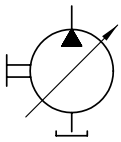
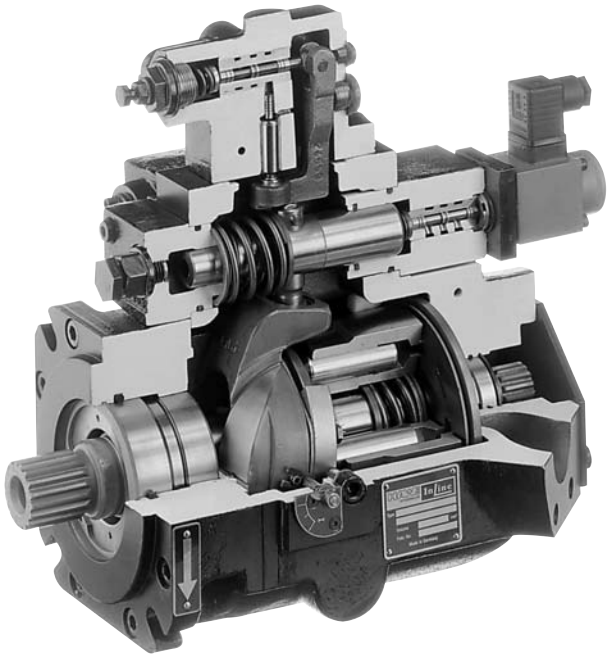
# Variable displacement axial piston pump type V30D

**for open circuit**

InLine

Pressure $p_{max}$ = 420 bar (6000 psi)
Displacement $V_{max}$ = 260 $cm^3$/rev (16.16 cu in/rev)







## 1. General description

The axial piston variable displacement pumps of the type V30 of D offer extremely high function safety. Its remarkably low noise levels, the high pressure rating (peak = 420 bar / perm. = 350 bar), the low weight/performance ratio as well as the wide controller range make it possible to employ it for most industrial and mobile applications. The variable displacement pumps work according to the swash plate principal: 9 pistons operate in a rotating cylinder cavities where they fulfill one suction and one pressure stroke per rotation.
Opening and closing of the cylinder cavities is via openings in the control disc. The axial movement of the pistons is provided by an adjustable swash plate. The setting angle (0 - max) can be steplessly varied in proportion to the desired displacement/flow. The setting range can be mechanically limited by setting screws (with V and VH controller only fixed limitation is possible). The position of the swash plate can be controlled via a visual mechanical indicator.
The latest knowledge and experience with regard to noise reduction has been used in the development of this pump design. V30D is therefore rather quiet, even when taken to the limit. All components used in the V30D are manufactured from high grade materials and machined with close tolerances.
The wide range of modular controllers along with a thru-shaft (option for mounting auxiliary pumps or a second V30D) open up a wide range of application possibilities.
Therefore type V30D features a pump design, which ideally suits the special requirements of modern industrial and mobile hydraulic drive systems

**Outstanding design features:**

- Low specific weight
- Very fast response times due to low mass moment of inertia of the setting unit
- Special swash plate bearing helps reduce noise
- New design of the hydrostatically balanced steel slipper shoes running on a bronze plate improves the life of typical wearing parts
- Valve plate made from steel provides high wear resistance. Carefully designed dampening slots result in exceptionally low noise level
- Large shaft bearings provide long life

**The most important advantages :**

- Low noise level, whereby secondary measures to reduce noise often are not necessary
- Controller assemblies have been designed on a modular basis and can be installed without dismantling the basic pump
- Thru- shaft allows tandem pump combinations and mounting of auxiliary pumps of all kinds (see sect. 5)
- Swash plate dial indicator provides visual indication of displacement and can also be used to provide feedback information in control systems

# 2. Available versions, main data (see also drawings page 4)

**Calculation:**

Unit conversion, see page 12 below

Flow rate

$$Q = \frac{V_g \cdot n \cdot \eta_v}{1000} \text{ (lpm)}$$

Torque

$$M = \frac{1{,}59 \cdot V_g \cdot \Delta p}{100 \cdot \eta_{mh}} \text{ (Nm)}$$

Power

$$P = \frac{2\pi \cdot M \cdot n}{60\,000} = \frac{M \cdot n}{9549} = \frac{Q \cdot \Delta p}{600 \cdot \eta_t} \text{ (kW)}$$

$V_g$ = Displacement [cm³/rev]
$\Delta p$ = Diff. pressure [bar]
$n$ = Speed [rpm]

$\eta_v$ = Volumentric efficiency
$\eta_{mh}$ = Mechanical efficiency
$\eta_t$ = Total efficiency ($\eta_t = \eta_v \times \eta_{mh}$)

Order example: **V30D - 095 R K N - 1 - 1 - XX/LN - 2/120 - 200**

- Basic type
- Direction of rotation: **L** = Left hand, **R** = Right hand (facing the drive shaft)
- Shaft: **D** = Spline shaft (DIN 5480), **K** = Key shaft, **S** = Spline shaft and flange SAE
- Shaft seals: **N** = NBR (Nitril), **E** = EPDM [2], **V** = FKM (Viton) [2]
- Shaft design: **1** = Standard, **2** = Thru-shaft (see also sect. 5)
- Swash angle indicator: **0** = without indicator, **1** = with indicator
- HAWE serial no.
- see tab. 2 below
- Special versions: [5] **1** = Prepared for L-controller, **2** = With stroke limitation
- Torque setting in Nm [3] (1 Nm = 0.741 lbf ft) (alternative power in kW and speed in rpm as additional text)
- Pressure (bar) [4]

**Table 1:** Designation

| Coding | 045 | 075 | 095 | 115 | 140 | 160 | 250 |
|---|---|---|---|---|---|---|---|
| Displacement cm³/rev. (cu. in./rev.) | 45 (2.75) | 75 (4.58) | 96 (5.86) | 115 (7.02) | 142 (8.66) | 164 (9.90) | 260 [6] (16.16) |
| Flow (theor.) at 1450rpm[lpm] (1800 rpm [gpm]) | 65 (21.4) | 109 (35.7) | 139 (45.7) | 167 (54.7) | 206 (67.6) | 238 (77.3) | 356 (99.9) |
| Max. continuous pressure bar (psi) | 350 (5000) | 350 (5000) | 350 (5000) | 250 [1] (3600) [1] | 350 (5000) | 250 [1] (3600) [1] | 350 (5000) |
| Max. peak pressure bar (psi) | 420 (6000) | 420 (6000) | 420 (6000) | 300 [1] (4300) [1] | 420 (6000) | 300 [1] (4300) [1] | 420 (6000) |
| Max. case pressure bar (psi) [2] | 1.0 (15) | 1.0 (15) | 1.0 (15) | 1.0 (15) | 1.0 (15) | 1.0 (-) | 1.0 (15) |

[1] Higher pressure is only possible with reduce displacment
[2] Special versions
[3] Spec. required with controller coding L, LF1
[4] Spec. required with controller coding N, LSN
[5] Combinations are possible (-1-2)
[6] See foot note [2], page 5

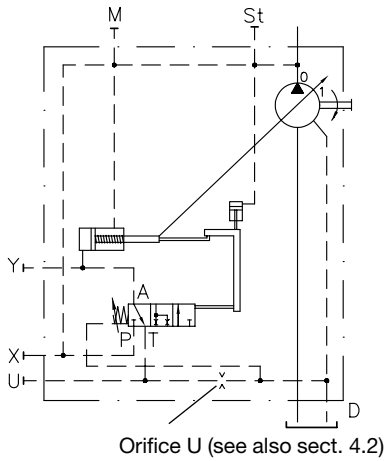
**Table 2:** Controller

| Coding | Description |
|---|---|
| **L** | The V30D pump with power controller is used in applications with highly varying pressure demands and where it is important to protect the electric motor (engine) from overload. The controller limits the hydraulic power (at constant shaft speed) according to the ideal curve “pressure x flow = constant”. The product of pressure and flow cannot exceed the pre-set power value. If, for example, the pressure doubles (at max power) the flow is automatically reduced by 50%. |
| **Lf1** | Means that there is a hydraulic displacement limiter included. The displacement can be reduced by a pilot pressure from an outside source. |
| **LS** | Load-Sensing-Controller<br>This controller is designed for load sensing systems utilizing a suitable directional control valve. |
| **LSN** | Like coding LS, but with additional pressure limitation |
| **N** | Pressure controller, adjustable directly at the pump.<br>Pressure controller automatically mainains a constant system pressure independant of the required flow. Therefore it is suited for constant pressure systems, where differing flow is required or as efficient pressure limitation of the hydraulic system. |
| **P** | Remotely adjustable pressure setting; the pressure is set with a pilot relief valve. The pilot relief can be positioned up to 20 m (60 ft) from the pump. |
| **Pb** | Like coding N, recommended only for systems with tendency to oczillations (accumulator systems). Exterral lines are necessaery. |
| **Q** | The flow compensator maintains a constant flow, with small power losses, in spite of variations in shaft speed and ressure. The flow is determined by the size of the flow restrictor (see the schematic on the right). |
| **Qb** | This is a special version of the Q compensator above. It has been developed to meet the accuracy and response requirements of hydrostatic transmission for generator drives and similar applications. The flow restrictor should be installed close to the pump in the main high pressure line. Pressure is sensed before and after the flow restrictor and connected to the compensator with two external lines. This provides increased control accuracy. |
| **V** | The controller V is used to control flow or speed in electronic or computer controlled systems. The V controller consists of a proportional solenoid acting on a servo valve that determines the position of the pump setting piston. The displacement of the pump is proportional to the current through the 24 VDC solenoid (about 250 - 750 mA). In order to minimize valve hysteresis, a pulse width modulated control signal of approx. 80-100 Hz frequency is recommended. |
| **VH** | The VH is a flow controller. It is similar to the V controller but the control signal is hydraulic. The required signal range is 7...32 bar (215...725 psi). The pump displacement is determined by the control signal (refer to the diagram). Pilot pressure can be supplied either from the system through a pressure reducing valve, or from an auxiliary pump. The pump should provide a pulsating flow of about 100 Hz; gear pump with 7 teeth and 750 rpm is recommended. If the system pressure is below 40...60 bar (580...870 psi) (depending on size) a small auxiliary pump is required to secure proper functioning of the controller. |

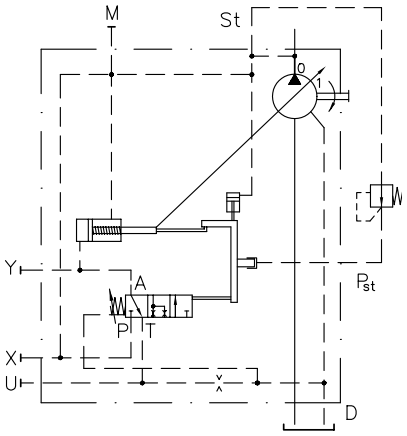
**Table 3:** Flow pattern

Variable displacement axial piston pump with controller

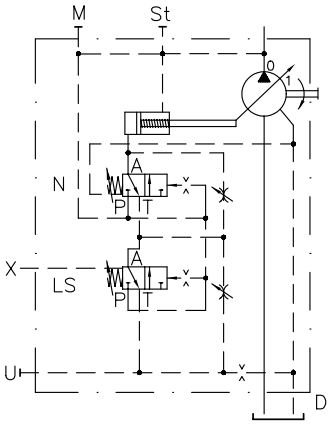
Coding **L**



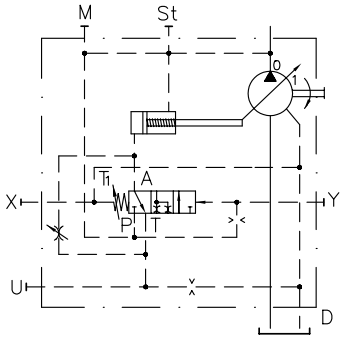

Coding **Lf1**



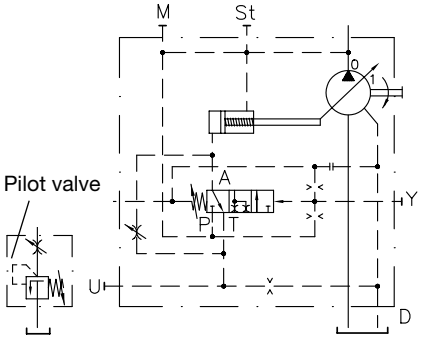

Coding **LS, LSN** [1]



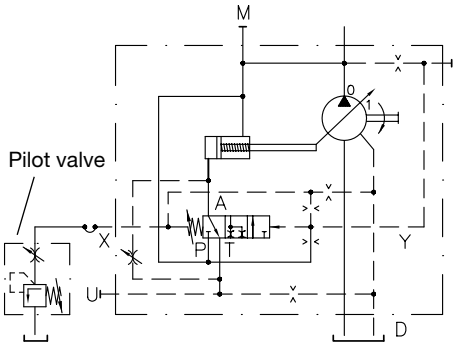

Coding **N**



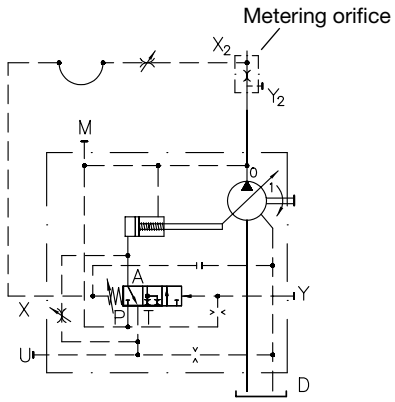

Coding **P**



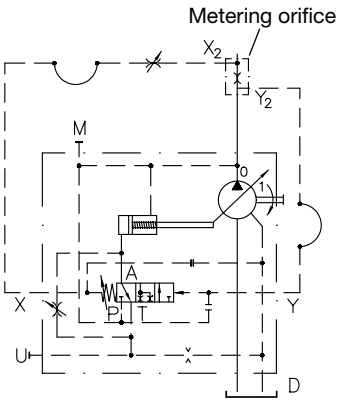

Coding **Pb**



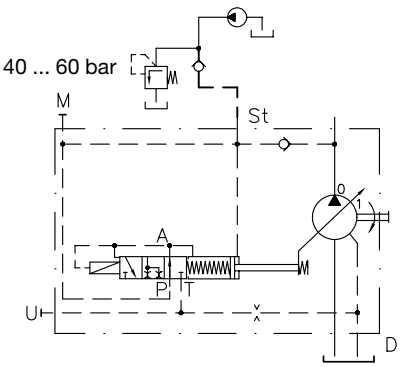

Coding **Q**



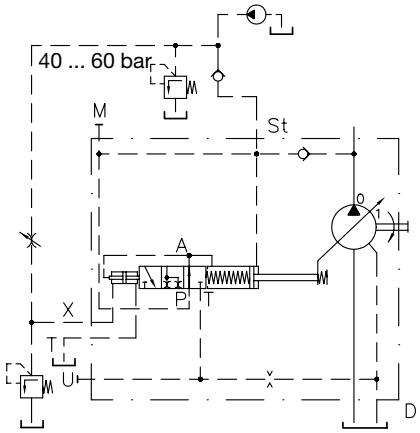

Coding **Qb**




Coding **V**




Coding **VH**

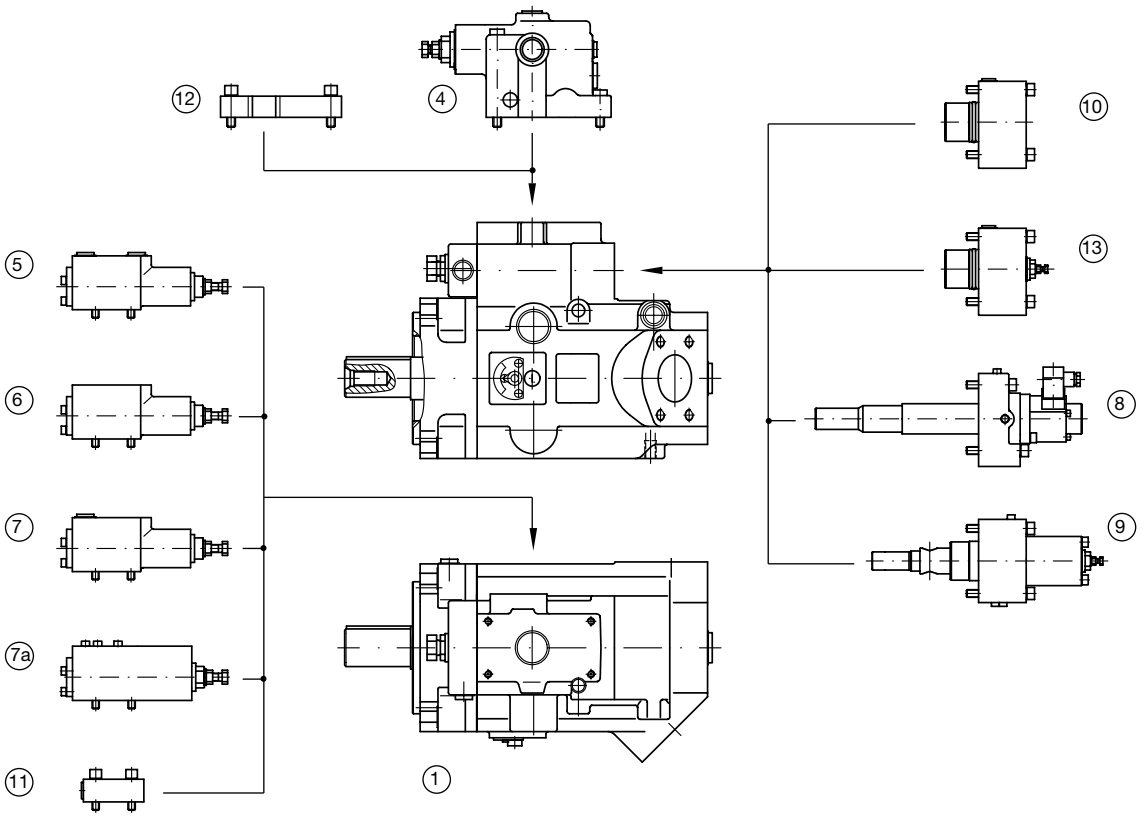



[1] The pressure limiting valve "N" is not available with type LS (version without pressure cut-off)

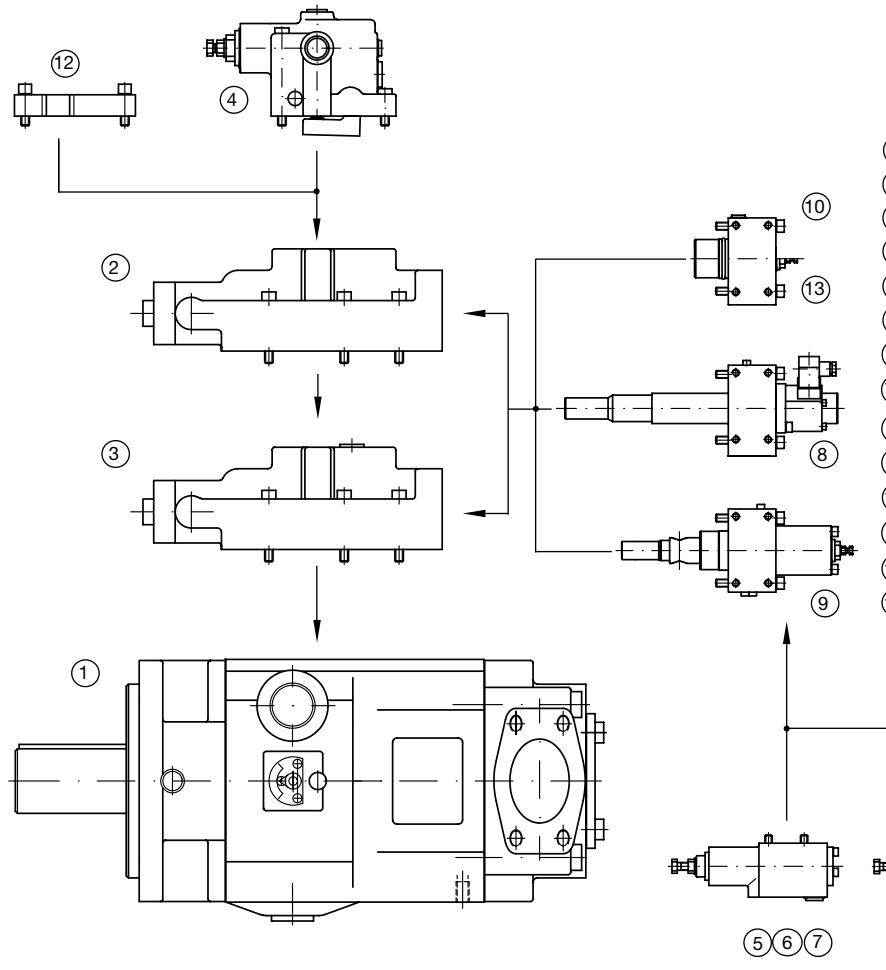
**Illustration controller range**

**Type V30D - 045 (075; 140; 160)**

(For position of controller for pumps type V30D-095 (115), see page 11!)




**Type V30D - 250**




1. Pump
2. Adaptor for controller L
3. Adaptor for all other controllers (standard)
4. Controller L, LF1
5. Controller N
6. Controller Qb
7. Controller Q, P, LS
7a. Controller LSN
8. Controller V
9. Controller VH
10. Blanking, when without V or VH
11. Blanking, when without N, P, Q, Qb, LS, LSN
12. Blanking, when without L
13. Blanking, when without V or VH but with stroke limitation

# 3. Additional versions

## 3.1 General

| | |
|---|---|
| Working principle | Variable displacement axial piston pump acc. to swash plate principle |
| Installation | Flange or brachet mounting |
| Direction of rotation | Right hand or left hand |
| Mounting position | Optional |
| Pressure fluid | Hydraulic fluid (DIN 51524 table 2 and 3); ISO VG 10 to 68 (DIN 51519)<br>Viscosity range: min. 10; max. 1000 $mm^2/s$,<br>optimal operation range: 10...35 $mm^2/s$<br>Also suitable are biodegradable pressure fluids of the type HEES (synth. Ester) at operation temperatures up to +70°C. |
| Temperatur | Ambient: -40 ... +60°C<br>Fluid: -25...+80°C, pay attention to the viscosity range!<br>Start temperature down to -40°C are allowable (Pay attention to the viscosity range during start!), as long as the operation temperature during consequent running is at least 20K (Kelvin) higher. |
| Filtration | Should conform to ISO standard 4406 coding 18/13. |
| Start-up | All hydraulic lines should be flushed with appropriate hydraulic fluid before start-up. The pump case should then be titled through the uppermost drain port. The drain line must be positioned so that the case is always filled during operation. At start-up and during the first few minutes of the operation the pressure relief valve should be adjusted to 50 bar (700 psi) or less. |

| Designation | | **045** | **075** | **095** | **115** | **140** | **160** | **250** |
|---|---|---|---|---|---|---|---|---|
| Max. swash plate angle | [°] | 17 | 17.5 | 17 | 20 | 17.5 | 20 | 17.5 |
| Min. inlet pressure (absolute), | bar | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| open circuit | (psi) | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| Self-priming speed at max swash plate angle and 1 bar (15 psi ) absolute inlet pressure | rpm | 2600 | 2400 | 2200 | 2000 | 2200 | 1900 | 1800 [2] |
| Max. speed (requires increased inlet pressure) | rpm | 3600 | 3200 | 2900 | 2800 | 2600 | 2500 | 2000 |
| Min. continuous speed | rpm | 500 | 500 | 500 | 500 | 500 | 500 | 500 |
| Torque (theor.) at 1000 psi | Nm | 71 | 119 | 153 | 185 | 226 | 261 | 414 |
| | (lbf ft) | 35 | 61 | 78 | 93 | 115 | 132 | 203 |
| Input power at 250 bar and 1450rpm | kW | 30 | 50 | 64 | 77 | 95 | 109 | 174 |
| at 3000 psiand 1800 rpm | (hp) | 41 | 68 | 87 | 105 | 129 | 148 | 237 |
| Weight (approx. kg) without controller | | 40 | 60 | 70 | 70 | 85 | 85 | 130 |
| (approx. lbs) | | 88 | 132 | 154 | 154 | 187 | 187 | 287 |
| (approx. kg) with controller | | 46 | 66 | 76 | 76 | 91 | 91 | 136 |
| (approx. lbs) | | 101 | 145 | 168 | 168 | 201 | 201 | 300 |
| Moment of inertia | kg $m^2$ | 0.0056 | 0.0124 | 0.0216 | 0.0216 | 0.03 | 0.03 | 0.0825 |
| | (ft. lbs. $sec^2$) | 0.0041 | 0.0092 | 0.016 | 0.016 | 0.022 | 0.022 | 0.061 |
| L10 bearing life at 250bar (1450 rpm) | (h) | 31000 | 20000 | 17000 | 10000 | 17000 | 10000 | 23000 |
| or 3600 psi (1800 rpm) and max. displacement | (h) | 25000 | 16000 | 14000 | 8000 | 14000 | 8000 | 19000 |
| Max. dynamic torque | | | | | | | | |
| Spline shaft (D) input | Nm | 550 | 910 | 1200 | 1200 | 1700 | 1700 | 3100 |
| | (lbf ft) | 405 | 670 | 885 | 885 | 1250 | | 2285 |
| Spline shaft (D) output | Nm | 275 | 455 | 600 | 600 | 850 | 850 | 1550 |
| | (lbf ft) | 205 | 333 | 445 | 445 | 625 | | 1145 |
| Key shaft (K) input | Nm | 280 | 460 | 650 | 650 | 850 | 850 | 1550 |
| | (lbf ft) | 205 | 340 | 480 | 480 | 630 | 630 | 1145 |
| Spline shaft (S) input | Nm | 500 | 500 | 1200 | 1200 | 1200 | 1200 | 1200 |
| | (lbf ft) | 370 | 370 | 885 | 885 | 885 | 885 | 885 |
| Spline shaft (S) output [1] | Nm | 275 | 455 | 600 | 600 | 850 | 850 | 1000 |
| | (lbf ft) | 205 | 335 | 445 | 445 | 625 | 625 | 740 |
| Noise level at 250 bar and (1450 rpm), | (dB(A)) | 72 | 74 | 75 | 75 | 76 | 76 | 77 |
| or 3600 psi and max. (1800 rpm) displacement (measured in a semi-anechoic room according to ISO 4412 measuring distance 1m) | (dB(A)) | 75 | 78 | 79 | 79 | 80 | 80 | 82 |

[1] (theoretical) Drive torque must not be exeeded

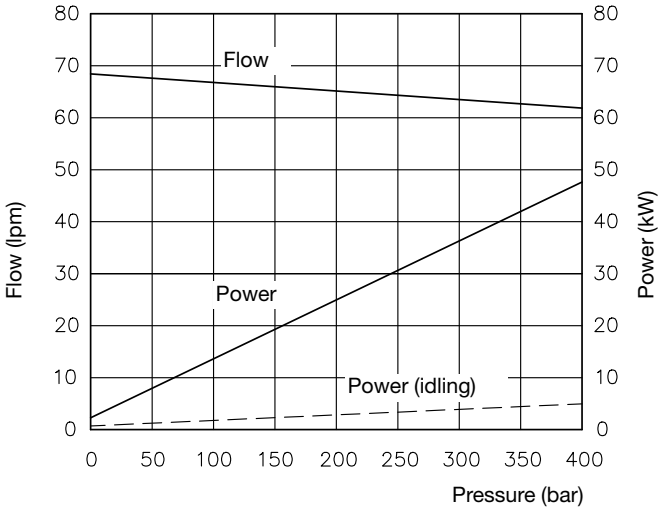
[2] The max. geometric displacement of 260 $cm^3$/rev can only be achieved up to a self sucking speed of 1600 rpm

## 3.2 Curves

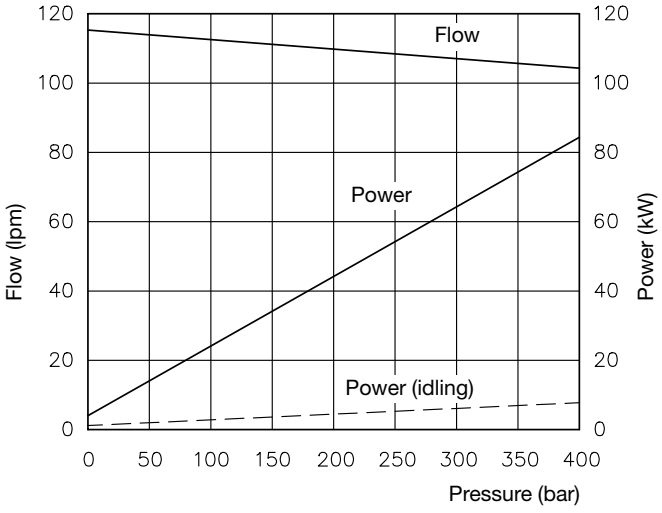
### 3.2.1 **Flow and Power** (basic pump)

The folloving diagrams show max. delivered flow vs. pressure (without controller).
Required input power at max. swash angle and required input power when the pump is operating at "idling". Shaft speed: 1450 rpm

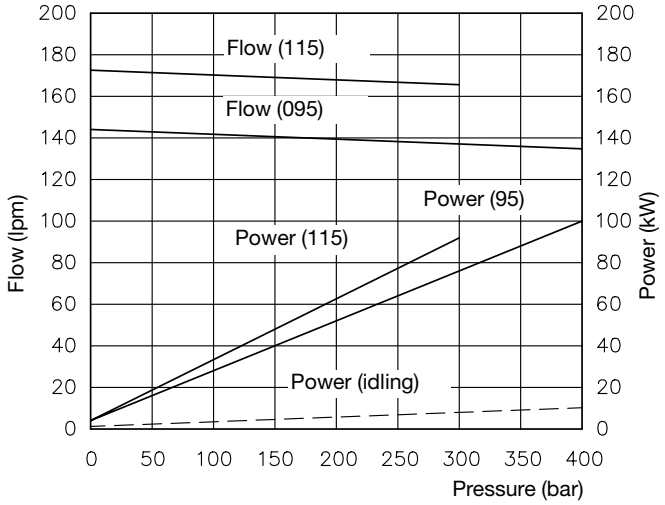
**Type V30D - 045**



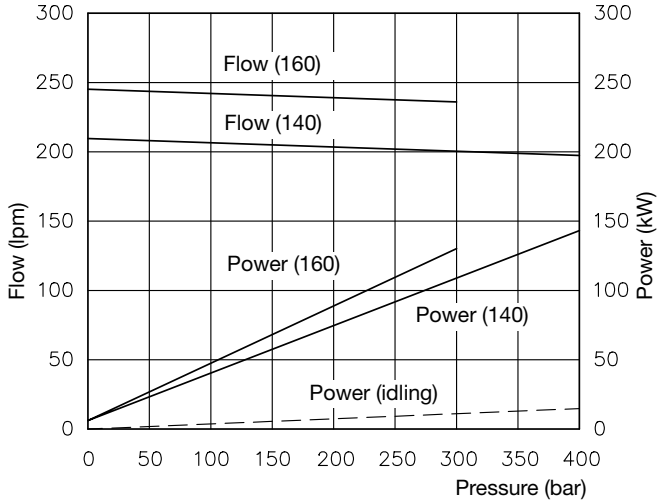

**Type V30D - 075**




**Type V30D - 095 (115)**



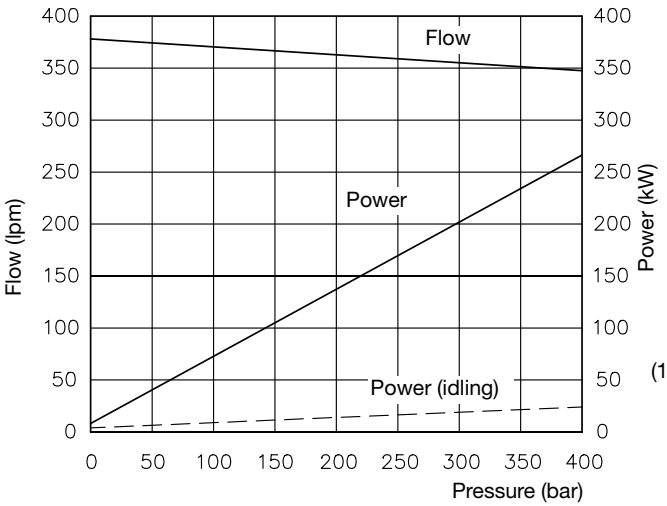

**Type V30D - 140 (160)**

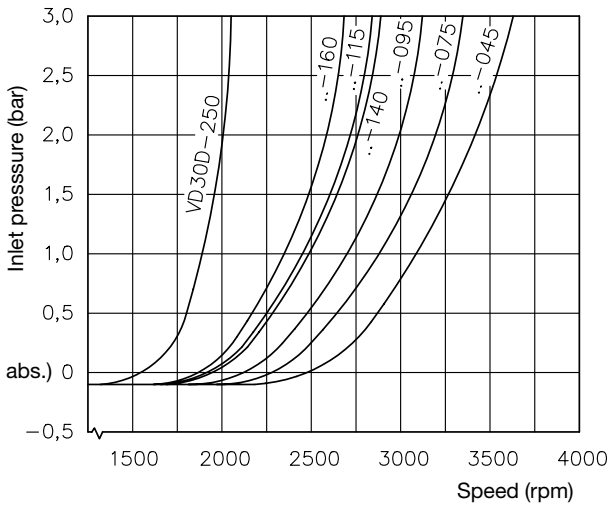



**Inlet pressure**

To avoid cavitation, it is essential to ensure that the pump inlet pressure always exceeds the min pressure shown in the diagram abowe. The diagram is valid for viscosities up to 75 mm²/s at max. swash plate angle

**Type V30D - 250**



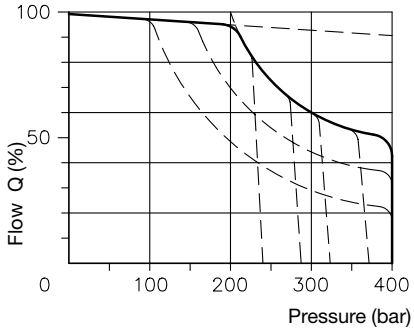



### 3.2.2 Controller-curves

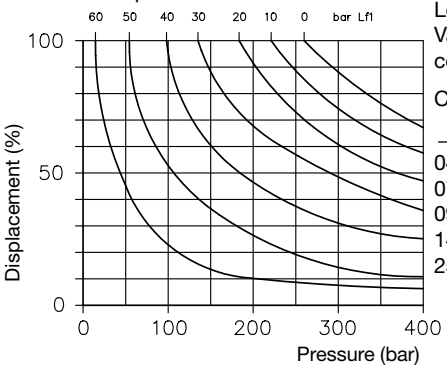
| Coding | Curves, notes |
|---|---|

**L**
**Lf1**
**Lf1**

Pressure / flow




Pilot pressure

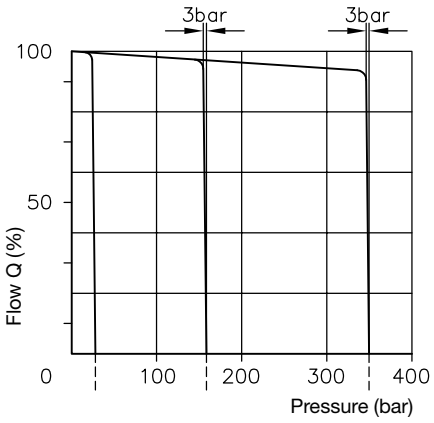



Lowest recommended torque setting:
Valid only for version with power controller without additional combination

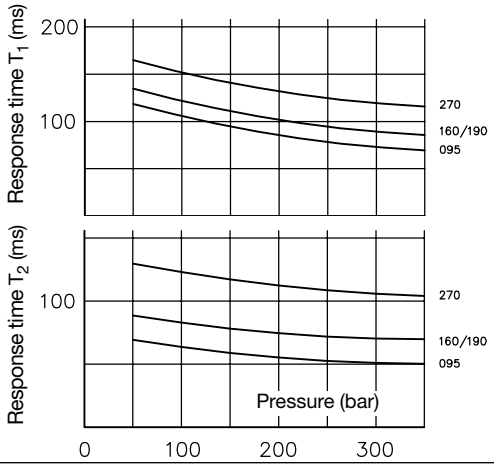
| Coding | Nm (lbf ft) | Power kW/rpm (hp/rpm) |
|---|---|---|
| 045 | 40 (29.5) | 6 /1500 (10/1800) |
| 075 | 70 (51.6) | 11/1500 (18/1800) |
| 095/115 | 99 (73.0) | 15/1500 (25/1800) |
| 140/160 | 146 (107.7) | 22/1500 (37/1800) |
| 250 | 271 (199.8) | 41/1500 (69/1800) |

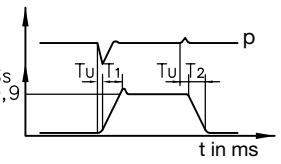
**N**
**P**
**Pb**

Pressure / flow




Response




$S_s$ = Displacement
$T_u$ = Delay < 3 ms
$T_1$ = Response time min to max
$T_2$ = Response time max to min
p = Pressure for hydraulic capacity 0.15 cm³ /bar (1.5 m pipe nom. dia. 20 mm)

**Q**
**Qb**
**LS**

Calculation of flow Q:

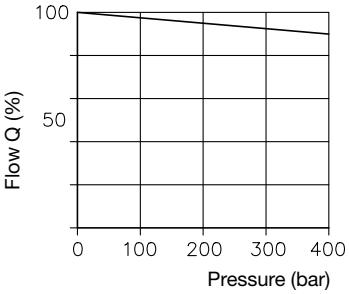
Q = $C \cdot A\sqrt{\Delta p}$ (lpm)
A = Size of orifice (mm²)
Δp = Pressure drop = 10 bar (LS = 30 bar)
= 145 psi (LS = 435 psi)
C = 0.6

Caracteristics:
Accuracy with max. flow:

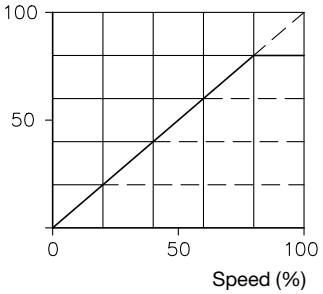
a) Speed “n” constant, pressure varying between 30 and 350 bar, (430 and 3600 psi): (< 3%)

b) Pressure “p” constant, speed varying (< 1%)

Speed constant

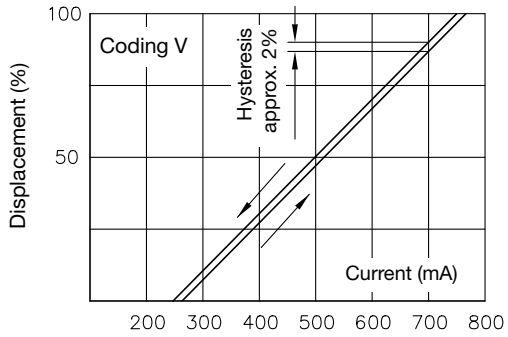



Speed varying

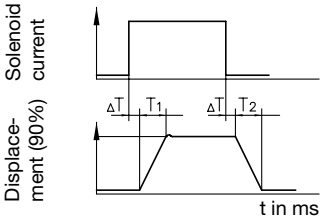



**V**
**VH**

Solenoid current /displacement

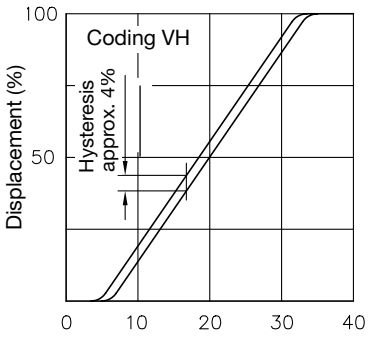



Response time

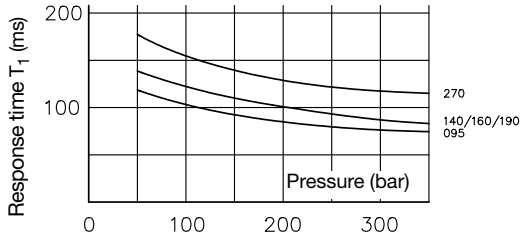


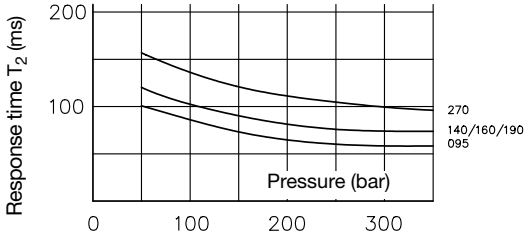

ΔT = Delay
$T_1$ = Response time min to max
$T_2$ = Response time max to min

Signal pressure/displacement




Response



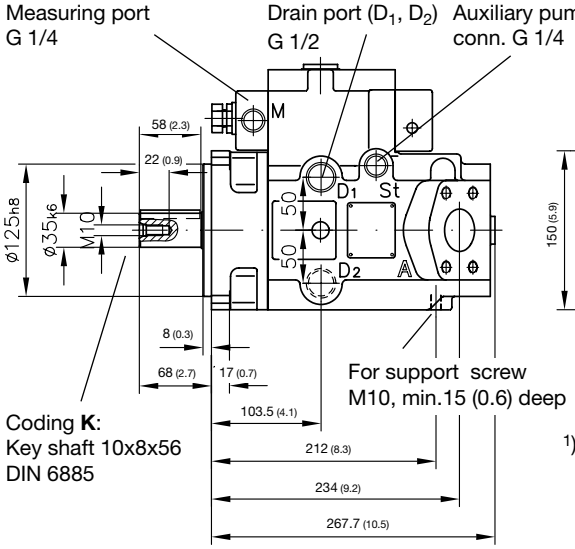



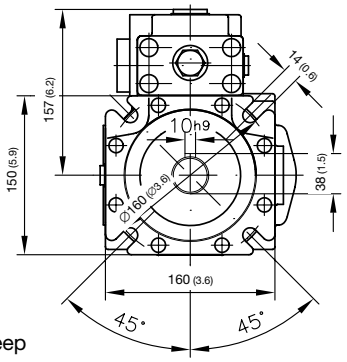
# 4. Unit dimensions All dimensions in mm, (inch) and subject to change without notice!

## 4.1 Basic pump

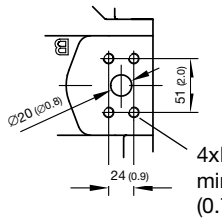
**Type V30D - 045** (Drawings shows clockwise rotation, ports A and B are located different with anti clockwise rotation, see foot note 1) )

(G = BSPP)

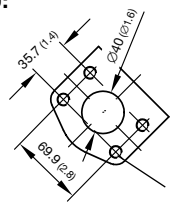



**View X:**

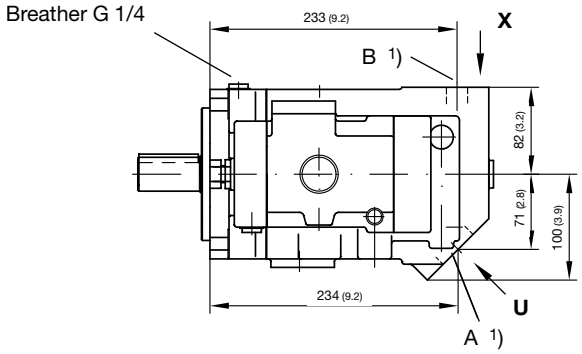


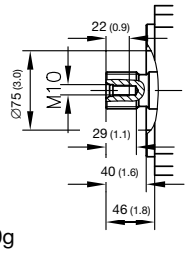

**View U:**



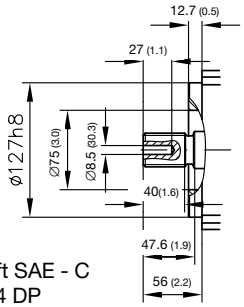

[1]) Clockwise rotation:
A = Suction SAE 1 1/2" (3000 psi)
B = Pressure SAE 3/4" (6000 psi)

Anti clockwise rotation:
A = Pressure SAE 3/4" (6000 psi)
B = Suction SAE 1 1/2" (3000 psi)



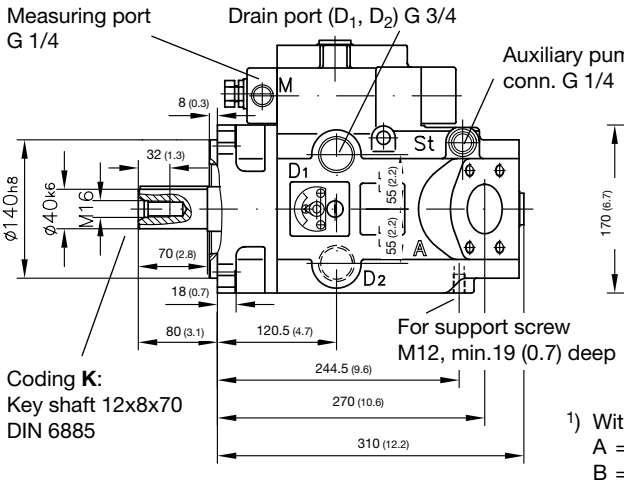



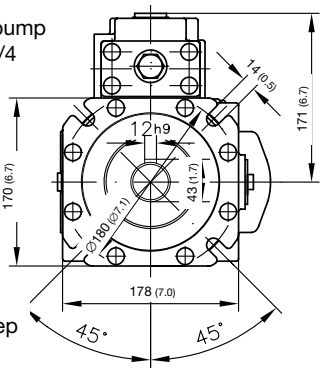

Coding **D**:
Spline shaft
W35x2x16x9g
DIN 5480



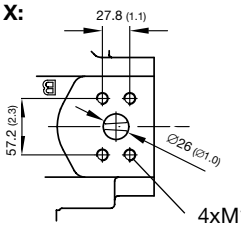

Coding **S**:
Spline shaft SAE - C
14T - 12/24 DP
Flat Root Side Fit
For flange, see foot note 1) page 12

**Type V30D - 075** (Drawings shows clockwise rotation, ports A and B are located different with anti clockwise rotation, see foot note 1) )

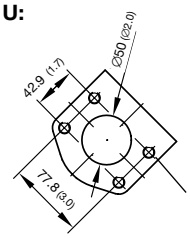



**View X:**

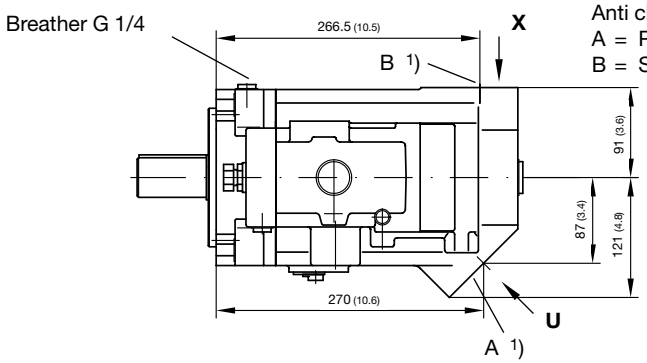


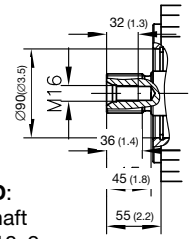

**View U:**



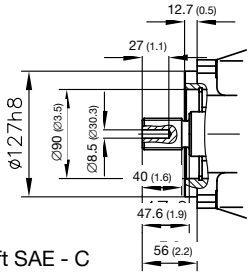

[1]) With right-hand rotation:
A = Suction SAE 2" (3000 psi)
B = Pressure SAE 1" (6000 psi)

Anti clockwise rotation:
A = Pressure SAE 1" (6000 psi)
B = Suction SAE 2" (3000 psi)



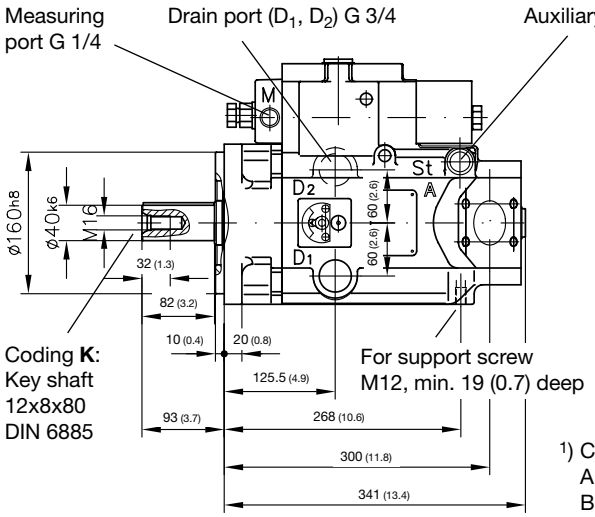




Coding **D**:
Spline shaft
W40x2x18x9g
DIN 5480




Coding **S**:
Spline shaft SAE - C
14T - 12/24 DP
Flat Root Side Fit
For flange, see foot note 1) page 12

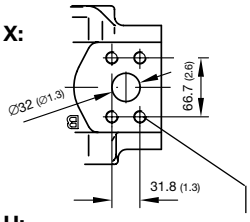
**Type V30D - 095 (115)** (Drawings shows clockwise rotation, ports A and B are located different with anti clockwise rotation, see foot note 1) )



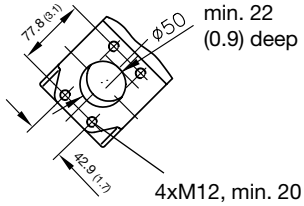

All dimensions in mm, (inch) and subject to change without notice!

(G = BSPP)

**View X:**

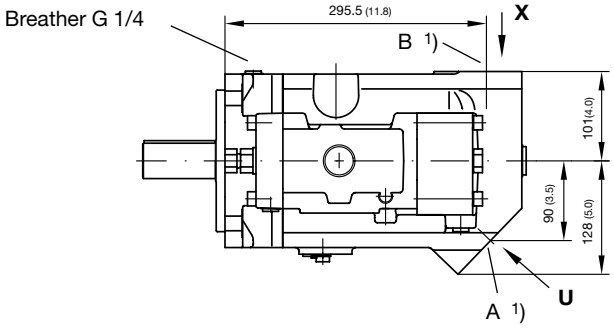


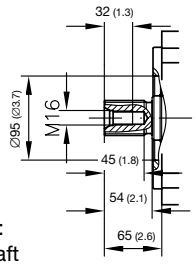

**View U:**



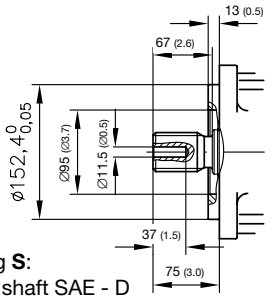

1) Clockwise rotation:
A = Suction SAE 2” (3000 psi)
B = Pressure SAE 1 1/4” (6000 psi)

Anti clockwise rotation:
A = Pressure SAE 1 1/4” (6000 psi)
B = Suction SAE 2” (3000 psi)



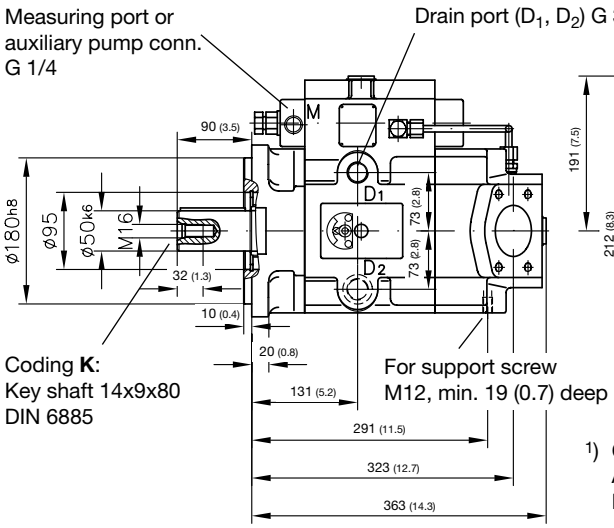




Coding **D**:
Spline shaft
W40x2x18x9g
DIN 5480

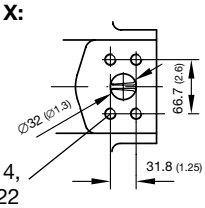



Coding **S**:
Spline shaft SAE - D
13T - 8/16 DP
Flat Root Side Fit
For flange, see foot note 1) page 12

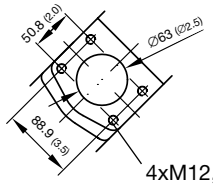
**Type V30D - 140 (160)** (Drawings shows clockwise rotation, ports A and B are located different with anti clockwise rotation, see foot note 1))




**View X:**

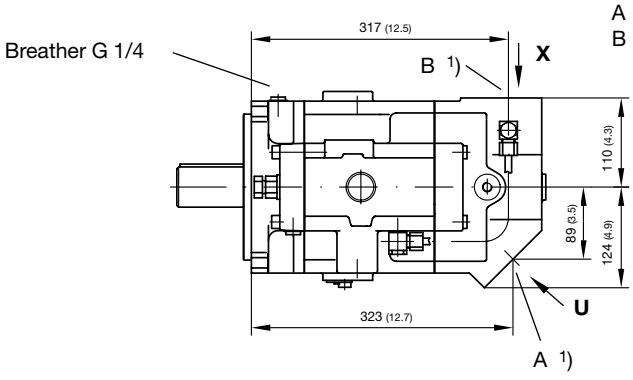


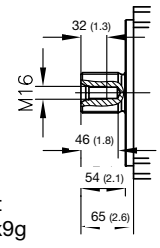

**View U:**



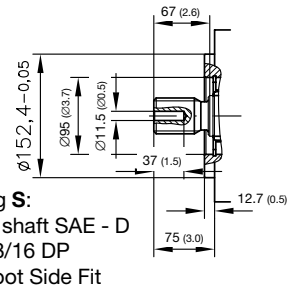

1) Clockwise rotation:
A = Suction SAE 2 1/2” (3000 psi)
B = Pressure SAE 1 1/4” (6000 psi)

Anti clockwise rotation:
A = Pressure SAE 1 1/4” (6000 psi)
B = Suction SAE 2 1/2” (3000 psi)




Coding **D**:
Spline shaft
W50x2x24x9g
DIN 5480

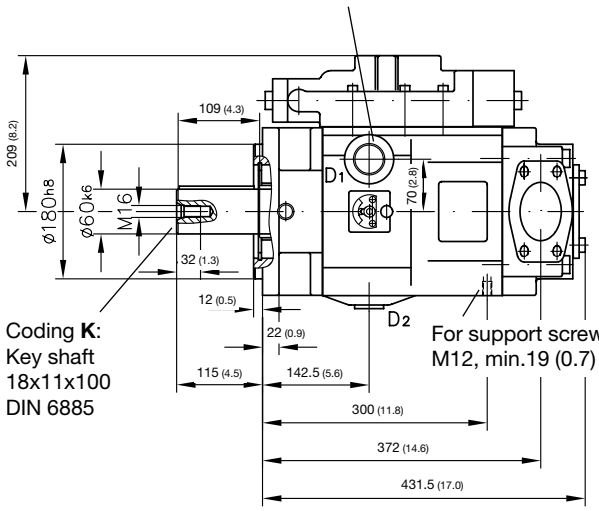


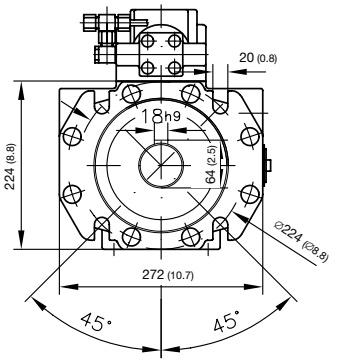

Coding **S**:
Spline shaft SAE - D
13T - 8/16 DP
Flat Root Side Fit
For flange, see foot note 1) page 12

**Type V30D - 250** (Drawings shows clockwise rotation, ports A and B are located different with anti clockwise rotation, see foot note 1) )

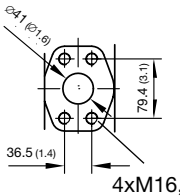
All dimensions in mm, (inch) and subject to change without notice!

(G = BSPP)

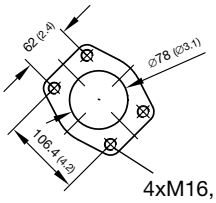



**View X:**

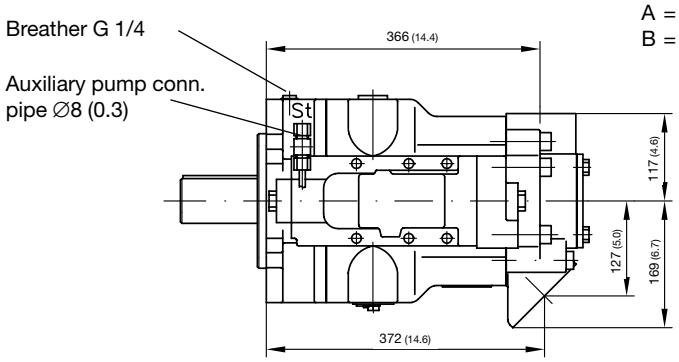


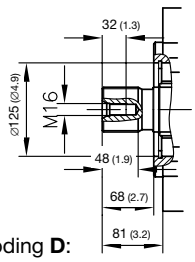

**View U:**

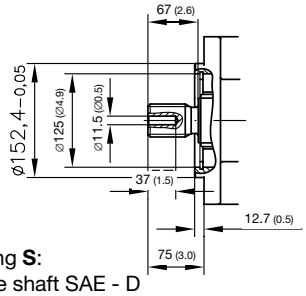



1) Clockwise rotation:
A = Suction port SAE 3" (3000 psi)
B = Pressure port SAE 1 1/2" (6000 psi)

Anti clockwise rotation:
A = Pressure port SAE 1 1/2" (6000 psi)
B = Suction port SAE 3" (3000 psi)



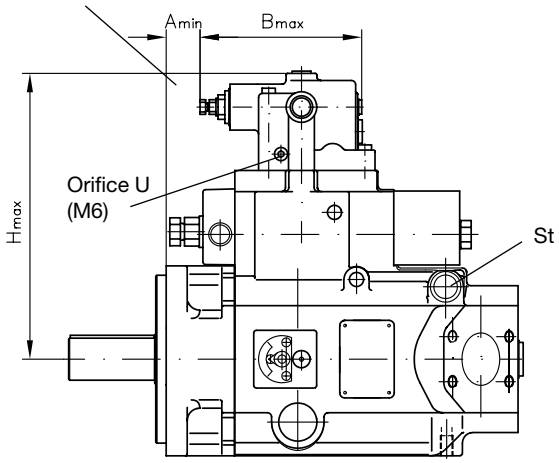



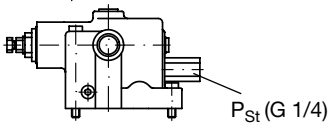

## 4.2 Controller

Coding **L**

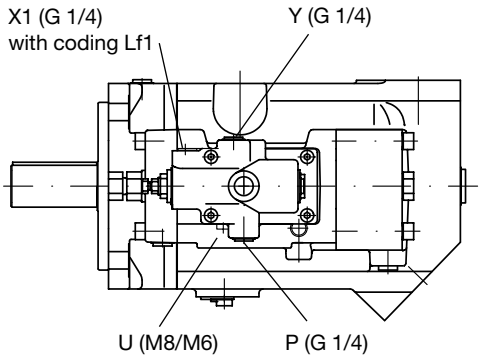
(G = BSPP)




Coding **Lf1**

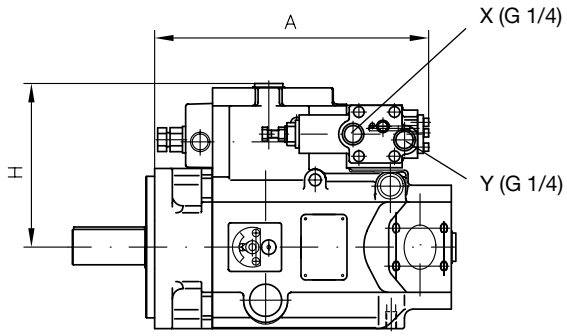



For missing dimensions, see basic pump sect. 4.1!

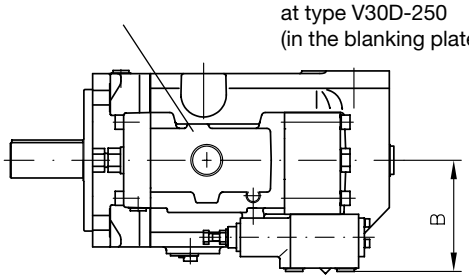



| Basic type | A mm (in) | B mm (in) | H mm (in) |
|---|---|---|---|
| 045 | 3.5 (0.14) | 159 (6.26) | 247 (9.7) |
| 075 | 14.5 (0.57) | 169 (6.65) | 258 (10.2) |
| 095/115 | 18.5 (0.73) | 169 (6.65) | 262 (10.3) |
| 140/160 | 24.5 (0.96) | 169 (6.65) | 278 (10.9) |
| 250 | 55.5 (2.19) | 169 (6.65) | 293 (11.5) |

Coding **N, P, Pb, Q, Qb, LS and LSN**



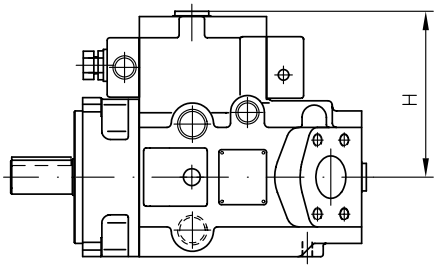

Location of orifice U (M6) [1] at type V30D-095/115 (in the pump housing) at type V30D-250 (in the blanking plate)



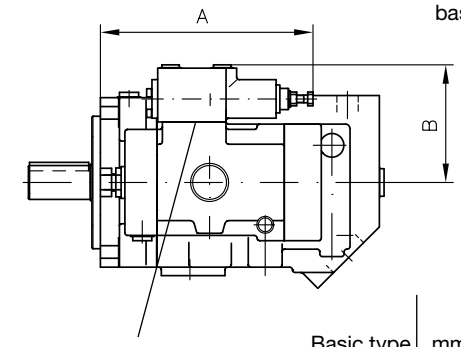

[1]) at version without power controller

**Type V30D - 045**
**V30D - 075**
**V30D - 140/160**

(G = BSPP)



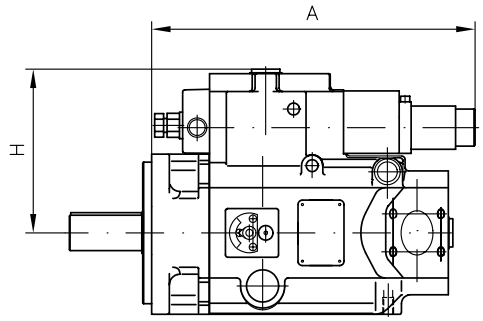

For missing dimensions, see basic pump sect. 4.1!

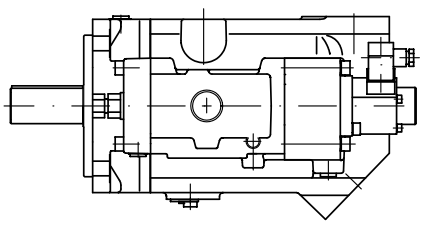



Orifice U (M6) below controller [1]

| Basic type | A mm (in) | H mm (in) | B mm (in) |
|---|---|---|---|
| 045 | 208(8.19) | 157(6.18) | 117(4.60) |
| 075 | 224(8.82) | 171(6.73) | 117(4.60) |
| 095/115 | 307(12.1) | 185(7.28) | 120(4.72) |
| 140/160 | 240(9.44) | 191(7.52) | 118(4.64) |
| 250 | 365(14.4) | 209(8.23) | 122(4.80) |

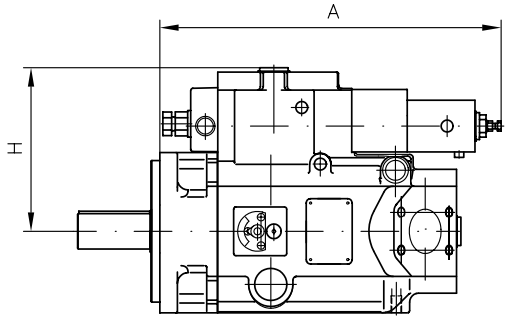
Coding **V**

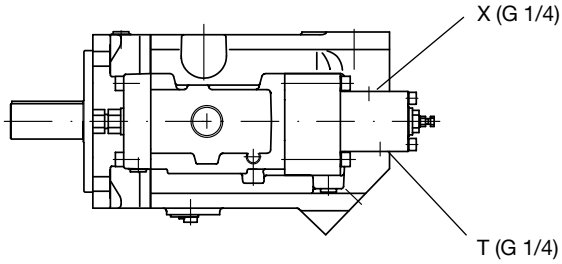


| Basic type | A mm (in) | H mm (in) |
|---|---|---|
| 045 | 319(12.56) | 157(6.18) |
| 075 | 351(13.82) | 171(6.73) |
| 095/115 | 362(14.25) | 185(7.28) |
| 140/160 | 371(14.61) | 191(7.52) |
| 250 | 419(16.49) | 209(8.22) |

Coding **VH**




| Basic type | A mm (in) | H mm (in) |
|---|---|---|
| 045 | 338(13.31) | 157(6.18) |
| 075 | 371(14.65) | 171(6.73) |
| 095/115 | 381(15.00) | 185(7.28) |
| 140/160 | 390(15.35) | 191(7.52) |
| 250 | 438(17.24) | 209(8.22) |

For missing dimensions, see basic pump sect. 4.1!

# 5. Tandem pumps

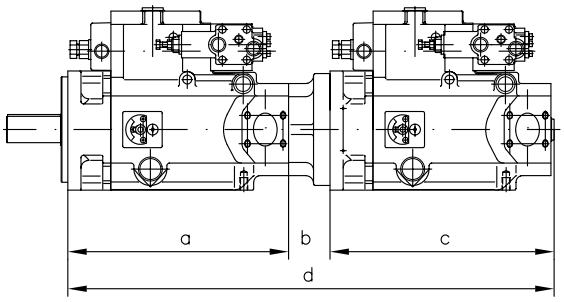
Two variable displacement axial piston pumps can be linked via an intermediate flange.
Available are shaft design “D” and “S”.
Same controller range as for individual pumps.

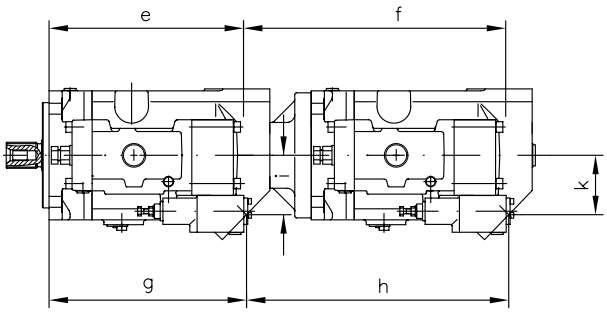
Order example:

V30D - 140 RKN-2-1-XX/LLSN -2/120 - 200 - V30D - 140 RKN-1-1-XX/LLSN -2/120 - 200
(1. pump) (2. pump)

(For type coding key, see sect. 2)

1. pump 2. pump




| 1. pump / 2. pump | a | b | c | d | e | f | g | h | i | k |
|---|---|---|---|---|---|---|---|---|---|---|
| V30D-045 | 263 | 62 | 268 | 593 | 233 | 325 | 234 | 325 | 71 | 71 |
| | V30D-075 | | | | | | | | | |
| | a | b | c | d | e | f | g | h | i | k |
| V30D-045 | 305 | 63 | 268 | 636 | 267 | 334 | 270 | 332 | 87 | 71 |
| V30D-075 | 305 | 63 | 310 | 678 | 267 | 368 | 270 | 368 | 87 | 87 |
| | V30D-140 (160) | | | | | | | | | |
| | a | b | c | d | e | f | g | h | i | k |
| V30D-045 | 358 | 63 | 268 | 689 | 317 | 337 | 323 | 332 | 89 | 71 |
| V30D-075 | 358 | 63 | 310 | 731 | 317 | 371 | 323 | 368 | 89 | 87 |
| V30D-095 (115) | 358 | 63 | 341 | 762 | 317 | 400 | 323 | 398 | 89 | 90 |
| V30D-140 (160) | 358 | 84 | 363 | 805 | 317 | 442 | 323 | 442 | 89 | 89 |
| | V30D-095 (115) | | | | | | | | | |
| | a | b | c | d | e | f | g | h | i | k |
| V30D-045 | 336 | 63 | 268 | 667 | 296 | 336 | 300 | 333 | 90 | 71 |
| V30D-075 | 336 | 63 | 310 | 709 | 296 | 369 | 300 | 369 | 90 | 87 |
| V30D-095 (115) | 336 | 63 | 341 | 740 | 296 | 399 | 300 | 399 | 90 | 90 |
| | V30D-250 | | | | | | | | | |
| | a | b | c | d | e | f | g | h | i | k |
| V30D-045 | 415 | 60 | 268 | 743 | 366 | 342 | 372 | 337 | 127 | 71 |
| V30D-075 | 415 | 60 | 310 | 785 | 366 | 376 | 372 | 373 | 127 | 87 |
| V30D-095 (115) | 415 | 75 | 341 | 831 | 366 | 420 | 372 | 418 | 127 | 90 |
| V30D-140 (160) | 415 | 87 | 363 | 865 | 366 | 453 | 372 | 453 | 127 | 89 |
| V30D-250 | 415 | 87 | 431 | 933 | 366 | 502 | 372 | 502 | 127 | 127 |

There are additionally several other combination possibilities via the SAE-flange . This enables direct connection of an auxiliary pump (e.g. gear pump).

Order example:

V30D - 140 RSN -2-1-XX/LN - 2 /120 - 200 - **SAE-C/4**

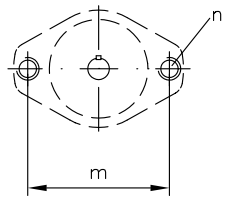
Combination possibilities and dimensions (dimension b acc. to above illustration)

| | SAE-A | SAE-B/2 | SAE-B/4 | SAE-C/2 | SAE-C/4 | SAE-D |
|---|---|---|---|---|---|---|
| V30D - 045 | 36 | 62 | 62 | -- | -- | -- |
| V30D - 075 | 31,5 | 52 | 52 | 83,5 | 63 | -- |
| V30D - 095 (115) | 24 | 52 | 52 | 83,5 | 63 | 73 |
| V30D - 140 (160) | 30,5 | 52 | 52 | 83,5 | 63 | 73 |
| V30D - 250 | 38 | 52 | 52 | 66 | 66 | 81,5 |
| Dimension m | 106,4 | 146 | 89,8 | 181 | 114,5 | 161,9 |
| n | 2xM10 | 2xM12 | 4xM12 | 2xM16 | 4xM12 | 4xM16 |

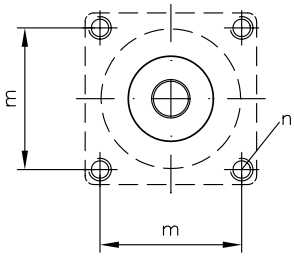
Metric conversions:

| | | | |
|---|---|---|---|
| 1 psi | = | 0.0689 | bar |
| 1 cu in | = | 16.387 | $cm^3$ |
| 1 lbf ft | = | 1.3562 | Nm |
| 1 US gal | = | 3.7854 | l |
| 1 lb | = | 0.454 | kg |
| 1 in | = | 25.4 | mm |
| 1 hp | = | 0.745 | kW |
| 1 ft lns $s^2$ | = | 1.3558 | kg $m^2$ |

Flange
SAE-A
SAE-B/2
SAE-C/2




Flange
SAE-B/4
SAE-C/4
SAE-D




[1]) Notes to version with shaft end coding **S**
The SAE-flanges on the drive side feature thru-holes instead of threads n