

Variable displacement axial piston pump type V30E

Product documentation

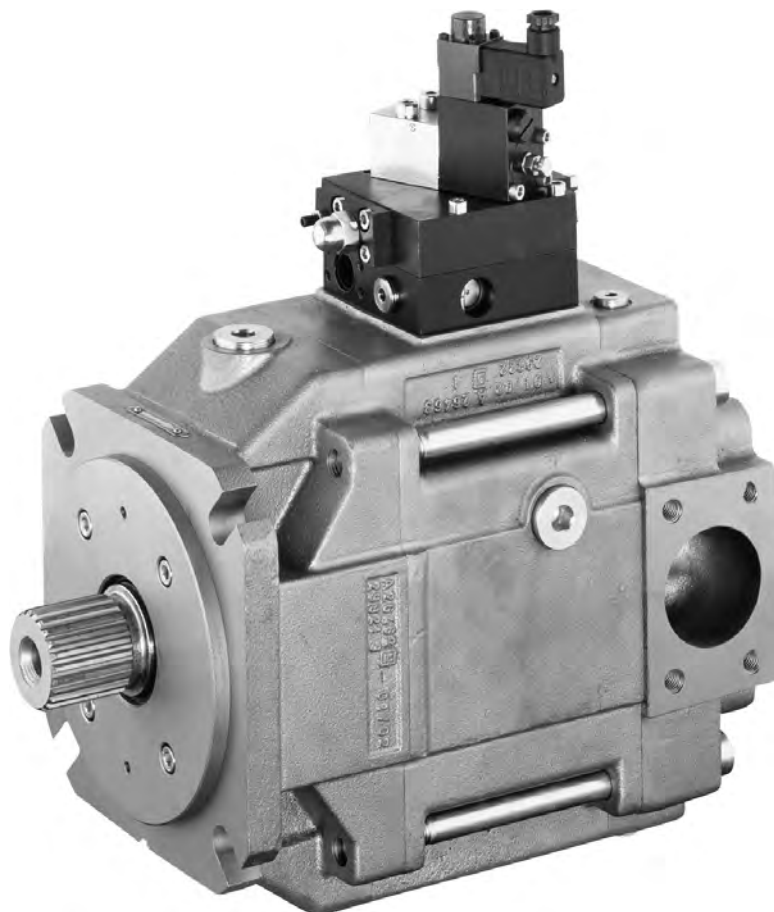


Open circuit

Nominal pressure $p_{\text{nom max}}$: 350 bar

Peak pressure p_{max} : 420 bar

Geometric displacement V_{max} : 270 cm³/rev



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1 Overview: variable displacement axial piston pump types V30E

Variable displacement axial piston pumps operate according to the bent axis principle. They adjust the geometric output volume from maximum to zero. As a result they vary the flow rate that is provided to the loads.

The axial piston pump type V30E is designed for open circuits in mobile hydraulics and operate according to the swash plate principle. They are available with the option of a thru-shaft for operating additional hydraulic pumps in series.

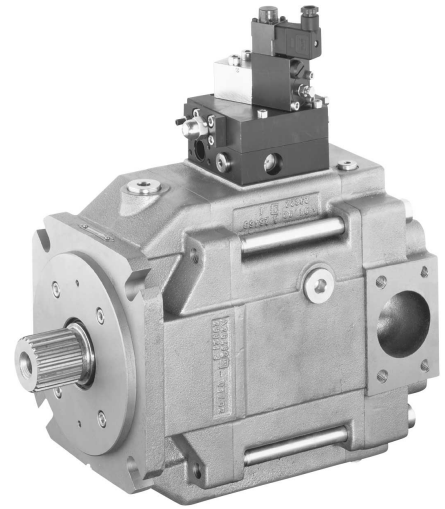
The sturdy pump is particularly suitable for continuous operation in challenging applications. The range of pump controllers allows the axial piston pump to be used in a variety of applications.

Features and benefits:

- Low noise emissions
- Wide controller options
- Full torque available at the second pump in tandem pump applications

Intended applications:

- Machines for forestry and agricultural purposes
- Cranes and lifting equipment
- Construction machines

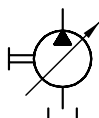


Variable displacement axial piston pump type V30E

2 Available versions, main data

2.1 Basic version

Circuit symbol:



Order coding example:

| V30E | -095 | R | D | G | N | - 2 | - 0 | - XX | /PL | - 200 | C 211 | - Z 05 | |
|------|--------------------|---------------|-----------------------------|------------------------|--------------------------------------|---------------------|--------------------------|------------------------------|-----|------------|------------------------------|---|---------------------------------------|
| | | | | | | | | | | 2nd pump | | 2nd pump: see Chapter 4.4.2, "Combination with dent pump" | |
| | | | | | | | | | | | Flange version | | Table 9 Flange versions (output side) |
| | | | | | | | | | | | Pressure specification (bar) | | |
| | | | | | | | | | | Controller | | Table 8 Controllers | |
| | | | | | | | | Release | | Release | | | |
| | | | | | | Additional function | | Table 7 Additional functions | | | | | |
| | | | | | Housing version | | Table 6 Housing versions | | | | | | |
| | | | | Seal | | Table 5 Seals | | | | | | | |
| | | | Flange version | | Table 4 Flange versions (input side) | | | | | | | | |
| | | Shaft version | | Table 3 Shaft versions | | | | | | | | | |
| | Rotating direction | | Table 2 Rotating directions | | | | | | | | | | |
| | Nominal size | | Table 1 Nominal size | | | | | | | | | | |

Basic type

Table 1 Nominal size

| Coding | Geometric displacement (cm ³ /rev) | Nominal pressure p _{nom} (bar) | Peak pressure p _{max} (bar) |
|--------|---|---|--------------------------------------|
| 095 | 98 | 350 | 420 |
| 160 | 160 | 350 | 420 |
| 270 | 270 | 350 | 420 |



Note

When using HFC pressure fluid (Table 5, coding C), p_{max} = 300 bar.

Table 2 Rotation directions

| Coding | Description |
|--------|----------------|
| L | Anti-clockwise |
| R | Clockwise |

Table 3 Shaft versions

| Coding | Description | Designation/Standard | Max. drive torque (Nm) |
|--------|--------------|---|------------------------|
| D | Spline shaft | W45x2x21x9g DIN 5480 (V30E-095) | 1200 |
| | | W50x2x24x9g DIN 5480 (V30E-160) | 1700 |
| | | W60x2x28x9g DIN 5480 (V30E-270) | 3400 |
| K | Parallel key | ∅40 - 12x8x80 DIN 6885 (V30E-095) | 650 |
| | | ∅50 - 14x9x80 DIN 6885 (V30E-160) | 850 |
| | | ∅60 - 18x11x100 DIN 6885 (V30E-270) | 1700 |
| S | Spline shaft | SAE-D J 744 13T 8/16 DP 44-4 DIN ISO 3019-1 (V30E-095, V30E-160) | 1200 |
| | | 17T 8/16 DP (V30E-270) | 3100 |
| U | Spline shaft | SAE-D J 744 13T 8/16 DP 44-4 DIN ISO 3019-1 (only V30E-270) | 1200 |

Table 4 Flange versions (input side)

| Coding | Description | Designation |
|--------|-------------|--|
| G | Flange | 160 B4 HW DIN ISO 3019-2 (V30E-095) |
| | | 180 B4 HW DIN ISO 3019-2 (V30E-160, V30E-270) |
| F | Flange | SAE-D 4-hole J 744 152-4 DIN ISO 3019-1 (V30E-095, V30E-160) |
| | | SAE-E 4-hole J 744 165-4 DIN ISO 3019-1 (V30E-270) |
| W | Flange | SAE-D 4-hole J 744 152-4 DIN ISO 3019-1 (V30E-270) |

Table 5 Seals

| Coding | Description |
|--------|--|
| N | NBR |
| V | FKM |
| E | EPDM |
| C | FKM, suitable for HFC, see restrictions Chapter 5, "Assembly, operation and maintenance recommendations" |

Table 6 Housing versions

| Coding | Description |
|--------|----------------------------|
| 1 | No thru-shaft |
| 2 | Thru-shaft for tandem pump |

Table 7 Additional functions, swash plate angle indicator

| Coding | Description |
|--------|---|
| 0 | Without display |
| 1 | With display |
| 2 | With pivoting angle pick-up (Hall sensor) |

Table 8 Controllers

| Coding | Description |
|---|--|
| -... P - | Pressure controller with pre-set pressure on the integrated pilot valve and connection for external pilot valve. The pressure controller automatically maintains a constant system pressure independently of the required delivery flow. Therefore, it is suited to constant pressure systems where differing delivery flows are required or for efficient pressure limitation of a hydraulic system. The pre-set pressure can be adjusted at a later point. |
| -... Pb - | Coding Pb with external feedback of the pump pressure to compensate for a pressure loss in the pump pressure line. |
| -... LSP - | Load-sensing controller with pressure limitation. Stand-by pressure adjustable from 20 to 35 bar. Default differential pressure setting: 27 bar |
| -... LSPb - | Coding LSPb with external feedback of the pump pressure to compensate for a pressure loss in the pump pressure line. |
| - PMVPS 4 - 41 /G 12 - 42 /G 24 - 43 | <p>Pressure range</p> <p>-41: (5) ... 180 bar</p> <p>-42: (5) ... 290 bar</p> <p>-43: (5) ... 440 bar</p> <p>G ...: Solenoid voltage</p> <p>Additional, directly mounted proportional pressure-limiting valve for setpoint adjustment for the pressure controller (nominal voltage 12 V DC or 24 V DC with specification of the relevant max. pressure range). Can be combined with all controllers listed above. Valve type PMVPS 4 is used in accordance with D 7485/1. Retrofitting is possible at any time.</p> <p>Order coding example: V30E-095 RDGN - 1 - 0 - XX / P - PMVPS 4 - 43 / G 24 - 350</p> |
| - BVPM 1 S /G 12 R /G 24 | <p>S: Energised closed (deenergised open)</p> <p>R: Energised open (deenergised closed)</p> <p>Additional, directly mounted 2/2-way directional seated valve for pump direction switching (nominal pressure/stand-by pressure)</p> <p>Order coding example: V30E-095 RDGN - 1 - 0 - XX / P - BVPM 1 S / G 24 - 350</p> |

Table 8 Controllers

| Coding | Description |
|--------|--|
| EM.CH | <p>The electro-hydraulic delivery volumetric flow controller adjusts the displacement volume of the pump between "zero" and "maximum" in proportion to an electrical input signal, (target 0 ... 10 V or 0 ... 20 mA). The power for the adjustment is taken from the high-pressure line. For system pressures below 50 bar, an additional auxiliary pump is required (thru-shaft). Corresponding auxiliary pump in accordance with Section 7.1: V30E-095: Z 02-5, V30E-160: Z 02-8, V30E-270: Z 02-10 The control system consists of the pump adjustment system, an NG 6 prop. directional valve and a pivoting angle pick-up (coding 2) for actual value determination. Control electronics (coding CH, type DAC-4) compare the setpoint and actual values and supply the solenoid valves with the appropriate current. The control electronics used offer a wide range of options for individual adaptation, such as ramps and setpoint recall.</p> <div style="border: 1px solid gray; padding: 5px; margin-top: 10px;"> <p>Note The adjustment times are approx. 200 ms.</p> </div> <p>The adjustment can be combined with pressure controllers (coding P, PMVPS) and/or power controllers (coding L) to limit pressure and/or power.</p> <div style="border: 1px solid gray; padding: 5px; margin-top: 10px;"> <p>Note In addition, a separately assigned overpressure protection (pressure-limiting valve) is also to be provided in the hydraulic circuit to avoid pressure peaks.</p> </div> <p>Order coding example: V30E-095 RKGN - 2 - 2-XX / EMPCH - 250 - C212 - Z 02-6 (version with pressure limitation) V30E-270 RSFN - 2 - 2-XX / EMLSPCH / 1800 - 350 - C232 - Z 02-11 (version with load-sensing controller) V30E-160 RDGN - 2 - 2-XX / EMOCH - C222 - Z 02-9 (version without pressure limitation)</p> |
| L | <p>The power controller with exact hyperbolic curve is used in the case of greatly varying pressures where the drive motor must also be protected against overloading. The drive torque is limited along the line "Pressure x Geometric displacement = Constant" by the special structure. If, for example, the pressure doubles at constant rotation speed, the delivery volumetric flow is automatically halved. External mechanical adjustment can be made to the drive torque at any time. Only in combination with pressure controller P. or load-sensing controller LSP. .</p> <p>Order coding example: V30E-160 RKGN - 0 - 1 - XX / PL / 180 - 300 V30E-095 RSFN - 1 - 1 - XX / LSPL / 120 - 200 - C 211</p> |
| Lf | As for coding L. In addition, the set power can be changed (increased) by means of an applied control pressure. |
| Lf1 | As for coding L. In addition, the set power can be changed (reduced) by means of an applied control pressure. |
| Lfe | As for coding L. In addition, the set power can be changed (increased) electrically. |

Order coding example:

V30E-160 RDGN-2-0-04/LSP-350- C 222

Table 9 Flange versions (output side)

| Coding V30E | | | Flange | Shaft | e.g. mounting of HAWE pump with coding |
|-------------|-------|-------|--|--|---|
| 095 | 160 | 270 | | | |
| C 211 | C 221 | C 231 | SAE-A 2-hole J 744 82-2 DIN ISO 3019-1 | SAE-A J 744 (16-4 DIN ISO 3019-1) 9T 16/32 DP | |
| C 212 | C 222 | C 232 | SAE-A 2-hole J 744 82-2 DIN ISO 3019-1 | SAE-A J 744 (16-4 DIN ISO 3019-1) 9T 16/32 DP ¹⁾ | |
| C 213 | C 223 | C 233 | SAE-A 2-hole J 744 82-2 DIN ISO 3019-1 | 19-4 DIN ISO 3019-1 11T 16/32 DP | |
| C 214 | C 224 | C 234 | SAE-B 2-hole J 744 101-2 DIN ISO 3019-1 | SAE-B J 744 (22-4 DIN ISO 3019-1) 13T 16/32 DP | V60N-060 .. HX |
| C 215 | C 225 | C 235 | SAE-B 4-hole J 744 101-4 DIN ISO 3019-1 | SAE-B J 744 (22-4 DIN ISO 3019-1) 13T 16/32 DP | V60N-060 .. HZ |
| C 216 | C 226 | C 236 | SAE-B 2/4-hole 101-2/4 DIN ISO 3019-1 | SAE-BB J 744 (25-4 DIN ISO 3019-1) 15T 12/24 DP | V40M |
| C 217 | C 227 | C 237 | SAE-C 2-hole J 744 127-2 DIN ISO 3019-1 | SAE-C J 744 (32-4 DIN ISO 3019-1) 14T 12/24 DP | |
| C 218 | C 228 | C 238 | SAE-C 4-hole J 744 127-4 DIN ISO 3019-1 | SAE-C J 744 (32-4 DIN ISO 3019-1) 14T 12/24 DP | V60N- .. SF |
| C 219 | C 229 | C 239 | SAE-C 4-hole J 744 127-4 DIN ISO 3019-1 | 23T 16/32 DP | |
| C 220 | C 230 | C 240 | SAE-D 4-hole J 744 152-4 DIN ISO 3019-1 | SAE-D&E J 744 (44-4 DIN ISO 3019-1) 13T 8/16 DP | V30E-095 ..SF.. /V30E-160 ..SF.. |
| -- | -- | C 241 | SAE-E 4-hole J 744 165-4 DIN ISO 3019-1 | 17T 8/16 DP | V30E-270 ..SF.. |
| C 247 | C 248 | C 249 | Prepared for thru-shaft (cover) | | |
| C 250 | C 255 | C 260 | 160 B4 HW DIN ISO 3019-2 | W45x2x21x9g DIN 5480 | V30E-095 ..DG.. |
| C 251 | C 256 | C 261 | SAE-D 4-hole J 744 152-4 DIN ISO 3019-1 | W45x2x21x9g DIN 5480 | V30E-095 ..DF.. |
| -- | C 257 | C 262 | 180 B4 HW DIN ISO 3019-2 | W50x2x24x9g DIN 5480 | V30E-160 ..DG.. |
| -- | C 258 | C 263 | SAE-D 4-hole J 744 152-4 DIN ISO 3019-1 | W50x2x24x9g DIN 5480 | V30E-160 ..DF.. |
| -- | -- | C 264 | 180 B4 HW DIN ISO 3019-2 | W60x2x28x9g DIN 5480 | V30E-270 ..DG.. |
| -- | -- | C 266 | SAE-E 4-hole J 744 165-4 DIN ISO 3019-2 | W60x2x28x9g DIN 5480 | V30E-270 ..DF.. |
| C 252 | C 259 | C 268 | 180 B4 HW DIN ISO 3019-2 | ∅25 wedge width 8 | R size 6014 (D 6010) RZ size 6914 (D 6910) |


Note

Pay attention to the maximum permissible drive torque, as the flange or shaft may be damaged otherwise.

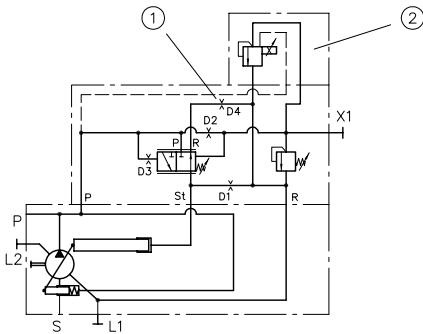

Note

- An additional support is to be provided for pump combinations.
- Additional versions on request.

¹⁾ ANSI B 92.1, FLAT ROOT SIDE FIT, spline width deviating from the standard, s = 2.357-0.03

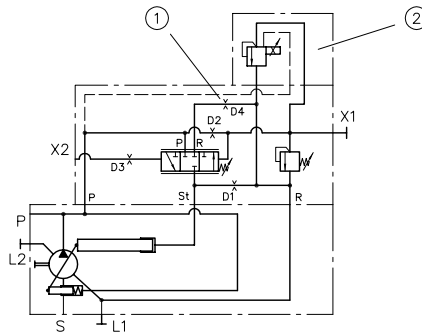
2.2 Controller switching symbols

Coding **P**



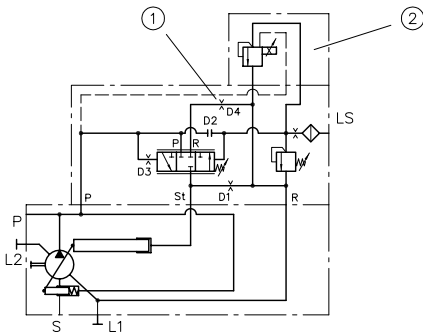
- 1 Optional
- 2 Optional prop. pressure-limiting valve type PMVPS or type BVPM

Coding **Pb**



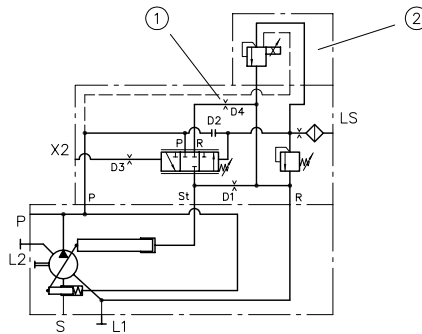
- 1 Optional
- 2 Optional prop. pressure-limiting valve type PMVPS or type BVPM

Coding **LSP**



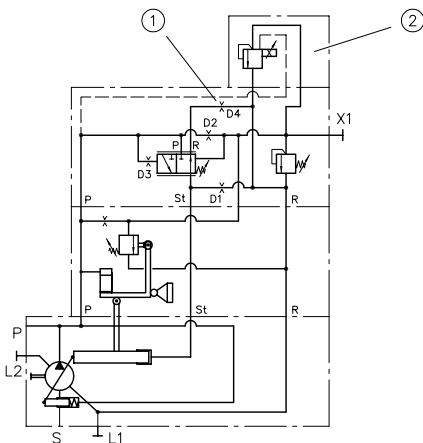
- 1 Optional
- 2 Optional prop. pressure-limiting valve type PMVPS or type BVPM

Coding **LSPb**



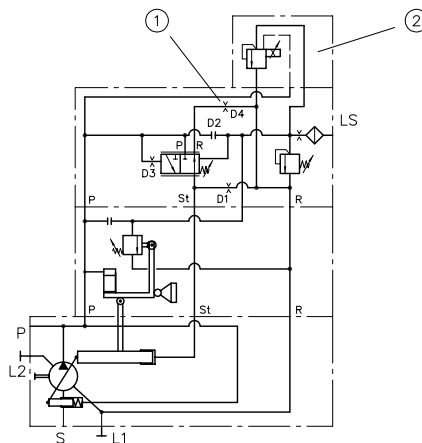
- 1 Optional
- 2 Optional prop. pressure-limiting valve type PMVPS or type BVPM

Coding **PL**



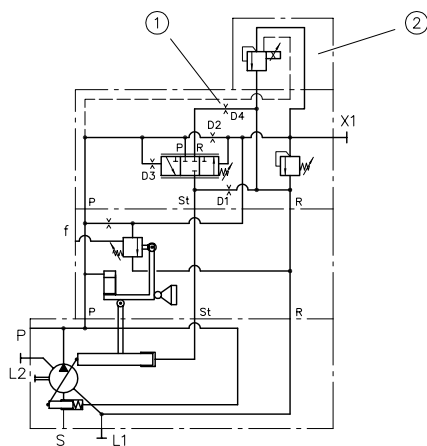
- 1 Optional
- 2 Optional prop. pressure-limiting valve type PMVPS or type BVPM

Coding **LSPL**



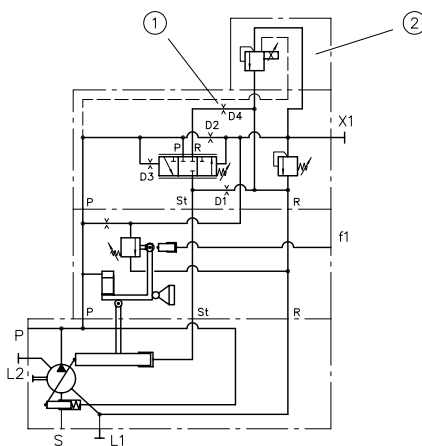
- 1 Optional
- 2 Optional prop. pressure-limiting valve type PMVPS or type BVPM

Coding Lf



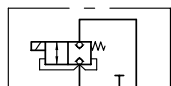
- 1 Optional
- 2 Optional prop. pressure-limiting valve type PMVPS or type BVPM

Coding Lf1

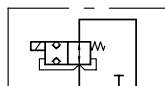


- 1 Optional
- 2 Optional prop. pressure-limiting valve type PMVPS or type BVPM

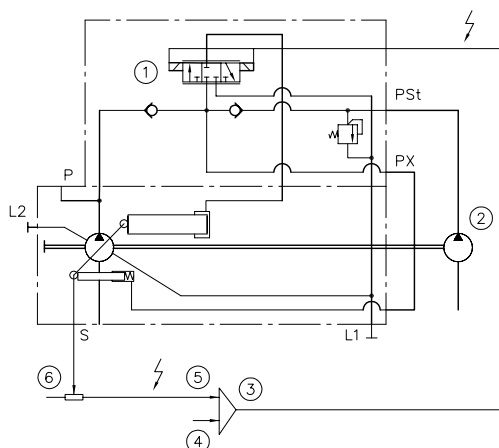
Coding BVPM1R



Coding BVPM1S



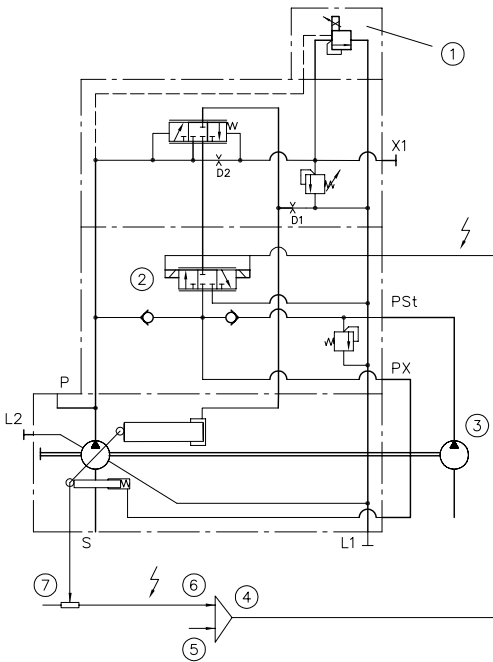
Coding EMOCH



- 1 Prop. directional valve
- 2 Auxiliary pump
- 3 Amplifier card
- 4 NOMINAL
- 5 ACTUAL
- 6 Pivoting angle pick-up

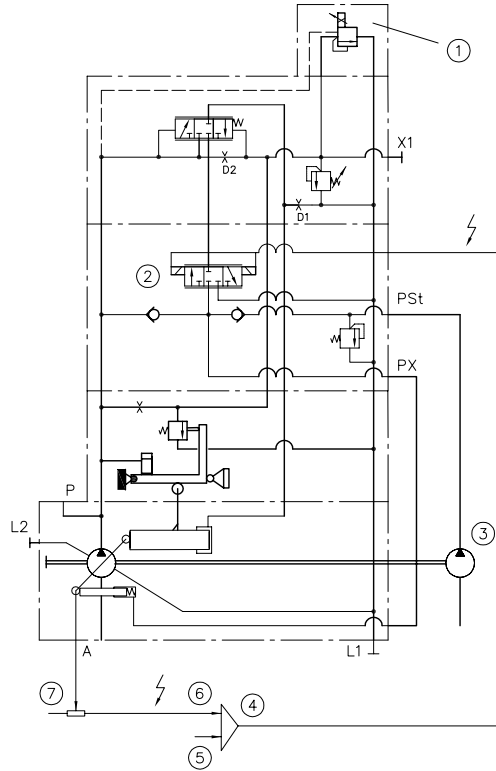
| | |
|-----------|--|
| S | Suction port |
| P | Pressure port |
| (L1) (L2) | Drain ports |
| X1 | Remote-control port (add. pilot valves) |
| LS | LS pressure port (load-sensing pressure; downstream of measuring throttle in main circuit) |
| X2 | External system pressure port |
| D1 | Damping orifice |
| D2 | Pilot orifice |
| D3 | Damping orifice, control piston |
| D4 | Orifice for on-stroke velocity |

Coding **EMPCH**



- 1 Optional prop. pressure-limiting valve type PMVPS or type BVPM
- 2 Prop. directional valve
- 3 Auxiliary pump
- 4 Amplifier card
- 5 NOMINAL
- 6 ACTUAL
- 7 Pivoting angle pick-up

Coding **EMPLCH**



- 1 Optional prop. pressure-limiting valve type PMVPS or type BVPM
- 2 Prop. directional valve
- 3 Auxiliary pump
- 4 Amplifier card
- 5 NOMINAL
- 6 ACTUAL
- 7 Pivoting angle pick-up

3 Parameters

3.1 General

| | |
|------------------------------|--|
| Description | Variable displacement axial piston pump |
| Design | Axial piston pump according to the swash plate principle |
| Mounting | Flange mounting or foot bracket |
| Surface | Primed |
| Drive/output torque | See Chapter 3, "Parameters" , under "Additional parameters" |
| Installation position | Any (for installation information see Chapter 5, "Assembly, operation and maintenance recommendations") |
| Rotating direction | Clockwise or anti-clockwise |
| Ports | <ul style="list-style-type: none"> ▪ Suction port ▪ Pressure port ▪ Drain port ▪ Pressure gauge connection |
| Hydraulic fluid | <ul style="list-style-type: none"> ▪ Hydraulic oil according to Part 1 to 3; ISO VG 10 to 68 according to DIN 51519 ▪ Viscosity range: min 10; max 1000 mm²/s ▪ Optimal operating range between 16 and 35 mm²/s ▪ Also suitable for biologically degradable hydraulic fluids type HEPG (polyalkylene glycol) and HEES (synthetic ester) at operating temperatures up to approx. +70°C. ▪ HFC pressure fluids (water glycol); note installation information in Chapter 5, "Assembly, operation and maintenance recommendations". |
| Purity class | ISO 4406 <hr style="width: 20%; margin-left: 0;"/> 19/17/14 |
| Temperatures | <ul style="list-style-type: none"> ▪ Surrounding area: -40°C to +60°C (observe viscosity range) ▪ Oil: - 25°C to +80°C (observe viscosity range) ▪ Start temperature: To -40°C is permissible (observe start viscosity), as long as the steady-state temperature is at least 20K higher during operation ▪ Biologically degradable hydraulic fluids: Not above +70°C |

Pressure and delivery flow

Operating pressure

See [Chapter 2, "Available versions, main data"](#)

Geometric displacement

See [Chapter 2, "Available versions, main data"](#)

Dimensions

| Type V30E | Without controller (kg) | With controller (kg) | | | |
|-----------|-------------------------|----------------------|---------|-----------------|-------|
| | | LSP, LSPb, P, Pb | PMVPS 4 | L, Lf, Lf1, Lfe | EM... |
| 095 | 54 | +3.2 | +1.1 | +2.7 | +6.1 |
| 160 | 74 | +3.2 | +1.1 | +2.7 | +6.1 |
| 270 | 126 | +3.2 | +1.1 | +2.7 | +6.1 |

Additional parameters

| Description | Nominal size | | |
|--|--------------------------|------------------------|--------------------------|
| | 095 | 160 | 270 |
| Max. swash plate angle | 15° | 15° | 15° |
| Absolute inlet pressure required in open circuit | 0.85 bar | 0.85 bar | 0.85 bar |
| Minimum operating pressure | 15 bar | 15 bar | 15 bar |
| Max. permissible housing pressure (static/dynamic) | 1 bar/2 bar | 1 bar/2 bar | 1 bar/2 bar |
| Max. rotation speed during suction operation and max. swash plate angle at 1 bar abs. Inlet pressure | 2500 rpm | 2100 rpm | 1800 rpm |
| Max. rotation speed in supply mode | 2900 rpm | 2500 rpm | 2000 rpm |
| Min. rotation speed in continuous operation | 500 rpm | 500 rpm | 500 rpm |
| Required drive torque at 100 bar | 153 Nm | 261 Nm | 414 Nm |
| Drive power at 250 bar and 1450 rpm | 66 kW | 107 kW | 177 kW |
| Inertia torque | 0.0216 kg m ² | 0.03 kg m ² | 0.0825 kg m ² |
| lifetime L _h of shaft bearings at 250 bar, 1450 rpm and max. swash plate angle | 20000 h | 19000 h | 20000 h |
| Noise level at 250 bar, 1450 rpm and max. swash plate angle (measured in acoustic measurement chamber according to DIN ISO 4412-1 with measuring distance 1 m) | 73 dB(A) | 74 dB(A) | 78 dB(A) |

Note
The minimum operating pressure in the pump line depends on the rotation speed and the pivoting angle; the pressure must not fall below 15 bar under any circumstances.

Note
The housing pressure is only allowed to be 1 bar higher than the suction pressure.

Max. permissible drive/output torque

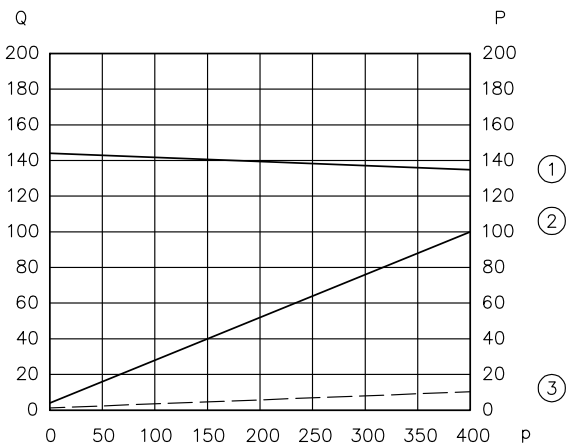
| Description | | Nominal size | | |
|----------------|--------------|----------------|----------------|-----------------|
| | | 095 | 160 | 270 |
| Spline shaft D | Drive/output | 1200 Nm/600 Nm | 1700 Nm/850 Nm | 3400 Nm/1700 Nm |
| Parallel key K | Drive/output | 650 Nm/600 Nm | 850 Nm/850 Nm | 1700 Nm/1700 Nm |
| Spline shaft S | Drive/output | 1200 Nm/600 Nm | 1200 Nm/850 Nm | 3100 Nm/1700 Nm |
| Spline shaft U | Drive/output | -- | -- | 1200 Nm/1200 Nm |

3.2 Characteristic curves

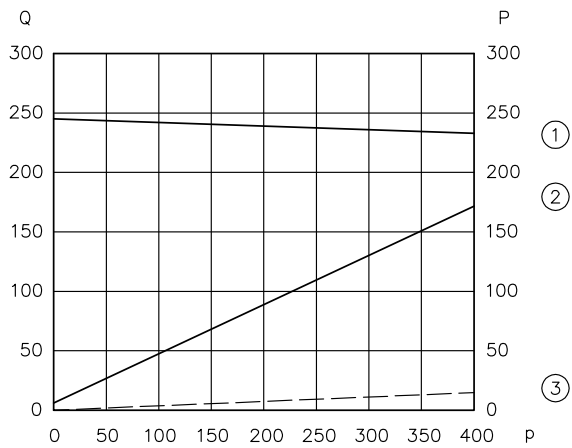
Delivery flow and power (basic pump)

The diagrams illustrate the delivery flow/pressure (without controller).
 Drive power at max. swash plate angle and drive power at zero stroke and 1500 rpm.
 Drive power/pressure at zero stroke and 1500 rpm

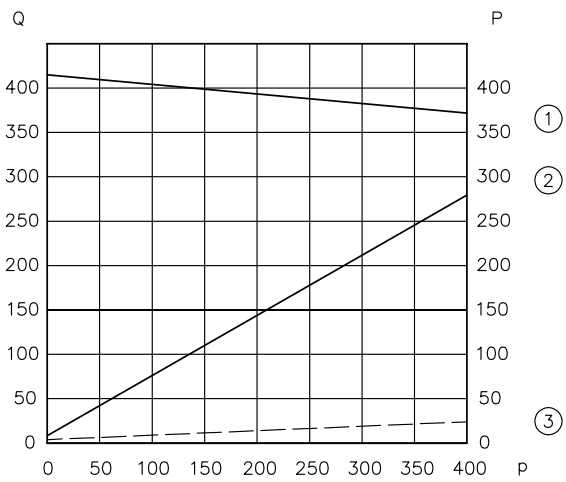
V30E-095



V30E-160



V30E-270

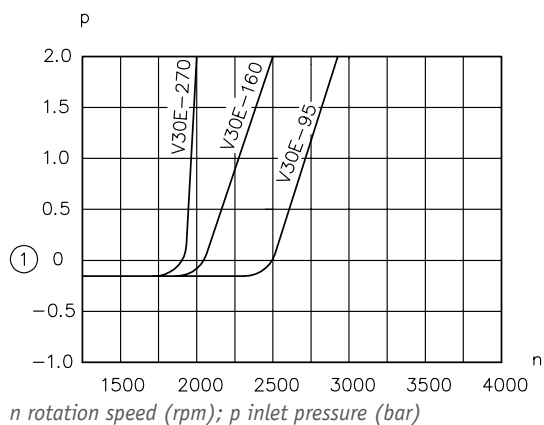


- 1 Delivery flow/pressure
- 2 Drive power/pressure
- 3 Drive power/pressure (zero stroke)

p pressure (bar); Q delivery flow (lpm); P power (kW)

Inlet pressure and self-suction speed

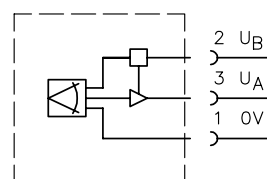
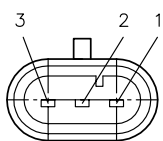
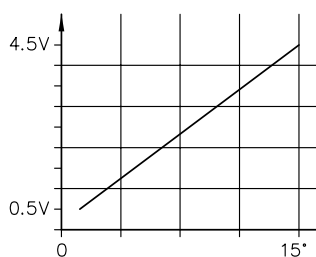
The diagrams show the inlet pressure/rotation speed at the max. swash plate angle and an oil viscosity of 75 mm²/s.



1 0 bar relative = 1 bar absolute

3.3 Pivoting angle pick-up

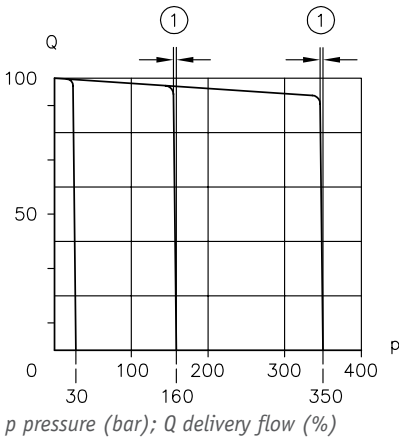
Pivoting angle pick-up



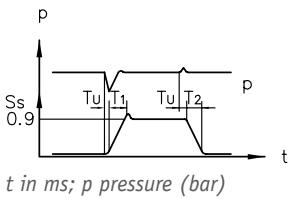
| | |
|-----------------------------|---------------------|
| Operating voltage | U_B 10 to 30 V DC |
| Output signal | U_A 0.5 to 4.5 V |
| Tested for automotive field | DIN 40839 |
| Test pulse | 1, 2, 3 a/b |
| Field control | 200 V/m |
| Electrical connection | 3-PIN AMP |
| Supersal | 1.5 plug |

3.4 Controller characteristic curves

Coding P



1 Approx. 4 bar



S_s = positioning travel of actuator

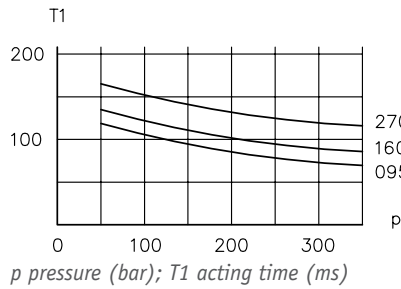
T_u = delay < 3 ms

T_1 = on-stroke time

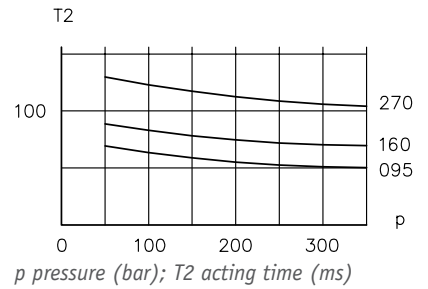
T_2 = destroke time

p = pressure

Acting times T1

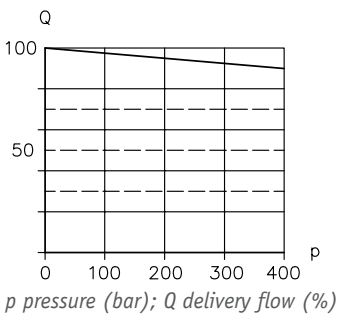


Acting times T2



Coding LSP

Drive rotation speed constant



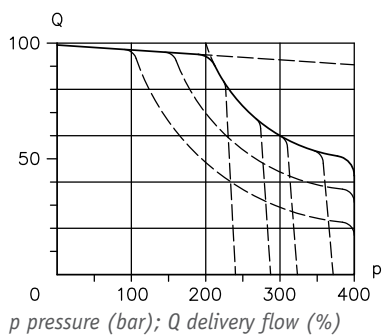
LS line approx. 10% of the volume of the P line

Parameters

Control accuracy in relation to max. delivery flow

- a) Rotation speed n constant, pressure variable between 30 and 350 bar (< 3%)
- b) Pressure p constant, rotation speed variable (< 1%)

Coding L, Lf, Lf1, Lfe

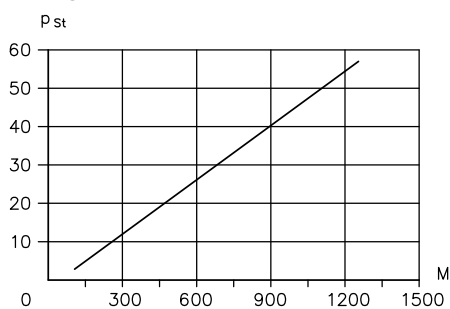


Note

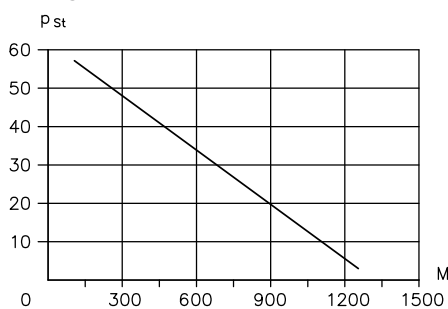
Lowest recommended nominal torque setting.

| Coding | Drive torque (Nm) | Corresponds to kW/rpm |
|--------|-------------------|-----------------------|
| 095 | 99 | 15/1500 |
| 160 | 146 | 22/1500 |
| 270 | 300 | 45/1500 |

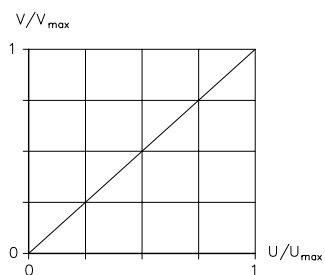
Coding Lf



Coding Lf1

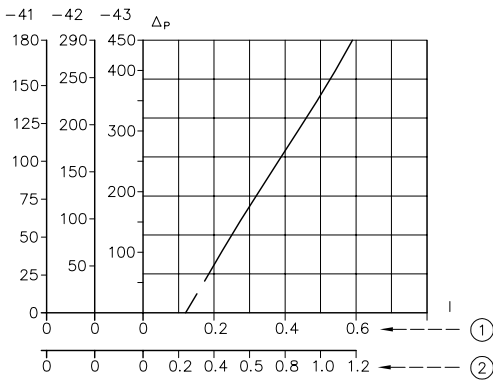


Coding EM..CH



| | |
|-------------------------------------|---------------------------------------|
| On-stroke time | 270 ms ...180 ms |
| Destroke time | 130 ms ...100 ms |
| Hysteresis and linearity | 1 % |
| Amplifier card and controller board | Type DAC -4 |
| - Supply voltage | 18 ... 30 V DC, residual ripple < 10% |
| - Target value inputs | 0 ... 10 V, 0 ... 20 mA |
| Proportional directional valve | 4/3-way directional valve NG 6 |

Coding **PMVPS 4**



I current (mA); p pressure (bar)

- 1 At 24 V DC
- 2 At 12 V DC

| | | |
|---------------------------|--|--------|
| Nominal voltage U_N | 12V DC | 24V DC |
| Nominal current I_N | 1.26 A | 0.63 A |
| Nominal power P_N | 9.5 W | 9.5 W |
| Protection class | IP 65 (IEC 60529) for plug assembled as prescribed | |
| Required dither frequency | 60...150 Hz | |
| Dither amplitude | 30 ... 60 % of I_N | |
| Further information | D 7485/1 | |
| Electrical connection | Industry standard (11 mm) | |



Coding **BVPM 1**

| | | |
|-----------------------|--|--------|
| Nominal voltage U_N | 12V DC | 24V DC |
| Nominal current I_N | 2.2 A | 1.1 A |
| Nominal power P_N | 29.4 W | 27.6 W |
| Protection class | IP 65 (IEC 60529) for plug assembled as prescribed | |
| Further information | D 7765 | |
| Electrical connection | DIN EN 175 301-803 A | |



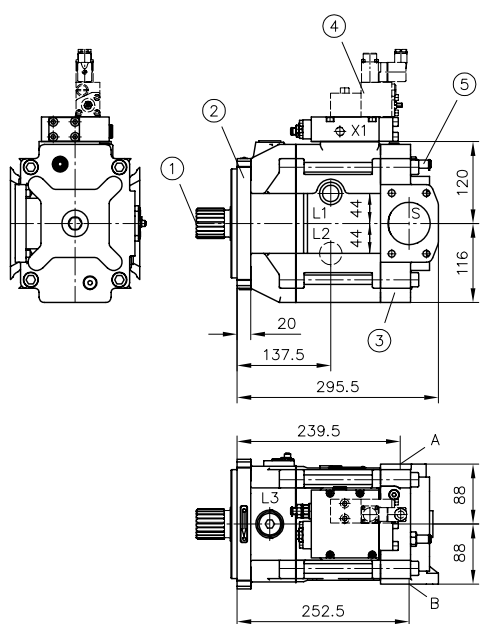
4 Dimensions

All dimensions in mm, subject to change.

4.1 Basic pump

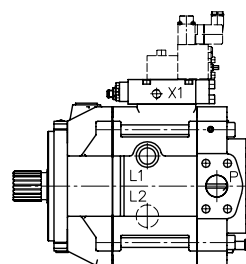
4.1.1 Type V30E-095

Rotating direction **clockwise** (viewed from shaft journal)



- 1 Shaft version
- 2 Flange version
- 3 Housing version
- 4 Controller
- 5 Stroke limitation (approx. 7.5 ccm/rev)

Rotating direction **anti-clockwise** (viewed from shaft journal)



Rotating direction clockwise

Rotating direction anti-clockwise

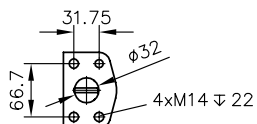
A = pressure port

A = suction port

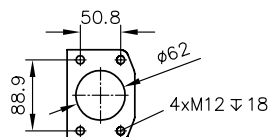
B = suction port

B = pressure port

Pressure port



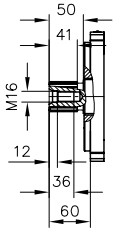
Suction port



Shaft versions

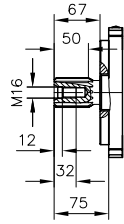
Spline shaft

Coding **D**
(W45x2x21x9g DIN 5480)



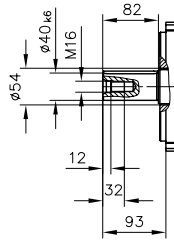
Spline shaft

Coding **S**
(SAE-D J 744 13T 8/16 DP)



Parallel key shaft

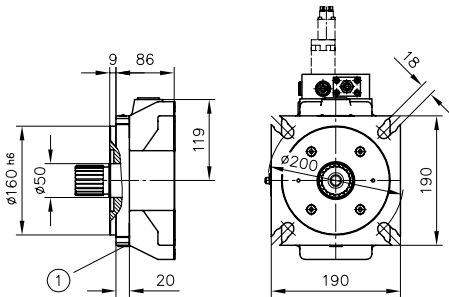
Coding **K**
(Ø40 - 12x8x80 DIN 6885)



Flange versions

Coding G

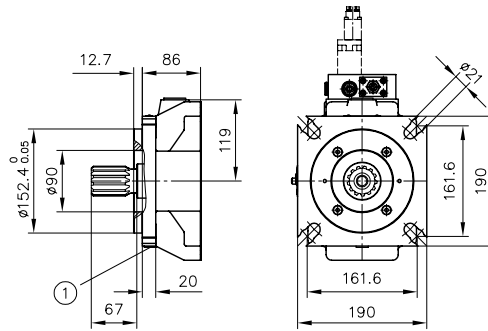
(160 B4 INSTR DIN ISO 3019-2)



1 Bleeding and flushing port G1/4

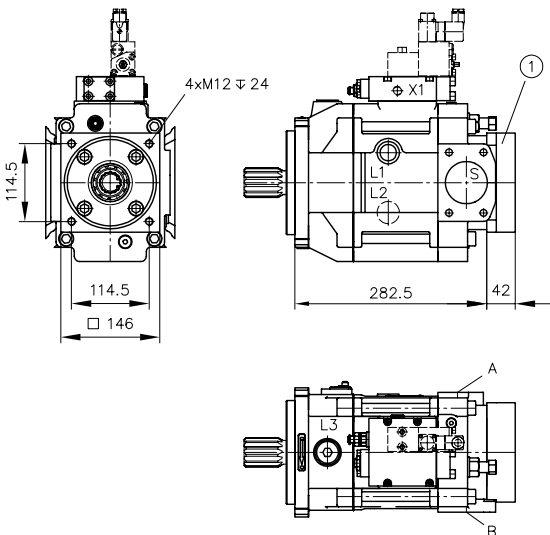
Coding F

(SAE-D 4-hole J 744)
(152-4 DIN ISO 3019-1)



1 Bleeding and flushing port G1/4

Housing version -2 (radial ports, with thru-shaft)



1 Flange version (output side)

Rotating direction clockwise

A = pressure port

B = suction port

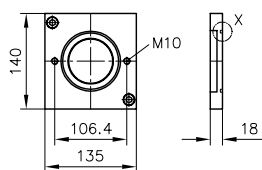
Rotating direction anti-clockwise

A = suction port

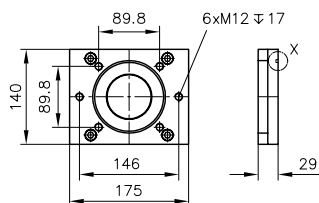
B = pressure port

Flange version (output side)

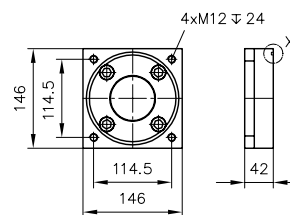
Coding **C211 and C212**
(SAE-A 2-hole)



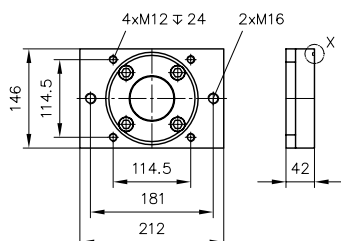
Coding **C214 and C215**
(SAE-B 2-hole and SAE-B 4-hole)



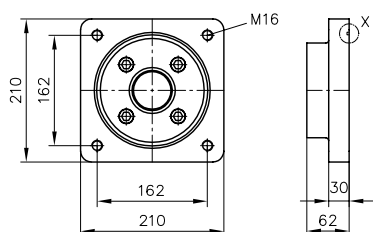
Coding **C218**
(SAE-C 4-hole)



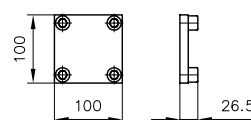
Coding **C219**
(SAE-C 4-hole and SAE-C 2-hole)



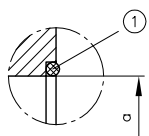
Coding **C220**
(SAE-D 4-hole)



Coding **C247**
(prepared for thru-shaft (cover))



Detail X



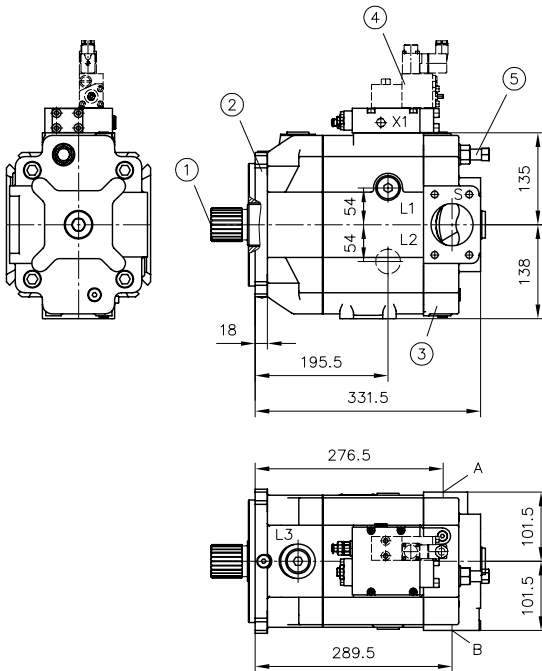
1 O-ring

| V30E-095 | Sealing ring | a |
|------------|----------------------------|---|
| C211, C212 | $\varnothing 84 \times 2$ | $\varnothing 82.55^{+0.03}_{+0.01}$ 7 deep |
| C214, C215 | $\varnothing 103 \times 2$ | $\varnothing 101.6^{+0.03}_{+0.01}$ 11 deep |
| C218, C219 | $\varnothing 132 \times 2$ | $\varnothing 127^{+0.08}_{+0.04}$ 14 deep |
| C220 | $\varnothing 164 \times 3$ | $\varnothing 152.4^{+0.08}_{+0.04}$ 14 deep |

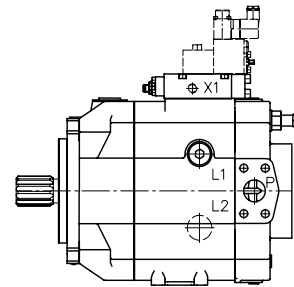
Sealing ring included in the items supplied

4.1.2 Type V30E-160

Rotating direction **clockwise** (viewed from shaft journal)



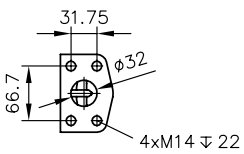
Rotating direction **anti-clockwise** (viewed from shaft journal)



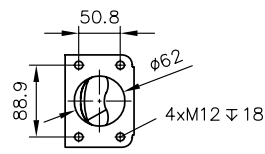
- 1 Shaft version
- 2 Flange version
- 3 Housing version
- 4 Controller
- 5 Stroke limitation (approx. 10 ccm/rev)

| Rotating direction clockwise | Rotating direction anti-clockwise |
|------------------------------|-----------------------------------|
| A = pressure port | A = suction port |
| B = suction port | B = pressure port |

Pressure port



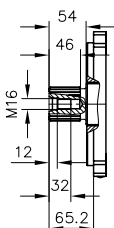
Suction port



Shaft versions

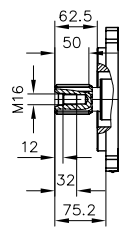
Spline shaft

Coding **D**
(W50x2x24x9g DIN 5480)



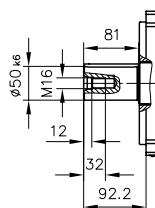
Spline shaft

Coding **S**
(SAE-D J 744 13T 8/16DP)



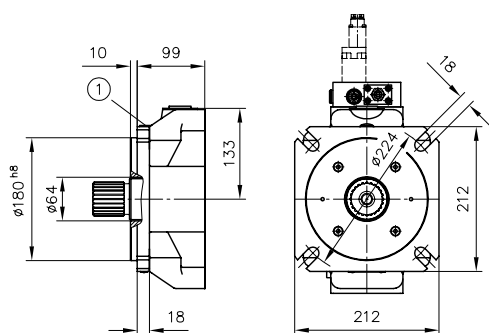
Parallel key shaft

Coding **K**
(Ø50 - 14x9x80 DIN 6885)



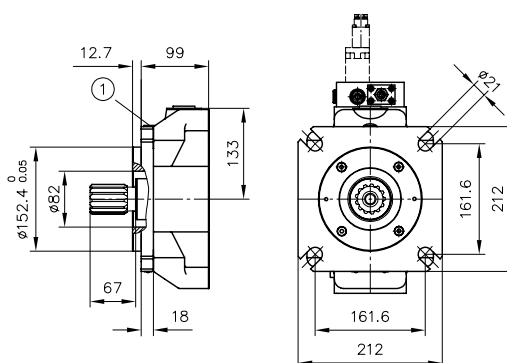
Flange versions

Coding G
(180 B4 INSTR DIN ISO 3019-2)



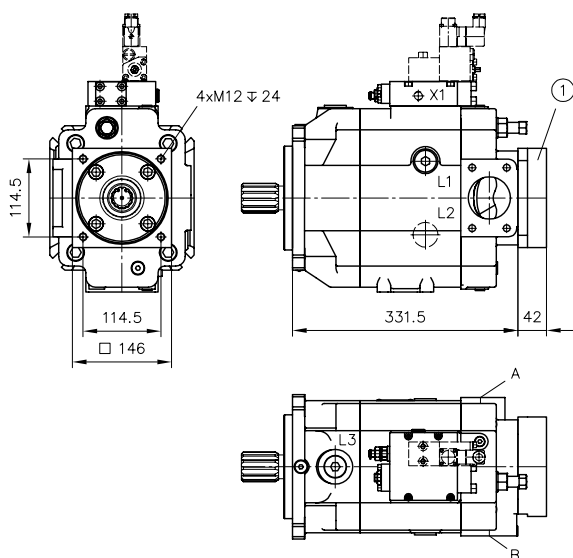
1 Bleeding and flushing port G1/4

Coding F
(SAE-D 4-hole J 744)
(152-4 DIN ISO 3019-1)



1 Bleeding and flushing port G1/4

Housing version -2 (radial ports, with thru-shaft)

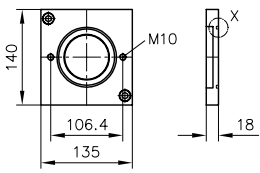


1 Flange version (output side)

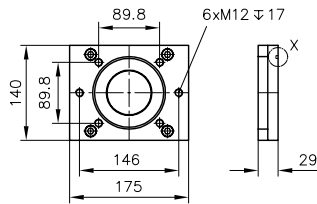
| Rotating direction clockwise | Rotating direction anti-clockwise |
|------------------------------|-----------------------------------|
| A = pressure port | A = suction port |
| B = suction port | B = pressure port |

Flange version (output side)

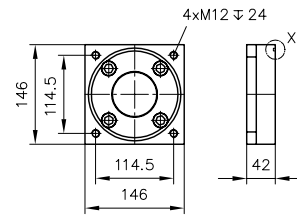
Coding C221 and C222
(SAE-A 2-hole)



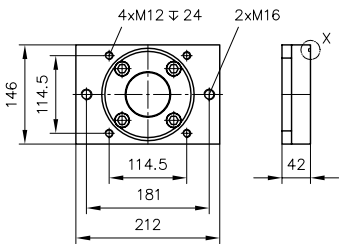
Coding C224 and C225
(SAE-B 2-hole and SAE-B 4-hole)



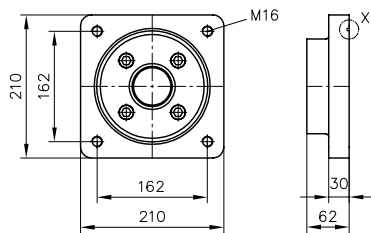
Coding C228
(SAE-C 4-hole)



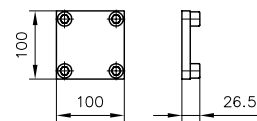
Coding C227
(SAE-C 2-hole and SAE-C 4-hole)



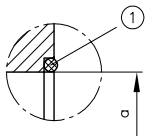
Coding C230
(SAE-D 4-hole)



Coding C248
(prepared for thru-shaft (cover))



Detail X



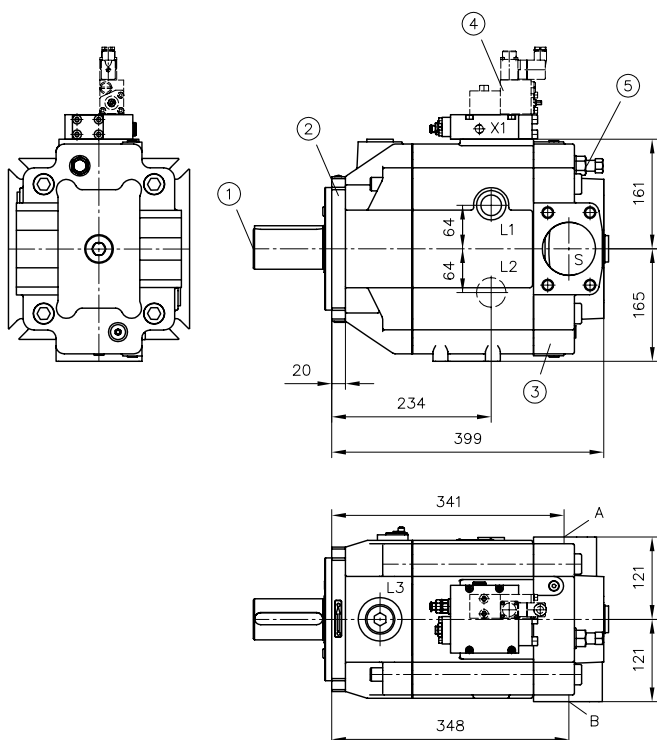
1 O-ring

| V30E-160 | Sealing ring | a |
|------------|--------------|---|
| C221, C222 | Ø84x2 | Ø 82.55 ^{+0.03} _{+0.01} 7 deep |
| C224, C225 | Ø103x2 | Ø 101.6 ^{+0.03} _{+0.01} 11 deep |
| C227, 228 | Ø132x2 | Ø 127 ^{+0.08} _{+0.04} 14 deep |
| C230 | Ø164x3 | Ø 152.4 ^{+0.08} _{+0.04} 14 deep |

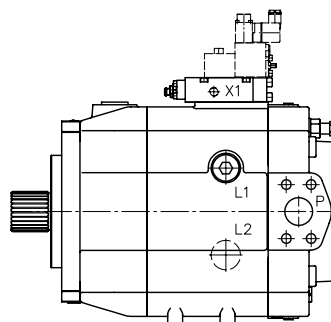
Sealing ring included in the items supplied

4.1.3 Type V30E-270

Rotating direction **clockwise** (viewed from shaft journal)



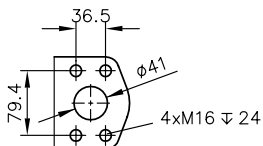
Rotating direction **anti-clockwise** (viewed from shaft journal)



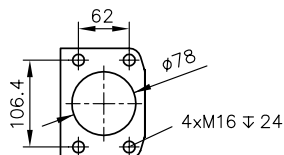
- 1 Shaft version
- 2 Flange version
- 3 Housing version
- 4 Controller
- 5 Stroke limitation (approx. 15 ccm/rev)

| Rotation direction clockwise | Rotation direction anti-clockwise |
|------------------------------|-----------------------------------|
| A = pressure connection | A = suction port |
| B = suction port | B = pressure connection |

Pressure connection



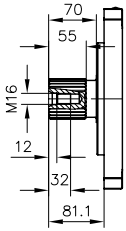
Suction port



Shaft versions

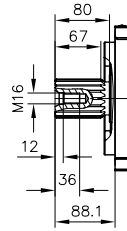
Spline shaft

Coding **D**
(W60x2x28x9g DIN 5480)



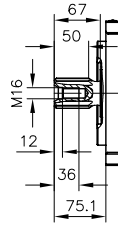
Spline shaft

Coding **S**
(17T 8/16DP)



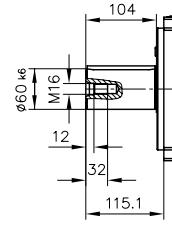
Spline shaft

Coding **U**
(SAE-D J 744 13T 8/16DP)



Parallel key shaft

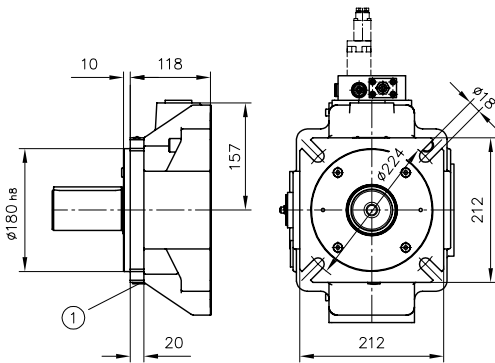
Coding **K**
(Ø60 - 18x11x100 DIN 6885)



Flange versions

Coding G

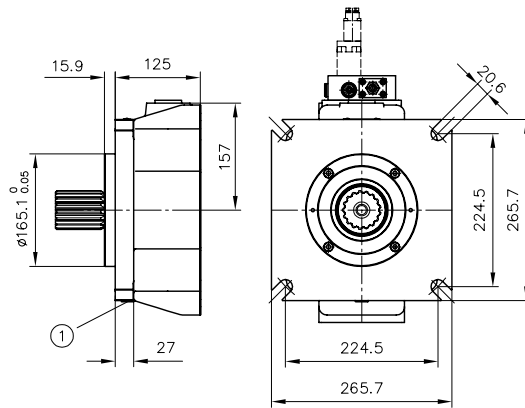
(180 B4 INSTR DIN ISO 3019-2)



1 Bleeding and flushing port G1/4

Coding F

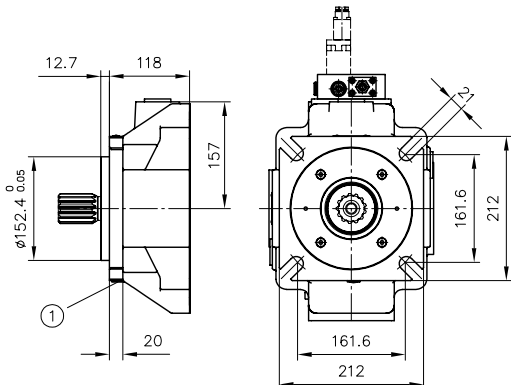
(SAE E-4-hole J 744)
(165-4 DIN ISO 3019-1)



1 Bleeding and flushing port G1/4

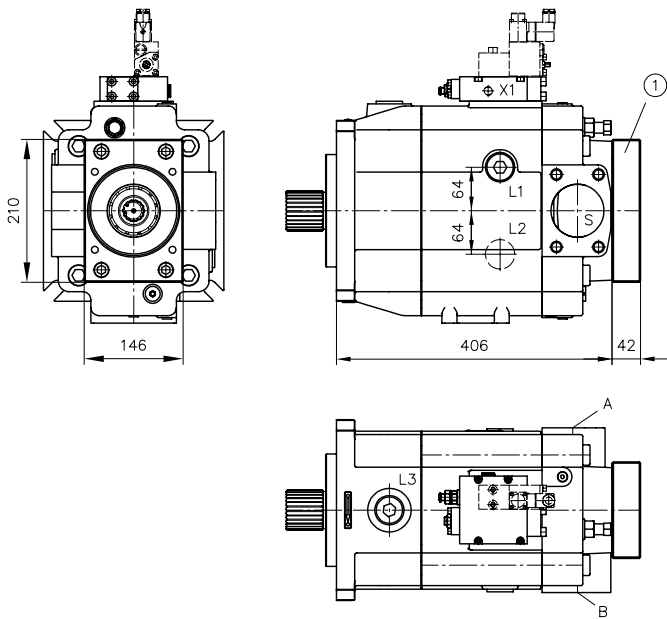
Coding W

(SAE-D 4-hole J 744)
(152-4 DIN ISO 3019-1)



1 Bleeding and flushing port G1/4

Housing version -2 (radial version, with thru-shaft)



1 Flange version (input side)

Rotation direction clockwise

A = pressure connection

B = suction port

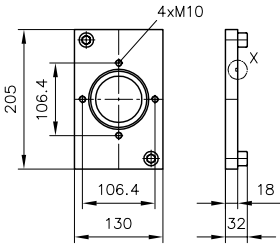
Rotation direction anti-clockwise

A = suction port

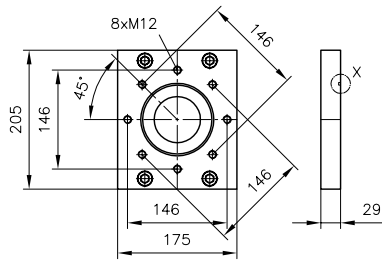
B = pressure connection

Flange version (output side)

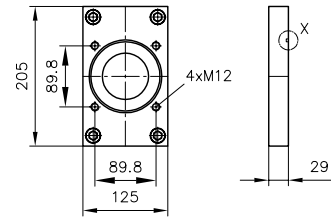
Coding C231 and C232
(SAE-A 2-hole)



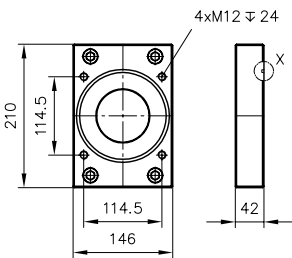
Coding C234
(SAE-B 2-hole and SAE-B 4-hole)



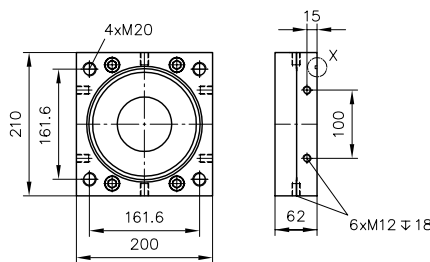
Coding C235
(SAE-B 4-hole)



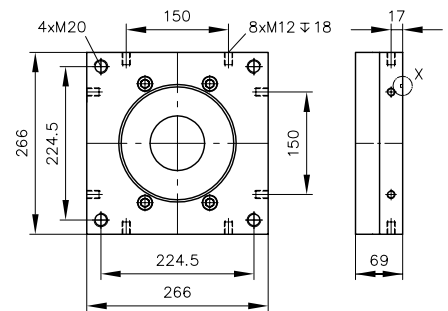
Coding C238
(SAE-C 4-hole)



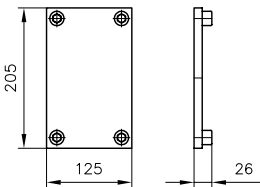
Coding C240
(SAE-D 4-hole)



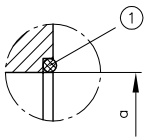
Coding C241
(SAE-E 4-hole)



Coding C249
(prepared for thru-shaft (cover))



Detail X



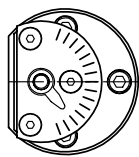
1 O-ring

| V30E-270 | Sealing ring | a |
|------------|--------------|---|
| C231, C212 | Ø 84x2 | Ø 82.55 ^{+0.03} / _{+0.01} 7 deep |
| C234, C235 | Ø 103x2 | Ø 101.6 ^{+0.03} / _{+0.01} 11 deep |
| C228 | Ø 132x2 | Ø 127 ^{+0.08} / _{+0.04} 13 deep |
| C240 | Ø 164x3 | Ø 152.4 ^{+0.08} / _{+0.04} 13 deep |
| C241 | Ø 167x3 | Ø 165.1 ^{+0.08} / _{+0.04} 16 deep |

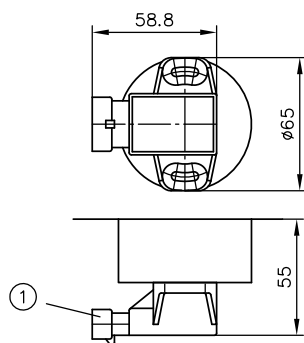
Sealing ring included in the items supplied

4.2 Pivoting angle indicator

swash plate angle indicator



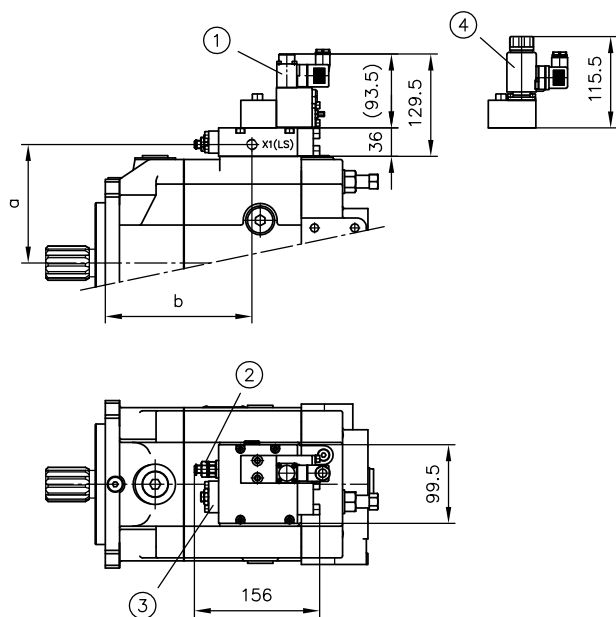
swash plate angle pick-up



1 3-PIN AMP Superseal

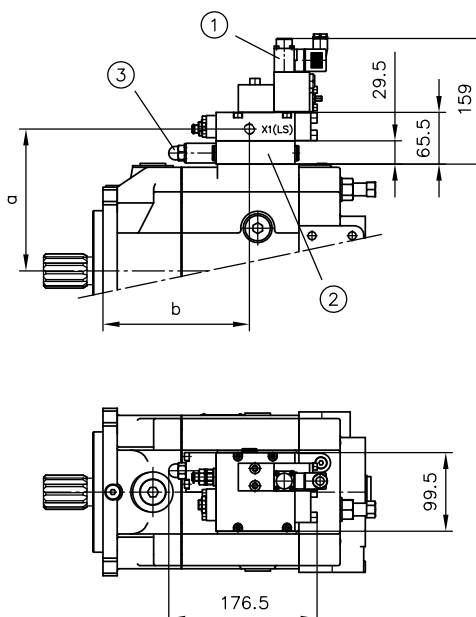
4.3 Controllers

Coding P, LSP



- 1 Prop. pressure-limiting valve type PMVPS 4 according to [D 7485/1](#)
- 2 Pressure setting (pressure controller)
- 3 LSP: setting of LS stand-by pressure; P: setting of p_{min}
- 4 2/2-way directional seated valve type BVPM

Coding PL, LSPL



- 1 Prop. pressure-limiting valve type PMVPS 4 according to [D 7485/1](#)
- 2 Power controller (intermediate plate)
- 3 Power setting

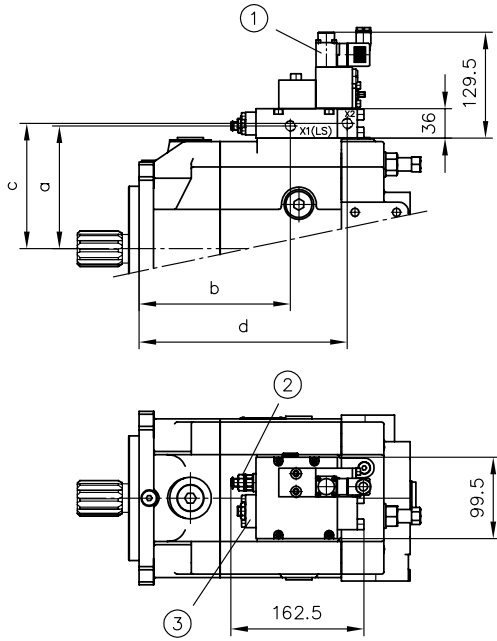
| | a | b | Power change/ revolution |
|----------|-----|-------|-----------------------------|
| V30E-095 | 135 | 151 | 140 Nm |
| V30E-160 | 150 | 185 | 237 Nm |
| V30E-270 | 176 | 223.5 | 400 Nm |

| | a | b | Power change/ revolution |
|----------|-------|-------|-----------------------------|
| V30E-095 | 164.5 | 151 | 140 Nm |
| V30E-160 | 179.5 | 185 | 240 Nm |
| V30E-270 | 205.5 | 223.5 | 400 Nm |

Ports (BSPP)

| | |
|--------|-------|
| LS, X1 | G 1/4 |
|--------|-------|

Coding **Pb, LSPb**

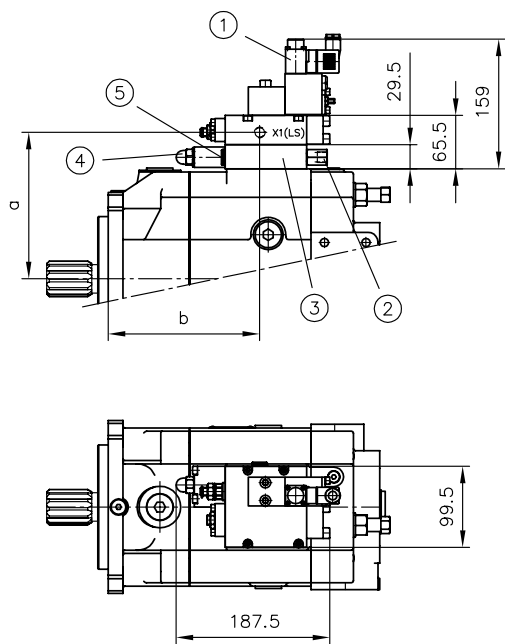


- 1 Prop. pressure-limiting valve type PMVPS 4 according to [D 7485/1](#)
- 2 Pressure setting (pressure controller)
- 3 LSP: setting of LS stand-by pressure; N: setting of p_{min}

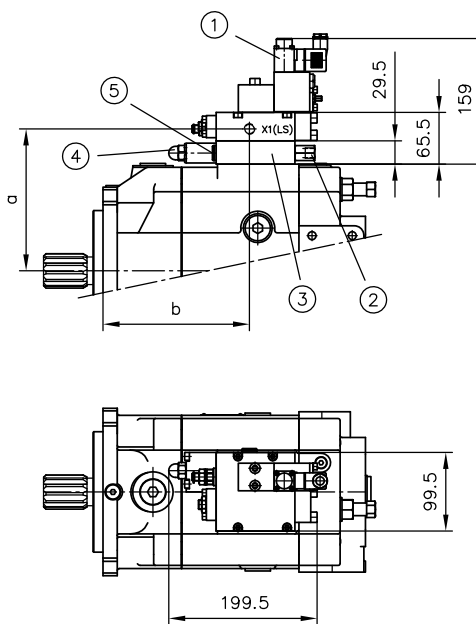
| | a | b | c | d |
|----------|-----|-------|-----|--------|
| V30E-095 | 135 | 151 | 138 | 220.75 |
| V30E-160 | 150 | 185 | 153 | 254.75 |
| V30E-270 | 176 | 223.5 | 179 | 293.25 |

| Ports | |
|------------|-------|
| LS, X1, X2 | G 1/4 |

Coding Lf, Lf1



Coding Lfe

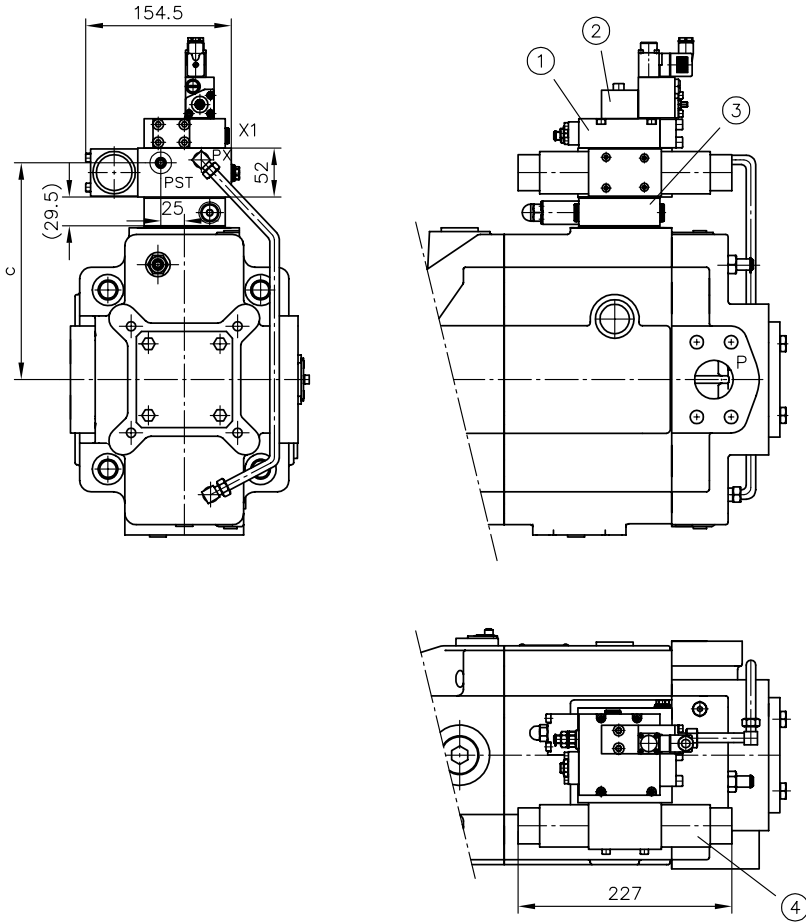


- 1 Prop. pressure-limiting valve type PMVPS 4 according to [D 7485/1](#)
- 2 Port f1 sealed in case of Lf
- 3 Power controller (intermediate plate)
- 4 Power setting
- 5 Port f sealed in case of Lf1

| | a | b | Power change/revolution |
|----------|-------|-------|-------------------------|
| V30E-095 | 164.5 | 151 | 140 Nm |
| V30E-160 | 179.5 | 185 | 240 Nm |
| V30E-270 | 205.5 | 223.5 | 400 Nm |

| Ports (BSPP) | |
|--------------|-------|
| LS, X1 | G 1/4 |

Coding EM..., EML...



- 1 Pressure controller (option)
- 2 Prop. pressure-limiting valve type PMVPS 4 according to [D 7485/1](#)
- 3 Power controller (option)
- 4 Prop. directional spool valve

| | c |
|----------|-----|
| V30E-095 | 156 |
| V30E-160 | 169 |
| V30E-270 | 197 |

Dimension "c" in version with power controller + 30 mm



Caution

Risk of injury on overloading components due to incorrect pressure settings!

Risk of minor injury.

- Always monitor the pressure gauge when setting and changing the pressure.

4.4 Pump combinations

4.4.1 Pump combinations

A support is to be provided for pump combinations installed horizontally.

Two variable displacement axial piston pumps can be coupled together using an intermediate flange. The sizing of the shafts also permits the transmission of the full torque to the second pump.

Same controller range as for individual pumps.

Available shaft designs: "D" and "S".

Flange versions available for tandem pumps, see [Chapter 2, "Available versions, main data"](#), Table 11

Order coding example

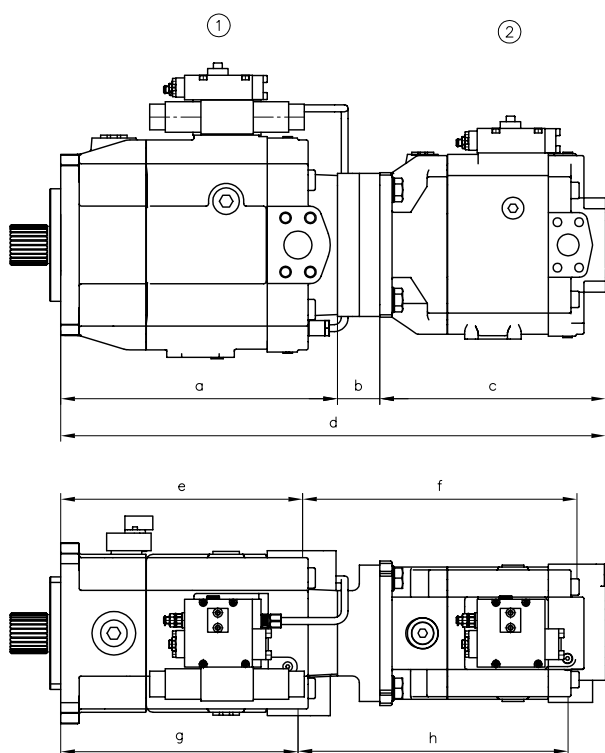
V30E-270 RDFN-2-2-02/EMP/120-200-C257-

V30E-160 RDGN-1-1-02/P/120-200

(1. Pump)

(2. Pump)

(Type code see [Chapter 2, "Available versions, main data"](#))



- 1 1st pump
- 2 2nd pump

Table of dimensions

| 1st pump | Coding | V30E-095 ..DG..-2-..-02 | | | | | | | | V30E-095 ..SF..-2-..-02 | | | | | | | |
|-------------------------|--------|-------------------------|----|-------|-----|-------|-------|-------|-------|-------------------------|----|-------|-----|-------|-------|-------|-------|
| 2nd pump | | a | b | c | d | e | f | g | h | a | b | c | d | e | f | g | h |
| V30E-095 ..DG..-1-..-02 | C 250 | 282.5 | 47 | 296.5 | 625 | 252.5 | 329.5 | 239.5 | 329.5 | | | | | | | | |
| V30E-095 ..SF..-1-..-02 | C 220 | | | | | | | | | 282.5 | 62 | 296.5 | 640 | 252.5 | 344.5 | 239.5 | 344.5 |

Table of dimensions

| 1st pump | Coding | V30E-160 ..DG..-2-..-02 | | | | | | | | V30E-160 ..SF..-2-..-02 | | | | | | | |
|-------------------------|--------|-------------------------|----|-------|-------|-------|-------|-------|-------|-------------------------|----|-------|-------|-------|-------|-------|-------|
| 2nd pump | | a | b | c | d | e | f | g | h | a | b | c | d | e | f | g | h |
| V30E-095 ..DG..-1-..-02 | C 255 | 331.5 | 47 | 296.5 | 675 | 289.5 | 341.5 | 276.5 | 341.5 | | | | | | | | |
| V30E-095 ..SF..-1-..-02 | C 230 | | | | | | | | | 331.5 | 62 | 296.5 | 690 | 289.5 | 356.5 | 276.5 | 256.5 |
| V30E-160 ..DG..-1-..-02 | C 257 | 331.5 | 52 | 344 | 727.5 | 289.5 | 383.5 | 276.5 | 383.5 | | | | | | | | |
| V30E-160 ..SF..-1-..-02 | C 230 | | | | | | | | | 331.5 | 62 | 344 | 737.5 | 289.5 | 393.5 | 276.5 | 393.5 |

Table of dimensions

| 1st pump | Coding | V30E-270 ..DG..-2-..-02 | | | | | | | | V30E-270 ..SF..-2-..-02 | | | | | | | |
|-------------------------|--------|-------------------------|----|-------|-------|-----|-------|-----|-------|-------------------------|----|-------|-------|-----|-------|-----|-------|
| 1st pump | | a | b | c | d | e | f | g | h | a | b | c | d | e | f | g | h |
| V30E-095 ..DG..-1-..-02 | C 260 | 399 | 47 | 296.5 | 742.5 | 348 | 350.5 | 341 | 344.5 | | | | | | | | |
| V30E-095 ..SF..-1-..-02 | C 240 | | | | | | | | | 406 | 62 | 296.5 | 764.5 | 355 | 365.5 | 348 | 359.5 |
| V30E-160 ..DG..-1-..-02 | | | | | | | | | | | | | | | | | |
| V30E-160 ..SF..-1-..-02 | C 240 | | | | | | | | | 406 | 62 | 344 | 812 | 355 | 402.5 | 348 | 396.5 |
| V30E-270 ..DG..-1-..-02 | | | | | | | | | | | | | | | | | |
| V30E-270 ..SF..-1-..-02 | C 241 | | | | | | | | | 406 | 69 | 413 | 888 | 355 | 475 | 348 | 475 |

4.4.2 Combination with dent pump

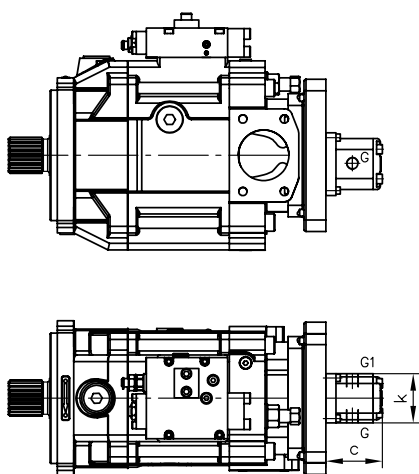
A directly mounted auxiliary or additional gear pump is available.

All pipe work is fitted when a pump with electro-hydraulic prop. adjustment together with directly mounted auxiliary pump is ordered.

Order coding example

V30E-160 RKGN 2 -1 - XX / LSP / 280 - C 221 - Z 02-5

V30E basic pump



| Coding | Geometric displacement V_g (cm ³ /rev.) | Auxiliary pump for | G (BSPP) | G1 (BSPP) | c | k |
|---------|---|--------------------|-------------|--------------|----|----|
| Z 02-6 | 6.0 | V30E-095 | G 3/8 | G 3/8 | 77 | 68 |
| Z 02-9 | 8.40 | V30E-160 | G 3/8 | G 3/8 | 87 | 68 |
| Z 02-11 | 10.80 | V30E-270 | G 3/8 | G 3/8 | 98 | 89 |

Note
Auxiliary pump is required for the electro-hydraulic pump adjustment coding EM...

Note
With EM a gear pump twice as large as the auxiliary pump can be used on tandem pumps.

Note
Values "c" and "k" are reference values only.

Further characteristic values on request!

5.1 Intended application

This product is intended exclusively for hydraulic applications (fluid engineering). The product meets high technical safety standards and regulations for fluid and electrical engineering.

The user must observe the safety measures and warnings in this documentation.

Essential requirements for the product to function correctly and safely:

- All information in this documentation must be observed. This applies in particular to all safety measures and warnings.
- The product must only be assembled and put into operation by qualified personnel.
- The product must only be operated within the specified technical parameters. The technical parameters are described in detail in this documentation.
- The operating and maintenance manual of the specific complete system must also always be observed.

If the product can no longer be operated safely:

Remove the product from operation and mark it accordingly. It is then not permitted to continue using or operating the product.

5.2 Assembly information

The hydraulic system must only be installed in the complete system with standard connection components that comply with market requirements (screw fittings, hoses, pipes, etc.).

The hydraulic system must be shut down correctly prior to dismantling; this applies in particular to hydraulic systems with hydraulic accumulators.

**Danger**

Risk to life caused by sudden movement of the hydraulic drives when dismantled incorrectly!

Risk of serious injury or death.

- Depressurise the hydraulic system.
- Perform safety measures in preparation for maintenance.

5.2.1 General information

The V30E variable displacement axial piston pump is designed for use in an open circuit.

The pump can be mounted using a flange in accordance with specifications.

The various controllers can be fitted as intermediate plate versions or as separate devices as required.

During assembly, note the following principles:

Only trained persons are allowed to mount or remove the pump. Always ensure absolute cleanliness so that no contamination can influence the pump.

- Remove all plastic plugs before operation.
- Avoid installation above the tank (see installation positions in [Chapter 5.2.3, "Installation positions"](#)).
- For electric reference values "Suction intakes" must be adhered to.
- Before initial use, fill the pump with hydraulic fluid and bleed. The pump automatically fills via the suction line when the drain ports are opened.
- Never drain the pump.
- Always supply the pump with hydraulic fluid from the start. Even just a short period with insufficient hydraulic fluid can damage the pump. Such damage is not immediately visible once the pump is put into operation.
- Hydraulic fluid which flows back into the tank must not be sucked back in immediately (install baffles!).
- Before first use, run the pump for approx. 10 minutes at max. 50 bar after initial start-up.
- Only use the entire pressure range of the pump once thorough bleeding and flushing have taken place.
- From the start, always keep the temperature in the specified range (see [Chapter 3, "Parameters"](#)). Never exceed maximum temperatures.
- Always comply with the cleanliness level of the hydraulic fluid. In addition, always filter the hydraulic fluid appropriately (see [Chapter 3, "Parameters"](#)).
- Self-installed filters in the suction line must be approved beforehand by HAWE Hydraulik SE.
- A system pressure-limiting valve must be installed in the pressure line so that the maximum system pressure is not exceeded.

5.2.2 Ports

The nominal diameter of the connecting lines depends on the specified operating conditions, the viscosity of the hydraulic fluid, the start-up and operating temperatures and the rotation speed of the pump. In principle we recommend the use of hose lines due to the superior damping characteristics.

Bleeding and flushing port

The V30E pumps are fitted with a G 1/4" (BSPP) bleeding and flushing port. This is used to bleed and flush the front shaft bearing in the case of vertical installation.

Pressure port

The pressure port connection is established in the case of type V30E via SAE ports, see [Chapter 4, "Dimensions"](#). Metric attachment threads are used in deviation from the standard.

Observe the tightening torque specified by the fitting manufacturer.

Suction port

The suction port can be established via SAE ports; see [Chapter 4, "Dimensions"](#). Metric attachment threads are used in deviation from the standard.

If possible, route the suction line to the tank in such a way that it is steadily rising. This allows trapped air to escape. Observe the specifications in "Installation positions" [Chapter 5.2.3, "Installation positions"](#). The absolute suction pressure must not fall below 0.85 bar. A hose line should generally be used in preference to a rigid pipe.

Drain port

The V30E pumps have 3 drain ports G 3/4" (BSPP) or G 1" (BSPP).

The nominal diameter of the leakage line must not be less than 16 mm. The cross-section is determined by the max. permissible housing pressure.

Integrate the leakage line in the system in such a way as to prevent direct connection with the suction line of the pump.

All drain ports can be used simultaneously.

A separate leakage line from the controller to the tank is not required. Observe the specifications in [Chapter 5.2.3, "Installation positions"](#).

The top drain port can be used to fill the housing.

LS port for versions LSP

The LS line is connected to the controller via a G 1/4" (BSPP) threaded connection.

The nominal diameter of the line depends on the installation position of the pump and should be 10% of the pressure line nominal volume. A hose line should generally be used in preference to a rigid pipe.

- When the proportional directional spool valve is in a neutral position, the LS line must be fully relieved (only controller type LSNR, LSN). In the case of controller type LSNRT, relief takes place internally in the controller.

For operation with HFC (35 - 50 % water content) the following restrictions apply

- The tank is above the pump
- The temperature does not exceed 50°C
- The fluid velocity in the suction line is below 1 m/s
- Pump pressure maximum 200 bar
- The two shaft bearings on a pump are flushed with cool oil via separate feeds, each bearing with 3 lpm (V30E-095), 4 lpm (V30E-160) and 5 lpm (V30E-270)

For operation with liquids with a water content ≤ 20 % the following restrictions apply

- The tank is above the pump
- The tank temperature does not exceed 70°C
- The fluid velocity in the suction line is below 1 m/s
- Pump pressure maximum 300 bar
- Possible without bearing flushing

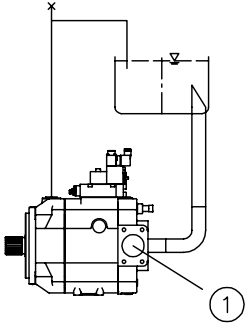
5.2.3 Installation positions

The variable displacement axial piston pump V30E can be installed in any installation position.

A support is required for tandem pumps or multiple hydraulic pumps mounted in series. The following points must be observed:

Horizontal installation: (pump below the min. fill level)

⇒ For horizontal installation, use the uppermost drain port

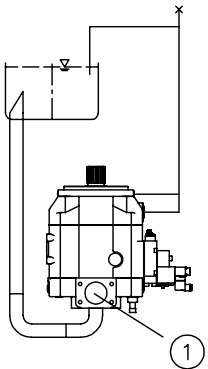


1 Suction port open

Vertical installation: (pump below the min. fill level)

- ⇒ Mount the pump so that the pump mounting flange is facing upwards
- ⇒ For vertical installation, use the uppermost drain port
- ⇒ Also connect the G 1/8" bleeding port on the pump flange.
- ⇒ Take appropriate measures to ensure continuous bleeding of this line (line routing/bleeding)

For installation with the pump flange facing downwards, please contact HAWE Hydraulik.



1 Suction port open

5.2.4 Tank installation

Tank installation (pump below the min. fill level)

The pump can be operated either with or without a suction tube. Using a short suction intake is recommended.



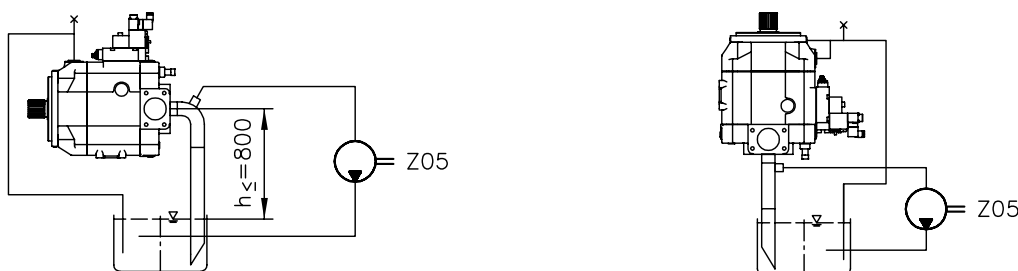
Additional notes regarding installation above the fill level

Special measures are required if the pump is installed above the fill level. The pump must not run dry via the pressure, intake, drain, bleed or control lines. This applies in particular to long periods of downtime.

- The leakage line must be installed in the tank in such a way that it ends below the oil level.
- Facilitate bleeding of connecting lines via separate bleed openings.
- Adjust the bleeding sequence to the specific installation.
- If necessary, a gear pump should be provided in order to draw air from the suction line.

For specialist advice on designing axial piston pumps, the following contact form is available:

[Checklist for designing variable displacement axial piston pumps: B 7960 checklist.](#)



For further information on installation, operation and maintenance, see the relevant assembly instructions:

[B 7960](#), [B 5488](#).

5.3 Operating instructions

Product configuration and setting the pressure and flow rate

The statements and technical parameters in this documentation must be strictly observed.
The instructions for the complete technical system must also always be followed.

**Note**

- Read the documentation carefully before usage.
- The documentation must be accessible to the operating and maintenance staff at all times.
- Keep documentation up to date after every addition or update.

**Caution****Risk of injury on overloading components due to incorrect pressure settings!**

Risk of minor injury.

- Always monitor the pressure gauge when setting and changing the pressure.

Purity and filtering of the hydraulic fluid

Fine contamination can significantly impair the function of a hydraulic power pack. Contamination can cause irreparable damage.

Examples of fine contamination include:

- Metal chips
- Rubber particles from hoses and seals
- Dirt due to assembly and maintenance
- Mechanical debris
- Chemical ageing of the hydraulic fluid

**Note**

Fresh hydraulic fluid from the drum does not always have the highest degree of purity. Under some circumstances the fresh hydraulic fluid must be filtered before use.

Pay attention to the cleanliness level of the hydraulic fluid in order to maintain faultless operation.
(Also see cleanliness level in [Chapter 3, "Parameters"](#).)

5.4 Maintenance information

This product is largely maintenance-free.

Conduct a visual inspection at regular intervals, but at least once per year, to check if the hydraulic connections are damaged. If external leakages are found, shut down and repair the system.

Clean the device surface of dust deposits and dirt at regular intervals, but at least once per year.

6 Other information

6.1 Planning information

Determination of nominal sizes

| | | | |
|---------------|---|-------------|--|
| Delivery flow | $Q = \frac{V_g \cdot n \cdot \eta_v}{1000} (l/min)$ | V_g | = Geom. output volume (cm ³ /rev.) |
| Drive torque | $M = \frac{V_g \cdot \Delta p}{20 \cdot \pi \cdot \eta_{mh}} (Nm)$ | Δp | = Differential pressure |
| Drive power | $P = \frac{2\pi \cdot M \cdot n}{60000} = \frac{Q \cdot \Delta p}{600 \cdot \eta_t} (kW)$ | n | = Rotation speed (rpm) |
| | | η_v | = Volumetric efficiency |
| | | η_{mh} | = Mechanical-hydraulic efficiency |
| | | η_t | = Overall efficiency ($\eta_t = \eta_v \cdot \eta_{mh}$) |

Further information

Additional versions

- General operating manual for the assembly, initial operation and maintenance of hydraulic components and systems: B 5488
- Variable displacement axial piston pump type V60N: D 7960 N
- Fixed displacement axial piston pump type K60N: D 7960 K
- Axial piston motors type M60N: D 7960 M
- Proportional directional spool valve, type PSL and PSV size 2: D 7700-2
- Proportional directional spool valve, type PSL, PSM and PSV size 3: D 7700-3
- Proportional directional spool valve, type PSL, PSM and PSV size 5: D 7700-5
- Proportional directional spool valve type PSLF, PSVF and SLF size 3: D 7700-3F
- Proportional directional spool valve type PSLF, PSVF and SLF size 5: D 7700-5F
- Proportional directional spool valve banks type PSLF and PSVF size 7: D 7700-7F
- Load-holding valve type LHT: D 7918
- Load-holding valve type LHDV: D 7770
- Proportional amplifier type EV1M3: D 7831/2
- Proportional amplifier type EV1D: D 7831 D