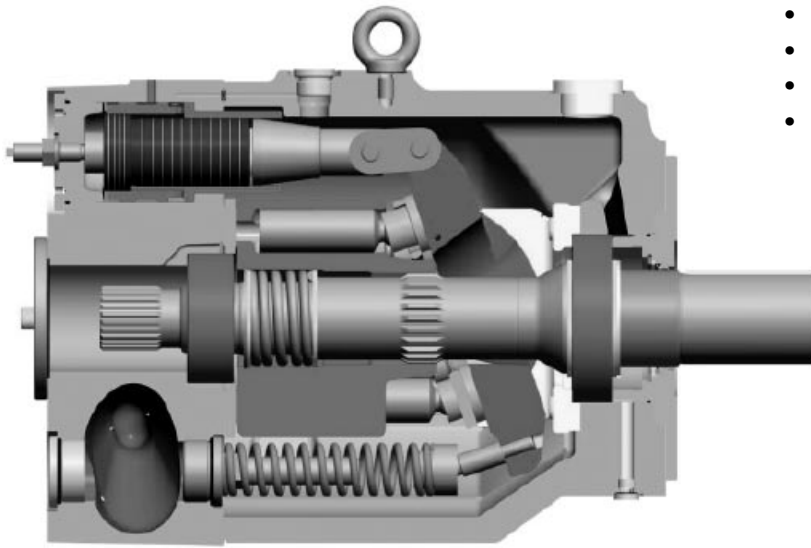


With thru drive for single and multiple pumps

Swash plate type for open circuit

**Technical Features**

- Low noise level
- Fast response
- Service-friendly
- High self-priming speed
- Compact design
- Thru drive for 100% nominal torque

General Information**Fluid recommendations**

Premium quality hydraulic mineral fluid is recommended, like HLP oils to DIN 51524, part 2. Bruggen- value has to be 30 N/mm² minimum for general application and 50 N/mm² for heavily loaded hydraulic equipment and fast cycling machines and/or high dynamic loads, measured in accordance with DIN 51 347-2. See also Document HY30-3248/UK Parker Hydraulic Fluids.

Viscosity

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

Filtration

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

Fluid cleanliness should be in accordance with ISO classification ISO 4406:1999. The quality of filter elements should be in accordance with ISO standards. General hydraulic systems for satisfactory operation: Class 20/18/15, according to ISO 4406:1999. Recommended cleanliness for maximum component life and functionality: Class 18/16/13, according to ISO 4406:1999

Seals

Check hydraulic fluid specification for chemical resistance of seal material.

Check temperature range of seal material and compare with max. system and ambient temperature.

N - Nitrile -40 ... +90 °C

Note: The highest fluid temperature will be at the drain port of the pump, up to 25 °C higher than in the reservoir.

| | | PV016 | PV020 | PV023 | PV028 | PV032 | PV040 | PV046 |
|---|-------------------------|--------|--------|--------|--------|--------|--------|--------|
| Frame size | | 1 | 1 | 1 | 1 | 2 | 2 | 2 |
| Max. Displacement | [cm ³ /rev.] | 16 | 20 | 23 | 28 | 32 | 40 | 46 |
| Output flow at 1500 rpm | [l/min] | 24 | 30 | 34,5 | 42 | 48 | 60 | 69 |
| Nominal pressure pN | [bar] | 350 | 350 | 350 | 350 | 350 | 350 | 350 |
| Max. pressure p _{max} at 20% working cycle ¹⁾ | [bar] | 420 | 420 | 420 | 420 | 420 | 420 | 420 |
| Case drain pressure, continuous | [bar] | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.55 |
| Case drain pressure, max. peak | [bar] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Min. Inlet pressure, abs. | [bar] | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| Max. Inlet pressure | [bar] | 16 | 16 | 16 | 16 | 16 | 16 | 16 |
| Input power at 1500 rpm and 350 bar | [kW] | 15.5 | 19.5 | 22.5 | 27.5 | 31 | 39 | 45 |
| Max speed at 1 bar, abs, inlet pressure | [rpm] | 3000 | 3000 | 3000 | 3000 | 2800 | 2800 | 2800 |
| Moment of inertia | [kgm ²] | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0043 | 0.0043 | 0.0043 |
| Weight | [kg] | 19 | 19 | 19 | 19 | 30 | 30 | 30 |

| | | PV063 | PV080 | PV092 | PV140 | PV180 | PV270 | PV360 |
|---|-------------------------|-------|-------|-------|-------|-------|-------|-------|
| Frame size | | 3 | 3 | 3 | 4 | 4 | 5 | 5 |
| Max. Displacement | [cm ³ /rev.] | 63 | 80 | 92 | 140 | 180 | 270 | 360 |
| Output flow at 1500 rpm | [l/min] | 94.5 | 120 | 138 | 270 | 405 | 405 | 540 |
| Nominal pressure pN | [bar] | 350 | 350 | 350 | 350 | 350 | 350 | 350 |
| Max. pressure p _{max} at 20% working cycle ¹⁾ | [bar] | 420 | 420 | 420 | 420 | 420 | 420 | 420 |
| Case drain pressure, continuous | [bar] | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Case drain pressure, max. peak | [bar] | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Min. Inlet pressure, abs. | [bar] | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| Max. Inlet pressure | [bar] | 16 | 16 | 16 | 16 | 16 | 16 | 16 |
| Input power at 1500 rpm and 350 bar | [kW] | 61.5 | 78 | 89.5 | 136 | 175 | 263 | 350 |
| Max speed at 1 bar, abs, inlet pressure | [rpm] | 2800 | 2500 | 2300 | 2400 | 2200 | 1800 | 1750 |
| Moment of inertia | [kgm ²] | 0.018 | 0.018 | 0.018 | 0.030 | 0.030 | 0.098 | 0.103 |
| Weight | [kg] | 59 | 59 | 59 | 90 | 90 | 172 | 180 |

1) Special control options required.

P V **R 1 K 1 T 1 N**

axial piston
pump
variable
displacement

size
and
displacement

rotation

variation

mounting
interface

threads
code

thru drive
code

coupling
code

seals

control

see next page

| Code | Displacement | Size |
|------|-------------------------|------|
| 016 | 16 cm ³ /rev | 1 |
| 020 | 20 cm ³ /rev | 1 |
| 023 | 23 cm ³ /rev | 1 |
| 028 | 28 cm ³ /rev | 1 |

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

| Code | Rotation ¹⁾ |
|------|------------------------|
| R | Clockwise |
| L | Counter clockwise |

¹⁾ When looked on shaft

| Code | Variation |
|------|----------------------------------|
| 1 | Standard |
| 9 | Special adjustment ²⁾ |

²⁾ requires Kxxxx number

| Code | Coupling for thru drive | as single part ⁶⁾ |
|------|---------------------------------------|------------------------------|
| 1 | Single pump, no coupling | |
| H | with coupling 25 x 1.5 x 15, DIN 5480 | MK-PVBGxK01 |
| Y | with coupling SAE A 9T-16/32 DP | MK-PVBGxK11 |
| A | with coupling SAE - 11T-16/32 DP | MK-PVBGxK12 |
| B | with coupling SAE B 13T-16/32 DP | MK-PVBGxK13 |
| C | with coupling SAE B-B 15T-16/32 DP | MK-PVBGxK14 |

| Code | Mounting interface | Shaft |
|------|---------------------------------|-------------------|
| K | metr. ISO 4-hole flange Ø100 mm | Cylindric, key |
| L | 3019/2 4-hole flange Ø100 mm | Splined, DIN 5480 |
| D | SAE 4-hole flange SAE B | Cylindric, key |
| E | ISO 4-hole flange SAE B-B | Splined, SAE |
| | 3019/1 | |

| Code | Port ³⁾ | Threads ⁴⁾ |
|-----------------|--------------------|-----------------------|
| 1 | BSPP | metric |
| 3 | UNF | UNC |
| 7 | ISO 6149 | UNC |
| 8 ⁵⁾ | ISO 6149 | metric |

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

See dimensions for details

⁶⁾ to be ordered separately as single part
 x= Frame size, see displacement.

³⁾ Drain, gauge and flushing ports

⁴⁾ All mounting and connecting threads

⁵⁾ Mounting interface, code K and L only

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

1) not for MT
2) only for MT

| Horse power / Torque control | | | | | | | | | | | |
|------------------------------|--|--|--|--|------|--|--|--|--|-------------------|--|
| Displacem. | | | | | Code | | | | | | |
| 016 | | | | | | | | Nominal HP at 1.500 rpm | | Nominal torque | |
| 028 | | | | | | | | | | | |
| | | | | | B | | | 3 kW | | 20 Nm | |
| | | | | | C | | | 4 kW | | 25 Nm | |
| | | | | | D | | | 5.5 kW | | 35 Nm | |
| | | | | | E | | | 7.5 kW | | 50 Nm | |
| | | | | | G | | | 11 kW | | 71 Nm | |
| | | | | | H | | | 15 kW | | 97 Nm | |
| | | | | | K | | | 18.5 kW | | 120 Nm | |
| Function | | | | | | | | | | | |
| | | | | | L | | | Horse power control with pressure control | | | |
| | | | | | C | | | Horse power control with load sensing (single spool) | | | |
| Control variation | | | | | | | | | | | |
| | | | | | C | | | Standard version | | | |
| | | | | | 1 | | | NG 6 interface top side | | | |
| | | | | | W | | | With unloading function, 24 VDC solenoid | | | |
| | | | | | K | | | Prop.-pilot valve type PVACRE..35 mounted | | | |
| | | | | | Z | | | Without integrated pilot valve, NG6 interface, for mounting of accessory code PVAC* | | | |

| Code | | | Control option |
|------|---|---|---|
| | | | electro hydraulic control |
| F | P | V | Proportional displacement control, no pressure compensation |
| U | P | | Proportional displacement control, with pressure compensation |
| | | | Control variation |
| | | R | pilot operated pressure control, open NG6 interface |
| | | K | pilot operated pressure control, proportional pilot valve type PVACRE..35 mounted |
| | | M | pilot operated pressure control, pressure sensor and proportional pilot valve type PVACRE..35 mounted for pressure control and/or power control |

P V **R 1 K 1 T 1 N**

axial piston
pump
variable
displacement

size
and
displacement

rotation

variation

mounting
interface

threads
code

thru drive
code

coupling
code

seals

control

see next page

| Code | Displacement | Size |
|------|-------------------------|------|
| 032 | 32 cm ³ /rev | 2 |
| 040 | 40 cm ³ /rev | 2 |
| 046 | 46 cm ³ /rev | 2 |

| Code | Rotation ¹⁾ |
|------|------------------------|
| R | Clockwise |
| L | Counter clockwise |

¹⁾ When looked on shaft

| Code | Variation |
|------|----------------------------------|
| 1 | Standard |
| 9 | Special adjustment ²⁾ |

²⁾ requires Kxxxx number

| Code | Mounting interface | Shaft |
|------|------------------------------|--------------------------|
| K | metr. ISO 3019/2 | Cylindric, key |
| L | 4-hole flange Ø125 mm | Splined, DIN 5480 |
| D | SAE | Cylindric, key |
| E | ISO 3019/1 | Splined, SAE |

| Code | Port ³⁾ | Threads ⁴⁾ |
|-----------------|--------------------|-----------------------|
| 1 | BSPP | metric |
| 3 | UNF | UNC |
| 7 | ISO 6149 | UNC |
| 8 ⁵⁾ | ISO 6149 | metric |

³⁾ Drain, gauge and flushing ports

⁴⁾ All mounting and connecting threads

⁵⁾ Mounting interface, code K and L only

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

| Code | Coupling for thru drive | as single part ⁶⁾ |
|------|---------------------------------------|------------------------------|
| 1 | Single pump, no coupling | |
| H | with coupling 25 x 1.5 x 15, DIN 5480 | MK-PVBGxK01 |
| J | with coupling 32 x 1.5 x 20, DIN 5480 | MK-PVBGxK02 |
| Y | with coupling SAE A 9T-16/32 DP | MK-PVBGxK11 |
| A | with coupling SAE - 11T-16/32 DP | MK-PVBGxK12 |
| B | with coupling SAE B 13T-16/32 DP | MK-PVBGxK13 |
| C | with coupling SAE B-B 15T-16/32 DP | MK-PVBGxK14 |
| D | with coupling SAE C 14T-12/24 DP | MK-PVBGxK15 |

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

See dimensions for details

⁶⁾ to be ordered separately as single part
x= Frame size, see displacement.

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

1) not for MT
2) only for MT

| Horse power / Torque control | | | | | | | | | |
|------------------------------|--|--|--|--|------|--|--|--|-------------------|
| Displacem. | | | | | Code | | | | |
| 032 | | | | | | | | Nominal HP at 1.500 rpm | Nominal torque |
| 046 | | | | | | | | | |
| | | | | | D | | | 5.5 kW | 35 Nm |
| | | | | | E | | | 7.5 kW | 50 Nm |
| | | | | | G | | | 11 kW | 71 Nm |
| | | | | | H | | | 15 kW | 97 Nm |
| | | | | | K | | | 18.5 kW | 120 Nm |
| | | | | | M | | | 22 kW | 142 Nm |
| | | | | | S | | | 30 kW | 195 Nm |
| Function | | | | | | | | | |
| | | | | | L | | | Horse power control with pressure control | |
| | | | | | C | | | Horse power control with load sensing (single spool) | |
| Control variation | | | | | | | | | |
| | | | | | C | | | Standard version | |
| | | | | | 1 | | | NG 6 interface top side | |
| | | | | | W | | | With unloading function, 24 VDC solenoid | |
| | | | | | K | | | Prop.-pilot valve type PVACRE..35 mounted | |
| | | | | | Z | | | Without integrated pilot valve, NG6 interface, for mounting of accessory code PVAC* | |

| Code | | | Control option |
|------|---|---|---|
| | | | electro hydraulic control |
| F | P | V | Proportional displacement control, no pressure compensation |
| U | P | | Proportional displacement control, with pressure compensation |
| | | | Control variation |
| | | R | pilot operated pressure control, open NG6 interface |
| | | K | pilot operated pressure control, proportional pilot valve type PVACRE..35 mounted |
| | | M | pilot operated pressure control, pressure sensor and proportional pilot valve type PVACRE..35 mounted for pressure control and/or power control |

P V **R 1 K 1 T 1 N**

axial piston
pump
variable
displacement
high
pressure
version

size
and
displacement

rotation

variation

mounting
interface

threads
code

thru drive
code

coupling
code

seals

compensator

see next page

| Code | Displacement | Size |
|------|-------------------------|------|
| 063 | 63 cm ³ /rev | 3 |
| 080 | 80 cm ³ /rev | 3 |
| 092 | 92 cm ³ /rev | 3 |

| Code | Rotation ¹⁾ |
|------|------------------------|
| R | Clockwise |
| L | Counter clockwise |

¹⁾ When looked on shaft

| Code | Variation |
|------|-------------------------------------|
| 1 | Standard |
| 9 | special adjustment ²⁾ |

²⁾ requires Kxxxx number

| Code | Mounting interface | | Shaft |
|------|--------------------|-----------------------|-------------------|
| K | metr. ISO | 4-hole flange Ø160 mm | Cylindric, key |
| L | 3019/2 | 4-hole flange Ø160 mm | Splined, DIN 5480 |
| D | SAE | 4-hole flange SAE D | Cylindric, key |
| E | ISO | 4-hole flange SAE D | Splined, SAE |
| | 3019/1 | | |

| Code | Port ³⁾ | Threads ⁴⁾ |
|-----------------|--------------------|-----------------------|
| 1 | BSPP | metric |
| 3 | UNF | UNC |
| 4 ⁵⁾ | BSPP | metr. M14 |
| 7 | ISO 6149 | UNC |
| 8 | ISO 6149 | metric |

³⁾ Drain, gauge and flushing ports

⁴⁾ All mounting and connecting threads

⁵⁾ For PV063-PV092 only: pressure port 1 1/4" with 4 x M14 instead of 4 x M12

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

| Code | Coupling for thru drive | as single part ⁶⁾ |
|------|---------------------------------------|------------------------------|
| 1 | Single pump, no coupling | |
| H | with coupling 25 x 1.5 x 15, DIN 5480 | MK-PVBGxK01 |
| J | with coupling 32 x 1.5 x 20, DIN 5480 | MK-PVBGxK02 |
| K | with coupling 40 x 1.5 x 25, DIN 5480 | MK-PVBGxK03 |
| Y | with coupling SAE A 9T-16/32 DP | MK-PVBGxK11 |
| A | with coupling SAE - 11T-16/32 DP | MK-PVBGxK12 |
| B | with coupling SAE B 13T-16/32 DP | MK-PVBGxK13 |
| C | with coupling SAE B-B 15T-16/32 DP | MK-PVBGxK14 |
| D | with coupling SAE C 14T-12/24 DP | MK-PVBGxK15 |
| E | with coupling SAE C - C | MK-PVBGxK16 |
| F | with coupling SAE D, E | MK-PVBGxK17 |

| Code | Thru drive option | |
|------|--|------------------------------|
| | No adaptor for 2nd pump | |
| T | Single pump prepared for thru drive | |
| | with adaptor for 2nd pump | as single part ⁶⁾ |
| A | SAE A, Ø 82.55 mm | MK-PVBGxAMN |
| B | SAE B, Ø 101.6 mm | MK-PVBGxBMN |
| C | SAE C, Ø 127 mm | MK-PVBGxCMN |
| D | SAE D, Ø 152,4 mm | MK-PVBGxDMN |
| G | metric, Ø 63 mm | MK-PVBGxGMN |
| H | metric, Ø 80 mm | MK-PVBGxHMN |
| J | metric, Ø 100 mm | MK-PVBGxJMN |
| K | metric, Ø 125 mm | MK-PVBGxKMN |
| L | metric, Ø 160 mm | MK-PVBGxLMN |

See dimensions for details

⁶⁾ to be ordered separately as single part
x= Frame size, see displacement.

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

1) not for MT
2) only for MT

| Horse power / Torque control | | | | | | | | | |
|------------------------------|--|--|--|--|------|--|--|--|-------------------|
| Displacem. | | | | | Code | | | | |
| 063 | | | | | | | | Nominal HP at 1.500 rpm | Nominal torque |
| 092 | | | | | | | | | |
| | | | | | G | | | 11 kW | 71 Nm |
| | | | | | H | | | 15 kW | 97 Nm |
| | | | | | K | | | 18.5 kW | 120 Nm |
| | | | | | M | | | 22kW | 142 Nm |
| | | | | | S | | | 30 kW | 195 Nm |
| | | | | | T | | | 37 kW | 240 Nm |
| | | | | | U | | | 45 kW | 290 Nm |
| | | | | | W | | | 55 kW | 355 Nm |
| Function | | | | | | | | | |
| | | | | | L | | | Horse power control with pressure control | |
| | | | | | C | | | Horse power control with load sensing (single spool) | |
| Control variation | | | | | | | | | |
| | | | | | C | | | Standard version | |
| | | | | | 1 | | | NG 6 interface top side | |
| | | | | | W | | | With unloading function, 24 VDC solenoid | |
| | | | | | K | | | Prop.-pilot valve type PVACRE..35 mounted | |
| | | | | | Z | | | Without integrated pilot valve, NG6 interface, for mounting of accessory code PVAC* | |

| Code | | | Control option |
|---------------------------|---|---|---|
| electro hydraulic control | | | |
| F | P | V | Proportional displacement control, no pressure compensation |
| U | P | | Proportional displacement control, with pressure compensation |
| | | | Control variation |
| | | R | pilot operated pressure control, open NG6 interface |
| | | K | pilot operated pressure control, proportional pilot valve type PVACRE..35 mounted |
| | | M | pilot operated pressure control, pressure sensor and proportional pilot valve type PVACRE..35 mounted for pressure control and/or power control |

P V **R 1 K 1 T 1 N**

axial piston
 pump
 variable
 displacement

size
 and
 displacement

rotation

variation

mounting
 interface

threads
 code

thru drive
 code

coupling
 code

seals

control

see next page

| Code | Displacement | Size |
|------|--------------|------|
| 140 | 140 cm³/rev | 4 |
| 180 | 180 cm³/rev | 4 |

| Code | Rotation ¹⁾ |
|------|------------------------|
| R | Clockwise |
| L | Counter clockwise |

¹⁾ When looked on shaft

| Code | Variation |
|------|----------------------------------|
| 1 | Standard |
| 9 | Special adjustment ²⁾ |

²⁾ requires Kxxxx number

| Code | Mounting interface | Shaft |
|------|---------------------------------|-------------------|
| K | metr. ISO 4-hole flange Ø160 mm | Cylindric, key |
| L | 3019/2 4-hole flange Ø160 mm | Splined, DIN 5480 |
| D | SAE 4-hole flange SAE D | Cylindric, key |
| E | ISO 4-hole flange SAE D-F | Splined, SAE |
| | 3019/1 | |
| F | 4-hole flange SAE D | Cylindric, key |
| G | 4-hole flange SAE D | Splined, SAE |

| Code | Port ³⁾ | Threads ⁴⁾ |
|-----------------|--------------------|-----------------------|
| 1 | BSPP | metric |
| 3 | UNF | UNC |
| 4 ⁵⁾ | BSPP | metr. M14 |
| 7 | ISO 6149 | UNC |
| 8 ⁶⁾ | ISO 6149 | metric |

³⁾ Drain, gauge and flushing ports

⁴⁾ All mounting and connecting threads

⁵⁾ Pressure port 1 1/4" with 4 x M14 instead of 4 x M12

⁶⁾ Mounting interface, code K and L only

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

| Code | Coupling for thru drive | as single part ⁷⁾ |
|------|---------------------------------------|------------------------------|
| 1 | Single pump, no coupling | |
| H | with coupling 25 x 1.5 x 15, DIN 5480 | MK-PVBGxK01 |
| J | with coupling 32 x 1.5 x 20, DIN 5480 | MK-PVBGxK02 |
| K | with coupling 40 x 1.5 x 25, DIN 5480 | MK-PVBGxK03 |
| L | with coupling 50 x 2 x 24, DIN 5480 | MK-PVBGxK04 |
| Y | with coupling SAE A 9T-16/32 DP | MK-PVBGxK11 |
| A | with coupling SAE - 11T-16/32 DP | MK-PVBGxK12 |
| B | with coupling SAE B 13T-16/32 DP | MK-PVBGxK13 |
| C | with coupling SAE B-B 15T-16/32 DP | MK-PVBGxK14 |
| D | with coupling SAE C 14T-12/24 DP | MK-PVBGxK15 |
| E | with coupling SAE C - C | MK-PVBGxK16 |
| F | with coupling SAE D, E | MK-PVBGxK17 |
| G | with coupling SAE F | MK-PVBGxK18 |

| | | |
|---------------------------|-------------------------------------|------------------------------|
| Code | Thru drive option | |
| No adaptor for 2nd pump | | |
| T | Single pump prepared for thru drive | |
| with adaptor for 2nd pump | | as single part ⁷⁾ |
| A | SAE A, Ø 82.55 mm | MK-PVBGxAMN |
| B | SAE B, Ø 101.6 mm | MK-PVBGxBMN |
| C | SAE C, Ø 127 mm | MK-PVBGxCMN |
| D | SAE D, Ø 152.4 mm | MK-PVBGxDMN |
| H | metric, Ø 80 mm | MK-PVBGxHMN |
| J | metric, Ø 100 mm | MK-PVBGxJMN |
| K | metric, Ø 125 mm | MK-PVBGxKMN |
| L | metric, Ø 160 mm | MK-PVBGxLMN |

See dimensions for details

⁷⁾ to be ordered separately as single part
 x= Frame size, see displacement.

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

1) not for MT
2) only for MT

| Horse power / Torque control | | | | | | | | | | | |
|------------------------------|-----|--|--|------|--|---|--|--|-------------------|--|--|
| Displacem. | | | | Code | | | | | | | |
| 140 | 180 | | | | | | | Nominal HP at 1.500 rpm | Nominal torque | | |
| | | | | | | K | | 18.5 kW | 120 Nm | | |
| | | | | | | M | | 22 kW | 142 Nm | | |
| | | | | | | S | | 30 kW | 195 Nm | | |
| | | | | | | T | | 37 kW | 240 Nm | | |
| | | | | | | U | | 45 kW | 290 Nm | | |
| | | | | | | W | | 55 kW | 355 Nm | | |
| | | | | | | Y | | 75 kW | 485 Nm | | |
| | | | | | | Z | | 90 kW | 585 Nm | | |
| | | | | | | 2 | | 110 kW | 715 Nm | | |
| Function | | | | | | | | | | | |
| | | | | | | L | | Horse power control with pressure control | | | |
| | | | | | | C | | Horse power control with load sensing (single spool) | | | |
| Control variation | | | | | | | | | | | |
| | | | | | | C | | Standard version | | | |
| | | | | | | 1 | | NG 6 interface top side | | | |
| | | | | | | W | | With unloading function, 24 VDC solenoid | | | |
| | | | | | | K | | Prop.-pilot valve type PVACRE..35 mounted | | | |
| | | | | | | Z | | Without integrated pilot valve, NG6 interface, for mounting of accessory code PVAC* | | | |

| Code | | | Control option |
|---------------------------|---|---|---|
| electro hydraulic control | | | |
| F | P | V | Proportional displacement control, no pressure compensation |
| U | P | | Proportional displacement control, with pressure compensation |
| | | | Control variation |
| | | R | pilot operated pressure control, open NG6 interface |
| | | K | pilot operated pressure control, proportional pilot valve type PVACRE..35 mounted |
| | | M | pilot operated pressure control, pressure sensor and proportional pilot valve type PVACRE..35 mounted for pressure control and/or power control |

P V **R 1 K 1 T 1 N**

axial piston
pump
variable
displacement
high
pressure
version

size
and
displacement

rotation

variation

mounting
interface

threads
code

thru drive
code

coupling
code

seals

compensator

see next page

| Code | Displacement | Size |
|------|--------------------------|------|
| 270 | 270 cm ³ /rev | 5 |

| Code | Rotation ¹⁾ |
|------|------------------------|
| R | Clockwise |
| L | Counter clockwise |

¹⁾ When looked on shaft

| Code | Variation |
|------|-------------------------------------|
| 1 | Standard |
| 9 | special adjustment ²⁾ |

²⁾ requires Kxxxx number

| Code | Mounting interface | | Shaft |
|------|--------------------|-----------------------|--------------------------|
| K | metr. ISO | 4-hole flange Ø200 mm | Cylindric, key |
| L | 3019/2 | 4-hole flange Ø200 mm | Splined, DIN 5480 |
| D | SAE | 4-hole flange SAE E | Cylindric, key |
| E | ISO | 4-hole flange SAE E-F | Splined, SAE |
| | 3019/1 | | |

| Code | Port ⁴⁾ | Threads ⁵⁾ |
|------|--------------------|-----------------------|
| 1 | BSPP | metric |
| 3 | UNF | UNC |
| 7 | ISO 6149 | UNC |
| 8 | ISO 6149 | metric |

⁴⁾ Drain, gauge and flushing ports

⁵⁾ All mounting and connecting threads

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

| Code | Coupling for thru drive | as single part ⁶⁾ |
|------|---------------------------------------|------------------------------|
| 1 | Single pump, no coupling | |
| H | with coupling 25 x 1.5 x 15, DIN 5480 | MK-PVBGxK01 |
| J | with coupling 32 x 1.5 x 20, DIN 5480 | MK-PVBGxK02 |
| K | with coupling 40 x 1.5 x 25, DIN 5480 | MK-PVBGxK03 |
| L | with coupling 50 x 2 x 24, DIN 5480 | MK-PVBGxK04 |
| M | with coupling 60 x 2 x 28, DIN 5480 | MK-PVBGxK05 |
| Y | with coupling SAE A 9T-16/32 DP | MK-PVBGxK11 |
| A | with coupling SAE - 11T-16/32 DP | MK-PVBGxK12 |
| B | with coupling SAE B 13T-16/32 DP | MK-PVBGxK13 |
| C | with coupling SAE B-B 15T-16/32 DP | MK-PVBGxK14 |
| D | with coupling SAE C 14T-12/24 DP | MK-PVBGxK15 |
| E | with coupling SAE C - C | MK-PVBGxK16 |
| F | with coupling SAE D, E | MK-PVBGxK17 |

| Code | Thru drive option | |
|------|--|------------------------------|
| | No adaptor for 2nd pump | |
| T | Single pump prepared for thru drive | |
| | with adaptor for 2nd pump | as single part ⁶⁾ |
| A | SAE A, Ø 82.55 mm | MK-PVBGxAMN |
| B | SAE B, Ø 101.6 mm | MK-PVBGxBMN |
| C | SAE C, Ø 127 mm | MK-PVBGxCMN |
| D | SAE D, Ø 152,4 mm | MK-PVBGxDMN |
| E | SAE E, Ø 165,1 mm | MK-PVBGxEMN |
| H | metric, Ø 80 mm | MK-PVBGxHMN |
| J | metric, Ø 100 mm | MK-PVBGxJMN |
| K | metric, Ø 125 mm | MK-PVBGxKMN |
| L | metric, Ø 160 mm | MK-PVBGxLMN |
| M | metric, Ø 200 mm | MK-PVBGxMMN |

See dimensions for details

⁶⁾ to be ordered separately as single part
x= Frame size, see displacement.

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

1) not for MT
2) only for MT

| Horse power / Torque control | | | | | | | | | | |
|------------------------------|--|--|--|--|------|--|--|--|-------------------|--|
| Displacem. | | | | | Code | | | | | |
| 270 | | | | | | | | Nominal HP at 1.500 rpm | Nominal torque | |
| | | | | | T | | | 37 kW | 240 Nm | |
| | | | | | U | | | 45 kW | 290 Nm | |
| | | | | | W | | | 55 kW | 350 Nm | |
| | | | | | Y | | | 75 kW | 480 Nm | |
| | | | | | Z | | | 90 kW | 580 Nm | |
| | | | | | 2 | | | 110 kW | 700 Nm | |
| | | | | | 3 | | | 132 kW | 840 Nm | |
| Function | | | | | | | | | | |
| | | | | | L | | | Horse power control with pressure control | | |
| | | | | | C | | | Horse power control with load sensing (single spool) | | |
| Control variation | | | | | | | | | | |
| | | | | | C | | | Standard version | | |
| | | | | | 1 | | | NG 6 interface top side | | |
| | | | | | W | | | With unloading function, 24 VDC solenoid | | |
| | | | | | K | | | Prop.-pilot valve type PVACRE..35 mounted | | |
| | | | | | Z | | | Without integrated pilot valve, NG6 interface, for mounting of accessory code PVAC* | | |

| Code | | | Control option |
|------|---|---|---|
| | | | electro hydraulic control |
| F | P | V | Proportional displacement control, no pressure compensation |
| U | P | | Proportional displacement control, with pressure compensation |
| | | | Control variation |
| | | R | pilot operated pressure control, open NG6 interface |
| | | K | pilot operated pressure control, proportional pilot valve type PVACRE..35 mounted |
| | | M | pilot operated pressure control, pressure sensor and proportional pilot valve type PVACRE..35 mounted for pressure control and/or power control |

P V **R 1 K 1 T 1 N**

axial piston
pump
variable
displacement

size
and
displacement

rotation

variation

mounting
interface

threads
code

thru drive
code

coupling
code

seals

control

see next page

| Code | Displacement | Size |
|------|--------------------------|------|
| 360 | 360 cm ³ /rev | 5 |

| Code | Rotation ¹⁾ |
|------|------------------------|
| R | Clockwise |

¹⁾ When looked on shaft

| Code | Variation |
|------|----------------------------------|
| 1 | Standard |
| 9 | Special adjustment ²⁾ |

²⁾ requires Kxxxx number

| Code | Mounting interface | Shaft |
|------|---------------------------------|-------------------|
| K | 4-hole flange Ø250 mm | Cylindric, key |
| L | metr. ISO 4-hole flange Ø250 mm | Splined, DIN 5480 |
| R | 3019/2 4-hole flange Ø224 mm | Cylindric, key |
| T | 4-hole flange Ø224 mm | Splined, DIN 5480 |
| D | SAE 4-hole flange SAE E | Cylindric, key |
| E | ISO 4-hole flange SAE E | Splined, SAE |
| | 3019/1 | |

| Code | Port ³⁾ | Threads ⁴⁾ |
|------|--------------------|-----------------------|
| 1 | BSPP | metric |
| 3 | UNF | UNC |

³⁾ Drain, gauge and flushing ports

⁴⁾ All mounting and connecting threads

| Code | Seals |
|------|-------|
| N | NBR |
| V | FPM |

| Code | Coupling for thru drive | as single part ⁶⁾ |
|------|---------------------------------------|------------------------------|
| 1 | Single pump, no coupling | |
| H | with coupling 25 x 1.5 x 15, DIN 5480 | MK-PVBGxK01 |
| J | with coupling 32 x 1.5 x 20, DIN 5480 | MK-PVBGxK02 |
| K | with coupling 40 x 1.5 x 25, DIN 5480 | MK-PVBGxK03 |
| L | with coupling 50 x 2 x 24, DIN 5480 | MK-PVBGxK04 |
| M | with coupling 60 x 2 x 28, DIN 5480 | MK-PVBGxK05 |
| P | with coupling 70 x 3 x 22, DIN 5480 | MK-PVBGxK06 |
| Y | with coupling SAE A 9T-16/32 DP | MK-PVBGxK11 |
| A | with coupling SAE - 11T-16/32 DP | MK-PVBGxK12 |
| B | with coupling SAE B 13T-16/32 DP | MK-PVBGxK13 |
| C | with coupling SAE B-B 15T-16/32 DP | MK-PVBGxK14 |
| D | with coupling SAE C 14T-12/24 DP | MK-PVBGxK15 |
| E | with coupling SAE C - C | MK-PVBGxK16 |
| F | with coupling SAE D, E | MK-PVBGxK17 |
| G | with coupling SAE F | MK-PVBGxK18 |

| | | |
|---------------------------|-------------------------------------|------------------------------|
| Code | Thru drive option | |
| No adaptor for 2nd pump | | |
| T | Single pump prepared for thru drive | |
| with adaptor for 2nd pump | | as single part ⁶⁾ |
| A | SAE A, Ø 82.55 mm | MK-PVBGxAMN |
| B | SAE B, Ø 101.6 mm | MK-PVBGxBMN |
| C | SAE C, Ø 127 mm | MK-PVBGxCMN |
| D | SAE D, Ø 152.4 mm | MK-PVBGxDMN |
| E | SAE E, Ø 165.1 mm | MK-PVBGxEMN |
| H | metric, Ø 80 mm | MK-PVBGxHMN |
| J | metric, Ø 100 mm | MK-PVBGxJMN |
| K | metric, Ø 125 mm | MK-PVBGxKMN |
| L | metric, Ø 160 mm | MK-PVBGxLMN |
| M | metric, Ø 200 mm | MK-PVBGxMMN |

See dimensions for details

⁶⁾ to be ordered separately as single part
x= Frame size, see displacement.

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

1) not for MT
2) only for MT

| Horse power / Torque control | | | | | | | | | |
|------------------------------|--|--|--|--|------|--|--|-------------------|--|
| Displacem. | | | | | Code | | | | |
| 360 | | | | | | | Nominal HP at 1.500 rpm | Nominal torque | |
| | | | | | U | | 45 kW | 290 Nm | |
| | | | | | W | | 55 kW | 350 Nm | |
| | | | | | Y | | 75 kW | 480 Nm | |
| | | | | | Z | | 90 kW | 580 Nm | |
| | | | | | 2 | | 110 kW | 700 Nm | |
| | | | | | 3 | | 132 kW | 840 Nm | |
| | | | | | 4 | | 160 kW | 1020 Nm | |
| | | | | | 5 | | 180 kW | 1150 Nm | |
| | | | | | 6 | | 200 kW | 1280 Nm | |
| Function | | | | | | | | | |
| | | | | | L | | Horse power control with pressure control | | |
| | | | | | C | | Horse power control with load sensing (single spool) | | |
| Control variation | | | | | | | | | |
| | | | | | C | | Standard version | | |
| | | | | | 1 | | NG 6 interface top side | | |
| | | | | | W | | With unloading function, 24 VDC solenoid | | |
| | | | | | K | | Prop.-pilot valve type PVACRE..35 mounted | | |
| | | | | | Z | | Without integrated pilot valve, NG6 interface, for mounting of accessory code PVAC* | | |

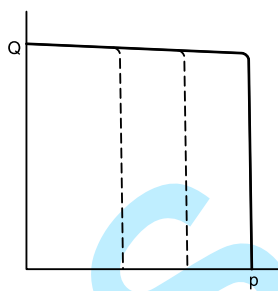
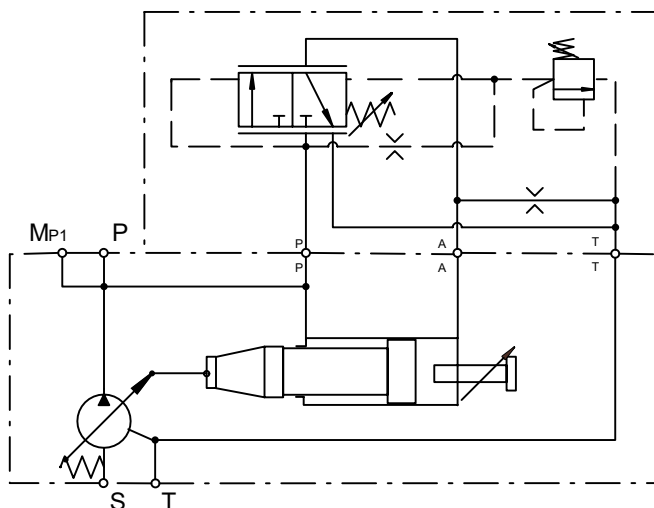
| Code | | | Control option |
|---------------------------|---|---|---|
| electro hydraulic control | | | |
| F | P | V | Proportional displacement control, no pressure compensation |
| U | P | | Proportional displacement control, with pressure compensation |
| | | | Control variation |
| | | R | pilot operated pressure control, open NG6 interface |
| | | K | pilot operated pressure control, proportional pilot valve type PVACRE..35 mounted |
| | | M | pilot operated pressure control, pressure sensor and proportional pilot valve type PVACRE..35 mounted for pressure control and/or power control |

Standard Pressure Control

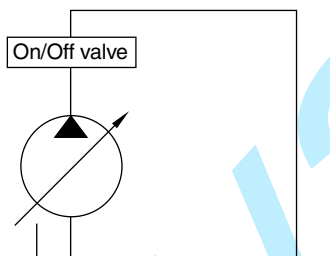
Control option MMC

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

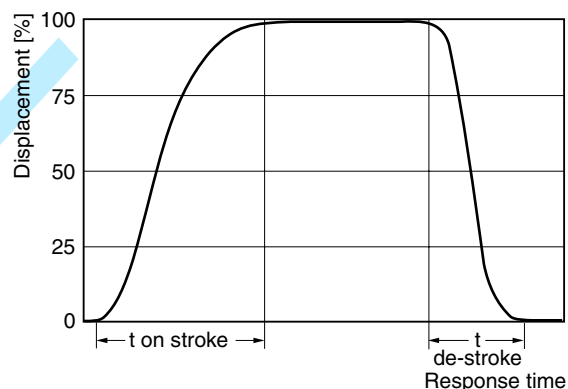
Control schematics



Response times of the pump are collected from a circuit as below by measuring the pumps swash angle movement at different pressures.



Dynamic characteristic of flow control *



* Curve shown exaggerated

| | Time on-stroke [ms] | | Time de-stroke [ms] | |
|-------|---------------------|-----------------|---------------------|---------------------|
| | against 50 bar | against 350 bar | zero stroke 50 bar | zero stroke 350 bar |
| PV360 | 520 | 180 | 120 | 82 |

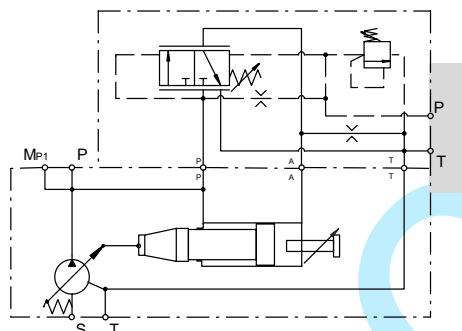
| | |
|--|---------------|
| Pressure adjustment range | 15 to 350 bar |
| Factory setting pressure | 50 bar |
| Differential pressure adjustment range | 10 to 40 bar |
| Factory setting differential pressure | 15 bar |
| Control oil consumption | Max 8.0 l/min |

Standard Pressure Control with NG6 Interface

Control option MM1

With code MM1 the standard pressure control has a valve interface size NG 6 DIN 24340 (CETOP 03 acc. RP35H, NFPA D03) on the top side.

This interface allows the mounting of accessories like multiple pressure selectors without the need of external piping and valve mounting.

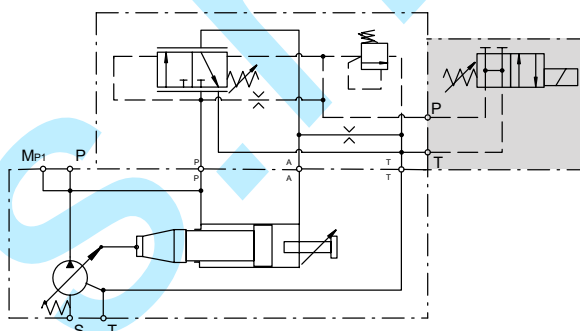


Standard Pressure Control with Electrical Unloading

Control option MMW

With code MMW a solenoid operated directional control valve (D1VW002KNJW) for electrical unloading is mounted on the control top side.

When the solenoid is de-energised, the pump compensates at a stand-by pressure of typically 15 bar. When the solenoid is energised, the pump compensates at the pressure adjusted on the integrated pilot valve.

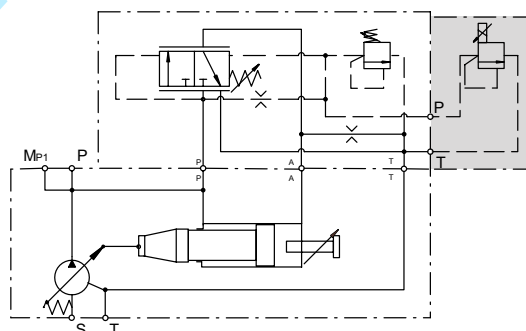


Standard Pressure Control with Proportional Pilot Valve

Control option MMK

With code MMK a proportional pilot valve of type PVACRE..35 (see page 35) is mounted on the top side interface.

This allows a variation of the pump compensating pressure between 20 and 350 bar by an electrical signal.

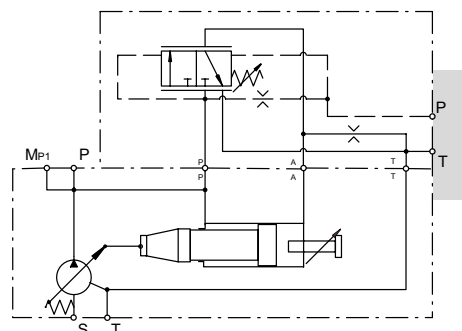


Standard Pressure Control with Accessory

Control option MMZ

Control MMZ has no integrated pilot valve but a valve interface NG6 DIN 24340 on the top.

This version is recommended for valve accessories.

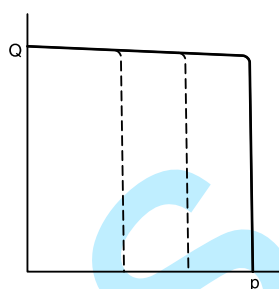
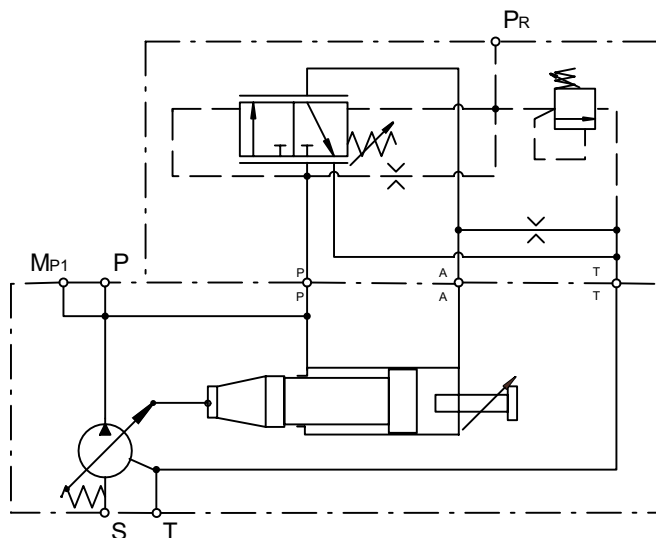


Remote Pressure Control

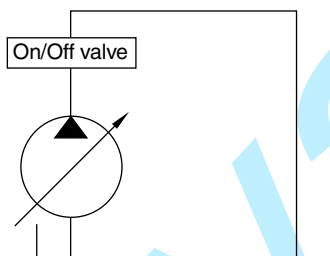
Control option MRC

The remote pressure control adjusts the pump displacement according to the actual need of flow in the system in order to keep the pressure constant at a level given by a remotely installed pilot valve.

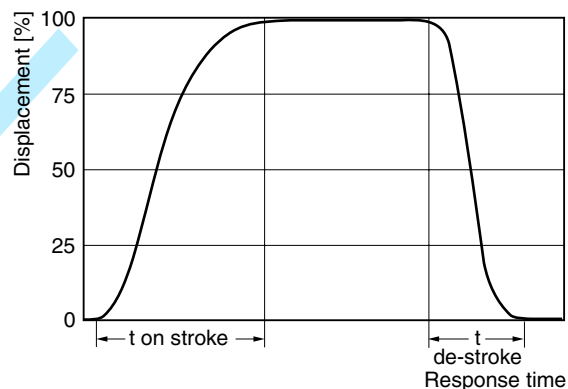
Control schematics



Response times of the pump are collected from a circuit as below by measuring the pumps swash angle movement at different pressures.



Dynamic characteristic of flow control *



* Curve shown exaggerated

| | Time on-stroke [ms] | | Time de-stroke [ms] | |
|-------|---------------------|-----------------|---------------------|---------------------|
| | against 50 bar | against 350 bar | zero stroke 50 bar | zero stroke 350 bar |
| PV360 | 520 | 180 | 120 | 82 |

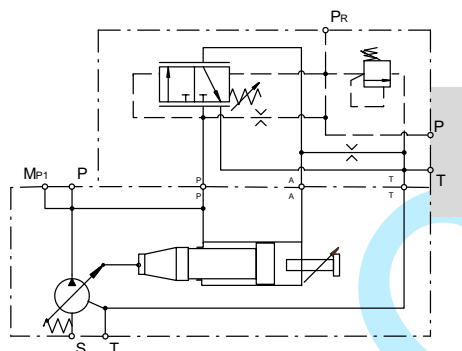
| | |
|--|---------------|
| Pressure adjustment range | 15 to 350 bar |
| Factory setting pressure | 50 bar |
| Differential pressure adjustment range | 10 to 40 bar |
| Factory setting differential pressure | 15 bar |
| Control oil consumption | Max 8.0 l/min |

Remote Pressure Control with NG6 Interface

Control option MR1

With code MR1 the remote pressure control has a valve interface size NG 6 DIN 24340 (CETOP 03 acc. RP35H, NFPA D03) on the top side.

This interface allows the mounting of accessories like multiple pressure selectors without the need of external piping and valve mounting.

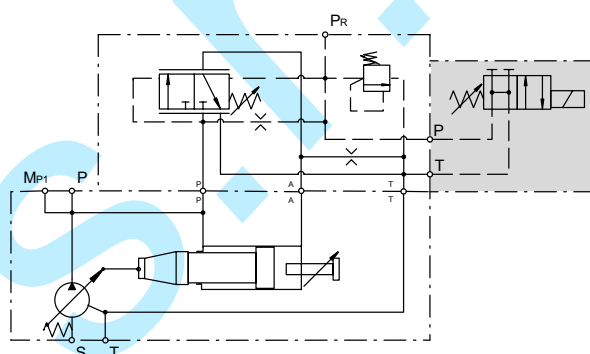


Remote Pressure Control with Electrical Unloading

Control option MRW

With code MRW a solenoid operated directional control valve (D1VW002KNJW) for electrical unloading is mounted on the control top side.

When the solenoid is de-energised, the pump compensates at a stand-by pressure of typically 15 bar. When the solenoid is energised, the pump compensates at the pressure adjusted on the integrated pilot valve.

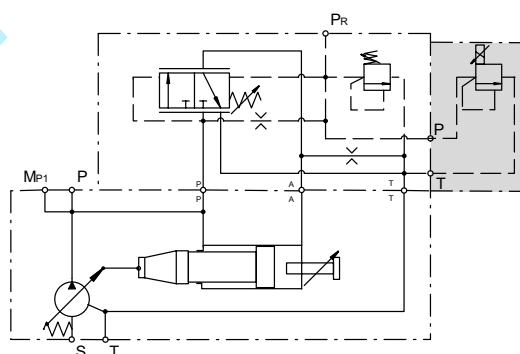


Remote Pressure Control with Proportional Pilot Valve

Control option MRK

With code MRK a proportional pilot valve of type PVACRE..35 (see page 35) is mounted on the top side interface.

This allows a variation of the pump compensating pressure between 20 and 350 bar by an electrical signal.

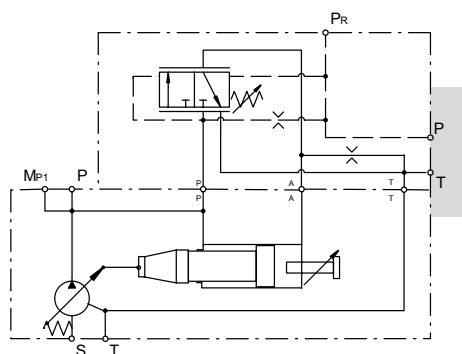


Remote Pressure Control with Accessory

Control option MRZ

Control MRZ has no integrated pilot valve but a valve interface NG6 DIN 24340 on the top.

This version is recommended for valve accessories.

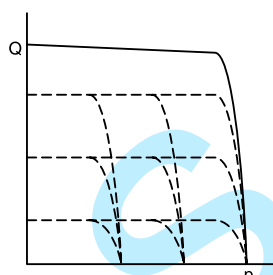
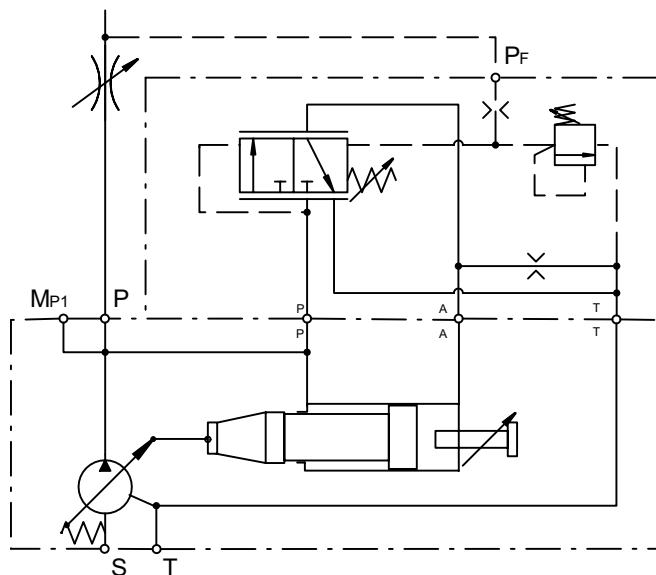


Load Sensing Control

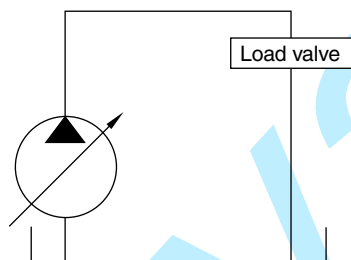
Control option MFC

The pilot pressure of the load sensing control is taken from a load sensing port in the hydraulic system. It is used to match pump flow to system demands.

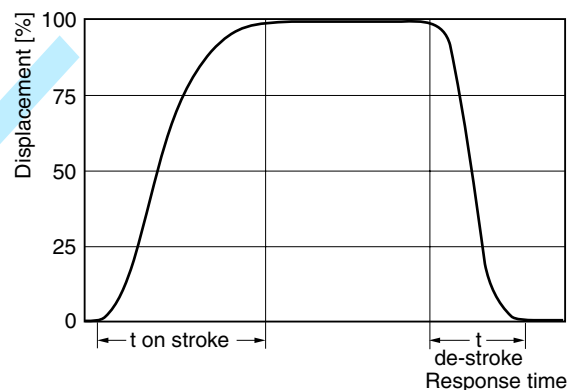
Control schematics



Response times of the pump are collected from a circuit as below by measuring the pumps swash angle movement at different pressures.



Dynamic characteristic of flow control *



* Curve shown exaggerated

| | Time on-stroke [ms] | | Time de-stroke [ms] | |
|-------|---------------------|---------------------|---------------------|---------------------|
| | stand-by to 50 bar | stand-by to 350 bar | 50 bar to stand-by | 350 bar to stand-by |
| PV360 | 500 | 690 | 830 | 50 |

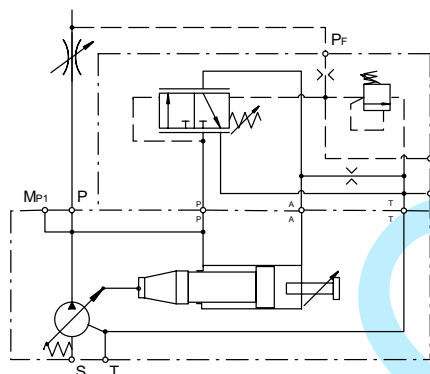
| | |
|--|---------------|
| Pressure adjustment range | 15 to 350 bar |
| Factory setting pressure | 50 bar |
| Differential pressure adjustment range | 10 to 40 bar |
| Factory setting differential pressure | 10 bar |
| Control oil consumption | Max 8.0 l/min |

Load Sensing Control with NG6 Interface

Control option MF1

With code MF1 the remote pressure control has a valve interface size NG 6 DIN 24340 (CETOP 03 acc. RP35H, NFPA D03) on the top side.

This interface allows the mounting of accessories like multiple pressure selectors without the need of external piping and valve mounting.

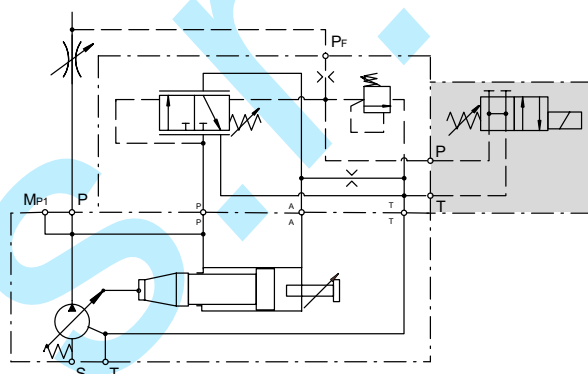


Load Sensing Control with Electrical Unloading

Control option MFW

With code MFW a solenoid operated directional control valve (D1VW002KNJW) for electrical unloading is mounted on the control top side.

When the solenoid is de-energised, the pump compensates at a stand-by pressure of typically 15 bar. When the solenoid is energised, the pump compensates at the pressure adjusted on the integrated pilot valve.

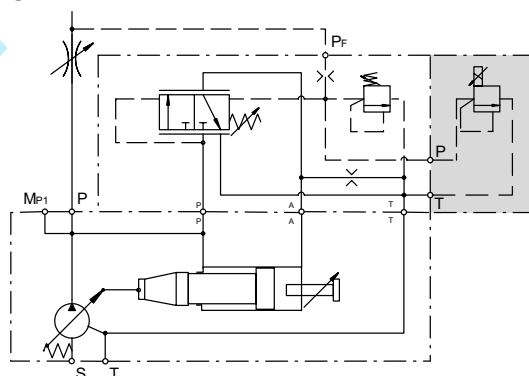


Load Sensing Control with Proportional Pilot Valve

Control option MFK

With code MFK a proportional pilot valve of type PVACRE..35 (see page 35) is mounted on the top side interface.

This allows a variation of the pump compensating pressure between 20 and 350 bar by an electrical signal.

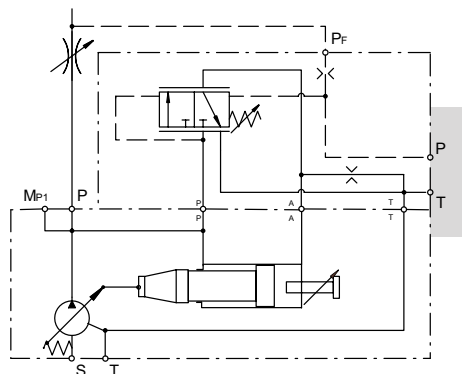


Load Sensing Control with Accessory

Control option MFZ

Control MFZ has no integrated pilot valve but a valve interface NG6 DIN 24340 on the top.

This version is recommended for valve accessories.

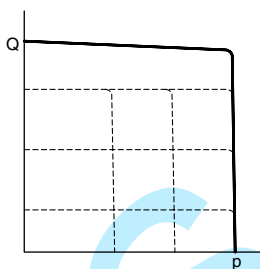
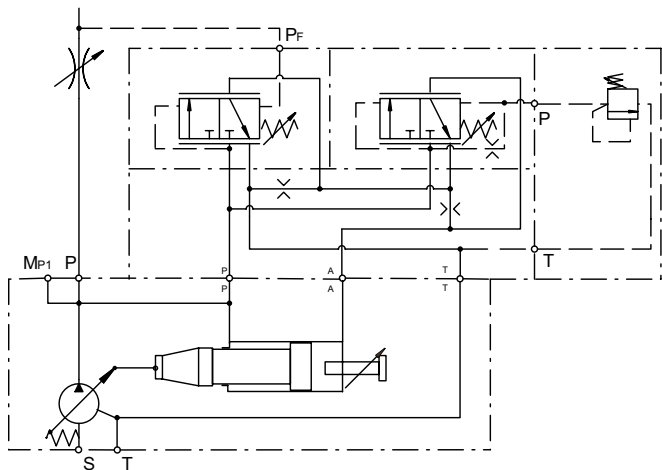


2 Spool Load Sensing Control

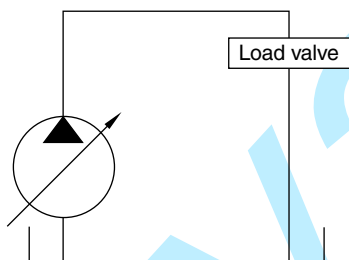
Control option MTP

The pilot pressure of the load sensing control is taken from a load sensing port in the hydraulic system. It is used to match pump flow to system demands. With the 2 spool control the interaction of the two control functions is avoided by using two separate control valves for flow and pressure compensation.

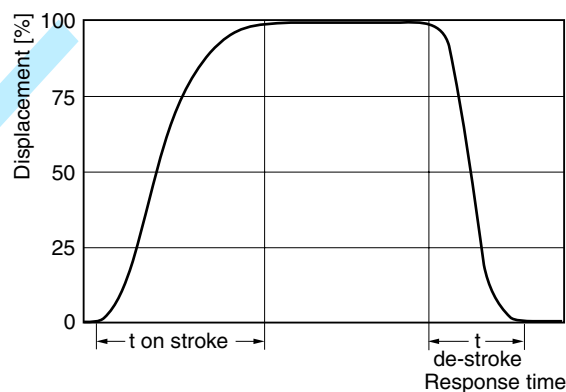
Control schematics



Response times of the pump are collected from a circuit as below by measuring the pumps swash angle movement at different pressures.



Dynamic characteristic of flow control *



* Curve shown exaggerated

| | Time on-stroke [ms] | | Time de-stroke [ms] | |
|-------|---------------------|---------------------|---------------------|---------------------|
| | stand-by to 50 bar | stand-by to 350 bar | 50 bar to stand-by | 350 bar to stand-by |
| PV360 | 920 | 670 | 1000 | 170 |

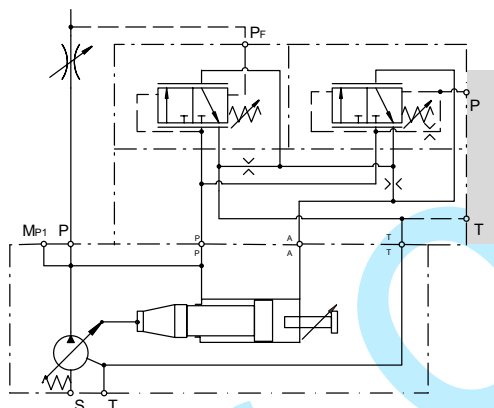
| | |
|---|---------------|
| Pressure adjustment range | 15 to 350 bar |
| Factory setting pressure | 50 bar |
| Differential pressure adjustment range | 10 to 40 bar |
| Factory setting differential pressure load sensing | 10 bar |
| Factory setting differential pressure, pressure control | 15 bar |
| Control oil consumption | Max 8.0 l/min |

2 Spool Load Sensing Control with NG6 Interface

Control option MT1

With code MT1 the remote pressure control has a valve interface size NG 6 DIN 24340 (CETOP 03 acc. RP35H, NFPA D03) on the top side.

This interface allows the mounting of accessories like multiple pressure selectors without the need of external piping and valve mounting.

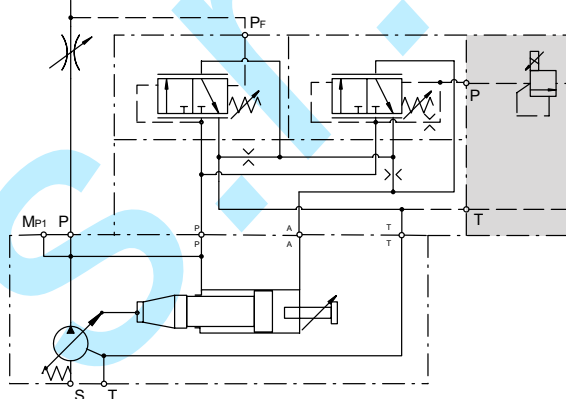


2 Spool Load Sensing Control with Proportional Pilot Valve

Control option MTK

With code MTK a proportional pilot valve of type PVACRE..35 (see page 35) is mounted on the top side interface.

This allows a variation of the pump compensating pressure between 20 and 350 bar by an electrical signal.

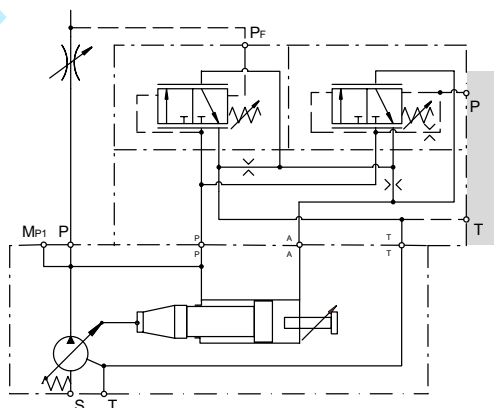


2 Spool Load Sensing Control with Accessory

Control option MTZ

Control MTZ has a valve accessory factory mounted on the NG6 interface.

Available valve accessory can be seen on page 33. Specify the accessory with full ordering code.

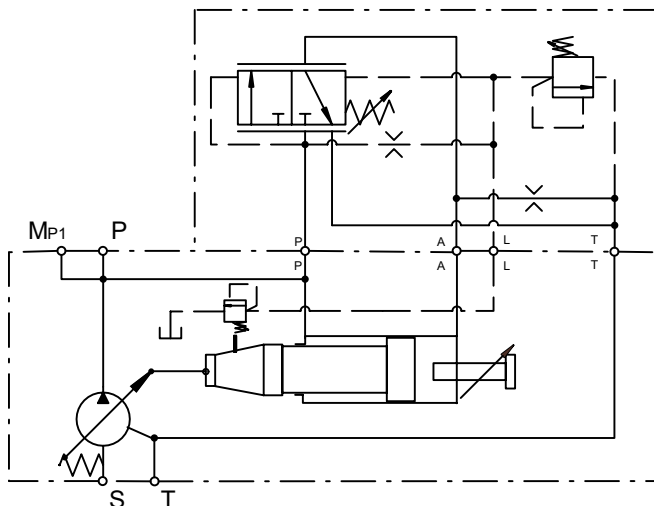


Horse Power/Torque Controls with Pressure Control

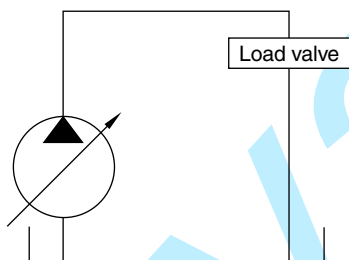
Control option *LC

The horse power control type *L* provides the benefit of the pressure control, plus the ability to limit the input power the pump will draw. These controls are beneficial when the power available from the prime mover for the hydraulics is limited or the application power demand has both high flow/low pressure and low flow/high pressure duty cycles.

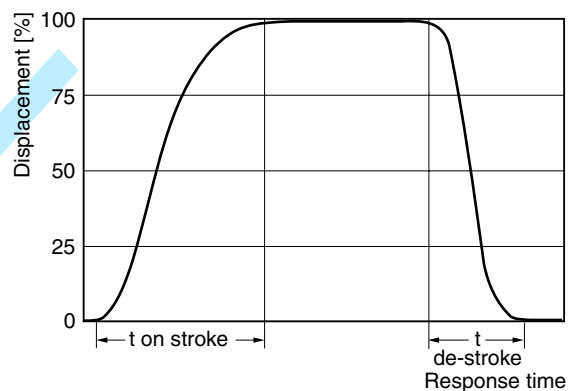
Control schematics



Response times of the pump are collected from a circuit as below by measuring the pumps swash angle movement at different pressures.



Dynamic characteristic of flow control *



* Curve shown exaggerated

| | Time on-stroke [ms] | | Time de-stroke [ms] | |
|-------|---------------------|-----------------|---------------------|---------------------|
| | against 50 bar | against 350 bar | zero stroke 50 bar | zero stroke 350 bar |
| PV360 | 90 | 90 | 100 | 100 |

| | |
|--|---------------|
| Pressure adjustment range | 15 to 350 bar |
| Factory setting pressure | 350 bar |
| Differential pressure adjustment range | 10 to 40 bar |
| Factory setting differential pressure | 15 bar |
| Control oil consumption | Max 8.0 l/min |

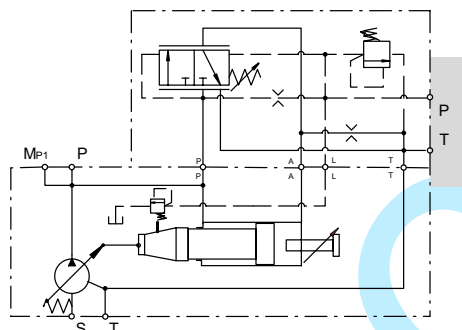
See Horse Power characteristic curves on page 24

Horse Power/Torque Control with NG6 Interface

Control option *L1

With code *L1 the remote pressure control has a valve interface size NG 6 DIN 24340 (CETOP 03 acc. RP35H, NFPA D03) on the top side.

This interface allows the mounting of accessories like multiple pressure selectors without the need of external piping and valve mounting.

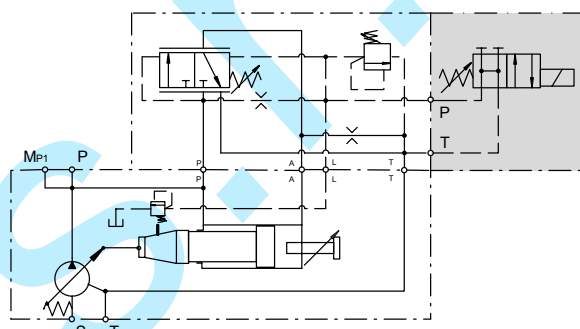


Horse Power/Torque Control with Electrical Unloading

Control option *LW

With code *LW a solenoid operated directional control valve (D1VW002KNJW) for electrical unloading is mounted on the control top side.

When the solenoid is de-energised, the pump compensates at a stand-by pressure of typically 15 bar. When the solenoid is energised, the pump compensates at the pressure adjusted on the integrated pilot valve.

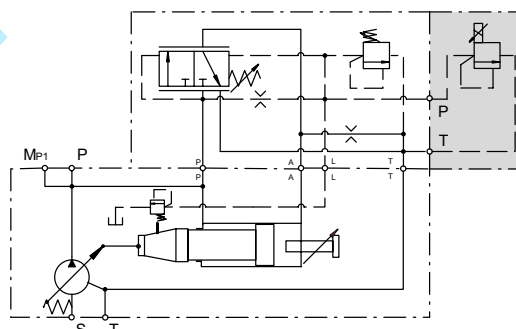


Horse Power/Torque Control with Proportional Pilot Valve

Control option *LK

With code *LK a proportional pilot valve of type PVACRE..35 (see page 35) is mounted on the top side interface.

This allows a variation of the pump compensating pressure between 20 and 350 bar by an electrical signal.

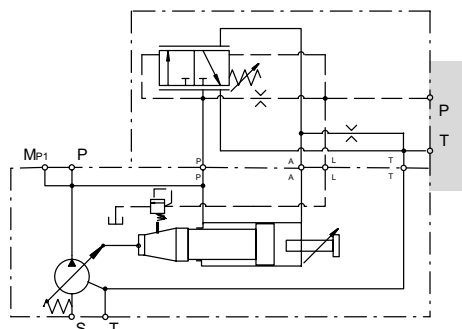


Horse Power/Torque Control with Accessory

Control option *LZ

Control *LZ has no integrated pilot valve but a valve interface NG6 DIN 24340 on the top.

This version is recommended for valve accessories.

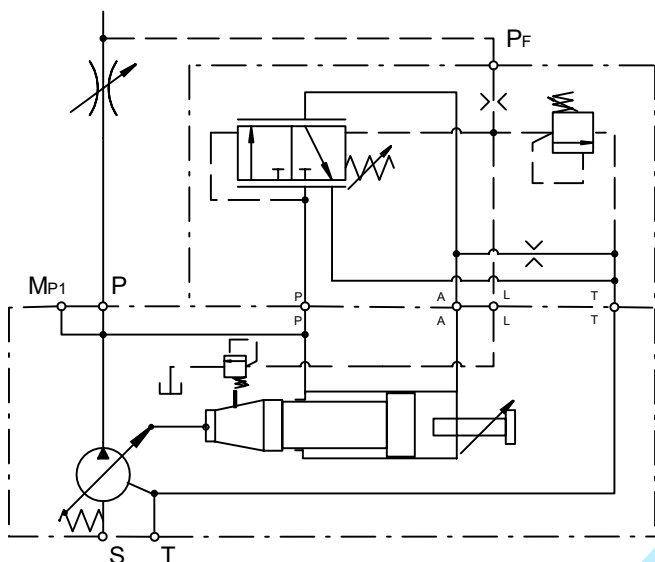


Horse Power/Torque Controls with Load Sensing

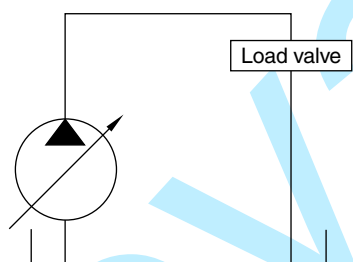
Control option *CC

The horse power control type *C* provides the benefit of the load sensing control, plus the ability to limit the input power the pump will draw. These controls are beneficial when the power available from the prime mover for the hydraulics is limited or the application power demand has both high flow/low pressure and low flow/high pressure duty cycles.

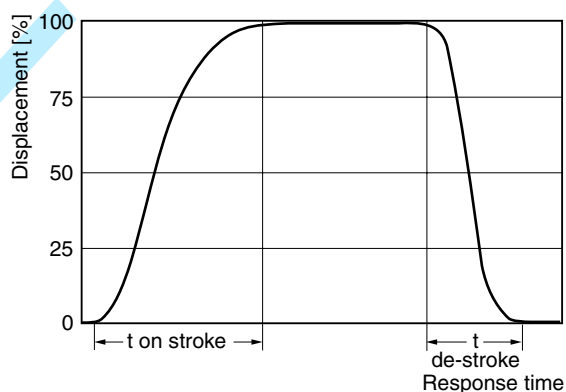
Control schematics



Response times of the pump are collected from a circuit as below by measuring the pumps swash angle movement at different pressures.



Dynamic characteristic of flow control *



* Curve shown exaggerated

| | Time on-stroke [ms] | | Time de-stroke [ms] | |
|-------|---------------------|---------------------|---------------------|---------------------|
| | stand-by to 50 bar | stand-by to 350 bar | 50 bar to stand-by | 350 bar to stand-by |
| PV360 | 90 | 90 | 100 | 100 |

| | |
|--|---------------|
| Pressure adjustment range | 15 to 350 bar |
| Factory setting pressure | 350 bar |
| Differential pressure adjustment range | 10 to 40 bar |
| Factory setting differential pressure | 15 bar |
| Control oil consumption | Max 8.0 l/min |

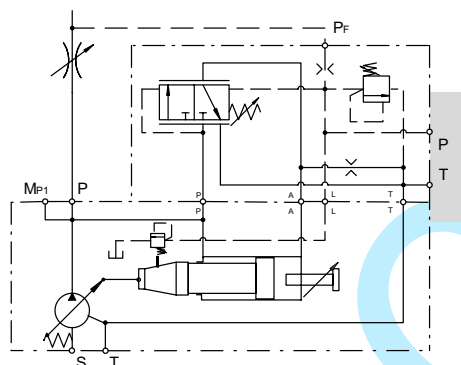
See Horse Power characteristic curves on page 24

Horse Power/Torque Control with NG6 Interface

Control option *C1

With code *C1 the remote pressure control has a valve interface size NG 6 DIN 24340 (CETOP 03 acc. RP35H, NFPA D03) on the top side.

This interface allows the mounting of accessories like multiple pressure selectors without the need of external piping and valve mounting.

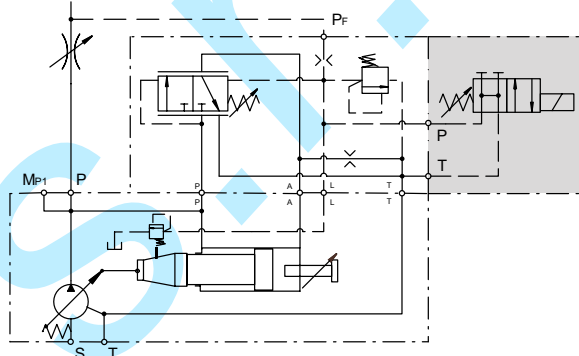


Horse Power/Torque Control with Electrical Unloading

Control option *CW

With code *CW a solenoid operated directional control valve (D1VW002KNJW) for electrical unloading is mounted on the control top side.

When the solenoid is de-energised, the pump compensates at a stand-by pressure of typically 15 bar. When the solenoid is energised, the pump compensates at the pressure adjusted on the integrated pilot valve.

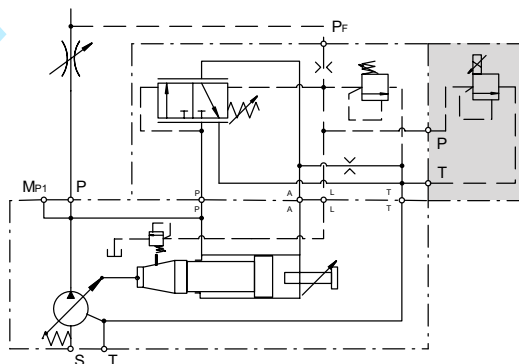


Horse Power/Torque Control with Proportional Pilot Valve

Control option *CK

With code *CK a proportional pilot valve of type PVACRE..35 (see page 35) is mounted on the top side interface.

This allows a variation of the pump compensating pressure between 20 and 350 bar by an electrical signal.

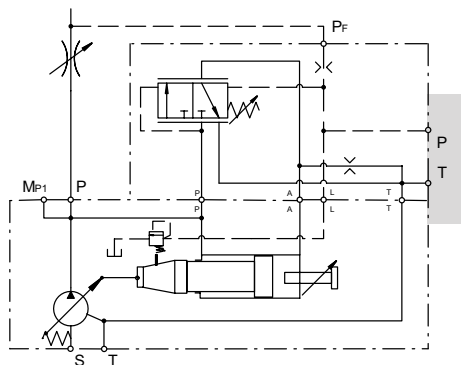


Horse Power/Torque Control with Accessory

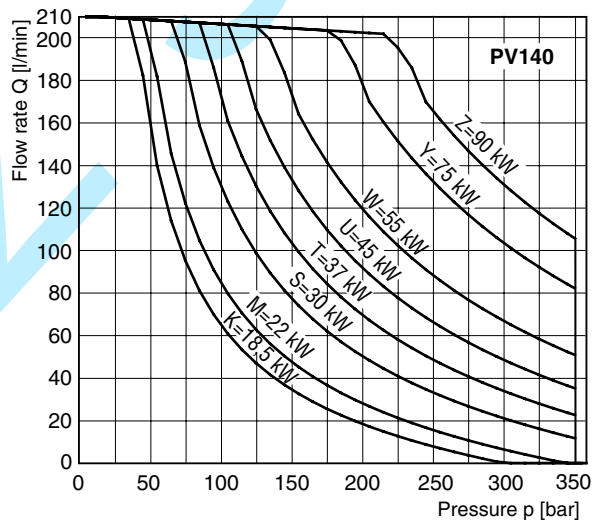
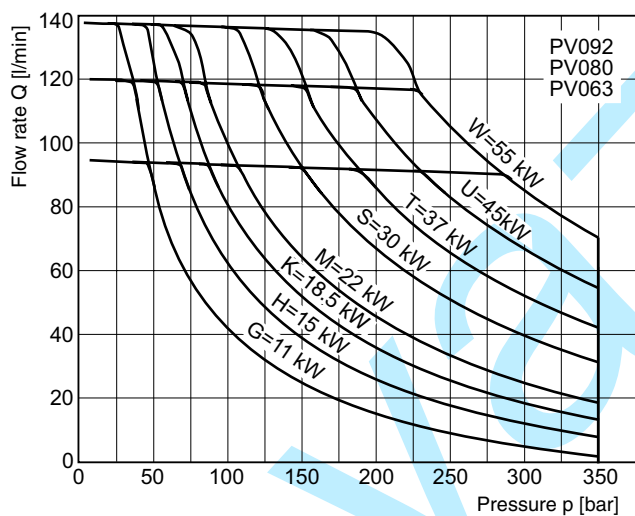
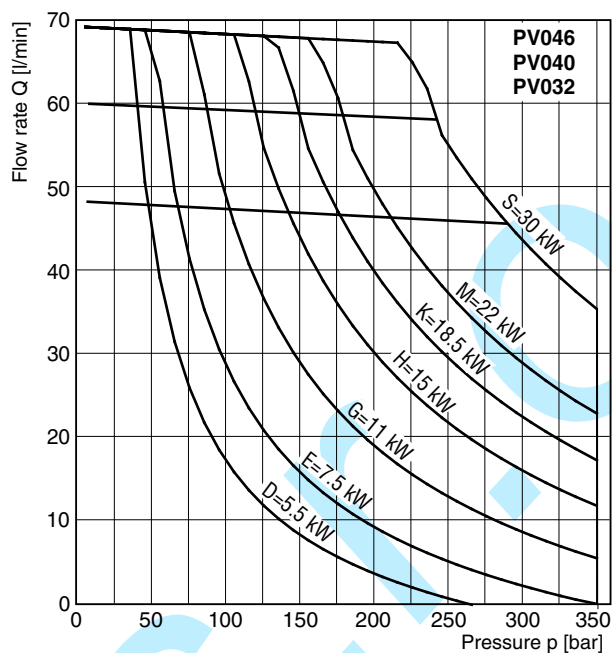
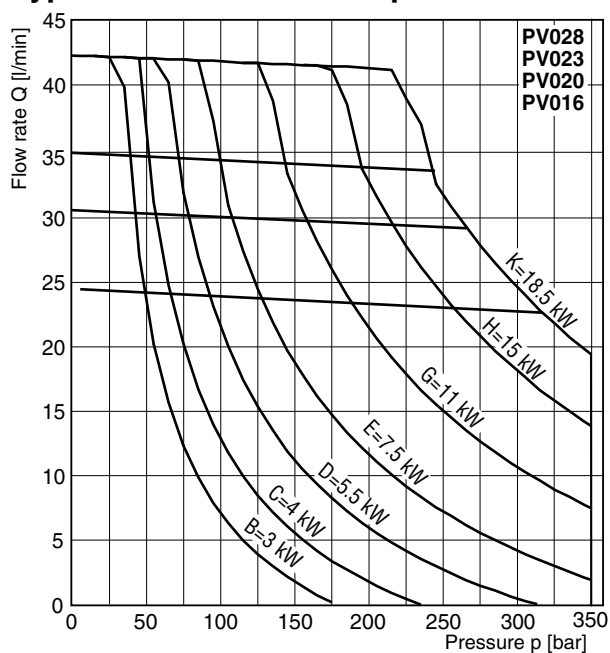
Control option *CZ

Control *CZ has no integrated pilot valve but a valve interface NG6 DIN 24340 on the top.

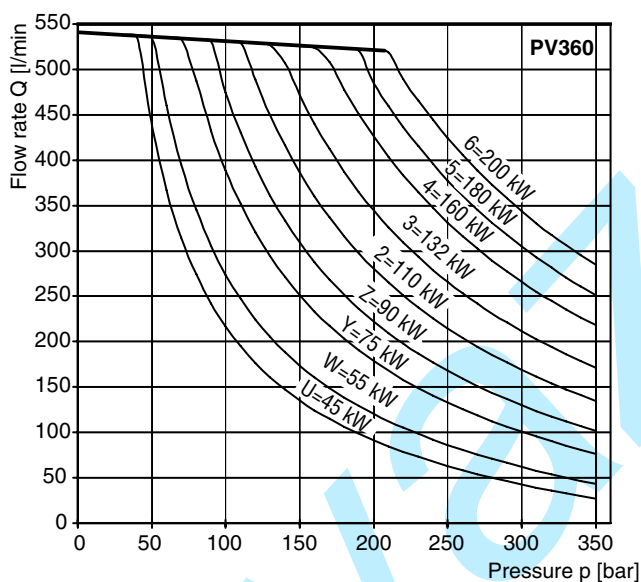
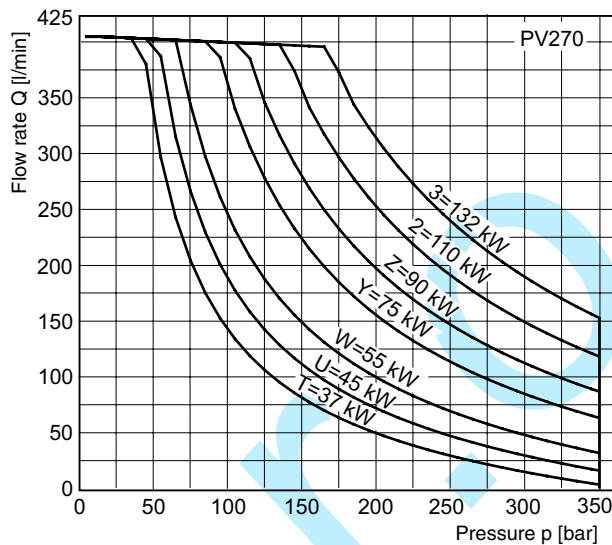
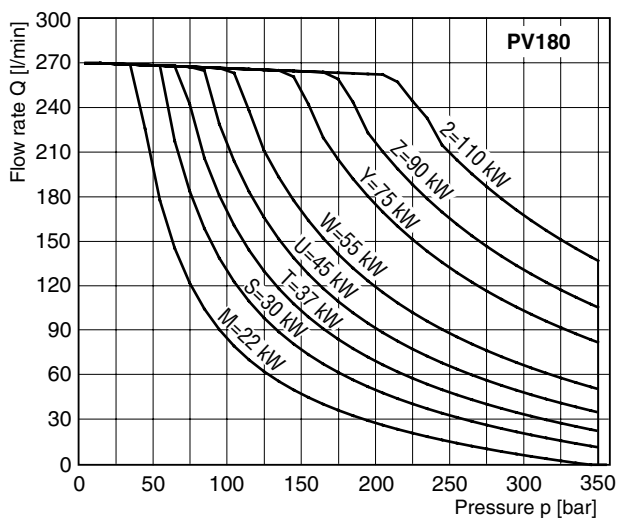
This version is recommended for valve accessories.



Typical Horse Power/Torque Control Characteristics



Typical Horse Power/Torque Control Characteristics



Speed : $n = 1500 \text{ rev/min}$
 Temperature : $t = 50^\circ\text{C}$
 Fluid : HLP, ISO VG46
 Viscosity : $\nu = 46 \text{ mm}^2/\text{s}$ at 40°C
 Pressure : Maximum 350 bar, depending on HP level

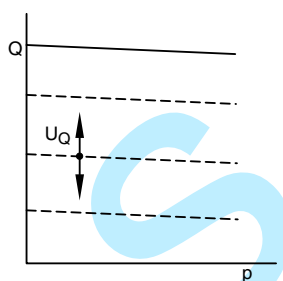
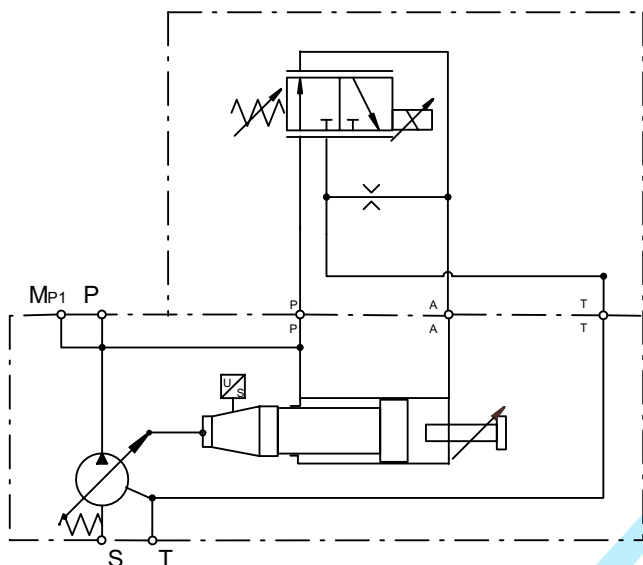
Proportional Displacement Control

Control option FPV

The proportional displacement control allows the adjustment of the pumps output flow with an electrical input signal. The actual displacement of the pump is monitored by an LVDT and compared with the commanded displacement in an electronic control module PQDXXA-Z00. The command is given as an electrical input signal (0 - 10 V) from the supervising machine control or a potentiometer.

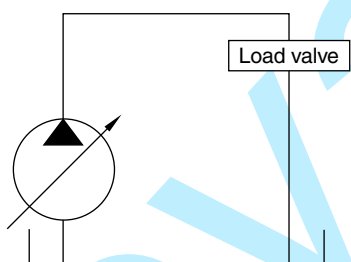
Version FPV of the proportional control does not provide a pressure compensation. The hydraulic circuit must be protected by a pressure relief valve.

Control schematics

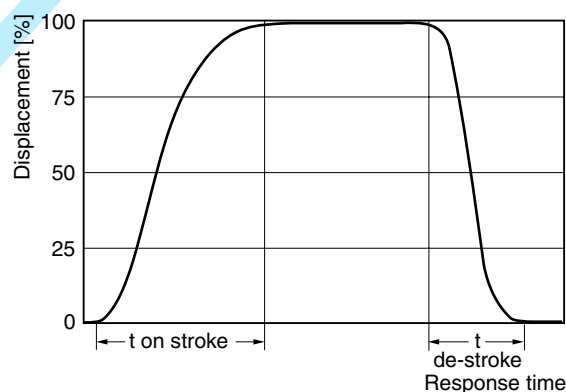


[---] = FPV included

Response times of the pump are collected from a circuit as below by measuring the pumps swash angle movement at different pressures.



Dynamic characteristic of flow control *



* Curve shown exaggerated

| | Time on-stroke [ms] | | Time de-stroke [ms] | |
|-------|---------------------|---------------------|---------------------|---------------------|
| | stand-by to 50 bar | stand-by to 350 bar | 50 bar to stand-by | 350 bar to stand-by |
| PV360 | 180 | 100 | 330 | 240 |

| | |
|--|---------------|
| Pressure adjustment range * | 25 to 350 bar |
| Factory setting pressure * | 50 bar |
| Differential pressure adjustment range * | 10 to 40 bar |
| Factory setting differential pressure * | 15 bar |
| Control oil consumption | Max 8.0 l/min |

| | |
|--|--------|
| Internal pilot pressure required to control the pump | |
| FPV | 15 bar |
| UPR | 25 bar |
| UPK | 25 bar |
| UPM | 25 bar |

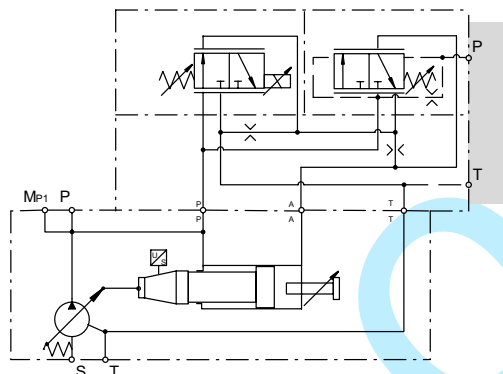
* Data valid for UP* version

Proportional Displacement Control with Overriding Pressure Control

Control option UPR

Control version UPR provides electro- hydraulic displacement control and pressure stage mounted on an elbow manifold.

The elbow manifold provides NG6/D03 interface on top to mount a pressure pilot valve (not included in UPR).

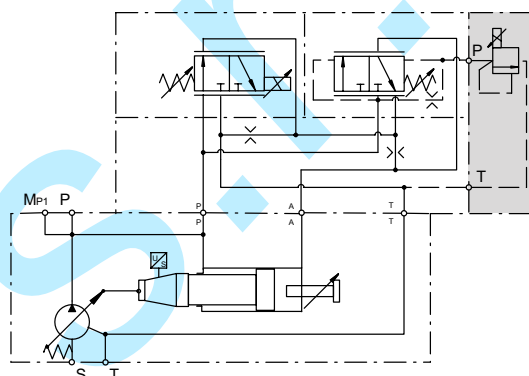


Proportional Displacement Control with Proportional Pressure Control

Control option UPK

When using a proportional pressure pilot valve an electro-hydraulic p/Q control can be realized. The proportional pressure pilot valve PVACRE..35 is included in control version UPK.

By using the digital module PQDXXA-Z00 it is possible to control the displacement proportionally with overriding open loop proportional pressure control.

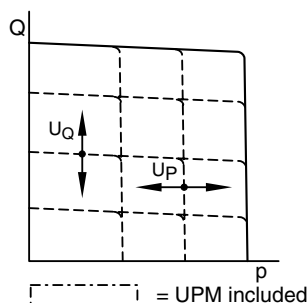
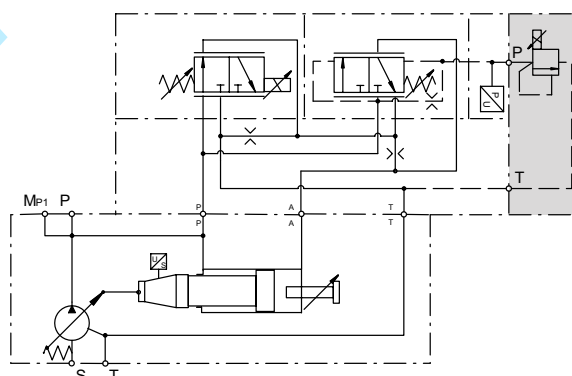


Proportional Displacement Control with Closed Loop Pressure Control

Control option UPM

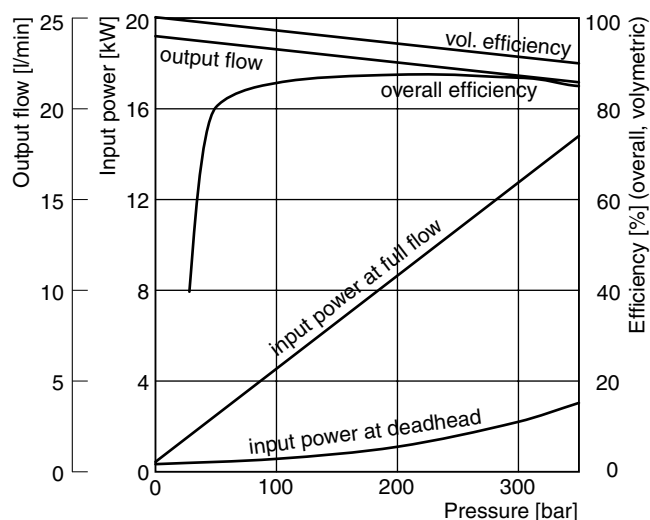
Control version UPM is completed by a pressure transducer Parker SCP 8181 CE. In combination with control module PQDXXA-Z00 a closed loop pressure control of pump outlet pressure is available.

The control module also offers an electronic power limiter in addition to closed loop pressure control with this control option.



Efficiency, power consumption

PV016



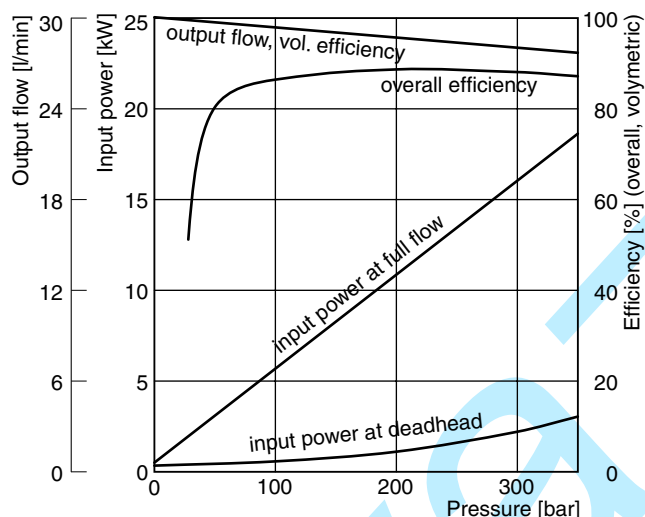
Efficiency and case drain flows PV016, PV020, PV023 and PV028

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

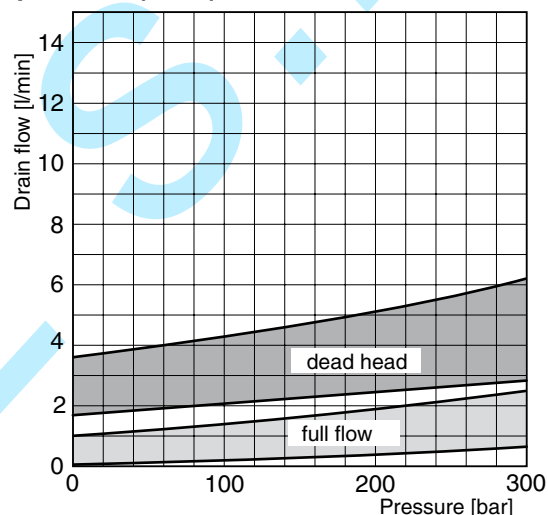
Case drain flow and compensator control flow leave via the drain port of the pump. To the values shown are to be added 1 to 1.2 l/min, if at pilot operated compensators the control flow of the pressure pilot valve also goes through the pump.

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

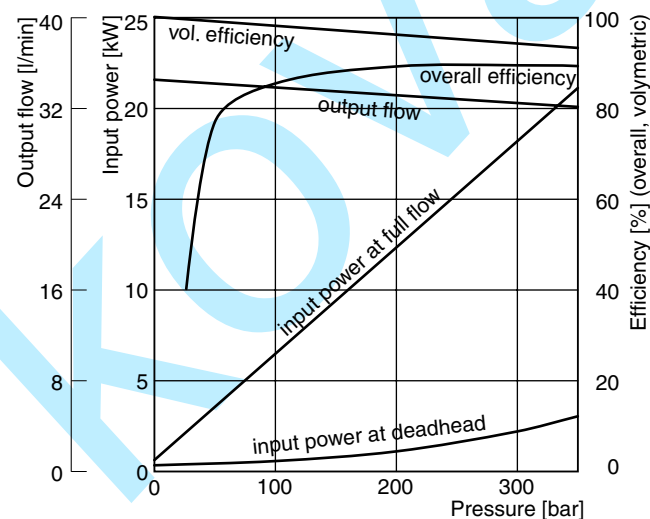
PV020



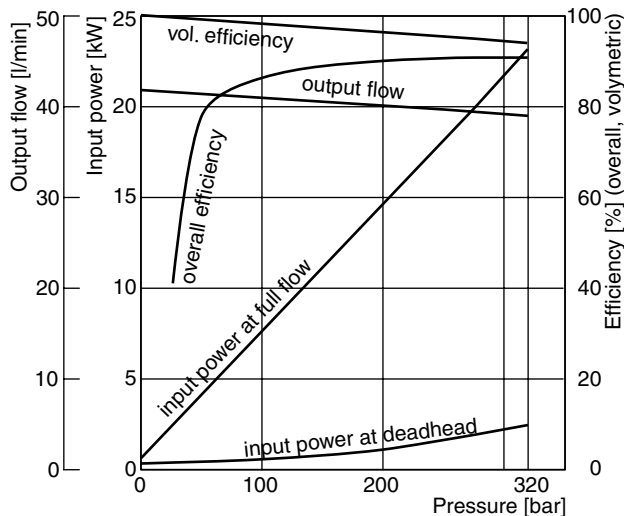
Case drain flow PV016-028 with pressure compensator (MMC)



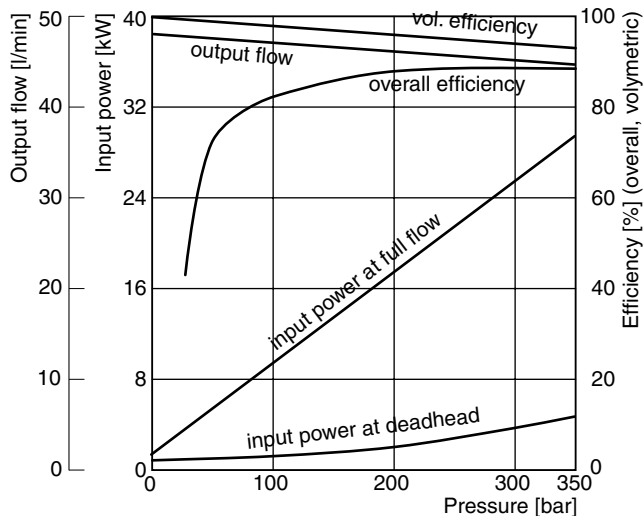
PV023



PV028



**Efficiency, power consumption
PV032**



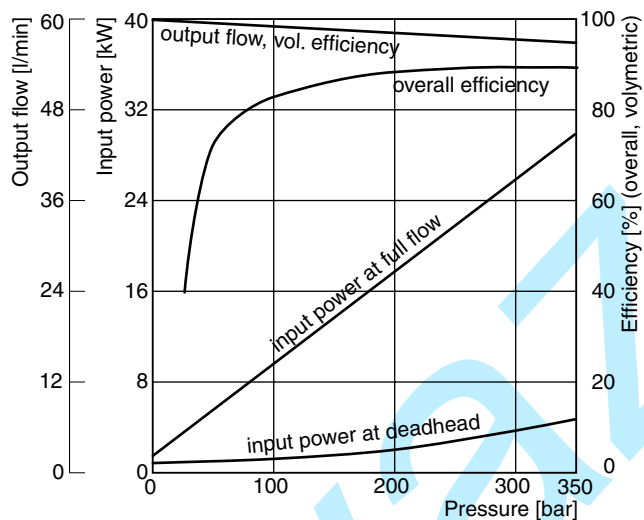
Efficiency and case drain flows PV032 to PV046

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

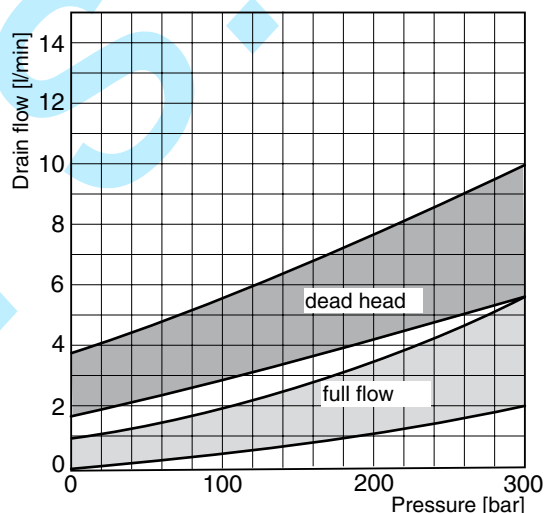
Case drain flow and compensator control flow leave via the drain port of the pump. To the values shown are to be added 1 to 1.2 l/min, if at pilot operated compensators the control flow of the pressure pilot valve also goes through the pump.

Please note: The values shown below are only valid for static operation. Under dynamic conditions and at rapid compensation of the pump the volume displaced by the servo piston also leaves the case drain port. This dynamic control flow can reach up to 60 l/min! Therefore the case drain line is to lead to the reservoir at full size and without restrictions as short and direct as possible.

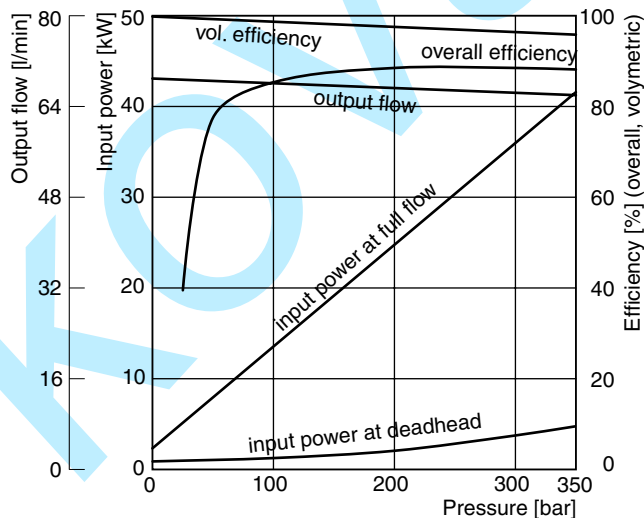
PV040



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

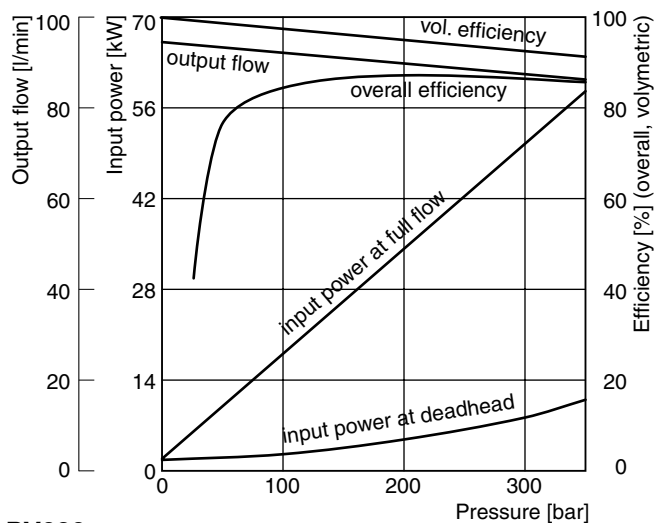


PV046



Efficiency, power consumption

PV063



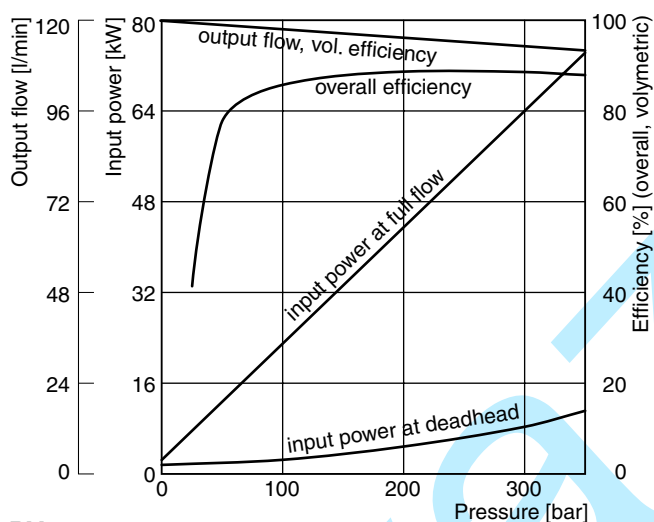
Efficiency and case drain flows PV063, PV080, PV092

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

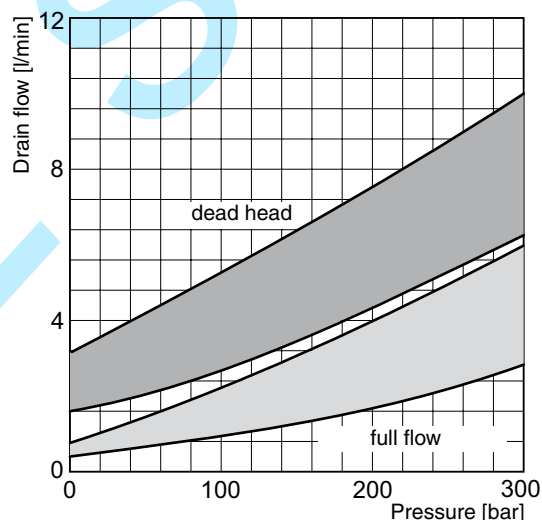
Case drain flow and compensator control flow leave via the drain port of the pump. To the values shown are to be added 1 to 1.2 l/min, if at pilot operated compensators (codes FR*, FF*, FT*, power compensator and p-Q-control) the control flow of the pressure pilot valve also goes through the pump.

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.

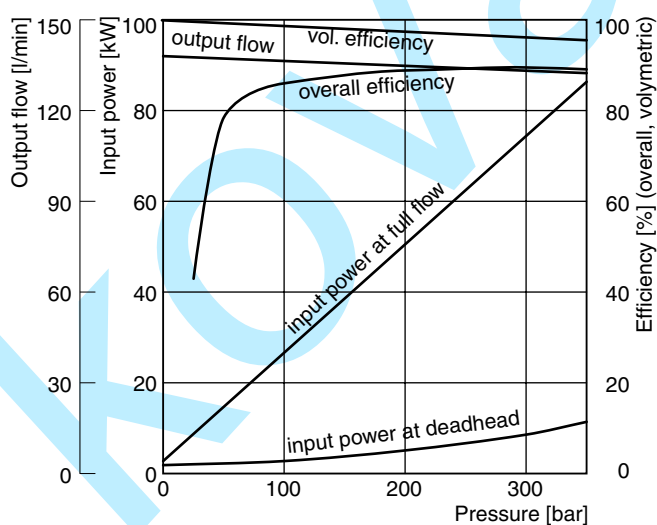
PV080



Case drain flows PV063-092

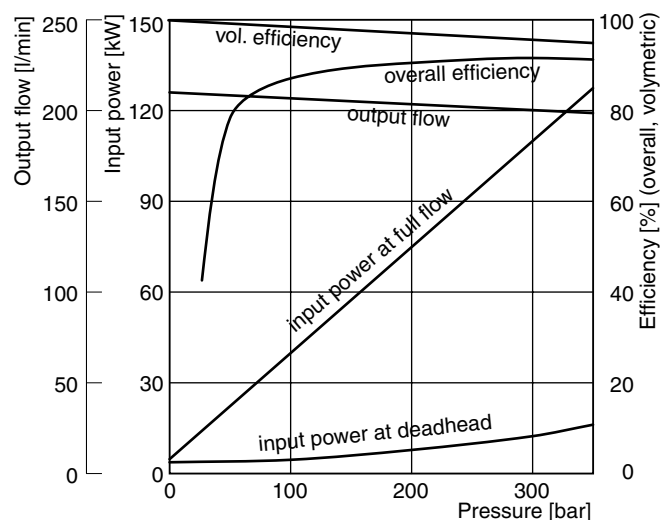


PV092

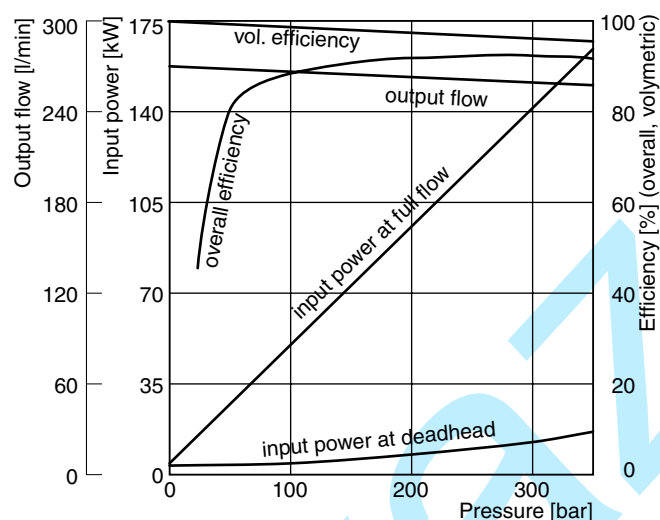


Efficiency, power consumption

PV140



PV180



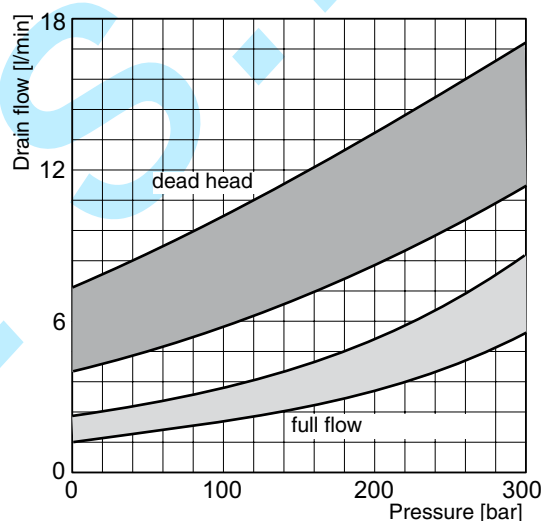
Efficiency and case drain flows PV140, PV180

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

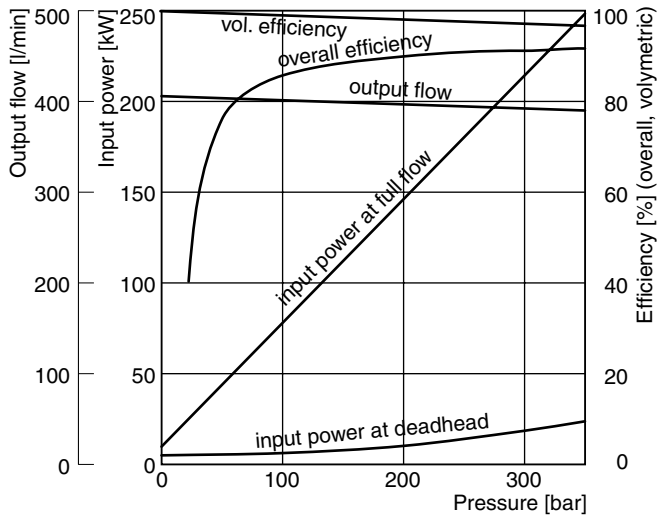
Case drain flow and compensator control flow leave via the drain port of the pump. To the values shown are to be added 1 to 1.2 l/min, if at pilot operated compensators the control flow of the pressure pilot valve also goes through the pump.

Please note: The values shown below are only valid for static operation. Under dynamic conditions and at rapid compensation of the pump the volume displaced by the servo piston also leaves the case drain port. This dynamic control flow can reach up to 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.

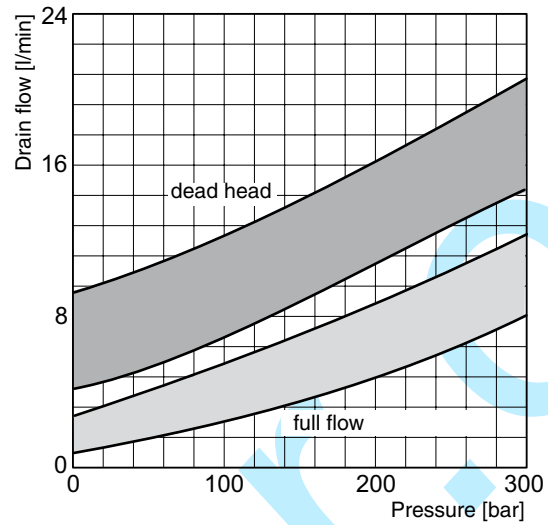
Case drain flows PV140-180



**Efficiency, power consumption
PV270**



Case drain flows PV270



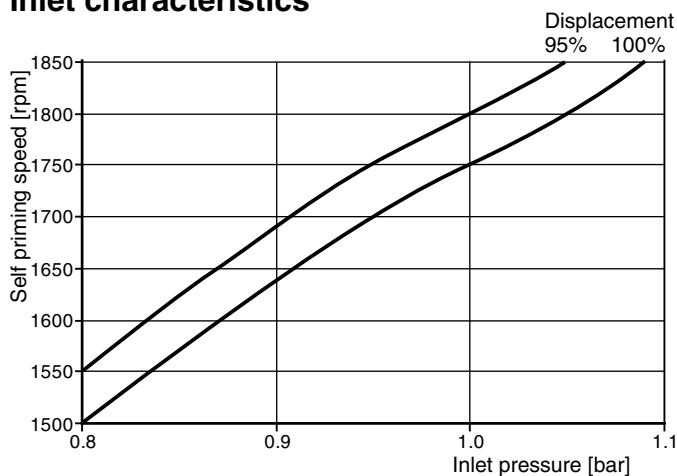
Efficiency and case drain flows PV270

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

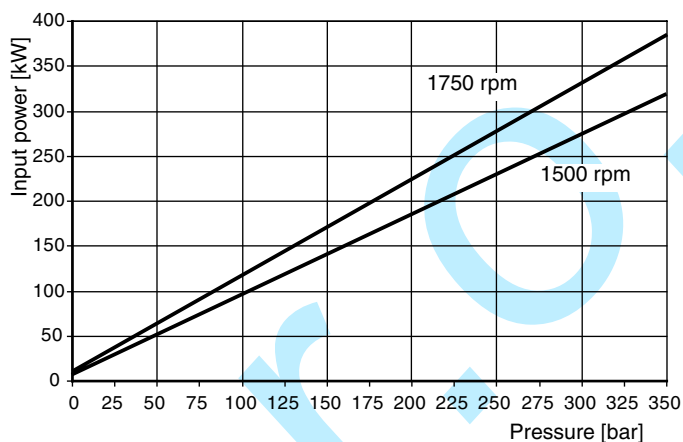
Case drain flow and compensator control flow leave via the drain port of the pump. To the values shown are to be added 1 to 1.2 l/min, if at pilot operated compensators (codes FR*, FF*, FT*, power compensator and p-Q-control) the control flow of the pressure pilot valve also goes through the pump.

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.

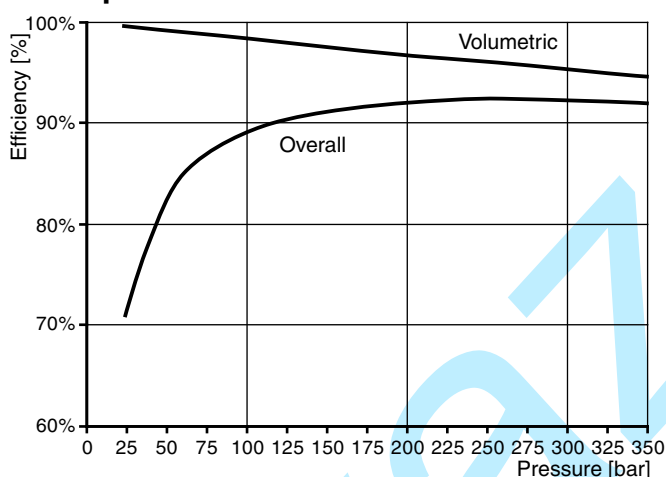
Typical inlet characteristics vs. speed at various percentage displacements
Inlet characteristics



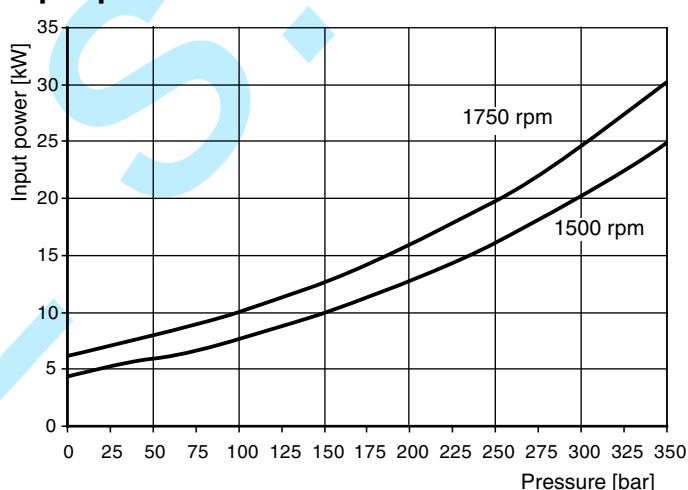
Typical drive power at full displacement
Input power – full stroke



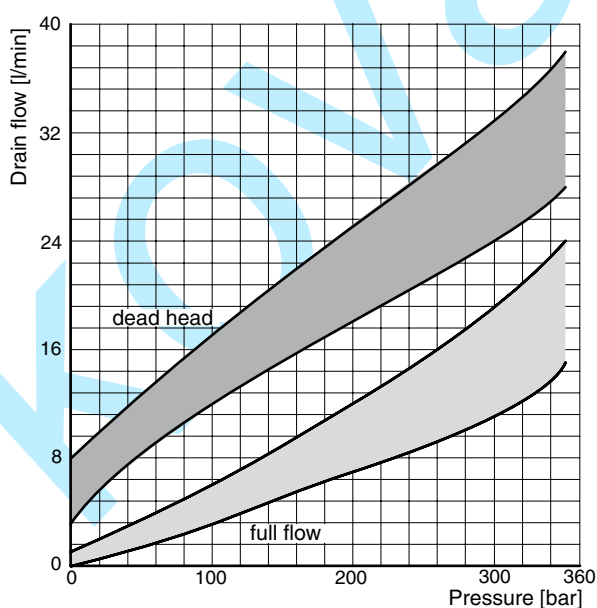
Typical efficiency at full displacement and 1500 rpm



Typical compensated power
Input power – zero stroke



Case drain flows



The curves show typical characteristics measured under following conditions:
Fluid: Mineral oil ISO VG 22 at 32 °C
Inlet pressure 1,0 bar (absolute), measured at inlet port.