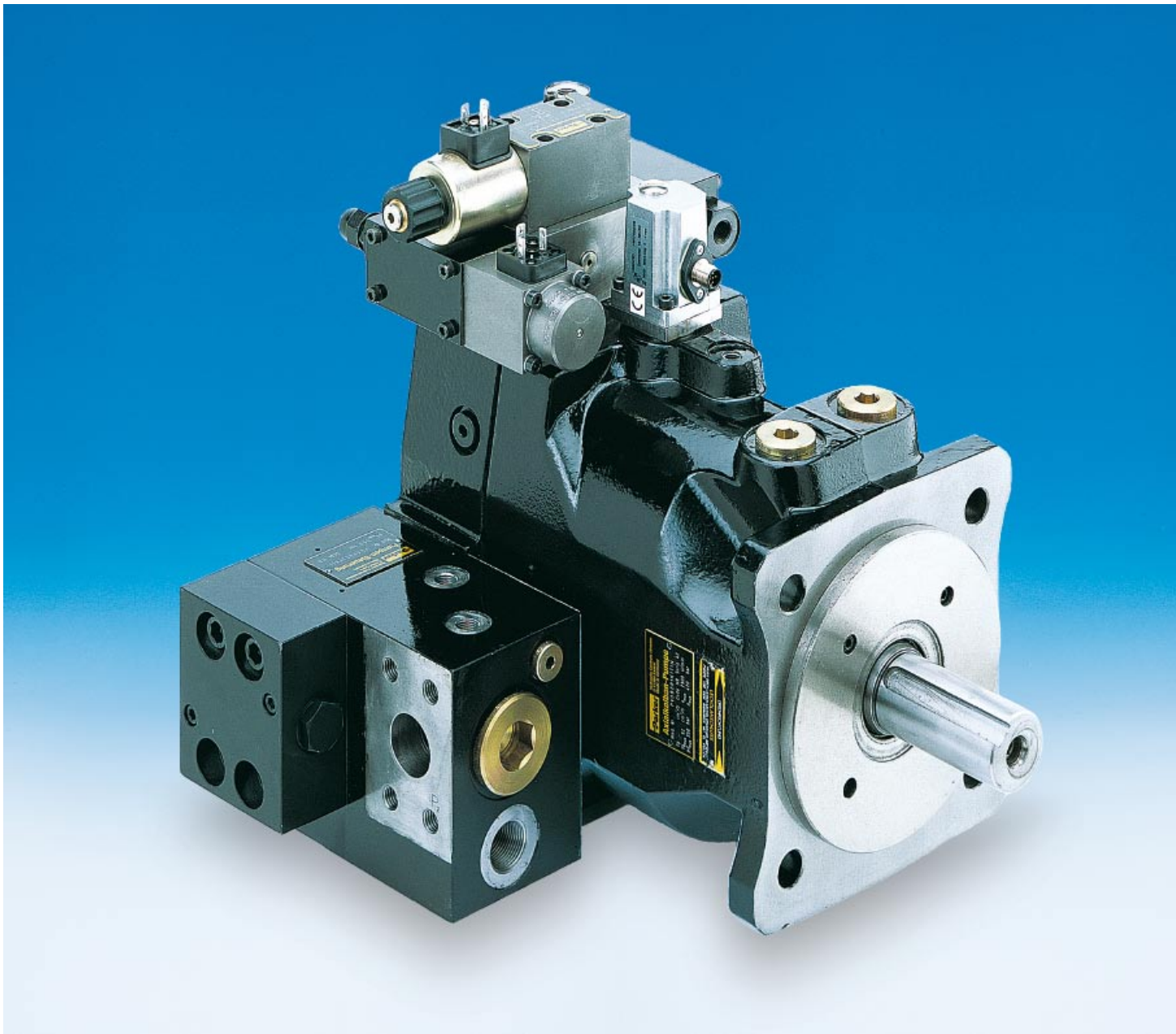
Axial Piston Pump
Series PV

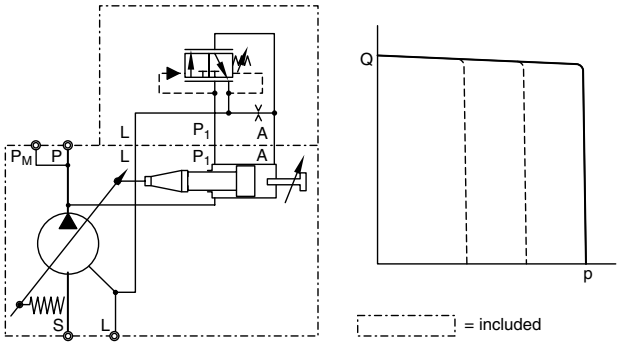
Variable Displacement

Catalogue HY30-3243/UK
April 2006

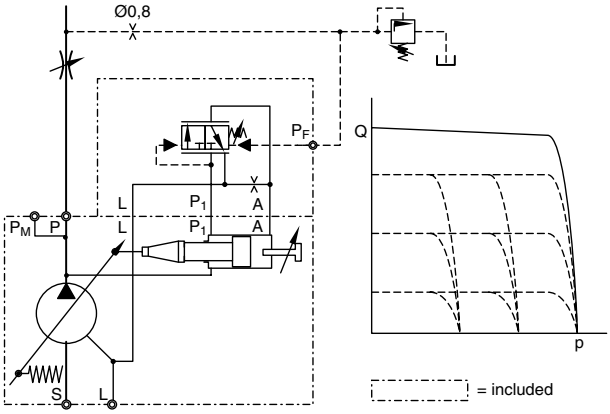


Contents Page

Pump with Standard Pressure Compensator, code F*S

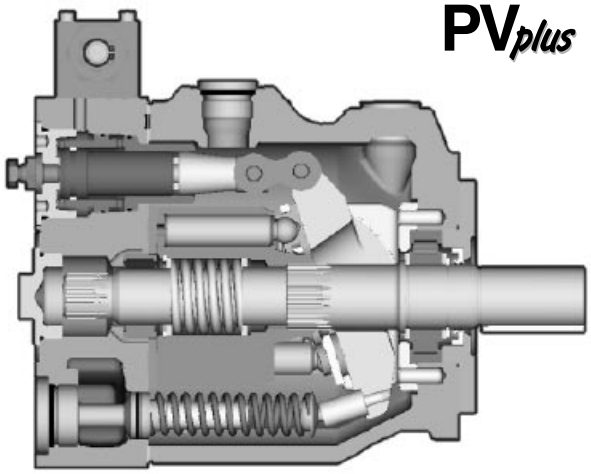


Pump with Load-Sensing Compensator, code FFC



With thru drive for single and multiple pumps

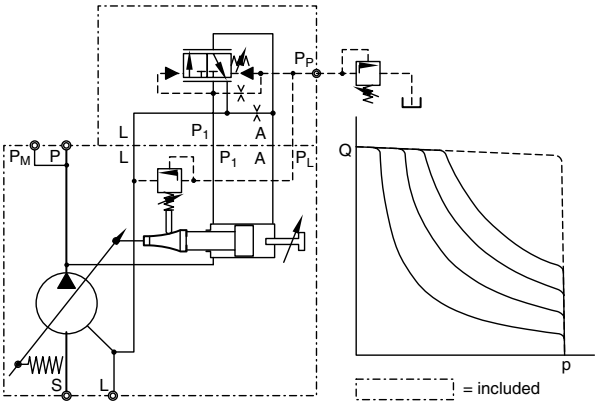
Swash plate type for open circuit



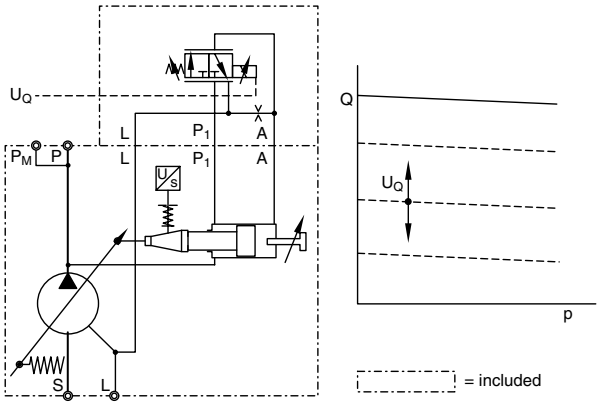
Technical Features

- Mounting interface according to VDMA-standards sheet 24560 part 1
- Standard: 4-hole flange ISO 3019/2 (metric)
- Large servo piston with strong bias spring achieves fast response; e.g. for PV042
  upstroke < 75 ms
  downstroke < 45 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 12-15 bar
- 9 piston and precompression technology (precompression 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 with Power Compensator, code *LB



Pump with Electrohydr. Displacement Control, code FPV



Parker Hannifin
Pump and Motor Division
Chemnitz, Germany

Technical data

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

1) max. 20% of working cycle
2) peak pressure only


Pump with Standard Pressure Comp.

Pump with Power Comp.


Combination PV/PV


Combination PV/PGP

Selection table

Model	Max. displacement [cm^3/rev]	Output flow at 1500 min^{-1} [l/min]	Input power at 1500 min^{-1} and 350 bar [kW]	Max speed * [min^{-1}]	Moment of inertia [kgm^2]	Weight [kg]
PV016	16	24	15.5			
PV020	20	30	19.5	3000	0.0017	19
PV023	23	34.5	22.5			
PV063	63	94.5	61.5	2800		
PV080	80	120	78	2500	0.018	60
PV092	92	138	89.5	2300		
PV140	140	210	136	2400	0.030	90
PV180	180	270	175	2200		
PV270	270	405	263	1800	0.098	172

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

PV | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ ☐

Axial piston pump variable displacement high pressure version

Size and displacement

Rotation

Variation

Mounting code

Threads

Thru drive

2nd pump

Seals

Compensator

Pump Design series: (not required for order)

Compensator

see opposite page →

Code	Displacement
016	**16 cm³/rev**
020	**20 cm³/rev**
023	**23 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	Rotation [1]
R	**Clockwise**
L	Counter clockwise

[1] When looked on shaft

Code	Variation
1	**Standard**
9	Reduced displacement adjusted [2]

[2] For order specify displacement.

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

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

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

[4] Drain, gauge and flushing ports

[5] All mounting and connecting threads

[6] For PV063-PV180 only: pressure port 1 1/4" with 4 x M14 instead of 4 x M12

Code	Seals
N	**NBR**
V	FPM
E	EPDM
W	NBR with PTFE shaft seal
P	FPM with PTFE shaft seal
S	EPDM with PTFE shaft seal

Code	2nd pump option[7]
1	**Single pump, no 2nd pump and coupling**
2	PV140 or PV180 mounted
3	PV or PVM pump mounted
4	Gear pump series PGP mounted

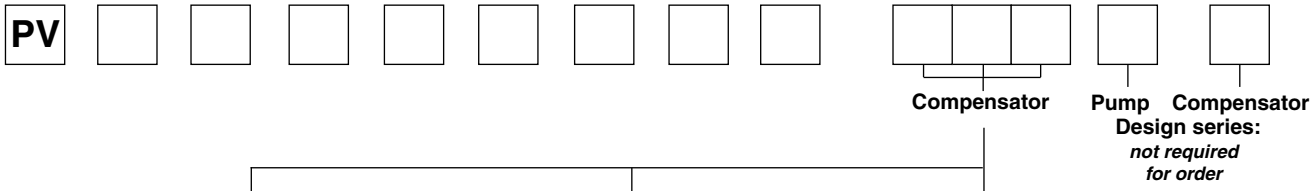
[7] Specify 2nd pump with full model code

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

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

Bold letters =
Short-term availability

Parker Hannifin
Pump and Motor Division
Chemnitz, Germany



Standard Pressure Compensator			
Code_			Compensator options
0	**0**	**1**	**No compensator**
1	**0**	**0**	**With coverplate, no control function**
F	**D**	**S**	**10 - 140 bar, spindle + lock nut**
F	**H**	**S**	**40 - 210 bar, spindle + lock nut**
F	**W**	**S**	**70 - 350 bar, spindle + lock nut**
			Remote Compensator options
F	**R**		**Remote pressure compensator**
F	S		Variation R, for quick unload valve
F	**F**		**Load-Sensing compensator**
F	T		Two valve load-sensing compensator
			Variations for Remote Compensator
		C	**External pressure pilot [13]**
		1	**NG6/D03 interface top side**
		2	**Like 1 but with ext. pilot port [15]**
		P	**Pilot valve PVAC1P* mounted**
		D	Proportional pilot valve type PVACPP* mounted
		L	Pilot valve with DIN lock mounted
		Z	Accessory mounted [14]

Power compensator									
Code			Displacement					Compensator option	
			016 023	063 092	140	180	270	Nom. power [kW] at 1500 min^{-1}	Nom. torque [Nm]
B			x					3	19.5
C			x					4	26
D			x					5.5	36
E			x					7.5	49
G			x	x				11	71
H			x	x				15	97
K			x	x	x			18.5	120
M				x	x	x		22	142
S				x	x	x		30	195
T				x	x	x	x	37	240
U				x	x	x	x	45	290
W				x	x	x	x	55	355
Y					x	x	x	75	485
Z					x	x	x	90	585
2						x	x	110	715
3							x	132	850
Function									
	L		x	x	x	x	x	Power compensator	
	C		x	x	x	x	x	Power compensator and load-sensing	
Variation									
		A	x	x	x	x	x	NG6 interface top side	
		B	x	x	x	x	x	No pressure compensation	
		C	x	x	x	x	x	Adjustable pressure compensation	
		D	x	x	x	x	x	Proportional pilot valve PVACPP* mounted	
		Z	x	x	x	x	x	Accessory mounted [14]	

Electrohydraulic compensator			
Code			Compensator option
			Pilot pressure supply
F			Standard (internal), no shuttle valve
U			Elbow manifold, compensator horizontal [16]
			Function
	P		Proportional displacement control
			Variation
		V	Standard, no pressure compensation
		R	Remote pressure comp. NG6 interface
		G	Variation R, Pressure sensor and proportional pilot valve mounted for pressure resp. power control
		D	Variation R, Proportional pilot valve PVACPP* mounted
		Z	Variation R, accessories mounted [14]
		S	Remote pressure comp., NG6 interface top side, for quick unload valve
		T	Variation S, pressure sensor and proportional pilot valve mounted for pressure resp. power control
		P	Remote pressure comp., NG6 interface top side, for preload and quick unload manifold
		E	Variation P, pressure sensor and proportional pilot valve mounted for pressure resp. power control

[16] not for *UPV

Note

Compensator differential Δp is to be adjusted:

Remote pressure comp., power comp. 15 ± 1 bar
(Codes FR*, FT*, *L*, *C*, FPR, FPD, FPZ, FPG)

With quick unload manifold 12 ± 1 bar
(Codes FS*, FPS, FPT, FPP, FPE)

Load-Sensing comp. (not power comp.) 10 ± 1 bar
(Codes FF*)

The ordering code PVACPP* correspond to the DSAE1007P07*

[13] Not for two-valve-compensator

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

[15] Only for Codes *FR* and *FT*

Bold letters =
Short-term availability

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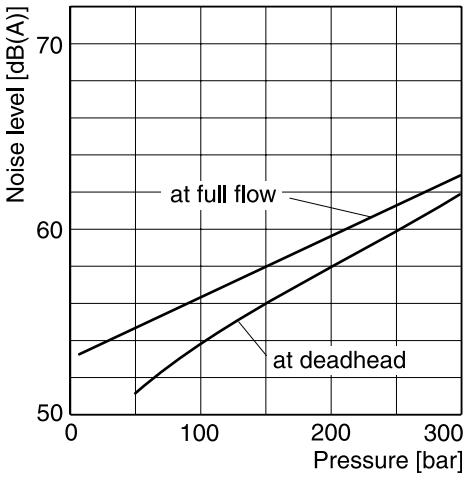
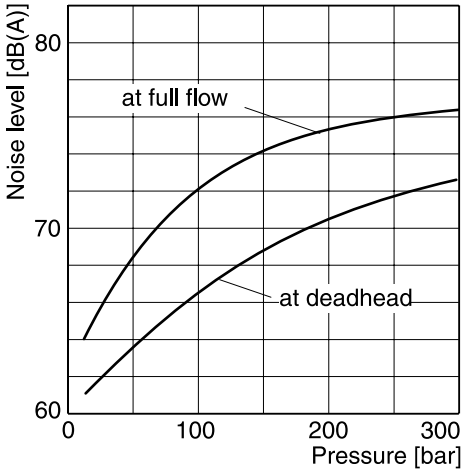
Pump and Motor Division
Chemnitz, Germany

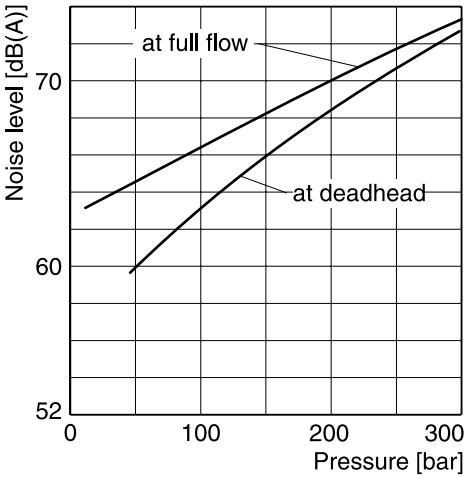
PV016 - PV023



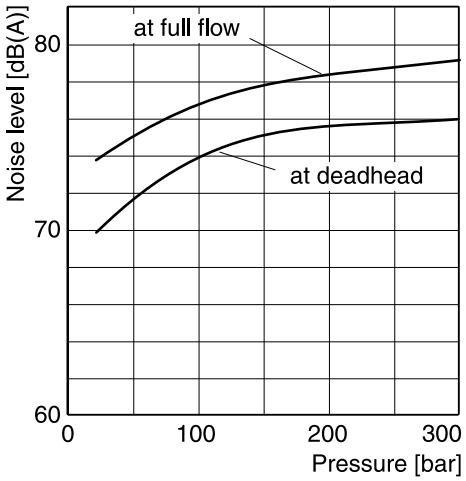
PV180



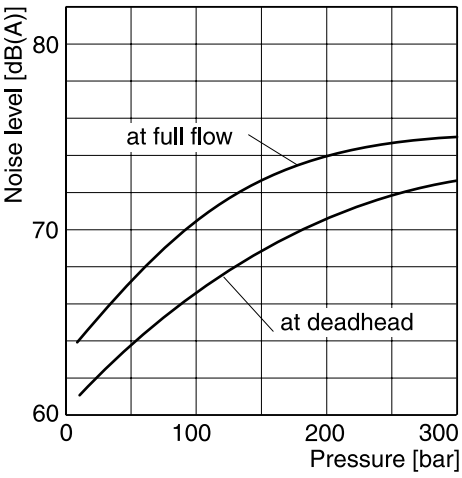
PV063 - PV092



PV270



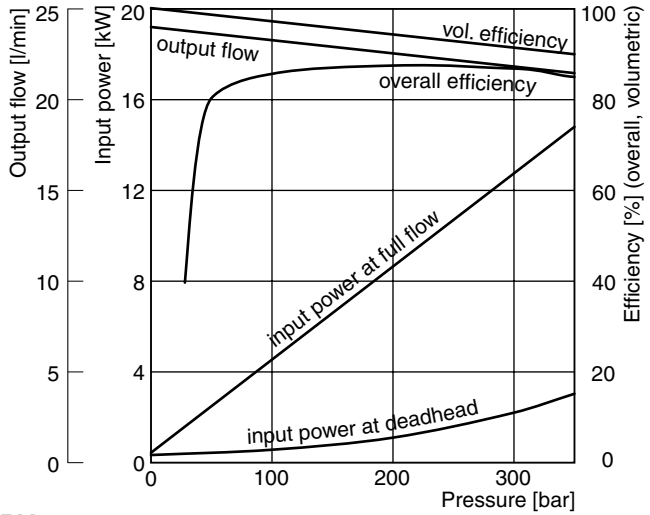
PV140



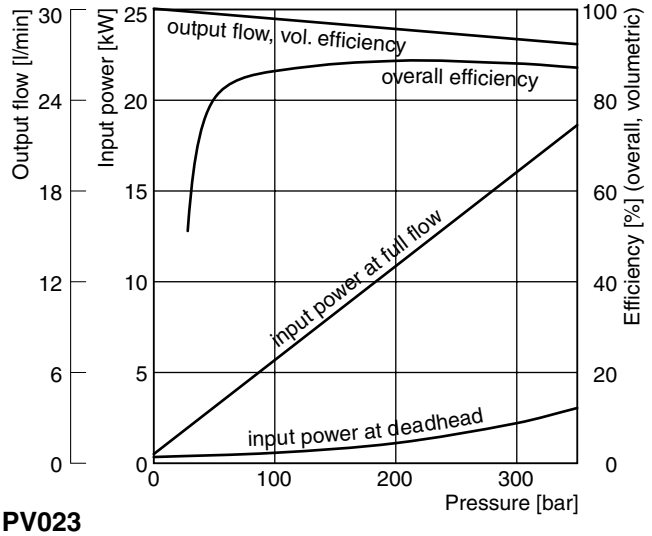
Typical sound level for single pumps, measured in unechoic chamber according to DIN 45 635, part 1 and 26. Microphone distance 1m; speed: n = 1500 min-1.

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

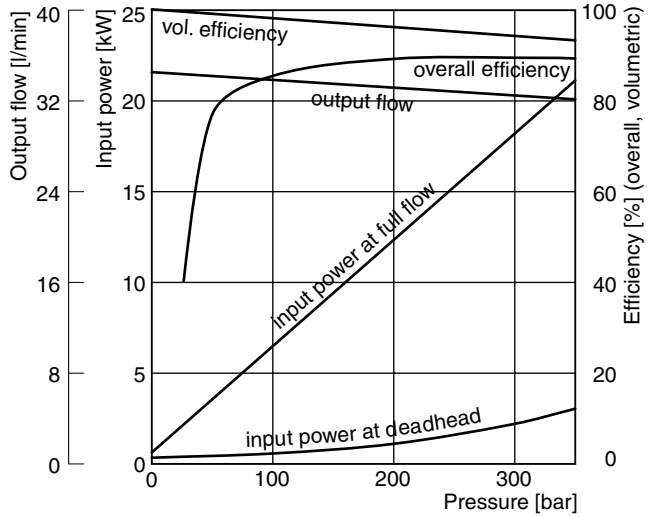
Efficiency, power consumption
PV016



PV020



PV023



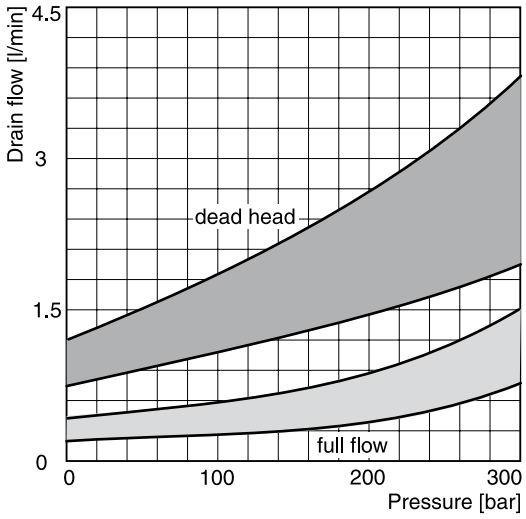
Efficiency and case drain flows PV016, PV020, PV023

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

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

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

Case drain flows PV016-023



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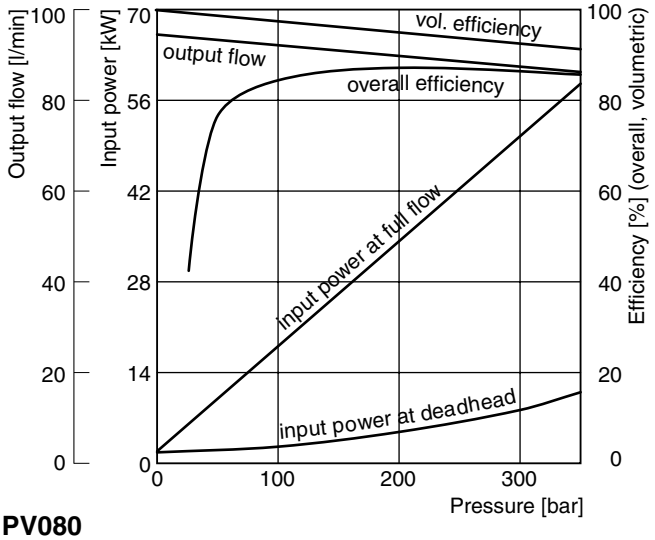
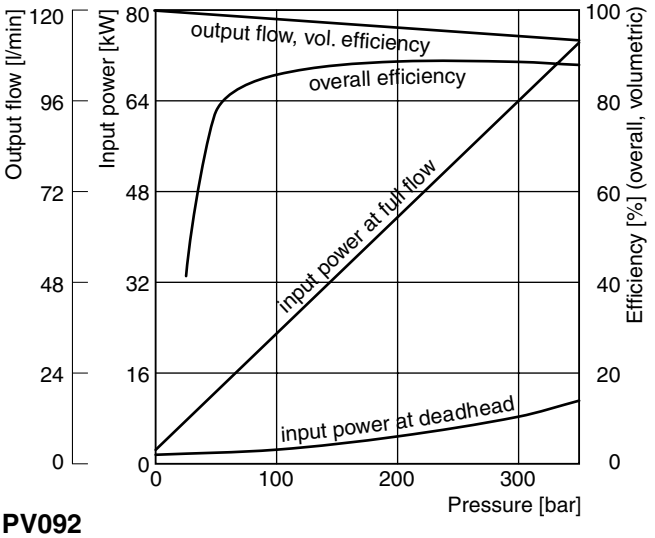
Efficiency, power consumption

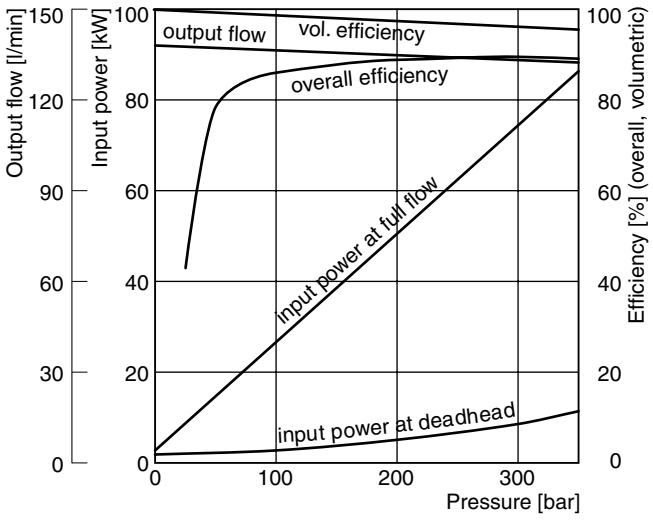
PV063



PV080



PV092



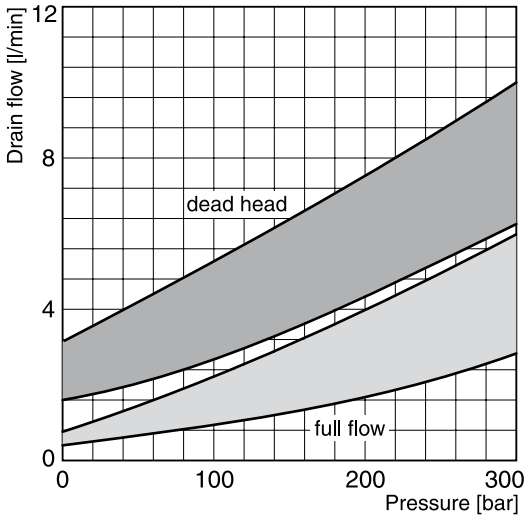
Efficiency and case drain flows PV063, PV080, PV092

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*, 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



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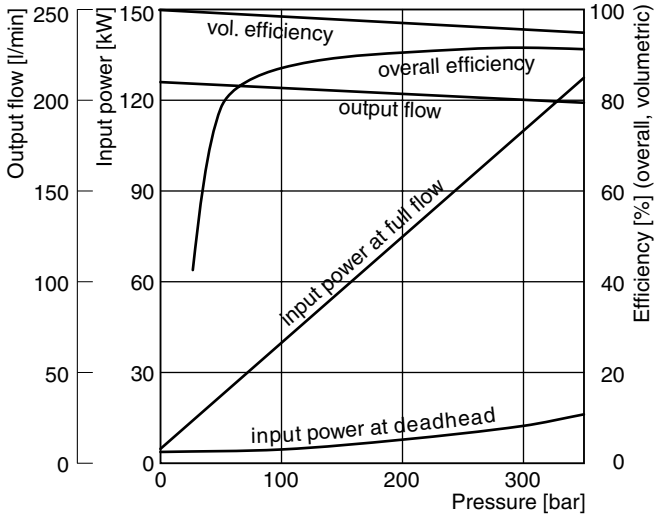
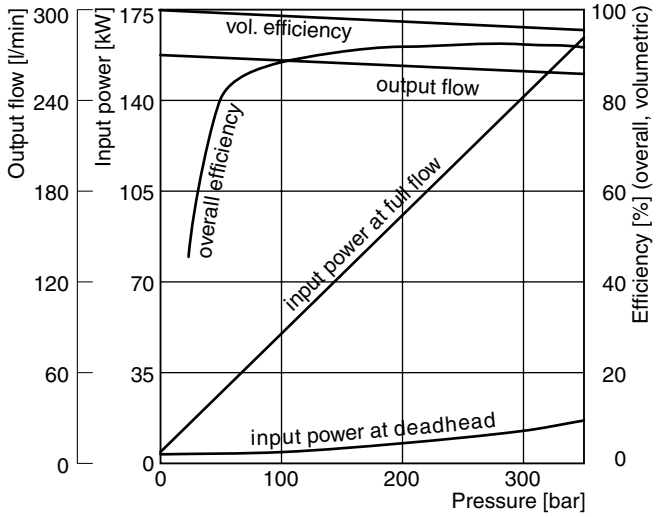
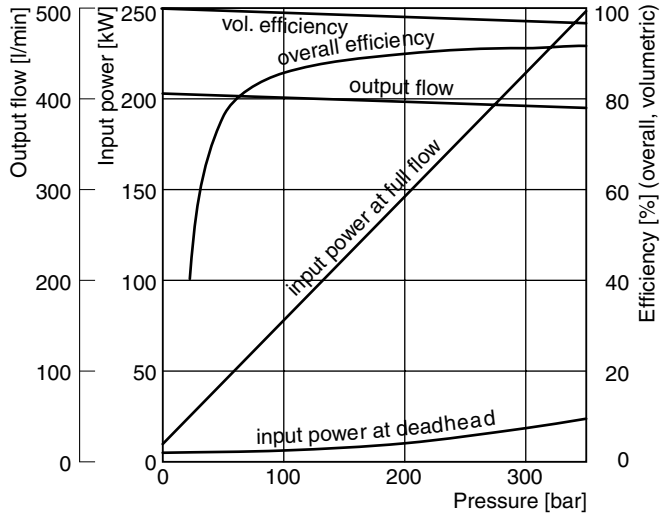
Efficiency, power consumption
PV140



PV180



PV270



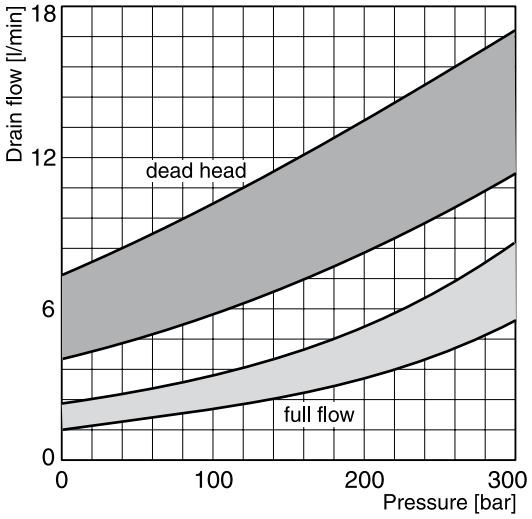
Efficiency and case drain flows PV140, PV180, PV270

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

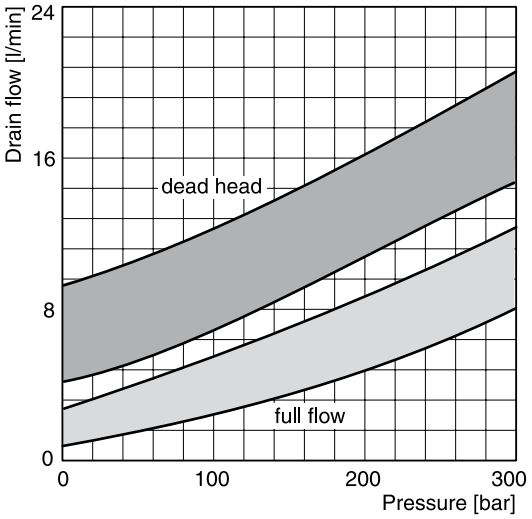
Case drain flow and compensator control flow leave via the drain port of the pump. To the values shown are to be added 1 to 1.2 l/min , if at pilot operated compensators (codes FR*, FF*, FT*, power compensator and p-Q-control) the control flow of the pressure pilot valve also goes through the pump.

Please note: The values shown below are only valid for static operation. Under dynamic conditions and at rapid compensation of the pump the volume displaced by the servo piston also leaves the case drain port. This dynamic control flow can reach up to 120 l/min! Therefore the case drain line is to lead to the reservoir at full size and without restrictions as short and direct as possible.

Case drain flows PV140-180



Case drain flows PV270



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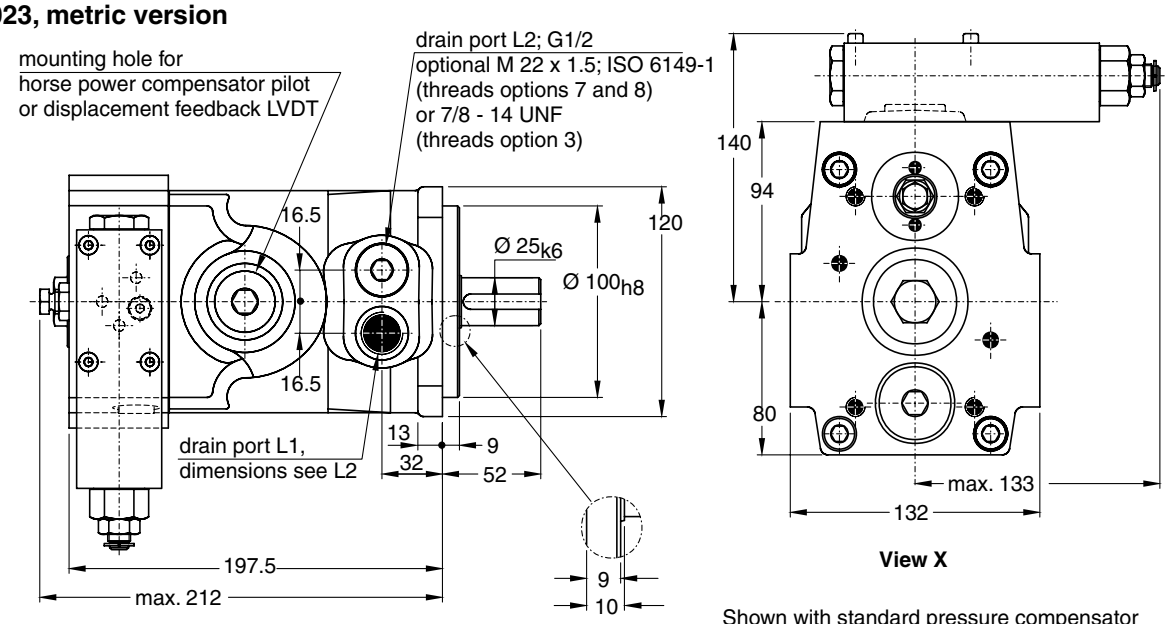
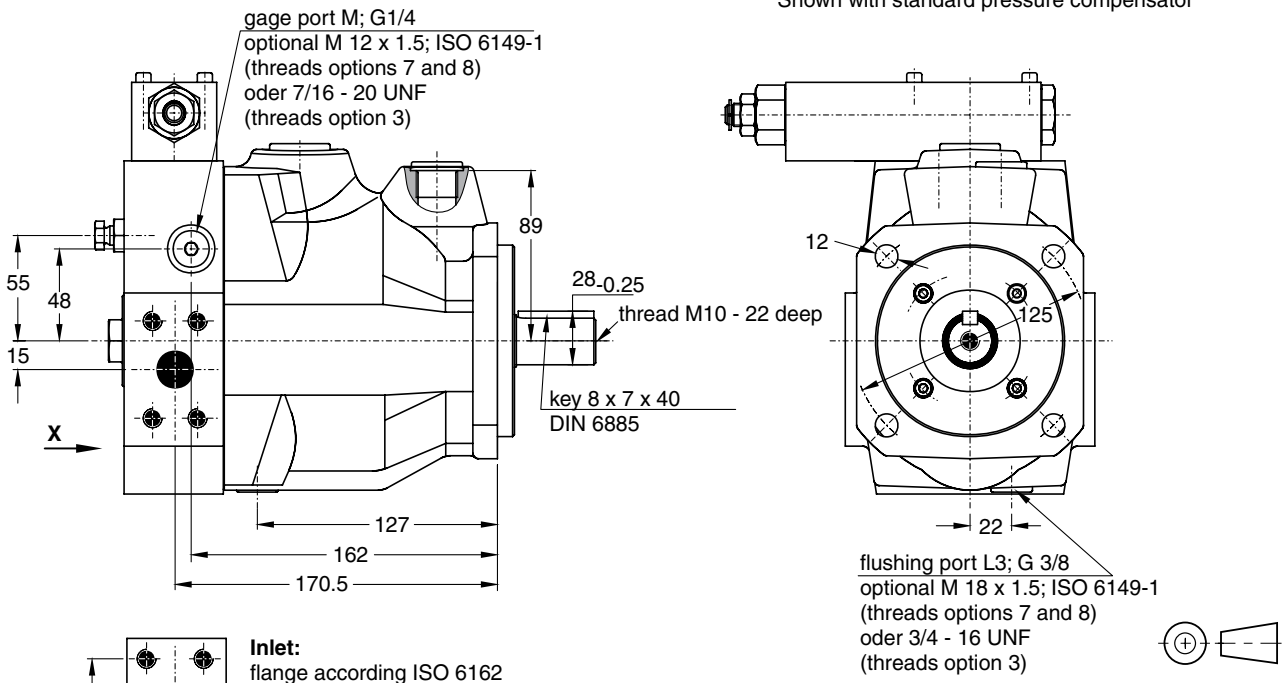
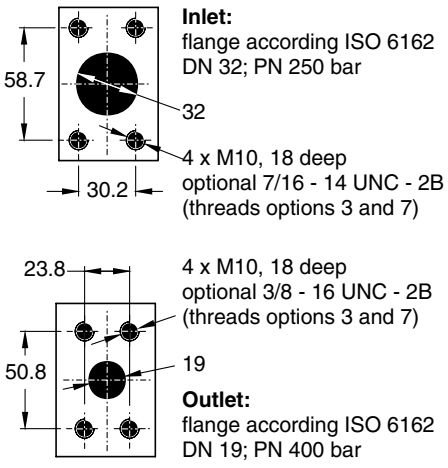
Chemnitz, Germany

PV016 - 023, metric version



Shown with standard pressure compensator





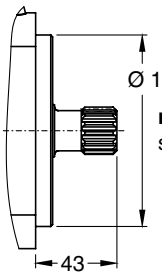
Inlet:
flange according ISO 6162
DN 32; PN 250 bar

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

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

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

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

For further information about flanges see catalogue No. 4039/UK „Pressure Hydraulic Flanges“ (on request).
Shown is a clockwise rotating pump. Counter clockwise rotating pumps have inlet, outlet and gauge ports reversed.

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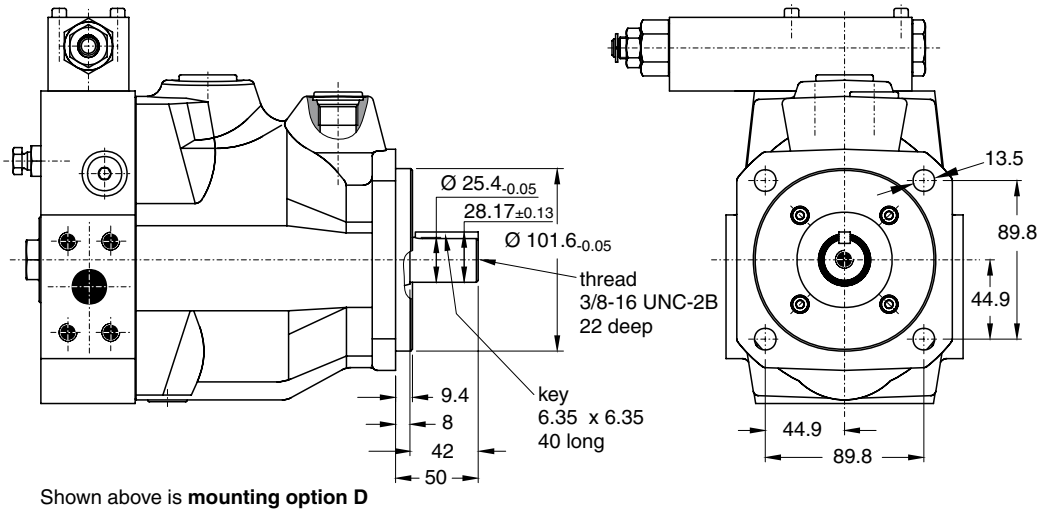
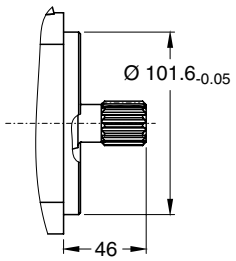
Chemnitz, Germany

PV016 - 023, SAE version and thru drive

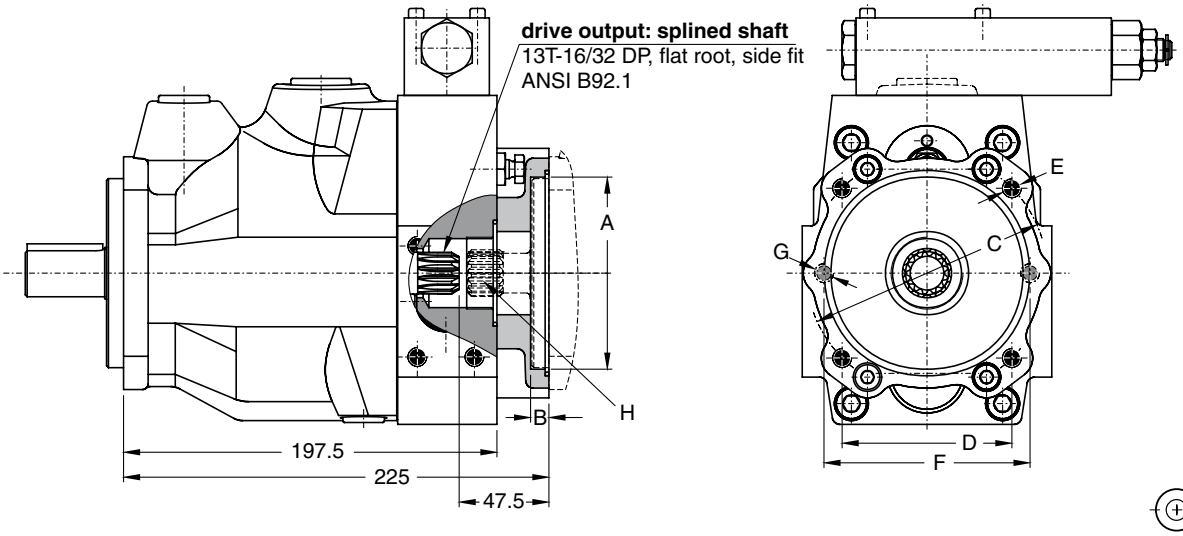


Shown above is **mounting option D**



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

Variation with thru drive



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

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

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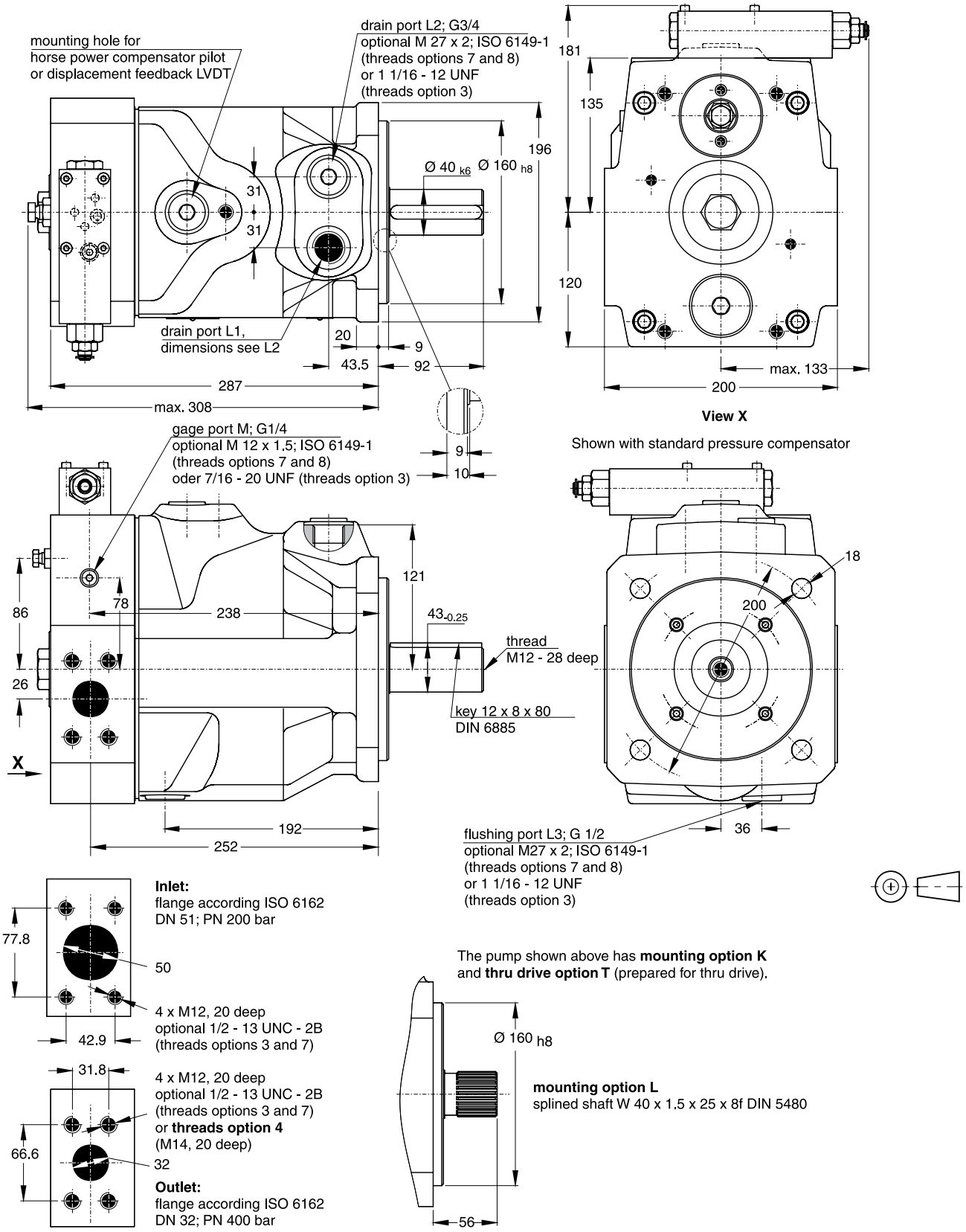
Pump and Motor Division
Chemnitz, Germany

PV063 - 092, metric version



For further information about flanges see catalogue No. 4039/UK „Pressure Hydraulic Flanges“ (on request).
Shown is a clockwise rotating pump. Counter clockwise rotating pumps have inlet, outlet and gauge ports reversed.

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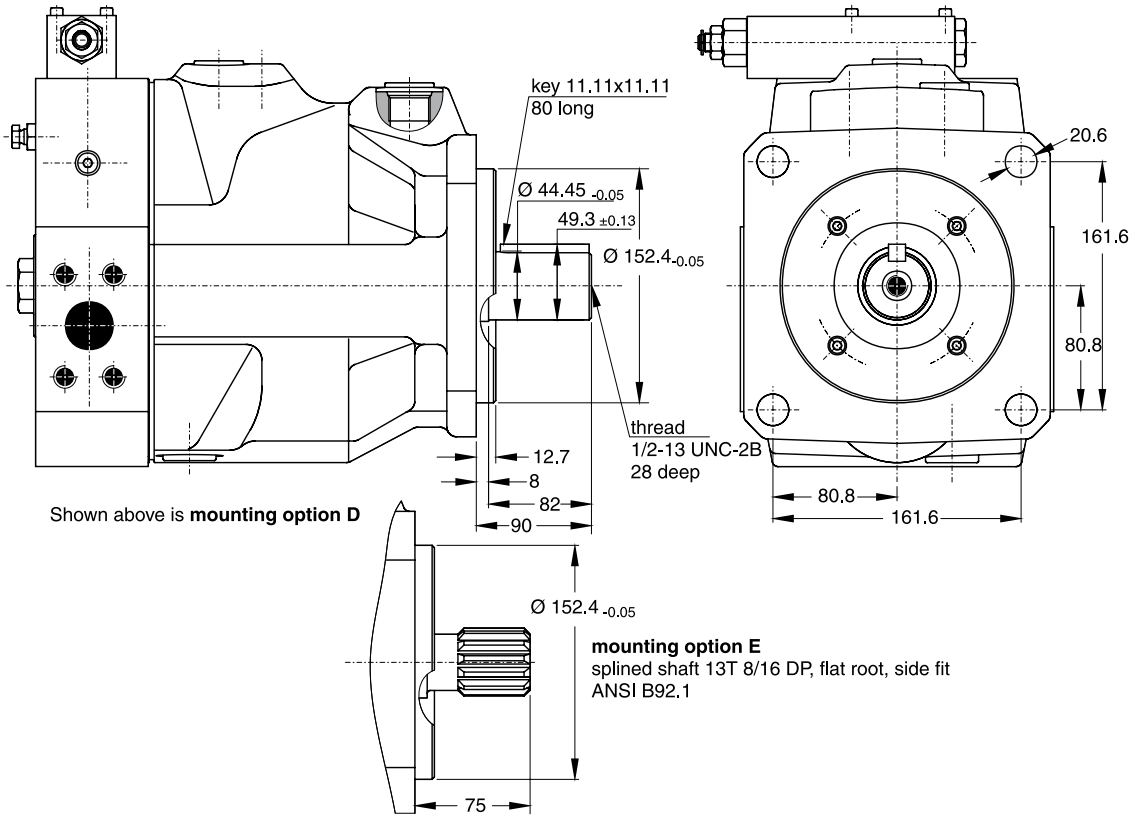
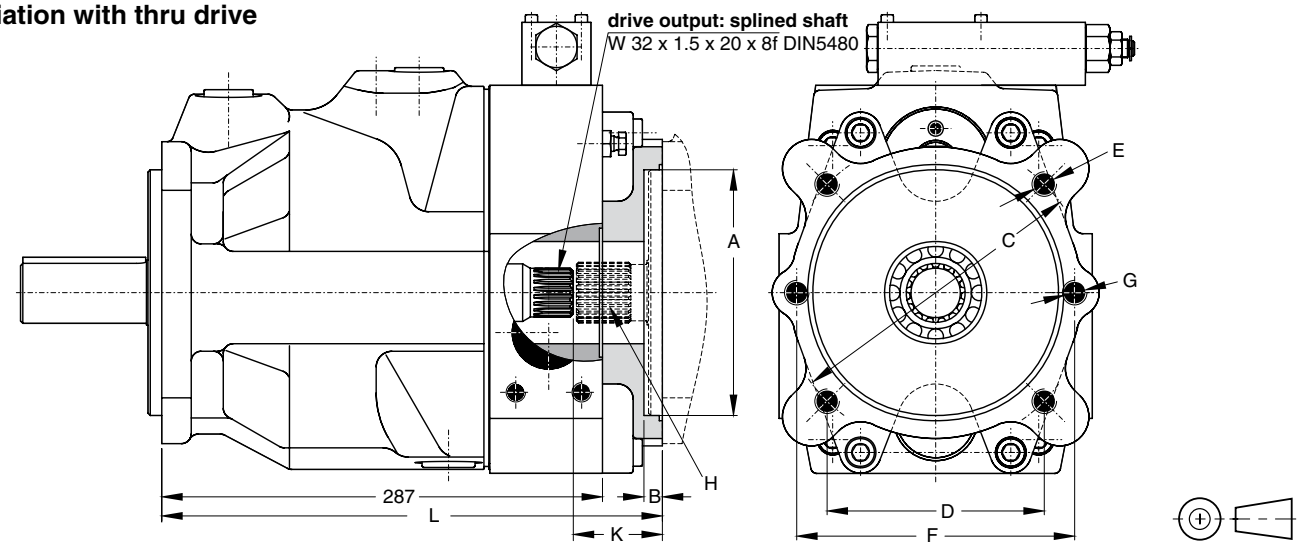
Pump and Motor Division
Chemnitz, Germany

PV063 - 092, SAE version and thru drive version



Variation with thru drive



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

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

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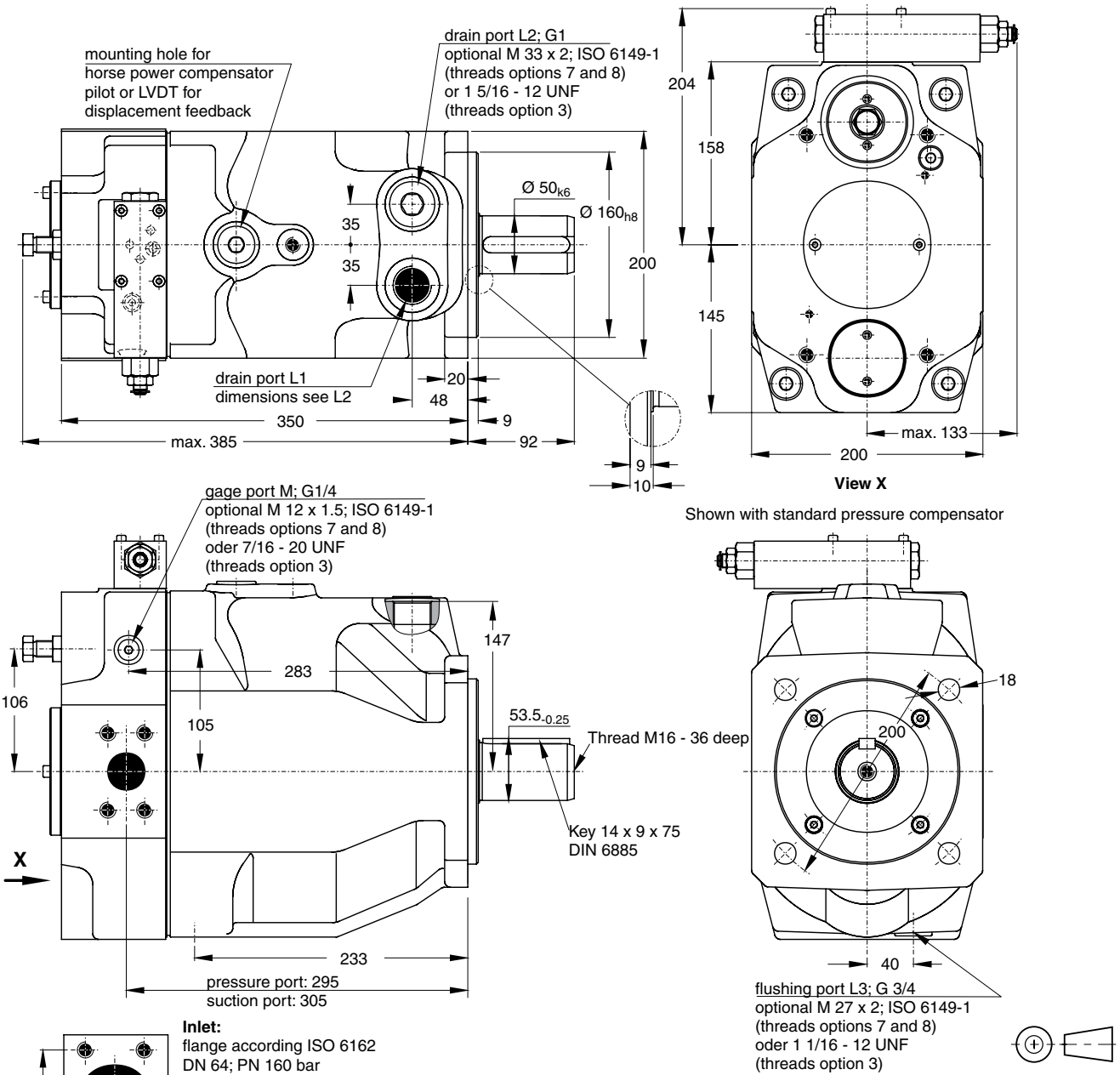
PV140 - 180, metric version



For further information about flanges see catalogue No. 4039/UK „Pressure Hydraulic Flanges“ (on request).
Shown is a clockwise rotating pump. Counter clockwise rotating pumps have inlet, outlet and gauge ports reversed.

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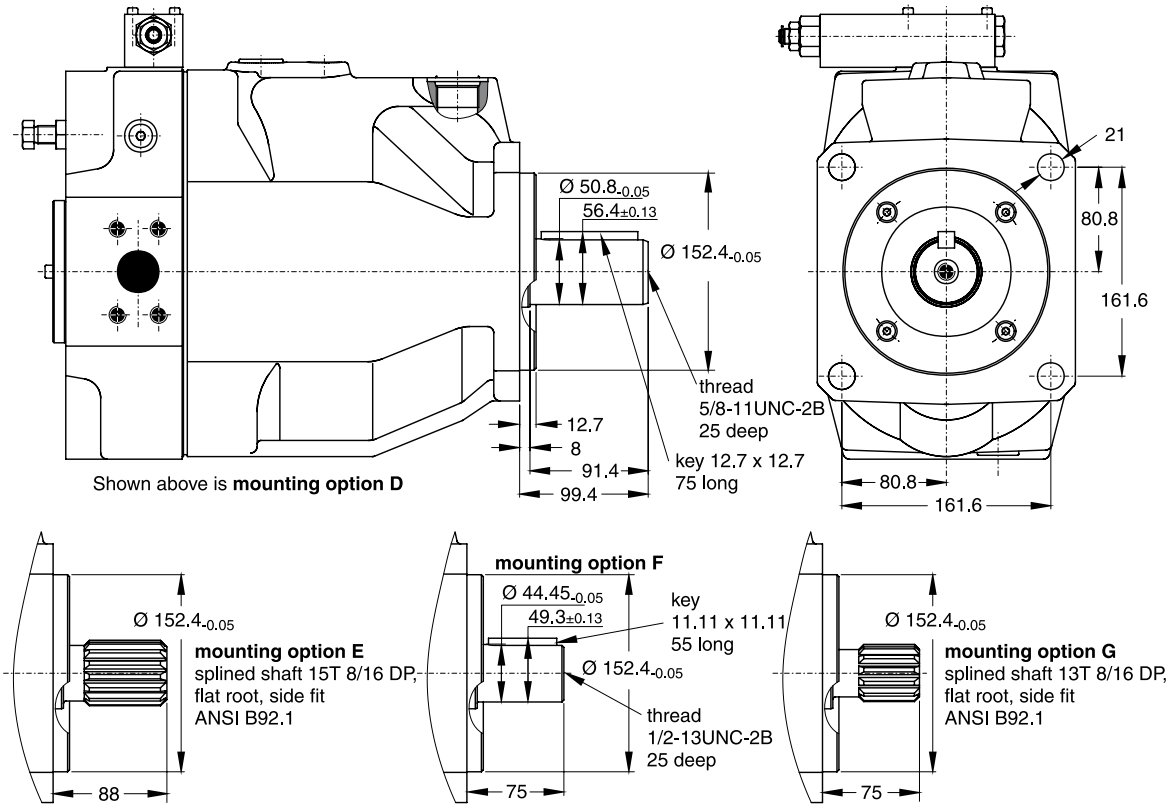
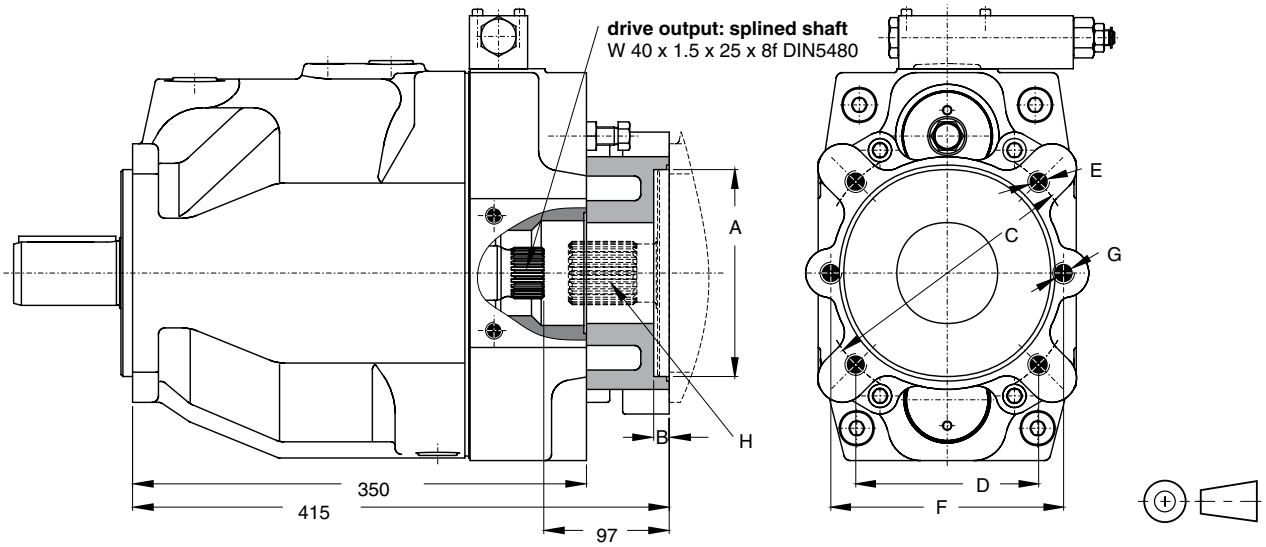
PV140 - 180, SAE version and thru drive version



Variation with thru drive



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

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

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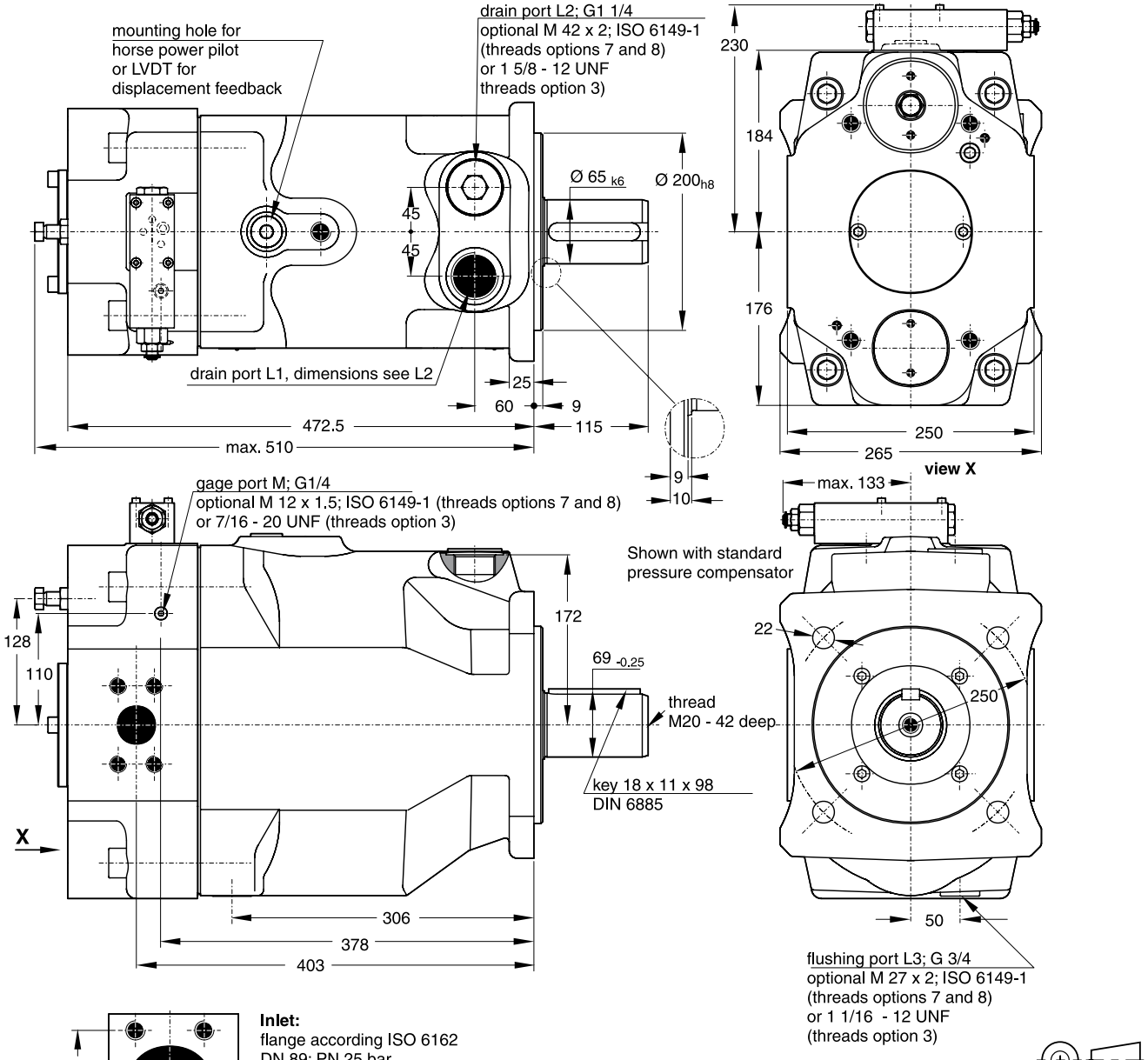
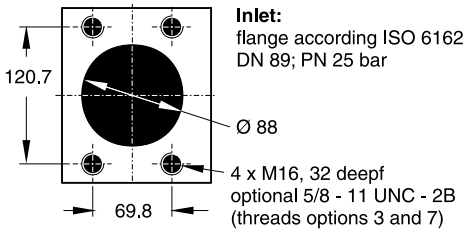
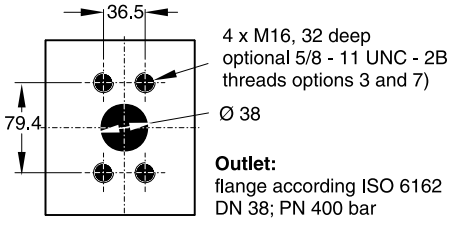
PV 270, metric version



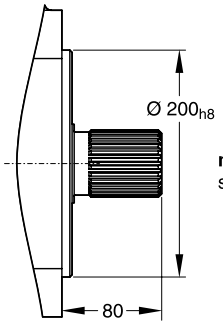


Inlet:
flange according ISO 6162
DN 89; PN 25 bar



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

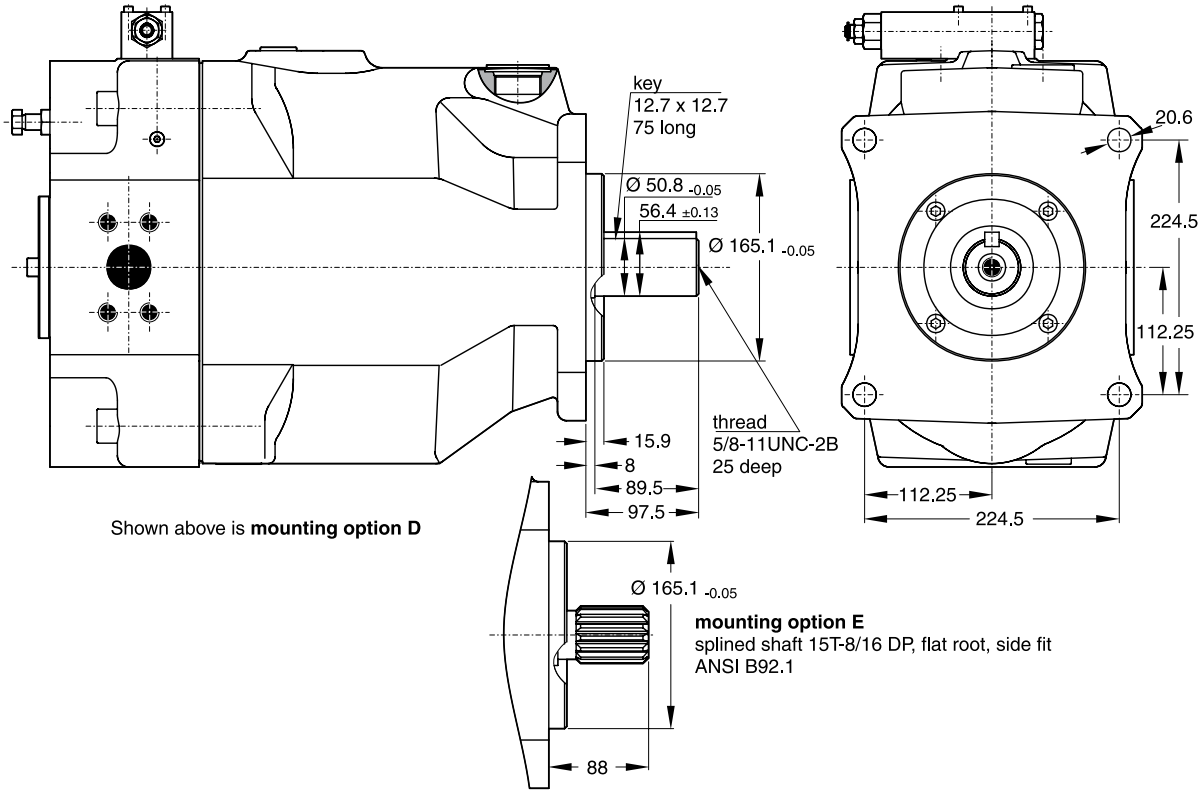
The pump shown above has **mounting option K**
and **thru drive variation T** (prepared for thru drive).



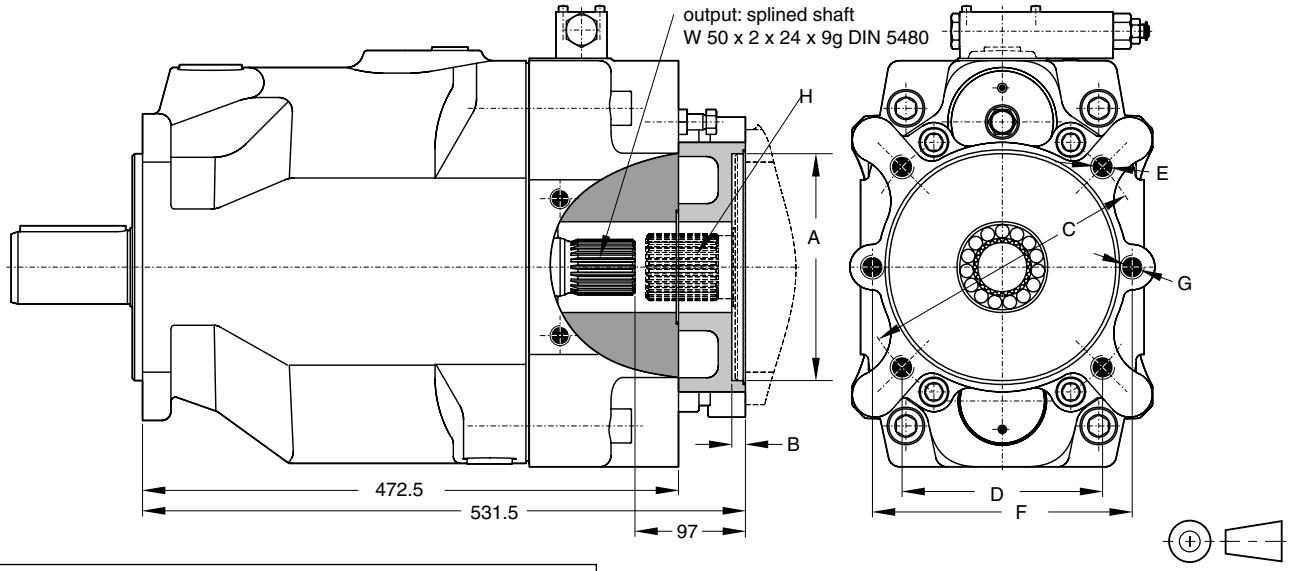
mounting option L
splined shaft W 60 x 2 x 28 x 9g DIN 5480

For further information about flanges see catalogue No. 4039/UK „Pressure Hydraulic Flanges“ (on request).
Shown is a clockwise rotating pump. Counter clockwise rotating pumps have inlet, outlet and gauge ports reversed.

PV 270, SAE version and thru drive version



Variation with thru drive



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

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

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Pump and Motor Division
Chemnitz, Germany

Mounting kits for multiple pumps, for second pump option

MK – PV BG □ □ □ □ □ □

- **MK – PV**: Mounting kit; Axial piston pump series PV
- **BG**: Size
- **□**: Second pump
- **□**: Thread
- **□**: Seals
- **□**: Design series (see name plate)

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

Code	Second pump, SAE
T	Prepared for thru drive option (plugged)
Y	SAE AA, diameter 50.8 mm
A	SAE A, diameter 82.55 mm
B	SAE B, diameter 101.6 mm
C	SAE C, diameter 127 mm
D	SAE D, diameter 152.4 mm
E	SAE E, diameter 165.1 mm
	Second pump, metric
G	Diameter 63 mm
H	Diameter 80 mm
J	Diameter 100 mm
K	Diameter 125 mm
L	Diameter 160 mm
M	Diameter 200 mm

Code	Seals
N	NBR
V	FPM
E	EPR

Code	Thread
M	Metric
S	SAE

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

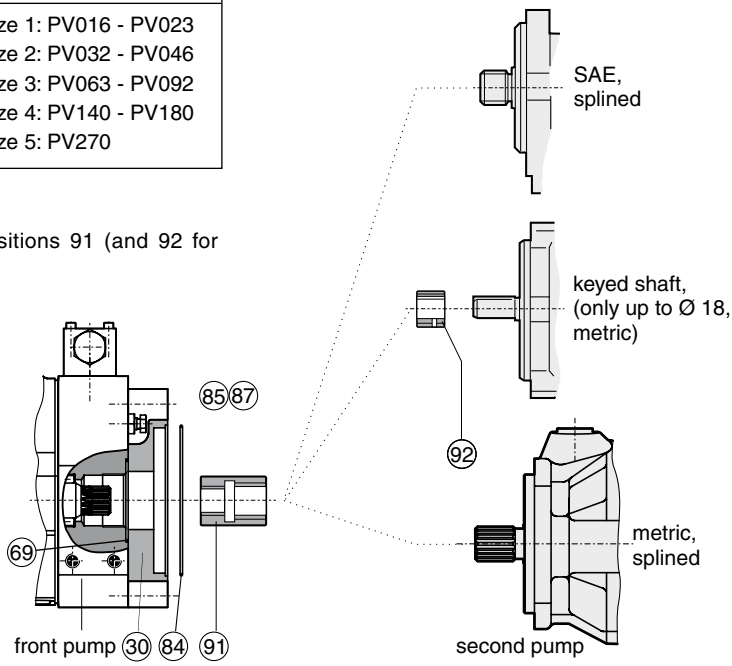
Mounting kits for multiple pumps, couplings

MK – PV BG □ K □ □

- **MK – PV**: Mounting kit; Axial piston pump series PV
- **BG**: Size
- **K**: Coupling
- **□**: Design series (see name plate)

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

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



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

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

Shaft code	PV016-023	PV063-092	PV140-180	PV270
D	300	1320	2000	2000
E	300	1218	2680	2680
F	--	--	1320	--
G	--	--	1640	--
K	300	1150	1900	2850
L	405	1400	2650	3980
Max. torque transmission cap. for rear mounted pump	140	560	1100	1650

Important notice

The max. allowable torque of the individual shaft must not be exceeded. For 2-pump combinations there is no problem because PV series offers 100% thru torque. For 3-pump combinations (and more) the limit torque could be reached or exceeded.

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

Required: calculated torque factor < torque limit factor

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

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

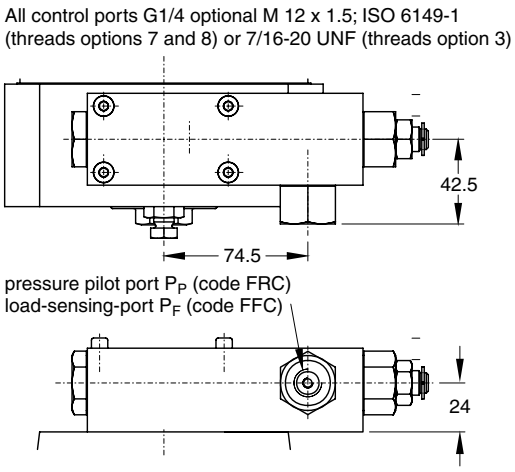
Total torque factor of the combination
= sum of individual torque factors of all pumps

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

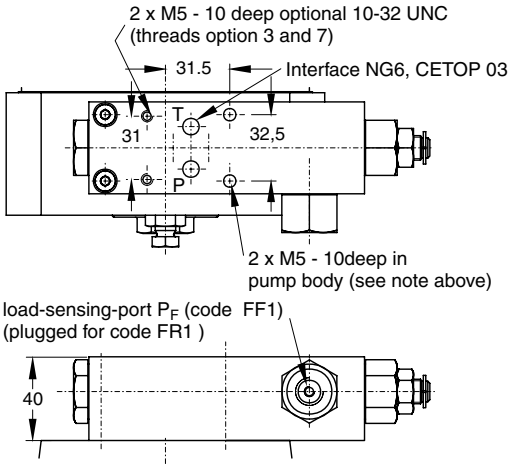
Torque factor of any pump
= p x Vg

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

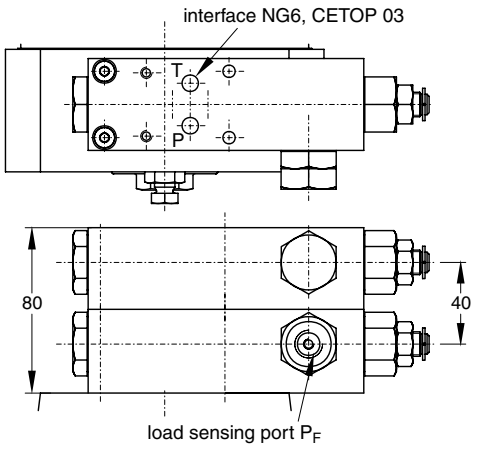
Remote pressure compensator, code FRC
Load-Sensing compensator, code FFC



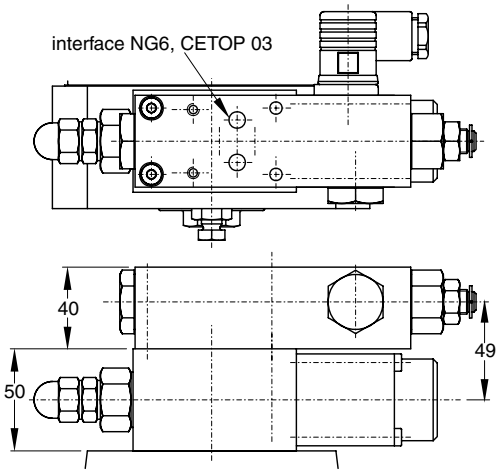
Remote pressure comp. with interface NG6, code FR1
Load-Sensing comp. with interface NG6, code FF1



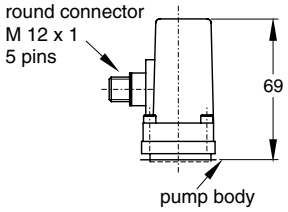
2-valve compensator, code FT1



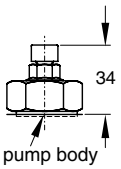
Proportional p-Q-compensator, code FPR
(for code FPV lower valve only without interface)

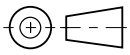


LVDT for proportional compensator



Pilot valve for power compensator



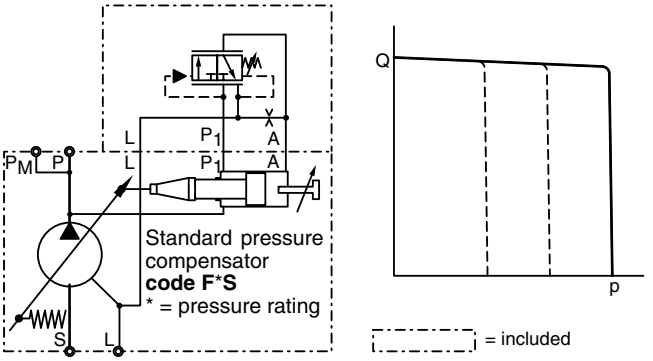


Standard pressure compensator, code F*S

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 P_1 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.

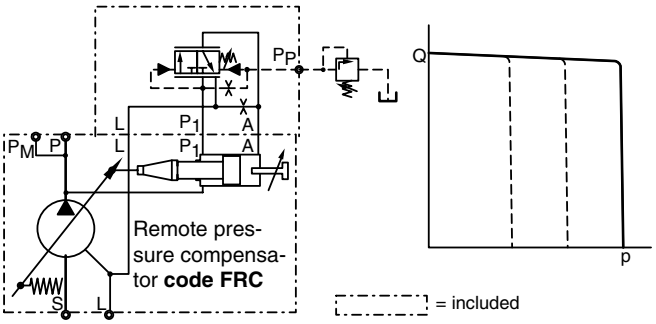


Remote pressure compensator, code FRC

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.

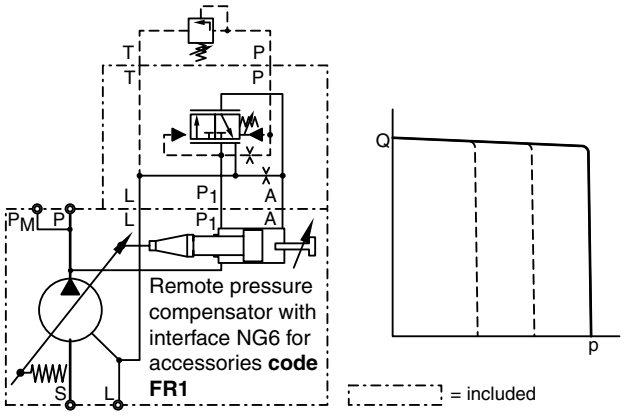


Remote pressure compensator, code FR1

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.

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.

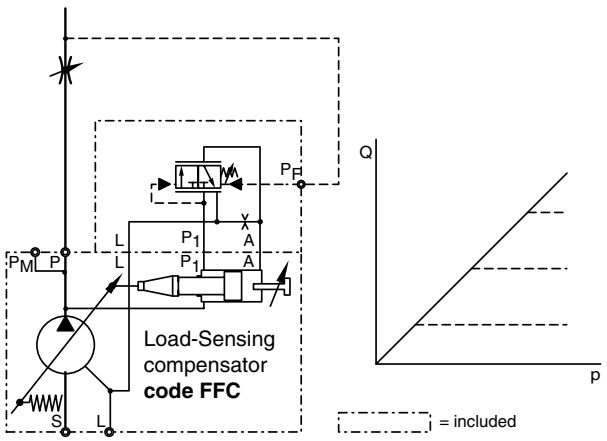


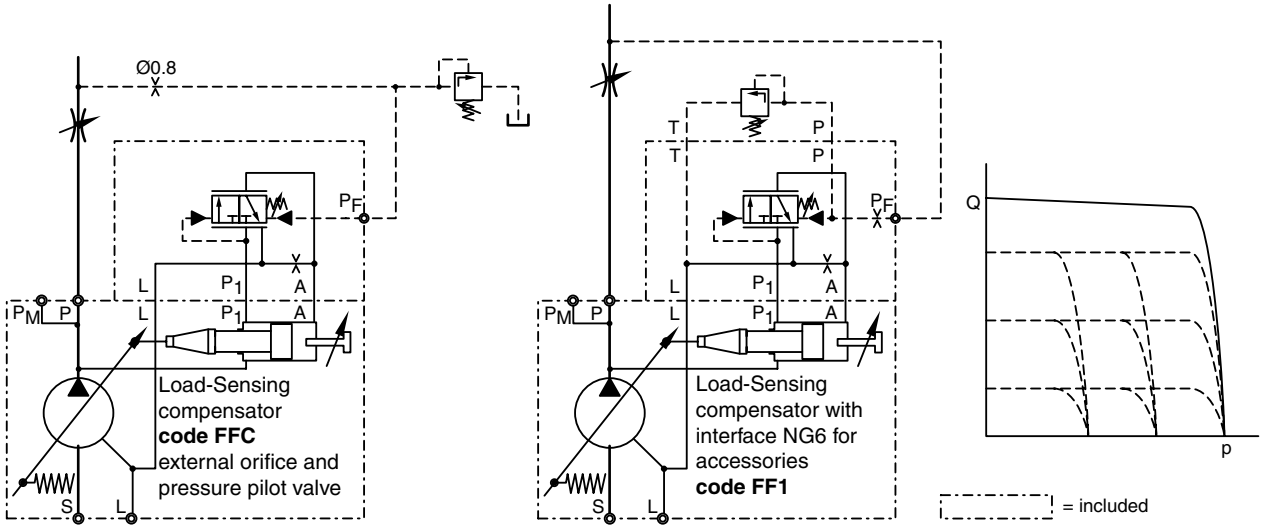
Load-Sensing compensator, code FFC

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.

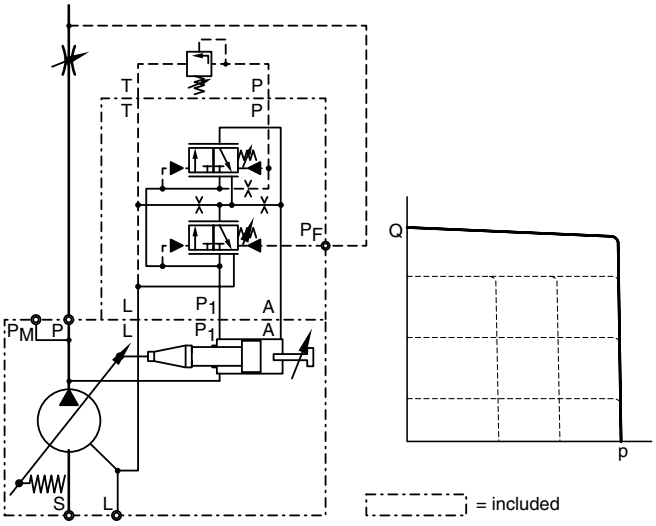
By adding a pilot orifice (Ø 0.8 mm) and a pressure pilot valve pressure compensation can be added to the flow control function. See the circuit diagram below, left.





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.



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Chemnitz, Germany

Hydraulic-mechanical power compensator

The hydraulic-mechanical power compensator consists of a modified remote pressure compensator (Code *L*) or of a modified load-sensing compensator (Code *C*) and a pilot valve. This pilot valve is integrated into the pump and is adjusted by a cam sleeve. The cam sleeve has a contour that is designed and machined for the individual displacement and the nominal power setting.

At a large displacement the opening pressure (given by the cam sleeve diameter) is lower than at small displacements. This makes the pump compensate along a constant power (torque) curve (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 power setting) can easily be done without disassembly of the pump.

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

Ordering code for the power option

The first digit designates the power setting:

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

The second digit designates the pilot flow source:

Code L internal pilot pressure, remote pressure function.

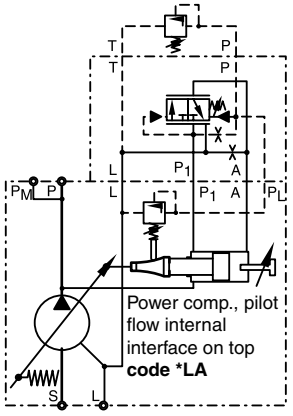
Code C external pilot pressure, combines power compensation with load-sensing compensation.

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

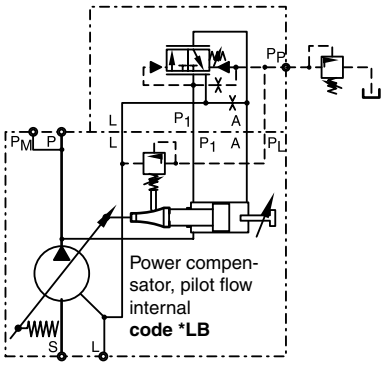
Code A comes with a top side NG6/D03 interface on the control valve to mount any suitable pilot valve or Parker pump accessories.

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

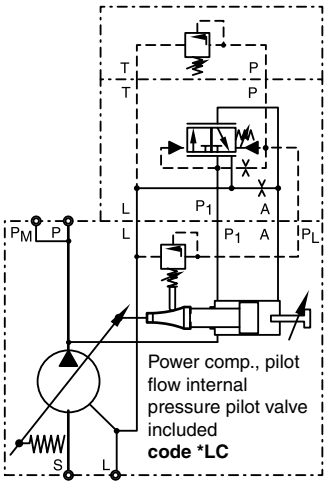
Code C includes a pilot valve for manual pressure adjustment. Max. setting: 350 bar.



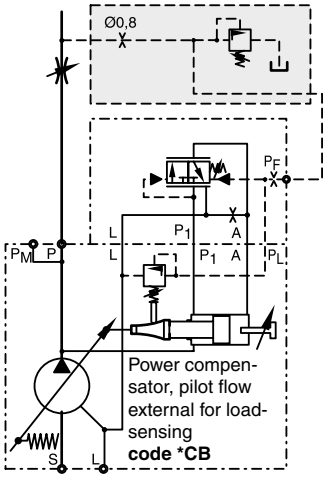
Power comp., pilot flow internal interface on top
code *LA



Power compensator, pilot flow internal
code *LB



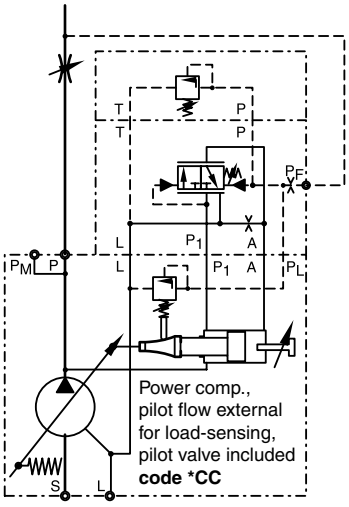
Power comp., pilot flow internal pressure pilot valve included
code *LC



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

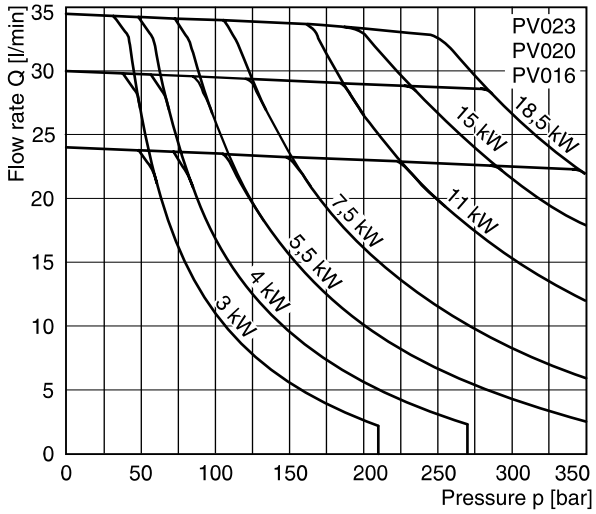
Note:
If version *CB is equiped with an external pilot valve and an Ø0.8 mm orifice, the orifice in port P_F has to be removed.

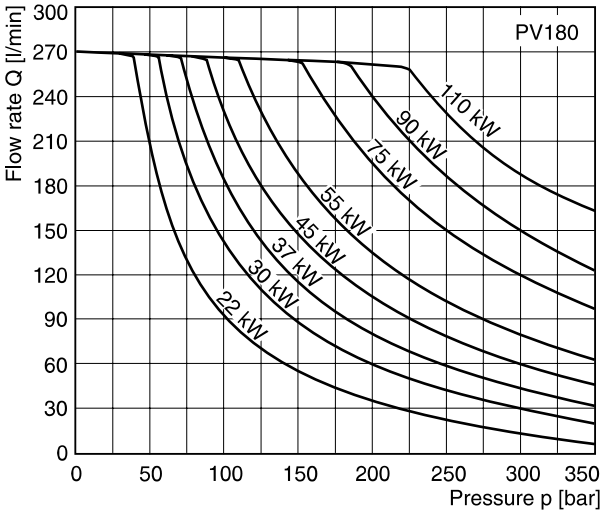
= included

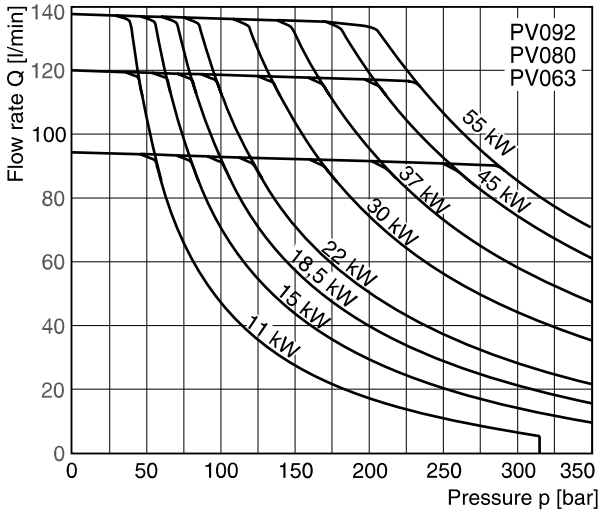


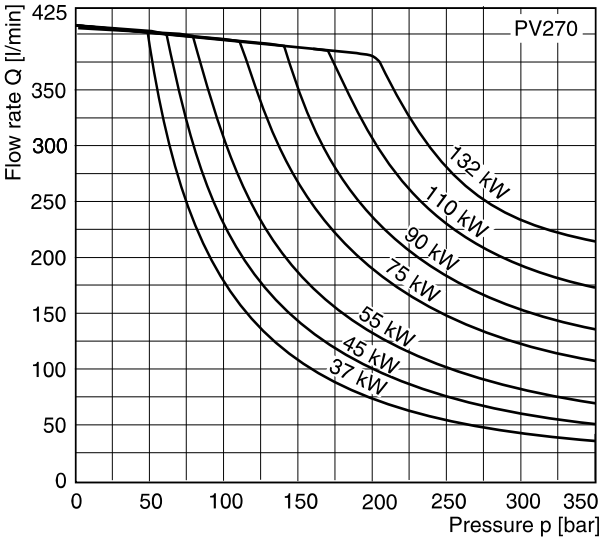
Power comp., pilot flow external for load-sensing, pilot valve included
code *CC

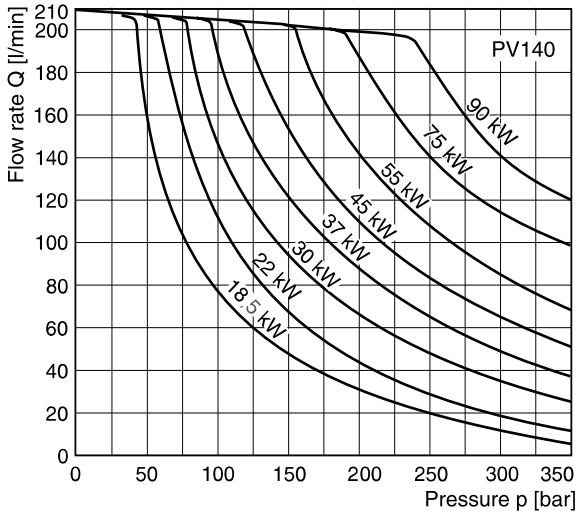
Characteristic curves, power compensators









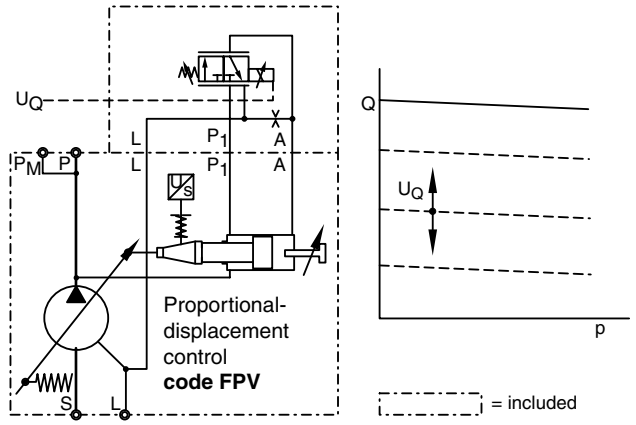


The diagrams shown are only valid for the following working conditions:

Speed	:	n = 1500 rev/min
Temperature	:	t = 50°C
Fluid	:	HLP, ISO VG46
Viscosity	:	ν = 46 mm^2/s at 40°C

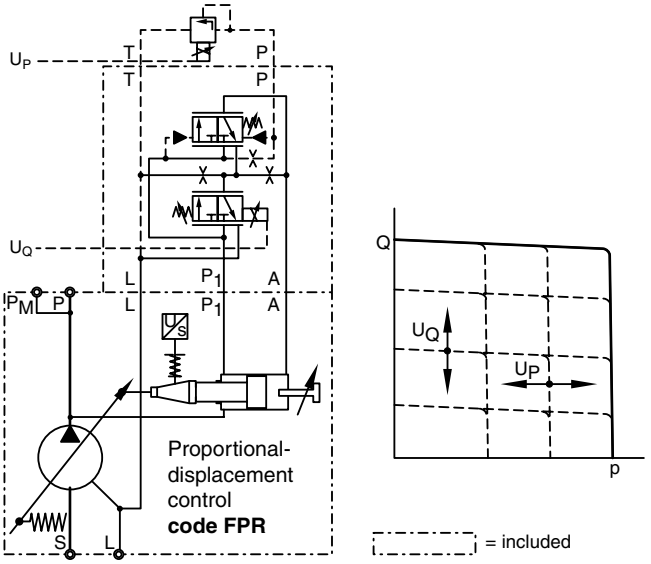
Proportional displacement control, code FPV

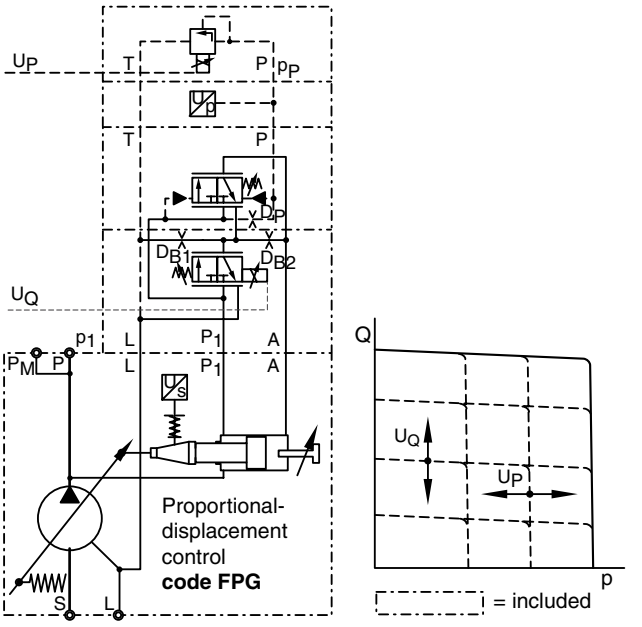
The proportional displacement control allows the adjustment of the pumps output flow with an electrical input signal.
The actual displacement of the pump is monitored by an LVDT and compared with the commanded displacement in an electronic control module PQ0*-F00 (see opposite side). The command is given as an electrical input signal (0 - 10 V or 0 resp. 4 - 20 mA) from the supervising machine control. The command can also be provided by a potentiometer. The electronic control module offers a stabilized 10 V source to supply the potentiometer.
The electronic module compares permanently the input command and the actual displacement by powering the proportional solenoid of the control valve. A deviation from the commanded displacement leads to a modulation of the input current to the solenoid. The control valve then changes the control pressure (port A) until the correct displacement is adjusted.
Version FPV of the proportional control does not provide a pressure compensation. The hydraulic circuit must be protected by a pressure relief valve.



Proportional displacement control with overriding pressure control, codes FPR, FPZ and FPG

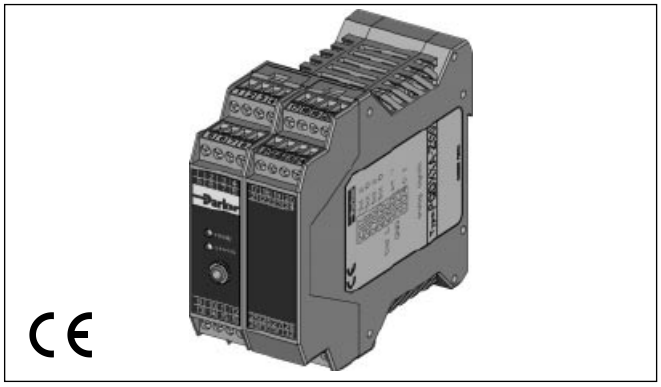
In **version FPR** an additional pressure compensator valve can override the electrohydraulic displacement control. That adds pressure compensation to this control.
The compensator valve has an NG6/D03 interface on top to mount a pressure pilot valve. When using a proportional pressure pilot valve an electro-hydraulic p/Q control can be realized. The electronic driver modules are tuned for the valve type PVACPP* to get the best performance.
The electronic control module PQ*-P00 (see page p-Q control analogue) 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 44-46) 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*-Q00 a closed loop pressure control of the pump outlet pressure is available. Module PQ*-L00 offers an electronic 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.





Parker Hannifin
Pump and Motor Division
Chemnitz, Germany

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



Features

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

Ordering code

PQD	XX	A	–	Z00
Digital control module for p/Q control	**For all frame sizes series PV**	**Version A**		**Option**

Please order the "interface cable to PC" separately.
Ordering code: PQDX-XA-KABEL

Technical data

Mounting style		Snap-on mounting for EN50022 rail
Body material		Polycarbonate
Inflammation class		V2...V0 acc. UL 94
Mounting position		any
Env. temperature range	[°C]	-20...+55
Protection class		IP 20 acc. DIN 40 050
Weight	[g]	160
Duty ratio	[%]	100
Supply voltage	[V]	18...30VDC, ripple <5% eff.
Rush in current	[A]	22 for 0.2 ms
Current consumption	[A]	< 4 for p/Q control ; < 2 for Q-control
Resolution	[%]	0.025 (power 0.1)
Interface		RS232C, 9600 baud, 3.5 mm cinch
EMC		EN 50 081-2, EN 50 082-2
Connctors		Screw terminals 0.2...2.5 mm², plug in style
Cables	[mm²]	1.5 (AWG 16) overall braid shield, for supply and solenoid connection 0.5 mm² (AWG 20) overall braid shield, for sensor and command signal connections
Max. cable length	[m]	50

For programming the module via PC, an interface cable is needed, please order separately.

Programming software

The programming of the p/Q control module is done in an easy to learn mode. To select the pump model and size and to set the control paramters the program **ProPVplus** must be started. This program runs under WINDOWS® 95 and higher.
The latest version of this software can be downloaded at the following internet address:

http://www.parker.com/euro_hcd

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

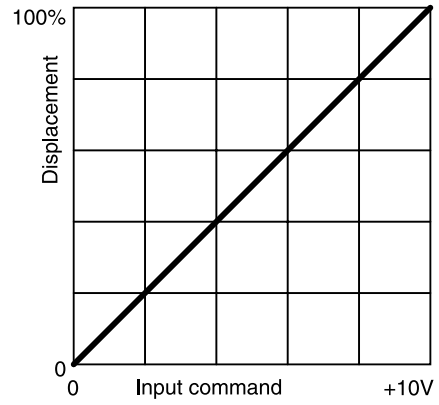
An **OSZILLOSKOP** window displays process variables as curves. The oscilloscope offers a start - stop function. The images can be saved and stored e. g. for import into other programs.

Features

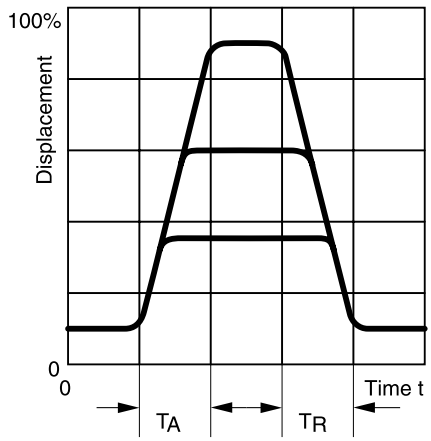
- Display and documentation of parameter sets
- Save ond reload of optimized parameter sets
- Offers oscilloscope function for easy performance evaluation and optimization
- Pre-optimized parameter sets for all PVplus piston pump
- Sizes already in E^2PROM memory

Diagrams

Typical static characteristic



Typical dynamic characteristic



Response times

Size	TA [ms]	TR [ms]
PV046	70	70

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Chemnitz, Germany

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