Variable displacement axial piston pump type V30D

for open circuit

Pressure $p_{\text{max}}$ = 420 bar (6000 psi)
Displacement $V_{\text{max}}$ = 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), optimised power-to-weight-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

<table>
<thead>
<tr>
<th>Coding</th>
<th>Displacement cm³/rev. (cu. in./rev.)</th>
<th>Flow rate ( Q = \frac{V_g \cdot n \cdot \eta_v}{1000} ) (lpm)</th>
<th>Torque ( M = \frac{1.59 \cdot V_g \cdot \Delta p}{1000 \cdot \eta_{bh}} ) (Nm)</th>
<th>Power ( P = \frac{2 \cdot M \cdot n}{60000} = \frac{M \cdot n}{9549} = \frac{Q \cdot \Delta p}{600 \cdot \eta_l} ) (kW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>045</td>
<td>45 (2.75)</td>
<td>75 (4.58)</td>
<td>96 (5.86)</td>
<td>115 (7.02)</td>
</tr>
<tr>
<td>075</td>
<td>65 (21.4)</td>
<td>109 (35.7)</td>
<td>139 (45.7)</td>
<td>167 (54.7)</td>
</tr>
<tr>
<td>095</td>
<td>350 (5000)</td>
<td>350 (5000)</td>
<td>350 (5000)</td>
<td>250 (1)</td>
</tr>
<tr>
<td>115</td>
<td>420 (6000)</td>
<td>420 (6000)</td>
<td>420 (6000)</td>
<td>300 (1)</td>
</tr>
<tr>
<td>140</td>
<td>1.0 (15)</td>
<td>1.0 (15)</td>
<td>1.0 (15)</td>
<td>1.0 (15)</td>
</tr>
<tr>
<td>160</td>
<td>250</td>
<td>250</td>
<td>250</td>
<td>250</td>
</tr>
<tr>
<td>250</td>
<td>300</td>
<td>300</td>
<td>300</td>
<td>300</td>
</tr>
</tbody>
</table>

Order example:

Basic type

V30D - 095 R K N - 1 - 1 - XX/LN - 2/120 - 200

Table 2: Controller

<table>
<thead>
<tr>
<th>Coding</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>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%.</td>
</tr>
<tr>
<td>LF1</td>
<td>Means that there is a hydraulic displacement limiter included. The displacement can be reduced by a pilot pressure from an outside source.</td>
</tr>
</tbody>
</table>
| LS | Load-Sensing-Controller
Like coding LS, but with additional pressure limitation |
| LSN | Pressure controller, adjustable directly at the pump. Pressure controller automatically maintains a constant system pressure independent 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. |
| N | 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 | 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 V DC 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. |
| Q | 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. |

Shaft and flange SAE

Shaft seals:

N: NBR (Nitril)
E: EPDM
V: FKM (Viton)

Shaft:

D: Spline shaft (DIN 5480)
K: Key shaft
S: Spline shaft and flange SAE

Special versions:

1) Higher pressure is only possible with reduce displacement
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

Shaft design:

0 = without indicator
1 = with indicator
2 = Thru-shaft

Higher pressure is possible with special design (see also sect. 5)

Hawe serial no.

Swash angle indicator: 0 = without indicator
1 = with indicator
2 = Thru-shaft

High pressure is only possible with reduce displacement

Special versions

Spec. required with controller coding L, LF1
Spec. required with controller coding N, LSN
Combinations are possible (-1-2)
See foot note 2, page 5

Direction of rotation:

L = Left hand (facing the drive shaft)
R = Right hand (facing the drive shaft)
Table 3: Flow pattern

Variable displacement axial piston pump with controller

Coding L

Coding Lf1

Coding LS, LSN

Orifice U (see also sect. 4.2)

Coding N

Coding P

Coding Pb

Pilot valve

Pilot valve

Coding Q

Coding Qb

Coding V

Metering orifice

Metering orifice

Coding VH

40 ... 60 bar

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!)

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
8. Controller LSN
9. Controller V
10. Controller VH
11. Blanking, when without V or VH
12. Blankling, when without N, P, Qb, LS, LSN
13. Blankling, when without L
14. Blankling, when without V or VH but with stroke limitation

Type V30D - 250
### 3. Additional versions

#### 3.1 General

<table>
<thead>
<tr>
<th>Working principle</th>
<th>Variable displacement axial piston pump acc. to swash plate principle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation</td>
<td>Flange or bracket mounting</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>Right hand or left hand</td>
</tr>
<tr>
<td>Mounting position</td>
<td>Optional</td>
</tr>
</tbody>
</table>

**Pressure fluid**
- Hydraulic fluid (DIN 51524 table 2 and 3); ISO VG 10 to 68 (DIN 51519)
- Viscosity range: min. 10; max. 1000 mm²/s,
- optimal operation range: 10...35 mm²/s
- Also suitable are biodegradable pressure fluids of the type HEES (synth. Ester) at operation temperatures up to +70°C.

**Temperatur**
- Ambient: -40...+60°C
- Fluid: -25...+80°C, pay attention to the viscosity range!
- 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 tilted 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

<table>
<thead>
<tr>
<th>Designation</th>
<th>045</th>
<th>075</th>
<th>095</th>
<th>115</th>
<th>140</th>
<th>160</th>
<th>250</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. swash plate angle [°]</td>
<td>17</td>
<td>17.5</td>
<td>17</td>
<td>20</td>
<td>17.5</td>
<td>20</td>
<td>17.5</td>
</tr>
<tr>
<td>Min. inlet pressure (absolute), open circuit bar (psi)</td>
<td>0.85</td>
<td>0.85</td>
<td>0.85</td>
<td>0.85</td>
<td>0.85</td>
<td>0.85</td>
<td>0.85</td>
</tr>
<tr>
<td>Self-priming speed at max. rpm</td>
<td>2600</td>
<td>2400</td>
<td>2200</td>
<td>2000</td>
<td>2200</td>
<td>1900</td>
<td>1800</td>
</tr>
<tr>
<td>Max. speed (requires increased inlet pressure) rpm</td>
<td>3600</td>
<td>3200</td>
<td>2900</td>
<td>2800</td>
<td>2600</td>
<td>2500</td>
<td>2000</td>
</tr>
<tr>
<td>Torque (theor.) at 1000 rpm Nm (lbf ft)</td>
<td>71</td>
<td>119</td>
<td>153</td>
<td>185</td>
<td>226</td>
<td>261</td>
<td>414</td>
</tr>
<tr>
<td>Input power at 250 bar and 1450 rpm kW (hp)</td>
<td>30</td>
<td>50</td>
<td>64</td>
<td>77</td>
<td>95</td>
<td>109</td>
<td>174</td>
</tr>
<tr>
<td>Weight (approx. kg) without controller (approx. lbs)</td>
<td>40</td>
<td>60</td>
<td>70</td>
<td>70</td>
<td>85</td>
<td>85</td>
<td>130</td>
</tr>
<tr>
<td>Moment of inertia kg m² (ft. lbs. sec²)</td>
<td>0.0056</td>
<td>0.0124</td>
<td>0.0216</td>
<td>0.0216</td>
<td>0.03</td>
<td>0.03</td>
<td>0.0825</td>
</tr>
<tr>
<td>L10 bearing life at 250bar (1450 rpm) (h)</td>
<td>31000</td>
<td>20000</td>
<td>17000</td>
<td>10000</td>
<td>17000</td>
<td>10000</td>
<td>23000</td>
</tr>
<tr>
<td>Max. dynamic torque</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spline shaft (D) input Nm (lbf ft)</td>
<td>550</td>
<td>910</td>
<td>1200</td>
<td>1200</td>
<td>1700</td>
<td>1700</td>
<td>3100</td>
</tr>
<tr>
<td>Spline shaft (D) output Nm (lbf ft)</td>
<td>275</td>
<td>455</td>
<td>600</td>
<td>600</td>
<td>850</td>
<td>850</td>
<td>1550</td>
</tr>
<tr>
<td>Key shaft (K) input Nm (lbf ft)</td>
<td>280</td>
<td>460</td>
<td>650</td>
<td>650</td>
<td>850</td>
<td>850</td>
<td>1550</td>
</tr>
<tr>
<td>Spline shaft (S) input Nm (lbf ft)</td>
<td>500</td>
<td>500</td>
<td>1200</td>
<td>1200</td>
<td>1200</td>
<td>1200</td>
<td>1200</td>
</tr>
<tr>
<td>Spline shaft (S) output ¹ Nm (lbf ft)</td>
<td>275</td>
<td>455</td>
<td>600</td>
<td>600</td>
<td>850</td>
<td>850</td>
<td>1000</td>
</tr>
</tbody>
</table>

¹) (theoretical) Drive torque must not be exceeded
²) The max. geometric displacement of 260 cm³/rev can only be achieved up to a self sucking speed of 1600 rpm

---

1) (theoretical) Drive torque must not be exceeded
2) The max. geometric displacement of 260 cm³/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 following 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)

Type V30D - 250

Inlet pressure

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

\[ Q = C \cdot \frac{A}{\Delta p} \text{ (lpm)} \]

A = Size of orifice (mm²)

\[ \Delta p = \text{Pressure drop} = 10 \text{ bar (LS = 30 bar)} = 145 \text{ psi (LS = 435 psi)} \]

C = 0.6

Characteristics:

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%)

Lowest recommended torque setting:

Valid only for version with power controller without additional combination

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

Characteristics:

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

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

Measuring port  
G 1/4

Drain port (D1, D2)  
Auxiliary pump  
G 1/2 conn. G 1/4

**View X:**

**For support screw**  
M10, min.15 (0.6) deep

Coding K:  
Key shaft 10x8x56  
DIN 6885

**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)

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

Measuring port  
G 1/4

Drain port (D1, D2)  
G 3/4

Auxiliary pump conn. G 1/4

**View X:**

**For support screw**  
M12, min.19 (0.7) deep

Coding K:  
Key shaft 12x8x70  
DIN 6885

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

Measuring port G 1/4

Drain port (D₁, D₂) G 3/4

For support screw M12, min. 19 (0.7) deep

Breather G 1/4

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

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 K:
Key shaft 12x8x80
DIN 6885

Coding D:
Spline shaft W40x2x18x9g
DIN 5480

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))

Measuring port or auxiliary pump conn. G 1/4

Drain port (D₁, D₂) G 3/4

For support screw M12, min. 19 (0.7) deep

Breather G 1/4

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 K:
Key shaft 14x9x80
DIN 6885

Coding D:
Spline shaft W50x2x24x9g
DIN 5480

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)

4.2 Controller

For missing dimensions, see basic pump sect. 4.1!

<table>
<thead>
<tr>
<th>Basic type</th>
<th>A (mm)</th>
<th>B (mm)</th>
<th>H (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>045</td>
<td>3.5 (0.14)</td>
<td>159 (6.26)</td>
<td>247 (9.7)</td>
</tr>
<tr>
<td>075</td>
<td>14.5 (0.57)</td>
<td>169 (6.65)</td>
<td>258 (10.2)</td>
</tr>
<tr>
<td>095/115</td>
<td>18.5 (0.73)</td>
<td>169 (6.65)</td>
<td>262 (10.3)</td>
</tr>
<tr>
<td>140/160</td>
<td>24.5 (0.96)</td>
<td>169 (6.65)</td>
<td>278 (10.9)</td>
</tr>
<tr>
<td>250</td>
<td>55.5 (2.19)</td>
<td>169 (6.65)</td>
<td>293 (11.5)</td>
</tr>
</tbody>
</table>
### Basic type

<table>
<thead>
<tr>
<th>Basic type</th>
<th>A (mm)</th>
<th>H (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>045</td>
<td>319(12.56)</td>
<td>157(6.18)</td>
</tr>
<tr>
<td>075</td>
<td>351(13.82)</td>
<td>171(6.73)</td>
</tr>
<tr>
<td>095/115</td>
<td>362(14.25)</td>
<td>185(7.28)</td>
</tr>
<tr>
<td>140/160</td>
<td>371(14.61)</td>
<td>191(7.52)</td>
</tr>
<tr>
<td>250</td>
<td>419(16.49)</td>
<td>209(8.22)</td>
</tr>
</tbody>
</table>

For missing dimensions, see basic pump sect. 4.1!

---

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

<table>
<thead>
<tr>
<th>Basic type</th>
<th>A (mm)</th>
<th>H (mm)</th>
<th>B (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>045</td>
<td>208(8.19)</td>
<td>157(6.18)</td>
<td>117(4.60)</td>
</tr>
<tr>
<td>075</td>
<td>224(8.82)</td>
<td>171(6.73)</td>
<td>117(4.60)</td>
</tr>
<tr>
<td>095/115</td>
<td>307(12.1)</td>
<td>185(7.28)</td>
<td>120(4.72)</td>
</tr>
<tr>
<td>140/160</td>
<td>381(15.00)</td>
<td>191(7.52)</td>
<td>118(4.64)</td>
</tr>
<tr>
<td>250</td>
<td>365(14.4)</td>
<td>209(8.23)</td>
<td>122(4.80)</td>
</tr>
</tbody>
</table>

---

**Type V30D - 045**

<table>
<thead>
<tr>
<th>Basic type</th>
<th>A (mm)</th>
<th>H (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>045</td>
<td>338(13.31)</td>
<td>157(6.18)</td>
</tr>
<tr>
<td>075</td>
<td>371(14.65)</td>
<td>171(6.73)</td>
</tr>
<tr>
<td>095/115</td>
<td>381(15.00)</td>
<td>185(7.28)</td>
</tr>
<tr>
<td>140/160</td>
<td>390(15.35)</td>
<td>191(7.52)</td>
</tr>
<tr>
<td>250</td>
<td>438(17.24)</td>
<td>209(8.22)</td>
</tr>
</tbody>
</table>

---

**Location of orifice U (M6)**

1) at version without power controller

---

**Coding V**

<table>
<thead>
<tr>
<th>Basic type</th>
<th>A (mm)</th>
<th>H (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>045</td>
<td>319(12.56)</td>
<td>157(6.18)</td>
</tr>
<tr>
<td>075</td>
<td>351(13.82)</td>
<td>171(6.73)</td>
</tr>
<tr>
<td>095/115</td>
<td>362(14.25)</td>
<td>185(7.28)</td>
</tr>
<tr>
<td>140/160</td>
<td>371(14.61)</td>
<td>191(7.52)</td>
</tr>
<tr>
<td>250</td>
<td>419(16.49)</td>
<td>209(8.22)</td>
</tr>
</tbody>
</table>

---

**Coding VH**

<table>
<thead>
<tr>
<th>Basic type</th>
<th>A (mm)</th>
<th>H (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>045</td>
<td>338(13.31)</td>
<td>157(6.18)</td>
</tr>
<tr>
<td>075</td>
<td>371(14.65)</td>
<td>171(6.73)</td>
</tr>
<tr>
<td>095/115</td>
<td>381(15.00)</td>
<td>185(7.28)</td>
</tr>
<tr>
<td>140/160</td>
<td>390(15.35)</td>
<td>191(7.52)</td>
</tr>
<tr>
<td>250</td>
<td>438(17.24)</td>
<td>209(8.22)</td>
</tr>
</tbody>
</table>
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 RDN-2-1-XX/LLSN -2/120 - 200 - V30D - 140 RDN-1-1-XX/LLSN -2/120 - 200

(1. pump)  
(2. pump)

(For type coding key, see sect. 2)

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)**

<table>
<thead>
<tr>
<th>SAE-A</th>
<th>SAE-B/2</th>
<th>SAE-B/4</th>
<th>SAE-C/2</th>
<th>SAE-C/4</th>
<th>SAE-D</th>
</tr>
</thead>
<tbody>
<tr>
<td>V30D - 045</td>
<td>36</td>
<td>62</td>
<td>62</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>V30D - 075</td>
<td>31.5</td>
<td>52</td>
<td>52</td>
<td>83.5</td>
<td>63</td>
</tr>
<tr>
<td>V30D - 095 (115)</td>
<td>24</td>
<td>52</td>
<td>52</td>
<td>83.5</td>
<td>63</td>
</tr>
<tr>
<td>V30D - 140 (160)</td>
<td>30.5</td>
<td>52</td>
<td>52</td>
<td>83.5</td>
<td>63</td>
</tr>
<tr>
<td>V30D - 250</td>
<td>38</td>
<td>52</td>
<td>52</td>
<td>83.5</td>
<td>63</td>
</tr>
</tbody>
</table>

**Dimension m**

- 106.4
- 146
- 89.8
- 181
- 114.5
- 161.9

**n**

- 2xM10
- 2xM12
- 4xM12
- 2xM16
- 4xM12
- 4xM16

**Flange**

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

**Flange**

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

**Metric conversions:**

- 1 psi = 0.0689 bar
- 1 cu in = 16.387 cm³
- 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 lns² = 1.3558 kg m²

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