

Variable-Speed Drive with Fixed Displacement Unit A10FZO/G Variable Displacement Unit A10VZO/G

RE 91485/06.11

1/60

Data sheet

Series 10
Size 6 to 180
For nominal pressure, maximum pressure, see Technical data,
pages 9 to 11
Open and closed circuits



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Features

- Suitable for variable-speed operation with synchronous and asynchronous motors
- Suitable for start/stop operation
- Suitable for long pressure retention operation
- Proven A10 rotary group technology
- Through-drive option
- High efficiency
- For use in single-, double- and four-quadrant operation

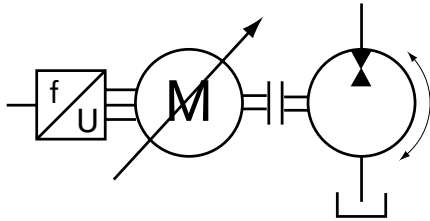
Function and assembly of variable-speed drives

Rexroth has developed the proven axial piston units of the A10 product family further for use in energy-efficient variable-speed drive systems and optimized the interplay between the electric motor and the pump. The especially robust units are employed for small to medium sizes and satisfy individual requirements with their numerous combination options.

Variable-speed pump drives featuring Rexroth BlueHydraulics technology reduce energy consumption in industrial applications and at the same time avoid medium-level noise emissions. At the same time, the familiar performance is retained or even improved. The extensive spectrum of different variable-speed pump drives from Rexroth includes ready-to-use solutions that are finely scalable in both function and power. The energy-efficient hydraulic drive can be realized with internal gear pumps, fixed or variable axial piston units. Equipped with a suitable controller, exactly the required flow and pressure are provided which are needed at the machine.

The proven axial piston units have been developed further for use in speed-controlled drives. These are approved for start/stop operation and for changing directions of rotation. At the lowest speeds, between 0 and 200 rpm, they provide a constant pressure and are characterized by very high efficiency in pressure retention operation. Efficiency is achieved optimized by either a fixed or variable displacement, depending on the requirements of the cycle. The A10 units can be used as pumps and as motors in single-, double- or four-quadrant operation. For the implementation of variable-speed drives, the new axial piston units offer numerous options for combination. The axial piston fixed displacement units A10FZO and A10FZG cover the sizes 6 to 63 cm³. The axial piston variable displacement units are available in the sizes 10 to 180 cm³ (A10VZO). Equipped with a torque controller and 2-point control, they are employed for dimensioning smaller servomotors. The numerous combination options allow a wide range of different customized system requirements to be satisfied.

A10FZO



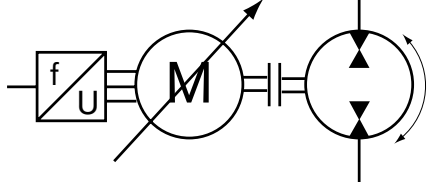
Axial piston fixed displacement units in **open circuit** with changing direction of rotation and unchanging pressure side (depends on the principal direction of rotation of the pump).

Single- or double-quadrant operation

For type codes, see page 3.

For technical data, see pages 12 and 13.

A10FZG



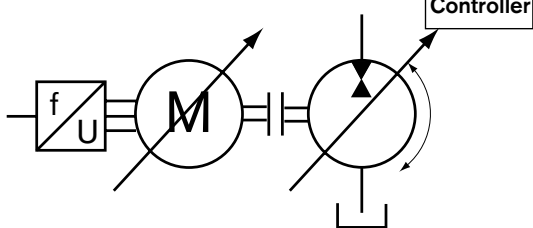
Axial piston fixed displacement unit in **closed circuit** with changing direction of rotation and two pressure sides.

Four-quadrant operation

For type codes, see page 4.

For technical data, see pages 14 and 15.

A10VZO



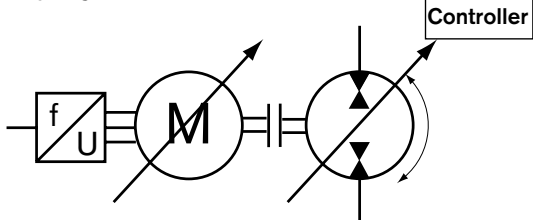
Axial piston variable displacement units in **open circuit** with changing direction of rotation and unchanging pressure side (depends on the principal direction of rotation of the pump).

Single- or double-quadrant operation

For type codes, see pages 6 and 7.

For technical data, see pages 16 and 17.

A10VZG



Axial piston variable displacement unit in **closed circuit** with changing direction of rotation and two pressure sides.

Four-quadrant operation

For type codes, see page 5.

Technical data on request.

Type codes for standard program, A10FZO

| | | | | | | | | | | | | |
|-------------|----------|----------|----|----------|-----------|----|----------|----------|----------|----------|----|----|
| A10F | Z | O | | / | 10 | | - | V | S | C | | |
| 01 | 02 | 03 | 04 | | 05 | 06 | | 07 | 08 | 09 | 10 | 11 |

Axial piston unit

| | | |
|----|--|-------------|
| 01 | Swashplate design, fixed, nominal pressure 315 bar, maximum pressure 350 bar | A10F |
|----|--|-------------|

Type of operation

| | | |
|----|-----------------------|----------|
| 02 | Variable-speed drives | Z |
|----|-----------------------|----------|

Type of operation

| | | |
|----|--|----------|
| 03 | Pump/motor, open circuit ¹⁾ | O |
|----|--|----------|

Size (NG)

| | | | | | | | | | | | | | | | |
|----|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 04 | Geometric displacement (see table of values on page 12) | 006 | 008 | 010 | 011 | 014 | 016 | 018 | 021 | 023 | 028 | 037 | 045 | 058 | 063 |
|----|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|

Series

| | | |
|----|-------------------|-----------|
| 05 | Series 1, Index 0 | 10 |
|----|-------------------|-----------|

Direction of rotation¹⁾

| | | | |
|----|--------------------------|-------------------|----------|
| 06 | With view on drive shaft | clockwise | R |
| | | counter-clockwise | L |

Seal

| | | |
|----|---------------------|----------|
| 07 | FKM (fluoro-rubber) | V |
|----|---------------------|----------|

Drive shaft

| | | |
|----|---------------------------|----------|
| 08 | Splined shaft ANSI B92.1a | S |
|----|---------------------------|----------|

Mounting flange

| | | |
|----|---------------------|----------|
| 09 | ISO 3019-1 – 2-hole | C |
|----|---------------------|----------|

Service line ports

| | | | | | | | | | | | | | | | | |
|----|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------|
| 10 | SAE flange port A and B, opposite sides, metric fixing thread | 006 | 008 | 010 | 011 | 014 | 016 | 018 | 021 | 023 | 028 | 037 | 045 | 058 | 063 | 02 |
| | | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |

Through drive

| | | | | | | | | | | | | | | | | | |
|------------------|--|--------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|------------|------------|
| 11 | Without through drive | | | | | | | | | | | | | | | N00 | |
| | Flange ISO 3019-1 Coupling for splined shaft ²⁾ | | | | | | | | | | | | | | | | |
| | 82-2 (A) | 5/8 in 9T 16/32DP | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | K01 |
| | | 3/4 in 11T 16/32DP | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | K52 |
| | 101-2 (B) | 7/8 in 13T 16/32DP | - | - | - | - | - | - | - | ○ | ○ | ○ | ○ | ○ | ○ | ○ | K68 |
| 1 in 15T 16/32DP | | - | - | - | - | - | - | - | ○ | ○ | ○ | ○ | ○ | ○ | ○ | K04 | |

1) Changing direction of rotation permissible with same pressure side (e.g. pressure drain)

2) 30° pressure angle, flat base, flank centering, tolerance class 5

● = Available

○ = On request

- = Not available

Type codes for standard program, A10FZG

| | | | | | | | | | | | | |
|-------------|----------|----------|----|----------|-----------|----------|----------|----------|----|----------|----|------------|
| A10F | Z | G | | / | 10 | W | - | V | | C | | N00 |
| 01 | 02 | 03 | 04 | | 05 | 06 | | 07 | 08 | 09 | 10 | 11 |

Axial piston unit

| | | |
|----|--|-------------|
| 01 | Swashplate design, fixed, nominal pressure 315 bar, maximum pressure 350 bar | A10F |
|----|--|-------------|

Application area

| | | |
|----|-----------------------|----------|
| 02 | Variable-speed drives | Z |
|----|-----------------------|----------|

Type of operation

| | | |
|----|------------------------------|----------|
| 03 | Pump/motor in closed circuit | G |
|----|------------------------------|----------|

Size (NG)

| | | | | | | | | | |
|----|---|------------|------------|------------|------------|------------|------------|------------|------------|
| 04 | Geometric displacement (see table of values on page 14) | 006 | 008 | 010 | 011 | 018 | 028 | 045 | 063 |
|----|---|------------|------------|------------|------------|------------|------------|------------|------------|

Series

| | | |
|----|-------------------|-----------|
| 05 | Series 1, Index 0 | 10 |
|----|-------------------|-----------|

Direction of rotation

| | | |
|----|---------------------------------------|----------|
| 06 | With view on drive shaft, alternating | W |
|----|---------------------------------------|----------|

Seal

| | | |
|----|---------------------|----------|
| 07 | FKM (fluoro-rubber) | V |
|----|---------------------|----------|

Drive shaft

| | | | | | | | | | | |
|----|--|------------|------------|------------|------------|------------|------------|------------|------------|----------|
| | | 006 | 008 | 010 | 011 | 018 | 028 | 045 | 063 | |
| 08 | Splined shaft ANSI B92.1a | ● | ● | ● | - | - | ○ | ○ | - | S |
| | Splined shaft for higher torque, ANSI B92.1a | - | - | - | ○ | ○ | - | - | ○ | R |

Mounting flange

| | | |
|----|---------------------|----------|
| 09 | ISO 3019-1 – 2-hole | C |
|----|---------------------|----------|

Service line ports

| | | | | | | | | | | |
|----|---|-----------|-----------|------------|------------|------------|------------|------------|------------|-----------|
| | | 06 | 08 | 010 | 011 | 018 | 028 | 045 | 063 | |
| 10 | SAE flange port A and B, opposite sides, metric fixing thread | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | 02 |

Through drive

| | | |
|----|-----------------------|------------|
| 11 | Without through drive | N00 |
|----|-----------------------|------------|

● = Available

○ = On request

- = Not available

Type codes for standard program, A10VZG

| | | | | | | | | | | | | | | | |
|-------------|----------|----------|----|----|----------|-----------|----------|----|----------|----------|----------|----------|-----------|------------|----------|
| A10V | Z | G | | | / | 10 | W | | - | V | S | C | 20 | N00 | H |
| 01 | 02 | 03 | 04 | 05 | | 06 | 07 | 08 | | 09 | 10 | 11 | 12 | 13 | 14 |

Axial piston unit

| | | |
|----|---|-------------|
| 01 | Swashplate design, variable, nominal pressure 280 bar, maximum pressure 350 bar | A10V |
|----|---|-------------|

Application area

| | | |
|----|-----------------------|----------|
| 02 | Variable-speed drives | Z |
|----|-----------------------|----------|

Type of operation

| | | |
|----|------------------------------|----------|
| 03 | Pump/motor in closed circuit | G |
|----|------------------------------|----------|

Size (NG)

| | | | | | | |
|----|--|------------|------------|------------|------------|------------|
| 04 | Geometric displacement $V_{g \max}$ in cm^3 | 010 | 018 | 028 | 045 | 063 |
|----|--|------------|------------|------------|------------|------------|

Control and adjustment device¹⁾

| | | | | | | | | |
|----|-----------------------------|---------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------|
| 05 | Two-point control, electric | U = 12V | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | EZ1 |
| | | U = 24V | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | EZ2 |

Series

| | | |
|----|-------------------|-----------|
| 06 | Series 1, Index 0 | 10 |
|----|-------------------|-----------|

Direction of rotation

| | | |
|----|---------------------------------------|----------|
| 07 | With view on drive shaft, alternating | W |
|----|---------------------------------------|----------|

Minimum displacement

| | | 010 | 018 | 028 | 045 | 063 | |
|----|--|------|-----|-----|-----|-----|----|
| 08 | $V_{g \min}$ (in cm^3) steplessly adjustable | from | - | - | 8 | 12 | 16 |
| | State default setting in clear text | to | - | - | 28 | 25 | 38 |
| | | from | - | - | - | 26 | 40 |
| | | to | - | - | - | 45 | 42 |

Seal

| | | |
|----|---------------------|----------|
| 09 | FKM (fluoro-rubber) | V |
|----|---------------------|----------|

Drive shaft

| | | |
|----|----------------------------|----------|
| 10 | Splined shaft ANSI B92.1a- | S |
|----|----------------------------|----------|

Mounting flange

| | | |
|----|---------------------|----------|
| 11 | ISO 3019-1 – 2-hole | C |
|----|---------------------|----------|

Service line ports

| | | |
|----|---|-----------|
| 12 | SAE flange port A and B, opposite sides, metric fixing thread | 02 |
|----|---|-----------|

Through drive

| | | |
|----|-----------------------|------------|
| 13 | Without through drive | N00 |
|----|-----------------------|------------|

Connectors for solenoids²⁾

| | | |
|----|---|----------|
| 14 | HIRSCHMANN connector – without suppressor diode | H |
|----|---|----------|

1) Other controllers on request

2) Connectors for other electric components can deviate.

Type codes for standard program, A10VZO

| | | | | | | | | | | | | | | |
|-------------|----------|----------|----|----|----------|-----------|----|----------|----------|----------|----|----|----|----|
| A10V | Z | O | | | / | 10 | | - | V | S | | | | |
| 01 | 02 | 03 | 04 | 05 | | 06 | 07 | | 08 | 09 | 10 | 11 | 12 | 13 |

Axial piston unit

010 018 028 045 071 100 140 180

| | | | | | | | | | | | | | | | |
|----|--|---|---|---|---|---|---|---|---|---|---|---|---|---|-------------|
| 01 | Swashplate design, variable | | | | | | | | | | | | | | A10V |
| | Nominal pressure 250 bar, maximum pressure 315 bar | ● | - | - | - | - | - | - | - | - | - | - | - | - | |
| | Nominal pressure 280 bar, maximum pressure 350 bar | - | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | |

Application area

| | | | | | | | | | | | | | | | |
|----|-----------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|----------|
| 02 | Variable-speed drives | | | | | | | | | | | | | | Z |
|----|-----------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|----------|

Type of operation

| | | | | | | | | | | | | | | | |
|----|--------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|----------|
| 03 | Pump/motor, open circuit | | | | | | | | | | | | | | O |
|----|--------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|----------|

Size (NG)

| | | | | | | | | | | | | | | | |
|----|---|------------|------------|------------|------------|------------|------------|------------|------------|--|--|--|--|--|--|
| 04 | Geometric displacement (see table of values on page 16) | | | | | | | | | | | | | | |
| | | 010 | 018 | 028 | 045 | 071 | 100 | 140 | 180 | | | | | | |

Control device

| | | | | | | | | | | | | | | | |
|----|------------------------------|----------------|---|---|---|---|---|---|---|---|---|---|---|-------------------------|-------------------------|
| 05 | Pressure control | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | DR¹⁾ |
| | hydraulic, remotely operated | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | DRG¹⁾ |
| | Torque controller | size 10 | | | | | | | | | | | | | |
| | Beginning of control | 10 to 35 bar | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | LA5D |
| | | 36 to 70 bar | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | LA6D |
| | | 71 to 105 bar | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | LA7D |
| | | 106 to 140 bar | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | LA8D |
| | | 141 to 230 bar | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | LA9D |
| | | 161 to 240 bar | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | LA9D |
| | Two-point control, electric | | | - | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | EZ3²⁾ |
| | | U = 12V | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | EZ4²⁾ | |
| | | U = 24V | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | EZ4²⁾ | |

Series

| | | | | | | | | | | | | | | | |
|----|-------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|-----------|
| 06 | Series 1, Index 0 | | | | | | | | | | | | | | 10 |
|----|-------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|-----------|

Direction of rotation³⁾

| | | | | | | | | | | | | | | | |
|----|--------------------------|-------------------|--|--|--|--|--|--|--|--|--|--|--|--|----------|
| 07 | With view on drive shaft | clockwise | | | | | | | | | | | | | R |
| | | counter-clockwise | | | | | | | | | | | | | L |

Seal

| | | | | | | | | | | | | | | | |
|----|---------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|----------|
| 08 | FKM (fluoro-rubber) | | | | | | | | | | | | | | V |
|----|---------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|----------|

Drive shaft

| | | | | | | | | | | | | | | | |
|----|---------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|----------|
| 09 | Splined shaft ANSI B92.1a | | | | | | | | | | | | | | S |
|----|---------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|----------|

1) For DR and DRG in conjunction with changing direction of rotation, Please contact us

2) If a mechanical flow limitation is required, please refer to item 11, port plate 12.

3) Changing direction of rotation permissible with unchanging pressure side (e.g. pressure drain)

Type codes for standard program, A10VZO

| | | | | | | | | | | | | | | |
|-------------|----------|----------|----|----|----------|-----------|----|----------|----------|----------|----|----|----|----|
| A10V | Z | O | | | / | 10 | | - | V | S | | | | |
| 01 | 02 | 03 | 04 | 05 | | 06 | 07 | | 08 | 09 | 10 | 11 | 12 | 13 |

| Mounting flange | | 010 | 018 | 028 | 045 | 071 | 100 | 140 | 180 | |
|------------------------|---------------------|-----|-----|-----|-----|-----|-----|-----|-----|---|
| 10 | ISO 3019-1 – 2-hole | ● | ● | ● | - | - | - | - | - | C |
| | ISO 3019-1 – 4-hole | - | - | - | ● | ● | ● | ● | ● | D |

| Service line ports | | 010 | 018 | 028 | 045 | 071 | 100 | 140 | 180 | |
|---------------------------|---|-----|-----|-----|-----|-----|-----|-----|-----|------------------|
| 11 | SAE flange port, top and bottom, opposite sides, metric fixing thread, with universal through drive | - | - | - | ● | ● | ● | ● | ● | 22 |
| | SAE flange port, top and bottom, opposite sides, metric fixing thread, size 45 to 140 without through drive | - | ● | ● | ● | ● | ● | ● | ○ | 12 ¹⁾ |
| | DIN metric threaded ports, rear, not for through drive | ● | - | - | - | - | - | - | - | 14 |
| | DIN threaded ports, opposite sides | ● | - | - | - | - | - | - | - | 7 |

| Through drive | | 010 | 018 | 028 | 045 | 071 | 100 | 140 | 180 | | |
|----------------------|--|--|-----|-----|-----|-----|-----|-----|-----|-------------------|-----|
| 12 | With through-drive shaft, without coupling, without intermediate flange, sealed with functionally reliable cover; only port plate 22 ³⁾ | - | - | - | ● | ● | ● | ● | ● | U00 ²⁾ | |
| | Without through drive; only port plate 12 ³⁾ | ● | ● | ● | ● | ● | ● | ● | ● | N00 | |
| | Flange ISO 3019-1 | Coupling for splined shaft ⁴⁾ | | | | | | | | | |
| | 82-2 (A) | 5/8 in 9T 16/32DP | ● | ● | ● | - | - | - | - | - | K01 |
| | | 3/4 in 11T 16/32DP | ● | ● | ● | - | - | - | - | - | K52 |
| | 101-2 (B) | 7/8 in 13T 16/32DP | - | - | ● | - | - | - | - | - | K68 |
| | 82-2 (A) | 5/8 in 9T 16/32DP | - | - | - | ● | ● | ● | ● | ● | U01 |
| | | 3/4 in 11T 16/32DP | - | - | - | ● | ● | ● | ● | ● | U52 |
| | 101-2 (B) | 7/8 in 13T 16/32DP | - | - | - | ● | ● | ● | ● | ● | U68 |
| | | 1 in 15T 16/32DP | - | - | - | ● | ● | ● | ● | ● | U04 |

| Connectors for solenoids⁵⁾ | | |
|--|---|---|
| 13 | HIRSCHMANN connector – without suppressor diode | H |

1) A mechanical flow limitation mechanism is only fitted as standard on the version 12 N00 with EZ control, sizes 18 to 140

$V_{g \max}$: setting range $V_{g \max}$ up to 50% $V_{g \max}$ stepless

$V_{g \min}$: setting range $V_{g \min}$ up to 50% $V_{g \max}$ stepless

State settings values in clear text.

$V_{g \max}$ and $V_{g \min}$ limitations for through drives with port plates 12K.. and 22U.. can only be made with permanently defined values. Again here, state in clear text.

2) See RE 95581 Universal through drive

3) When ordering sizes 45 to 180 with port plate 22U, please order the corresponding through drive **without** "K"

Example: A10VO180DRS/32R-VSD**22U01**

When ordering sizes 18 to 28 with port plate 12, please order the corresponding through drive **with** "K"

Example: A10VO18DRS/32R-VSD**12K01**

4) Coupling for splined shaft as per ANSI B92.1a (splined shaft assignment as per SAE J744)

5) Connectors for other electric components may differ.

● = Available

○ = On request

- = Not available

Technical data

Hydraulic fluid

Prior to project design, please see our data sheets RE 90220 (mineral oil) and RE 90221 (environmentally acceptable hydraulic fluids) for detailed information on hydraulic fluid and operating conditions.

When using environmentally acceptable hydraulic fluids, the limitations regarding technical data and seals must be observed. Please contact us. When ordering, indicate the hydraulic fluid that is to be used.

Operating viscosity range

We recommend you to choose the operating viscosity (at operating temperature) in the optimum range for efficiency and useful life of

$$v_{\text{opt}} = \text{opt. operating viscosity } 16 \dots 36 \text{ mm}^2/\text{s}$$

taking into account the reservoir temperature (open circuit) or circuit temperature (closed circuit).

Limits of viscosity range

For critical operating conditions the following values apply:

$$v_{\text{min}} = 10 \text{ mm}^2/\text{s}$$

for short periods ($t \leq 1 \text{ min}$)
at a max. perm. case drain temperature
of $90 \text{ }^\circ\text{C}$.

Note that the maximum case drain temperature of $90 \text{ }^\circ\text{C}$ may not be exceeded even locally (e.g. in the bearing area). The temperature in the bearing area is approx. 5 K higher than the average case drain temperature.

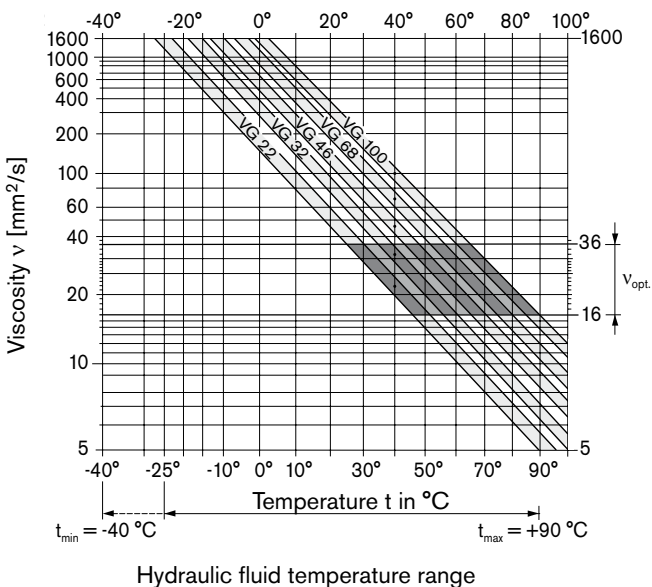
$$v_{\text{max}} = 1600 \text{ mm}^2/\text{s}$$

for short periods ($t \leq 1 \text{ min}$)
on cold start
($p \leq 30 \text{ bar}$, $n \leq 1000 \text{ rpm}$, $t_{\text{min}} -25 \text{ }^\circ\text{C}$)

Depending on the installation situation, special measures are necessary at temperatures between $-40 \text{ }^\circ\text{C}$ and $-25 \text{ }^\circ\text{C}$. Please contact us.

For detailed information about operation with low temperatures, see RE 90300-03-B.

Selection diagram



Notes on the selection of the hydraulic fluid

In order to select the correct fluid, it is necessary to know the operating temperature in the reservoir (open circuit) in relation to the ambient temperature: in an open circuit, the reservoir temperature; in a closed circuit, the circuit temperature.

The hydraulic fluid should be selected so that the viscosity in the operating temperature range is within the optimum range (v_{opt}), see shaded area of the selection diagram. We recommend that the higher viscosity class be selected in each case.

Example: at an ambient temperature of $X \text{ }^\circ\text{C}$, an operating temperature of $60 \text{ }^\circ\text{C}$ is set in the circuit. In the optimum operating viscosity range (v_{opt} , shaded area), this corresponds to the viscosity classes VG 46 or VG 68. VG 68 should be selected.

Note

The case drain temperature, which is influenced by pressure and speed, is always higher than the reservoir temperature. However, at no point in the component may the temperature exceed $90 \text{ }^\circ\text{C}$. The temperature difference specified on the left is to be taken into account when determining the viscosity in the bearing.

If the above conditions cannot be met due to extreme operating parameters, please contact us.

Filtration of the hydraulic fluid

The finer the filtration, the better the hydraulic fluid cleanliness class, and the longer the service life of the axial piston unit.

In order to guarantee the functional reliability of the axial piston unit, it is necessary to carry out a gravimetric evaluation of the hydraulic fluid to determine the particle contamination and the cleanliness class according to ISO 4406. The minimum cleanliness class to be observed is 20/18/15.

At very high hydraulic fluid temperatures ($90 \text{ }^\circ\text{C}$ to maximum $115 \text{ }^\circ\text{C}$), a cleanliness class of at least 19/17/14 according to ISO 4406 is necessary.

If the above classes cannot be maintained, please contact us.

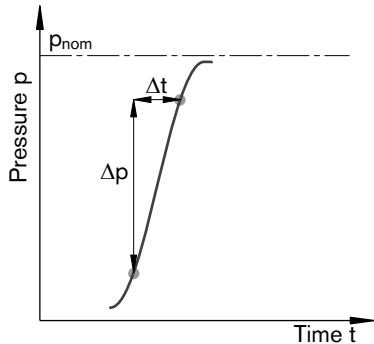
Technical data

Operating pressure range, A10FZO

Pressure at service line port B

Nominal pressure p_{nom} _____ 315 bar absolute
 Maximum pressure p_{max} _____ 350 bar absolute
 Individual operating period _____ 2.0 s
 Total operating period _____ 300 h
 Minimum pressure (high-pressure side) _____ 10 bar

Rate of pressure change R_A _____ 16,000 bar/s



Pressure at suction port A (inlet)

Minimum pressure $p_{S min}$ _____ 0.8 bar absolute
 Maximum pressure $p_{S max}$ _____ 5 bar absolute

Case drain pressure

Maximum permissible case drain pressure (at port L, L₁):
 Maximum 0.5 bar higher than inlet pressure at port S, but not higher than 2 bar absolute.

$p_{L max abs}$ _____ 2 bar

Flow direction

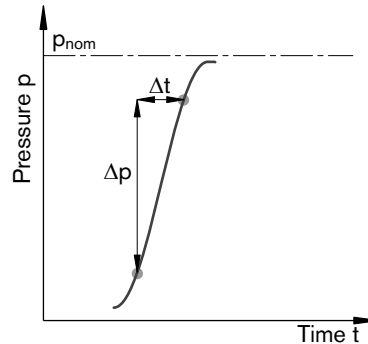
| Direction of rotation, with view on drive shaft | | |
|---|-----------|-------------------|
| Type of operation | clockwise | counter-clockwise |
| Pump mode | A to B | B to A |
| Motor mode | A to B | B to A |

Operating pressure range, A10FZG

Pressure at service line port A or B

Nominal pressure p_{nom} _____ 315 bar absolute
 Maximum pressure p_{max} _____ 350 bar absolute
 Individual operating period _____ 2.0 s
 Total operating period _____ 300 h
 Minimum pressure (high-pressure side) _____ 10 bar
 Minimum pressure (low-pressure side) _____ 0.8 bar absolute

Rate of pressure change R_A _____ 16,000 bar/s



Case drain pressure

Maximum permissible case drain pressure (at port L, L₁):
 Maximum 0.5 bar higher than inlet pressure at port A or B, but not higher than 2 bar absolute.

$p_{L max abs}$ _____ 2 bar

Flow direction

| Direction of rotation, with view on drive shaft | | |
|---|-----------|-------------------|
| Type of operation | clockwise | counter-clockwise |
| Pump mode | A to B | B to A |
| Motor mode | A to B | B to A |

For pressure definitions, see page 11

Technical data

Operating pressure range, A10VZO size 10

Pressure at service line port B

Nominal pressure p_{nom} _____ 250 bar absolute

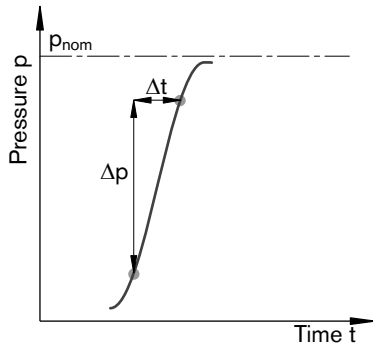
Maximum pressure p_{max} _____ 315 bar absolute

Individual operating period _____ 2.0 s

Total operating period _____ 300 h

Minimum pressure (high-pressure side) _____ 10 bar

Rate of pressure change R_A _____ 16,000 bar/s



Pressure at suction port S (inlet)

Minimum pressure $p_{abs min}$ _____ 0.8 bar absolute

Maximum pressure $p_{abs max}$ _____ 5 bar absolute

Case drain pressure

Maximum permissible case drain pressure (at port L, L₁):

Maximum 0.5 bar higher than inlet pressure at port S, but not higher than 2 bar absolute.

$p_{L max abs}$ _____ 2 bar

Flow direction

| Direction of rotation, with view on drive shaft | | |
|---|----------------------------|----------------------------|
| Type of operation | clockwise | counter-clockwise |
| Pump | S to B | S to B¹⁾ |
| Pressure drain | B to S¹⁾ | B to S |

¹⁾ Note: Comply with installation drawings for counter-clockwise rotation

Operating pressure range, A10VZO, size 18 to 180

Pressure at service line port B

Nominal pressure p_{nom} _____ 280 bar absolute

For 10% actuated time _____ 315 bar absolute

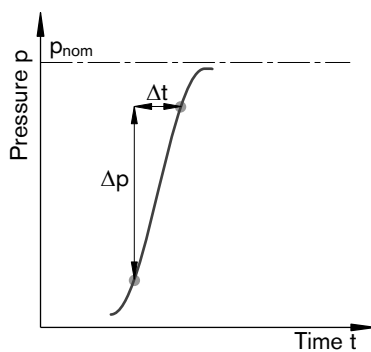
Maximum pressure p_{max} _____ 350 bar absolute

Individual operating period _____ 2.5 s

Total operating period _____ 300 h

Minimum pressure (high-pressure side) _____ 10 bar

Rate of pressure change R_A _____ 16,000 bar/s



Pressure at suction port S (inlet)

Minimum pressure $p_{abs min}$ _____ 0.8 bar absolute

Maximum suction pressure $p_{abs max}$ _____ 10 bar absolute

Case drain pressure

Maximum permissible case drain pressure (at port L, L₁):

Maximum 0.5 bar higher than inlet pressure at port S, but not higher than 2 bar absolute.

$p_{L max abs}$ _____ 2 bar

Flow direction

| Direction of rotation, with view on drive shaft | | |
|---|----------------------------|----------------------------|
| Type of operation | clockwise | counter-clockwise |
| Pump | S to B | S to B¹⁾ |
| Pressure drain | B to S¹⁾ | B to S |

Technical data

Definition

Nominal pressure p_{nom}

The nominal pressure corresponds to the maximum design pressure.

Maximum pressure p_{max}

The maximum pressure corresponds to the maximum operating pressure within the individual operating period. The sum of the individual operating periods must not exceed the total operating period.

Minimum pressure (high-pressure side)

Minimum pressure on high-pressure side (A or B) that is required to prevent damage to the axial piston unit.

Minimum pressure (inlet) open circuit

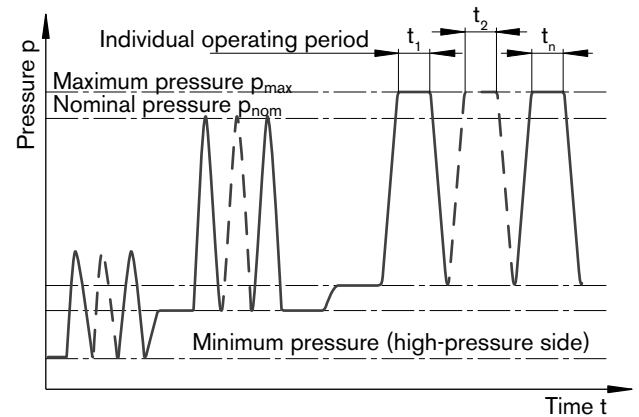
Minimum pressure at suction port S (inlet) that is required to prevent damage to the axial piston unit. The minimum pressure depends on the speed and displacement of the axial piston unit.

Minimum pressure (low-pressure side) closed circuit

Minimum pressure on the low-pressure side (A or B) that is required to prevent damage to the axial piston unit.

Rate of pressure change R_A

Maximum permissible rate of pressure build-up and pressure reduction with a pressure change over the entire pressure range.



$$\text{Total operating period} = t_1 + t_2 + \dots + t_n$$

Technical data, A10FZO

Table of values (theoretical values, without efficiency levels and tolerances; values rounded)

| Size | NG | | 6 | 8 | 10 |
|---|----------------|--------------------|--------|--------|--------|
| Displacement, geometric (per revolution) | V_g | cm ³ | 6 | 8.1 | 10.6 |
| Speed, maximum at V_g | | | | | |
| Suction speed, pump mode ¹⁾ | n_{nom} | rpm | 3600 | 3600 | 3600 |
| Max. speed, pressure drain mode ²⁾ | n_{nom} | rpm | 3600 | 3600 | 3600 |
| Flow | | | | | |
| at n_{nom} | $q_{vol\ max}$ | l/min | 21.6 | 28.8 | 38.2 |
| at $n_E = 1500$ rpm | $q_{vE\ max}$ | l/min | 9 | 12 | 15.9 |
| Power, pump mode | | | | | |
| at n_{nom} , $\Delta p = 315$ bar | P_{max} | kW | 11.3 | 15.3 | 20 |
| at $n_E = 1500$ rpm | P_{max} | kW | 4.7 | 6.4 | 8.3 |
| Torque | | | | | |
| at V_g and $\Delta p = 315$ bar | T_{max} | Nm | 30 | 40.5 | 53 |
| at V_g and $\Delta p = 100$ bar | T | Nm | 9.5 | 12.7 | 16.8 |
| Torsional stiffness Drive shaft S | c | Nm/rad | 8100 | 8100 | 8100 |
| Moment of inertia for rotary group | J_{GR} | kgm ² | 0.0006 | 0.0006 | 0.0006 |
| Angular acceleration ³⁾ | α | rad/s ² | 14000 | 14000 | 14000 |
| Filling capacity | V | L | 0.14 | 0.14 | 0.14 |
| Mass (without filling capacity) approx. | m | kg | 6.4 | 6.4 | 6.4 |

1) The values are applicable:

- for absolute pressure $p_{abs} = 1$ bar at suction port S
- for the optimum viscosity range of $v_{opt} = 16$ to 36 mm²/s
- for mineral-based operating materials with a specific mass of 0.88 kg/l.

2) Higher values on request

3) Values are only permissible if a pressure of 1 bar absolute is maintained at the suction port, and only for single pumps. Multiple-pump configurations on request.

Important

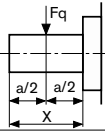
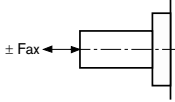
Exceeding the maximum or falling below the minimum permissible values can lead to a loss of function, a reduction in operational service life or the total destruction of the axial piston unit. We recommend checking the loading through tests or calculation / simulation and comparison with the permissible data.

Determination of size

| | | | |
|---|---|---------|---|
| Flow (absorbed volume flow) | $q_v = \frac{V_g \cdot n \cdot \eta_v}{1000 \cdot (\eta_v)}$ | [l/min] | $V_g =$ Displacement per revolution in cm ³ |
| Torque, pump mode (pressure drain mode) | $T = \frac{1.59 \cdot V_g \cdot \Delta p \cdot (\eta_{mh})}{100 \cdot \eta_{mh}}$ | [Nm] | $\Delta p =$ Differential pressure in bar |
| Power, pump mode (pressure drain mode) | $P = \frac{2\pi \cdot T \cdot n}{60000} = \frac{q_v \cdot \Delta p \cdot (\eta_t)}{600 \cdot \eta_t}$ | [kW] | $n =$ Speed in rpm |
| Drive speed (output speed) | $n = \frac{q_v \cdot 1000 \cdot (\eta_v)}{V_g \cdot \eta_v}$ | [rpm] | $\eta_v =$ Volumetric efficiency |
| | | | $\eta_{mh} =$ Mechanical-hydraulic efficiency |
| | | | $\eta_t =$ Overall efficiency ($\eta_t = \eta_v \cdot \eta_{mh}$) |

Technical data, A10FZO

Permissible radial and axial loading on drive shaft

| Size | 06 to 10 | | |
|-----------------------|---|-----------------|-----|
| Radial force, maximum |  | $F_{q \max}$ N | 250 |
| Axial force, maximum |  | $F_{ax \max}$ N | 400 |

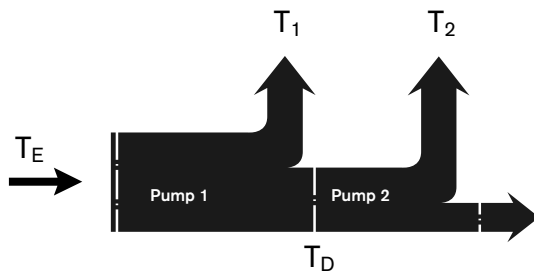
Permissible input and through-drive torques

| Size | NG | 6 to 10 | |
|--|---|----------|--------------------------------|
| Torque at V_g and $\Delta p = 315 \text{ bar}^1$ | T_{\max} | Nm | See table of values on page 12 |
| Input torque at drive shaft, maximum ²⁾ | | | |
| S | $T_{E \max}$ \varnothing drive shaft | Nm in | 126 3/4 |
| Through-drive torque at drive shaft, maximum | | | |
| S | $T_{D \max}$ | Nm | 42 |

1) Without considering efficiency

2) For drive shafts free of radial load

Distribution of torque



Technical data, A10FZG

Table of values (theoretical values, without efficiency levels and tolerances; values rounded)

| Size | NG | | 6 | 8 | 10 |
|--|----------------|--------------------|--------|--------|--------|
| Displacement, geometric (per revolution) | V_g | cm ³ | 6 | 8.1 | 10.6 |
| Speed, maximum at V_g | | | | | |
| Suction speed, pump mode ¹⁾ | n_{nom} | rpm | 3000 | 3000 | 3000 |
| Maximum speed, motor mode ²⁾ | n_{nom} | rpm | 3000 | 3000 | 3000 |
| Flow, pump mode | | | | | |
| at n_{nom} | $q_{vol\ max}$ | l/min | 18 | 24.3 | 32 |
| at $n_E = 1500$ rpm | $q_{vE\ max}$ | l/min | 9 | 12 | 15.9 |
| Displacement, motor mode | | | | | |
| at n_{nom} | $q_{vol\ max}$ | l/min | 18 | 24.3 | 32 |
| at $n_E = 1500$ rpm | $q_{vE\ max}$ | l/min | 9 | 12 | 15.9 |
| Power, pump mode | | | | | |
| at n_{nom} , $\Delta p = 315$ bar | P_{max} | kW | 9.4 | 12.8 | 16.7 |
| at $n_E = 1500$ rpm | P_{max} | kW | 4.7 | 6.4 | 8.3 |
| Power, motor mode | | | | | |
| at n_{nom} , $\Delta p = 315$ bar | P_{max} | kW | 9.4 | 12.8 | 16.7 |
| at $n_E = 1500$ rpm | P_{max} | kW | 4.7 | 6.4 | 8.3 |
| Torque | | | | | |
| at V_g and $\Delta p = 315$ bar | T_{max} | Nm | 30.1 | 40.5 | 53.1 |
| at V_g and $\Delta p = 100$ bar | T | Nm | 9.5 | 12.7 | 16.8 |
| Torsional stiffness of drive shaft | S | c | Nm/rad | 9370 | 9370 |
| | R | c | Nm/rad | – | – |
| Moment of inertia for rotary group | J_{GR} | kgm ² | 0.0006 | 0.0006 | 0.0006 |
| Angular acceleration ³⁾ | α | rad/s ² | 14000 | 14000 | 14000 |
| Filling capacity | V | L | 0.14 | 0.14 | 0.14 |
| Mass (without filling capacity) approx. | m | kg | 6.4 | 6.4 | 6.4 |

1) The values are applicable:

- for absolute pressure $p_{abs} = 1$ bar at ports A or B
- for the optimum viscosity range of $v_{opt} = 16$ to 36 mm²/s
- for mineral-based operating materials with a specific mass of 0.88 kg/l.

2) Higher values on request (could possibly cause an increase in low pressure)

3) Values are only permissible if a pressure of 1 bar absolute is maintained at the suction port, and only for single pumps. Multiple-pump configurations on request.

Note

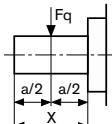
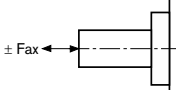
Exceeding the maximum or falling below the minimum permissible values can lead to a loss of function, a reduction in operational service life or the total destruction of the axial piston unit. We recommend checking the loading through tests or calculation / simulation and comparison with the permissible data.

Technical data, A10FZG

Determining the size

| | | | | |
|--------------------------------|---|---------|---------------|--|
| Absorbed volume flow (flow) | $q_v = \frac{V_g \cdot n \cdot (\eta_v)}{1000 \cdot \eta_v}$ | [l/min] | $V_g =$ | Displacement per revolution in cm^3 |
| Torque, motor mode (pump mode) | $T = \frac{1.59 \cdot V_g \cdot \Delta p \cdot \eta_{mh}}{100 \cdot (\eta_{mh})}$ | [Nm] | $\Delta p =$ | Differential pressure in bar |
| Power, motor mode (pump mode) | $P = \frac{2\pi \cdot T \cdot n}{60000} = \frac{q_v \cdot \Delta p \cdot \eta_t}{600 \cdot (\eta_t)}$ | [kW] | $n =$ | Speed in rpm |
| | | | $\eta_v =$ | Volumetric efficiency |
| | | | $\eta_{mh} =$ | Mechanical-hydraulic efficiency |
| | | | $\eta_t =$ | Overall efficiency ($\eta_t = \eta_v \cdot \eta_{mh}$) |
| Output speed (drive speed) | $n = \frac{q_v \cdot 1000 \cdot \eta_v}{V_g \cdot (\eta_v)}$ | [rpm] | | |

Permissible radial and axial loading on drive shaft

| Size | 06 | 08 | 10 |
|--|-----|-----|-----|
| Radial force, maximum  | 250 | 250 | 250 |
| Axial force, maximum  | 400 | 400 | 400 |

Technical data, A10VZO

Table of values (theoretical values, without efficiency levels and tolerances; values rounded)

| Size | NG | | 10 | 18 | 28 | 45 | 71 | 100 | 140 | 180 |
|--|------------------|--------------------|--------|---------|--------|--------|------------|--------|--------|--------|
| Displacement, geometric (per revolution) | $V_{g \max}$ | cm ³ | 10.5 | 18 | 28 | 45 | 71.1 | 100 | 140 | 180 |
| Speed, maximum at $V_{g \max}$ | | | | | | | | | | |
| Suction speed, pump mode ¹⁾ | n_{nom} | rpm | 3600 | 3300 | 3000 | 3000 | 2550 | 2300 | 2200 | 1800 |
| Maximum speed, pressure drain mode ²⁾ | n_{nom} | rpm | 3600 | 3300 | 3000 | 3000 | On request | | | |
| Flow | | | | | | | | | | |
| at n_{nom} | $q_{v0 \max}$ | l/min | 38 | 59 | 84 | 135 | 181 | 230 | 308 | 324 |
| at $n_E = 1500$ rpm | $q_{vE \max}$ | l/min | 15 | 27 | 42 | 68 | 106.6 | 150 | 210 | 270 |
| Power, pump mode | | | | | | | | | | |
| at n_{nom} and $\Delta p =$ | 250 bar | P_{\max} | 16 | – | – | – | – | – | – | – |
| | 280 bar | P_{\max} | – | 27.7 | 39 | 63 | 84.5 | 107 | 143 | 151 |
| at $n_E = 1500$ rpm | | P_{\max} | 7.5 | 12.5 | 20 | 31 | 50 | 70 | 98 | 125 |
| Torque | | | | | | | | | | |
| at $V_{g \max}$ and $\Delta p =$ | 250 bar | T_{\max} | 42 | – | – | – | – | – | – | – |
| | 280 bar | T_{\max} | – | 80 | 125 | 200 | 317 | 445 | 623 | 801 |
| | 100 bar | T | 17 | 29 | 45 | 72 | 113 | 159 | 223 | 286 |
| Torsional stiffness Drive shaft S | c | Nm/rad | 8100 | 10000 | 21500 | 35000 | 71884 | 121142 | 169537 | 171107 |
| Moment of inertia for rotary group | J_{GR} | kg/m ² | 0.0006 | 0.00093 | 0.0017 | 0.0033 | 0.0087 | 0.0185 | 0.0276 | 0.033 |
| Angular acceleration ³⁾ | α | rad/s ² | 14000 | 12600 | 11200 | 9500 | 7500 | 6200 | 5000 | 4000 |
| Filling capacity | V | L | 0.2 | 0.25 | 0.3 | 1.0 | 1.6 | 2.2 | 3.0 | 2.7 |
| Mass (without filling) approx. | m | kg | 8 | 12 | 15 | 30 | 47 | 69 | 73 | 78 |

1) The values are applicable:

- for absolute pressure $p_{\text{abs}} = 1$ bar at the suction port S
- for the optimum viscosity range of $\nu_{\text{opt}} = 16$ to 36 mm²/s
- for mineral-based operating materials with a specific mass of 0.88 kg/l.

2) Higher values on request.

3) Values are only permissible if a pressure of 1 bar absolute is maintained at the suction port, and only for single pumps. Multiple-pump configurations on request.

Note

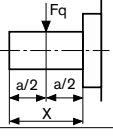
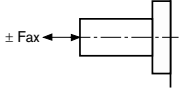
Exceeding the maximum or falling below the minimum permissible values can lead to a loss of function, a reduction in operational service life or the total destruction of the axial piston unit. We recommend checking the loading through tests or calculation / simulation and comparison with the permissible data.

Determination of size

| | | | |
|---|---|---------|---|
| Flow (absorbed volume flow) | $q_v = \frac{V_g \cdot n \cdot \eta_v}{1000 \cdot (\eta_v)}$ | [l/min] | $V_g =$ Displacement per revolution in cm ³ |
| Torque, pump mode (pressure drain mode) | $T = \frac{1.59 \cdot V_g \cdot \Delta p \cdot (\eta_{mh})}{100 \cdot \eta_{mh}}$ | [Nm] | $\Delta p =$ Differential pressure in bar |
| Power, pump mode (pressure drain mode) | $P = \frac{2\pi \cdot T \cdot n}{60000} = \frac{q_v \cdot \Delta p \cdot (\eta_t)}{600 \cdot \eta_t}$ | [kW] | $n =$ Speed in rpm |
| Drive speed (output speed) | $n = \frac{q_v \cdot 1000 \cdot (\eta_v)}{V_g \cdot \eta_v}$ | [rpm] | $\eta_v =$ Volumetric efficiency |
| | | | $\eta_{mh} =$ Mechanical-hydraulic efficiency |
| | | | $\eta_t =$ Overall efficiency ($\eta_t = \eta_v \cdot \eta_{mh}$) |

Technical data, A10VZO

Permissible radial and axial loading on drive shaft

| Size | 10 | 18 | 28 | 45 | 71 | 100 | 140 | 180 |
|--|-----|-----|------|------|------|------|------|------|
| Radial force, maximum | | | | | | | | |
|  at $a/2$ $F_{q\max}$ N | 250 | 250 | 1200 | 1500 | 1900 | 2300 | 2800 | 2300 |
| Axial force, maximum | | | | | | | | |
|  F_{ax} N | 400 | 400 | 1000 | 1500 | 2400 | 4000 | 4800 | 800 |

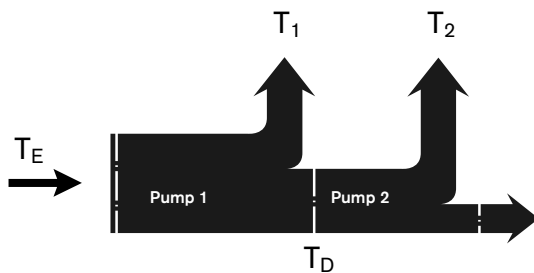
Permissible input and through-drive torques

| Size | NG | | 10 | 18 | 28 | 45 | 71 | 100 | 140 | 180 | |
|--|------------|--|----------|------------|------------|------------|----------|--------------|---------------|---------------|---------------|
| Torque at $V_{g\max}$ and $\Delta p = 280 \text{ bar}^1$ | T_{\max} | Nm | 50 | 90 | 140 | 225 | 356 | 500 | 701 | 901 | |
| Input torque at drive shaft, maximum ²⁾ | | | | | | | | | | | |
| ANSI B92.1a | S | $T_{E\max}$ \varnothing drive shaft | Nm in | 126 3/4 | 124 3/4 | 198 7/8 | 319 1 | 626 1 1/4 | 1104 1 1/2 | 1620 1 3/4 | 1620 1 3/4 |
| Through-drive torque at drive shaft, maximum | | | | | | | | | | | |
| | S | $T_{D\max}$ | Nm | 42 | 108 | 160 | 319 | 492 | 778 | 1266 | 1266 |

1) Without considering efficiency

2) For drive shafts free of radial load

Distribution of torque



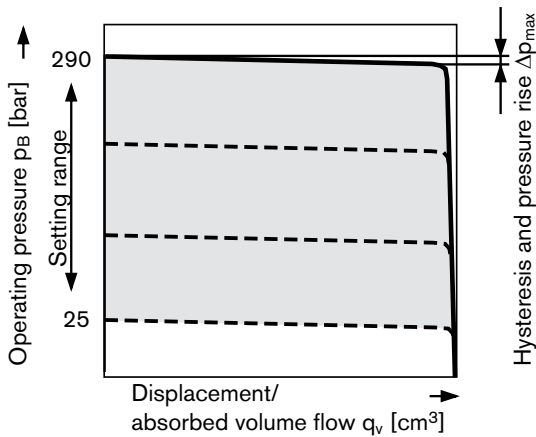
DR-Pressure control, A10VZO

The pressure control limits the maximum pressure at the pump output within the pump control range. The variable pump only supplies as much hydraulic fluid as is required by the consumers. If the operating pressure exceeds the pressure setpoint set at the integrated pressure valve, the pump will adjust towards a smaller displacement. The pressure can be set steplessly at the control valve.

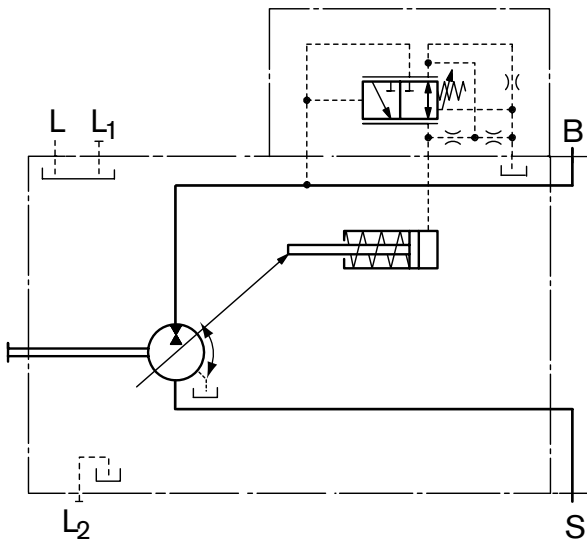
Please contact us with respect to applications with pressure control and changing direction of rotation.

Static characteristic

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

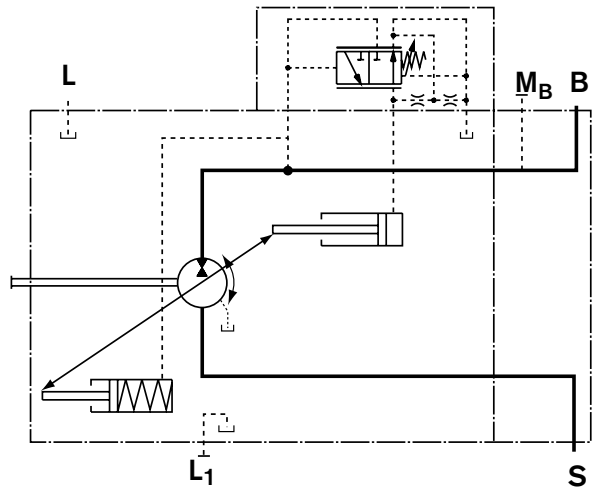


Schematic, A10VZO; size 10



| Ports for | |
|-------------------|--|
| B | Service line |
| S | Suction line |
| L, L ₁ | Case drain (L ₁ , L ₂ plugged) |

Schematic, A10VZO; size 18 to 180 port plate 22



| Port for | |
|-------------------|--|
| B | Service line |
| S | Suction line |
| L, L ₁ | Case drain (L ₁ plugged) |
| MB | Measuring operating pressure (plugged) |

Control data

Hysteresis and repeatability Δp _____ max. 3 bar

Pressure rise, max.

| | | | | | | | | |
|------------|-----|----|----|----|----|-----|-----|-----|
| NG | 10 | 18 | 28 | 45 | 71 | 100 | 140 | 180 |
| Δp | bar | 6 | 6 | 6 | 8 | 10 | 12 | 14 |

Control fluid consumption, _____ max. approx. 4.5 l/min

DRG-Pressure control, remotely operated

The DRG control valve overrides the function of the DR pressure control, see page 18.

A pressure-relief valve can be externally connected to port X as a remote control. This pressure-relief valve is included in the delivery contents of the DRG control.

The differential pressure at the control valve is set as standard to 20 bar. The pilot oil flow at port X is approx. 1.5 l/min. If another setting is required (range 10 to 22 bar), please state in clear text.

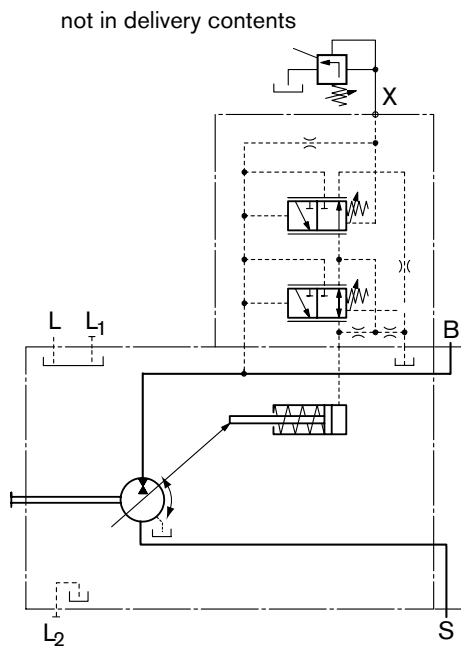
As a separate pressure-relief valve we recommend:

DBDH 6 (hydraulic) as per RE 25402 or
DBETR-SO 381 with orifice Ø 0.8 mm in P (electric) to RE 29166.

The maximum line length must not exceed 2 m.

Please contact us with respect to applications with remotely operated pressure control and changing direction of rotation.

Schematic, A10VZO; size 10



| Port for | |
|---------------------------|--|
| B | Service line |
| S | Suction line |
| L, L_{1,2} | Case drain (L ₁ , L ₂ plugged) |
| X | Pilot pressure (plugged) |

Control data

Hysteresis and repeatability Δp _____ max. 3 bar

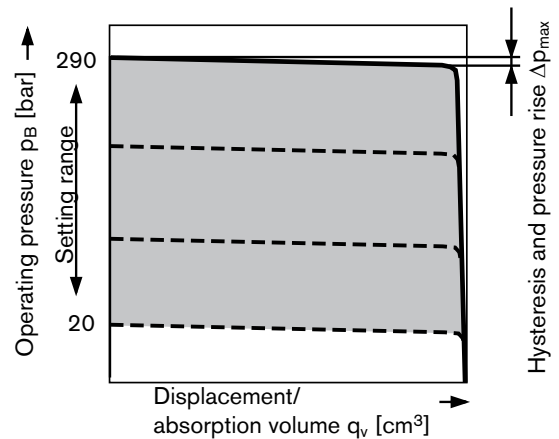
Pressure rise, max.

| | | | | | | | | | |
|------------|-----|----|----|----|----|-----|-----|-----|----|
| NG | 10 | 18 | 28 | 45 | 71 | 100 | 140 | 180 | |
| Δp | bar | 6 | 6 | 6 | 6 | 8 | 10 | 12 | 14 |

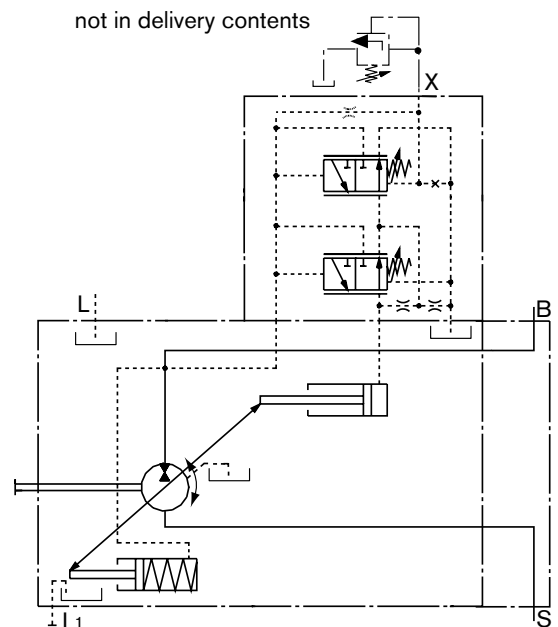
Control fluid consumption _____ max. approx. 4.5 l/min

Static characteristic

(at $n_1 = 1500$ rpm; $t_{fluid} = 50$ °C)



Schematic, A10VZO; size 18 to 180 port plate 22



| Port for | |
|-------------------------|--|
| B | Service line |
| S | Suction line |
| L, L₁ | Case drain (L ₁ plugged) |
| X | Pilot pressure (plugged) |
| M_B | Measuring operating pressure (plugged) |

LA.D-Pressure/torque controller (A10VZO)

Pressure control equipment as DR, see page 18.

In order to achieve a constant drive torque with varying operating pressure, the swivel angle and with it the output flow from the axial piston pump is varied so that the product of flow and pressure remains constant.

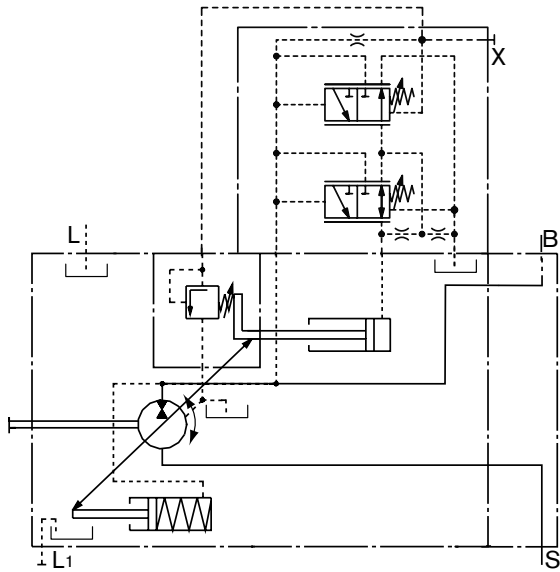
The torque characteristics are set at the plant. Please state in clear text, e.g. $T = 50 \text{ Nm}$.

Control data

For data and notes about the DR pressure control, see page 18.

For data and notes about the remotely operated DRG pressure control, see page 19.

Schematic, A10VZO LAxD with pressure cut-off,
size 18 to 180

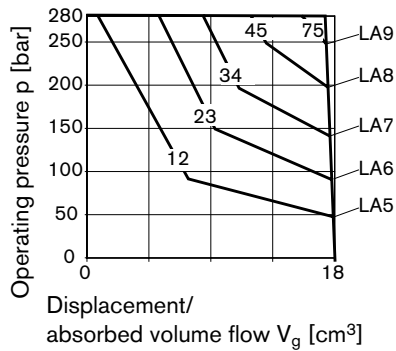


| | Port for |
|-------------------------|--|
| B | Service line |
| S | Suction line |
| L, L₁ | Case drain (L ₁ , L ₂ plugged) |

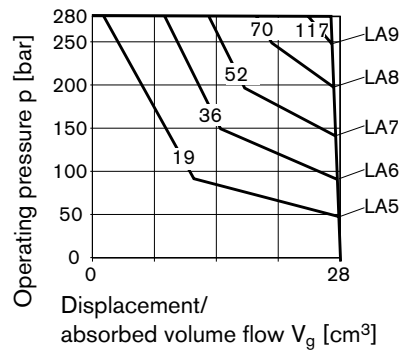
LA.D-Pressure/torque controller, characteristic curve (A10VZO)

Torque characteristic fields in Nm

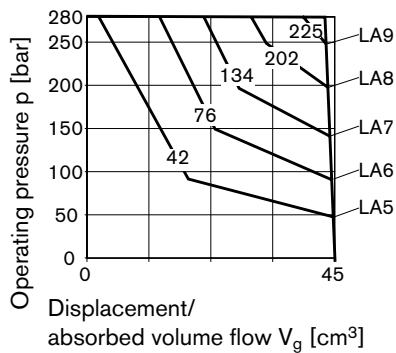
Size 18



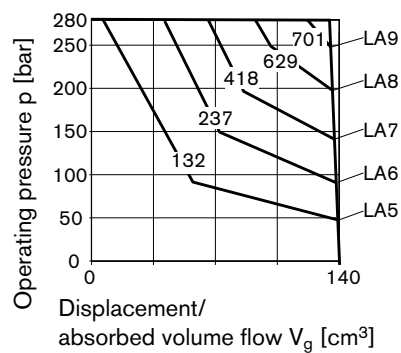
Size 28



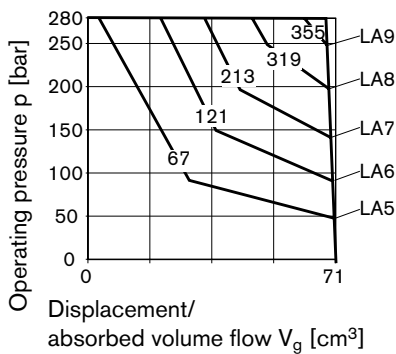
Size 45



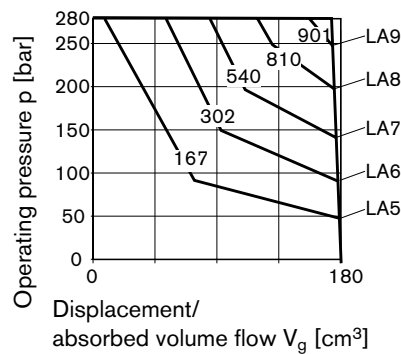
Size 140



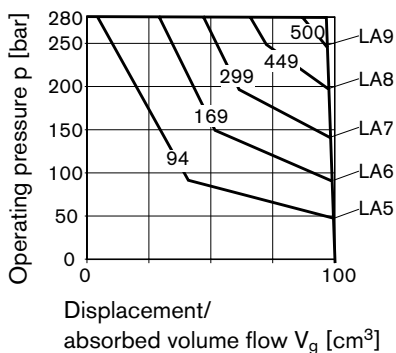
Size 71



Size 180



Size 100



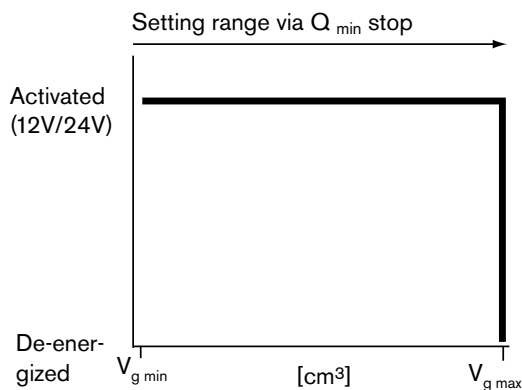
EZ-Two-point control, electric (A10VZO, A10VZG)

The variable displacement unit is set to minimum swivel angle by operating the switching solenoids. This supplies control pressure to the stroke piston via the switching valve.

The control pressure is taken internally from the respective high-pressure side, whereby a minimum operating pressure differential of $\Delta_{pA,B} \geq 20$ bar is required.

The axial piston unit can only be activated between $V_{g \max}$ and $V_{g \min}$.

Please state $V_{g \min}$ default setting in clear text when ordering.



De-energized $\hat{=} V_{g \max}$
 Current energized $\hat{=} V_{g \min}$

| Technical data, solenoid | EZ1/3 | EZ2/4 |
|--|--------------------|--------------------|
| Voltage | 12V ($\pm 15\%$) | 24V ($\pm 15\%$) |
| Position $V_{g \max}$ | De-energized | De-energized |
| Position $V_{g \min}$ | Current energized | Current energized |
| Rated current at 20 °C | 1.5 A | 0.8 A |
| Actuated time | 100% | 100% |
| Type of protection see connector design, page 55 | | |

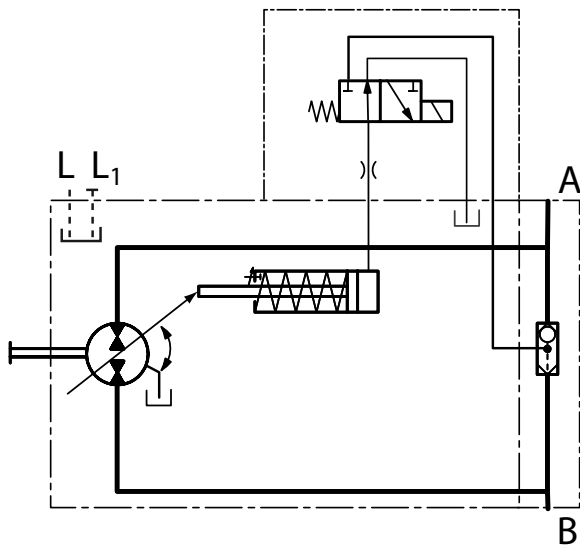
Ambient temperature range -20 °C to +60 °C.

If these temperatures cannot be achieved, please contact us.

For further information, please refer to page 55

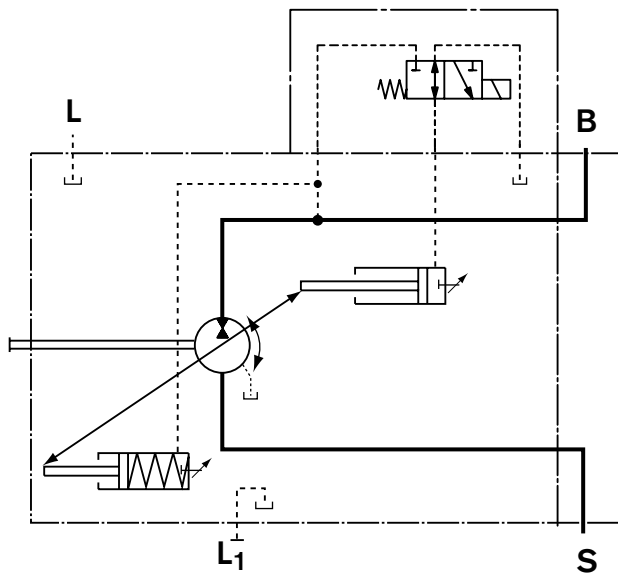
EZ-Two-point control, electric (A10VZO, A10VZG)

Schematic, A10VZG EZ1/2,



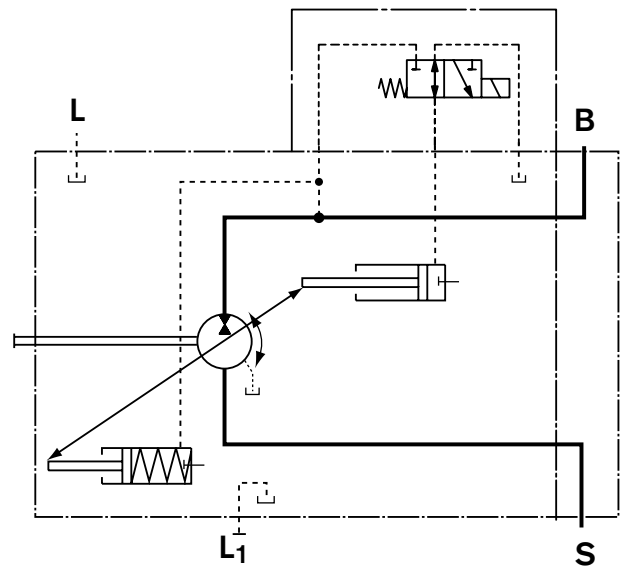
| Port for | |
|-------------------|-------------------------------------|
| A, B | Service line |
| L, L ₁ | Case drain (L ₁ plugged) |

Schematic, A10VZO EZ3/4; size 18 to 140
port plate 12



| Port for | |
|-------------------|-------------------------------------|
| B | Service line |
| S | Suction line |
| L, L ₁ | Case drain (L ₁ plugged) |

Schematic, A10VZO EZ3/4; size 45 to 180
port plate 22



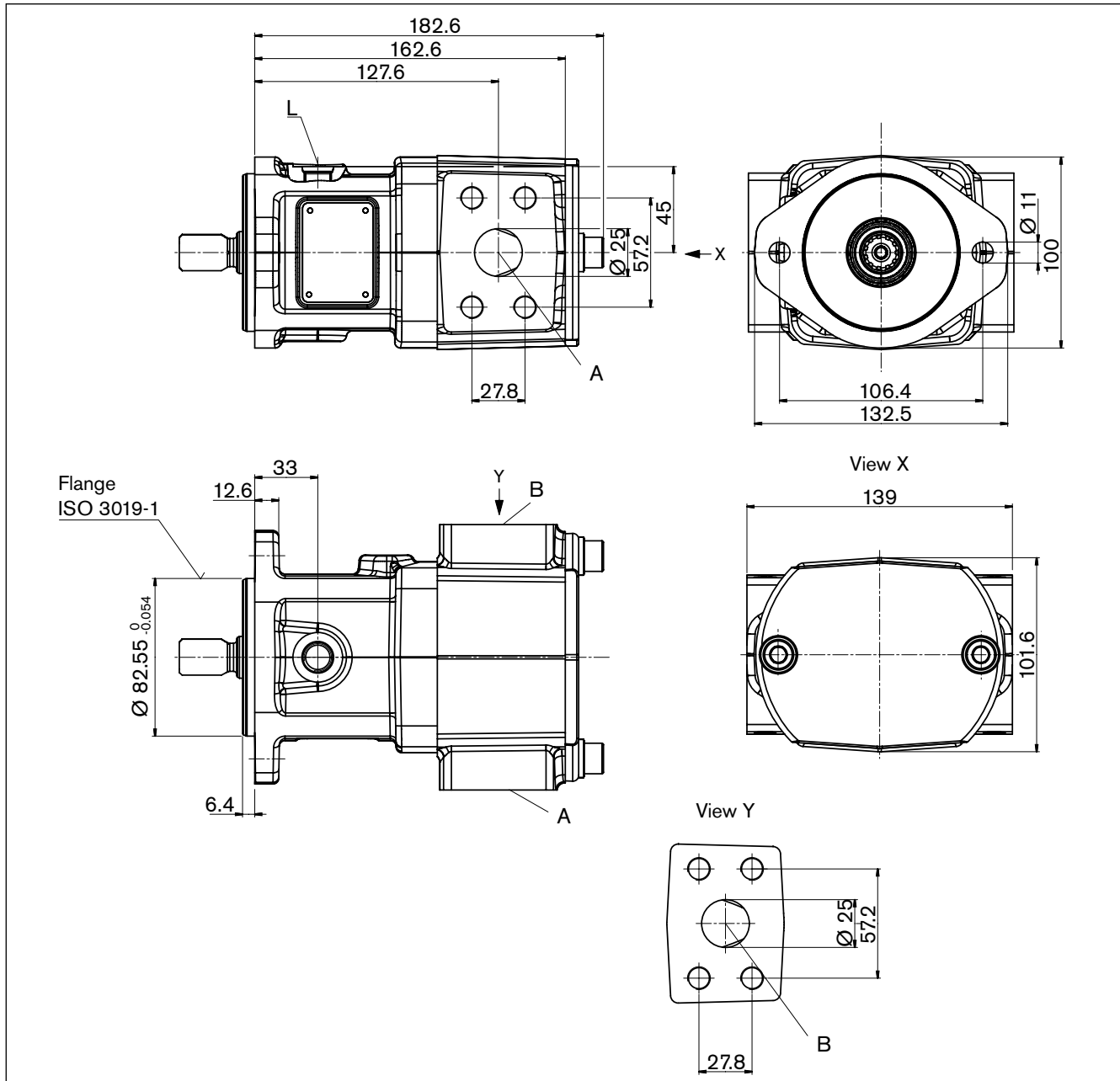
| Port for | |
|-------------------|-------------------------------------|
| B | Service line |
| S | Suction line |
| L, L ₁ | Case drain (L ₁ plugged) |

Dimensions, A10FZO

Size 06 to 10

Port plate 02: SAE flange port on opposite side, clockwise rotation

Before finalizing your design, request a certified installation drawing. Dimensions in mm.



Ports

| Designation | Port for | Standard | Size ¹⁾ | Maximum pressure [bar] ²⁾ | State |
|-------------|--|-------------------------|------------------------|--------------------------------------|-------|
| A, B | Suction and Service line ⁵⁾ | SAE J518 ³⁾ | 1 in | 350 | O |
| | Fixing thread | DIN 13 | M12 x 1.75; 17 deep | | |
| L | Case drain fluid | ISO 11926 ⁴⁾ | 9/16-18UNF-2B; 10 deep | 2 | O |

¹⁾ Please observe the general information on page 60 for the maximum tightening torques.

²⁾ Short-term pressure spikes may occur depending on the application. Keep this in mind when selecting measuring devices and fittings.

³⁾ Only dimensions complying with SAE J518. A metric fixing thread is a deviation from standard.

⁴⁾ The countersink may be deeper than specified in the standard.

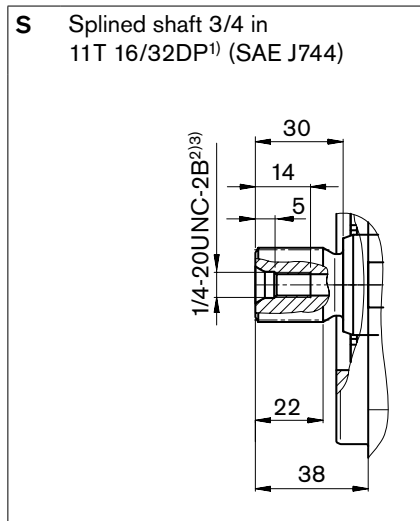
⁵⁾ See table on side 9

O = Must be connected (plugged on delivery)

Dimensions, A10FZO

Before finalizing your design, request a certified installation drawing. Dimensions in mm.

Drive shaft

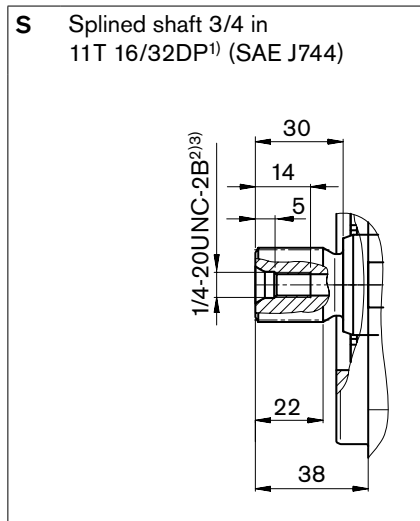


- 1) ANSI B92.1a, 30° pressure angle, flat base, flank centering, tolerance class 5
- 2) Thread according to ASME B1.1
- 3) Please observe the general information on page 68 for the maximum tightening torques.

Dimensions, A10FZG

Before finalizing your design, request a certified installation drawing. Dimensions in mm.

Drive shaft



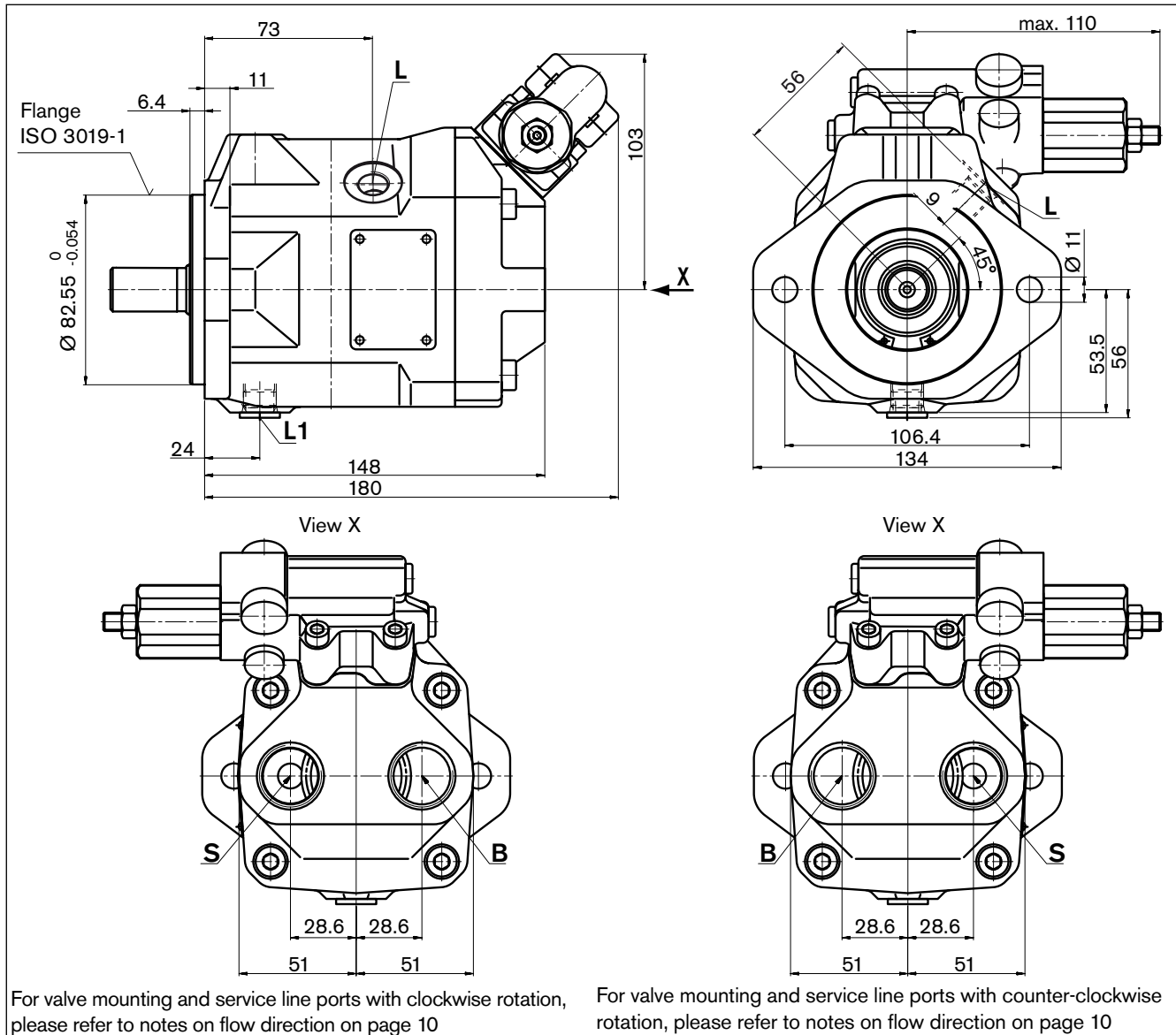
- 1) ANSI B92.1a, 30° pressure angle, flat base, flank centering, tolerance class 5
- 2) Thread according to ASME B1.1
- 3) Please observe the general information on page 68 for the maximum tightening torques.

Dimensions, A10VZO

Before finalizing your design, request a certified installation drawing. Dimensions in mm.

Size 10

DR pressure control, hydraulic, **port plate 14** – DIN threaded ports at rear, clockwise rotation



Ports

| Designation | Port for | Standard | Size ¹⁾ | Maximum pressure [bar] ²⁾ | State |
|----------------|------------------|-------------------------|------------------------|--------------------------------------|-----------------|
| B | Service line | DIN 3852-1 | 27 x 2; 16 deep | 315 | O |
| S | Suction line | DIN 3852-1 | 27 x 2; 16 deep | 5 | O |
| L | Case drain fluid | ISO 11968 ⁴⁾ | 9/16-18UNF-2B; 10 deep | 2 | O ³⁾ |
| L ₁ | Case drain fluid | ISO 11968 ⁴⁾ | 9/16-18UNF-2B; 10 deep | 2 | X ³⁾ |

1) Please observe the general information on page 60 for the maximum tightening torques.

2) Short-term pressure spikes may occur depending on the application. Keep this in mind when selecting measuring devices and fittings.

3) Depending on the installation position, L or L₁ must be connected (see installation notes on page 56, 57)

4) The countersink may be deeper than specified in the standard.

O = Must be connected (plugged on delivery)

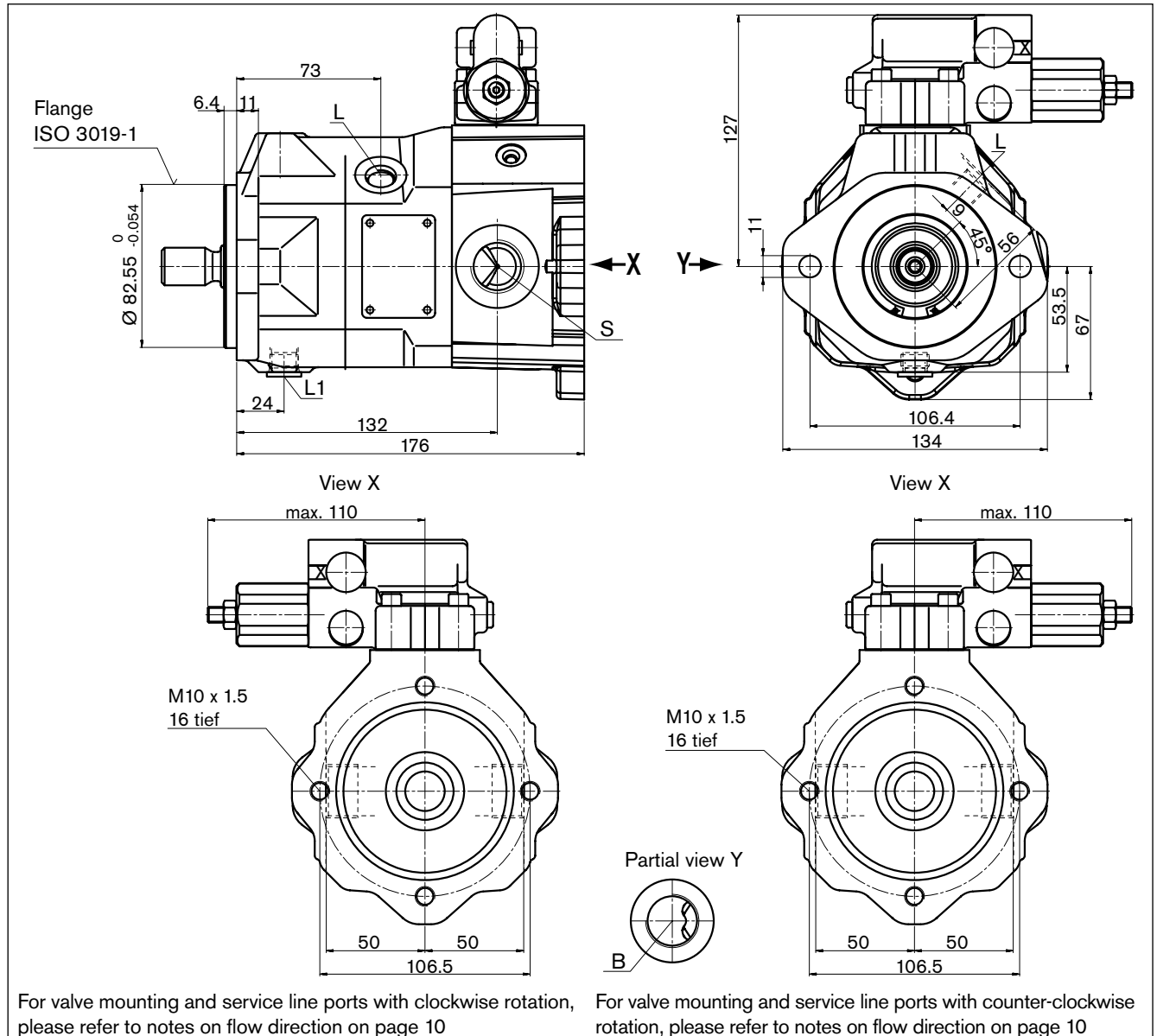
X = Plugged in normal operation

Dimensions, A10VZO

Before finalizing your design, request a certified installation drawing. Dimensions in mm.

Size 10

DR pressure control, hydraulic, **port plate 07** – DIN threaded ports on opposite side, clockwise rotation



Ports

| Designation | Port for | Standard | Size ¹⁾ | Maximum pressure [bar] ²⁾ | State |
|----------------|------------------|-------------------------|------------------------|--------------------------------------|-----------------|
| B | Service line | DIN 3852-1 | 27 x 2; 16 deep | 315 | O |
| S | Suction | DIN 3852-1 | 27 x 2; 16 deep | 5 | O |
| L | Case drain fluid | ISO 11968 ⁴⁾ | 9/16-18UNF-2B; 10 deep | 2 | O ³⁾ |
| L ₁ | Case drain fluid | ISO 11968 ⁴⁾ | 9/16-18UNF-2B; 10 deep | 2 | X ³⁾ |

1) Please observe the general information on page 60 for the maximum tightening torques.

2) Short-term pressure spikes may occur depending on the application. Keep this in mind when selecting measuring devices and fittings.

3) Depending on the installation position, L or L₁ must be connected (see installation notes on page 56, 57)

4) The countersink may be deeper than specified in the standard.

O = Must be connected (plugged on delivery)

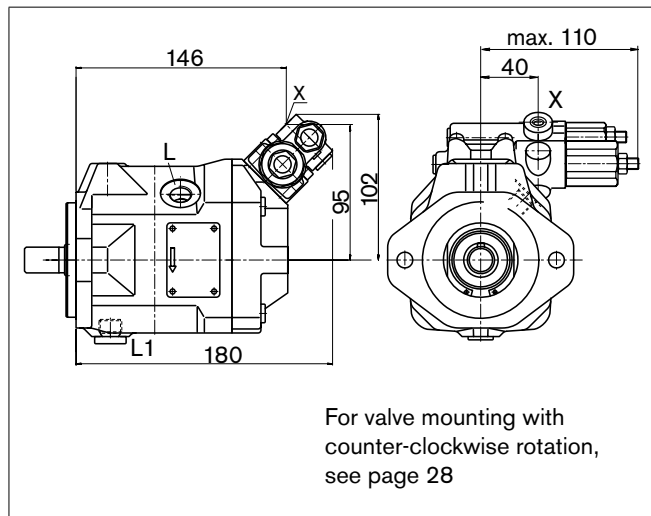
X = Plugged in normal operation

Dimensions, A10VZO

Before finalizing your design, request a certified installation drawing. Dimensions in mm.

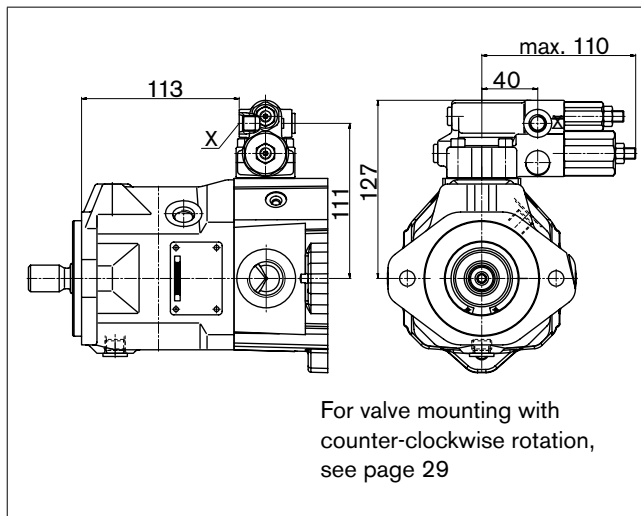
DRG

Remotely operated pressure control, **port plate 14**

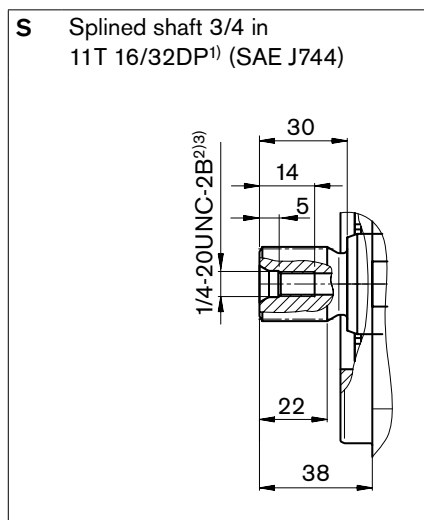


DRG

Remotely operated pressure control, **port plate 7**



Drive shaft



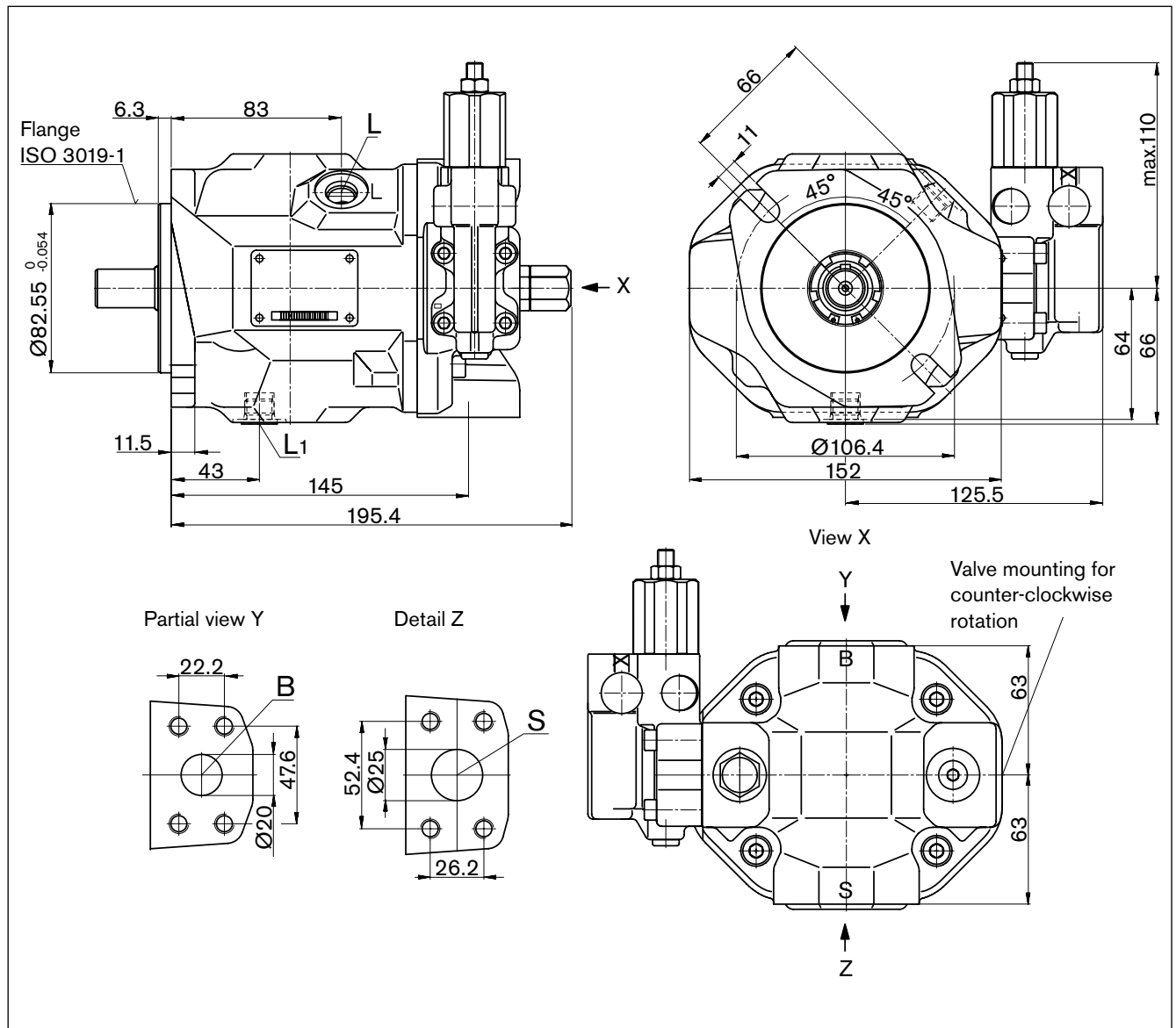
- 1) ANSI B92.1a, 30° pressure angle, flat base, flank centering, tolerance class 5
- 2) Thread according to ASME B1.1
- 3) Please observe the general information on page 60 for the maximum tightening torques.

Dimensions, A10VZO

Before finalizing your design, request a certified installation drawing. Dimensions in mm.

Size 18

DR pressure control, hydraulic, port plate 12: SAE flange port on opposite side, clockwise rotation



Ports

| Designation | Port for | Standard | Size ¹⁾ | Maximum pressure [bar] ²⁾ | State |
|----------------|-----------------------------|----------------------------------|------------------------------|--------------------------------------|-----------------|
| B | Service line, Fixing thread | SAE J518 ⁵⁾ DIN 13 | 3/4 in M10 x 1.5; 17 deep | 350 | O |
| S | Suction line, fixing thread | SAE J518 ⁵⁾ DIN 13 | 1 in M10 x 1.5; 17 deep | 10 | O |
| L | Case drain fluid | ISO 11926 ⁴⁾ | 9/16-18 UNF-2B; 10 deep | 2 | O ³⁾ |
| L ₁ | Case drain fluid | ISO 11926 ⁴⁾ | 9/16-18 UNF-2B; 10 deep | 2 | X ³⁾ |
| X | Pilot pressure | ISO 11926 ⁴⁾ | 7/16-20UNF-2B; 11.5 deep | 350 | O |

1) Please observe the general information on page 60 for the maximum tightening torques.

2) Short-term pressure spikes may occur depending on the application. Keep this in mind when selecting measuring devices and fittings.

3) Depending on the installation position, L or L₁ must be connected (see installation notes on page 56, 57)

4) The countersink may be deeper than specified in the standard.

5) Only dimensions complying with SAE J518. A metric fixing thread is a deviation from standard.

O = Must be connected (plugged on delivery)

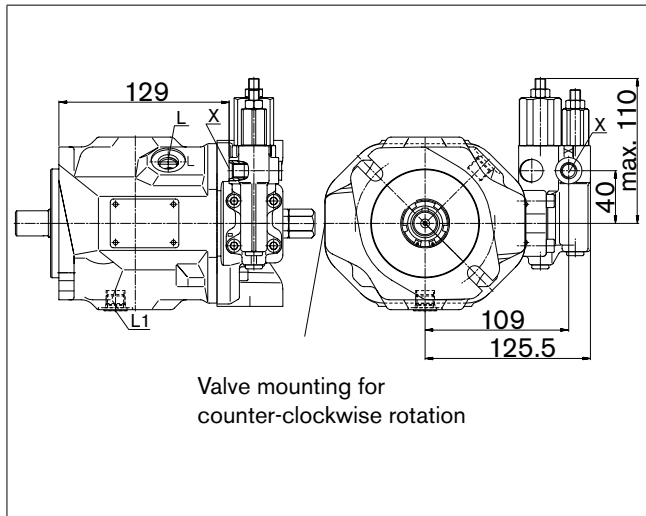
X = Plugged in normal operation

Dimensions, A10VZO

Before finalizing your design, request a certified installation drawing. Dimensions in mm.

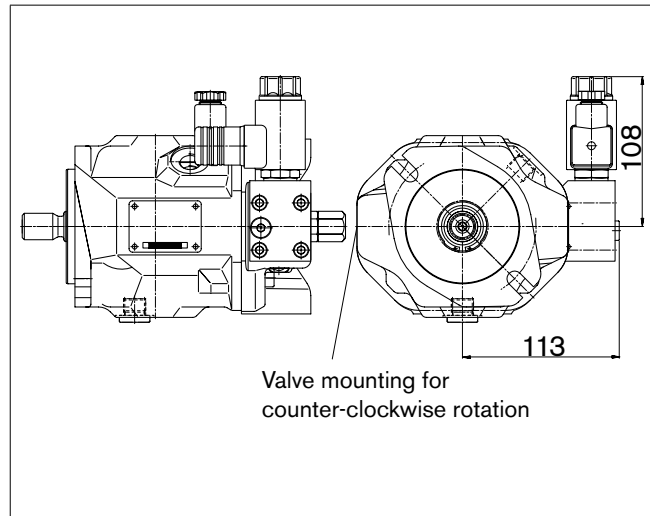
DRG

Pressure control, remotely operated



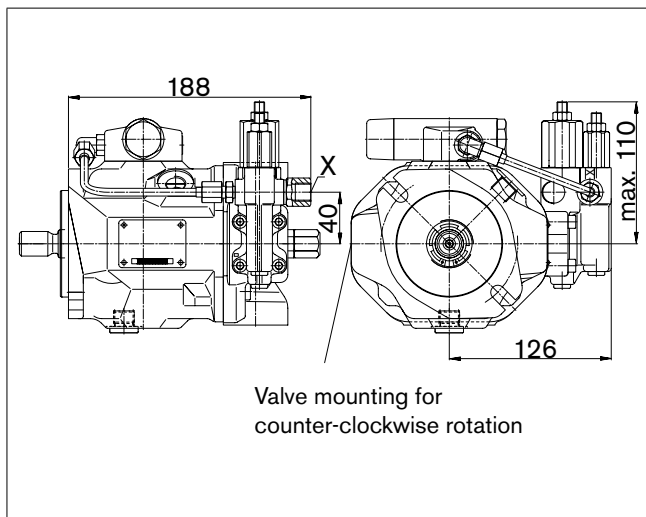
EZx

Two-point control, electric

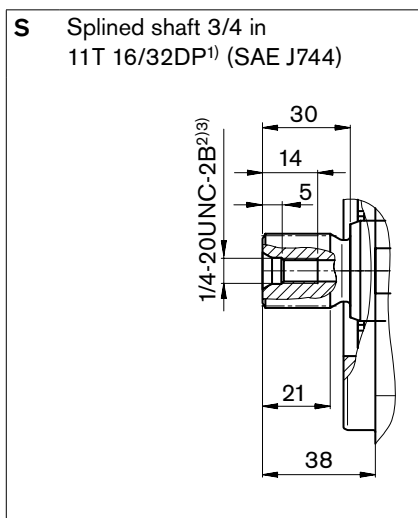


LAxD

Torque controller



Drive shaft



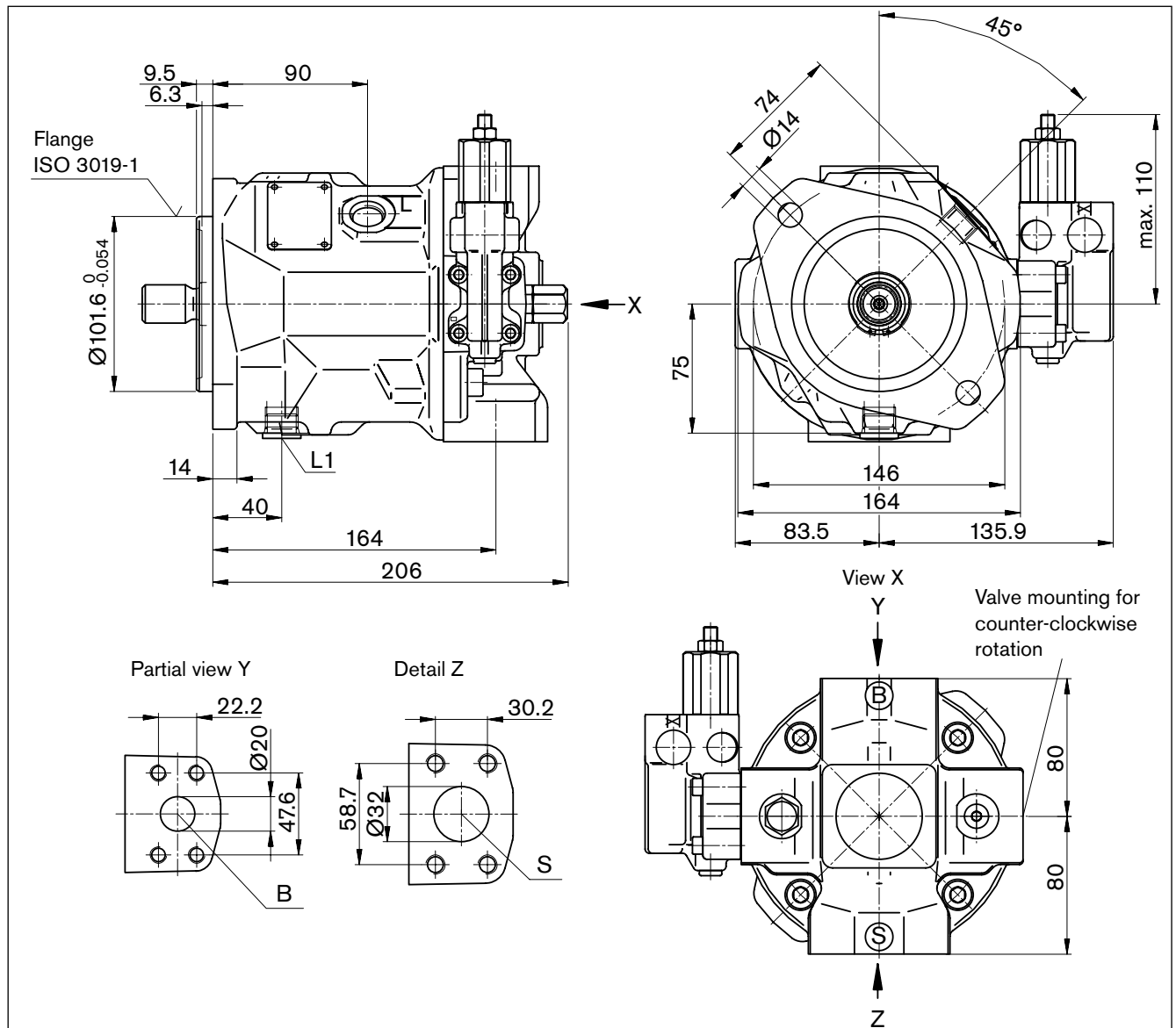
- 1) ANSI B92.1a, 30° pressure angle, flat base, flank centering, tolerance class 5
- 2) Thread according to ASME B1.1
- 3) Please observe the general information on page 60 for the maximum tightening torques.

Dimensions, A10VZO

Before finalizing your design, request a certified installation drawing. Dimensions in mm.

Size 28

DR pressure control, hydraulic, port plate 12: SAE flange port on opposite side, clockwise rotation



Ports

| Designation | Port for | Standard | Size ¹⁾ | Maximum pressure [bar] ²⁾ | State |
|----------------|-----------------------------|----------------------------------|--------------------------------|--------------------------------------|-----------------|
| B | Service line, Fixing thread | SAE J518 ⁵⁾ DIN 13 | 3/4 in M10 x 1.5; 17 deep | 350 | O |
| S | Suction line, fixing thread | SAE J518 ⁵⁾ DIN 13 | 1 1/4 in M10 x 1.5; 17 deep | 10 | O |
| L | Case drain fluid | ISO 11926 ⁴⁾ | 3/4-16 UNF-2B; 11 deep | 2 | O ³⁾ |
| L ₁ | Case drain fluid | ISO 11926 ⁴⁾ | 3/4-16 UNF-2B; 11 deep | 2 | X ³⁾ |
| X | Pilot pressure | ISO 11926 ⁴⁾ | 7/16-20UNF-2B; 11.5 deep | 350 | O |

1) Please observe the general information on page 60 for the maximum tightening torques.

2) Short-term pressure spikes may occur depending on the application. Keep this in mind when selecting measuring devices and fittings.

3) Depending on the installation position, L or L₁ must be connected (see installation notes on page 56, 57)

4) The countersink may be deeper than specified in the standard.

5) Only dimensions complying with SAE J518. A metric fixing thread is a deviation from standard.

O = Must be connected (plugged on delivery)

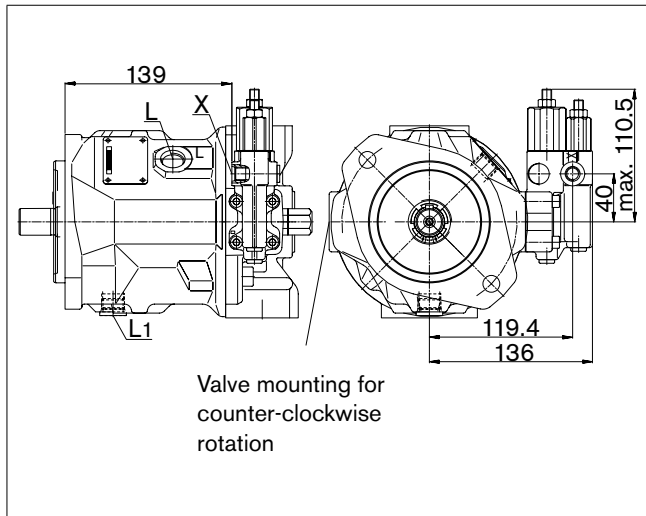
X = Plugged in normal operation

Dimensions, A10VZO

Before finalizing your design, request a certified installation drawing. Dimensions in mm.

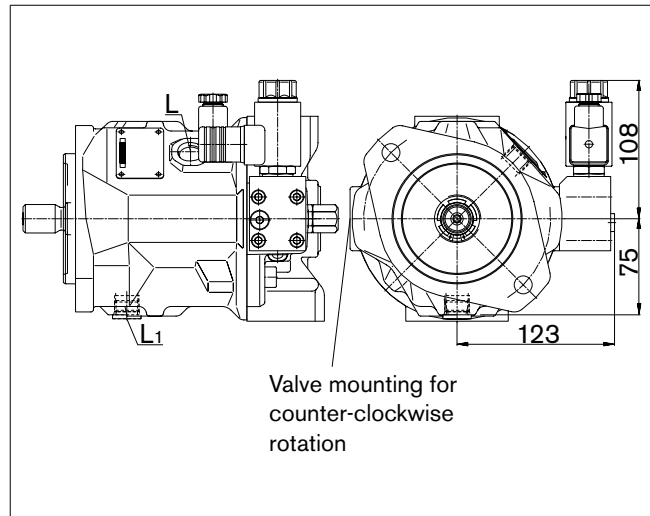
DRG

Pressure control, remotely operated



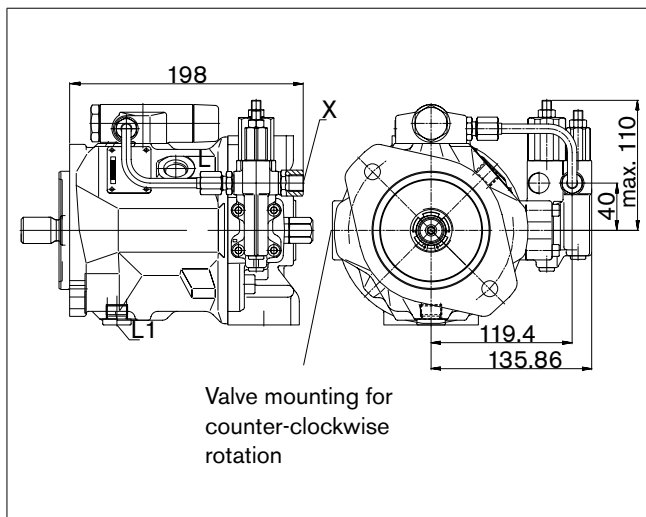
EZx

Two-point control, electric

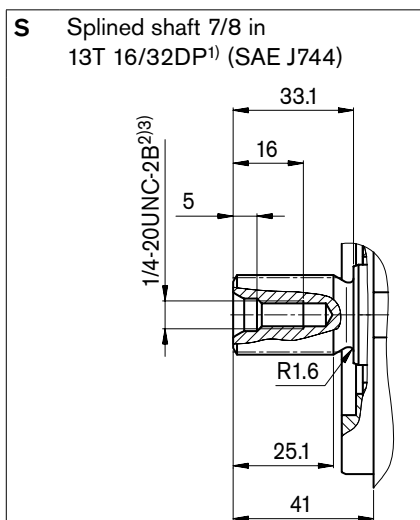


LAxD

Torque controller



Drive shaft



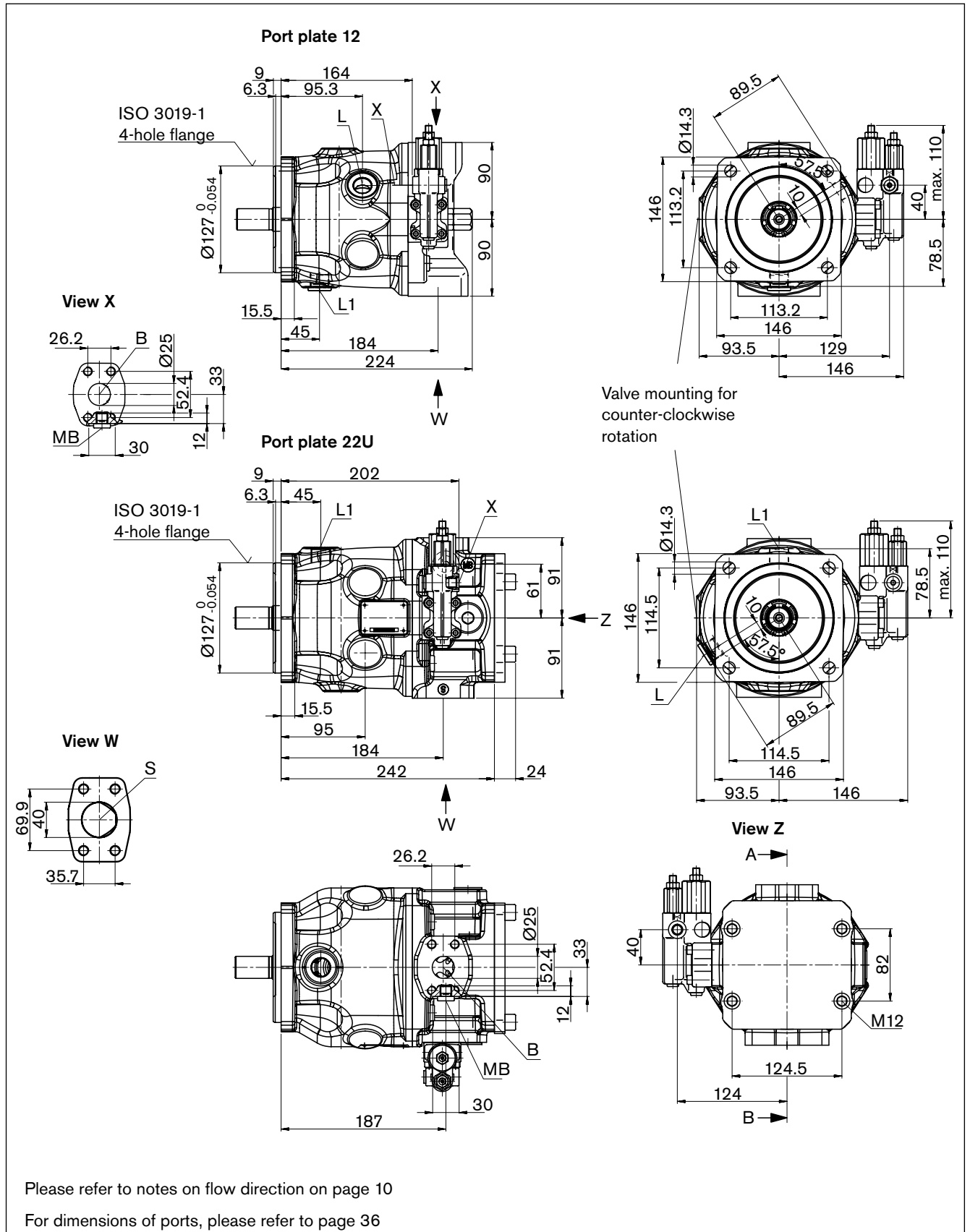
- 1) ANSI B92.1a, 30° pressure angle, flat base, flank centering, tolerance class 5
- 2) Thread according to ASME B1.1
- 3) Please observe the general information on page 60 for the maximum tightening torques.

Dimensions, A10VZO

Before finalizing your design, request a certified installation drawing. Dimensions in mm.

Size 45

DRG pressure control, remotely operated, port plate 12/22: SAE flange port on opposite side, clockwise rotation



Please refer to notes on flow direction on page 10

For dimensions of ports, please refer to page 36

Dimensions, A10VZO

Before finalizing your design, request a certified installation drawing. Dimensions in mm.

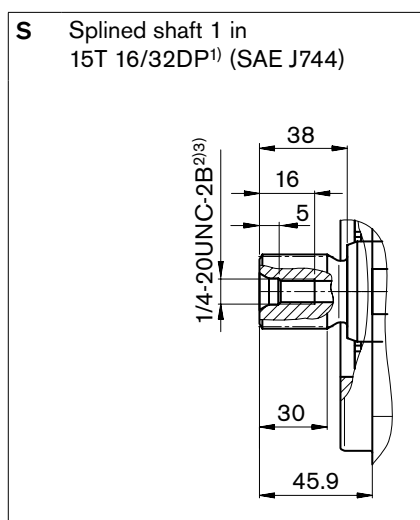
Size 45

Ports

| Designation | Port for | Standard | Size ¹⁾ | Maximum pressure [bar] ²⁾ | State |
|----------------|--------------------------------|----------------------------------|---------------------------------|--------------------------------------|-----------------|
| B | Service line, Fixing thread | SAE J518 ⁵⁾ DIN 13 | 1 in M10 x 1.5; 17 deep | 350 | O |
| S | Suction line, fixing thread | SAE J518 ⁵⁾ DIN 13 | 1 1/2 in M12 x 1.75; 20 deep | 10 | O |
| L | Case drain fluid | ISO 11926 ⁴⁾ | 7/8-14 UNF-2B; 13 deep | 2 | O ³⁾ |
| L ₁ | Case drain fluid | ISO 11926 ⁴⁾ | 7/8-14 UNF-2B; 13 deep | 2 | X ³⁾ |
| X | Pilot pressure | ISO 11926 ⁴⁾ | 7/16-20UNF-2B; 11.5 deep | 350 | O |
| M _B | Measuring, pressure B | DIN 3852 ⁴⁾ | G 1/4 in; 12 deep | 350 | X |

- 1) Please observe the general information on page 60 for the maximum tightening torques.
 - 2) Short-term pressure spikes may occur depending on the application. Keep this in mind when selecting measuring devices and fittings.
 - 3) Depending on the installation position, L or L₁ must be connected (see installation notes on page 56, 57)
 - 4) The countersink may be deeper than specified in the standard.
 - 5) Only dimensions complying with SAE J518. A metric fixing thread is a deviation from standard.
- O = Must be connected (plugged on delivery)
X = Plugged in normal operation

Drive shaft



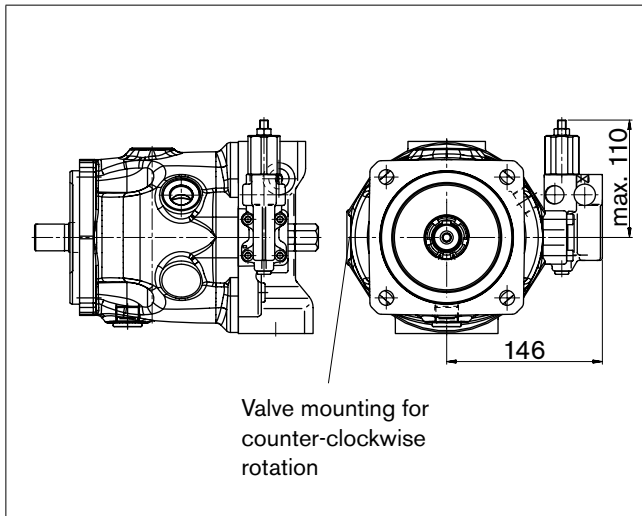
- 1) ANSI B92.1a, 30° pressure angle, flat base, flank centering, tolerance class 5
- 2) Thread according to ASME B1.1
- 3) Please observe the general information on page 60 for the maximum tightening torques.

Dimensions, A10VZO

Before finalizing your design, request a certified installation drawing. Dimensions in mm.

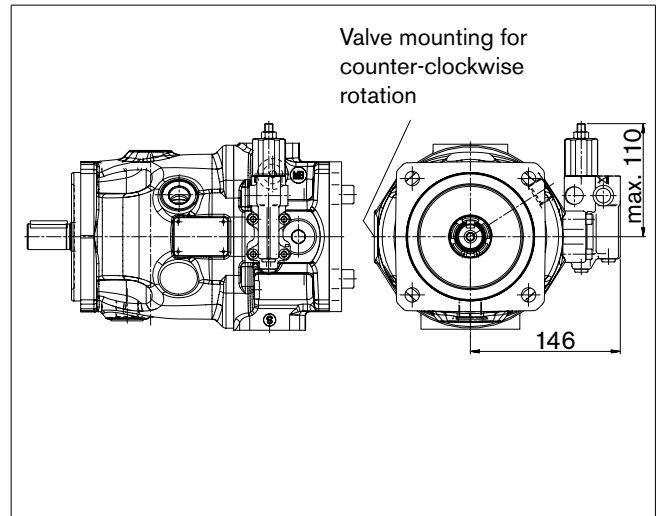
DR

Hydraulic pressure control, port plate 12



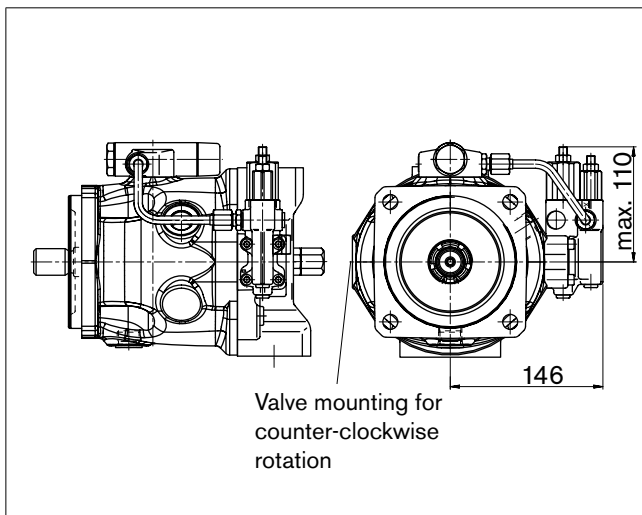
DR

Hydraulic pressure control, port plate 22



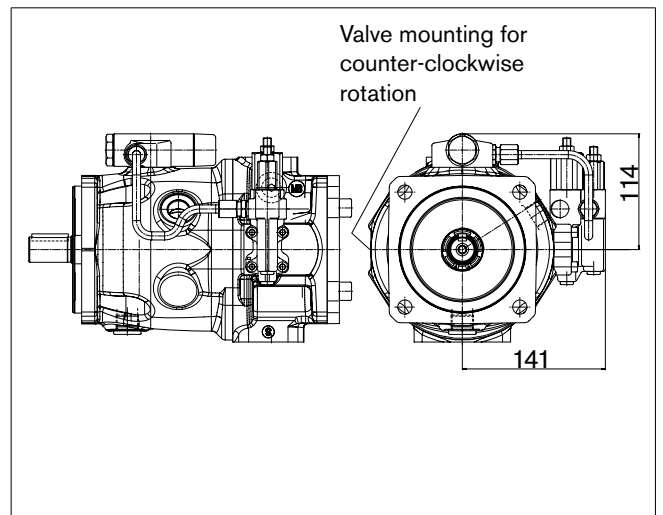
LAXD

Torque controller, port plate 12



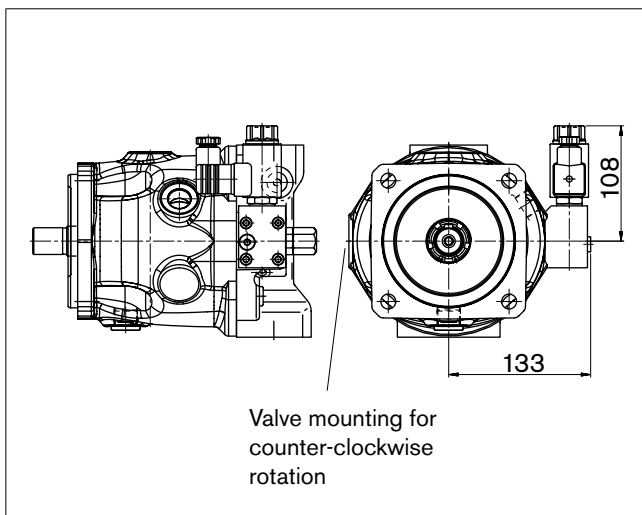
LAXD

Torque controller, port plate 22



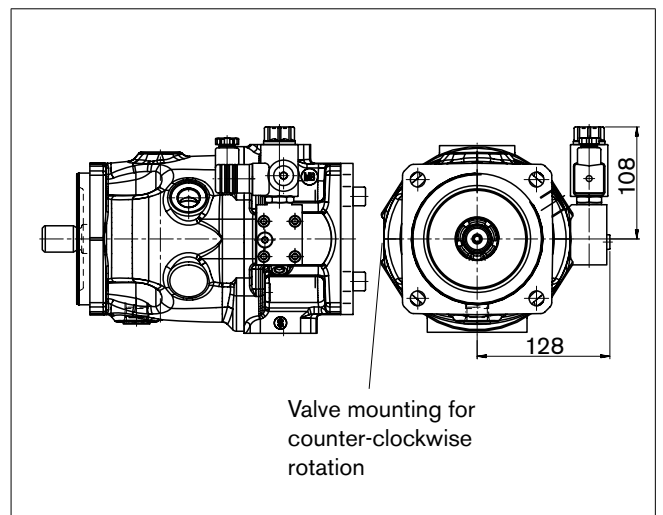
EZx

Two-point control, electric, port plate 12



EZx

Two-point control, electric, port plate 22

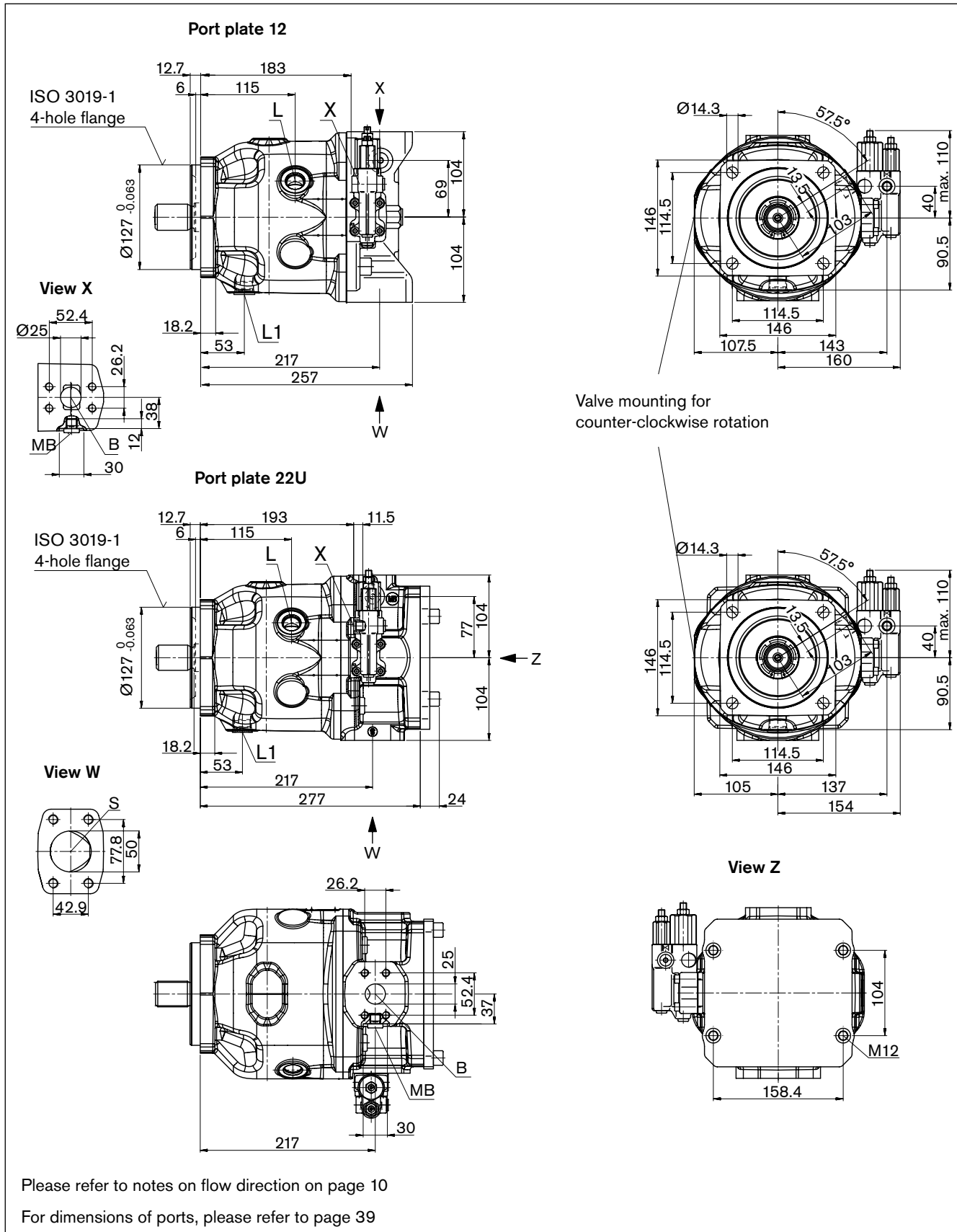


Dimensions, A10VZO

Before finalizing your design, request a certified installation drawing. Dimensions in mm.

Size 71

DRG pressure control, remotely operated, port plate 12/22: SAE flange port on opposite side, clockwise rotation



Please refer to notes on flow direction on page 10

For dimensions of ports, please refer to page 39

Dimensions, A10VZO

Before finalizing your design, request a certified installation drawing. Dimensions in mm.

Size 71

Ports

| Designation | Port for | Standard | Size ¹⁾ | Maximum pressure [bar] ²⁾ | State |
|----------------|--------------------------------|----------------------------------|-----------------------------|--------------------------------------|-----------------|
| B | Service line, Fixing thread | SAE J518 ⁵⁾ DIN 13 | 1 in M10 x 1.5 ; 17 deep | 350 | O |
| S | Suction line, fixing thread | SAE J518 ⁵⁾ DIN 13 | 2 in M12 x 1.75; 20 deep | 10 | O |
| L | Case drain fluid | ISO 11926 ⁴⁾ | 7/8-14 UNF-2B; 12 deep | 2 | O ³⁾ |
| L ₁ | Case drain fluid | ISO 11926 ⁴⁾ | 7/8-14 UNF-2B; 12 deep | 2 | X ³⁾ |
| X | Pilot pressure | ISO 11926 ⁴⁾ | 7/16-20UNF-2B; 11.5 deep | 350 | O |
| M _B | Measuring, pressure B | DIN 3852 ⁴⁾ | G 1/4 in; 12 deep | 350 | X |

1) Please observe the general information on page 60 for the maximum tightening torques.

2) Short-term pressure spikes may occur depending on the application. Keep this in mind when selecting measuring devices and fittings.

3) Depending on the installation position, L or L₁ must be connected (see installation notes on page 56, 57)

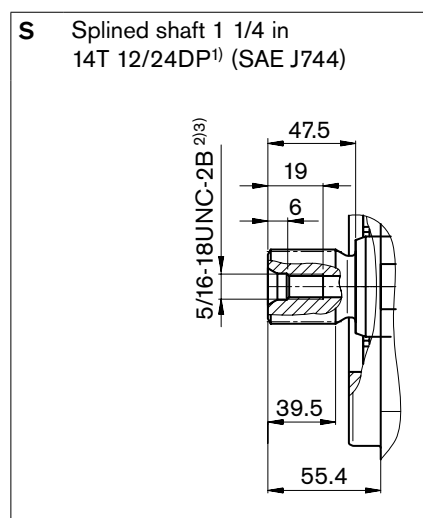
4) The countersink may be deeper than specified in the standard.

5) Only dimensions complying with SAE J518. A metric fixing thread is a deviation from standard.

O = Must be connected (plugged on delivery)

X = Plugged in normal operation

Drive shaft



1) ANSI B92.1a, 30° pressure angle, flat base, flank centering, tolerance class 5

2) Thread according to ASME B1.1

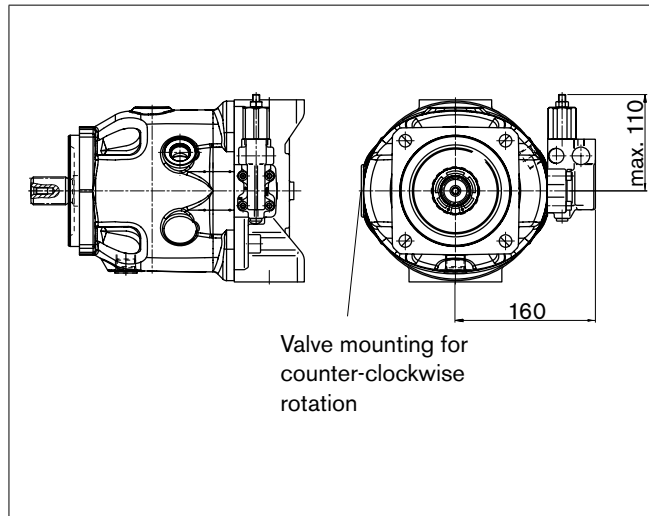
3) Please observe the general information on page 60 for the maximum tightening torques.

Dimensions, A10VZO

Before finalizing your design, request a certified installation drawing. Dimensions in mm.

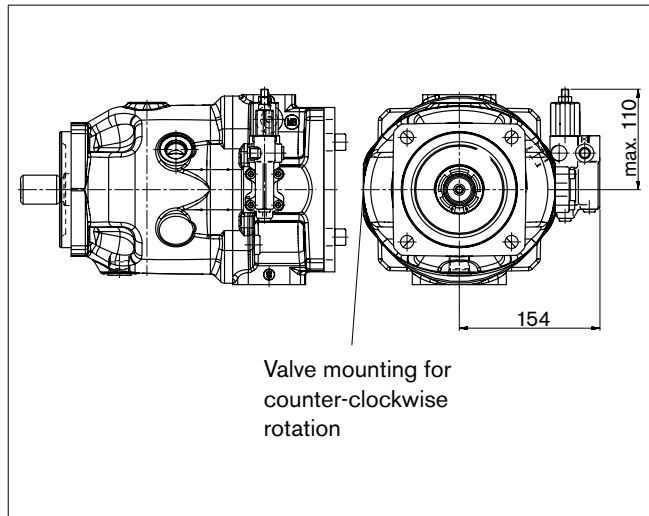
DR

Hydraulic pressure control, port plate 12



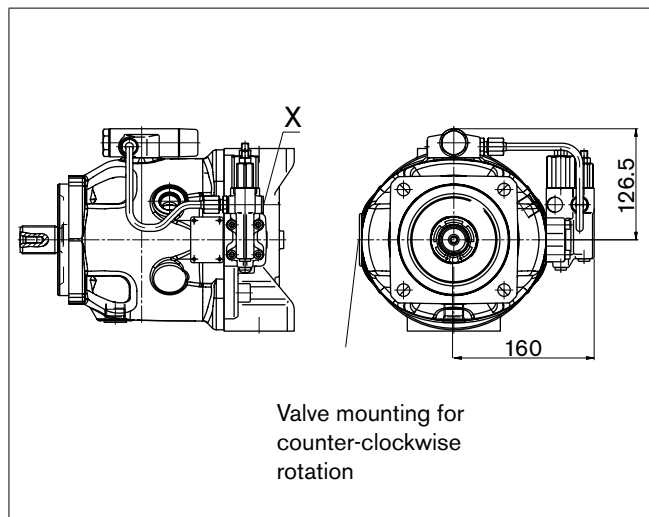
DR

Hydraulic pressure control, port plate 22



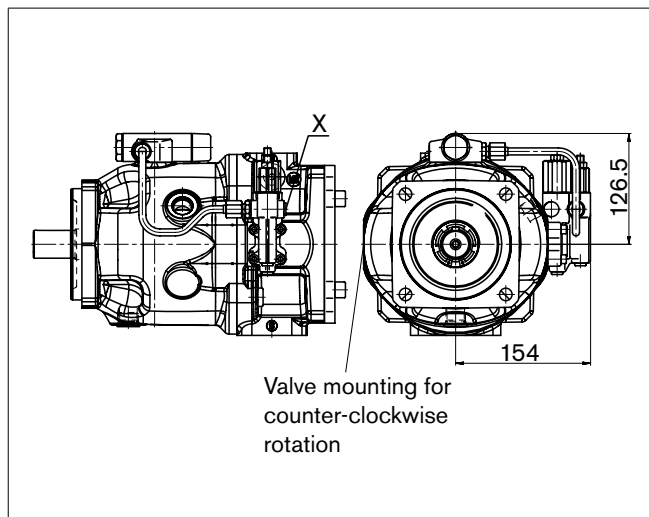
LAxD

Torque controller, port plate 12



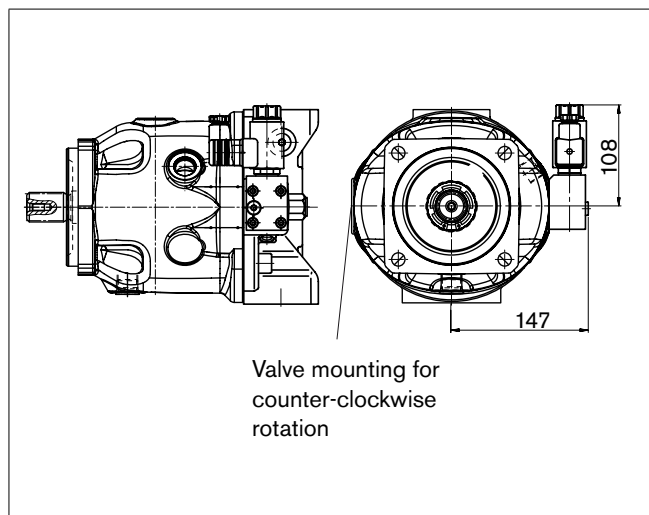
LAxD

Torque controller, port plate 22



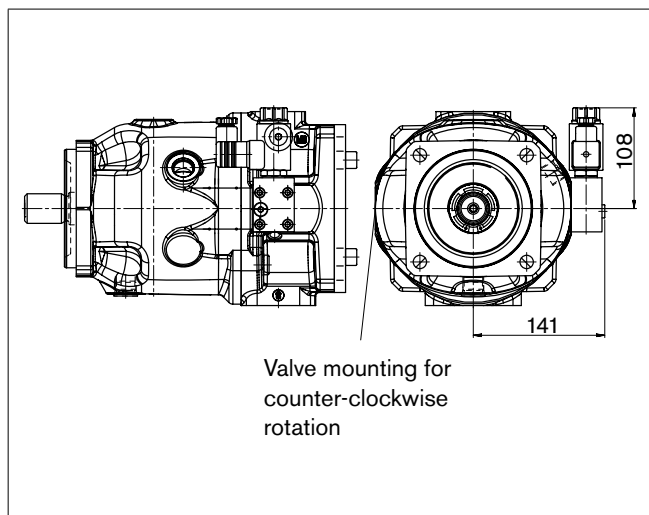
EZx

Two-point control, electric, port plate 12



EZx

Two-point control, electric, port plate 22

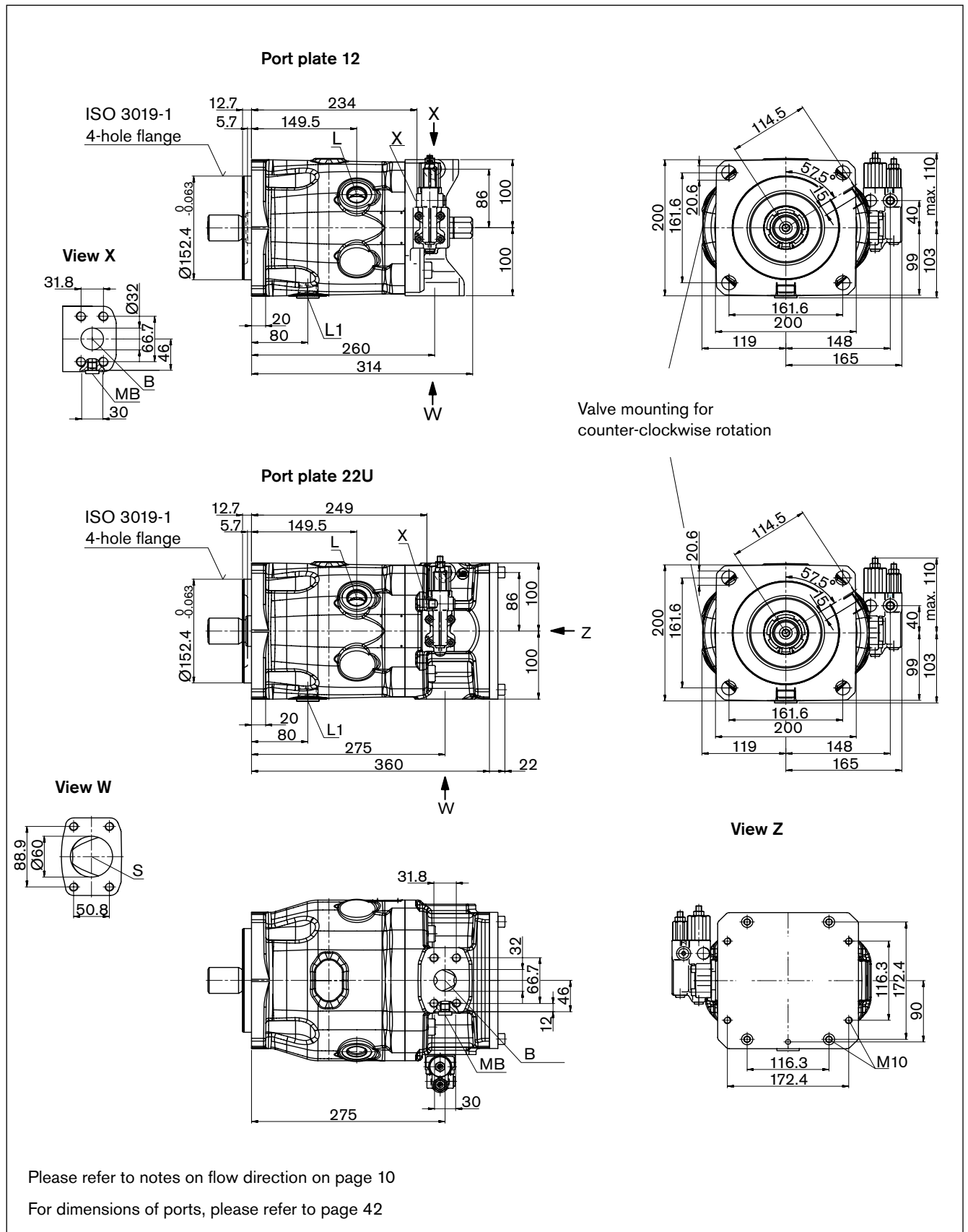


Dimensions, A10VZO

Before finalizing your design, request a certified installation drawing. Dimensions in mm.

Size 100

DRG pressure control, remotely operated, port plate 12/22: SAE flange port on opposite side, clockwise rotation



Please refer to notes on flow direction on page 10

For dimensions of ports, please refer to page 42

Dimensions, A10VZO

Before finalizing your design, request a certified installation drawing. Dimensions in mm.

Size 100

Ports

| Designation | Port for | Standard | Size ¹⁾ | Maximum pressure [bar] ²⁾ | State |
|----------------|--------------------------------|----------------------------------|---------------------------------|--------------------------------------|-----------------|
| B | Service line, Fixing thread | SAE J518 ⁵⁾ DIN 13 | 1 1/4 in M14 x 2 ; 19 deep | 350 | O |
| S | Suction line, fixing thread | SAE J518 ⁵⁾ DIN 13 | 2 1/2 in M12 x 1.75; 17 deep | 10 | O |
| L | Case drain fluid | ISO 11926 ⁴⁾ | 1 1/16-12 UNF-2B; 15 deep | 2 | O ³⁾ |
| L ₁ | Case drain fluid | ISO 11926 ⁴⁾ | 1 1/16-12 UNF-2B; 15 deep | 2 | X ³⁾ |
| X | Pilot pressure | ISO 11926 ⁴⁾ | 7/16-20UNF-2B; 11.5 deep | 350 | O |
| M _B | Measuring pressure in B | DIN 3852 ⁴⁾ | G 1/4 in; 12 deep | 350 | X |

1) Please observe the general information on page 60 for the maximum tightening torques.

2) Short-term pressure spikes may occur depending on the application. Keep this in mind when selecting measuring devices and fittings.

3) Depending on the installation position, L or L₁ must be connected (see installation notes on page 56, 57)

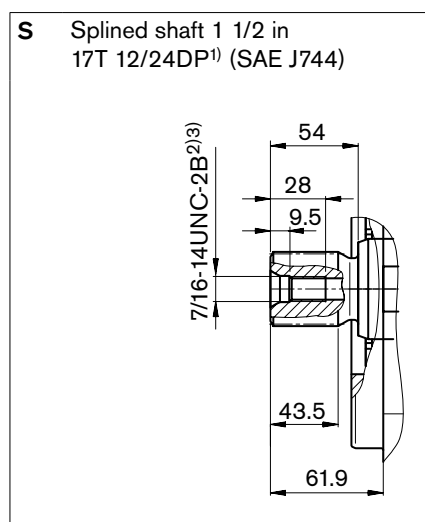
4) The countersink may be deeper than specified in the standard.

5) Only dimensions complying with SAE J518. A metric fixing thread is a deviation from standard.

O = Must be connected (plugged on delivery)

X = Plugged in normal operation

Drive shaft



1) ANSI B92.1a, 30° pressure angle, flat base, flank centering, tolerance class 5

2) Thread according to ASME B1.1

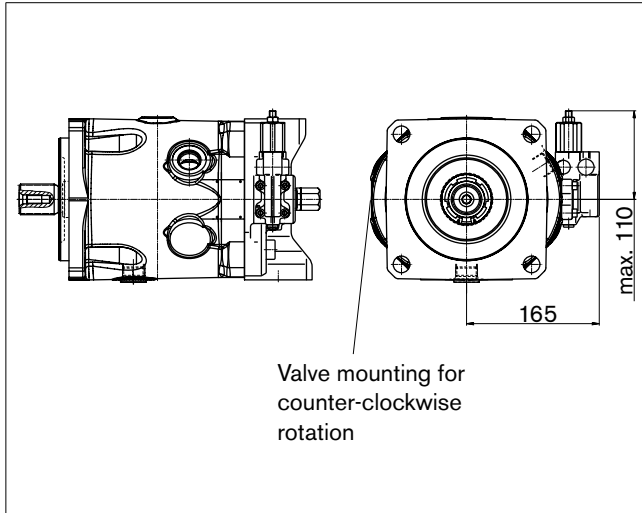
3) Please observe the general information on page 68 for the maximum tightening torques.

Dimensions, A10VZO

Before finalizing your design, request a certified installation drawing. Dimensions in mm.

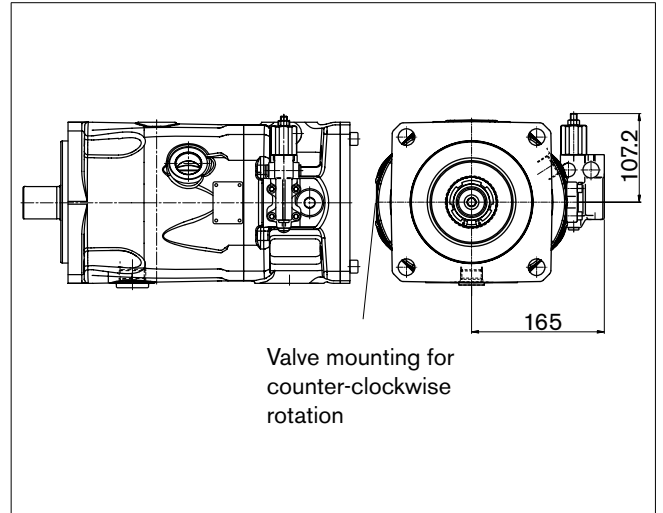
DR

Hydraulic pressure control, port plate 12



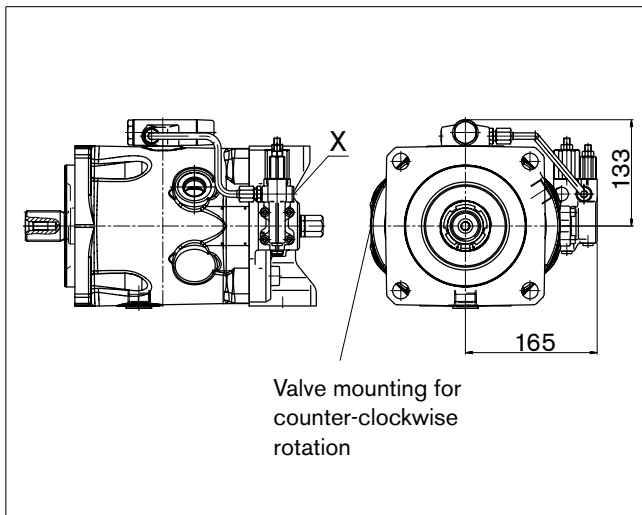
DR

Hydraulic pressure control, port plate 22



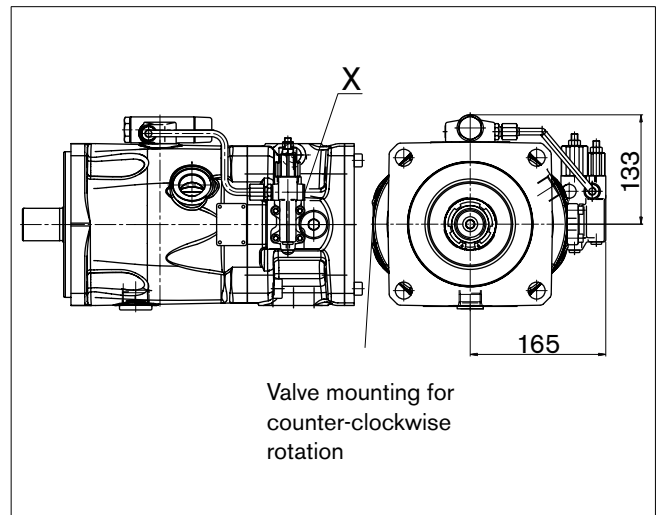
LAXD

Torque controller, port plate 12



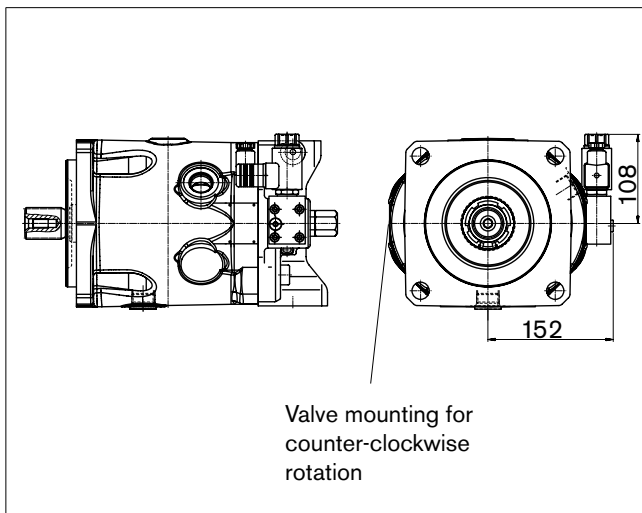
LAXD

Torque controller, port plate 22



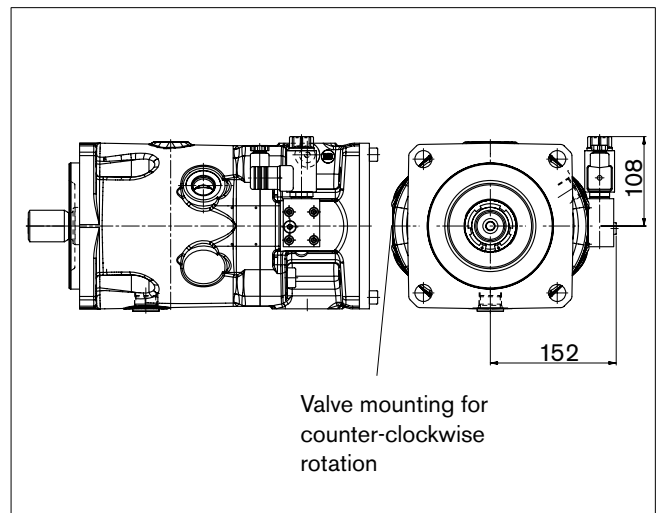
EZx

Two-point control, electric, port plate 12



EZx

Two-point control, electric, port plate 22

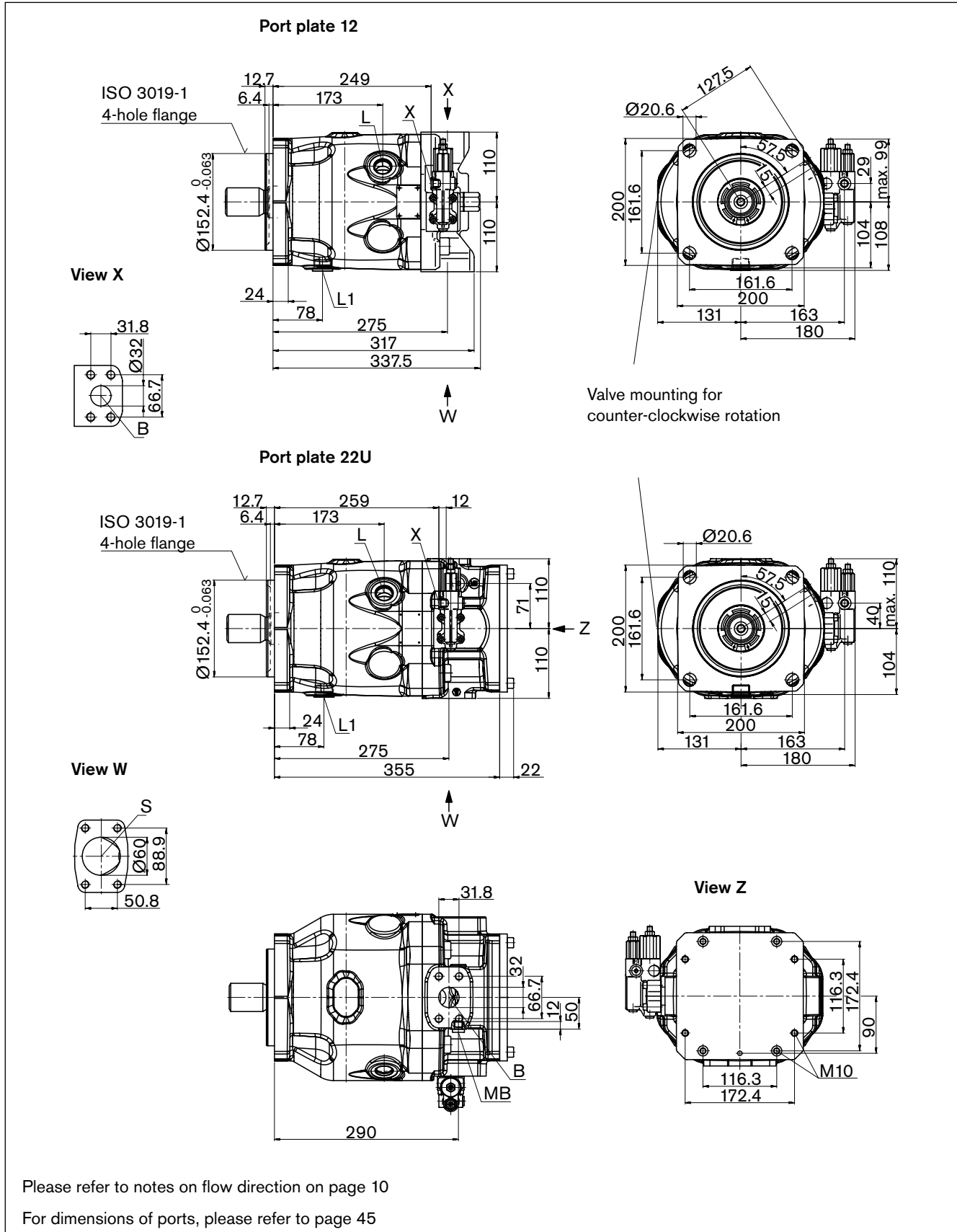


Dimensions, A10VZO

Before finalizing your design, request a certified installation drawing. Dimensions in mm.

Size 140

DRG pressure control, remotely operated, port plate 12/22: SAE flange port on opposite side, clockwise rotation



Please refer to notes on flow direction on page 10

For dimensions of ports, please refer to page 45

Dimensions, A10VZO

Before finalizing your design, request a certified installation drawing. Dimensions in mm.

Size 140

Ports

| Designation | Port for | Standard | Size ¹⁾ | Maximum pressure [bar] ²⁾ | State |
|----------------|--------------------------------|----------------------------------|---------------------------------|--------------------------------------|-----------------|
| B | Service line, Fixing thread | SAE J518 ⁵⁾ DIN 13 | 1 1/4 in M14 x 2 ; 19 deep | 350 | O |
| S | Suction line, fixing thread | SAE J518 ⁵⁾ DIN 13 | 2 1/2 in M12 x 1.75; 17 deep | 10 | O |
| L | Case drain fluid | ISO 11926 ⁴⁾ | 1 1/16-12 UNF-2B; 15 deep | 2 | O ³⁾ |
| L ₁ | Case drain fluid | ISO 11926 ⁴⁾ | 1 1/16-12 UNF-2B; 15 deep | 2 | X ³⁾ |
| X | Pilot pressure | ISO 11926 ⁴⁾ | 7/16-20UNF-2B; 12 deep | 350 | O |
| M _B | Measuring, pressure B | DIN 3852 ⁴⁾ | G 1/4 in; 12 deep | 350 | X |

1) Please observe the general information on page 60 for the maximum tightening torques.

2) Short-term pressure spikes may occur depending on the application. Keep this in mind when selecting measuring devices and fittings.

3) Depending on the installation position, L or L₁ must be connected (see installation notes on page 56, 57)

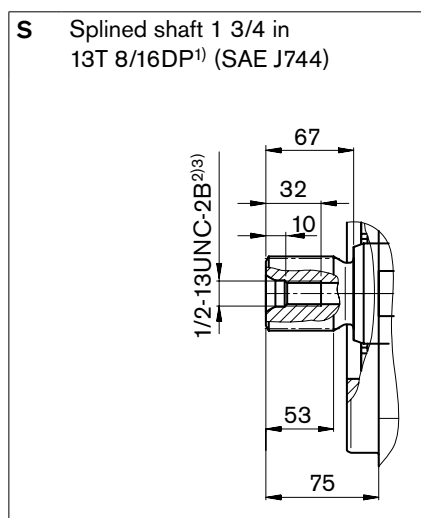
4) The countersink may be deeper than specified in the standard.

5) Only dimensions complying with SAE J518. A metric fixing thread is a deviation from standard.

O = Must be connected (plugged on delivery)

X = Plugged in normal operation

Drive shaft



1) ANSI B92.1a, 30° pressure angle, flat base, flank centering, tolerance class 5

2) Thread according to ASME B1.1

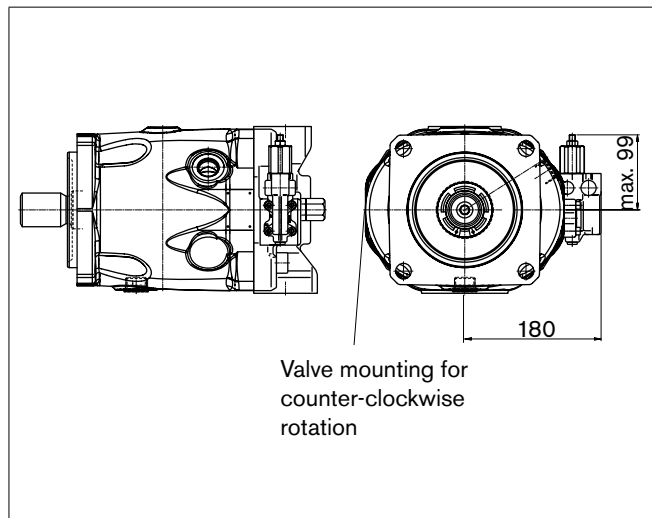
3) Please observe the general information on page 68 for the maximum tightening torques.

Dimensions, A10VZO

Before finalizing your design, request a certified installation drawing. Dimensions in mm.

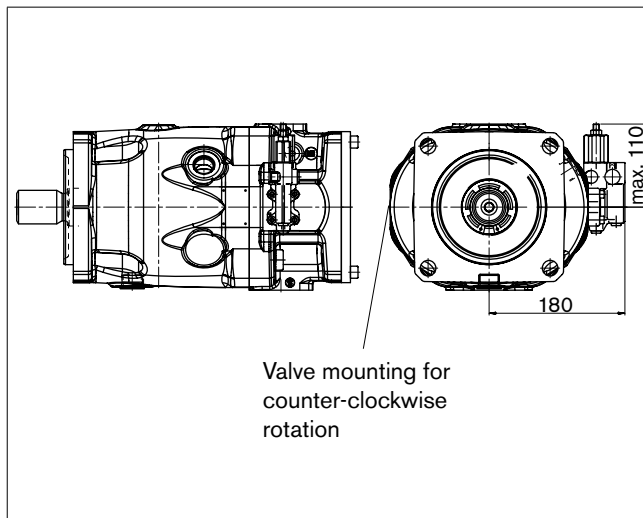
DR

Hydraulic pressure control, port plate 12



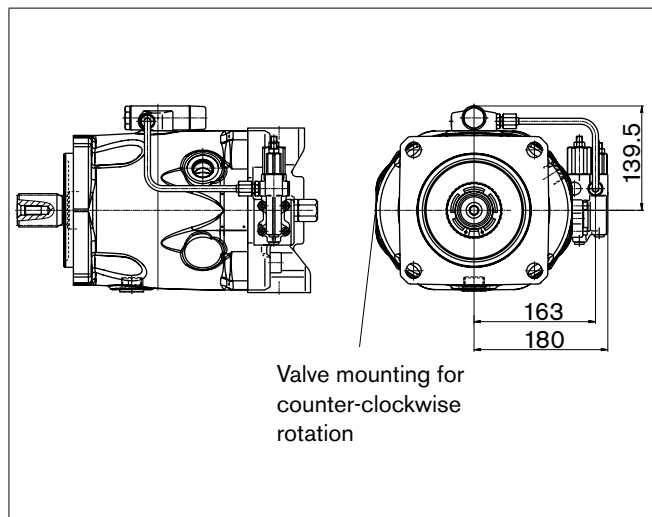
DR

Hydraulic pressure control, port plate 22



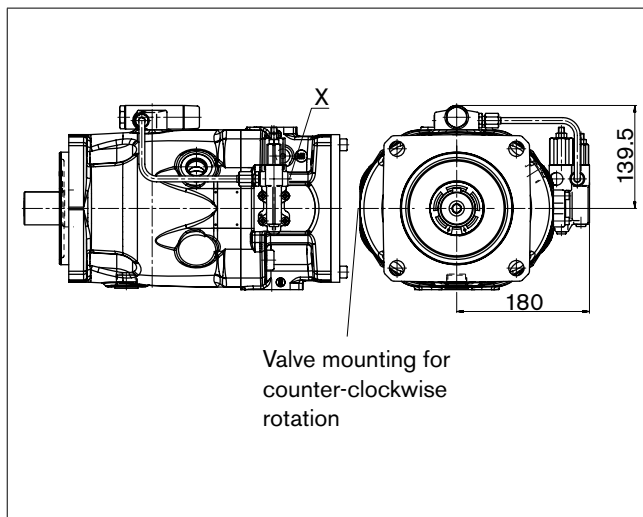
LAxD

Torque controller, port plate 12



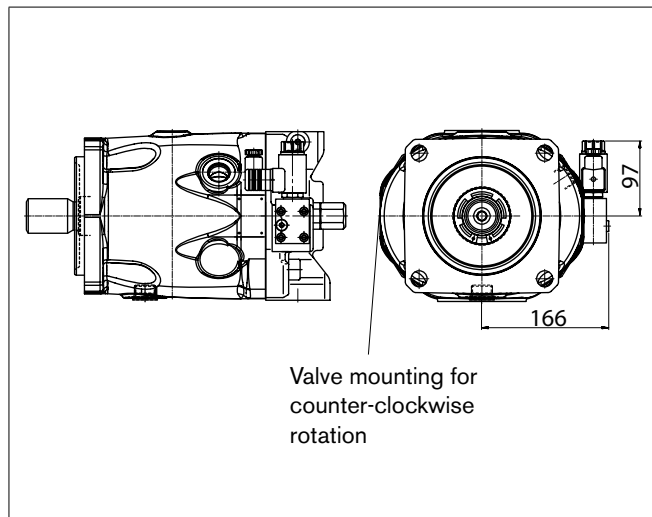
LAxD

Torque controller, port plate 22



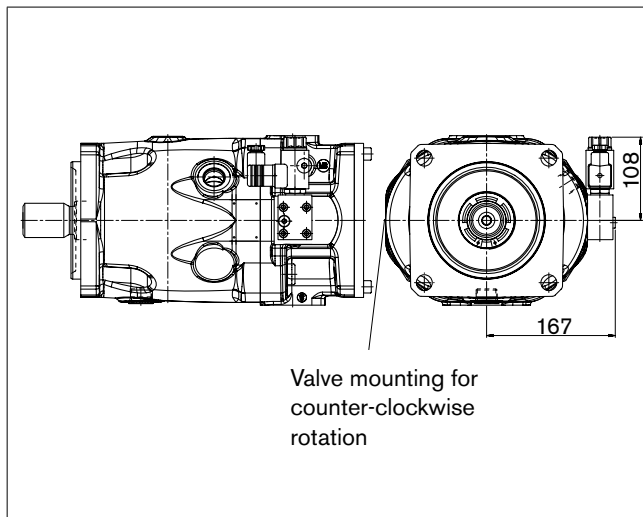
EZx

Two-point control, electric, port plate 12



EZx

Two-point control, electric, port plate 22

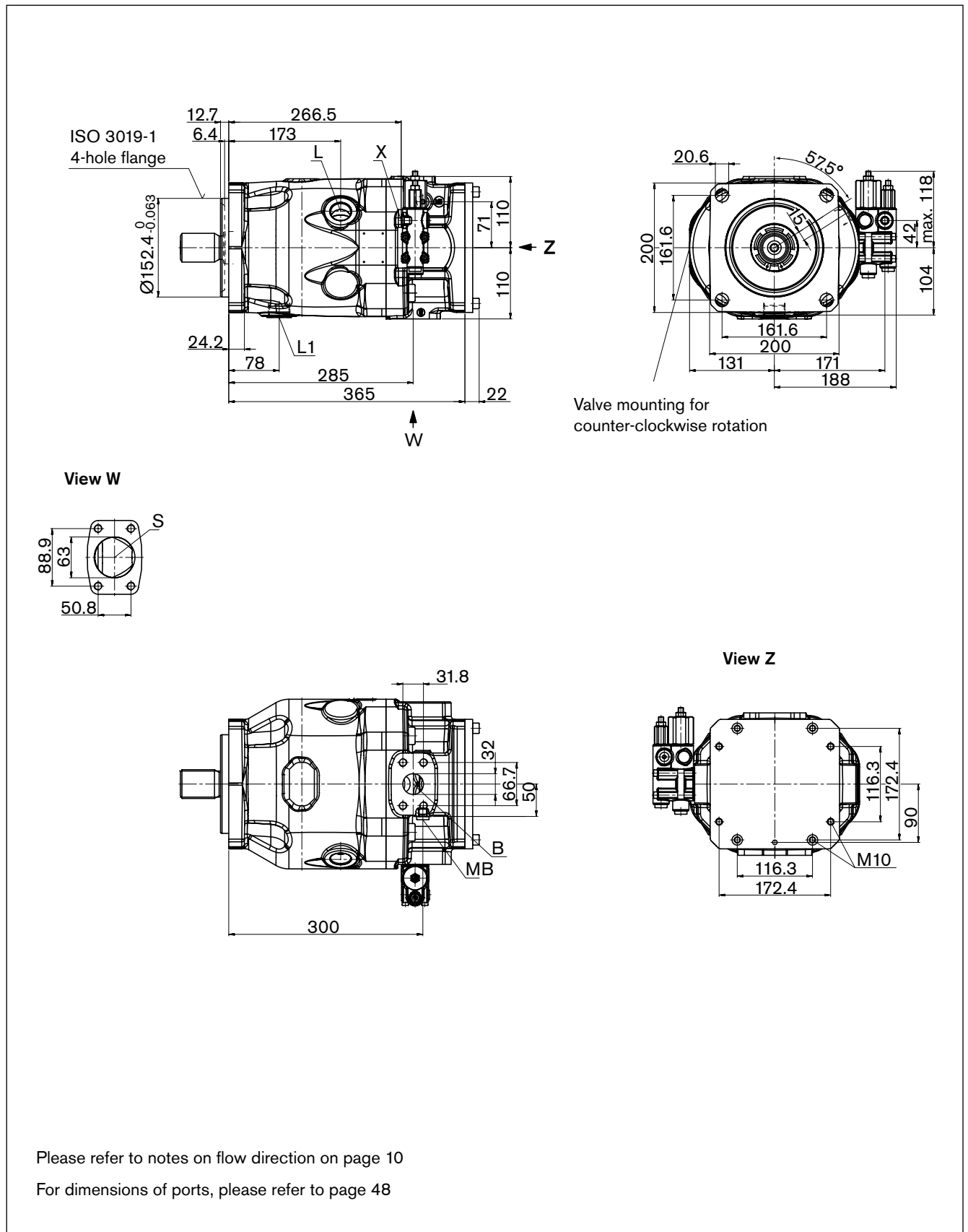


Dimensions, A10VZO

Before finalizing your design, request a certified installation drawing. Dimensions in mm.

Size 180

DRG pressure control, remotely operated, port plate 22: SAE flange port on opposite side, clockwise rotation



Please refer to notes on flow direction on page 10

For dimensions of ports, please refer to page 48

Dimensions, A10VZO

Before finalizing your design, request a certified installation drawing. Dimensions in mm.

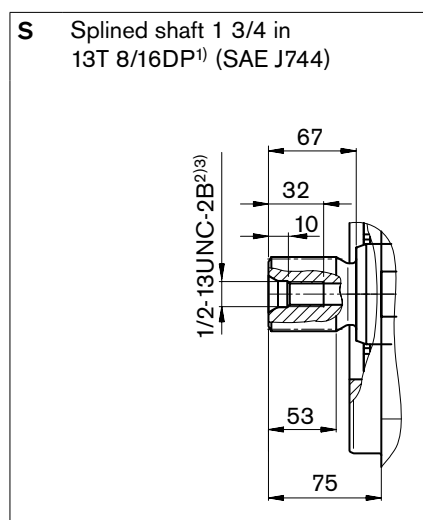
Size 180

Ports

| Designation | Port for | Standard | Size ¹⁾ | Maximum pressure [bar] ²⁾ | State |
|----------------|-----------------------------|----------------------------------|---------------------------------|--------------------------------------|-----------------|
| B | Service line, Fixing thread | SAE J518 ⁵⁾ DIN 13 | 1 1/4 in M14 x 2; 19 deep | 350 | O |
| S | Suction line, fixing thread | SAE J518 ⁵⁾ DIN 13 | 2 1/2 in M12 x 1.75; 17 deep | 10 | O |
| L | Case drain fluid | ISO 11926 ⁴⁾ | 1 5/16-12 UNF-2B; 15 deep | 2 | O ³⁾ |
| L ₁ | Case drain fluid | ISO 11926 ⁴⁾ | 1 5/16-12 UNF-2B; 15 deep | 2 | X ³⁾ |
| X | Pilot pressure | ISO 11926 ⁴⁾ | 7/16-20UNF-2B; 12 deep | 350 | O |
| M _B | Measuring, pressure B | DIN 3852 ⁴⁾ | G 1/4 in; 12 deep | 350 | X |

- 1) Please observe the general information on page 60 for the maximum tightening torques.
 - 2) Short-term pressure spikes may occur depending on the application. Keep this in mind when selecting measuring devices and fittings.
 - 3) Depending on the installation position, L or L₁ must be connected (see installation notes on page 56, 57)
 - 4) The countersink may be deeper than specified in the standard.
 - 5) Only dimensions complying with SAE J518. A metric fixing thread is a deviation from standard.
- O = Must be connected (plugged on delivery)
X = Plugged in normal operation

Drive shaft



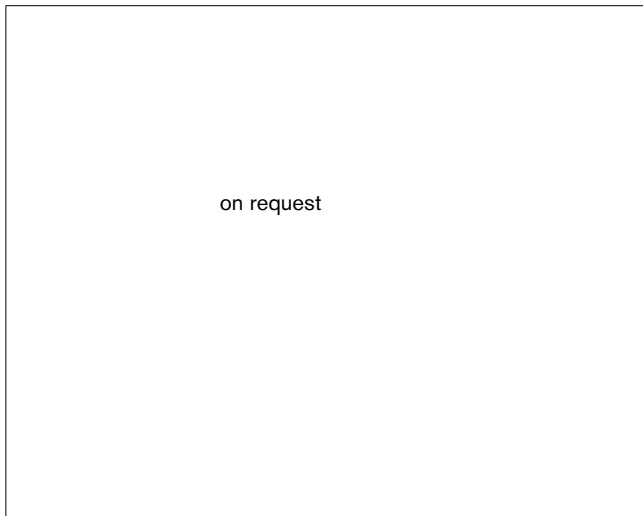
- 1) ANSI B92.1a, 30° pressure angle, flat base, flank centering, tolerance class 5
- 2) Thread according to ASME B1.1
- 3) Please observe the general information on page 68 for the maximum tightening torques.

Dimensions, A10VZO

Before finalizing your design, request a certified installation drawing. Dimensions in mm.

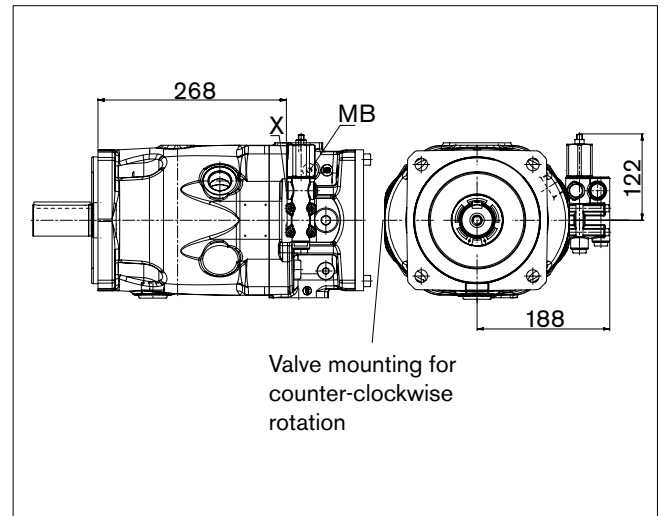
DR

Hydraulic pressure control, port plate 12



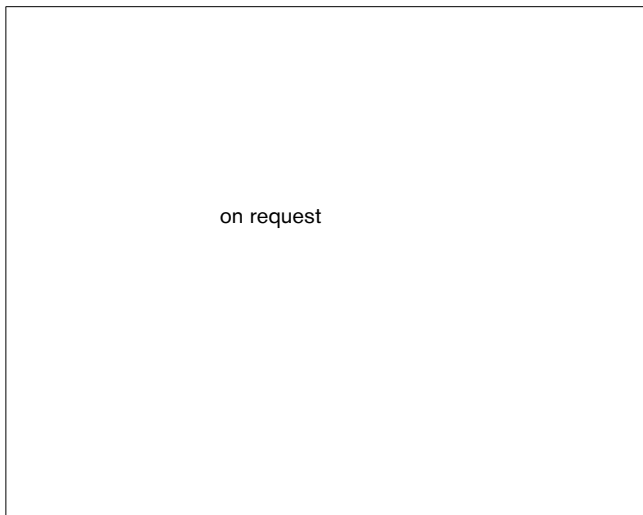
DR

Hydraulic pressure control, port plate 22



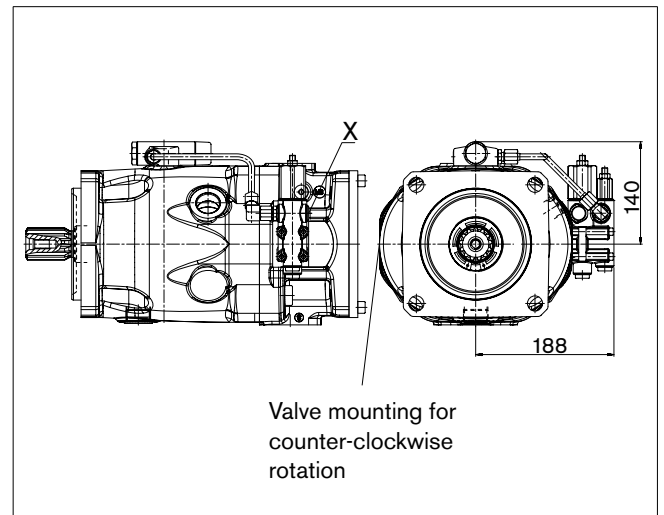
LAxD

Torque controller, port plate 12



LAxD

Torque controller, port plate 22



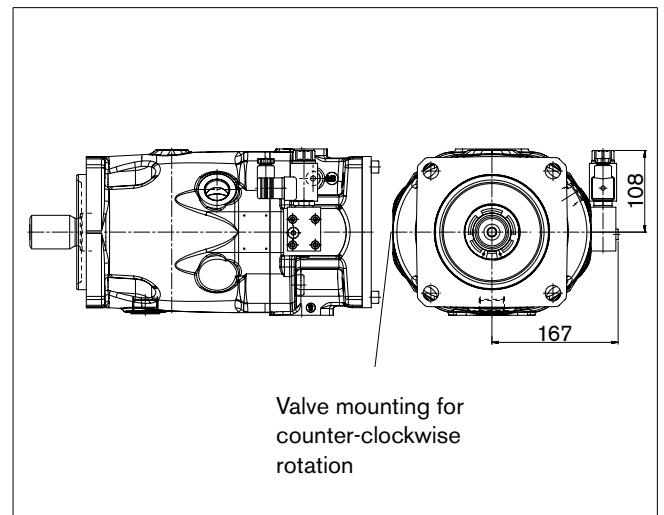
EZx

Two-point control, electric, port plate 12



EZx

Two-point control, electric, port plate 22



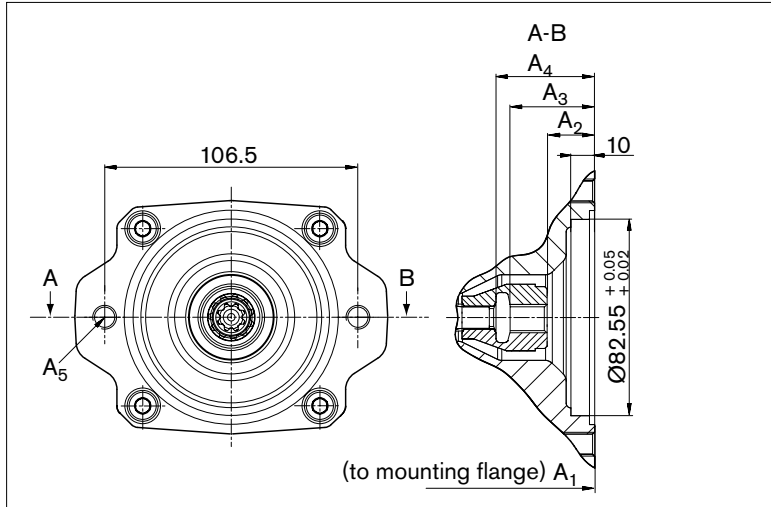
Through drive dimensions

Before finalizing your design, please request approved installation drawing. Dimensions in mm.

K01 Flange SAE J744 - 82-2 (A)

Coupling for splined shaft to ANSI B92.1a 5/8in 9T 16/32 DP1)

(SAE J744 - 16-4 (A))



A10FZO

| NG | A ₁ | A ₂ | A ₃ | A ₄ | A ₅ ²⁾ |
|---------|----------------|----------------|----------------|----------------|------------------------------|
| 06 - 10 | 162.6 | 20 | 35.5 | 41.5 | M10x1.5; 15 deep |
| 11 - 18 | on request | | | | |
| 21 - 28 | | | | | |
| 37 - 45 | | | | | |
| 58 - 63 | | | | | |

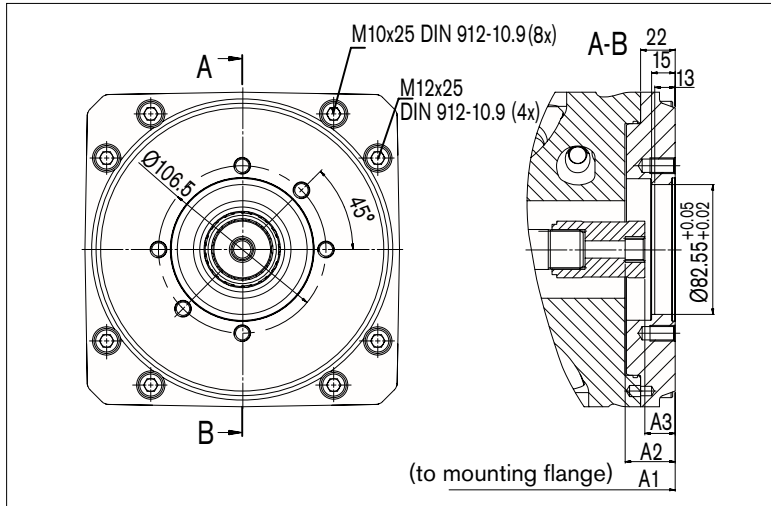
A10VZO

| NG | A ₁ | A ₂ | A ₃ | A ₄ |
|----|----------------|----------------|----------------|----------------|
| 10 | on request | | | |

U01 Flange SAE J744 - 82-2 (A)

Coupling for splined shaft to ANSI B92.1a 5/8in 9T 16/32 DP1)

(SAE J744 - 16-4 (A))



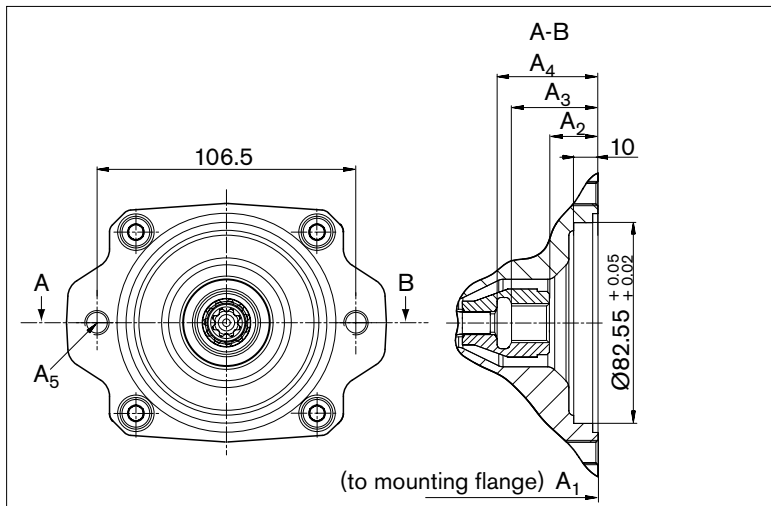
A10VZO

| NG | A ₁ | A ₂ | A ₃ | A ₄ ²⁾ |
|-----|----------------|----------------|----------------|------------------------------|
| 45 | 264 | 31.8 | 19.3 | M10x1.5; 16 deep |
| 71 | 299 | 31.8 | 19.3 | M10x1.5; 16 deep |
| 100 | 360 | 31.8 | Inquiry | M10x1.5; 16 deep |
| 140 | 377 | 31.8 | Inquiry | M10x1.5; 16 deep |
| 180 | 387 | 31.8 | Inquiry | M10x1.5; 16 deep |

K52 Flange SAE J744 - 82-2 (A)

Coupling for splined shaft to ANSI B92.1a 3/4in 11T 16/32 DP1)

(SAE J744 - 19-4 (A-B))



A10FZO

| NG | A ₁ | A ₂ | A ₃ | A ₄ | A ₅ ²⁾ |
|---------|----------------|----------------|----------------|----------------|------------------------------|
| 06 - 10 | 162.6 | 20 | 35.5 | 41.5 | M10x1.5; 15 deep |
| 11 - 18 | on request | | | | |
| 21 - 28 | | | | | |
| 37 - 45 | | | | | |
| 58 - 63 | | | | | |

A10VZO

| NG | A ₁ | A ₂ | A ₃ | A ₄ |
|----|----------------|----------------|----------------|----------------|
| 10 | on request | | | |

1) 30° pressure angle, flat base, flank centering, tolerance class 5

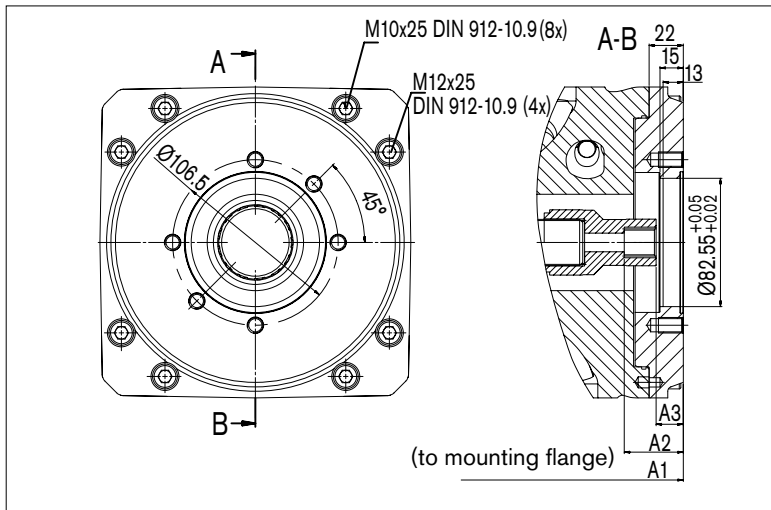
2) Thread according to DIN 13, observe the general information on page 60 for the maximum tightening torques.

Through drive dimensions

Before finalizing your design, please request approved installation drawing. Dimensions in mm.

U52 Flange SAE J744 - 82-2 (A)

Coupling for splined shaft to ANSI B92.1a 3/4in 11T 16/32 DP1 (SAE J744 - 19-4 (A-B))

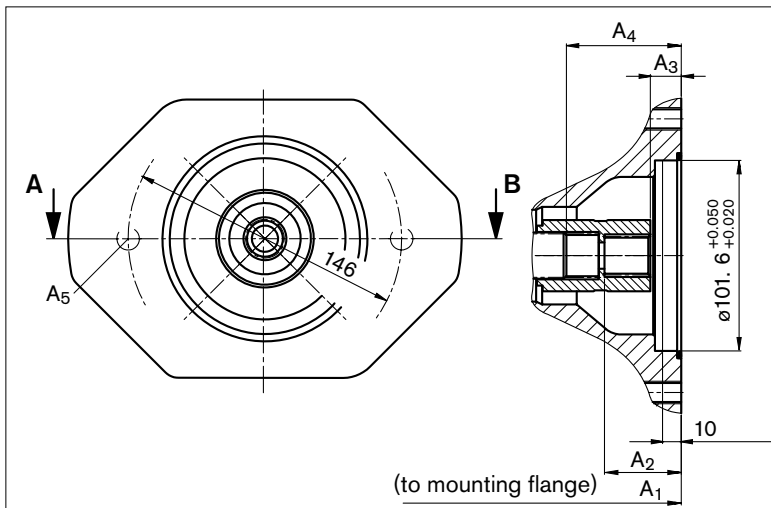


A10VZO

| NG | A ₁ | A ₂ | A ₃ | A ₄ ²⁾ |
|-----|----------------|----------------|----------------|------------------------------|
| 45 | 264 | 38 | 17.5 | M10x1.5; 16 deep |
| 71 | 299 | 38 | 17.5 | M10x1.5; 16 deep |
| 100 | 360 | 38 | 17.5 | M10x1.5; 16 deep |
| 140 | 377 | 38 | 17.5 | M10x1.5; 16 deep |
| 180 | 387 | 38 | 17.5 | M10x1.5; 16 deep |

K68 Flange SAE J744 - 101-2 (B)

Coupling for splined shaft to ANSI B92.1a 7/8in 13T 16/32 DP1 (SAE J744 - 22-4 (B))

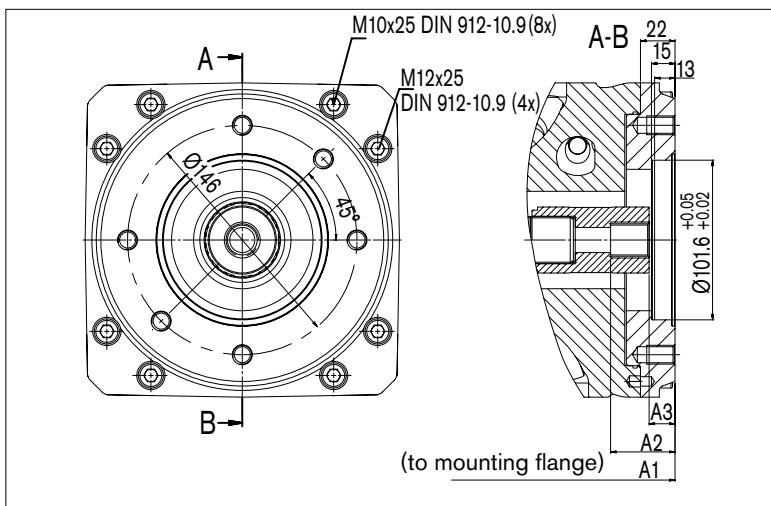


A10FZO

| NG | A ₁ | A ₂ | A ₃ | A ₄ | A ₅ ²⁾ |
|-------|----------------|----------------|----------------|----------------|------------------------------|
| 21-28 | on request | | | | |
| 37-45 | on request | | | | |

U68 Flange SAE J744 - 101-2 (B)

Coupling for splined shaft to ANSI B92.1a 7/8in 13T 16/32 DP1 (SAE J744 - 22-4 (B))



A10VZO

| NG | A ₁ | A ₂ | A ₃ | A ₄ ²⁾ |
|-----|----------------|----------------|----------------|------------------------------|
| 45 | 264 | 41 | 16.5 | M12x1.75; 18 deep |
| 71 | 299 | 41 | 16.5 | M12x1.75; 18 deep |
| 100 | 360 | 41 | 16.5 | M12x1.75; 18 deep |
| 140 | 377 | 41 | 16.5 | M12x1.75; 18 deep |
| 180 | 387 | 41 | 16.5 | M12x1.75; 18 deep |

1) 30° pressure angle, flat base, flank centering, tolerance class 5

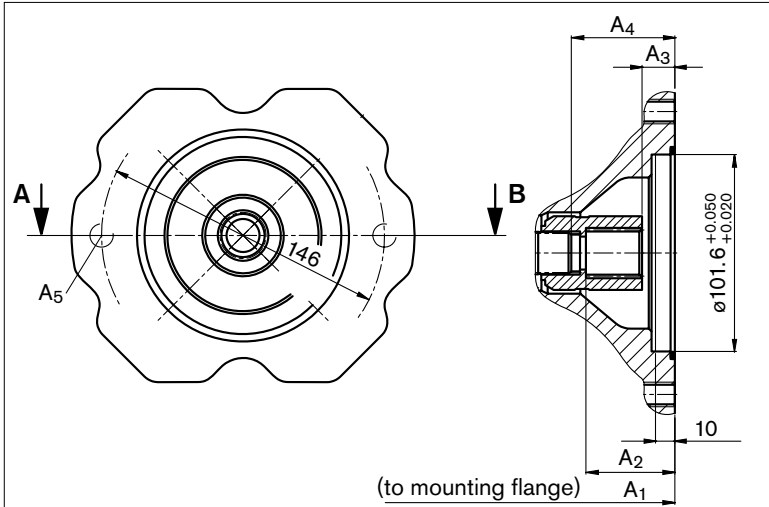
2) Thread according to DIN 13, observe the general information on page 60 for the maximum tightening torques.

Through drive dimensions

Before finalizing your design, please request approved installation drawing. Dimensions in mm.

K04 Flange SAE J744 - 101-2 (B)

Coupling for splined shaft to ANSI B92.1 a-1996



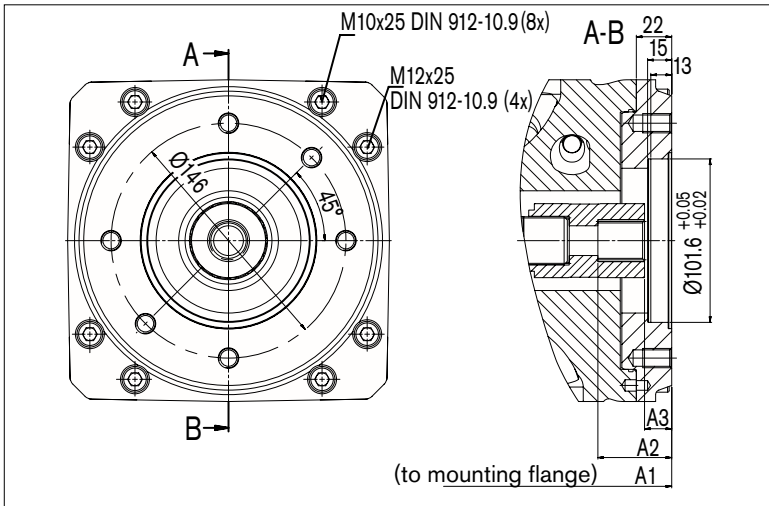
1 in 15T 16/32 DP1) (SAE J744 - 25-4 (B-B))

A10FZO

| NG | A ₁ | A ₂ | A ₃ | A ₄ ²⁾ |
|-------|----------------|----------------|----------------|------------------------------|
| 21-28 | on request | | | |
| 37-45 | | | | |

U04 Flange SAE J744 - 101-2 (B)

Coupling for splined shaft to ANSI B92.1 a-1996



1 in 15T 16/32 DP1) (SAE J744 - 25-4 (B-B))

A10VZO

| NG | A ₁ | A ₂ | A ₃ | A ₄ ²⁾ |
|-----|----------------|----------------|----------------|------------------------------|
| 45 | 264 | 45.9 | 16.9 | M12x1.75; 18 deep |
| 71 | 299 | 45.9 | 16.9 | M12x1.75; 18 deep |
| 100 | 360 | 45.9 | 16.9 | M12x1.75; 18 deep |
| 140 | 377 | 45.9 | 16.9 | M12x1.75; 18 deep |
| 180 | 387 | 45.9 | 16.9 | M12x1.75; 18 deep |

1) 30° pressure angle, flat base, flank centering, tolerance class 5

2) Thread according to DIN 13, observe the general information on page 60 for the maximum tightening torques.

Overview of attachments

| Through drive - A10FZO | | | Attachment of 2nd pump | | | Through drive |
|------------------------|----------------------------|------------|------------------------|---------------------|------------------------------|--------------------|
| Flange | Coupling for splined shaft | Short code | A10FZO Size (shaft) | A10VZO Size (shaft) | External gear pump Size (NG) | Available for size |
| ISO 3019-1 | | | | | | |
| 82-2(A) | 5/8 in | K01 | 06 to 10, 11 to 18 (S) | 10, 18 (S) | F (5 to 22) | 11 to 63 |
| | 3/4 in | K52 | 06 to 10, 11 to 18 (S) | 10, 18 (S) | – | 06 to 63 |
| 101-2(B) | 7/8 in | K68 | 21 to 28 (S) | 28 (S) | N/G (26 to 49) | 21 to 63 |
| | 1 in | K04 | 21 to 28 (S) | 28 (S) | – | 21 to 63 |

| Through drive - A10VZO | | | Attachment of 2nd pump | | | Through drive |
|------------------------|----------------------------|------------|------------------------|---------------------|------------------------------|--------------------|
| Flange | Coupling for splined shaft | Short code | A10FZO Size (shaft) | A10VZO Size (shaft) | External gear pump Size (NG) | Available for size |
| ISO 3019-1 | | | | | | |
| 82-2(A) | 5/8 in | K01 | 06 to 10, 11 to 18 (S) | 10, 18 (S) | F (5 to 22) | 18 to 28 |
| | 3/4 in | K52 | 06 to 10, 11 to 18 (S) | 10, 18 (S) | – | 18 to 28 |
| 101-2(B) | 7/8 in | K68 | 21 to 28 (S) | 28 (S) | N/G (26 to 49) | 28 |
| | 1 in | K04 | 21 to 28 (S) | 28 (S) | – | 28 |
| 82-2(A) | 5/8 in | U01 | 06 to 10, 11 to 18 (S) | 10, 18 (S) | F (5 to 22) | 45 to 180 |
| | 3/4 in | U52 | 06 to 10, 11 to 18 (S) | 10, 18 (S) | – | 45 to 180 |
| 101-2(B) | 7/8 in | U68 | 21 to 28 (S) | 28 (S) | N/G (26 to 49) | 45 to 180 |
| | 1 in | U04 | 21 to 28 (S) | 28 (S) | – | 45 to 180 |

The A10VZO in sizes 45 to 180 is equipped with a flexible universal through-drive (U..). This allows the through drive to be exchanged without having to machine the port plate. Details of the add-on parts can be found in data sheet RE 95581.

Combination pumps A10VZO + A10VZO; A10FZO + A10FZO

When using combination pumps, it is possible to have multiple, independent hydraulic circuits without the need for a splitter gearbox.

When ordering combination pumps, the model codes of the 1st and 2nd pumps must be joined by a "+".

Order example: A10VZO45DR/32R-VPD22U01 + A10VZO45DR/32R-VSD22U00
A10FZO 28/10R-VSC12K01 + A10FZO 28/10R-VSC11N00

Permissible moments of inertia

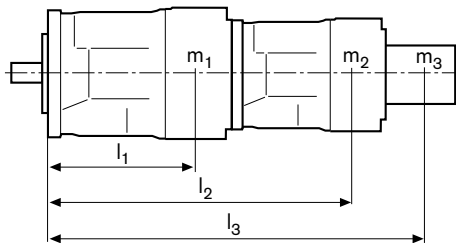
The arrangement of two single pumps in line is permissible up to the same size (tandem pump), taking into account a dynamic mass acceleration of max. 10 g (98.1 m/s²) without additional support.

A10VZO

| NG | 10 | 18 | 28 | 45 | 71 | 100 | 140 | 180 |
|---|------------|-----|-----|-----|-----|-----|-----|-----|
| Permissible moment of inertia | on request | | | | | | | |
| Static T_m Nm | | | | | | | | |
| Dynamic at 10 g (98.1 m/s ²) T_m Nm | | | | | | | | |
| Ground m_1 kg | | | | | | | | |
| Distance of center of gravity l_1 mm | 90 | 110 | 130 | 142 | 169 | 172 | 196 | |

A10FZO

| NG | 06-10 | 11-18 | 21-28 | 37-45 | 58-63 |
|---|------------|-------|-------|-------|-------|
| Permissible moment of inertia | on request | | | | |
| Static T_m Nm | | | | | |
| Dynamic at 10 g (98.1 m/s ²) T_m Nm | | | | | |
| Ground m_1 kg | | | | | |
| Distance of center of gravity l_1 mm | | | | | |



m_1, m_2, m_3 mass of pumps [kg]

l_1, l_2, l_3 Distance of center of gravity [mm]

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

Connector for solenoids

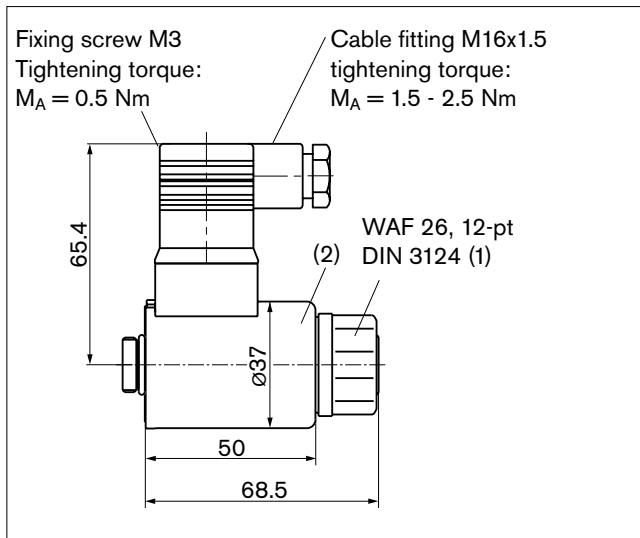
HIRSCHMANN DIN EN 175 301-803-A /ISO 4400

Without bidirectional suppressor diode _____ H
 type of protection as per DIN/EN 43650 _____ IP65

The sealing ring in the screw cable fitting is suitable for line diameters of 4.5 mm to 10 mm.

The line connector is not included in the delivery contents. This can be supplied by Rexroth on request.

Rexroth material number: R902602623



Changing connector position

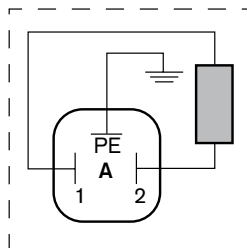
If necessary, you can change the position of the connector by turning the solenoid.

To do this, proceed as follows:

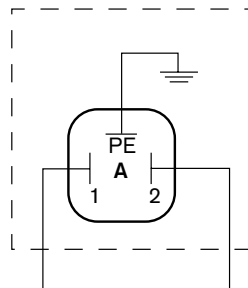
1. Loosen the mounting nut (1) of the solenoid.
 To do this, turn the mounting nut (1) one revolution counter-clockwise.
2. Turn the solenoid body (2) to the desired position.
3. Retighten the mounting nut of the solenoid.
 Tightening torque of the mounting nut: 5+1 Nm.
 (size WAF26, 12-pt DIN 3124)

On delivery, the position of the connector may differ from that shown in the brochure or drawing.

Equipment connector as per DIN 43650



Line connector DIN EN 175301-803-A Wiring screw connector M 16x1.5



| Control | Electronics function | Electronics | | Further information |
|----------------------------|-------------------------|------------------------|---------|---------------------|
| Electric two point control | Controlled power outlet | RA | Analog | RE 95 230 |
| | | VT2000 | Analog | RE 29 904 |
| | | RC2-2/21 ¹⁾ | Digital | RE 95 201 |

¹⁾ Power outlets for 2 valves, can be actuated separately

Installation notes

General

The axial piston unit must be filled with hydraulic fluid and air bled during commissioning and operation. This must also be observed following a longer standstill as the axial piston unit empty via the hydraulic lines.

Especially with the installation position "drive shaft upwards" or "drive shaft downward", attention must be paid to a complete filling and air bleeding since there is a risk, for example, of dry running.

The case drain fluid in the case interior must be directed to the reservoir via the highest case drain port (L_1 , L_2 , L_3).

For combinations comprising several units, make sure that the respective case pressure is not exceeded. If there is a pressure difference at case drain port L, each pump is to be fitted with a separate case drain line.

To achieve favorable noise values, decouple all connecting lines using elastic elements and avoid above-reservoir installation.

In all operating states, the suction line and case drain line must flow into the reservoir below the minimum fluid level. The permissible suction height h_S is a result of the overall pressure loss, but may not be greater than $h_{S \max} = 800$ mm. The minimum suction pressure at port S of $p_{S \min} = 0.8$ bar absolute must not be exceeded in operation.

Installation position

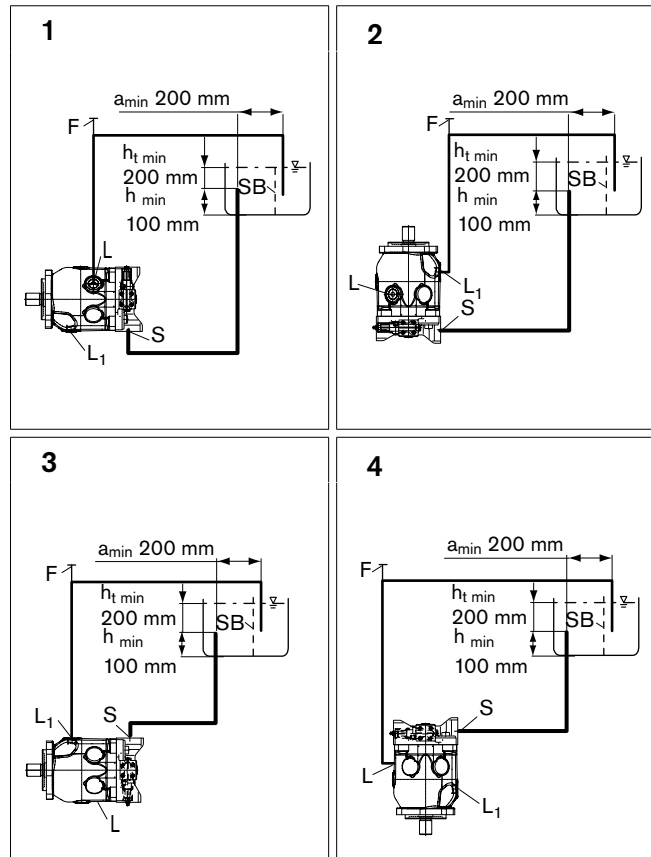
See the following examples 1 to 12.

Additional installation positions are available upon request.

Recommended installation positions: 1 and 3.

Below-reservoir installation (standard)

Below-reservoir installation means the axial piston unit is installed outside of the reservoir below the minimum fluid level.



| Installation position | Air bleed | Filling |
|-----------------------|-----------|---------------------------|
| 1, 3 | F | S + L, L ₁ (F) |
| 2, 4 | F | S + L, L ₁ (F) |

Key, see page 51.

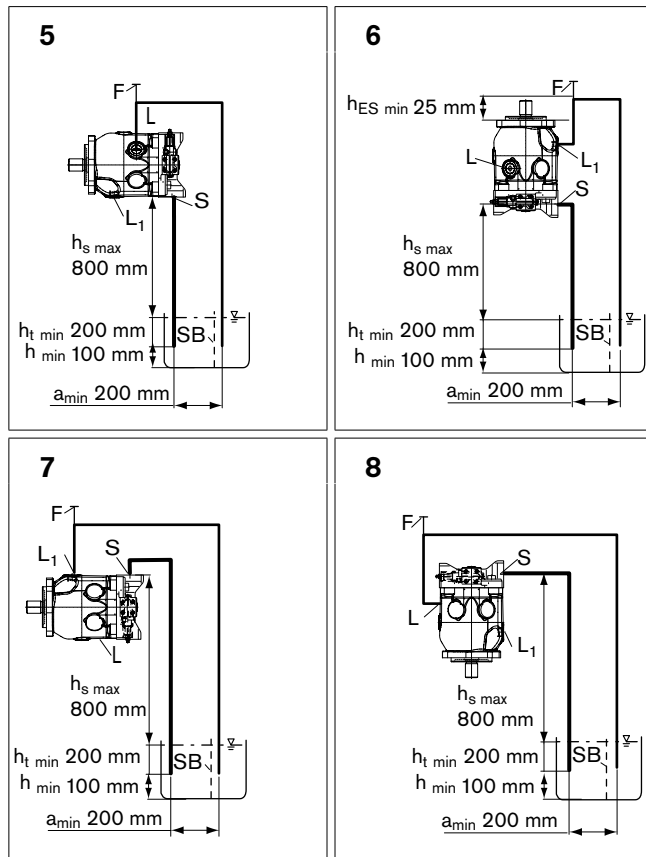
Installation notes

Above-reservoir installation

Above-reservoir installation means the axial piston unit is installed above the minimum fluid level of the reservoir. To prevent the axial piston unit from draining, a height difference $h_{ES\ min}$ of at least 25 mm is required in installation position 6

Observe the maximum permissible suction height $h_{S\ max} = 800\ mm$.

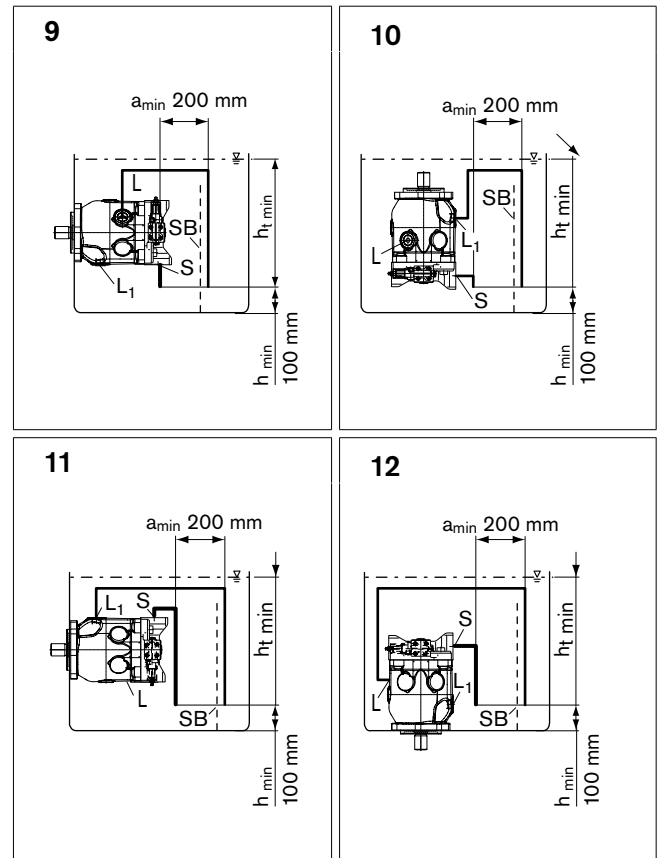
A check valve in the case drain line is only permissible in individual cases. Consult us for approval.



| Installation position | Air bleed | Filling |
|-----------------------|-----------|---------------------------|
| 5, 7 | F | L, L ₁ (F) |
| 6, 8 | F | S + L, L ₁ (F) |

Inside-reservoir installation

Inside-reservoir installation means the pump is installed within the minimum reservoir fluid level.



| Installation position | Air bleed | Filling |
|-----------------------|-------------------|-----------------------|
| 9, 11 | L, L ₁ | L, L ₁ |
| 10, 12 | L, L ₁ | S + L, L ₁ |

- S** Filling / air bleeding
- F** Air bleed port
- S** Suction port
- L, L₁** Case drain port
- SB** Baffle (baffle plate)
- h_{t min}** Minimum necessary immersion depth (200 mm)
- h_{min}** Minimum necessary spacing to reservoir base (100 mm)
- h_{ES min}** Minimum necessary height needed to protect the axial piston unit from draining (25 mm).
- h_{S max}** Maximum permissible suction height (800 mm)
- a_{min}** When designing the reservoir, ensure adequate distance between the suction line and the case drain line. This prevents the heated, return flow from being drawn directly back into the suction line.

Notes

Notes

General information

- The axial piston units A10FZO and A10VZO are designed to be used in open circuits. The axial piston unit A10FZG and A10VZG is specified for use in closed circuits.
- Project planning, assembly and commissioning of the axial piston unit require the involvement of qualified personnel.
- Before operating the axial piston unit, please read the appropriate operating instructions thoroughly and completely. If necessary, request these from Rexroth.
- During and shortly after operation, there is a risk of burns on the axial piston unit and especially on the solenoids. Take appropriate safety measures (e.g. by wearing protective clothing).
- Depending on the operating conditions of the axial piston unit (operating pressure, fluid temperature), the characteristics may shift.
- Service line ports:
 - The ports and fixing threads are designed for the specified maximum pressure. The machine or system manufacturer must ensure that the connecting elements and lines correspond to the specified operating conditions (pressure, flow, hydraulic fluid, temperature) with the necessary safety factors.
 - The service line ports and function ports are only designed to accommodate hydraulic lines.
- Pressure cut-off and pressure control do not provide security against pressure overload. A separate pressure relief valve is to be provided in the hydraulic system.
- The data and notes contained herein must be adhered to.
- The product is not approved as a component for the safety concept of a general machine according to DIN EN ISO 13849.
- The following tightening torques apply:
 - Fittings: Observe the manufacturer's instruction regarding the tightening torques of the used fittings.
 - Fixing screws: For fixing screws with metric ISO thread according to DIN 13 or thread according to ASME B1.1, we recommend checking the tightening torque individually according to VDI 2230.
 - Female threads in axial piston unit: The maximum permissible tightening torques $M_{G \max}$ are maximum values for the female threads and must not be exceeded. For values, see the following table.

Threaded plugs:

For the metal threaded plugs supplied with the axial piston unit, the required tightening torques of the threaded plugs M_V apply. For values, see the following table.

| Ports | | Maximum permissible tightening torque for female threads $M_{G \max}$ | Required tightening torque for threaded plugs M_V | WAF hexagon socket for threaded plugs |
|-----------|------------------|---|---|---------------------------------------|
| Standard | Thread size | | | |
| ISO 11936 | 7/16-20 UNF-2B | 40 Nm | 15 Nm | 3/16 in |
| | 9/16-18UNF-2B | 80 Nm | 25 Nm | 1/4 in |
| | 3/4-16UNF-2B | 160 Nm | 62 Nm | 5/16 in |
| | 7/8-14UNF-2B | 240 Nm | 127 Nm | 3/8 in |
| | 1 1/16-12 UNF-2B | 360 Nm | 147 Nm | 9/16 in |
| DIN 3852 | G 1/4 in | 70 Nm | – | – |
| | M14x1.5 | 80 Nm | 35 Nm | 6 mm |
| | M16x1.5 | 100 Nm | 50 Nm | 8 mm |
| | M18x1.5 | 140 Nm | 60 Nm | 8 mm |
| | M22x1.5 | 210 Nm | 80 Nm | 10 mm |
| | M27x2 | 330 Nm | 135 Nm | 12 mm |