

Type V30E

Variable displacement axial piston pump



Product documentation

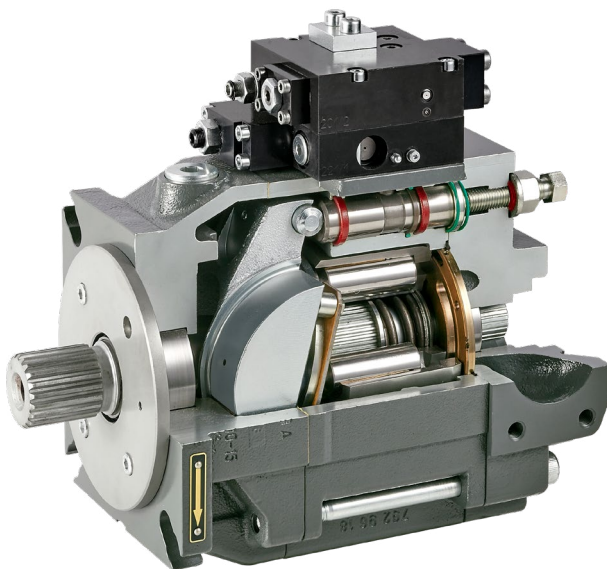
2025-08-01

Open circuit

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

Peak pressure p_{max} : 420 bar

Geometric displacement V_{max} : 95~270 cm³/rev

**V30E-160**

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1 Overview: variable displacement axial piston pump types V30E

Variable displacement axial piston pumps adjust the geometric delivery volume from maximum to zero. As a result they vary the volumetric flow that is provided to the loads.

The axial piston pump type V30E is designed for open circuits according to the swash plate principle. It is 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 range of controllers
- Full torque available at the second pump in tandem pump applications

Intended applications:

- Coal mining
- Concrete pump
- Extruder
- Industrial plants
- Marine cranes and winches
- Pile driving machine
- Power pack assembly
- Presses
- Tunnel boring machine



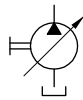
Type V30E-270

Variable displacement axial piston pump

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 C211 -Z05

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 version

Seal

Table 5: Seals

Flange version

Table 4: Flange version (input side)

Shaft version

Table 3: Shaft version

Rotating direction

Table 2: Rotating direction

Nominal size

Table 1: Nominal size

Basic type

2.1 Basic version

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 hydraulic fluid (Table 5, coding C), p_{max} = 300 bar

Table 2: Rotating directions

Coding	Description
L	Anti-clockwise
R	Clockwise

Table 3: Shaft versions

Coding	Description	Designation/Standard	Max. drive torque (Nm)
D	Spline shaft	W45×2×21×9g DIN 5480 (V30E-095)	1200
		W50×2×24×9g DIN 5480 (V30E-160)	1700
		W60×2×28×9g DIN 5480 (V30E-270)	3400
K	Key shaft	Ø40 - 12×8×80 DIN 6885 (V30E-095)	650
		Ø50 - 14×9×80 DIN 6885 (V30E-160)	850
		Ø60 - 18×11×100 DIN 6885 (V30E-270)	1700
S	Spline shaft	SAE-D J 744 13T 8/16 DP 44-4 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 ISO 3019-1 (only V30E-270,)	1200

Table 4: Flange versions (input side)

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

2.1 Basic version

Table 5: Seals

Coding	Description
N	NBR
V	FKM
E	EPDM
C	FKM, suitable for HFC, see Chapter 5, "Installation information"

Table 6: Housing versions

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

Table 7: Additional functions, pivoting angle indicator

Coding	Description
0	None
1	with indicator
2	With pivoting angle pick-up (Hall sensor)

Table 8: Controller

Coding	Description
-... P -	Pressure controller with adjustable pressure on the integrated pilot valve and port 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.
-... 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 15 ... 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	Pressure range: -41: (5) ... 180 bar -42: (5) ... 290 bar -43: (5) ... 440 bar Additional, directly mounted proportional pressure-limiting valve for setpoint adjustment for the pressure controller (nominal voltage 12V DC or 24V 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. Order coding example: V30E-095 RDGN - 1 - 0 - XX / P - PMVPS 4 - 43 / G 24 - 350
- BVPM 1 S /G 12 R /G 24	S: Energised closed (deenergised open) R: Energised open (deenergised closed) Additional, directly mounted 2/2-way directional seated valve for pump direction switching (nominal pressure/stand-by pressure) Order coding example: V30E-095 RDGN - 1 - 0 - XX / P - BVPM 1 S / G 24 - 350

2.1 Basic version

Table 8: Controller

Coding	Description
EM.CH	The electro-hydraulic delivery 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 Chapter 4.4.2: V30E-095: Z 02-6, V30E-160: Z 02-9, V30E-270: Z 02-11 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.  Note: The adjustment times are approx. 200 ms. The adjustment can be combined with pressure controllers (coding P, PMVPS) and/or power controllers (coding L) to limit pressure and/or power.  Note: In addition, a separately assigned overpressure protection (pressure-limiting valve) is also to be provided in the hydraulic circuit to avoid pressure peaks. Order coding example: V30E-095 RKG N - 2 - 2-XX / EM PCH - 250 - C212 - Z 02-6 (version with pressure limitation) V30E-160 RDGN - 2 - 2-XX / EM OCH - C222 - Z 02-9 (version without pressure limitation)
L.	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×Geometric displacement=Constant" by the special structure. If, for example, the pressure doubles at constant rotation speed, the delivery 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. . Order coding example: V30E-160 RKG N - 0 - 1 - XX / LP / 180 - 300 V30E-095 RSFN - 1 - 1 - XX / LLSP / 120 - 200 - C 211
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.

2.1 Basic version

Order coding example:

V30E -160 R D G N -2 -0 -04 /LSP -350 **C222**

Table 9: Flange versions (output side)

Coding V30E			Flange	Shaft	e.g. mounting of InLine pump with coding
095	160	270			
C 211	C 221	C 231	SAE-A 2-hole J 744 82-2 ISO 3019-1	SAE-A J 744 (16-4 ISO 3019-1) 9T 16/32 DP	
C 212	C 222	C 232	SAE-A 2-hole J 744 82-2 ISO 3019-1	SAE-A J 744 (16-4 ISO 3019-1) 9T 16/32 DP ¹⁾	
C 213	C 223	C 233	SAE-A 2-hole J 744 82-2 ISO 3019-1	19-4 ISO 3019-1 11T 16/32 DP	
C 214	C 224	C 234	SAE-B 2-hole J 744 101-2 ISO 3019-1	SAE-B J 744 (22-4 ISO 3019-1) 13T 16/32 DP	V60N-060 .. HX
C 215	C 225	C 235	SAE-B 4-hole J 744 101-4 ISO 3019-1	SAE-B J 744 (22-4 ISO 3019-1) 13T 16/32 DP	V60N-060 .. HZ
C 216	C 226	C 236	SAE-B 2/4-hole 101-2/4 ISO 3019-1	SAE-BB J 744 (25-4 ISO 3019-1) 15T 16/32 DP	
C 217	C 227	C 237	SAE-C 2-hole J 744 127-2 ISO 3019-1	SAE-C J 744 (32-4 ISO 3019-1) 14T 12/24 DP	
C 218	C 228	C 238	SAE-C 4-hole J 744 127-4 ISO 3019-1	SAE-C J 744 (32-4 ISO 3019-1) 14T 12/24 DP	V60N- .. SF
C 219	C 229	C 239	SAE-C 4-hole J 744 127-4 ISO 3019-1	23T 16/32 DP	
C 220	C 230	C 240	SAE-D 4-hole J 744 152-4 ISO 3019-1	SAE-D&E J 744 (44-4 ISO 3019-1) 13T 8/16 DP	V30E-095 ..SF.. /V30E-160 ..SF..
--	--	C 241	SAE-E 4-hole J 744 165-4 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 ISO 3019-2	W45×2×21×9g DIN 5480	V30E-095 ..DG..
C 251	C 256	C 261	SAE-D 4-hole J 744 152-4 ISO 3019-1	W45×2×21×9g DIN 5480	V30E-095 ..DF..
--	C 257	C 262	180 B4 HW ISO 3019-2	W50×2×24×9g DIN 5480	V30E-160 ..DG..
--	C 258	C 263	SAE-D 4-hole J 744 152-4 ISO 3019-1	W50×2×24×9g DIN 5480	V30E-160 ..DF..
--	--	C 264	180 B4 HW ISO 3019-2	W60×2×28×9g DIN 5480	V30E-270 ..DG..
--	--	C 266	SAE-E 4-hole J 744 165-4 ISO 3019-1	W60×2×28×9g DIN 5480	V30E-270 ..DF..
C 252	C 259	C 268	180 B4 HW ISO 3019-2	Ø25 Key width 8	

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



Note:

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

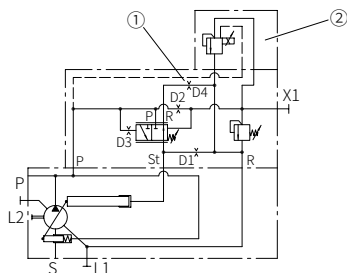


Note:

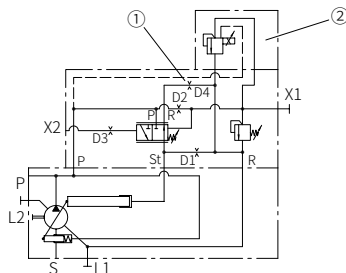
An additional support is to be provided for pump combinations. Other versions on request.

2.2 Controller switching symbols

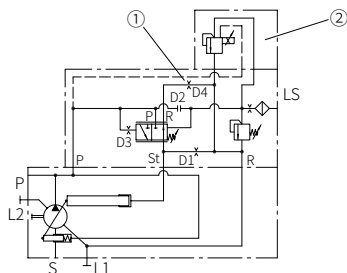
Coding P



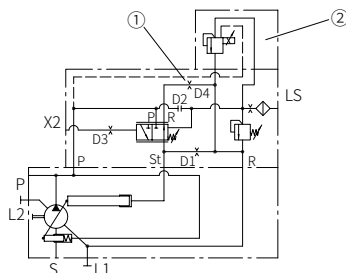
Coding Pb



Coding LSP



Coding LSPb



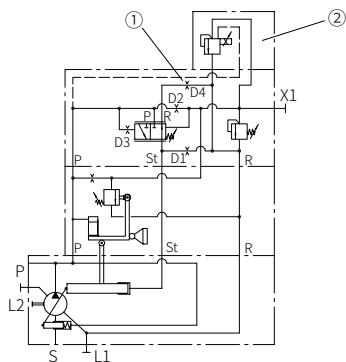
S	Suction port
P	Pressure port
(L1) (L2)	Drain ports
X1	Remote-control port (add. pilot valves)
LS	LS pressure port (load-sensing pressure; downstream of measuring throttle in main circuit)
X2	External system pressure port
D1	Damping orifice
D2	Pilot orifice
D3	Damping orifice, control piston
D4	Orifice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

① Optional

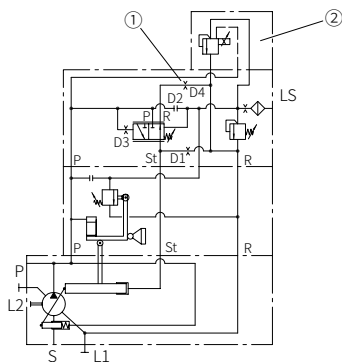
② Optional prop. pressure-limiting valve type PMVPS or type BVPM

2.2 Controller switching symbols

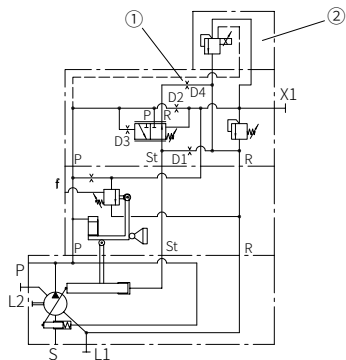
Coding PL



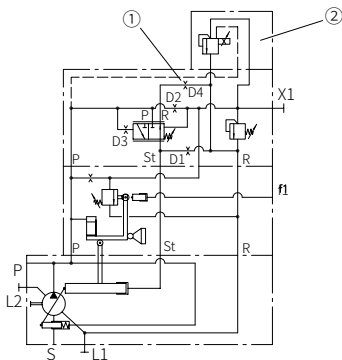
Coding LSPL



Coding PLf

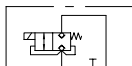


Coding PLf1

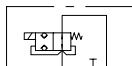


- ① Optional
- ② Optional prop. pressure-limiting valve type PMVPS or type BVPM

Coding BVPM1R

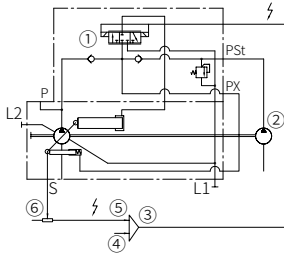


Coding BVPM1S



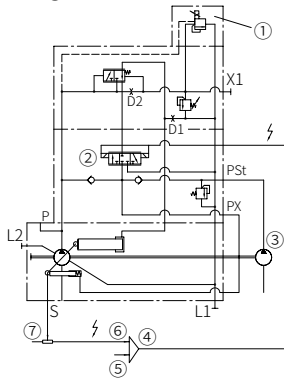
2.2 Controller switching symbols

Coding EMOCH



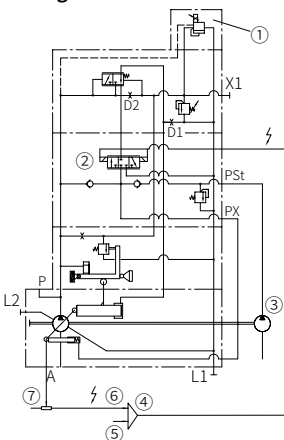
- ① Prop. directional valve
- ② Auxiliary pump
- ③ Amplifier card
- ④ Nominal
- ⑤ Actual
- ⑥ Pivoting angle pick-up

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, "Installation information")
Rotating direction	Clockwise, anti-clockwise
Ports	· Suction port · Pressure port · Drain port · Pressure gauge connection
Hydraulic fluid	Hydraulic oil: according to DIN 51 524 Part 1 to 3; ISO VG 10 to 68 according to DIN 51 519 Viscosity range: min. approx. 10; max. approx. 1000 mm²/s Optimal operating range: 16 to 35mm²/s, when lower than 16mm², please contact InLine Hydraulik. Also suitable for biologically degradable pressure fluids type HEPG (polyalkalene glycol) and HEES (synthetic ester) at operating temperatures up to approx. +70°C . HFC pressure fluids (water glycol), note installation information in Chapter 5, "Installation information".
Purity class	19/17/14, ISO 4406
Temperatures	Ambient: approx. -40 to +60°C , oil: -25 to +80°C , pay attention to the viscosity range! Start temperature: down to -40°C is permissible (observe start-viscosity!), as long as the steady-state temperature is at least 20K higher for subsequent operation. Biologically degradable pressure fluids: note manufacturer specifications. With consideration for the seal compatibility, not above +70°C .

3.1 General

Pressure and delivery flow

Operating pressure	See Chapter 2, "Available versions, main data"
Geometric displacement	See Chapter 2, "Available versions, main data"

Weight

Type	Without controller (kg)	With controller (kg)			
		LSP, LSPb, P, Pb	PMVPS 4	L, Lf, Lf1	EM...
V30E-095	54	+2.5	+1.1	+2.5	+6.1
V30E-160	74	+2.5	+1.1	+2.5	+6.1
V30E-270	126	+2.5	+1.1	+2.5	+6.1

Additional parameters

Description		Nominal size		
		095	160	270
Max. swash plate angle	°	15	15	15
Min. inlet pressure (absolute) open circuit	bar	0.85	0.85	0.85
Minimum operating pressure	bar	15	15	15
Max. permissible housing pressure (static/dynamic)	bar	1 / 2	1 / 2	1 / 2
Max. permissible inlet pressure (static/dynamic)	bar	20 / 30	20 / 30	20 / 30
Max. rotation speed during suction operation and max. swash plate angle at 1 bar abs. Inlet pressure	rpm	2500	2100	1800
Max. rotation speed in supply mode	rpm	2900	2500	2000
Min. rotation speed in continuous operation	rpm	500	500	500
Required drive torque at 100 bar	Nm	153	261	414
Drive power at 250 bar and 1450 rpm	kW	66	107	177
Inertia torque	kg m ²	0.0216	0.03	0.0825
Noise level at 250 bar, 1450 rpm and max. swash plate angle (measured in acoustic measurement chamber according to DIN ISO 4412, measurement distance 1m)	dB(A)	73	74	78



Note:

The minimum operating pressure in the pump line depends on the 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.

3.1 General

Max. permissible drive/output torque

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

3.2 Planning information for parameters

Determination of nominal sizes

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

3.3 Characteristic curves

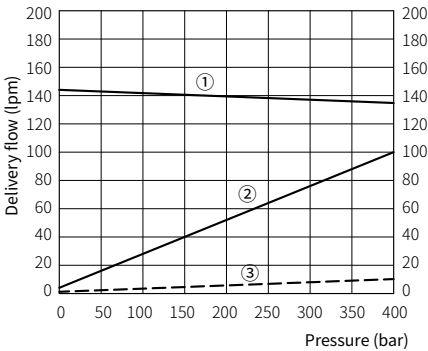
Delivery flow and power (basic pump)

The diagrams illustrate the delivery flow/pressure (without controller).

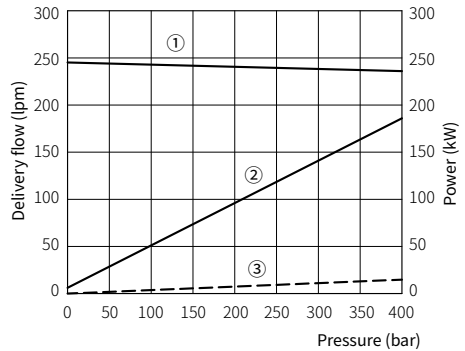
Drive power at max. swash plate angle and 1500 rpm.

Drive power/pressure at zero stroke and 1500 rpm.

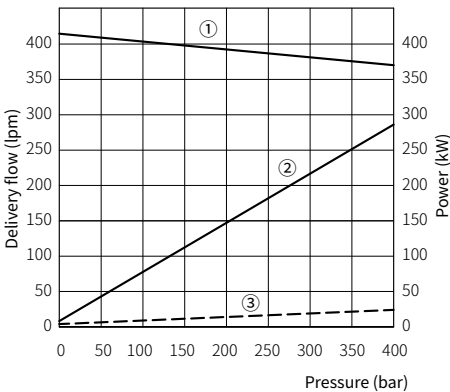
Type V30E - 095



Type V30E - 160



Type V30E - 270



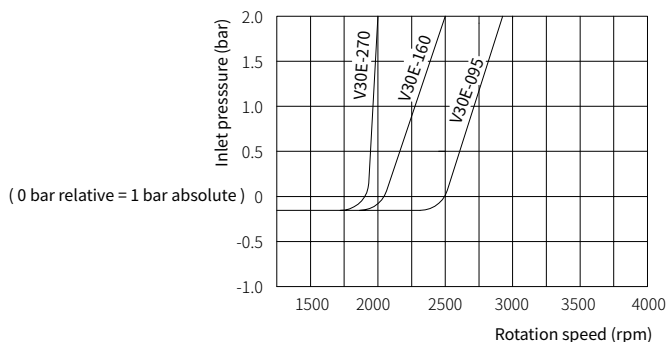
- ① Delivery flow/pressure
- ② Drive power/pressure
- ③ Drive power/pressure (zero stroke)

3.3 Characteristic curves

Inlet pressure and self-suction speed

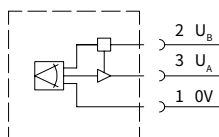
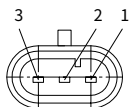
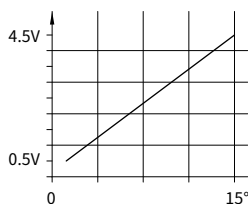
To avoid cavitation, it is essential to ensure that the pump inlet pressure always exceeds the min pressure shown in the diagram above.

The diagrams show the inlet pressure/speed at the max. swash plate angle and an oil viscosity of $75 \text{ mm}^2/\text{s}$.



3.4 Swash angle pick-up

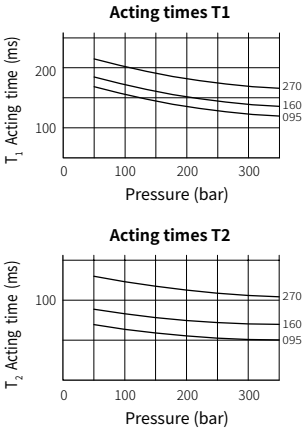
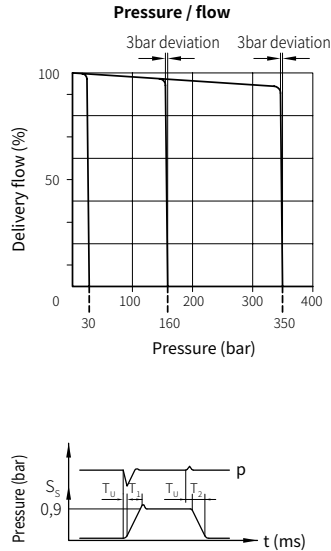
Swash angle pick-up (Hall sensor)



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

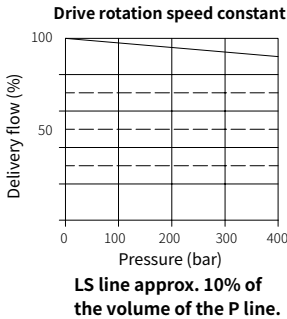
3.5 Controller characteristic curves

Coding P

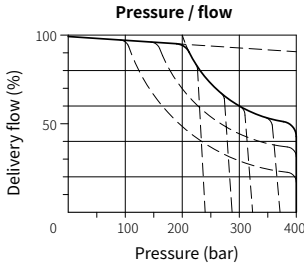


S _s	Positioning travel of actuator
T _U	Delay < 3 ms
T ₁	On-stroke time
T ₂	Destroke time
P	Pressure

Coding LSP



Coding L, Lf, Lf1



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%)

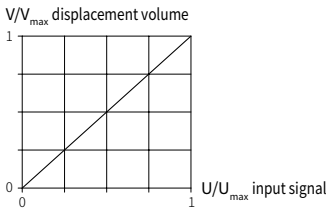


Note:
Smallest recommended nominal torque setting.

Coding	Drive torque (Nm)	Corresponds to (kW/rpm)
095	99	15/1500
160	146	22/1500
270	300	45/1500
280	300	45/1500

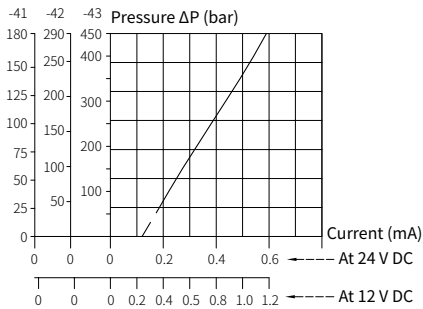
3.5 Controller characteristic curves

Codings EM..CH



On-stroke time	270 ms ...180 ms
Destroke time	130 ms ...100 ms
Hysteresis and linearity	1%
Amplifier card and controller card	Type DAC -4, DMA-22
- Supply voltage	18 ... 30 V DC, residual ripple < 10%
- Target value inputs	0 ... 10V, 4 ... 20 mA
Proportional directional valve	4/3-way directional valve NG 6

Coding PMVPS 4



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) with connector installed as a precautionary measure	
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) with connector installed as a precautionary measure	
Further information	D 7765	
Electrical connection	DIN EN 175 301-803 A	

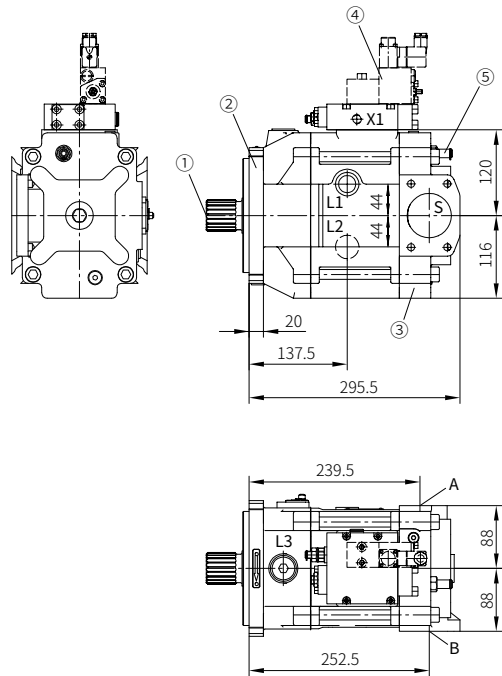
4 Dimensions

All dimensions in mm, subject to change!

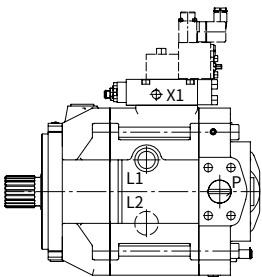
4.1 Basic pump

4.1.1 Type V30E-095

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



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



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

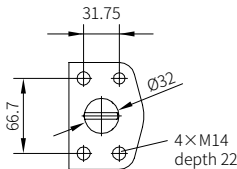
Rotating direction **clockwise**

A	= pressure port
B	= suction port

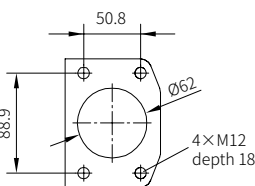
Rotating direction **anti-clockwise**

A	= suction port
B	= pressure port

Pressure port
SAE 1 1/4" (6000 psi)



Suction port
SAE 2 1/2" (3000 psi)

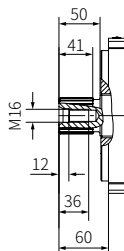


4.1.1 Type V30E-095

Shaft versions

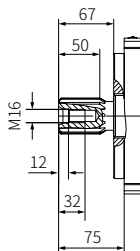
Spline shaft Coding D

(DIN 5480 W45×2×21×9g)



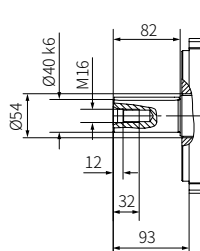
Spline shaft Coding S

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



Key shaft Coding K

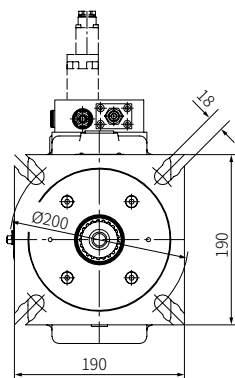
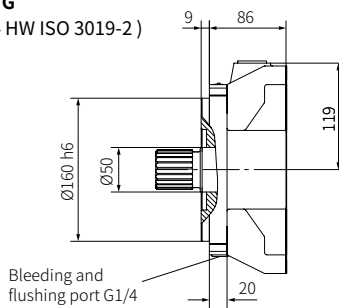
(DIN 6885 Ø40 - 12×8×80)



Flange versions

Coding G

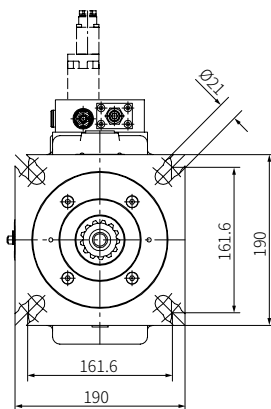
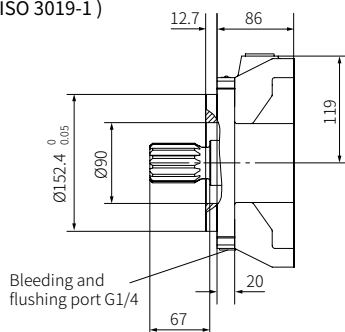
(160 B4 HW ISO 3019-2)



Coding F

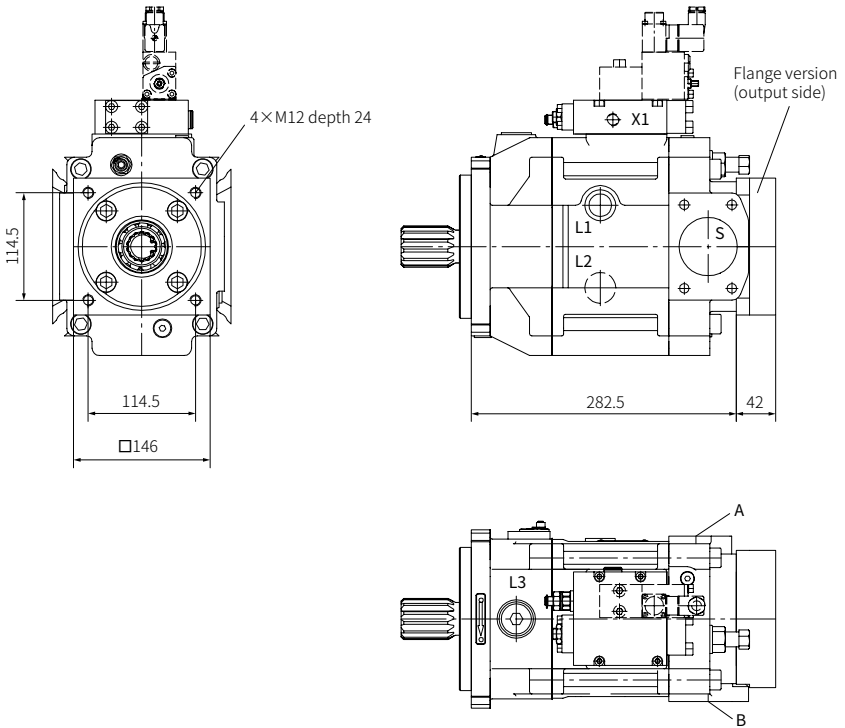
(SAE-D 4-hole J 744)

(152-4 ISO 3019-1)



4.1.1 Type V30E-095

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



Rotating direction **clockwise**

A = pressure port

B = suction port

Rotating direction **anti-clockwise**

A = suction port

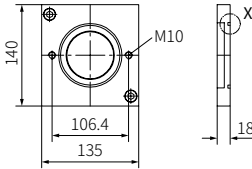
B = pressure port

4.1.1 Type V30E-095

Flange version (output side)

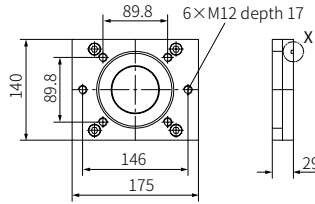
Coding C211 and C212

(SAE-A 2-hole)



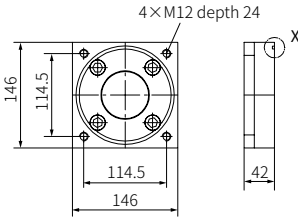
Coding C214 and C215

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



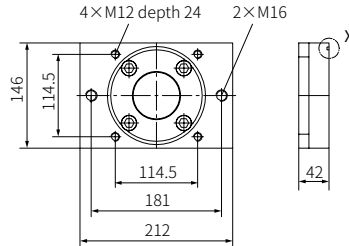
Coding C218

(SAE-C 4-hole)



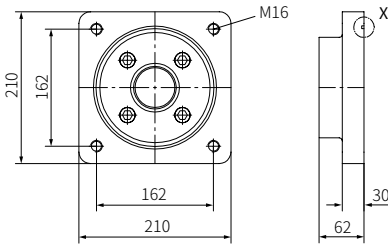
Coding C219

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



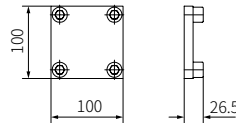
Coding C220

(SAE-D 4-hole)

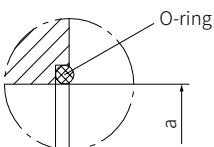


Coding C247

(prepared for thru-shaft (cover))



Detail X



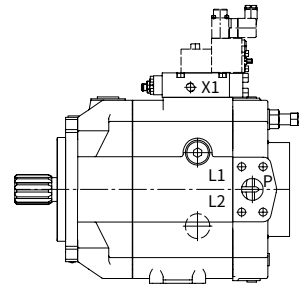
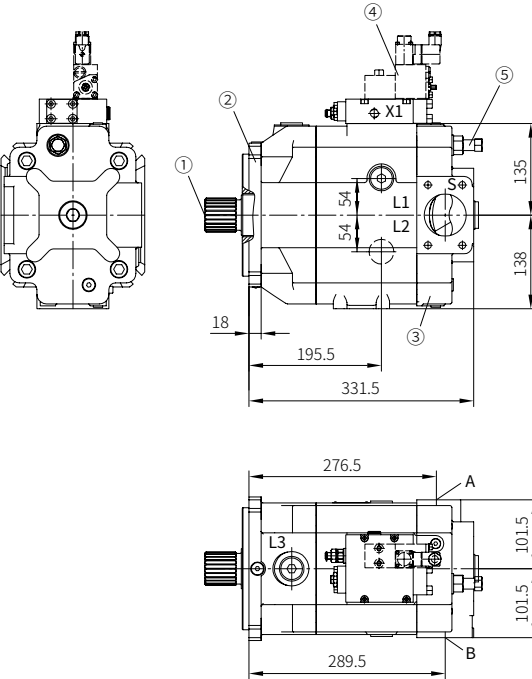
V30E-095	Sealing ring	a
C211, C212	Ø84×2	Ø82.55 ^{+0.03} _{+0.01} 7 deep
C214, C215	Ø103×2	Ø101.6 ^{+0.03} _{+0.01} 11 deep
C218, C219	Ø132×2	Ø127 ^{+0.08} _{+0.04} 14 deep
C220	Ø164×3	Ø152.4 ^{+0.08} _{+0.04} 14 deep

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)

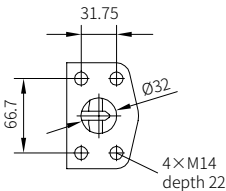
Rotating direction **clockwise**

A	= pressure port
B	= suction port

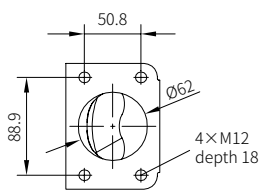
Rotating direction **anti-clockwise**

A	= suction port
B	= pressure port

Pressure port
SAE 1 1/4" (6000 psi)



Suction port
SAE 2 1/2" (3000 psi)

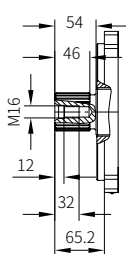


4.1.2 Type V30E-160

Shaft versions

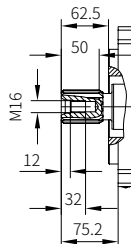
Spline shaft Coding D

(DIN 5480 W50×2×24×9g)



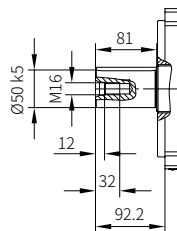
Spline shaft Coding S

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



Key shaft Coding K

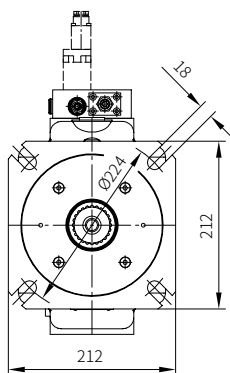
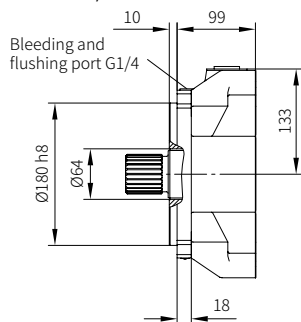
(DIN 6885 Ø50 - 14×9×80)



Flange versions

Coding G

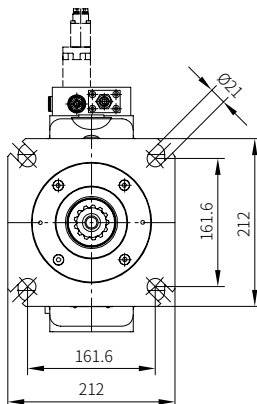
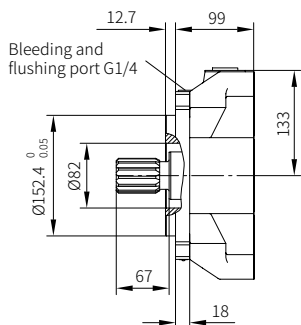
(180 B4 HW ISO 3019-2)



Coding F

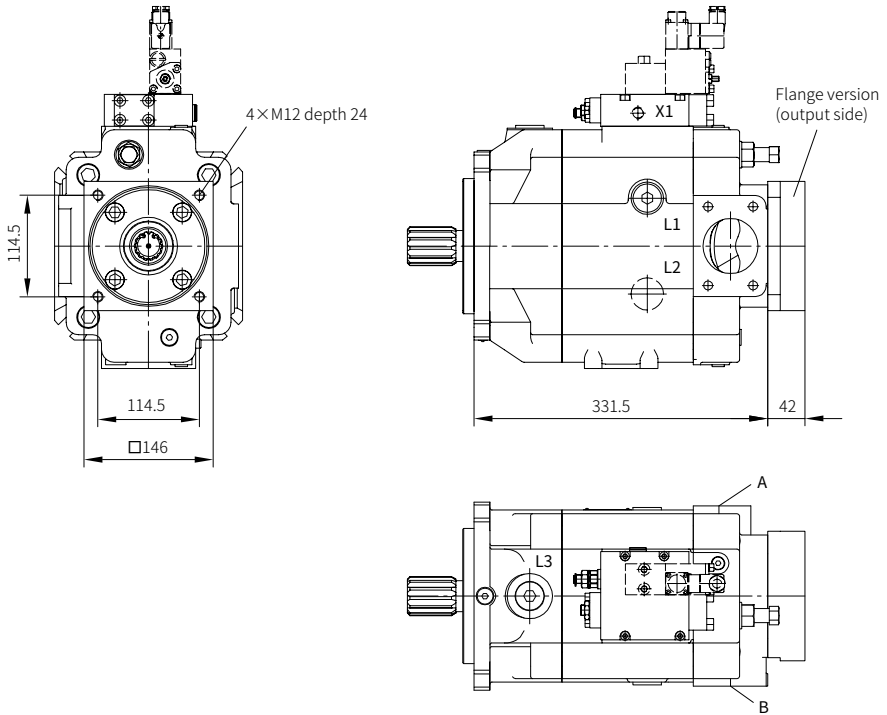
(SAE-D 4-hole J 744)

(152-4 ISO 3019-1)



4.1.2 Type V30E-160

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



Rotating direction **clockwise**

A = pressure port

B = suction port

Rotating direction **anti-clockwise**

A = suction port

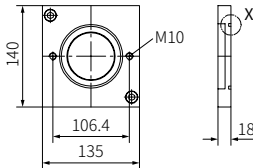
B = pressure port

4.1.2 Type V30E-160

Flange version (output side)

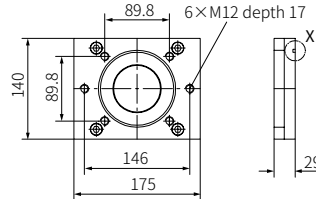
Coding C221 and C222

(SAE-A 2-hole)



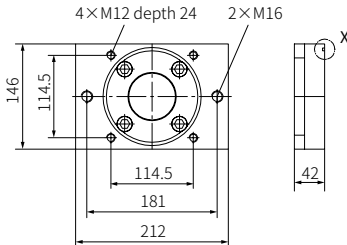
Coding C224 and C225

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



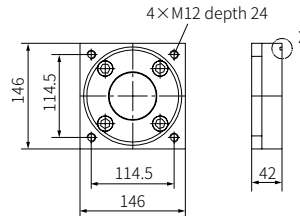
Coding C227

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



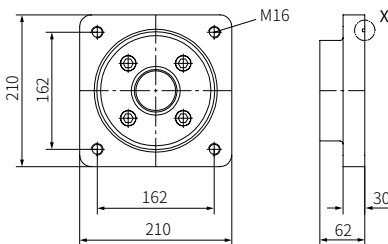
Coding C228

(SAE-C 4-hole)



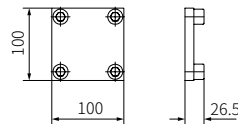
Coding C230

(SAE-D 4-hole)

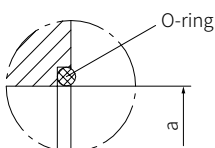


Coding C248

(prepared for thru-shaft (cover))



Detail X

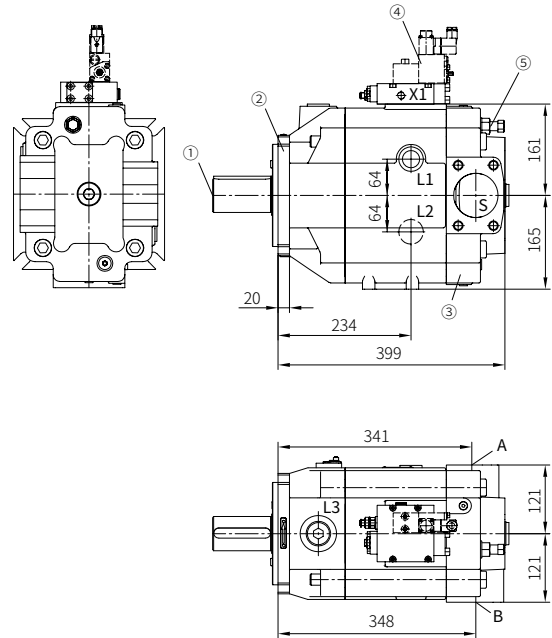


V30E-160	Sealing ring	a
C221, C222	Ø84x2	Ø82.55 ^{+0.03} / _{+0.01} 7 deep
C224, C225	Ø103x2	Ø101.6 ^{+0.03} / _{+0.01} 11 deep
C227, C228	Ø132x2	Ø127 ^{+0.08} / _{+0.04} 14 deep
C230	Ø164x3	Ø152.4 ^{+0.08} / _{+0.04} 14 deep

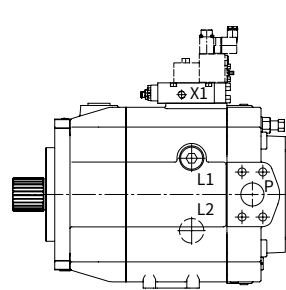
Sealing ring included in the items supplied.

4.1.3 Type V30E-270

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



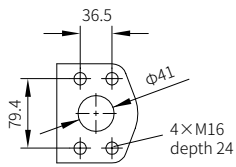
Rotating direction **anti-clockwise**
(viewed from shaft journal)



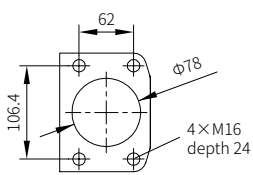
- 1 Shaft version
- 2 Flange version
- 3 Housing version
- 4 Controller
- 5 Stroke limitation
(approx. 15 ccm/rev)

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

Pressure port
SAE 1 1/2" (6000 psi)



Suction port
SAE 3" (3000 psi)



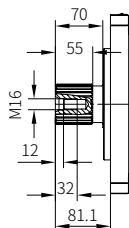
4.1.3 Type V30E-270

Shaft versions

Spline shaft

Coding D

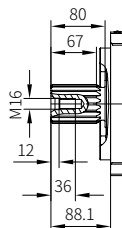
(DIN 5480 W60×2×28×9g)



Spline shaft

Coding S

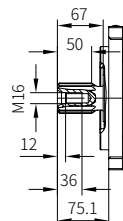
(17T 8/16DP)



Spline shaft

Coding U

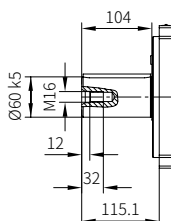
(SAE-D J 744 13T 8/16DP)



Key shaft

Coding K

(DIN 6885 Ø60 - 18×11×100)

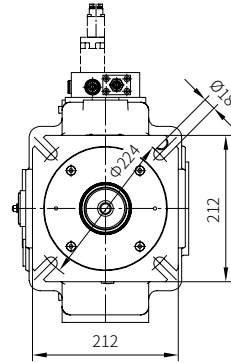
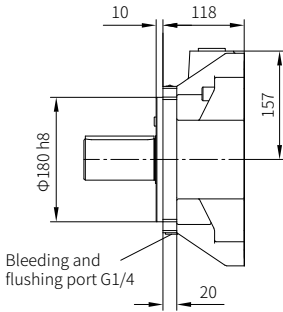


4.1.3 Type V30E-270

Flange versions

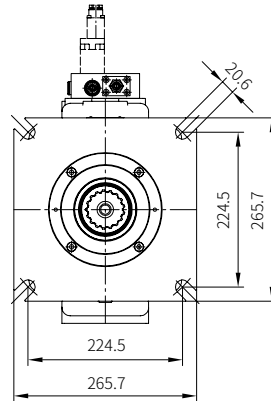
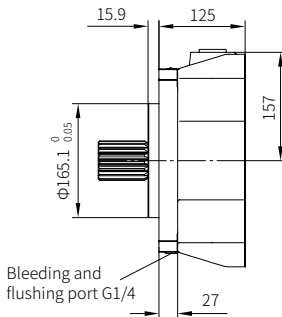
Coding G

(180 B4 HW ISO 3019-2)



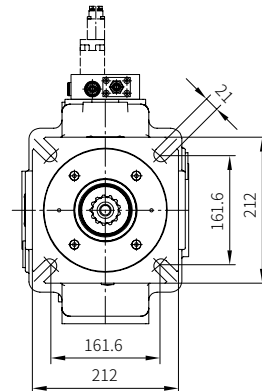
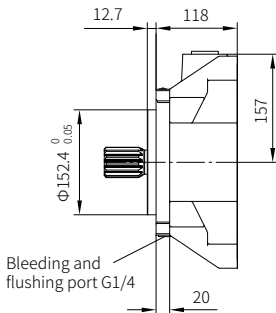
Coding F

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



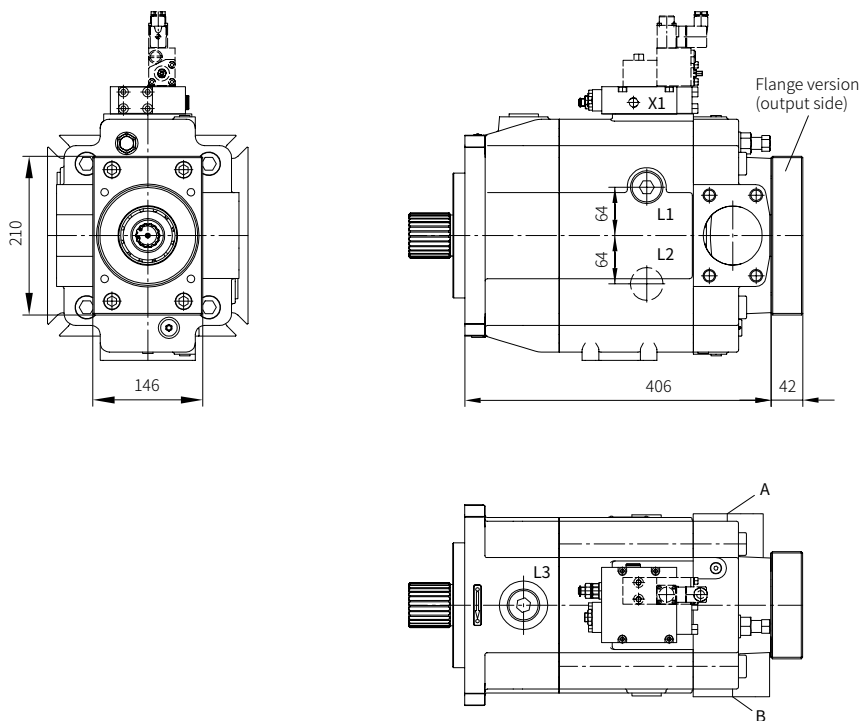
Coding W

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



4.1.3 Type V30E-270

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



Rotating direction **clockwise**

A = pressure port

B = suction port

Rotating direction **anti-clockwise**

A = suction port

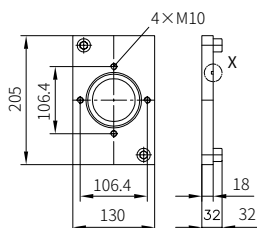
B = pressure port

4.1.3 Type V30E-270

Flange version (output side)

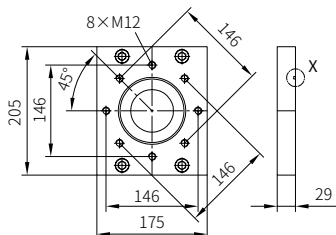
Coding C231 and C232

(SAE-A 2-hole)



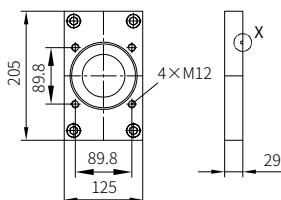
Coding C234

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



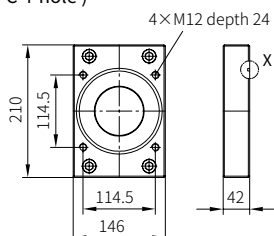
Coding C235

(SAE-B 4-hole)



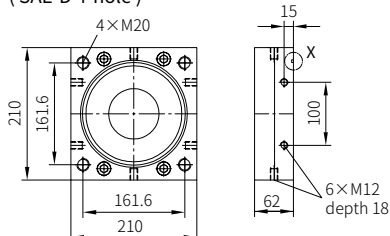
Coding C238

(SAE-C 4-hole)



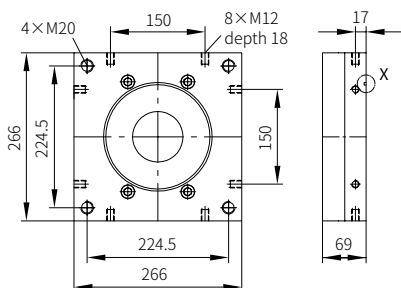
Coding C240

(SAE-D 4-hole)



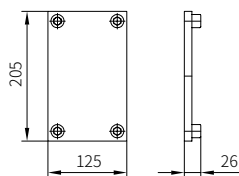
Coding C241

(SAE-E 4-hole)

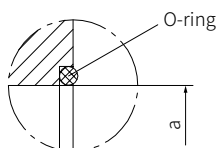


Coding C249

(prepared for thru-shaft (cover))



Detail X

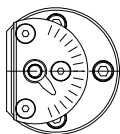


V30E-270	Sealing ring	a
C231, C232	Ø84x2	Ø82.55 ^{+0.03} _{+0.01} 7 deep
C234, C235	Ø103x2	Ø101.6 ^{+0.03} _{+0.01} 11 deep
C238	Ø132x2	Ø127 ^{+0.08} _{+0.04} 13 deep
C240	Ø164x3	Ø152.4 ^{+0.08} _{+0.04} 13 deep
C241	Ø167x3	Ø165.1 ^{+0.08} _{+0.04} 16 deep

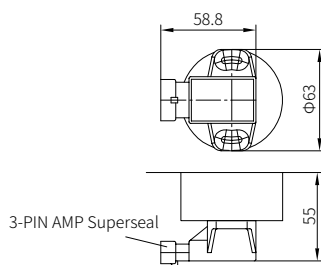
Sealing ring included in the items supplied.

4.2 Pivoting angle indicator

Pivoting angle indicator

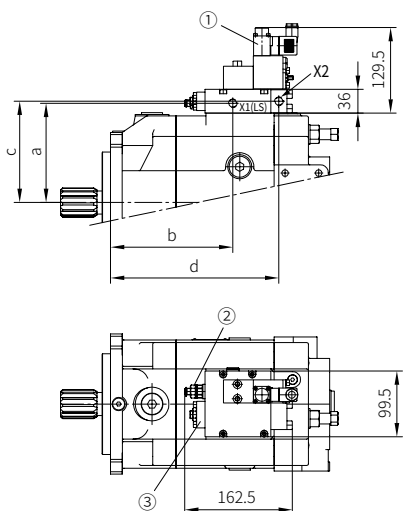


With pivoting angle pick-up (Hall sensor)



4.3 Controller

Coding Pb and LSPb

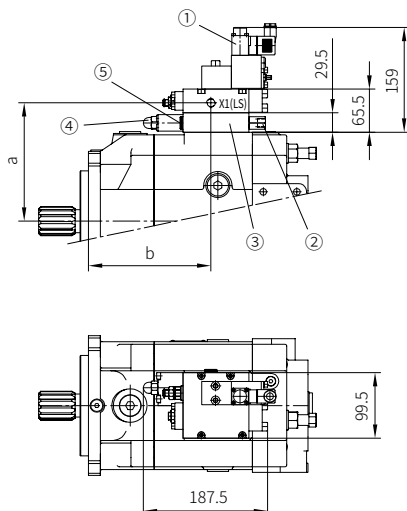


- 1 Prop. pressure-limiting valve type PMVPS 4 according to D 7485/1
- 2 Pressure setting (pressure controller)
- 3 LSP: setting of LS stand-by pressure;
N: setting of $p_{\max}$

	a	b	c	d
V30E-095	135	151	138	220.75
V30E-160	150	185	153	254.75
V30E-270	176	223.5	170	293.25

	Ports (ISO 228/1)
LS, X1, X2	G 1/4

Coding Lf and Lf1

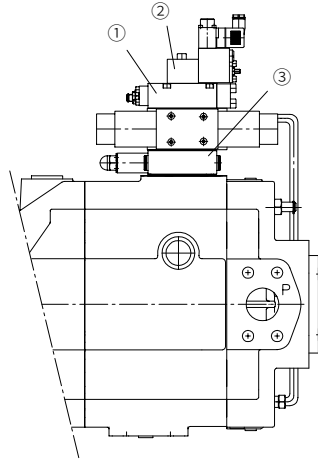
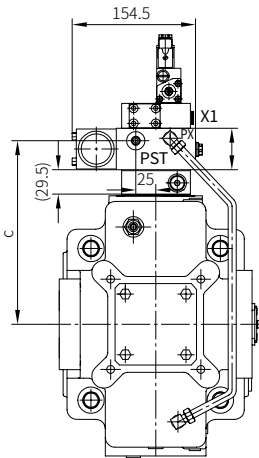


- 1 Prop. pressure-limiting valve type PMVPS 4 according to D 7485/1
- 2 Port f1 closed in case of Lf
- 3 Power controller (intermediate plate)
- 4 Power setting
- 5 Port f closed in case of Lf1

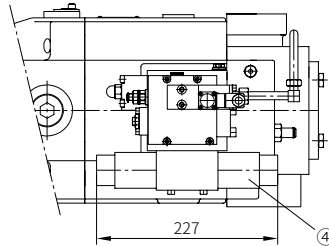
	a	b	Power change/ revolution
V30E-095	164.5	151	140Nm
V30E-160	179.5	185	240Nm
V30E-270	205.5	223.5	400Nm

4.3 Controller

Coding EM... and 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!

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

4.4 Pump combinations

4.4.1 Tandem pumps

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 9

Order coding example

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

① : 1st pump

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

② : 2nd pump

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

The image shows a technical drawing of two tandem pumps, labeled "1. pump" and "2. pump". The drawing includes two views: a side view and a front view. The side view shows the pumps connected by an intermediate flange. Dimensions are indicated as follows: 'a' is the length of the first pump, 'b' is the length of the intermediate flange, 'c' is the length of the second pump, and 'd' is the total length of the assembly. The front view shows the pumps from the front, with dimensions 'e' and 'f' indicating the width of the first and second pumps respectively, and 'g' and 'h' indicating the width of the first and second pumps respectively.

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4.4.1 Tandem pumps

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

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-160 ..DG..-1-..-02	C 255	331.5	47	296.5	675	289.5	341.5	276.5	341.5								
V30E-160 ..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

1st pump	Coding	V30E-270 ..DG..-2-..-02								V30E-270 ..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 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

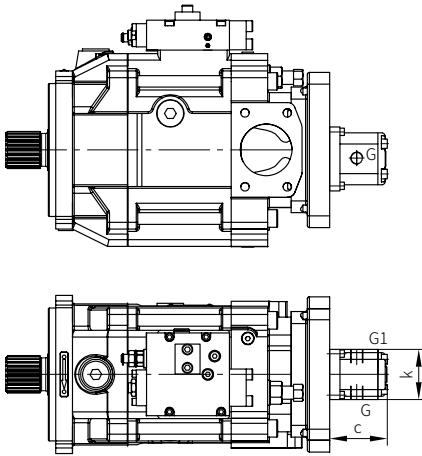
A directly mounted auxiliary or additional gear pump is available.

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 R K G N 2 -1 -XX /LSP 280 -C211 -Z02 -9

V30E basic pump



Coding	Geometric displacement V_g (cm ³ /rev.)	Auxiliary pump for	Suction port	Pressure port	c	k
Z 02-6	6.0	V30E-095			91	86
Z 02-9	8.40	V30E-160			95	86
Z 02-11	10.80	V30E-270			99	86

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 Installation information

5.1 General information

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

The following essential points must be noted when installing the pump:

Mounting and removal of the pump and attached components may be performed by trained persons only. Ensure absolute cleanliness during all work. Contamination may have an adverse effect on the function and lifetime of the pump.

- Remove all plastic plugs prior to initial operation.
- Avoid installing the motor above the tank
(see [Chapter 5.3, "Installation positions"](#)).
- Observe the reference values in Section .
- Prior to initial operation, fill the pump with oil and bleed.
Automatic pump filling via the suction line by opening the drain ports is not possible.
- Prevent the pump and suction line from running dry.
- Always ensure a constant supply of oil.
Even a brief shortage in the supply of hydraulic fluid to the pump may damage internal parts.
This may not be immediately evident after initial operation.
- The hydraulic oil returning to the tank from the system must not be sucked back in immediately (baffles).
- Run the pump for approx. 10 minutes at max. 50 bar after initial operation.
- Thorough bleeding/flushing of the entire system is recommended before the full pressure range is used.
- Observe the max. permissible operating range temperatures (see [Chapter 3, "Parameters"](#)) at all times.
- Always comply with the specified oil purity classes (see [Chapter 3, "Parameters"](#));
provide appropriate hydraulic fluid filtering.
- Use of a filter in the suction line must be approved by InLine Hydraulik.
- Include a main pressure-limiting valve in the pressure line to limit the max. system pressure.
- For tandem pump, which supply into common high pressure line, it's recommended to install check valve at each pump, close to pump pressure port, to avoid any recirculation of oil.

5.2 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 [Chapter 5.3, "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 16mm. 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 5.3, "Installation positions"](#).

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

LS port for version 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 LSPT, relief takes place internally in the controller.

5.2 Ports

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

- The tank is above the pump
- The tank 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

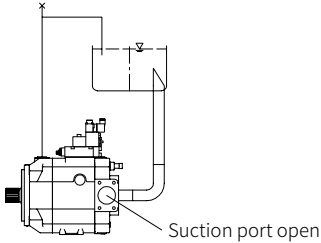
- The tank is above the pump
- The tank temperature does not exceed 70°C
- The fluid velocity in the suction line is below 1 m/s
- Pump pressure maximum 300 bar
- Possible without bearing flushing

5.3 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)

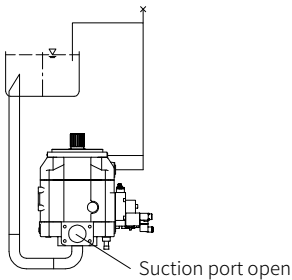
For horizontal installation, use the uppermost drain port.



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 1/4" (BSPP) bleeding port on the pump flange. Take appropriate measures to ensure continuous bleeding of this line (line routing/bleeding).

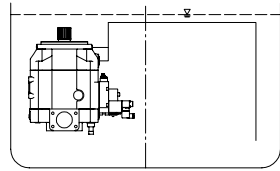
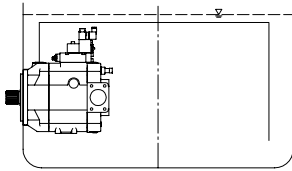
For installation with the pump flange facing downwards, please contact InLine Hydraulik.



5.4 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.



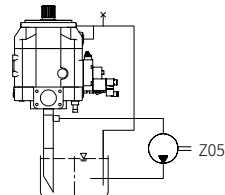
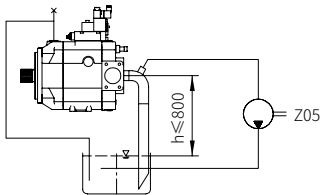
Additional notes regarding installation above the fill level

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.
- A gear pump must 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](#).

6 Installation, operation and maintenance information

6.1 Designated use

This fluid-power product has been designed, manufactured and tested using standards and regulations generally applicable in the European Union and left the plant in a safe and fault-free condition. To maintain this condition and ensure safe operation, operators must observe the information and warnings in this documentation.

This fluid-power product must be installed and integrated in a hydraulic system by a qualified specialist who is familiar with and adheres to general engineering principles and relevant applicable regulations and standards.

In addition, application-specific features of the system or installation location must be taken into account if relevant.

This product may only be used as a flow control valve as a pump within oil-hydraulic systems.

The product must be operated within the specified data. This documentation contains the technical parameters for various product versions.



Note:

Non-compliance will void any warranty claims made against InLine Hydraulik.

6.2 Assembly information

The hydraulic accumulator must be integrated in the system via state of the art connection components (screw fittings, hoses, pipes, etc.). The hydraulic system must be shut down as a precautionary measure prior to dismantling; this applies in particular to systems with hydraulic accumulators.

6.3 Operating instructions

Product, pressure and/or flow settings

All statements in this documentation must be observed for all product, pressure and/or flow settings on or in the hydraulic system.



Caution:

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

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

Filtering and purity of the hydraulic fluid

Soiling in the fine range, e.g. abraded material and dust, or in the macro range, e.g. chips, rubber particles from hoses and seals, can cause significant malfunctions in a hydraulic system. It is also to be noted that new hydraulic fluid "from the drum" does not necessarily meet the highest purity requirements.

For trouble-free operation pay attention to the purity of the hydraulic fluid (see also purity class in [Chapter 3, "Parameters"](#)).

6.4 Maintenance information

This product is largely maintenance-free.

Conduct a visual inspection to check the hydraulic connections for damage at regular intervals, but at least once per year. If external leaks are found, shut down and remedy.

Check the device surfaces for dust deposits at regular intervals (but at least annually) and clean the device if required.

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