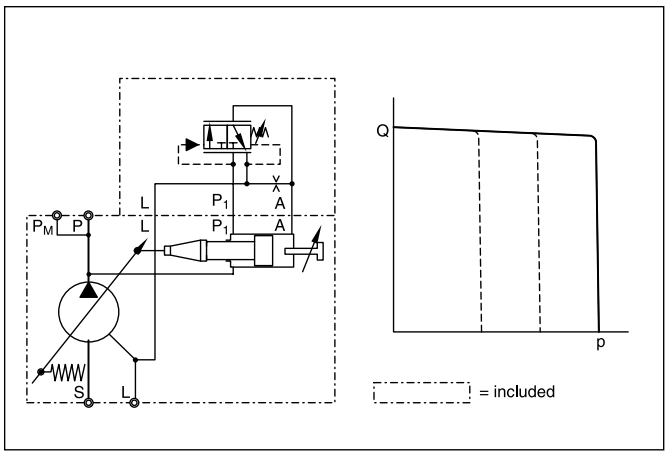
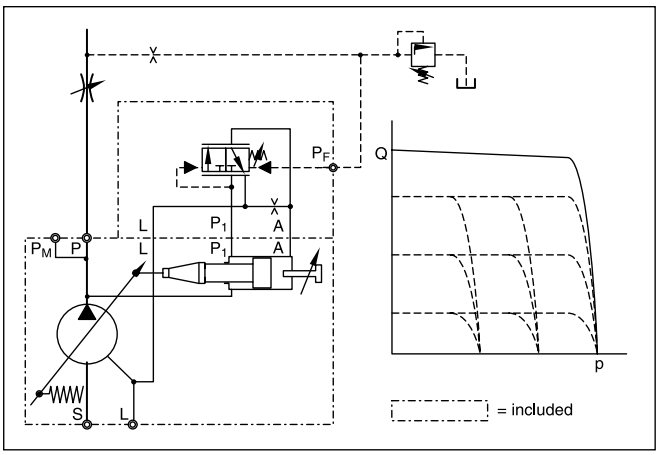
If you are interested in fast delivery, please follow this hint in our ordering codes when choosing your individual product:

Bold letters =
Short-term availability

1



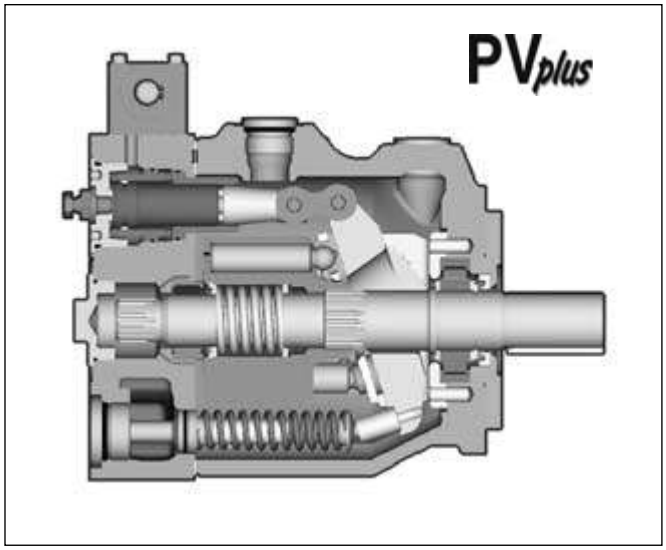
Pump with standard pressure compensator code F*S



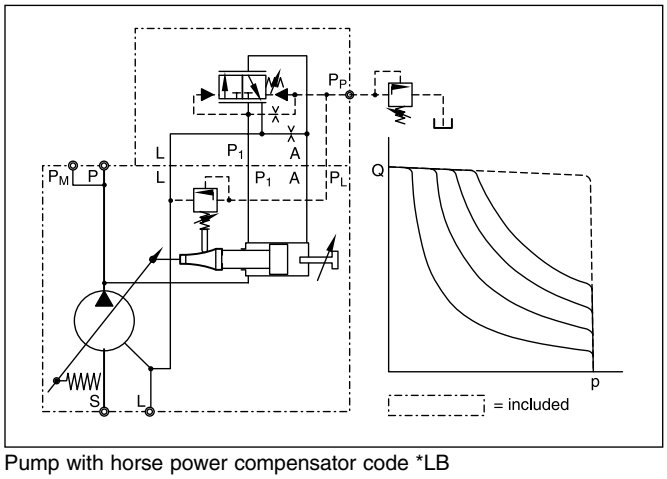
Pump with load-sensing compensator code FFC

With thru drive
for single and multiple pumps

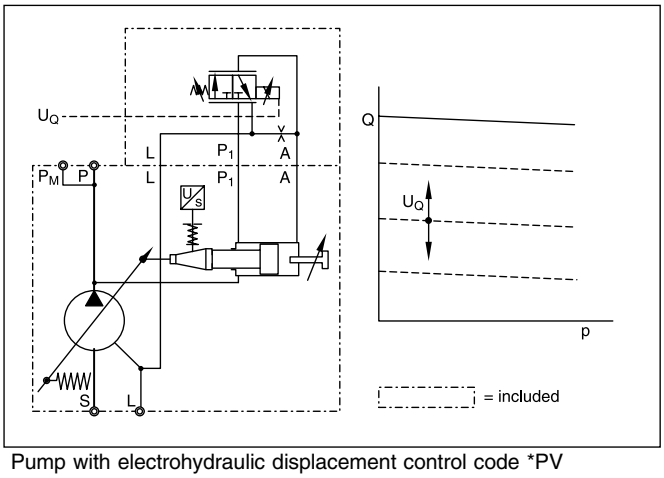
Swash plate type for open circuit



- 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 electrohydraulic displacement control code *PV

PV_GB.PM6.5MM

Technical data

Displacement	from 16 to 270 cm^3/rev	
Operating pressures		
Outlet	nominal pressure p_N	350 bar
	max. pressure $p_{max.}$	420 bar[1)]
	drain port	2 bar[1)]
Inlet	min. 0.8 bar (absolute) max. 16 bar	
Minimum speed	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

Pump with standard pressure comp.

Pump with horse power comp.

Combination PV/PV

Combination PV/gear pump GP

Pump combinations

See pages 24 - 25.

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 viskosity of ν = 30 mm^2/s.

1

P	V																	

Axial piston pump variable displacement high pressure version

Size and displacement

Rotation

Variation

Mounting code

Threads code

Thru drive code

2nd pump code

Seals

Compensator

Design series: pump compensator
not required for order

see opposite page →

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

Code	material
N	**NBR**
V	FPM
E	ethylene-propylene

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

* please specify 2nd pump with full model code

Code	rotation*
R	**clockwise**
L	counter clockwise

* when looked on shaft

Code	variation
1	**standard**
9	reduced displacement adjusted*

* for order, specify displacement (cm³/rev.)

Code	ports[1]	threads[2]
1	**BSPP**	**metric**
3	UNF	UNC
4[3]	BSPP	metric, M14
7	ISO 6149	UNC
8	ISO 6149	metric

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

Code	mounting interface		shaft
D	SAE ISO 3019/1	4-hole flange	cylindric, key
E		4-hole flange	splined, SAE
F*		4-hole flange	cylindric, key
G*		4-hole flange	splined, SAE
K	**metr. ISO 3019/2**	**4-hole flange**	**cylindric, key**
L		**4-hole flange**	**splined, DIN 5480**

* codes F and G only for PV140/180, see dimension sheet

Code	thru drive option
no adapter for 2nd pump	
T	**single pump prepared for thru drive**
with adaptor for 2nd pump	
Y[1]	SAE AA, Ø 50.8mm
A	SAE A, Ø 82.55mm
B	SAE B, Ø 101.6mm
C[2]	SAE C, Ø 127mm
D[3]	SAE D, Ø 152.4mm
E[4]	SAE E, Ø 165.1mm
G[5]	metric, Ø 63mm
H	metric, Ø 80mm
J	metric, Ø 100mm
K[2]	metric, Ø 125mm
L[3]	metric, Ø 160mm
M[4]	metric, Ø 200mm

[1] only for PV016 - PV023
[2] only for PV032 and larger
[3] only for PV063 and larger
[4] only for PV270
[5] only for PV016 - PV092
For dimensions, see thru-shaft adaptor table.

Bold letters =
Short-term availability

P	V																		

Compensator — **Design series: pump compensator** *not required for order*

Code			Compensator option
0	**0**	**1**	**No compensator**
Standard pressure 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		variaton R, for quick unload valve
F	**F**		**load-sensing compensator**
F	T		two valve load-sensing compensator
Variations for remote compensators			
		C[1]	**external pressure pilot**
		1	**NG6/D03 interface top side**
		P	**pilot valve PVAC1P...mounted**
		D	proportional pilot valve type DSAE1007P07KLAF mounted
		L	pilot valve with DIN lock mounted
		Z[2]	accessory mounted

Displacement						Code			Compensator option
Horse power compensator									
016 023	032 046	063 092	140	180	270	nominal horse power			
■						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
		■	■	■	■	T			37 kW
		■	■	■	■	U			45 kW
			■	■	■	W			55 kW
				■	■	Y			75 kW
				■	■	Z			90 kW
					■	2			110 kW
					■	3			132 kW
function									
■	■	■	■	■	■		L		horse power compensator
■	■	■	■	■	■		C		horse power comp.& loadsensing
variation									
■	■	■	■	■	■			A	NG6/D03 interface top side
■	■	■	■	■	■			B	no pressure compensation
■	■	■	■	■	■			C	adjustable pressure compensation
■	■	■	■	■	■			Z[2]	accessories mounted

Code	Compensator option
Electrohydraulic compensator	
Pilot pressure supply	
F	standard (internal) no shuttle valve
W	with shuttle valve, compensator horizontal
Function	
P	proportional displacement control
Variation	
V	standard, no pressure compensation
R	remote pressure compensation NG 6 interface top side
D	proportional pilot valve type DSAE1007P07KLAF mounted
Z[2]	variation R, accessories mounted on topside interface
G	variation R, pressure sensor and proportional pilot valve mounted for pressure resp. horse power control
S	remote pressure compensation NG 6 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 compensation NG 6 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

[1] not for two-valve-compensator
[2] accessories not included, please specify on order with full model code

Bold letters =
Short-term availability

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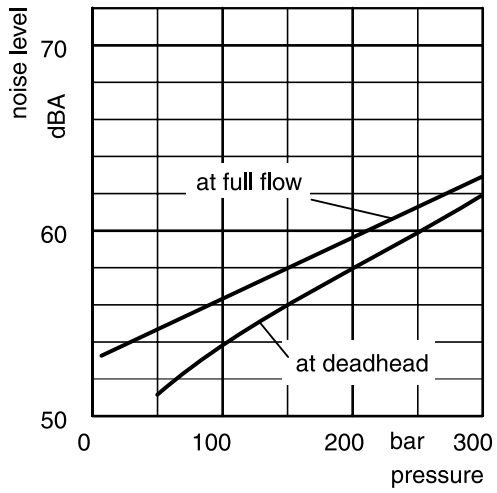
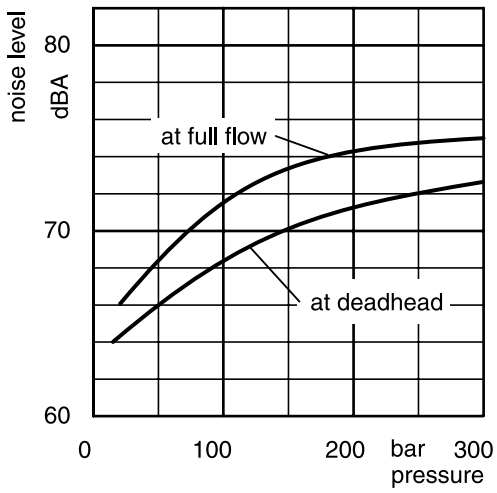
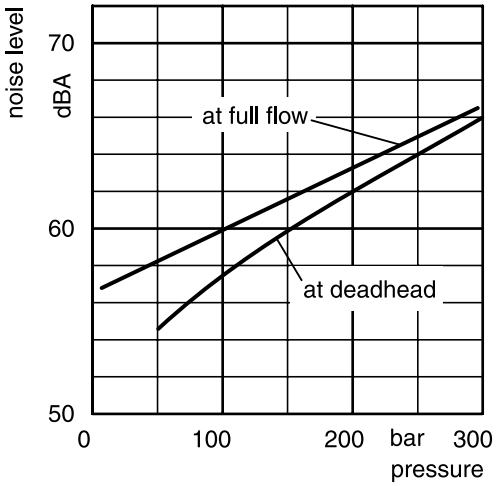
PV016 - PV023



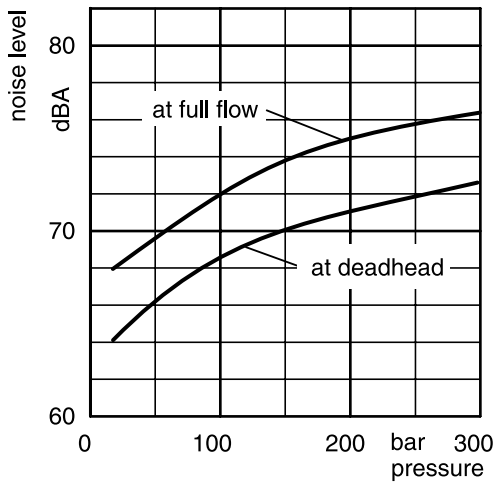
PV140



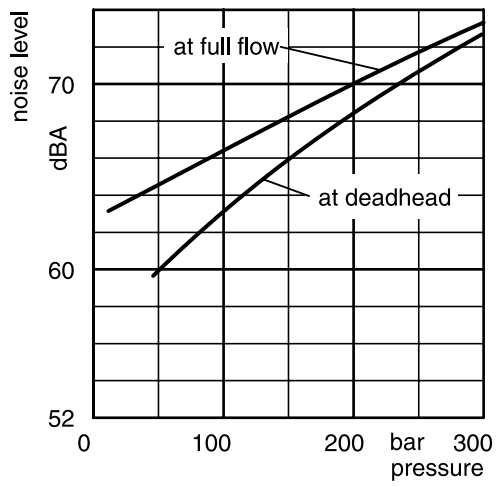
PV032 - PV046



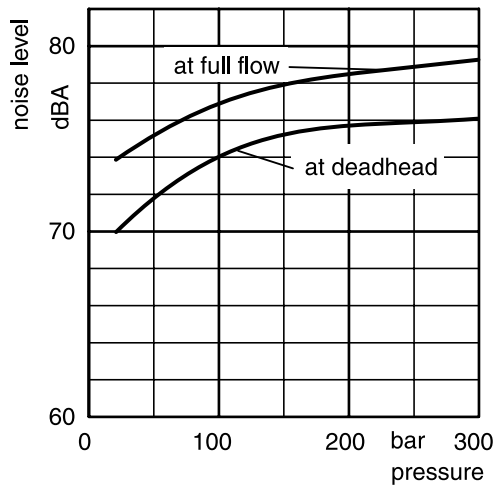
PV180



PV063 - PV092



PV270



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

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

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.

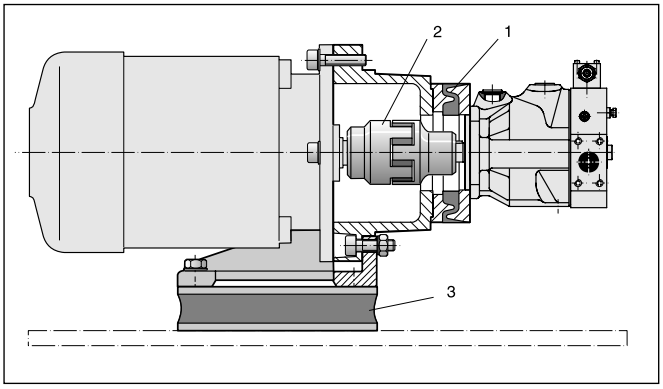
Exclusive use of gas tight tube fittings for inlet connections to avoid ingression of air causing cavitation and excessive noise.

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)

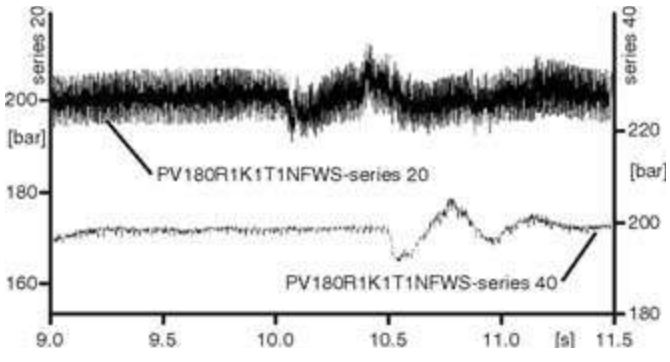


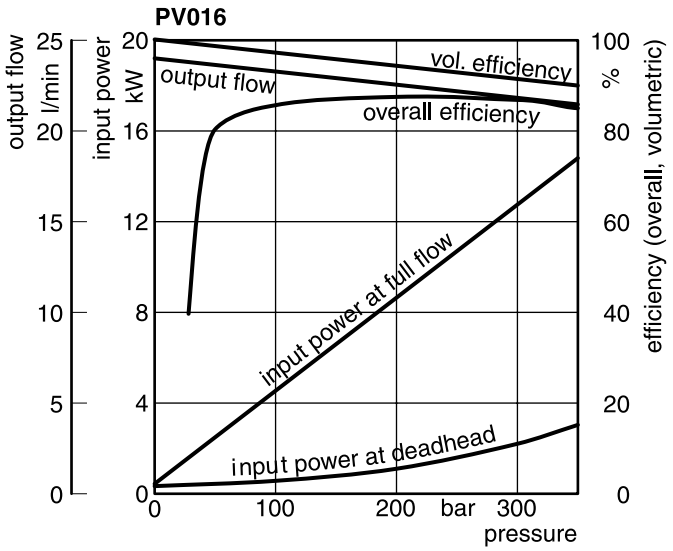
Figure 2: Comparison of the pressure pulsation in a system with 6 old PV pumps versus the same system with 6 PVplus pumps. The pulsation reduction effect of the precompression volume is evident.

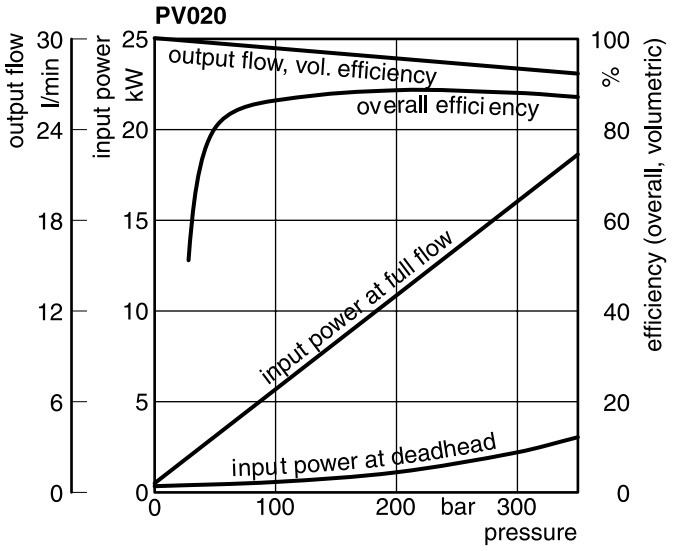
Other measures

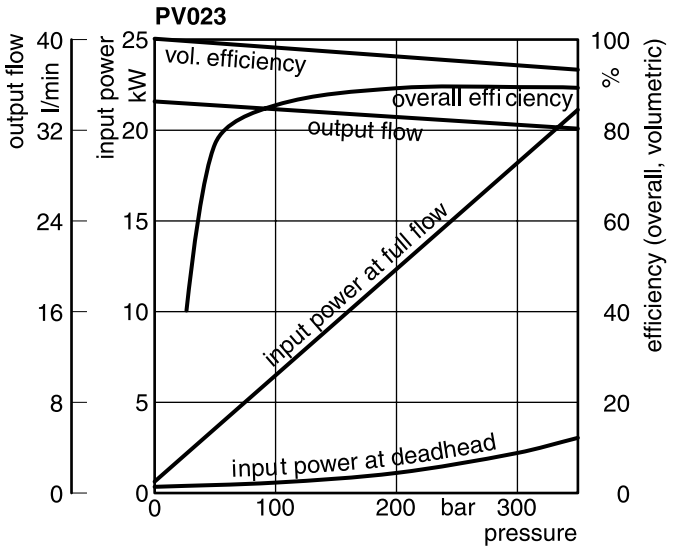
Small diameter tubes do not only cause high flow speeds, turbulences inside the tubes and cavitation in the pump, they also produce noise.
Only correctly sized connections of the largest possible diameter according to the port size of the pump should be used.

1

Efficiency, power consumption







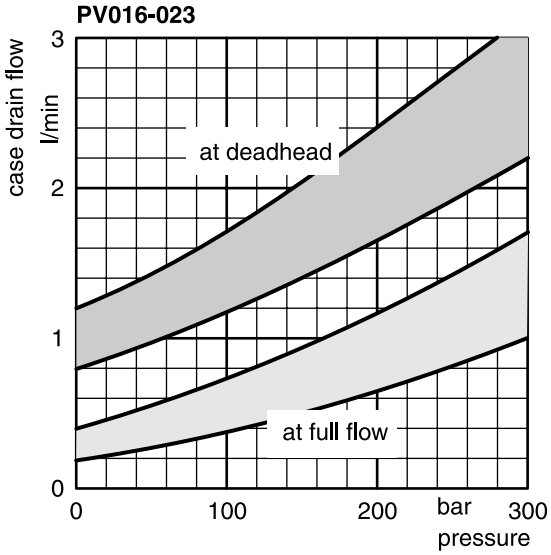
Efficiency and case drain flows PV016, PV020, PV023

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.

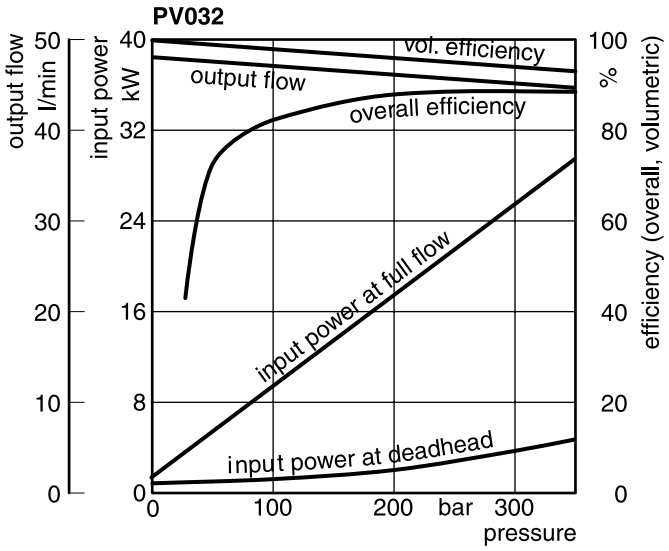
Case drain flow and compensator control flow leave via the drain port of the pump. To the values shown are to be added 1 to 1.2 l/min , if at pilot operated compensators (codes FR*, FF*, FT*, horse power compensator and p/Q-control) the control flow of the pressure pilot valve also goes through the pump.

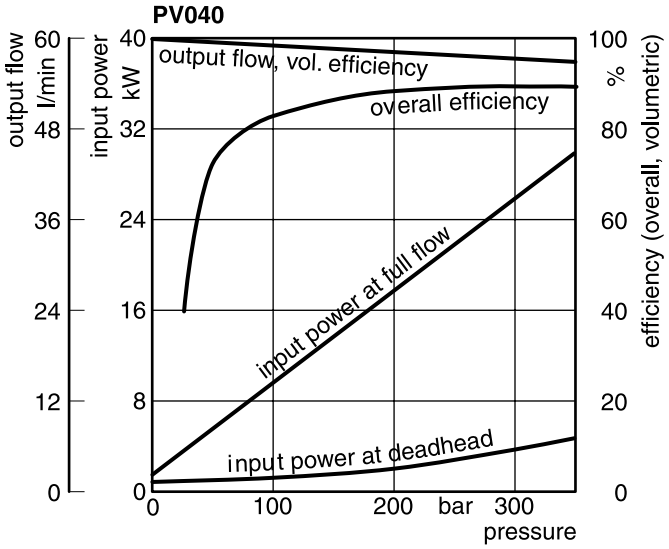
Please note: The values shown below are only valid for static operation. Under dynamic conditions and at rapid compensation of the pump the volume displaced by the servo piston also leaves the case drain port. This dynamic control flow can reach up to 40 l/min! Therefore the case drain line is to lead to the reservoir at full size and without restrictions as short and direct as possible.

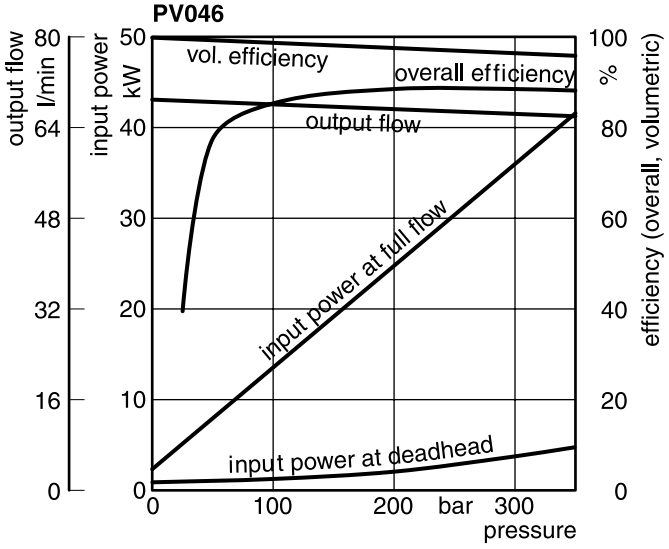
Case drain flows



Efficiency, power consumption







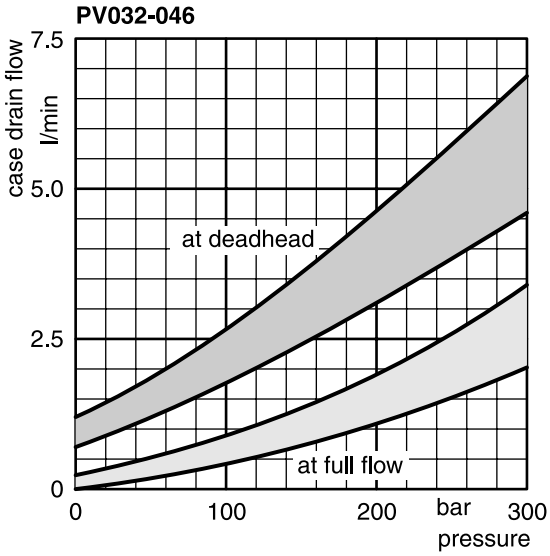
Efficiency and case drain flows PV032, PV040, PV046

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



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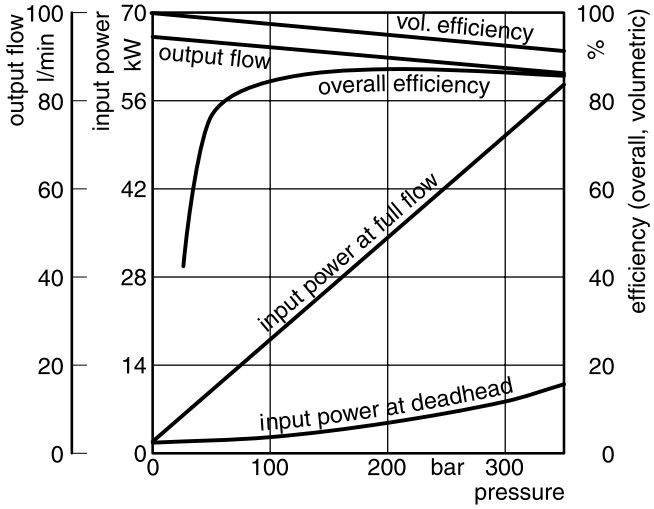
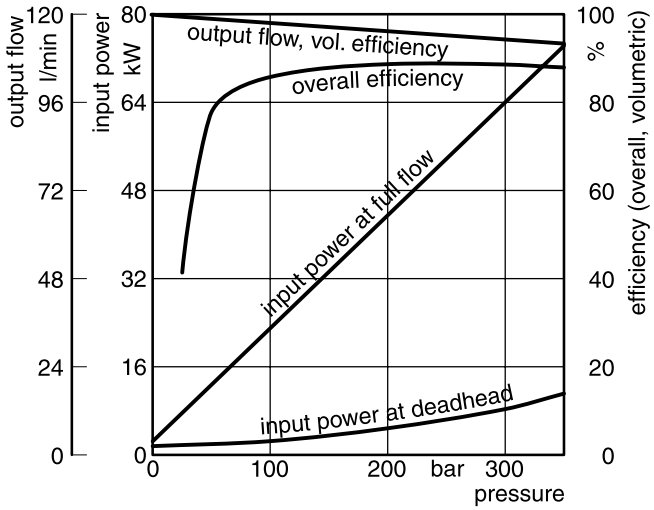
Efficiency, power consumption

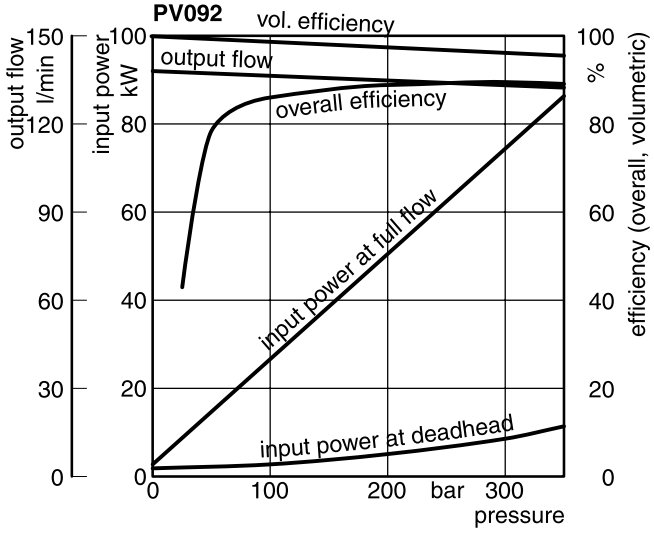
PV063



PV080



PV092



Efficiency and case drain flows PV063, PV080, PV092

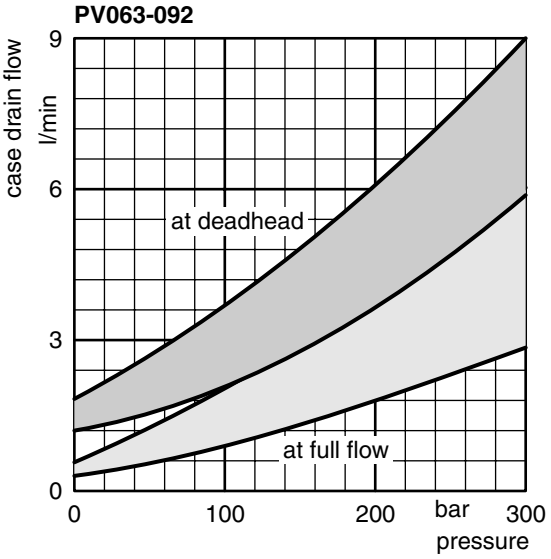
The efficiency and power graphs are measured at an input speed of n = 1500 min^{-1}, a temperature of 50°C and a fluid viscosity of 30 mm^2/s.

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.

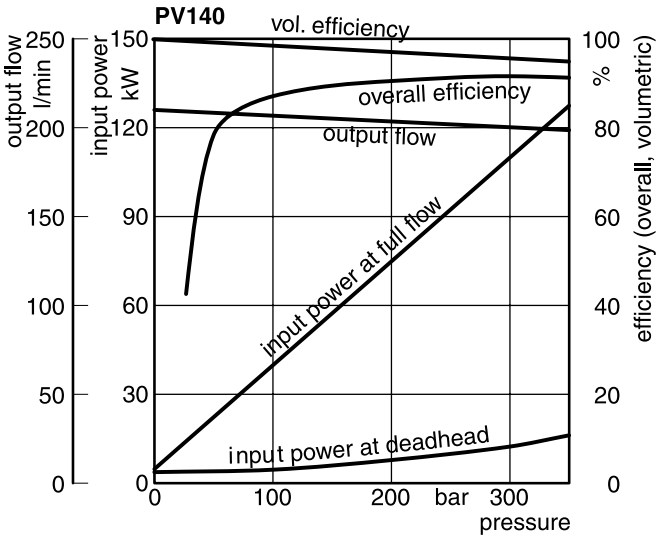
Please note: The values shown below are only valid for static operation. Under dynamic conditions and at rapid compensation of the pump the volume displaced by the servo piston also leaves the case drain port. This dynamic control flow can reach up to 80 l/min! Therefore the case drain line is to lead to the reservoir at full size and without restrictions as short and direct as possible.

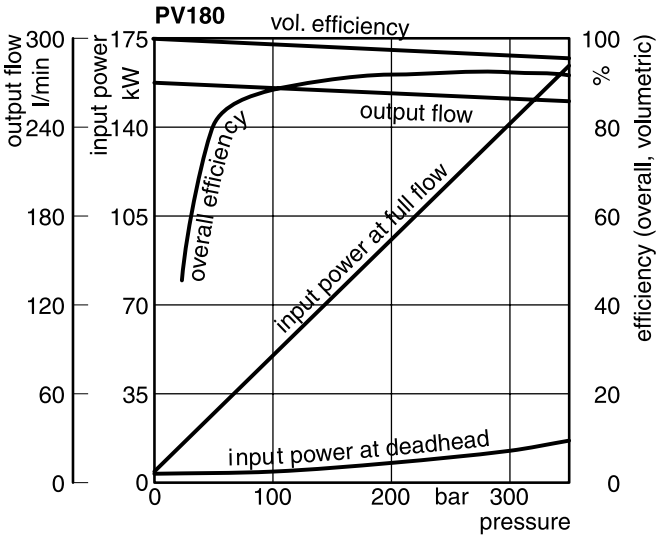
Case drain flows

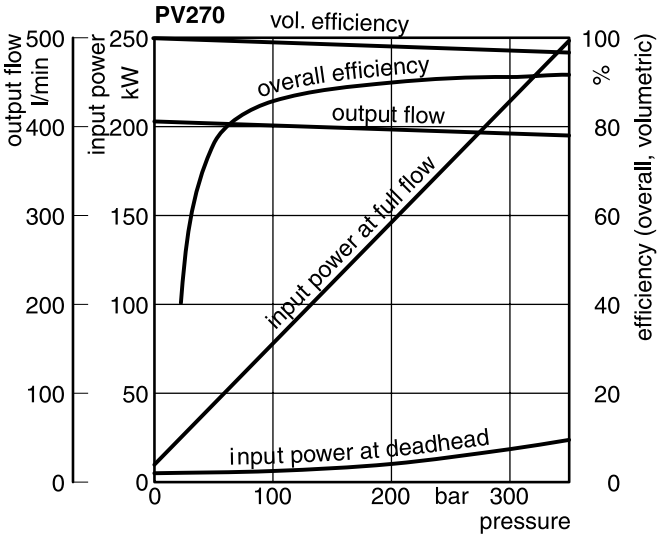
PV063-092



Efficiency, power consumption







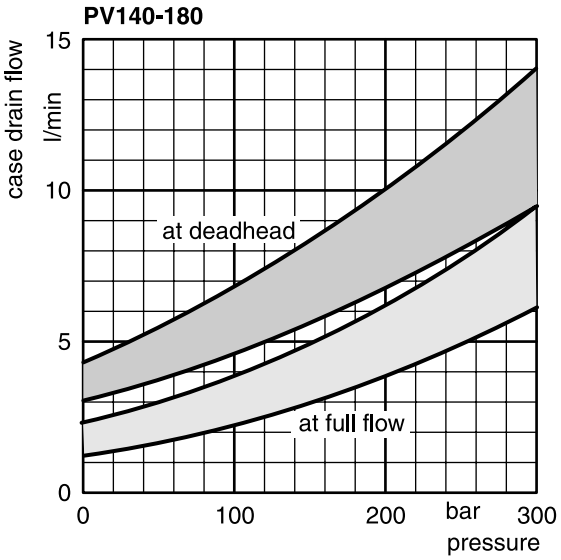
Efficiency and case drain flows PV140, PV180, PV270

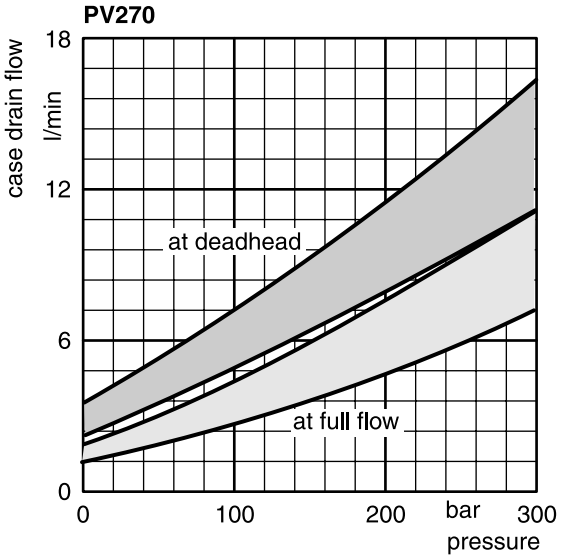
The efficiency and power graphs are measured at an input speed of n = 1500 min^{-1}, a temperature of 50°C and a fluid viscosity of 30 mm^2/s.

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.

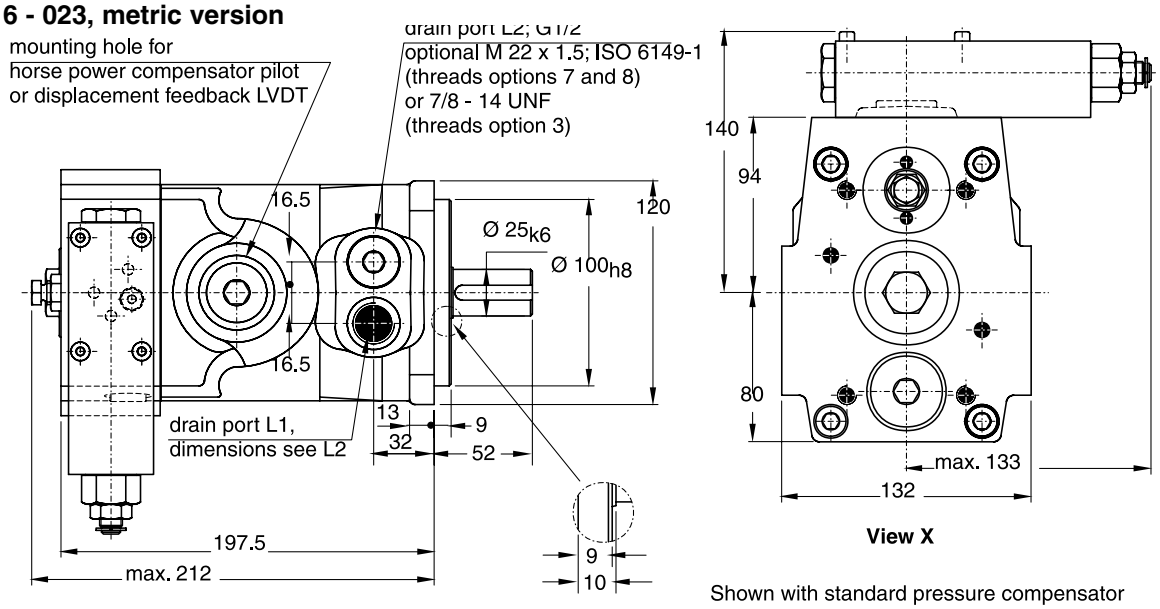
Case drain flows



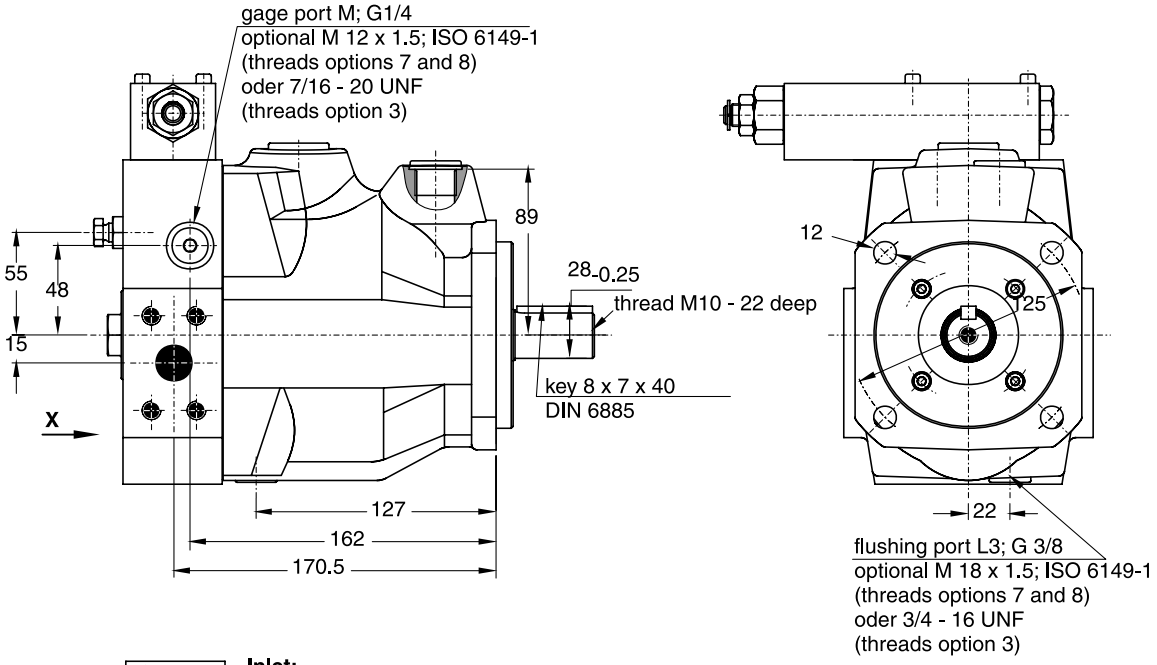


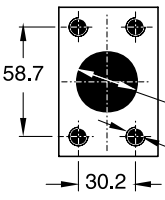
1

PV016 - 023, metric version



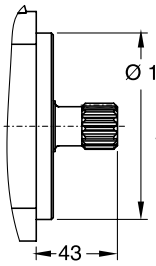
Shown with standard pressure compensator



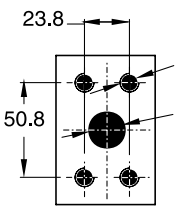


Inlet:
flange according ISO 6162
DN 32; PN 250 bar
1 1/4”
32
4 x M10, 18 deep
optional 7/16 - 14 UNC - 2B
(threads options 3 and 7)

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



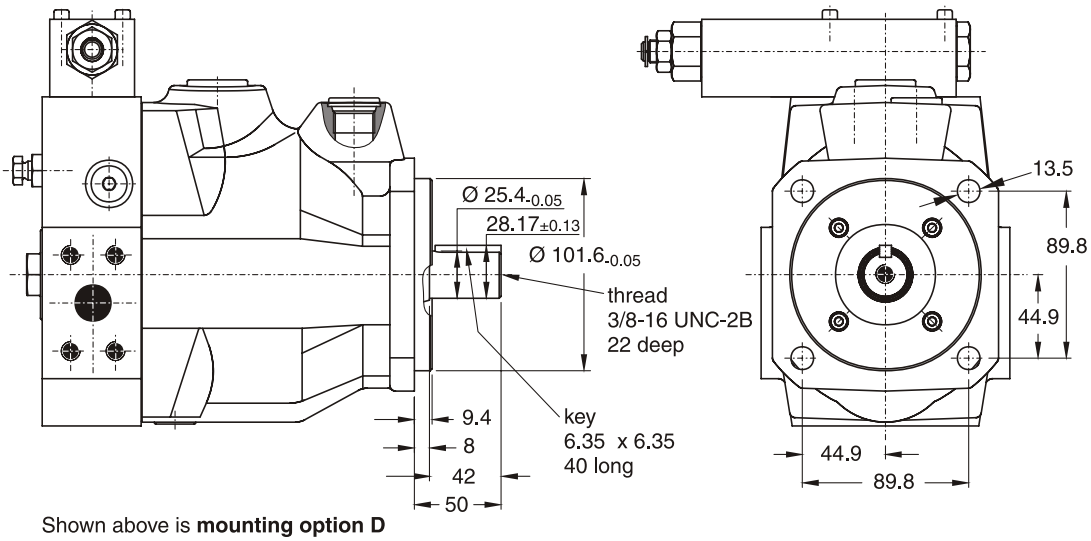
mounting option L
splined shaft W 25 x 1.5 x 15 x 8f DIN 5480



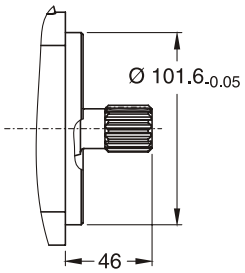
4 x M10, 18 deep
optional 3/8 - 16 UNC - 2B
(threads options 3 and 7)
19

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

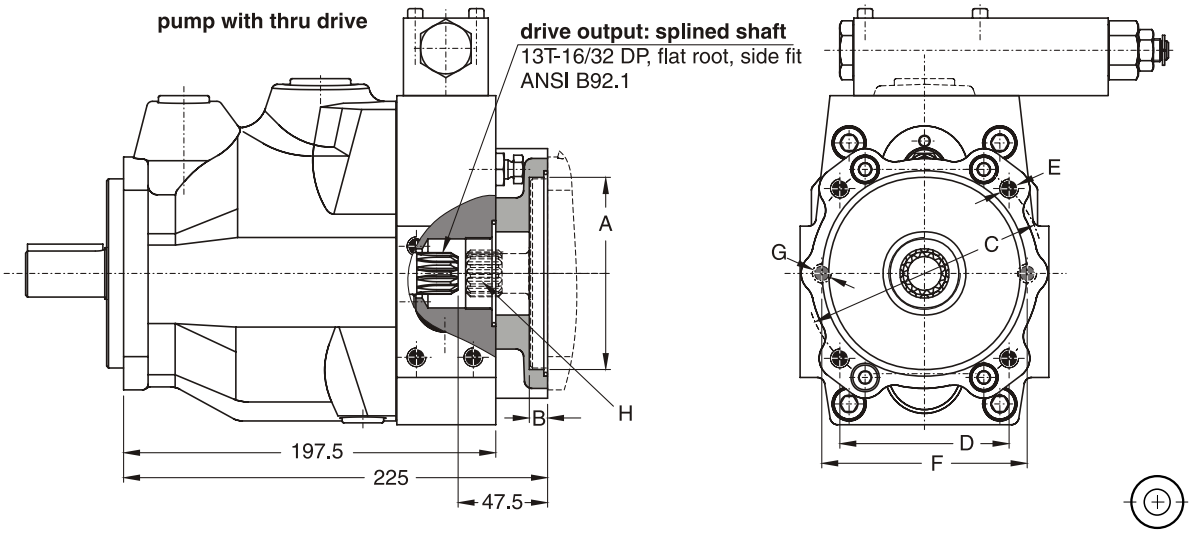
PV016 - 023, SAE version and thru drive



Shown above is **mounting option D**



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

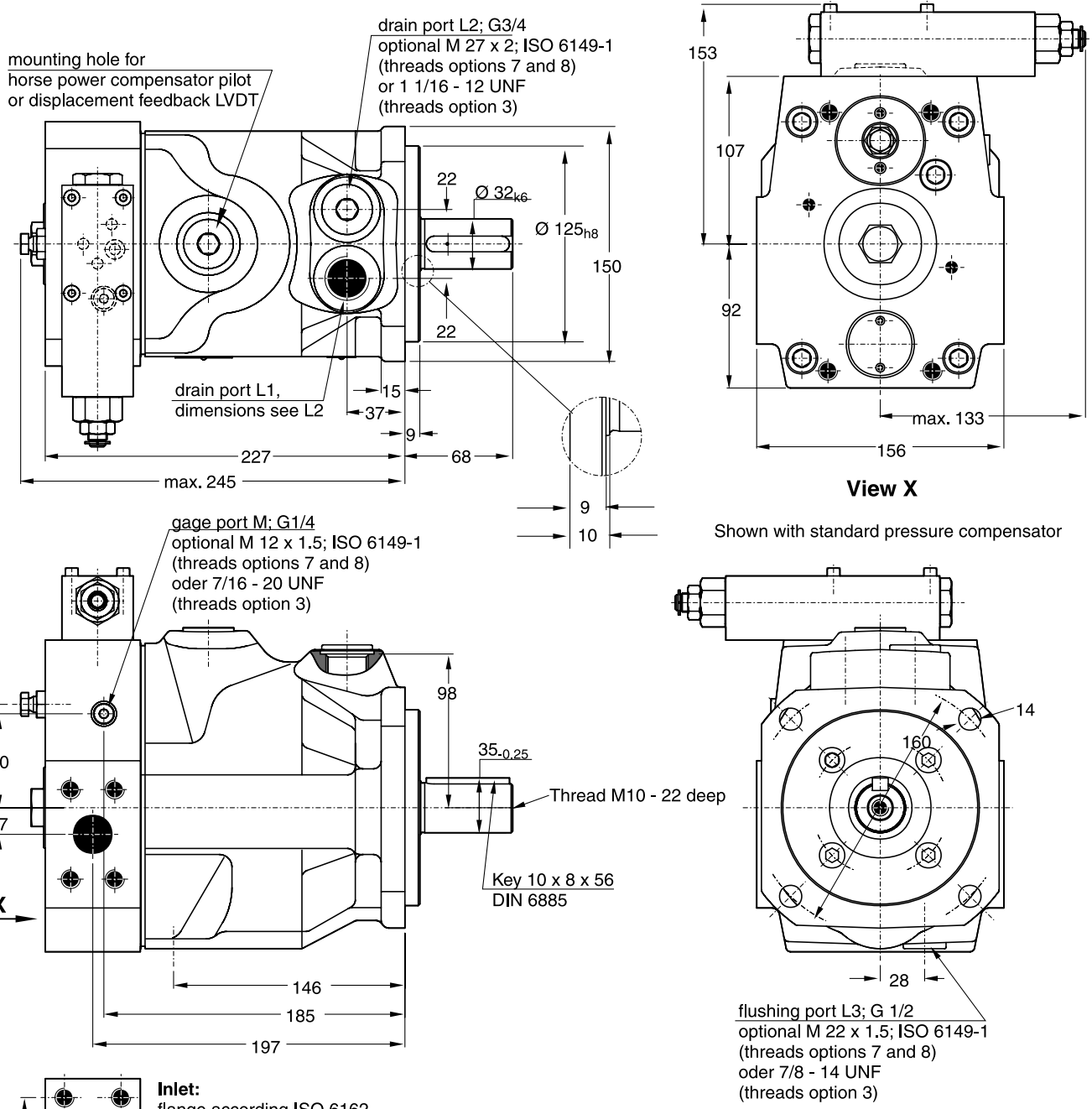


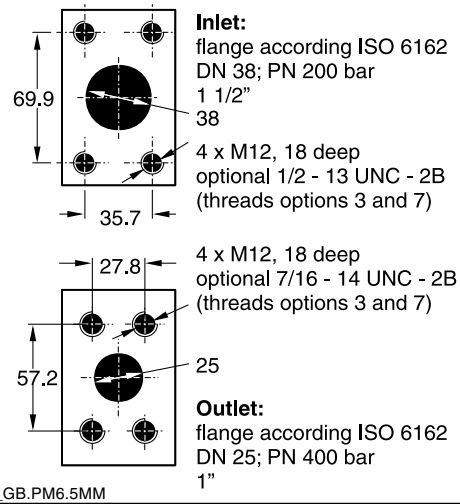
Thru shaft adaptors are available with the following dimensions:						
A	**B**	**C**	**D**	**E**	**F**	**G**
63	10	85	-	M8	100	M8
80	10	103	-	M8	109	M10
100	10.5	125	-	M10	n. avail.	n. avail.
50.8	10	-	-	-	82	M8
82.55	10	-	-	-	106	M10
101.6	10.5	-	89.8	M12	n. avail.	n. avail.

Dimension H and available couplings see page 22.
At **threads options 3** and **7** the dimensions **E** and **G** are UNC - 2B threads.

1

PV032 - 046, metric version





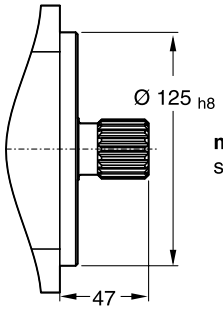
Inlet:
flange according ISO 6162
DN 38; PN 200 bar
1 1/2”
38
4 x M12, 18 deep
optional 1/2 - 13 UNC - 2B
(threads options 3 and 7)

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

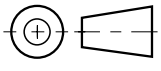
25

Outlet:
flange according ISO 6162
DN 25; PN 400 bar
1”

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



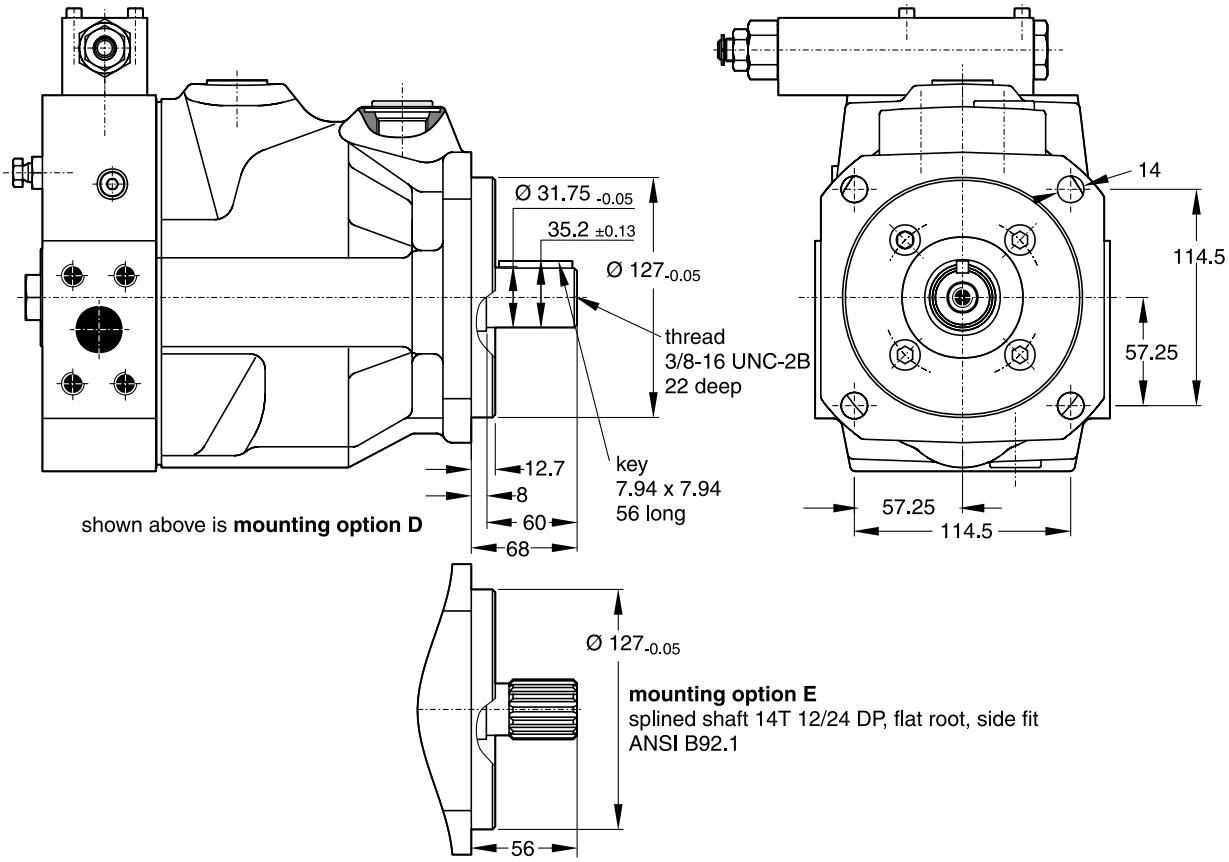
mounting option L
splined shaft W 32 x 1.5 x 20 x 8f DIN 5480

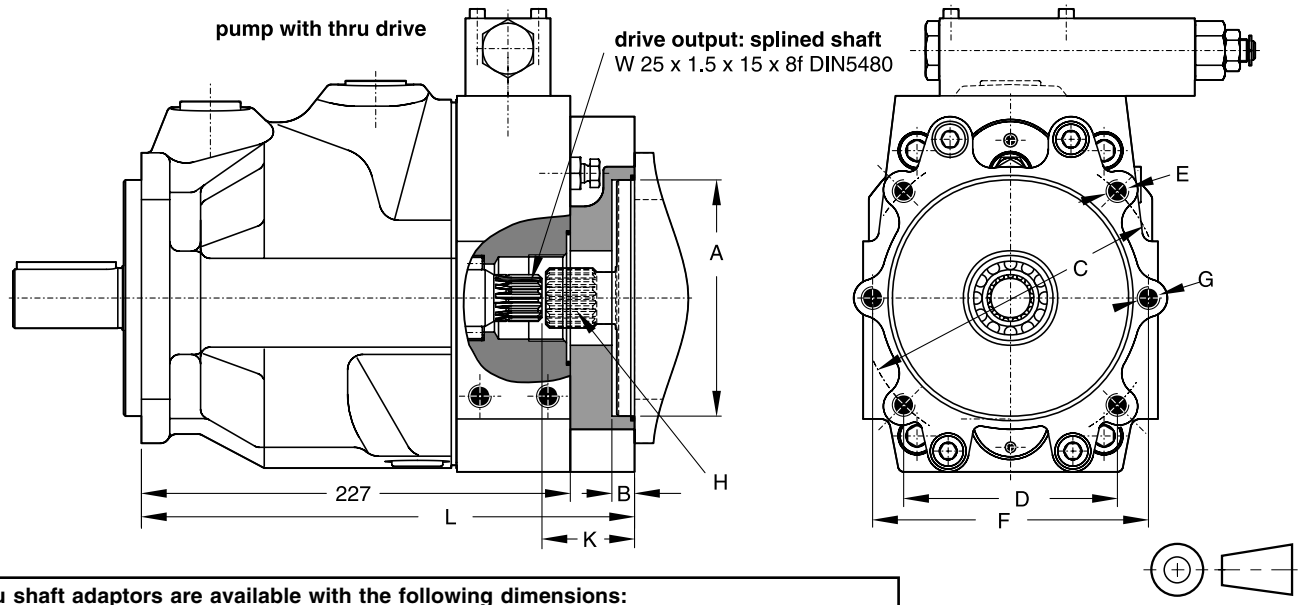


PV_GB.PM6.5MM

1

PV032 - 046, SAE version and thru drive version



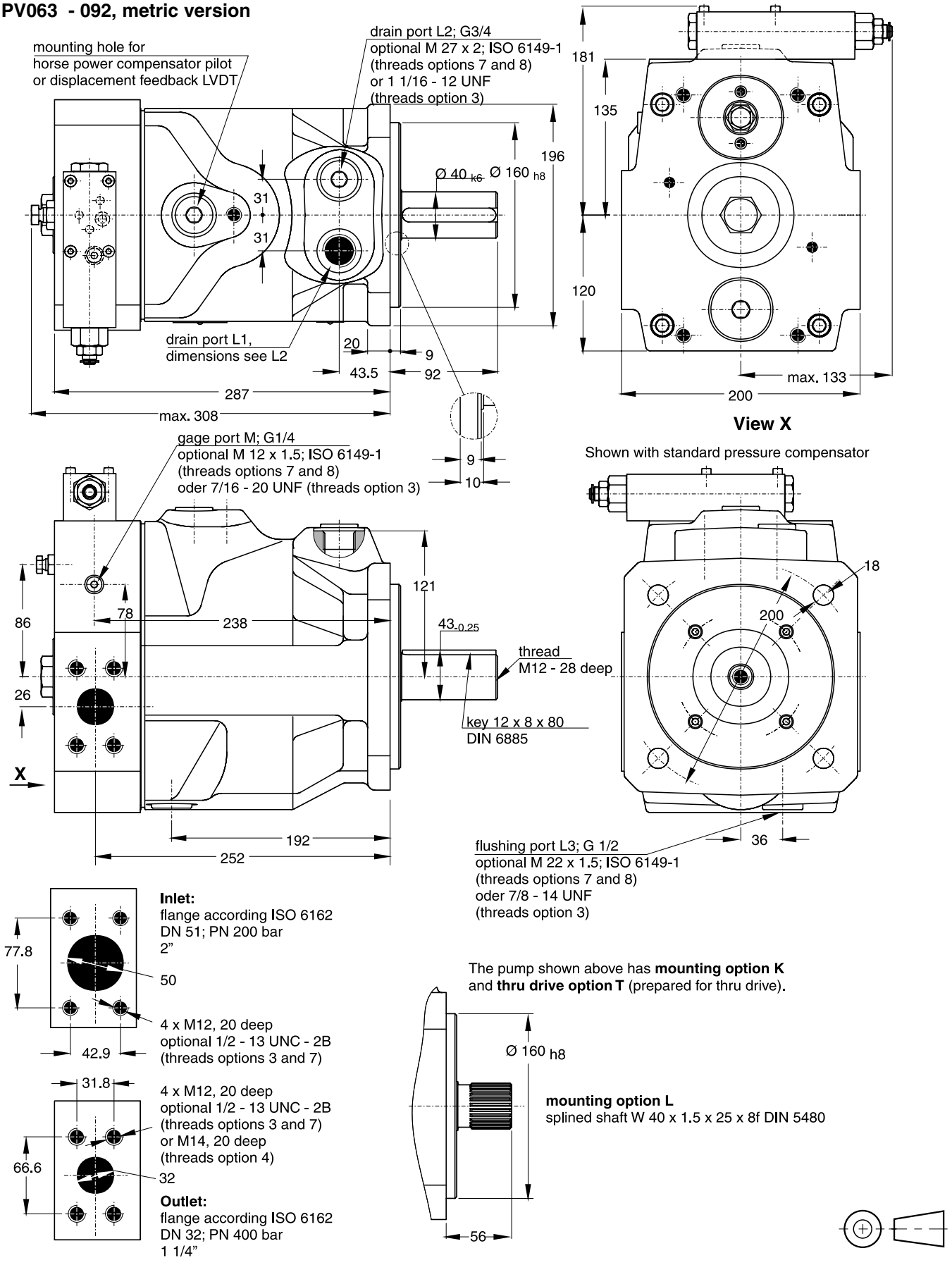


Thru shaft adaptors are available with the following dimensions:								
A	**B**	**C**	**D**	**E**	**F**	**G**	**K**	**L**
63	8.5	85	-	M8	100	M8	49	261
80	8.5	103	-	M8	109	M10	49	261
100	10.5	125	-	M10	140	M12	49	261
125	12	160	-	M12	n. avail.	n. avail.	49	261
82.55	8	-	-	-	106	M12	49	261
101.6	11	-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

Dimension H and available couplings see page 22.
At **threads options 3** and **7** the dimensions **E** and **G** are UNC - 2B threads.

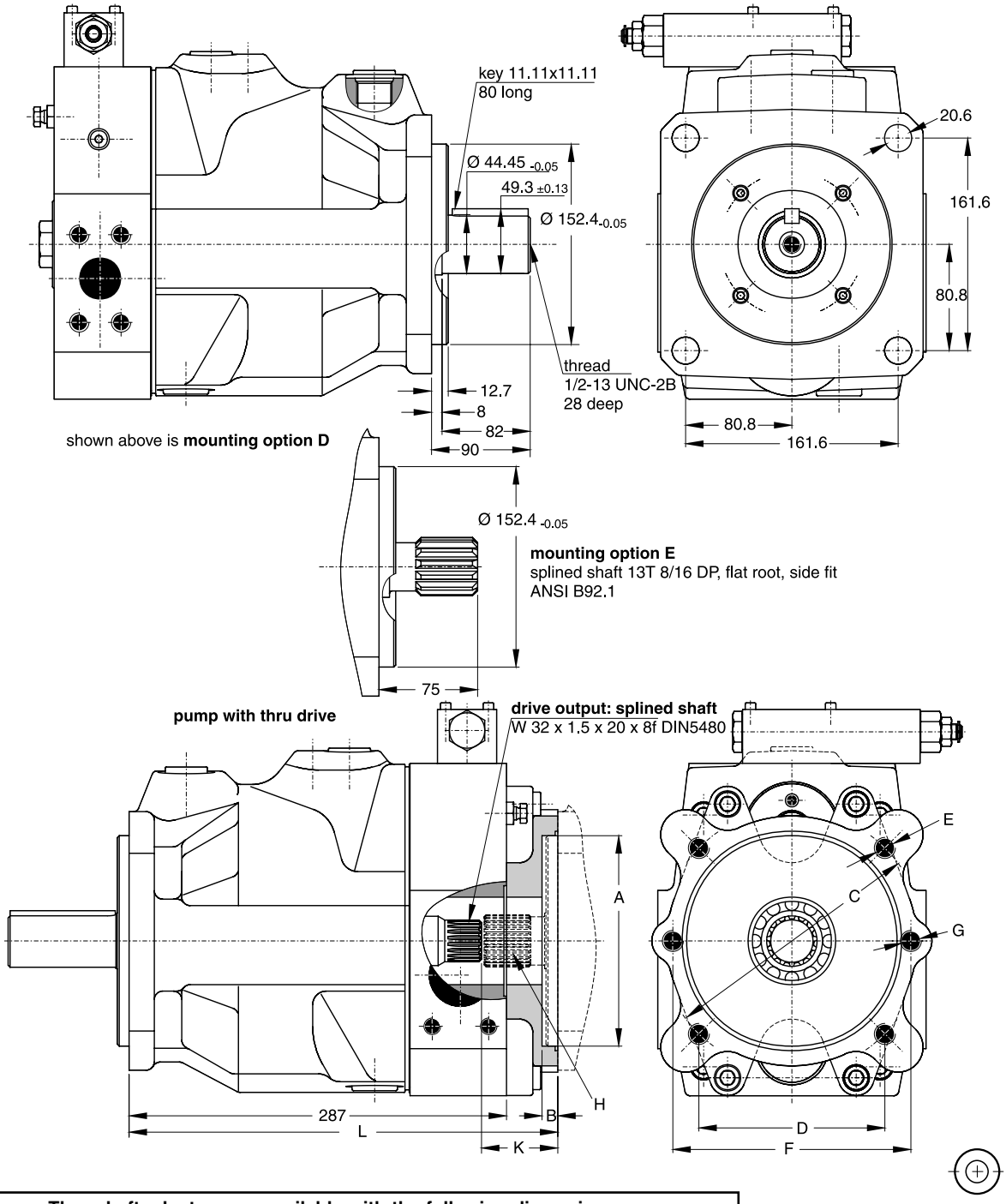
1

PV063 - 092, metric version



1

PV063 - 092, SAE version and thru drive version

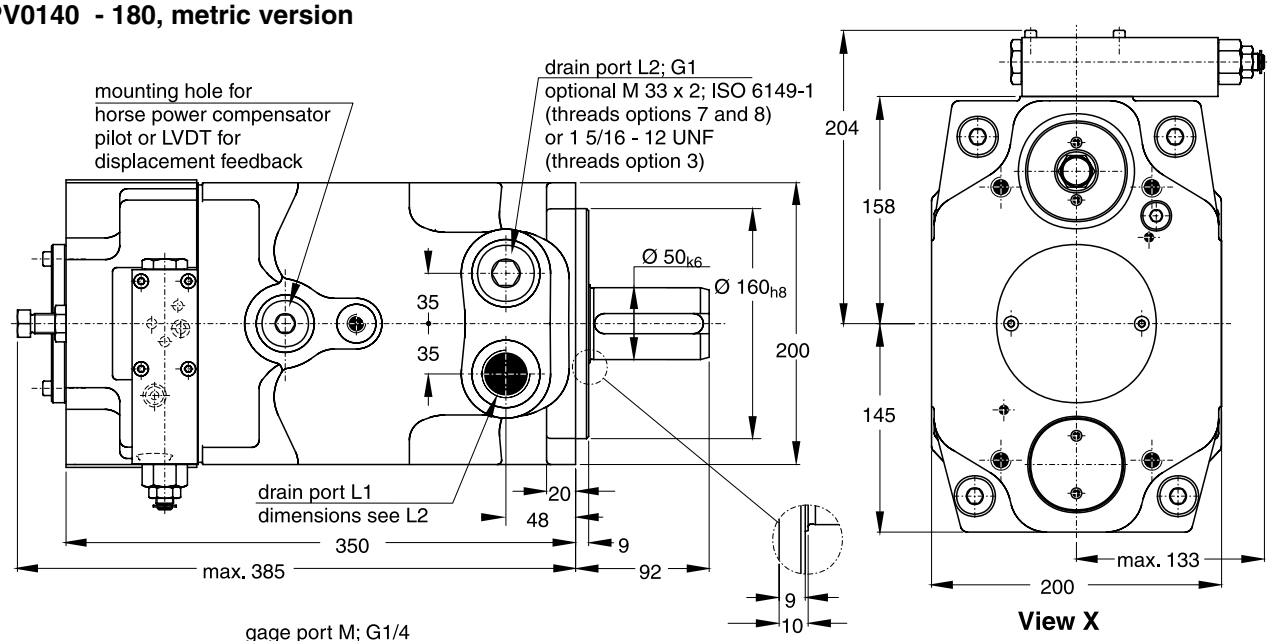


Thru shaft adaptors are available with the following dimensions:								
A	**B**	**C**	**D**	**E**	**F**	**G**	**K**	**L**
63	10	85	-	M8	100	M8	58	326
80	10	103	-	M8	109	M10	58	326
100	12	125	-	M10	140	M12	58	326
125	12	160	-	M12	180	M16	58	326
160	12	200	-	M16	n. avail.	n. avail.	58	326
82.55	10	-	-	-	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	n. avail.	n. avail.	83	351

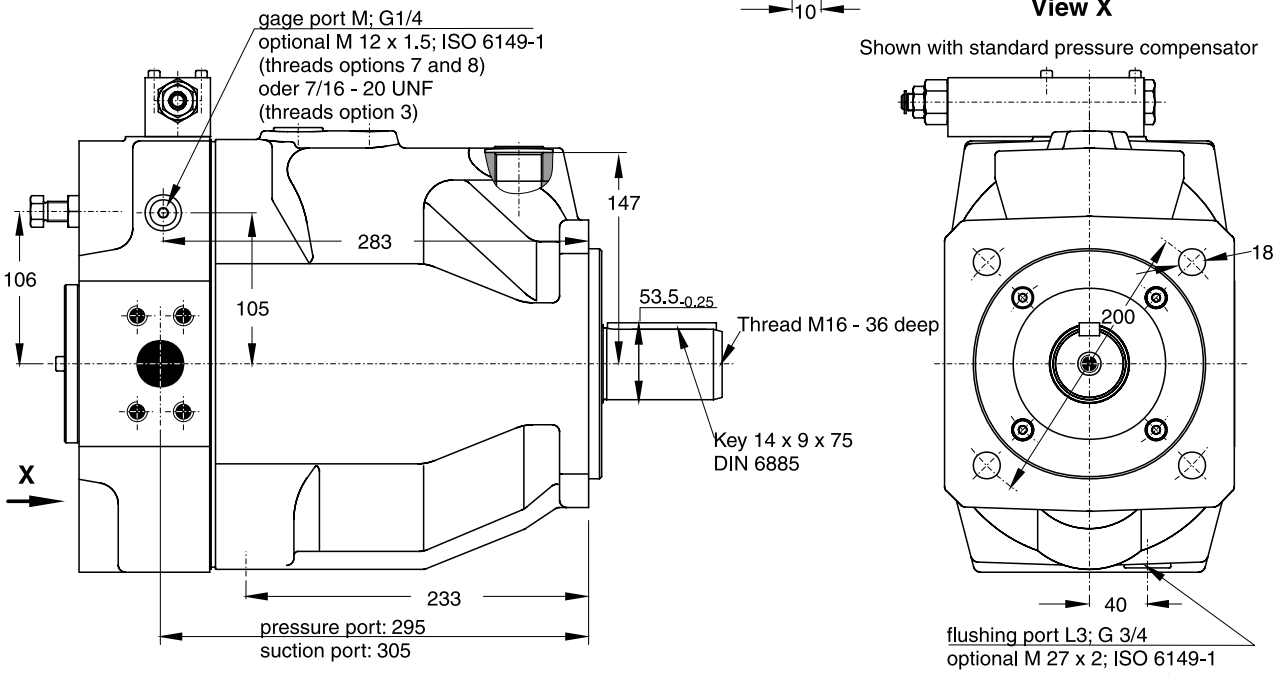
Dimension H and available couplings see page 1-22.
At **threads options 3** and **7** the dimensions **E** and **G** are UNC - 2B threads.

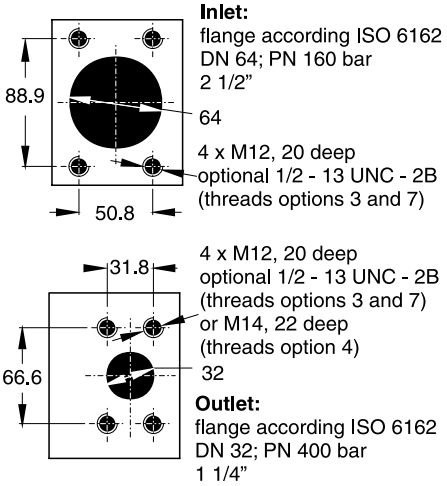
1

PV0140 - 180, metric version



Shown with standard pressure compensator

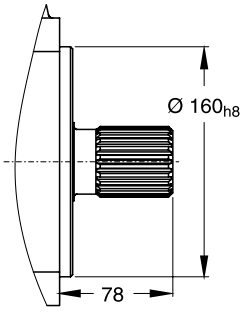




Inlet:
flange according ISO 6162
DN 64; PN 160 bar
2 1/2”

Outlet:
flange according ISO 6162
DN 32; PN 400 bar
1 1/4”

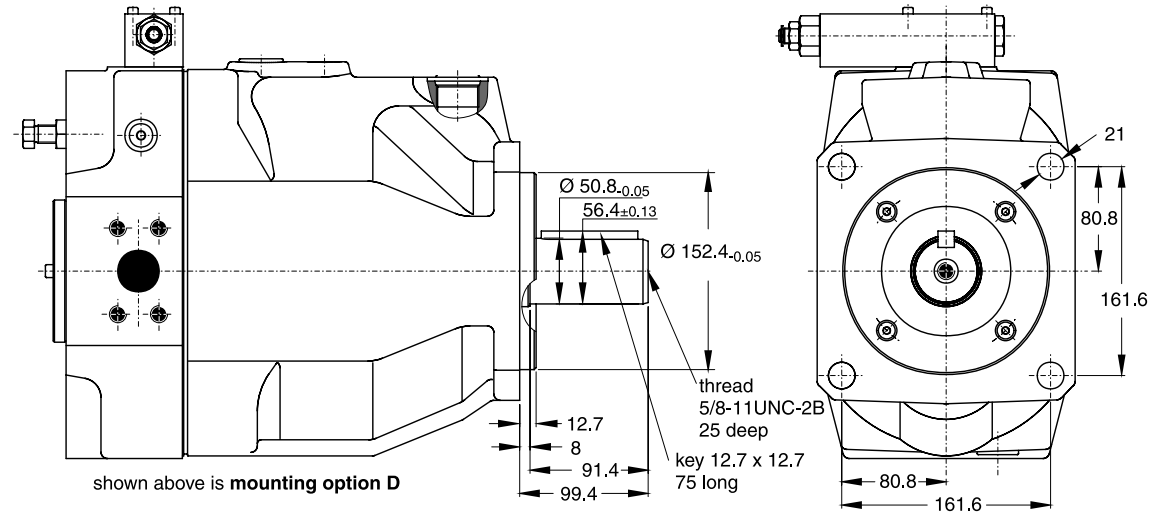
The pump shown above has **mounting option K**
and **thru drive option T (prepared for thru drive).**

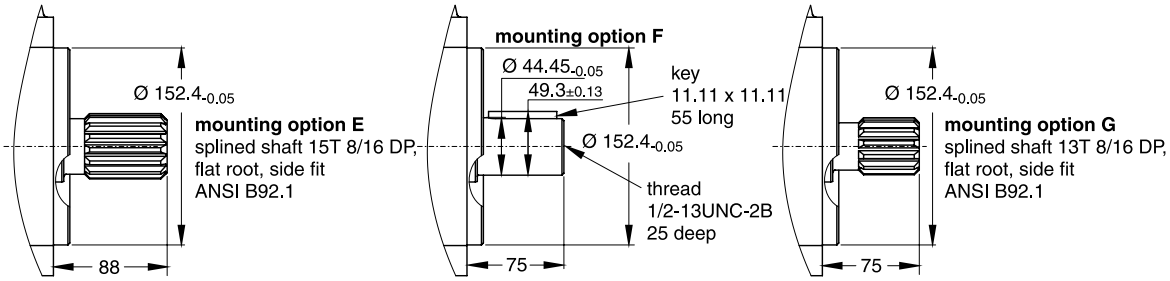


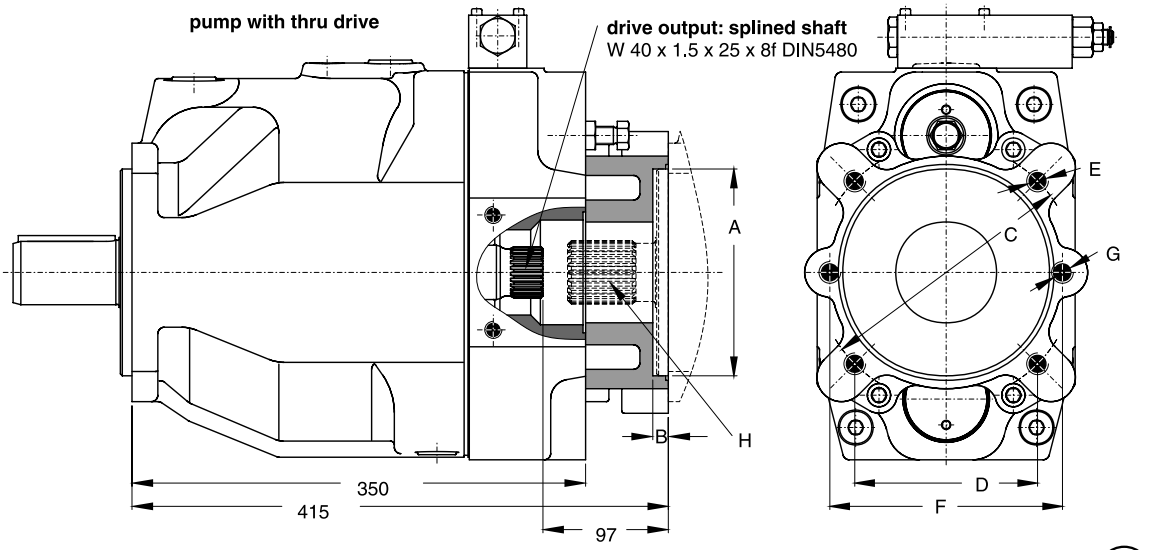
mounting option L
splined shaft W 50 x 2 x 24 x 9g DIN 5480

1

PV140 - 180, SAE version and thru drive version





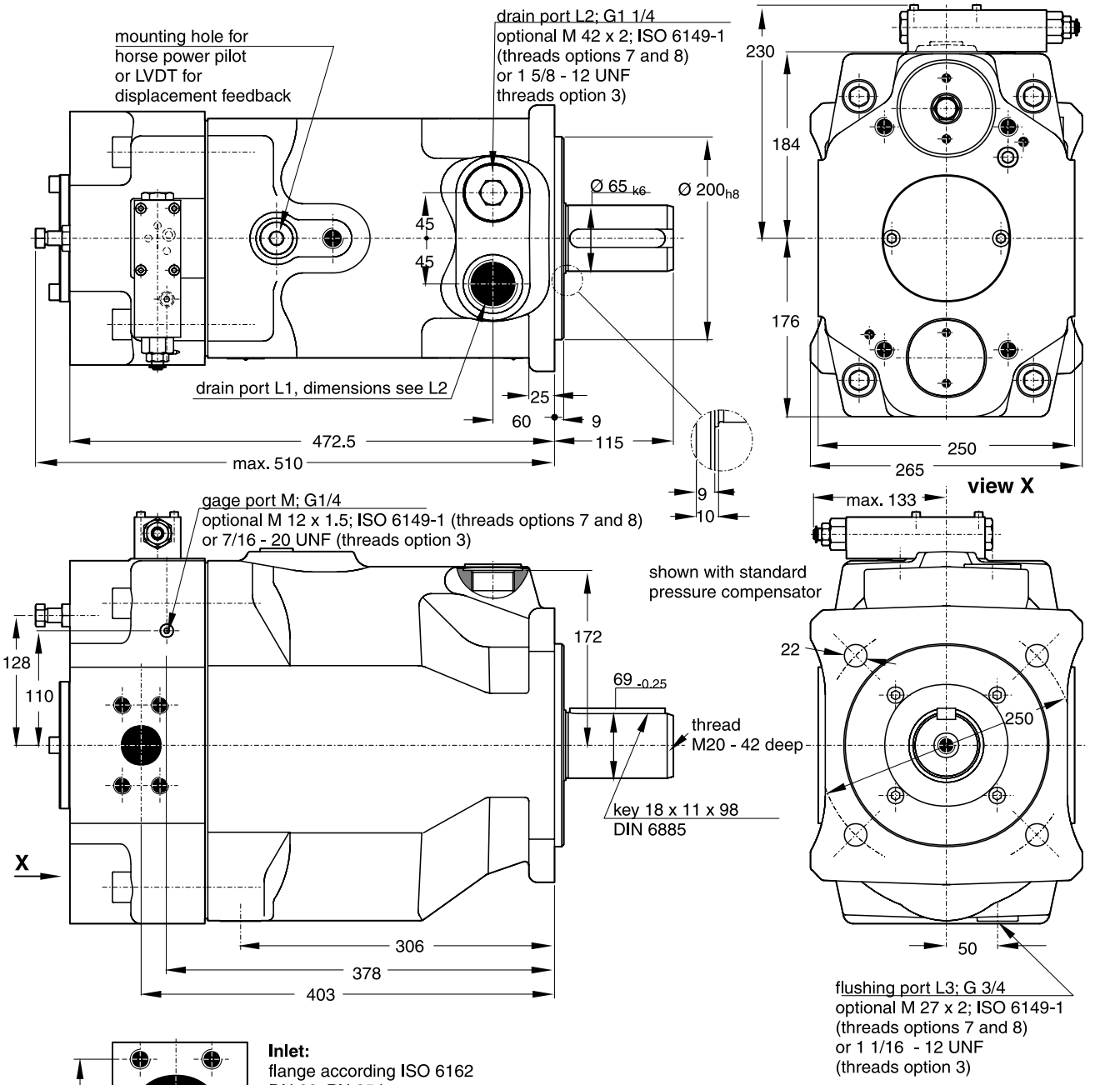


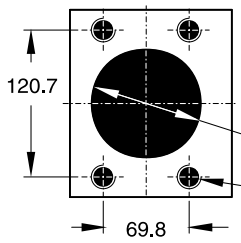
Thru shaft adaptors are available with the following dimensions:						
A	**B**	**C**	**D**	**E**	**F**	**G**
80	10	103	-	M8	109	M10
100	12	125	-	M10	140	M12
125	12	160	-	M12	180	M16
160	12	200	-	M16	n. avail.	n. avail.
82.55	10	-	-	-	106	M10
101.6	12	-	89.8	M12	146	M12
127	14	-	114.5	M12	181	M16
152.4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

Dimension H and available couplings see page 1-22.
At **threads options 3** and **7** the dimensions **E** and **G** are UNC - 2B threads.

1

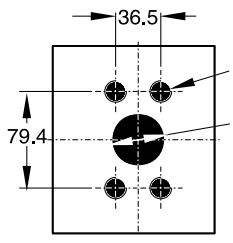
PV 270, metric version





Inlet:
flange according ISO 6162
DN 89; PN 25 bar
3 1/2”

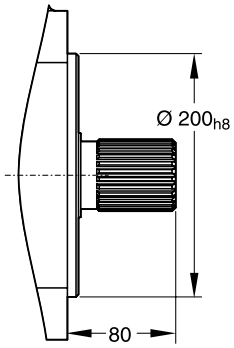
4 x M16, 32 deepf
optional 5/8 - 11 UNC - 2B
(threads options 3 and 7)



4 x M16, 32 deep
optional 5/8 - 11 UNC - 2B
threads options 3 and 7)

Outlet:
flange according ISO 6162
DN 38; PN 400 bar
1 1/2”

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

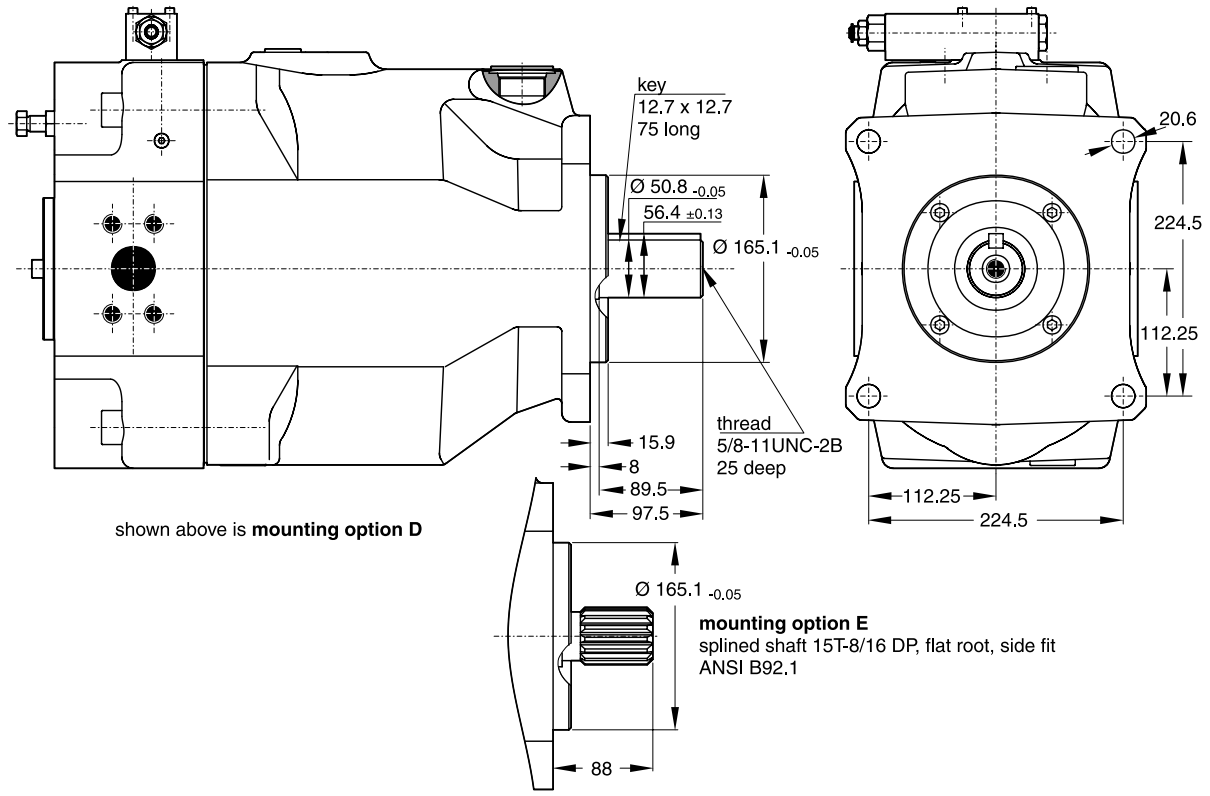


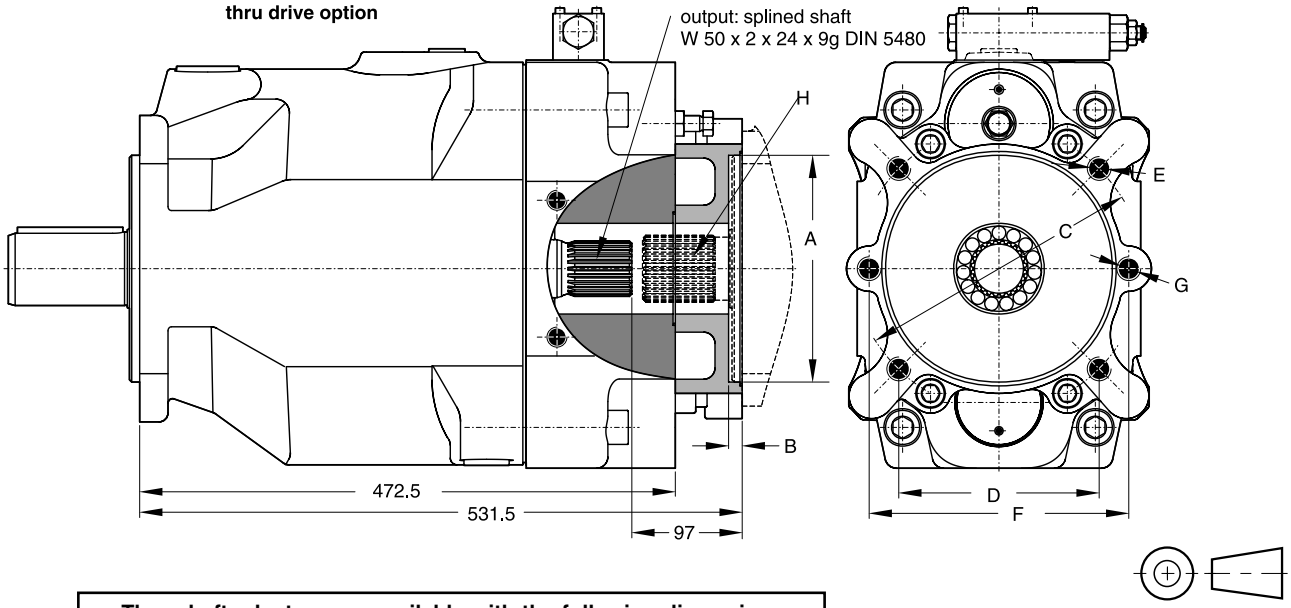
mounting option L
splined shaft W 60 x 2 x 28 x 9g DIN 5480

PV_GB.PM6.5MM

1

PV 270, SAE version and thru drive version





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	n. avail.	n. avail.
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	n. avail.	n. avail.

Dimension H and available couplings see page 1-22.
At **threads options 3** and **7** the dimensions **E** and **G** are UNC - 2B threads.

1

Mounting kits for multiple pumps, for second pump option

M	K	–	P	V	B	G					
Mounting kit			Axial piston pump series PV		Pump size			Second pump	Thread	Seals	Pump 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 151.4 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	EPDM

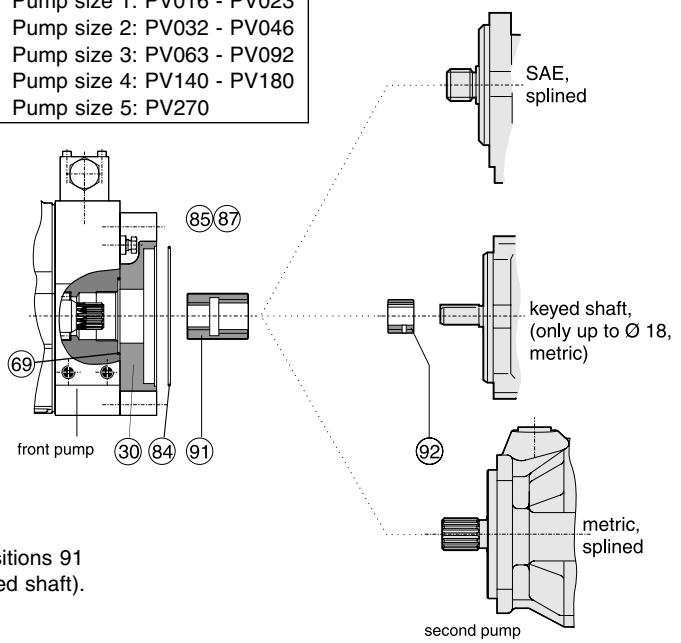
Code	Thread
M	metric
S	SAE

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

Mounting kits for multiple pumps, couplings

M	K	–	P	V	B	G		K			
Mounting kit			Axial piston pump series PV		Pump size			Coupling			Pump 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	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

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

PV_GB.PM6.5MM

Seal kit

S	K	–	P	V	B	G					

Seal kit | **Axial piston pump series PV** | **Pump size** | **Seals** | **Thread, port** | **Pump 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	Seals
N	NBR
V	FPM
E	EPDM

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

Repair and spare parts kits

R	K	–	P	V	B	G					

Repair/ Spare parts kit | **Axial piston pump series PV** | **Pump size** | **Contents** | ***partly optional:* Thread *or* Rotation *or* Seals** | **Pump 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	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-clockwise
	Seals
N	NBR
V	FPM
E	EPDM

Repair and spare parts kits for adjustable displacement limiter

R	K	–	P	V						

Repair/ Spare parts kit | **Axial piston pump series PV** | **Displacement** | **Contents** | **Seals** | **Pump design series (see name plate)**

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

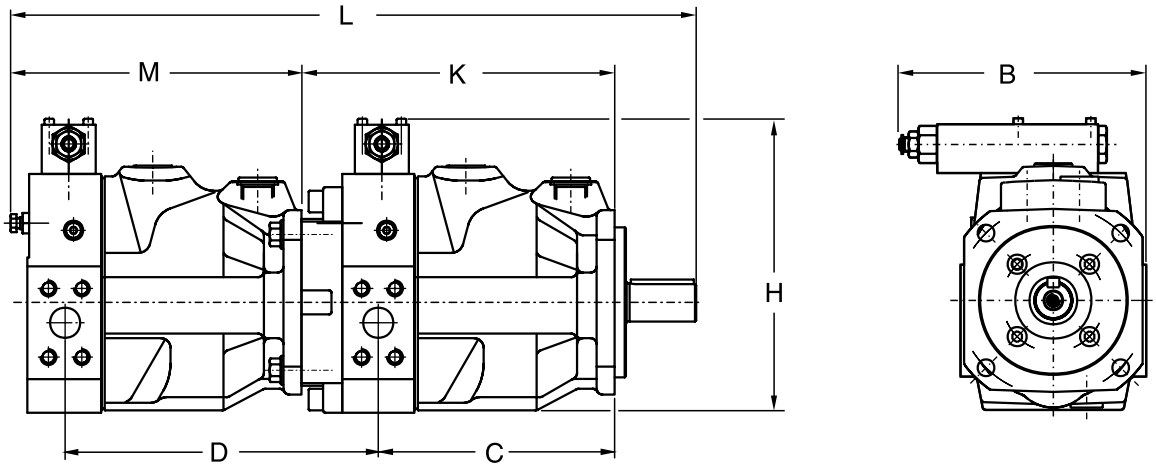
Code	Seals
N	NBR
V	FPM
E	EPDM

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

PV_GB.PM6.5MM

1

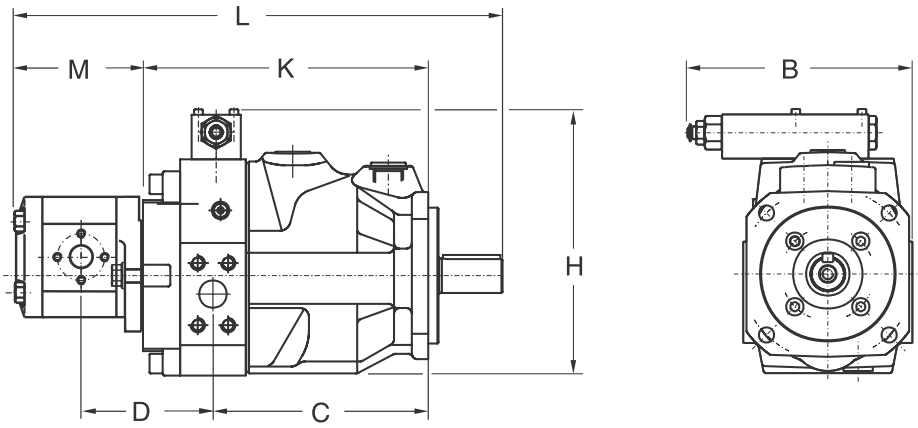
Combinations PV/PV, PV/PVM (metric version)



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	125 B4 HW	541	208	197	235.5	245	261	212
	PV032, 040 or 046		574	208	197	261	245	261	245
PV063, 080 or 092	PV016, 020 or 023	160 B4 HW	630	232	252	244.5	301	326	212
	PV032, 040 or 046		663	232	252	271	301	326	245
	PV063, 080 or 092		724	232	252	326	301	326	306
PV140 or 180	PV016, 020 or 023	160 B4 HW	719	230	305	280.5	349	415	212
	PV032, 040 or 046		752	230	305	307	349	415	245
	PV063, 080 or 092		813	230	305	362	349	415	306
	PV140 or 180[1)]		878	230	305	415	349	415	385
PV270	PV016, 020 or 023	200 B4 HW	860	255	403	299	406	531.5	212
	PV032, 040 or 046		893	255	403	325.5	406	531.5	245
	PV063, 080 or 092		954	255	403	380.5	406	531.5	306
	PV140 or 180		1033	255	403	433.5	406	531.5	385
	PV270[1)]		1134	255	403	531.5	406	531.5	510

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

Combinations PV/GP



Main pump	Second pump	Interface main p.	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

1

Max. transferable torque in [Nm] for the 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 transmitt. cap. at shaft end	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.

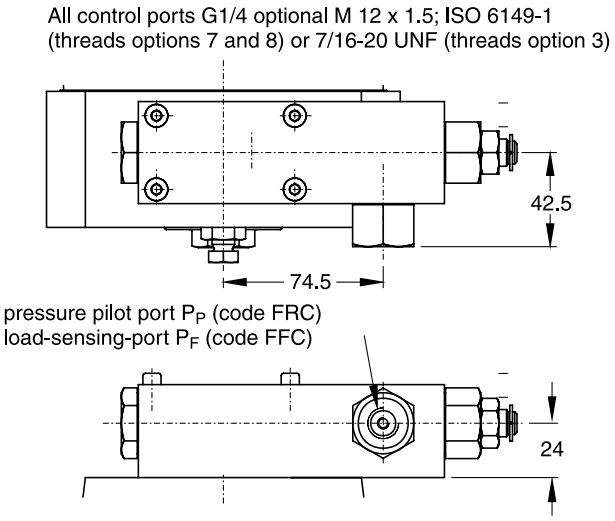
Pump	Shaft	Torque Limit Factor
PV016-023	D	17700
	E	17700
	K	17700
	L	20130
PV032-046	D	32680
	E	36380
	K	33810
	L	40250
PV063-092	D	77280
	E	72450
	K	67620
	L	83720
PV140-180	D	118400
	E	158760
	F	78750
	G	97650
	K	113400
	L	157500
PV270	D	119000
	E	159700
	K	170100
	L	236250

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

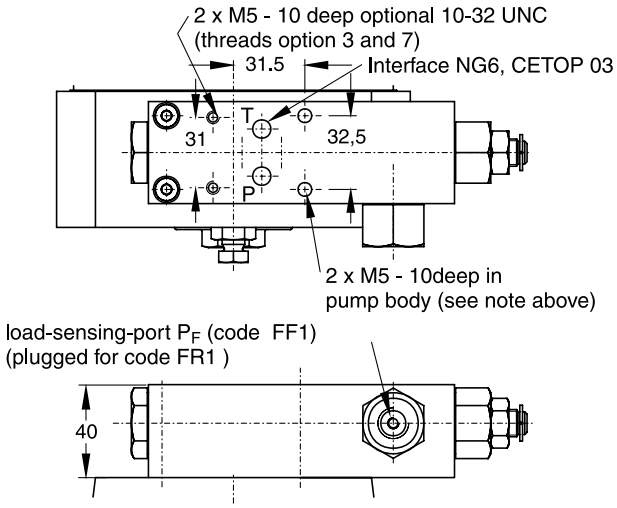
Total torque factor of the combination
= sum of individual torque factors of all pumps

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).

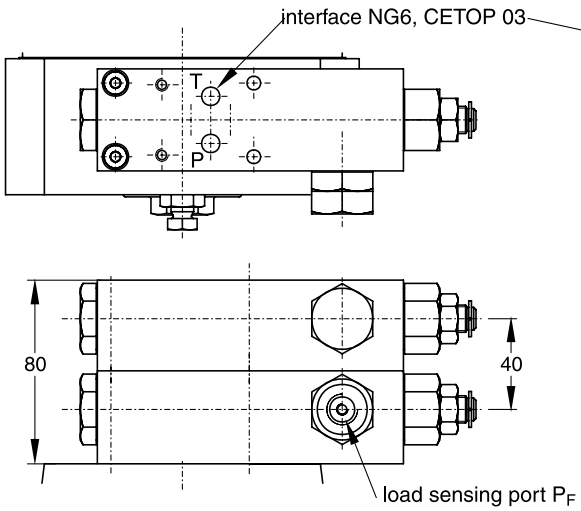
Torque factor of any pump
= p x Vg (pressure in bar x displacement in cm^3/rev)



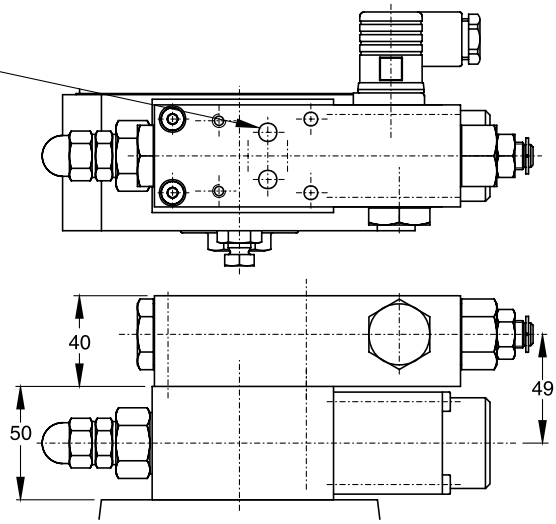
Remote pressure compensator, code FRC
load-sensing compensator, code FFC



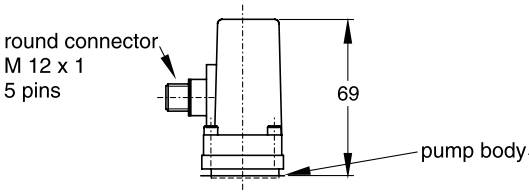
Remote pressure comp. with NG6 interface, code FR1
load-sensing comp. with NG6 interface, code FF1



2-valve-compensator, code FT1



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



LVDT for prop. compensator

Pilot valve for horse power compensator

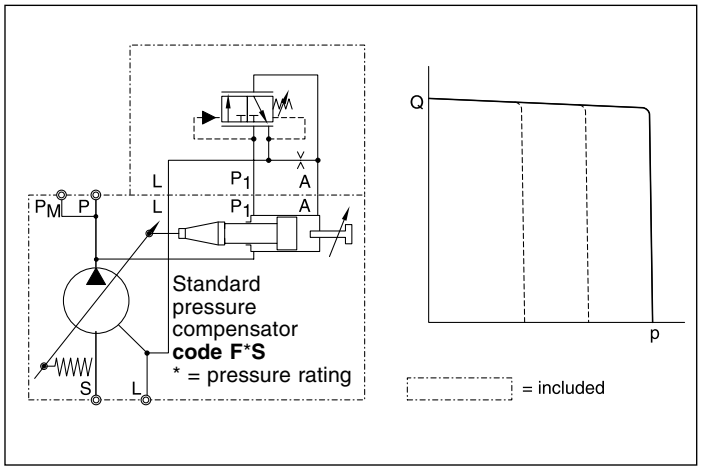
Seal kit, compensator

S	K	–	P	V	C	
Seal kit			**Compensator for axial piston pump PV series**			**Seal**

Code	Material
N	NBR
V	FPM
E	EPDM

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

1

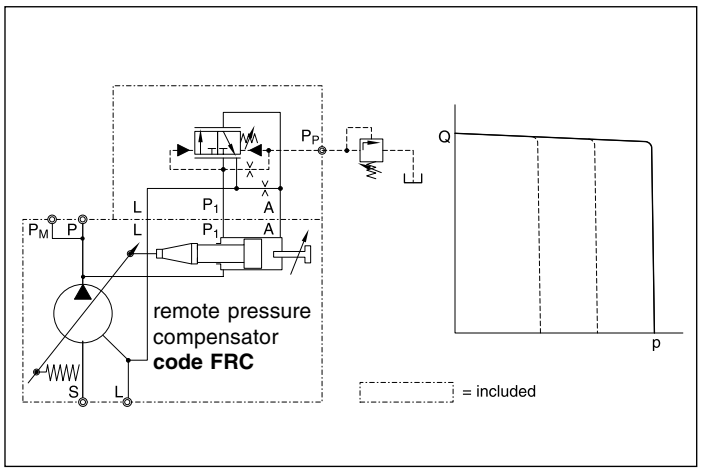


Standard pressure compensator code F*S

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.

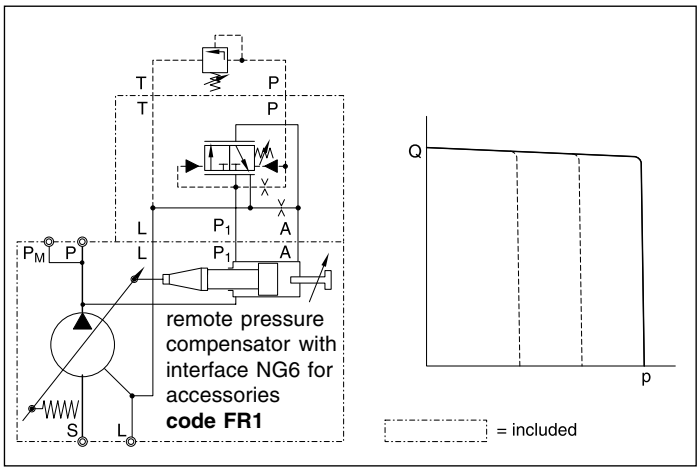


Remote pressure compensator code FRC

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.

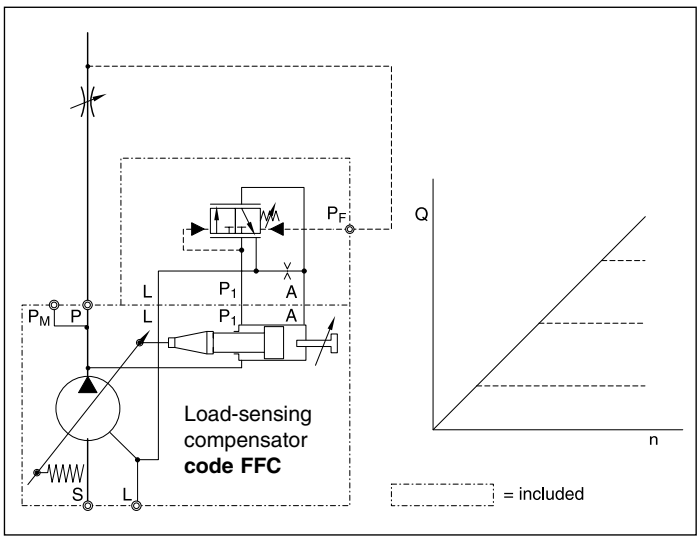


Remote pressure compensator code FR1

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 36 and 37 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.

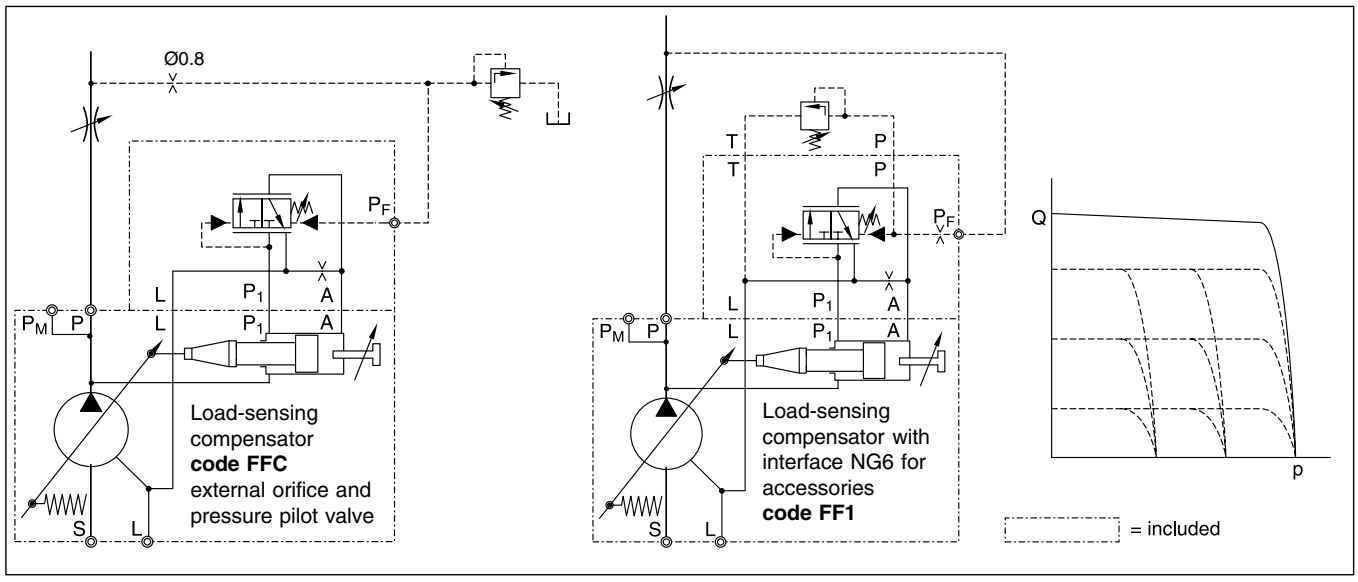


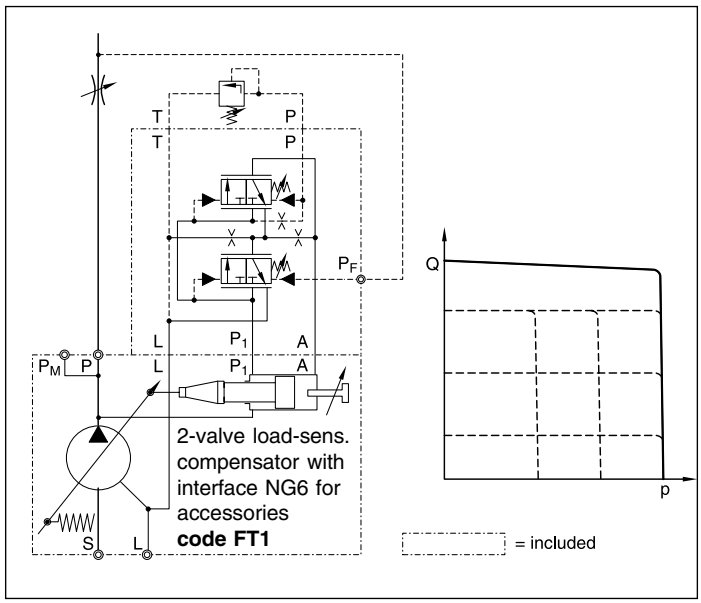
Load-sensing compensator code FFC

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.





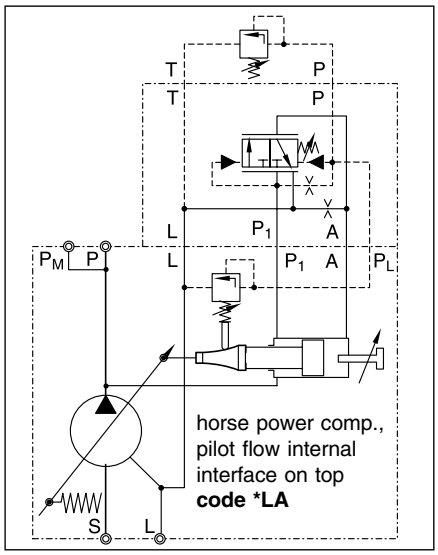
Shown above is **load sensing compensator code FF1** with an NG6 interface on top of the control valve. That allows direct mounting of a pilot valve for pressure compensation. This version includes the pilot orifice.

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.

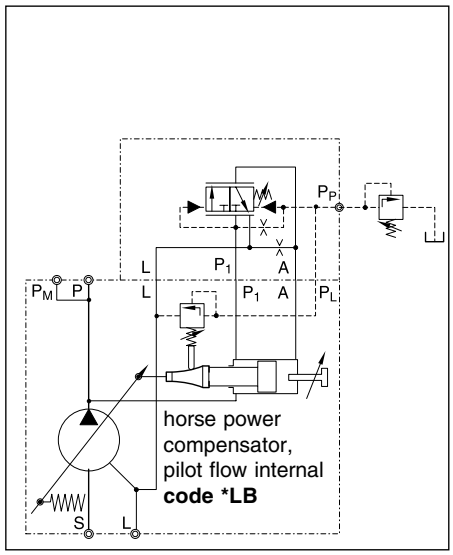
If a more accurate pressure compensation is required, the **2-valve load-sensing compensator code FT1** can be used. The circuit diagram of this version is shown left.

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

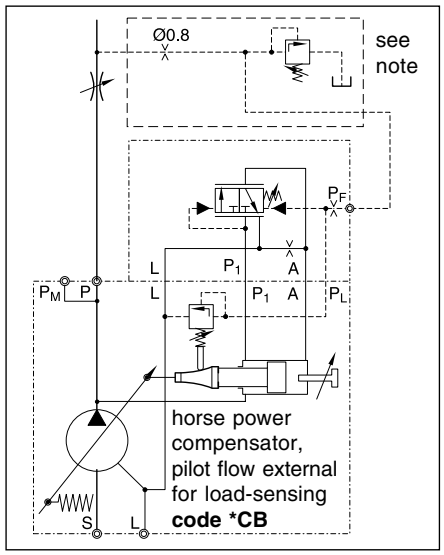
The 2-valve compensator is equipped with an interface NG6 on the compensators top side.



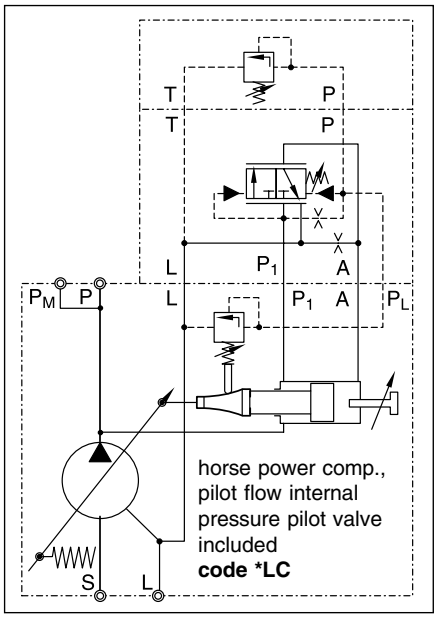
horse power comp.,
pilot flow internal
interface on top
code *LA



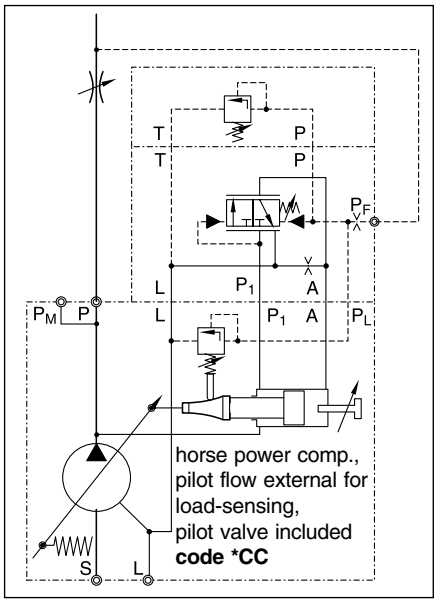
horse power
compensator,
pilot flow internal
code *LB



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



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



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

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.

The ordering code for the horse power option is as follows:

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 to connect a remote pilot valve with piping.
Code C includes a pilot valve for manual pressure adjustment. Max. setting: 350 bar.

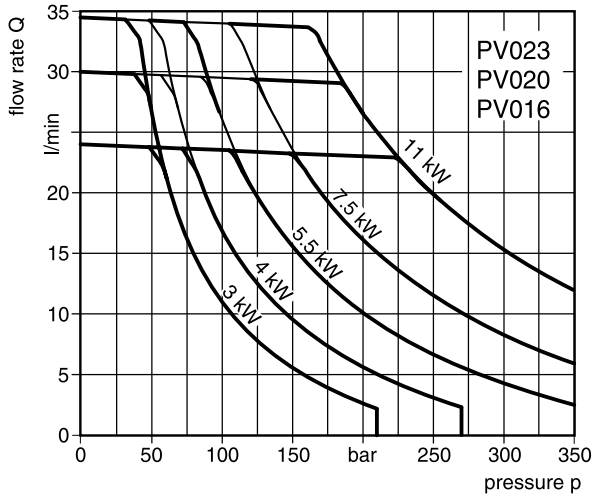
Page 31 shows the typical control characteristics and the available control sleeves for the different pump sizes and displacements.

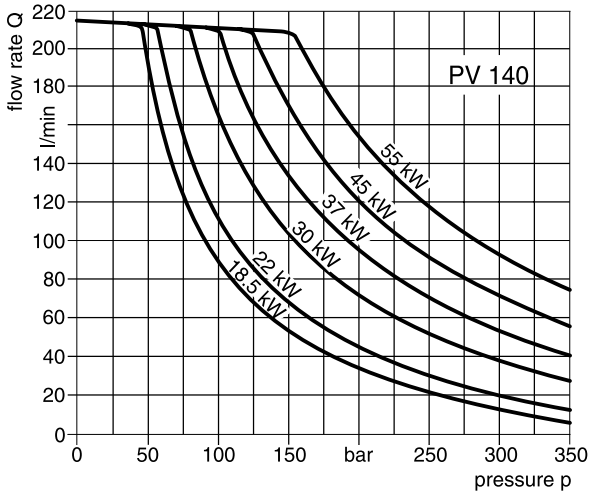
Note: If version *CB is equipped with [ ] external pilot valve and 0.8 mm orifice, the orifice in port P_F has to be removed.

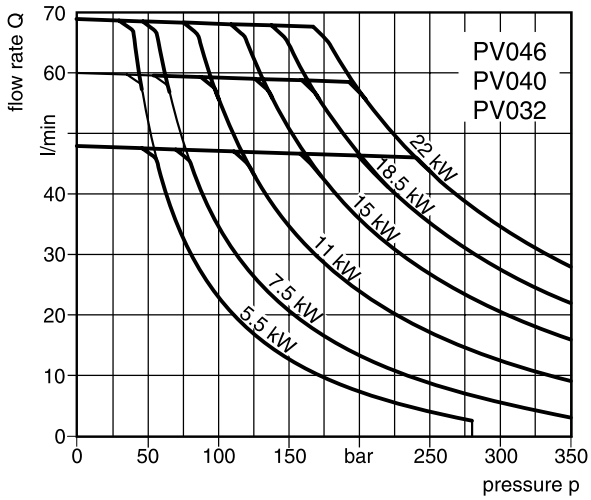
[ ] = included

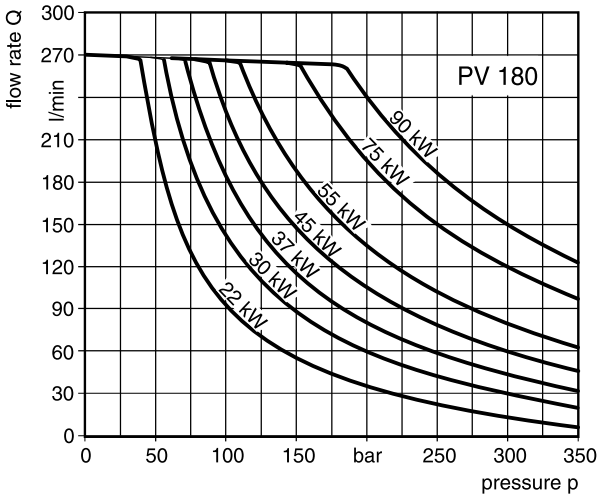
PV_GB.PM6.5MM

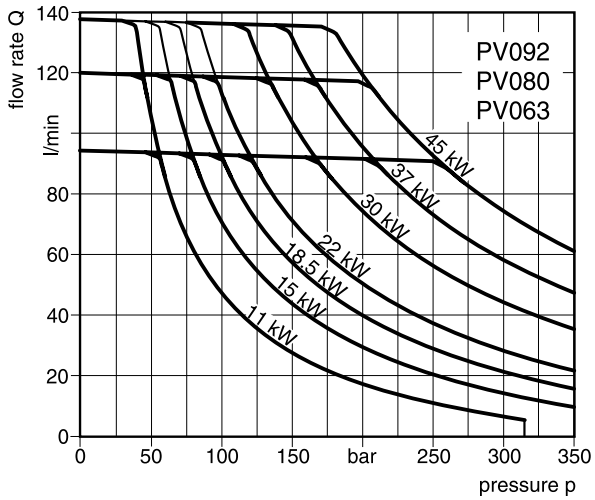
Characteristic curves, horse power compensators

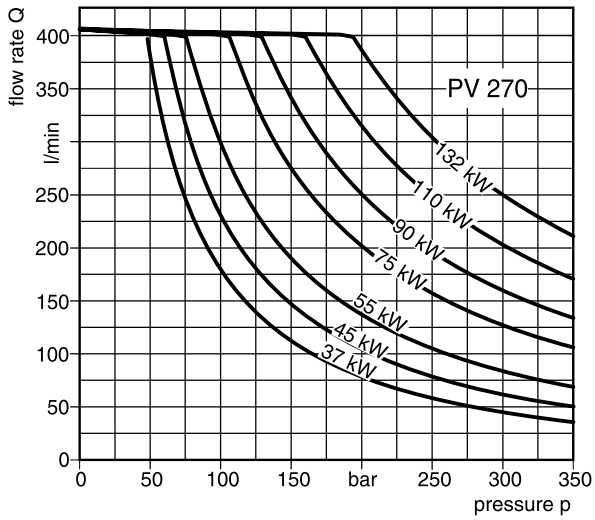








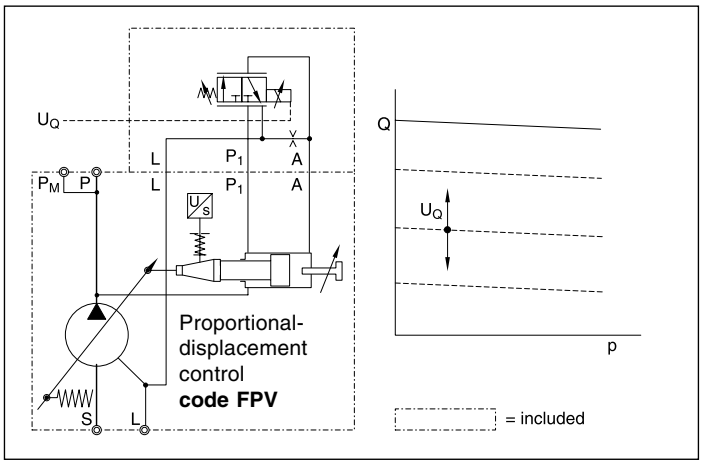


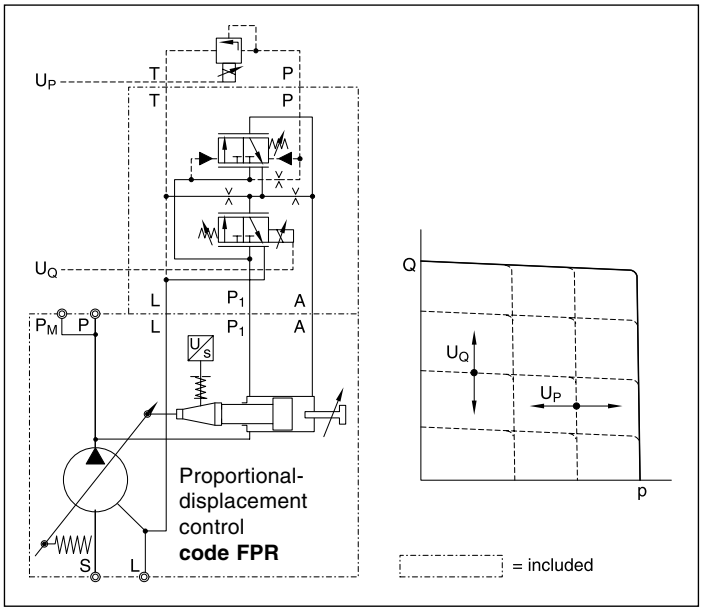


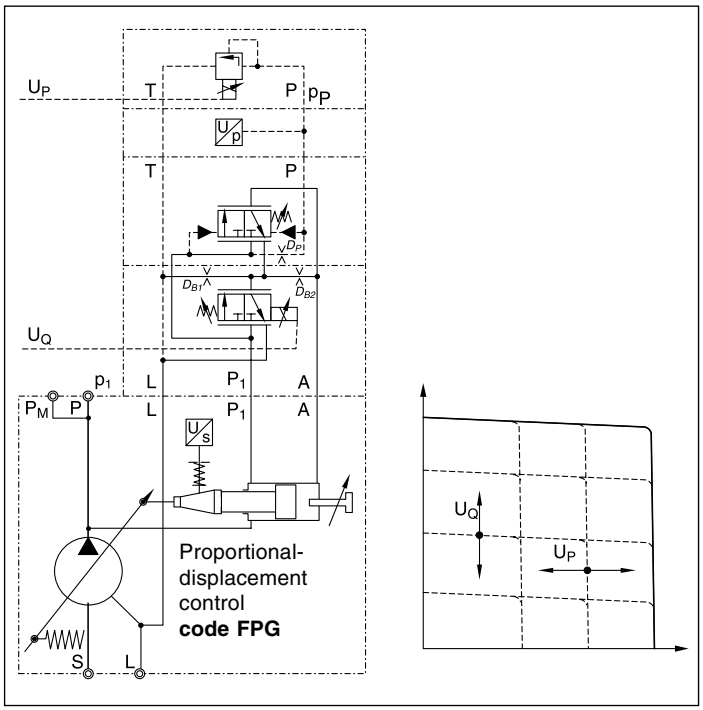
The diagrams shown are only valid for the following working conditions:

speed	:	n = 1500 rev/min
temperature	:	t = 50 °C
fluid	:	mineral oil HLP, ISO VG46
viscosity	:	ν = 46 mm²/s at 40°C

1







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 1-36 and 1-37) 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.

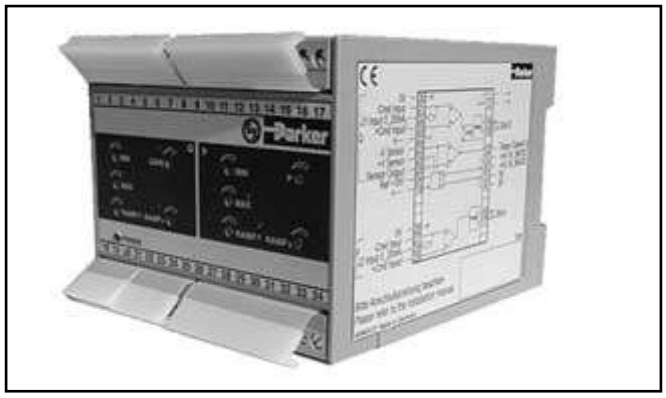
Parker variable displacement pumps have a large servo piston. That leads to a extremely robust and stable pump control. On the other hand that requires high control flows (up to > 100 l/min). Parker has therefore chosen the 2-valve-p/Q-control concept, because in this case a hydraulic-mechanical compensator 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.

For more details see manual PVI017.

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

Ordering code

PQ	0	□	—	□	00	□
Electronic module for pumps	For axial piston pumps series PV	Frame size of pump		Module variation	Option	Design series (not required for order)

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

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 !

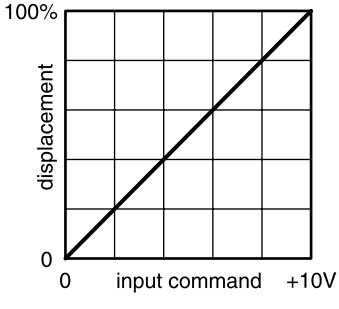
The electronic modules are not included in the pump compensator. Please order separately. More technical information on these modules can be found in chapter 10, Electronics.

Technical Data

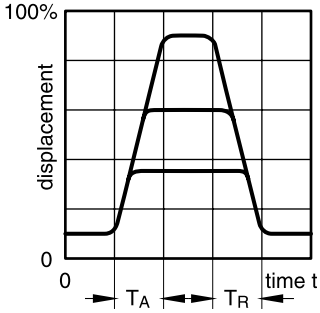
- Minimum control pressure required (at internal pressure supply = minimum system pressure)	15 bar
- Repeatability	± 0.75 %
Proportional flow compensator (solenoid):	
- nominal voltage	16 V
- environmental temperature	50 °C
- duty cycle	100 %
- protection class	IP54
- connector	ISO 4400
Inductive position 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
- connector	(short circuit protected) round connector M12 x 1.5pin

Diagrams

typical static characteristic



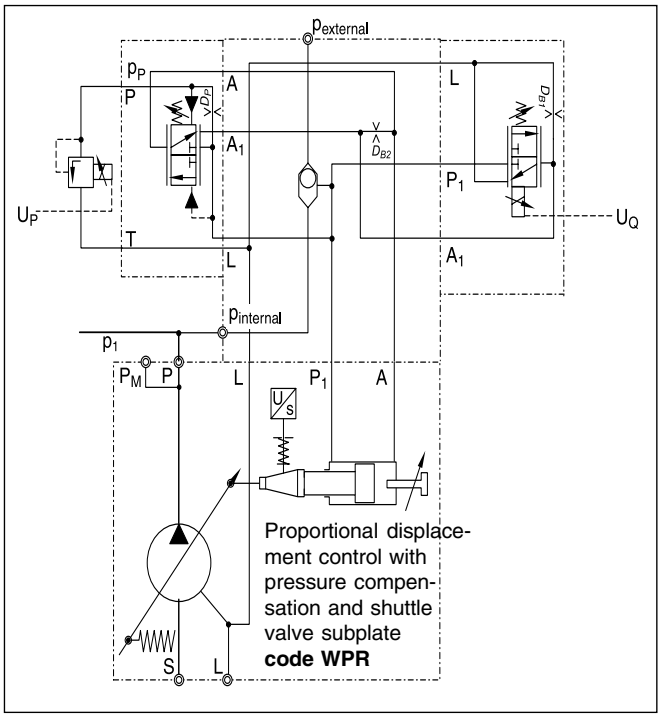
typical dynamic characteristic



Response times

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

1



Proportional displacement control with pressure compensation and shuttle valve subplate **code WPR**

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.

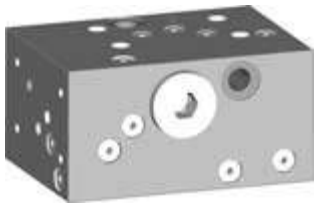
If the system does not provide enough back pressure - especially at low displacement and low load - there are two options: the shuttle valve subplate and the preload valve option.

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.

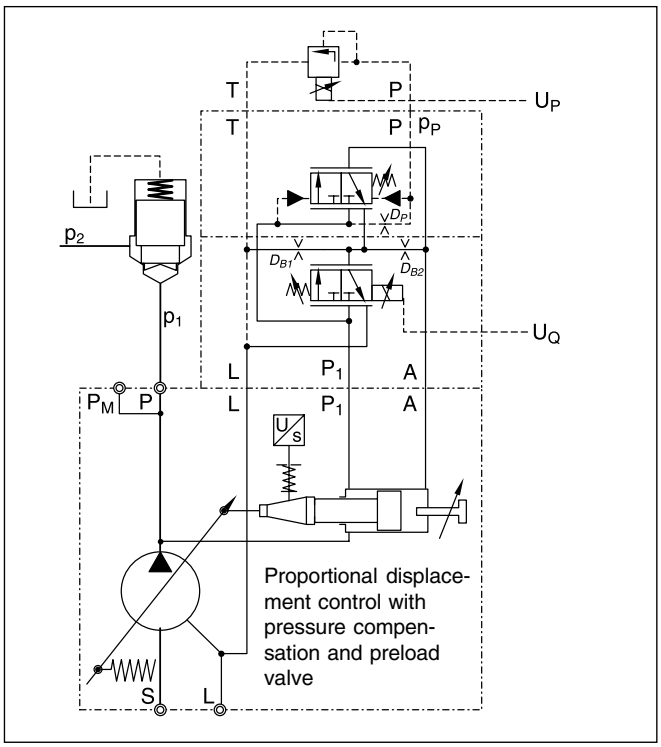
shuttle valve subplate for proportional displacement control



pressure compensator interface

displacement control valve interface

interface for pump mounting



Proportional displacement control with pressure compensation and preload valve

Preload valve for proportional displacement control, code PVAPVV*

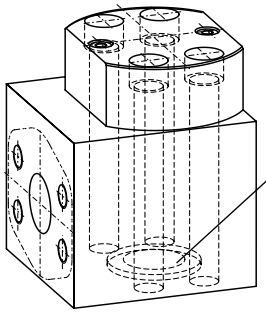
An alternative solution is the use of a direct operated preload valve. The preload valve is offered in a manifold for direct mounting to the pressure port of the pump.

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.

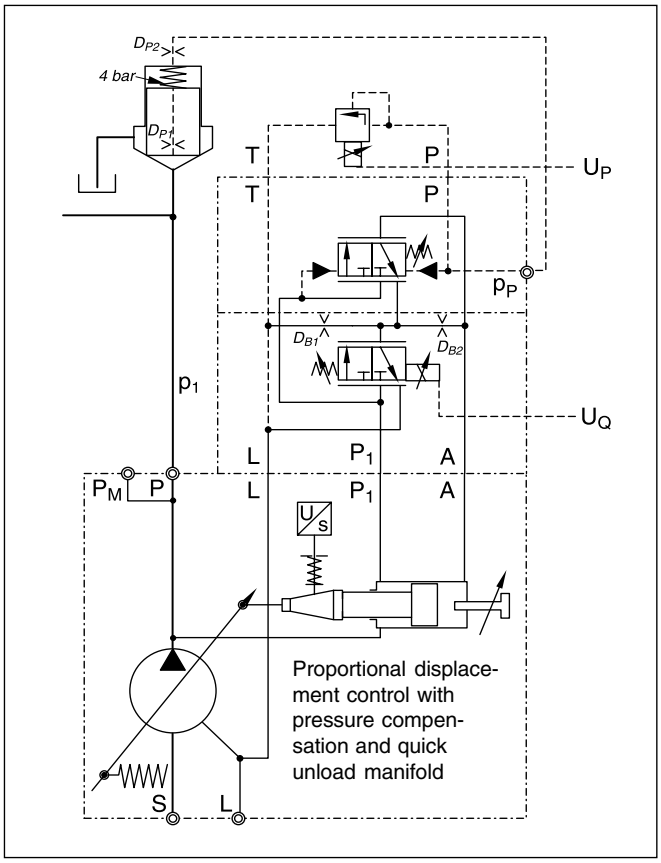
The design of the preload valve is shown below. For dimensions see **installation manual PVI-017-UK** (available upon request).

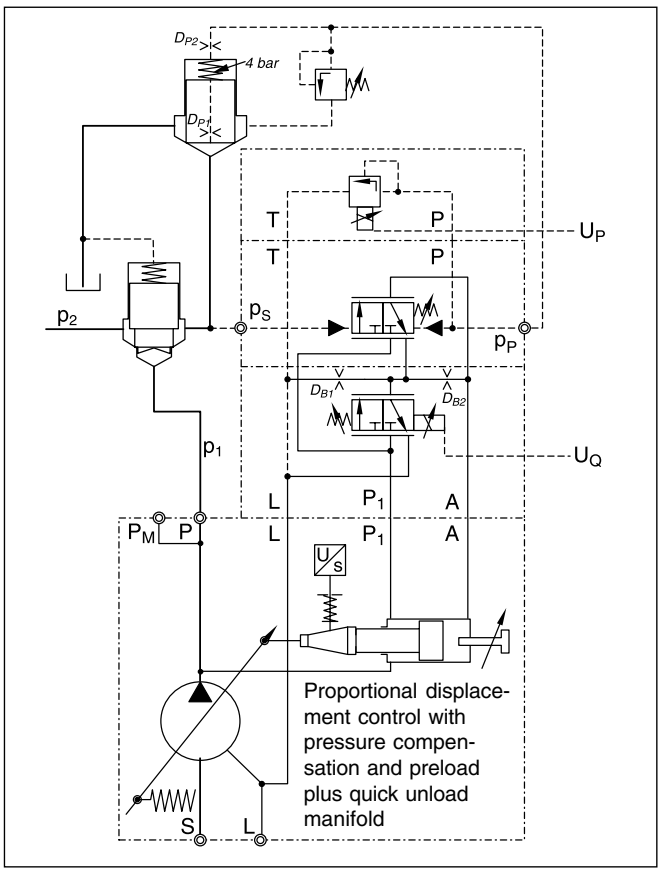
preload valve manifold code PVAPVV*



outlet: flange port ISO 6162

inlet: flange port ISO 6162, flanged direct to pump pressure port





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:

P	V	A	P						

Accessories for axial piston pump, PV series, pressure port mounting

Function

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

Frame size

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

Threads option

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

Seal option

Code	Seals
N	NBR
V	FPM
E	EPR

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

1

Ordering Examples

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:**

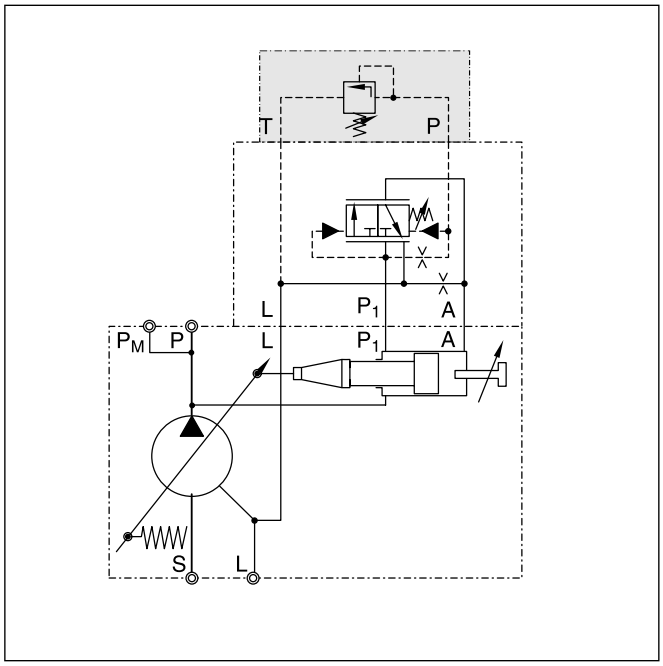
   PV * * * * * * * * FR**Z**
   PVAC2PCMNSJP

2) Same pump, accessories **not fitted:**
   PV * * * * * * * * FR**1**
   PVAC2PCMNSJP

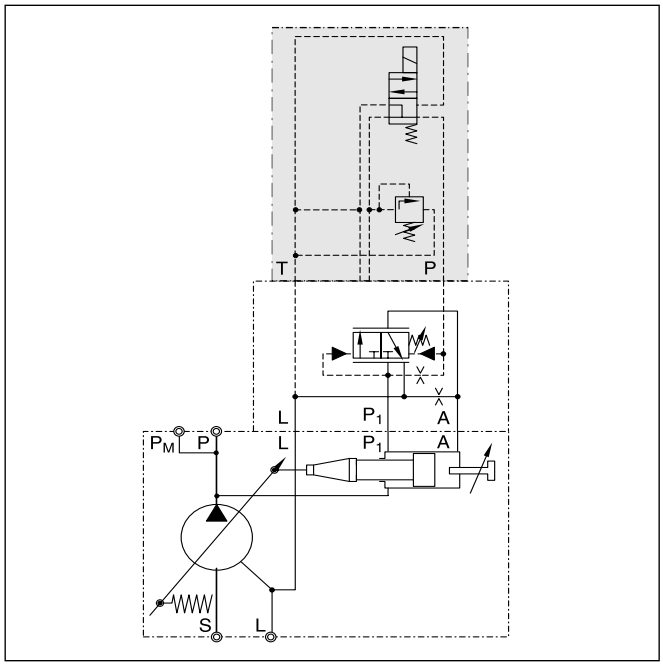
3) Usable for horsepower control and proportional volume control, too.

Schemactis

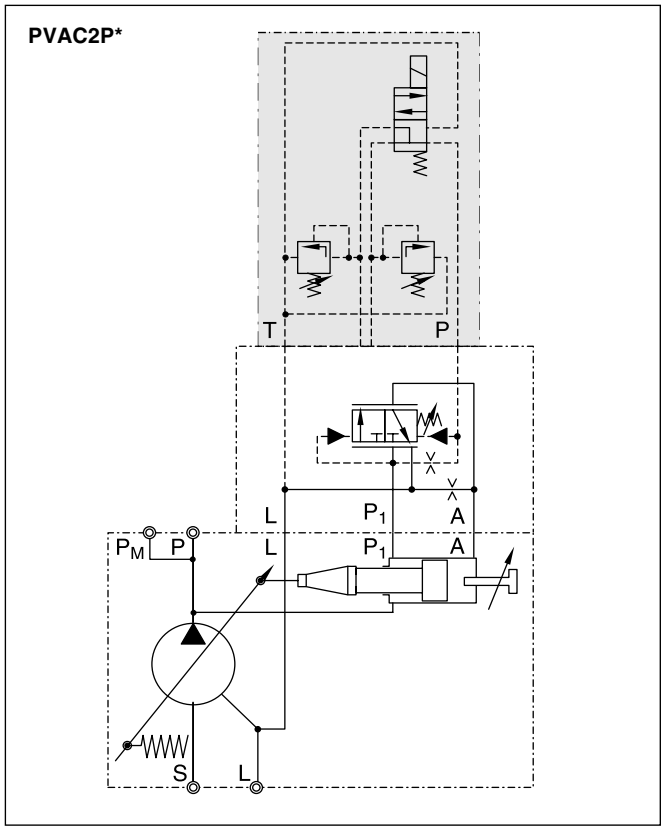
PVAC1P*



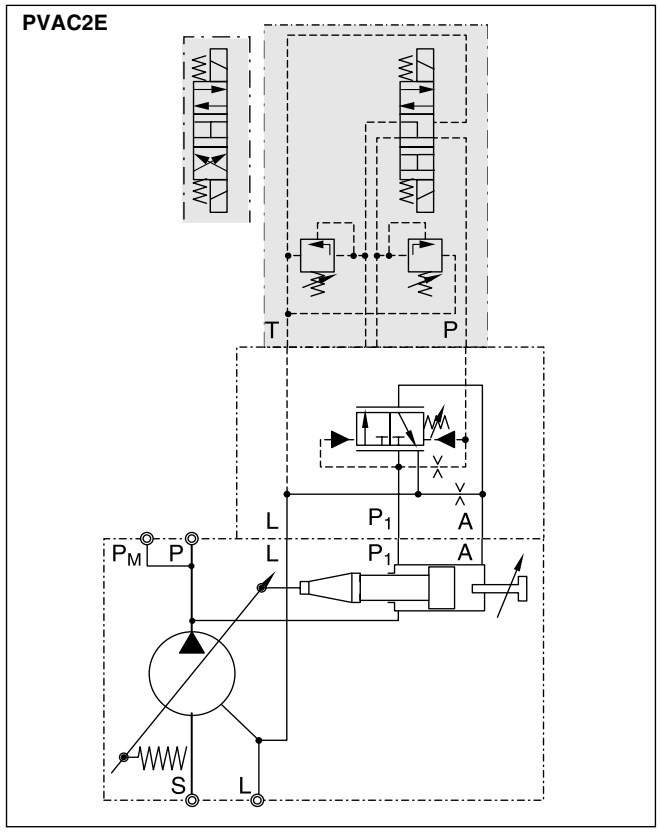
PVAC1E*



PVAC2P*



PVAC2E



PV **AC** [ ] [ ] **M** [ ] [ ] [ ] [ ] [ ]

- **PV** — For PV Pump Series
- **AC** — Accessories for Compensators
- [ ] — Function
- [ ] — Mounting Bolts
- **M** — Metric Bolts
- [ ] — Seals
- [ ] — Adjustment
- [ ] — Solenoid
- [ ] — Solenoid Accessories
- [ ] — 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

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

Code	Compound
N	NBR
V	FPM

Code	Adjustment
S	Spindle with lock nut
L	DIN lock

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

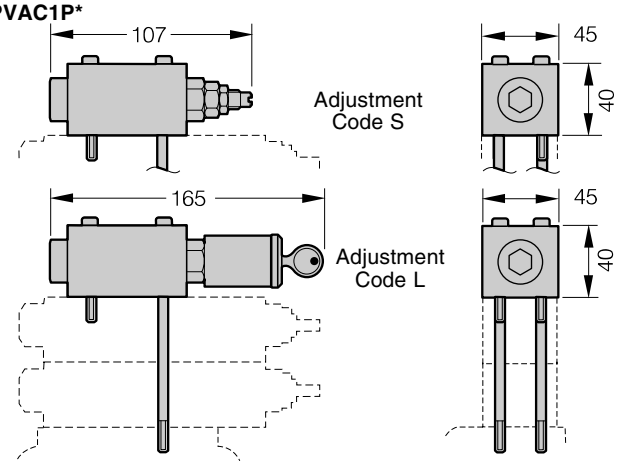
Code	Solenoid voltage
omit	For function 1P
Y	110V/50 Hz - 120V/60 Hz
T	220V/50 Hz - 240V/60 Hz
J	24V DC

Please order plugs separately.
See chapter 2, page 88

For spare parts and replacement kits see manual PVI-PVAC-UK; available upon request.

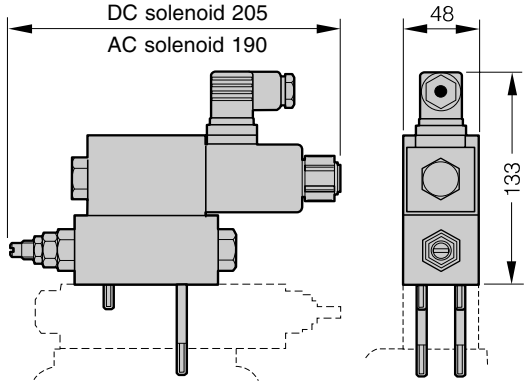
Dimensions

PVAC1P*



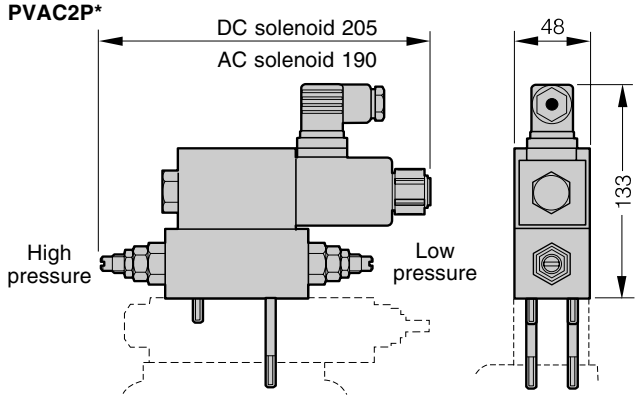
Pressure relief valve
mounted on 2-valve pressure-flow compensator type T

PVAC1E*



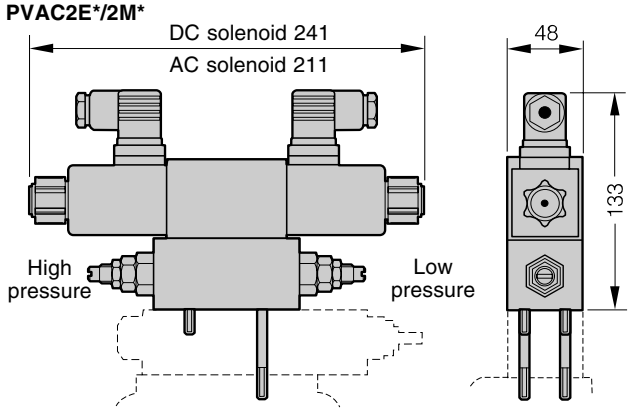
Pressure relief valve, electrical unloading,
mounted on compensator type R or F

PVAC2P*



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

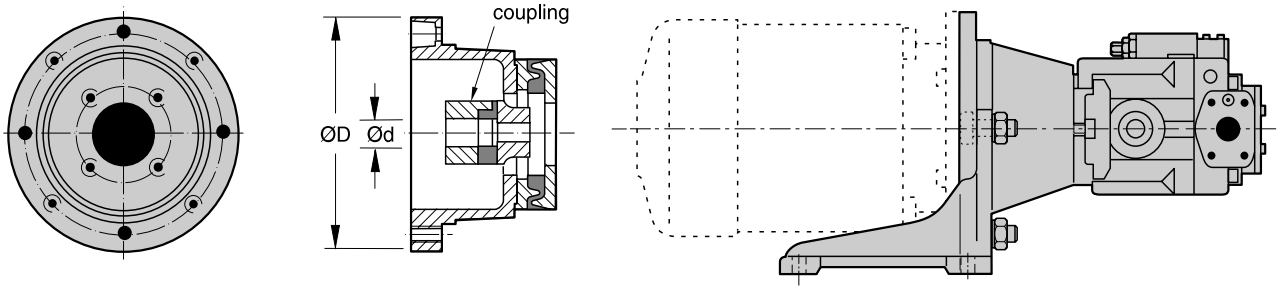
PVAC2E*/2M*



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

1

Bell housing, coupling and foot flange



Can be purchased at:

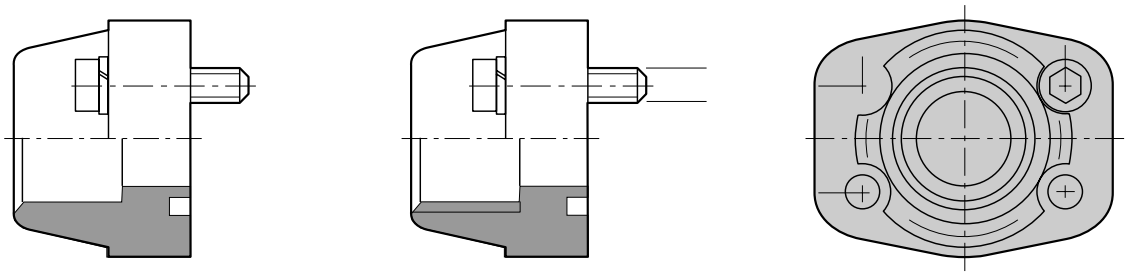
Raja
Rahmer + Jansen GmbH
Vorthstr. 1
58775 Werdohl, Germany
Tel.: (+2392) 5090, fax: (+2392) 4966

or

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

Welding flange

Threaded flange



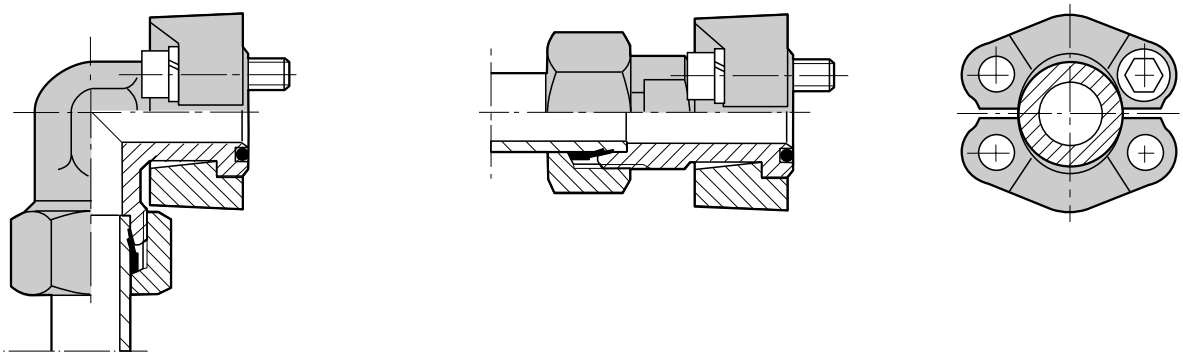
Can be purchased at:

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. 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 19/15, to ISO 4406
x = 25 mm ($ß_{25} \geq 75$) to ISO 4572

Hydraulic systems with maximised component life and functionability:

Class 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

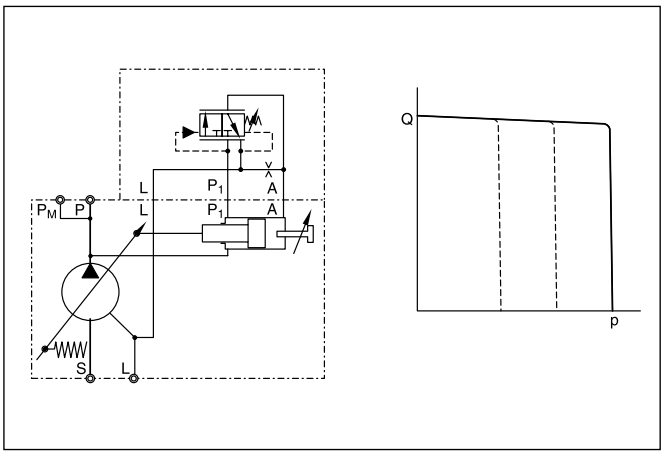
Pump and motor shafts must be aligned within 0.25mm T.I.R. maximum. A floating coupling must be used. Bellhousings and couplings can be ordered at manufacturers listed in this catalogue. Please follow the coupling manufacturer's installation instructions. Consult your Parker representative for assistance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

Start up

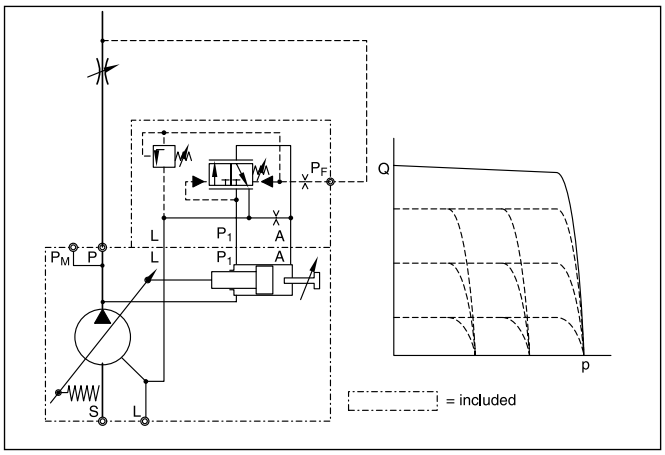
Prior to start up, the pump case must be filled with hydraulic fluid (use case drain port). Initial start up should be at zero pressure with an open circuit to enable the pump to prime. Pressure should only be increased once the pump has been fully primed.

Attention: Check motor rotation direction.
Compare chapter 12.
For more details see Installation manual PVI016.

1



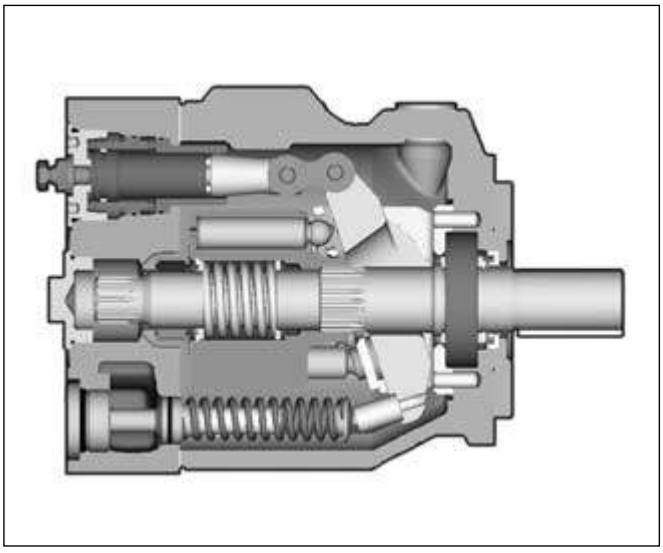
Pump with standard pressure compensator, Code MS



Pump with load-sensing compensator, Code FC

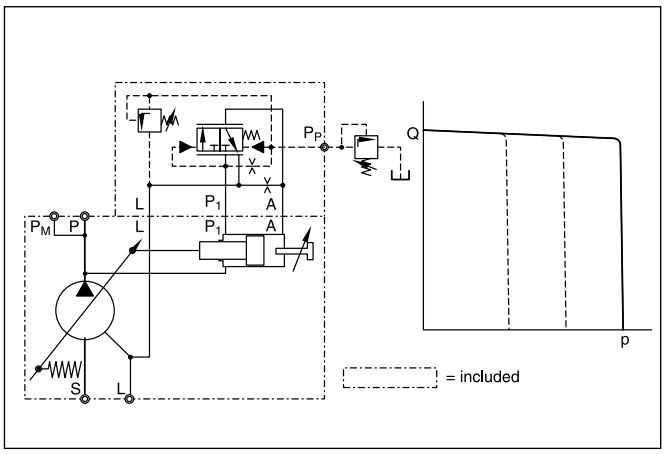
With thru drive
for single and multiple pumps

Swash plate type for open circuit

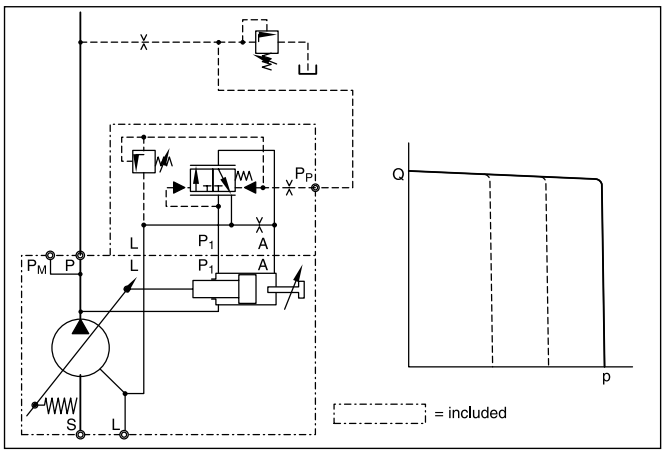


- Mounting interface according to VDMA-standards sheet 24560 part 1.
- Standard: 4-hole flange ISO 3019/2 (metric).
  Optional: 4-hole flange ISO 3019/1 (SAE).
- Large servo piston with strong bias spring achieves fast response; e.g. for PVM046
  upstroke < 80 ms
  downstroke < 50 ms
  Note: follow installation 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
- 9 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.
- 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 remote pressure compensator RC



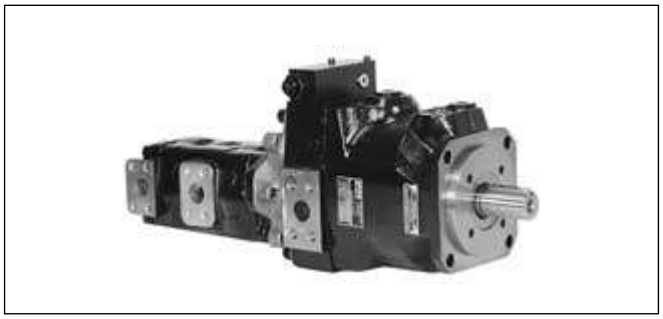
Pump with remote pressure compensator, ext. option RE

Displacement	from 16 to 92 cm³/rev	
Operating pressures		
Outlet	nominal pressure p_N	280 bar
	max. pressure $p_{max.}$	350 bar[1)]
	drain port	2 bar[1)]
Inlet	min. 0.8 bar (absolute) max. 16 bar	
Minimum speed	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

Pump with standard press. comp.

Pump with remote press. comp.



Pump with gear pump

Pump combinations
see pages 56 - 57.

Selection table and technical data

Model	Max.displacement in cm³/rev	Output flow in l/min at 1500 min⁻¹	Input horse power in kW at 1500 min⁻¹ and 280 bar	* Max speed in min⁻¹	Weight in kg
PVM016	16	24	11.0		
PVM020	20	30	14.0	3000	19
PVM023	23	34.5	16		
PVM028	28	42	19.5		
PVM032	32	48	22		
PVM040	40	60	28	2800	30
PVM046	46	69	32		
PVM063	63	94.5	44	2800	
PVM080	80	120	55.5	2500	60
PVM092	92	138	64	2300	

* The maximum speed ratings are shown for an inlet pressure of 1 bar (absolute) and for a fluid viscosity of ν = 30mm²/s.

1

P	V	M																	

Axial piston pump variable displacement medium pressure version

Size and displacement

Rotation

Variation

Mounting code

Thread code

Thru shaft code

Sec. pump code

Seals

Compensator

Design series: **Pump** **Comp.** *not required for order*

Code	Displacement
016	**16 cm³/rev**
020	**20 cm³/rev**
023	**23 cm³/rev**
028	**28 cm³/rev**
032	**32 cm³/rev**
040	**40 cm³/rev**
046	**46 cm³/rev**
063	**63 cm³/rev**
080	**80 cm³/rev**
092	**92 cm³/rev**

Code		Compensator option
0	**1**	**no compensator**
		Stand. press. compensator
M	**S**	**10 - 280 bar**
Remote compensator options		
R	**C**	**remote press. compensator**
R	**E**	**remote press. comp., extern.**
F	**C**	**load sensing comp.**

Code	Rotation*
R	**clockwise**
L	counter clockwise

* when looking at shaft

Code	Material
N	**NBR**
V	FPM

Code	Variation
1	**Standard**
9	reduced displacement adjusted.*

* when ordering, specify displacement (cm³/rev)

Code	Second pump option*
1	**single pump, no 2nd pump and coupling**
3	PVM-Pump, mounted
4	gear pump, series GP, mounted

* specify 2nd pump with full model code

Code	Mounting flange		Shaft
D	SAE, ISO	4-hole flange	cylindrical, key
E	3019/1	4-hole flange	splined, SAE
K	**metr. ISO**	**4-hole flange**	**cylindrical, key**
L	**3019/2**	**4-hole flange**	**splined, DIN 5480**

Code	Thru shaft options without 2nd pump
T	**single pump prepared f. thru shaft**
	with thru shaft adapter
Y[1]	SAE AA, Ø 50.8mm
A	SAE A, Ø 82.55mm
B	SAE B, Ø 101.6mm
C[2]	SAE C, Ø 127mm
D[3]	SAE D, Ø 152.4mm
G	metric, Ø 63mm
H	metric, Ø 80mm
J	metric, Ø 100mm
K[2]	metric, Ø 125mm
L[3]	metric, Ø 160mm

[1] only for PVM016 - PVM028
[2] only for PVM032 and larger
[3] only for PVM063 and larger

Code	Ports[1]	Threads[2]
1	**BSPP**	**metric**
8	ISO 6149	metric

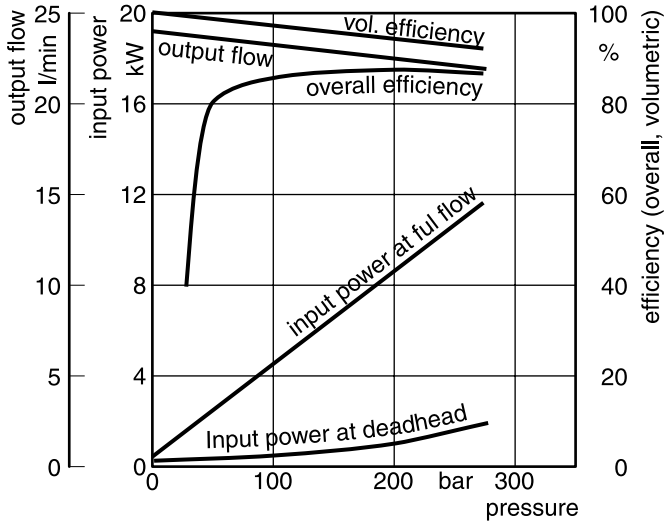
[1] drain, gauge, and flushing ports,
[2] all mounting and connecting threads

Bolt letters =
Short-term availability

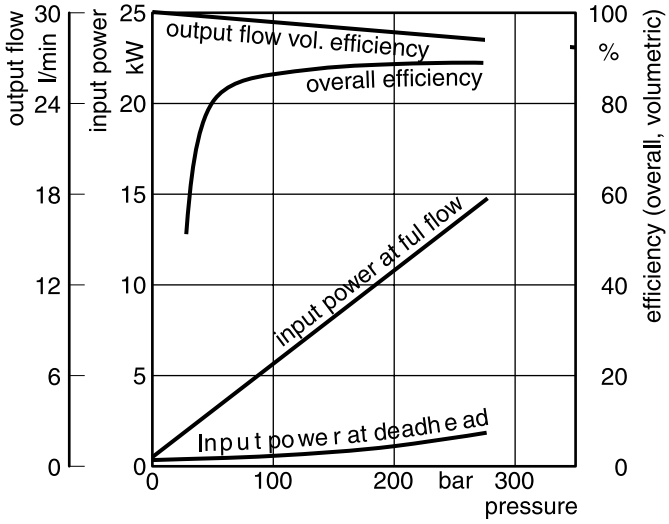
PVM-GB.PM6.5MM

Efficiency, power consumption

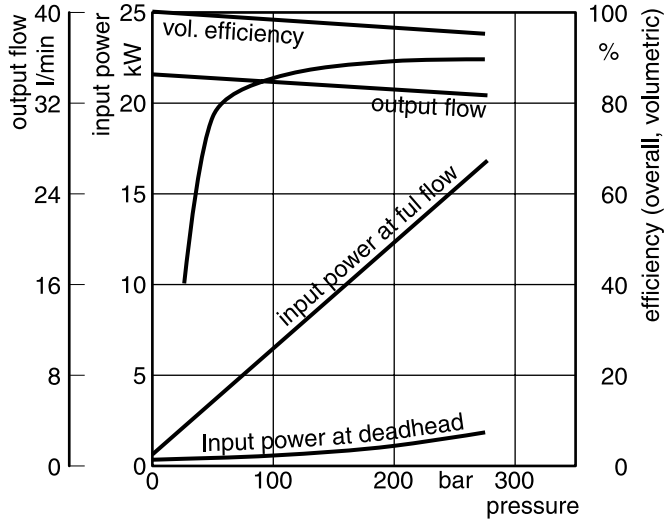
PVM016



PVM020



PVM023



Efficiency and case drain flows
PVM016, PVM020, PVM023, PVM028

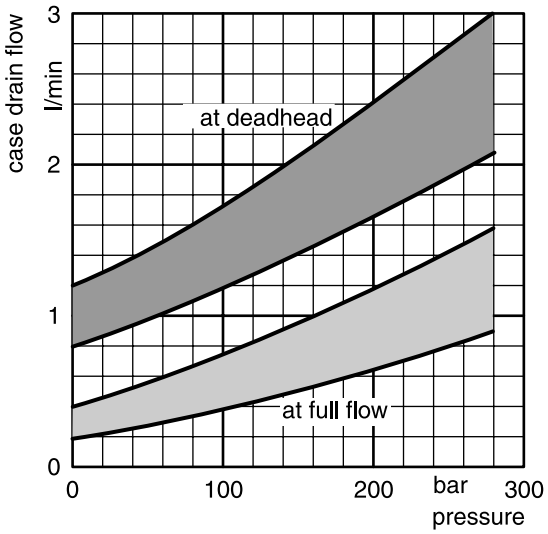
The efficiency and power graphs are measured at an input speed of n = 1500 min^{-1}, a temperature of 40°C and a fluid viscosity of 46 mm^2/s.

Case drain flow and compensator control flow leave via the drain port of the pump. 1 to 1.2 l/min are to be added to the values shown for the pilot operated compensators (codes RC, RE, FC) because the control flow of the pressure pilot valve also goes through the pump.

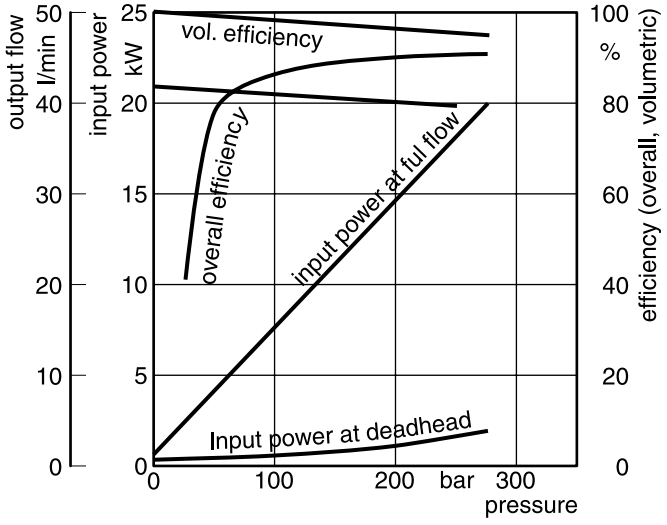
Please note: The values shown below are only valid for static operation. Under dynamic conditions and at rapid compensation of the pump the volume displaced by the servo piston also leaves the case drain port. This dynamic control flow can reach up to 40 l/min! Therefore the case drain line is to lead to the reservoir at full size and without restrictions as short and direct as possible.

Case drain flows

PVM016-028

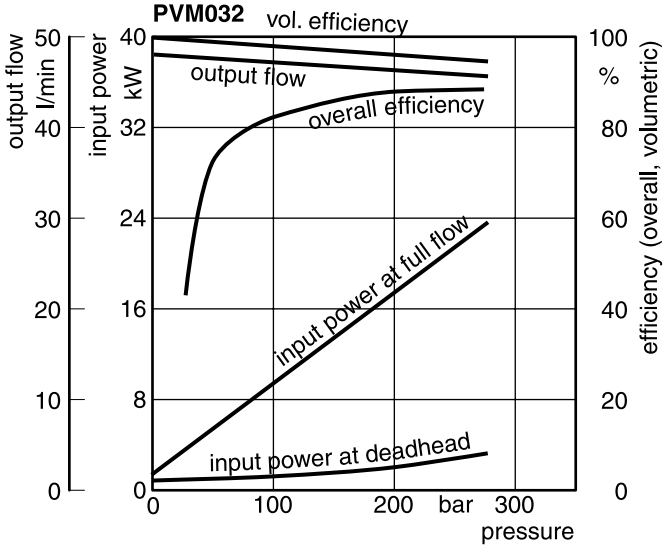


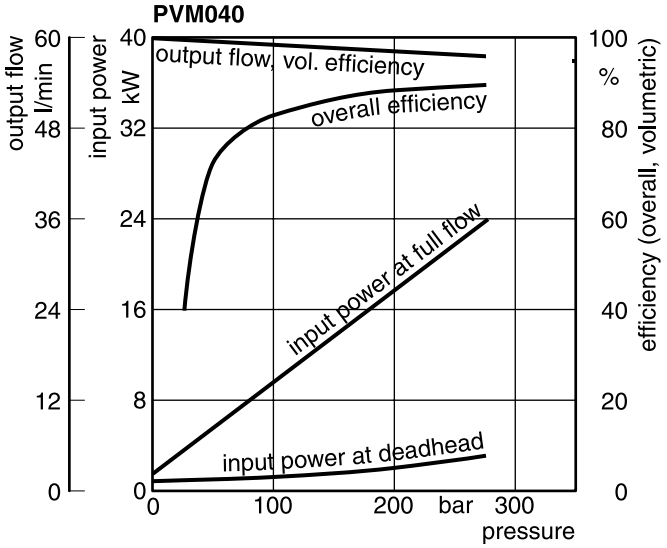
PVM028

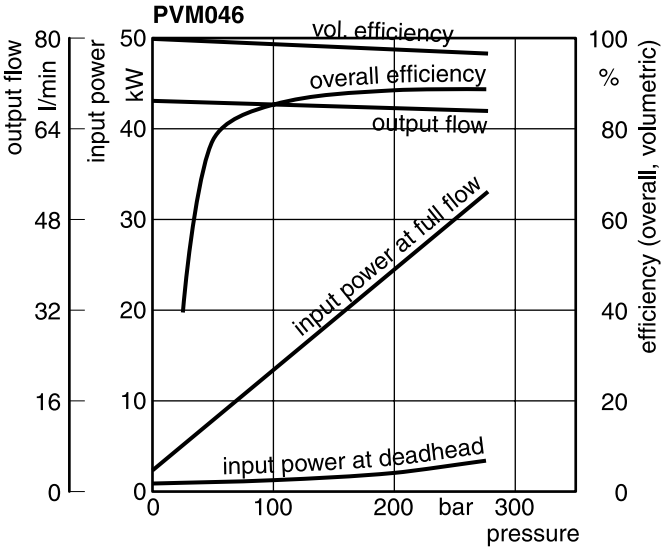


1

Efficiency, power consumption







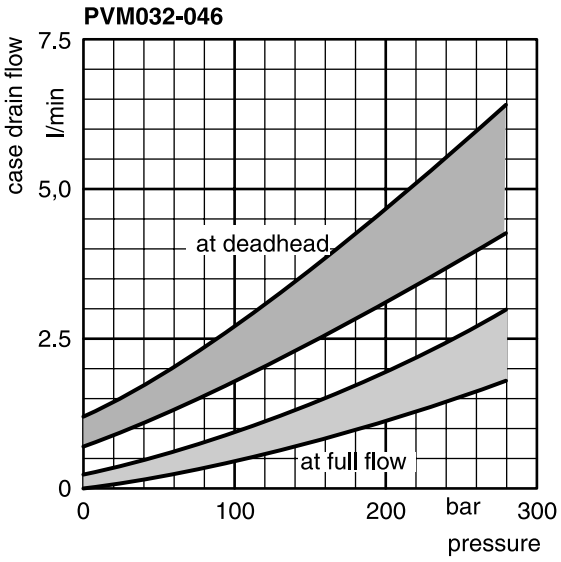
Efficiency and case drain flows
PVM032, PVM040, PVM046

The efficiency and power graphs are measured at an input speed of n = 1500 min^{-1}, a temperature of 40°C and a fluid viscosity of 46 mm^2/s.

Case drain flow and compensator control flow leave via the drain port of the pump. 1 to 1.2 l/min are to be added to the values shown for the pilot operated compensators (codes RC, RE, FC) because the control flow of the pressure pilot valve also goes through the pump.

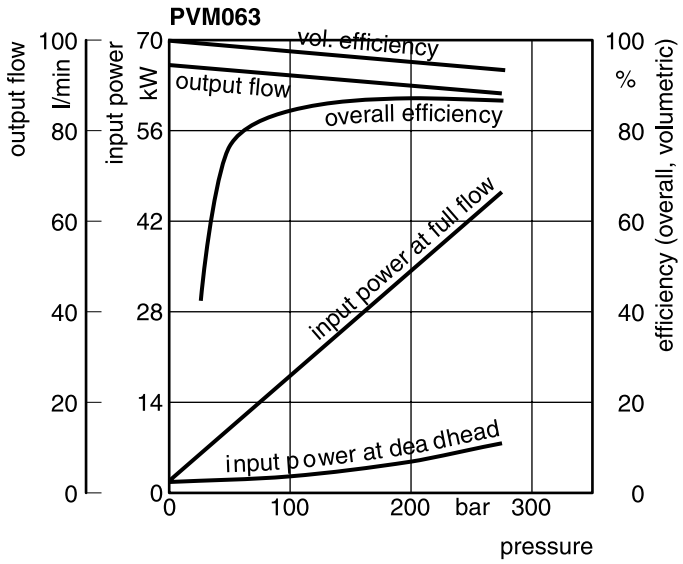
Please note: The values shown below are only valid for static operation. Under dynamic conditions and at rapid compensation of the pump the volume displaced by the servo piston also leaves the case drain port. This dynamic control flow can reach up to 50 l/min! Therefore the case drain line is to lead to the reservoir at full size and without restrictions as short and direct as possible.

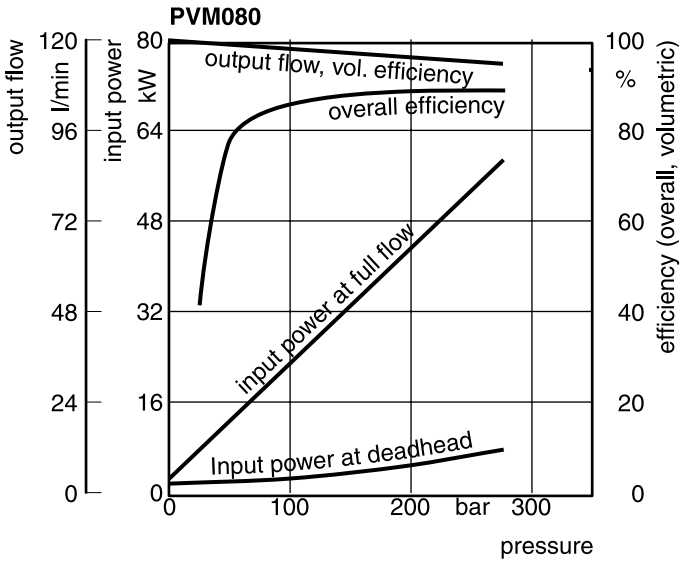
Case drain flows

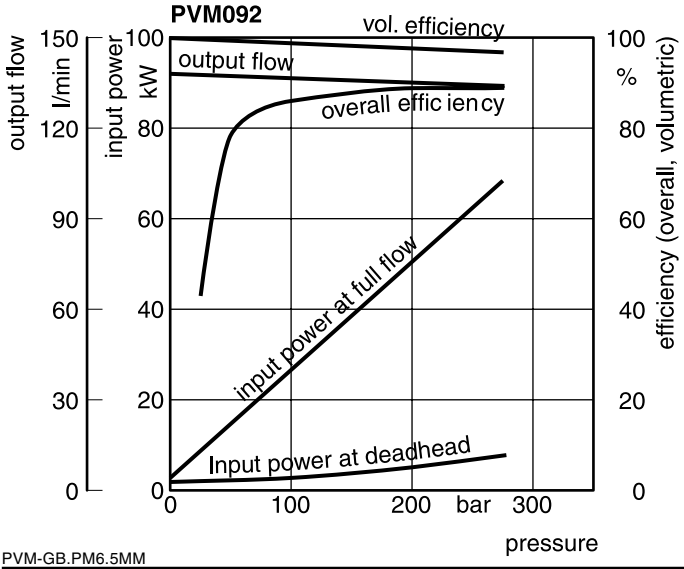


PVM-GB.PM6.5MM

Efficiency, power consumption







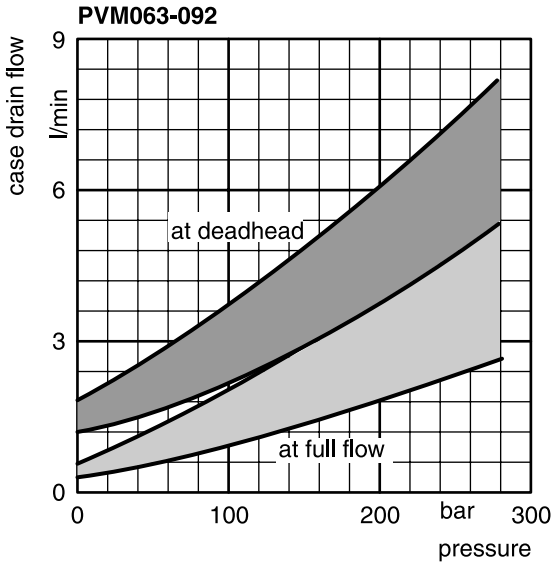
Efficiency and case drain flows
PVM063, PVM080, PVM092

The efficiency and power graphs are measured at an input speed of n = 1500 min^{-1}, a temperature of 40°C and a fluid viscosity of 46 mm^2/s.

Case drain flow and compensator control flow leave via the drain port of the pump. 1 to 1.2 l/min are to be added to the values shown for the pilot operated compensators (codes RC, RE, FC) because the control flow of the pressure pilot valve also goes through the pump.

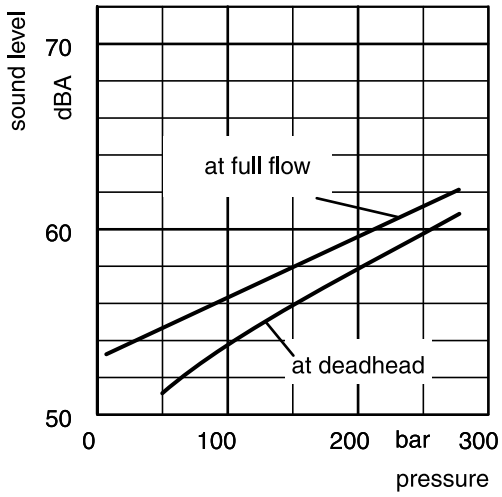
Please note: The values shown below are only valid for static operation. Under dynamic conditions and at rapid compensation of the pump the volume displaced by the servo piston also leaves the case drain port. This dynamic control flow can reach up to 70 l/min! Therefore the case drain line is to lead to the reservoir at full size and without restrictions as short and direct as possible.

Case drain flows

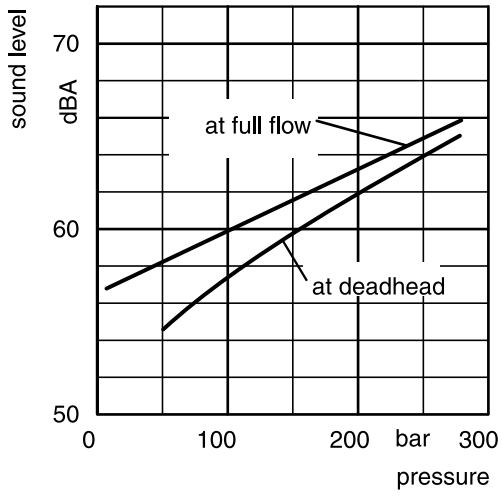


1

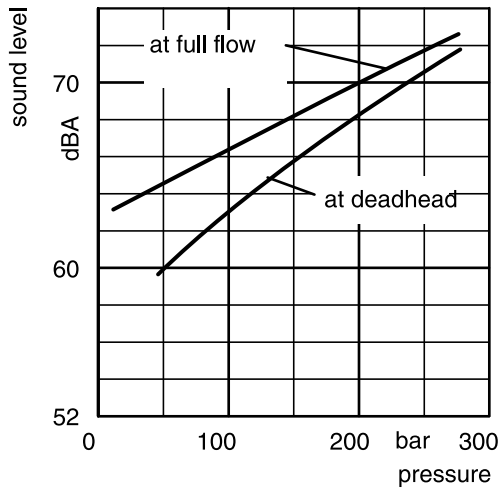
PVM016 - PVM028



PVM032 - PVM046



PVM063 - PVM092



Typical sound level for single pumps, measured in un-echoic chamber according to DIN 45 635, part1 and 26. microphone distance 1 m. Speed: n = 1500 min-1.

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

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 boda 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.

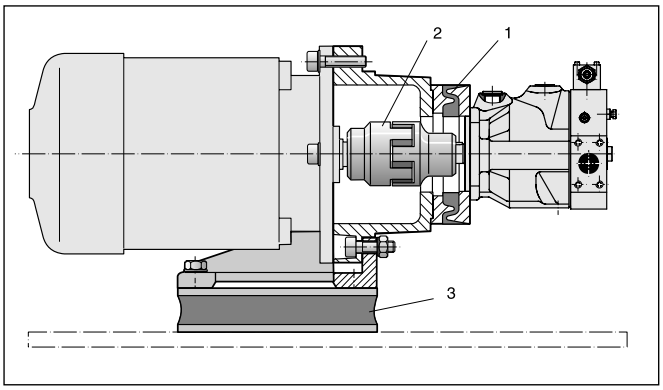
Exclusive use of gas tight tube fittings for inlet connections to avoid ingression of air causing cavitation and excessive noise.

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 PVM 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 PVM 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)

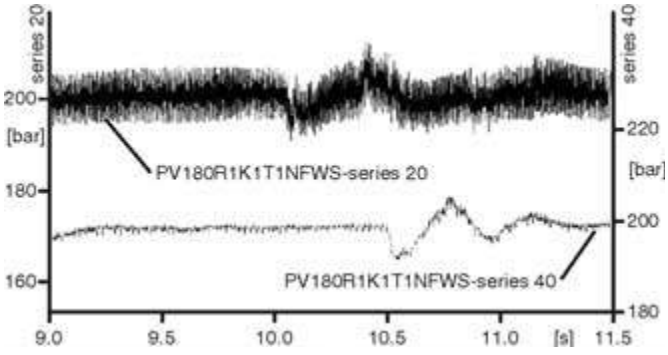


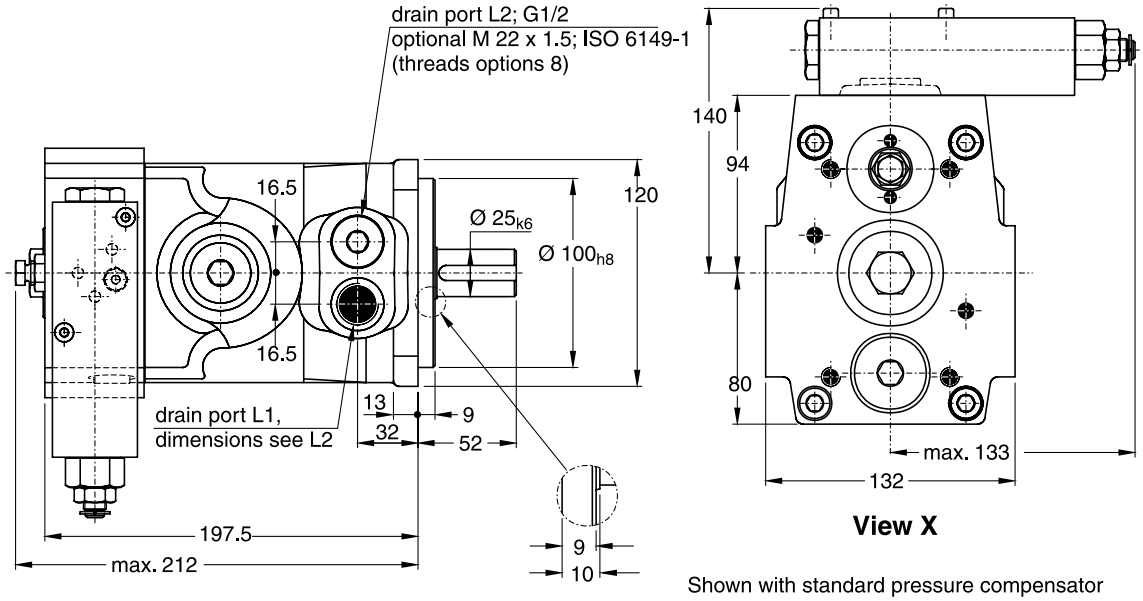
Figure 2: Comparison of the pressure pulsation in a system with 6 old PV pumps versus the same system with 6 PVplus pumps. The pulsation reduction effect of the precompression volume is evident.

Other measures

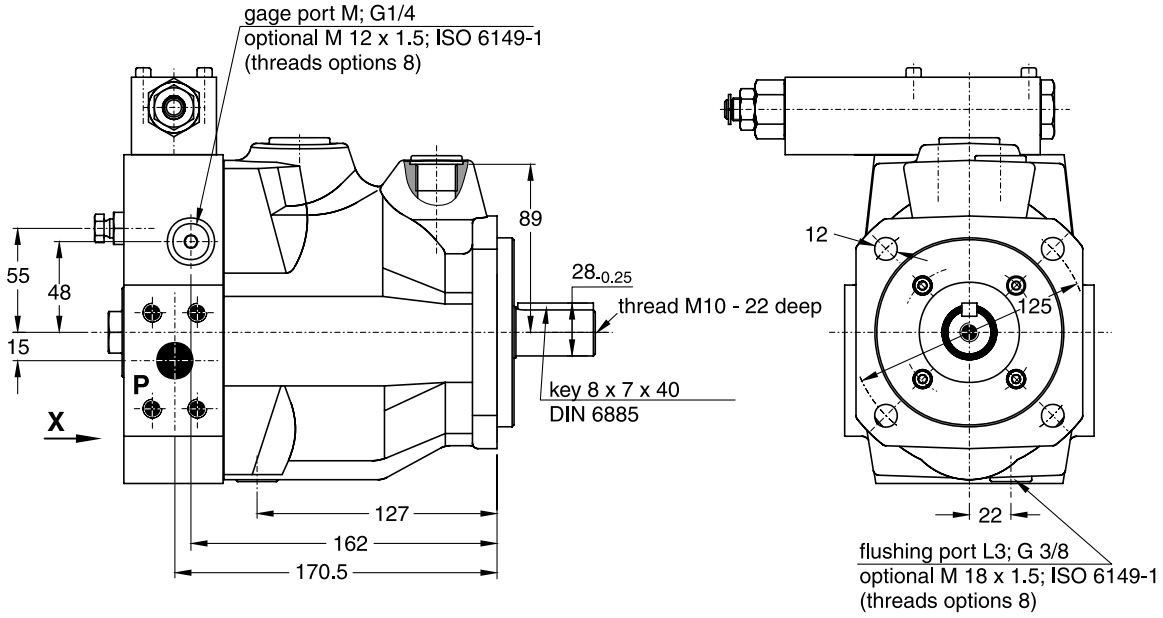
Small diameter tubes do not only cause high flow speeds, turbulences inside the tubes and cavitation in the pump, they also produce noise.
Only correctly sized connections of the largest possible diameter according to the port size of the pump should be used.

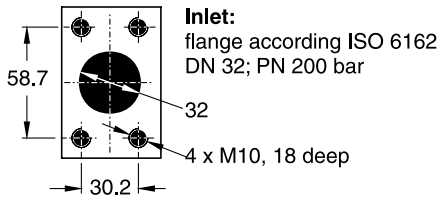
1

PVM016 - 028, metric version



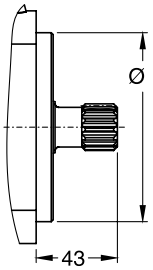
Shown with standard pressure compensator



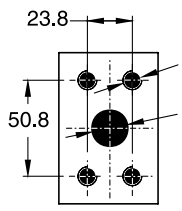


Inlet:
flange according ISO 6162
DN 32; PN 200 bar

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

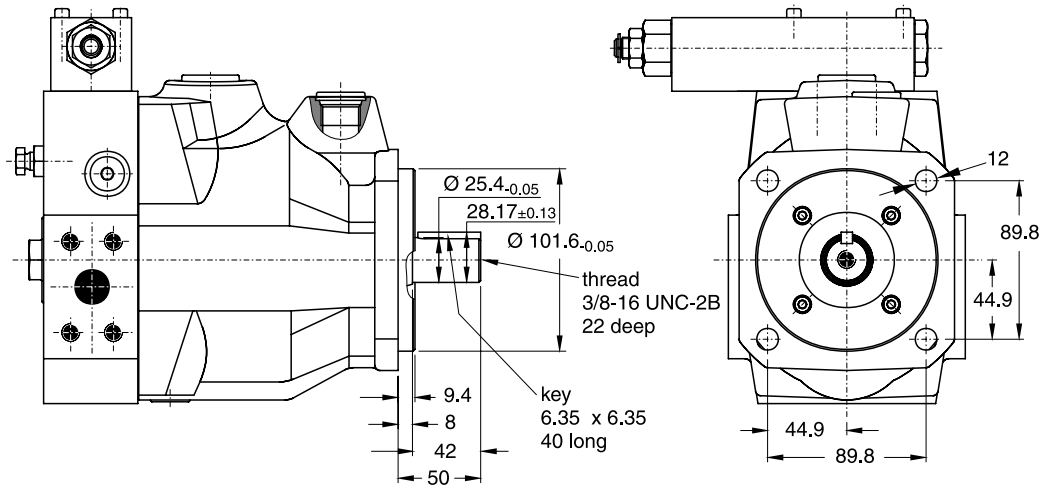


mounting option L
splined shaft W 25 x 1.5 x 15 x 8f DIN 5480

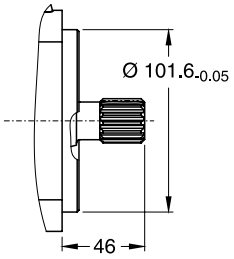


Outlet:
flange according ISO 6162
DN 19; PN 400 bar

PVM016 - 028, SAE version and thru drive

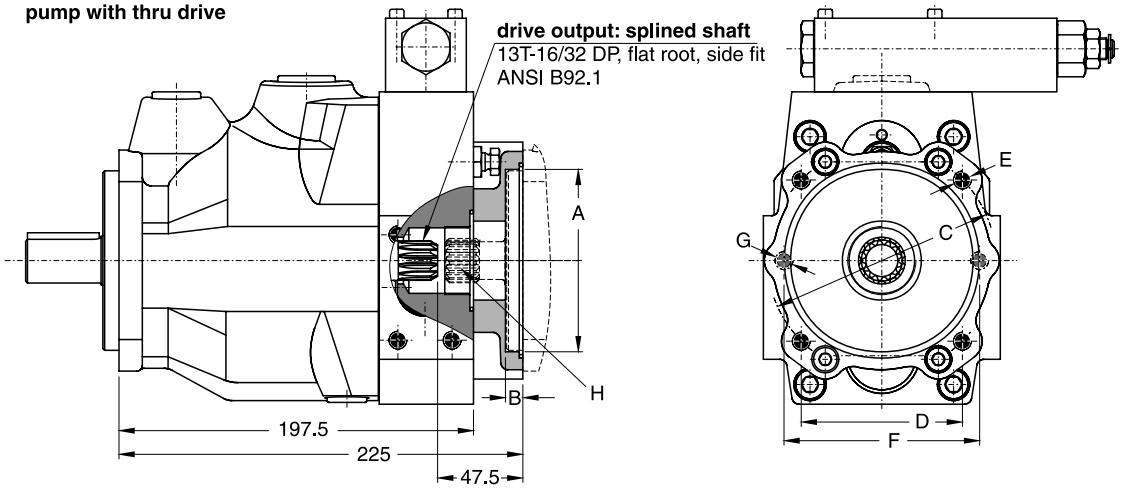


Shown above is **mounting option D**



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

pump with thru drive

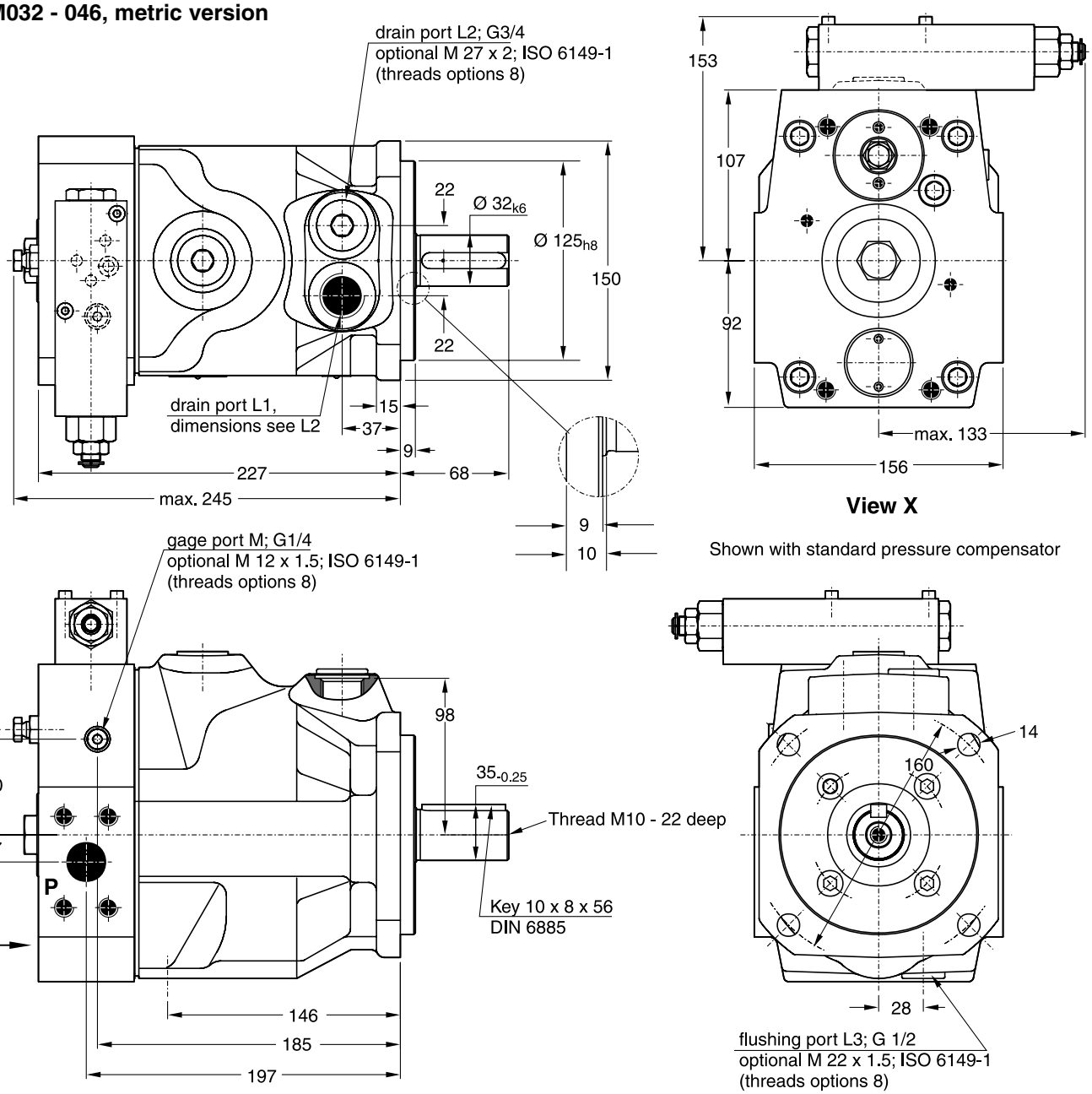


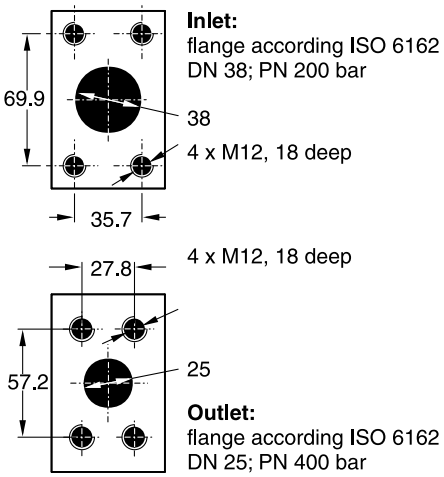
Thru shaft adapters are available in the following dimensions:						
A	**B**	**C**	**D**	**E**	**F**	**G**
63	10	85	-	M8	100	M8
80	10	103	-	M8	109	M10
100	12	125	-	M10	n. avail.	n. avail.
50.8	10	-	-	-	82	M8
82.55	10	-	-	-	106	M10
101.6	12	-	89.8	M10	n. avail.	n. avail.

Dimension H and available coupling sleeves, see page 1-54.

1

PVM032 - 046, metric version

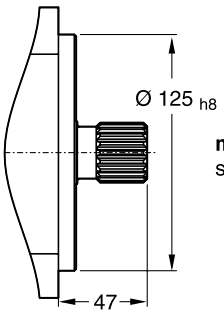




Inlet:
flange according ISO 6162
DN 38; PN 200 bar

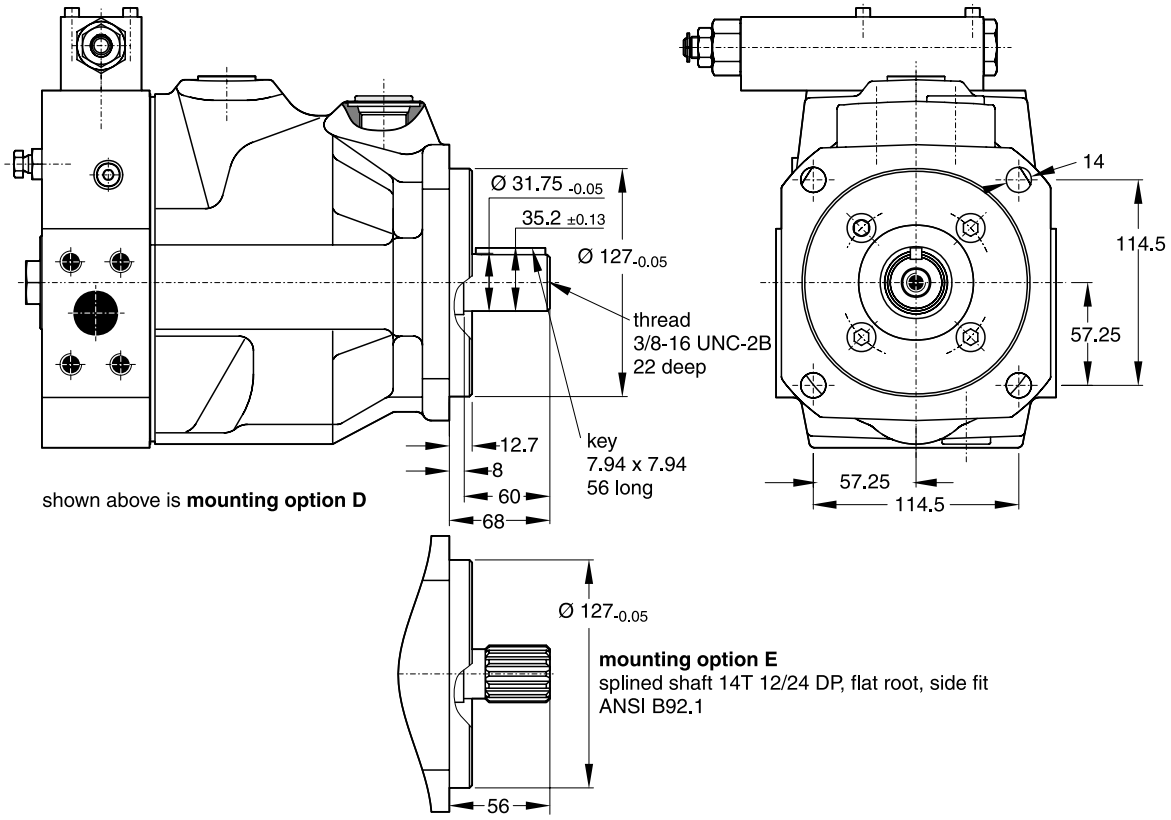
Outlet:
flange according ISO 6162
DN 25; PN 400 bar

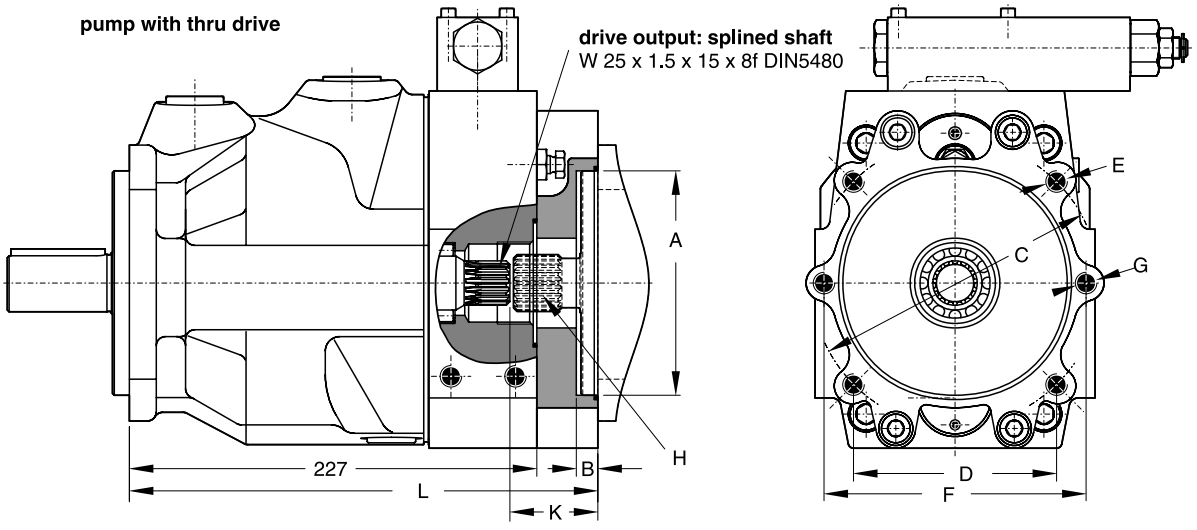
The pump shown above has **mounting option K** and **thru drive option T** (prepared for thru drive).



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

PVM032 - 046, SAE version and thru drive



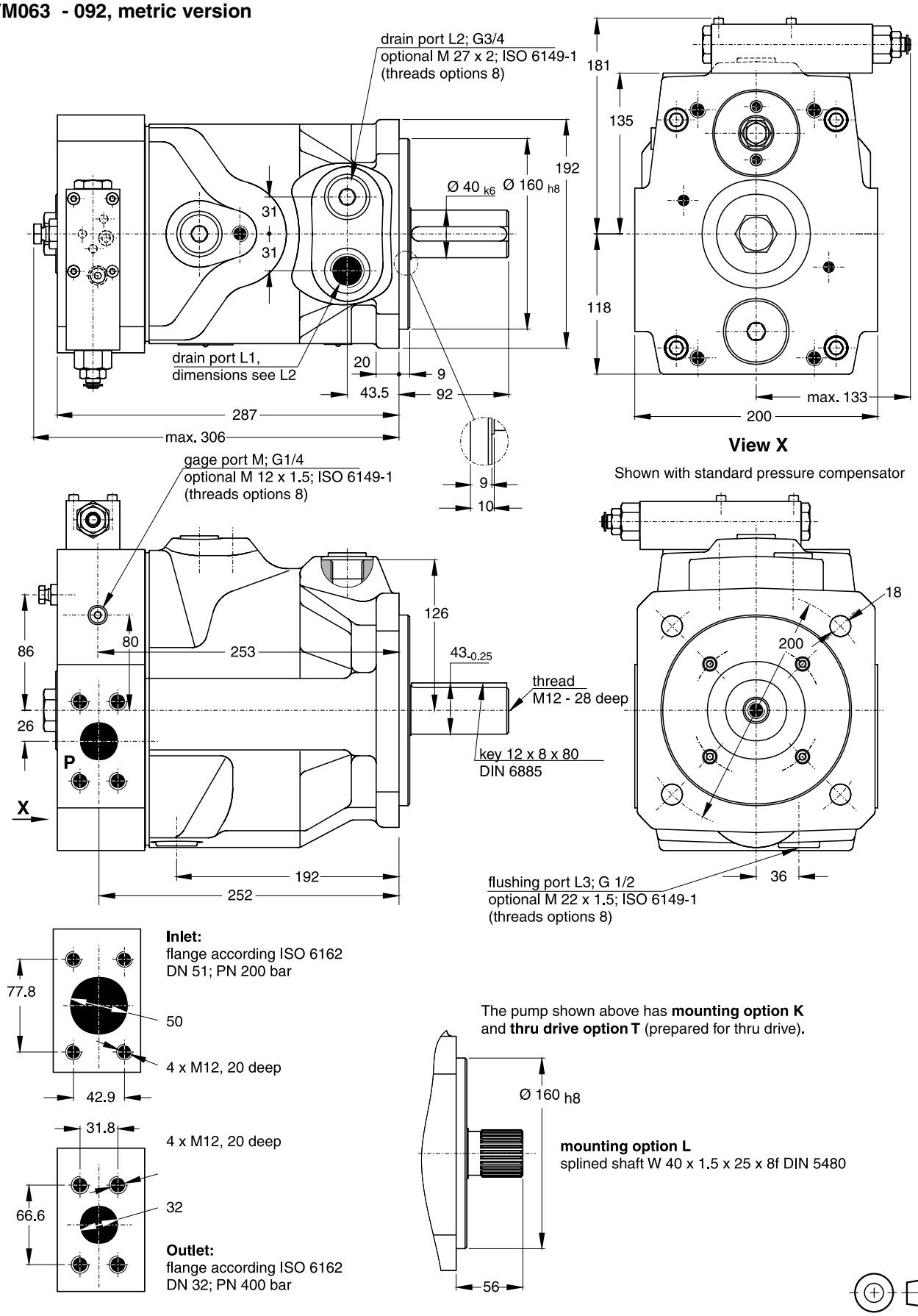


Thru shaft adapters are available in the following dimensions:								
A	**B**	**C**	**D**	**E**	**F**	**G**	**K**	**L**
63	8.5	85	-	M8	100	M8	49	261
80	8.5	103	-	M8	109	M10	49	261
100	10.5	125	-	M10	140	M12	49	261
125	12	160	-	M12	n. avail.	n. avail.	49	261
82.55	8	-	-	-	106	M10	49	261
101.6	11	-	89.8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

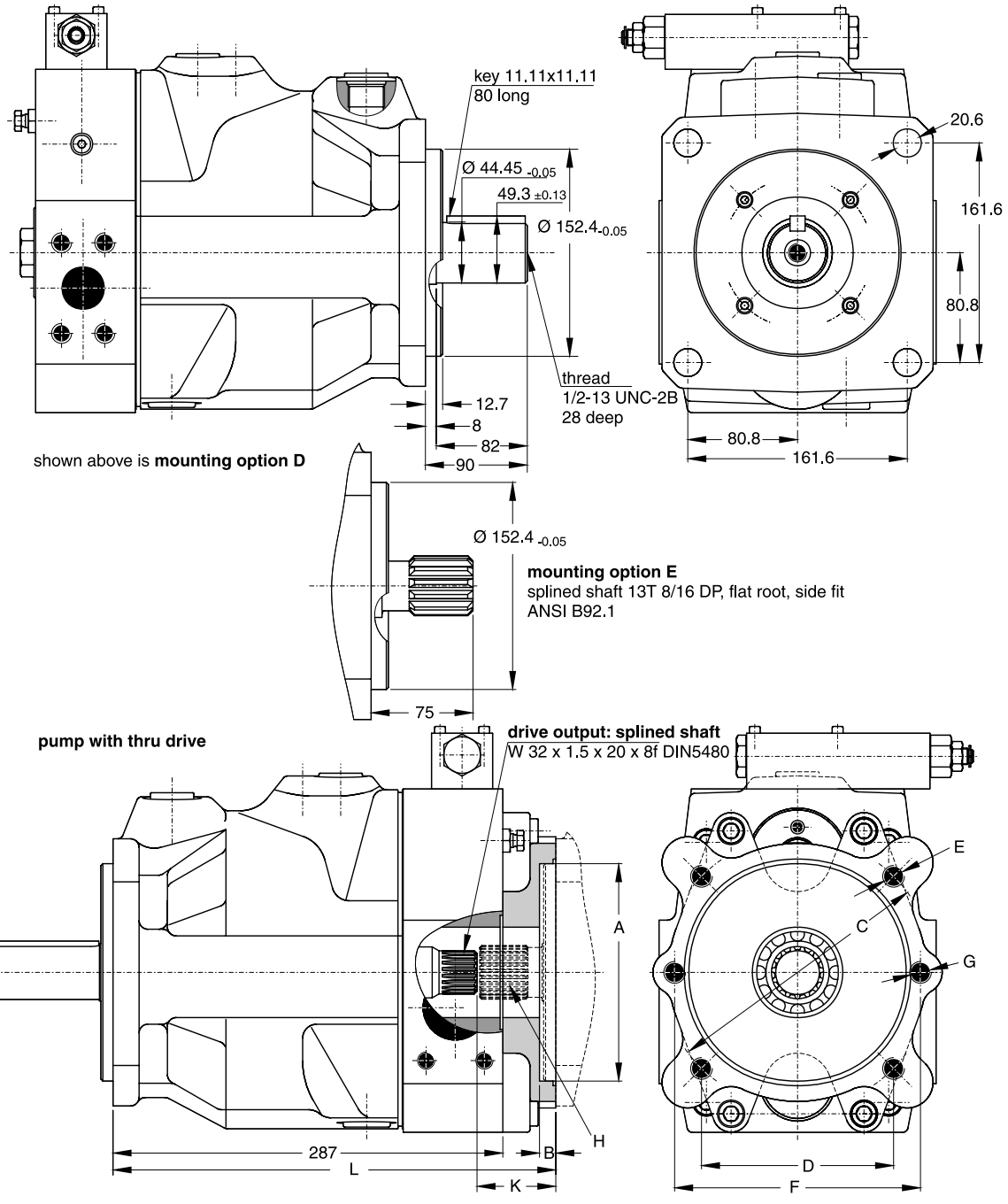
Dimension H and available coupling sleeves, see pages 1- 54.

1

PVM063 - 092, metric version



PVM063 - 092, SAE version and thru drive



Thru shaft adapters are available in 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	n. avail.	n. avail.	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	M20	n. avail.	n. avail.	78	360

Dimension H and available coupling sleeves, see pages 1-54.

1

Mounting kits for multiple pumps, for second pump option

M	K	–	P	V	M	B	G					
Mounting kit			Axial piston pump series PV			Pump size			Second pump	Thread	Seals	Pump design series (see name plate)

Code	Pump size
1	PVM016 - PVM028
2	PVM032 - PVM046
3	PVM063 - PVM092

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 151.4 mm
	Second pump, metric
G	Diameter 63 mm
H	Diameter 80 mm
J	Diameter 100 mm
K	Diameter 125 mm
L	Diameter 160 mm

Code	Seals
N	NBR
V	FPM

Code	Thread
M	metric
S	SAE

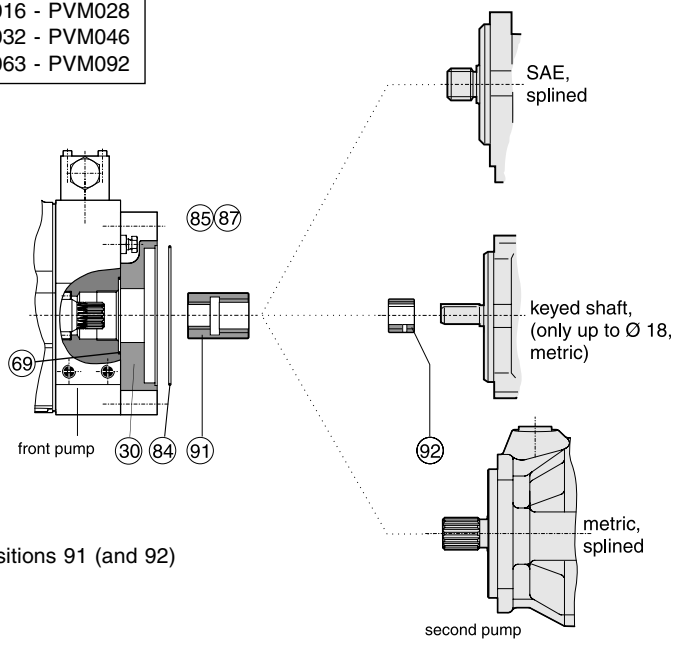
Kit contains positions 30, 69, 84 85 and 87, see drawing below

Mounting kits for multiple pumps, couplings

M	K	–	P	V	M	B	G		K			
Mounting kit			Axial piston pump series PV			Pump size			Coupling			Pump design series (see name plate)

Code	Pump size
1	PVM016 - PVM028
2	PVM032 - PVM046
3	PVM063 - PVM092

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
	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
	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.

Seal kit

S	K	–	P	V	M	B	G					

Seal kit — **Axial piston pump series PV** — **Pump size** — **Seals** — **Thread, port** — **Pump design series (see name plate)**

Code	Pump size
1	Pump size 1: PVM016 - PVM028
2	Pump size 2: PVM032 - PVM046
3	Pump size 3: PVM063 - PVM092

Code	Seals
N	NBR
V	FPM

Code	Thread	Port
1	Metric	BSPP
8	Metric	ISO 6149

Repair and spare parts kits

R	K	–	P	V	M	B	G					

Repair/ Spare parts kit — **Axial piston pump series PV** — **Pump size** — **Contents** — ***partly optional:* Thread *or* Rotation *or* Seals** — **Pump design series (see name plate)**

Code	Pump size
1	Pump size 1: PVM016 - PVM028
2	Pump size 2: PVM032 - PVM046
3	Pump size 3: PVM063 - PVM092

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	
RFE	Bias spring kit	
SKS	Servo piston kit	

Code	Thread
M	Metric
S	SAE / UNC
	Rotation
R	Clockwise
L	Counter-clockwise
	Seals
N	NBR
V	FPM

Repair and spare parts kits for adjustable displacement limiter

R	K	–	P	V	M							

Repair/ Spare parts kit — **Axial piston pump series PV** — **Pump series** — **Contents** — **Seals** — **Pump design series (see name plate)**

Code	Pump series
016	PVM016
020	PVM020
023	PVM023
028	PVM028
032	PVM032
040	PVM040
046	PVM046
063	PVM063
080	PVM080
092	PVM092

Code	Contents
HE	Displacement limiter, adjustable

Code	Seals
N	NBR
V	FPM

For parts included, see spare parts list PVMI-BGx-UK-yy; available upon request.
x stands for frame size 1 - 3,
yy stands for design series.

1

Seal-kit Compensator

S	K	–	P	V	M	C	

Seal kit

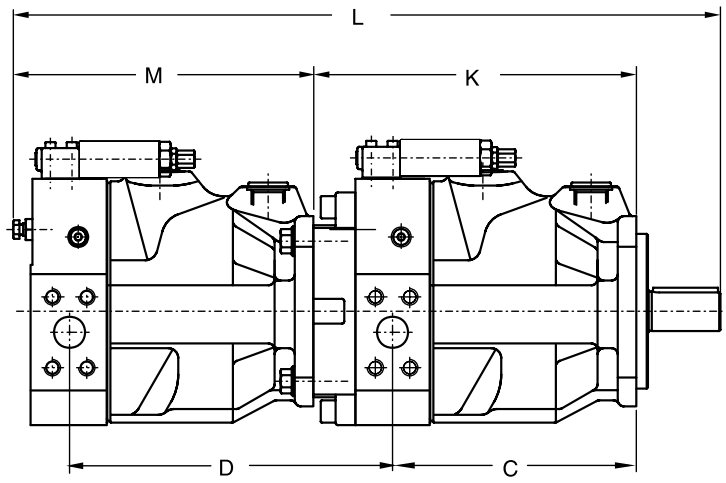
Compensator for Axial piston pump Series PVM

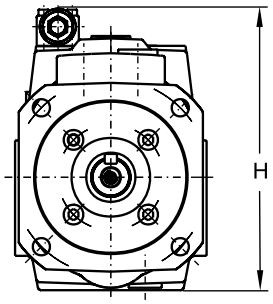
Seals

Code	Seals
N	NBR
V	FPM

The seal kit contains all the seals required for single compensators, LVDT and feed valves. For 2-valve compensators, please order 2 seal kits. Details on spare compensator lists and ordering codes are given in documentation PVMI-PVC-UK.

Combinations PVM/PVM

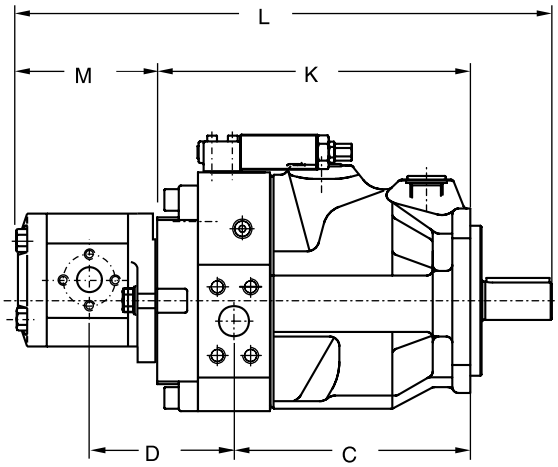


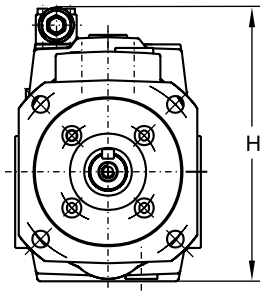


Main pump	Second pump	Interface main pump	L	C	D	H	K	M
PVM016, 020, 023 or 028	PVM016, 020, 023 or 028	100 B4 HW	489	170.5	225	206	225	212
PVM032, 040 or 046	PVM016, 020, 023 or 028	125 B4 HW	541	197	235.5	231	261	212
	PVM032, 040 or 046		574	197	261	231	261	245
PVM063, 080 or 092	PVM016, 020, 023 or 028	160 B4 HW	630	252	244.5	285	326	212
	PVM032, 040 or 046		663	252	271	285	326	245
	PVM063, 080 or 092		724	252	326	285	326	306

1

Combinations PVM/PGP





Main pump	Second pump	Interface main pump	L*	C	D*	H	K	M
PVM016, 020, 023 or 028	PGP505	100 B4 HW	420	170.5	124	206	225	99 - 146
PVM032, 040 or 046	PGP505	125 B4 HW	472	197	133.5	231	261	99 - 143
	PGP511		506	197	152	231	261	132 - 177
PVM063, 080 or 092	PGP505	160 B4 HW	561	252	143.5	285	326	99 - 143
	PGP511		595	252	162	285	326	132 - 177

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

1

Max. transferable torque in Nm for the different shafts options:

Shaft code	PVM016-028	PVM032-046	PVM063-092
D	300	550	1320
E	300	610	1218
K	300	570	1150
L	405	675	1400
Max. torque transmitt. cap. at shaft end	170	275	560

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 can 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.

Pump	Shaft	Torque limit factor
PVM016-028	D E K L	17700 17700 17700 20130
PVM032-046	D E K L	32680 36380 33810 40250
PVM063-092	D E K L	77280 72450 67620 83720

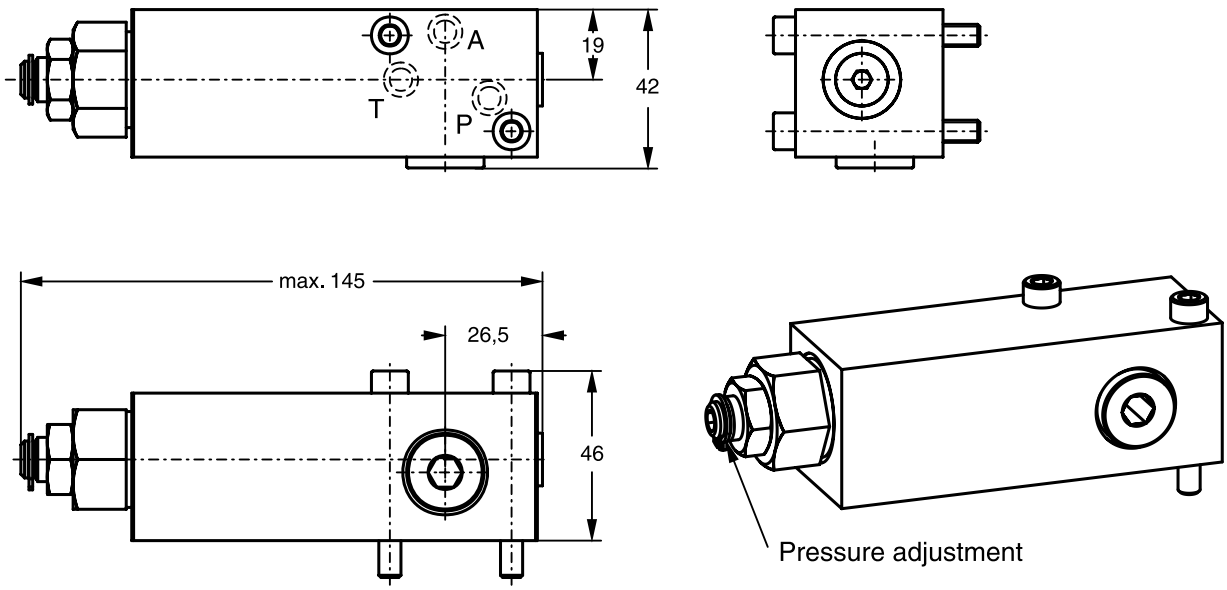
The **total torque factor** is represented by the sum of the individual torque factors of all pumps in the complete pump combination.

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

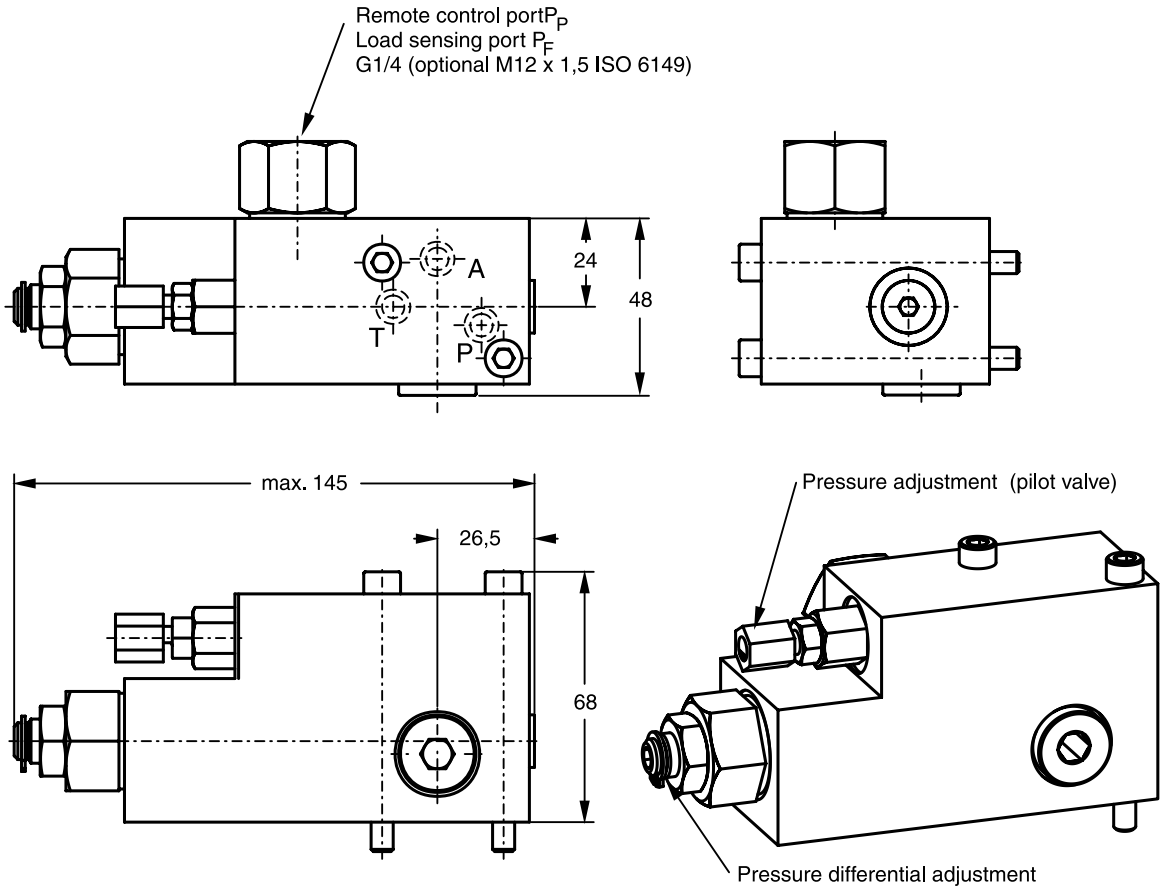
The **torque factor of each individual pump** is calculated by multiplying the max. operating pressure p of the pump (in bar) with the max. displacement Vg (in cm³/rev).

Torque factor of any pump
= p x Vg (pressure in bar x displacement in cm³/rev)

Dimensions standard pressure compensator, code ...MS



Dimensions remote pressure and load sensing compensators, codes ...RC and ...FC



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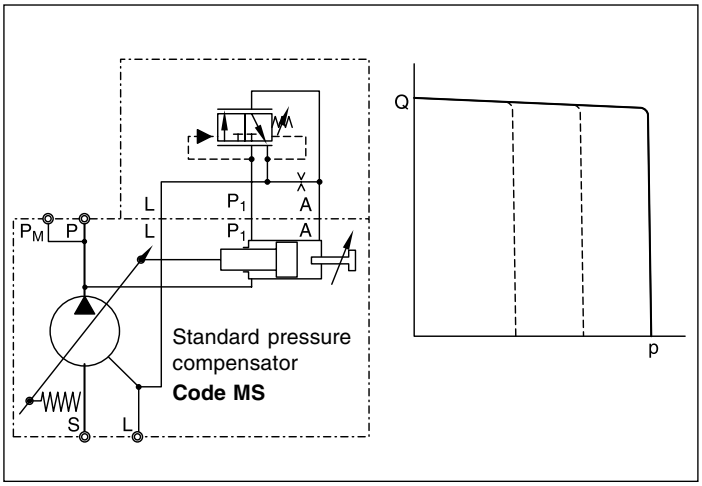
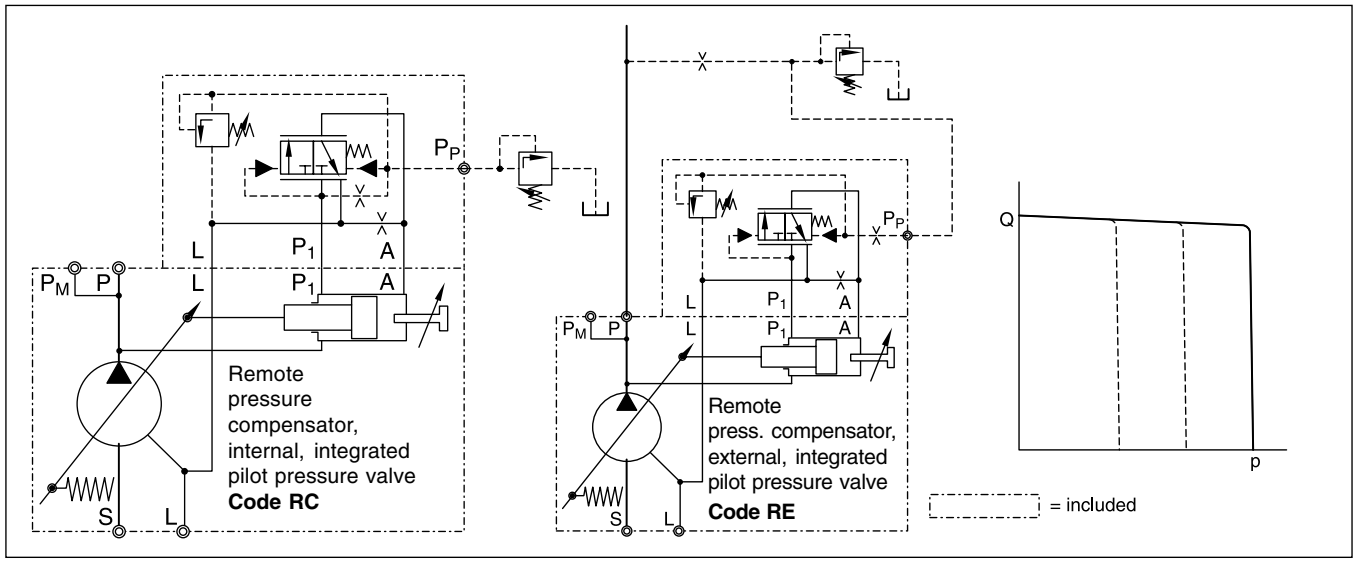
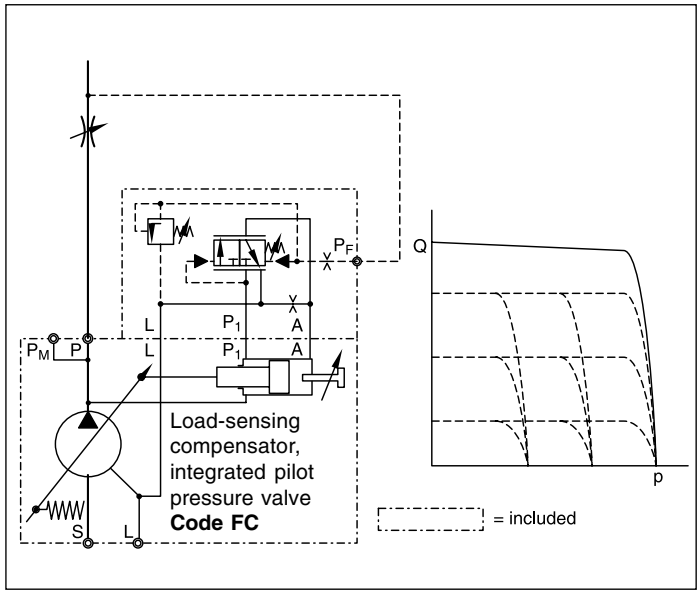


Standard pressure compensator Code MS

In the standard pressure compensator, the pressure on the pump outlet port is compared with the reference pressure set in the compensator valve spool. As long as this reference pressure is not reached, the control valve connects the large adjustment piston surface with the pump, and the compensator valve spool maintains the pump at full displacement.

If the reference pressure is reached and the pilot valve is moved against the compensator valve spool , port P1 is connected to A, the large adjustment piston surface is impinged with pressure, and the pump is limited. The displacement of the pump is controlled in order to match the flow requirement of the system. If the requirement is returned to zero, the pump then only delivers the quantity necessary to cover its own lubrication and pilot volume requirement.





Remote pressure compensator codes RC and RE

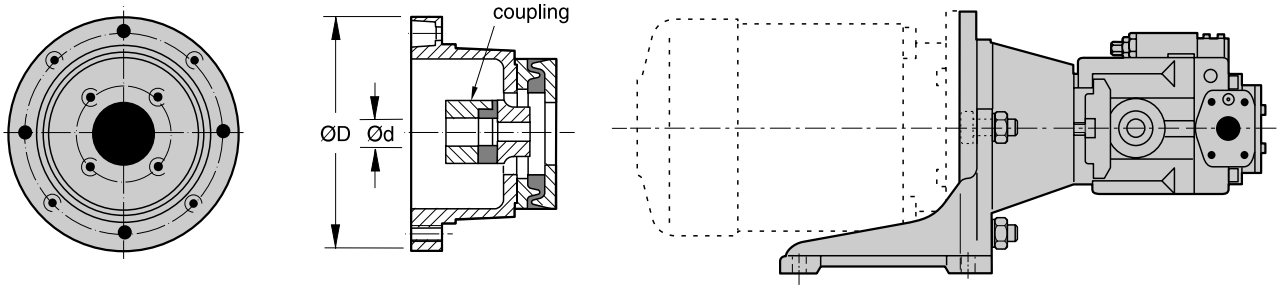
The system pressure is compared with a pilot pressure on the on the control valve for the remote pressure compensators. This pilot pressure can be influenced both by a pilot pressure valve integrated in the compensator and externally cased. The pilot pressure supply is governed internally by the compensator for code RC, for code RE externally via the pilot port P_P. The pilot pressure flow is approx. 1 – 1.2 l/min. The pilot valve can also be installed some distance away from the pump so that a pressure setting can be achieved from the control panel of the machine.

Load-sensing compensator code FC

The pilot oil for the compensator is tapped behind a main stream resistor for load-sensing compensators. Therefore, the compensator keeps the pressure drop at the main stream resistor constant, beneath the reference pressure (set on the integrated pilot valve). Thus there is a flow control for the pump output flow. When the reference pressure is reached, the pilot valve opens and the pump is limited.

The mutual influence of flow and pressure compensation leads to the represented, strongly rounded characteristic curves.

Bell housing, coupling and foot flange



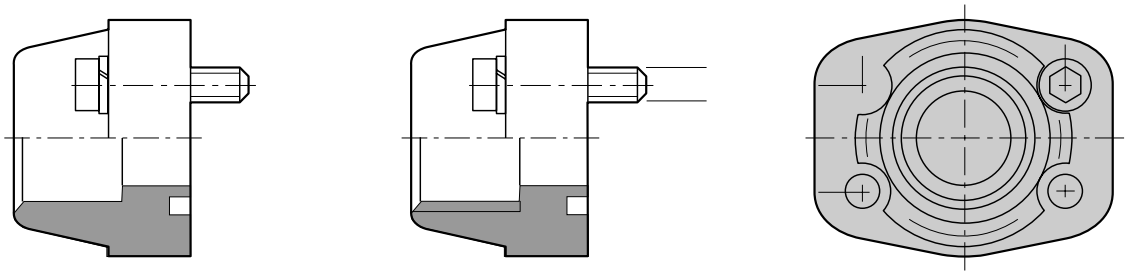
Can be purchased at:

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

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

Welding flange

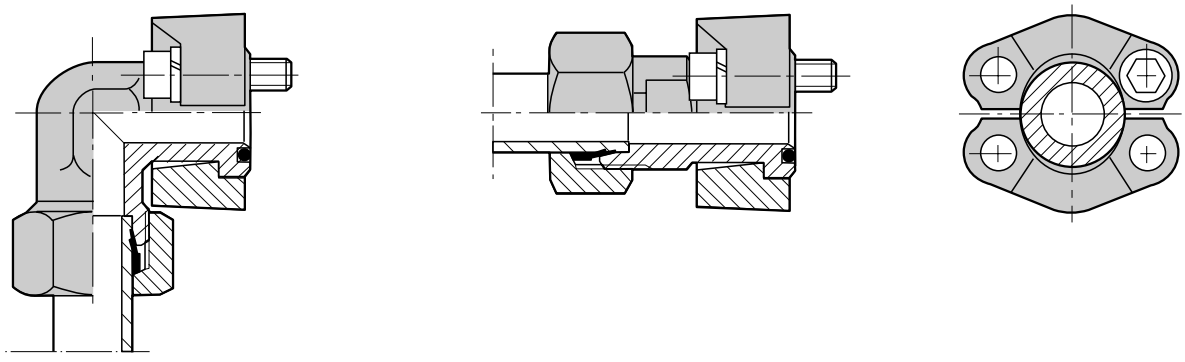
Threaded flange



Can be purchased at:

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

1

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. 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, such as 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 (µm):

General hydraulic systems for satisfactory operation:

Class 19/15, to ISO 4406

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

Hydraulic systems with maximised component life and functionability:

Class 16/13, to ISO 4406

x = 10 µm ($ß_{10} \geq 75$) 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.

Installation and mounting

Horizontal mounting: Outlet port side or top, inlet port side or bottom. Drain port always uppermost or rotated 90 degrees on the axis.

Vertical mounting: Shaft pointing upwards

Inlet (suction side): 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° 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 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 airheated oil will not be recirculated.

For the same reason, when the pump is mounted inside the reservoir, the drain line should be arranged in such a way that a siphon is created. This ensures that the pump is always filled with fluid. The drain pressure must not exceed 1 bar. Drain line length should not exceed 2 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. Bell housings 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. An axial load on the pump shaft is not permitted.

Start up

Prior to start up, as well as after long stand-still periods when it is possible that the pump body could have been emptied, 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. A quick on and off switching (inching mode) makes priming easier and enables quick filling of the displacement space in the pump.

Attention: Check motor rotation direction. See also the statements on hydraulic fluids in Chapter 12.

Notes

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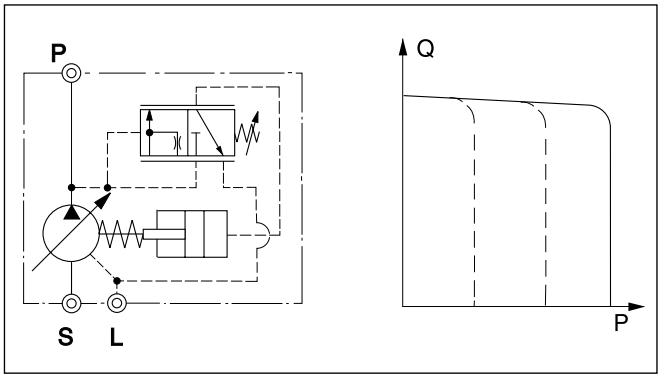
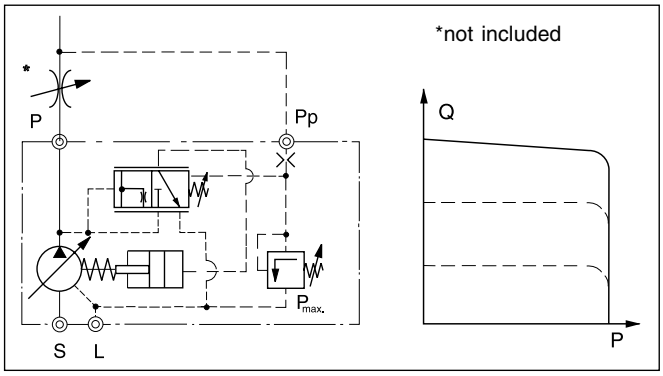
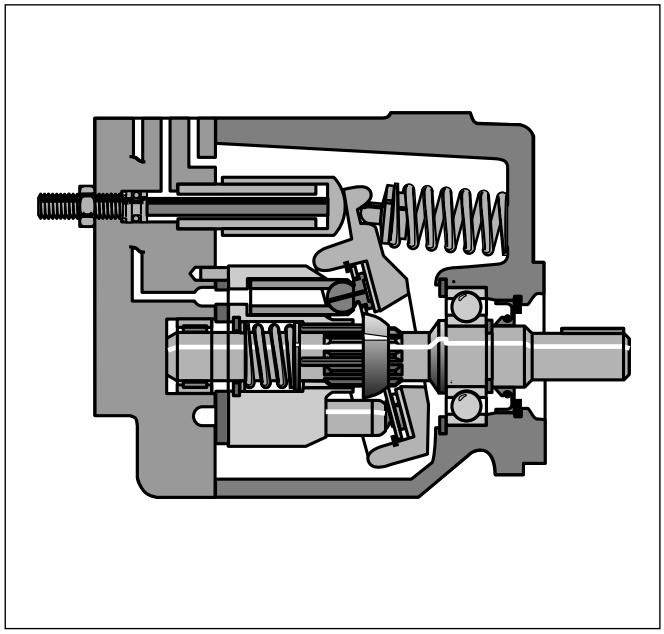


Pump with standard compensator, code: "omit"



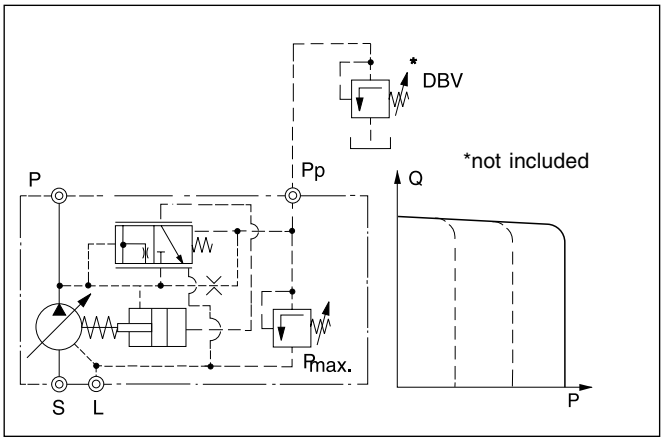
Pump with load sensing, code: "A"

With thru shaft option
for multiple pump options
Swash plate type for open circuit

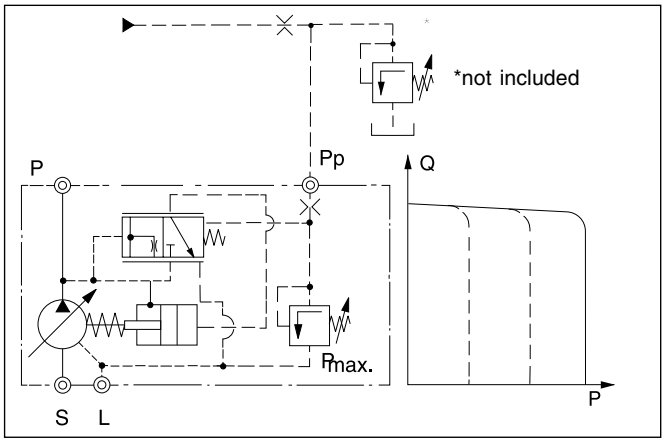


Representation of PVP16

- Mounting style metric or SAE.
- High strength cast iron body for high security and low noise.
- Port connections side, with SAE flange connection.
- Wide range of controls.
- Thru shaft.
- Selection of metric and SAE keyed shafts and SAE splined shafts.
- Compatible to HWBF (high water based fluids) up to 70 bar.



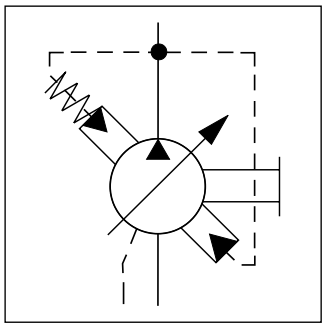
Pump with remote pressure compensator option: "M"
(internal pilot supply)

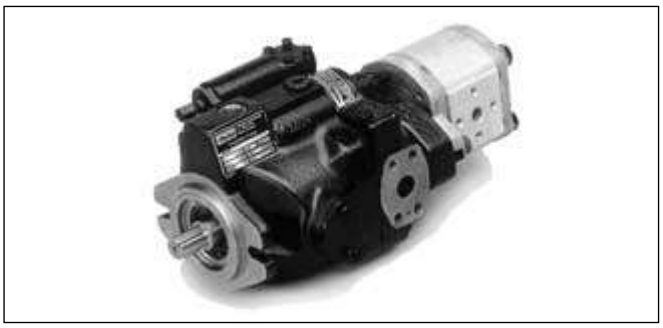


Pump with remote pressure compensator option: "ME"
(external pilot supply)

Technical data

Max. Displacement	16 to 140 cm³/rev
Pressure range Outlet	Nominal pressure p_N : 250 bar Maximum pressure p_{max} : 350 bar with HWBF type fluids on request
Inlet	maximum 0.7 bar minimum 0.8 bar absolute values for 1500 rpm
Drain port	maximum 0.7 bar
Minimum speed	500 rpm
Temperature range	-40°C to +70°C





PVP with gear pump mounted

Selection table

Model	Max. displacement in cm³/rev	Delivery l/min at 1500 rpm and 20 bar	Input power at 1500 rpm and P_N in kW	Speed max. rpm	Weight in kg
PVP 16	16	24.6	11.3	3000	13.2
PVP 23	23	34.5	15.3	3000	20.4
PVP 33	33	49.5	21.3	3000	20.4
PVP 41	41	61.5	27.7	2800	25
PVP 48	48	72.0	33.6	2400	25
PVP 60	60	90.0	41.7	2200	41
PVP 76	76	114.0	52.8	2200	41
PVP 100	100	150.0	69.5	1800	82
PVP 140	140	210.0	97.3	1800	82

1

P	V	P																

Axial piston pump variable displacement

Size and displacement

Pressure range

Shaft

Ports

Rotation

Displacement limiter

Thru shaft and mounting flange

Control options

Seals

Design series
not required for order

Code	Max. Displacement
16	**16 cm³/U**
23	23 cm³/U
33	33 cm³/U
41	41 cm³/U
48	48 cm³/U
60	60 cm³/U
76	76 cm³/U
100	100 cm³/U
140	140 cm³/U

Code	Pressure range
36	**15 - 250 bar**

Code	Material
omit	**NBR**
V	FPM

Code	Description			
	PVP16	**PVP23/33 PVP41/48**	**PVP60/76**	**PVP100/140**
omit	straight with key Ø19.05mm (3/4“) SAE A Ø82.55mm	straight with key Ø22,23mm (7/8“) SAE B, Ø101.6mm	straight with key Ø31.75 mm (11/4“) SAE C, Ø127 mm	straight with key Ø31.75 mm (11/4“) SAE C, Ø127 mm
B	splined shaft* 9 teeth, 9T16/32 SAE A, Ø82.55mm	splined shaft 13 teeth, 13T16/32 SAE B, Ø101.6mm	splined shaft 14 teeth, 14T12/24 SAE C, Ø127mm	splined shaft 14 teeth, 14T12/24 SAE C, Ø127mm
C	splined shaft 11teeth, 11T16/32 SAE A, Ø82.55mm	straight with key Ø25,4mm (1“) SAE B, Ø101.6mm	straight with key Ø38.1mm (11/2“) SAE C, Ø127mm	straight with key Ø38.1mm (11/2“) SAE C, Ø127mm
D	-	splined shaft 15 teeth, 15T16/32 SAE B, Ø101.6mm	splined shaft 17 teeth, 17T12/24 SAE C, Ø127mm	splined shaft 17 teeth, 17T12/24 SAE C, Ø127mm
E	-	-	-	straight with key Ø44.45mm (1 3/4") SAE C, Ø152.4mm
K	**straight with key Shaft Ø18mm Pilot-Ø80mm**	straight with key Shaft Ø25mm Pilot-Ø100mm	straight with key Shaft Ø32mm Pilot-Ø125mm	straight with key Shaft Ø40mm Pilot-Ø125mm

*Only for single or second pump

Code	Description
omit	**Standard pressure compensator**
M	**Remote pressure compensator (internal)**
ML	Option M with DIN 2H lock
ME	Hydr. remote control (external)
A	**Pressure flow control**
C*	Horse power control with load sensing
H*	Horse power control

* for PVP60/76 a. 100/140 on request

Code	Thru shaft variation mounting threads metric
omit	**Single pump, without thru shaft**
9A4	Thru shaft, Flange SAE A shaft 9T16/32
9A5	Thru shaft, Flange SAE A shaft 11T16/32 [1]
9B3	Thru shaft, Flange SAE B shaft 13T16/32 [1]
9B4	Thru shaft, Flange SAE B shaft 15T16/32 [1]
9C3	Thru shaft, Flange SAE C shaft 14T12/24 [2]
9T	thru shaft with cover
	mounting bolts metric

[1] not for PVP16
[2] only for PVP60/76 and PVP100/140

Code	Ports	
	Suction port	Pressure port
	PVP16	
9	**SAE Flange 3/4“**	
	PVP23/33	
9	SAE Flange 1 1/4“	
	PVP41/48	
9	SAE Flange 1 1/2“	SAE Flange 1“
	PVP60/76	
9	SAE Flange 2“	SAE Flange 1 1/4“*
	PVP100/140	
9	SAE Flange 2 1/2“	SAE Flange 1 1/2“*

Code	Rotation*
R	**Clockwise**
L	Counter clockwise

* when looking at shaft

Code	Description
omit	without displacement limiter
2	**adjustable displ. limiter**
5	acc. to customer request

Bold letters =
Short-term availability

210 bar/3000 psi Version, mount. threads metric
*420 bar/6000 psi Version, mount. threads metric

PVP_GB.PM6.5MM

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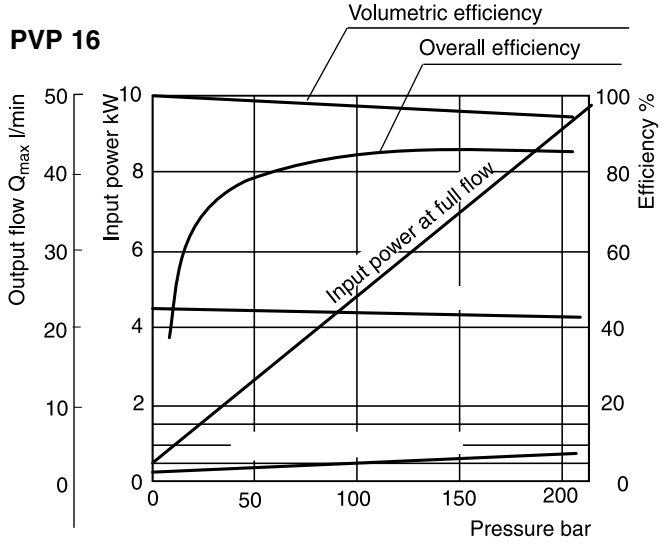
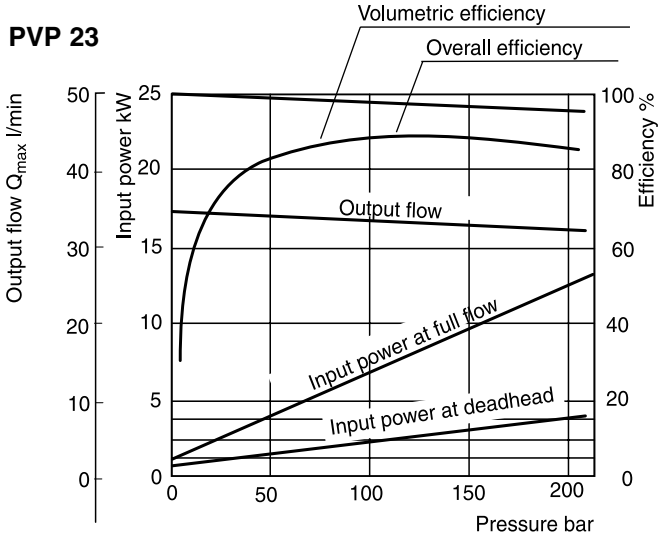
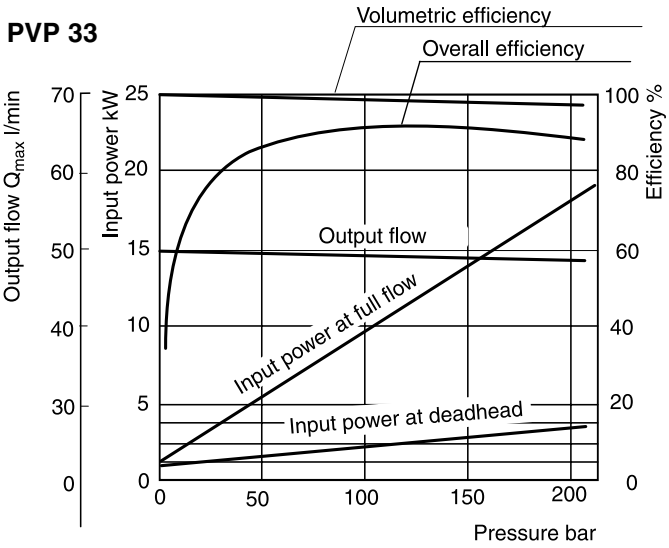
PVP 16



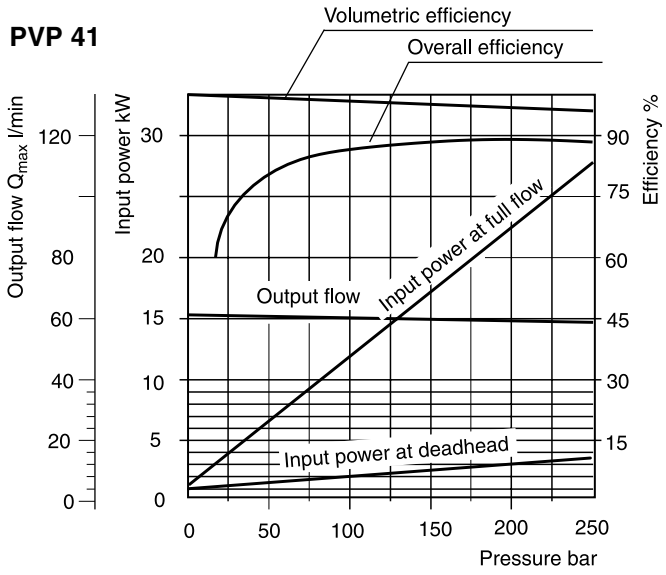
PVP 23



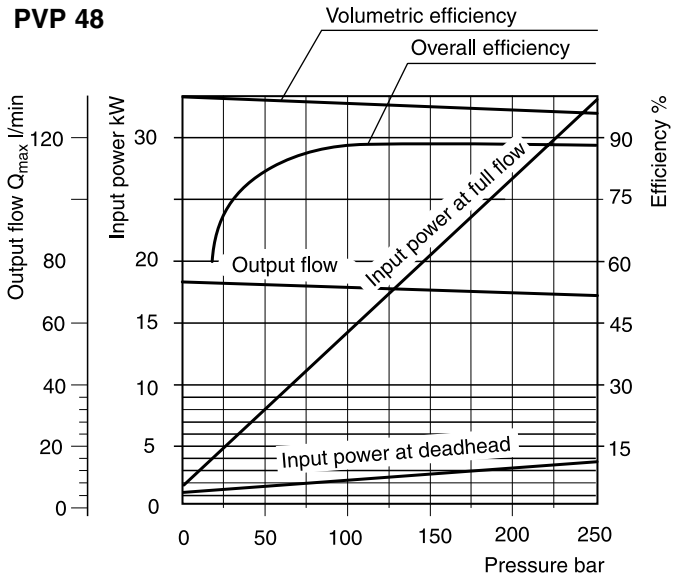
PVP 33



PVP 41



PVP 48

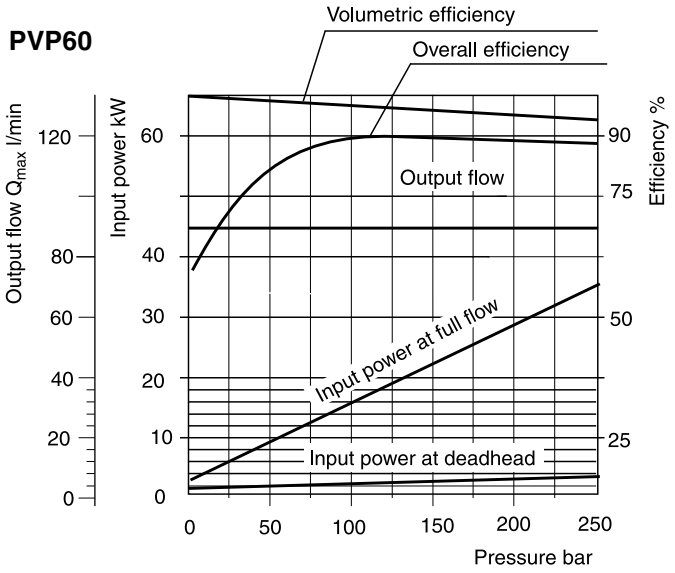


Flow rate at 1500 rpm
Input power consumption and efficiency

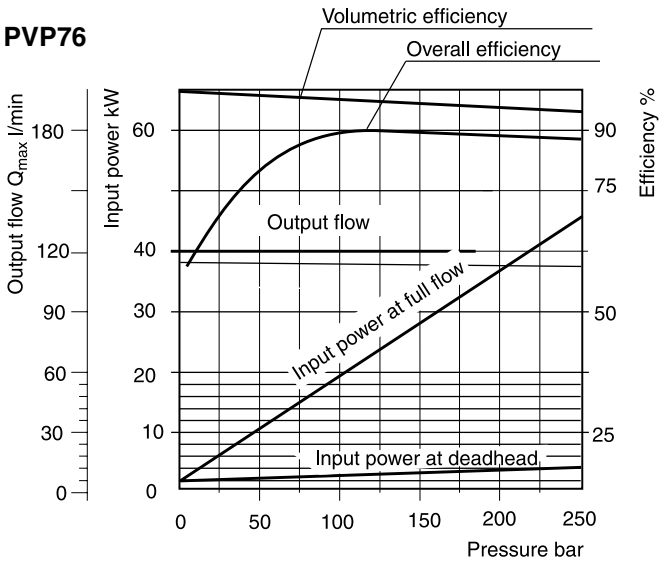
The values for the input power apply for fully compensated pumps.

Values for flow, efficiency, and power consumption measured at 35° C and viscosity 30 mm^2/s.

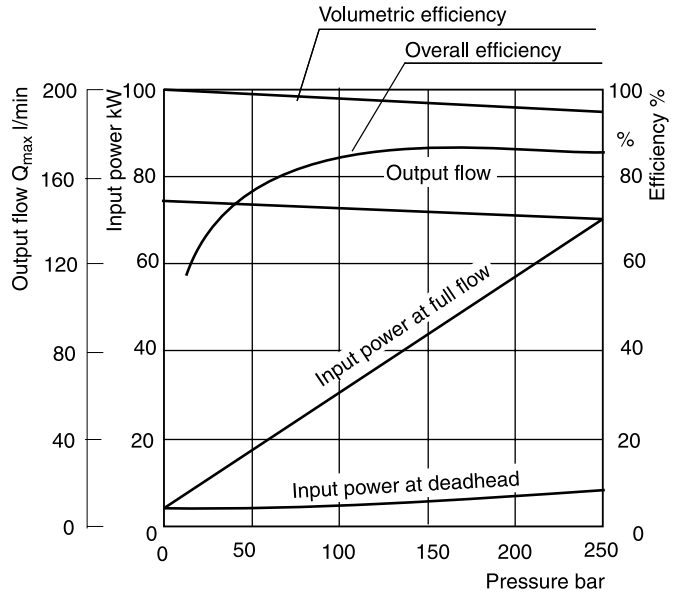
PVP60



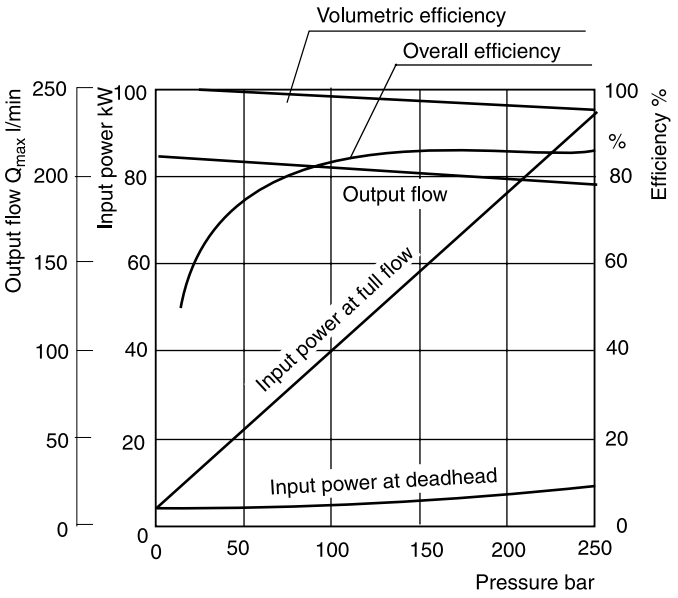
PVP76



PVP 100



PVP 140



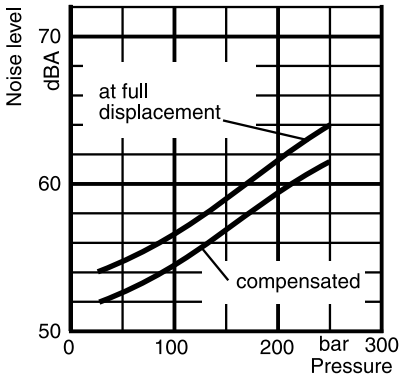
Flow rate at 1500 rpm
Input power consumption and efficiency

The values for the input power apply for fully compensated pumps.

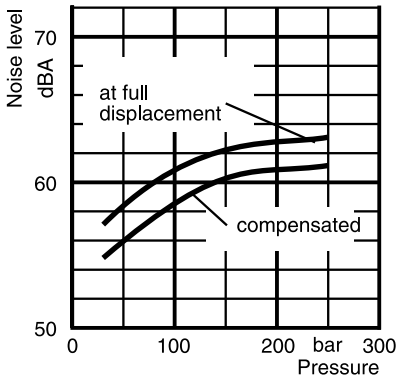
Values for flow, efficiency, and power consumption measured at 35° C and viscosity 30 mm^2/s.

1

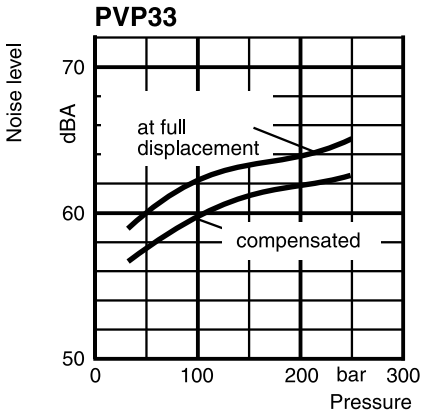
PVP16



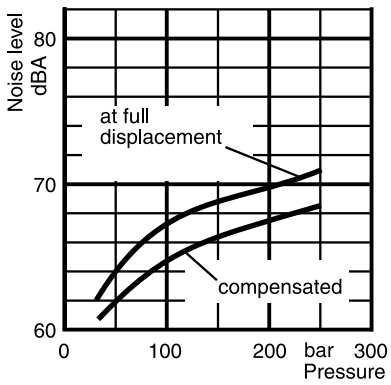
PVP23



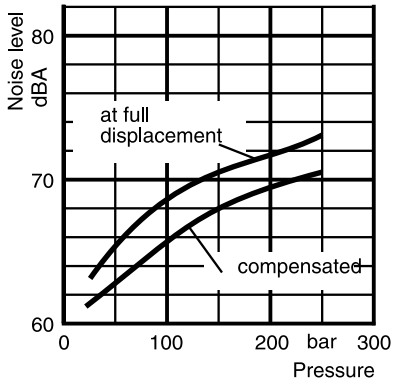
PVP33



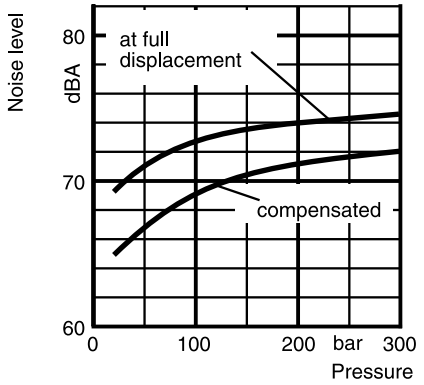
PVP41



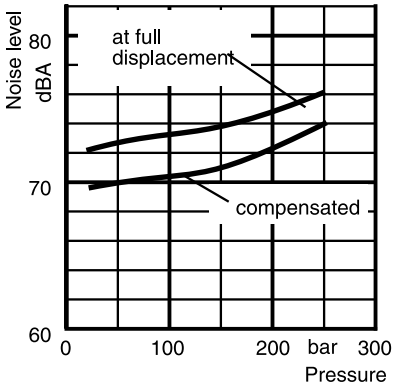
PVP48



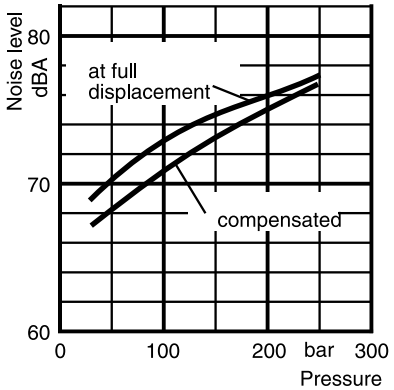
PVP60



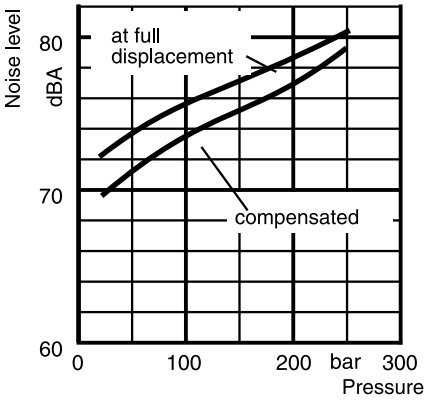
PVP76



PVP100



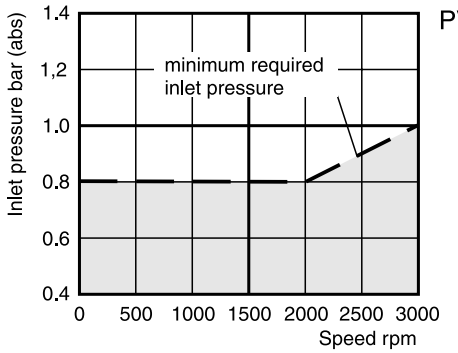
PVP140



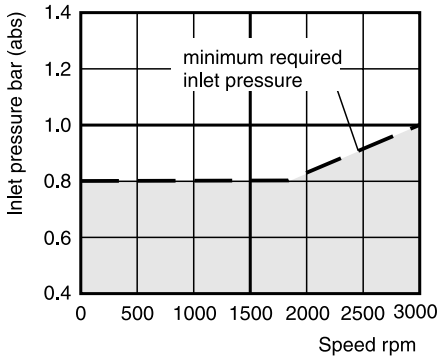
Typical sound level for single pumps, measured in unechoic chamber according to DIN 45 635, part 1 and 26. microphone distance 1 m. speed: n = 1500 min-1.

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

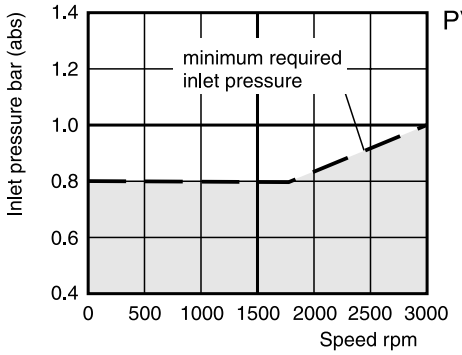
PVP16



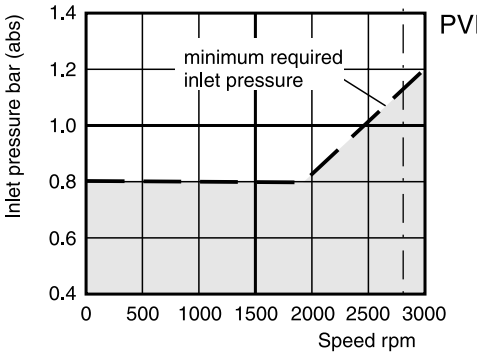
PVP23



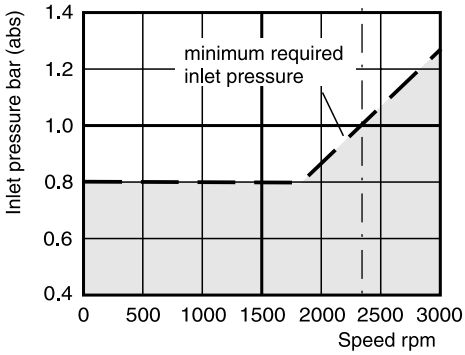
PVP33



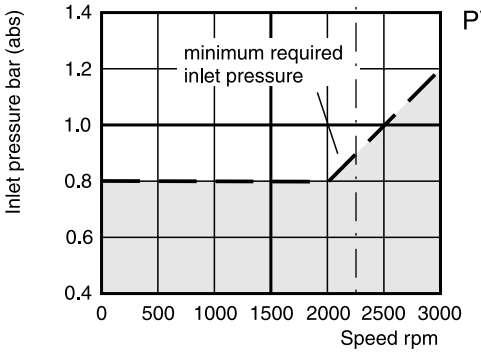
PVP41



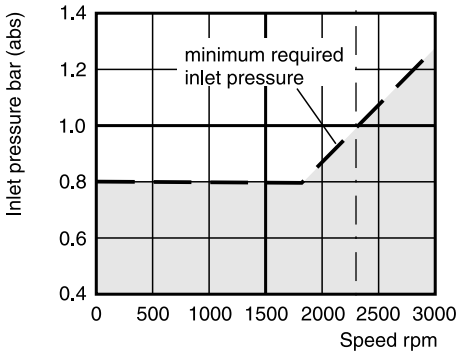
PVP48



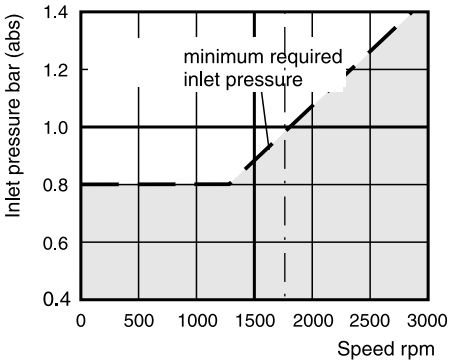
PVP60



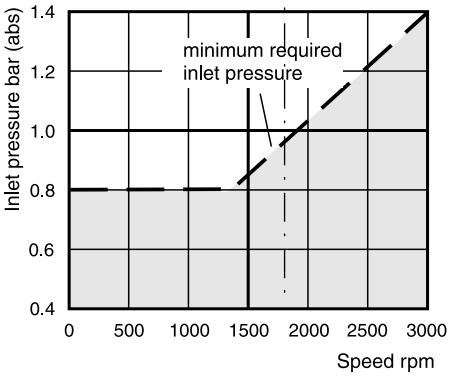
PVP76



PVP100



PVP140



Suction limits for pumps from the PVP series

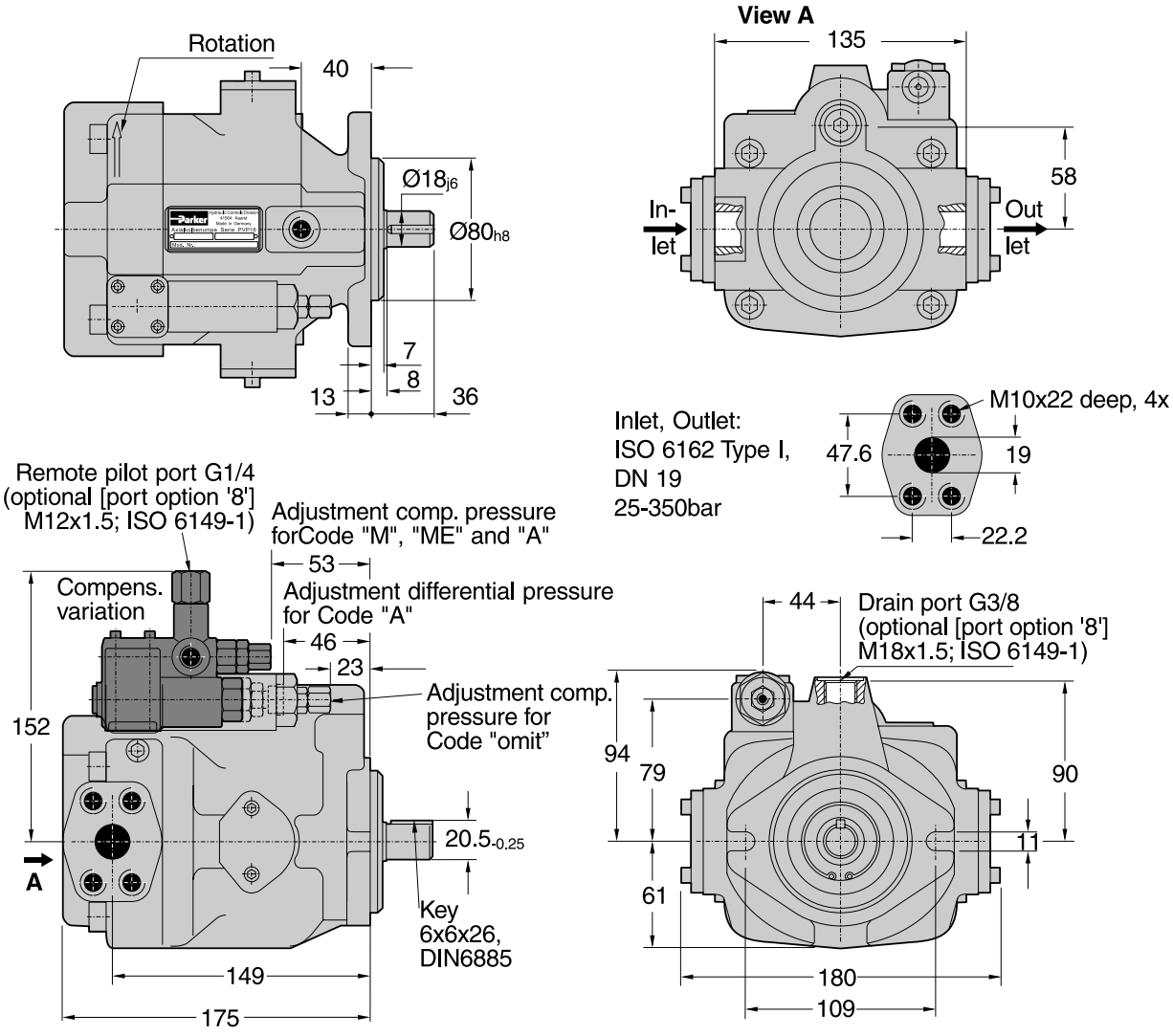
The pressures given represent the minimum required pressures on the inlet port of the pump (connection flange).
Note that long, narrow suction lines, bends, T-pieces, and other add-ons can cause a considerable drop in pressure.
Suction filters must also be carefully dimensioned and serviced regularly.
Low oil temperatures and dynamic processes (quick control movements) add to the loss in pressure.

Metric Version

PVP16

1

The drawing shows a pump for **clockwise** rotation. For counter clockwise rotation, inlet port and outlet port are on the opposite sides. Compensator is always on the outlet port side.

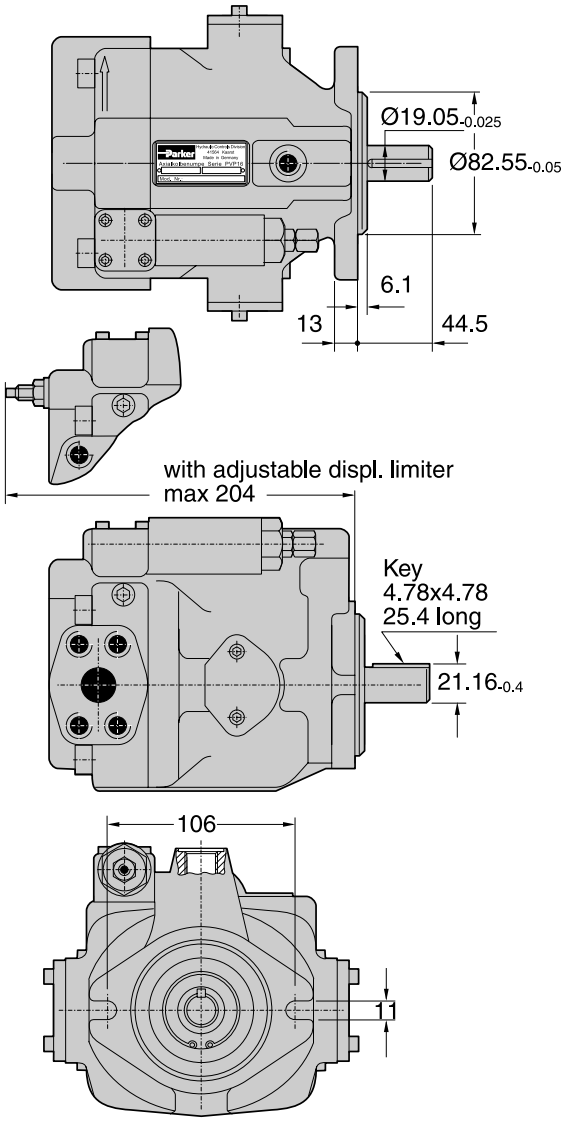


SAE and Thru Shaft Option

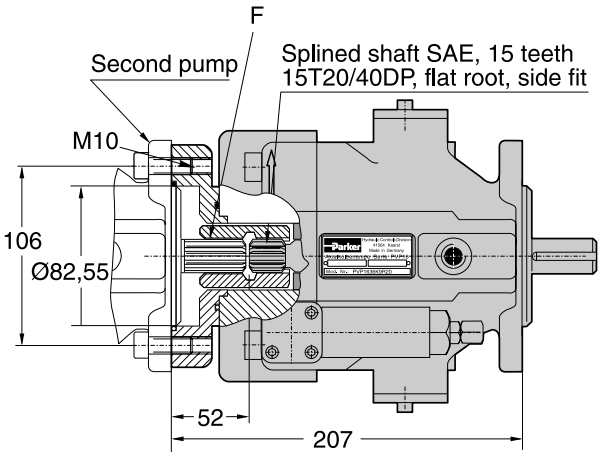
PVP16

The drawing shows a pump for **clockwise** rotation. For counter clockwise rotation, inlet port and outlet port are on the opposite sides. Compensator is always on the outlet port side.

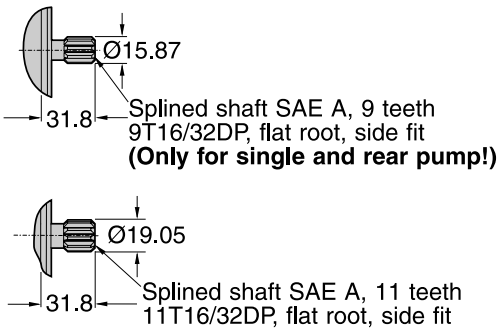
Mounting style SAE and adjustable displacement limiter



Thru shaft option



Mounting Styles with splined shaft

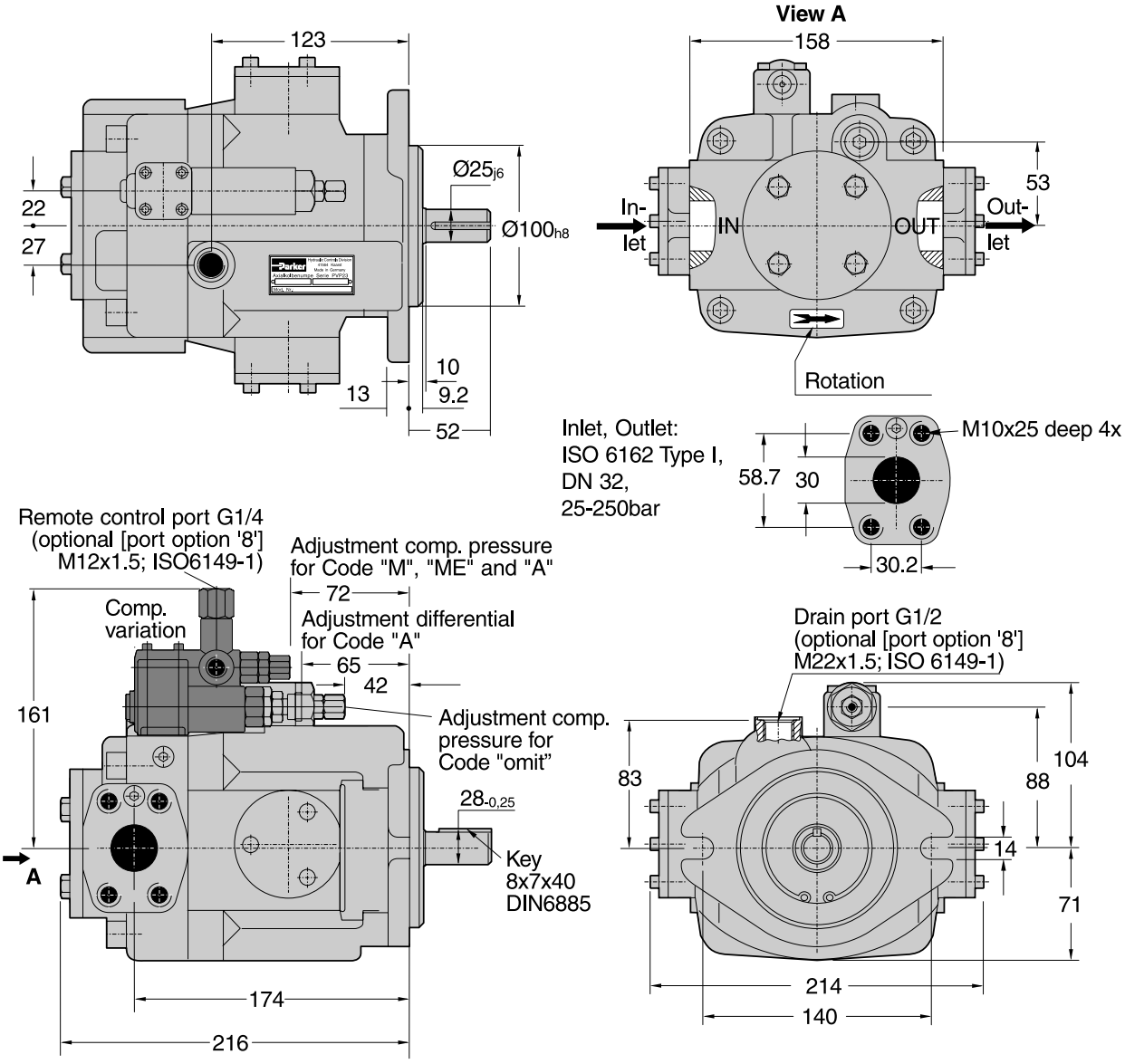


Metric Version

1

PVP23 and 33

The drawing shows a pump for **clockwise** rotation. For counter clockwise rotation, inlet port and outlet port are on the opposite sides.



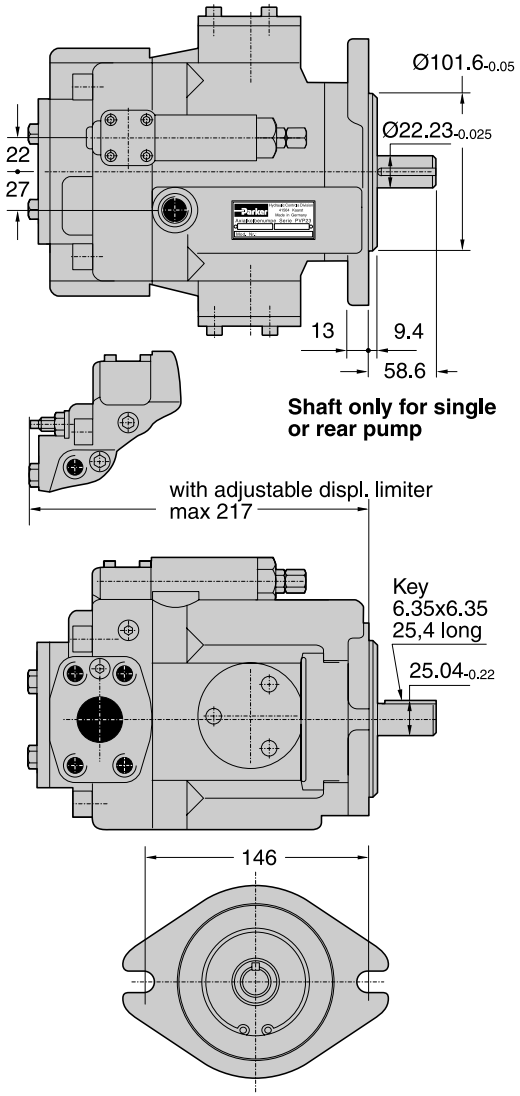
SAE and Thru Shaft Option

PVP 23 und 33

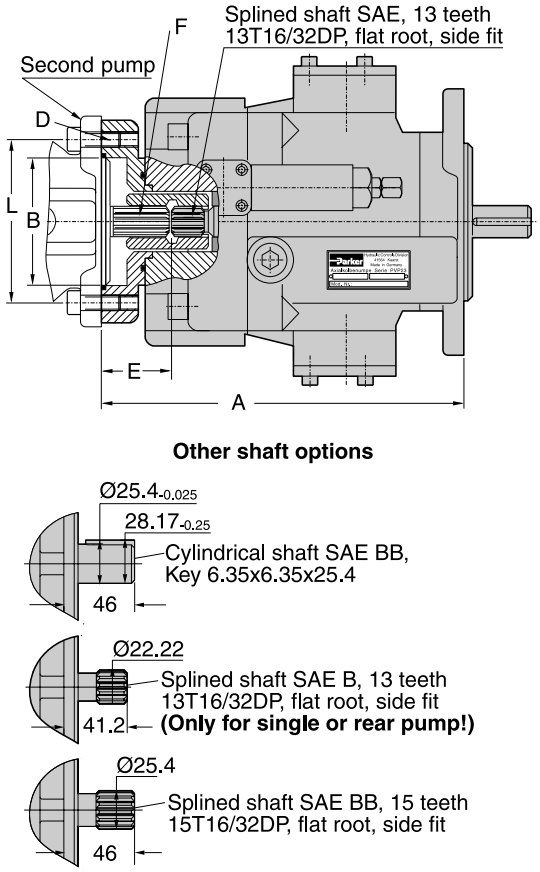
The drawing shows a pump for **clockwise** rotation.
For counter clockwise rotation, inlet port and outlet port are on the opposite sides.

Variation	A	B + 0.03	D	E	F	L
9A4	238.5	82.55	M10	54	9T16/32DP	106
9A5	238.5	82.55	M10	54	11T16/32DP	106
9B3	252.5	101.6	M12	68	13T16/32DP	146

Mounting style SAE and adjustable displacement limiter



Thru shaft option

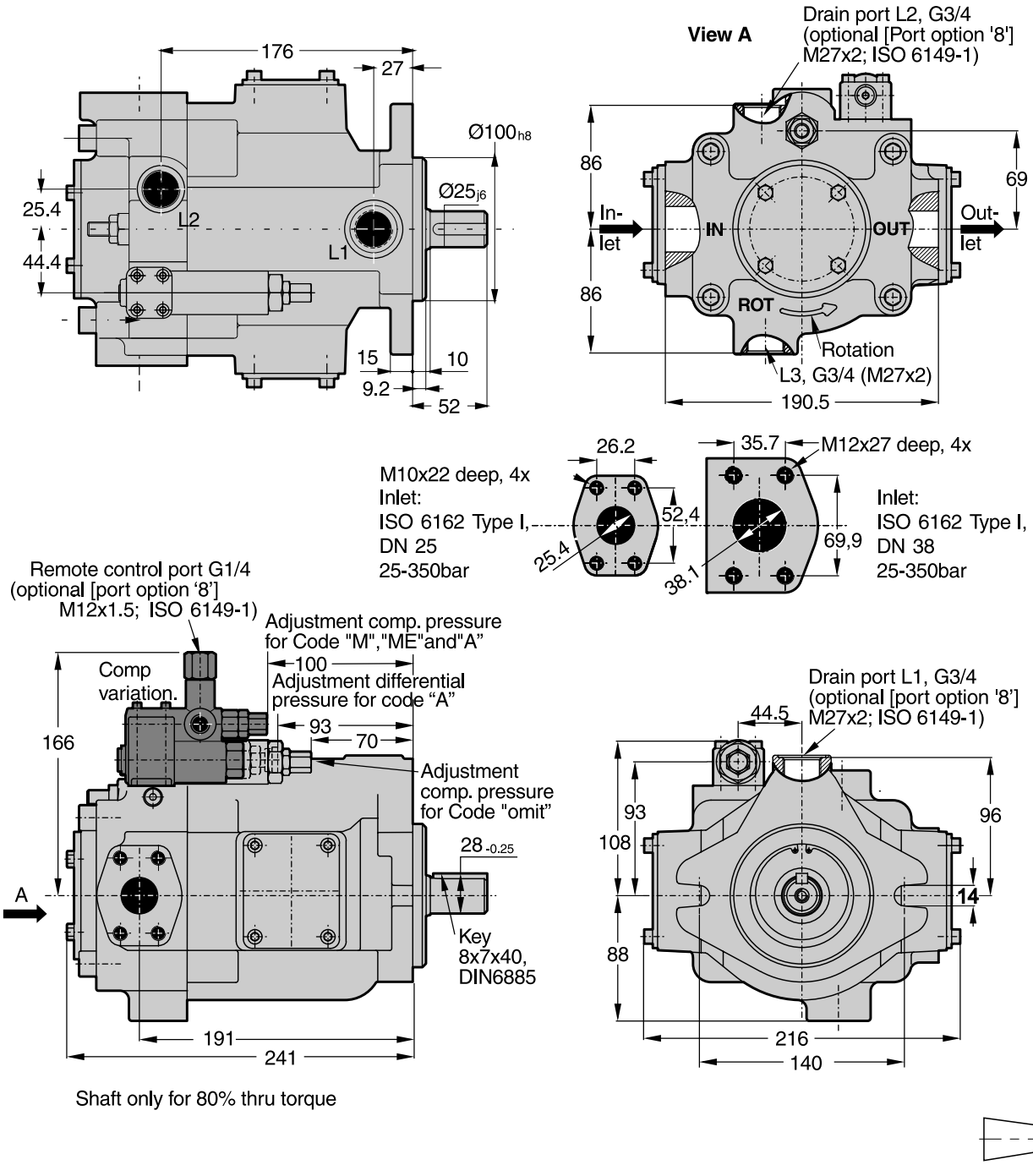


Metric Version

1

PVP41 and 48

The drawing shows a pump for **clockwise** rotation. For counter clockwise rotation, inlet port and outlet port are on the opposite sides.



Shaft only for 80% thru torque

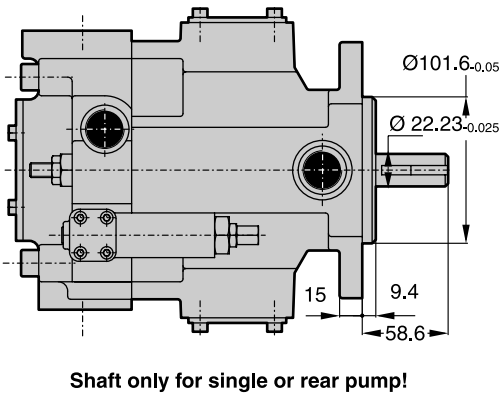
SAE and Thru Shaft Option

PVP 41 and 48

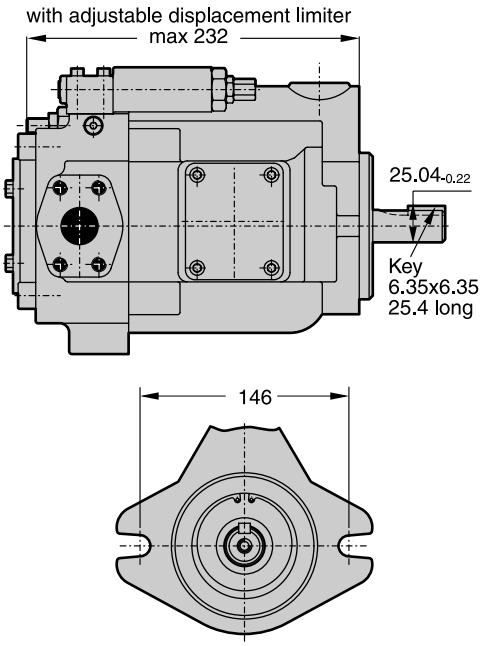
The drawing shows a pump for **clockwise** rotation.
For counter clockwise rotation, inlet port and outlet port are on the opposite sides.

Variation	A	B +0.03	D	E	F	L
9A4	263.5	82.55	M10	54	9T16/32DP	106
9A5	263.5	82.55	M10	54	11T16/32DP	146
9B3	277.5	101.6	M12	68	13T16/32DP	146
9B4	277.5	101.6	M12	68	15T16/32DP	146

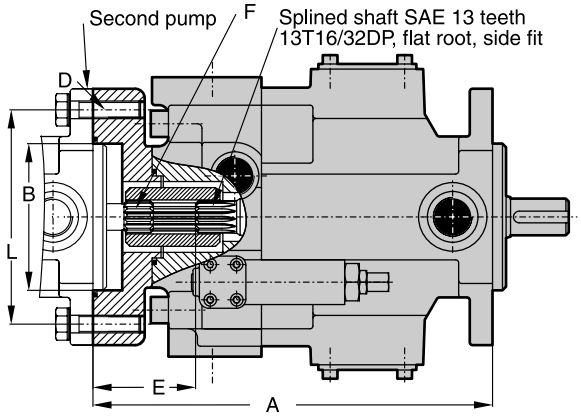
Mounting style SAE and adjustable displacement limiter



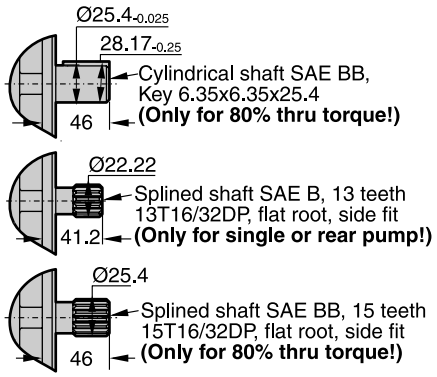
Shaft only for single or rear pump!



Thru shaft option



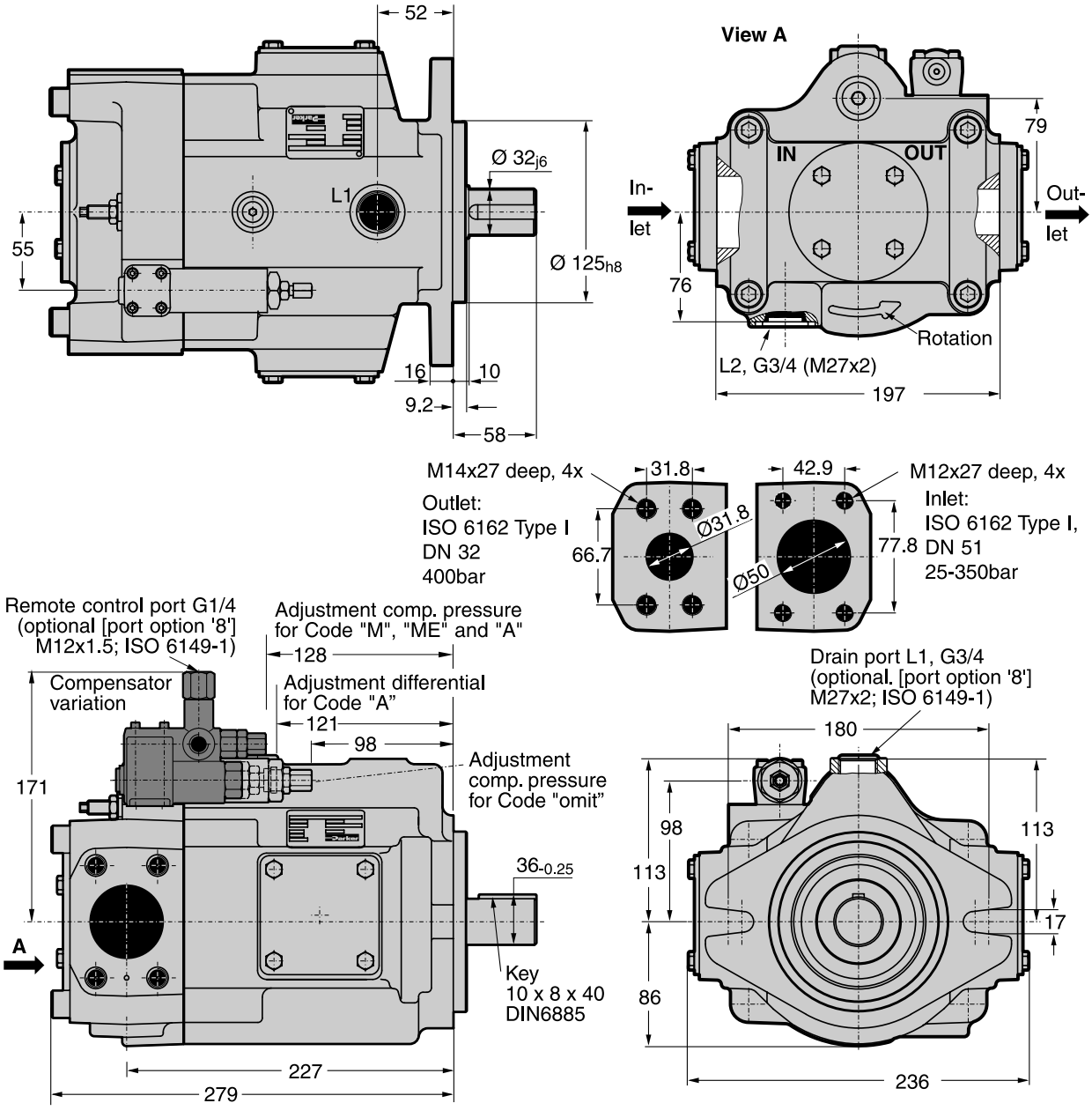
Thru shaft option



Metric version

PVP60 and 76

The drawing shows a pump for **clockwise** rotation. For counter clockwise rotation, inlet port and outlet port are on the opposite sides. Compensator is always on the outlet port side.



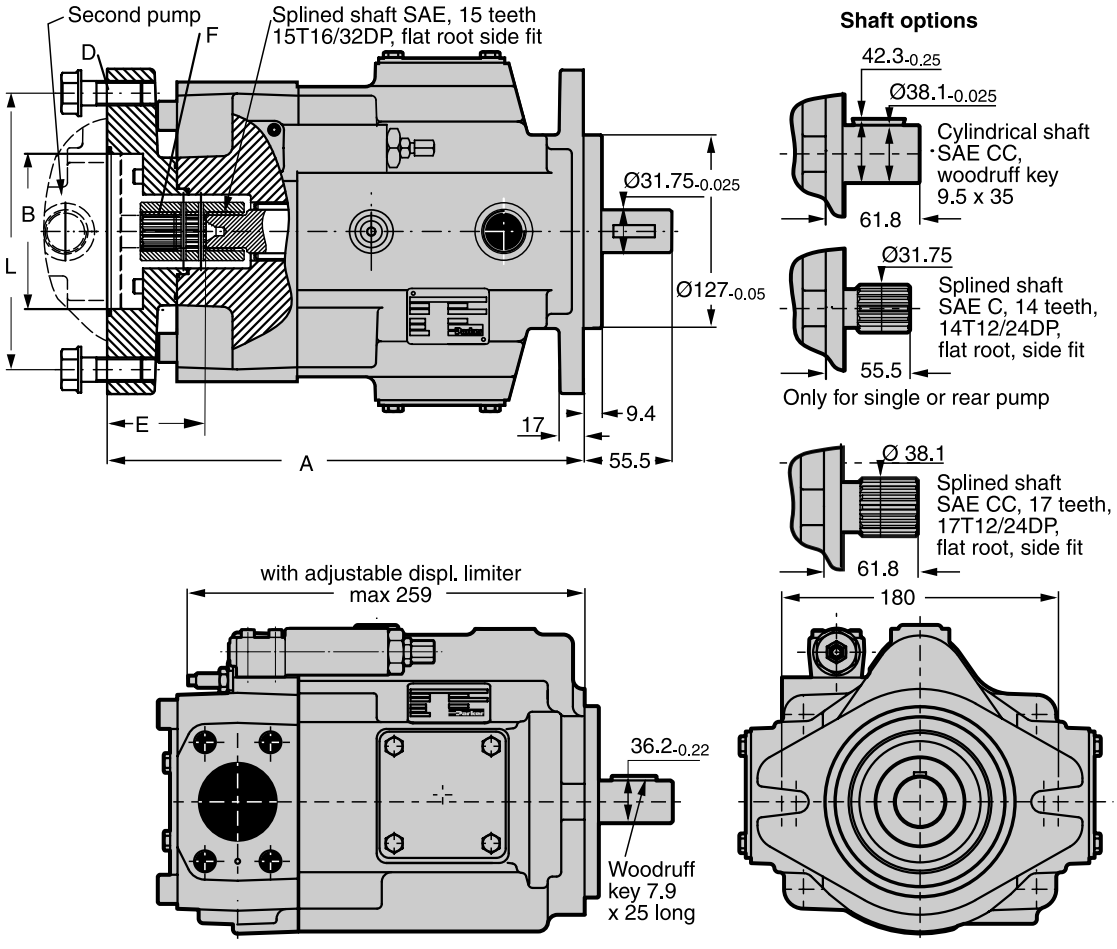
SAE and Thru Shaft Option

PVP60 and 76

The drawing shows a pump for **clockwise** rotation. For counter clockwise rotation, inlet port and outlet port are on the opposite sides. Compensator is always on the outlet port side.

Variation	A	B +0.03	D	E	F	L
9A4	298	82.55	M10	45	9T16/32DP	106
9B3	312	101.6	M12	59	13T16/32DP	146
9B4	312	101.6	M12	59	15T16/32DP	146
9C3	321	127	M16	68.5	14T12/24DP	181

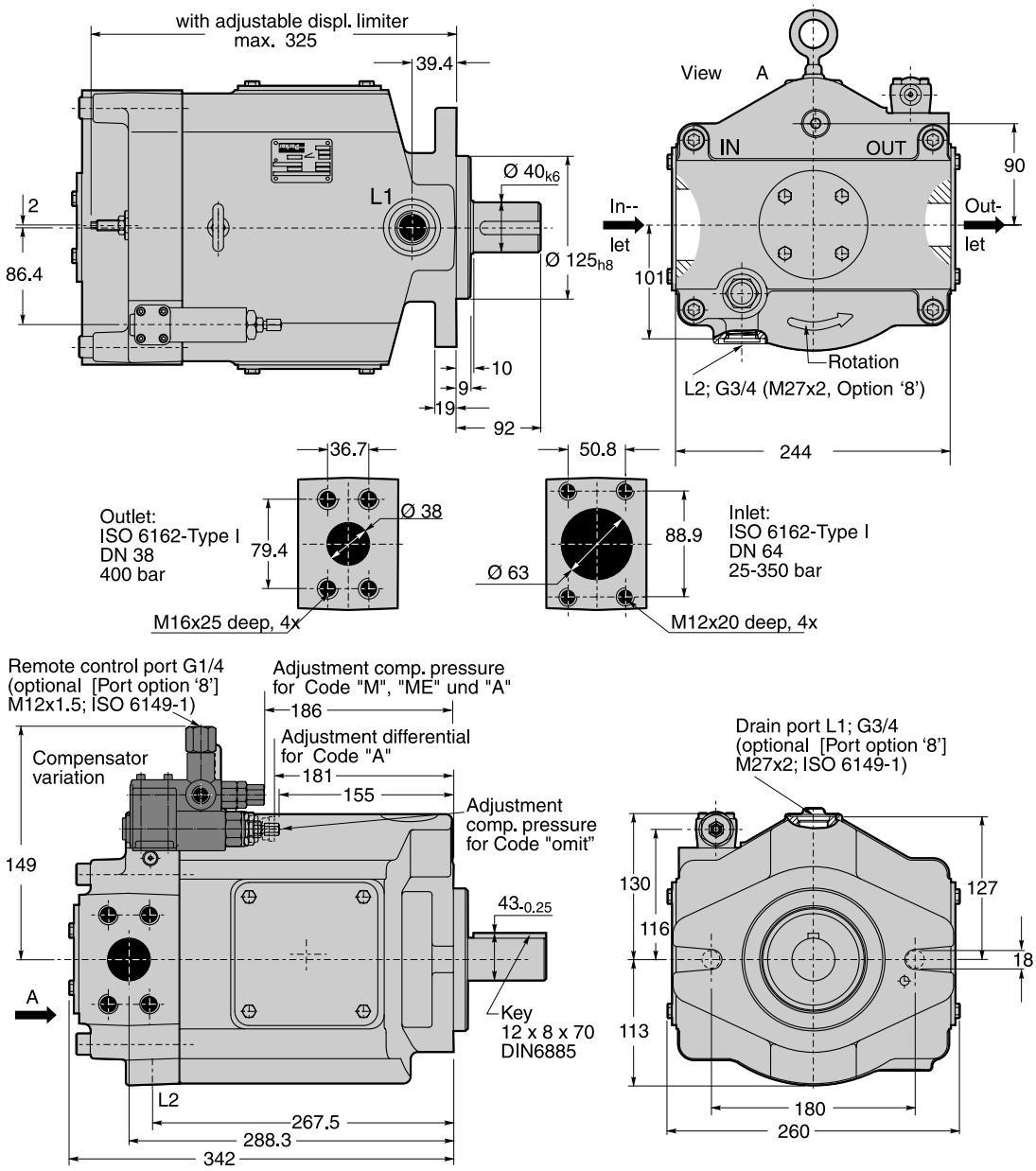
Mounting style SAE, adjustable displacement limiter and thru shaft option



Metric Version

PVP 100 and 140

The drawing shows a pump for **clockwise** rotation. For counter clockwise rotation, inlet port and outlet port are on the opposite sides. Compensator is always on the outlet port side.



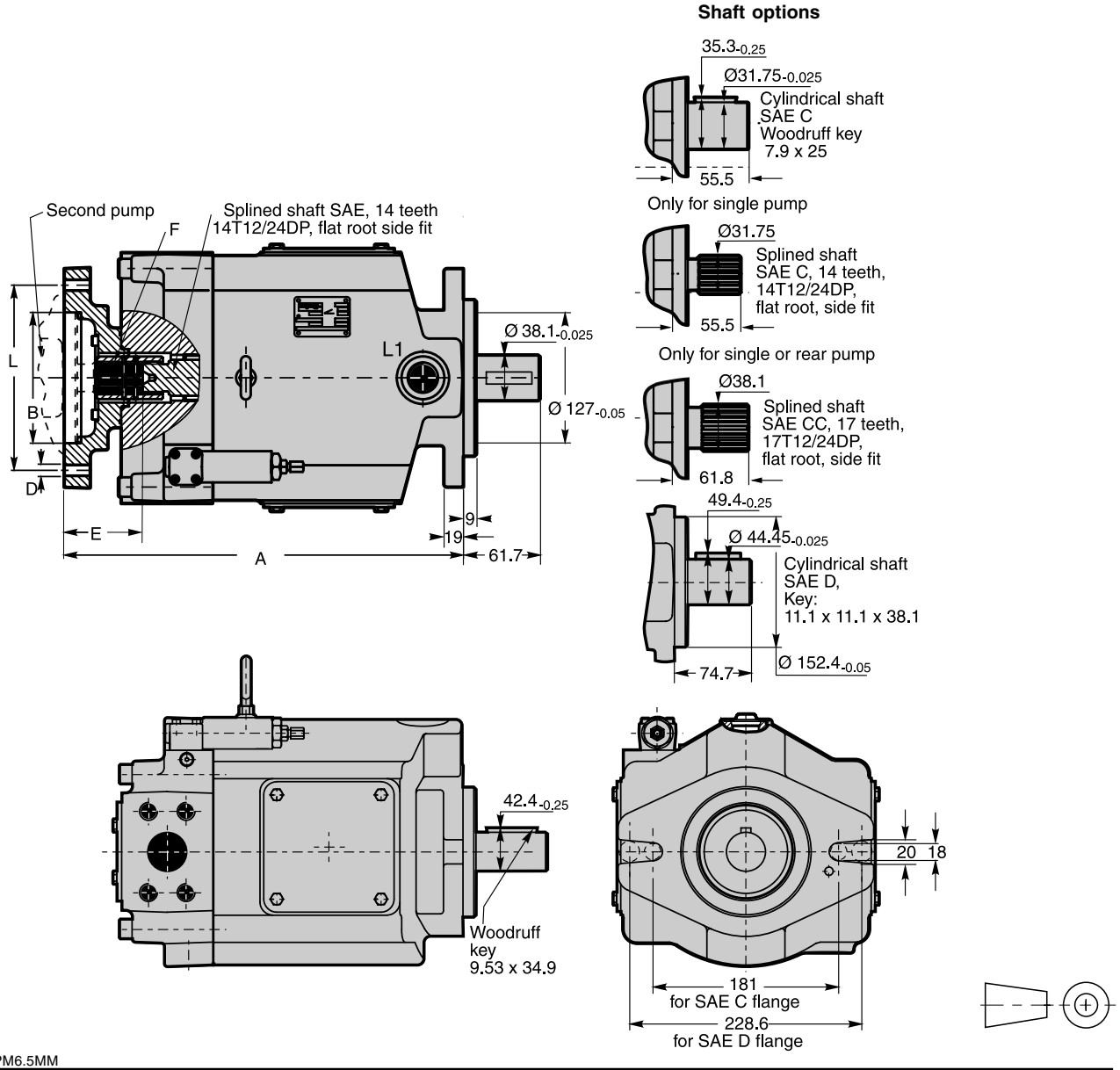
SAE and Thru Shaft Option

PVP100 and 140

The drawing shows a pump for **clockwise** rotation. For counter clockwise rotation, inlet port and outlet port are on the opposite sides. Compensator is always on the outlet port side.

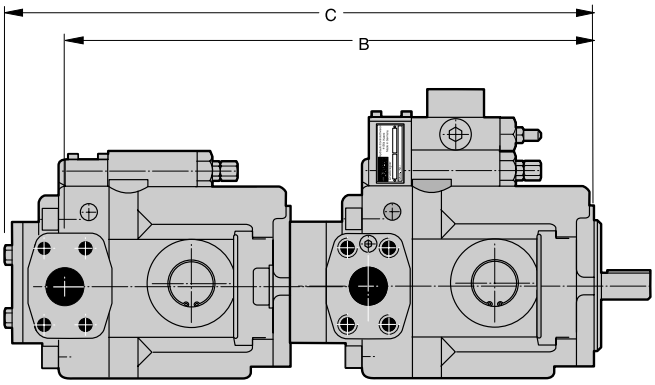
Variation	A	B + 0.03	D	E	F	L
9A4	364.5	82.55	M10	52	9T16/32	106
9B3	378.5	101.6	M12	66	13T16/32	146
9B4	378.5	101.6	M12	66	15T16/32	146
9C3	388	127	M16	75.5	14T12/24	181

Mounting style SAE and thru shaft option



1

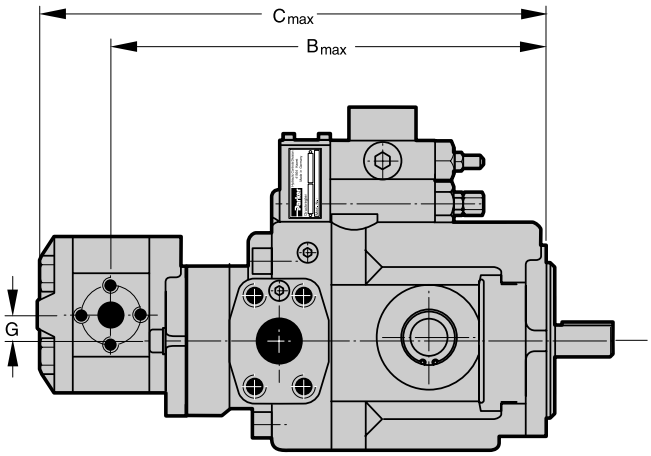
Combinations PVP/PVP



Main pump	Second pump	B	C
PVP16	PVP16	356	382
PVP23/33	PVP16	387.5	413.5
PVP23/33	PVP23/33	426.5	468.5
PVP41/48	PVP16	412.5	438.5
PVP41/48	PVP23/33	451.5	493.5
PVP41/48	PVP41/48	468.5	518.5
PVP60/76	PVP16	446.5	472.5
PVP60/76	PVP23/33	485.5	527.5
PVP60/76	PVP41/48	502.5	552.5
PVP60/76	PVP60/76	539.5	588
PVP100/140	PVP16	513.5	539.5
PVP100/140	PVP23/33	552.5	594.5
PVP100/140	PVP41/48	569.5	619.5
PVP100/140	PVP60/76	615	667
PVP100/140	PVP100/140	676.3	730

Combinations PVP/PGP (gear pump)

Attention: check max. torque on driving shaft.
see page 83.



Main pump	Second pump	B^*_{max}	C^*_{max}
PVP16	PGP505	276.5	350
PVP23/33	PGP505	308	381.5
PVP41/48	PGP505	333	406.5
PVP41/48	PGP511	365.5	454
PVP60/76	PGP505	367.5	441
PVP60/76	PGP511	400	488.5
PVP100/140	PGP505	434	507.5
PVP100/140	PGP511	466.5	555

* PGP505/PGP511 with lowest displacement for their size.

Note:
The upper drawing shows a pump combination PVP33+PVP33, the lower drawing a combination PVP33+PGP505. The values in the table show the dimensions for the pump combination of the first column.

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

Shaft code	PVP16	PVP23/33	PVP41/48	PVP60/76	PVP100/140
omit	116	209	209	641	641
B	56	209	209	641	641
C	102	337	337	1218	1218
D	--	337	337	1218	1218
E	--	--	--	--	1320
K	105	250	250	650	1250

Important notice

The max. allowable torque of the individual shaft must not be 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.

Pump	Shaft	Torque limit factor
PVP16	"omit"	6480
	C	5800
	K	5870
PVP23/33	"omit"	12040
	C	19470
	D	19470
	K	14450
PVP41/48	C	19490
	D	19490
	K	14400
PVP60/76	"omit"	37000
	C	70350
	D	70350
	K	37620
PVP100/140	C	69720
	D	69720
	E	75600
	K	71540

The table shows limit factors that include material specification, safety factors and conversion factors.

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

The torque factor (charcateristic value) 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 (pressure in bar x displacement in cm^3/rev)

1

Standard pressure compensator, code: "omit"

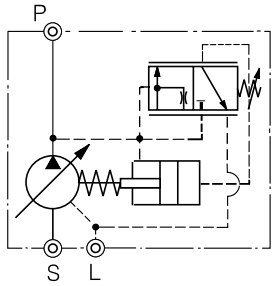
Description

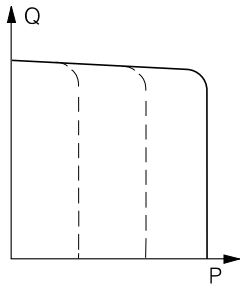
The standard pressure compensator controls the output flow (displacement, swash plate angle) in a way that when the set pressure is reached, the output flow of the pump just covers the flow needed by the system.

As long as the system pressure is below the set pressure - set by adjusting spring pre-load at the compensator - compensator spool is moved by the spring in a position where the servo piston is connected to the pump case drain port. The servo spring keeps the pump at full displacement.

When system pressure at pump outlet reaches the set pressure the compensator spool is moved against the spring into a position where the servo piston gets connected to the pump pressure port. The pressure moves the servo piston against the servo spring and reduces the swash plate angle of the pump. The displacement of the pump is reduced to exact the output flow required to keep the system pressure on the set level.

When no flow is needed by the system and the set pressure is reached the pump is compensated to deadhead. The displacement only covers the flow requirements of the pump (leakage of rotating group and compensator pilot flow).





Remote pressure compensator, Code: "M" (internal pilot supply)

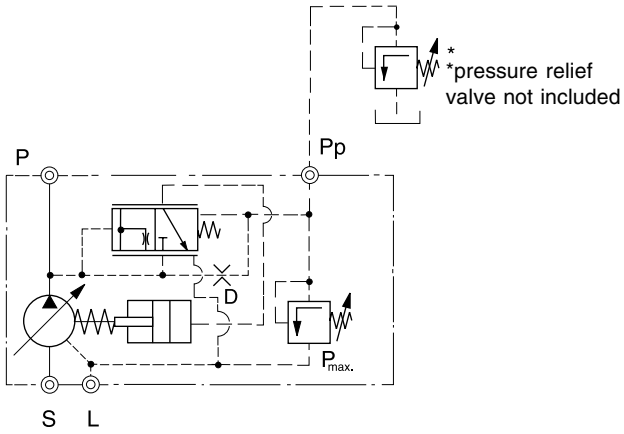
Description

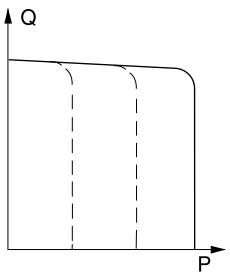
The remote hydraulic pressure compensator is controlled by a pressure relief valve set up outside of the pump, however, the pilot supply takes place internally using a orifice D.

The pressure relief valve must be designed for a flow rate of approx.1.2 l/min.

The built-on pressure relief valve pre-set at the factory for the maximum system pressure of p_{max}, protects the pump from overload. An arrangement of several pressure limiting valves (pressure stages) is possible, in connection with one or more directional valves.

The pressure compensator of the pump is set at a differential pressure. When setting the system pressure and when adjusting with one or more pressure limiting valves, the accumulative effect of the compensator must be taken into account.





Recommended Parker valves:
For inline mounting:
DUDB20*R15**

** Code for pressure ranges

For subplate mounting:
PVAC1PCMNS or
Continuous pressure valves RE06M**T2N1*01*X580 with integrated electronics
Continuous pressure valves RE06M**w2V1XP
Subplate G 3/8 SP1D23BA910

Remote pressure compensator,
Code: "ME" (external pilot supply)

Description
The remote hydraulic pressure compensator is controlled by a pressure relief valve set up outside of the pump, however, the pilot supply takes place externally using a orifice with 0.8 mm diameter.

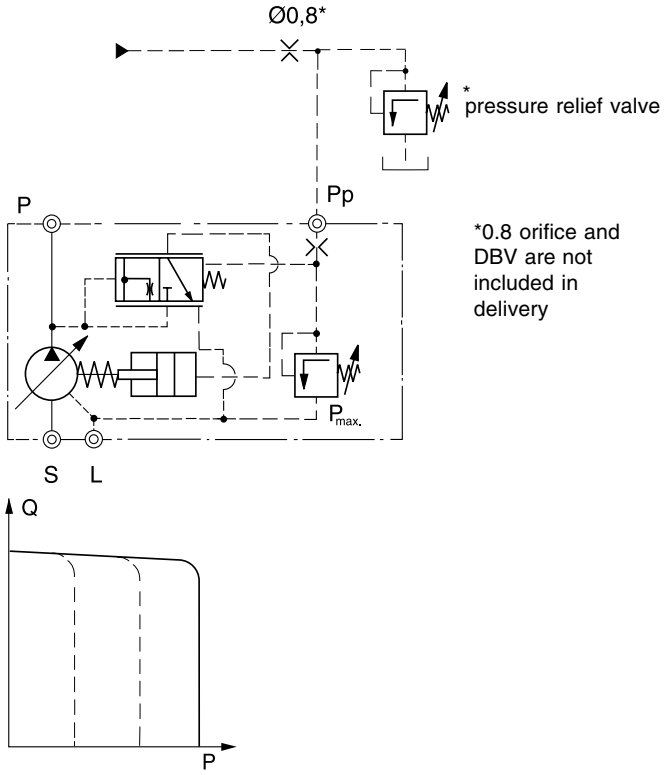
The pressure relief valve must be designed for a flow rate of ≥1.2 l/min.

The built-on pressure relief valve pre-set at the factory for the maximum system pressure of p_{max}, protects the pump from overload. An arrangement of several pressure limiting valves (pressure stages) is possible, in connection with one or more directional valves.

The pressure compensator of the pump is set at a differential pressure. When setting the system pressure and when adjusting with one or more pressure limiting valves, the accumulative effect of the compensator must be taken into account.

Recommended Parker valves:
For inline mounting:
DUDB20*R15**

**Code for pressure ranges



*0.8 orifice and DBV are not included in delivery

For subplate mounting:
PVAC1PCMNS or
Continuous pressure valves RE06M **T2N1*01*X580 with integrated electronics
Continuous pressure valve DSAE 1007P07*LA*X580
Subplate G 3/8 SP1D23BA910

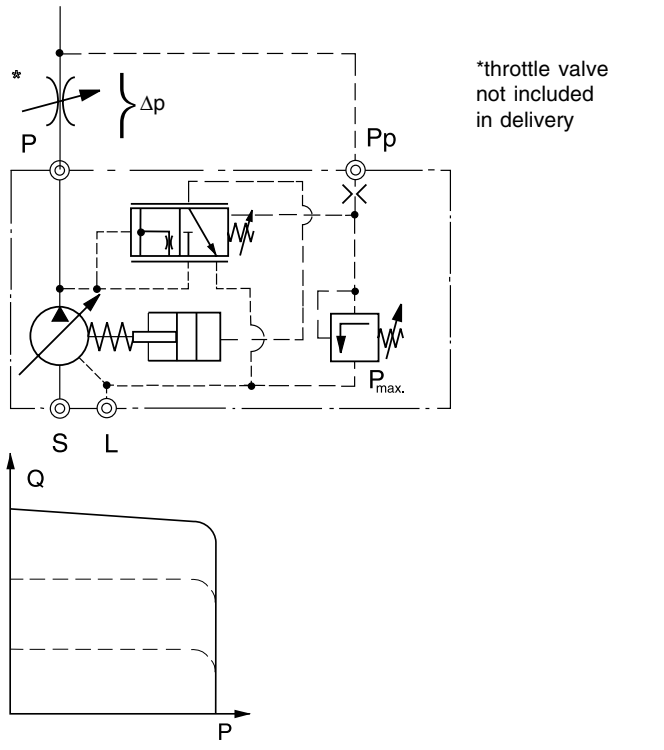
Load sensing compensator, Code: "A"
(Load Sensing)

Description
The delivery of the pump is controlled independent of load using the pressure load sensing compensator and a throttle valve DV (optional prop. DC valve) built into the pressure line. The throttle valve causes a pressure drop in the line of Δp. Using a pilot line, the pressure behind the throttle valve is directed to the compensator, whose sliding spool has the effect of a 2 way pressure compensator together with the adjustable pilot control cartridge spring. A change in the throttle opening – opening or closing the valve – produces a change in the pressure drop Δp. A smaller pressure drop increases the pump's delivery, and vice versa.

The built-on pressure limiting valve pre-set at the factory for the maximum system pressure of p_{max}, protects the pump from overload.

Throttle valves without a 2 way pressure compensator are used as throttles with a manual or electric-proportional adjustment.

Recommended Parker valves:
For inline mounting:
9N1200S



*throttle valve not included in delivery

For subplate mounting:
Proportional valves series D31FH or D31FT

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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. 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, such as phosphoric acid esters, fluorocarbon seals are required. Consult your Parker representative for assistance.

Filtration

For maximum pump and system component function-ability 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 (µm):

General hydraulic systems for satisfactory operation:

Class 19/15, to ISO 4406
x = 25 µm ($ß_{25} \geq 75$) to ISO 4572

Hydraulic systems with maximised component life and functionability:

Class 16/13, to ISO 4406
x = 10 µm ($ß_{10} \geq 75$) 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.

Installation and mounting

Horizontal mounting: Outlet port side or top, inlet port side or bottom. Drain port always uppermost.
Vertical mounting: Shaft pointing upwards
Inlet (suction side): 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° 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. 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 aerated oil will not be recirculated.

For the same reason, when the pump is mounted inside the reservoir, the drain line should be arranged in such a way that a siphon is created. This ensures that the pump is always filled with fluid. The drain pressure must not exceed 1 bar. Drain line length should not exceed 2 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. Bell housings 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, as well as after long stand-still periods when it is possible that the pump body could have been emptied, 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. A quick on and off switching (inching mode) makes priming easier and enables quick filling of the displacement space in the pump.

Attention: Check motor rotation direction.
Compare Chapter 12.

Notes

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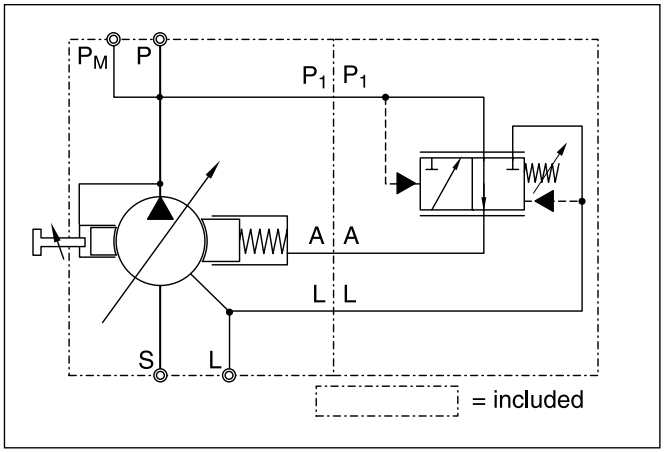
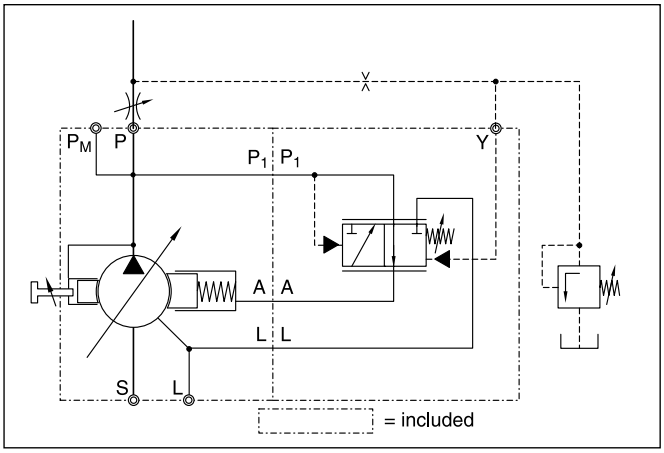
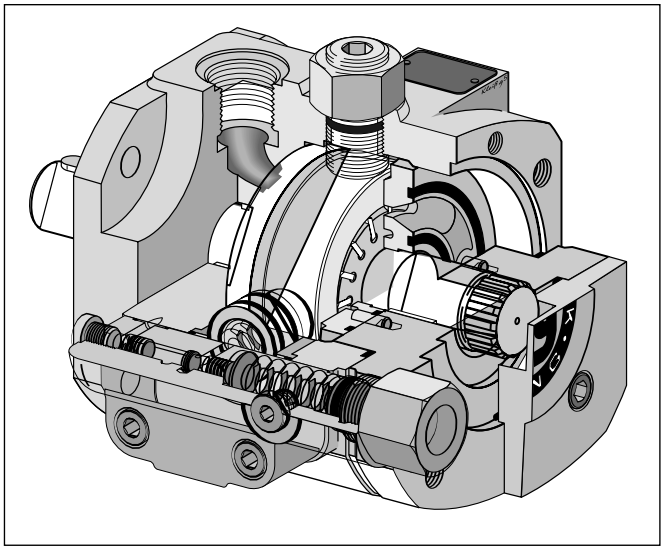


Pump with standard pressure compensator, Code PVS

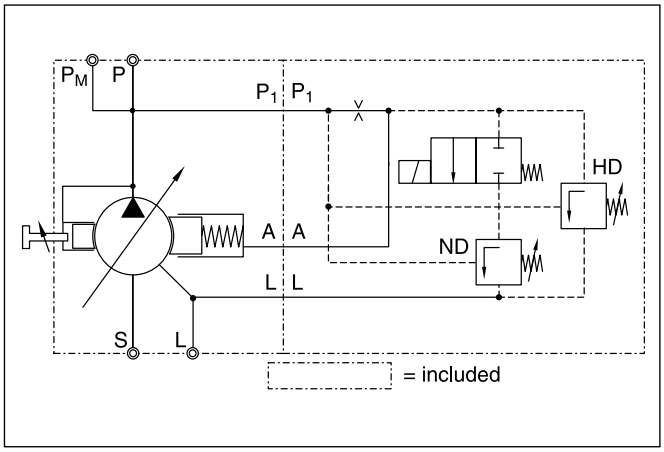


Pump with pressure flow compensator, Code PVM

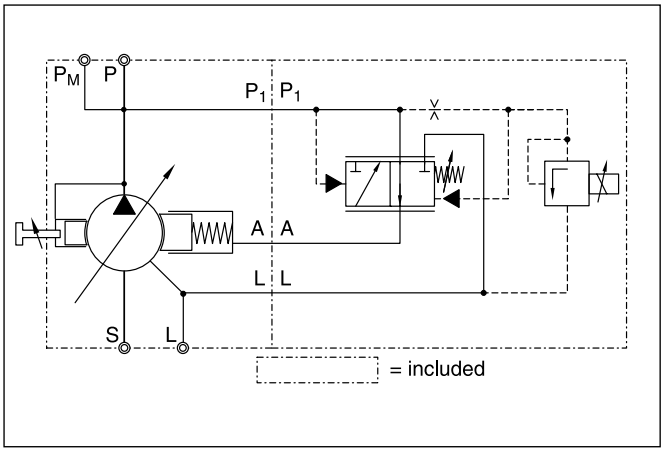
With thru shaft option
for multiple pump options
for open circuit



- Mounting pattern according to VDMA 24560/1 specification.
- 4 bolt flange ISO 3019/2 (metric).
- Fast response.
- Wide range of controls for diverse tasks.
- Low noise level.
- Good efficiency.



Pump with two-stage compensator, Code PVH



Pump with proportional pressure compensator, Code PVL

Displacement	8 - 50 cm³/rev
Pressure range	
Outlet	Nominal pressure 140 bar
Inlet	1.0 bar 0.8 bar abolute
Drain port	maximum 0.5 bar
Speed ranges	1000 – 1800 rpm
Press. fluid temperature	-10°C ...+70°C
Viscosity range	22 - 100 mm²/s 800 mm²/s (short-term at start up)
Rotation	clockwise

Characteristics and weights

Model	Displacement in cm^3/rev	Output flow at 1500 rpm in l/min	Input power at nominal pressure in kW	Weight in kg single pump	Weight in kg main pump	Weight in kg intermediate pump	Weight in kg second pump
PVS08	8.3	12	3.65	8.9	8.9	8.8	8.8
PVS12	12.8	19	5.0	8.9	8.9	8.8	8.8
PVS16	16	23	8.7	18.1	16.9	18.0	16.8
PVS25	24	35	9.9	18.1	16.9	18.0	16.8
PVS32	31	45	12.7	33.2	30.8	33.0	30.6
PVS40	40	60	15.9	33.2	30.8	33.0	30.6
PVS50	51.5	75	19.7	33.2	30.8	33.0	30.6

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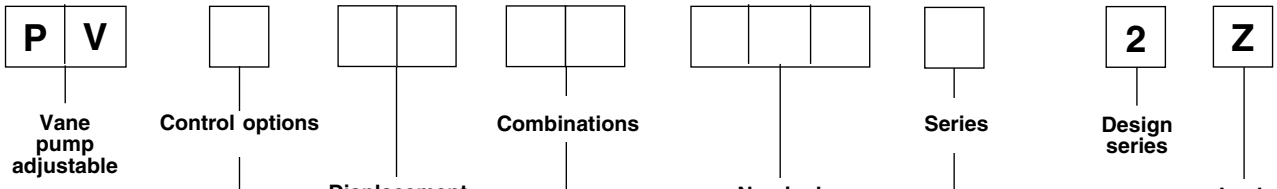


Code	Description
S	**Servo pressure compensator**
Y	Remote control compensator
D	Two pressure compensator Low pressure – high pressure
H	Two pressure compensator High pressure - low pressure
M	Pressure flow compensator (load-sensing)
K	Pressure flow / press. compen.
L	Proportional pressure compensator

Code	Description	
08	**8.3 cm³/U**	BG I
12	**12.8 cm³/U**	
16	**16 cm³/U**	BG II
25	**24 cm³/U**	
32	**31 cm³/U**	BG III
40	**40 cm³/U**	
50	**51.5 cm³/U**	

Code	Combinations
EH	**Single pump / main pump**
AZ[1)]	Second pump / interm. pump
BY[2)]	Second pump / interm. pump to frame size BG I

[1)] only for BG II and BG III
[2)] only for BG I

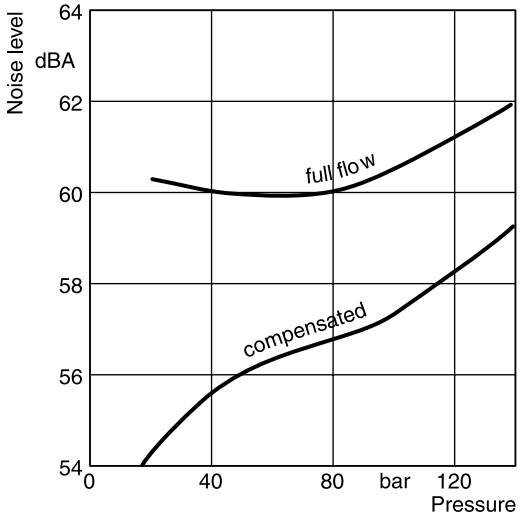
Code	Description
omit	**Standard**
Z	With DIN lock for comp. adjustment

Code	Description
C	**Standard**

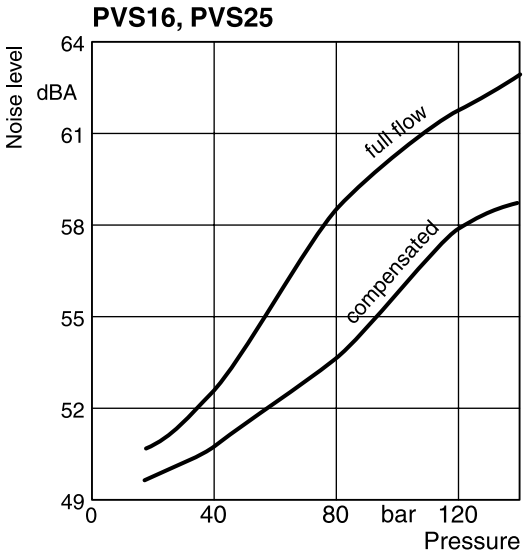
Code	Nominal pressure
140	**up to 140 bar**

Bold letters =
Short-term availability

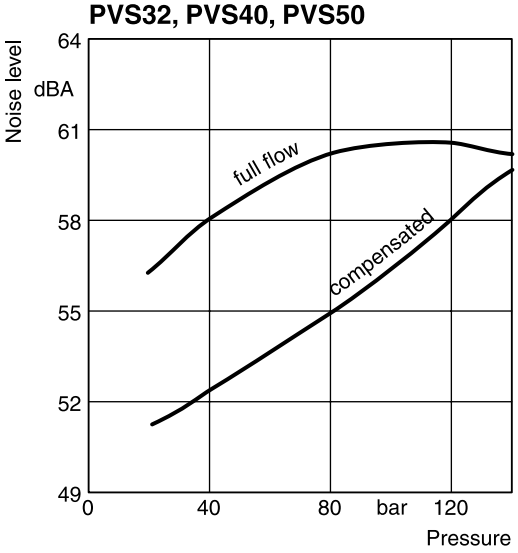
PVS08, PVS12



PVS16, PVS25



PVS32, PVS40, PVS50



Typical noise levels for single pumps, measured in an unechoic chamber according to DIN 45 635 Microphone distance 1 m.

Speed n = 1.500 rpm

All values measured with mineral oil at a viscosity of 30 mm²/s and 50° C.

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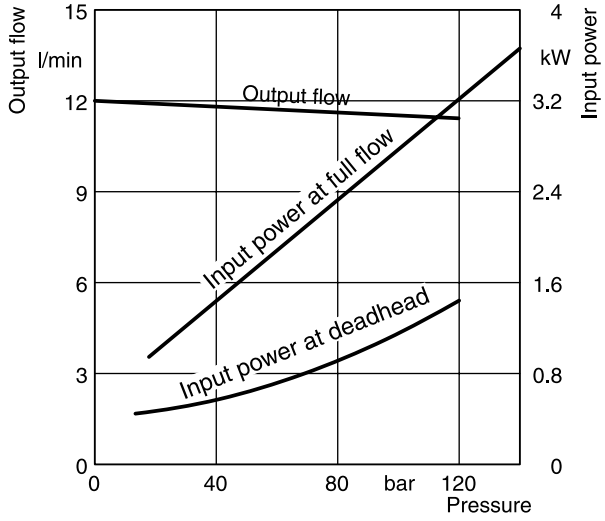
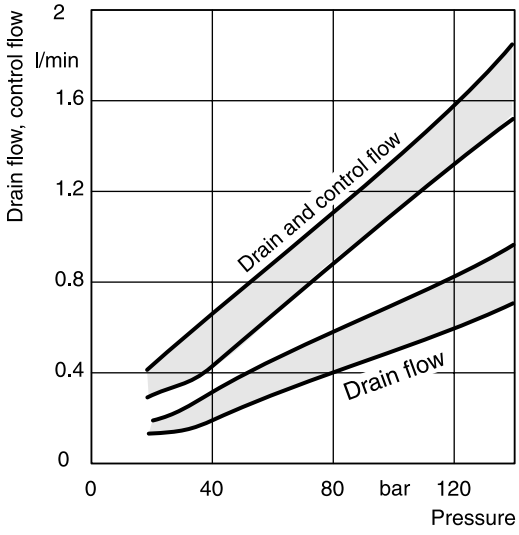
Size I, Size 08 and 12

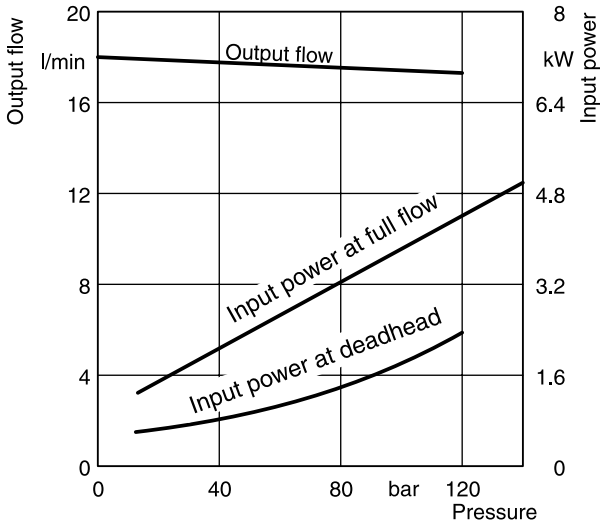
PVS08



PVS08, PVS12



PVS12

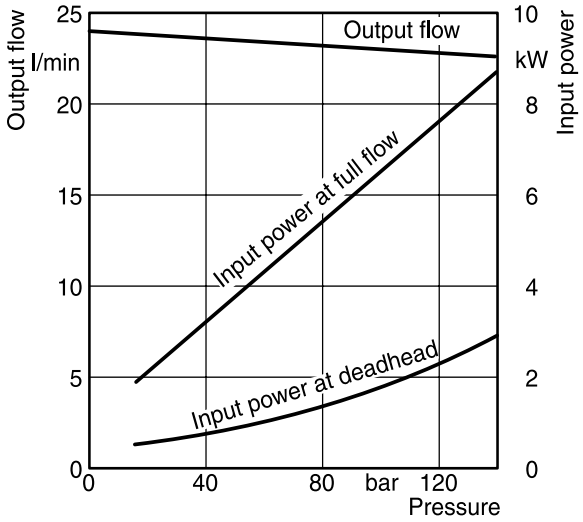


Characteristic curves determin. at speed n = 1500 rpm
All values were measured with mineral oil at a viscosity of 30 mm²/s and 50° C.
All characteristics shown are typical. They can deviate by up to 5% of the shown values depending on production tolerances of new pumps under certain conditions.

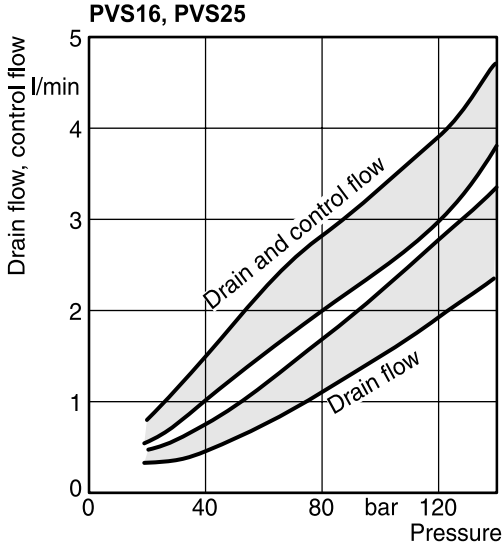
Please note: The values shown for drain and pilot oil apply for quasi-static operation (constant operation conditions).
During the pilot processes, significantly higher pilot oil flows can take place in short-term and can exceed 20 l/min in extreme cases. Therefore, it is absolutely necessary to set up the drain line without restrictions and as short as possible to avoid unacceptably high pressure peaks in the pump body.

Size II, Size16 and 25

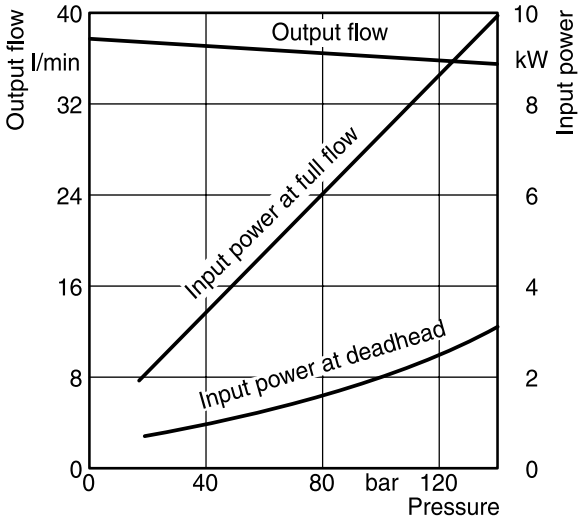
PVS16



PVS16, PVS25



PVS25



Characteristic curves determin. at speed n = 1500 rpm
All values were measured with mineral oil at a viscosity of 30 mm²/s and 50° C.
All characteristics shown are typical. They can deviate by up to 5% of the shown values depending on production tolerances of new pumps under certain conditions.

Please note: The values shown for drain and pilot oil apply for quasi-static operation (constant operation conditions).
During the pilot processes, significantly higher pilot oil flows can take place in short-term and can exceed 20 l/min in extreme cases. Therefore, it is absolutely necessary to set up the drain line without restrictions and as short as possible to avoid unacceptably high pressure peaks in the pump body.

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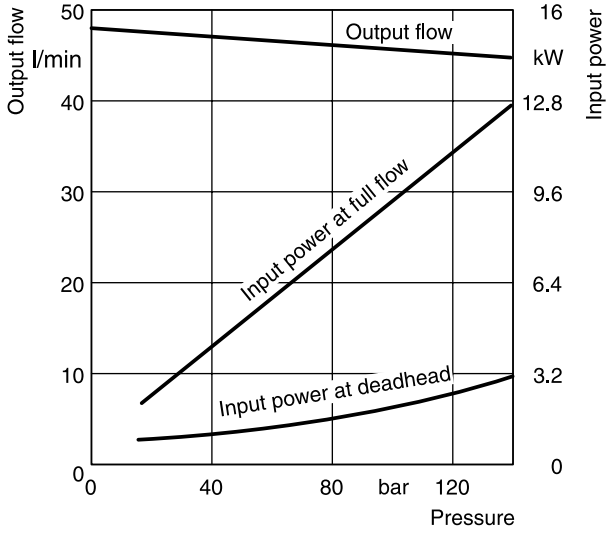
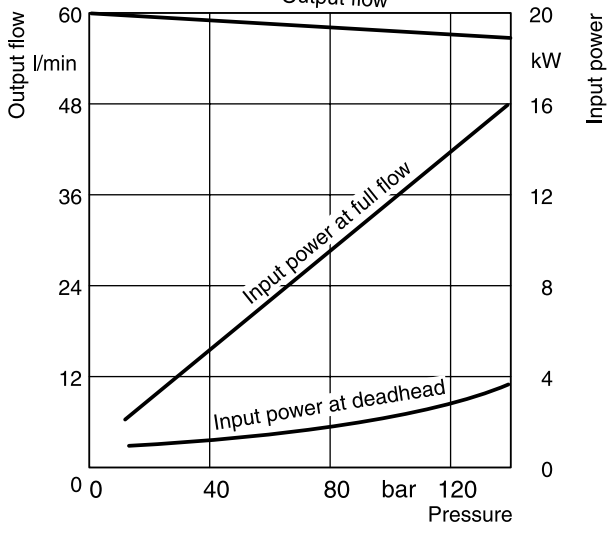
Size III, Size 32, 40, 50

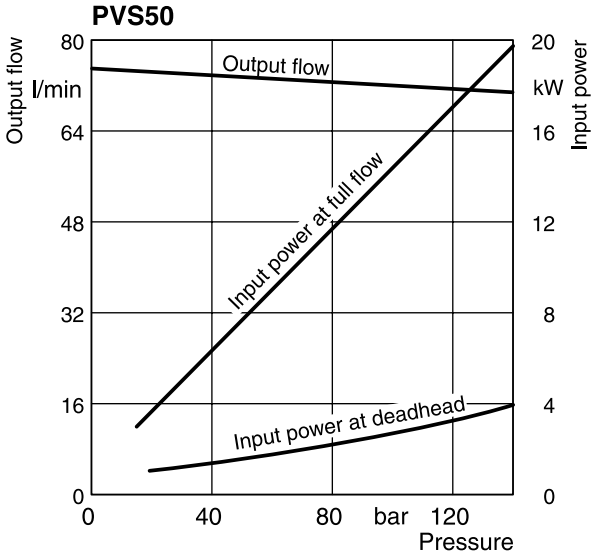
PVS32



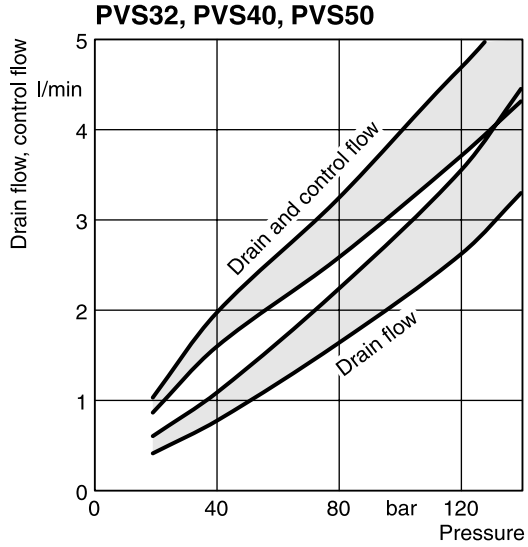
PVS40



PVS50



PVS32, PVS40, PVS50

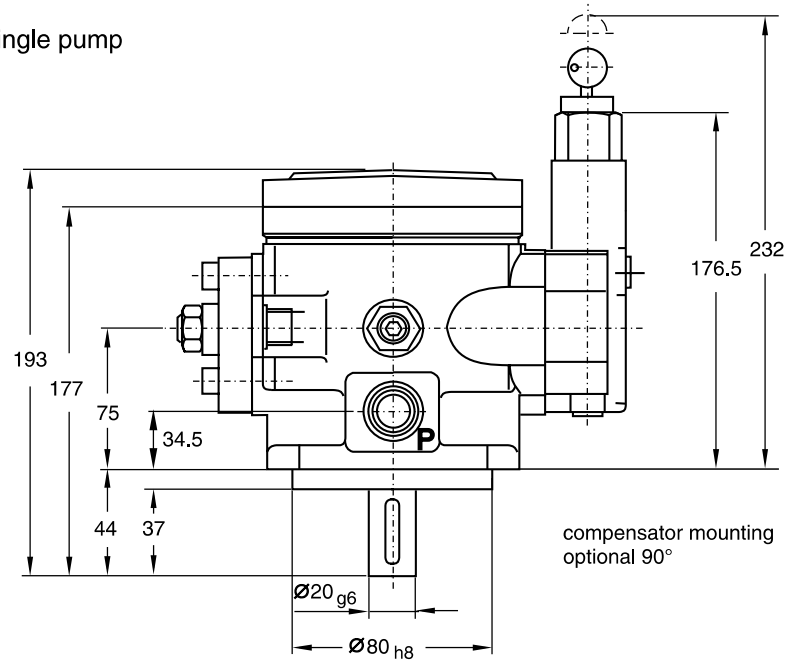


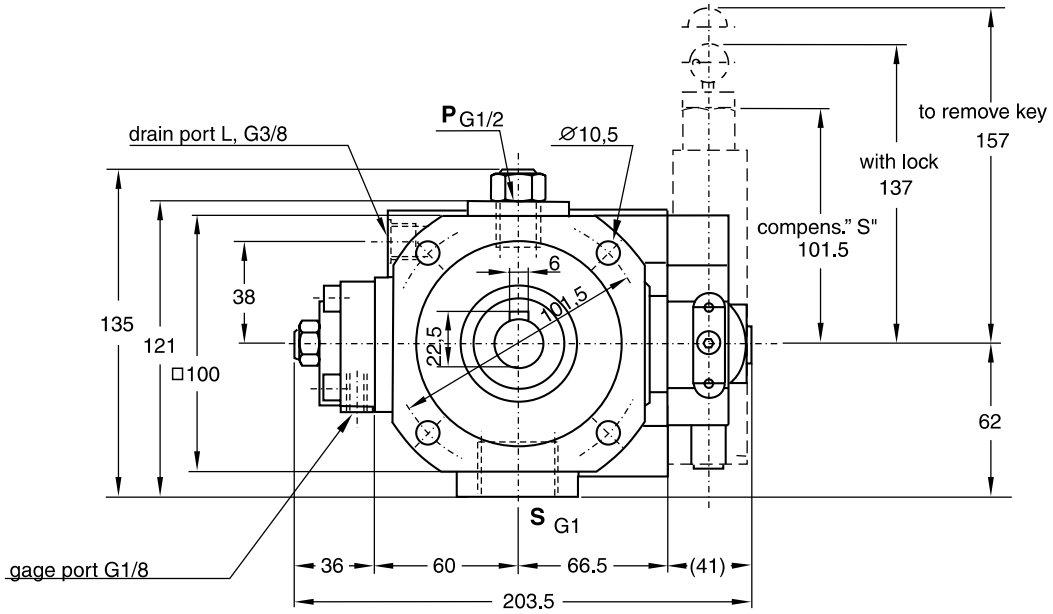
Characteristic curves determin. at speed n = 1500 rpm
All values were measured with mineral oil at a viscosity of 30 mm²/s and 50° C.
All characteristics shown are typical. They can deviate by up to 5% of the shown values depending on production tolerances of new pumps under certain conditions.

Please note: The values shown for drain and pilot oil apply for quasi-static operation (constant operation conditions).
During the pilot processes, significantly higher pilot oil flows can take place in short-term and can exceed 20 l/min in extreme cases. Therefore, it is absolutely necessary to set up the drain line without restrictions and as short as possible to avoid unacceptably high pressure peaks in the pump body.

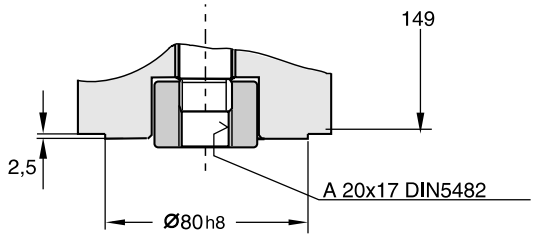
Frame size (BG) I

Single pump

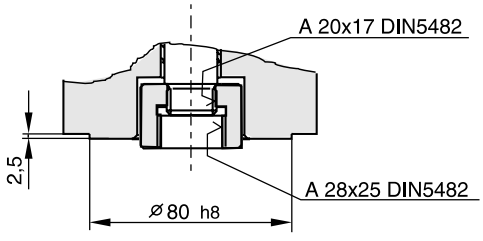




second pump to
BG I



second pump to
BG II and III



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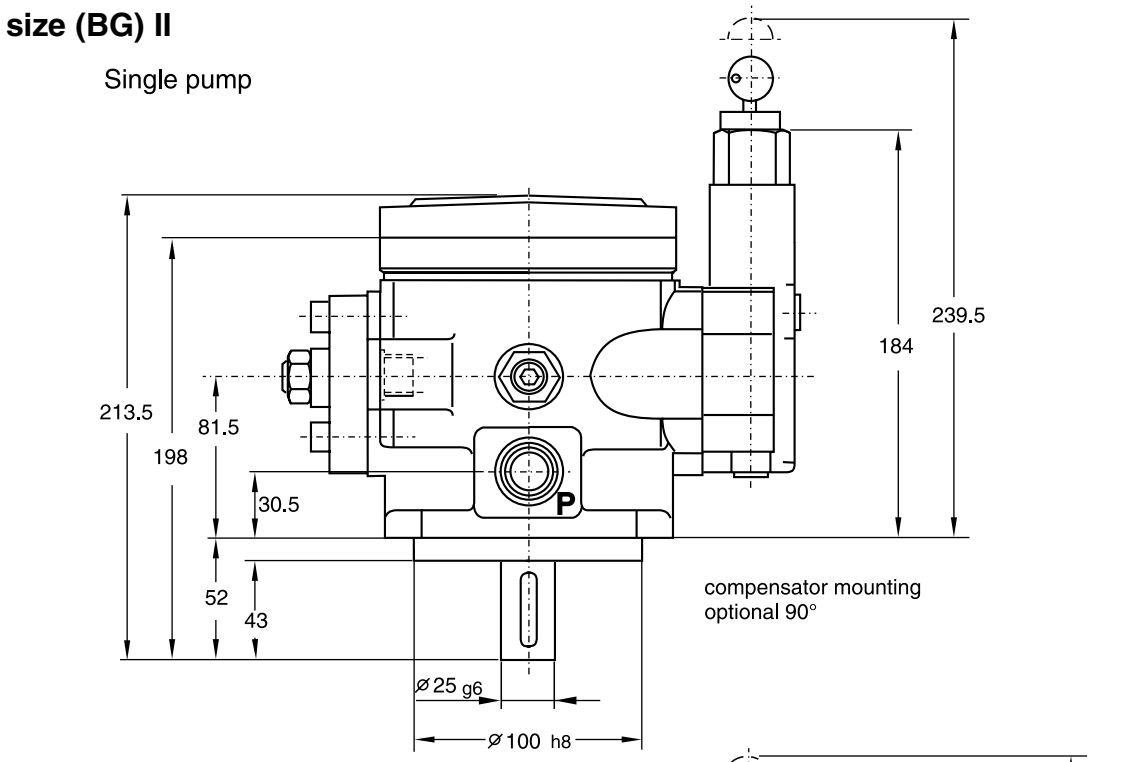
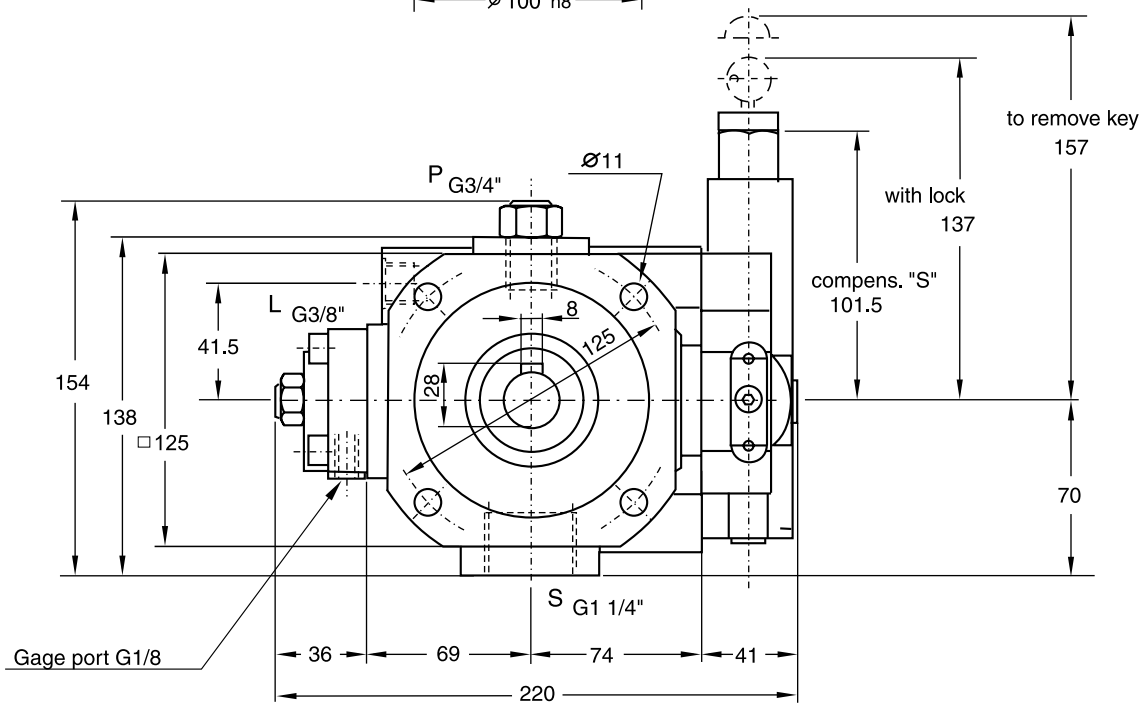
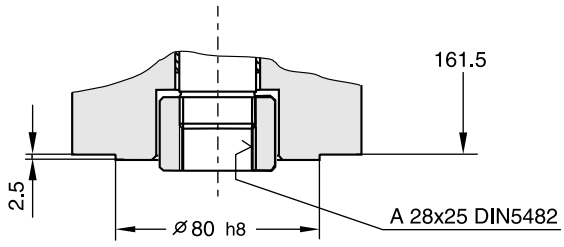
Frame size (BG) II

Single pump



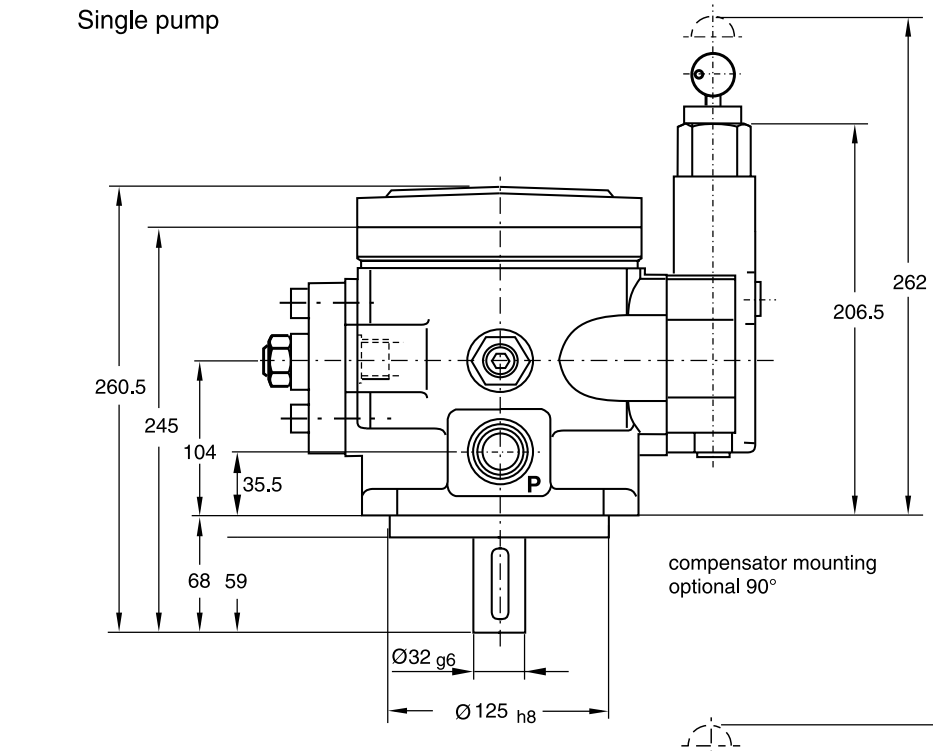


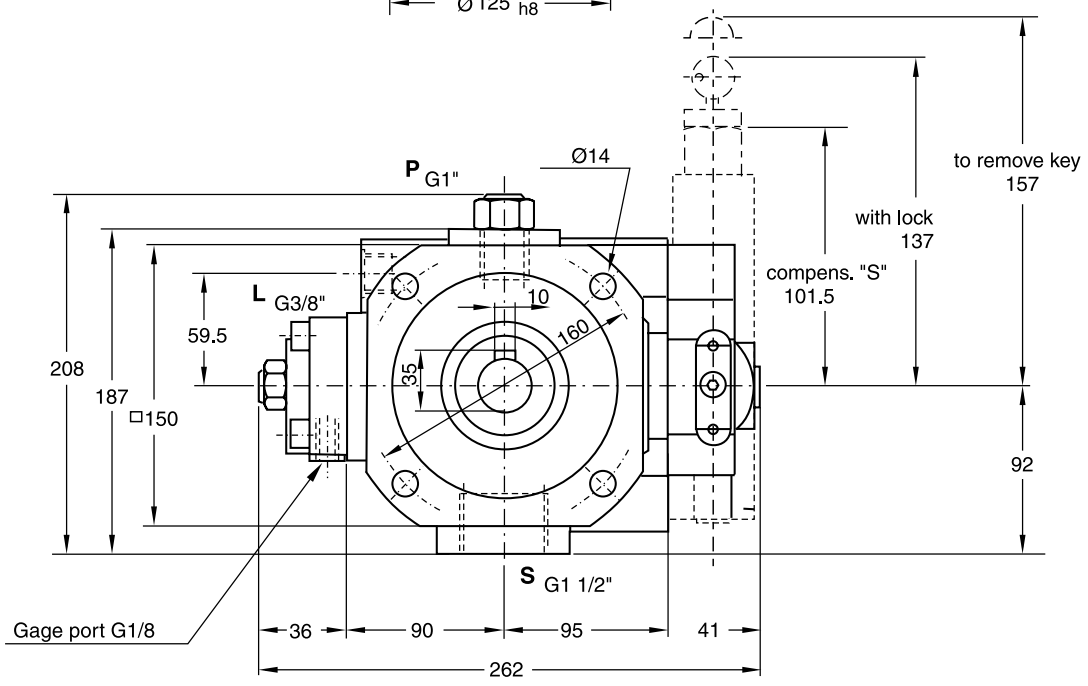
Second pump



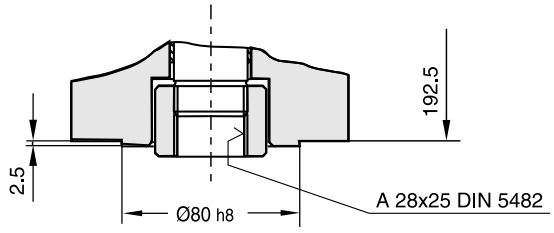
Frame size (BG) III

Single pump





Second pump



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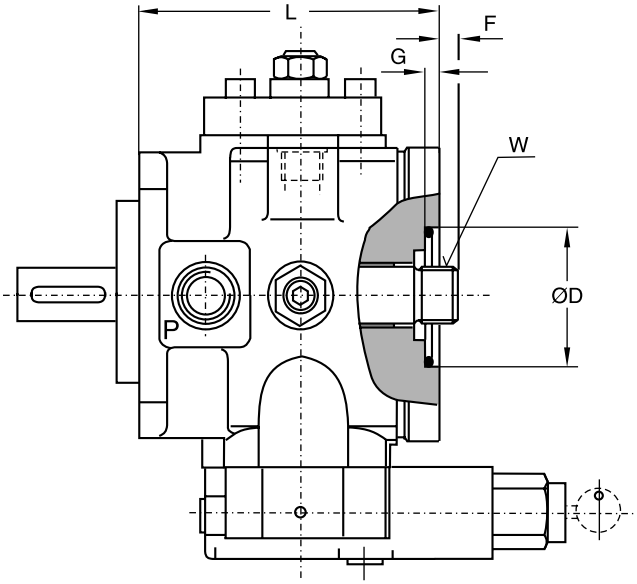
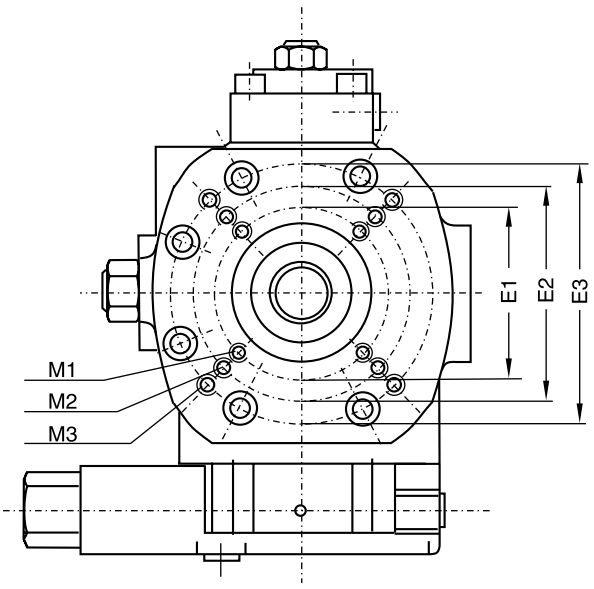
Thru drive

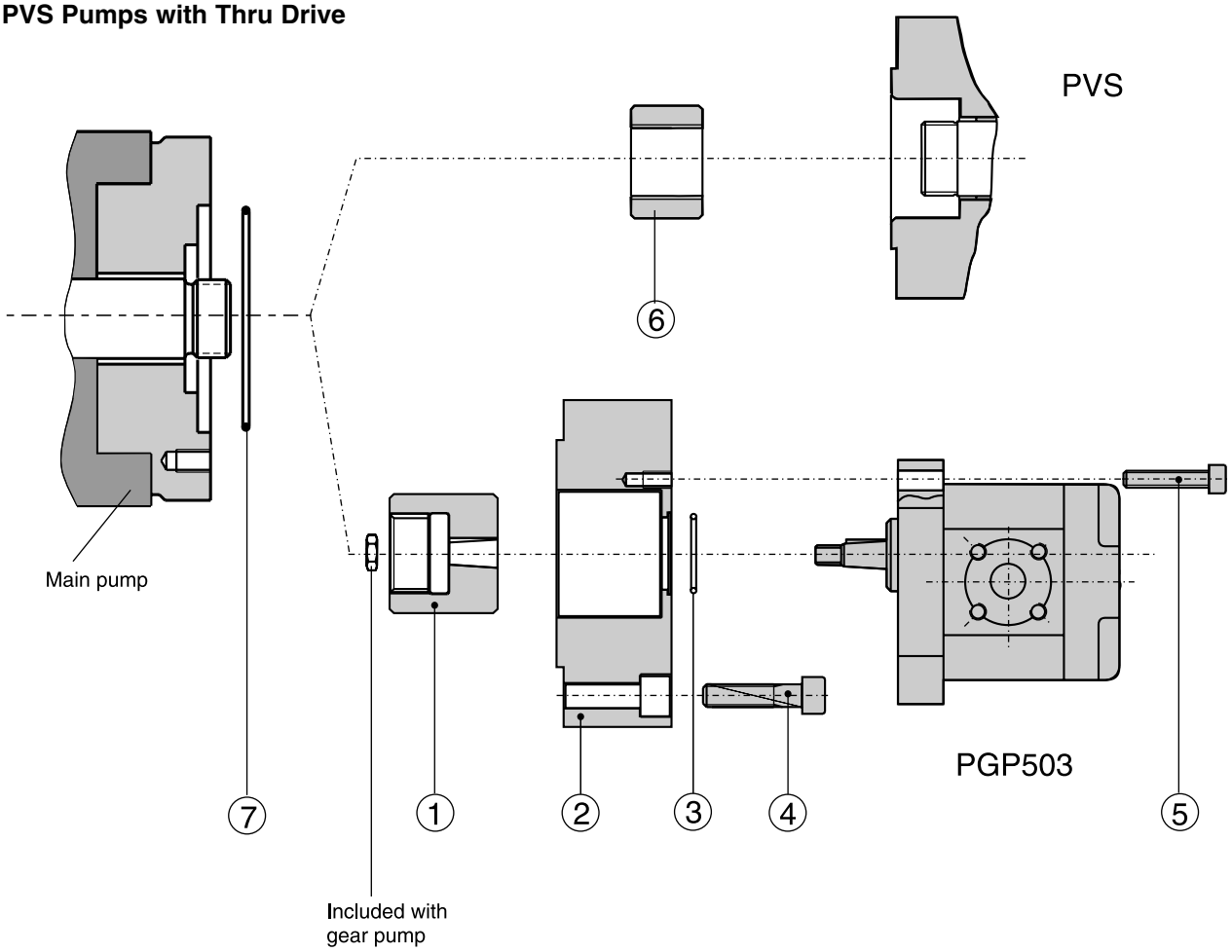




compensator mounting optional 90°.

Pump	L	D	F	G	Thru drive shaft "W"	M1	M2	M3	E1	E2	E3
PVS 08 or 12	133	80^{H7}	7	4.5	B20x17 DIN 5482	M8	-	-	100	-	-
PVS 16 or 25	146				B28x25 DIN 5482	M8	M10	-	100	125	-
PVS 32, 40, or 50	177				B28x25 DIN 5482	M8	M10	M12	100	125	160

PVS Pumps with Thru Drive



The drawing displays the mounting possibilities for Parker pumps. Other pumps on request.

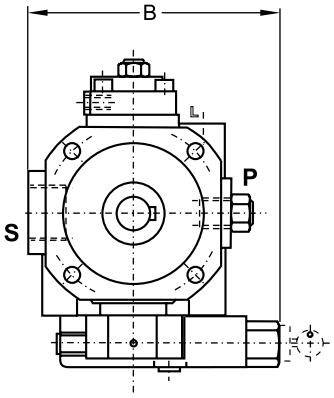
Table

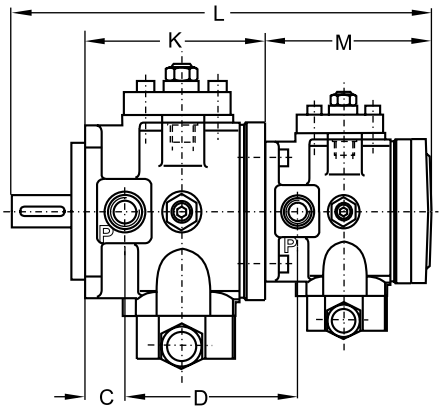
Mounting parts for pump combinations

Main pump	Second pump	Coupling Pos.: 1	Adapter Pos.: 2	O-Ring Pos.: 3	Screw Pos.: 4	Screw Pos.: 5	Coupling Pos.: 6	O-Ring Pos.: 7
PVS 08-12	PVS 08-12	-	-	-	-	-	HR10047482	2-151-V747-75
	PGP503	HR10056670	HR10056667	HR01090121	M8x35	M6x25	-	2-151-V747-75
PVS 16-25	PVS 08-12	-	-	-	-	-	HR10047479	2-151-V747-75
	PVS 16-25	-	-	-	-	-	HR10047342	2-151-V747-75
	PGP503	HR10056673	HR10056667	HR01090121	M8x35	M6x25	-	2-151-V747-75
PVS 32-50	PVS 08-12	-	-	-	-	-	HR10047479	2-151-V747-75
	PVS 16-25	-	-	-	-	-	HR10047342	2-151-V747-75
	PVS 32-50	-	-	-	-	-	HR10047342	2-151-V747-75
	PGP503	HR10056673	HR10056667	HR01090121	M8x35	M6x35	-	2-151-V747-75

1

Combinations PVS/PVS



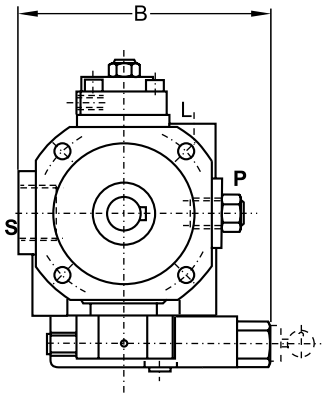


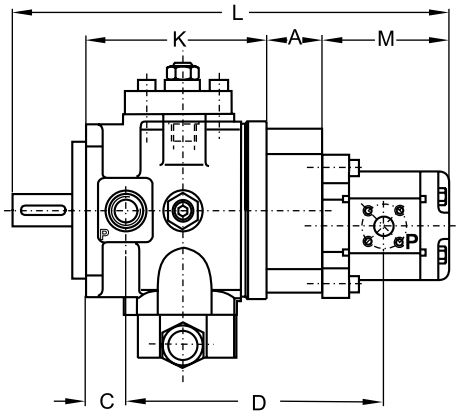
The compensators can only be mounted in the direction shown.

Main pump	Second pump	Interface main pump	B	C	K	M	D	L
PVS 08 or 12	PVS 08 or 12	80 B4 HW	163.5	34,5	133	149	133	326
PVS 16 or 25	PVS 08 or 12	100 B4 HW	171.5	30.5	146	149	150	347
	PVS 16 or 25					161.5	146	359.5
* PVS 32, 40, or 50	PVS 08 or 12					149	176	394
	PVS 16 or 25	125 B4 HW	193.5	35.5	177	161.5	172	406.5
	PVS 32, 40, or 50					192.5	177	437.5

* Without lock, the compensators can be optionally mounted rotated 90º, in the following combinations:
PVS 32/40/50 + PVS 16/25
PVS 32/40/50 + PVS 32/40/50

Combinations PVS/GP (gear pump)





Compensator can be optionally mounted, rotated 90°.

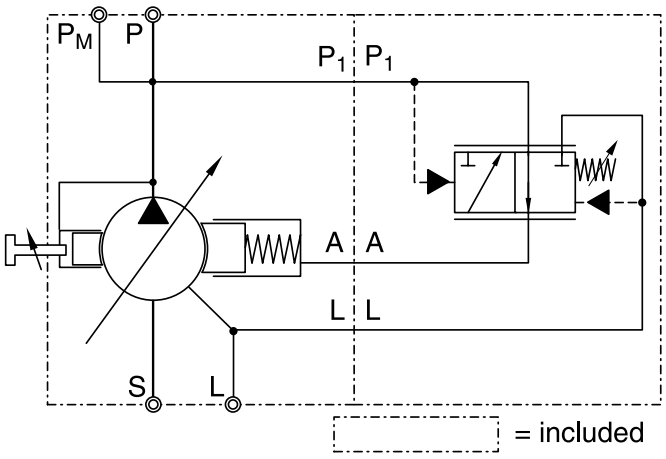
Main pump	Second pump	Interface main pump	A	B	C	D*	K	L*	M*
PVS 08 or 12		80 B4 HW		163.5	34.5	183.5	133	265	
PVS 16 or 25	PGP503	100 B4 HW	38	171.5	30.5	200.5	146	278	94
PVS 32, 40, or 50		125 B4 HW		193.5	35.5	226.5	177	309	

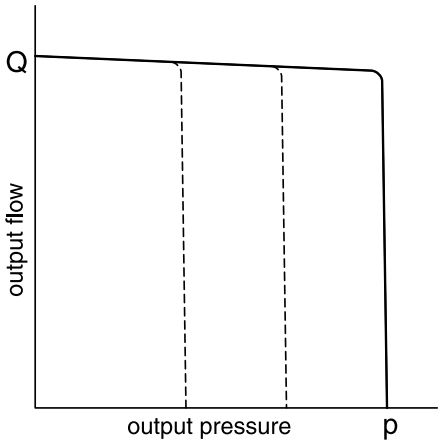
* maximum length with largest displacement of a gear pump frame size

Compensator type S

PV<u>S</u> - Standard-pressure compensator.
The pressure is mechanically adjustable via the preload of the pilot control cartridge spring.

Schematic diagram and performance curves

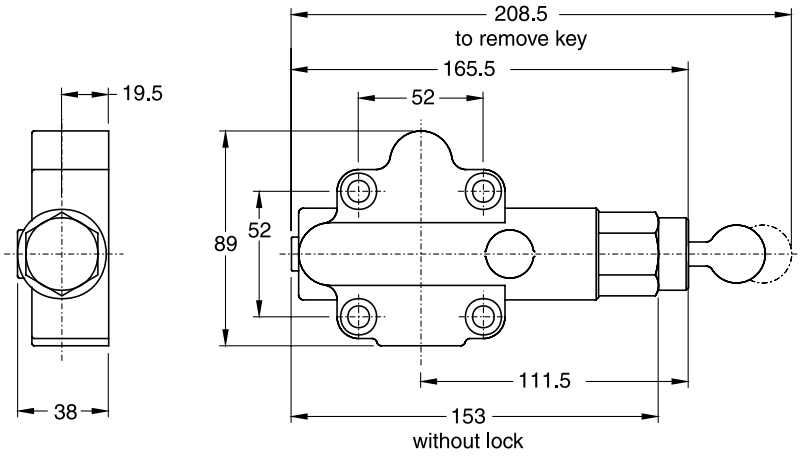




Task and function

When reaching the set pressure on the compensator, the pressure flow of the servo-controlled pump is automatically adjusted to the actual pressure flow requirement of the consumer.
Thus an undesired flow is avoided and only the required medium amount is delivered. As long as the system pressure is lower than the set pressure on the compensator, the stroke ring is kept in the position of maximum eccentricity, so that the pump continues its full delivery. If the system pressure exceeds the set compensator pressure, the control valve opens, and the pressure on the control piston is relieved. The stroke ring is moved by the auxiliary piston up to the central position to the point where the pressure flow corresponds to the system requirements at the set pressure. The pump is regulated.

Dimensions

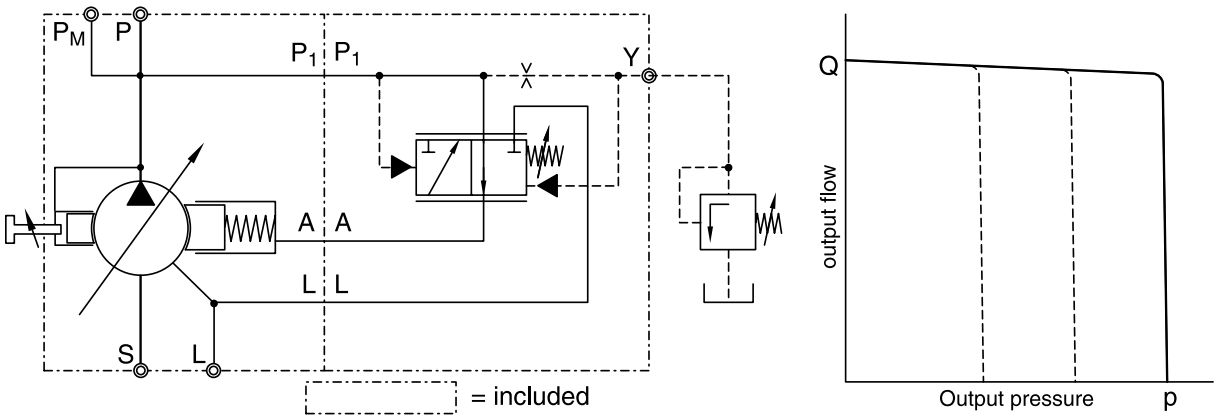


1

Compensator type Y

PVY - Remote controlled pressure compensator.
Pressure is adjustable hydraulically via pilot valve connected to Y port.

Schematic diagram and performance curves



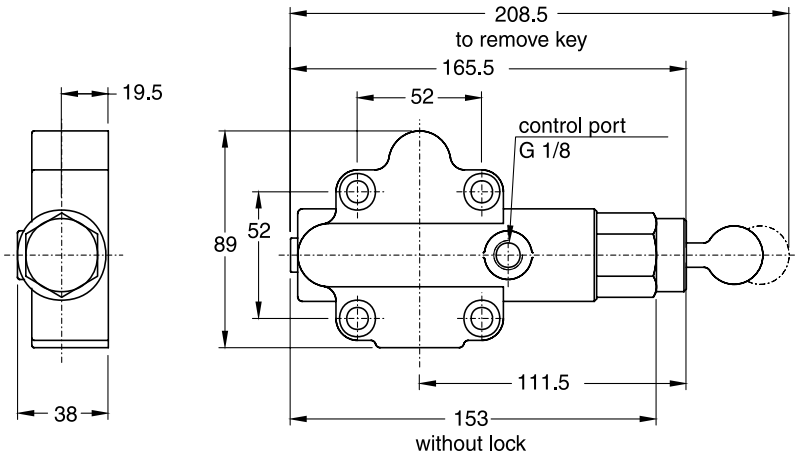
Task and function

The range of application for the remote control compensator is similar to the proportional compensator. The pump can be mounted in an inaccessible position (e.g. in an oil container). It is possible for the operating personnel to adjust the desired system pressure via a pressure limiting valve from a remote control desk.
It should be noted however, that the response times for the pump increase with increasing control cable length.
The remote control compensator functions in principle like a pilot-operated pressure limiting valve. In contrast to the servo pressure compensator, the force contained in the equilibrium of the system pressure on the compensator piston is applied not only by the compensator valve spool, but also by additional pressure from the spool area together with an external pilot valve (pressure limiting valve). The actual control process in the pump corresponds to that of the servo pressure compensator (an external pilot valve is not included with the pump).

Note

For safety reasons, the Y port of the remote control compensator must never be closed. Otherwise, the pump will not compensate.

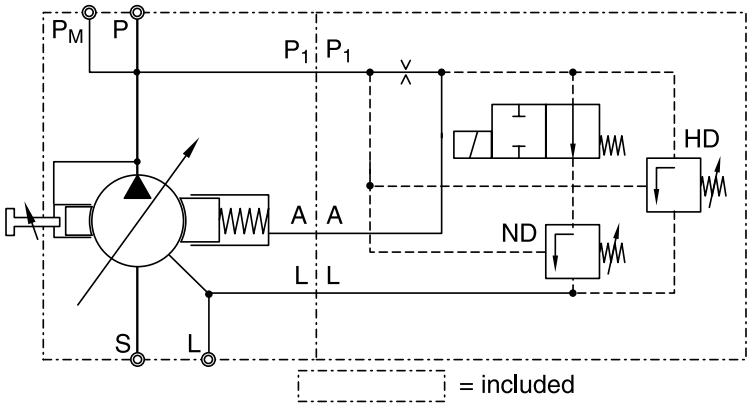
Dimensions

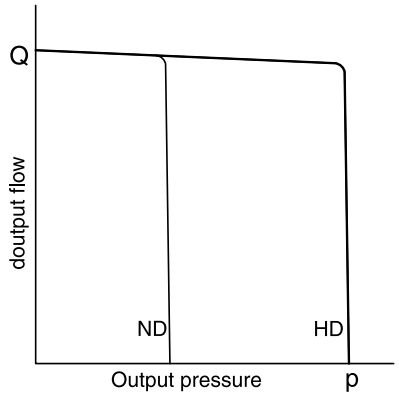


Compensator type D
Low pressure – high pressure

PVD_ – Two stage pressure compensator.
High pressure and low pressure mechanically adjustable via spring pre-loading, electric switching.

Schematic diagram and performance curves



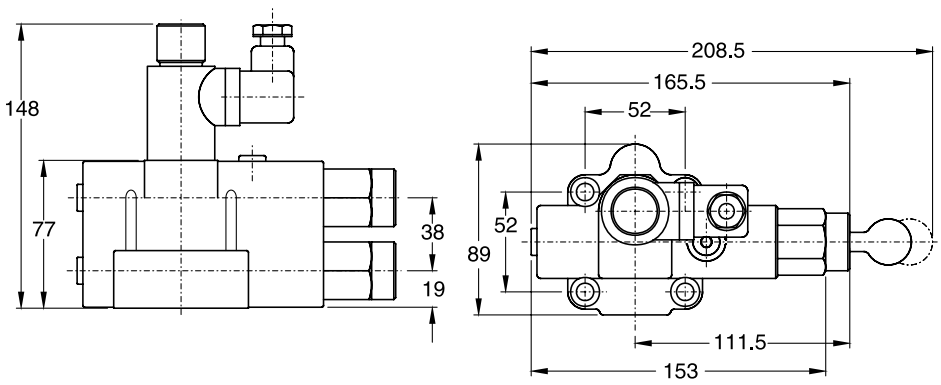


Task and function

The double pressure compensator offers the user the possibility to electrically select between two different pressures. Hydraulic systems, where a higher pressure is only needed in peaks, can be created to be very energy-saving, based on such a design. The double pressure compensator can also be labelled as a double servo pressure compensator, divided into low and high pressure stages. Both compensator pistons are connected together via an integrated directional valve.

Initially both compensator pistons are pressurised with system pressure at the unloaded directional valve. The compensator piston with the lower spring pre-loading is responsible for the system pressure. If the directional valve piston is changed over from LP to HP via electrical signal, the connection to the low pressure compensator piston is interrupted. Then, only the high pressure compensator piston is connected to the pilot oil space. The actual control process for the pump corresponds to one from a servo pressure compensator.

Dimensions

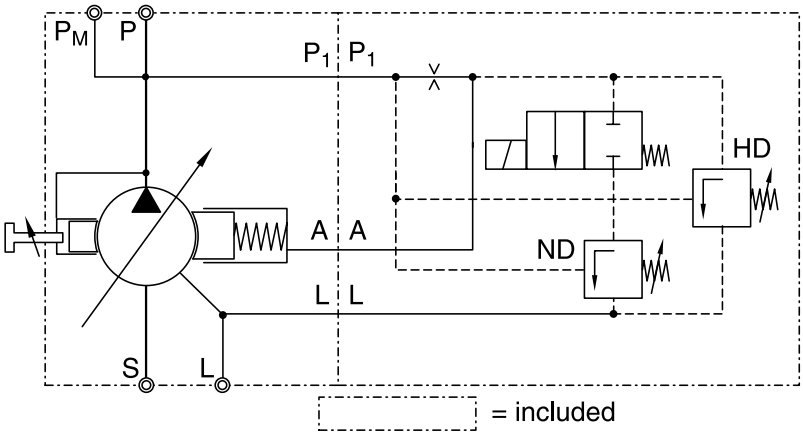


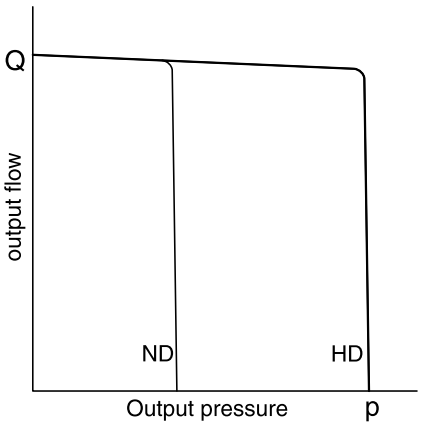
Compensator type H
Low pressure – high pressure

PVH – Two stage pressure compensator.
High pressure and low pressure mechanically adjustable via spring pre-loading, electric switching.

1

Schematic diagram and performance curves



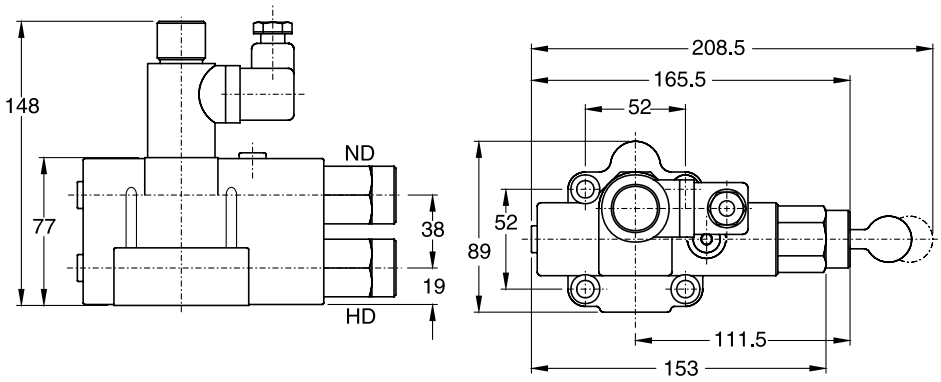


Task and function

The double pressure compensator offers the user the possibility to electrically select between two different pressures. Hydraulic systems, where a lower pressure is only needed for short intervals, can be created very easily, based on such a design. The double pressure compensator can also be labelled as a double servo pressure compensator, divided into low and high pressure stages. Both compensator pistons are connected together via an integrated directional valve.

Only the high pressure stage is pressurised with system pressure at the unloaded directional valve. If the directional valve piston is changed over from HP to LP via electrical signal, the connection to the low pressure compensator piston is created. Both compensator pistons are then connected with the pilot oil space. The compensator piston with the lower spring pre-loading is responsible for the system pressure. The actual control process for the pump corresponds to one from a servo pressure compensator.

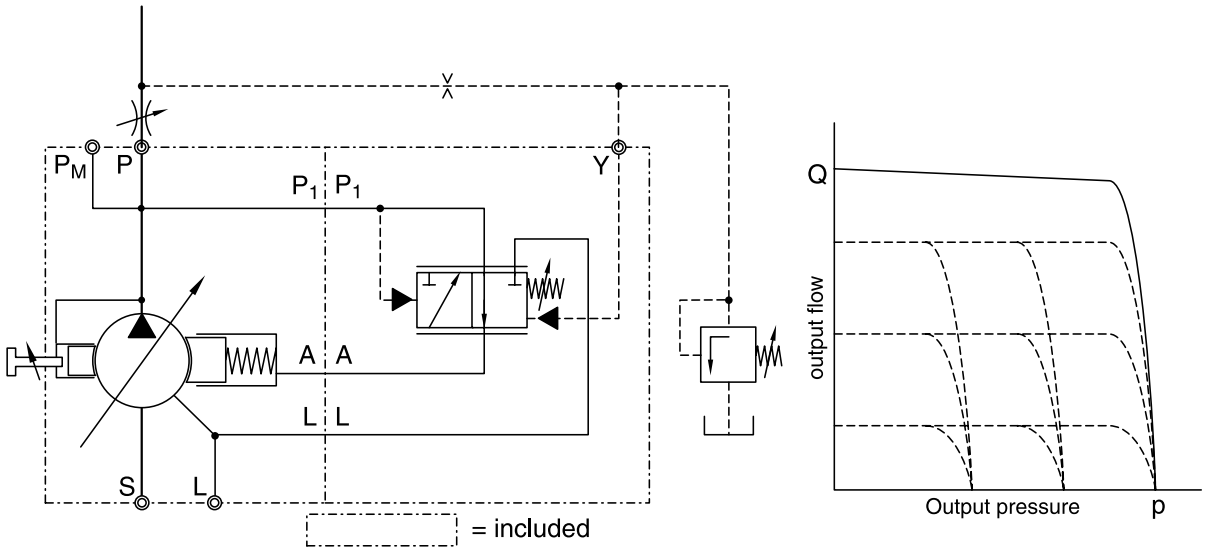
Dimensions



Compensator type M
Pressure flow compensator

PVM - Pressure flow compensator.
Flow adjustable via main stream throttle valve, load pressure independent flow control, no internal pressure compensation.

Schematic diagram and performance curves

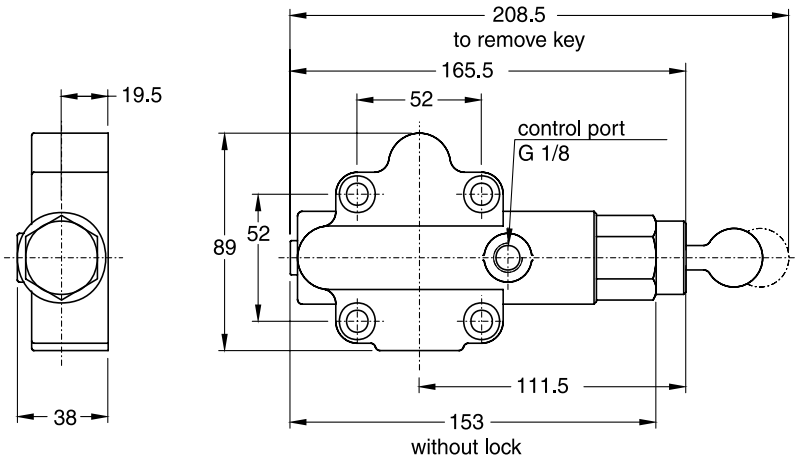


Task and function

The pressure flow compensator is responsible to keep the pressure flow of the pump to the metering position (orifice, choke, proportional valve, etc.) constant despite fluctuations in load and input speed. However, it must be remembered that this compensation is not possible at Q_{max}. To ensure proper control behaviour, a maximum of approx. 2/3 Q_{max} should be worked with. The necessary constant pressure differential is achieved for constant flow at the metering position by directing both pressures (pressure before and after the metering position) on to the compensator piston, such that the lower pressure (pressure behind the metering position) with the compensator valve spool works against the pump pressure (2 way pressure compensator function). (Throttle and external pressure limiting valve are not included with the pump).

Note
When using the pressure flow compensator, max. pressure protection via an external pressure limiting valve is absolutely necessary. Otherwise, the pump will not compensate.

Dimensions



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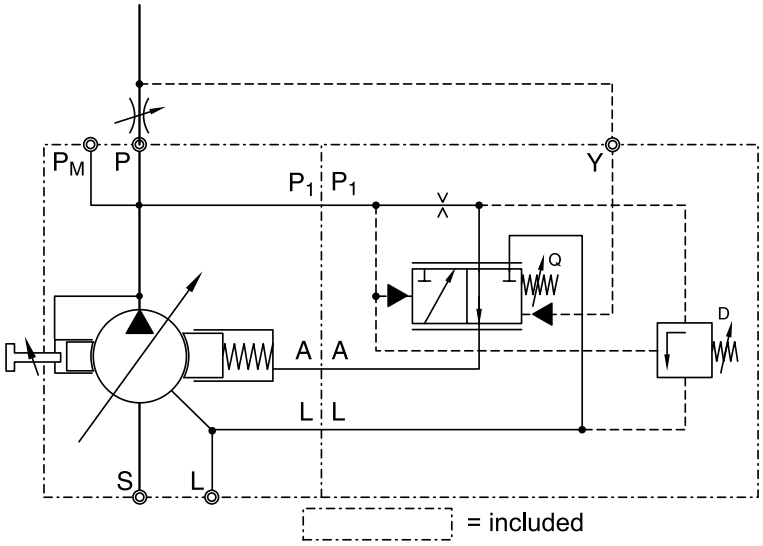
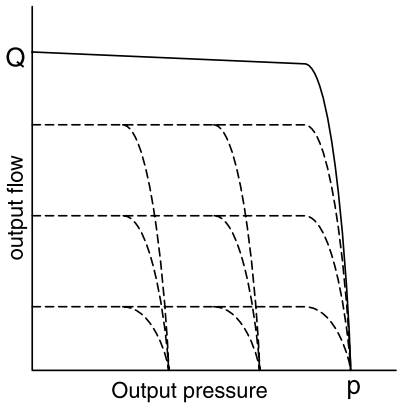
Compensator type K
Pressure flow pressure compensator

PVK - Pressure flow - pressure compensator.
Flow adjustable via main stream throttle valve, pressure mechanically adjustable via pre-load spring, load pressure independent flow control.

Schematic diagram and performance curves

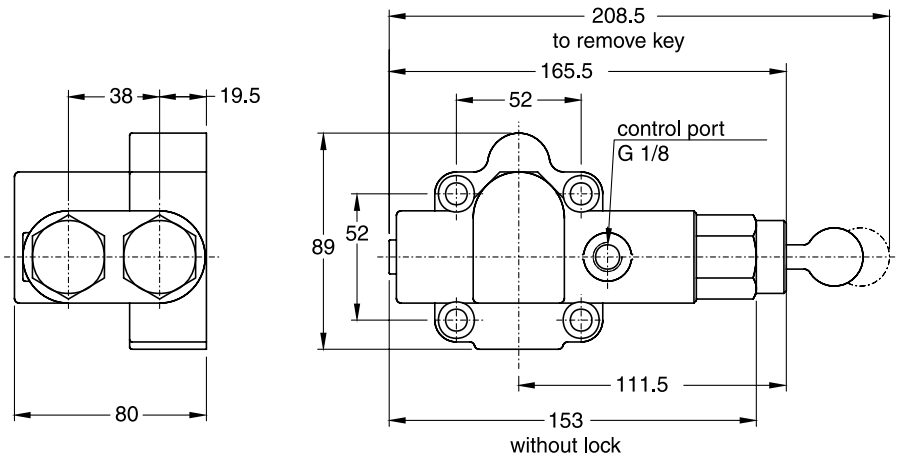




Task and function

The pressure flow - pressure compensator is a compensation device that was specially designed for use in load sensing systems. The displacement control is executed dependent on load, i.e. the optimal ratio of pressure and flow are set independent of pending load pressure on the consumer (e.g. hydro-motor). A characteristic feature of all load sensing compensators is the feedback of the load pressure (Y). In systems with variable load pressures, this control is characterised by the energetic and functional superiority compared to conventional compensators. On the compensator are two basic system-dependant settings undertaken, the setting for the differential pressure (Δp) necessary for the pressure flow (Q) and the setting of the maximum pressure (D). The setting (Q) is a result of the differential pressure (Δp) with which a metering position is flown through (orifice, choke, proportional valve, etc.). If the load pressure is altered at the consumer or the pressure in the feedback (Y), the pump decreases or increases its pressure until the differential pressure set on (Q) is reached again (2 way pressure compensator function). This process takes place continuously, up until the pressure set on (D) is reached.

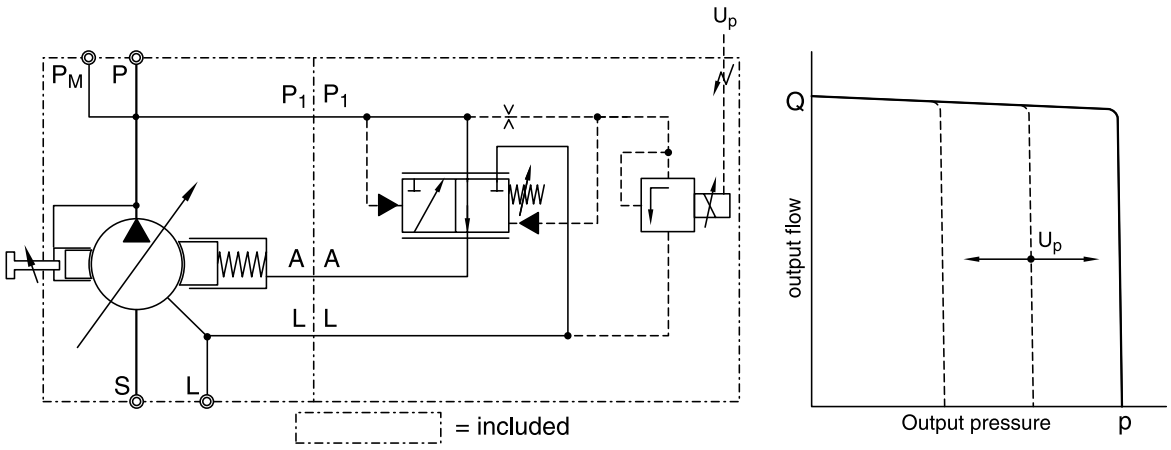
Dimensions



Compensator type L
Proportional pressure compensator

PVL - Proportional pressure compensator.
Pressure can be adjusted electrically using a proportional solenoid and control electronics.

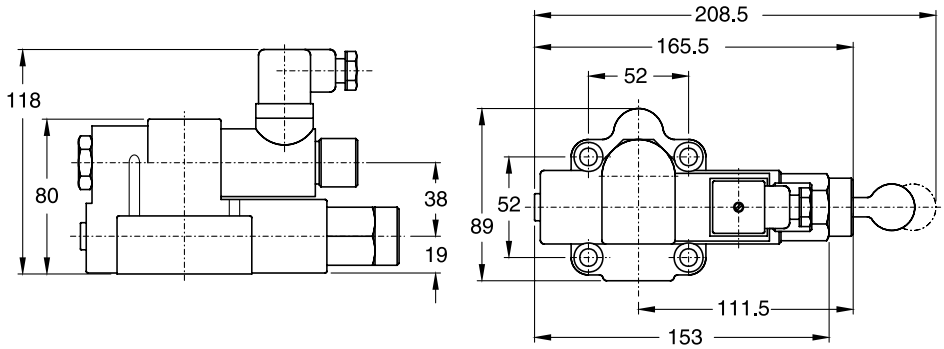
Schematic diagram and performance curves



Task and function

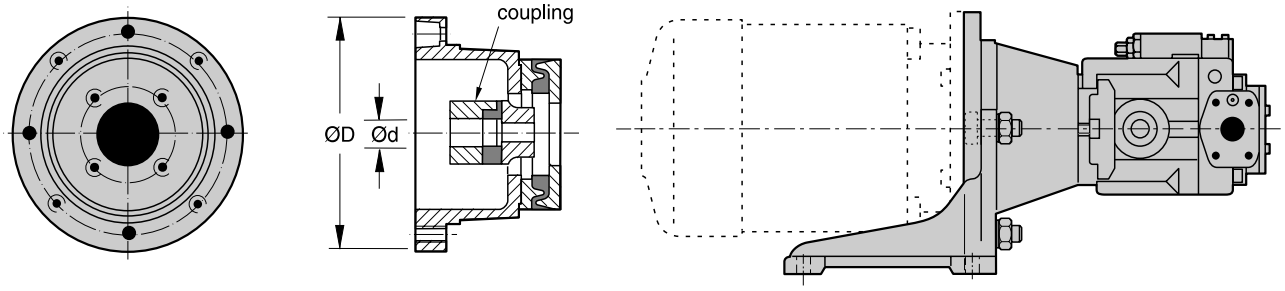
The range of application for the proportional compensator is similar to the remote control compensator. The pump can be mounted in an inaccessible position. It is possible for the operating personnel to adjust the desired system pressure from a remote control desk, manually or by a program.
Further advantages are the controllable process of the transition between various command settings, the reproducibility of the control pressure, and fast response times. The principle of the proportional compensator is similar to the servo pressure compensator. Setting the pressure does not take place at the compensator, but instead through infinitely variable control via a pilot valve with proportional solenoid.

Dimensions



1

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

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

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. 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.

Filtration

For maximum pump and system component function-ability 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 (µm):

General hydraulic systems for satisfactory operation:

Class 19/15, to ISO 4406
x = 25 µm ($ß_{25} \geq 75$) to ISO 4572

Hydraulic systems with maximised component life and functionability:

Class 16/13, to ISO 4406
x = 10 µm ($ß_{10} \geq 75$) 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.

Installation and mounting

Horizontal mounting: Outlet port side or top, inlet port side or bottom. Drain port always uppermost.
Vertical mounting: Shaft pointing upwards
Inlet (suction side): 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° 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 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 aerated oil will not be recirculated.

For the same reason, when the pump is mounted inside the reservoir, the drain line should be arranged in such a way that a siphon is created. This ensures that the pump is always filled with fluid. The drain pressure must not exceed 1 bar. Drain line length should not exceed 2 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. Bell housings 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. An axial load on the pump shaft is not permitted.

Start up

Prior to start up, as well as after long stand-still periods when it is possible that the pump body could have been emptied, 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. A quick on and off switching (inching mode) makes priming easier and enables quick filling of the displacement space in the pump.

Attention: Check motor rotation direction. See also the statements on hydraulic fluids in Chapter 12.