, e.g. 30 l/min (PV 016 to 023), 40 l/min (PV 032 to 046), 60 l/min (PV 063 to 092),80 l/min (PV 140 to 180) and/or 120 l/min (PV270). Please consider for dimensioning.

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 does not empty itself when not in operation and that 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 2 bar. Drain line length should not exceed 2 metres. Minimum diameter should be selected according to the port size and a straight low pressure fitting with maximised bore should be used.

Shaft rotation and alignment

Pump and motor shafts must be aligned within 0.25mm T.I.R. maximum. A floating coupling must be used. Bellhousings and couplings can be ordered at manufacturers listed in this catalogue. Please follow the coupling manufacturer's installation instructions. Consult your Parker representative for assistance on radial load type drives.

Start up

Prior to start up, the pump case must be filled with hydraulic fluid (use 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.

For more details see installation manual HY11-PVI016.

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Catalogue HY11-3243/UK
08/02, LB