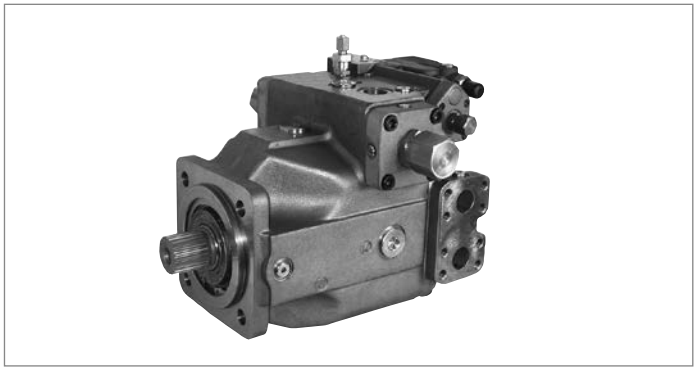
RE-A 92080/2020-07-31
Replaces: 06.2006

rexroth
A Bosch Company

Control devices HD

Americas



- For variable pump (A)A4VSO series 1 and 3
- For variable pump (A)A4VSG series 1 and 3
- For variable pump (A)A4CSG series 3
- Open and closed circuit

Features

- Control is pilot-pressure related
- Different pilot pressure ranges available
- Optional pressure control
- Optional hydraulic power control
- Optional electrical control of pilot pressure
- Mechanical $V_{g\,min}$ - and $V_{g\,max}$ - limitation
- Standard spring-centering of the stroking cylinder
- Resets to zero in the event of a signal failure
- The special version enables mooring, overcenter, and decompression via the pump

Variable pump (A)A4VSO, data sheet 92050
Variable pump (A)A4VSG, data sheet 92100
Variable pump (A)A4CSG, data sheet 92105

Contents

Type code

01	02	03	04	05	06		07	08		09	10	11	12	13	14	15
	(A)A4...		**HD.**			**/**			**–**							

Hydraulic fluid

01	For details see data sheet 92050 (A4VSO), 92100 (A4VSG), 92105 (A4CSG)	

Axial piston unit

02	Swashplate design, variable / pump, open circuit (see data sheet 92050)	**(A)A4VSO**
	Swashplate design, variable / pump, closed circuit (see data sheet 92100)	**(A)A4VSG**
	Compact unit swashplate design, variable / pump, closed circuit (see data sheet 92105)	**(A)A4CSG**

Size (NG)

03	Geometric displacement, for technical data see data sheets	**40**	**71**	**125**	**180**	**250**	**355**	**500**	**750**	**1000**

Control device

04	**Hydraulic control, pilot-pressure related**										**HD**
	Pilot pressure characteristics 145 to 650 psi (10...45 bar)	●	●	●	●	●	●	●	●	●	**1**
	Pilot pressure characteristics 145 to 400 psi (10...28 bar)	●	●	●	●	●	●	●	●	●	**2**
	Pilot pressure characteristics 80 to 275 psi (5.5...19 bar)	●	●	●	●	●	●	●	●	●	**3**
05	**Pressure control**										
	without pressure control (without code)										
	with pressure control in **A**	●	●	●	●	●	●	●	●	●	**A**[1) 2)]
	with remote pressure control in **A**	●	●	●	●	●	●	●	●	●	**GA**[1) 2)]
	with pressure control in **B**	●	●	●	●	●	●	●	●	●	**B**[2)]
	with remote pressure control in **B**	●	●	●	●	●	●	●	●	●	**GB**[2)]
	with pressure control on both sides	●	●	●	●	●	●	●	●	●	**D**[1) 2)]
	with remote pressure control on both sides	●	●	●	●	●	●	●	●	●	**G**[1) 2)]
06	**Power control and electrical control of pilot pressure for HD1**										
	without power control and electrical control of pilot pressure (without code)										
	Power control with power limiting valve	●	●	●	●	●	●	●	●	●	**P**
	Electrical control of pilot pressure	●	●	●	●	●	●	●	●	●	**T**[3)]
	Power control and electrical control of pilot pressure	●	●	●	●	●	●	●	●	●	**U**[3)]

Series

07	(A)A4VSO, (A)A4VSG	●	●	–	–	–	–	–	–	–	**11**
	(A)A4VSO, (A)A4VSG	–	–	●	●	●	●	●	●	●	**30**
	(A)A4CSG	–	–	–	–	●	●	●	●	–	**30**

For details see data sheet 92050 (A4VSO)**, 92100** (A4VSG)**, 92105** (A4CSG)

08	Direction of rotation
09	Seal
10	Drive shaft
11	Mounting flange
12	Working line ports
13	Through drive
14	Valves
15	Filtration

● = Available – = Not available

1) Not available for (A)A4VSO
2) Bidirectional direction of rotation not possible
3) for operation with HF hydraulic fluid, please observe data sheet 29164 (prop. pressure relief valve type DBEP); for (A)A4CSG, please contact us

HD1/2/3 – Hydraulic control, pilot-pressure related

The HD1/2/3 control sets the displacement of the pump based on the pilot pressure.
A stroking chamber is continuously supplied with control pressure. The control spool is shifted by the differential pilot pressure $\mathbf{X_1}$–$\mathbf{X_2}$ and controls the hydraulic fluid supply to the other stroking chamber. The spring feedback acts on the control spool. The adjustable stroke can thus be controlled proportional to the specified setpoint value ($\mathbf{X_1}$-$\mathbf{X_2}$).
When dimensioning the pilot pressure, it must be ensured that the effective hydraulic control pressure setpoint value for the (A)A4VSO is the difference between the control and case pressure, or for (A)A4VSG and (A)A4CSG, is the difference between $\mathbf{X_1}$ and $\mathbf{X_2}$.

- Upon loss of pilot pressure, the spring feedback will return the control **to a defined central position**.
- Upon loss of control pressure, the spring centering of the stroking piston assists in the return to **a defined central position**.

Both features are standard.

Notice

- The spring feedback in the controller and pump control spring centering are not safety devices. The controller can stick in an undefined position due to internal contamination (contaminated hydraulic fluid, abrasion or residual contamination from system components). As a result, the flow in the axial piston unit will no longer respond correctly to the operator's specifications. Check whether the application on your machine requires additional safety measures to bring the driven consumer to a safe position (immediate stop).

The mechanical swivel angle limitation can be set at both sides on the control in the range from $V_{g\,max}$ to 50 % $V_{g\,max}$, for size 500 $V_{g\,max}$ to 70 % $V_{g\,max}$.
For sizes 500...1000, it is possible to adjust the setting time on the control module. The long setting time is set as standard (see the setting time data table on page 4).
This is required for the power limiting valve LV06 for HD1P and HD1U.
Three versions are available:
HD1 Pilot pressure range 145 to 650 psi (10...45 bar)
HD2 Pilot pressure range 145 to 405 psi (10...28 bar)
HD3 Pilot pressure range 80 to 275 psi (5.5...19 bar)
Version with inductive position transducer is available on request.

Control pressure and pilot pressure supply
The minimum required control pressure must be externally connected at **P** for (A)A4VSO and (A)A4VSG and enables adjustment in zero stroke if the pump does not build up pressure itself. The high pressure in the pump supplies control pressure when p_A, p_B > p.

For **(A)A4CSG** in standard version (boost pump "F") the control is supplied internally with the control pressure from the boost circuit. This saves the use of a separate control pressure pump, which means port **P** is already internally connected.
Recommended setting value on the control pressure relief valve: double boost pressure, additional +75 psi (+5 bar) for NG 355

Recommendation: separate control/pilot pressure pump for sizes 40...250, an auxiliary pump with 0.49 in^3 (8 cm^3) for sizes 355...1000, an auxiliary pump with 0.67 in^3 (11 cm^3)
Direct mounting on the through drive of the (A)A4VSO/G or (A)A4CSG possible, see data sheet of the respective variable pump.

Size		NG		40	71	125	180	250	355	500	750	1000
Pilot pressure[1] (in **X1**, **X2**)	HD1	p_{St}	psi	145[2] – 650[3]								
			bar	10[2] – 45[3]								
	HD2	p_{St}	psi	145[2] – 405[3]								
			bar	10[2] – 28[3]								
	HD3	p_{St}	psi	80[2] – 275[3]								
			bar	5.5[2] – 19[3]								
Control pressure (in **P**)		p_{min}[5][6]	psi (bar)	2 × boost pressure however minimum 465 psi (32 bar) NG 355: 2 x boost pressure +75 psi (+5 bar)								
		p_{max}[4][5]	psi	5100								
			bar	350								
Control stroke		s_{max}	in	0.56	0.67	0.81	0.81	1.02	1.02	1.28	1.46	1.63
			mm	14.2	17.1	20.7	20.7	25.9	25.9	32.6	37	41.41
Control area		A	in²	0.60	0.99	1.40	1.40	2.23	2.23	2.91	4.42	5.02
			cm²	3.9	6.4	9	9	14.4	14.4	18.8	28.5	32.4
Control volume		V_{Smax}	in³	0.34	0.67	1.14	1.14	2.28	2.28	3.75	6.41	8.18
			cm³	5.5	11	18.7	18.7	37.3	37.3	61.4	105	134.1
Control time (at 2900 psi (200 bar) high pressure)		t	s	0.08	0.09	0.10	0.10	0.15	0.15	0.75	1.0	1.5
Setting range of control time (at 2900 psi (200 bar) high pressure)		t	s	–	–	–	–	–	–	0.15... 0.75	0.2... 1.0	0.3... 1.5
Boost pressure	(A)A4VSG	$p_{Sp\ min}$	psi	230								
			bar	16								
		$p_{Sp\ max}$[6]	psi	435								
			bar	30								
	(A)A4CSG	$p_{Sp\ min}$	psi	–	–	–	–	230				
			bar	–	–	–	–	16				–
		$p_{Sp\ max}$	psi	–	–	–	–	290				
			bar	–	–	–	–	20				–
Weight approx. ((A)A4VSO...HD. ...N00)			lbs	93	86	216	246	440	484	733	1047	1333
			kg	42	59	98	112	200	220	333	476	606
Hysteresis				≤ ± 3 % of $V_{g\ max}$								
Repeat accuracy				≤ 1 % of $V_{g\ max}$								

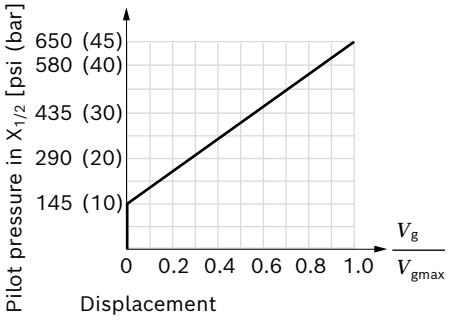
1) Pilot pressure characteristics, see page 5
2) ± 7.5 psi (± 0.5 bar) in an open circuit;
± 22 psi (± 1.5 bar) in a closed circuit
3) ± 22 psi (± 1.5 bar) in an open circuit;
± 30 psi (± 2 bar) in a closed circuit
4) With the pressure control lower than the pressure setting
5) With mounted DBEP6 (HD1T and HD1U) for all sizes limited to minimum 725 psi (50 bar) ...maximum 1450 psi (100 bar); with mounted power limiting valve (HD1P and HD1U) the set control pressure is lower than the beginning of control of the power characteristic
6) With version H06, the boost pressure is to be limited to maximum 365 psi (25 bar) since the control pressure is set at 725 psi (50 bar)

Characteristic curves

(A)A4VSO - open circuit

For the open circuit (one-sided swiveling) of the (A)A4VSO, the $V_{g\,min}$ stop is set so that pump pressure reaches approx. 290 psi (20 bar) when port **B** is plugged. Mooring or overcenter operation is available on request.

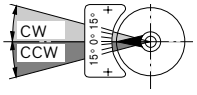
▼ **HD1 pilot pressure 145...650 psi (10...45 bar)**



▼ **Flow direction**

Direction of rotation	Pilot pressure	Swiveling range[1)]	Flow direction	High-pressure port
clockwise	in **X₂**	Counter-clockwise	**S** to **B**	**B**
Counter-clockwise	in **X₁**	clockwise	**S** to **B**	**B**

1) See swivel angle indicator



(A)A4VSG and A4CSG – closed circuit

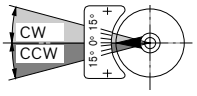
Stepless adjustment of the pump displacement according to the pilot pressure. The control is proportional to the specified pilot pressure setpoint value (difference between **X₁**, **X₂**).

▶ For information on spring feedback, see note on page 3.

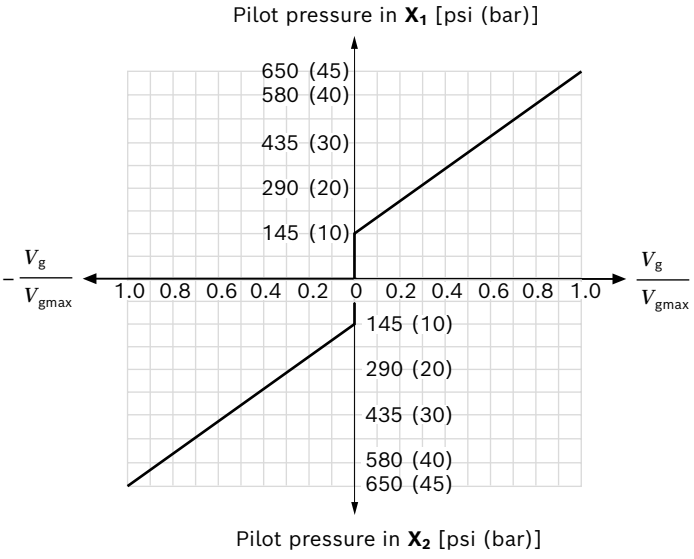
▼ **Flow direction**

Direction of rotation	Pilot pressure	Swiveling range[2)]	Flow direction	High-pressure port
clockwise	in **X₁**	clockwise	**B** to **A**	**A**
	in **X₂**	Counter-clockwise	**A** to **B**	**B**
Counter-clockwise	in **X₁**	clockwise	**A** to **B**	**B**
	in **X₂**	Counter-clockwise	**B** to **A**	**A**

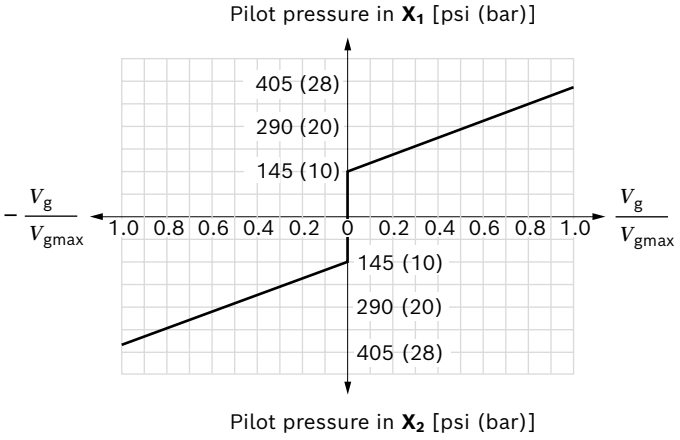
2) See swivel angle indicator



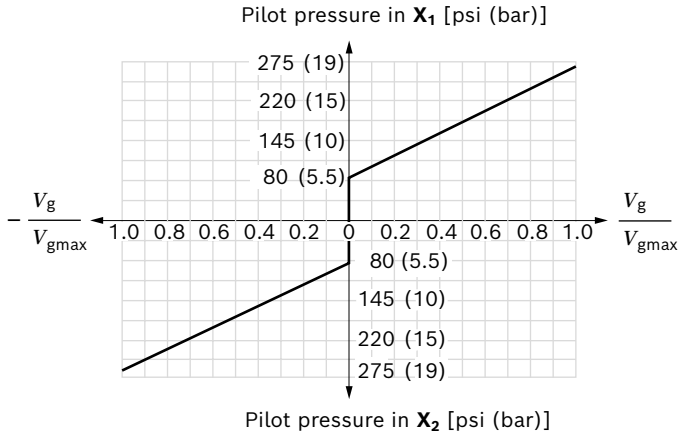
▼ **HD1 pilot pressure 145...650 psi (10...45 bar)**



▼ **HD2 pilot pressure 145...405 psi (10...28 bar)**

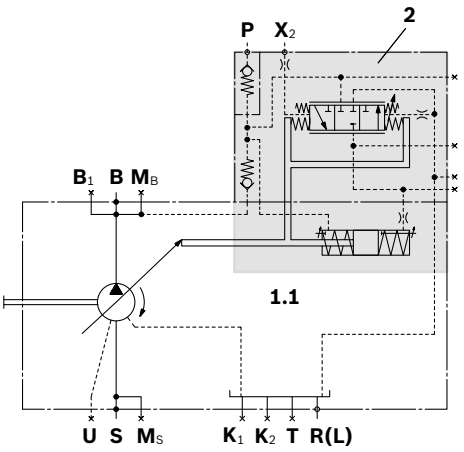


▼ **HD3 pilot pressure 80...275psi (5.5...19 bar)**

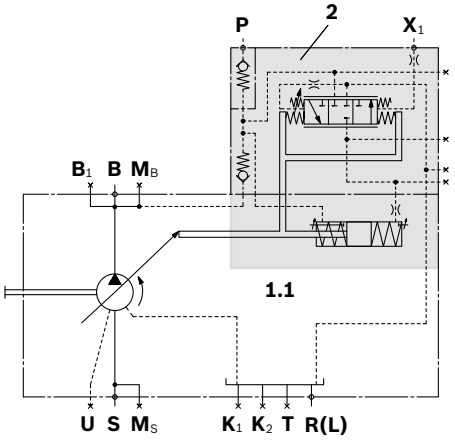


Circuit diagrams

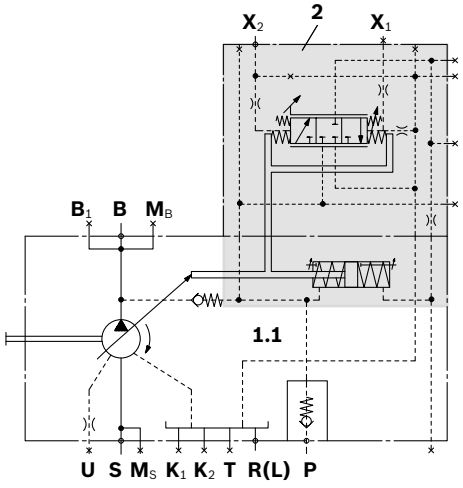
▼ **(A)A4VSO, sizes 40 and 71**
Clockwise rotation



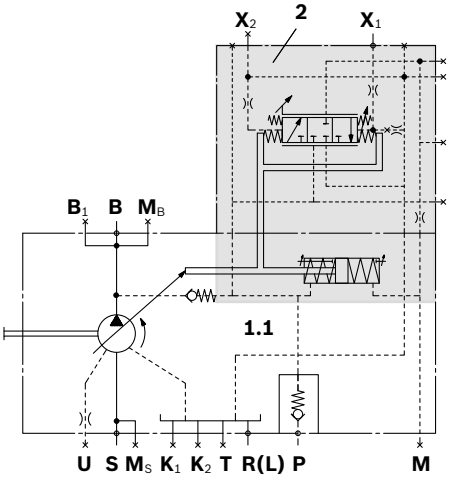
▼ **(A)A4VSO, sizes 40 and 71**
Counter-clockwise rotation



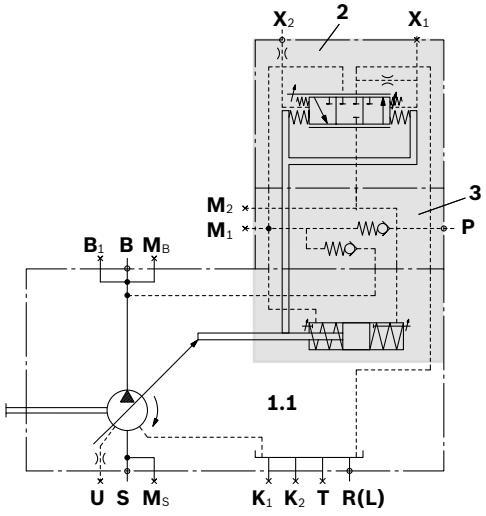
▼ **(A)A4VSO, sizes 125 to 355**
Clockwise rotation



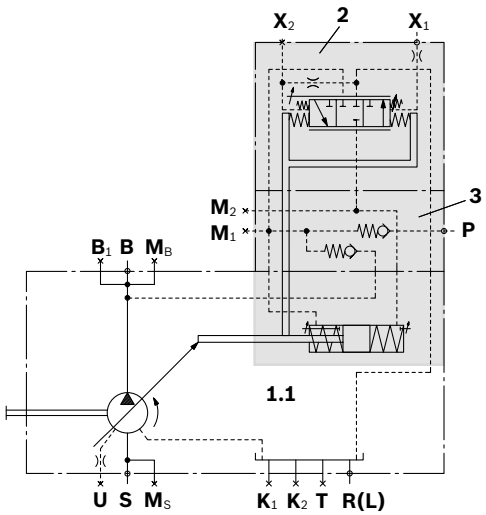
▼ **(A)A4VSO, sizes 125 to 355**
Counter-clockwise rotation



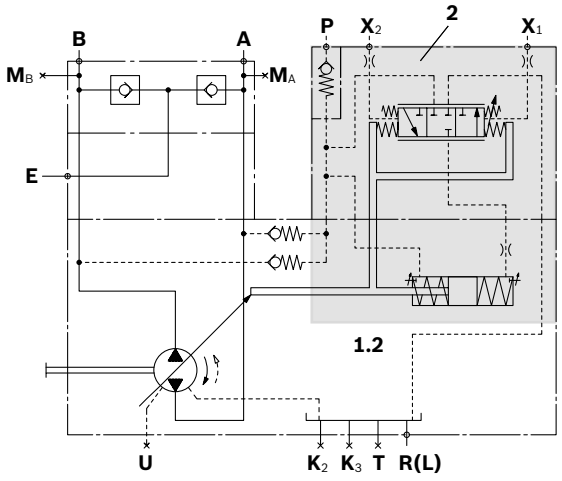
▼ **(A)A4VSO, sizes 500 to 1000**
Clockwise rotation



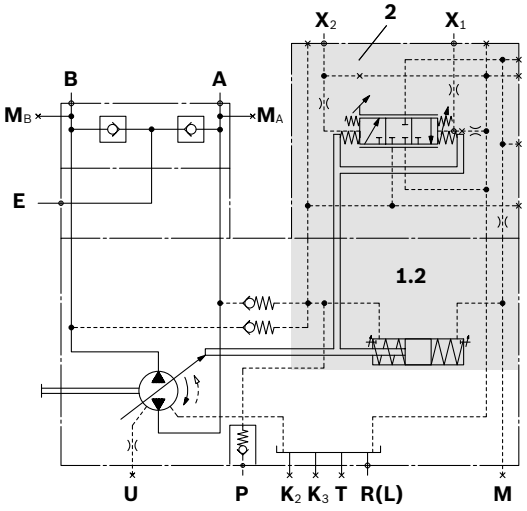
▼ **(A)A4VSO, sizes 500 to 1000**
Counter-clockwise rotation



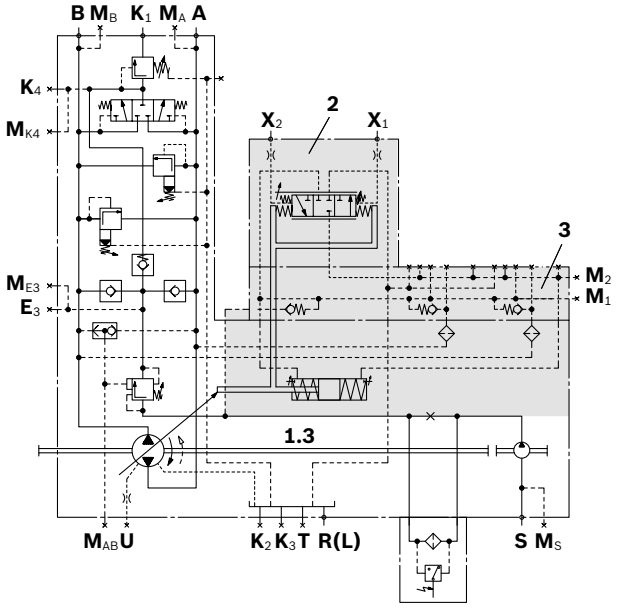
▼ **(A)A4VSG, sizes 40 and 71**



▼ **(A)A4VSG, sizes 125 to 355**



▼ **(A)A4CSG, sizes 500 to 1000**



Components	
1	Pump with hydraulic control device
1.1	(A)A4VSO (see data sheet 92050)
1.2	(A)A4VSG (see data sheet 92100)
1.3	(A)A4CSG (see data sheet 92105)
2	Control module
3	Intermediate plate

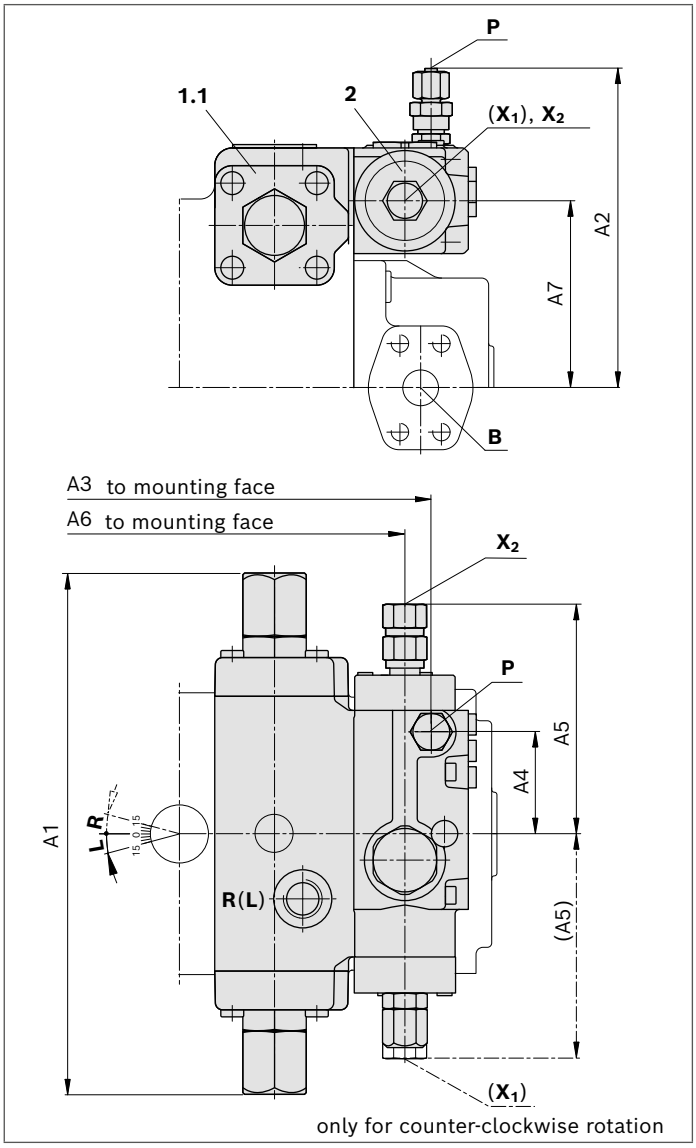
Ports	
X_1; X_2	Pilot pressure port
P	Control pressure port
M	Measuring port stroking chamber pressure (NG 125 to 355)
M_1	Measuring port small stroking chamber (NG 500 to 1000)
M_2	Measuring port large stroking chamber (NG 500 to 1000)

Notice

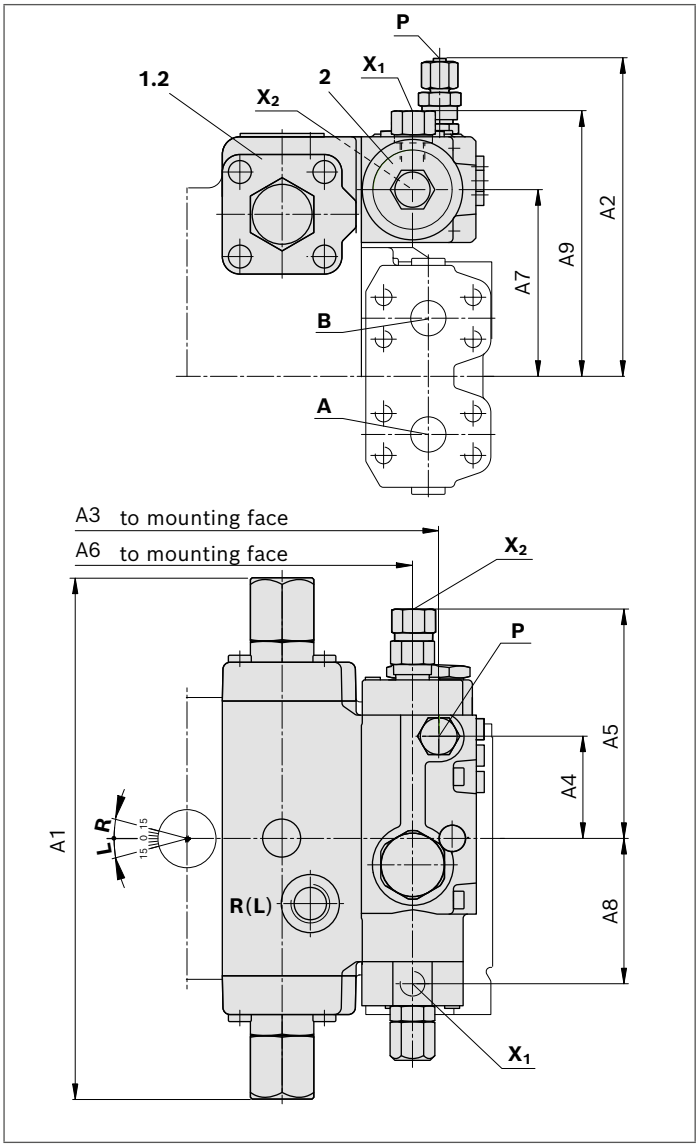
▶ For detailed dimensions and technical data of the variable pump, see data sheet 92050, 92100 and 92105

Dimensions

▼ **(A)A4VSO, sizes 40 and 71**



▼ **(A)A4VSG, sizes 40 to 71**



NG	A1	A2	A3	A4	A5	A6	A7	A8	A9
40	11.65 (296)	7.60 (193)	9.25 (235)	2.28 (58)	5.31 (135)	8.66 (220)	4.17 (106)	3.25 (82.5)	6.10 (155)
71	13.07 (332)	8.23 (209)	10.31 (262)	2.28 (58)	5.31 (135)	9.72 (247)	4.80 (122)	3.25 (82.5)	6.73 (171)

Port		Standard	Size	$p_{max\ abs}$ [psi (bar)][2]	State[3]
X_1; X_2[1]	Pilot pressure	ISO 11926	9/16-18UNF-2B; 0.51 (13) deep	650 (45)	O
P	Control pressure	(DIN 3853)	Tube DIA 8 × 1.5 mm (S8 form W)	5100 (350)	X

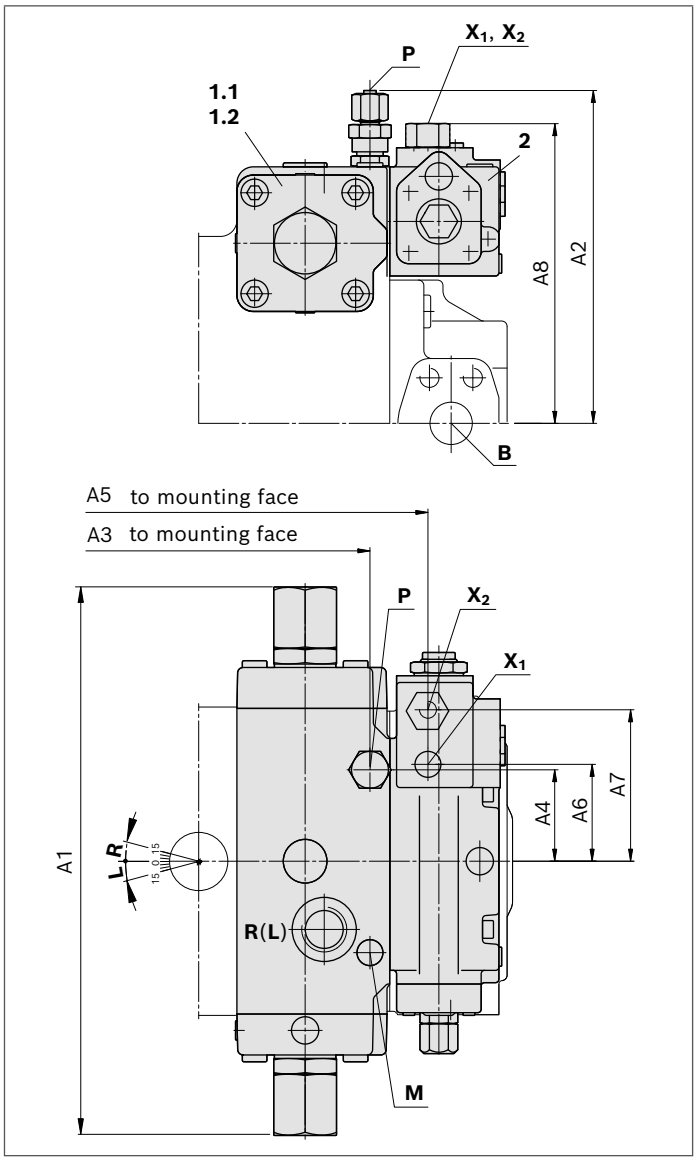
Components see page 7

1) For (A)A4VSO clockwise rotation only **X_2** is available; for (A)A4VSO counter-clockwise rotation only **X_1** is available

2) Depending on the application, momentary pressure peaks can occur.
Keep this in mind when selecting measuring devices and fittings.

3) O = Must be connected (plugged on delivery)
X = Plugged (in normal operation)

▼ **(A)A4VSO, (A)A4VSG, sizes 125 to 355**



▼ **A4CSG, in preparation, dimensions on request**

Components	
1	Pump with hydraulic control device
1.1	(A)A4VSO (see data sheet 92050)
1.2	(A)A4VSG (see data sheet 92100)
2	Control module
3	Intermediate plate (NG 500 to 1000)

NG	A1	A2	A3	A4	A5	A6	A7	A8
125	15.83 (402)	9.65 (245)	9.96 (253)	2.64 (67)	11.61 (295)	2.80 (71)	4.37 (111)	8.82 (224)
180	15.83 (402)	9.65 (245)	9.96 (253)	2.64 (67)	11.61 (295)	2.80 (71)	4.37 (111)	8.82 (224)
250	19.09 (485)	11.71 (297.5)	12.32 (313)	2.80 (71)	14.06 (357)	2.80 (71)	4.37 (111)	10.24 (260)
355	19.09 (485)	11.71 (297.5)	12.32 (313)	2.80 (71)	14.06 (357)	2.80 (71)	4.37 (111)	10.24 (260)

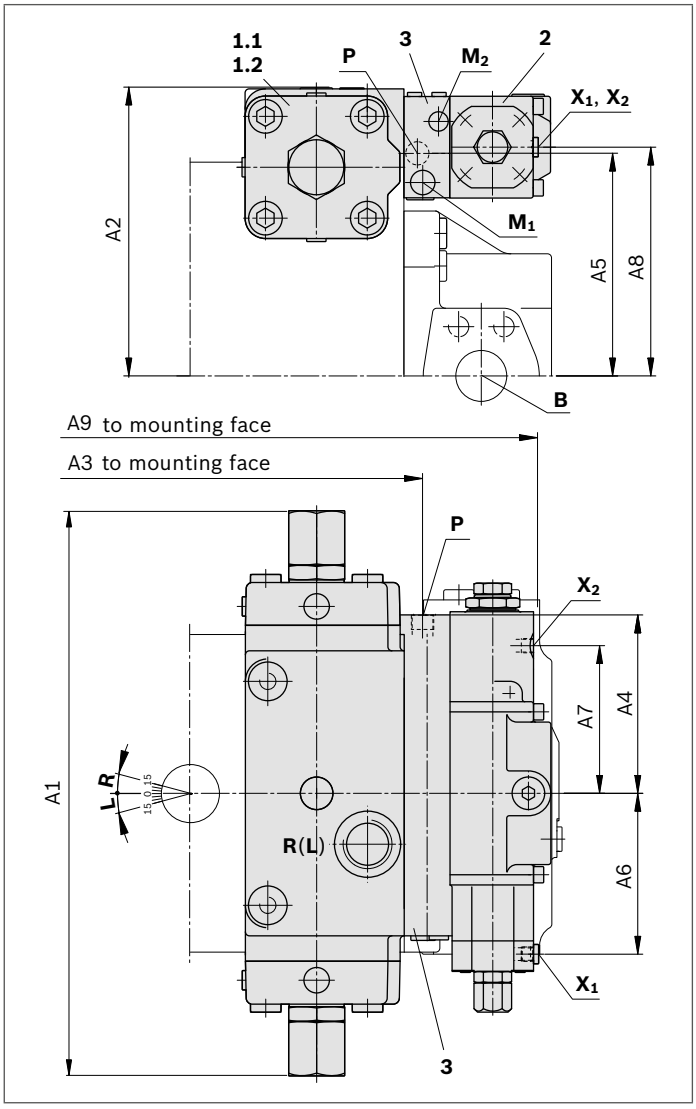
Port		Standard	Size	$p_{max\ abs}$ [psi (bar)][2]	State[3]
X_1; X_2[1]	Pilot pressure	ISO 11926	9/16-18UNF-2B; 0.51 (13) deep	650 (45)	O
P	Control pressure (NG 125 and 180)	(DIN 3853)	Tube DIA 8 × 1.5 mm (S8 form W)	5100 (350)	X
	Control pressure (NG 250 and 355)	(DIN 3853)	Tube DIA 12 × 2 mm (S12 form W)	5100 (350)	X
M	Stroking chamber measurement (NG 125 and 180)	DIN 3852	M14 × 1.5; 0.47 (12) deep	5100 (350)	X
	Stroking chamber measuring (NG 250 and 355)	DIN 3852	M18 × 1.5; 0.47 (12)deep	5100 (350)	X

1) For (A)A4VSO clockwise rotation only **X_2** is available; for (A)A4VSO counter-clockwise rotation only **X_1** is available

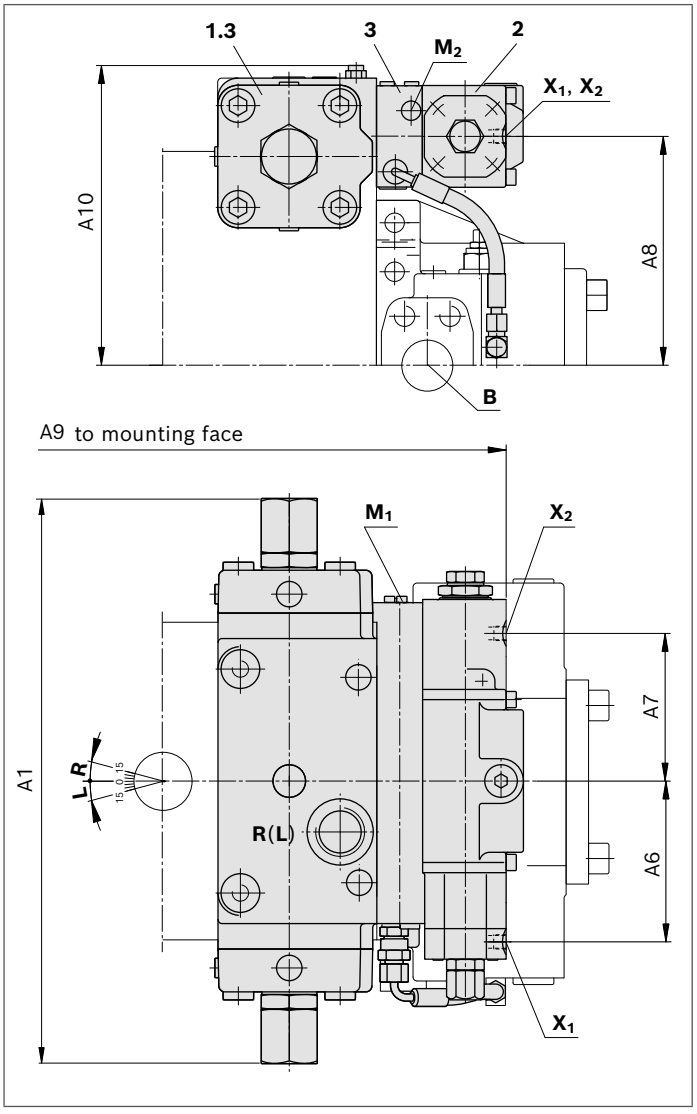
2) Depending on the application, momentary pressure peaks can occur. Keep this in mind when selecting measuring devices and fittings.

3) O = Must be connected (plugged on delivery)
X = Plugged (in normal operation)

▼ **(A)A4VSO, (A)A4VSG, sizes 500 to 1000**



▼ **A4CSG, sizes 500 to 1000**



NG	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10
500	21.85 (555)	11.14 (283)	15.08 (383)	6.89 (175)	7.87 (200)	6.22 (158)	5.71 (145)	8.86 (225)	19.37 (492)	11.69 (297)
750	24.80 (630)	12.68 (322)	16.34 (415)	6.89 (175)	9.06 (230)	6.22 (158)	5.71 (145)	11.02 (280)	20.63 (524)	13.98 (355)
1000	26.38 (670)	13.66 (347)	18.98 (482)	6.89 (175)	9.96 (253)	6.22 (158)	5.71 (145)	10.94 (278)	23.23 (590)	–

Port		Standard	Size	$p_{max\ abs}$ [psi (bar)][2]	State[3]
X_1; X_2[1]	Pilot pressure ((A)A4VSO, (A)A4VSG, (A)A4CSG)	DIN 3852	M14 × 1.5; 0.47 (12) deep	650 (45)	O
P	Control pressure ((A)A4VSO, (A)A4VSG)	DIN 3852	M22 × 1.5; 0.55 (14) deep	5100 (350)	O
M_1	Small stroking chamber measuring ((A)A4VSO, (A)A4VSG)	DIN 3852	M18 × 1.5; 0.47 (12) deep	5100 (350)	X
	Small stroking chamber measuring (A4CSG)	DIN 3852	M22 × 1.5; 0.55 (14) deep	5100 (350)	X
M_2	Large stroking chamber measuring ((A)A4VSO, (A)A4VSG, A4CSG)	DIN 3852	M14 × 1.5; 0.47 (12) deep	5100 (350)	X

Components see page 9

1) For (A)A4VSO clockwise rotation only **X_2** is available;
for (A)A4VSO counter-clockwise rotation only **X_1** is available

2) Depending on the application, momentary pressure peaks can occur.
Keep this in mind when selecting measuring devices and fittings.

3) O = Must be connected (plugged on delivery)
X = Plugged (in normal operation)

Pressure control

The pressure control is an additional function which controls the displacement of the pump as soon as the set pressure command value has been reached. If the pressure setting at the pressure control valve is exceeded, the pressure control valve opens and swivels the pump back until the set pressure is reached again. With control on both sides of center, it swivels over zero in operation as a motor for decompression.
The pressure control enables controlled deceleration during the decelerating of rotational drives with inertial mass.

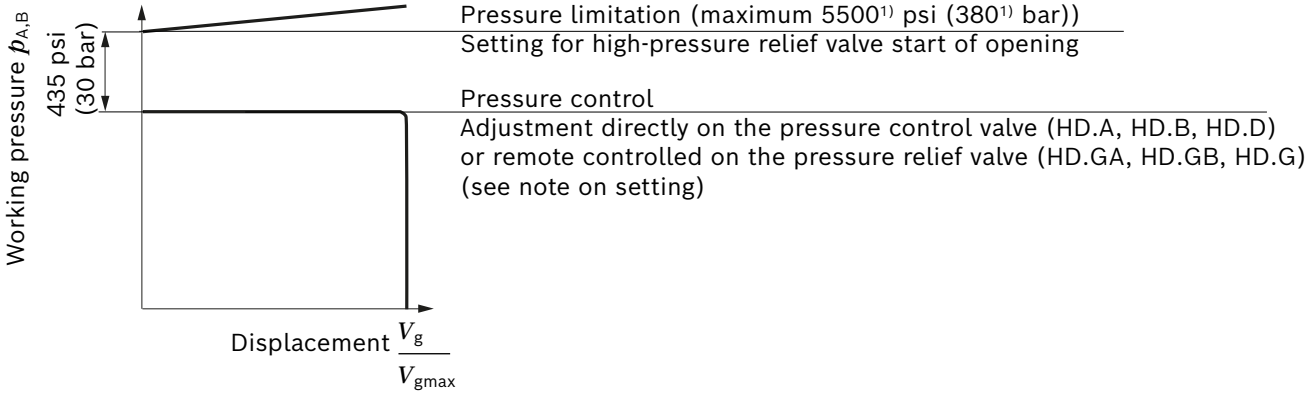
- The pressure control is optionally available:
  - HD.A on one side in port **A**
  - HD.B on one side in port **B**
  - HD.D on both sides in ports **A** and **B**
- Setting range 725 to 5100 psi (50 to 350 bar)

5100 psi (350 bar) is the standard setting. When ordering, please state other values in plain text.
The setting values, however, must be 435 psi (30 bar) lower than the high-pressure relief valve setting ((A)A4CSG or (A)A4VSG with SDVB attachment) since the occurring pressure peaks and the maximum pressure are safeguarded by these.
The **setting value** must also be **higher than** the applied **control pressure**.

Remote pressure control
The pressure control is remote controlled via the port **X**A or **X**B.
The external pressure relief valves are not included in the scope of delivery.
Recommendation DBD 6 (RE 25 402)
The maximum line length should not exceed 6.5 ft (2 m).
The differential pressure at the pressure control valve is set as standard to 435 psi (30 bar). The pilot oil consumption then lies at approx. 2 l/min. If a different setting (range 200 – 725 psi (14 – 50 bar)) is required, please state in plain text.
Note for setting the remote pressure control:
The setting value for the external pressure relief valve plus the differential pressure value at the pressure control valve determines the level of the pressure control.
Example: external pressure relief valve 4650 psi (320 bar)
Differential pressure at pressure control valve 435 psi (30 bar)
resulting pressure control of 4650 + 435= 5100 psi (320 + 30= 350 bar)

- Optional remote pressure control:
  - HD.GA on one side in port **A**
  - HD.GB on one side in port **B**
  - HD.G on both sides in ports **A** and **B**

- **Characteristic curve**

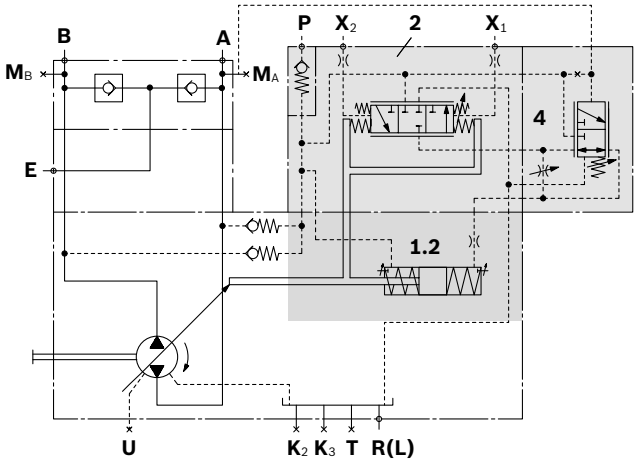


1) only valid in combination with pressure control - without pressure control, pressure limitation at 350 bar

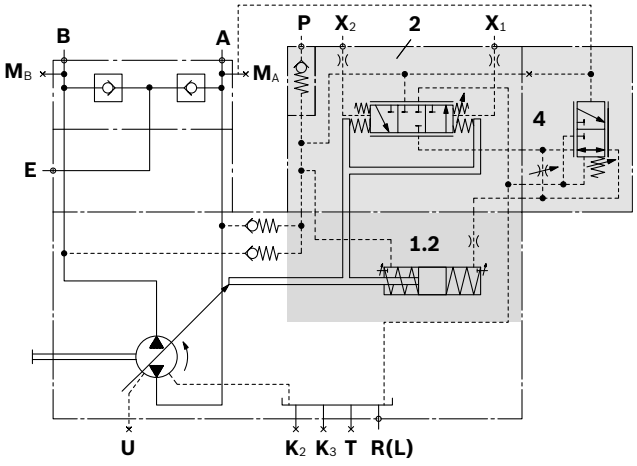
HD.A with pressure control on one side for port A

The pressure control valve controls the pressure in port **A**.
Not available for (A)A4VSO.
Bidirectional direction of rotation not possible.

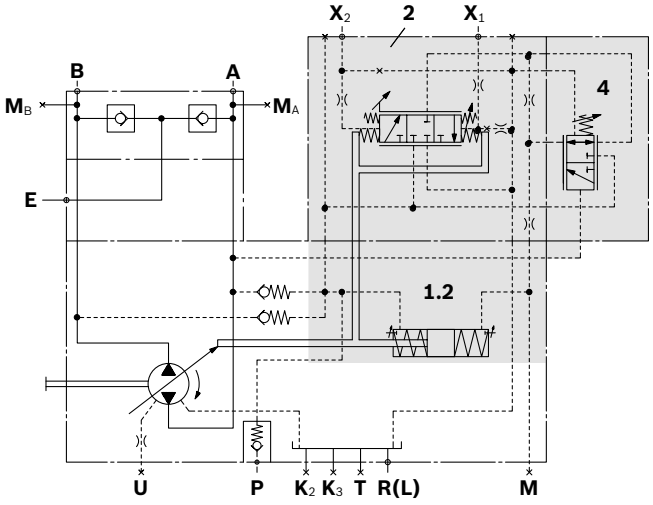
▼ **(A)A4VSG, sizes 40 and 71**
Clockwise rotation



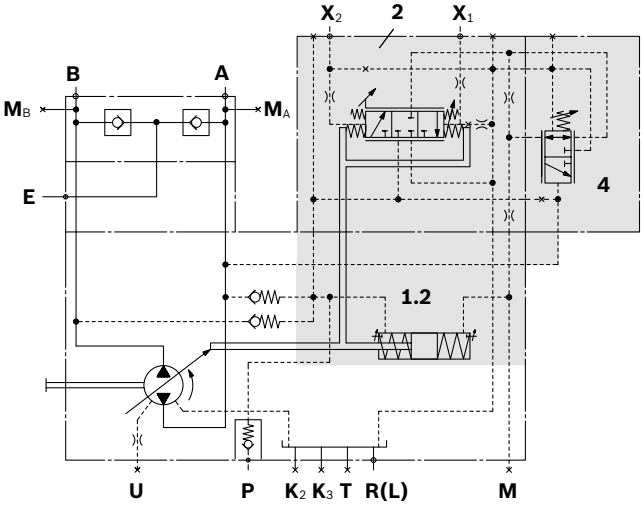
▼ **(A)A4VSG, sizes 40 and 71**
Counter-clockwise rotation



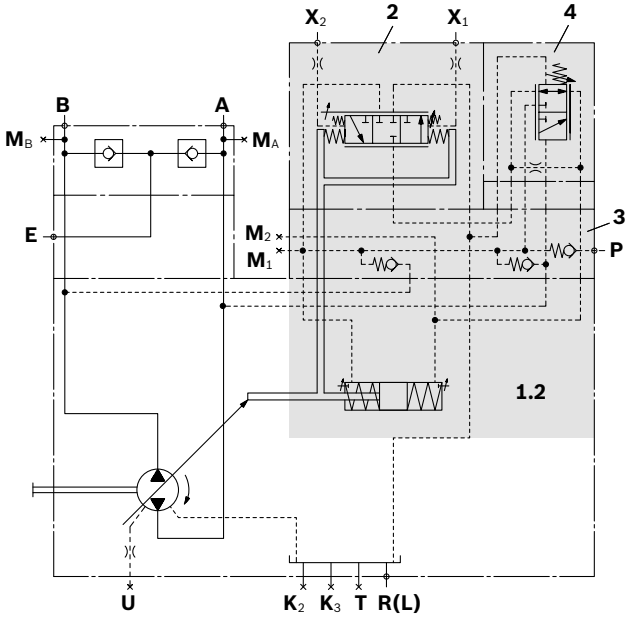
▼ **(A)A4VSG, sizes 125 to 355**
Clockwise rotation



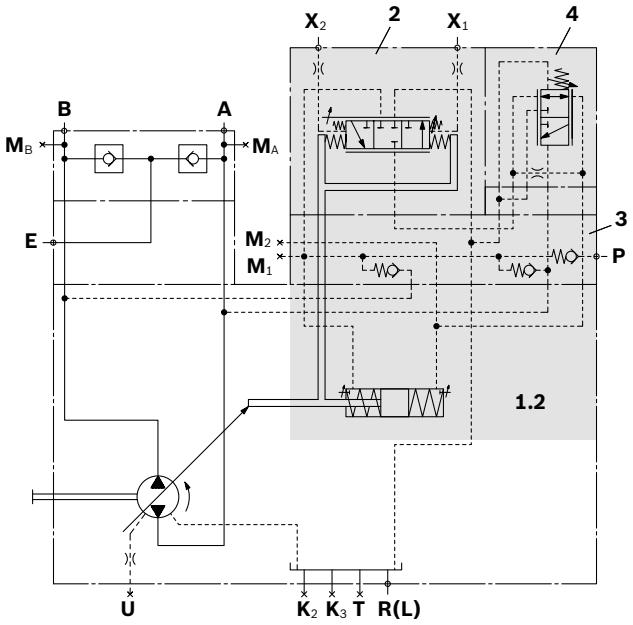
▼ **(A)A4VSG, sizes 125 to 355**
Counter-clockwise rotation



▼ **(A)A4VSG, sizes 500 to 1000**
Clockwise rotation



▼ **(A)A4VSG, sizes 500 to 1000**
Counter-clockwise rotation



Components	
1	Pump with hydraulic control device
1.2	(A)A4VSG (see data sheet 92100)
2	Control module
3	Intermediate plate
4	Pressure control valve for port **A**

Ports	
$\mathbf{X_1}$; $\mathbf{X_2}$	Pilot pressure port
P	Control pressure port
M	Measuring port stroking chamber pressure (NG 125 to 355)
$\mathbf{M_1}$	Measuring port small stroking chamber (NG 500 to 1000)
$\mathbf{M_2}$	Measuring port large stroking chamber (NG 500 to 1000)

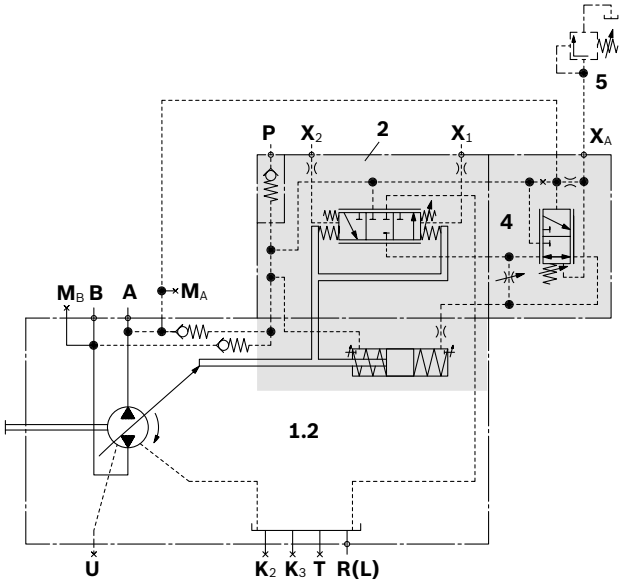
Notice

- For detailed dimensions and technical data of the variable pump, see data sheet 92100

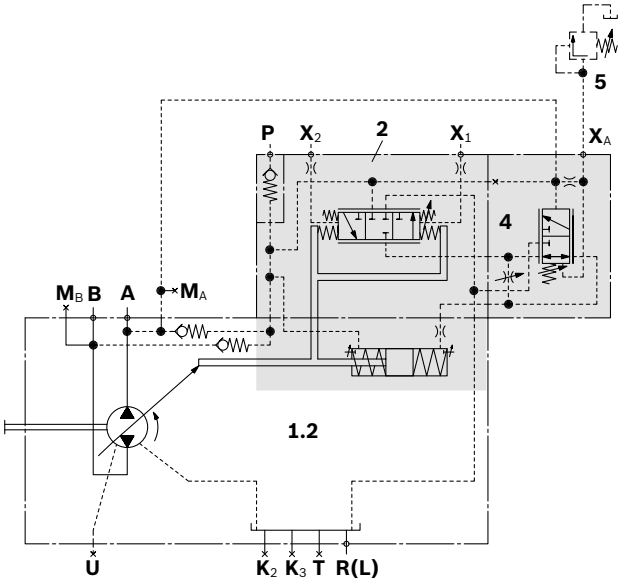
HD.GA with remote pressure control for port A

The pressure control is remote controlled via the port $\mathbf{X}_A$.
The external pressure relief valve (pos. **5**) is not included in the scope of delivery.
Not available for (A)A4VSO.
Bidirectional rotation is not possible.

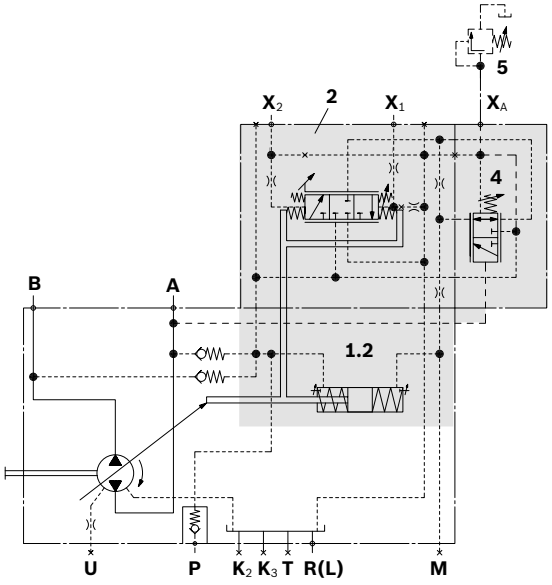
▼ **(A)A4VSO, sizes 40 and 71**
Clockwise rotation



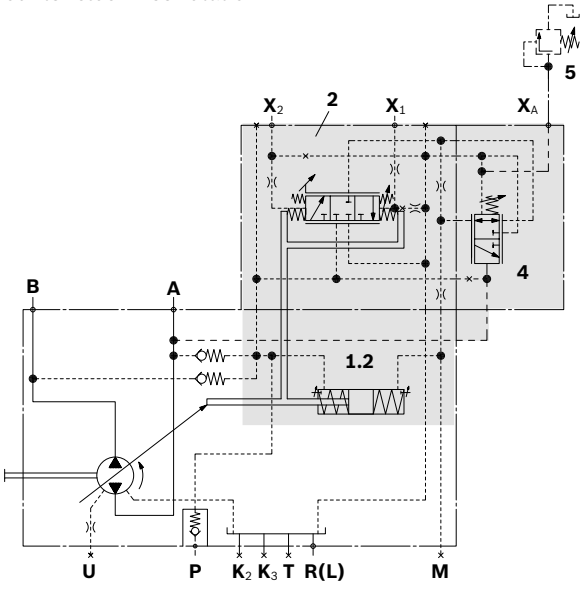
▼ **(A)A4VSO, sizes 40 and 71**
Counter-clockwise rotation



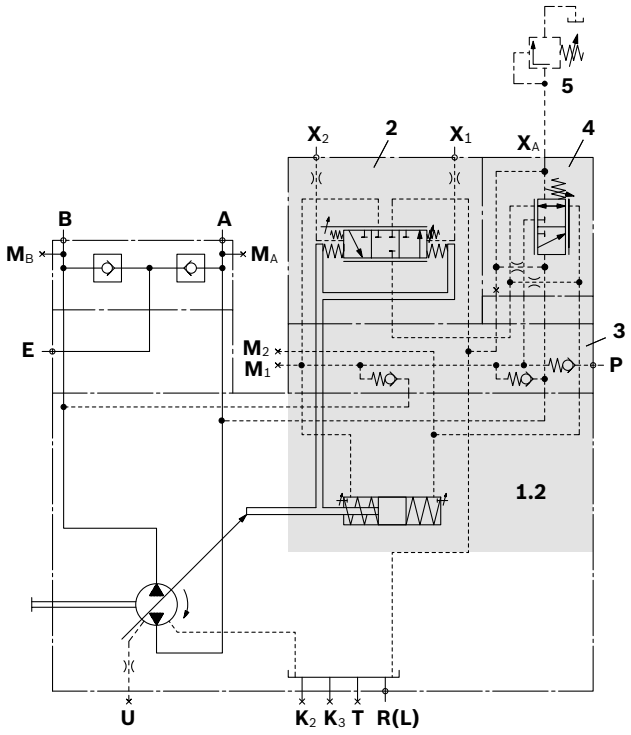
▼ **(A)A4VSO, sizes 125 to 355**
Clockwise rotation



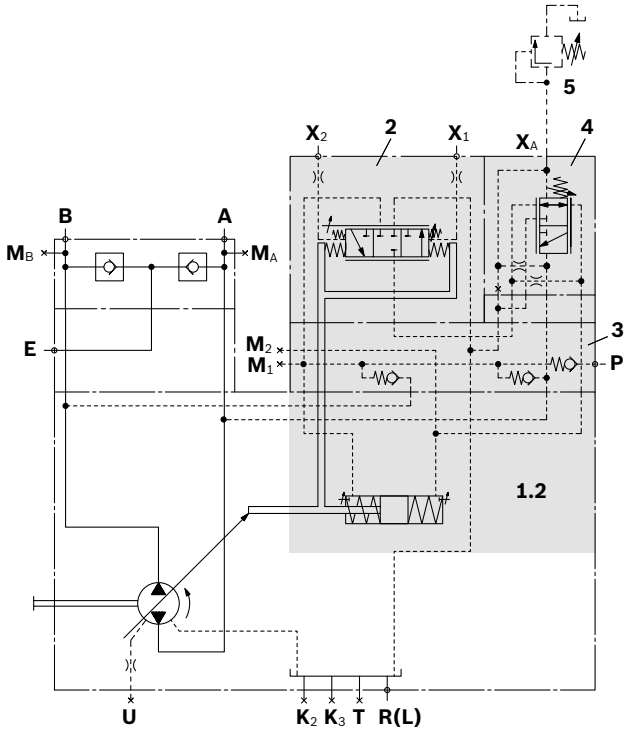
▼ **(A)A4VSO, sizes 125 to 355**
Counter-clockwise rotation



▼ **(A)A4VSG, sizes 500 to 1000**
Clockwise rotation



▼ **(A)A4VSG, sizes 500 to 1000**
Counter-clockwise rotation



Components	
1	Pump with hydraulic control device
1.2	(A)A4VSG (see data sheet 92100)
2	Control module
4	Pressure control valve for port **A**
5	External pressure relief valve (not included in the scope of delivery)

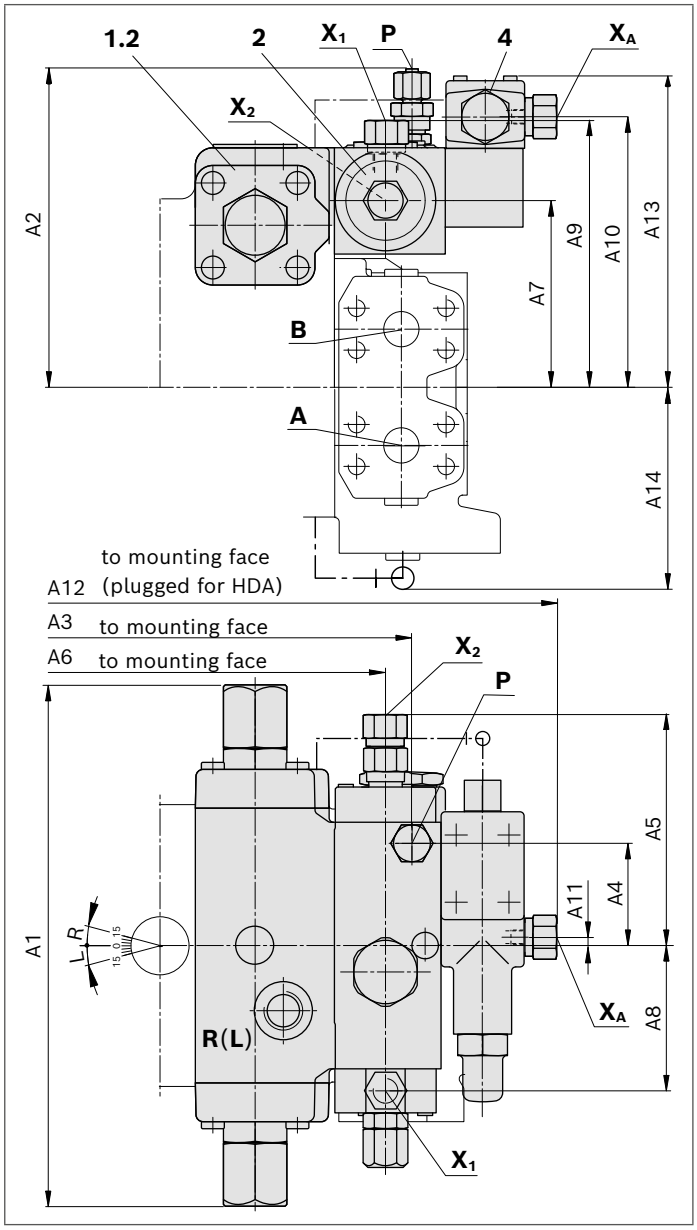
Ports	
$\mathbf{X_A}$	Pilot pressure port, remote control pressure control **A**
$\mathbf{X_1}$; $\mathbf{X_2}$	Pilot pressure port
P	Control pressure port
M	Measuring port stroking chamber pressure (NG 125 to 355)
$\mathbf{M_1}$	Measuring port small stroking chamber (NG 500 to 1000)
$\mathbf{M_2}$	Measuring port large stroking chamber (NG 500 to 1000)

Notice

▶ For detailed dimensions and technical data of the variable pump, see data sheet 92050 or 92100

Dimensions

▼ **(A)A4VSG, sizes 40 to 71**



Components	
1	Pump with hydraulic control device
1.2	(A)A4VSG (see data sheet 92100)
2	Control module
4	Pressure control valve for port **A**

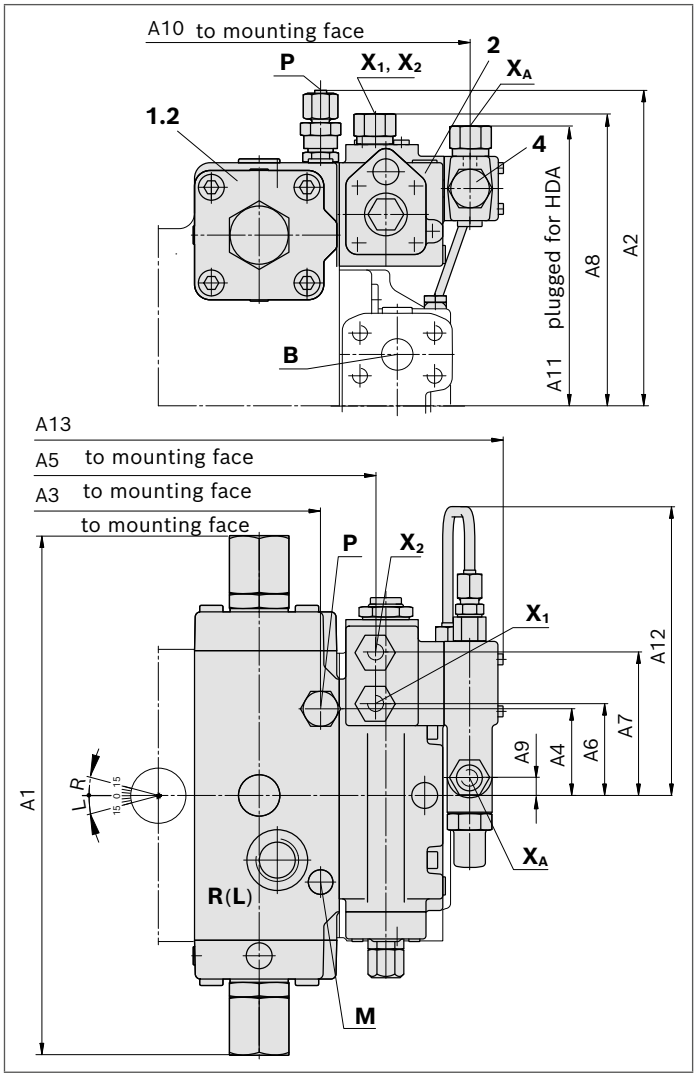
NG	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14
40	11.65 (296)	7.60 (193)	9.25 (235)	2.28 (58)	5.31 (135)	8.66 (220)	4.17 (106)	3.25 (82.5)	6.08 (154.5)	6.42 (163)	0.16 (4)	12.72 (323)	7.44 (189)	5.35 (136)
71	13.07 (332)	8.23 (209)	10.31 (262)	2.28 (58)	5.31 (135)	9.72 (247)	4.80 (122)	3.25 (82.5)	6.71 (170.5)	7.05 (179)	0.16 (4)	13.78 (350)	8.07 (205)	5.47 (139)

Port		Standard	Size	$p_{max\ abs}$ [psi (bar)][1]	State[2]
X_A	Pilot pressure remote control pressure control **A**	ISO 11926	9/16-18UNF-2B; 0.51 (13) deep	650 (45)	O
X_1; X_2	Pilot pressure	ISO 11926	9/16-18UNF-2B; 0.51 (13) deep	650 (45)	O
P	Control pressure	(DIN 3853)	Tube DIA 8 × 1.5 mm (S8 form W)	5100 (350)	X

1) Depending on the application, momentary pressure peaks can occur. Keep this in mind when selecting measuring devices and fittings.

2) O = Must be connected (plugged on delivery)
X = Plugged (in normal operation)

▼ **(A)A4VSG, sizes 125 to 355**



▼ **A4CSG,** in preparation, dimensions on request

Components	
1	Pump with hydraulic control device
1.2	(A)A4VSG (see data sheet 92100)
2	Control module
3	Intermediate plate (NG 500 to 1000)
4	Pressure control valve for port **A**

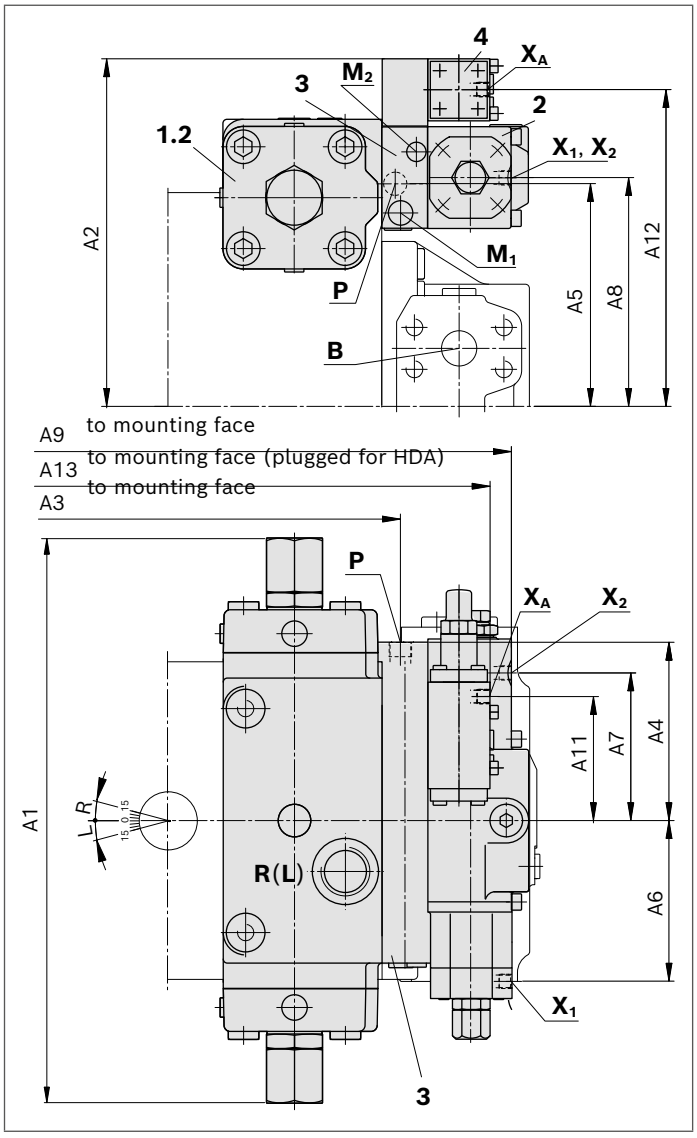
NG	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13
125	15.83 (402)	9.65 (245)	9.96 (253)	2.64 (67)	11.61 (295)	2.80 (71)	4.37 (111)	8.82 (224)	0.51 (13)	14.49 (368)	8.43 (214)	8.82 (224)	15.51 (394)
180	15.83 (402)	9.65 (245)	9.96 (253)	2.64 (67)	11.61 (295)	2.80 (71)	4.37 (111)	8.82 (224)	0.51 (13)	14.49 (368)	8.43 (214)	8.82 (224)	15.59 (396)
250/ 355	19.09 (485)	11.71 (297.5)	12.32 (313)	2.80 (71)	14.06 (357)	2.80 (71)	4.37 (111)	10.24 (260)	0.51 (13)	16.93 (430)	9.84 (250)	8.82 (224)	17.95 (456)

Port		Standard	Size	$p_{max\ abs}$ [bar][1]	State[2]
X_A	Pilot pressure remote control pressure control **A**	ISO 11926	9/16-18UNF-2B; 0.51 (13) deep	650 (45)	O
X_1; X_2	Pilot pressure	ISO 11926	9/16-18UNF-2B; 0.51 (13) deep	650 (45)	O
P	Control pressure (NG 125 and 180)	(DIN 3853)	Tube DIA 8 × 1.5 mm (S8 form W)	5100 (350)	X
	Control pressure (NG 250 and 355)	(DIN 3853)	Tube DIA 12 × 2 mm (S12 Form W)	5100 (350)	X
M	Stroking chamber measurement (NG 125 and 180)	DIN 3852	M14 × 1.5; 0.47 (12) deep	5100 (350)	X
	Stroking chamber measuring (NG 250 and 355)	DIN 3852	M18 × 1.5; 0.47 (12) deep	5100 (350)	X

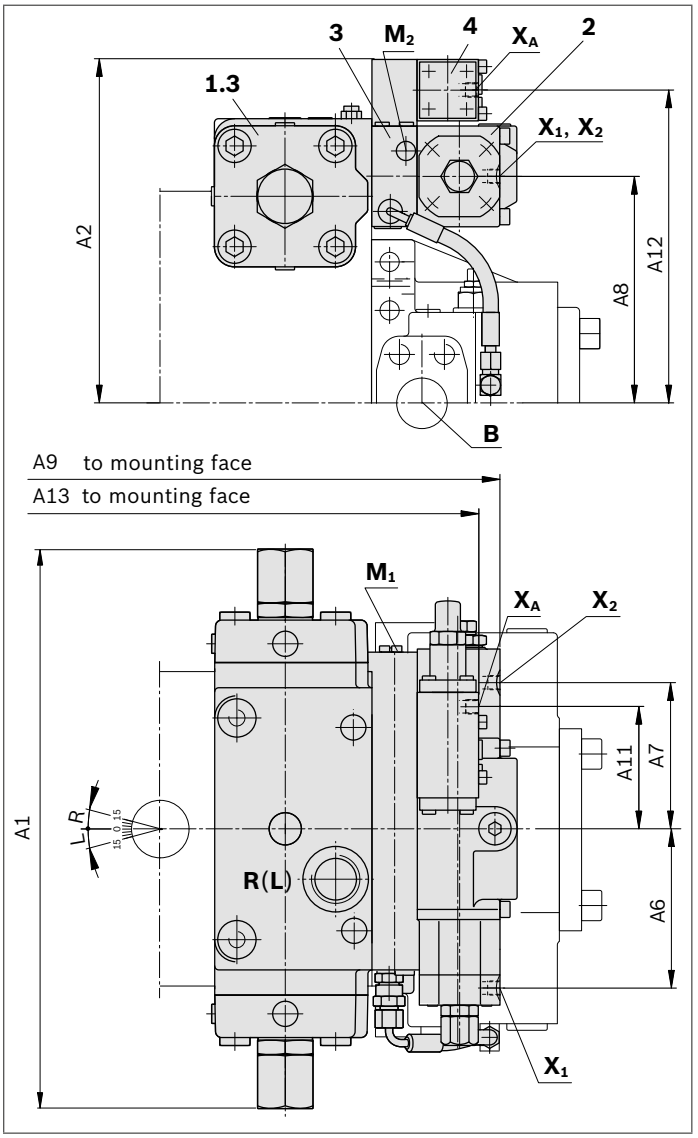
1) Depending on the application, momentary pressure peaks can occur.
Keep this in mind when selecting measuring devices and fittings.

2) O = Must be connected (plugged on delivery)
X = Plugged (in normal operation)

▼ **(A)A4VSG, sizes 500 to 1000**



▼ **A4CSG, sizes 500 to 1000**



NG	A1	A2	A3	A4	A5	A6	A7	A8	A9	A11	A12	A13
500	21.85 (555)	13.46 (342)	15.08 (383)	6.89 (175)	7.87 (200)	6.22 (158)	5.71 (145)	8.86 (225)	19.37 (492)	5.35 (136)	12.40 (315)	18.46 (469)
750	24.80 (630)	14.61 (371)	16.34 (415)	6.89 (175)	9.06 (230)	6.22 (158)	5.71 (145)	11.02 (280)	20.63 (524)	5.35 (136)	13.58 (345)	19.72 (501)
1000	26.38 (670)	15.51 (394)	18.94 (481)	6.89 (175)	9.96 (253)	6.22 (158)	5.71 (145)	10.94 (278)	23.23 (590)	5.35 (136)	14.49 (368)	22.32 (567)

Port		Standard	Size	$p_{max\ abs}$ [psi (bar)][1]	State[2]
X_A	Pilot pressure remote control pressure control **A**	DIN 3852	M14 × 1.5; 0.47 (12) deep	650 (45)	O
X_1; X_2	Pilot pressure	DIN 3852	M14 × 1.5; 0.47 (12) deep	650 (45)	O
P	Control pressure (only with (A)A4VSG)	DIN 3853	M22 × 1.5; 0.55 (14) deep	5100 (350)	X
M_1	Stroking chamber measurement ((A)A4VSG)	DIN 3852	M18 × 1.5; 0.47 (12) deep	5100 (350)	X
	Stroking chamber measurement ((A)A4CSG)	DIN 3852	M22 × 1.5; 0.55 (14) deep	5100 (350)	X
M_2	Stroking chamber measuring (NG 250 and 355)	DIN 3852	M14 × 1.5; 0.47 (12) deep	5100 (350)	X

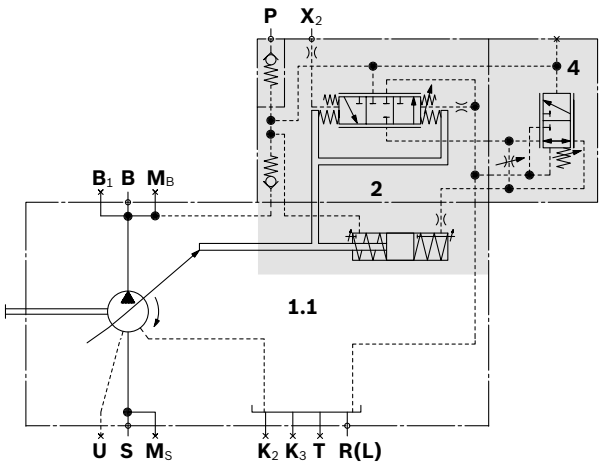
1) Depending on the application, momentary pressure peaks can occur.
Keep this in mind when selecting measuring devices and fittings.

2) O = Must be connected (plugged on delivery)
X = Plugged (in normal operation)

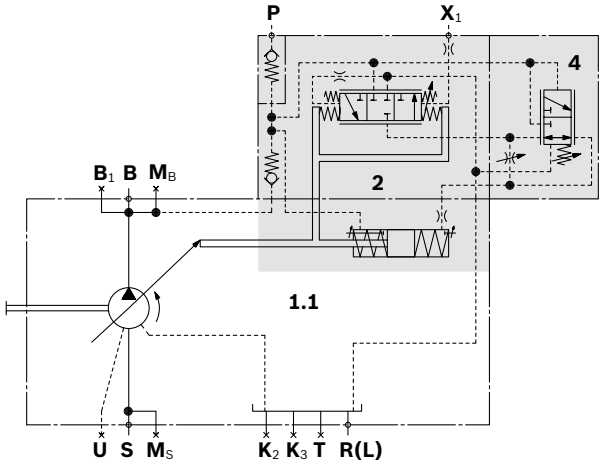
HD. B with pressure control on one side for port B

The pressure control valve controls the pressure in port B.
Bidirectional direction of rotation not possible.

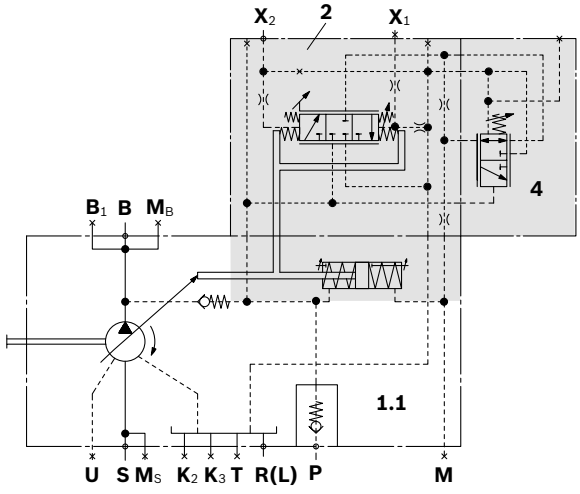
▼ **(A)A4VSO, sizes 40 and 71**
Clockwise rotation



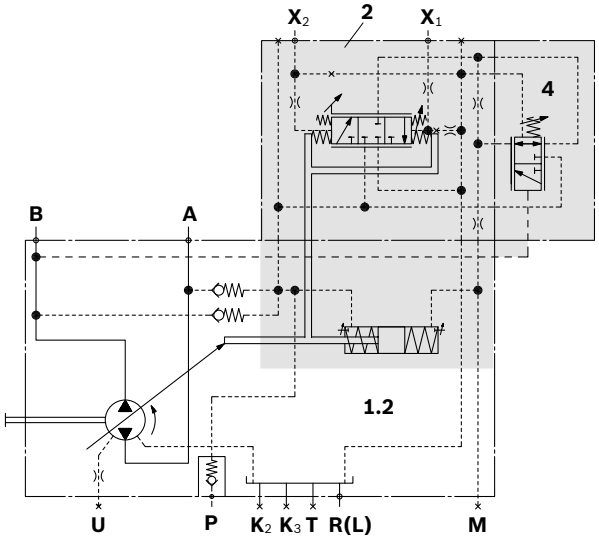
▼ **(A)A4VSO, sizes 40 and 71**
Counter-clockwise rotation



▼ **(A)A4VSO, sizes 125 to 355**
Clockwise rotation



▼ **(A)A4VSG, sizes 125 to 355**
Counter-clockwise rotation

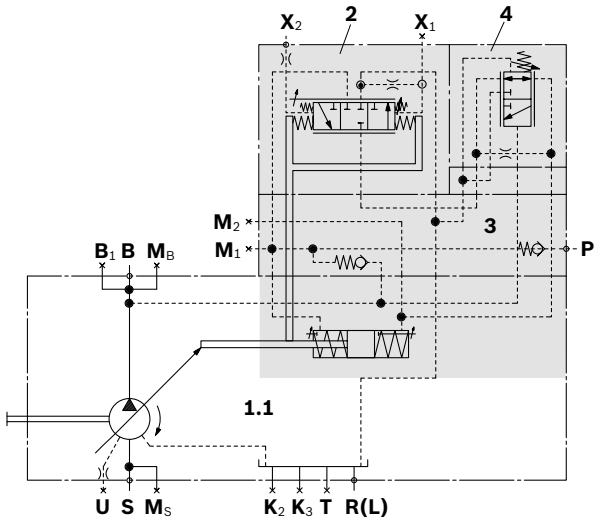


Notice

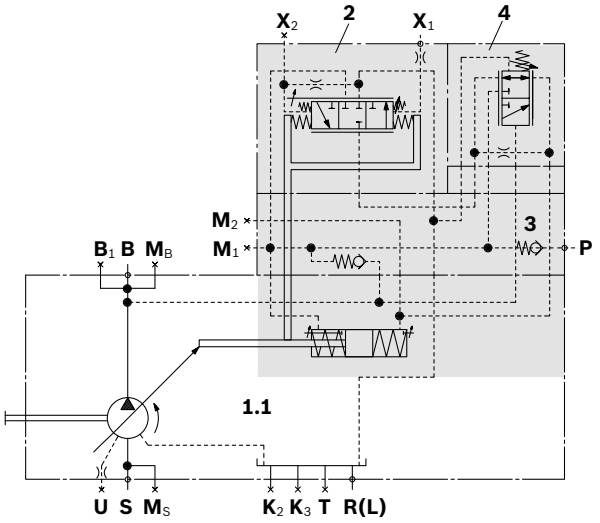
- For detailed dimensions and technical data of the variable pump, see data sheet 92050

Circuit diagrams

▼ **(A)A4VSO, sizes 500 to 1000**
Clockwise rotation



▼ **(A)A4VSO, sizes 500 to 1000**
Counter-clockwise rotation



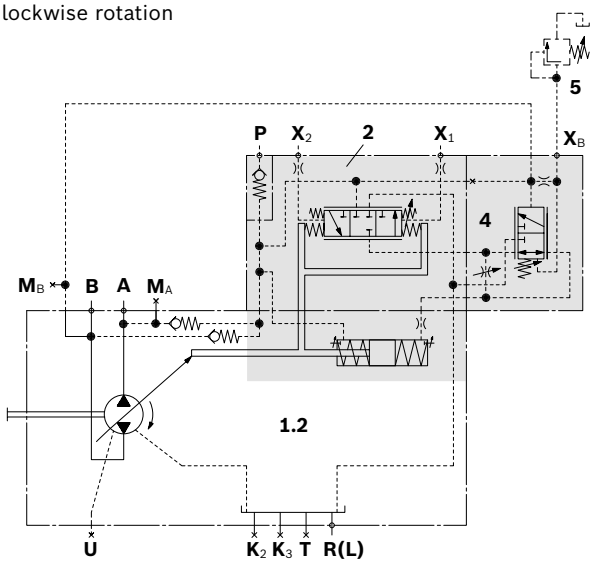
Components	
1	Pump with hydraulic control device
1.1	(A)A4VSO (see data sheet 92050)
1.2	(A)A4VSG (see data sheet 92100)
2	Control module
4	Pressure control valve for port B

Ports	
$\mathbf{X_A}$	Pilot pressure port, remote control pressure control **A**
$\mathbf{X_1}$; $\mathbf{X_2}$	Pilot pressure port
P	Control pressure port
M	Measuring port stroking chamber pressure (NG 125 to 355)
$\mathbf{M_1}$	Measuring port small stroking chamber (NG 500 to 1000)
$\mathbf{M_2}$	Measuring port large stroking chamber (NG 500 to 1000)

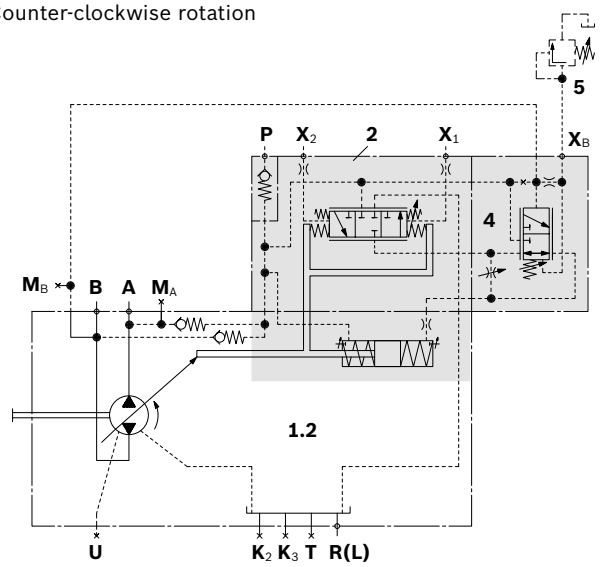
HD.GB with remote pressure control for port B

The pressure control is remote controlled via the port $\mathbf{X}_B$.
The external pressure relief valve (pos. **5**) is not included in the scope of delivery.
Bidirectional of rotation not is possible.

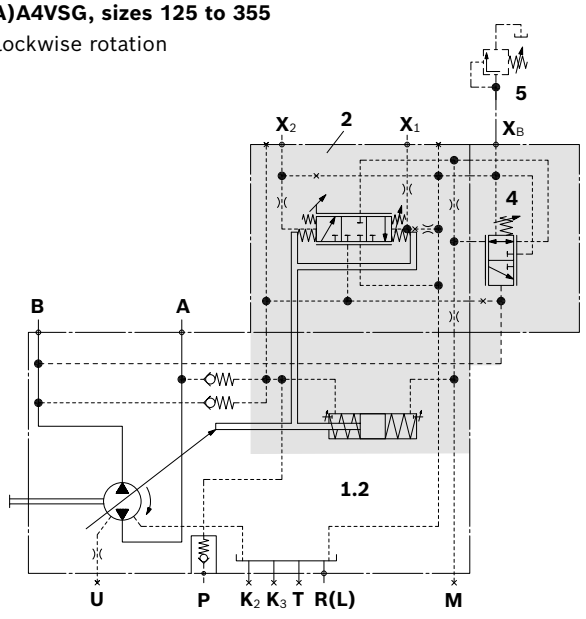
▼ **(A)A4VSG, sizes 40 and 71**
Clockwise rotation



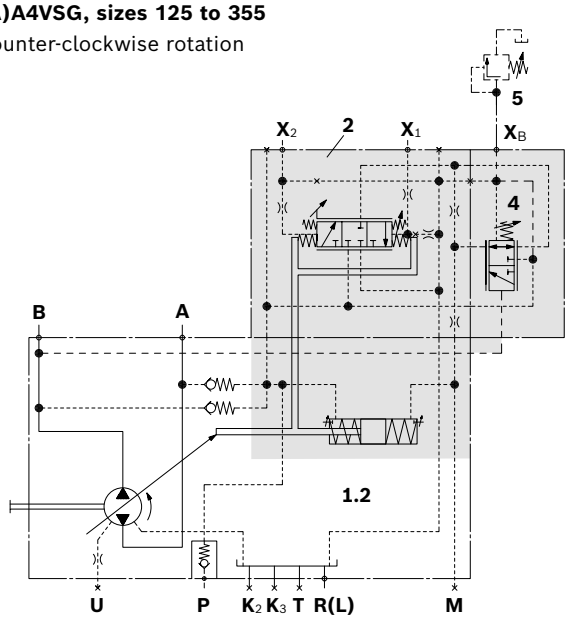
▼ **(A)A4VSG, sizes 40 and 71**
Counter-clockwise rotation



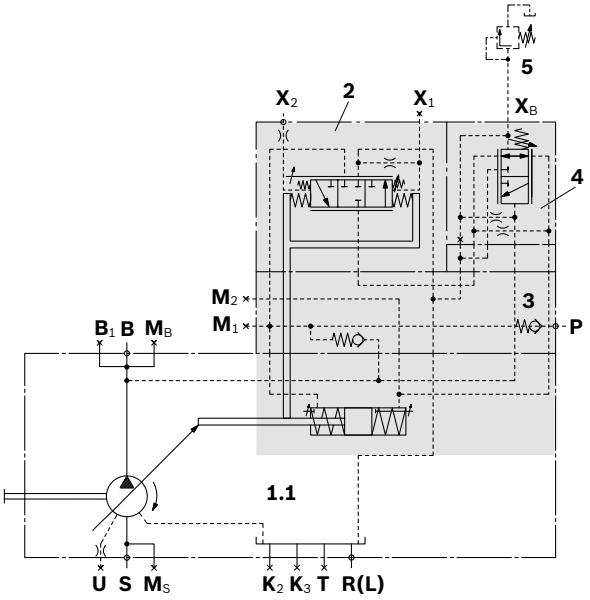
▼ **(A)A4VSG, sizes 125 to 355**
Clockwise rotation



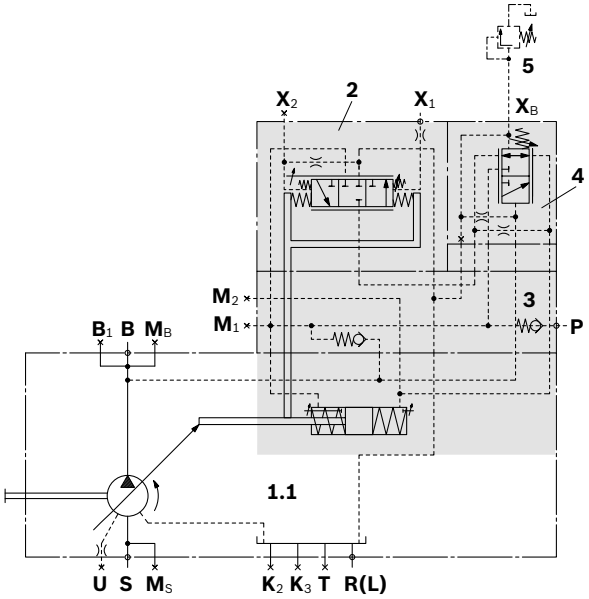
▼ **(A)A4VSG, sizes 125 to 355**
Counter-clockwise rotation



▼ **(A)A4VSO, sizes 500 to 1000**
Clockwise rotation



▼ **(A)A4VSO, sizes 500 to 1000**
Counter-clockwise rotation



Components	
1	Pump with hydraulic control device
1.1	(A)A4VSO (see data sheet 92050)
1.2	(A)A4VSG (see data sheet 92100)
2	Control module
4	Pressure control valve for port **B**
5	External pressure relief valve (not included in the scope of delivery)

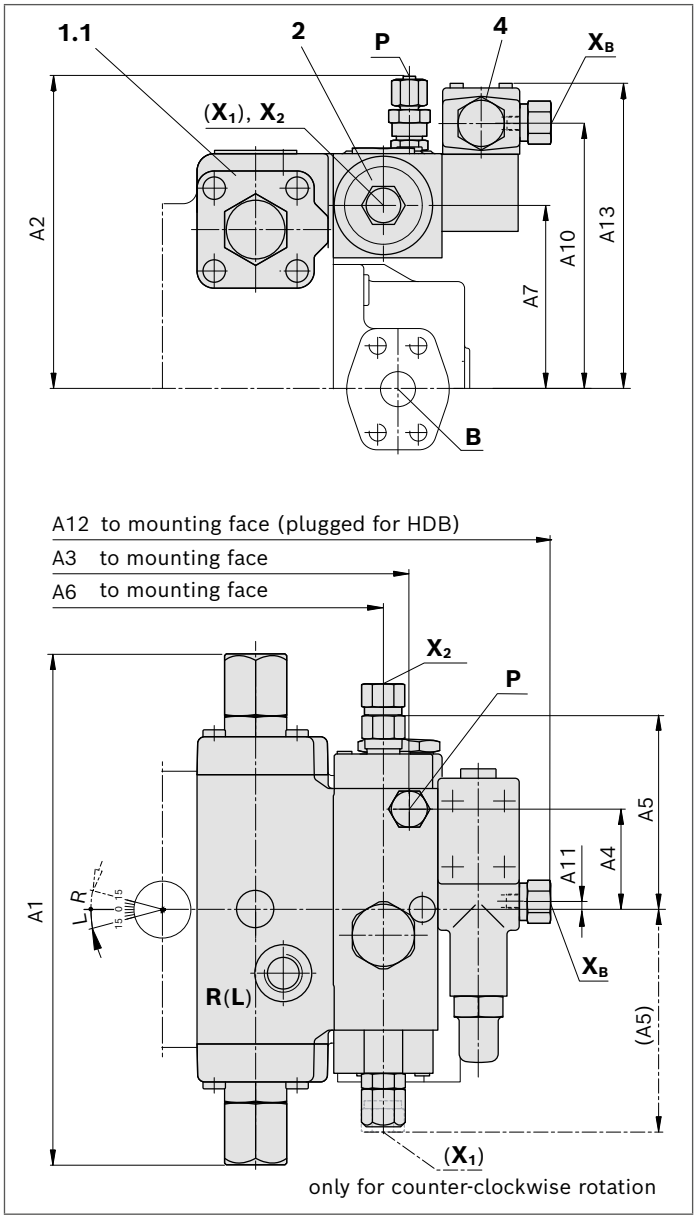
Ports	
$\mathbf{X}_B$	Pilot pressure port, remote control pressure control **B**
$\mathbf{X}_1$; $\mathbf{X}_2$	Pilot pressure port
P	Control pressure port
M	Measuring port stroking chamber pressure (NG 125 to 355)
$\mathbf{M}_1$	Measuring port small stroking chamber (NG 500 to 1000)
$\mathbf{M}_2$	Measuring port large stroking chamber (NG 500 to 1000)

Notice

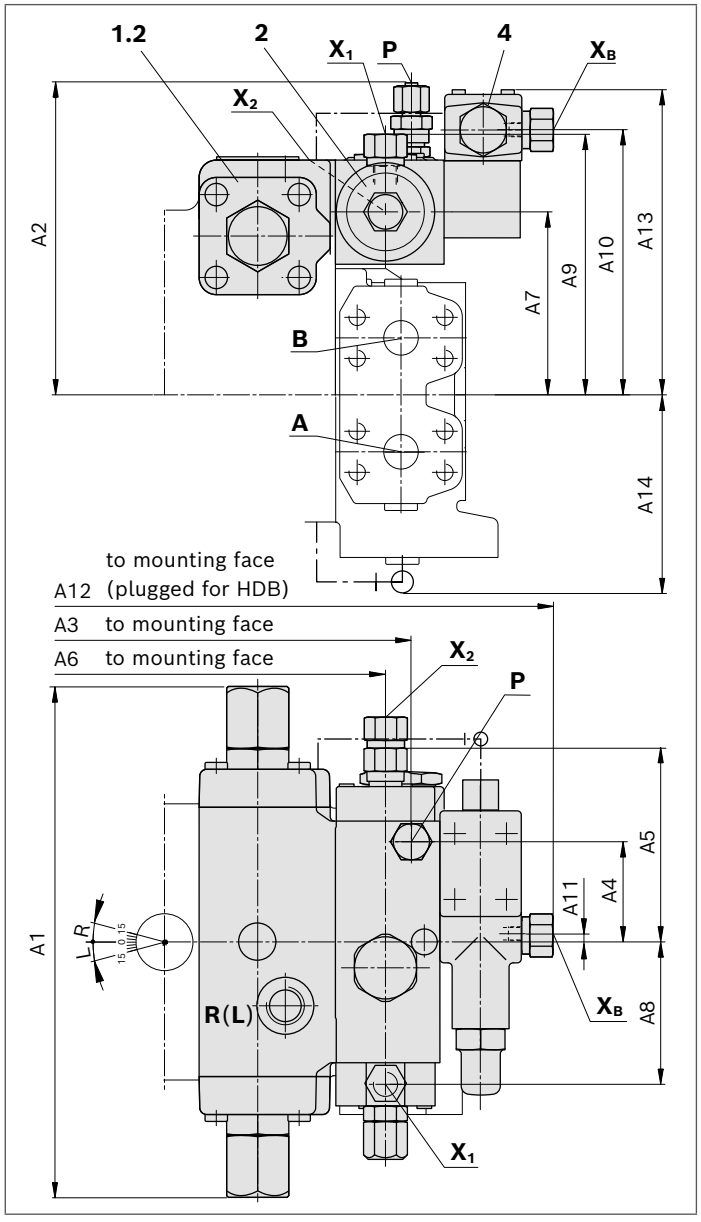
▶ For detailed dimensions and technical data of the variable pump, see data sheet 92050 or 92100

Dimensions

▼ **(A)A4VSO, sizes 40 and 71**



▼ **(A)A4VSG, sizes 40 and 71**



NG	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14
40	11.65 (296)	7.60 (193)	9.25 (235)	2.28 (58)	5.31 (135)	8.66 (220)	4.17 (106)	3.25 (82.5)	6.08 (154.5)	6.42 (163)	0.16 (4)	12.72 (323)	7.44 (189)	5.35 (136)
71	13.07 (332)	8.23 (209)	10.31 (262)	2.28 (58)	5.31 (135)	9.72 (247)	480 (122)	3.25 (82.5)	6.71 (170.5)	7.05 (179)	0.16 (4)	13.78 (350)	8.07 (205)	5.47 (139)

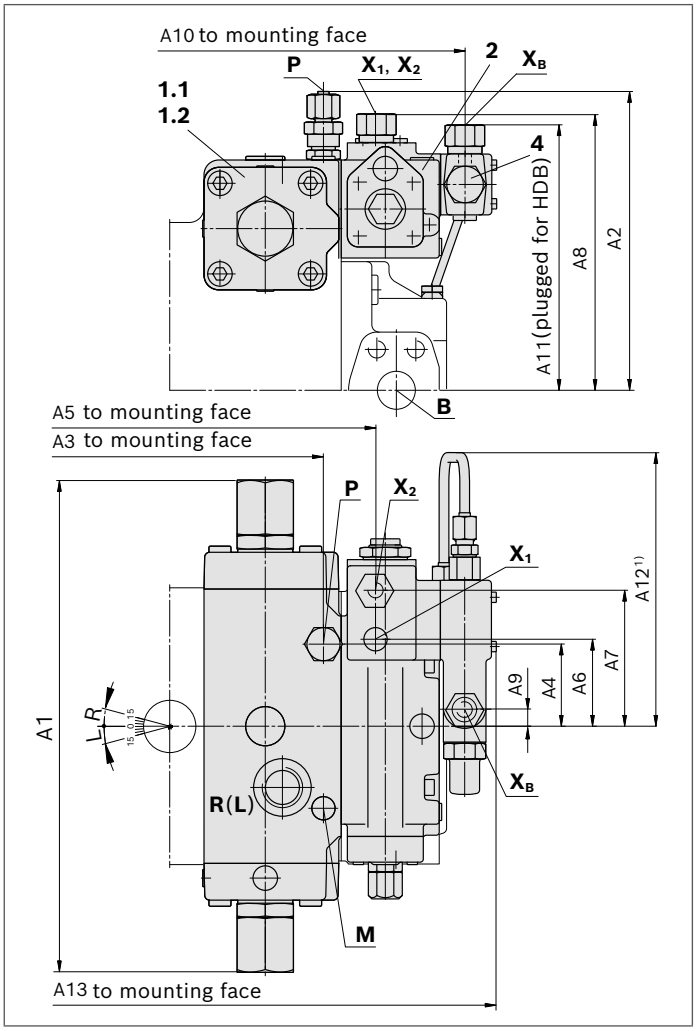
Port		Standard	Size	$p_{max\ abs}$ [psi (bar)][2]	State[3]
X_B	Pilot pressure remote control pressure control **B**	ISO 11926	9/16-18UNF-2B; 0.51 (13) deep	650 (45)	O
X_1; X_2[1]	Pilot pressure	ISO 11926	9/16-18UNF-2B; 0.51 (13) deep	650 (45)	O
P	Control pressure	(DIN 3853)	Tube DIA 8 × 1.5 mm (S8 form W)	5100 (350)	X

1) For (A)A4VSO clockwise rotation only **X_2** is available; for (A)A4VSO counter-clockwise rotation only **X_1** is available

2) Depending on the application, momentary pressure peaks can occur.
Keep this in mind when selecting measuring devices and fittings.

3) O = Must be connected (plugged on delivery)
X = Plugged (in normal operation)

▼ **(A)A4VSO, (A)A4VSG, sizes 125 to 355**



▼ **(A)A4CSG,** in preparation, dimensions on request

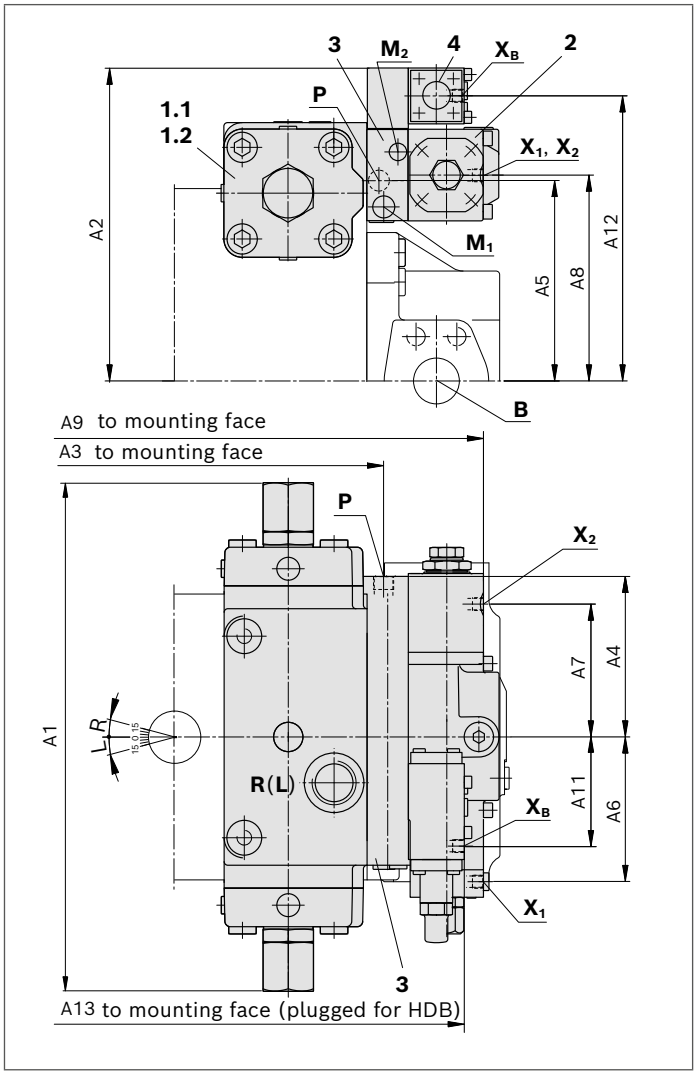
Components	
1	Pump with hydraulic control device
1.1	(A)A4VSO (see data sheet 92050)
1.2	(A)A4VSG (see data sheet 92100)
1.3	(A)A4CSG (see data sheet 92105)
2	Control module
3	Intermediate plate (NG 500 to 1000)
4	Pressure control valve for port **B**

NG	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12[1]	A13
125/ 180	15.83 (402)	9.65 (245)	9.96 (253)	2.64 (67)	11.61 (295)	2.80 (71)	4.37 (111)	8.82 (224)	0.51 (13)	14.49 (368)	8.43 (214)	8.82 (224)	15.51 (394)
250/ 355	19.09 (485)	11.73 (298)	12.32 (313)	2.80 (71)	14.06 (357)	2.80 (71)	4.37 (111)	10.24 (260)	0.51 (13)	16.93 (430)	9.84 (250)	8.82 (224)	17.95 (456)

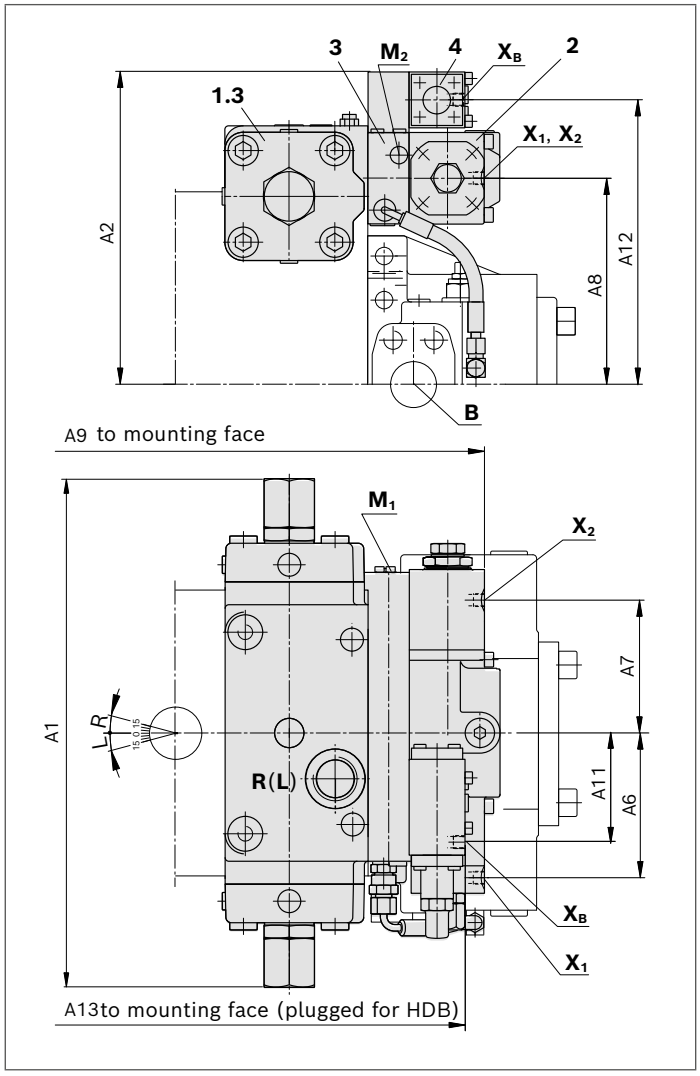
Port		Standard	Size	$p_{max\ abs}$ [psi (bar)][3]	State[4]
X_B	Pilot pressure remote control pressure control **B**	ISO 11926	9/16-18UNF-2B; 0.51 (13) deep	650 (45)	O
X_1; X_2[2]	Pilot pressure	ISO 11926	9/16-18UNF-2B; 0.51 (13) deep	650 (45)	O
P	Control pressure (NG 125 and 180)	(DIN 3853)	Tube DIA 8 × 1.5 mm (S8 form W)	5100 (350)	X
	Control pressure (NG 250 and 355)	(DIN 3853)	Tube DIA 12 × 2 mm (S12 Form W)	5100 (350)	X
M	Stroking chamber measurement (NG 125 and 180)	DIN 3852	M14 × 1.5; 0.47 (12) deep	5100 (350)	X
	Stroking chamber measuring (NG 250 and 355)	DIN 3852	M18 × 1.5; 0.47 (12) deep	5100 (350)	X

1) Piping only available for (A)A4VSO
2) For (A)A4VSO clockwise rotation only **X_2** is available; for (A)A4VSO counter-clockwise rotation only **X_1** is available
3) Depending on the application, momentary pressure peaks can occur.
Keep this in mind when selecting measuring devices and fittings.
4) O = Must be connected (plugged on delivery)
X = Plugged (in normal operation)

▼ **(A)A4VSO, A4CSG, sizes 500 to 1000**



▼ **(A)A4CSG, sizes 500 to 1000**



NG	A1	A2	A3	A4	A5	A6	A7	A8	A9	A11	A12	A13
500	21.85 (555)	13.46 (342)	15.08 (383)	6.89 (175)	7.87 (200)	6.22 (158)	5.71 (145)	8.86 (225)	19.37 (492)	5.35 (136)	11.97 (304)	18.46 (469)
750	24.80 (630)	14.61 (371)	16.34 (415)	6.89 (175)	9.06 (230)	6.22 (158)	5.71 (145)	11.02 (280)	20.63 (524)	5.35 (136)	13.15 (334)	19.72 (501)
1000	26.38 (670)	15.51 (394)	18.94 (481)	6.89 (175)	9.96 (253)	6.22 (158)	5.71 (145)	10.94 (278)	23.23 (590)	5.35 (136)	14.06 (357)	22.32 (567)

Port		Standard	Size	$p_{max\ abs}$ [psi (bar)][2]	State[3]
X_B	Pilot pressure remote control pressure control **B**	DIN 3852	M14 × 1.5; 0.47 (12) deep	650 (45)	O
X_1; X_2[1]	Pilot pressure	DIN 3852	M14 × 1.5; 0.47 (12) deep	650 (45)	O
P	Control pressure (only with (A)A4VSG)	DIN 3853	M22 × 1.5; 0.55 (14) deep	5100 (350)	X
M_1	Stroking chamber measurement ((A)A4VSG)	DIN 3852	M18 × 1.5; 0.47 (12) deep	5100 (350)	X
	Stroking chamber measurement ((A)A4CSG)	DIN 3852	M22 × 1.5; 0.55 (14) deep	5100 (350)	X
M_2	Stroking chamber measurement	DIN 3852	M14 × 1.5; 0.47 (12) deep	5100 (350)	X

1) For (A)A4VSO clockwise rotation only **X_2** is available;
for (A)A4VSO counter-clockwise rotation only **X_1** is available

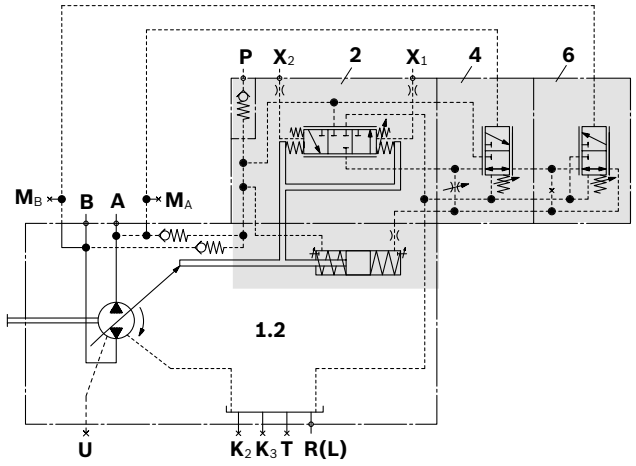
2) Depending on the application, momentary pressure peaks can occur.
Keep this in mind when selecting measuring devices and fittings.

3) O = Must be connected (plugged on delivery)
X = Plugged (in normal operation)

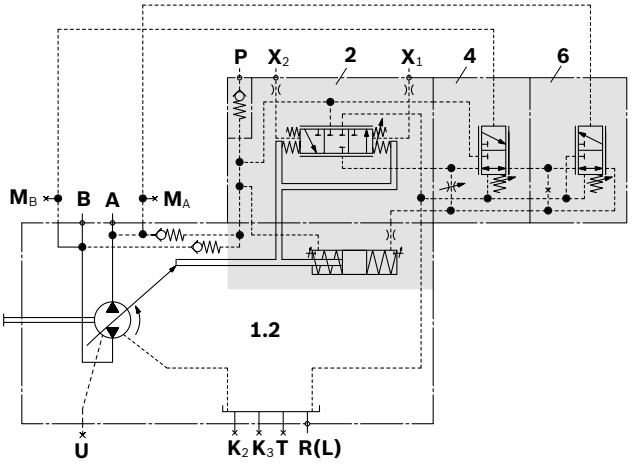
HD.D with pressure control on both sides for ports A and B

Two pressure control valves control the respective pressure in the ports **A** or **B** independently of each other.
Not available for (A)A4VSO.
Bidirectional direction of rotation not possible.

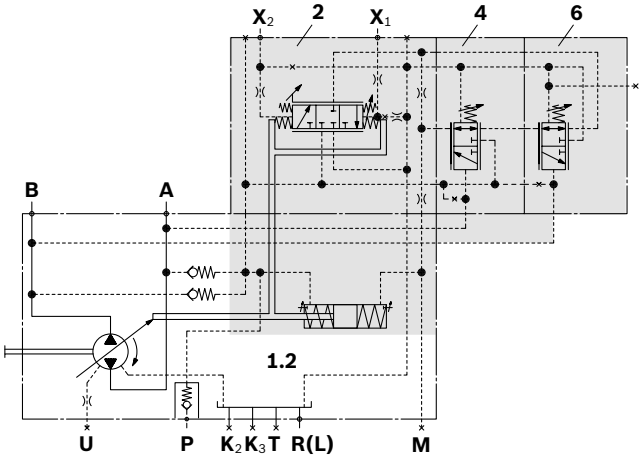
▼ **(A)A4VSG, sizes 40 and 71**
Clockwise rotation



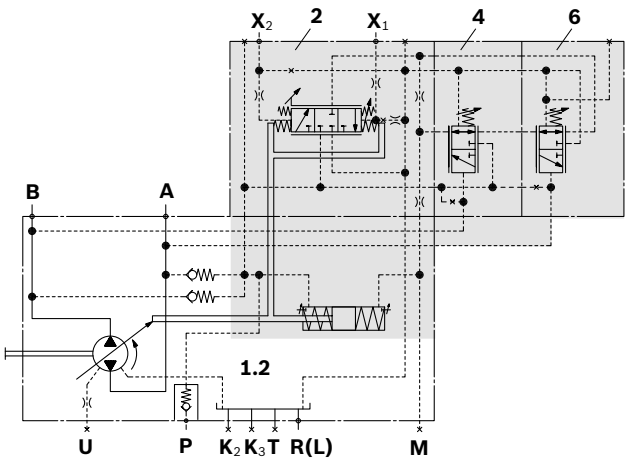
▼ **(A)A4VSG, sizes 40 and 71**
Counter-clockwise rotation



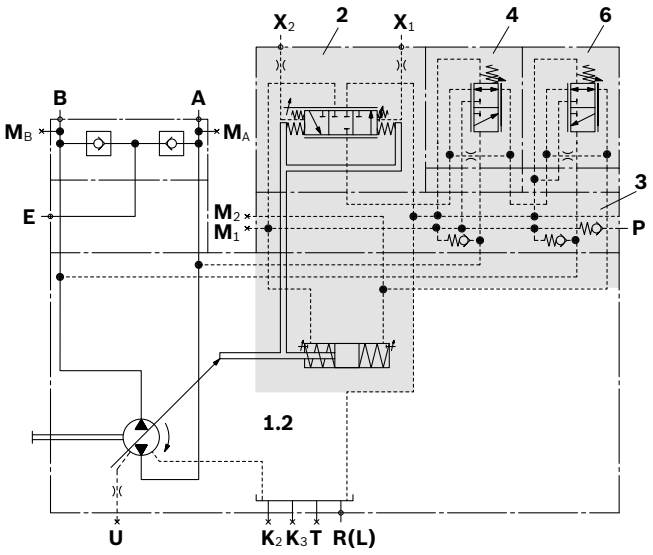
▼ **(A)A4VSG, sizes 125 to 355**
Clockwise rotation



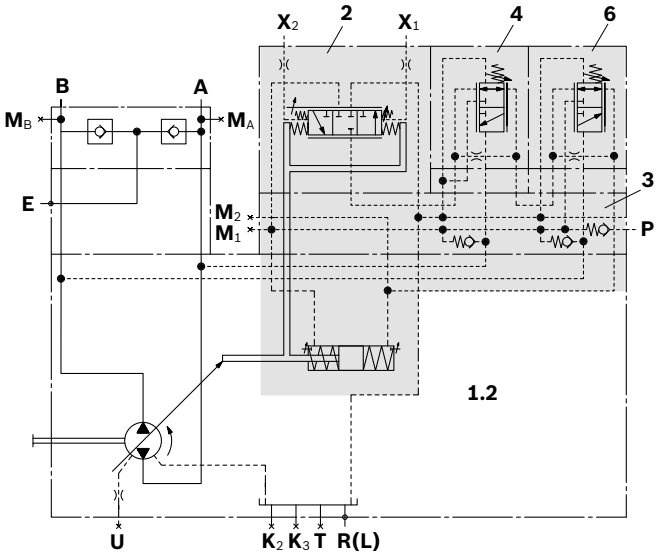
▼ **(A)A4VSG, sizes 125 to 355**
Counter-clockwise rotation



▼ **(A)A4VSG, sizes 500 to 1000**
Clockwise rotation



▼ **(A)A4VSG, sizes 500 to 1000**
Counter-clockwise rotation



Components	
1	Pump with hydraulic control device
1.2	(A)A4VSG (see data sheet 92100)
2	Control module
4	Pressure control valve for port **A** (for port **B** counter-clockwise rotation)
6	Pressure control valve for port **B** (for port **A** counter-clockwise rotation)

Ports	
$\mathbf{X_1}$; $\mathbf{X_2}$	Pilot pressure port
P	Control pressure port
M	Measuring port stroking chamber pressure (NG 125 to 355)
$\mathbf{M_1}$	Measuring port small stroking chamber (NG 500 to 1000)
$\mathbf{M_2}$	Measuring port large stroking chamber (NG 500 to 1000)

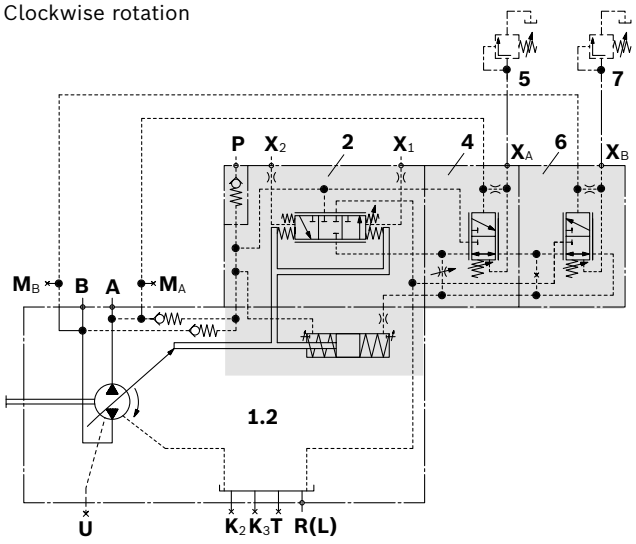
Notice

▶ For detailed dimensions and technical data of the variable pump, see data sheet 92100

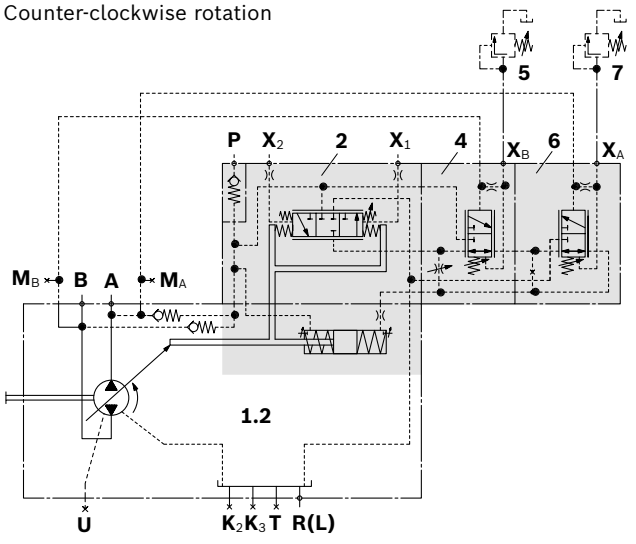
HD.G with remote pressure control on both sides for ports A and B

The pressure control valves are remote controlled via the ports **X**A or **X**B. The external pressure relief valves (pos. **5** and **7**) are not included in the scope of delivery.
Not available for (A)A4VSO.
Bidirectional direction of rotation not possible.

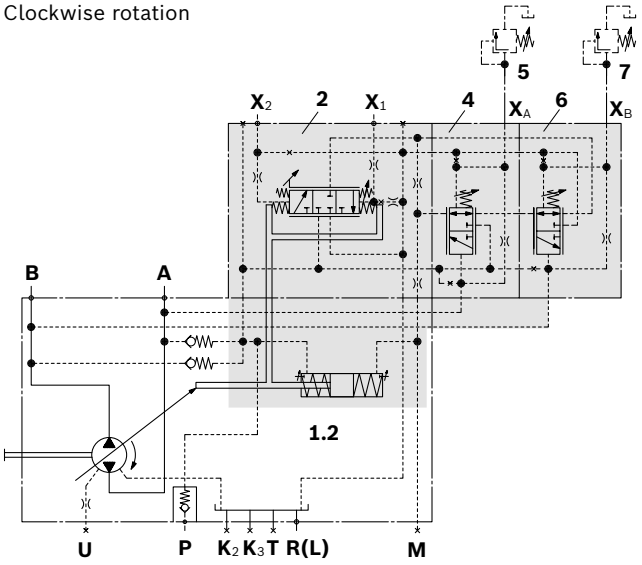
▼ **(A)A4VSG, sizes 40 and 71**
Clockwise rotation



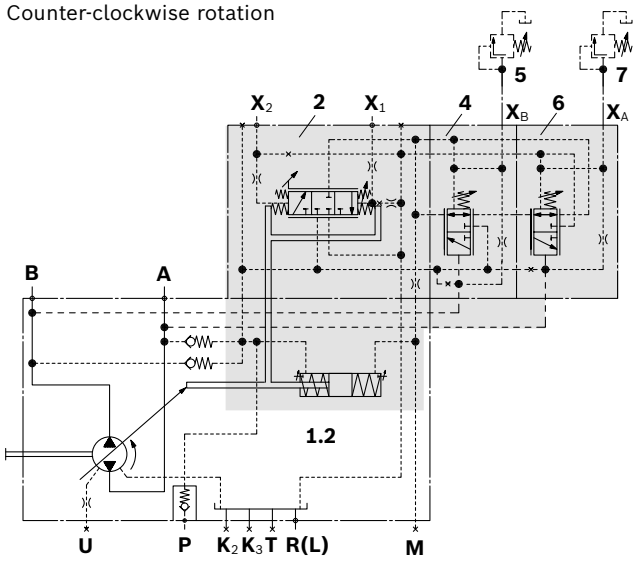
▼ **(A)A4VSG, sizes 40 and 71**
Counter-clockwise rotation



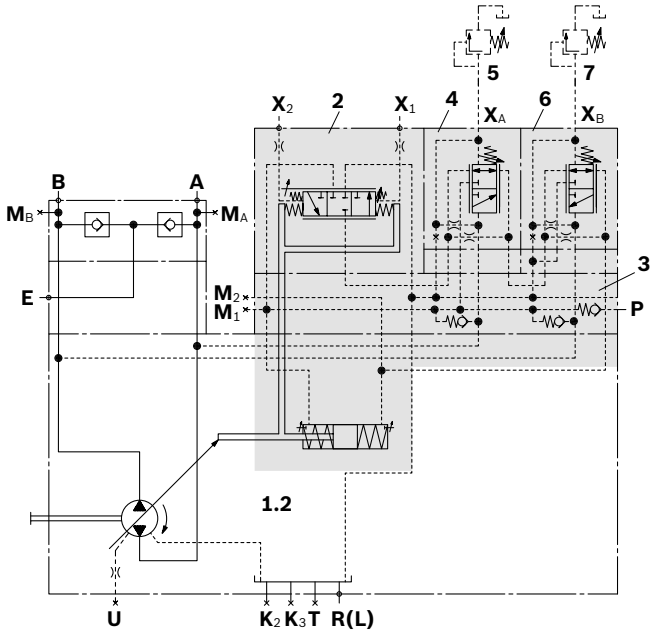
▼ **(A)A4VSG, sizes 125 to 355**
Clockwise rotation



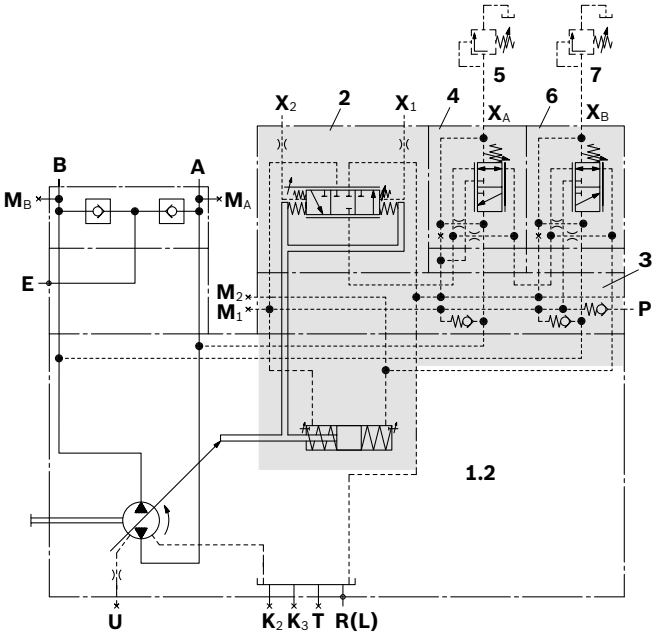
▼ **(A)A4VSG, sizes 125 to 355**
Counter-clockwise rotation



▼ **(A)A4VSG, sizes 500 to 1000**
Clockwise rotation



▼ **(A)A4VSG, sizes 500 to 1000**
Counter-clockwise rotation



Components	
1	Pump with hydraulic control device
1.2	(A)A4VSG (see data sheet 92100)
2	Control module
3	Intermediate plate
4	Pressure control valve for port **A**
5; 7	External pressure relief valves (not included in the scope of delivery)
6	Pressure control valve for port **B**

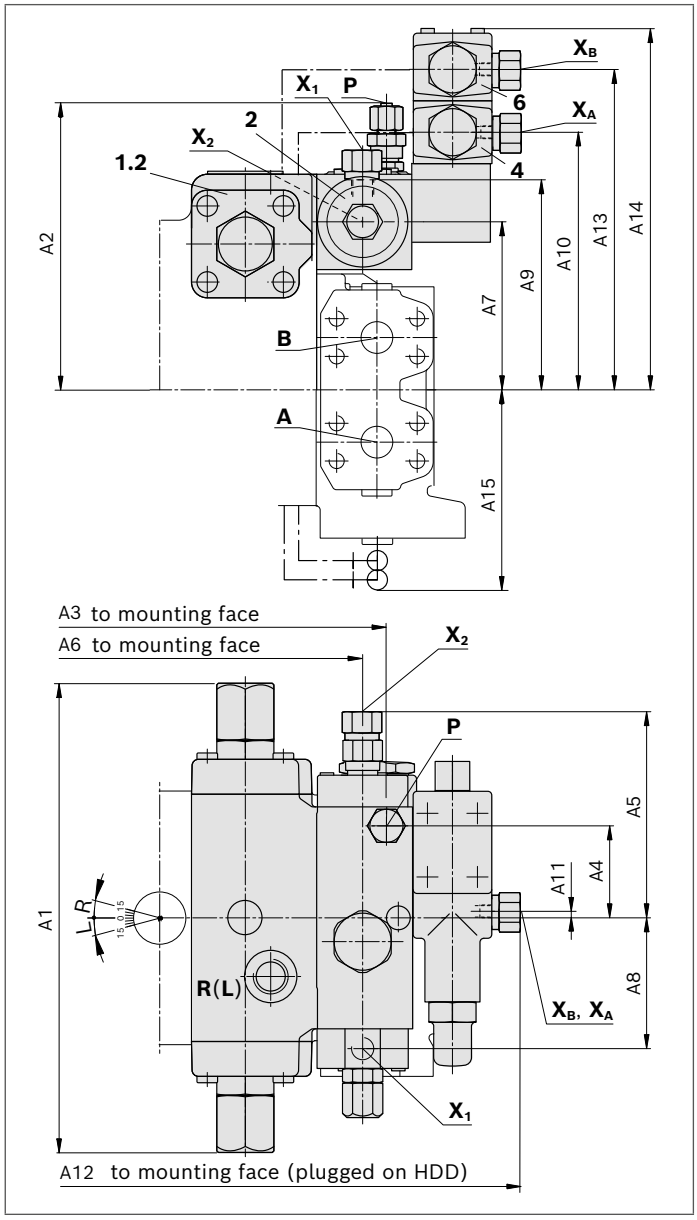
Ports	
X_A; X_B	Pilot pressure port, remote control pressure control
X_1; X_2	Pilot pressure port
P	Control pressure port
M	Measuring port stroking chamber pressure (NG 125 to 355)
M_1	Measuring port small stroking chamber (NG 500 to 1000)
M_2	Measuring port large stroking chamber (NG 500 to 1000)

Notice

- For detailed dimensions and technical data of the variable pump, see data sheet 92100

Dimensions

▼ **(A)A4VSG, sizes 40 to 71**



Components	
1	Pump with hydraulic control device
1.2	(A)A4VSG (see data sheet 92100)
1.3	(A)A4CSG (see data sheet 92105)
2	Control module
3	Intermediate plate (NG 500 to 1000)
4	Pressure control valve for port **A**
	(for port **B** counter-clockwise rotation NG 40 bis 355)
6	Pressure control valve for port **B**
	(for port **A** counter-clockwise rotation NG 40 bis 355)

NG	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15
40	11.65 (296)	7.60 (193)	9.25 (235)	2.28 (58)	5.31 (135)	8.66 (220)	4.17 (106)	3.25 (82.5)	6.10 (155)	6.42 (163)	0.16 (4)	12.72 (323)	7.99 (203)	9.02 (229)	6.50 (165)
71	12.68 (332)	8.23 (209)	10.31 (262)	2.28 (58)	5.31 (135)	9.76 (248)	480 (122)	3.25 (82.5)	6.73 (171)	7.05 (179)	0.16 (4)	13.78 (350)	8.62 (219)	9.65 (245)	6.61 (168)

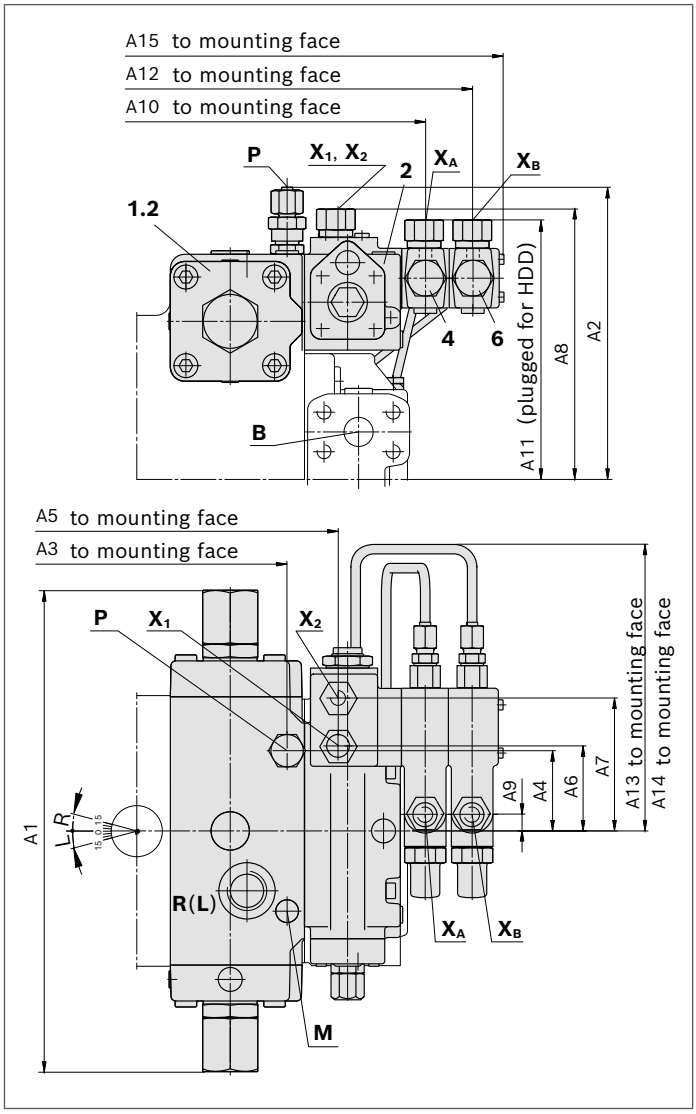
Port		Standard	Size	$p_{max\ abs}$ [psi (bar)][1]	State[2]
X_A; X_B	Pilot pressure remote control pressure control	ISO 11926	9/16-18UNF-2B; 0.51 (13) deep	650 (45)	O
X_1; X_2	Pilot pressure	ISO 11926	9/16-18UNF-2B; 0.51 (13) deep	650 (45)	O
P	Control pressure	(DIN 3853)	Tube DIA 8 × 1.5 mm (S8 form W)	5100 (350)	X

1) Depending on the application, momentary pressure peaks can occur.
Keep this in mind when selecting measuring devices and fittings.

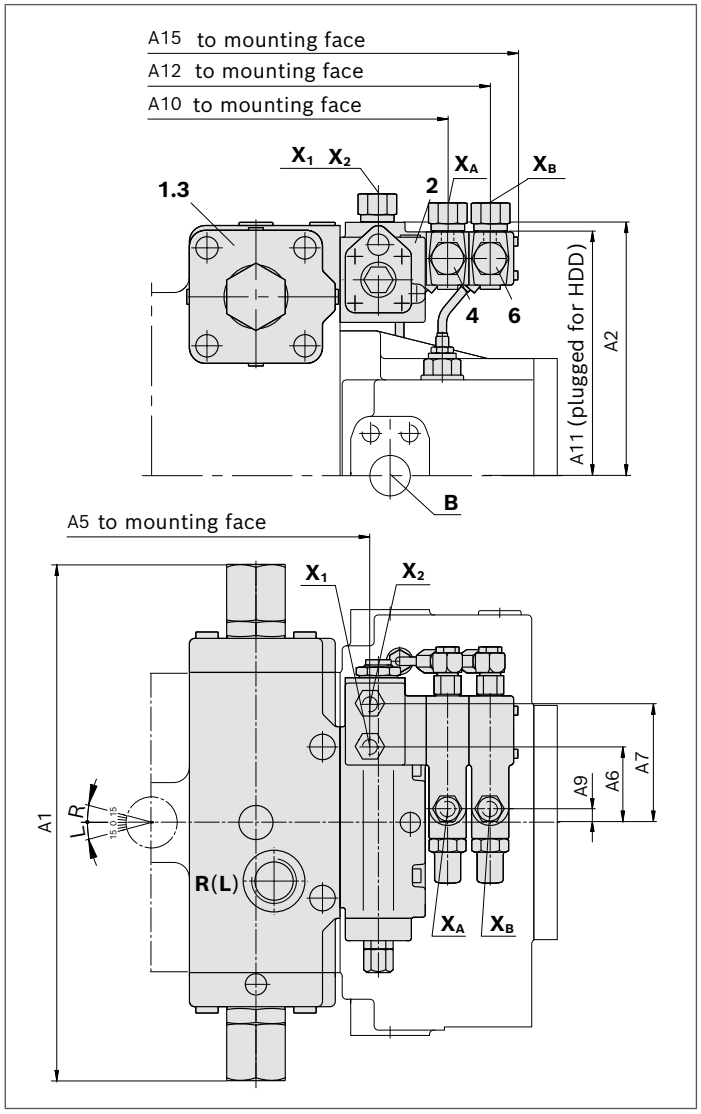
2) O = Must be connected (plugged on delivery)
X = Plugged (in normal operation)

HD.G with remote pressure control on both sides for ports A and B

▼ **(A)A4VSG, sizes 125 to 355**



▼ **(A)A4CSG, sizes 250 to 355**



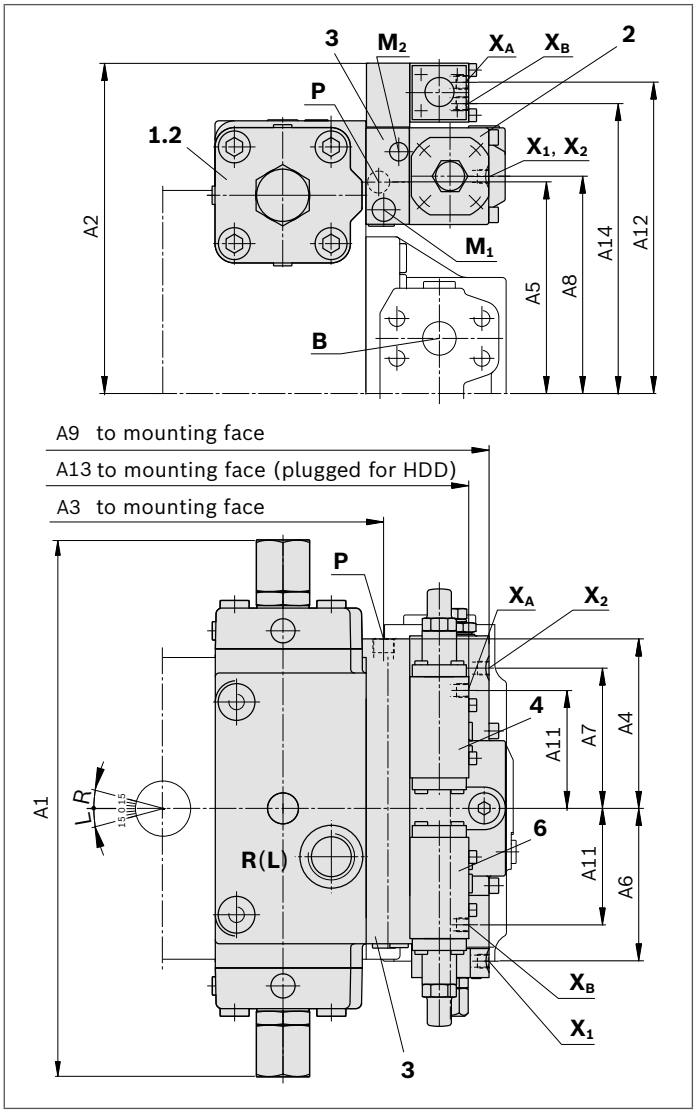
NG	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15
125/ 180	15.83 (402)	9.65 (245)	9.96 (253)	2.64 (67)	11 .61 (295)	2.80 (71)	4.37 (111)	8.82 (224)	0.51 (13)	14.49 (368)	8.43 (214)	16.06 (408)	9.41 (239)	8.82 (224)	17.09 (434)
250/ 355	19.09 (485)	11.73 (298)	12.32 (313)	2.80 (71)	14.06 (357)	2.80 (71)	4.37 (111)	10.24 (260)	0.51 (13)	16.93 (430)	9.84 (250)	18.50 (470)	9.41 (239)	8.82 (224)	19.53 (496)

Port		Standard	Size	$p_{max\ abs}$ [psi (bar)][1]	State[2]
X_A; X_B	Pilot pressure, remote control pressure control	ISO 11926	9/16-18UNF-2B; 0.51 (13) deep	650 (45)	O
X_1; X_2	Pilot pressure	ISO 11926	9/16-18UNF-2B; 0.51 (13) deep	650 (45)	O
P	Control pressure	(DIN 3853)	Tube DIA 8 × 1.5 mm (S8 form W) (NG 125 and 180)	5100 (350)	X
	(only with (A)A4VSG)	(DIN 3853)	Tube DIA 12 × 2 mm S12 Form W (NG 250 and 355)	5100 (350)	X
M	Stroking chamber measurement	DIN 3852	M14 × 1.5; 0.47 (12) deep (NG 125 and 180)	5100 (350)	X
		DIN 3852	M18 × 1.5; 0.47 (12) deep (NG 250 and 355)	5100 (350)	X

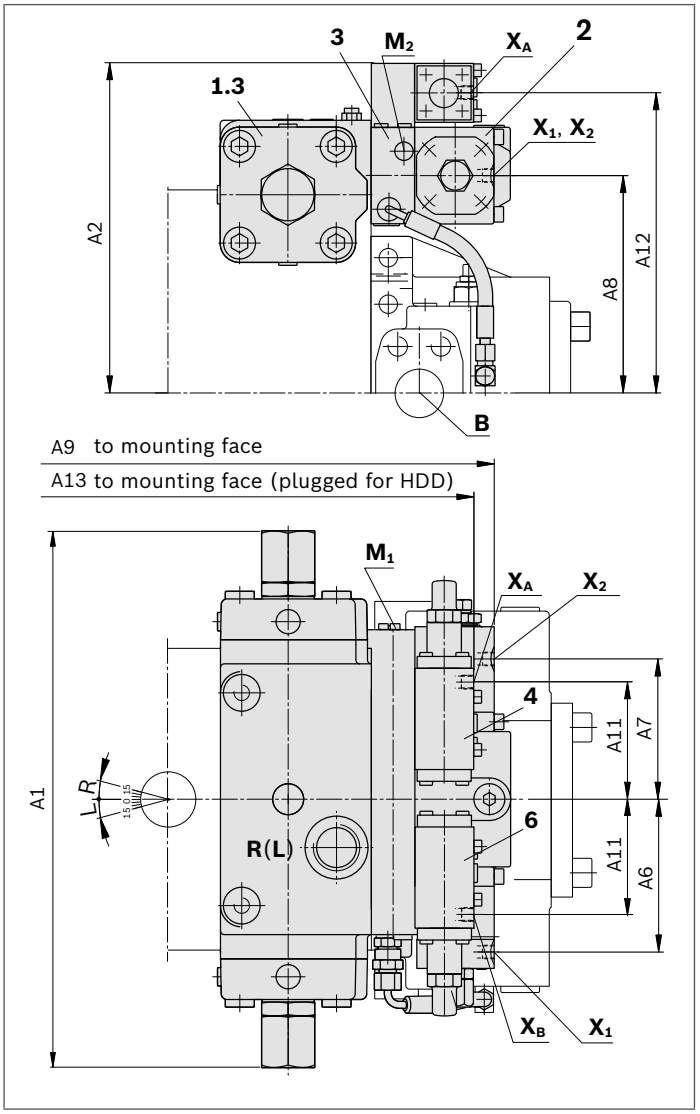
1) Depending on the application, momentary pressure peaks can occur.
Keep this in mind when selecting measuring devices and fittings.

2) O = Must be connected (plugged on delivery)
X = Plugged (in normal operation)

▼ **(A)A4VSG, sizes 500 to 1000**



▼ **A4CSG, sizes 500 to 1000**



NG	A1	A2	A3	A4	A5	A6	A7	A8	A9	A11	A12	A13	A14
500	21.85 (555)	13.46 (342)	15.08 (383)	6.89 (175)	7.87 (200)	6.22 (158)	5.71 (145)	8.86 (225)	19.37 (492)	5.35 (136)	12.40 (315)	18.46 (469)	11.97 (304)
750	24.80 (630)	14.61 (371)	16.34 (415)	6.89 (175)	9.06 (230)	6.22 (158)	5.71 (145)	11.02 (280)	20.63 (524)	5.35 (136)	13.58 (345)	19.72 (501)	13.15 (334)
1000	26.38 (670)	15.51 (394)	18.94 (481)	6.89 (175)	9.96 (253)	6.22 (158)	5.71 (145)	10.94 (278)	23.23 (590)	5.35 (136)	14.49 (368)	22.32 (567)	14.06 (357)

Port		Standard	Size	$p_{max\ abs}$ [psi (bar)][1]	State[2]
X_A; X_B	Pilot pressure, remote control pressure control	DIN 3852	M14 × 1.5; 0.47 (12) deep	650 (45)	O
X_1; X_2	Pilot pressure	DIN 3852	M14 × 1.5; 0.47 (12) deep	650 (45)	O
P	Control pressure	DIN 3852	M22 × 1.5; 0.55 (14) deep ((A)A4VSG)	5100 (350)	X
M_1	Small stroking chamber measurement	DIN 3852	M18 × 1.5; 0.47 (12) deep ((A)A4VSG)	5100 (350)	X
		DIN 3852	M22 × 1.5; 0.55 (14) deep ((A)A4CSG)	5100 (350)	X
M_2	Stroking chamber measurement	DIN 3852	M14 × 1.5; 0.47 (12) deep	5100 (350)	X

1) Depending on the application, momentary pressure peaks can occur.
Keep this in mind when selecting measuring devices and fittings.

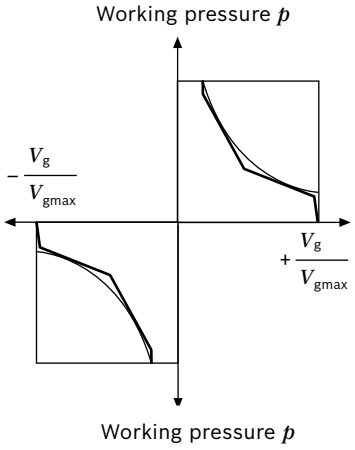
2) O = Must be connected (plugged on delivery)
X = Plugged (in normal operation)

HD1P with power control

With increasing working pressure, the pilot pressure (i.e. the setpoint value of the HD) is reduced by the power limiting valve LV 06. The displacement of the pump is thereby changed so that a certain specified drive torque is not exceeded.

For **combination pumps** in tandem design **A4 + A4**, some combinations may result in some restrictions when mounting the power limiting valve.
In the following cases, we recommend that the power limiting valve be mounted on the rear pump or that you contact us:
NG 40 + NG 40
NG 71 with pressure control + NG 71

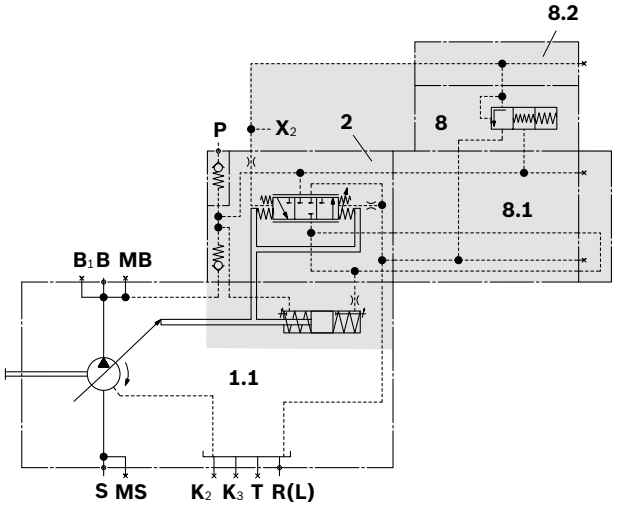
▼ **Characteristic curve**



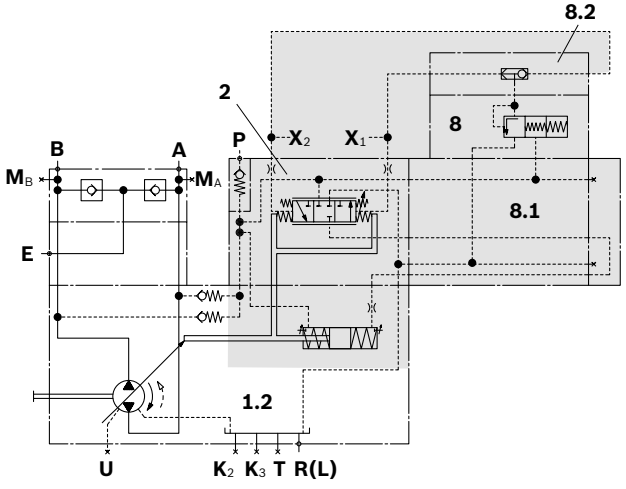
Technical data

Minimum beginning of control must be higher than the set control pressure at **P** or on the control pressure relief valve of the A4CSG.
The power characteristic is set at the factory.
Please state in plain text when ordering
e.g. 74 HP (55 kW) at 1500 rpm.
For power characteristic examples, see data sheet 95546.
The power is approximated to the theoretical hyperbola by two springs plus stop.

▼ **(A)A4VSO, sizes 40 and 71**
Clockwise rotation[1)]



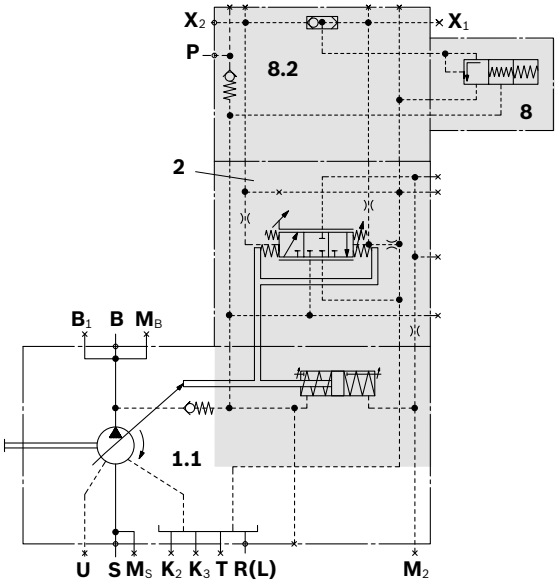
▼ **(A)A4VSG, sizes 40 and 71**
Clockwise or counter-clockwise rotation



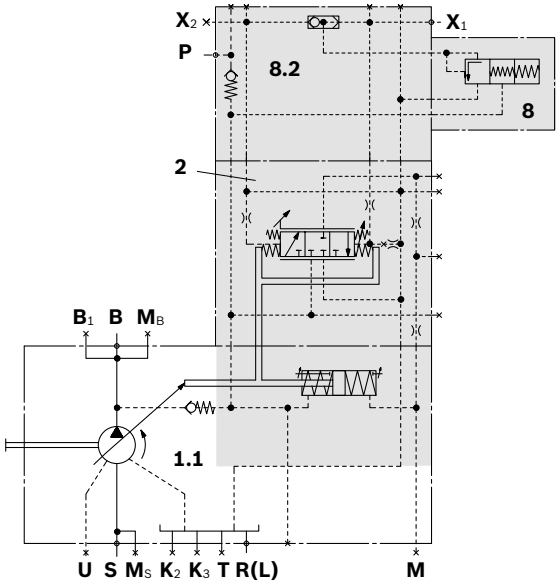
1) For (A)A4VSO counter-clockwise rotation only $\mathbf{X_1}$ is available and is connected to the power limiting valve.

Circuit diagrams

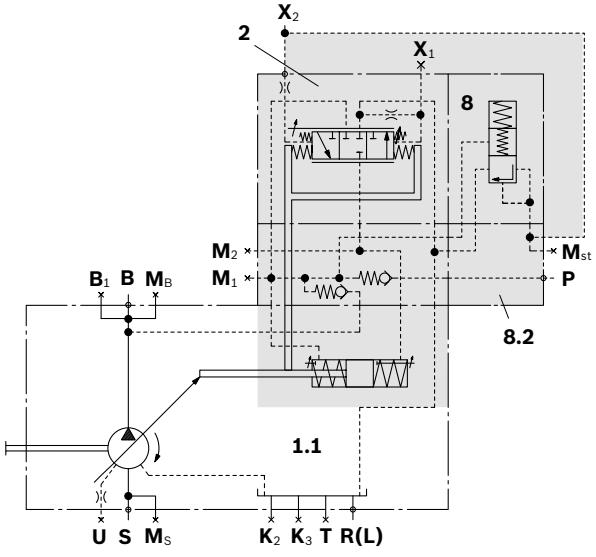
▼ **(A)A4VSO, sizes 125 to 355**[1)]
Clockwise rotation



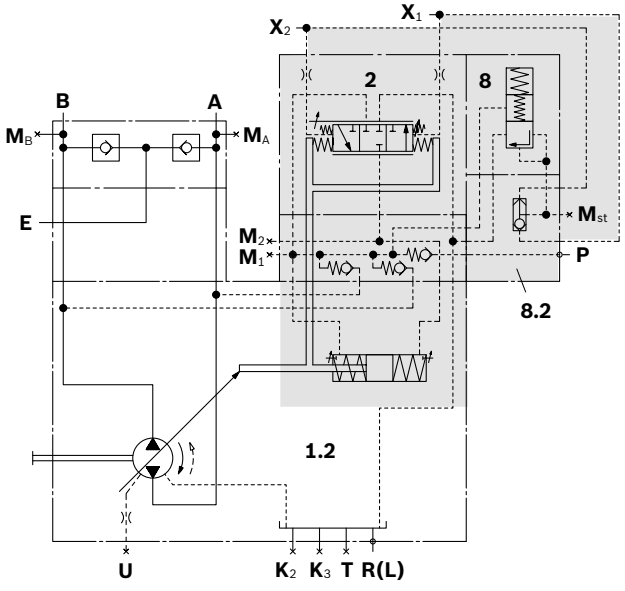
▼ **(A)A4VSO, sizes 125 to 355**[1)]
Counter-clockwise rotation



▼ **(A)A4VSO, sizes 500 to 1000**[1)]
Clockwise rotation



▼ **(A)A4VSG, sizes 500 to 1000**[2)]
Clockwise or counter-clockwise rotation



Components	
1.1	(A)A4VSO
1.2	(A)A4VSG
2	Control module
8	Power limiting valve LV 06 405 (for NG 40 and 71)
8.1	Intermediate plate for mounting power limiting valve (for NG 40 and 71)
8.2	Control valve with shuttle valve (for (A)A4VSG)

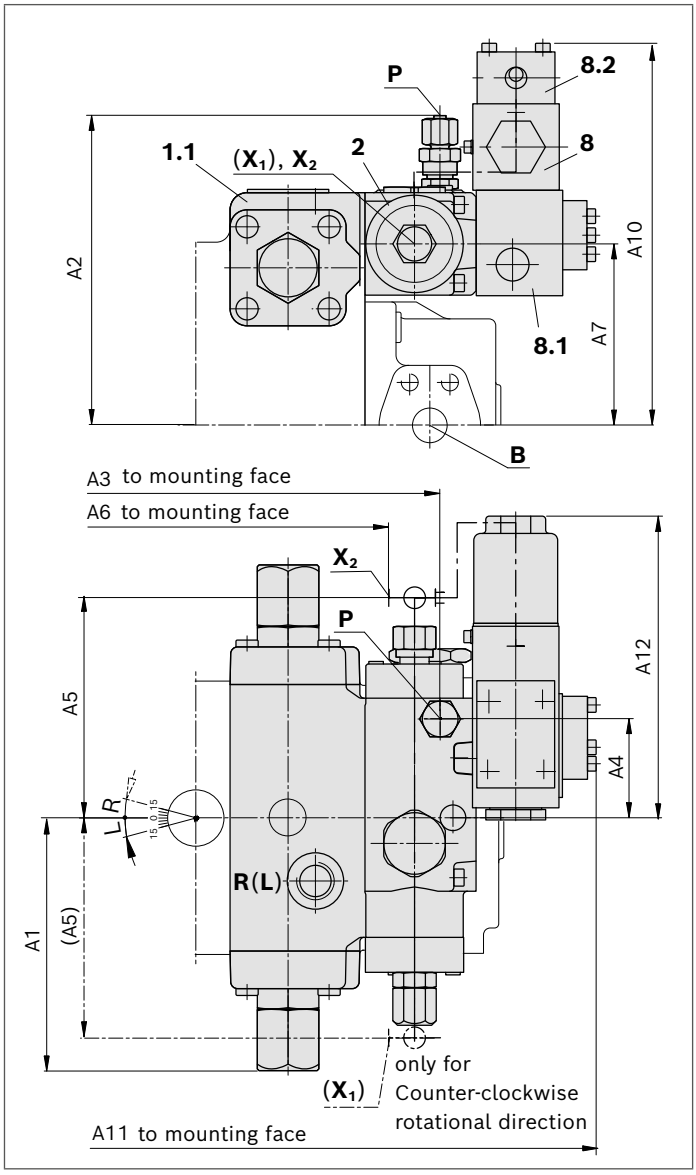
1) For **(A)A4VSO clockwise rotation** only **X_2**, **counter-clockwise rotation** only **X_1**, is connected to the power limiting valve and **open**.

Ports	
X_1; X_2	Pilot pressure port
P	Control pressure port
M	Measuring port stroking chamber pressure (NG 125 to 355)
M_1	Measuring port small stroking chamber (NG 500 to 1000)
M_2	Measuring port large stroking chamber (NG 500 to 1000)
M_{st}	Measuring port pilot pressure (NG 500 to 1000)

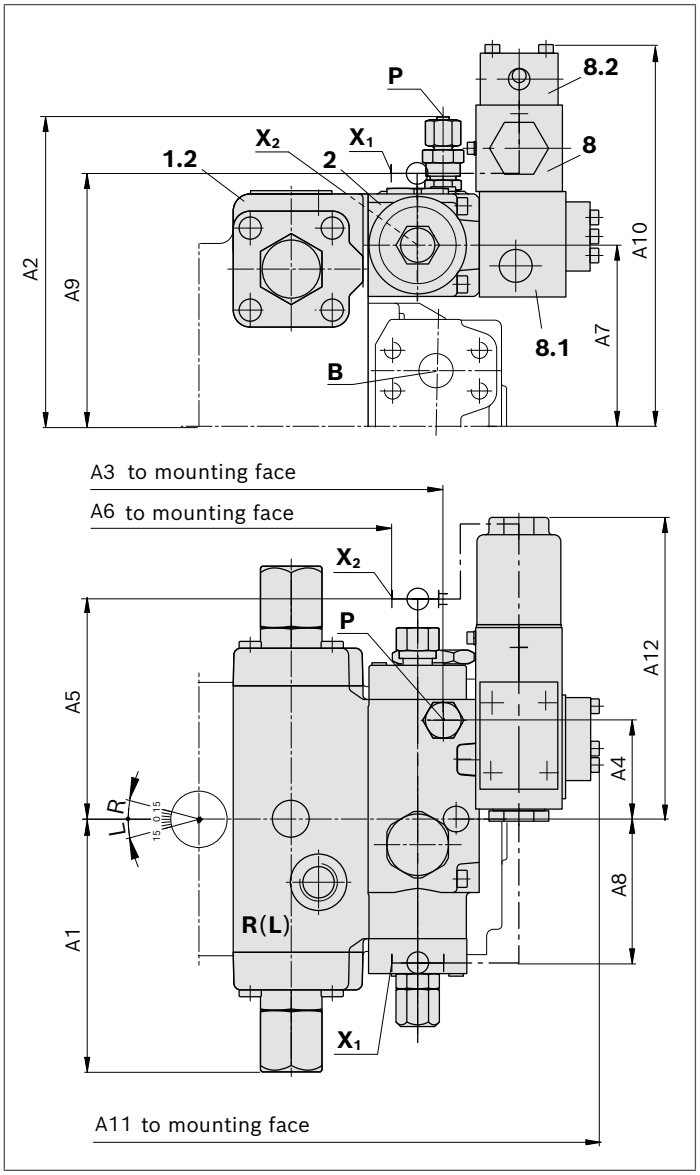
2) For **(A)A4VSG** and **A4CSG**, **both the ports X_1** and **X_2** are connected to the shuttle valve (either internally or via the T fitting) and **open**.

Dimensions

▼ **(A)A4VSO, sizes 40 and 71**



▼ **(A)A4VSG, sizes 40 and 71**



NG	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12
40	5.83 (148)	8.74 (222)	9.25 (235)	2.28 (58)	5.04 (128)	8.07 (205)	4.17 (106)	3.25 (82.5)	5.81 (147.5)	8.74 (222)	12.80 (325)	6.89 (175)
71	6.54 (166)	9.45 (240)	10.31 (262)	2.28 (58)	5.04 (128)	8.07 (205)	4.80 (122)	3.25 (82.5)	5.81 (147.5)	9.37 (238)	13.86 (352)	6.89 (175)

Port		Standard	Size	$p_{max\ abs}$ [psi (bar)][2]	State[3]
X_1; X_2[1]	Pilot pressure	(DIN 3853)	Tube DIA 8 × 1.5 mm (S8 form W)	650 (45)	O
P	Control pressure	(DIN 3853)	Tube DIA 8 × 1.5 mm (S8 form W)	5100 (350)	X

1) For (A)A4VSO clockwise rotation only **X_2** is available; for (A)A4VSO counter-clockwise rotation only **X_1** is available

2) Depending on the application, momentary pressure peaks can occur.
Keep this in mind when selecting measuring devices and fittings.

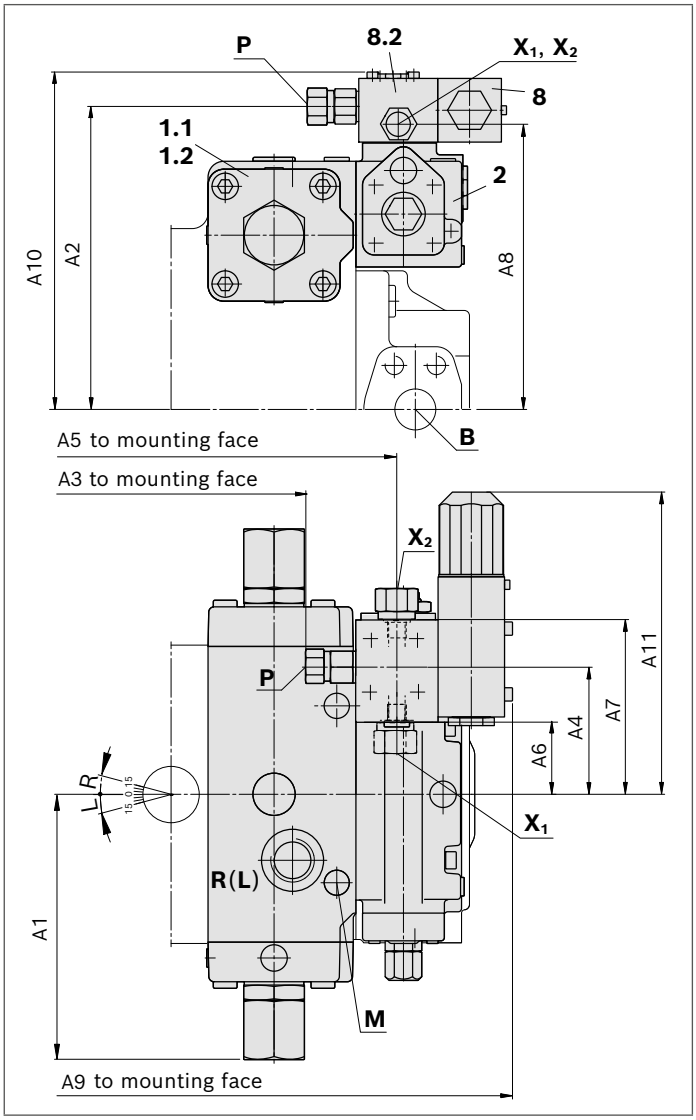
3) O = Must be connected (plugged on delivery)
X = Plugged (in normal operation)

Notice

- For detailed dimensions and technical data of the variable pump, see data sheet 92050 and 92100

Dimensions

▼ **(A)A4VSO, (A)A4VSG, sizes 125 and 355**



▼ **A(A)4CSG,** in preparation, dimensions on request

Components	
1	Pump with hydraulic control device
1.1	(A)A4VSO (see data sheet 92050)
1.2	(A)A4VSG (see data sheet 92100)
2	Control module
8	Power limiting valve (see data sheet 95546) LV 06 405 (NG 40 and 71) LV 06 205 (NG 125 to 1000)
8.1	Intermediate plate for mounting the power limiting valve (NG 40 and 71)
8.2	Control valve with shuttle valve ((A)A4VSG and A4CSG)

NG	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11
125/ 180	7.91 (201)	9.06 (230)	8.70 (221)	3.76 (95.5)	11.77 (299)	1.32 (33.5)	5.96 (151.5)	8.50 (216)	15.20 (386)	10.12 (257)	8.94 (227)
250/ 355	9.57 (243)	10.47 (266)	11.14 (283)	3.76 (95.5)	14.21 (361)	1.32 (33.5)	5.96 (151.5)	9.92 (252)	17.64 (448)	11.54 (293)	8.94 (227)

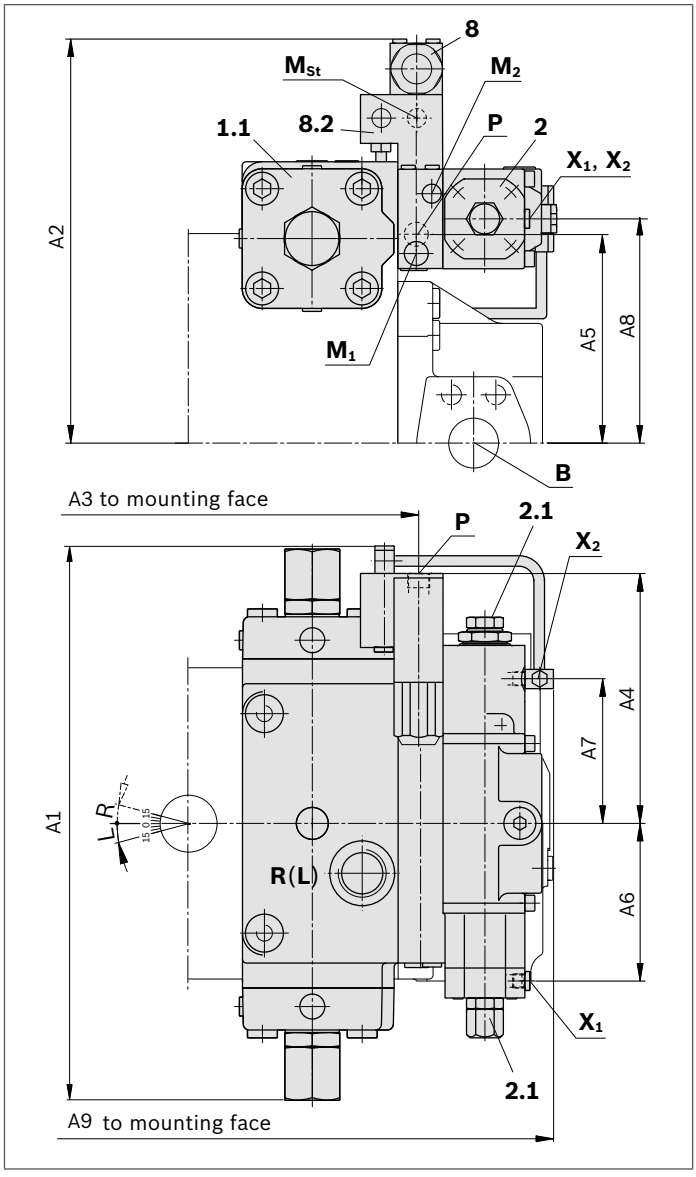
Port		Standard	Size	$p_{max\ abs}$ [psi (bar)][2]	State[3]
X_1; X_2[1]	Pilot pressure	ISO 11926	9/16-18UNF-2B; 0.51 (13) deep	650 (45)	O
P	Control pressure	ISO 11926	3/4-16UNF-2B; 0.59 (15)deep	5100 (350)	X
M	Stroking chamber measurement	DIN 3852	M14 × 1.5; 0.47 (12) deep (NG 125 and 180)	5100 (350)	X
		DIN 3852	M18 × 1.5; 0.47 (12) deep (NG 250 and 355)	5100 (350)	X

1) For (A)A4VSO clockwise rotation only **X_2** is available;
for (A)A4VSO counter-clockwise rotation only **X_1** is available

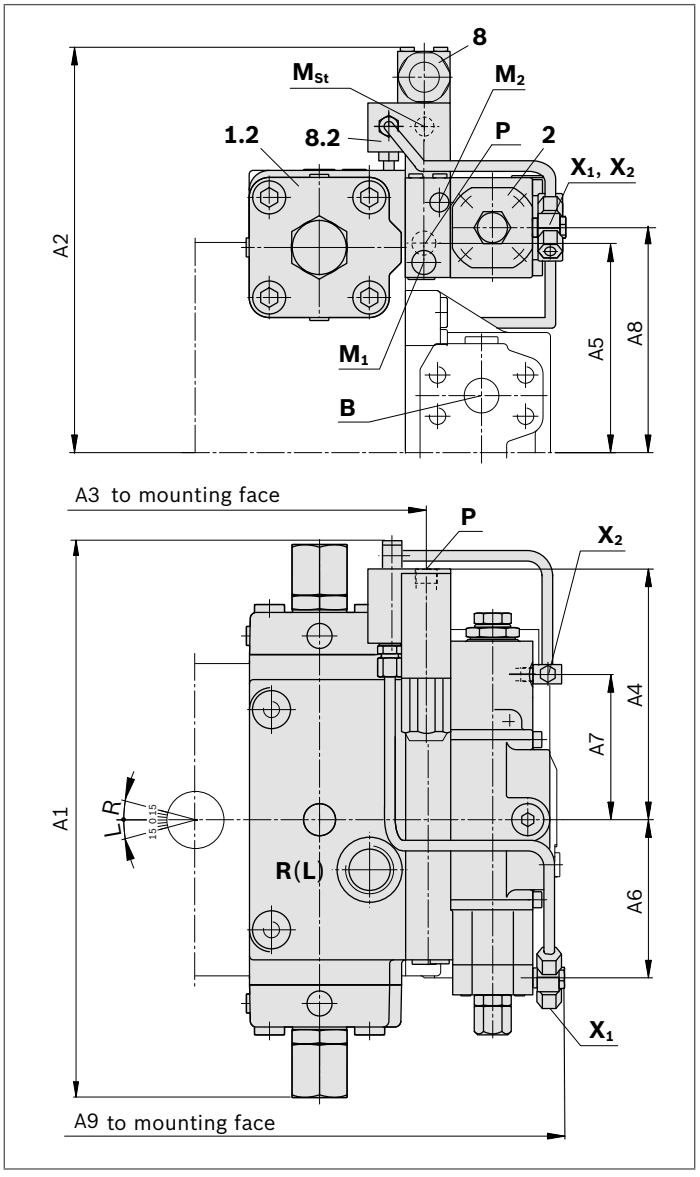
2) Depending on the application, momentary pressure peaks can occur.
Keep this in mind when selecting measuring devices and fittings.

3) O = Must be connected (plugged on delivery)
X = Plugged (in normal operation)

▼ **(A)A4VSO, sizes 500 to 1000**



▼ **(A)A4VSG, sizes 500 to 1000** ((A)A4CSG on request)



NG	A1	A2	A3	A4	A5	A6	A7	A8	A9
500	21.85 (555)	15.98 (406)	15.08 (383)	9.88 (251)	8.11 (206)	6.22 (158)	5.71 (145)	8.86 (225)	20.51 (521)
750	24.80 (630)	16.93 (430)	16.34 (415)	9.88 (251)	9.29 (236)	6.22 (158)	5.71 (145)	11.02 (280)	21.77 (553)
1000	26.38 (670)	18.07 (459)	18.94 (481)	9.88 (251)	10.20 (259)	5.51 (140)	5.51 (140)	10.94 (278)	24.37 (619)

Port		Standard	Size	$p_{max\ abs}$ [psi (bar)][2)]	State[3)]
X_1; X_2[1)]	Pilot pressure	(DIN 3853)	Tube DIA 8 × 1.5 mm (S8 form W)	650 (45)	O
P	Control pressure	DIN 3852	M22 × 1.5; 0.55 (14) deep	5100 (350)	X
M_{St}	Pilot pressure measuring	DIN 3852	M14 × 1.5; 0.47 (12) deep	5100 (350)	X
M_1	Small stroking chamber measurement	DIN 3852	M18 × 1.5; 0.47 (12) deep	5100 (350)	X
M_2	Stroking chamber measurement	DIN 3852	M14 × 1.5; 0.47 (12) deep	5100 (350)	X

1) For (A)A4VSO clockwise rotation only **X_2** is available; for (A)A4VSO counter-clockwise rotation only **X_1** is available (M14 × 1.5)

2) Depending on the application, momentary pressure peaks can occur.
Keep this in mind when selecting measuring devices and fittings.

3) O = Must be connected (plugged on delivery)
X = Plugged (in normal operation)

HD1T – with electrical control of pilot pressure

The corresponding control chamber $\mathbf{X_1}$ or $\mathbf{X_2}$ is supplied with pilot pressure proportional to the current applied to the solenoids **a** or **b** on the proportional valve DBEP6 (data sheet 29164).
The solenoid current limits the hydraulic pilot pressure.
In a closed circuit, each swivel direction is assigned a proportional solenoid. In an open circuit, only 1 solenoid is accordingly available.
Control by means of an electric setpoint value.
Current control by means of pulse width modulation.
Analog or digital amplifiers can be used to control the solenoids, e.g. proportional amplifier VT 3000 with 170 Hz (see data sheet 29935). Please order separately.
For more information on the selection of the control electronics and hydraulic fluid, description of the function, emergency manual actuation, and other technical data, please consult data sheet 29164.

(e.g. 1.06 gpm (4 l/min) per de-energized solenoid at p = 725 psi (50 bar)) should be taken into account when dimensioning the inlet flow in **P**.

Technical data – electric

Operating voltage	24 V
Nominal current per solenoid	700 mA
Control current	
Beginning of control at V_{g0} and 145 psi (10 bar) pilot pressure	300 mA
Beginning of control at V_{gmax} and 650 psi (45 bar) pilot pressure	700 mA
Nominal resistance at 68 °F (20 °C) (R_{68} (R_{20}))	19.5 Ω
Maximum duty cycle	100 % (S1)
Device connector	DIN EN 175 301-803/ISO 4400 with line screw fitting M16 ×1.5 for cable DIA 0.18...0.39 inch (⌀ 4.5...10 mm)
Type of protection according to DIN/EN 60529	IP 65
emergency manual actuation	available, see data sheet 29164
Operating temperature coils	up to 302 °F (150 °C)

Attention! Risk of burning:
During and shortly after operation, the pump and the solenoids in particular are hot!
Always wear suitable protective clothing.

Calculation formula for resistor

at **T** > 68 °F

$$\mathbf{R}_W = \frac{\mathbf{R}_{68} \times (391+\mathbf{T})}{459}$$

at **T** > 20 °C

$$\mathbf{R}_W = \frac{\mathbf{R}_{20} \times (235+\mathbf{T})}{255}$$

Technical data – hydraulic

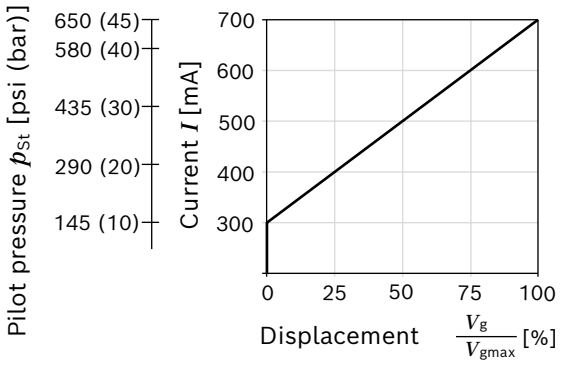
Control pressure (in **P**)	p_{min}	psi (bar)	725 (50)
	p_{max}	psi (bar)	1450 (100)
Hysteresis			≤ ± 4 % of V_{gmax}
Repeat accuracy			≤ 2 % of V_{gmax}

Due to the restrictions in data sheet 29164, the control pressure in **P** is limited to 725...1450 psi (50...100 bar) for HD1T and HD1U. Losses in the proportional valve

(A)A4VSO - open circuit

DBEP 6, version B or A

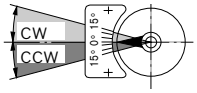
▼ **Characteristic curve**



▼ **Flow direction**

Direction of rotation	Swiveling range[1)]	Flow direction	High-pressure port
clockwise	counter-clockwise	**S** to **B**	**B**
counter-clockwise	clockwise	**S** to **B**	**B**

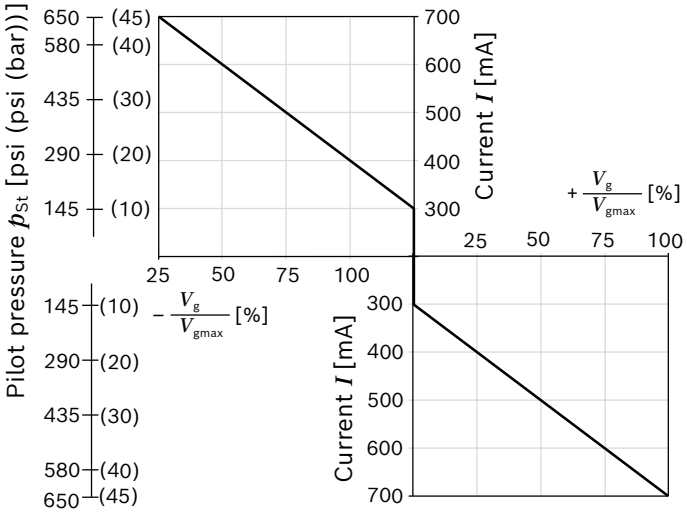
1) cf. swivel angle indicator



(A)A4VSG - closed circuit

DBEP 6, version C

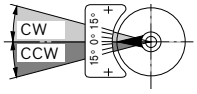
▼ **Characteristic curve**



▼ **Flow direction**

Direction of rotation	Solenoid actuation	Swiveling range[2)]	Flow direction	High-pressure port
clockwise	b	clockwise	**B** to **A**	**A**
	a	counter-clockwise	**A** to **B**	**B**
counter-clockwise	b	clockwise	**A** to **B**	**B**
	a	counter-clockwise	**B** to **A**	**A**

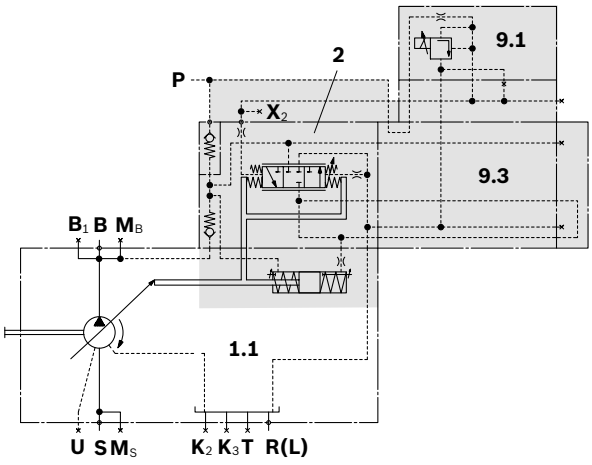
2) See swivel angle indicator



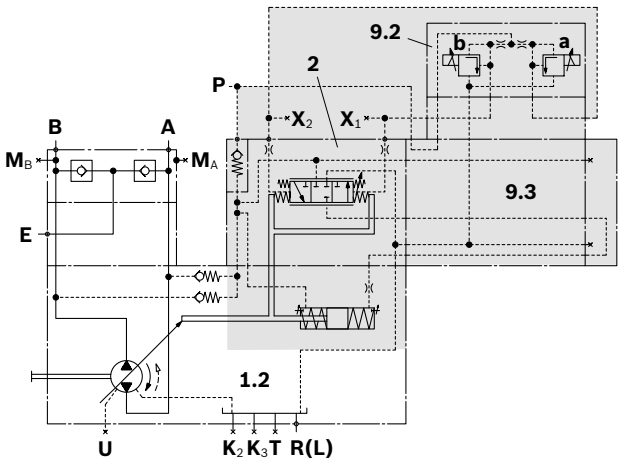
A4CSG with HD1T

Is in preparation and available on request.

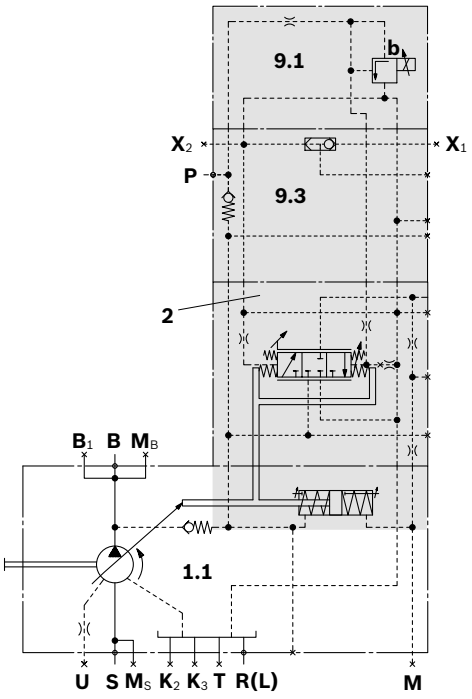
▼ **(A)A4VSO, sizes 40 and 71**[1)]
Clockwise rotation



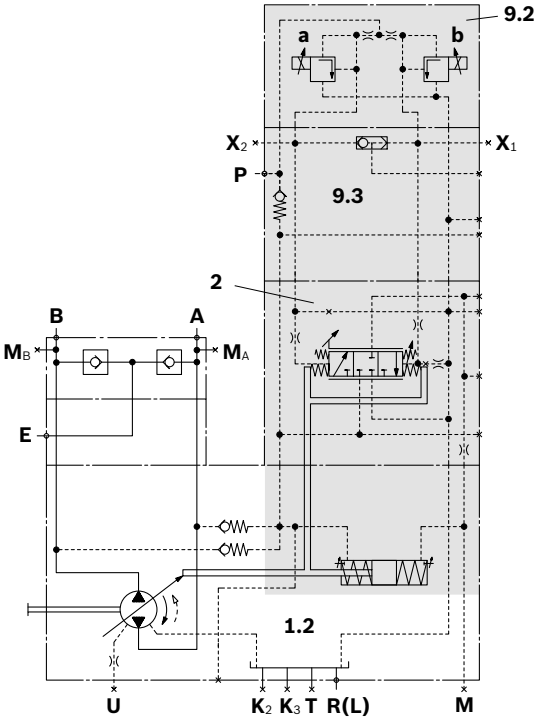
▼ **(A)A4VSG, sizes 40 and 71**
Clockwise rotation



▼ **(A)A4VSO, sizes 125 to 355**[1)]
Counter-clockwise rotation



▼ **(A)A4VSG, sizes 125 to 355**
Clockwise rotation

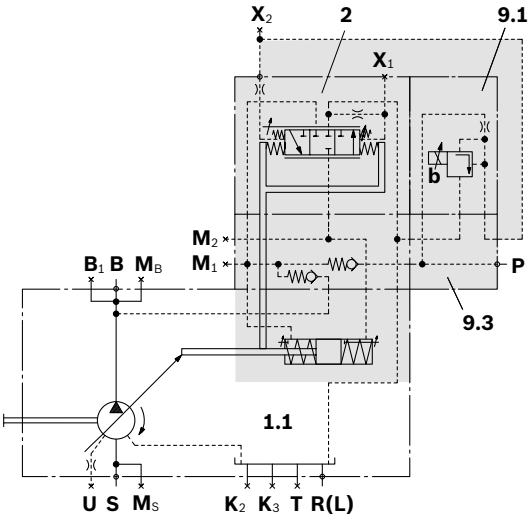


Ports	
X_1; X_2	Pilot pressure port
P	Control pressure port
M	Measuring port stroking chamber pressure (NG 125 to 355)
M_1	Measuring port small stroking chamber (NG 500 to 1000)
M_2	Measuring port large stroking chamber (NG 500 to 1000)

1) For counter-clockwise rotation only X_1, with the proportional valve piped up and X^2 not available.

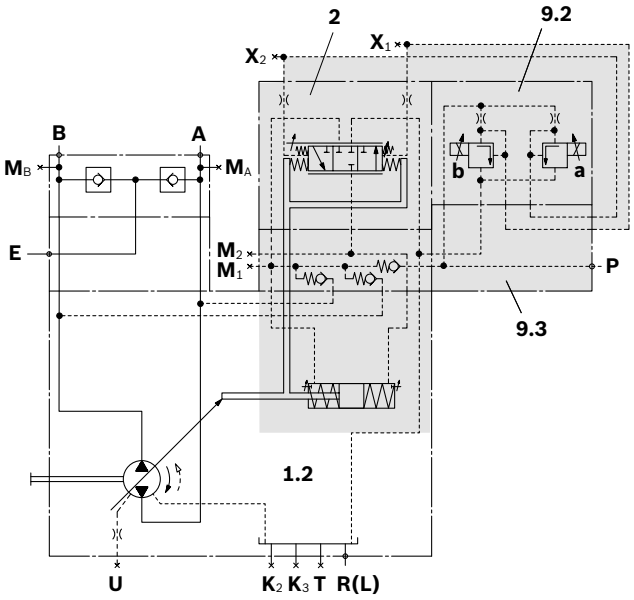
▼ **(A)A4VSO, sizes 500 to 1000**[1)]

Clockwise rotation



▼ **(A)A4VSG, sizes 500 to 1000**

Clockwise rotational direction



Components		
1	Pump with hydraulic control device	
1.1	(A)A4VSO	
1.2	(A)A4VSG	
2	Control module	
9.1	Proportional pressure relief valve (open circuit) DBEP6 B06-1X/45AG24NZ4M-382 with inlet nozzle DIA 0.04 inch (ø1.0 mm) DBEP6 A06-1X/45AG24NZ4M-382 for NG 125...355 clockwise rotation	Solenoids with plug-in connectors according to DIN EN 175 301-803 / ISO 4400 type of protection IP 65 and cable fitting M16 ×1.5 for line diameter 0.18...0.39 inch (4.5...10 mm)
9.2	Proportional pressure relief valve (closed circuit) DBEP6 C06-1X/45AG24NZ4M-382 with inlet nozzle DIA 0.04 inch (ø1.0 mm)	
9.3	Intermediate plate for mounting proportional valve	

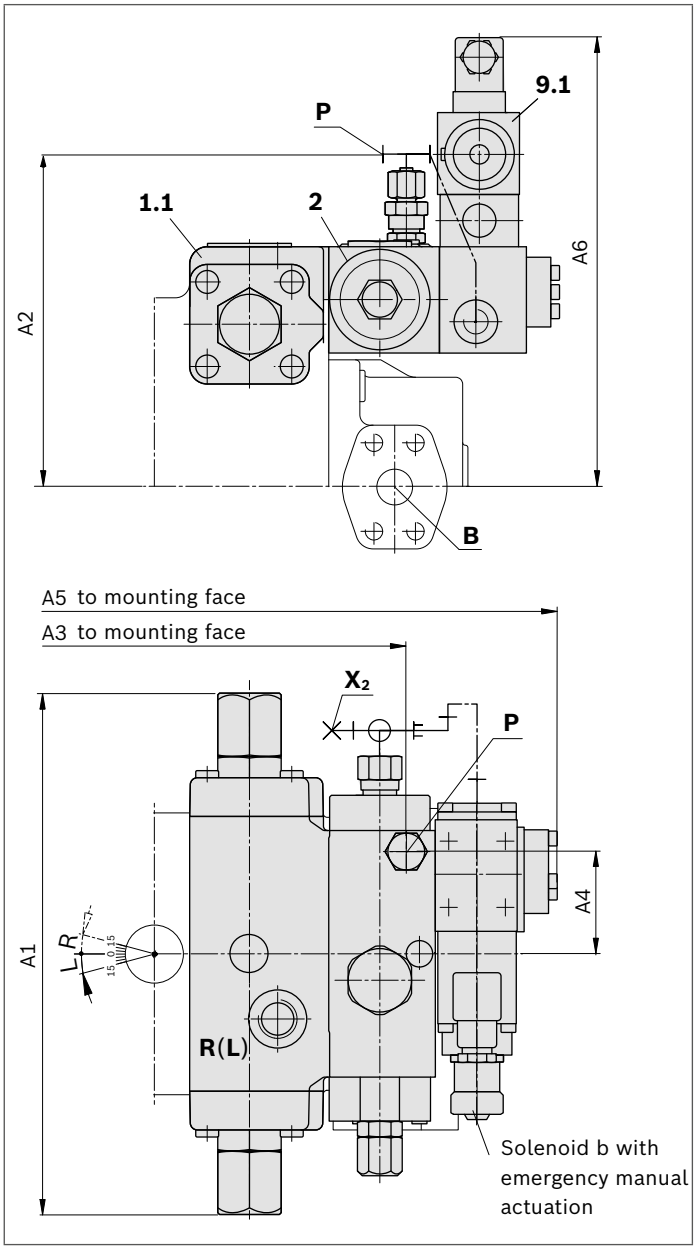
1) For (A)A4VSO clockwise rotation only $\mathbf{X_2}$, counter-clockwise rotation only $\mathbf{X_1}$, with the proportional valve piped up and $\mathbf{X_2}$ not available.

Notice

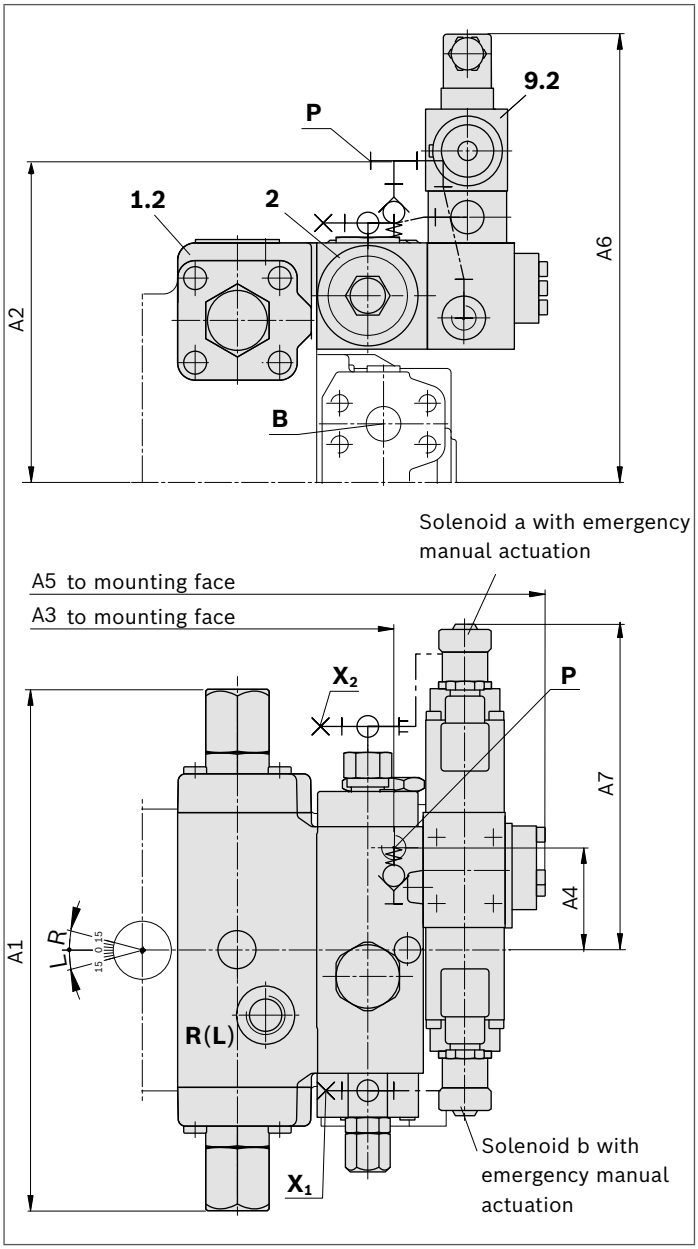
▶ For detailed dimensions and technical data of the variable pump, see data sheet 92050 and 92100

Dimensions

▼ **(A)A4VSO, sizes 40 and 71**



▼ **(A)A4VSG, sizes 40 and 71**



NG	A1	A2	A3	A4	A5	A6	A7
40	11.65 (296)	7.60 (193)	9.25 (235)	2.28 (58)	12.80 (325)	10.27 (257)	7.44 (189)
71	13.07 (332)	8.23 (209)	10.31 (262)	2.28 (58)	13.86 (352)	10.75 (273)	7.44 (189)

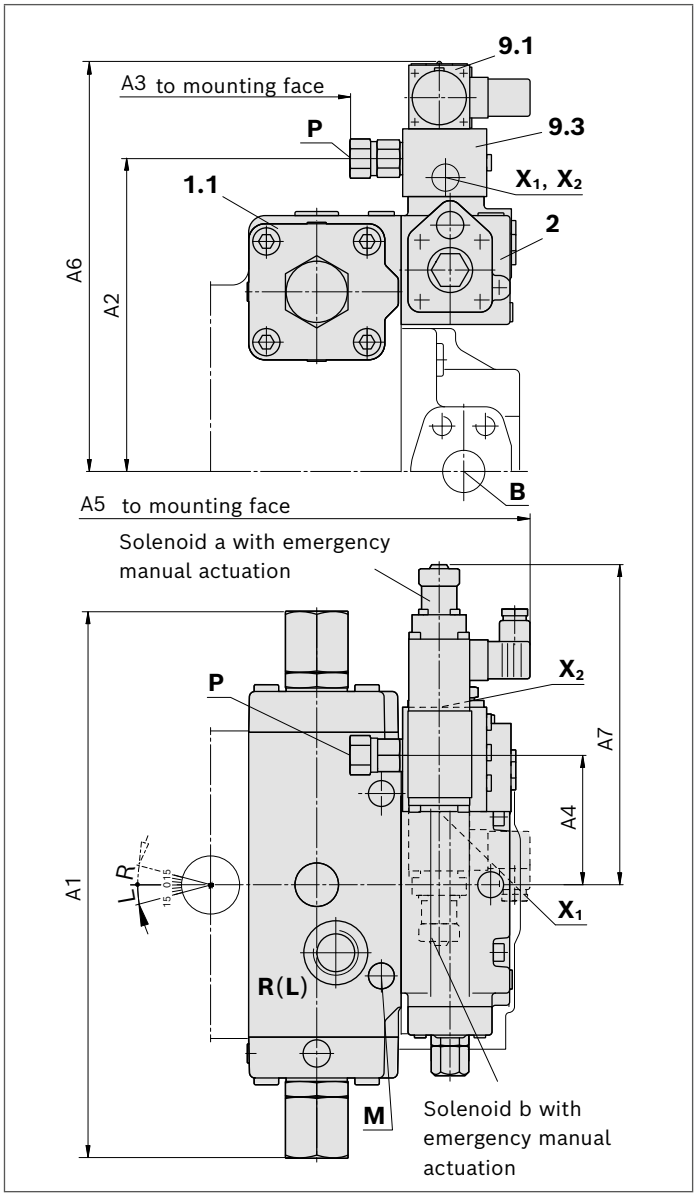
Port		Standard	Size	$p_{max\ abs}$ [psi (bar)][2]	State[3]
P	Control pressure	(DIN 3853)	Tube DIA 8 × 1.5 mm (S8 form W)	5100 (350)	O
X_1; X_2[1]	Pilot pressure measuring	(DIN 3853)	Tube DIA 8 × 1.5 mm (S8 form W)	650 (45)	X

1) For (A)A4VSO clockwise rotation only **X_2** is available; for (A)A4VSO counter-clockwise rotation only **X_1** is available (dimensions on request)

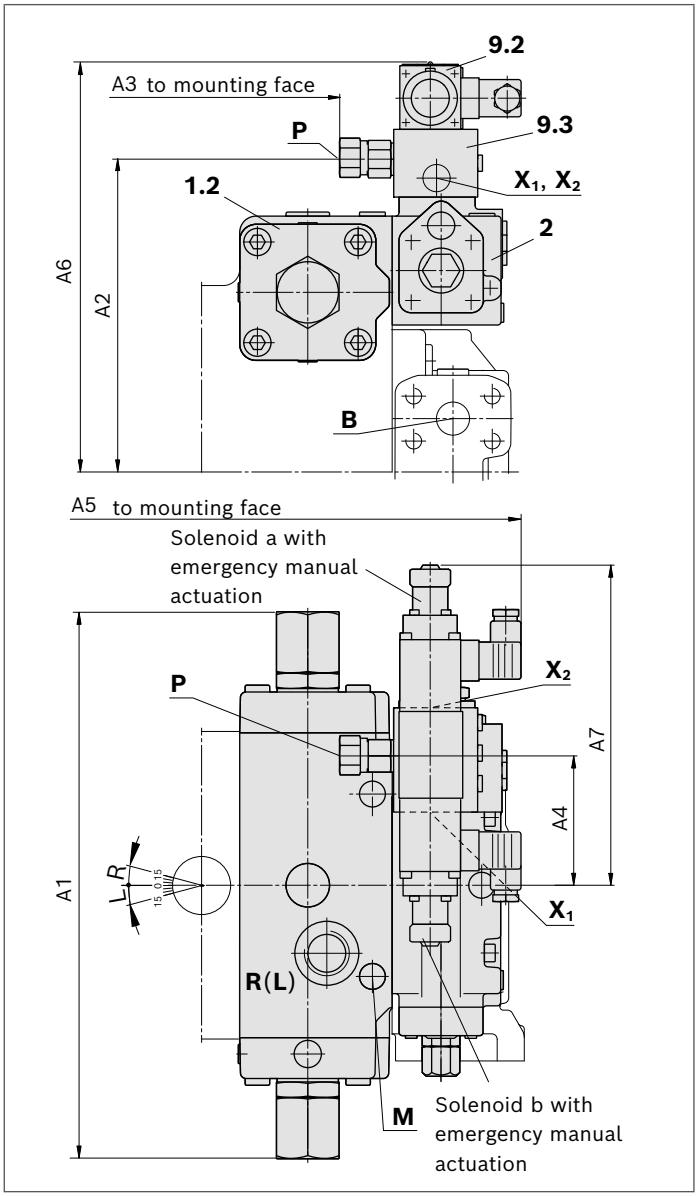
2) Depending on the application, momentary pressure peaks can occur.
Keep this in mind when selecting measuring devices and fittings.

3) O = Must be connected (plugged on delivery)
X = Plugged (in normal operation)

▼ **(A)A4VSO, sizes 125 to 355**



▼ **(A)A4VSG, sizes 125 to 355** ((A)A4CSG in preparation)



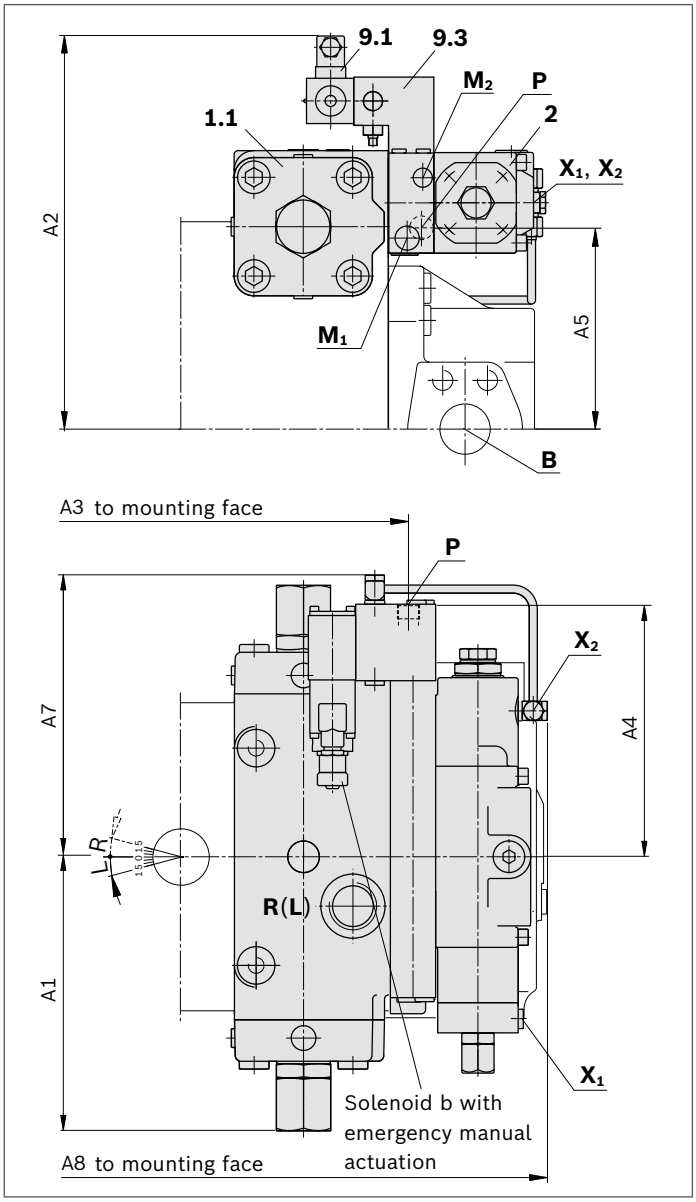
NG	A1	A2	A3	A4	A5	A6	A7
125	15.83 (402)	9.06 (230)	8.70 (221)	3.78 (96)	14.25 (362)	11.89 (302)	9.29 (236)
180	15.83 (402)	9.06 (230)	8.70 (221)	3.78 (96)	14.25 (362)	11.89 (302)	9.29 (236)
250	19.09 (485)	10.47 (266)	11.14 (283)	3.78 (96)	16.69 (424)	13.31 (338)	9.29 (236)
355	19.09 (485)	10.47 (266)	11.14 (283)	3.78 (96)	16.69 (424)	13.31 (338)	9.29 (236)

Port		Standard	Size	$p_{max\ abs}$ [psi (bar)][1]	State[2]
P	Control pressure	ISO 11926	3/4-16UNF-2B; 0.59 (15)deep	5100 (350)	O
X_1; X_2	Pilot pressure measuring	DIN 3852	M14 × 1.5; 0.47 (12) deep	650 (45)	X
M	Measuring stroking chamber pressure	DIN 3852	M14 × 1.5; 0.47 (12) deep (NG 125 and 180)	5100 (350)	X
		DIN 3852	M18 × 1.5; 0.47 (12) deep (NG 250 and 355)	5100 (350)	X

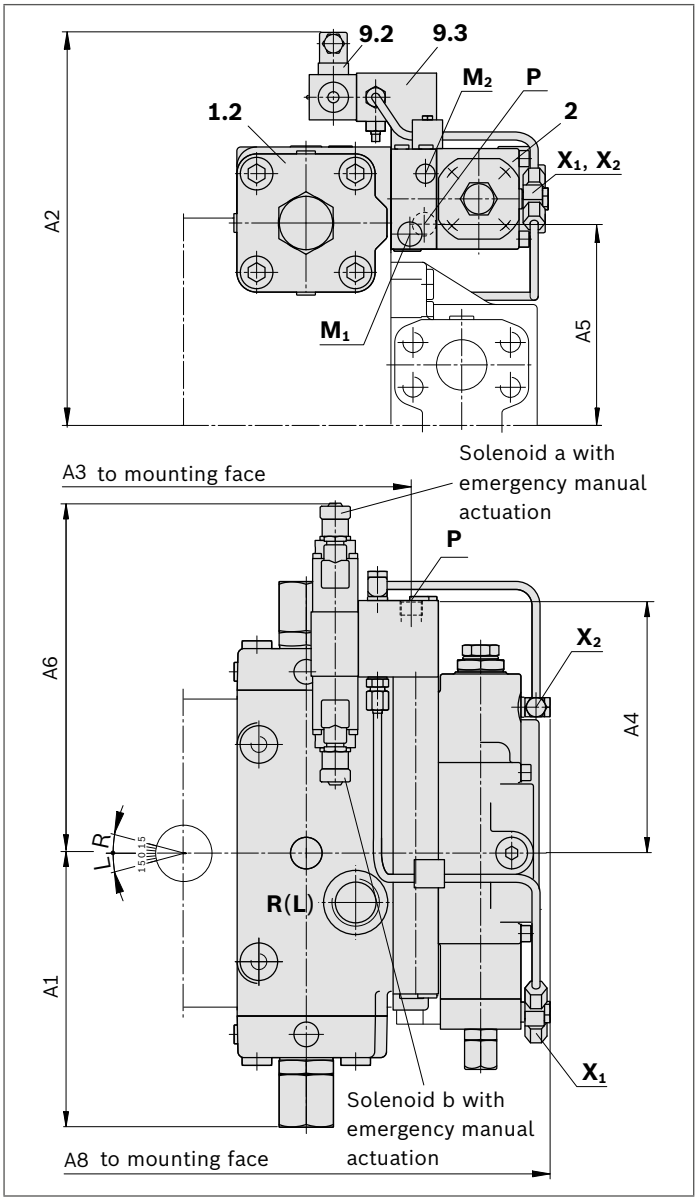
1) Depending on the application, momentary pressure peaks can occur.
Keep this in mind when selecting measuring devices and fittings.

2) O = Must be connected (plugged on delivery)
X = Plugged (in normal operation)

▼ **(A)A4VSO, sizes 500 to 1000**



▼ **(A)A4VSG, sizes 500 to 1000** ((A)A4CSG in preparation)



NG	A1	A2	A3	A4	A5	A6	A7	A8
500	10.94 (278)	15.39 (391)	15.08 (383)	9.88 (251)	8.11 (206)	13.70 (348)	10.94 (278)	20.51 (521)
750	12.40 (315)	16.65 (423)	16.34 (415)	9.88 (251)	9.29 (236)	13.70 (348)	10.94 (278)	21.77 (553)
1000	13.19 (335)	17.48 (444)	18.94 (481)	9.88 (251)	10.20 (259)	13.70 (348)	10.94 (278)	24.37 (619)

Port		Standard	Size	$p_{max\ abs}$ [psi (bar)][2]	State[3]
P	Control pressure	DIN 3852	M22 × 1.5; 0.55 (14) deep	5100 (350)	O
M_1	Small stroking chamber measurement	DIN 3852	M18 × 1.5; 0.47 (12) deep	5100 (350)	X
M_2	Stroking chamber measurement	DIN 3852	M14 × 1.5; 0.47 (12) deep	5100 (350)	X
X_1; X_2[1]	Pilot pressure measuring	(DIN 3853)	Tube DIA 8 × 1.5 mm (S8 form W)	650 (45)	X

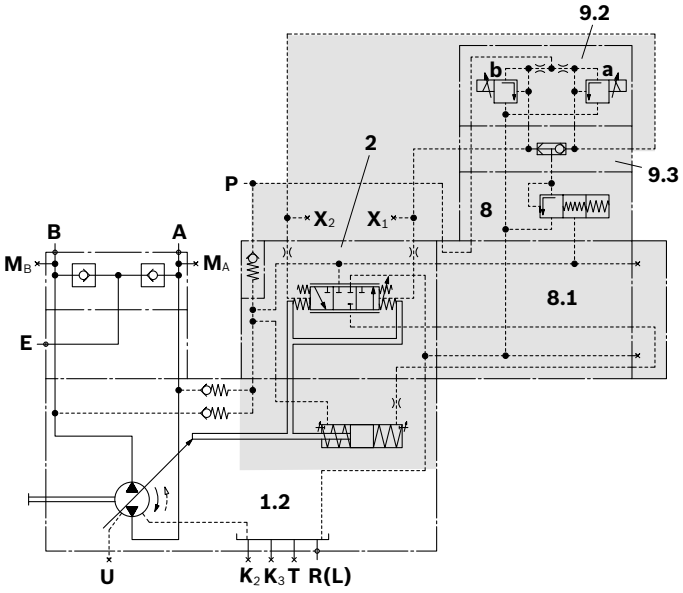
1) For (A)A4VSO clockwise rotation only **X_2** is available;
for (A)A4VSO counter-clockwise rotation only **X_1** is available

2) Depending on the application, momentary pressure peaks can occur.
Keep this in mind when selecting measuring devices and fittings.

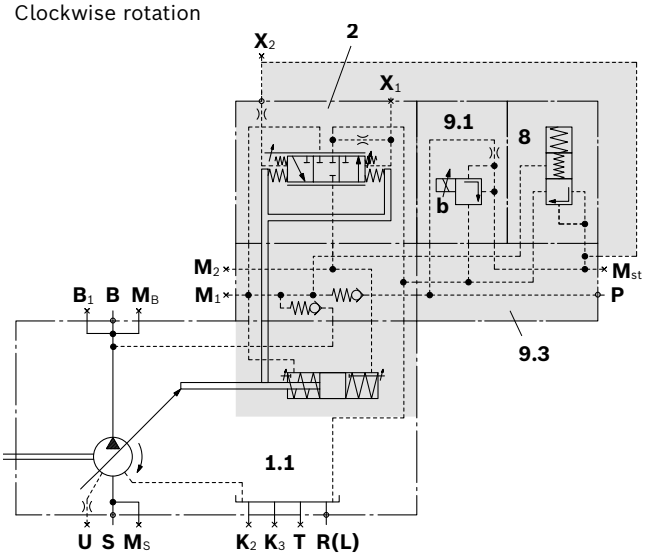
3) O = Must be connected (plugged on delivery)
X = Plugged (in normal operation)

HD1U – with power control and electrical control of pilot pressure

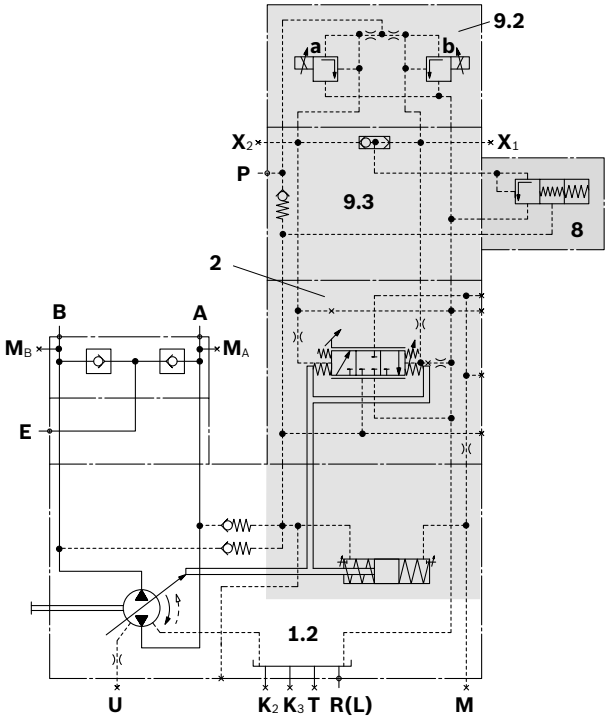
▼ **(A)A4VSG, sizes 40 and 71**[1)]
Clockwise rotation



▼ **(A)A4VSO, sizes 500 to 1000**[2)]
Clockwise rotation



▼ **(A)A4VSG, sizes 125 to 355**
Clockwise rotation



Components	
1	Pump with hydraulic control device
1.1	(A)A4VSO
1.2	(A)A4VSG
2	Control module
8	Power limiting valve LV 06 405 (NG 40 and 71) Power limiting valve LV 06 205 (NG 125 to 1000)
9.1	Proportional pressure relief valve ((A)A4VSO) DBEP6 B06; DBEP6 A06 (NG 125 to 1000)
9.2	Proportional-pressure relief valve DBEP6 B06 ((A)A4VSG and A4CSG)
9.3	Intermediate plate for mounting proportional valve

Ports	
X_1; X_2	Pilot pressure port
P	Control pressure port
M	Measuring port stroking chamber pressure (NG 125 to 355)
M_1	Measuring port small stroking chamber (NG 500 to 1000)
M_2	Measuring port large stroking chamber (NG 500 to 1000)
M_{st}	Measuring port pilot pressure (NG 500 to 1000)

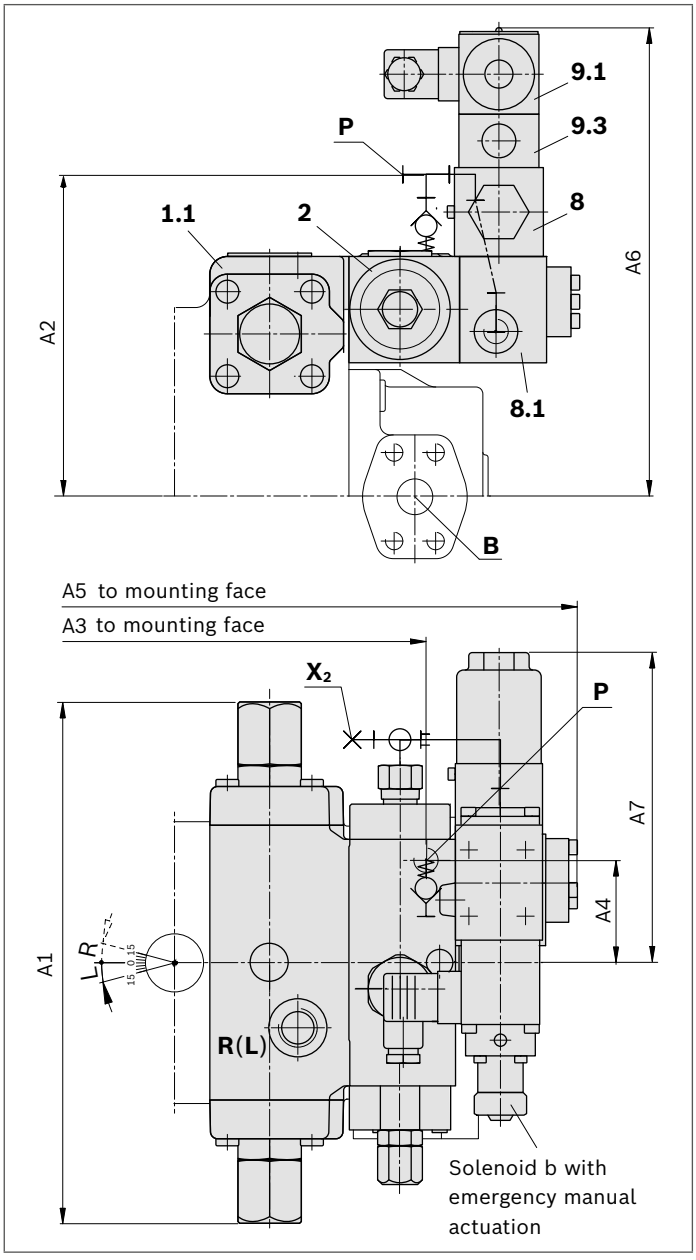
1) For (A)A4VSO clockwise rotation only X_2, counter-clockwise rotation only X_1, with the proportional valve piped up and X_2 not available.
2) For counter-clockwise rotation X_1 connected with the power limiting valve.

Notice

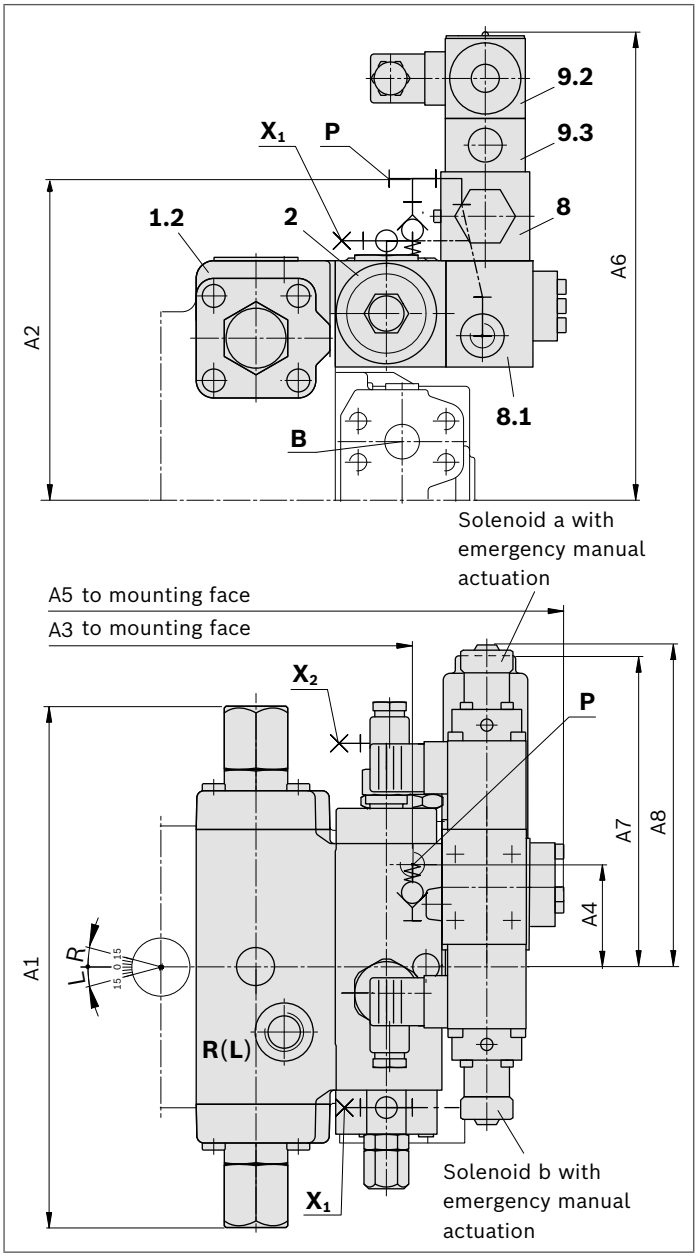
▶ For detailed dimensions and technical data of the variable pump, see data sheet 92050 and 92100

Dimensions

▼ **(A)A4VSO, sizes 40 and 71**



▼ **(A)A4VSG, sizes 40 and 71**



NG	A1	A2	A3	A4	A5	A6	A7	A8
40	11.65 (296)	8.03 (204)	9.25 (235)	2.28 (58)	12.80 (325)	10.47 (266)	6.89 (175)	7.44 (189)
71	13.07 (332)	8.66 (220)	10.31 (262)	2.28 (58)	13.86 (352)	11.10 (282)	6.89 (175)	7.44 (189)

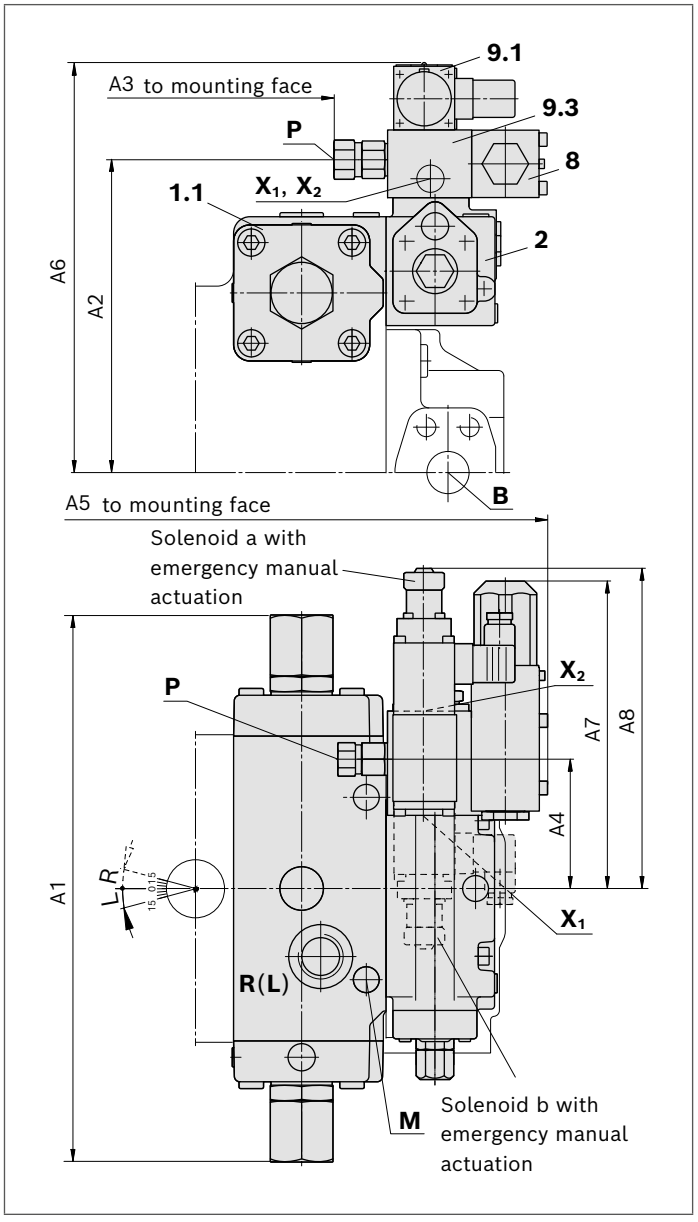
Port		Standard	Size	$p_{max\ abs}$ [bar][2]	State[3]
P	Control pressure	(DIN 3853)	Tube DIA 8 × 1.5 mm (S8 form W)	5100 (350)	O
X_1; X_2[1]	Pilot pressure measuring	(DIN 3853)	Tube DIA 8 × 1.5 mm (S8 form W)	650 (45)	X

1) For (A)A4VSO clockwise rotation only **X_2** is available; for (A)A4VSO counter-clockwise rotation only **X_1** is available (dimensions on request)

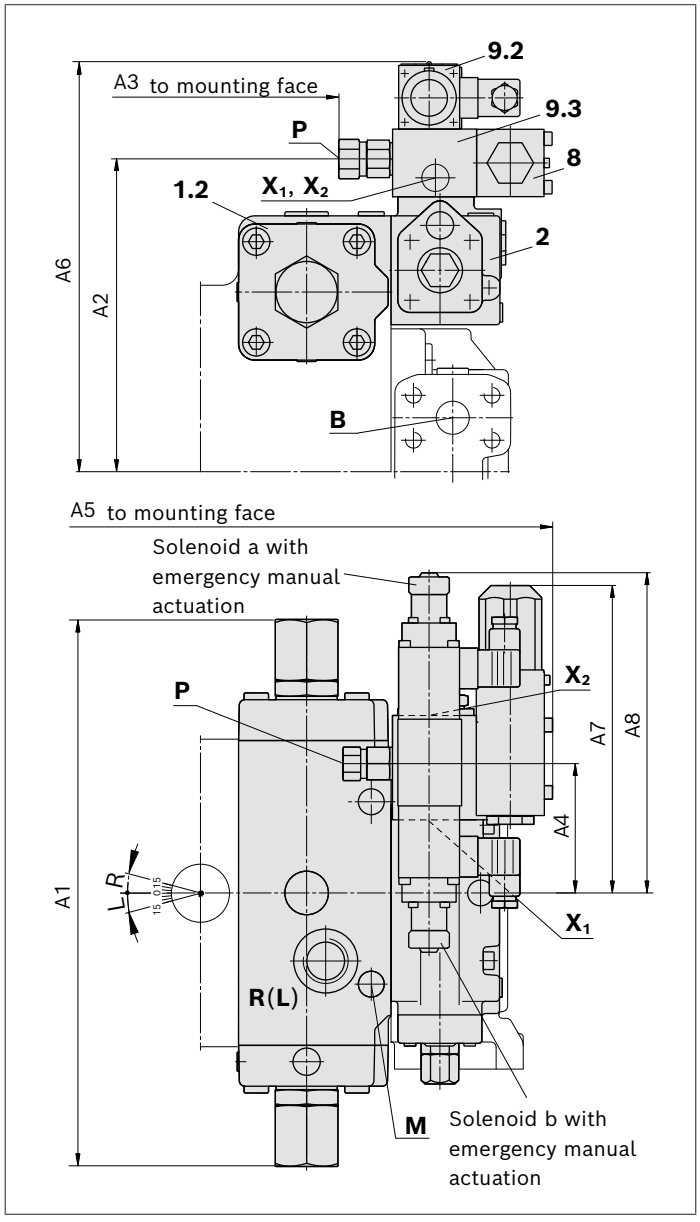
2) Depending on the application, momentary pressure peaks can occur.
Keep this in mind when selecting measuring devices and fittings.

3) O = Must be connected (plugged on delivery)
X = Plugged (in normal operation)

▼ **(A)A4VSO, sizes 125 to 355**



▼ **(A)A4VSG, sizes 125 to 355** ((A)A4CSG in preparation)



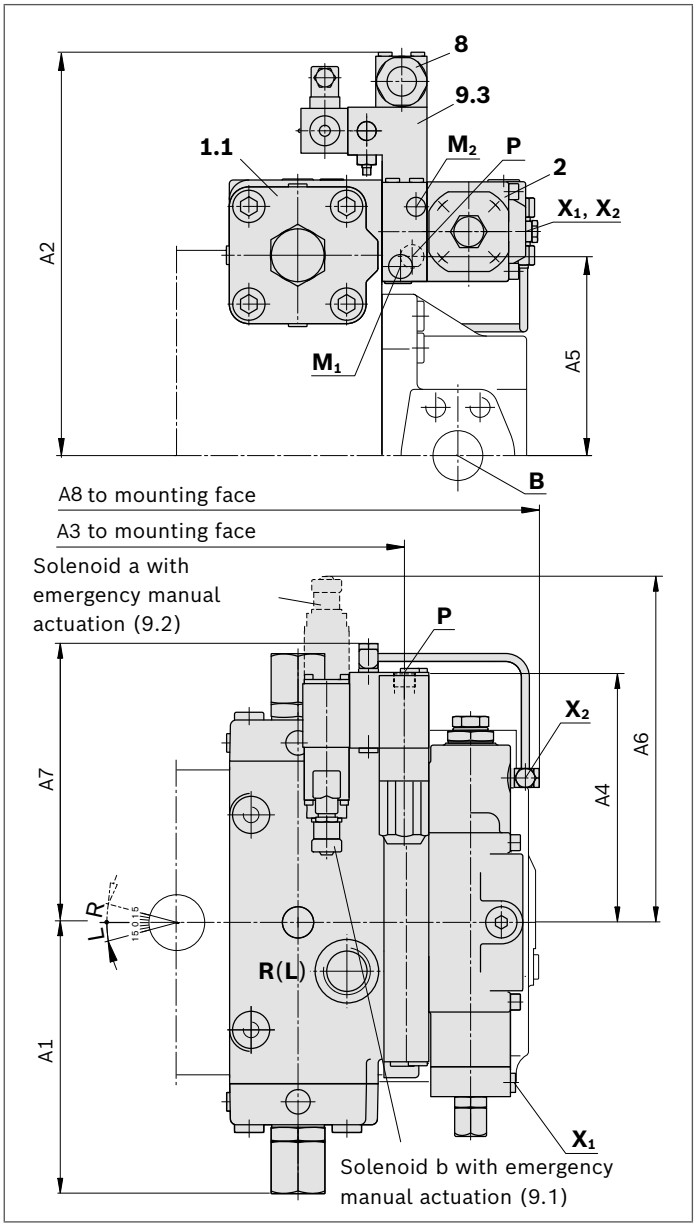
NG	A1	A2	A3	A4	A5	A6	A7	A8
125	15.83 (402)	9.06 (230)	8.70 (221)	3.78 (96)	15.20 (386)	11.89 (302)	8.94 (227)	9.29 (236)
180	15.83 (402)	9.06 (230)	8.70 (221)	3.78 (96)	15.20 (386)	11.89 (302)	8.94 (227)	9.29 (236)
250	19.09 (485)	10.47 (266)	11.14 (283)	3.78 (96)	17.64 (448)	13.31 (338)	8.94 (227)	9.29 (236)
355	19.09 (485)	10.47 (266)	11.14 (283)	3.78 (96)	17.64 (448)	13.31 (338)	8.94 (227)	9.29 (236)

Port		Standard	Size	$p_{max\ abs}$ [psi (bar)][1]	State[2]
P	Control pressure	ISO 11926	3/4-16UNF-2B; 0.59 (15) deep	5100 (350)	O
M	Measuring stroking chamber pressure	DIN 3852	M14 × 1.5; 0.47 (12) deep	5100 (350)	X
X_1; X_2	Pilot pressure measuring	DIN 3852	M14 × 1.5; 0.47 (12) deep	650 (45)	X

1) Depending on the application, momentary pressure peaks can occur.
Keep this in mind when selecting measuring devices and fittings.

2) O = Must be connected (plugged on delivery)
X = Plugged (in normal operation)

▼ **(A)A4VSO, (A)A4VSG, sizes 500 to 1000**



▼ **(A)A4CSG** in preparation

Components	
1	Pump with hydraulic control device
1.1	(A)A4VSO (see data sheet 92050)
1.2	(A)A4VSG (see data sheet 92100)
2	Control module
8	Power limiting valve (see data sheet 95546)
	LV 06 405 (for NG 40 and 71)
	LV 06 205 (for NG 125 to 1000)
8.1	Intermediate plate for mounting power limiting valve
9.1	Proportional-pressure relief valve (for (A)A4VSO)
	DBEP6 B06
	DBEP6 A06 (for NG 125 to 355 clockwise rotation)
9.2	Proportional-pressure relief valve DBEP6 C06
	(for (A)A4VSG and (A)A4CSG)
9.3	Intermediate plate for mounting proportional valve

NG	A1	A2	A3	A4	A5	A6	A7	A8
500	10.94 (278)	15.98 (406)	15.08 (383)	9.88 (251)	8.11 (206)	13.86 (352)	10.94 (278)	20.51 (521)
750	12.40 (315)	16.93 (430)	16.34 (415)	9.88 (251)	9.29 (236)	13.70 (348)	10.94 (278)	21.77 (553)
1000	13.19 (335)	18.07 (459)	18.94 (481)	9.88 (251)	10.20 (259)	13.70 (348)	10.94 (278)	24.37 (619)

Port		Standard	Size	$p_{max\ abs}$ [psi (bar)][2]	State[3]
P	Control pressure	DIN 3852	M22 × 1.5; 0.55 (14) deep	5100 (350)	O
M_1	Small stroking chamber measurement	DIN 3852	M18 × 1.5; 0.47 (12) deep	5100 (350)	X
M_2	Stroking chamber measurement	DIN 3852	M14 × 1.5; 0.47 (12) deep	5100 (350)	X
X_1; X_2[1]	Pilot pressure measuring	(DIN 3853)	Tube DIA 8 × 1.5 mm (S8 form W)	650 (45)	X

1) For (A)A4VSO clockwise rotation only **X_2** is available; for (A)A4VSO counter-clockwise rotation only **X_1** is available (M14 x 1.5; 12 deep)

2) Depending on the application, momentary pressure peaks can occur.
Keep this in mind when selecting measuring devices and fittings.

3) O = Must be connected (plugged on delivery)
X = Plugged (in normal operation)

Project planning notes

- The hydraulic control HD is intended for use in the open circuit ((A)A4VSO) or closed circuit ((A)A4VSG, (A)A4CSG) depending on the pump.
- Project planning, installation and commissioning of the axial piston units requires the involvement of skilled personnel.
- Before using the axial piston unit, please read the appropriate instruction manual thoroughly and in full. If necessary, this can be requested from Bosch Rexroth.
- Before finalizing your design, request a binding installation drawing.
- The specified data and notes contained herein must be observed.
- Depending on the operating conditions of the axial piston unit (working pressure, fluid temperature), the characteristic curve may shift.
- Preservation: Our axial piston units are supplied as standard with preservative protection for a maximum of 12 months. If longer preservative protection is required (maximum 24 months), please specify this in plain text when placing your order. The preservation periods apply under optimal storage conditions, details of which can be found in the data sheet 90312 or the instruction manual.
- Depending on the type of control used, electromagnetic effects can be produced when using solenoids. Use of the recommended direct current (DC) on the electromagnet does not produce any electromagnetic interference (EMI) nor is the electromagnet influenced by EMI. A possible electromagnetic interference (EMI) exists if the solenoid is supplied with modulated direct current (e.g. PWM signal). The machine manufacturer should conduct appropriate tests and take appropriate measures to ensure that other components or operators (e.g. with a pacemaker) are not affected by this potentiality.
- Pressure controllers are not safeguards against pressure overload. Be sure to add a pressure relief valve to the hydraulic system.
- In drives, the natural frequency of the hydraulic system can be stimulated by the excitation frequency of the pump (rotational speed frequency ×9). This can be prevented with suitably designed hydraulic lines.
- Please note the details regarding the tightening torques of port threads and other threaded joints in the instruction manual.
- Working ports:
  - The ports and fastening threads are designed for the specified maximum pressure. The machine or system manufacturer must ensure the connecting elements and lines correspond to the specified application conditions (pressure, flow, hydraulic fluid, temperature) with the necessary safety factors.
  - The service ports and function ports are only designed to accommodate hydraulic lines.

Safety instructions

- During and shortly after operation, there is a risk of burning on the axial piston unit and especially on the solenoids. Take the appropriate safety measures (e.g. by wearing protective clothing).
- Moving parts in control equipment (e.g. valve spools) can, under certain circumstances, get stuck in position as a result of contamination (e.g. contaminated hydraulic fluid, abrasion, or residual dirt from components). As a result, the hydraulic fluid flow and the build-up of torque in the axial piston unit can no longer respond correctly to the operator's specifications. Even the use of various filter elements (external or internal flow filtration) will not rule out a fault but merely reduce the risk. The machine/system manufacturer should test whether additional measures are required on the machine for the relevant application in order to bring the driven consumer into a safe position (e.g., safe stop) and make sure any measures are properly implemented.

Bosch Rexroth Corporation
8 Southchase Court
Fountain Inn, SC 29644-9018
USA
Telephone (864) 967-2777
Facsimile (864) 962-5338
www.boschrexroth-us.com

Bosch Rexroth Corporation
2315 City Line Road
Bethlehem, PA 18017-2131
USA
Telephone (610) 694-8300
Facsimile (610) 694-8467
www.boschrexroth-us.com