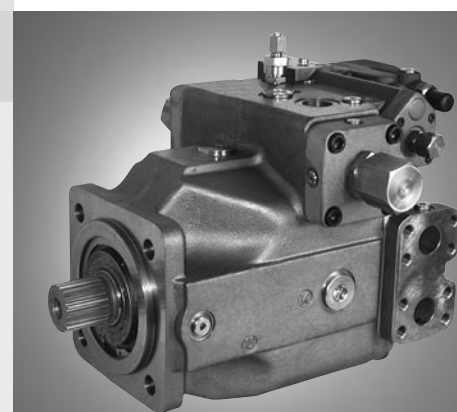


Hydraulic control, pilot pressure dependent HD

RE 92 080/01.06 1/52
Replaces: 08.93

Technical data sheet

for the variable pumps
A4VSO and A4VSG series 1 and 3
A4CSG series 3
open and closed circuits



Contents

Ordering code / Standard program	2
HD1/2/3 – Hydraulic control, pilot pressure dependent	4
Unit dimensions HD1/2/3	9
Pressure control	12
HD.A with pressure control, one side only, in port A	13
HD.GA with remote pressure control, in port A only	15
Unit dimensions HD.A / HD.GA	17
HD.B with pressure control, one side only, in port B	20
HD.GB with remote pressure control, in port B only	22
Unit dimensions HD.B / HD.GB	24
HD.D with pressure control in both ports A and B	27
HD.G with remote pressure control in both ports A and B	29
Unit dimensions HD.D / HD.G	31
HD1P with power control	34
Unit dimensions HD1P	36
HD1T with electrical control of pilot pressure	39
Unit dimensions HD1T	43
HD1U with power control and elec. control of pilot press.	46
Unit dimensions HD1U	47
General notes	52

Features

- Displacement control for the variable pumps A4VSO, A4VSG and A4CSG
- Control is pilot pressure dependent
- Different pilot pressure ranges available
- Optional pressure control
- Optional hydraulic power control
- Optional electrical control of pilot pressure
- Mechanical limitation of $V_{g \min}$ and $V_{g \max}$
- Standard spring centering of control cylinder
- Loss of pilot pressure signal causes swivel back to center
- Mooring operation: enables swiveling over center and de-compression via the pump

Further information:

Variable pump A4VSO	Size 40...1000	RE 92050
Variable pump A4VSG	Size 40...1000	RE 92100
Variable pump A4CSG	Size 250...750	RE 92105

Ordering code / Standard program

	A4 ...		HD .			/		-								
01	02	03	04	05	06		07	08		09	10	11	12	13	14	15

01 **Hydraulic fluid** (for detailed information see RE 92050, RE 92100 or RE 92105)

Axial piston unit / type of operation

02	Swash plate design, variable / pump, open circuit (see RE 92050)	A4VSO
	Swash plate design, variable / pump, closed circuit (see RE 92100)	A4VSG
	Compact unit swash plate design, variable / pump, closed circuit (see RE 92105)	A4CSG

Size

		40	71	125	180	250	355	500	750	1000
03	Displacement $V_{g \max}$ [cm ³]	40	71	125	180	250	355	500	750	1000

Control and regulating devices

04	Hydraulic control, pilot pressure dependent										HD
	Pilot pressure characteristic										
	10...45 bar	●	●	●	●	●	●	●	●	●	1
	10...28 bar	●	●	●	●	●	●	●	●	●	2
05	5,5...19 bar	●	●	●	●	●	●	●	●	●	3
	Pressure control										
	without pressure control (no code)										
	with pressure control in A	●	●	●	●	●	●	●	●	●	A^{1) 2)}
	with remote pressure control in A	●	●	●	●	●	●	●	●	●	GA^{1) 2)}
	with pressure control in B	●	●	●	●	●	●	●	●	●	B²⁾
	with remote pressure control in B	●	●	●	●	●	●	●	●	●	GB²⁾
	with pressure control in both ports	●	●	●	●	●	●	●	●	●	D^{1) 2)}
06	with remote pressure control in both ports	●	●	●	●	●	●	●	●	●	G^{1) 2)}
	Power control and/or electrical control of pilot pressure for HD1										
	without power control or electrical control of pilot pressure (no code)										
	Power control with power control valve LV 06	●	●	●	●	●	●	●	●	●	P
	Electrical control of pilot pressure	●	●	●	●	●	●	●	●	●	T³⁾
	Power control and electrical control of pilot pressure	●	●	●	●	●	●	●	●	●	U³⁾

Series

07	for A4VSO	●	●	-	-	-	-	-	-	-	11
		-	-	●	●	●	●	●	●	●	30
	for A4VSG	●	●	-	-	-	-	-	-	-	11
		-	-	●	●	●	●	●	●	●	30
	for A4CSG	-	-	-	-	●	●	●	●	-	30
		-	-	-	-	-	-	-	-	-	

¹⁾ not available on A4VSO

²⁾ not possible for bi-directional rotation

³⁾ for operation with HF-fluids please observe data sheet RE 29164 (Prop. pressure relief valve type DBEP);
for A4CSG please consult us

● available - not available

	A4 ...		HD .			/			-							
01	02	03	04	05	06		07	08		09	10	11	12	13	14	15

08	Direction of rotation	
09	Seals	
10	Shaft end	
11	Mounting flange	for detailed data see: RE 92050 – A4VSO
12	Connecting options for service ports	RE 92100 – A4VSG
13	Through drive	RE 92105 – A4CSG
14	Valves	
15	Filter options	

HD1/2/3 – Hydraulic control, pilot pressure dependent

The HD1/2/3 control sets the pump displacement dependent on a pilot pressure signal.

One control chamber is permanently pressurized by control pressure. The pilot piston is shifted through the pilot pressure differential $X_1 - X_2$ and controls the oil supply to the opposite control chamber. The resulting control stroke gives a spring pressure feed-back signal to the pilot pressure piston. This enables a proportional control stroke movement, dependent on the pressure differential ($X_2 - X_1$).

When determining the pilot pressure requirements, it must be considered, that on the A4VSO the effective pilot pressure command signal is equal to the difference between actual pilot pressure and housing pressure, in case of the A4VSG and A4CSG it is the pressure differential between X_1 and X_2 .

- Upon loss of pilot pressure signal the pump control system will swivel **back to center through the built in spring centering**.
 - When loosing control pressure, **the spring centering of the control piston will support the reset to center position**.
- Both features are standard.

Note

The spring centering in the pilot control unit is not a safety device

Through contamination in the control unit – eg. in hydraulic fluid, wear particles, or particles out of a system – the valve spool can get stuck in an undefined position. In this case, the pump flow does not follow the command inputs of the machine operator anymore.

- Make sure that a proper emergency shut down function can bring the driven machine movements to a safe position immediately (eg. stop).
- Adhere to the specified cleanliness level 20/18/15 ($< 90^\circ\text{C}$) or 19/17/14 ($> 90^\circ\text{C}$) to ISO 4406.

The mechanical swivel angle limitation can be set at both sides of center in the range of $V_{g\max}$ to 50 % of $V_{g\max}$, on size 500 $V_{g\max}$ to 70% of $V_{g\max}$.

The sizes 500...1000 offer the possibility to adjust the control time at the pilot unit. As standard the units are set at the long control times (for times see table on page 5). This is necessary for the power control valve LV06 on HD1P and HD1U.

3 executions are available:

HD1	pilot pressure range 10...45 bar
HD2	pilot pressure range 10...28 bar
HD3	pilot pressure range 5,5...19 bar

An execution with inductive displacement transducer is available on request.

Supply of control and pilot pressure

On A4VSO and A4VSG the minimum required control pressure must be connected externally to P. This enables a control out of center position without sufficient control pressure from the pump itself. The pump internal pressure output supplies the control pressure as soon as $p_A, p_B > p$.

On **A4CSG** in standard execution (boost pump „F“) the control pressure comes internally out of the boost circuit. This eliminates the need for a separate control pressure pump, that means port P is already hooked up internally.

Recommended setting on control pressure relief valve: double the boost pressure

Recommended: as separate control/pilot press. pump for the sizes 40...250 an auxiliary pump with 8 cm³
for the sizes 355...1000 an auxiliary pump with 11 cm³

Direct mounting at the through drive on A4VSO/G or A4CSG is possible, see the technical data sheet of the relevant pump.

HD1/2/3 – Technical data

Size				40	71	125	180	250	355	500	750	1000
Pilot pressure ¹⁾ (in X_1 , X_2)	HD1	p_{St}	bar	10 ²⁾ – 45 ³⁾								
	HD2	p_{St}	bar	10 ²⁾ – 28 ³⁾								
	HD3	p_{St}	bar	5,5 ²⁾ – 19 ³⁾								
Control pressure (in P)		p_{min} ^{5) 6)}	bar	2x boost press. but at least 32 bar								
		p_{max} ^{4) 5)}	bar	350								
Control stroke		s_{max}	mm	14,2	17,1	20,7	20,7	25,9	25,9	32,6	37	41,41
Control area		A	cm ²	3,9	6,4	9	9	14,4	14,4	18,8	28,5	32,4
Control volume		$V_{S max}$	cm ³	5,5	11	18,7	18,7	37,3	37,3	61,4	105	134,1
Control time (at 200 bar pressure output)		t	s	0,08	0,09	0,10	0,10	0,15	0,15	0,75	1,0	1,5
Setting range control time (at 200 bar pressure output)		t	s	–	–	–	–	–	–	0,15... 0,75	0,2... 1,0	0,3... 1,5
Boost pressure	A4VSG	$p_{Sp min}$	bar	16	16	16	16	16	16	16	16	16
		$p_{Sp max}$ ⁶⁾	bar	30	30	30	30	30	30	30	30	30
	A4CSG	$p_{Sp min}$	bar	–	–	–	–	16	16	16	16	–
		$p_{Sp max}$	bar	–	–	–	–	20	20	20	20	–
Weight approx. (A4VSO...HD. ...N00)			kg	42	59	98	112	200	220	333	476	606
Hysteresis				$\leq \pm 3 \%$ von $V_{g max}$								
Repeatability				$\leq 1 \%$ von $V_{g max}$								

¹⁾ Pilot pressure characteristics see page 6.

²⁾ $\pm 0,5$ bar at open circuit; $\pm 1,5$ bar at closed circuit

³⁾ $\pm 1,5$ bar at open circuit; ± 2 bar at closed circuit

⁴⁾ with pressure control, the max. control pressure at port P must be below the pressure control setting

⁵⁾ with built on valve DBEP6 (HD1T and HD1U) max. pressure at port P for all sizes must be limited from min. 50 bar to max. 100 bar;
with built on power control valve (HD1P und HD1U) the max. pressure at port P must be below the beginning of control on the power curve

⁶⁾ on execution H06 the boost pressure must be limited to max. 25 bar, since the control pressure is set at 50 bar.

Characteristics

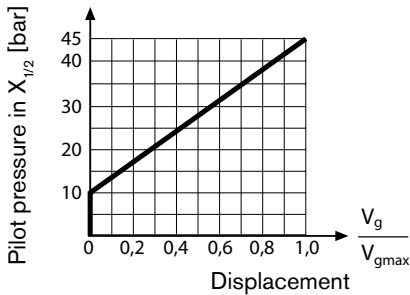
A4VSO - open circuit

Please note: on the A4VSO for open circuit (swivel to one side of center only) the $V_{g\min}$ -stop is set so that pump pressure reaches 20 bar when port B is closed.

Mooring or over center operation available on request.

Characteristic

Example: HD1 pilot pressure 10...45 bar

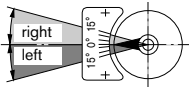


Relation between

Direction of rotation – Pilot pressure – Direction of flow

Direction of rotation	Pilot pressure	Swivel range ¹⁾	Direction of flow	Pressure output port
clockwise	in X_2	left	S to B	B
counter clockwise	in X_1	right	S to B	B

¹⁾ compare swivel angle indicator

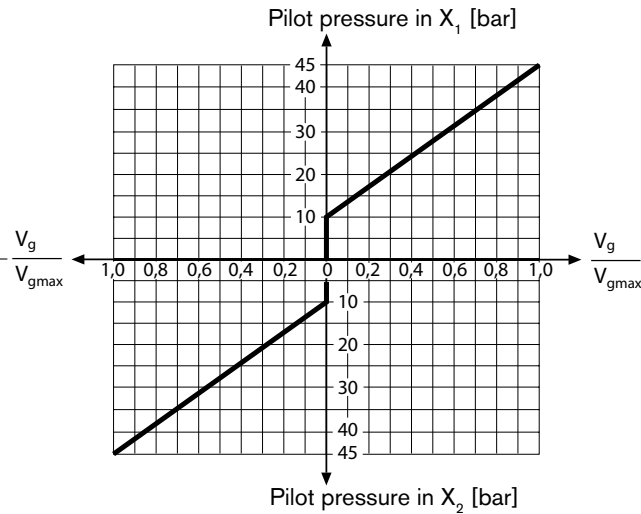


A4VSG and A4CSG - closed circuit

On the standard execution of the **A4CSG** (boostpump „F“) with HD, control fluid is taken internally out of the boost circuit. This eliminates the need for a separate control pressure pump.

Characteristic

HD1 pilot pressure 10...45 bar

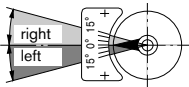


Relation between

Direction of rotation – Pilot pressure – Direction of flow

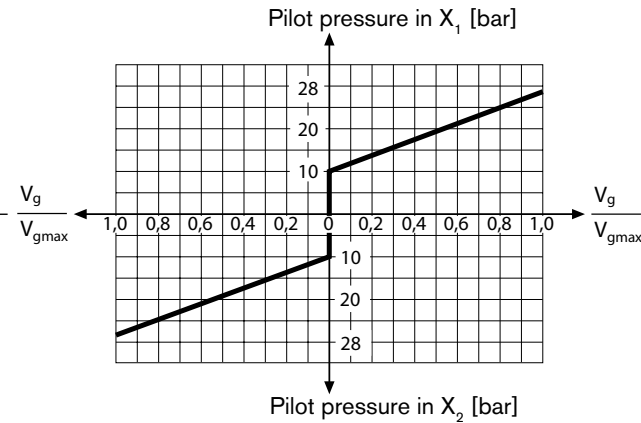
Direction of rotation	Pilot pressure	Swivel range ¹⁾	Direction of flow	Pressure outlet port
clockwise	in X_1	right	B to A	A
	in X_2	left	A to B	B
counter clockwise	in X_1	right	A to B	B
	in X_2	left	B to A	A

¹⁾ compare swivel angle indicator



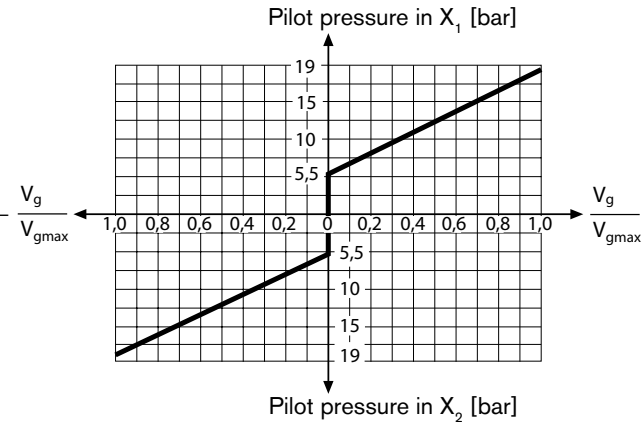
Characteristic

HD2 pilot pressure 10...28 bar



Characteristic

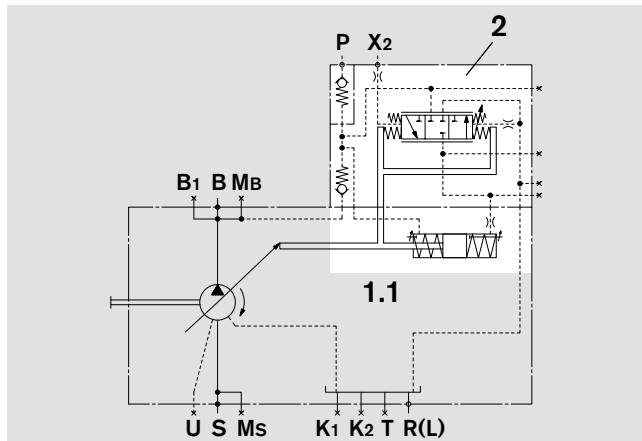
HD3 pilot pressure 5,5...19 bar



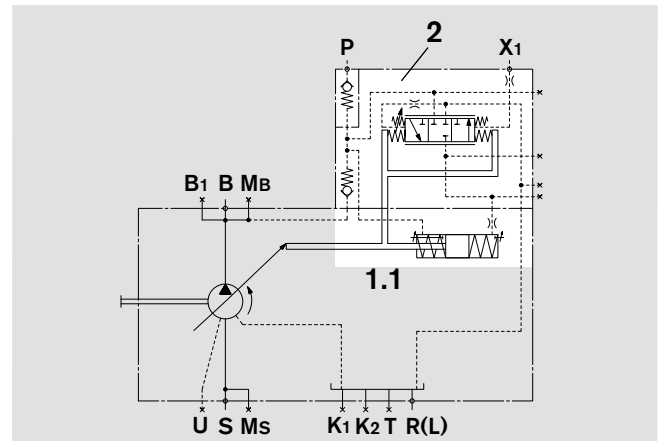
Schematics A4VSO HD1/2/3

Size 40 and 71

Direction of rotation clockwise

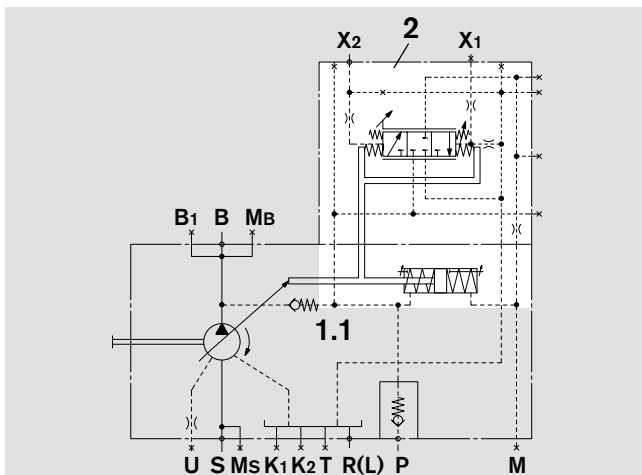


Direction of rotation counter clockwise

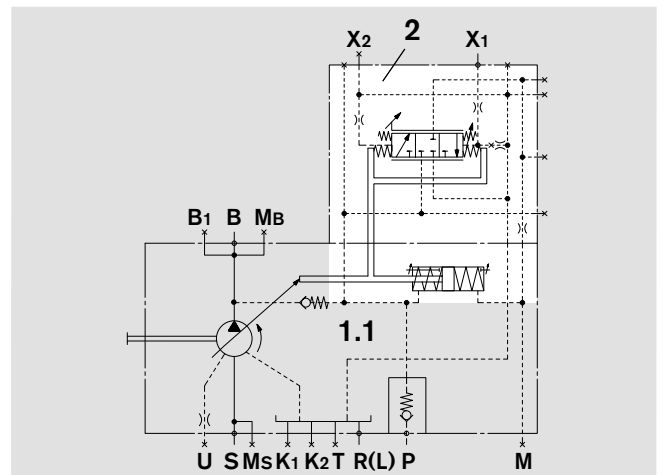


Size 125...355

Direction of rotation clockwise

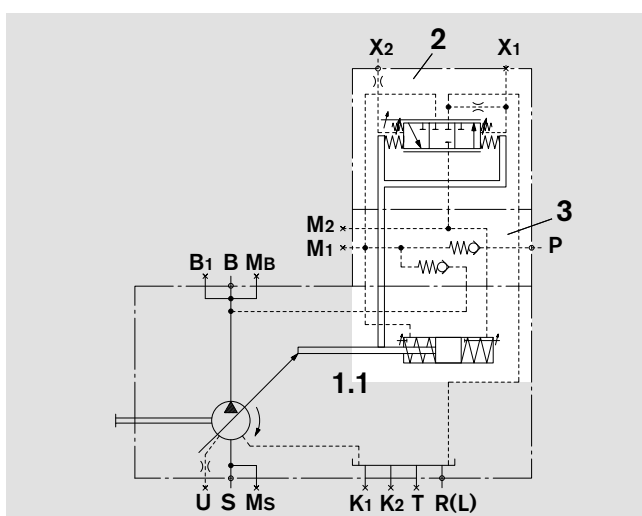


Direction of rotation counter clockwise

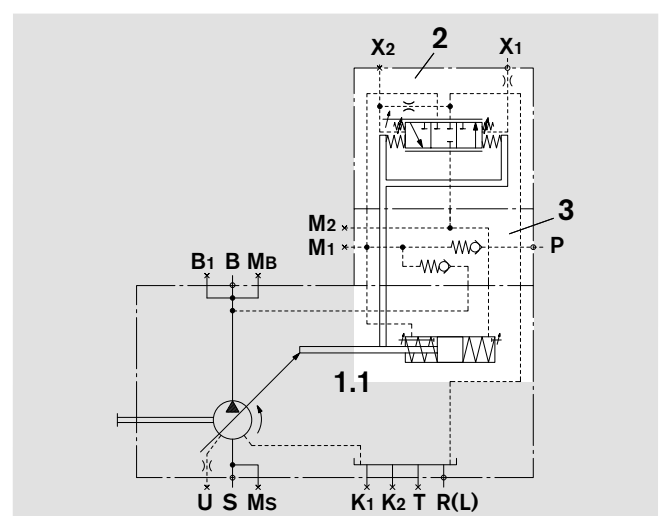


Size 500...1000

Direction of rotation clockwise



Direction of rotation counter clockwise



Ports

$X_1; X_2$ Pilot pressure ports
P Control pressure port

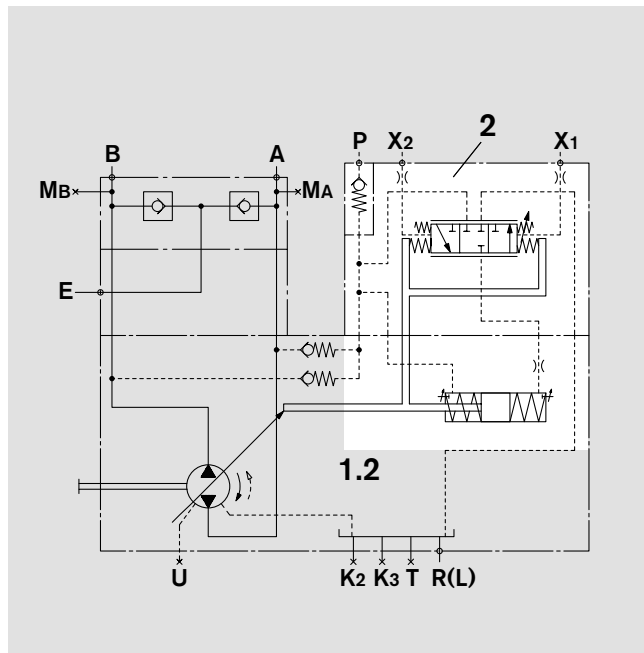
M; M_1 ; M_2 Gauging ports control chamber pressure

Sub-assemblies see page 8.

Schematics A4VSG and A4CSG HD1/2/3

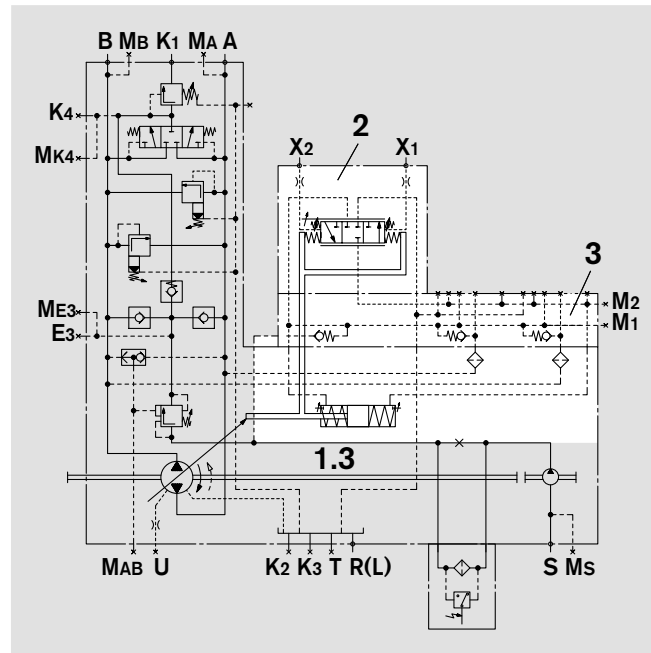
Size 40 and 71

Example: A4VSG



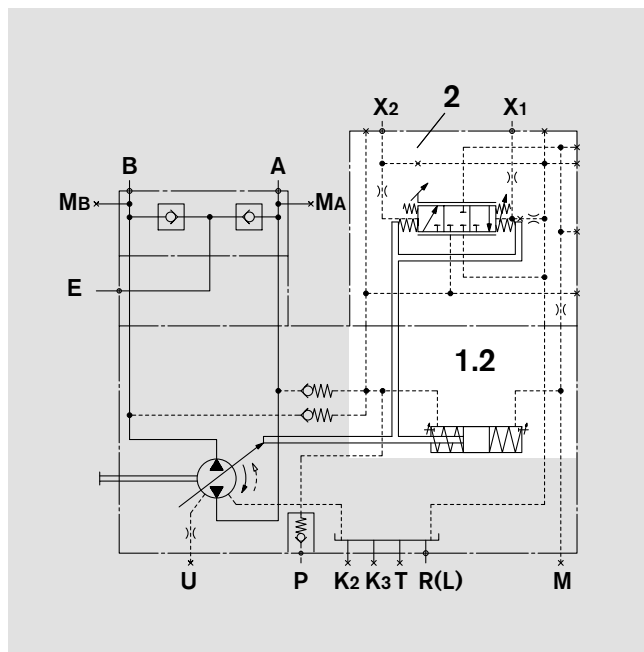
Size 500...1000

Example: A4CSG



Size 125...355

Example: A4VSG



Sub-assemblies

- 1 Pump with hydraulic control device
- 1.1 A4VSO (see RE 92050)
- 1.2 A4VSG (see RE 92100)
- 1.3 A4CSG (see RE 92105)
- 2 Pilot control unit
- 3 Sandwich plate

Ports

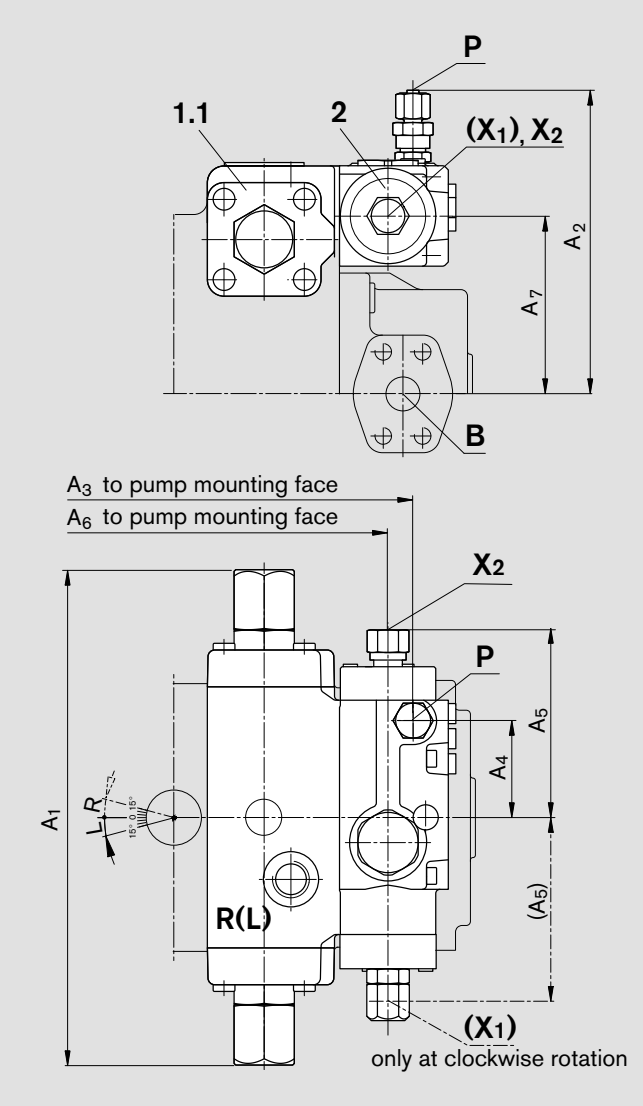
- X_1 ; X_2 Pilot pressure ports
- P Control pressure port (at A4VSG)
- M Gauging port control chamber pressure (Size 125...355)
- M_1 Gauging port small control chamber (Size 500...1000)
- M_2 Gauging port large control chamber (Size 500...1000)

Unit dimensions HD1/2/3

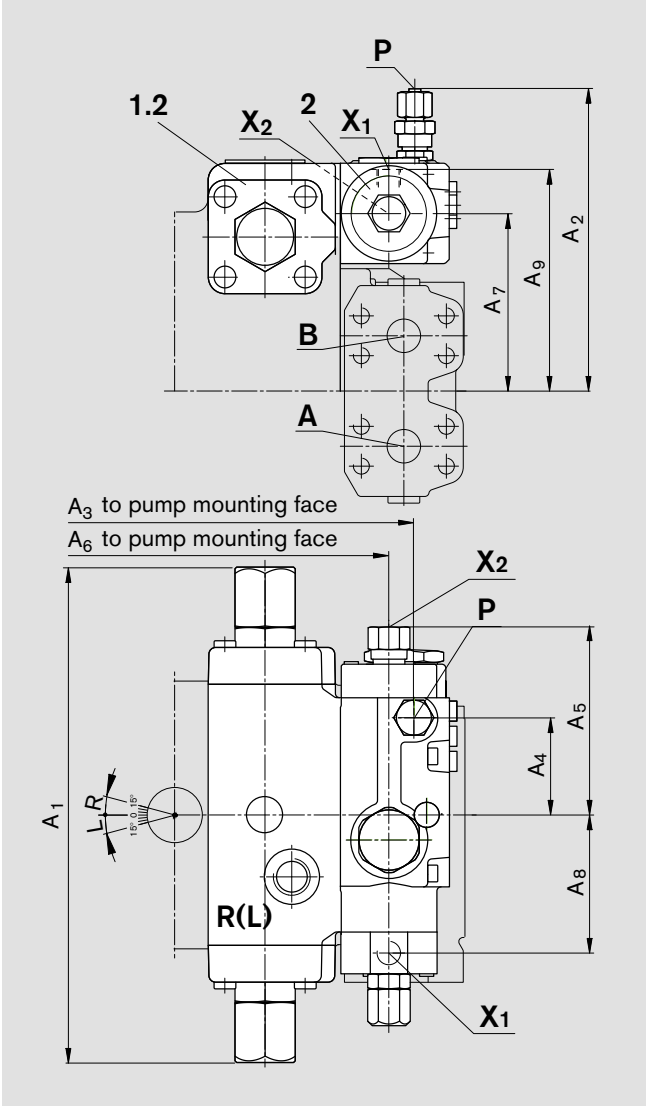
Before finalising your design please request a certified installation drawing.

Size 40 and 71

A4VSO – open circuit



A4VSG – closed circuit



Sub-assemblies see page 8.

Ports

- X₁; X₂ Pilot pressure ports DIN 3852 M14x1,5; 12 deep
- A4VSO in clockwise rotation shows only X₂, A4VSO in counter clockwise rotation has only X₁
- P Control pressure port DIN 3853 S8 Form W

max. tightening torques ¹⁾

- 80 Nm
- 50 Nm

Unit dimensions

Size	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈	A ₉	
40	296	193	233	58	113	218	106	82,5	132,5	For detailed unit dimensions and technical data on the variable pumps see the technical data sheets A4VSO RE 92050 or A4VSG RE 92100
71	332	209	260	58	113	245	122	82,5	148,5	

¹⁾ see general notes

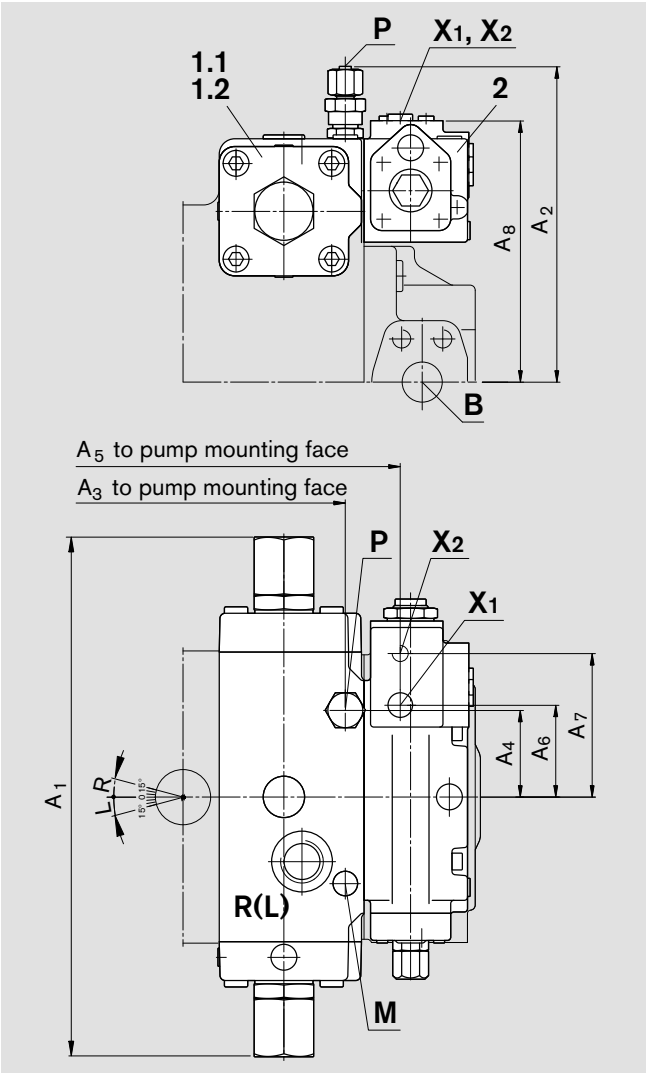
Unit dimensions HD1/2/3

Before finalising your design please request a certified installation drawing.

Size 125...355

A4VSO and A4VSG

A4CSG in preparation, dimensions on request



Sub-assemblies

- 1 Pump with hydraulic control device
- 1.1 A4VSO (see RE 92050)
- 1.2 A4VSG (see RE 92100)
- 2 Pilot control unit
- 3 Sandwich plate (size 500...1000)

Ports

				max. tightening torques ¹⁾
X ₁ ; X ₂	Pilot pressure ports	DIN 3852	M14x1,5; 12 deep	80 Nm
on A4VSO in clockwise rotation X ₁ is plugged, on A4VSO in counter clockwise rotation X ₂ is plugged				
P	Control pressure port	DIN 3853	S8 Form W (size 125 and 180) S12 Form W (size 250 and 355)	50 Nm 90 Nm
M	Gauging port control chamber pressure	DIN 3852	M14x1,5; 12 deep; plugged (size 125 a. 180) M18x1,5; 12 deep; plugged (size 250 a. 355)	80 Nm 140 Nm

Unit dimensions

Size	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈	For detailed dimensions and technical data on the variable pumps see the technical data sheets A4VSO RE 92050, A4VSG RE 92100 or A4CSG RE 92105
125	402	245	251	67	293	71	111	202	
180	402	245	251	67	293	71	111	202	
250	485	297,5	311	71	355	71	111	238	
355	485	297,5	311	71	355	71	111	238	

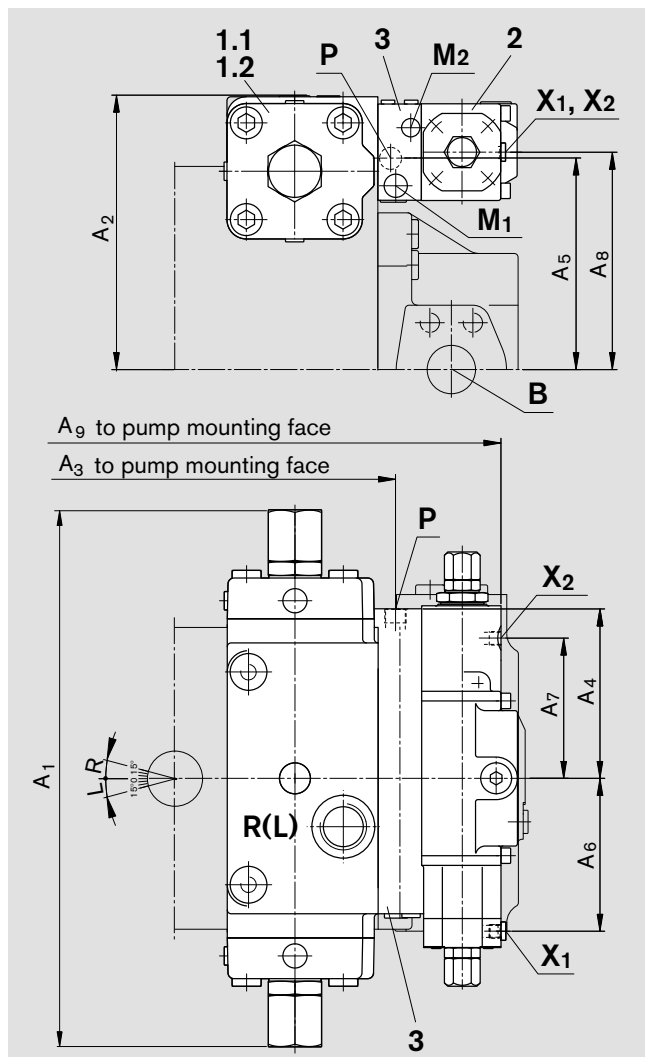
¹⁾ see general notes

Unit dimensions HD1/2/3

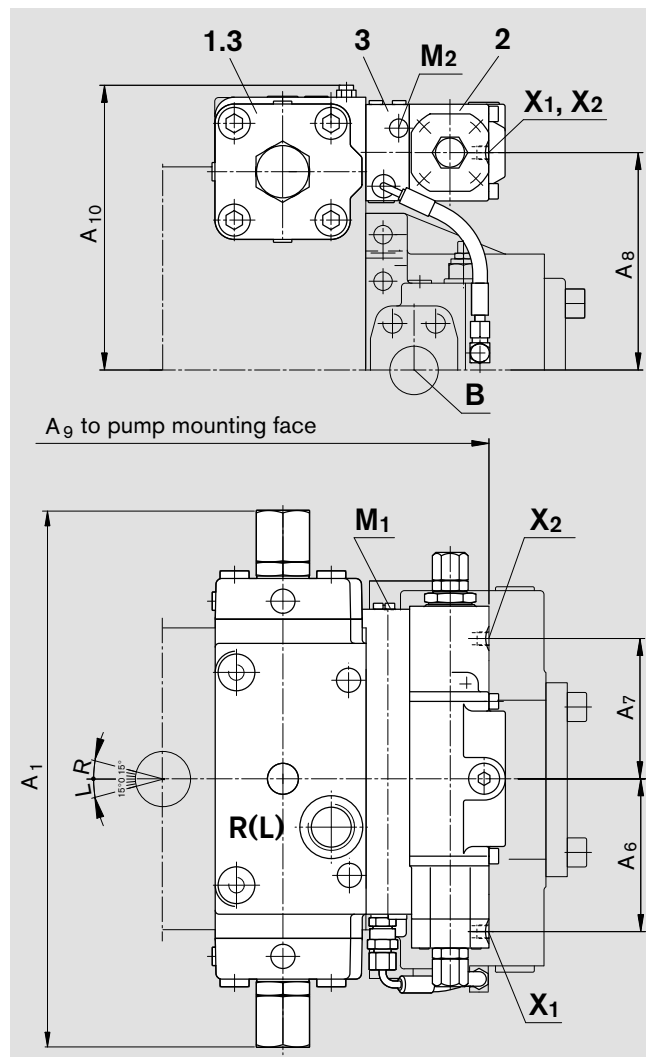
Before finalising your design please request a certified installation drawing.

Size 500...1000

A4VSO and A4VSG



A4CSG



Sub-assemblies see page 10.

Ports A4VSO and A4VSG

X ₁ ; X ₂	Pilot pressure ports	DIN 3852	M14x1,5; 12 deep	80 Nm
on A4VSO in clockwise rotation X ₁ is plugged, on A4VSG in counter clockwise rotation X ₂ is plugged				
P	Control pressure port	DIN 3852	M22x1,5; 14 deep	210 Nm
M ₁	Gauging port small control chamber	DIN 3852	M18x1,5; 12 deep; plugged	140 Nm
M ₂	Gauging port large control chamber	DIN 3852	M14x1,5; 12 deep; plugged	80 Nm

max. tightening torques ¹⁾

Ports A4CSG

X ₁ ; X ₂	Pilot pressure ports	DIN 3852	M14x1,5; 12 deep	80 Nm
M ₁	Gauging port small control chamber	DIN 3852	M22x1,5; 14 deep; plugged	210 Nm
M ₂	Gauging port large control chamber	DIN 3852	M14x1,5; 12 deep; plugged	80 Nm

max. tightening torques ¹⁾

Unit dimensions

Size	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈	A ₉	A ₁₀	
500	555	283	383	175	200	158	145	225	492	297	For detailed dimensions and technical data on the variable pumps see the technical data sheets A4VSO RE 92050, A4VSG RE 92100 or A4CSG RE 92105
750	630	322	415	175	230	158	145	280	524	355	
1000	670	347	482	175	253	158	145	278	590	–	

¹⁾ see general notes

Pressure control

The pressure control is an additional function, which controls pump displacement as soon as a certain preset pressure level is reached. When this preset pressure level is exceeded, the pressure control valve opens and destrokes the pump till this set pressure level is reached again. With control on both sides of center, this pressure control feature enables swiveling over center (pump „swallows“ fluid) and thereby a fast decompression of the pressure line.

On rotary drives with inert, large rotating masses, the pressure control enables a smooth, controlled deceleration.

The pressure control is optionally available as:

- HD.A one side in port A (schematics see page 13 and 14)
- HD.B one side in port B (schematics see page 20 and 21)
- HD.D both sides in ports A and B (schematics see page 27 and 28)

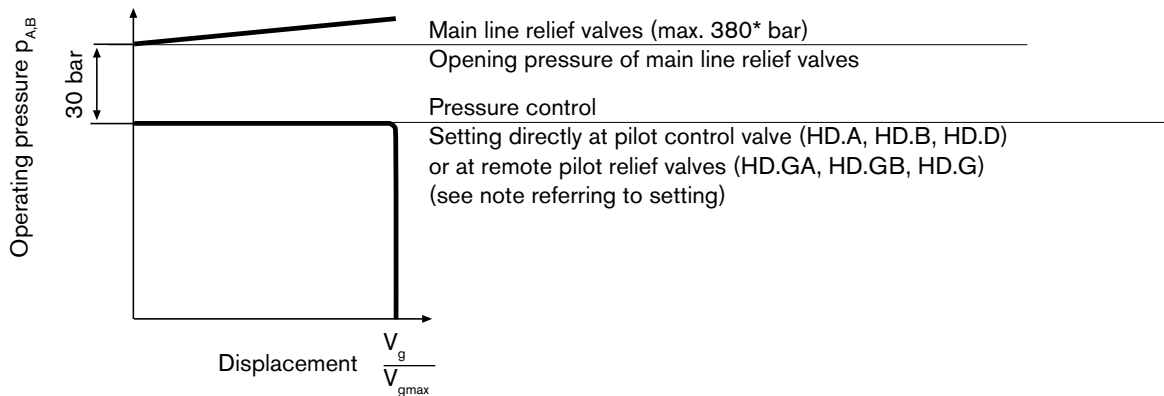
Setting range 50...350 bar

Standard setting 350 bar. Other settings please state in clear text when ordering.

The settings must be 30 bar below the setting of the main line relief valves (A4CSG), since the system induced pressure spikes should be limited through these relief valves.

Moreover, the setting must be **higher than the control pressure level at port P.**

Characteristic



Pressure rise $\Delta p \leq 5 \text{ bar}$

Hysteresis $\leq \pm 5 \text{ bar}$

* only valid in combination with pressure control – without pressure control, max. main line relief settings 350 bar

Remote pressure control

Remote control is carried out via ports X_A or X_B .

The external pilot pressure relief valves are not included in the supply.

Recommended: DBD 6 (RE 25 402)

The max. line length should not exceed 2m.

The standard setting of the differential pressure at the pumps control valve is 30 bar. With this setting the pilot oil consumption amounts to approx. 2 L/min. If another setting is required (range 14...50 bar) please state in clear text.

Notes about the setting of the remote pressure control level:

The s

overall pressure control level.

Example: external pilot relief valve setting 320 bar

differential pressure at control valve 30 bar

equals pressure control level of $320 + 30 = 350 \text{ bar}$

Remote pressure control available as :

- HD.GA one side in port A (schematics see page 15 and 16)
- HD.GB one side in port B (schematics see page 22 and 23)
- HD.G both sides in ports A and B (schematics see page 29 and 30)

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

The pressure control valve controls the pressure in port A. Description see page 12.

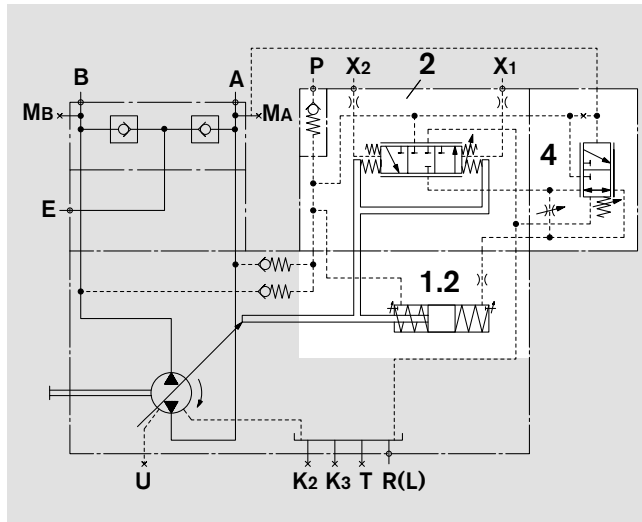
Not available on A4VSO.

Not possible on pumps for bi-directional rotation.

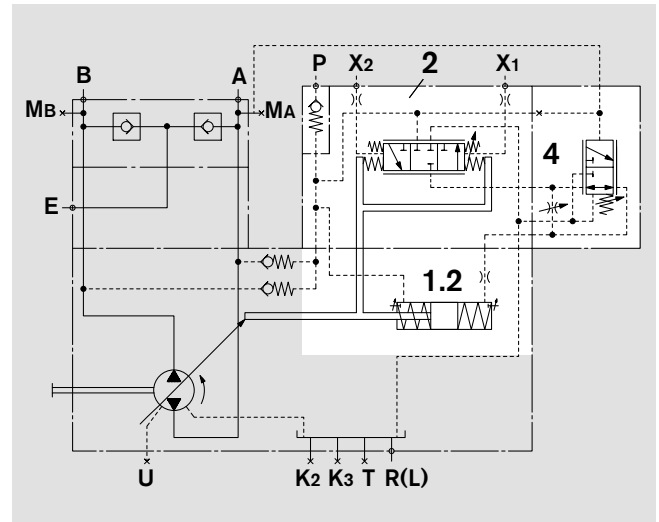
Schematics example A4VSG

Size 40 and 71

Direction of rotation clockwise

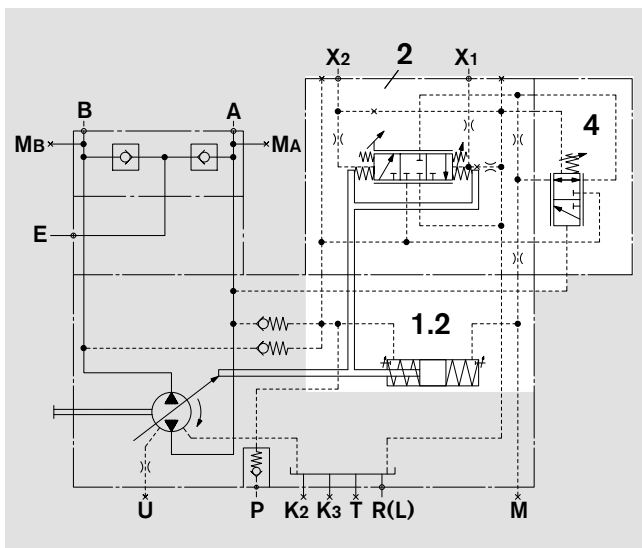


Direction of rotation counter clockwise

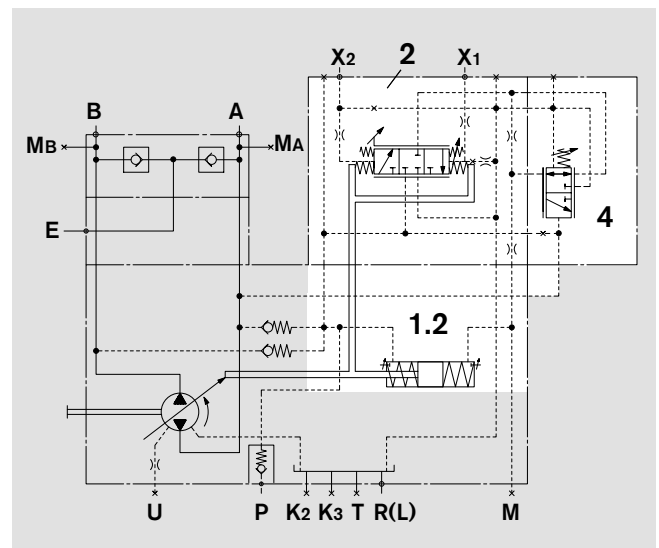


Size 125...355

Direction of rotation clockwise



Direction of rotation counter clockwise



Ports

- $X_1; X_2$ Pilot pressure ports
- P Control pressure port
- M Gauging port control chamber pressure (Size 125...355)

Sub-assemblies

- 1 Pump with hydraulic control device
- 1.2 A4VSG (see RE 92100)
- 2 Pilot control unit
- 4 Pressure control valve for port A

Size 500...1000 see page 14

HD.GA with remote pressure control for port A

The remote control is carried out via port X_A . The external pilot relief valve (item 5) is not included in the supply. Description on page 12.

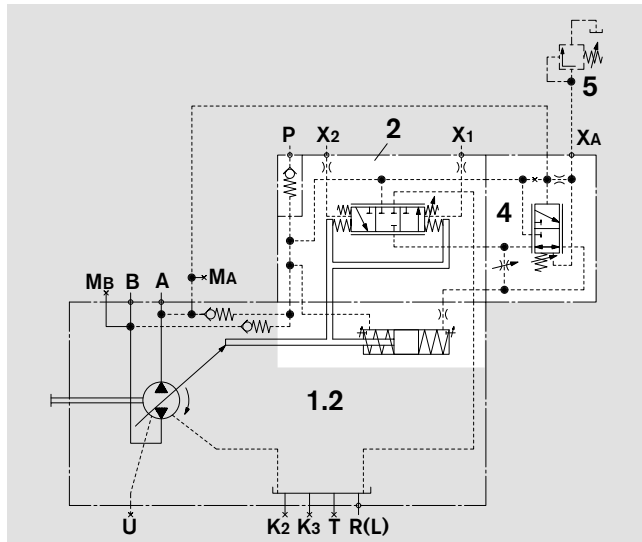
Not available on A4VSO.

Not possible on pumps for bi-directional rotation.

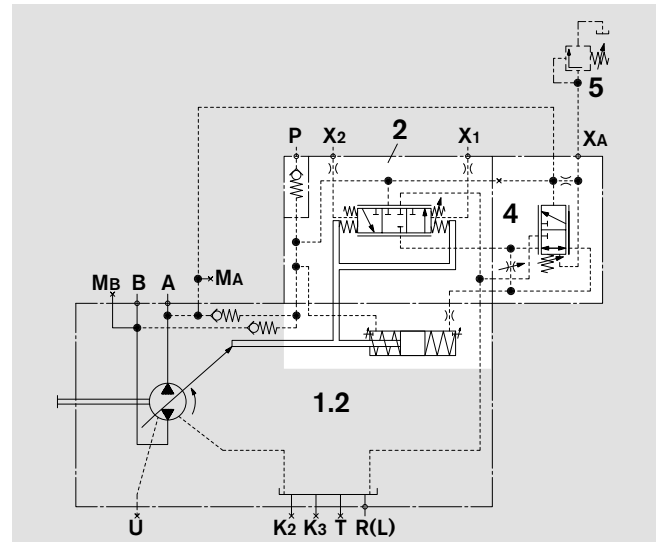
Schematics example A4VSG

Size 40 and 71

Direction of rotation clockwise

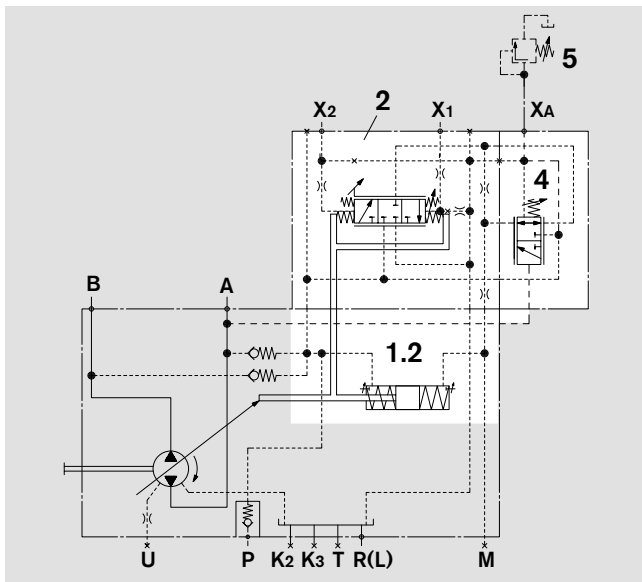


Direction of rotation counter clockwise

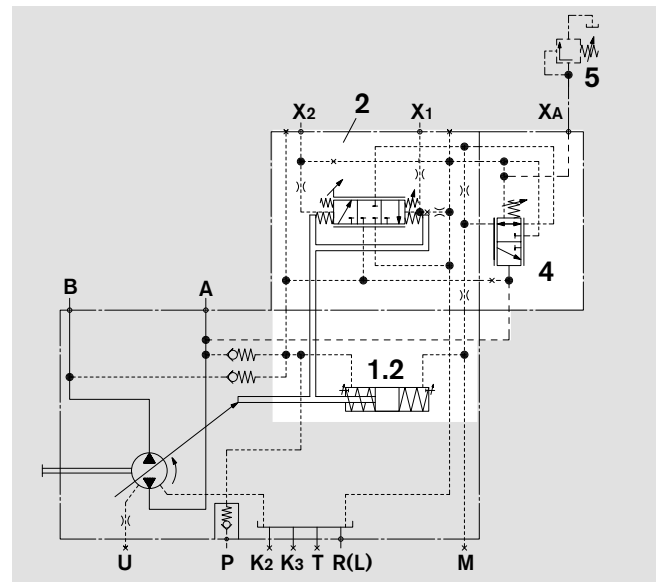


Size 125...355

Direction of rotation clockwise



Direction of rotation counter clockwise



Ports

- X_A Pilot pressure port for remote pressure control in A
- $X_1; X_2$ Pilot pressure ports
- P Control pressure port
- M Gauging port control chamber press. (Size 125...355)

Size 500...1000 see page 16

Sub-assemblies

- 1 Pump with hydraulic control device
- 1.2 A4VSG (see RE 92100)
- 2 Pilot control valve
- 4 Pressure control valve for port A
- 5 External pilot relief valve (not included in supply)

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

The remote pressure control is carried out via port X_A . The external pilot relief valve (item 5) is not included in the supply. Description see page 12.

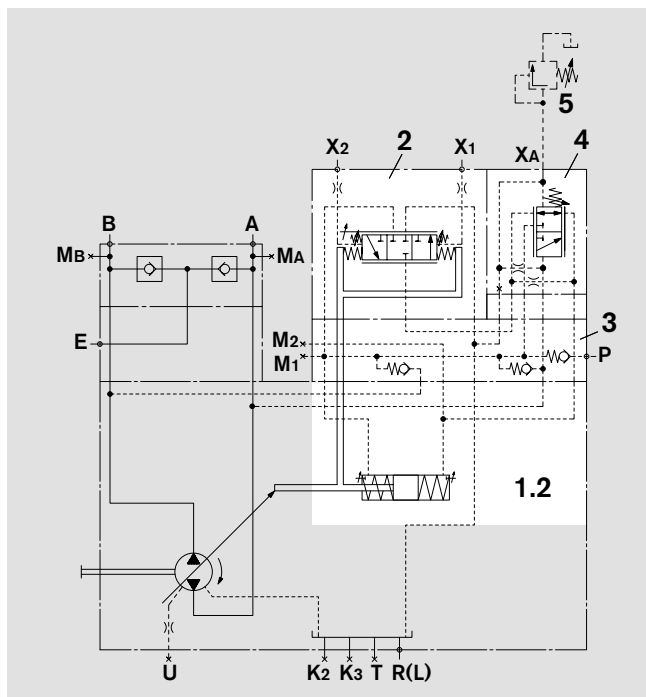
Not available on A4VSO.

Not possible for bi-directional rotation.

Schematics example A4VSG

Size 500...1000

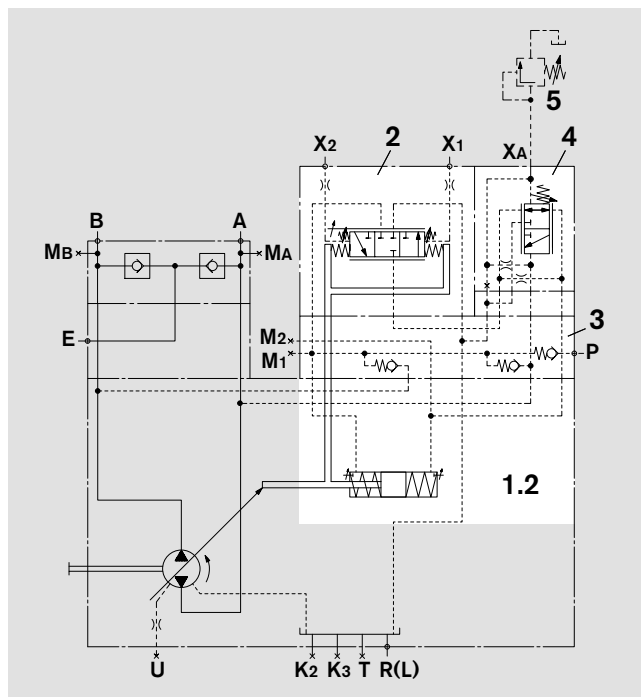
Direction of rotation clockwise



Ports

- X_A Pilot pressure port for remote pressure control in A
- X_1, X_2 Pilot pressure ports
- P Control pressure port
- M_1 Gauging port small control chamber
- M_2 Gauging port large control chamber

Direction of rotation counter clockwise



Sub-assemblies

- 1 Pump with hydraulic control device
- 1.2 A4VSG (see RE 92100)
- 2 Pilot control unit
- 3 Sandwich plate
- 4 Pressure control valve for port A
- 5 External pilot relief valve (not included in supply)

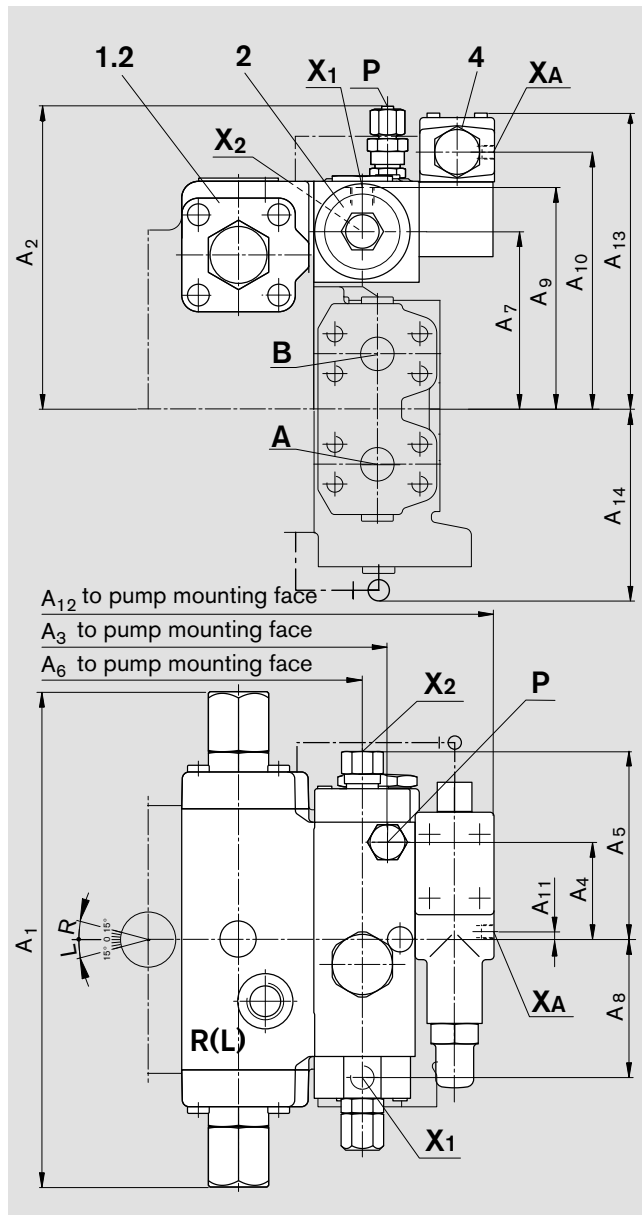
Size 40...355 see page 15

Unit dimensions HD.A / HD.GA

Before finalising your design please request a certified installation drawing.

Size 40 and 71

A4VSG



Sub-assemblies

- 1 Pump with hydraulic control device
- 1.2 A4VSG (see RE 92100)
- 2 Pilot control unit
- 4 Pressure control valve for port A

Ports

max. tightening torques ¹⁾

X _A	Pilot pressure port for remote pressure control in A	DIN 3852	M14x1,5; 12 deep; plugged on HDA	80 Nm
X ₁ ; X ₂	Pilot pressure ports	DIN 3852	M14x1,5; 12 deep	80 Nm
P	Control pressure port	DIN 3853	S8 Form W	50 Nm

Unit dimensions

Size	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈	A ₉	A ₁₀	A ₁₁	A ₁₂	A ₁₃	A ₁₄	
40	296	193	233	58	113	218	106	82,5	132,5	163	4	299	189	136	For detailed unit dimensions and technical data on the variable pump see the technical data sheet A4VSG RE 92100
71	332	209	260	58	113	245	122	82,5	148,5	179	4	326	205	139	

¹⁾ see general notes

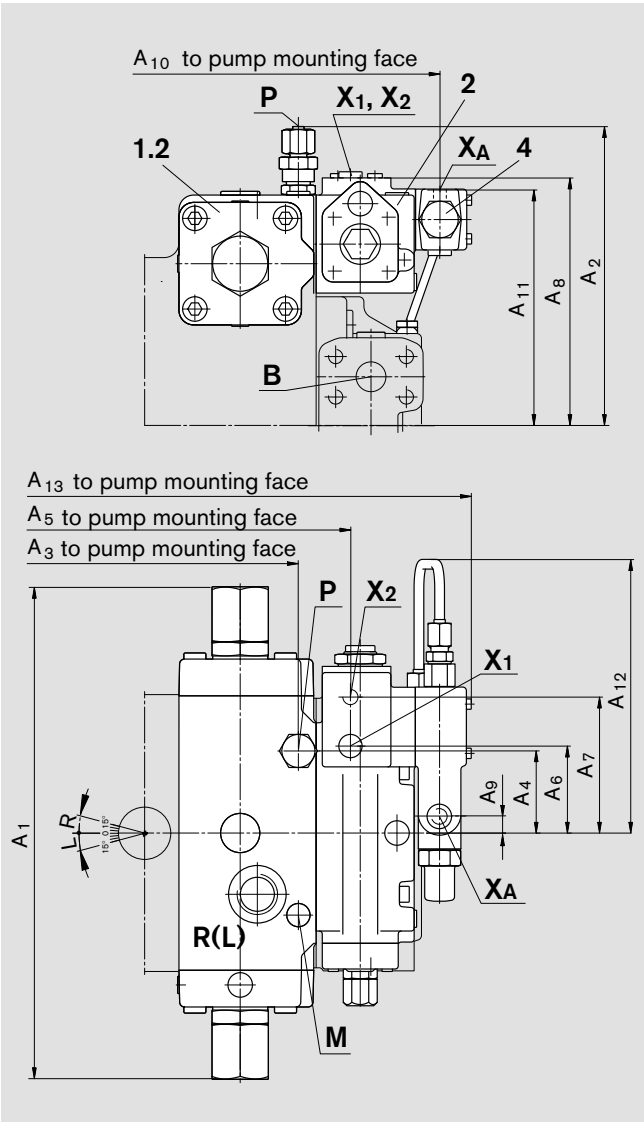
Unit dimensions HD.A / HD.GA

Before finalising your design please request a certified installation drawing.

Size 125...355

A4VSG

A4CSG in preparation, dimensions on request



Sub-assemblies

- 1 Pump with hydraulic control device
- 1.2 A4VSG (see RE 92100)
- 2 Pilot control unit
- 3 Sandwich plate (Size 500...1000)
- 4 Pressure control valve for port A

Ports

max. tightening torques ¹⁾

X _A	Pilot pressure port for remote pressure control in A	DIN 3852	M14x1,5; 12 deep; plugged on HDA	80 Nm
X ₁ ; X ₂	Pilot pressure ports	DIN 3852	M14x1,5; 12 deep	80 Nm
P	Control pressure port	DIN 3853	S8 Form W (Size 125 and 180) S12 Form W (Size 250 and 355)	50 Nm 90 Nm
M	Gauging port control chamber pressure	DIN 3852	M14x1,5; 12 deep; plugged (Size 125 a. 180) M18x1,5; 12 deep; plugged (Size 250 a. 355)	80 Nm 140 Nm

Unit dimensions

Size	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈	A ₉	A ₁₀	A ₁₁	A ₁₂	A ₁₃	For detailed dimensions and technical data on the variable pumps see the technical data sheets A4VSG RE 92100 or A4CSG RE 92105
125	402	245	251	67	293	71	111	202	13	366	192	224	392	
180	402	245	251	67	293	71	111	202	13	366	192	224	394	
250	485	297,5	311	71	355	71	111	238	13	428	228	224	454	
355	485	297,5	311	71	355	71	111	238	13	428	228	224	454	

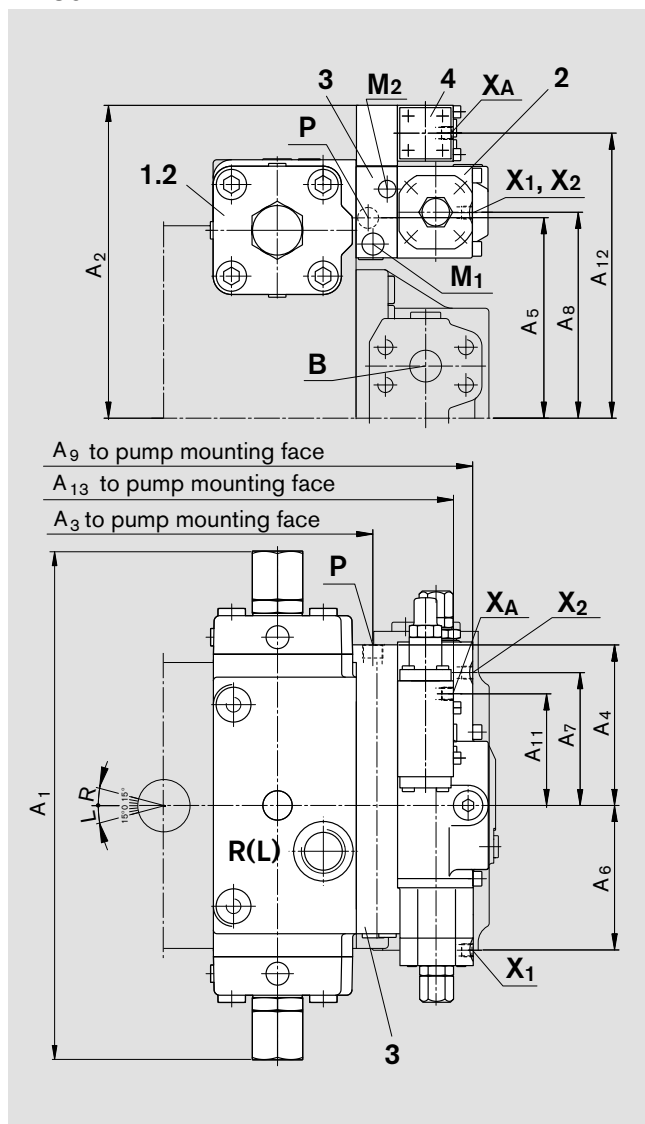
¹⁾ see general notes

Unit dimensions HD.A / HD.GA

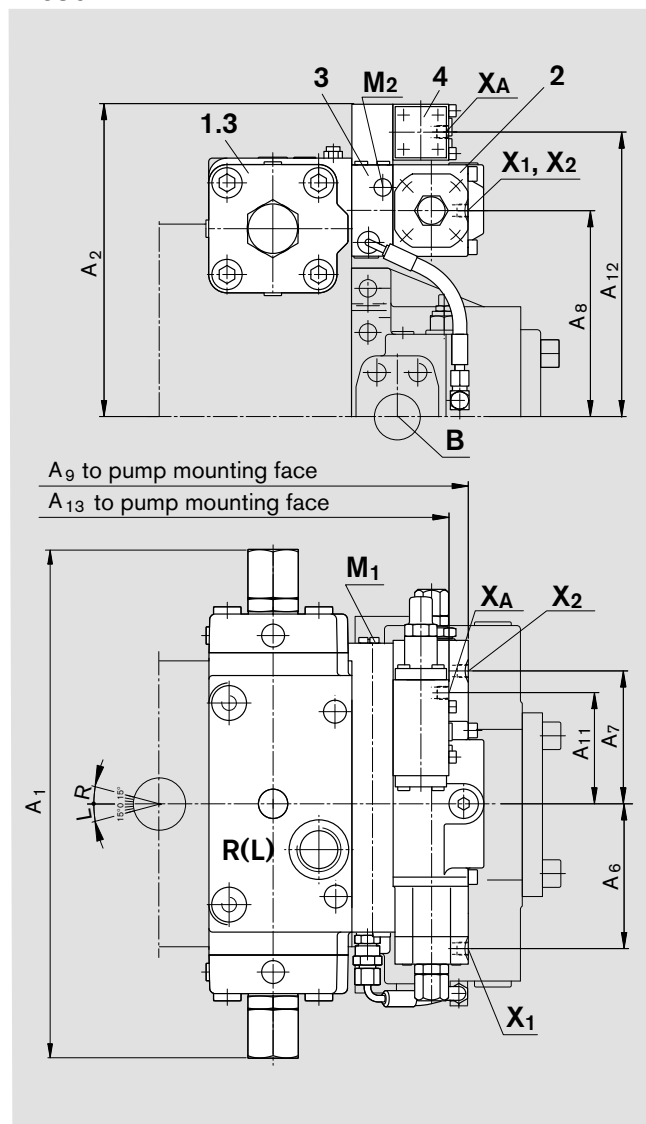
Before finalising your design please request a certified installation drawing.

Size 500...1000

A4VSG



A4CSG



Sub-assemblies see page 18.

Ports

max. tightening torques ¹⁾

X _A	Pilot pressure port for remote pressure control in A	DIN 3852 M14x1,5; 12 deep; plugged on HDA	80 Nm
X ₁ ; X ₂	Pilot pressure ports	DIN 3852 M14x1,5; 12 deep	80 Nm
P	Control pressure port	DIN 3852 M22x1,5; 14 deep (only on A4VSG)	210 Nm
M ₁	Gauging port small control chamber	DIN 3852 M18x1,5; 12 deep; plugged (A4VSG) M22x1,5; 14 deep; plugged (A4CSG)	140 Nm 210 Nm
M ₂	Gauging port large control chamber	DIN 3852 M14x1,5; 12 deep; plugged	80 Nm

Unit dimensions

Size	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈	A ₉	A ₁₁	A ₁₂	A ₁₃	
500	555	342	383	175	200	158	145	225	492	136	315	469	For detailed dimensions and technical data on the variable pumps see the technical data sheets A4VSG RE 92100 or A4CSG RE 92105
750	630	371	415	175	230	158	145	280	524	136	345	501	
1000	670	394	481	175	253	158	145	278	590	136	368	567	

¹⁾ see general notes

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

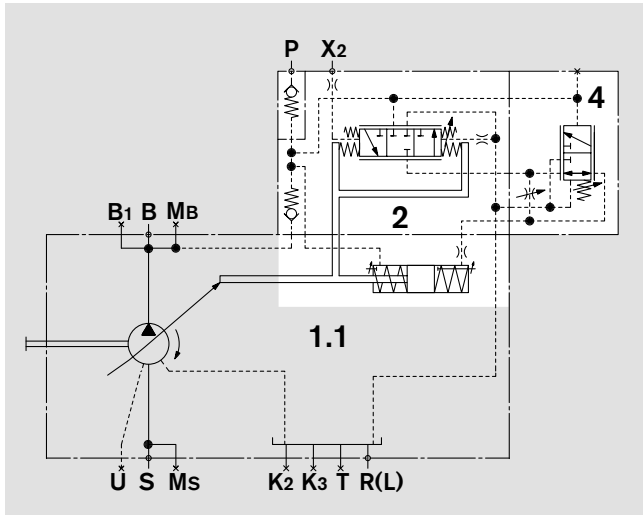
The pressure control valve controls the pressure in port B. Description see page 12.

Not possible on pumps for bi-directional rotation.

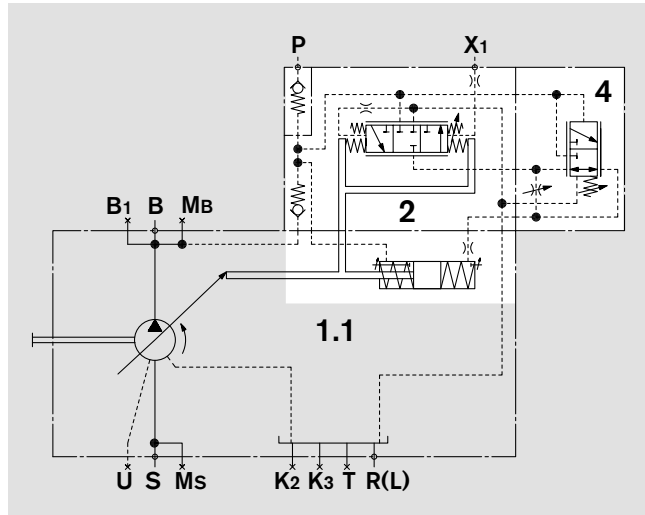
Schematics

Size 40 and 71

Direction of rotation clockwise
(Example A4VSO)

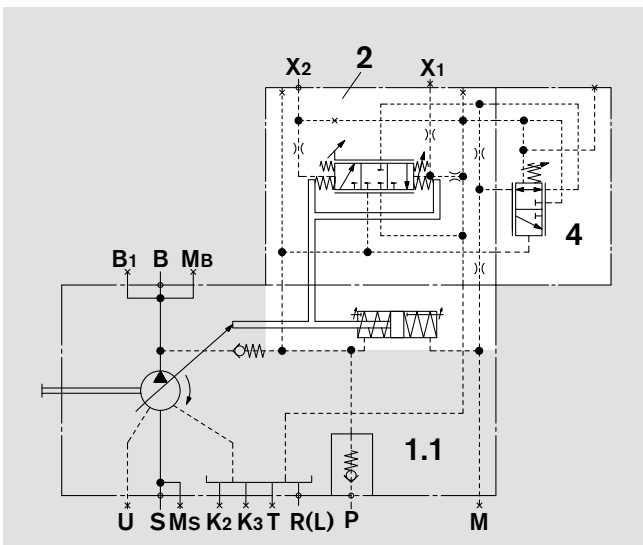


Direction of rotation counter clockwise
(Example A4VSO)

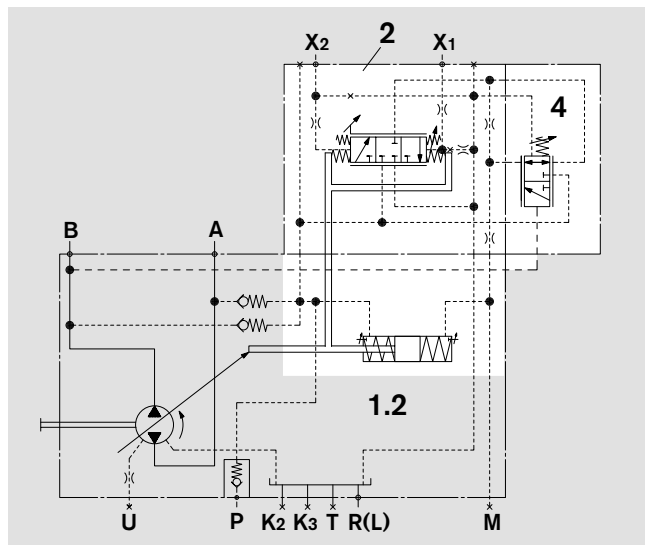


Size 125...355

Direction of rotation clockwise
(Example A4VSO)



Direction of rotation counter clockwise
(Example A4VSG)



Ports

- $X_1; X_2$ Pilot pressure ports
- P Control pressure port
- M Gauging port control chamber pressure (Size 125...355)

Sub-assemblies

- 1 Pump with hydraulic control device
- 1.1 A4VSO (see RE 92050)
- 1.2 A4VSG (see RE 92100)
- 2 Pilot control unit
- 4 Pressure control valve for port B

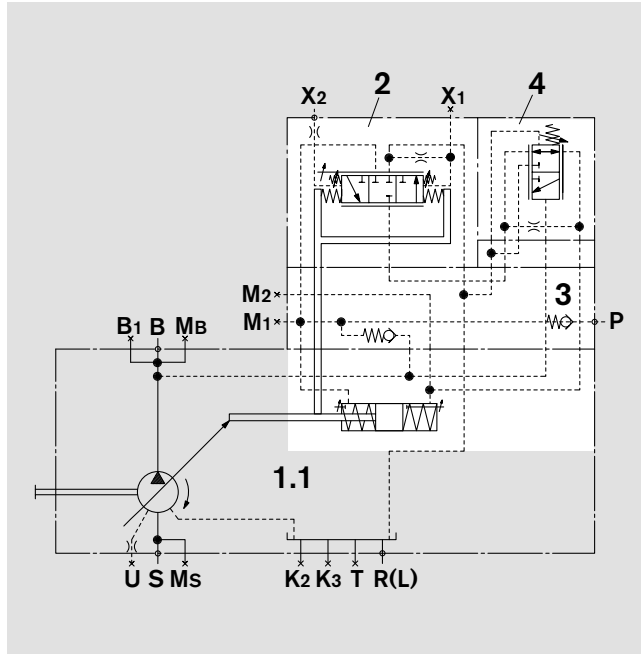
Size 500...1000 see page 21

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

Schematics example A4VSO

Size 500...1000

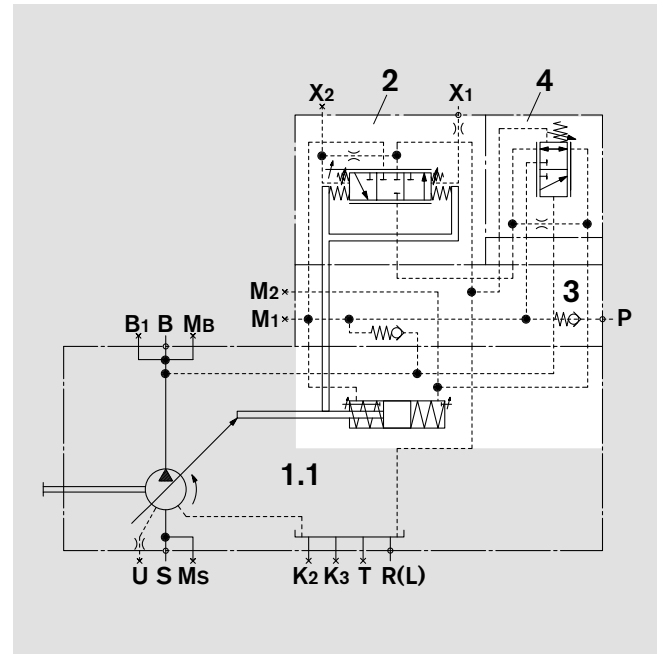
Direction of rotation clockwise



Ports

- | | |
|------------|------------------------------------|
| $X_1; X_2$ | Pilot pressure ports |
| P | Control pressure port |
| M_1 | Gauging port small control chamber |
| M_2 | Gauging port large control chamber |

Direction of rotation counter clockwise



Sub-assemblies

- 1** Pump with hydraulic control device
- 1.1** A4VSO (see RE 92050)
- 2** Pilot control unit
- 3** Sandwich plate
- 4** Pressure control valve for port B

HD.GB with remote pressure control for port B

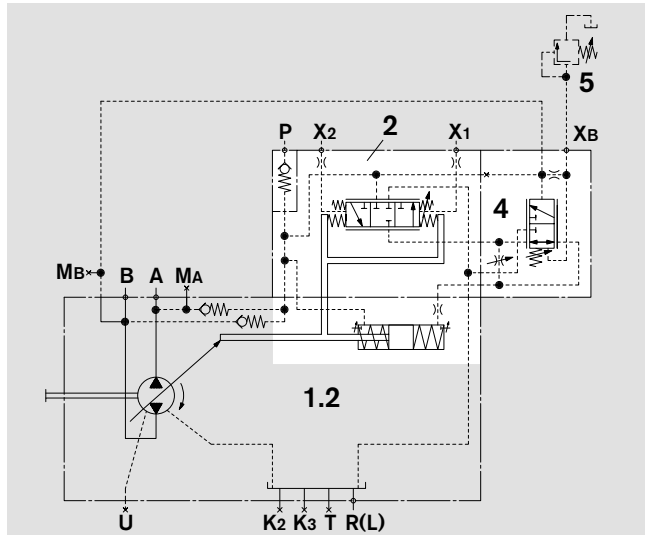
The remote pressure control is carried out via port X_B. The external pilot relief valve (item 5) is not included in the supply. Description see page 12.

Not possible on pumps for bi-directional rotation.

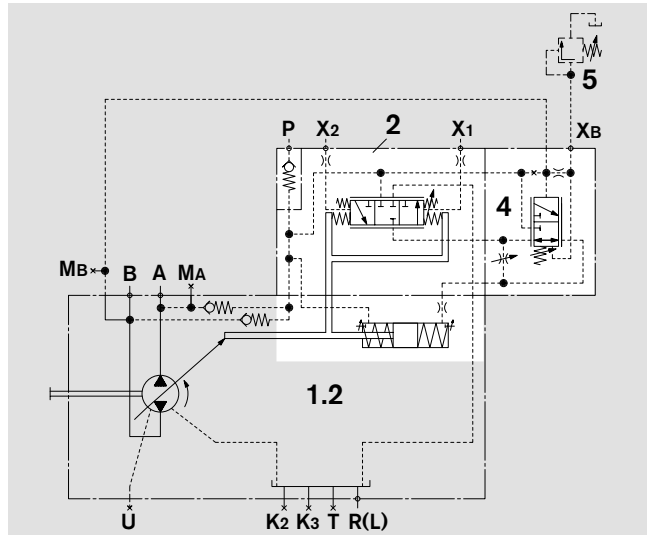
Schematics example A4VSG

Size 40 and 71

Direction of rotation clockwise

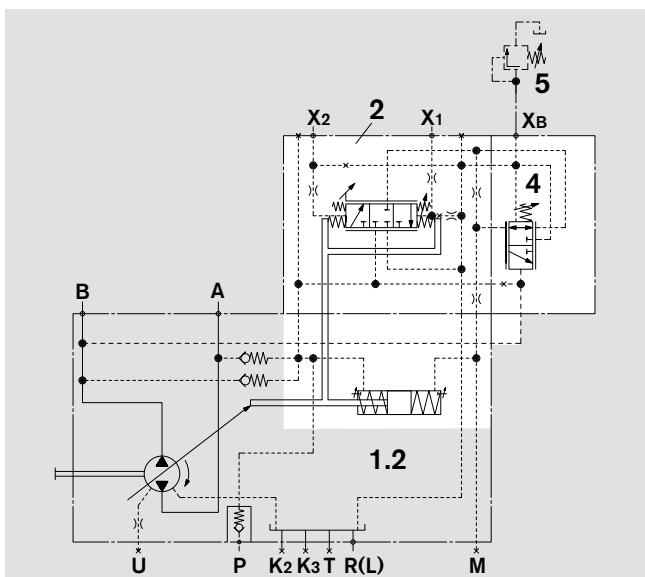


Direction of rotation counter clockwise

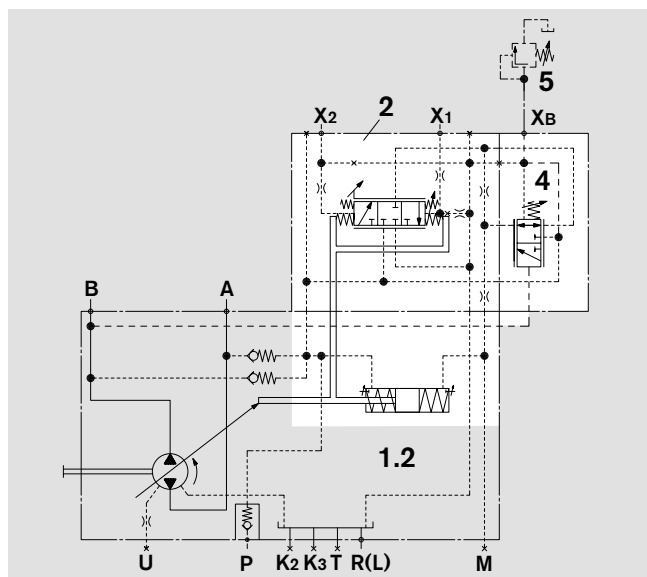


Size 125...355

Direction of rotation clockwise



Direction of rotation counter clockwise



Ports

- | | |
|---------------------------------|--|
| X _B | Pilot pressure port for remote pressure control in B |
| X ₁ ; X ₂ | Pilot pressure ports |
| P | Control pressure port |
| M | Gauging port control chamber pressure (Size 125...355) |

Sub-assemblies

- 1** Pump with hydraulic control device
- 1.1** A4VSO (see RE 92050)
- 1.2** A4VSG (see RE 92100)
- 2** Pilot control unit
- 4** Pressure control valve for port B
- 5** External pilot relief valve
(not included in supply)

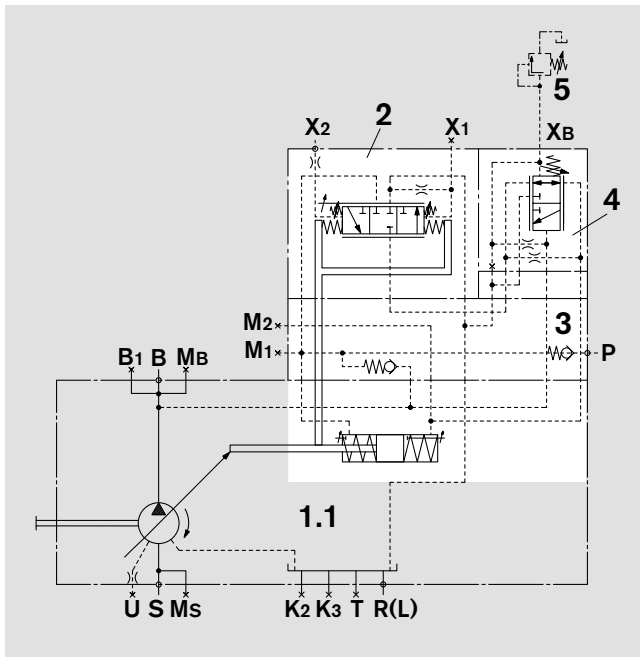
Size 500...1000 see page 23

HD.GB with remote pressure control for port B

Schematics example A4VSO

Size 500...1000

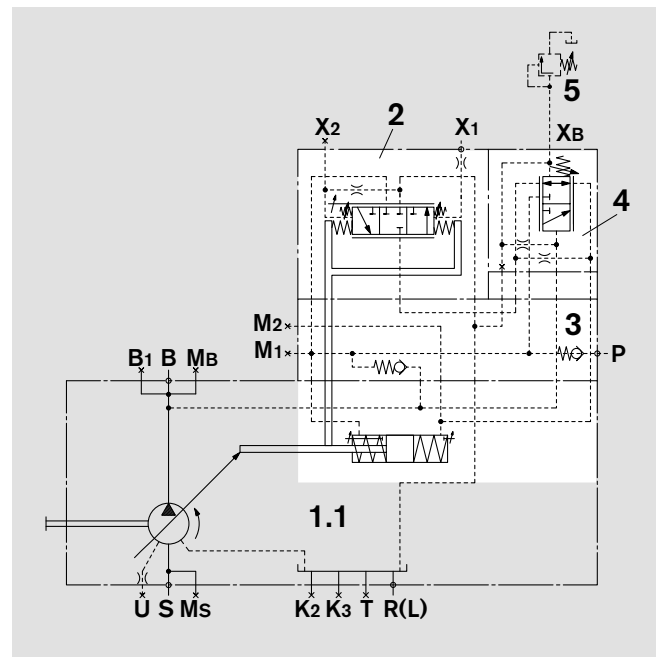
Direction of rotation clockwise



Ports

- | | |
|------------|--|
| X_B | Pilot pressure port for remote pressure control in B |
| $X_1; X_2$ | Pilot pressure ports |
| P | Control pressure port |
| M_1 | Gauging port small control chamber |
| M_2 | Gauging port large control chamber |

Direction of rotation counter clockwise



Sub-assemblies

- 1** Pump with hydraulic control device
- 1.1** A4VSO (see RE 92050)
- 2** Pilot control valve
- 3** Sandwich plate
- 4** Pressure control valve for port B
- 5** External pilot relief valve
(not included in supply)

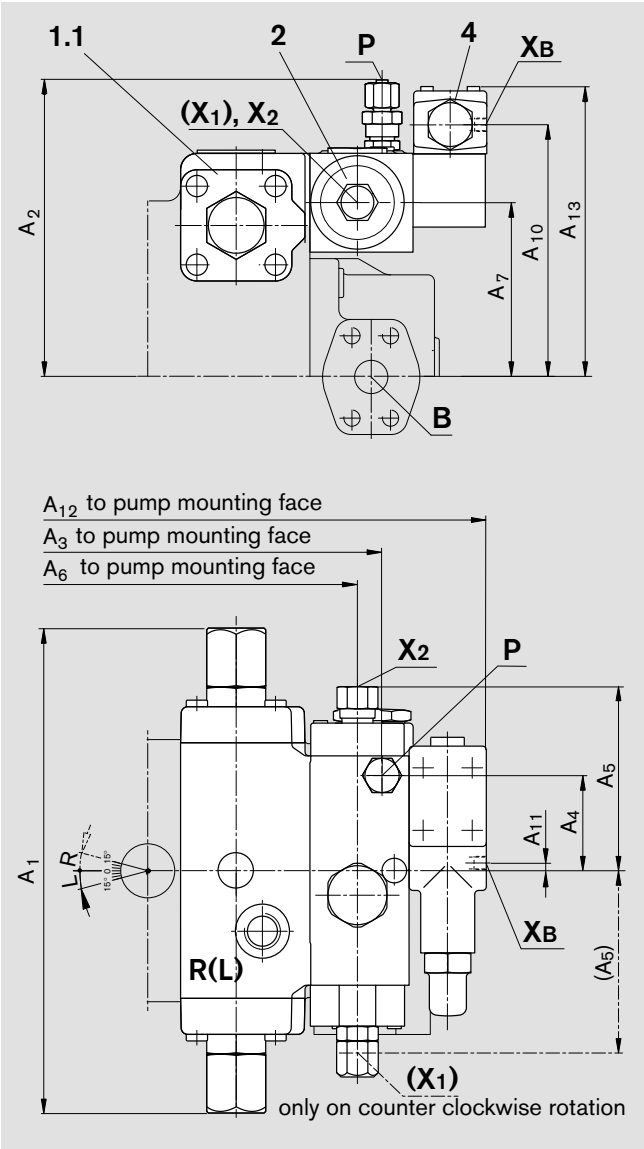
Size 40...355 see page 22

Unit dimensions HD.B / HD.GB

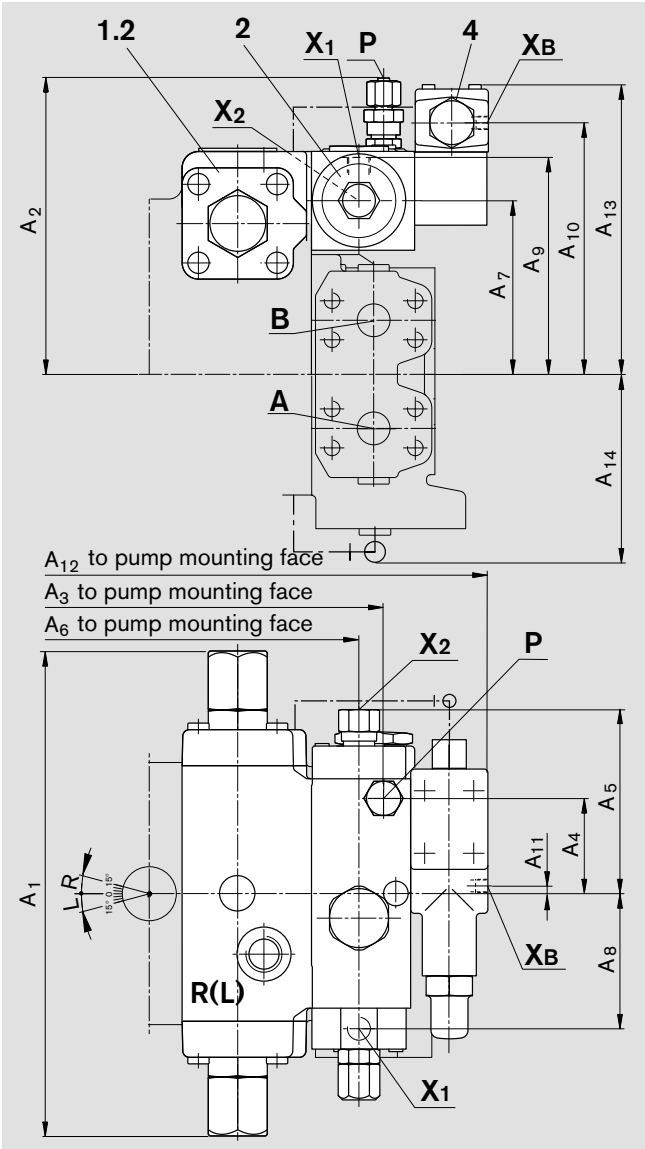
Before finalising your design please request a certified installation drawing.

Size 40 and 71

A4VSO



A4VSG



Sub-assemblies see page 25

Ports

X _B	Pilot pressure port for remote pressure control in B	DIN 3852	M14x1,5; 12 deep; plugged on HDB	80 Nm
X ₁ ; X ₂	Pilot pressure ports	DIN 3852	M14x1,5; 12 deep	80 Nm
on A4VSO clockwise rotation only X ₂ exists, on A4VSO counter clockwise rotation only X ₁ exists				
P	Control pressure port	DIN 3853	S8 Form W	50 Nm

max. tightening torques ¹⁾

Unit dimensions

Size	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈	A ₉	A ₁₀	A ₁₁	A ₁₂	A ₁₃	A ₁₄	
40	296	193	233	58	113	218	106	82,5	132,5	163	4	299	189	136	For detailed dimensions and technical data on the variable pumps see the technical data sheets A4VSO RE 92050 or A4VSG RE 92100
71	332	209	260	58	113	245	122	82,5	148,5	179	4	326	205	139	

¹⁾ see general notes

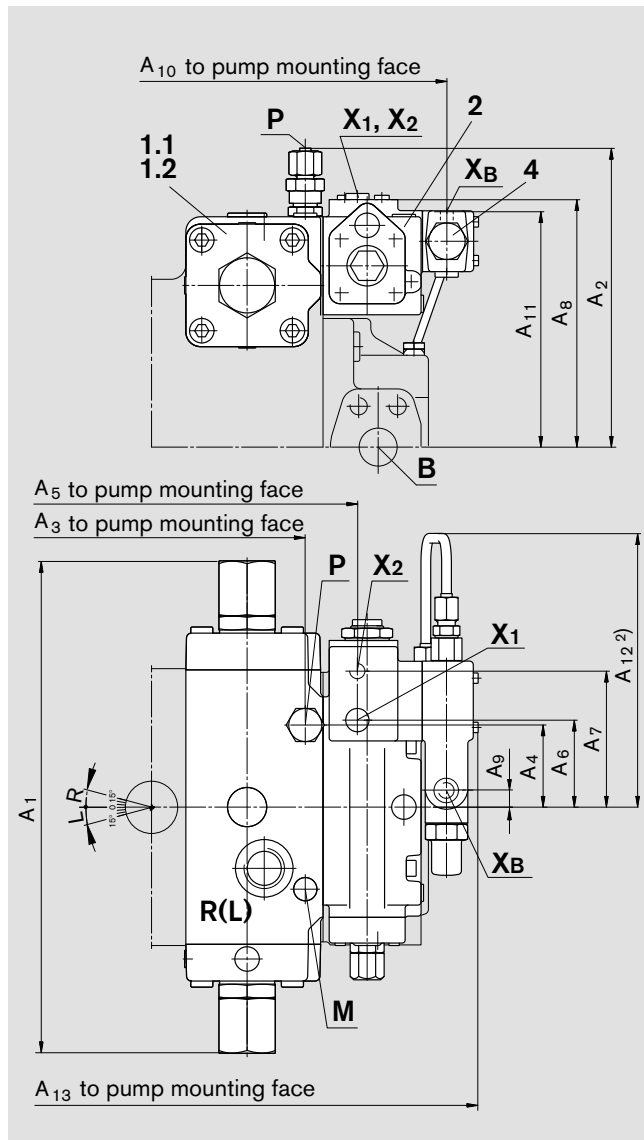
Unit dimensions HD.B / HD.GB

Before finalising your design please
request a certified installation drawing.

Size 125...355

A4VSO and A4VSG

A4CSG in preparation, dimensions on request



Sub-assemblies

- 1 Pump with hydraulic control device
- 1.1 A4VSO (see RE 92050)
- 1.2 A4VSG (see RE 92100)
- 1.3 A4CSG (see RE 92105)
- 2 Pilot control unit
- 3 Sandwich plate (Size 500...1000)
- 4 Pressure control valve for port B

Ports

max. tightening torques ¹⁾

X _B	Pilot pressure port for remote pressure control in B	DIN 3852 M14x1,5; 12 deep; plugged on HDB	80 Nm
X ₁ ; X ₂	Pilot pressure ports on A4VSO in clockwise rotation X ₁ is plugged, on A4VSG in counter clockwise rotation X ₂ is plugged	DIN 3852 M14x1,5; 12 deep	80 Nm
P	Control pressure port	DIN 3853 S8 Form W (Size 125 and 180) S12 Form W (Size 250 and 355)	50 Nm 90 Nm
M	Gauging port control chamber pressure	DIN 3852 M14x1,5; 12 deep; plugged (Size 125 a. 180) M18x1,5; 12 deep; plugged (Size 250a. 355)	80 Nm 140 Nm

Unit dimensions

Size	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈	A ₉	A ₁₀	A ₁₁	A ₁₂ ²⁾	A ₁₃	For detailed dimensions and technical data on the variable pumps see the technical data sheets A4VSO RE 92050, A4VSG RE 92100 or A4CSG RE 92105
125	402	245	251	67	293	71	111	202	13	366	192	224	392	
180	402	245	251	67	293	71	111	202	13	366	192	224	392	
250	485	297,5	311	71	355	71	111	238	13	428	228	224	454	
355	485	297,5	311	71	355	71	111	238	13	428	228	224	454	

¹⁾ see general notes

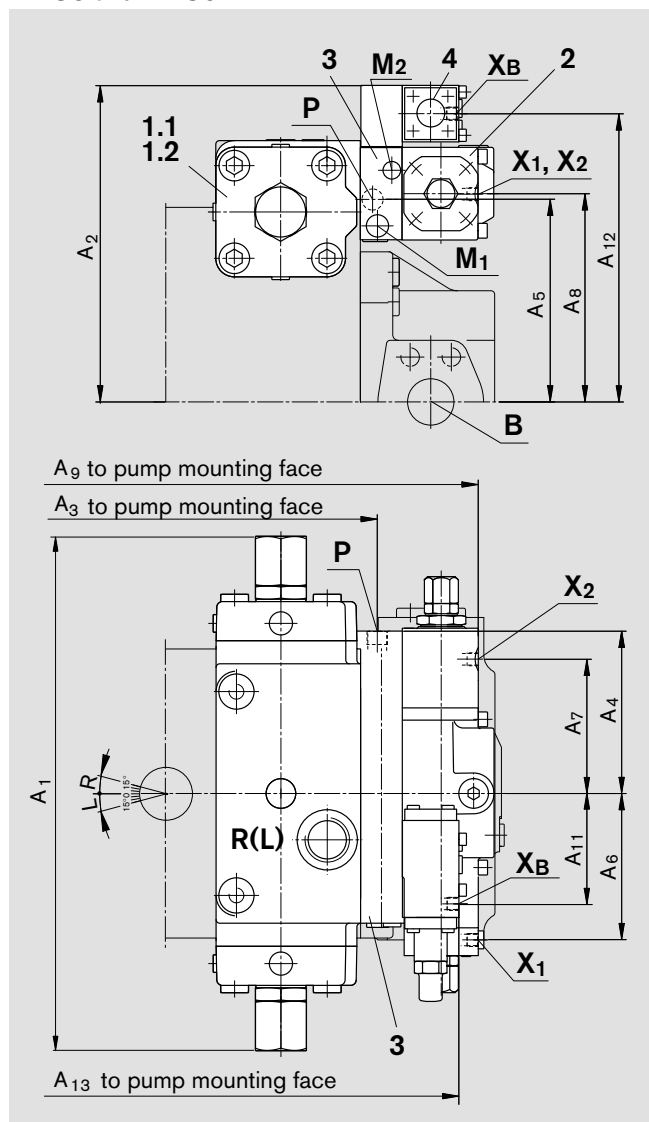
²⁾ Piping exists only on A4VSO

Unit dimensions HD.B / HD.GB

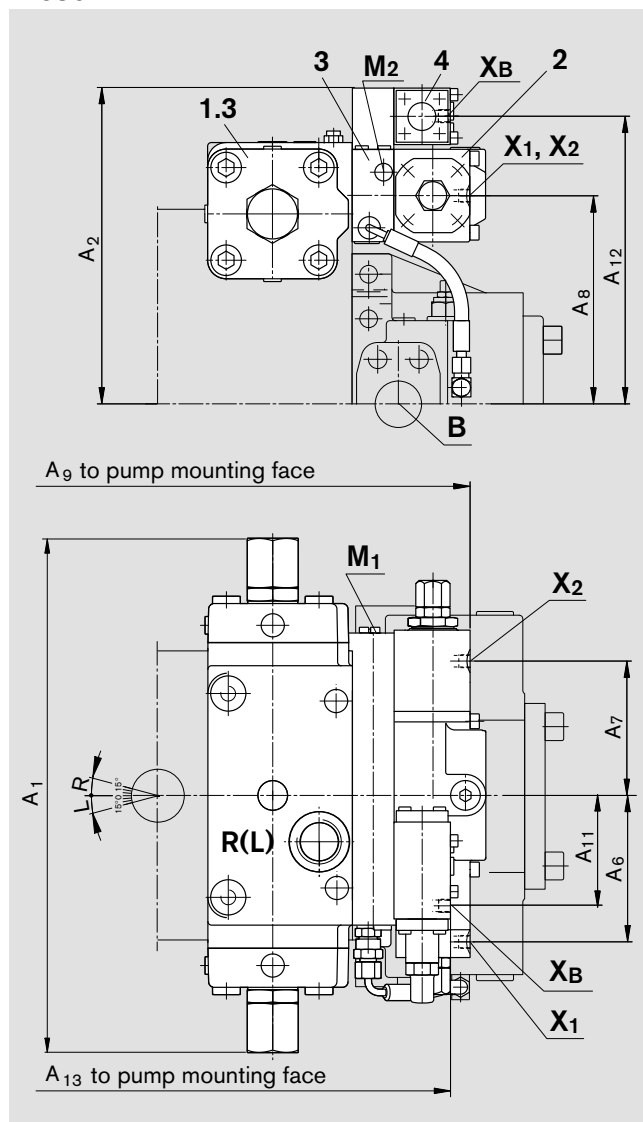
Before finalising your design please request a certified installation drawing.

Size 500...1000

A4VSO and A4VSG



A4CSG



Sub-assemblies see page 25.

Ports

max. tightening torques ¹⁾

X_B	Pilot pressure port for remote pressure control in B	DIN 3852	M14x1,5; 12 deep; plugged on HDB	80 Nm
$X_1; X_2$	Pilot pressure ports on A4VSO in clockwise rotation X_1 is plugged, on A4VSO in counter clockwise rotation X_2 is plugged	DIN 3852	M14x1,5; 12 deep	80 Nm
P	Control pressure port	DIN 3852	M22x1,5; 14 deep (only on A4VSG)	210 Nm
M_1	Gauging port small control chamber	DIN 3852	M18x1,5; 12 deep; plugged (A4VSG) M22x1,5; 14 deep; plugged (A4CSG)	140 Nm 210 Nm
M_2	Gauging port large control chamber	DIN 3852	M14x1,5; 12 deep; plugged	80 Nm

Unit dimensions

Size	A_1	A_2	A_3	A_4	A_5	A_6	A_7	A_8	A_9	A_{11}	A_{12}	A_{13}	
500	555	342	383	175	200	158	145	225	492	136	304	469	For detailed dimensions and technical data on the variable pumps see the technical data sheets A4VSO RE 92050, A4VSG RE 92100 or A4CSG RE 92105
750	630	371	415	175	230	158	145	280	524	136	334	501	
1000	670	394	481	175	253	158	145	278	590	136	357	567	

¹⁾ see general notes

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

Two pressure control valves enable a control of max. pressure in ports A or B independent of each other. Description see page 12.

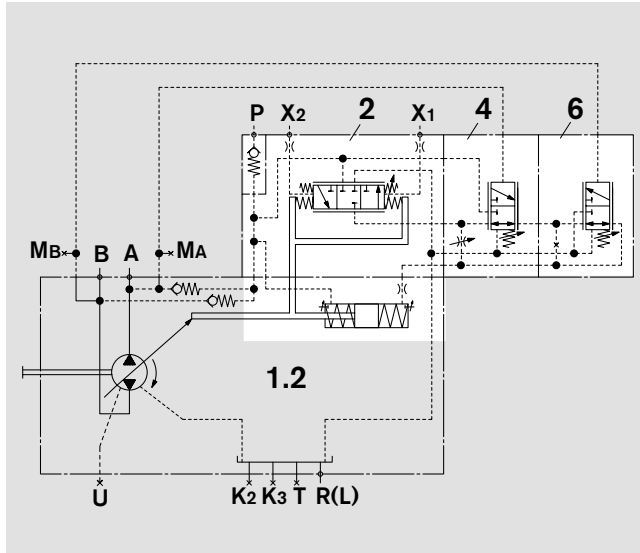
Not available on A4VSO.

Not possible on pumps for bi-directional rotation.

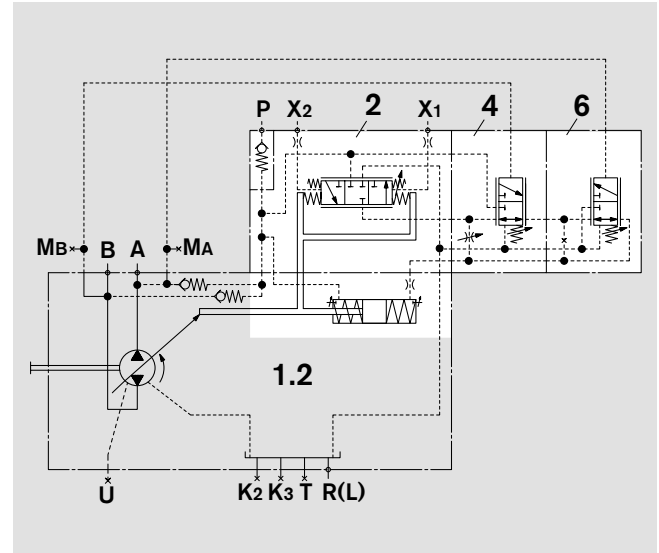
Schematics example A4VSG

Size 40 and 71

Direction of rotation clockwise

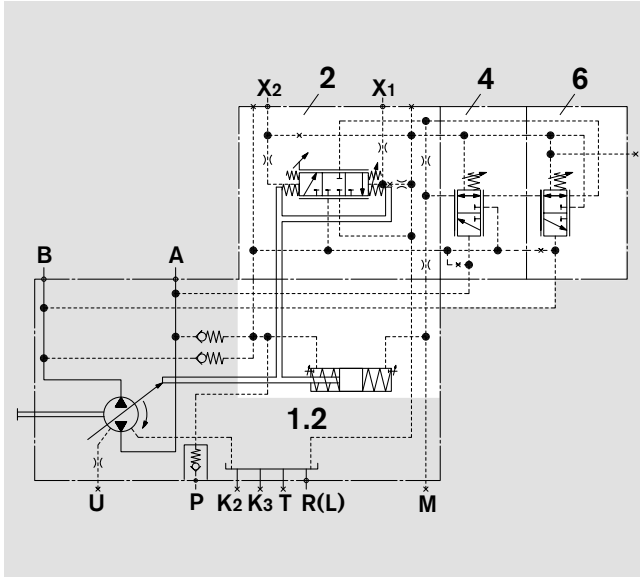


Direction of rotation counter clockwise

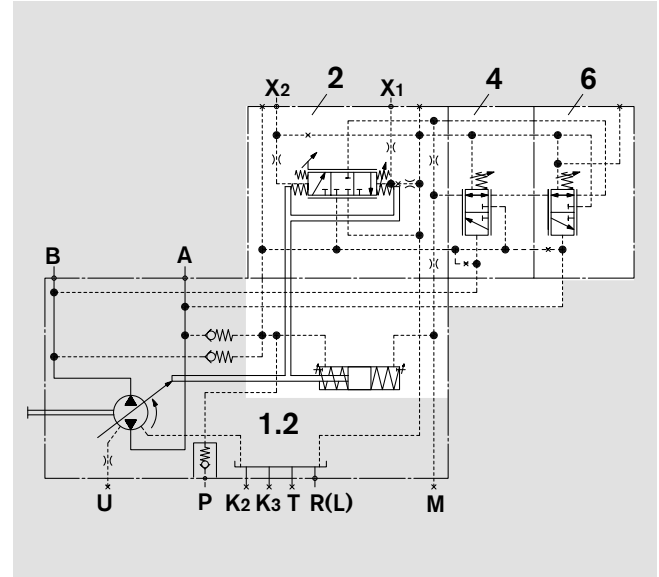


Size 125...355

Direction of rotation clockwise



Direction of rotation counter clockwise



Ports

- X₁; X₂ Pilot pressure ports
- P Control pressure port
- M Gauging port control chamber pressure (Size 125...355)

Size 500...1000 see page 28

Sub-assemblies

- 1 Pump with hydraulic control device
- 1.2 A4VSG (see RE 92100)
- 2 Pilot control unit
- 4 Pressure control valve for port A
(for port B on counter clockwise rotation)
- 6 Pressure control valve for port B
(for port A on counter clockwise rotation)

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

Two pressure control valves enable a control of max. pressure in ports A or B independent of each other. Description see page 12.

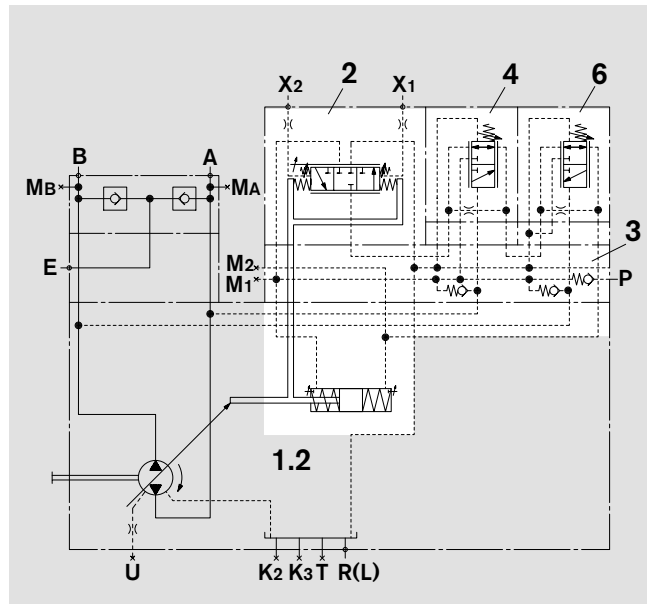
Not available on A4VSO.

Not possible on pumps for bi-directional rotation.

Schematics example A4VSG

Size 500...1000

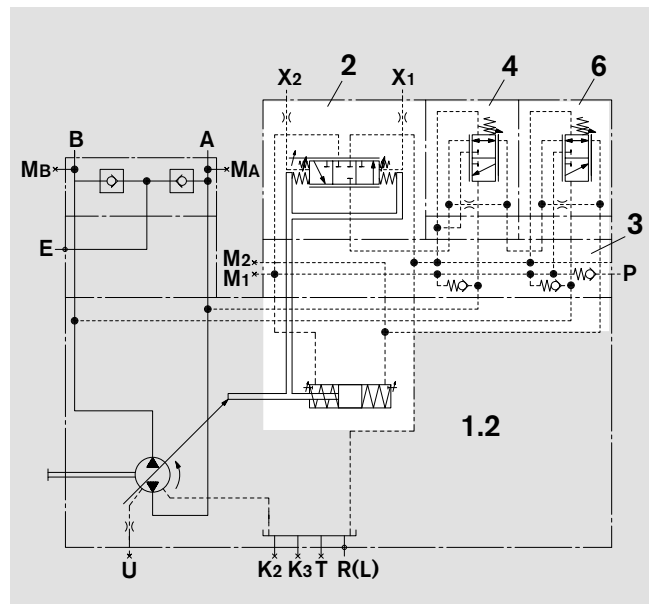
Direction of rotation clockwise



Ports

- $X_1; X_2$ Pilot pressure ports
- P Control pressure port
- M_1 Gauging port small control chamber
- M_2 Gauging port large control chamber

Direction of rotation counter clockwise



Sub-assemblies

- 1 Pump with hydraulic control device
- 1.2 A4VSG (see RE 92100)
- 2 Pilot control valve
- 4 Pressure control valve for port A
- 6 Pressure control valve for port B

Size 40...355 see page 27

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

The remote pressure control is carried out via the ports X_A and X_B . The external pilot relief valves (item 5 and item 7) are not included in the supply. Description see page 12.

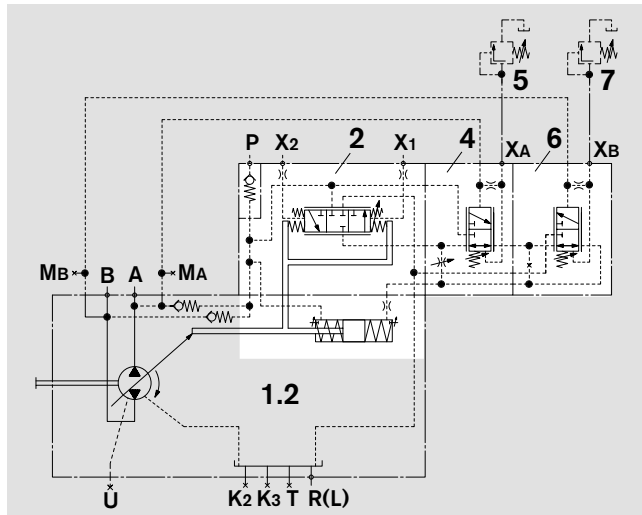
Not available on A4VSO.

Not possible on pumps for bi-directional rotation.

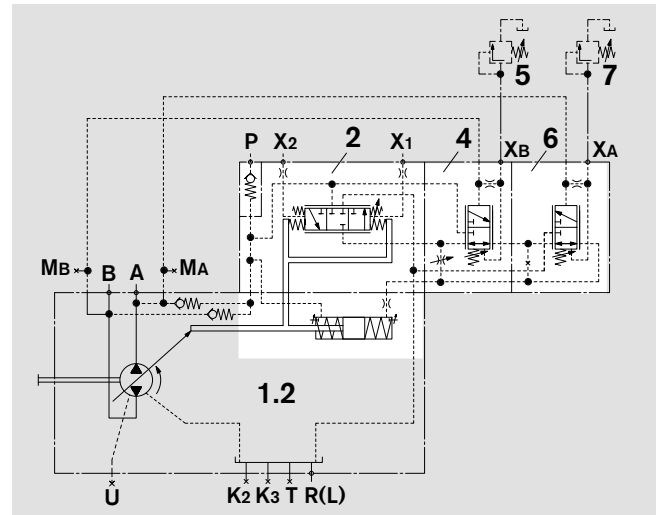
Schematics example A4VSG

Size 40 and 71

Direction of rotation clockwise

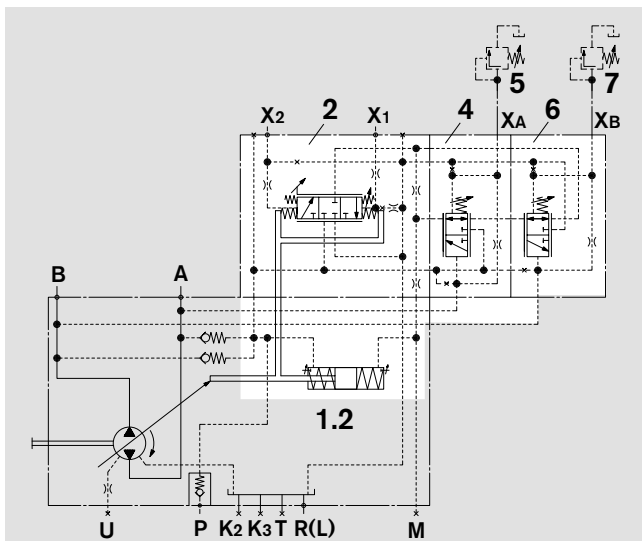


Direction of rotation counter clockwise

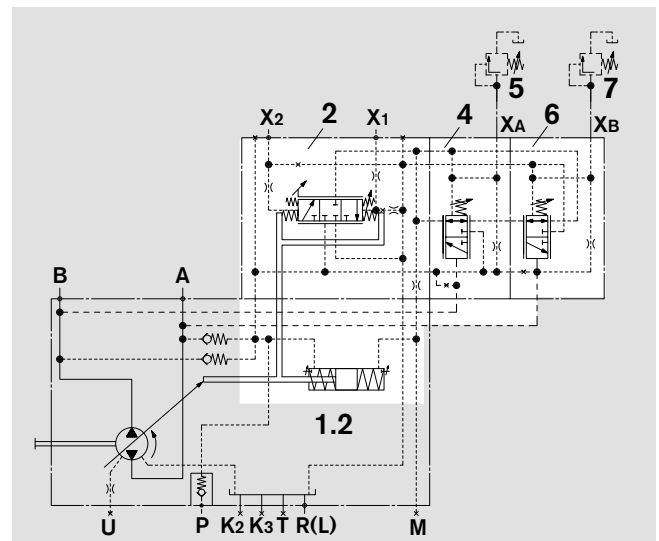


Size 125...355

Direction of rotation clockwise



Direction of rotation counter clockwise



Ports

- X_A ; X_B Pilot pressure ports for remote pressure control
- X_1 ; X_2 Pilot pressure ports
- P Control pressure port
- M Gauging port control chamber pressure (size 125...355)

Size 500...1000 see page 30

Sub-assemblies

- 1 Pump with hydraulic control device
- 1.2 A4VSG (see RE 92100)
- 2 Pilot control unit
- 4 Pressure control valve for port A (for port B on counter clockwise rotation)
- 5; 7 External pilot relief valves (not included in supply)
- 6 Pressure control valve for port B (for port A on counter clockwise rotation)

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

The remote pressure control is carried out via the ports X_A and X_B . The external pilot relief valves (item 5 and 7) are not included in the supply. Description see page 12.

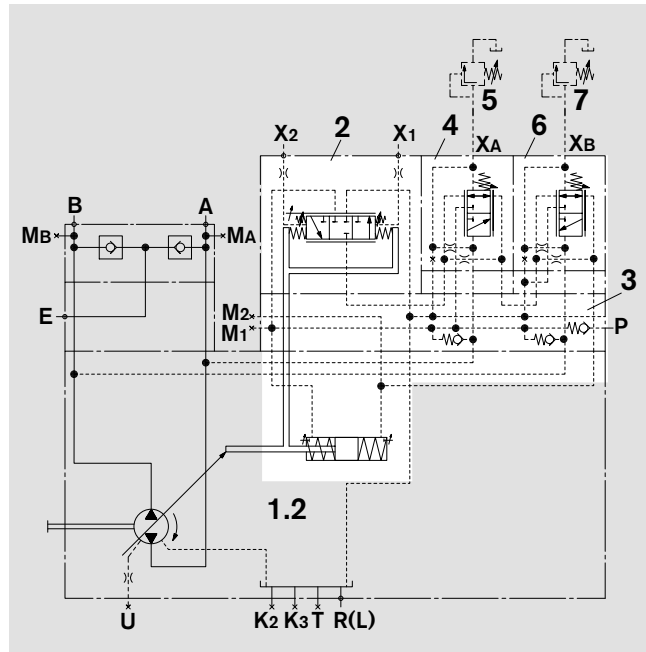
Not available on A4VSO.

Not possible on pumps for bi-directional rotation.

Schematics example A4VSG

Size 500...1000

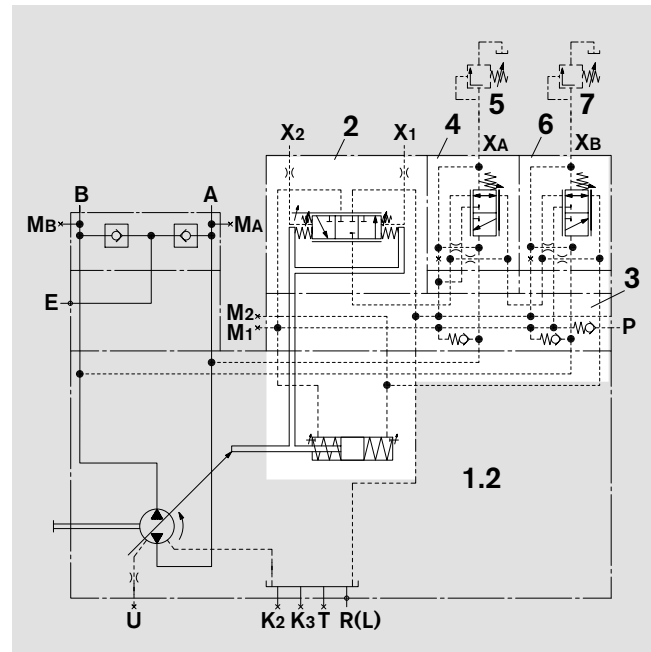
Direction of rotation clockwise



Ports

- X_A Pilot pressure port for remote pressure control in A
- X_B Pilot pressure port for remote pressure control in B
- $X_1; X_2$ Pilot pressure ports
- P Control pressure port
- M_1 Gauging port small control chamber
- M_2 Gauging port large control chamber

Direction of rotation counter clockwise



Sub-assemblies

- 1 Pump with hydraulic control device
- 1.2 A4VSG (see RE 92100)
- 2 Pilot control unit
- 3 Sandwich plate
- 4 Pressure control valve for port A
- 5; 7 External pilot relief valves (not included in supply)
- 6 Pressure control valve for port B

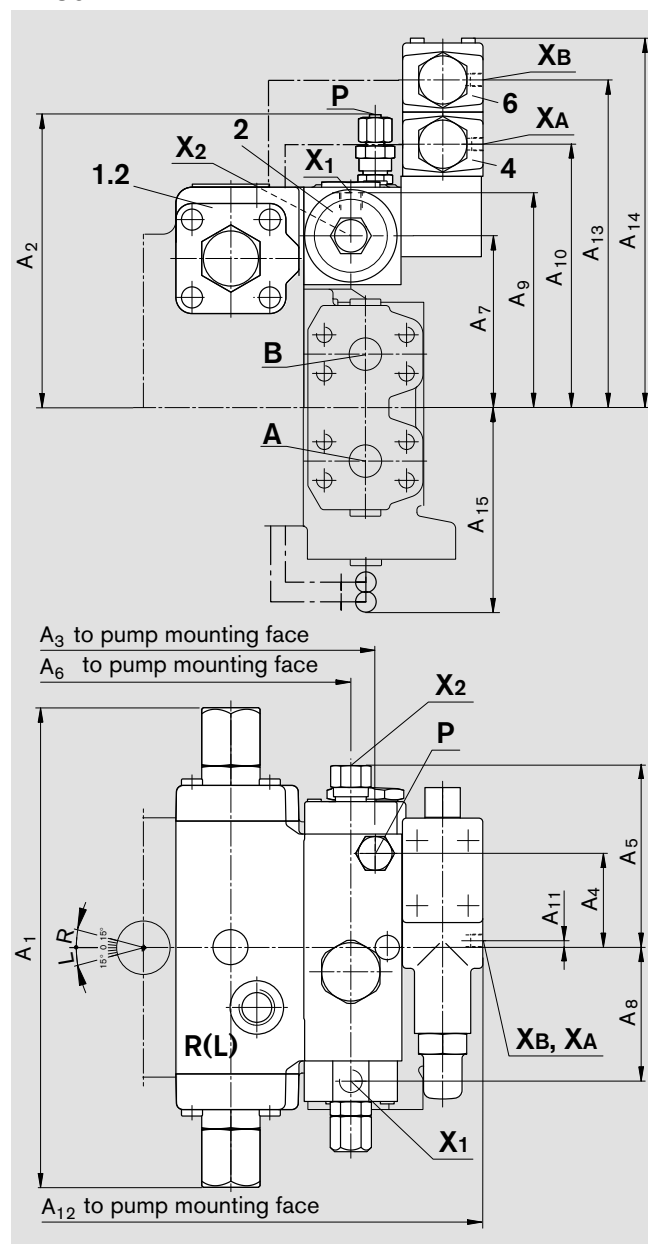
Size 40...355 see page 29

Unit dimensions HD.D / HD.G

Before finalising your design please request a certified installation drawing.

Size 40 and 71

A4VSG



Sub-assemblies

- 1 Pump with hydraulic control device
- 1.2 A4VSG (see RE 92100)
- 1.3 A4CSG (see RE 92105)
- 2 Pilot control unit
- 3 Sandwich plate (Size 500...1000)
- 4 Pressure control valve for port A
(for port B on counter clockwise rotation size 40...355)
- 6 Pressure control valve for port B
(for port A on counter clockwise rotation size 40...355)

Ports

max. tightening torques ¹⁾

X_A, X_B	Pilot pressure ports for remote pressure control	DIN 3852	M14x1,5; 12 deep; plugged on HDD	80 Nm
X_1, X_2	Pilot pressure ports	DIN 3852	M14x1,5; 12 deep	80 Nm
P	Control pressure port	DIN 3853	S8 Form W	50 Nm

Unit dimensions

Size	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈	A ₉	A ₁₀	A ₁₁	A ₁₂	A ₁₃	A ₁₄	A ₁₅	
40	296	193	233	58	113	218	106	82,5	132,5	163	4	299	203	229	165	For detailed dimensions and technical data on the variable pump see the technical data sheet A4VSG RE 92100
71	332	209	260	58	113	246	122	82,5	148,5	179	4	326	219	245	168	

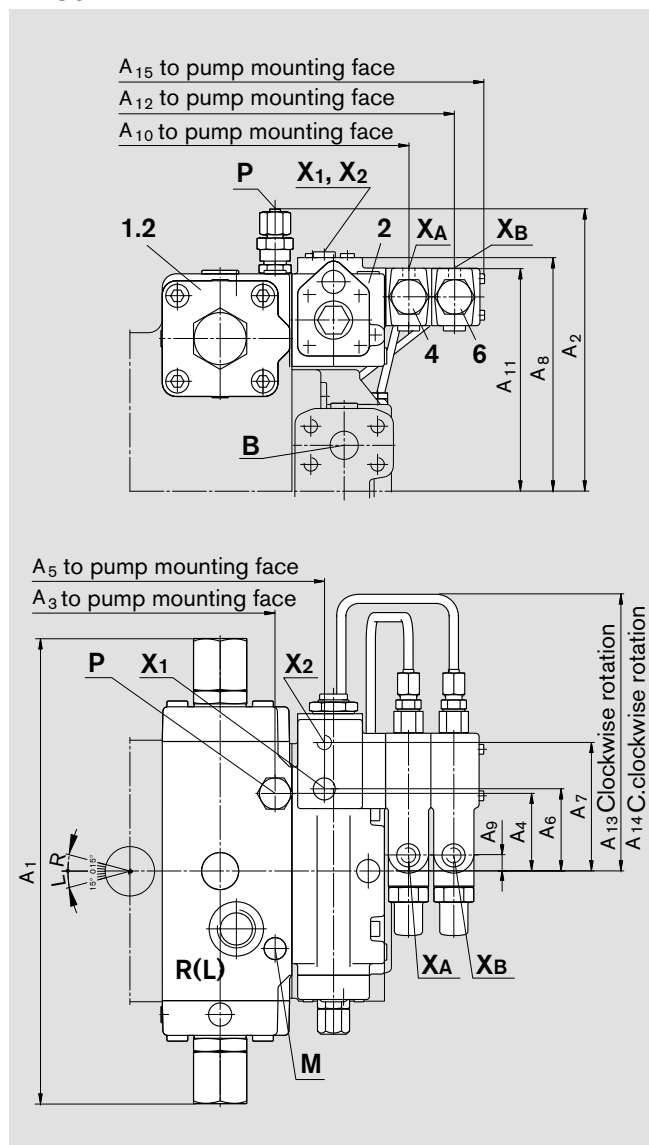
¹⁾ see general notes

Unit dimensions HD.D / HD.G

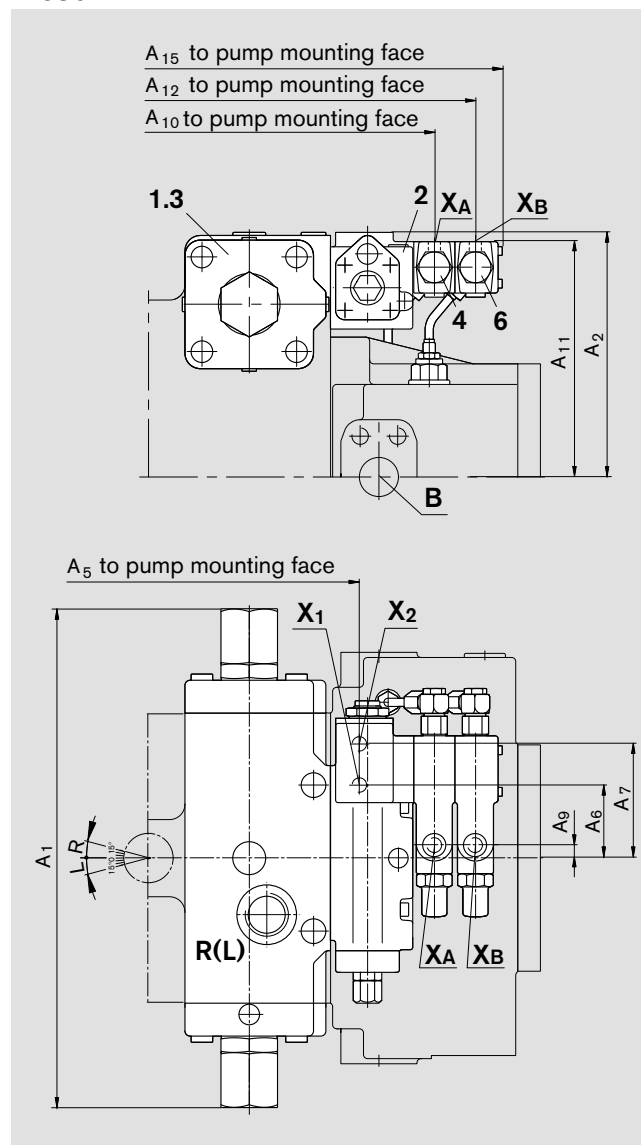
Before finalising your design please request a certified installation drawing.

Size 125...355

A4VSG



A4CSG



Sub-assemblies see page 31

Ports

max. tightening torques ¹⁾

X _A ; X _B	Pilot pressure ports for remote pressure control	DIN 3852	M14x1,5; 12 deep; plugged on HDD	80 Nm
X ₁ ; X ₂	Pilot pressure ports	DIN 3852	M14x1,5; 12 deep	80 Nm
P	Control pressure port only on A4VSG	DIN 3853	S8 Form W (Size 125 and 180) S12 Form W (Size 250 and 355)	50 Nm 90 Nm
M	Gauging port control chamber pressure	DIN 3852	M14x1,5; 12 deep; plugged (Size 125 a. 180) M18x1,5; 12 deep; plugged (Size 250 a. 355)	80 Nm 140 Nm

Unit dimensions

Size	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈	A ₉	A ₁₀	A ₁₁	A ₁₂	A ₁₃	A ₁₄	A ₁₅	
125	402	245	251	67	293	71	111	202	13	366	192	406	239	224	432	For detailed dimensions and technical data on the variable pumps see the technical data sheets A4VSG RE 92100 or A4CSG RE 92105
180	402	245	251	67	293	71	111	202	13	366	192	406	239	224	432	
250	485	297,5	311	71	355	71	111	238	13	428	228	468	239	224	494	
355	485	297,5	311	71	355	71	111	238	13	428	228	468	239	224	494	

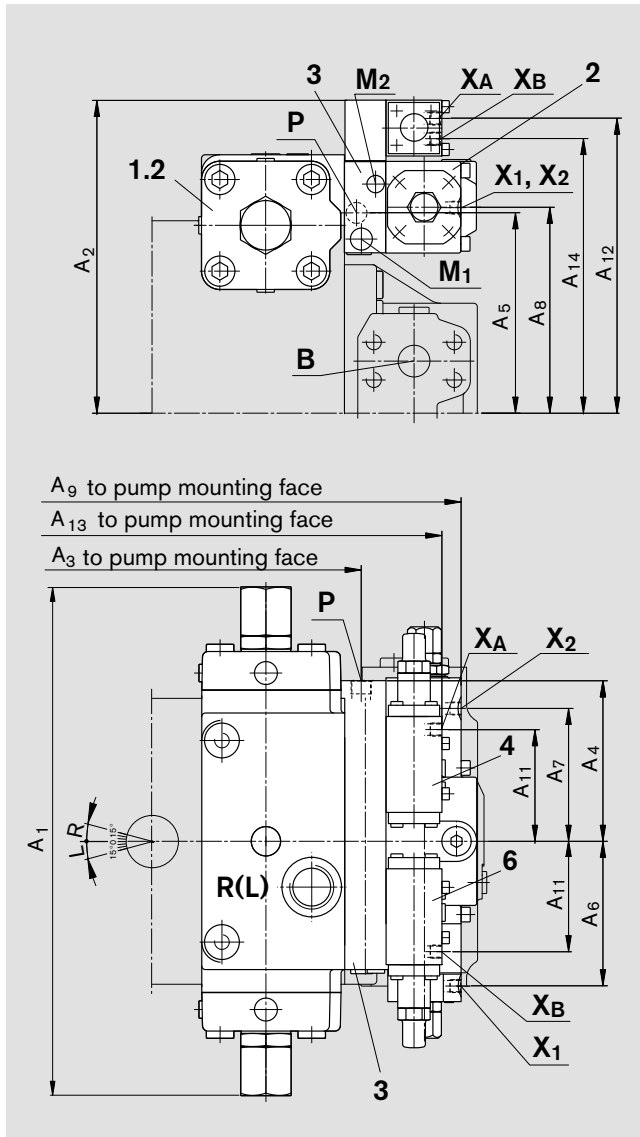
¹⁾ see general notes

Unit dimensions HD.D / HD.G

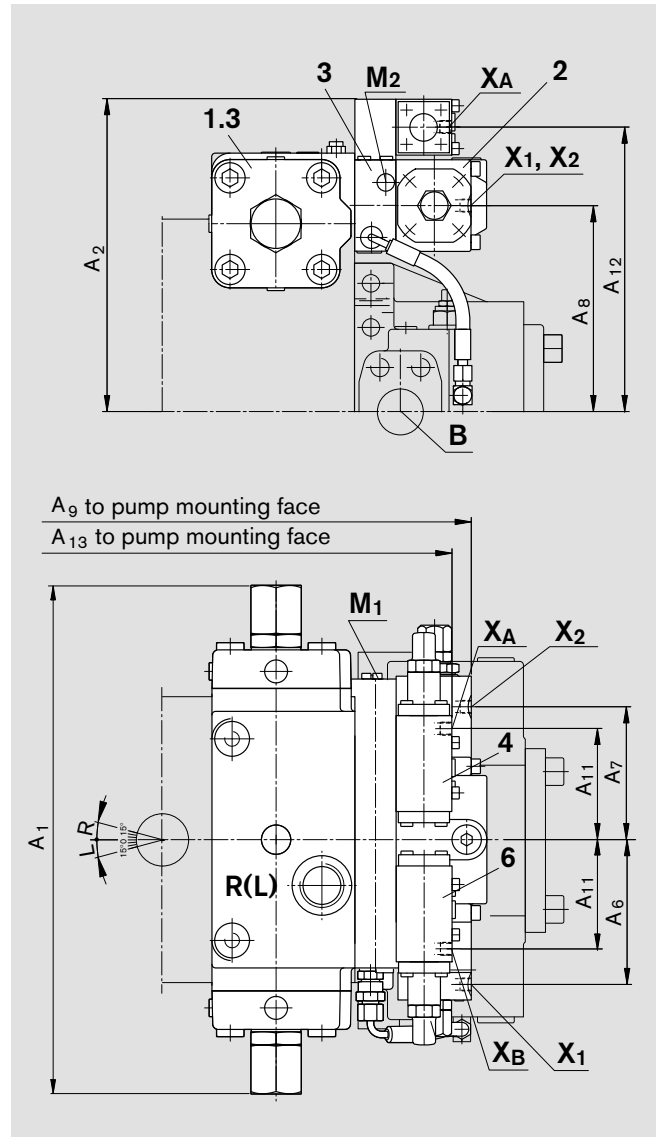
Before finaliaing your design please
request a certified installation drawing.

Size 500...1000

A4VSG



A4CSG



Sub-assemblies see page 31.

Ports

max. tightening torques ¹⁾

X _A ; X _B	Pilot pressure ports for remote pressure control	DIN 3852 M14x1,5; 12 deep plugged on HDD	80 Nm
X ₁ ; X ₂	Pilot pressure ports	DIN 3852 M14x1,5; 12 deep	80 Nm
P	Control pressure port	DIN 3852 M22x1,5; 14deep (only on A4VSG)	210 Nm
M ₁	Gauging port small control chamber	DIN 3852 M18x1,5; 12 deep; plugged (A4VSG) M22x1,5; 14 deep; plugged (A4CSG)	140 Nm 210 Nm
M ₂	Gauging port large control chamber	DIN 3852 M14x1,5; 12 deep; plugged	80 Nm

Unit dimensions

Size	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈	A ₉	A ₁₁	A ₁₂	A ₁₃	A ₁₄	
500	555	342	383	175	200	158	145	225	492	136	315	469	304	For detailed dimensions and technical data on the variable pumps see the technical data sheets A4VSG RE 92100 or A4CSG RE 92105
750	630	371	415	175	230	158	145	280	524	136	345	501	334	
1000	670	394	481	175	253	158	145	278	590	136	368	567	357	

¹⁾ see general notes

HD1P with power control

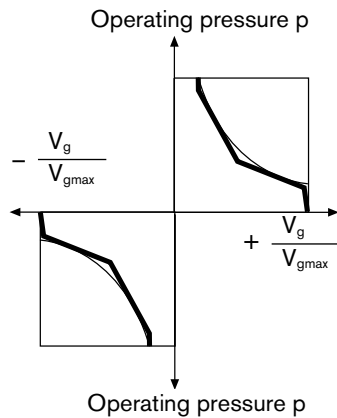
As the operating pressure rises, the pilot pressure (i.e. the command value for HD) is reduced by the power limiting valve LV 06, thereby reducing the pump displacement in such a manner, that a certain preset drive torque cannot be exceeded.

On some pump combinations **A4 + A4 dimensional restrictions** can limit the mounting of the power limiting valve.

In the following cases we recommend the mounting of the power valve on the rear pump, or consult us for more information:

Size 40 + Size 40
Size 71 with pressure control + Size 71

Characteristic



Technical data

Min. beginning of control for pump operating pressure must be higher than the set control pressure at P or at the control pressure relief valve on the A4CSG.

The power control curve is factory set

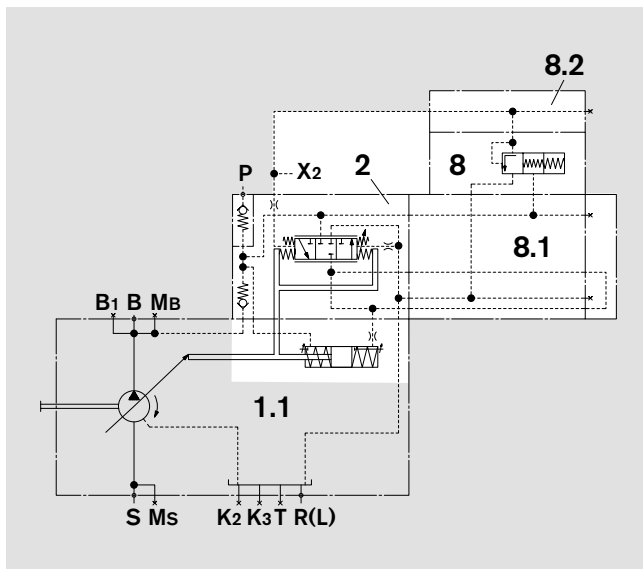
Please state in clear text when ordering
e.g. 55 kW at 1500 rpm.

Examples of power control curves see RE 95546

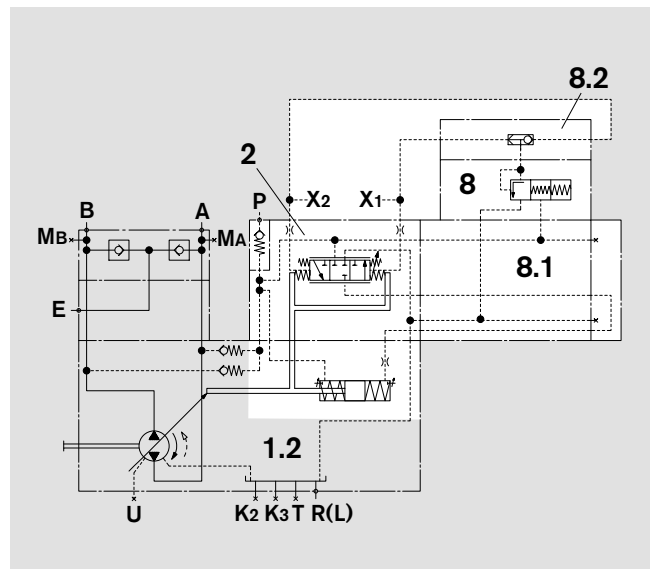
Schematics

Size 40 and 71

(Example A4VSO in clockwise rotation; in counter clockwise rotation only X_1 exists and is connected to the power valve)



(Example A4VSG)



Ports

X_1 ; X_2 Pilot pressure ports
P Control pressure port

Sub-assemblies

- 1.1 A4VSO (see RE 92050)
- 1.2 A4VSG (see RE 92100)
- 2 Pilot control unit
- 8 Power limiting valve (see RE 95546)
LV 06 405 (on size 40 and 71)
- 8.1 Sandwich plate for mounting of power valve (size 40 and 71)
- 8.2 Shuttle valve (on A4VSG)

Schematics size 125...1000 see page 35

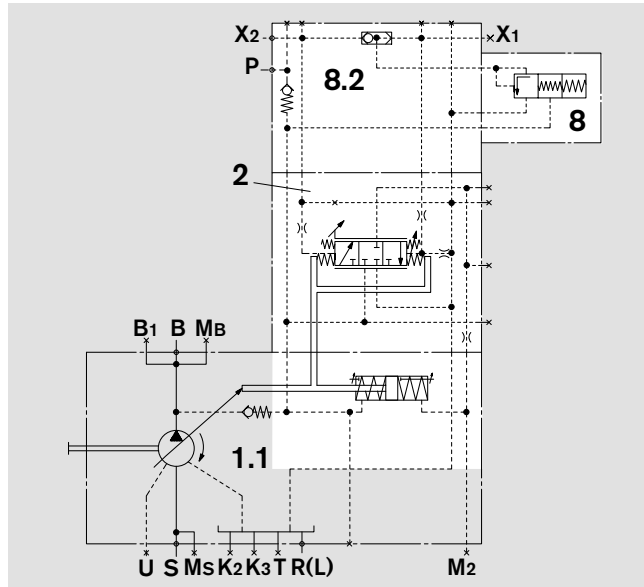
HD1P with power control

Schematics

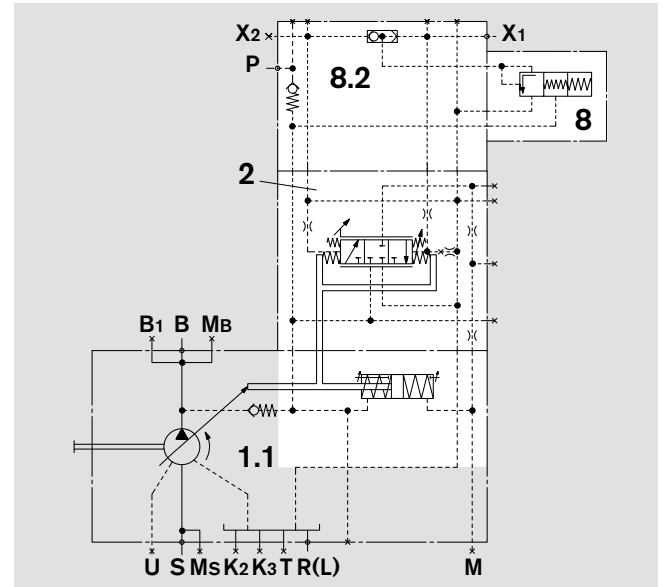
On the **A4VSG** and **A4CSG** both ports X_1 and X_2 are connected to the shuttle valve (either internally or via a T-joint) and **open**. On the **A4VSO** in clockwise rotation only port X_2 , and in counter clockwise rotation only port X_1 , is connected to the power valve and **open**.

Size 125...355

Example A4VSO clockwise rotation

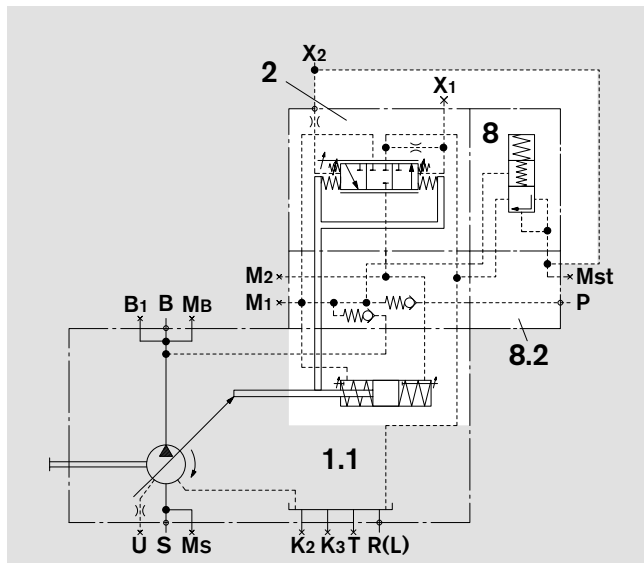


Example A4VSO counter clockwise rotation

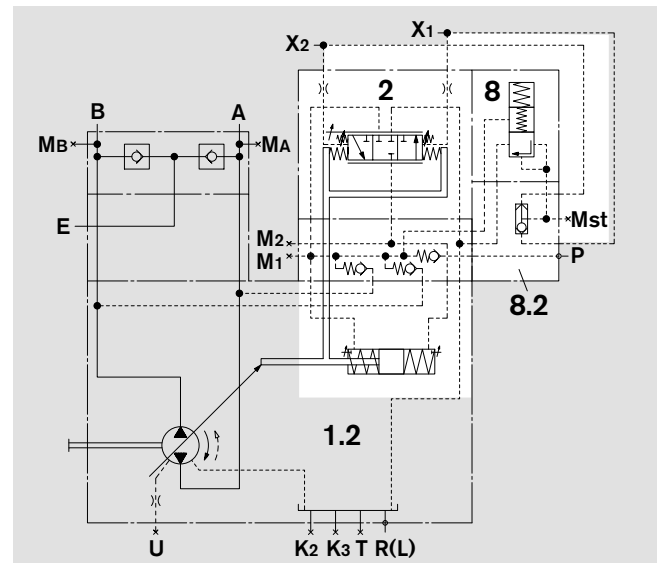


Size 500...1000

Example A4VSO clockwise rotation



Example A4VSG



Ports

- X_1 ; X_2 Pilot pressure ports
- P Control pressure port
- M_{st} Gauging port pilot pressure (Size 500...1000)
- M Gauging port control chamber pressure (Size 125...355)
- M_1 Gauging port small control chamber (Size 500...1000)
- M_2 Gauging port large control chamber (Size 500...1000)

Size 40 and 71 see page 34

Sub-assemblies

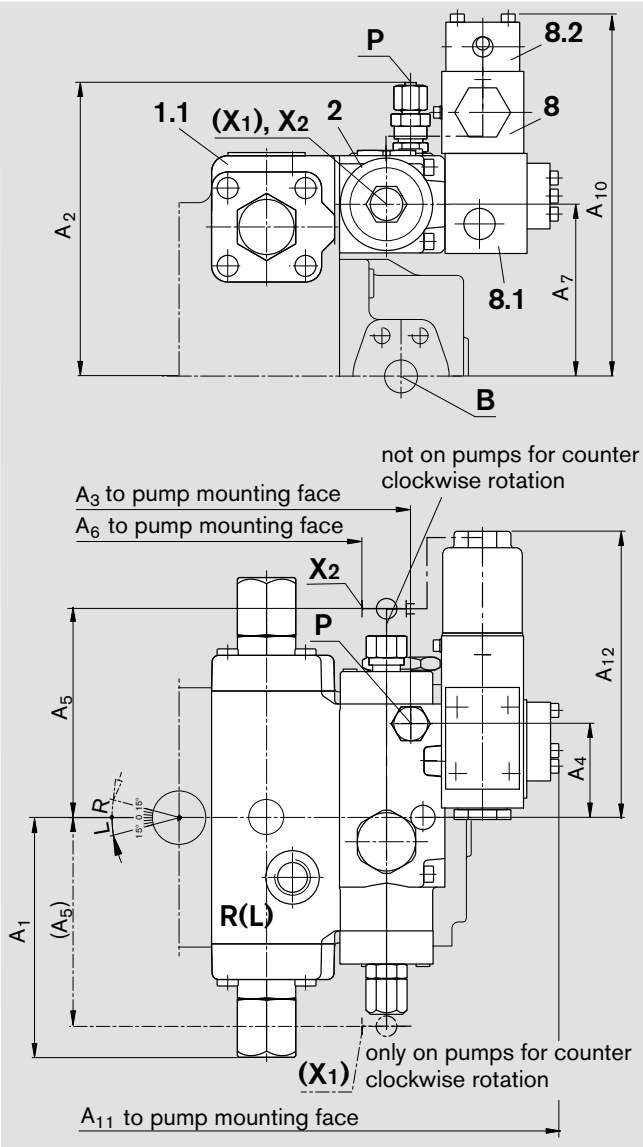
- 1.1 A4VSO (see RE 92050)
- 1.2 A4VSG (see RE 92100)
- 2 Pilot control unit
- 8 Power valve (see RE 95546)
LV 06 205 (on size 125...1000)
- 8.2 Shuttle valve assembly (on A4VSG and A4CSG)

Unit dimensions HD1P

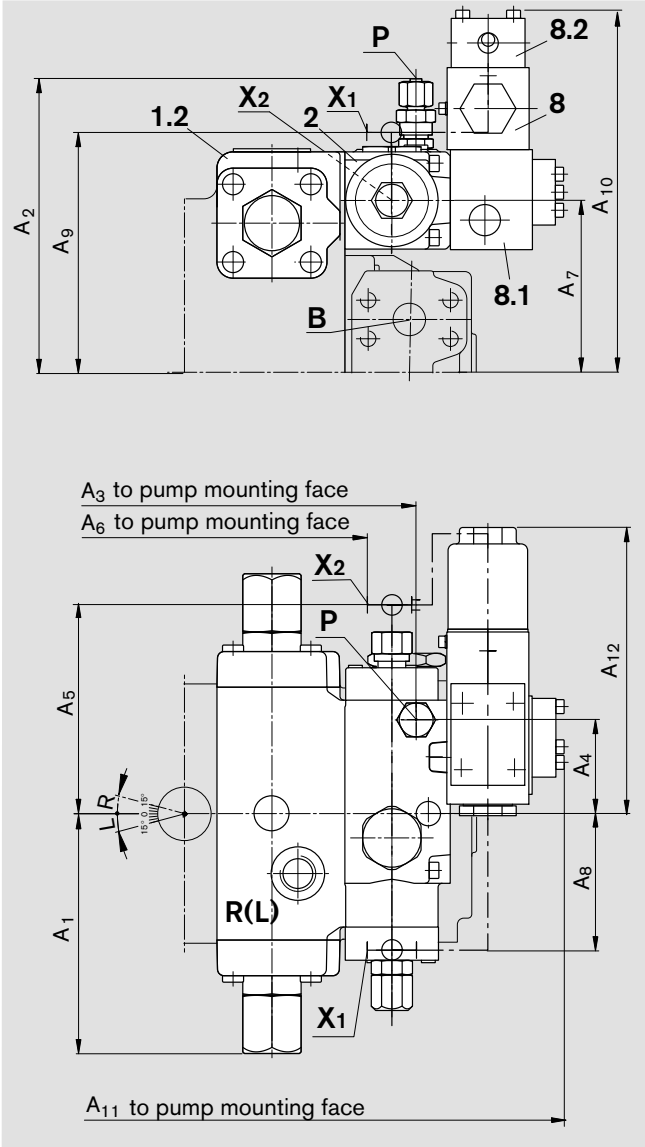
Before finalising your design please request a certified installation drawing.

Size 40 and 71

A4VSO



A4VSG



Sub-assemblies see page 37

Ports

X₁; X₂ Pilot pressure ports DIN 3853 S8 Form W
on A4VSO clockwise rotation only X₂ exists, on A4VSO counter clockwise rotation only X₁ exists

P Control pressure port DIN 3853 S8 Form W

max. tightening torques ¹⁾

50 Nm

50 Nm

Unit dimensions

Size	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈	A ₉	A ₁₀	A ₁₁	A ₁₂	
40	148	222	233	58	128	203	106	82,5	147,5	222	323	175	For detailed dimensions and technical data on the variable pumps see the technical data sheets A4VSO RE 92050 or A4VSG RE 92100
71	166	240	260	58	128	203	122	82,5	147,5	238	350	175	

¹⁾ see general notes

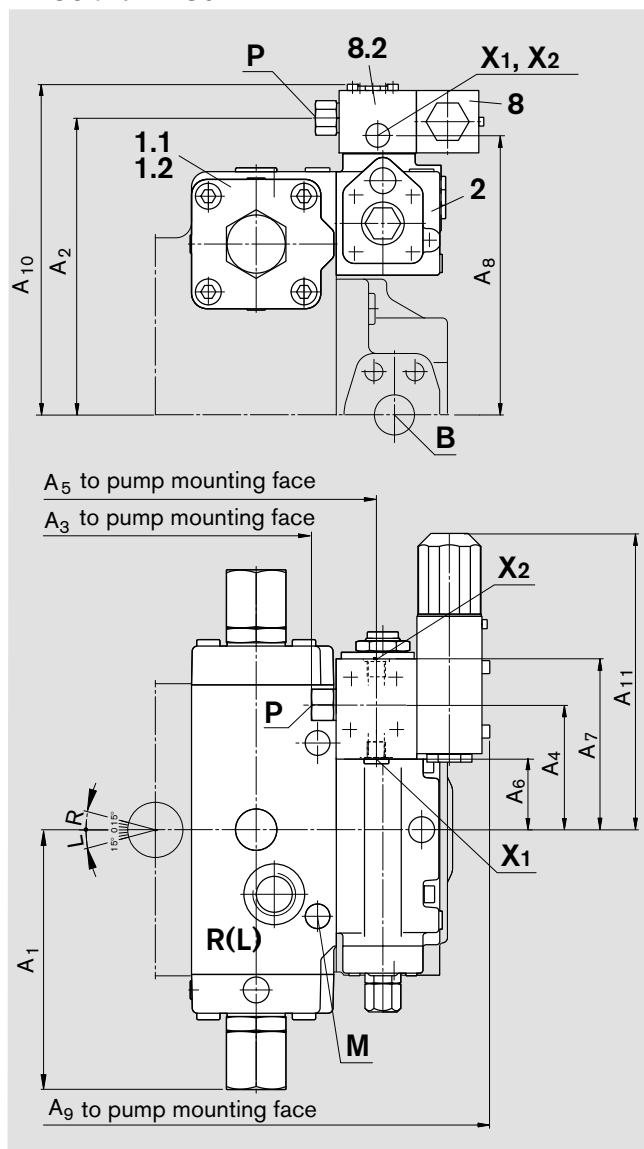
Unit dimensions HD1P

Before finalising your design please request a certified installation drawing.

Size 125...355

A4VSO and A4VSG

A4CSG in preparation, dimensions on request



Sub-assemblies

- 1 Pump with hydraulic control device
- 1.1 A4VSO (see RE 92050)
- 1.2 A4VSG (see RE 92100)
- 2 Pilot control unit
- 8 Power valve (see RE 95546)
LV 06 405 (on size 40 and 71)
LV 06 205 (on size 125...1000)
- 8.1 Adapter plate for power valve (Size 40 and 71)
- 8.2 Shuttle valve assembly
(on A4VSG and A4CSG)

Ports

			max. tightening torques ¹⁾
P	Control pressure port	DIN 3852 M18x1,5; 12 deep	140 Nm
X ₁ ; X ₂	Pilot pressure ports	DIN 3852 M14x1,5; 12 deep	80 Nm
on A4VSO clockwise rotation X ₁ is plugged, on A4VSO counter clockwise rotation X ₂ is plugged			
M	Gauging port control chamber pressure	DIN 3852 M14x1,5; 12 deep; plugged (size 125...180) M18x1,5; 12 deep; plugged (size 250 a. 355)	80 Nm 140 Nm

Unit dimensions

Size	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈	A ₉	A ₁₀	A ₁₁	
125	201	230	247	95,5	297	55,5	129,5	216	384	257	227	For detailed dimensions and technical data on the variable pumps see the technical data sheets A4VSO RE 92050 or A4VSG RE 92100
180	201	230	247	95,5	297	55,5	129,5	216	384	257	227	
250	243	266	309	95,5	359	55,5	129,5	252	446	293	227	
355	243	266	309	95,5	359	55,5	129,5	252	446	293	227	

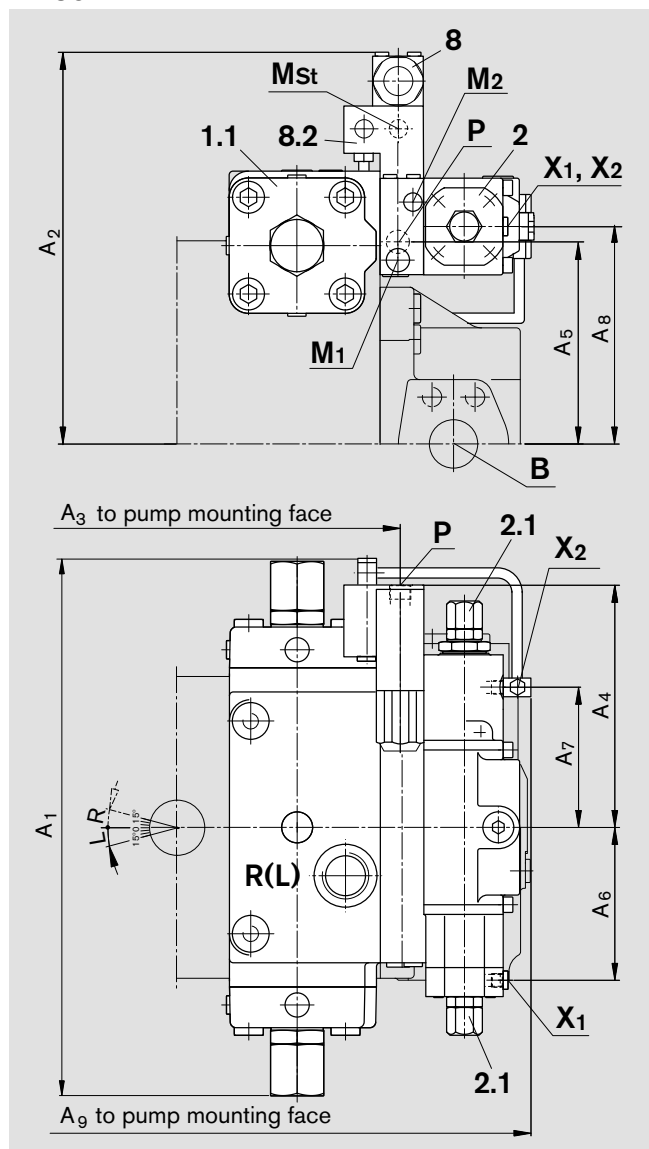
¹⁾ see general notes

Unit dimensions HD1P

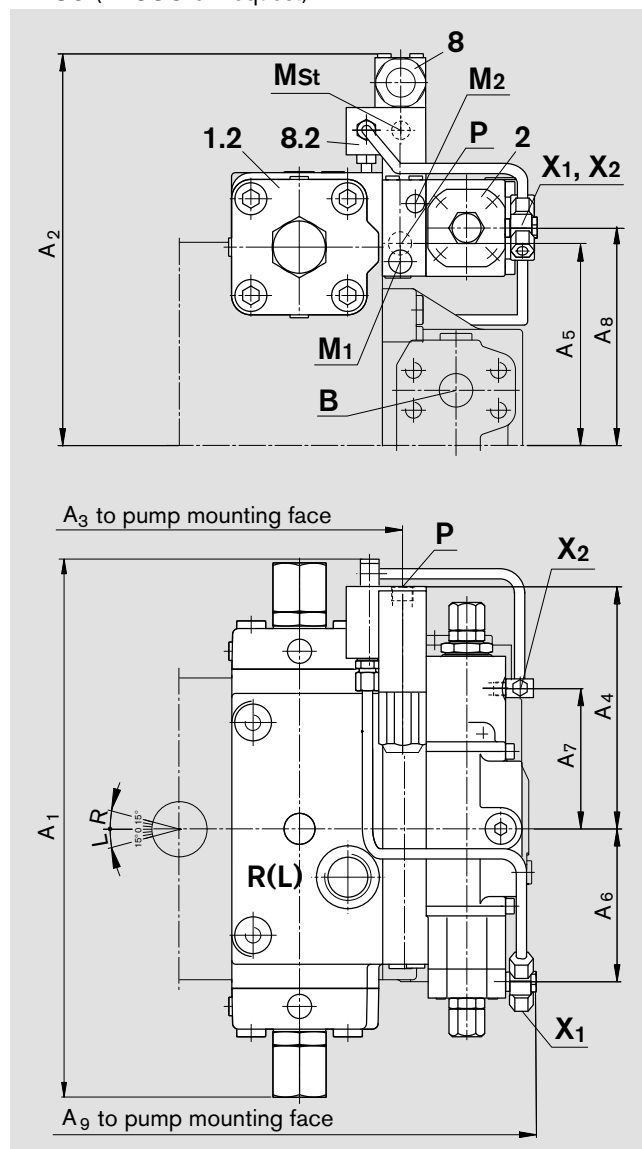
Before finalising your design please request a certified installation drawing.

Size 500...1000

A4VSO



A4VSG (A4CSG on request)



Sub-assemblies see page 37

Ports

				max. tightening torques ¹⁾
P	Control pressure port	DIN 3852	M22x1,5; 14 deep	210 Nm
X ₁ ; X ₂	Pilot pressure ports	DIN 3853	S8 Form W	50 Nm
on A4VSO clockwise rotation X ₁ , on A4VSO counter clockwise rotation X ₂ M14x1,5 plugged				
M _{st}	Gauging port pilot pressure	DIN 3852	M14x1,5; 12 deep; plugged	80 Nm
M ₁	Gauging port small control chamber	DIN 3852	M18x1,5; 12 deep; plugged	140 Nm
M ₂	Gauging port large control chamber	DIN 3852	M14x1,5; 12 deep; plugged	80 Nm

Unit dimensions

Size	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈	A ₉	
500	555	406	383	251	206	158	145	225	521	For detailed dimensions and technical data on the variable pumps see the technical data sheets A4VSO RE 92050 or A4VSG RE 92100
750	630	430	415	251	236	158	145	280	553	
1000	670	459	481	251	259	140	140	278	619	

¹⁾ see general notes

HD1T with electrical control of pilot pressure

The pilot pressure level in the X_1 or X_2 pilot channel is generated by means of a proportional current signal to one of the solenoids a or b at the proportional valve DBEP6 (acc. to RE 29164).

The pilot pressure is limited by the current signal.

In pumps for closed circuit operation each direction of swivel is controlled by its own proportional solenoid. In open circuit pumps (one side of center) there is only one solenoid.

Control through an electrical command value. Current control through pulsewidth modulation.

Analog or digital amplifiers can be used for control of the solenoids e.g. proportional amplifier VT 3000 with 170 Hz (see RE 29935). Please order separately.

For more information on the selection of available control electronics and hydraulic fluid, functional description and manual emergency override and further technical data please consult RE 29164.

Technical data – electrical

Operating voltage	24 V
Nominal solenoid current	700 mA
Control current	
Beginning of control at V_{g0} and 10 bar pilot pressure	300 mA
End of control at V_{gmax} and 45 bar pilot pressure	700 mA
Nominal resistance at 20°C (R_{20})	19,5 Ω
Max. duty cycle	100 % (S1)
Type of plug	DIN EN 175 301-803/ISO 4400 with wiring screw joint M16x1,5 for cable dia. 4,5...10 mm
Type of protection DIN/EN 60529	IP 65
Manual emergency override	exists, see RE 29164
Coil operating temperature	up to 150 °C

Caution! Avoid being burned:

The pump and especially the solenoids are during and shortly after operation very hot!
Wear always suitable protective clothing.

Calculation formula for the resistance

at $T > 20$ °C

$$R_w = \frac{R_{20} \times (235 + T)}{255}$$

Technical data – hydraulic

Control pressure (in P)	p_{min}	bar	50
	p_{max}	bar	100
Hysteresis			$\leq \pm 4$ % of V_{gmax}
Repeatability			≤ 2 % of V_{gmax}

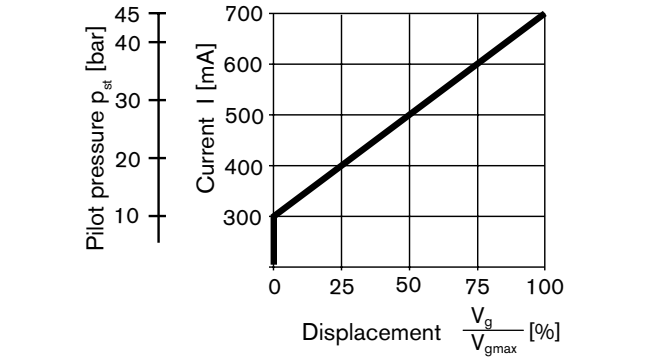
Because of the restrictions in RE 29164 the control pressure in P is limited to 50...100 bar on the controls HD1T and HD1U.

The flow losses in the proportional valve (e.g. 4 L/min per de-energized solenoid at $p = 50$ bar) must be compensated for in the calculation of the required control oil flow in P.

HD1T with electrical control of pilot pressure

A4VSO - open circuit
DBEP 6, Execution B resp. A

Characteristic

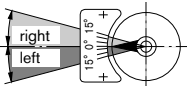


Relation between

Direction of rotation – Direction of flow at actuation of solenoid

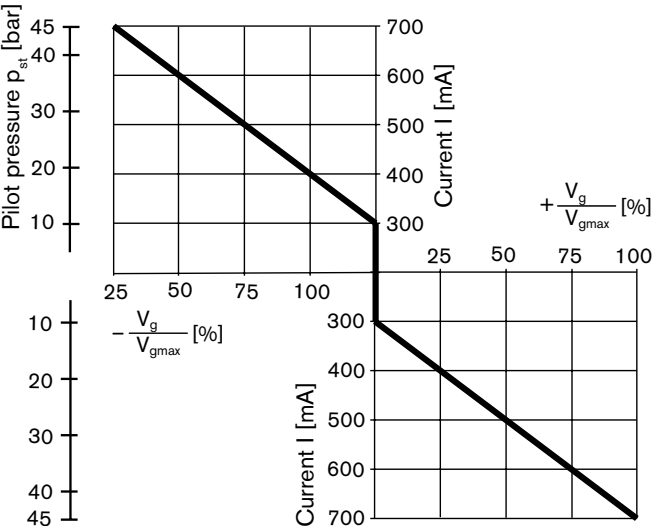
Direction of rotation	Swivel range ¹⁾	Direction of flow	Pressure outlet port
clockwise	left	S to B	B
counter clockwise	right	S to B	B

¹⁾ compare swivel angle indicator



A4VSG - closed circuit
DBEP 6, Execution C

Characteristic

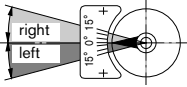


Relation between

Direction of rotation – Actuation of solenoid – Direction of flow

Direction of rotation	Actuation of solenoid	Swivel range ¹⁾	Direction of flow	Pressure outlet port
clockwise	b	right	B to A	A
	a	left	A to B	B
counter clockwise	b	right	A to B	B
	a	left	B to A	A

¹⁾ compare swivel angle indicator



A4CSG with HD1T

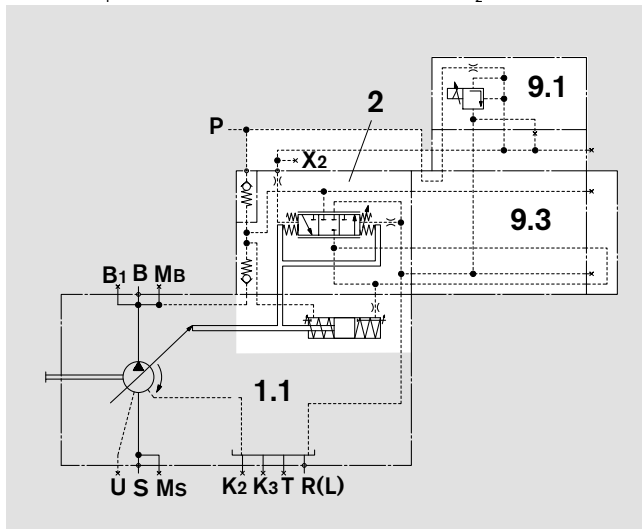
is in preparation and can be supplied on request.

HD1T with electrical control of pilot pressure

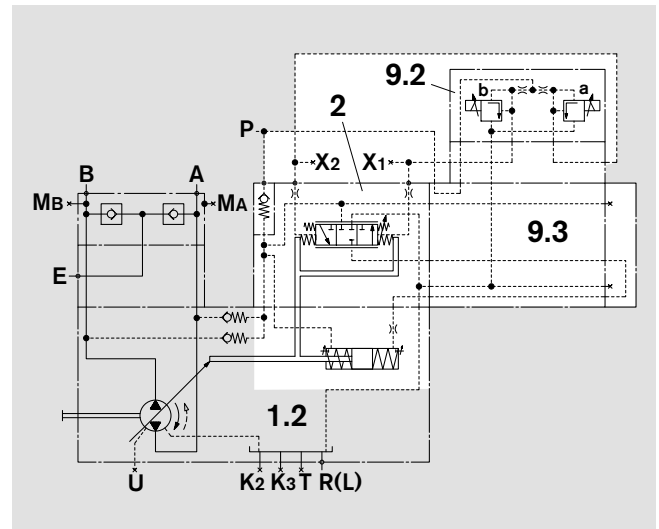
Schematics

Size 40 and 71

Example A4VSO in clockwise rotation, in counter clockwise rotation X_1 connected to the prop. valve and X_2 deleted

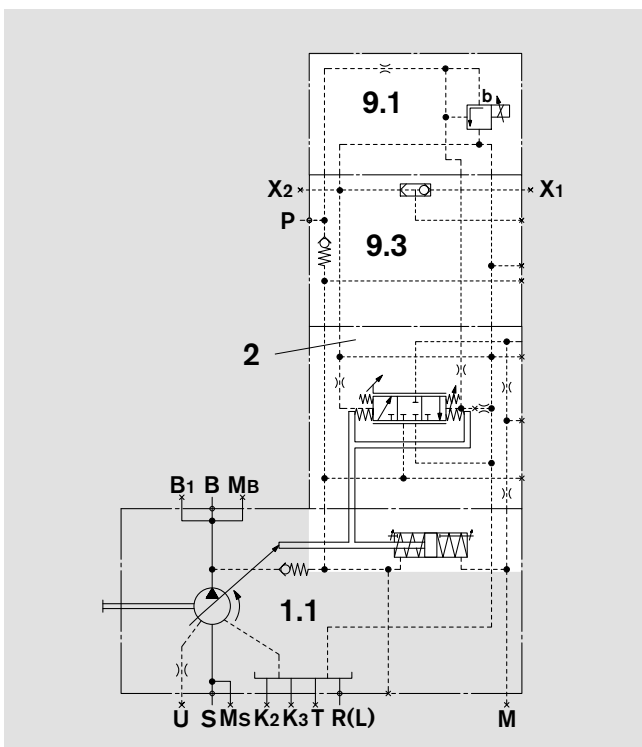


Example A4VSG

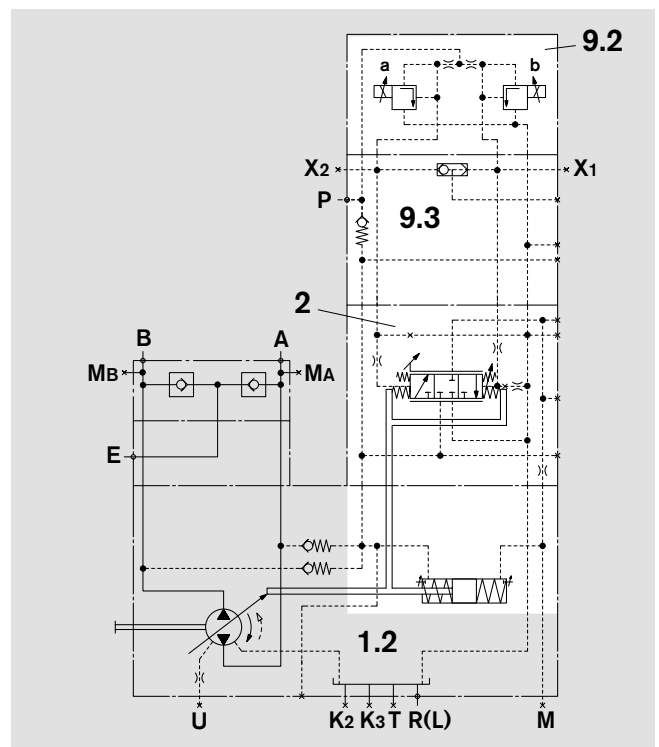


Size 125...355

Example A4VSO in counter clockwise rotation



Example A4VSG



Ports

- P Control pressure port
- X_1 ; X_2 Gauging ports pilot pressure
- M Gauging port control chamber pressure (Size 125...355)

Sub-assemblies see page 42

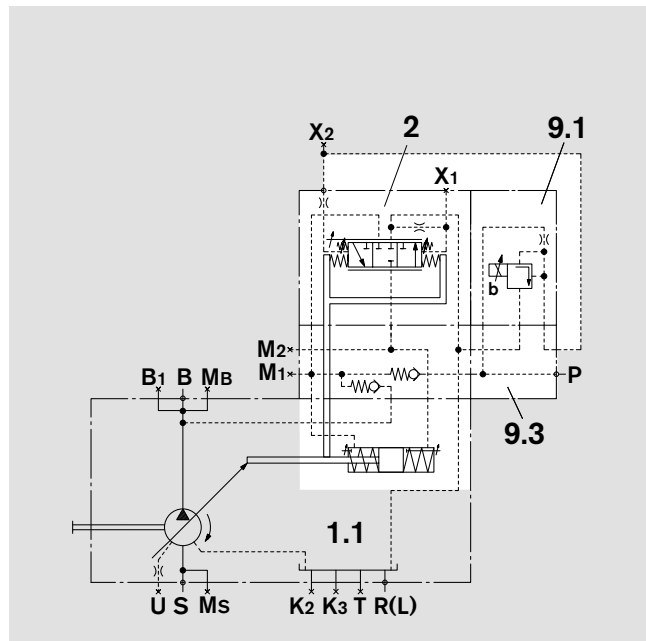
Size 500...1000 see page 42

HD1T with electrical control of pilot pressure

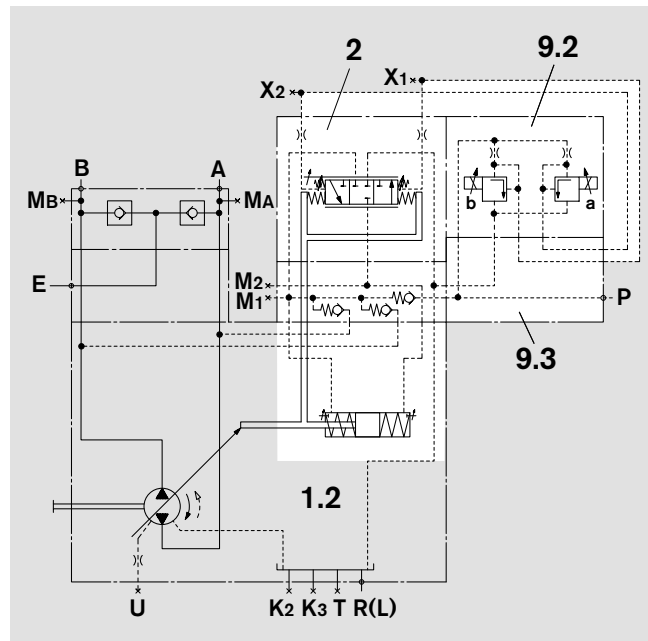
Schematics

Size 500...1000

Example A4VSO in clockwise rotation, in counter clockwise rotation X_1 connected to the proportional valve



Example A4VSG



Ports

- P Control pressure port
- X_1 ; X_2 Gauging ports pilot pressure
- M_1 Gauging port small control chamber (size 500...1000)
- M_2 Gauging port large control chamber (size 500...1000)

Subassemblies

- 1 Pump with hydraulic control device
- 1.1 A4VSO (see RE 92050)
- 1.2 A4VSG (see RE 92100)
- 2 Pilot control unit

- 9.1 Proportional-pressure relief valve
(open circuit)
DBEP6 B06-1X/45AG24NZ4M-382 with inlet orifice dia. 1,0 mm
DBEP6 A06-1X/45AG24NZ4M-382 on size 125...355 clockwise rotation

- 9.2 Proportional-pressure relief valve
(closed circuit)
DBEP6 C06-1X/45AG24NZ4M-382 with inlet orifice dia.1,0 mm

- 9.3 Sandwich plate to mount proportional valve

Solenoids with plugs
to DIN EN 175 301-803 / ISO 4400
Type of protection IP 65
and wiring screw joint M16x1,5 for
cable dia. 4,5...10mm

Size 40...355 see page 41

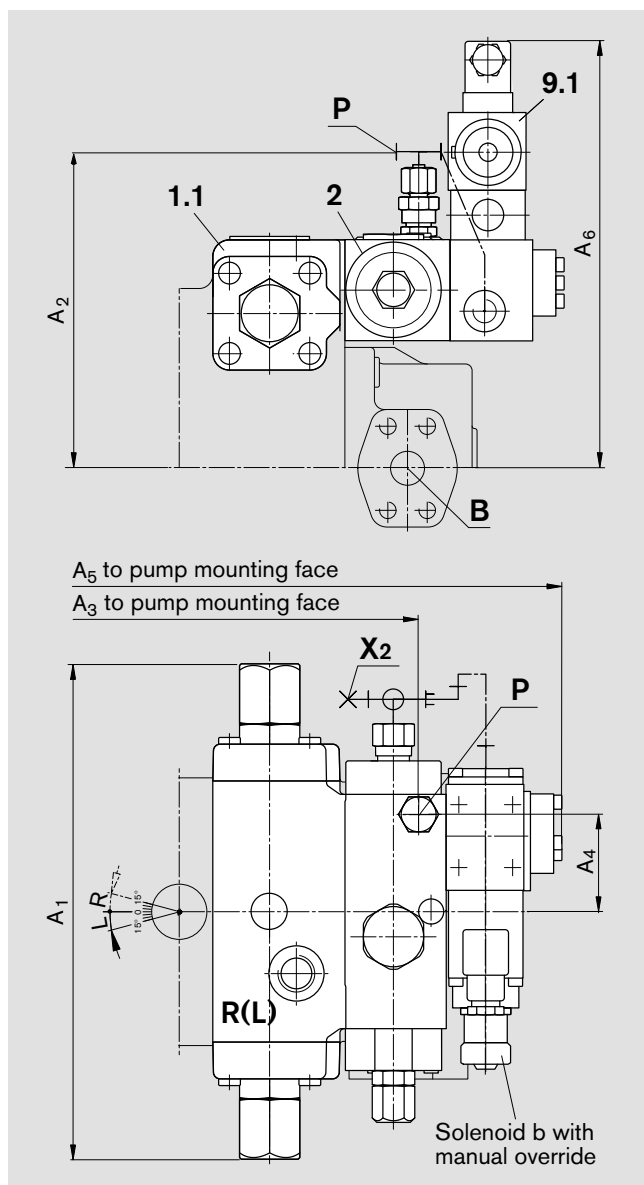
Unit dimensions HD1T

Before finalising your design please request a certified installation drawing.

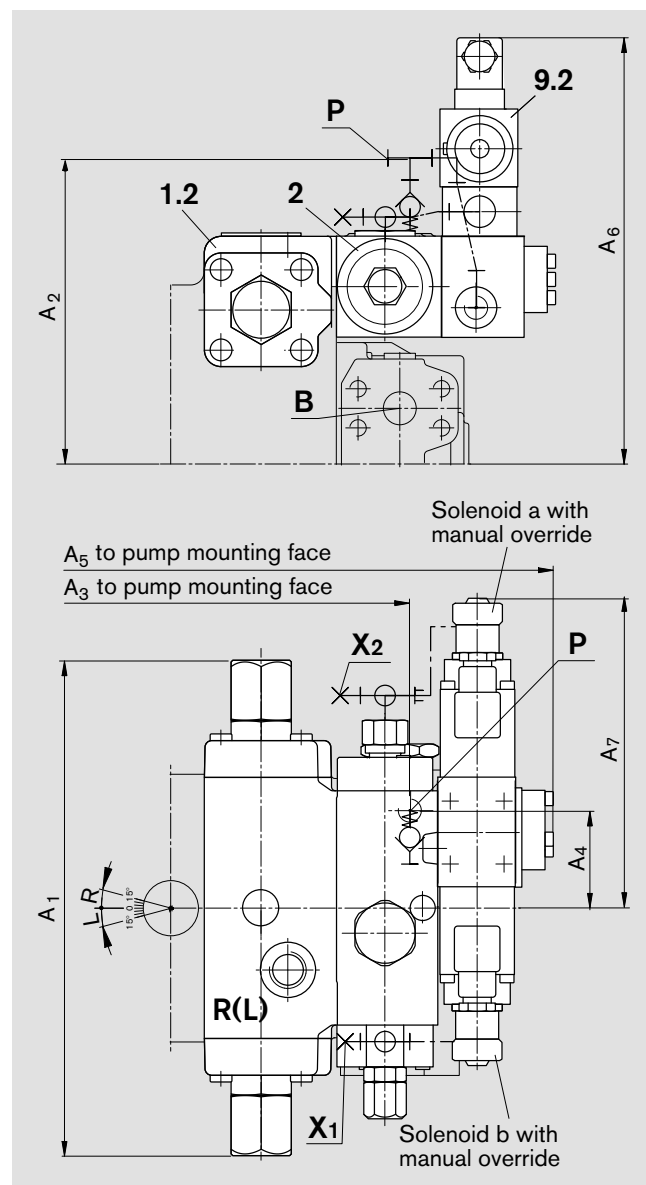
Size 40 and 71

A4VSO in clockwise rotation

(Counter clockwise rotation on request)



A4VSG



Sub-assemblies see page 42

Ports

P	Control pressure port	DIN 3853	S8 Form W	50 Nm
X ₁ ; X ₂	Gauging ports pilot pressure	DIN 3853	S8 Form W plugged	50 Nm

on A4VSO clockwise rotation only X₂ exists, on A4VSO counter clockwise rotation only X₁ exists (dimensions on request)

max. tightening torques ¹⁾

Unit dimensions

Size	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇	
40	296	193	233	58	323	257	189	For detailed dimensions and technical data on the variable pumps see the technical data sheets A4VSO RE 92050 or A4VSG RE 92100
71	332	209	260	58	350	273	189	

¹⁾ see general notes

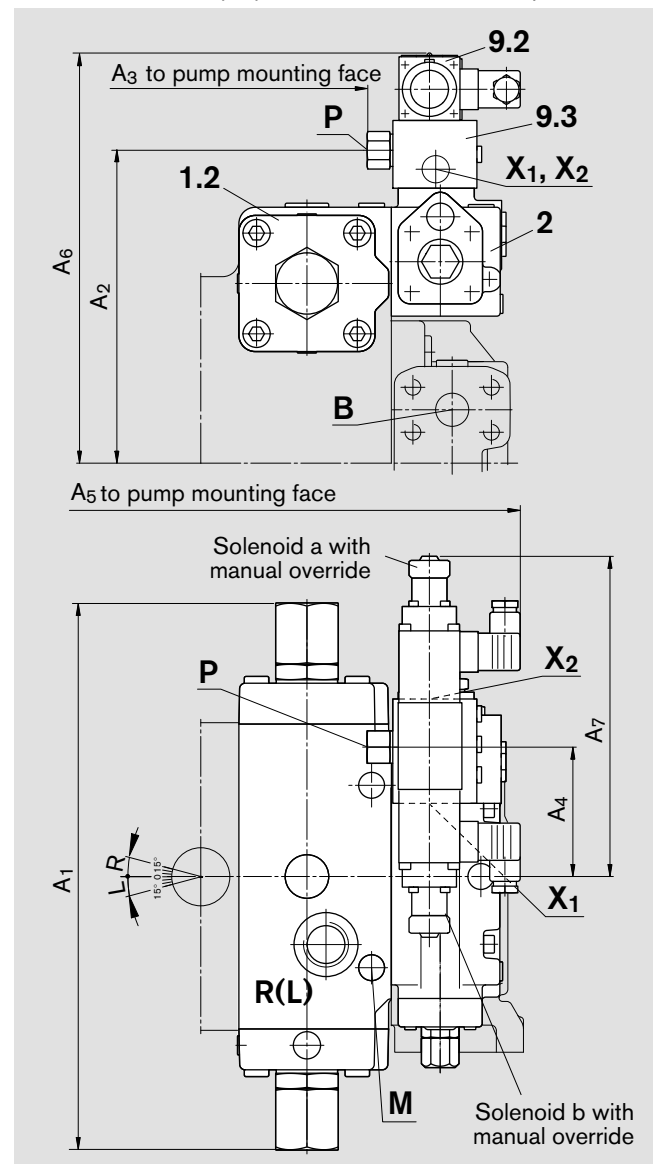
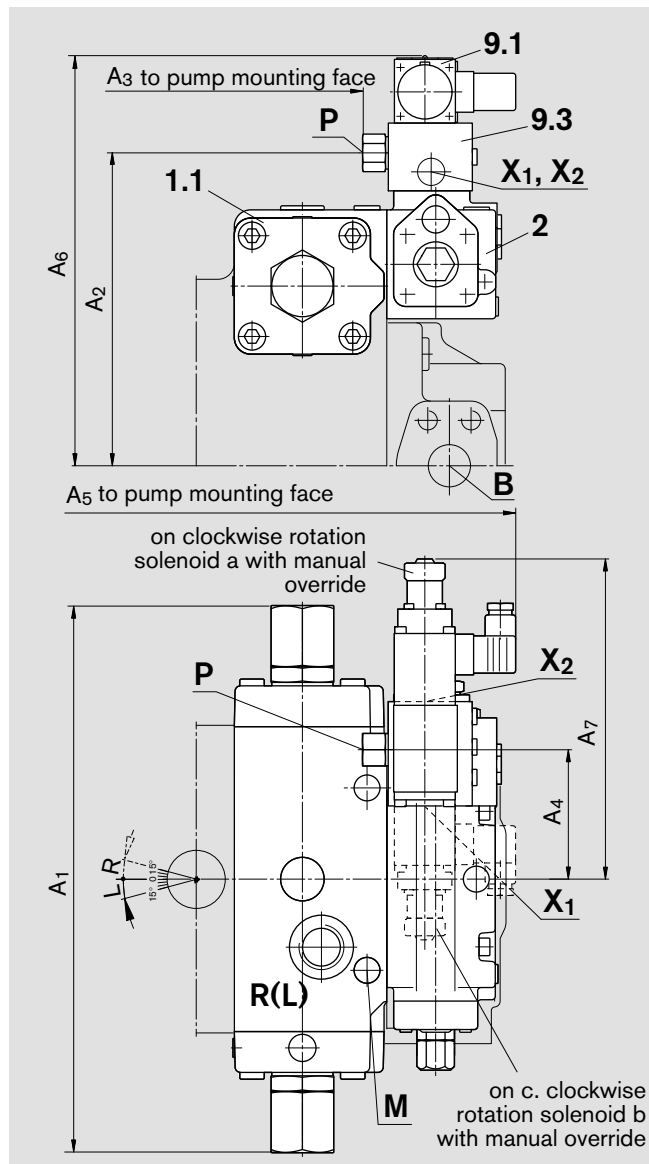
Unit dimensions HD1T

Before finalising your design please request a certified installation drawing.

Size 125...355

A4VSO

A4VSG (A4CSG in preparation, dimensions on request)



Sub-assemblies see page 42

Ports

P	Control pressure port	DIN 3852	M18x1,5; 12 deep	140 Nm
M	Gauging port control chamber pressure	DIN 3852	M14x1,5; 12 deep; plugged (size 125 a. 180)	80 Nm
			M18x1,5; 12 deep; plugged (NG 250 a. 355)	140 Nm
X ₁ ; X ₂	Gauging ports pilot pressure	DIN 3852	M14x1,5; 12 deep; plugged	80 Nm

max. tightening torques ¹⁾

Unit dimensions

Size	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇
125	402	230	247	96	360	302	236
180	402	230	247	96	360	302	236
250	485	266	309	96	422	338	236
355	485	266	309	96	422	338	236

For detailed dimensions and technical data on the variable pumps see the technical data sheets A4VSO RE 92050 or A4VSG RE 92100

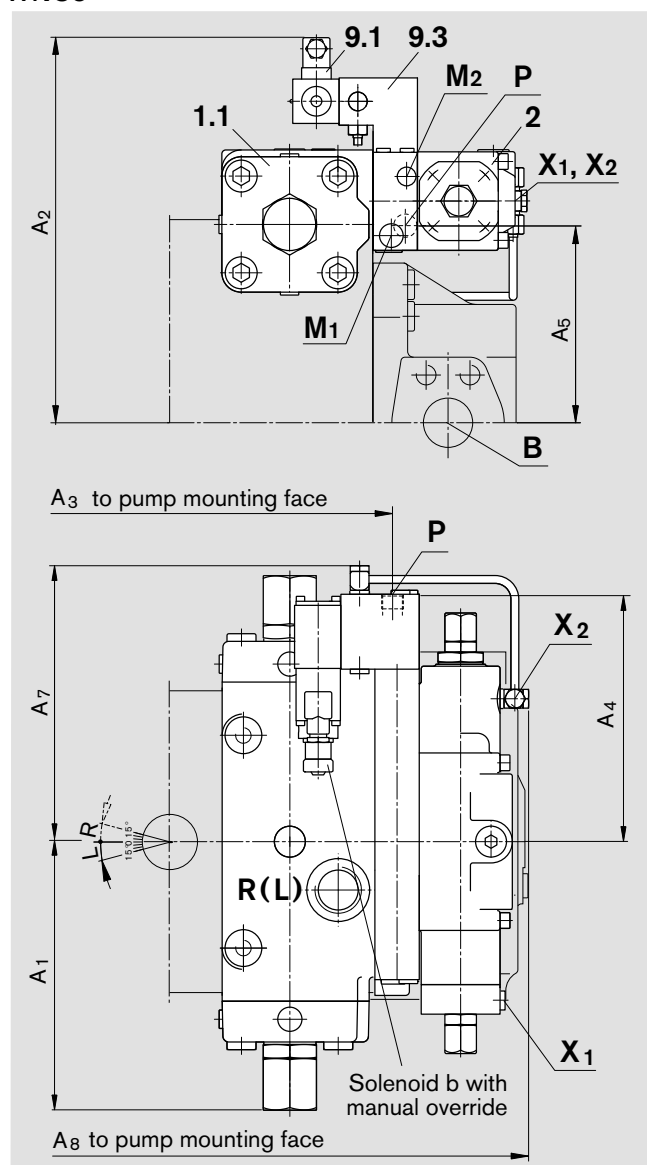
¹⁾ see general notes

Unit dimensions HD1T

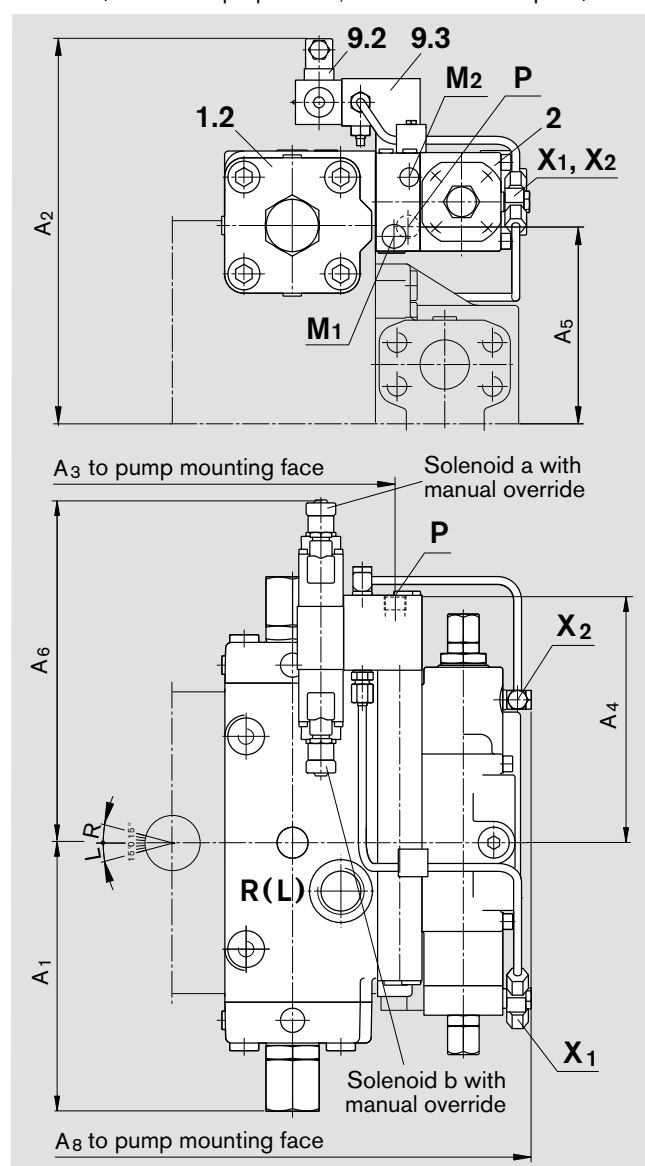
Before finalising your design please request a certified installation drawing.

Size 500...1000

A4VSO



A4VSG (A4CSG in preparation, dimensions on request)



Sub-assemblies see page 42

Ports

P	Control pressure port	DIN 3852	M22x1,5; 14 deep	210 Nm
M ₁	Gauging port small control chamber	DIN 3852	M18x1,5; 12 deep; plugged	80 Nm
M ₂	Gauging port large control chamber	DIN 3852	M14x1,5; 12 deep; plugged	80 Nm
X ₁ ; X ₂	Gauging ports pilot pressure	DIN 3853	S8 Form W; plugged	50 Nm
on A4VSO clockwise rotation X ₁ , c.clockwise X ₂		DIN 3852	M14x1,5; 12 deep; plugged	80 Nm

max. tightening torques ¹⁾

Unit dimensions

Size	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈	
500	278	391	383	251	206	348	278	521	For detailed dimensions and technical data on the variable pumps see the technical data sheets A4VSO RE 92050 or A4VSG RE 92100
750	315	423	415	251	236	348	278	553	
1000	335	444	481	251	259	348	278	619	

¹⁾ see general notes

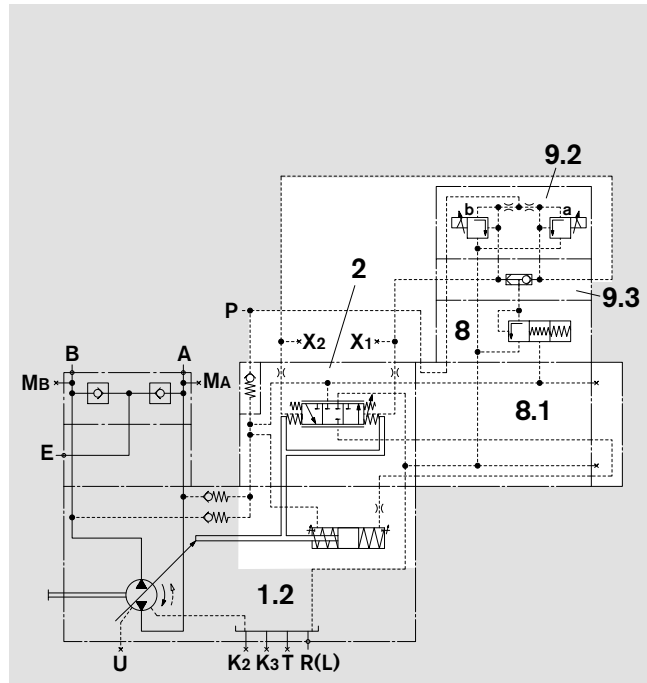
HD1U with power control and electr. control of pilot pressure

This version is a combination of HD1P (see page 34) and HD1T (see page 39)

Schematics

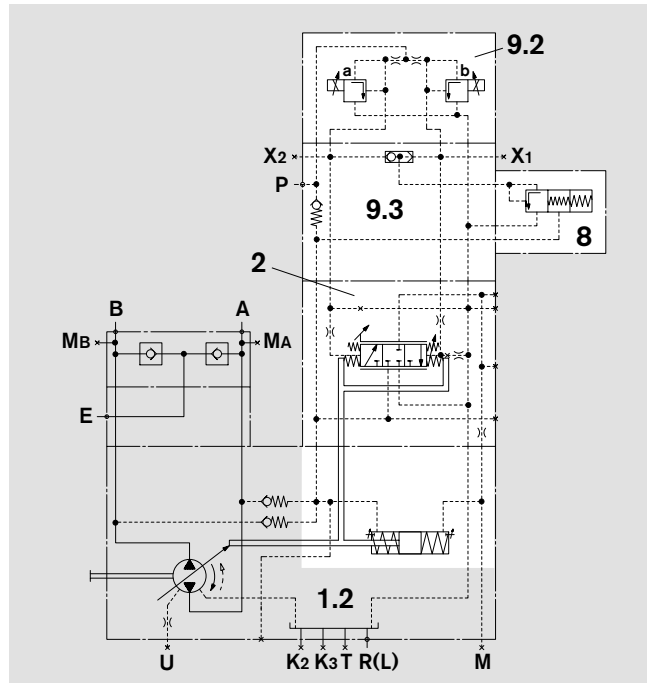
Size 40 and 71

Example A4VSG; on A4VSO clockwise rotation only X_2 , on A4VSO counter clockwise rotation only X_1 exists



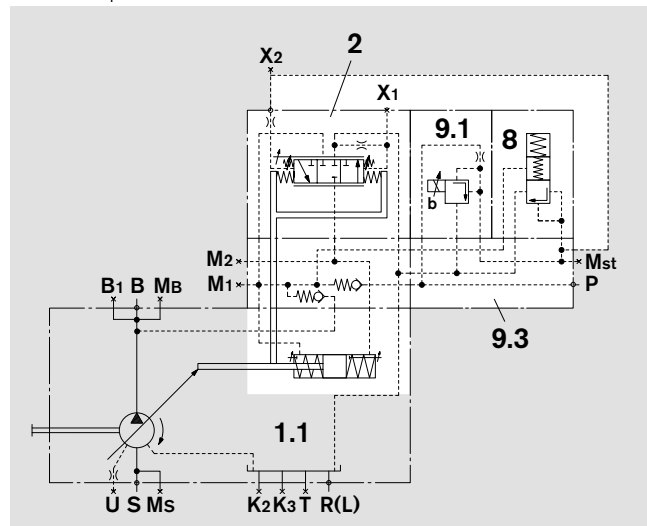
Size 125...355

Example A4VSG



Size 500...1000

Example A4VSO clockwise rotation; on counter clockwise rotation X_1 is connected to the power valve



Ports

- P Control pressure port
- X_1 ; X_2 Gauging ports pilot pressure
- M Gauging port control chamber pressure (size 125...355)
- M_1 Gauging port small control chamber (size 500...1000)
- M_2 Gauging port large control chamber (size 500...1000)
- M_{st} Gauging port pilot pressure (size 500...1000)

Sub-assemblies

- 1 Pump with hydraulic control device
- 1.1 A4VSO (see RE 92050)
- 1.2 A4VSG (see RE 92100)
- 2 Pilot control unit
- 8 Power valve (see RE 95546)
LV 06 405 (on size 40 and 71)
LV 06 205 (on size 125...1000)
- 8.1 Sandwich plate for mounting of power valve (size 40 a. 71)
- 9.1* Proportional-pressure relief valve (on A4VSO)
DBEP6 B06
DBEP6 A06 (on size 125...355 clockwise rotation)
- 9.2* Proportional-pressure relief valve DBEP6 C06
(on A4VSG and A4CSG)
- 9.3 Sandwich plate for mounting of proportional valve

* detailed information see page 42

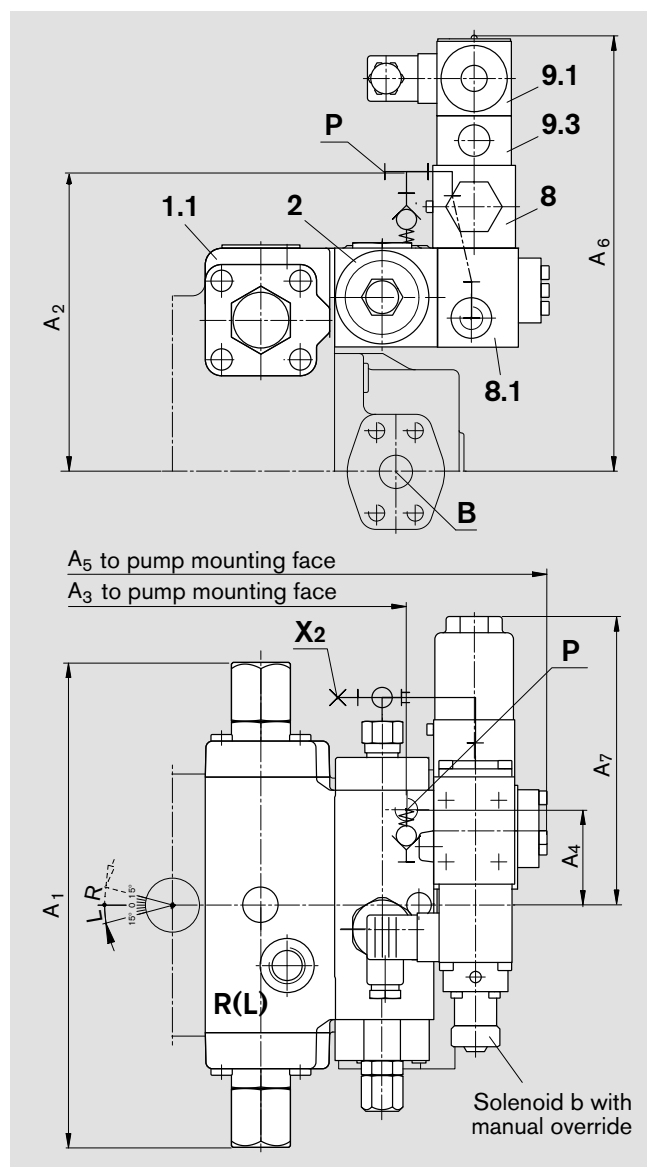
Unit dimensions HD1U

Before finalising your design please request a certified installation drawing.

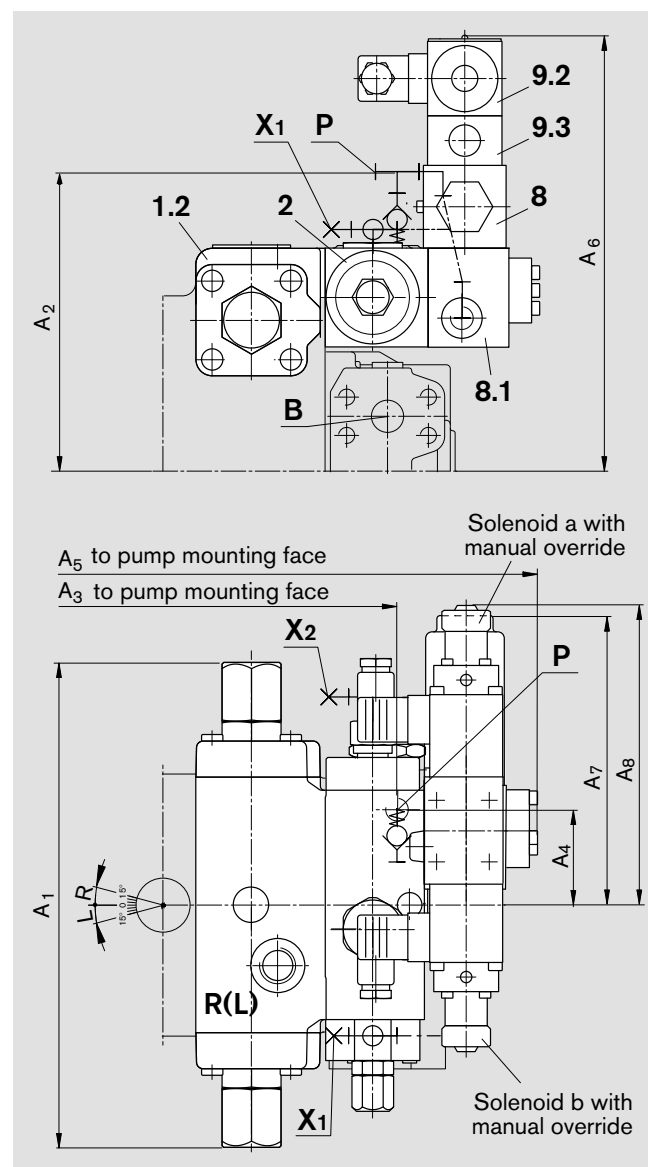
Size 40 and 71

A4VSO clockwise rotation

(Counter clockwise rotation on request)



A4VSG



Sub-assemblies see page 46

Ports

									max. tightening torques ¹⁾
P	Control pressure port	DIN 3853	S8 Form W						50 Nm
X ₁ ; X ₂	Gauging ports pilot pressure	DIN 3853	S8 Form W plugged						50 Nm
on A4VSO clockwise rotation only X ₂ exists, on A4VSO counter clockwise rotation only X ₁ exists (dimensions on request)									

Unit dimensions

Size	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈	
40	296	193	233	58	323	266	175	189	For detailed dimensions and technical data on the variable pumps see the technical data sheets A4VSO RE 92050 or A4VSG RE 92100
71	332	209	260	58	350	282	175	189	

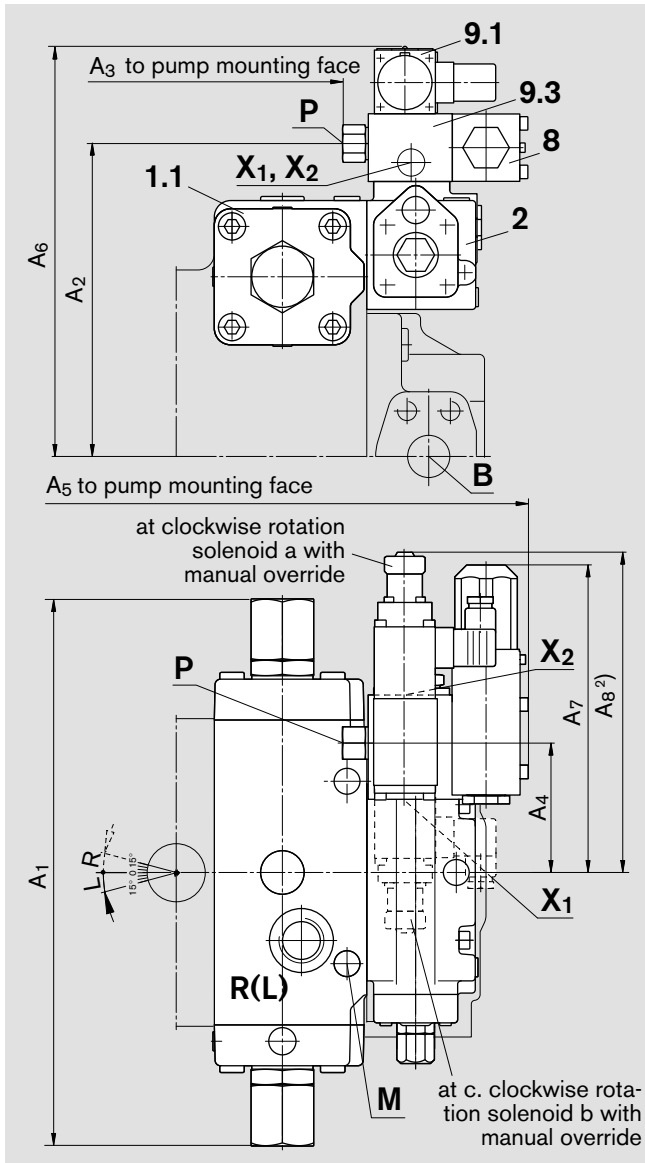
¹⁾ see general notes

Unit dimensions HD1U

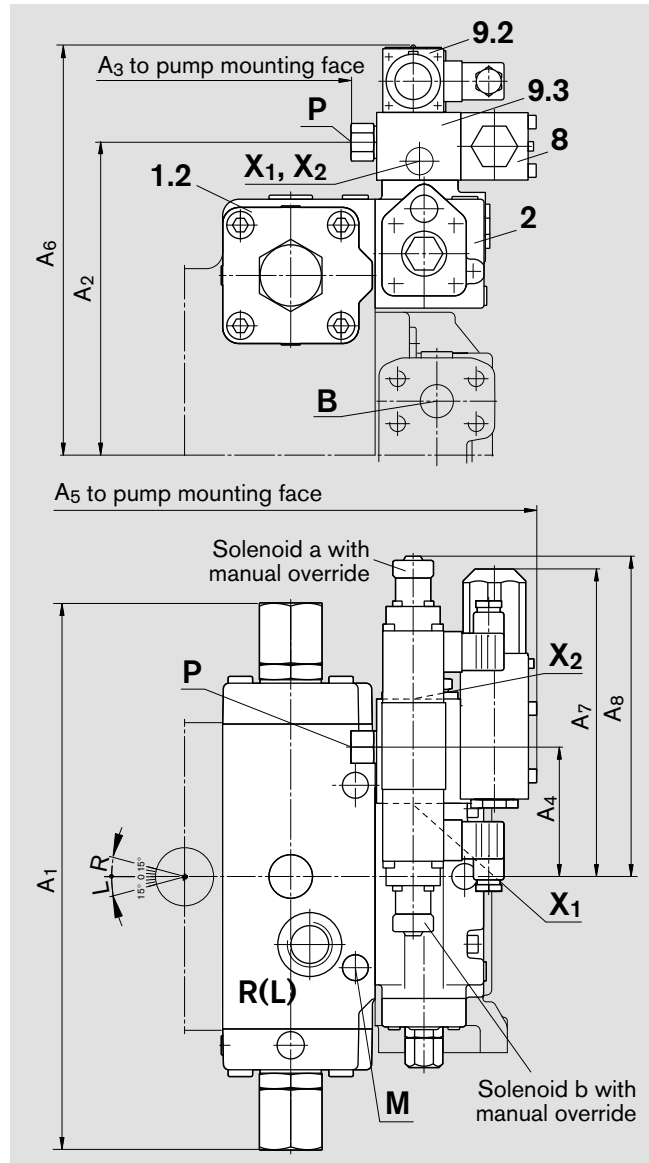
Before finalising your design please request a certified installation drawing.

Size 125...355

A4VSO



A4VSG (A4CSG in preparation, dimensions on request)



Sub-assemblies see page 49

Ports

			max. tightening torques ¹⁾
P	Control pressure port	DIN 3852 M18x1,5; 12 deep	140 Nm
M	Gauging port control chamber pressure	DIN 3852 M14x1,5; 12 deep; plugged (size 125 a. 180)	80 Nm
		M18x1,5; 12 deep; plugged (size 250 a. 355)	140 Nm
X ₁ ; X ₂	Gauging ports pilot pressure	DIN 3852 M14x1,5; 12 deep; plugged	80 Nm

Unit dimensions

Size	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈ ²⁾
125	402	230	247	96	384	302	227	236
180	402	230	247	96	384	302	227	236
250	485	266	309	96	446	338	227	236
355	485	266	309	96	446	338	227	236

For detailed dimensions and technical data on the variable pumps see the technical data sheets A4VSO RE 92050 or A4VSG RE 92100

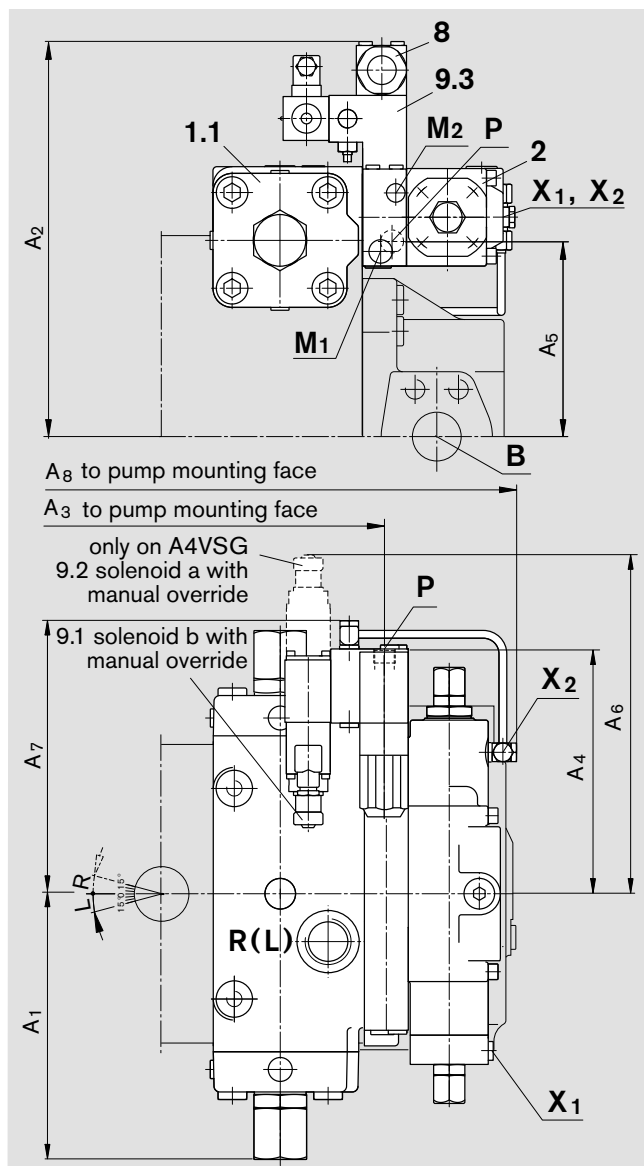
¹⁾ see general notes ²⁾ deleted on counter clockwise rotation, since only solenoid b exists

Unit dimensions HD1U

Before finalising your design please request a certified installation drawing.

Size 500...1000

A4VSO



A4VSG has additional solenoid a (see dimension A_6)
A4CSG in preparation, dimensions on request

Sub-assemblies

- 1 Pump with hydraulic control device
- 1.1 A4VSO (see RE 92050)
- 1.2 A4VSG (see RE 92100)
- 2 Pilot control unit
- 8 Power valve (see RE 95546)
 LV 06 405 (on size 40 and 71)
 LV 06 205 (on size 125...1000)
- 8.1 Sandwich plate for mounting of power valve
- 9.1 Proportional-pressure relief valve (on A4VSO)
 DBEP6 B06
 DBEP6 A06 (on size 125...355 clockwise rotation)
- 9.2 Proportional-pressure relief valve DBEP6 C06
 (on A4VSG and A4CSG)
- 9.3 Sandwich plate for mounting of proportional valve

Ports

P	Control pressure port	DIN 3852	M22x1,5; 14 deep	210 Nm
M ₁	Gauging port small control chamber	DIN 3852	M18x1,5; 12 deep; plugged	80 Nm
M ₂	Gauging port large control chamber	DIN 3852	M14x1,5; 12 deep; plugged	80 Nm
X ₁ ; X ₂	Gauging ports pilot pressure	DIN 3853	S8 Form W; plugged	50 Nm
	on A4VSO clockwise rotation X ₁ , c. clockw. rot. X ₂	DIN 3852	M14x1,5; 12 deep; plugged	80 Nm

max. tightening torques ¹⁾

Unit dimensions

Size	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈	
500	278	406	383	251	206	352	278	521	For detailed dimensions and technical data on the variable pumps see the technical data sheets A4VSO RE 92050 or A4VSG RE 92100
750	315	430	415	251	236	348	278	553	
1000	335	459	481	251	259	348	278	619	

¹⁾ see general notes

General notes

- The hydraulic control HD is, depending on the type of operation, suitable for open circuit (A4VSO) or closed circuit operation (A4VSG, A4CSG).
- Project planning, assembly, and startup of the motor require the involvement of trained personnel.
- The working and functional ports are only designed to accommodate hydraulic piping.
- Tightening torques: The tightening torques specified in this data sheet are maximum values and may not be exceeded (maximum value for screw thread). Manufacturer specifications for the max. permissible tightening torques of the used fittings must be observed!
For DIN 13 fastening screws we recommend checking the tightening torque individually according to VDI 2230 Edition 2003.
- The housing temperature rises during and shortly after operation. Take suitable safety precautions (e.g. wear protective clothing).
- The data and information contained herein must be adhered to.