Variable Displacement Pump A10VO
Series 31, for open loop circuits,
Axial piston, swashplate design

Size 18:
RE 92712

Axial piston pump A10VO in swashplate design is used for hydrostatic transmissions in open loop circuits. Flow is proportional to drive speed and displacement. By adjusting the position of the swashplate it is possible to smoothly vary the flow.

- Flange connections to SAE-UNC or SAE metric
- 2 leakage ports
- High permissible speeds
- Good suction characteristics
- Low noise level
- High power/weight ratio
- Long service life
- Short control times
- Axial and radial loading of drive shaft possible
- Wide range of controls
- Through drive option for multi-circuit system
Variable Displacement Pump A10VO, Series 31

Ordering code

Fluid
Mineral oil (no short code)

Axial piston unit
Swashplate design, variable A10V
Nominal pressure 280 bar, peak pressure 350 bar

Operational mode
Pump, open loop circuit O

Size
Displacement $V_g$ max (cm$^3$) 28 45 71* 100 140

Control devices
2-pos. adjustment, direct control DG
Pressure control DR G
Remote control
Movable pressure control DR T 1 0 0 0 0 0 DRT1
for when required DR T 2 0 0 0 0 0 DRT2
X port closed
Pressure, flow and power control DFLR
Pressure, flow and summ. power control DFSR
Flow control, pilot pressure-dependent FHD
with pressure control
Electronic flow control FE1
Electronic pressure and flow control DFE1

Series
31

Direction of rotation
Viewed on drive shaft clockwise R
anti-clockwise L

= preferred program (with short delivery times)
(type list see page 44)

* With size 71 please note the following when designing:
Pressure port B consists of a multiple high pressure port
SAE 11/4” standard pressure range, 3000 psi, for pressures of up to 250 bar
SAE 1” standard pressure range, 5000 psi, for pressures > 250 bar (see page 14).
For new applications high pressure port SAE 1” must be used.

● = available
○ = in preparation
= not available

Brueninghaus Hydromatik
Variable Displacement Pump A10VO, Series 31

Axial piston pump

Operational mode

Size

Adjustment and control devices

Series

Direction of rotation

Seals

NBR (Nitrile rubber to DIN ISO 1629) P
FPM (Fluoro rubber to DIN ISO 1629) V

Shaft end

28 45 71 100 140

Splined shaft SAE 7/8" 1" 1 1/4" 1 1/2" 1 3/4" S
Splined shaft SAE (higher through drive torque) 7/8" 1" 1 1/4" – – R
Splined shaft SAE (not suitable for through drive) – 7/8" – 1 1/4" – U

Mounting flange

28 45 71 100 140

SAE 2-hole ● ● ● ● ● – C
SAE 4-hole – – – – ● D

Port for service lines

Pressure port B SAE at rear, fixing thread UNC
Suction port S

Pressure port B SAE on opposite sides, fixing thread UNC
Suction port S

Pressure port B SAE at rear, metric fixing thread
Suction port S

Pressure port B SAE on opposite sides, metric fixing thread
Suction port S

Port pos. 61 and 11 only for version without through drive

Through drive

Without through drive ● ● ● ● ● N00
With through drive (port pos. 62, 12) for mounting AKM or ZRP
Mounting flange Shaft/coupling For mounting:
82-2(SAE A) 16-4(SAE A) G2, GC2/GC3-1X ● ● ● ● ● K01
82-2(SAE A) 19-4(SAE A-B) A10VSO 18 (shaft S) ● ● ● ● ● K52
101-2(SAE B) 22-4(SAE B) A10VO 28 (shaft S), G3 ● ● ● ● ● K02
101-2(SAE B) 22-4(SAE B) G4 ● ● ● ● ● K68
101-2(SAE B) 25-4(SAE B-B) A10VO 45 (shaft S), GC4-1X – ● ● ● ○ K04
101-2(SAE B) 32-4(SAE C) GC5-1X – ● ● ● ○ K06
127-2(SAE C) 32-4(SAE C) A10VO 71 (shaft S) – – ● ● ● ○ K07
127-2(SAE C) 38-4(SAE C-C) A10VO 100 (shaft S), GC6-1X – – – ● ● ● K24
152-4(SAE D) 44-4(SAE D) A10VO 140 (shaft S) – – – – ● K17

Multiple pumps
1. If a second Brueninghaus Hydromatik pump is to be factory-mounted, then both ordering codes are to be specified, combined with a "+". Ordering code 1st pump + Ordering code 2nd pump
   Ordering example: A10VO 100DR/31R-PSC62K07 + A10VO 71DR/31R-PSC62N00
2. If a gear pump is to be factory-mounted please contact us (RE 90139 in preparation)
Fluid

Prior to project design, please see our data sheets RE 90220 (mineral oil) and RE 90221 (ecologically acceptable fluids) for detailed information on fluids and application conditions. When using ecologically acceptable fluids attention must be paid to possible limitations of the technical data. If necessary please contact us.

Operating viscosity range
For optimum efficiency and service life we recommend that the operating viscosity (at operating temperature) be selected in the range

\[ \nu_{\text{opt}} = \text{opt. operating viscosity} \quad 16...36 \text{ mm}^2/\text{s} \]

to tank temperature (open loop circuit).

Limits of viscosity range
The following values are valid for extreme operating conditions:

\[ \nu_{\text{min}} = 10 \text{ mm}^2/\text{s} \]
for short periods at max. leakage oil temperature of 90\(^\circ\) C.

\[ \nu_{\text{max}} = 1000 \text{ mm}^2/\text{s} \]
for short periods upon cold start.

Temperature range (see selection diagram)
\[ t_{\text{min}} = -25\, ^\circ\text{C} \]
\[ t_{\text{max}} = +90\, ^\circ\text{C} \]

Selection diagram

Notes on the selection of fluid
For correct selection of the fluid it is assumed that the operating temperature in the tank is known (open loop circuits), in relation to the ambient temperature.

The fluid should be selected so that, within the operating temperature range, the operating viscosity lies within the optimum range (\(\nu_{\text{opt}}\)). (see shaded section of selection diagram). We recommend that the higher viscosity grade is selected in each case.

Example: At an ambient temperature of \(X\, ^\circ\text{C}\) the operating temperature in the tank will be \(60\, ^\circ\text{C}\). In the optimum operating viscosity range (\(\nu_{\text{opt}}\); shaded section) this corresponds to viscosity grade VG 46 or VG 68; VG 68 should be selected.

Important: The leakage oil temperature is influenced by pressure and speed and is always higher than the tank temperature. At no point in the system, however, may the temperature be higher than 90\(^\circ\) C.

If it is not possible to comply with the above conditions because of extreme operating parameters or a high ambient temperature, please consult us.

Filtration
In order to ensure reliable operation of the axial piston unit, the operating fluid must be maintained to a cleanliness class of at least

- 9 to NAS 1638
- 6 to SAE
- 18/15 to ISO/DIS 4406.

This may be achieved, for example, with filter elements type...D 020...(see RE 31278).

This gives the following degree of separation:

\[ \beta_{20} \geq 100 \]
Technical data

Inlet operating pressure range
Absolute pressure at port S (A)
\[ p_{\text{abs min}} = 0.8 \text{ bar} \]
\[ p_{\text{abs max}} = 30 \text{ bar} \]

Outlet operating pressure range
Pressure at port B
Nominal pressure \( p_n \) ........................................... 280 bar
Peak pressure \( p_{\text{max}} \) ........................................... 350 bar
(Pressure data to DIN 24312)
Applications with intermittent operating pressures of up to 315 bar at 10% duty cycle are permitted.

Case drain pressure
Maximum pressure of leakage fluid (at ports L, L1): maximum 0.5 bar higher than input pressure at port S, but not exceeding 2 bar absolute.

Direction of flow
S to B

Tabulated data (theoretical values, without considering \( \eta_{\text{mh}} \) and \( \eta_v \); approximate values)

<table>
<thead>
<tr>
<th>Size</th>
<th>28</th>
<th>45</th>
<th>71</th>
<th>100</th>
<th>140</th>
</tr>
</thead>
<tbody>
<tr>
<td>Displacement ( V_g \text{ max} ) [cm³]</td>
<td>28</td>
<td>45</td>
<td>71</td>
<td>100</td>
<td>140</td>
</tr>
<tr>
<td>Max. speed ( n_{\text{o max}} ) [rpm]</td>
<td>3000</td>
<td>2600</td>
<td>2200</td>
<td>2000</td>
<td>1800</td>
</tr>
<tr>
<td>Max. flow at ( n_{\text{o max}} ) ( Q_{\text{o max}} ) [L/min]</td>
<td>84</td>
<td>117</td>
<td>156</td>
<td>200</td>
<td>252</td>
</tr>
<tr>
<td>at ( n_e = 1500 \text{ rpm} ) ( Q_{\text{o max}} ) [L/min]</td>
<td>42</td>
<td>68</td>
<td>107</td>
<td>150</td>
<td>210</td>
</tr>
<tr>
<td>Max. power ( (\Delta p = 280 \text{ bar}) ) at ( n_{\text{o max}} ) ( P_{\text{max}} ) [kW]</td>
<td>39</td>
<td>55</td>
<td>73</td>
<td>93</td>
<td>118</td>
</tr>
<tr>
<td>at ( n_e = 1500 \text{ rpm} ) ( P_{\text{max}} ) [kW]</td>
<td>20</td>
<td>32</td>
<td>50</td>
<td>70</td>
<td>98</td>
</tr>
<tr>
<td>Max. torque ( (\Delta p = 280 \text{ bar}) ) at ( V_g \text{ max} ) ( T_{\text{max}} ) [Nm]</td>
<td>125</td>
<td>200</td>
<td>316</td>
<td>445</td>
<td>623</td>
</tr>
<tr>
<td>Torque ( (\Delta p = 100 \text{ bar}) ) bei ( V_g \text{ max} ) ( T ) [Nm]</td>
<td>45</td>
<td>72</td>
<td>113</td>
<td>159</td>
<td>223</td>
</tr>
<tr>
<td>Moment of inertia at drive axis ( J ) [kgm²]</td>
<td>0.0017</td>
<td>0.0033</td>
<td>0.0083</td>
<td>0.0167</td>
<td>0.0242</td>
</tr>
<tr>
<td>Filling capacity ( L )</td>
<td>0.7</td>
<td>1.0</td>
<td>1.6</td>
<td>2.2</td>
<td>3.0</td>
</tr>
<tr>
<td>Weight (without fluid) ( m ) [kg]</td>
<td>15</td>
<td>21</td>
<td>33</td>
<td>45</td>
<td>60</td>
</tr>
</tbody>
</table>

Permissible loading of drive shaft:
Max. axial force \( F_{\text{ax max}} \) [N] | 1000 | 1500 | 2400 | 4000 | 4800 |
Max. radial force \( F_{\text{q max}} \) [N] | 1200 | 1500 | 1900 | 2300 | 2800 |

\(^1\) Values shown are valid for an absolute pressure of 1 bar at suction port S.
If the flow is reduced or if the inlet pressure is increased the speed may be increased according to the diagram.
\(^2\) Please consult us for higher radial forces.

Determination of size

Flow \( Q = \frac{V_g \cdot n \cdot \eta_v}{1000} \) [L/min]

Drive torque \( T = \frac{1.59 \cdot V_g \cdot \Delta p}{100 \cdot \eta_{\text{mh}}} \) [Nm]

Drive power \( P = \frac{2\pi \cdot T \cdot n}{60000} = \frac{9549}{600 \cdot \eta_{\text{t}}} = \frac{Q \cdot \Delta p}{600 \cdot \eta_{\text{t}}} \) [kW]

\( V_g \) = geometric displacement [cm³] per rev.
\( \Delta p \) = differential pressure [bar]
\( n \) = speed [rpm]
\( \eta_v \) = volumetric efficiency
\( \eta_{\text{mh}} \) = mechanical-hydraulic efficiency
\( \eta_{\text{t}} \) = total efficiency \( (\eta_{\text{t}} = \eta_v \cdot \eta_{\text{mh}}) \)
Installation notes
Optional installation position. The pump housing must be filled with fluid during commissioning and remain full when operating.
In order to attain the lowest noise level, all connections (suction, pressure, case drain ports) must be linked by flexible couplings to tank.
Avoid placing a check valve in the case drain line.
This may, however, be permissible in individual cases, after consultation with us.

1. Vertical installation (shaft end upwards)
The following installation conditions must be taken into account:

1.1. Arrangement in tank
Before installation fill pump housing, keeping it in a horizontal position.
a) If the minimum fluid level is equal to or above the pump mounting surface leave ports “L”, “L1”, and “S” open (see Fig. 1).
b) If the minimum fluid level is below the pump mounting surface pipe port “L1”, and possibly “S” according to Fig. 2. Close port “L” with respect to conditions in 1.2.1.

1.2. Arrangement outside tank
Before installation fill pump housing, keeping it in a horizontal position. For mounting above tank see Fig. 2.
Limiting condition:
1.2.1. Minimum pump inlet pressure \( p_{\text{inlet min}} \) = 0,8 bar under static and dynamic loading.
Note: Avoid mounting above tank wherever possible in order to attain a low noise level.
pressure loss, but may not be greater than \( h_{\text{max}} = 800 \text{ mm} \) (immersion depth \( h_{\text{min}} = 200 \text{ mm} \)).

The permissible suction height \( h \) is a result of the overall Total pressure loss \( \Delta p_{\text{total}} = \Delta p_1 + \Delta p_2 + \Delta p_3 \leq (1 - p_{\text{inlet min}}) = 0.2 \text{ bar} \)
\( \Delta p_1 \): Pressure loss in pipe due to accelerating column of fluid
\[ \Delta p_1 = \rho \cdot l \cdot \frac{dv}{dt} \cdot 10^{-5} \text{ (bar)} \]
\( \rho \) = density (kg/m\(^3\))
\( l \) = pipe length (m)
\( dv/dt \) = change in rate of suction (m/s\(^2\))

\( \Delta p_2 \): Pressure loss due to static head
\[ \Delta p_2 = h \cdot \rho \cdot g \cdot 10^{-5} \text{ (bar)} \]
\( h \) = height (m)
\( \rho \) = density (kg/m\(^3\))
\( g \) = acc. due to gravity. = 9.81 m/s\(^2\)

\( \Delta p_3 \): Line losses (elbows etc.)

2. Horizontal installation
The pump must be installed so that either "L" or "L1" is at the top.

2.1. Arrangement in tank
a) If the minimum fluid level is above the top of the pump leave ports "L", "L1", and "S" open (see Fig. 3).
b) If the minimum fluid level is equal to or below the top of the pump pipe ports "L", "L1", and possibly "S" according to Fig. 4.
Conditions according to 1.2.1.

2.2. Arrangement outside tank
Fill pump housing before commissioning.
Pipe port "S" and the higher of the two case drain ports "L" and "L1".

a) For mounting above tank see Fig. 4.
Conditions according to 1.2.1.
b) Position below tank

Pipe ports "L" and "S" according to Fig. 5.
Characteristics for pump with pressure control DR

Noise characteristic
Measured in an anechoic chamber
Distance from microphone to pump = 1 m
Measurement tolerance: ± 2 dB (A)
(Fluid: hydraulic oil ISO VG 46 DIN 51519, t = 50° C)

Size 28

Size 45

Size 100

Size 140

Size 71

Brueninghaus Hydromatik
Drive power and flow

(Fluid: hydraulic oil ISO VG 46 DIN 51519, \( t = 50^\circ\) C)

**Size 28**
- \(--\) \( n = 1500 \) rpm
- \( \) \( n = 3000 \) rpm

**Size 45**
- \(--\) \( n = 1500 \) rpm
- \( \) \( n = 2600 \) rpm

**Size 71**
- \(--\) \( n = 1500 \) rpm
- \( \) \( n = 2200 \) rpm
Drive power and flow
(Fluid: hydraulic oil ISO VG 46 DIN 51519, t = 50° C)

**Size 100**
- – – – n = 1500 rpm
- – – – n = 2000 rpm

**Size 140**
- – – – n = 1500 rpm
- – – – n = 1800 rpm

Total efficiency: \[ \eta_t = \frac{Q \cdot p}{P_{Q_{max}} \cdot 600} \]
Volumetric efficiency: \[ \eta_v = \frac{Q}{Q_{theor.}} \]
Unit dimensions, size 28

Service ports at rear, no through drive;
Model 61 N00
without considering adjustment

Flange 101-2
(SAE B; 2-hole)
SAE J744 OCT 83

Shaft S
Shaft 22-4, (SAE B)
SAE J744 OCT 83

Shaft R
Shaft 22-4, (SAE B)
SAE J744 OCT 83

Ports
B Pressure port SAE 3/4" (standard pressure series)
S Suction port SAE 1 1/4" (standard pressure series)
L Case drain port 3/4-16 UNF-2B
L’ Case drain port 3/4-16 UNF-2B (sealed in factory)
Unit dimensions, size 28

Service ports on side, no through drive;
Model 62 N00

Ports
L Case drain port M18x1.5

Service ports at rear, no through drive;
Model 11 N00

Ports
L Case drain port M18x1.5

Service ports on side, no through drive;
Model 12 N00

Ports
L Case drain port M18x1.5
Unit dimensions, size 45

Service ports at rear, no through drive;

Model 61 N00

without considering adjustment

Flange 101-2
(SAE B; 2-hole)
SAE J744 OCT 83

Ports
B Pressure port SAE 1” (standard pressure series)
S Suction port SAE 1 1/2” (standard pressure series)
L Case drain port 7/8-14 UNF-2B
L Case drain port 7/8-14 UNF-2B (sealed in factory)
Unit dimensions, size 45

Service ports on sides, no through drive;
Model 62 N00

Ports
L  Case drain port  M22x1,5

Service ports at rear, no through drive;
Model 11 N00

Ports
L  Case drain port  M22x1,5

Service ports on sides, no through drive;
Model 12 N00

Ports
L  Case drain port  M22x1,5
Unit dimensions, size 71

Service ports at rear, no through drive;

Model 61 N00

without considering adjustment

Flange 127-2
(SAE C; 2-hole)
SAE J744 OCT 83

Shaft S
Shaft 32-4, (SAE C)
SAE J744 OCT 83

30° pressure angle,
14 splines,
12/24 pitch

Fixing thread
3/8-16UNC-2B; 18 deep
for SAE 1"

Shaft R
Shaft 32-4, (SAE C)
SAE J744 OCT 83

30° pressure angle,
14 splines,
12/24 pitch

Fixing thread
7/16-14UNC-2B; 24 deep
for SAE 1 1/4"

Please note the following when designing:

For pressure port B there are two SAE mounting positions, set at 90° to each other.
SAE 11/4" standard pressure series, 3000 psi, for pressures of up to 250 bar or
SAE 1" standard pressure series, 5000 psi, for pressures above 250 bar

For operating pressures greater than 250 bar or with new applications pressure flange SAE 1" must be used.

Ports

<table>
<thead>
<tr>
<th>Port</th>
<th>Description</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>Suction port</td>
<td>SAE 2&quot;</td>
</tr>
<tr>
<td>L</td>
<td>Case drain port</td>
<td>7/8-14 UNF-2B</td>
</tr>
<tr>
<td>L₁</td>
<td>Case drain port</td>
<td>7/8-14 UNF-2B (sealed in factory)</td>
</tr>
</tbody>
</table>

Before finalising your design please request a certified drawing.
Subject to revision.
Variable Displacement Pump A10VO, Series 31

Service ports on sides, no through drive;
Model 62 N00

Ports
L  Case drain port  M22x1,5

Service ports at rear, no through drive;
Model 11 N00

Ports
L  Case drain port  M22x1,5

Service ports on sides, no through drive;
Model 12 N00

Ports
L  Case drain port  M22x1,5

Fixing thread
3/8-16UNC-2B; 18 deep for SAE 1"

Fixing thread
7/16-14UNC-2B; 24 deep for SAE 1 1/4"

Fixing thread
M10; 17 deep for SAE 1"

Fixing thread
M10; 17 deep for SAE 1 1/4"
Unit dimensions, size 100
Service ports at rear, no through drive;
Model 61 N00
without considering adjustment

Flange 127-2
(SAE C; 2-hole)
SAE J744 OCT 83

Shaft S
Shaft 38-4; (SAE C-C)
SAE J744 OCT 83

Shaft U
Shaft 32-4; (SAE C)
SAE J744 OCT 83

Ports
B Pressure port SAE 1 1/4" (high pressure series)
S Suction port SAE 2 1/2" (standard pressure series)
L Case drain port 1 1/16-12 UN-2B
L Case drain port 1 1/16-12 UN-2B (sealed in factory)
Unit dimensions, size 100
Service ports on sides, no through drive;
Model 62 N00

Ports
L  Case drain oil  M27x2

Service ports at rear, no through drive;
Model 11 N00

Ports
L  Case drain port  M27x2

Service ports on sides, no through drive;
Model 12 N00

Port
L  Case drain port  M27x2
Variable Displacement Pump A10VO, Series 31

Unit dimensions, size 140
Service ports at rear, no through drive;
Model 61 N00
without considering adjustment

Flange 152-4
(SAE D; 4-hole)
SAE J744 OCT 83

Shaft S
Shaft 44-4 (SAE D)
SAE J744 OCT 83

Ports
| B (A) | Pressure port | SAE 1 1/4" (high pressure series) |
| S     | Suction port  | SAE 2 1/2" (standard pressure series) |
| L     | Case drain port | 1 1/16-12 UN-2B |
| L1    | Case drain port | 1 1/16-12 UN-2B (sealed in factory) |
Unit dimensions, size 140
Service ports on sides, no through drive;
Model 62 N00

Service ports at rear, no through drive;
Model 11 N00

Ports
L Case drain port M27x2

Service ports on sides, no through drive;
Model 12 N00

Ports
L Case drain port M27x2
DG  2-position adjustment, direct control

The pump can be set to a minimum swivel angle by connecting an external switching pressure to port X. This will supply the piston direct with oil, a minimum setting pressure of \( p_{St} \geq 30 \) bar being required.

The pump can only be switched between \( V_{gmax} \) or \( V_{gmin} \).

**Static characteristic**

<table>
<thead>
<tr>
<th>Switching pressure [bar]</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 bar ( = V_{gmax} )</td>
</tr>
<tr>
<td>( \geq 30 ) bar ( = V_{gmin} )</td>
</tr>
</tbody>
</table>

**Ports**
- B  Pressure port
- S  Suction port
- L, L1  Case drain ports (L1 sealed)
- X  Pilot pressure port (sealed)

**Control data**
- Min. switching pressure  30 bar
- Max. perm. switching pressure  280 bar

**Unit dimensions**

<table>
<thead>
<tr>
<th>Size</th>
<th>( A_1 )</th>
<th>( A_2 )</th>
<th>( A_3 )</th>
<th>( A_4 )</th>
<th>( A_5 )</th>
<th>( A_6 )</th>
<th>( A_7 )</th>
<th>( A_8 )</th>
<th>X (sealed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>28</td>
<td>193,5</td>
<td>190</td>
<td>0</td>
<td>55</td>
<td>158</td>
<td>100</td>
<td>103,5</td>
<td>3</td>
<td>R 1/4*</td>
</tr>
<tr>
<td>45</td>
<td>212,5</td>
<td>209</td>
<td>3</td>
<td>63,5</td>
<td>173</td>
<td>110</td>
<td>113,5</td>
<td>3</td>
<td>R 1/4*</td>
</tr>
<tr>
<td>71</td>
<td>246,5</td>
<td>242,5</td>
<td>3</td>
<td>73,5</td>
<td>201</td>
<td>123,5</td>
<td>127,5</td>
<td>3</td>
<td>R 1/4*</td>
</tr>
<tr>
<td>100</td>
<td>311,5</td>
<td>307,5</td>
<td>3</td>
<td>81</td>
<td>268</td>
<td>128,5</td>
<td>132,5</td>
<td>3</td>
<td>R 1/4*</td>
</tr>
<tr>
<td>140</td>
<td>338</td>
<td>334</td>
<td>3</td>
<td>94</td>
<td>268</td>
<td>150,5</td>
<td>155</td>
<td>3</td>
<td>R 1/4*</td>
</tr>
</tbody>
</table>

{for all models
Variable Displacement Pump A10VO, Series 31

Unit dimensions DG
Service ports at rear; Models 61N00 and 11N00
Sizes 28 to 100

Unit dimensions DG
Service ports on sides; Models 62 and 12
Sizes 28 to 100

Before finalising your design please request a certified drawing.
Subject to revision.
DR Pressure control

The pressure control serves to maintain a constant pressure in the hydraulic system, within the control range of the pump. The pump therefore supplies only the amount of hydraulic fluid required by the actuators. Pressure may be smoothly set at the pilot valve.

Static characteristic
(at \( n_c = 1500 \text{ rpm}; t_o = 50^\circ \text{C} \))

Hysteresis and pressure increase \( \Delta p \)

Dynamic characteristics
The curves show average measured values under test conditions, with the unit within the tank.
Conditions: \( n = 1500 \text{ rpm} \)
\( t_o = 50^\circ \text{C} \)
Pressure cut-off at 350 bar
Stepped loading by suddenly opening or closing the pressure line using a pressure relief valve set at 1 m downstream from the axial piston unit.

Control data
Hysteresis and repetitive accuracy \( \Delta p \) .................. max. 3 bar
Max. pressure increase

<table>
<thead>
<tr>
<th>Size</th>
<th>( t_{SA} ) (ms)</th>
<th>( t_{SA} ) (ms)</th>
<th>( t_{SE} ) (ms)</th>
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</thead>
<tbody>
<tr>
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<td>60</td>
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<td>20</td>
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<tr>
<td>100</td>
<td>125</td>
<td>90</td>
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<tr>
<td>140</td>
<td>130</td>
<td>110</td>
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</tbody>
</table>

Pilot oil consumption max. approx. 3 L/min
Flow loss at \( Q_{max} \) see pages 8 and 9.
Variable Displacement Pump A10VO, Series 31

Unit dimensions DR
Service ports at rear; Models 61N00 and 11N00

Sizes 28 to 100

For sizes 28 to 100 the DFR valve is used, whereby the flow control is sealed in the factory and not tested.

Sizes 28 to 100

Mounting of pilot valve for clockwise direction of rotation

Mounting of pilot valve for anti-clockwise direction of rotation

Size 140

Mounting of pilot valve for clockwise direction of rotation

Mounting of pilot valve for anti-clockwise direction of rotation

Unit dimensions DR
Service ports on sides; Models 62 and 12

Sizes 28 to 100
**Variable Displacement Pump A10VO, Series 31**

**DRG  Pressure control, remote control**

Function and design as for DR.

A pressure relief valve may be externally piped to port X for remote control purposes. It is not, however, included with the DRG control.

The differential pressure at the pilot valve is set as standard to 20 bar and this results in a pilot flow of 1.5 L/min. If another setting is required (in the range 10 – 22 bar), please state this in clear text.

We recommend that one of the following is used as the separate pressure relief valve:

DBDH 6 (hydraulic) to RE 25402,
DBEC-3X (electrical) to RE 29142 or
DBETR-SO 381 with 0.8mm dia. nozzle in P (electrical) to RE 29166.

The length of piping must not exceed 2m.

**Static characteristic**
(at \( n_1 = 1500 \) rpm; \( t_{oil} = 50 ^\circ C \))

![Graph showing hysteresis and pressure increase](chart)

**Control data**

- Hysteresis and repetitive accuracy \( \Delta p \) ................. max. 3 bar
- Max. pressure increase

<table>
<thead>
<tr>
<th>Size</th>
<th>28</th>
<th>45</th>
<th>71</th>
<th>100</th>
<th>140</th>
</tr>
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<tbody>
<tr>
<td>( \Delta p ) bar</td>
<td>4</td>
<td>6</td>
<td>8</td>
<td>10</td>
<td>12</td>
</tr>
</tbody>
</table>

- Pilot oil consumption ......................... approx. 4.5 L/min
- Flow loss at \( Q_{max} \) see pages 8 and 9.

**Ports**

<table>
<thead>
<tr>
<th>B</th>
<th>Pressure port</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>Suction port</td>
</tr>
<tr>
<td>L, L1</td>
<td>Case drain ports (L1 sealed)</td>
</tr>
<tr>
<td>X</td>
<td>Pilot pressure port</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>Sizes 28-100</th>
<th>Size 140</th>
</tr>
</thead>
<tbody>
<tr>
<td>61 and 62</td>
<td>without adaptor</td>
<td>with adaptor</td>
</tr>
<tr>
<td>11 and 12</td>
<td>with adaptor</td>
<td>without adaptor</td>
</tr>
</tbody>
</table>
### Unit dimensions DRG

**Service ports at rear; Models 61 N00 and 11 N00**

**Sizes 28 to 100**

#### View Z

Setting screw for differential pressure

Mounting of pilot valve for clockwise direction of rotation

Mounting of pilot valve for anti-clockwise direction of rotation

**Size 140**

Setting screw for differential pressure

**Unit dimensions DRG**

**Service ports on sides; Models 62 and 12**

**Sizes 28 to 100**

**Setting screw for differential pressure**

**Mounting of pilot valve for anti-clockwise direction of rotation**

**Mounting of pilot valve for clockwise direction of rotation**

**Size 140**

### Table

<table>
<thead>
<tr>
<th>Size</th>
<th>A_1</th>
<th>A_2</th>
<th>A_3</th>
<th>A_4</th>
<th>A_5</th>
<th>A_6</th>
<th>A_7</th>
<th>A_8</th>
<th>A_9</th>
<th>A_{10}</th>
<th>A_{11}</th>
<th>A_{12}</th>
<th>Port X Models 61, 62</th>
<th>Port X Models 11, 12</th>
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<tbody>
<tr>
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<td>140</td>
<td>119</td>
<td>7/16-20 UNF-2B; 10 deep</td>
<td>M14x1.5; 12 deep</td>
</tr>
<tr>
<td>45</td>
<td>106</td>
<td>244</td>
<td>228</td>
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<td>102.5</td>
<td>81.5</td>
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<td>146</td>
<td>40</td>
<td>129</td>
<td>155</td>
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<td>262</td>
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<td>112.5</td>
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<td>160</td>
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<td>229</td>
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<td>339</td>
<td>313</td>
<td>27</td>
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<td>127</td>
<td>169</td>
<td>27</td>
<td>143</td>
<td>222</td>
<td>244</td>
<td>9/16-18 UNF-2B; 13 deep</td>
<td>M14x1.5; 12 deep</td>
</tr>
</tbody>
</table>
DRT1/2 Offsettable pilot pressure control for load pressure control

DRT1/2 is a pressure control offsettable by means of pilot pressure.
Without pilot pressure the pump is on stand-by (approx. 25 bar).
With pilot pressure the pump pressure is increased, according to the transmission factor of either the DRT1 or DRT2 (see Static characteristic).
This control is designed especially for load pressure control.
It is used in mobile machinery applications.
In this system the main spool is hydraulically actuated and the pump pressure selected by means of the pilot transmitter.
We recommend that a separate 4/3 way directional valve e.g. M1-16 to RE 64263 be used.

Transmission factors
- DRT1: $i = 18.2$
- DRT2: $i = 12.4$

Static characteristics

Ports
- B: Pressure port
- S: Suction port
- L, L1: Case drain ports (L1 sealed)
- T: Case drain port (pipe separately to tank)
- X: Pilot pressure port

Control data
Pilot oil consumption .................. approx. 4.5 L/min
Flow loss at $Q_{\text{max}}$ see pages 8 and 9.
Variable Displacement Pump A10VO, Series 31

Before finalising your design please request a certified drawing.
Subject to revision.

Unit dimensions DRT1/2
Service ports at rear; Model 61N00

Size 45

Metric model 11 N00 on request

Metric model 12 on request

<table>
<thead>
<tr>
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<td>146</td>
<td>155</td>
<td>40</td>
<td>129</td>
<td>155</td>
<td>134 7/16-20 UNF-2B; 10 deep</td>
</tr>
</tbody>
</table>
DFR/DFR1 Pressure/flow control

In addition to the pressure control function, the pump flow may be varied by means of a differential pressure at the actuator (e.g. an orifice).

In model DFR1 the X orifice is plugged.

For function and fittings see pages 22/23.

Static characteristic
(at \(n_1 = 1500\) rpm; \(t_{oi} = 50^\circ\) C)

Static characteristic at variable speed

Dynamic characteristic of flow control
The curves shown are measured average values under test conditions, with the unit within the tank.

Control data
For pressure control technical data see page 22.

Pilot oil consumption DFR ............. max. approx. 3 - 4,5 L/min
Pilot oil consumption DFR1 ................... max. approx. 3 L/min
Flow loss at \(Q_{\text{max}}\), see pages 8 and 9.

Flow control/differential pressure \(\Delta p\):
Adjustable between 10 and 22 bar (higher values on request)
Standard setting: 14 bar. If a different setting is required, please state in clear text.

When port X is unloaded to tank, a zero stroke pressure of \(p = 18 \pm 2\) bar ("stand by") results.

Optional valves at port B
(not included in supply)
Mobile valve blocks SP 12 (RE 64145)
Mobile valve blocks SP 16 (RE 64148)
Mobile valve blocks MP 18 (RE 64594)
Mobile valve blocks MP 22 (RE 64598)
Proportional directional valves 4WRE (RE 29060)
**Unit dimensions DFR**

**Service ports at rear; Models 61N00 and 11 N00**

**Sizes 28 to 100**

- Setting screw for pressure control zero stroke pressure
- Setting screw for flow control differential pressure

**Size 140**

- Setting screw for pressure control zero stroke pressure
- Setting screw for flow control differential pressure

**Unit dimensions DFR**

**Service ports on sides; Models 62 and 12**

**Sizes 28 to 100**

<table>
<thead>
<tr>
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<th>A_3</th>
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<td>119</td>
<td>140 7/16-20 UNF-2B; 10 deep</td>
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<td>106</td>
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<td>40</td>
<td>143</td>
<td>162 7/16-20 UNF-2B; 10 deep</td>
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<td>183</td>
<td>222 9/16-18 UNF-2B; 13 deep</td>
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</tr>
</tbody>
</table>

**Mounting of pilot valve**

- Model 11
- Model 61

**Setting screw for pressure control zero stroke pressure**

**Setting screw for flow control differential pressure**

**View Z**

Before finalising your design please request a certified drawing.
Subject to revision.
DFLR Pressure/flow/power control

In order to achieve a constant drive torque with a varying operating pressure, the swivel angle and with it the output flow from the axial piston unit is varied so that the product of flow and pressure remain constant. Flow control is possible below the limit of the power curve.

The power characteristic is factory-set, so please enter details in clear text, e.g. 20 kW at 1500 rpm.

### Static characteristic

![Graph showing power curve]

The power characteristic is factory-set, so please enter details in clear text, e.g. 20 kW at 1500 rpm.

### Control data

For pressure control technical data see page 22.
For flow control technical data see page 28.

- Start of control: from 80 bar
- Pilot oil consumption: max. approx. 5.5 L/min
- Flow loss at $Q_{\text{max}}$: see pages 8 and 9.

### Ports

- **B**: Pressure port
- **S**: Suction port
- **L, L1**: Case drain ports (L1 sealed)
- **X**: Pilot pressure port

### Flow Q [%] vs. Operating pressure $p$ [bar]

<table>
<thead>
<tr>
<th>Size</th>
<th>$A_1$</th>
<th>$A_2$</th>
<th>$A_3$</th>
<th>$A_4$</th>
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<th>$A_{10}$</th>
<th>$A_{11}$</th>
<th>$A_{12}$</th>
<th>$A_{13}$</th>
<th>$A_{14}$</th>
<th>Port X Models 61, 62</th>
<th>Port X Models 11, 12</th>
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<tbody>
<tr>
<td>28</td>
<td>109</td>
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<td>194</td>
<td>197</td>
<td>7/16-20 UNF-2B; 10 deep</td>
<td>M14x1.5; 12 deep</td>
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<td>209</td>
<td>212</td>
<td>7/16-20 UNF-2B; 10 deep</td>
<td>M14x1.5; 12 deep</td>
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<td>71</td>
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<td>48</td>
<td>314</td>
<td>314</td>
<td>7/16-20 UNF-2B; 10 t.(Mod.61)</td>
<td>M14x1.5; 12 deep</td>
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<td>9/16-18 UNF-2B; 13 t.(Mod.62)</td>
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</table>
Variable Displacement Pump A10VO, Series 31

Before finalising your design please request a certified drawing.
Subject to revision.

Unit dimensions DFLR
Service ports at rear; Models 61N00 and 11N00
Sizes 28 to 100

Size 140

Unit dimensions DFLR
Service ports on sides; Models 62 and 12
Sizes 28 to 100

Size 140
DFSR Pressure/flow/summation control

The summated input to the A10 control pump and a second pump is limited.

There are two overload ratios 70 : 30 and 50 : 50, the former relating to the A10 and the latter to the second pump. Example:

A10VO 45 DFSR + G2 19

gives an area ratio 45 : 19 ÷ 70 : 30

If this is the first design please consult the relevant project office.

Flow control is possible below the limit of the power curve.

Static characteristic pressure transfer ratio 50:50
for equal pressures \( p_1 = p_2 \)

\[
\begin{array}{c|c|c|c|c|c|c|c|c}
\text{Flow Q [%]} & 0 & 50 & 100 & 150 & 200 & 250 & 300 \\
\hline
\text{Operating pressure \( p \) (bar)} & 0 & 50 & 75 & 100 & 250 & 280 & 300 \\
\end{array}
\]

Static characteristic pressure transfer ratio 70:30
for equal pressures \( p_1 = p_2 \)

\[
\begin{array}{c|c|c|c|c|c|c|c|c}
\text{Flow Q [%]} & 0 & 50 & 100 & 150 & 200 & 250 & 300 \\
\hline
\text{Operating pressure \( p \) (bar)} & 0 & 50 & 75 & 100 & 250 & 280 & 300 \\
\end{array}
\]

The power characteristic is factory-set, so please enter details in clear text, e.g. Size 71; 20 kW at 1500 rpm; 70:30

<table>
<thead>
<tr>
<th>Ports</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>B</td>
<td>Pressure port</td>
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<tr>
<td>S</td>
<td>Suction port</td>
</tr>
<tr>
<td>L, L1</td>
<td>Case drain ports (L1 sealed)</td>
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<tr>
<td>P2</td>
<td>Pressure port pump 2</td>
</tr>
<tr>
<td>X</td>
<td>Pilot pressure port</td>
</tr>
</tbody>
</table>

Control data

For pressure control technical data see page 22.

For flow control technical data see page 28.

Pilot oil consumption .................... max. approx. 5.5 L/min

Flow loss at \( Q_{\text{max}} \) see pages 8 and 9.

For Models 61 N00 and 11 N00 this is not applicable, as the second pump is usually flanged onto the through drive.
Unit dimensions DFSR
Service ports on sides; Models 62 and 12

Sizes 28 to 100

<table>
<thead>
<tr>
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<td>314</td>
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<td>51</td>
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<td>9/16-18 UNF-2B</td>
<td>M14x1.5</td>
</tr>
</tbody>
</table>

Before finalising your design please request a certified drawing.

Subject to revision.
Variable Displacement Pump A10VO, Series 31

### FHD Flow control, dependent on pilot pressure with pressure control

The swivel angle of the pump, and hence the displacement or flow, is dependent on the pilot pressure $P_{\text{pilot}}$ in port X. A constant pressure of $p_y = 35$ bar must be fed to port Y. There is integral pressure control which may be smoothly varied at the pilot valve.

(Please state setting values in clear text).

#### Control data

- **Hysteresis**: $\pm 2\%$ of $V_{g\max}$
- **Ext. pilot oil consumption in Y**: max. approx. 3 ... 4.5 L/min
- **Pressure increase $\Delta p$**: max. 4 bar
- **Flow loss at Q_max**, see pages 8 and 9.

#### Ports

- **B**: Pressure port
- **S**: Suction port
- **L, L1**: Case drain ports (L1 sealed)
- **X, Y**: Pilot pressure port
- **MSt**: Measurement port

#### Static characteristic

(at $n_1 = 1500$ rpm; $t_{\text{oil}} = 50^\circ C$)

#### Unit dimensions

<table>
<thead>
<tr>
<th>Size</th>
<th>$A_I$</th>
<th>$A_{II}$</th>
<th>$A_{III}$</th>
<th>$A_{IV}$</th>
<th>$A_{V}$</th>
<th>$A_{VI}$</th>
<th>$A_{VII}$</th>
<th>$A_{VIII}$</th>
<th>$A_{IX}$</th>
<th>$A_{X}$</th>
<th>$A_{XI}$</th>
<th>Ports X, Y</th>
<th>Ports X, Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>28</td>
<td>106</td>
<td>136</td>
<td>40</td>
<td>119</td>
<td>140</td>
<td>119</td>
<td>107</td>
<td>48</td>
<td>51</td>
<td>86</td>
<td>48</td>
<td>113</td>
<td>7/16-20 UNF-2B; 10 deep</td>
</tr>
<tr>
<td>45</td>
<td>106</td>
<td>146</td>
<td>40</td>
<td>129</td>
<td>155</td>
<td>134</td>
<td>112</td>
<td>48</td>
<td>51</td>
<td>91,5</td>
<td>54</td>
<td>113</td>
<td>7/16-20 UNF-2B; 10 deep</td>
</tr>
<tr>
<td>71</td>
<td>106</td>
<td>160</td>
<td>40</td>
<td>143</td>
<td>183</td>
<td>162</td>
<td>124</td>
<td>48</td>
<td>51</td>
<td>103,5</td>
<td>69</td>
<td>113</td>
<td>7/16-20 UNF-2B; 10 deep</td>
</tr>
<tr>
<td>100</td>
<td>106</td>
<td>165</td>
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<td>250</td>
<td>229</td>
<td>129</td>
<td>48</td>
<td>51</td>
<td>108,5</td>
<td>111</td>
<td>113</td>
<td>7/16-20 UNF-2B; 10 deep</td>
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<tr>
<td>140</td>
<td>127</td>
<td>209</td>
<td>27</td>
<td>183</td>
<td>222</td>
<td>244</td>
<td>140</td>
<td>48</td>
<td>51</td>
<td>119</td>
<td>99</td>
<td>150</td>
<td>9/16-18 UNF-2B; 13 t(X)</td>
</tr>
</tbody>
</table>

7/16-20 UNF-2B: 10 deep M14x1,5; 12 deep
Unit dimensions FHD
Service ports at rear; Models 61N00 and 11 N00

On request

Unit dimensions FHD
Service ports on sides; Models 62 and 12
Sizes 28 to 100

Size 140
FE1 Electronic flow control

The FE1 control is used for the electro-hydraulic swivel angle control of the A10VO variable displacement pump. The FE1 model pump is suitable for use with analogue amplifier card VT 5041. The amplifier card is to be ordered separately. For further information see RE 30022.

Control data
- Hysteresis: < 1% of Vₖₐₙₐₓ
- Repetitive accuracy: < 1%
- Pilot oil consumption: max. approx. 1 L/min
- Flow loss at Qₘₐₓ: see pages 8 and 9.

Components
- 1 A10VO with hydraulic control device
  - 1.1 Proportional valve STW 0063
  - 1.2 Inductive positional transducer IW9–03–01
- Control electronics (order separately in accordance with RE 30022).

Ports
- B Pressure port
- S Suction port
- L, L1 Case drain ports (L1 sealed)

DFE1 Pressure and flow control

Pressure and flow control of the pump are carried out by an electrically controlled proportional valve. Flow control is by means of the variable pump swivel angle, any variation in drive speed – e.g. caused by the diesel motor – is not adjusted. Pump pressure and pump position are registered by means of a pressure sensor and inductive positional transducer to the relevant amplifier card.

The DFE1 model pump is suitable for use with analogue amplifier card VT 5041.

Both amplifier card and pressure sensor are to be ordered separately.

For reasons of safety a pressure relief valve should be mounted in addition to the pump pressure control. This ensures that the maximum permissible operating pressure is not exceeded.

For further information and application examples see RE 30022 and RE 98090.

Static characteristics

Control data
- Hysteresis: < 1% of Vₖₐₙₐₓ
- Repetitive accuracy: < 1%
- Pilot oil consumption: max. approx. 1 L/min
- Flow loss at Qₘₐₓ: see pages 8 and 9.
Unit dimensions
FE1 Flow control, pressure and DFE1 electronic flow control

Unit dimensions FE1 and DFE1
Service ports on sides; Models 61 and 11
on request

Unit dimensions FE1 and DFE1
Service ports on sides; Models 62 and 12
Sizes 28 to 140

<table>
<thead>
<tr>
<th>Size</th>
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<th>A₂</th>
<th>A₃</th>
<th>A₄</th>
<th>A₅</th>
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<td>171</td>
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<td>63</td>
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<td>143</td>
<td>78</td>
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</table>
**Through drive**

Axial piston unit A10VO can be supplied with a through drive, as shown in the ordering code on page 3. The type of through drive is determined by codes (K01–K17). If the combination pump is not mounted in the factory, the simple type code is sufficient.

Included in this case are: coupling sleeve, fixing screws, seals and if necessary a sandwich flange.

**Combination pumps**

By mounting combination pumps circuits independent of each other are available for use.

1. If the combination pump consists of 2 A10VO pumps and if these are to be delivered ready assembled, then the two type codes are to be combined with a “+”. Ordering example:
   
   A10VO 71 DR/31 R–PSC62K02 +
   A10VO 28 DR/31 R–PSC82N00

2. If a gear pump or radial piston pump is to be mounted in the factory as a second pump, please refer to RE 90139 (in preparation). It contains a list of the various pump combinations together with the type code of the first pump.

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**Permissible moment of inertia**

\[ M_m = (m_1 \cdot l_1 + m_2 \cdot l_2 + m_3 \cdot l_3) \cdot \frac{1}{102} \text{ [Nm]} \]

<table>
<thead>
<tr>
<th>Size</th>
<th>28</th>
<th>45</th>
<th>71</th>
<th>100</th>
<th>140</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perm. moment of inertia</td>
<td>M (_m)</td>
<td>Nm</td>
<td>88</td>
<td>137</td>
<td>216</td>
</tr>
<tr>
<td>Mass</td>
<td>m (_1)</td>
<td>kg</td>
<td>15</td>
<td>21</td>
<td>33</td>
</tr>
<tr>
<td>Dist. betw. centr. of gravity</td>
<td>l (_1)</td>
<td>mm</td>
<td>110</td>
<td>130</td>
<td>150</td>
</tr>
</tbody>
</table>

**Permissible through drive torque**

1. Perm. thru. drive tor. | M \(_{D1_{\text{max}}}\) | Nm | 125 | 200 | 316 | 445 | 623 |
| M \(_{D2_{\text{max}}}\) | Nm | 55 | 100 | 184 | 445 | 623 |

2. Perm. thru. drive tor. | M \(_{D1_{\text{max}}}\) | Nm | 55 | 100 | 184 | 445 | 623 |
| M \(_{D2_{\text{max}}}\) | Nm | 125 | 200 | 316 | 445 | 623 |

<table>
<thead>
<tr>
<th>Size</th>
<th>28</th>
<th>45</th>
<th>71</th>
<th>100</th>
<th>140</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. perm. total through drive torque at shaft “S” pump 1</td>
<td>M (<em>{\text{total}</em>{\text{max}}})</td>
<td>Nm</td>
<td>180</td>
<td>300</td>
<td>500</td>
</tr>
</tbody>
</table>

1. Perm. thru. drive tor. | M \(_{D1_{\text{max}}}\) | Nm | 125 | 200 | 316 | 445 | 623 |
| M \(_{D2_{\text{max}}}\) | Nm | 55 | 100 | 184 | 445 | 623 |

2. Perm. thru. drive tor. | M \(_{D1_{\text{max}}}\) | Nm | 125 | 200 | 316 | 445 | 623 |
| M \(_{D2_{\text{max}}}\) | Nm | 125 | 200 | 316 | 445 | 623 |

<table>
<thead>
<tr>
<th>Size</th>
<th>28</th>
<th>45</th>
<th>71</th>
<th>100</th>
<th>140</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. perm. total through drive torque at shaft “R” pump 1</td>
<td>M (<em>{\text{total}</em>{\text{max}}})</td>
<td>Nm</td>
<td>223</td>
<td>400</td>
<td>632</td>
</tr>
</tbody>
</table>

1. Perm. thru. drive tor. | M \(_{D1_{\text{max}}}\) | Nm | 125 | 200 | 316 | – | – |
| M \(_{D2_{\text{max}}}\) | Nm | 98 | 200 | 316 | – | – |

2. Perm. thru. drive tor. | M \(_{D1_{\text{max}}}\) | Nm | 98 | 200 | 316 | – | – |
| M \(_{D2_{\text{max}}}\) | Nm | 125 | 200 | 316 | – | – |
Unit dimensions of the combination pump

Before finalising your design please request a certified drawing.
Subject to revision.
Dimensions of through drives

**Flange SAE 82-2** (SAE A, 2-hole) for mounting of external gear pump G2 (see RE 10030) or internal gear pump 1 PF2GC2/3-1X/XXXR07MU2 (see RE 10215)

Ordering code **K01**

**Flange SAE 82-2** (SAE A, 2-hole) for mounting of A10VSO 18 -shaft S (see RE 92712)

Ordering code **K52**

<table>
<thead>
<tr>
<th>Size</th>
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<th>A₂</th>
<th>A₃</th>
</tr>
</thead>
<tbody>
<tr>
<td>28</td>
<td>204</td>
<td>47</td>
<td>M 10; 16 deep</td>
</tr>
<tr>
<td>45</td>
<td>229</td>
<td>53</td>
<td>M 10; 16 deep</td>
</tr>
<tr>
<td>71</td>
<td>267</td>
<td>61</td>
<td>M 10; 20 deep</td>
</tr>
<tr>
<td>100</td>
<td>338</td>
<td>65</td>
<td>M 10; 20 deep</td>
</tr>
<tr>
<td>140</td>
<td>350</td>
<td>77</td>
<td>M 10; 20 deep</td>
</tr>
</tbody>
</table>

**Flange SAE 101-2** (SAE B, 2-hole) for mounting of external gear pump G3 (see RE 10039) or A10VO 28 (shaft S)

Ordering code **K02**

<table>
<thead>
<tr>
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<th>A₂</th>
<th>A₃</th>
</tr>
</thead>
<tbody>
<tr>
<td>28</td>
<td>204</td>
<td>47</td>
<td>M 12; 15 deep</td>
</tr>
<tr>
<td>45</td>
<td>229</td>
<td>53</td>
<td>M 12; 18 deep</td>
</tr>
<tr>
<td>71</td>
<td>267</td>
<td>61</td>
<td>M 12; 20 deep</td>
</tr>
<tr>
<td>100</td>
<td>338</td>
<td>65</td>
<td>M 12; 20 deep</td>
</tr>
<tr>
<td>140</td>
<td>350</td>
<td>77</td>
<td>M 12; 20 deep</td>
</tr>
</tbody>
</table>

Before finalising your design please request a certified drawing.

Subject to revision.
Flange SAE 101-2 (SAE B, 2-hole) for mounting of G4 (see RE 10042);
Ordering code K68

Flange SAE 101-2 (SAE B, 2-hole) for mounting of A10VO 45-shaft S or internal gear pump 1PF2GC4-1X/0XXR07MU2 (see RE 10215)
Ordering code K04

### Table 1: Flange SAE 101-2 for G4 Mounting

<table>
<thead>
<tr>
<th>Size</th>
<th>$A_1$</th>
<th>$A_2$</th>
<th>$A_3$</th>
<th>$A_4$</th>
</tr>
</thead>
<tbody>
<tr>
<td>28</td>
<td>204</td>
<td>47</td>
<td>M12; 15 deep</td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>229</td>
<td>53</td>
<td>M12; 18 deep</td>
<td></td>
</tr>
<tr>
<td>71</td>
<td>267</td>
<td>61</td>
<td>M12; 20 deep</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>338</td>
<td>65</td>
<td>M12; 20 deep</td>
<td></td>
</tr>
<tr>
<td>140</td>
<td>350</td>
<td>77</td>
<td>M12; 20 deep</td>
<td></td>
</tr>
</tbody>
</table>

With size 28 gear pump G4 may only be mounted rotated at 45°.

### Table 2: Flange SAE 101-2 for A10VO 45-shaft S or internal gear pump Mounting

<table>
<thead>
<tr>
<th>Size</th>
<th>$A_1$</th>
<th>$A_2$</th>
<th>$A_3$</th>
<th>$A_4$</th>
</tr>
</thead>
<tbody>
<tr>
<td>45</td>
<td>229</td>
<td>9</td>
<td>53</td>
<td>M12; 18 deep</td>
</tr>
<tr>
<td>71</td>
<td>267</td>
<td>8</td>
<td>61</td>
<td>M12; 20 deep</td>
</tr>
<tr>
<td>100</td>
<td>338</td>
<td>10</td>
<td>65</td>
<td>M12; 20 deep</td>
</tr>
</tbody>
</table>

To pump mounting face $A_1$
Flange SAE 101-2 (SAE B, 2-hole) for mounting internal gear pump 1PF2GC5-1X/0XXXR07MU2 (see RE 10215)
Ordering code K06

<table>
<thead>
<tr>
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<th>( A_3 )</th>
<th>( A_4 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>45</td>
<td>244</td>
<td>53</td>
<td>M 12</td>
<td></td>
</tr>
<tr>
<td>71</td>
<td>267</td>
<td>61</td>
<td>M 12; 20 deep and partly through</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>338</td>
<td>65</td>
<td>M 12; 20 deep</td>
<td></td>
</tr>
</tbody>
</table>

Flange SAE 127-2 (SAE C) for mounting of A10VO 71 (shaft S);
Ordering code K07

<table>
<thead>
<tr>
<th>Size</th>
<th>( A_1 )</th>
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<th>( A_3 )</th>
<th>( A_4 )</th>
<th>( A_5 )</th>
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</thead>
<tbody>
<tr>
<td>45</td>
<td>244</td>
<td>53</td>
<td>M 12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>71</td>
<td>267</td>
<td>61</td>
<td>M 12; 18 deep</td>
<td></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>338</td>
<td>65</td>
<td>M 12; 25 deep</td>
<td></td>
<td></td>
</tr>
<tr>
<td>140</td>
<td>350</td>
<td>77</td>
<td>M 16; 32 deep</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Variable Displacement Pump A10VO, Series 31

Before finalising your design please request a certified drawing.
Subject to revision.

Flange SAE 127-2 (SAE C) for mounting of A10VO 100 (shaft S) or internal gear pump 1PF2GC6-1XXXXR07MU2;
Ordering code K24

<table>
<thead>
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<tr>
<td>100</td>
<td>338</td>
<td>8</td>
<td>65</td>
<td>M 16; 25 deep</td>
</tr>
<tr>
<td>140</td>
<td>350</td>
<td>10</td>
<td>77</td>
<td>M 16; 25 deep</td>
</tr>
</tbody>
</table>

Flange SAE 152-4 (SAE D) for mounting of A10VO 140 (shaft S);
Ordering code K17

Section A – B

Splined sleeve 1 1/2"
12/24 DP; 17 splines

Splined sleeve 1 3/4"
8/16 DP; 13 splines
<table>
<thead>
<tr>
<th>type</th>
<th>part no.</th>
<th>type</th>
<th>part no.</th>
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<tbody>
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<td>940787</td>
<td>A10VO71DFR/31L-PSC62N00</td>
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See RDE 90132.