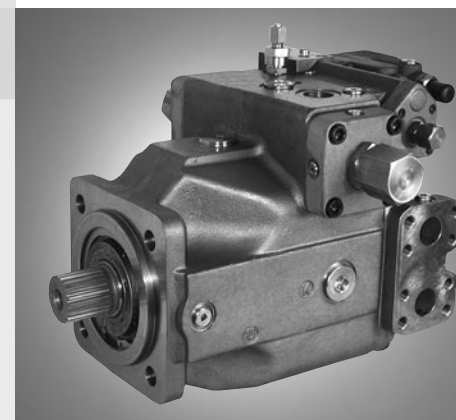


# Hydraulic control, pilot pressure dependent HD

**RA 92 080/06.06** 1/56  
Replaces: 05.95

## Technical Data Sheet

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



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### Features

- Displacement control for the variable pumps (A)A4VSO, (A)A4VSG and (A)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 decompression via the pump

#### Further information:

Variable pump (A)A4VSO	Size 40...1000	RA 92050
Variable pump (A)A4VSG	Size 40...1000	RA 92100
Variable pump (A)A4CSG	Size 250...750	RA 92105
ISO Version	Sizes 40...355 see	RE 92080

## Ordering code / Standard program

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

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

## Axial piston unit / type of operation

02	Swash plate design, variable / pump, open circuit (see RA 92050)	Size 40...355	AA4VSO
		Size 500...1000	A4VSO
	Swash plate design, variable / pump, closed circuit (see RA92100)	Size 40...355	AA4VSG
		Size 500...1000	A4VSG
	Compact unit swash plate design, variable / pump, closed circuit (see RA 92105)	Size 250 and 355	AA4CSG
		Size 500 and 750	A4CSG

Size		40	71	125	180	250	355	500	750	1000	
03	Displacement $V_{g \max}$	in <sup>3</sup> /rev	2.44	4.33	7.63	10.98	15.26	21.66	30.51	45.76	61.02
		cm <sup>3</sup> /rev	40	71	125	180	250	355	500	750	1000

## Control and regulating devices

04	Hydraulic control, pilot pressure dependent										HD	
	Pilot pressure characteristic											
	145 to 650 psi (10...45 bar)	●	●	●	●	●	●	●	●	●	●	1
	145 to 400 psi (10...28 bar)	●	●	●	●	●	●	●	●	●	●	2
80 to 275 psi (5,5...19 bar)	●	●	●	●	●	●	●	●	●	●	3	
05	Pressure control											
	without pressure control (no code)											
	with pressure control in A	●	●	●	●	●	●	●	●	●	●	A <sup>1) 2)</sup>
	with remote pressure control in A	●	●	●	●	●	●	●	●	●	●	GA <sup>1) 2)</sup>
	with pressure control in B	●	●	●	●	●	●	●	●	●	●	B <sup>2)</sup>
	with remote pressure control in B	●	●	●	●	●	●	●	●	●	●	GB <sup>2)</sup>
	with pressure control in both ports	●	●	●	●	●	●	●	●	●	●	D <sup>1) 2)</sup>
with remote pressure control in both ports	●	●	●	●	●	●	●	●	●	●	G <sup>1) 2)</sup>	
06	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	●	●	●	●	●	●	●	●	●	●	T <sup>3)</sup>
	Power control and electrical control of pilot pressure	●	●	●	●	●	●	●	●	●	●	U <sup>3)</sup>

## Series

07	for (A)A4VSO	●	●	-	-	-	-	-	-	-	11
		-	-	●	●	●	●	●	●	●	30
	for (A)A4VSG	●	●	-	-	-	-	-	-	-	11
		-	-	●	●	●	●	●	●	●	30
	for (A)A4CSG	-	-	-	-	●	●	●	●	-	30

<sup>1)</sup> not available on (A)A4VSO      <sup>2)</sup> not possible for bi-directional rotation

<sup>3)</sup> for operation with HF-fluids please observe data sheet RA 29164 (Prop. pressure relief valve type DBEP);  
for (A)A4CSG please consult us

● available    - not available

	(A)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														
12	Connecting options for service ports														
13	Through drive														
14	Valves														
15	Filter options														

for detailed data see:  
 RA 92050 – (A)A4VSO  
 RA 92100 – (A)A4VSG  
 RA 92105 – (A)A4CSG

## 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 feedback 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 (A)A4VSO the effective pilot pressure command signal is equal to the difference between actual pilot pressure and housing pressure, in case of the (A)A4VSG and (A)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 (< 194°F (90 °C)) or 19/17/14 (> 194°F (90 °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 145 to 650 psi (10...45 bar)
HD2	pilot pressure range 145 to 400 psi (10...28 bar)
HD3	pilot pressure range 80 to 275 psi (5.5...19 bar)

An execution with inductive displacement transducer is available on request.

### Supply of control and pilot pressure

On (A)A4VSO and (A)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 **(A)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 0.49 in<sup>3</sup> (8 cm<sup>3</sup>) displacement  
for the sizes 355...1000 an auxiliary pump with 0.67 in<sup>3</sup> (11 cm<sup>3</sup>) displacement

Direct mounting at the through drive on (A)A4VSO/G or (A)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 <sup>1)</sup> (in X <sub>1</sub> , X <sub>2</sub> )	HD1	$p_{St}$	psi (bar)	145 <sup>2)</sup> – 650 <sup>3)</sup> (10 <sup>2)</sup> – 45 <sup>3)</sup>									
	HD2	$p_{St}$	psi (bar)	145 <sup>2)</sup> – 400 <sup>3)</sup> (10 <sup>2)</sup> – 28 <sup>3)</sup>									
	HD3	$p_{St}$	psi (bar)	80 <sup>2)</sup> – 275 <sup>3)</sup> (5.5 <sup>2)</sup> – 19 <sup>3)</sup>									
Control pressure (in P)	$p_{min}$ <sup>5) 6)</sup>			2x boost press. but at least 465 psi (32 bar)									
	$p_{max}$ <sup>4) 5)</sup>			5100 psi (350 bar)									
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	in <sup>2</sup>		0.60	0.99	1.40	1.40	2.23	2.23	2.91	4.42	5.02	
		cm <sup>2</sup>		3.9	6.4	9	9	14.4	14.4	18.8	28.5	32.4	
Control volume	$V_{S max}$	in <sup>3</sup>		0.34	0.67	1.14	1.14	2.28	2.28	3.75	6.41	8.18	
		cm <sup>3</sup>		5.5	11	18.7	18.7	37.3	37.3	61.4	105	134.1	
Control time (at 2900 psi (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 2900 psi (200 bar) pressure output)	t	s		–	–	–	–	–	–	0.15...	0.2...	0.3...	
Boost pressure (A)A4VSG	$p_{Sp min}$		psi (bar)	230 (16)									
	$p_{Sp max}$ <sup>6)</sup>		psi (bar)	435 (30)									
	(A)A4CSG	$p_{Sp min}$		psi (bar)	–	–	–	–	230 (16)				–
		$p_{Sp max}$		psi (bar)	–	–	–	–	290 (20)				–
Weight approx. ((A)A4VSO...HD. ...N00)			lbs	92	86	216	246	440	484	733	1047	1333	
			kg	42	59	98	112	200	220	333	476	606	
Hysteresis				$\leq \pm 3\%$ von $V_{g max}$									
Repeatability				$\leq 1\%$ von $V_{g max}$									

<sup>1)</sup> Pilot pressure characteristics see page 6.

<sup>2)</sup>  $\pm 7$  psi (0.5 bar) at open circuit;  $\pm 22$  psi (1.5 bar) at closed circuit

<sup>3)</sup>  $\pm 22$  psi (1.5 bar) at open circuit;  $\pm 29$  psi (2 bar) at closed circuit

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

<sup>5)</sup> with built on valve DBEP6 (HD1T and HD1U) max. pressure at port P for all sizes must be limited from min. 725 psi (50 bar) to max. 1450 psi (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

<sup>6)</sup> on execution H06 the boost pressure must be limited to max. 362 psi (25 bar), since the control pressure is set at 725 psi (50 bar).

# Characteristics

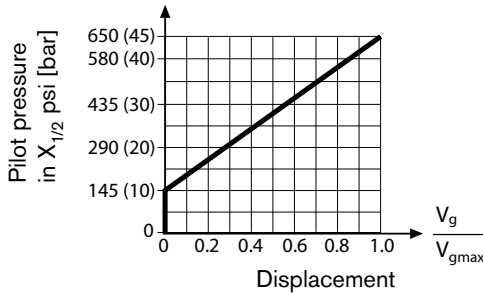
## (A)A4VSO - open circuit

**Please note:** on the (A)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

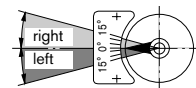


### Relation between

#### Direction of rotation – Pilot pressure – Direction of flow

Direction of rotation	Pilot pressure	Swivel range <sup>1)</sup>	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

<sup>1)</sup> compare swivel angle indicator

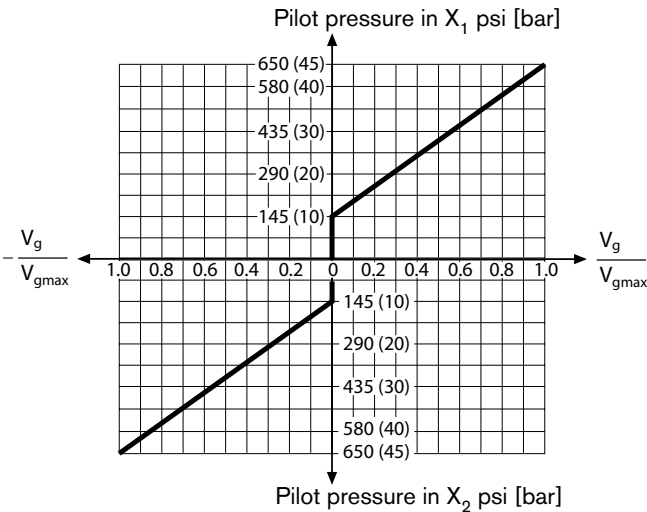


## (A)A4VSG and (A)A4CSG - closed circuit

On the standard execution of the (A)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 145...650 psi (10...45 bar)

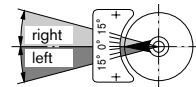


### Relation between

#### Direction of rotation – Pilot pressure – Direction of flow

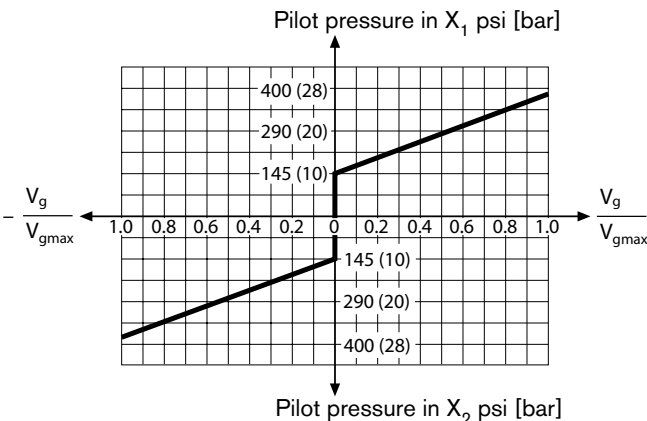
Direction of rotation	Pilot pressure	Swivel range <sup>1)</sup>	Direction of flow	Pressure outlet port
clockwise	in $X_1$	right	B to A	A
	in $X_2$	left	A to B	B
counter clockwise	in $X_1$	right	A to B	B
	in $X_2$	left	B to A	A

<sup>1)</sup> compare swivel angle indicator



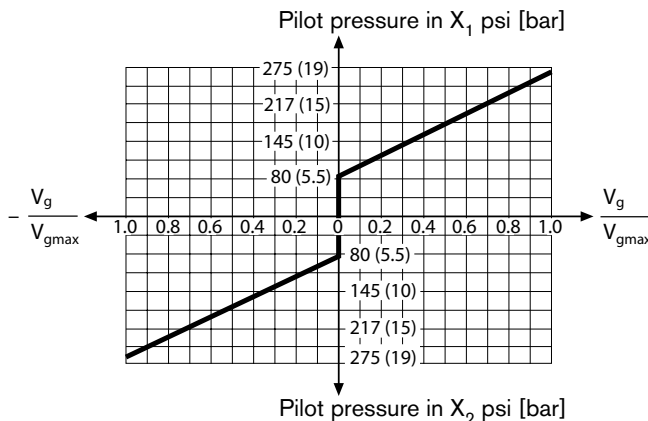
### Characteristic

HD2 pilot pressure 145...400 psi (10...28 bar)



### Characteristic

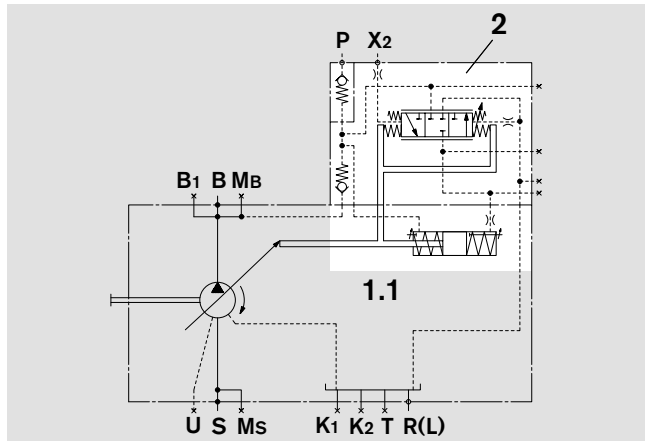
HD3 pilot pressure 80...275 psi (5.5...19 bar)



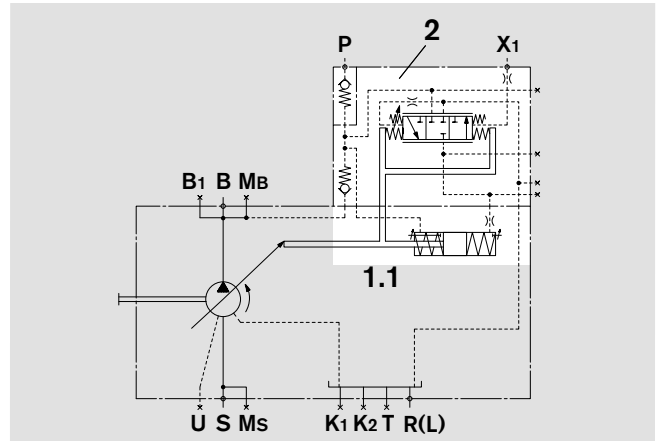
# Schematics (A)A4VSO HD1/2/3

## Size 40 and 71

Direction of rotation clockwise

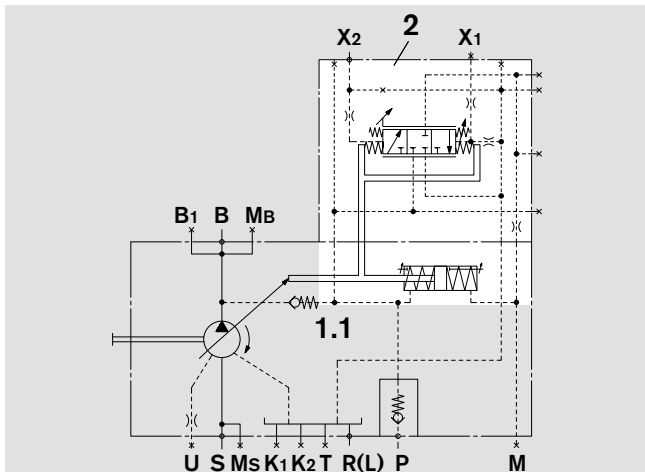


Direction of rotation counter clockwise

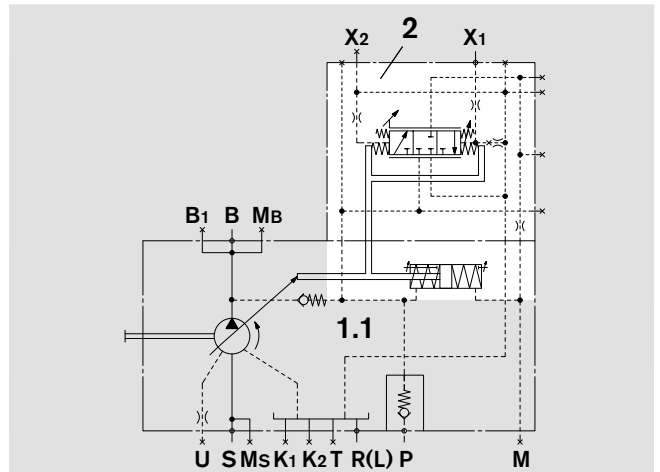


## Size 125...355

Direction of rotation clockwise

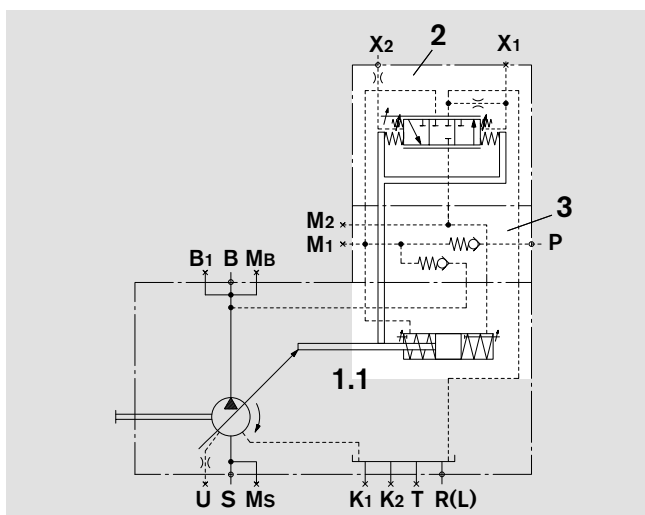


Direction of rotation counter clockwise

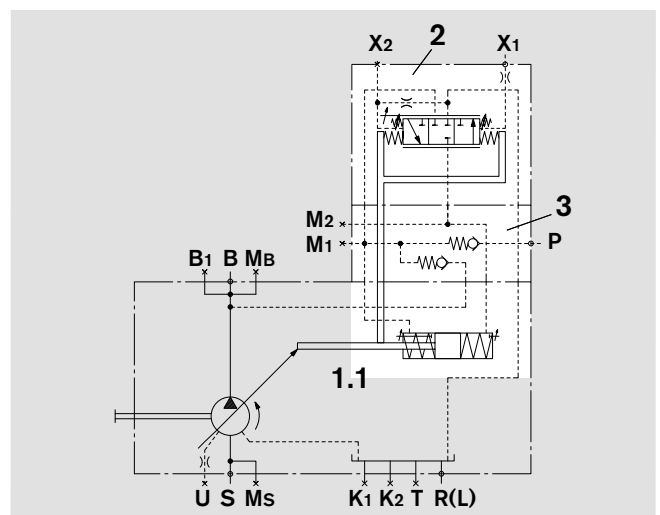


## Size 500...1000

Direction of rotation clockwise



Direction of rotation counter clockwise



### Ports

- X<sub>1</sub>; X<sub>2</sub> Pilot pressure ports
- P Control pressure port

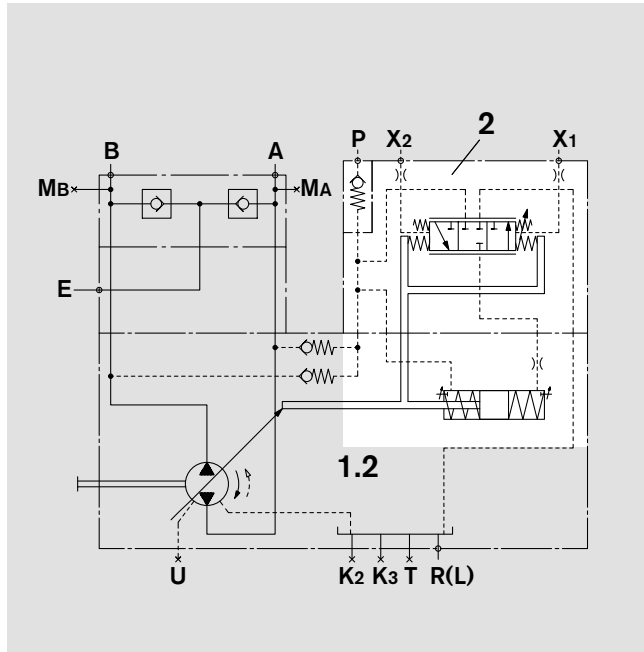
- M; M<sub>1</sub>; M<sub>2</sub> Gauging ports control chamber pressure

**Sub-assemblies** see page 8.

# Schematics (A)A4VSG and (A)A4CSG HD1/2/3

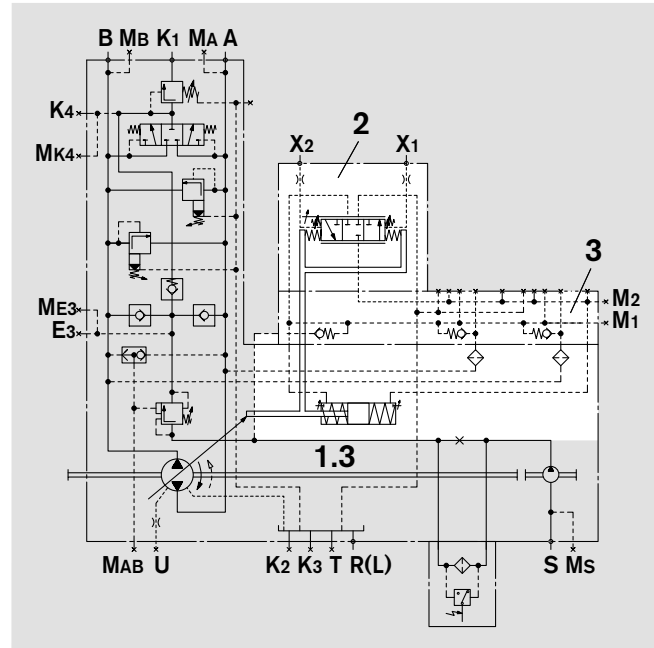
## Size 40 and 71

Example: AA4VSG



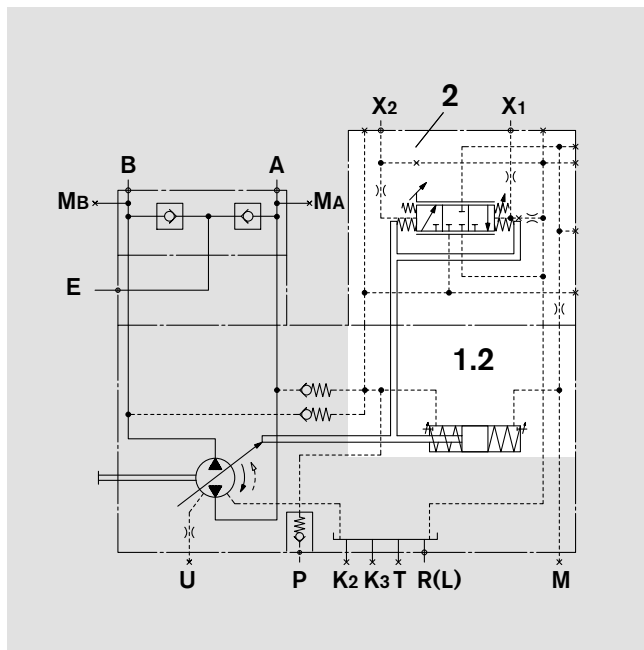
## Size 500...1000

Example: A4CSG



## Size 125...355

Example: AA4VSG



### Sub-assemblies

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

### Ports

- X<sub>1</sub>; X<sub>2</sub> Pilot pressure ports
- P Control pressure port (at (A)A4VSG)
- M Gauging port control chamber pressure (Size 125...355)
- M<sub>1</sub> Gauging port small control chamber (Size 500...1000)
- M<sub>2</sub> Gauging port large control chamber (Size 500...1000)

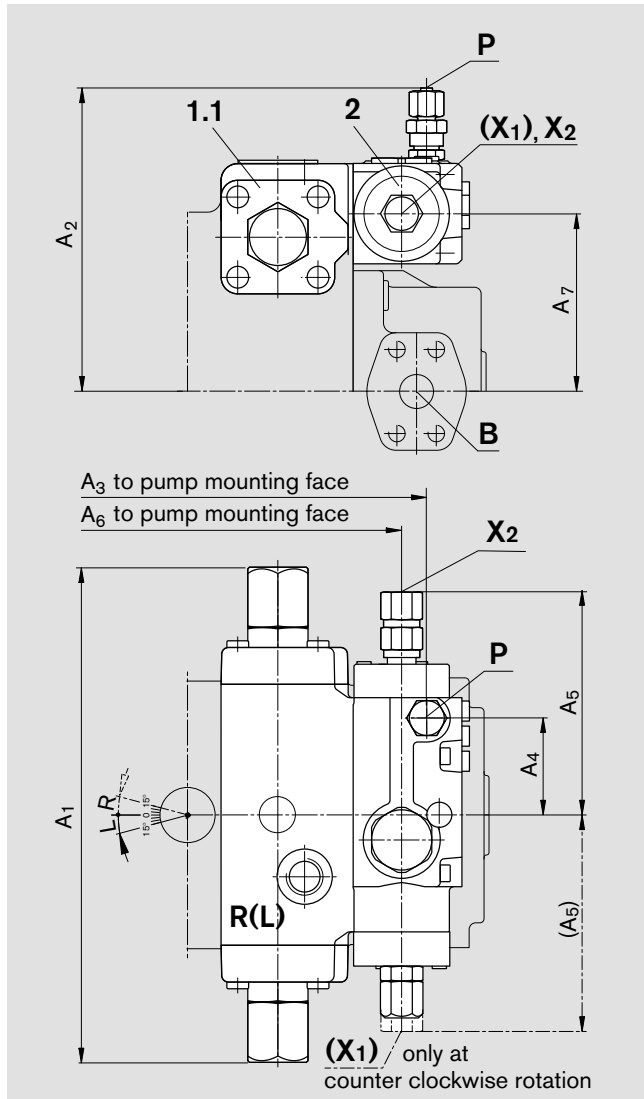


# Unit dimensions HD1/2/3

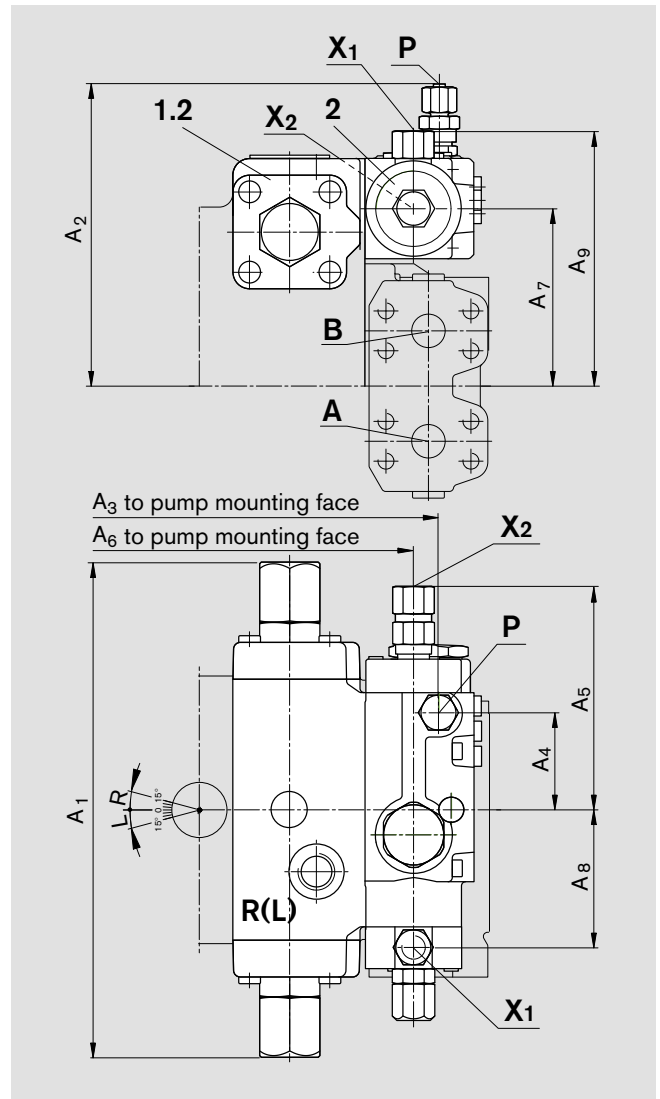
Before finalising your design please request a certified installation drawing. Dimensions in inches and (millimeters)

## Size 40 and 71

### AA4VSO – open circuit



### AA4VSG – closed circuit



**Sub-assemblies** see page 8.

### Ports

X<sub>1</sub>; X<sub>2</sub> Pilot pressure ports ISO 11926 9/16-18UNF-2B; 0.51 (13) deep

AA4VSO in clockwise rotation shows only X<sub>2</sub>, AA4VSO in counter clockwise rotation has only X<sub>1</sub>

P Control pressure port Tube dia 8x1.5mm (DIN 3853 S8 Form W)

**max. tightening torques** <sup>1)</sup>

59 lb-ft (80 Nm)

37 lb-ft (50 Nm)

### Unit dimensions

Size	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	A <sub>4</sub>	A <sub>5</sub>	A <sub>6</sub>	A <sub>7</sub>	A <sub>8</sub>	A <sub>9</sub>	
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)	For detailed unit dimensions and technical data on the variable pumps see the technical data sheets AA4VSO RA 92050 or AA4VSG RA 92100
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)	

<sup>1)</sup> see general notes

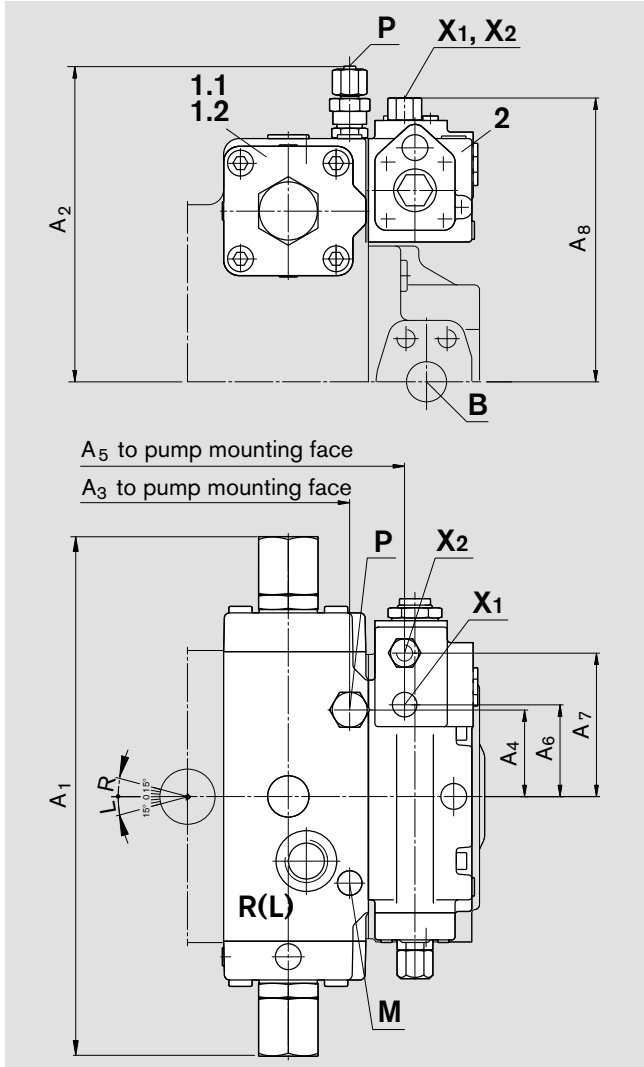
# Unit dimensions HD1/2/3

Before finalising your design please request a certified installation drawing. Dimensions in inches and (millimeters)

## Size 125...355

AA4VSO and AA4VSG

AA4CSG in preparation, dimensions on request



### Sub-assemblies

- 1 Pump with hydraulic control device
- 1.1 AA4VSO (see RA 92050)
- 1.2 AA4VSG (see RA 92100)
- 2 Pilot control unit

### Ports

max. tightening torques <sup>1)</sup>

X <sub>1</sub> ; X <sub>2</sub>	Pilot pressure ports	ISO 11926 9/16-18UNF-2B; 0.51 (13) deep	59 lb-ft (80 Nm)
on AA4VSO in clockwise rotation X <sub>1</sub> is plugged, on AA4VSO in counter clockwise rotation X <sub>2</sub> is plugged (M14x1.5)			
P	Control pressure port	Tube dia 8x1,5 mm (DIN 3853 S8 Form W) (size 125 u. 180)	37 lb-ft (50 Nm)
		Tube dia 12x2 mm (DIN 3853 S12 Form W) (size 250 u. 355)	66 lb-ft (90 Nm)
M	Gauging port control chamber pressure	DIN 3852 M14x1.5; 0.47 (12) deep; plugged (size 125 a. 180)	59 lb-ft (80 Nm)
		M18x1.5; 0.47 (12) deep; plugged (size 250 a. 355)	103 lb-ft (140 Nm)

### Unit dimensions

Size	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	A <sub>4</sub>	A <sub>5</sub>	A <sub>6</sub>	A <sub>7</sub>	A <sub>8</sub>
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)

For detailed dimensions and technical data on the variable pumps see the technical data sheets AA4VSO RA 92050, AA4VSG RA 92100 or AA4CSG RA 92105

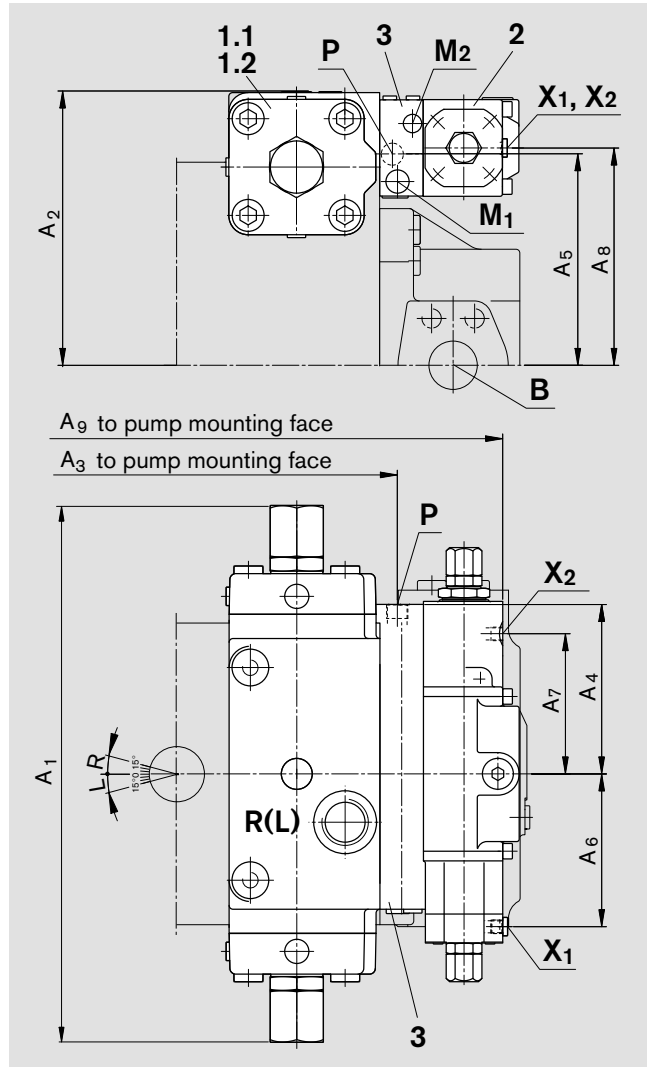
<sup>1)</sup> see general notes

# Unit dimensions HD1/2/3

Before finalising your design please request a certified installation drawing. Dimensions in inches and (millimeters)

## Size 500...1000

### A4VSO and A4VSG



### Sub-assemblies

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

### Ports

Port	Description	Standard	Dimensions	max. tightening torques <sup>1)</sup>
X <sub>1</sub> ; X <sub>2</sub>	Pilot pressure ports	DIN 3852	M14x1.5; 0.47 (12) deep	59 lb-ft (80 Nm)
on A4VSO in clockwise rotation X <sub>1</sub> is plugged, on A4VSG in counter clockwise rotation X <sub>2</sub> is plugged				
P	Control pressure port	DIN 3852	M22x1.5; 0.55 (14) deep	155 lb-ft (210 Nm)
M <sub>1</sub>	Gauging port small control chamber	DIN 3852	M18x1.5; 0.47 (12) deep; plugged	103 lb-ft (140 Nm)
M <sub>2</sub>	Gauging port large control chamber	DIN 3852	M14x1.5; 0.47 (12) deep; plugged	59 lb-ft (80 Nm)

### Unit dimensions

Size	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	A <sub>4</sub>	A <sub>5</sub>	A <sub>6</sub>	A <sub>7</sub>	A <sub>8</sub>	A <sub>9</sub>
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)
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)
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)

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

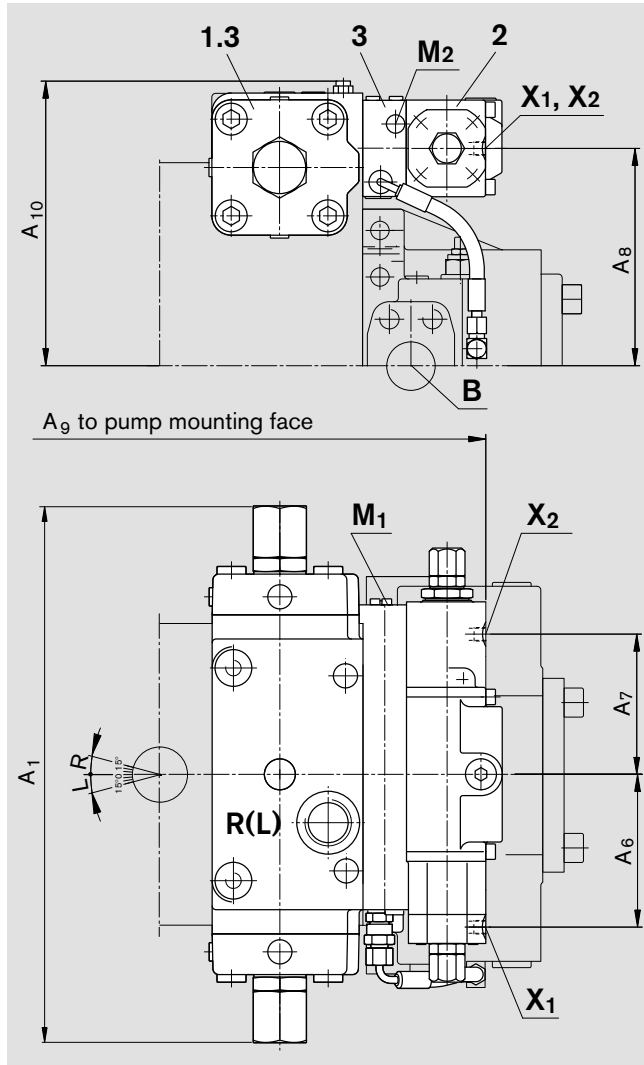
<sup>1)</sup> see general notes

# Unit dimensions HD1/2/3

Before finalising your design please request a certified installation drawing. Dimensions in inches and (millimeters)

Size 500...1000

A4CSG



## Sub-assemblies

- 1 Pump with hydraulic control device
- 1.3 A4CSG (see RA 92105)
- 2 Pilot control unit
- 3 Sandwich plate

## Ports

max. tightening torques <sup>1)</sup>

X <sub>1</sub> ; X <sub>2</sub>	Pilot pressure ports	DIN 3852	M14x1.5; 0.47 (12) deep	59 lb-ft (80 Nm)
M <sub>1</sub>	Gauging port small control chamber	DIN 3852	M22x1.5; 0.55 (14) deep; plugged	155 lb-ft (210 Nm)
M <sub>2</sub>	Gauging port large control chamber	DIN 3852	M14x1.5; 0.47 (12) deep; plugged	59 lb-ft (80 Nm)

## Unit dimensions

Size	A <sub>1</sub>	A <sub>6</sub>	A <sub>7</sub>	A <sub>8</sub>	A <sub>9</sub>	A <sub>10</sub>	
500	21.85 (555)	6.22 (158)	5.71 (145)	8.86 (225)	19.37 (492)	11.69 (297)	
750	24.80 (630)	6.22 (158)	5.71 (145)	11.02 (280)	20.63 (524)	13.98 (355)	For detailed dimensions and technical data on the variable pump see the technical data sheet A4CSG RA 92105
1000	26.38 (670)	6.22 (158)	5.71 (145)	10.94 (278)	23.23 (590)	-	

<sup>1)</sup> 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 14 and 15)  
 HD.B one side in port B (schematics see page 22 and 23)  
 HD.D both sides in ports A and B (schematics see page 30 and 31)

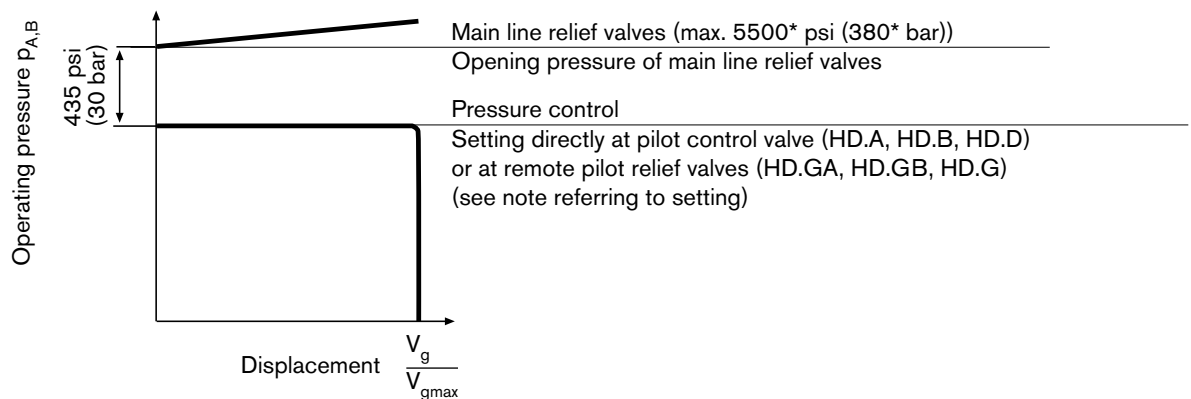
## Setting range 725...5075 psi (50...350 bar)

Standard setting 5075 psi (350 bar). Other settings please state in clear text when ordering.

The settings must be 435 psi (30 bar) below the setting of the main line relief valves ((A)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  $\Delta p \leq 73 \text{ psi (5 bar)}$

Hysteresis  $\leq \pm 73 \text{ psi (5 bar)}$

\* only valid in combination with pressure control – without pressure control, max. main line relief settings 5075 psi (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 (RA 25 402)

The max. line length should not exceed 6.5 ft (2m).

The standard setting of the differential pressure at the pumps control valve is 435 psi (30 bar). With this setting the pilot oil consumption amounts to approx. 0.53 gpm (2 L/min). If another setting is required (range 200...725 psi (14...50 bar)) please state in clear text.

### Notes about the setting of the remote pressure control level:

The setting of the external relief valve plus the differential pressure at the control valve make up the value of the overall pressure control level.

Example: external pilot relief valve setting	4640 psi (320 bar)
differential pressure at control valve	435 psi (30 bar)
equals pressure control level of	$4640 + 435 = 5075 \text{ psi (320 + 30 = 350 bar)}$

Remote pressure control available as : HD.GA one side in port A (schematics see page 16 and 17)  
 HD.GB one side in port B (schematics see page 24 and 25)  
 HD.G both sides in ports A and B (schematics see page 32 and 33)

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

The pressure control valve controls the pressure in port A. Description see page 13.

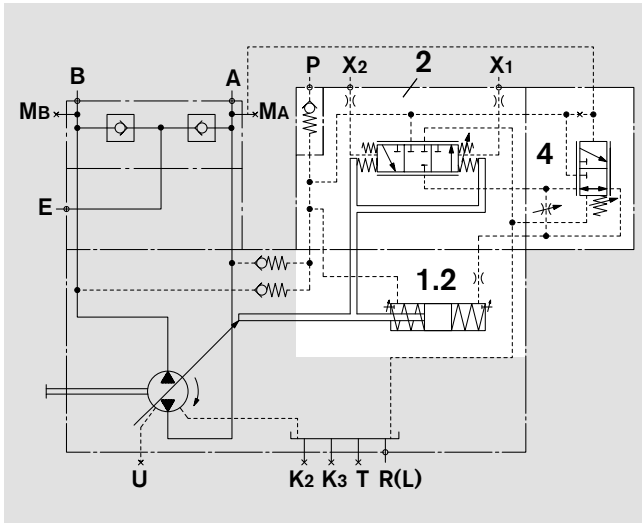
Not available on AA4VSO.

Not possible for bi-directional rotation.

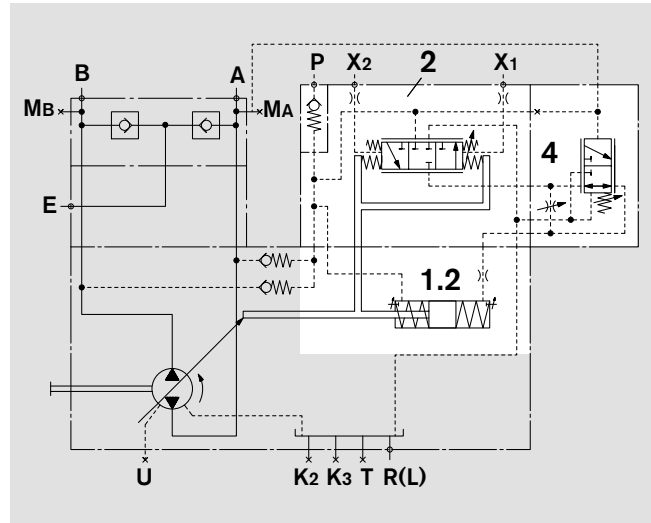
## Schematics example AA4VSG

Size 40 and 71

Direction of rotation clockwise

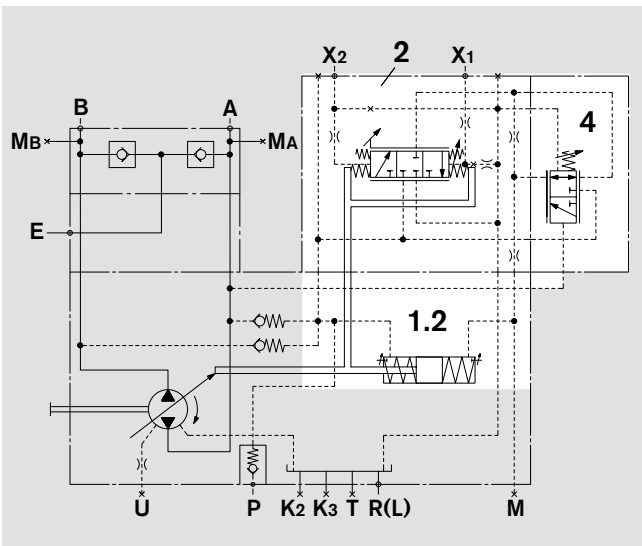


Direction of rotation counter clockwise

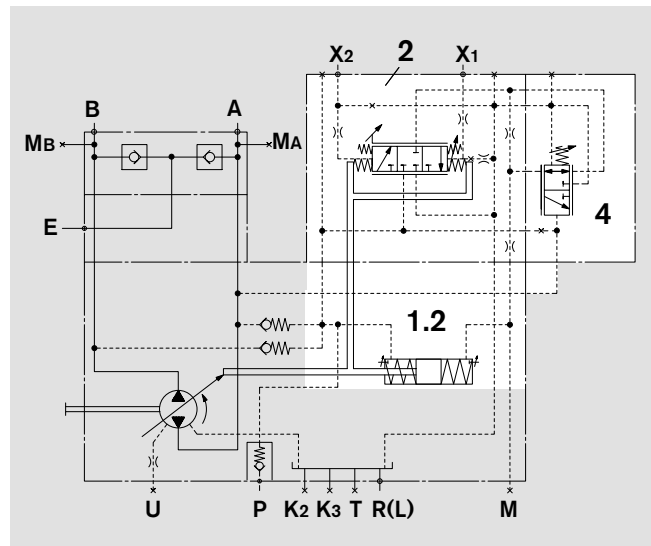


Size 125...355

Direction of rotation clockwise



Direction of rotation counter clockwise



### Ports

- X<sub>1</sub>; X<sub>2</sub> 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 AA4VSG (see RA 92100)
- 2 Pilot control unit
- 4 Pressure control valve for port A

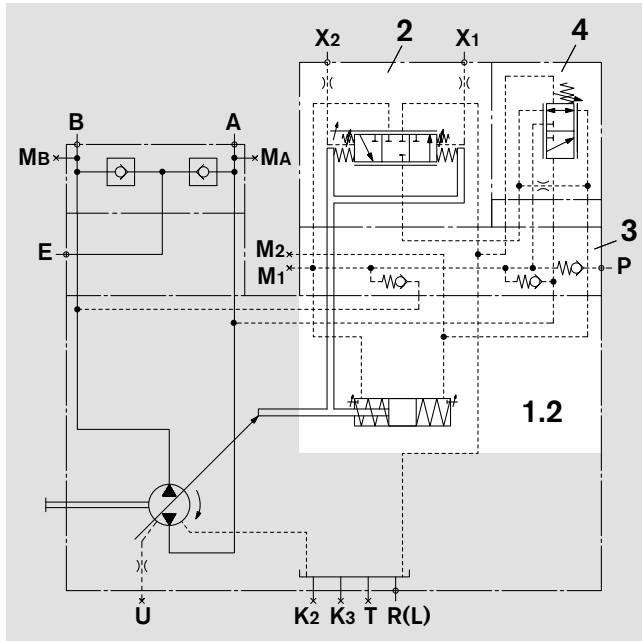
Size 500...1000 see page 15

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

## Schematics example A4VSG

Size 500...1000

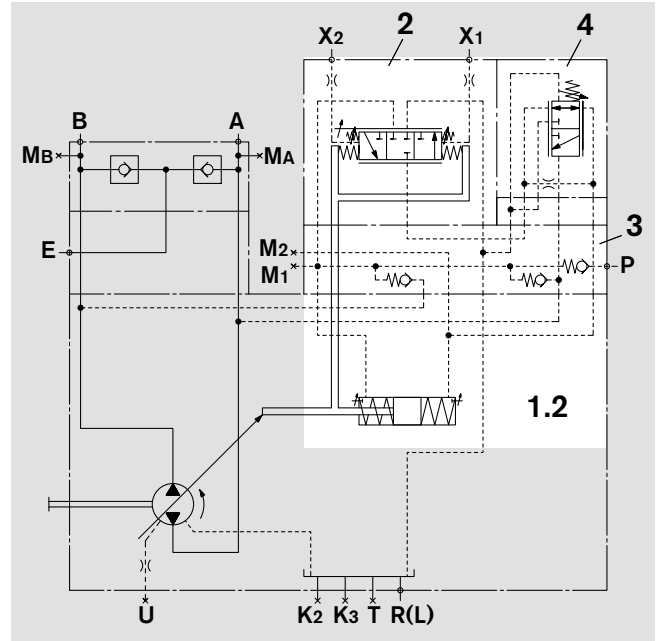
Direction of rotation clockwise



### 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 RA 92100)
- 2 Pilot control unit
- 3 Sandwich plate
- 4 Pressure control valve for port A

# 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 13.

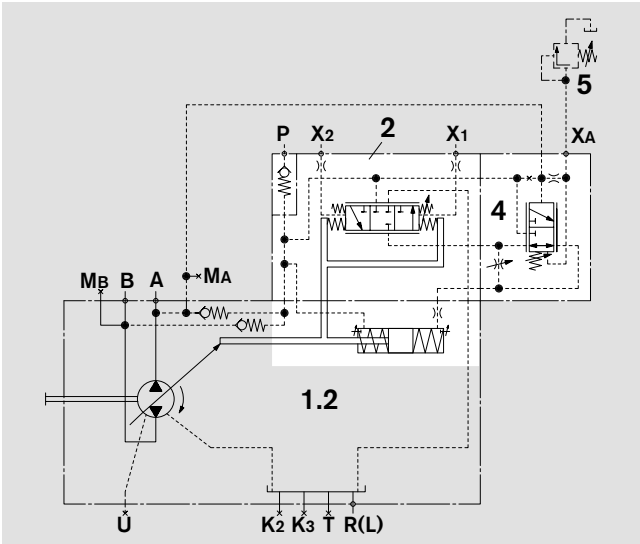
Not available on AA4VSO.

Not possible for bi-directional rotation.

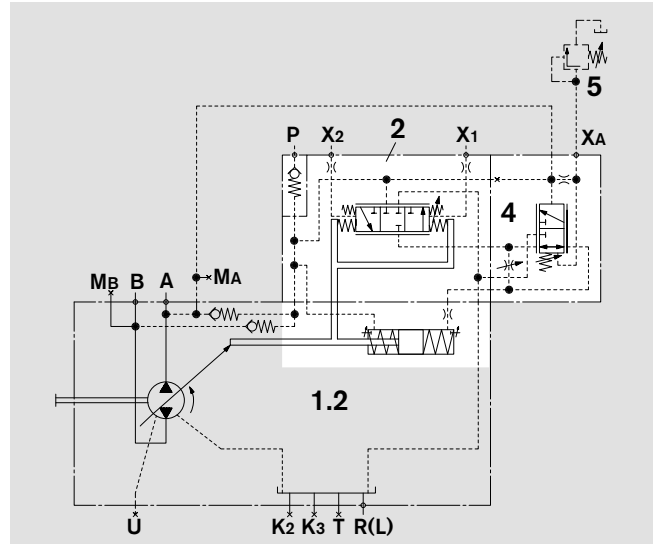
## Schematics example AA4VSG

Size 40 and 71

Direction of rotation clockwise

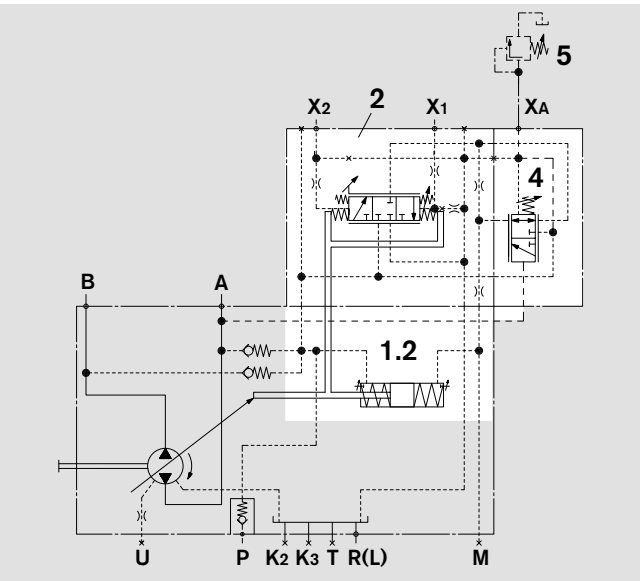


Direction of rotation counter clockwise

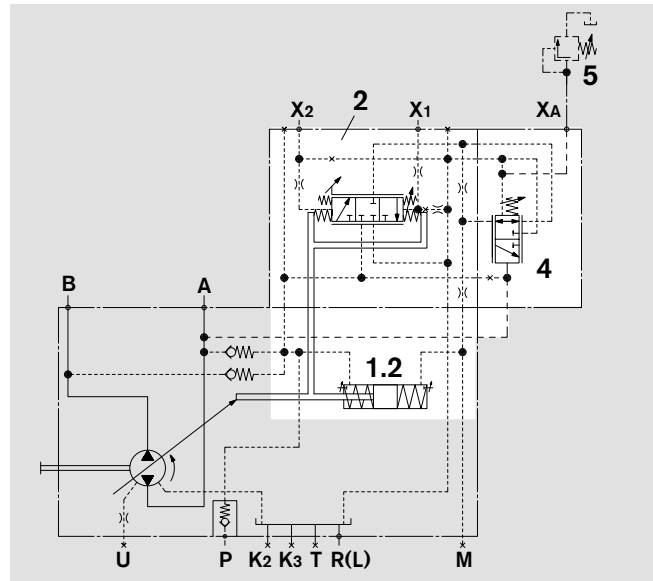


Size 125...355

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 17

### Sub-assemblies

- 1 Pump with hydraulic control device
- 1.2 AA4VSG (see RA 92100)
- 2 Pilot control valve
- 4 Pressure control valve for port A
- 5 External pilot relief valve (not included in supply)

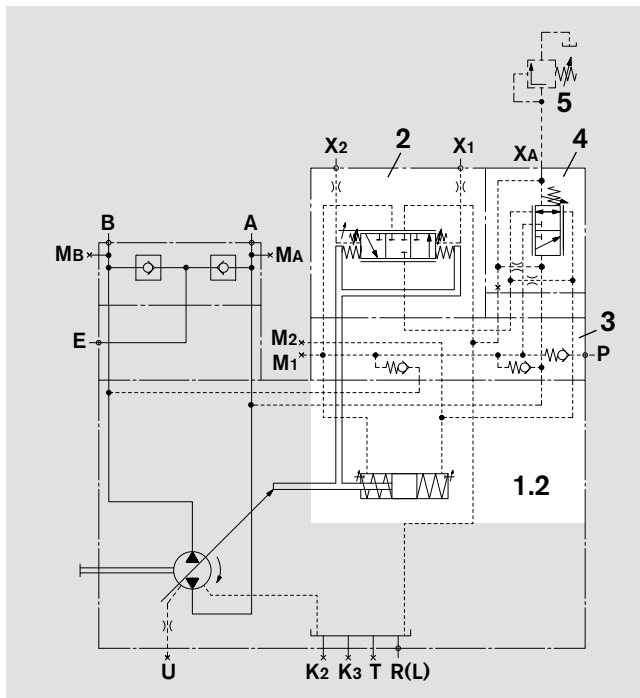


# HD.GA with remote pressure control on one side for port A

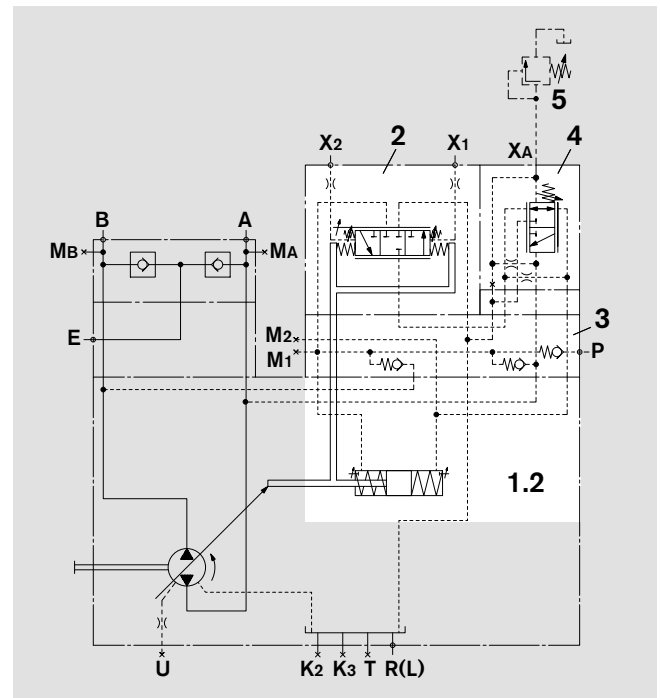
## Schematics example A4VSG

Size 500...1000

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
- $M_1$  Gauging port small control chamber
- $M_2$  Gauging port large control chamber

### Sub-assemblies

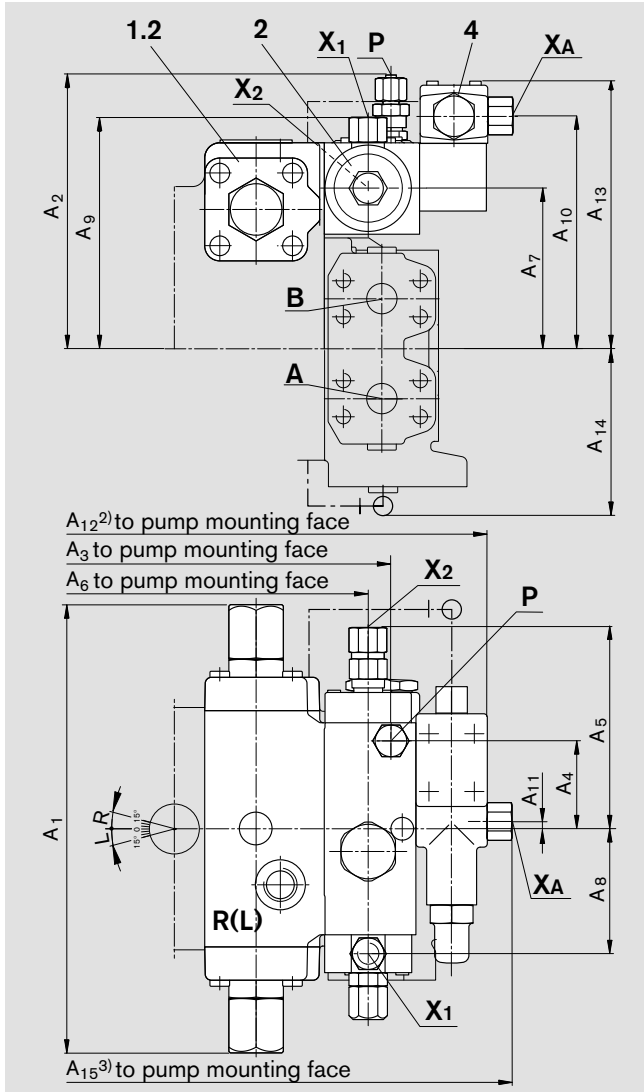
- 1 Pump with hydraulic control device
- 1.2 A4VSG (see RA 92100)
- 2 Pilot control unit
- 3 Sandwich plate
- 4 Pressure control valve for port A
- 5 External pilot relief valve (not included in supply)

# Unit dimensions HD.A / HD.GA

Before finalising your design please request a certified installation drawing. Dimensions in inches and (millimeters)

## Size 40 and 71

### AA4VSG



### Sub-assemblies

- 1 Pump with hydraulic control device
- 1.2 AA4VSG (see RA 92100)
- 2 Pilot control unit
- 4 Pressure control valve for port A

### Ports

Port	Description	ISO	Dimensions	max. tightening torques <sup>1)</sup>
X <sub>A</sub>	Pilot pressure port for remote pressure control in A	ISO 11926	9/16-18UNF-2B; 0.51 (13) deep; plugged on HDA (M14x1.5)	59 lb-ft (80 Nm)
X <sub>1</sub> ; X <sub>2</sub>	Pilot pressure ports	ISO 11926	9/16-18UNF-2B; 0.51 (13) deep	59 lb-ft (80 Nm)
P	Control pressure port		Tube dia. 8x1.5 mm (DIN 3853 S8 Form W)	37 lb-ft (50 Nm)

### Unit dimensions

Size	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	A <sub>4</sub>	A <sub>5</sub>	A <sub>6</sub>	A <sub>7</sub>	A <sub>8</sub>	A <sub>9</sub>	A <sub>10</sub>	A <sub>11</sub>	A <sub>12</sub> <sup>2)</sup>	A <sub>13</sub>	A <sub>14</sub>	A <sub>15</sub> <sup>3)</sup>	Notes
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)	11.85 (301)	7.44 (189)	5.35 (136)	12.72 (323)	For detailed unit dimensions and tech. data on the variable pump see the technical data sheet AA4VSG RA 92100
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)	12.91 (328)	8.07 (205)	5.47 (139)	13.78 (350)	

<sup>1)</sup> see general notes, <sup>2)</sup> valid for HD.A, <sup>3)</sup> valid for HD.GA

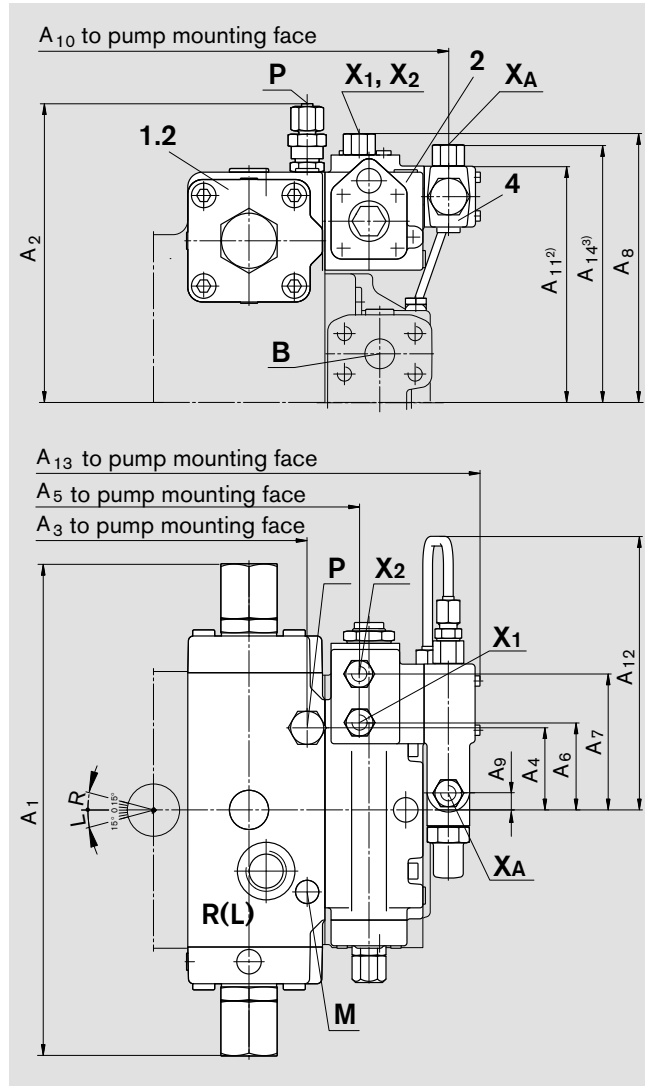
# Unit dimensions HD.A / HD.GA

Before finalising your design please request a certified installation drawing. Dimensions in inches and (millimeters)

## Size 125...355

### AA4VSG

### AA4CSG in preparation, dimensions on request



### Sub-assemblies

- 1 Pump with hydraulic control device
- 1.2 AA4VSG (see RA 92100)
- 2 Pilot control unit
- 4 Pressure control valve for port A

### Ports

Port	Description	Dimensions	max. tightening torques <sup>1)</sup>
X <sub>A</sub>	Pilot pressure port for remote pressure control in A	ISO 11926 9/16-18UNF-2B; 0.51 (13) deep; plugged on HDA (M14x1.5)	59 lb-ft (80 Nm)
X <sub>1</sub> ; X <sub>2</sub>	Pilot pressure ports	ISO 11926 9/16-18UNF-2B; 0.51 (13) deep	59 lb-ft (80 Nm)
P	Control pressure port	Tube dia. 8x1.5mm (DIN 3853 S8 Form W) (Size 125 a. 180) Tube dia. 12x2mm (DIN 3853 S12 Form W) (Size 250 a. 355)	37 lb-ft (50 Nm) 66 lb-ft (90 Nm)
M	Gauging port control chamber pressure	DIN 3852 M14x1.5; 0.47 (12) deep; plugged (Size 125 a. 180) M18x1.5; 0.47 (12) deep; plugged (Size 250 a. 355)	59 lb-ft (80 Nm) 103 lb-ft (140 Nm)

### Unit dimensions

Size	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	A <sub>4</sub>	A <sub>5</sub>	A <sub>6</sub>	A <sub>7</sub>	A <sub>8</sub>	A <sub>9</sub>	A <sub>10</sub>	A <sub>11</sub> <sup>2)</sup>	A <sub>12</sub>	A <sub>13</sub>	A <sub>14</sub> <sup>3)</sup>	
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)	7.56 (192)	8.82 (224)	15.51 (394)	8.43 (214)	For detailed dimensions and technical data on the variable pumps see the technical data sheets AA4VSG RA 92100 or AA4CSG RA 92105
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)	7.56 (192)	8.82 (224)	15.59 (396)	8.43 (214)	
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)	0.51 (13)	16.93 (430)	8.98 (228)	8.82 (224)	17.95 (456)	9.84 (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)	8.98 (228)	8.82 (224)	17.95 (456)	9.84 (250)	

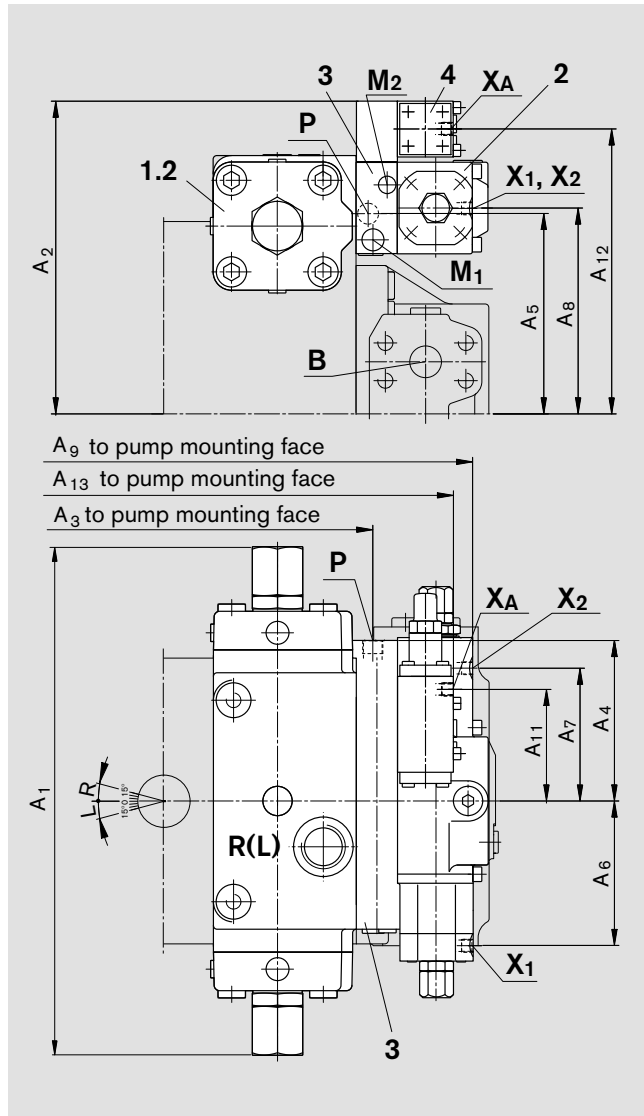
<sup>1)</sup> see general notes, <sup>2)</sup> valid for HD.A, <sup>3)</sup> valid for HD.GA

# Unit dimensions HD.A / HD.GA

Before finalising your design please request a certified installation drawing. Dimensions in inches and (millimeters)

## Size 500...1000

### A4VSG



### Sub-assemblies

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

### Ports

Port	Description	Thread	max. tightening torques <sup>1)</sup>
X <sub>A</sub>	Pilot pressure port for remote pressure control in A	DIN 3852 M14x1.5; 0.47 (12) deep; plugged on HDA	59 lb-ft (80 Nm)
X <sub>1</sub> ; X <sub>2</sub>	Pilot pressure ports	DIN 3852 M14x1.5; 0.47 (12) deep	59 lb-ft (80 Nm)
P	Control pressure port	DIN 3852 M22x1.5; 0.55 (14) deep	155 lb-ft (210 Nm)
M <sub>1</sub>	Gauging port small control chamber	DIN 3852 M18x1.5; 0.47 (12) deep; plugged	103 lb-ft (140 Nm)
M <sub>2</sub>	Gauging port large control chamber	DIN 3852 M14x1.5; 0.47 (12) deep; plugged	59 lb-ft (80 Nm)

### Unit dimensions

Size	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	A <sub>4</sub>	A <sub>5</sub>	A <sub>6</sub>	A <sub>7</sub>	A <sub>8</sub>	A <sub>9</sub>	A <sub>11</sub>	A <sub>12</sub>	A <sub>13</sub>	
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)	For detailed dimensions and technical data on the variable pump see the technical data sheet A4VSG RA 92100
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)	

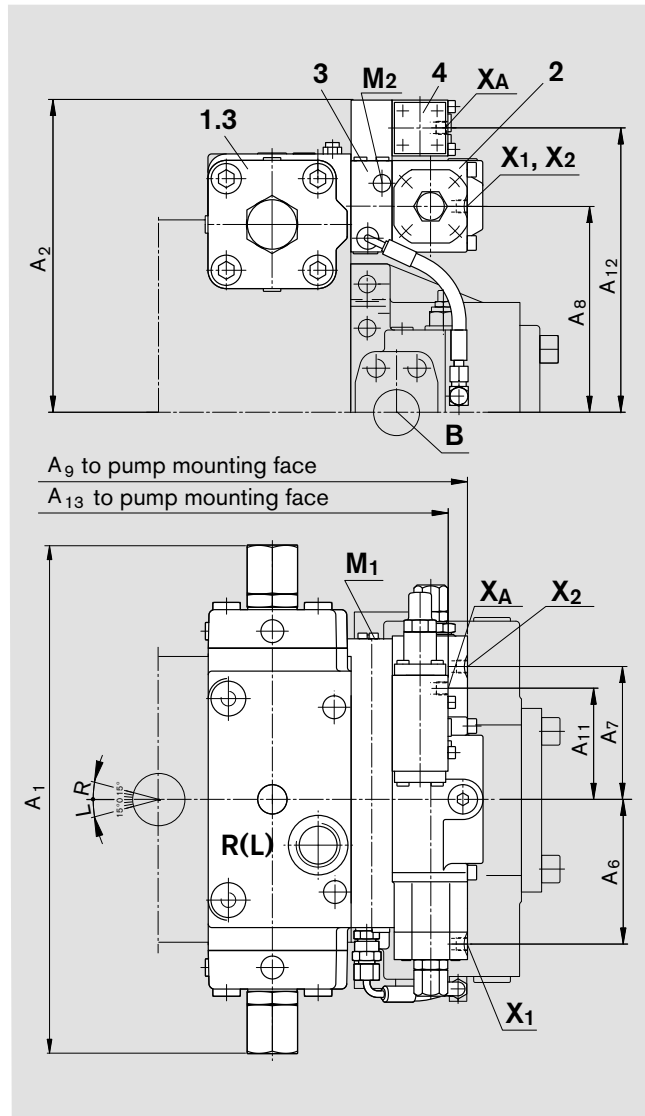
<sup>1)</sup> see general notes

# Unit dimensions HD.A / HD.GA

Before finalising your design please request a certified installation drawing. Dimensions in inches and (millimeters)

Size 500...1000

A4CSG



## Sub-assemblies

- 1 Pump with hydraulic control device
- 1.3 A4CSG (see RA 92105)
- 2 Pilot control unit
- 3 Sandwich plate
- 4 Pressure control valve for port A

## Ports

max. tightening torques <sup>1)</sup>

X <sub>A</sub>	Pilot pressure port for remote pressure control in A	DIN 3852 M14x1.5; 0.47 (12) deep; plugged on HDA	59 lb-ft (80 Nm)
X <sub>1</sub> ; X <sub>2</sub>	Pilot pressure ports	DIN 3852 M14x1.5; 0.47 (12) deep	59 lb-ft (80 Nm)
M <sub>1</sub>	Gauging port small control chamber	DIN 3852 M22x1.5; 0.55 (14) deep; plugged (A4CSG)	155 lb-ft (210 Nm)
M <sub>2</sub>	Gauging port large control chamber	DIN 3852 M14x1.5; 0.47 (12) deep; plugged	59 lb-ft (80 Nm)

## Unit dimensions

Size	A <sub>1</sub>	A <sub>2</sub>	A <sub>6</sub>	A <sub>7</sub>	A <sub>8</sub>	A <sub>9</sub>	A <sub>11</sub>	A <sub>12</sub>	A <sub>13</sub>
500	21.85 (555)	13.46 (342)	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)	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)	6.22 (158)	5.71 (145)	10.94 (278)	23.23 (590)	5.35 (136)	14.49 (368)	22.32 (567)

For detailed dimensions and technical data on the variable pump see the technical data sheet A4CSG RA 92105

<sup>1)</sup> see general notes

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

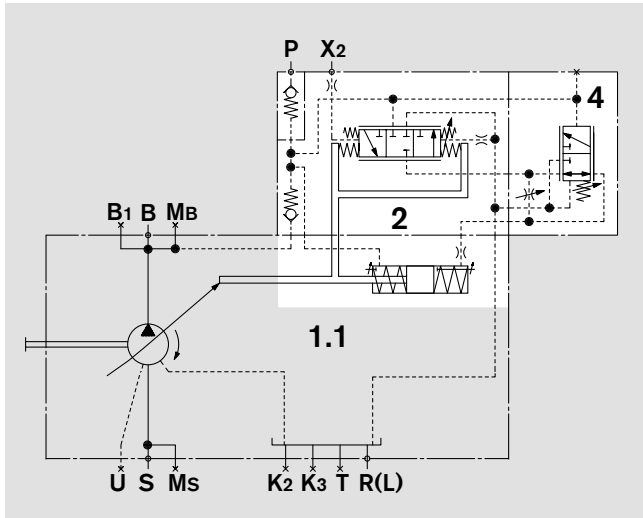
The pressure control valve controls the pressure in port B. Description see page 13.

Not possible for bi-directional rotation.

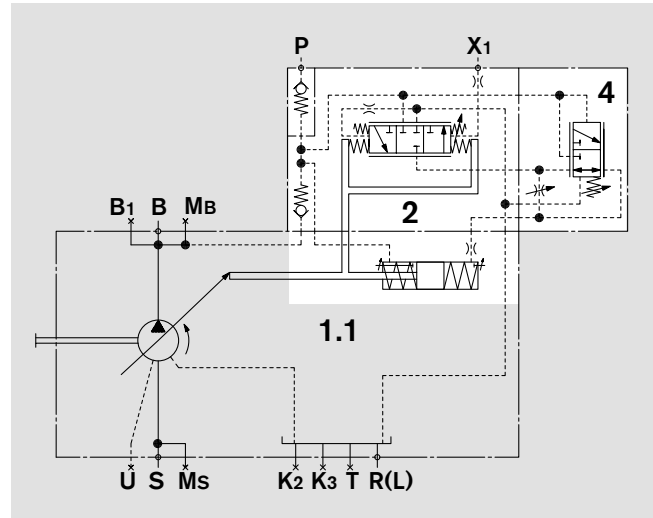
## Schematics

### Size 40 and 71

Direction of rotation clockwise  
(Example AA4VSO)

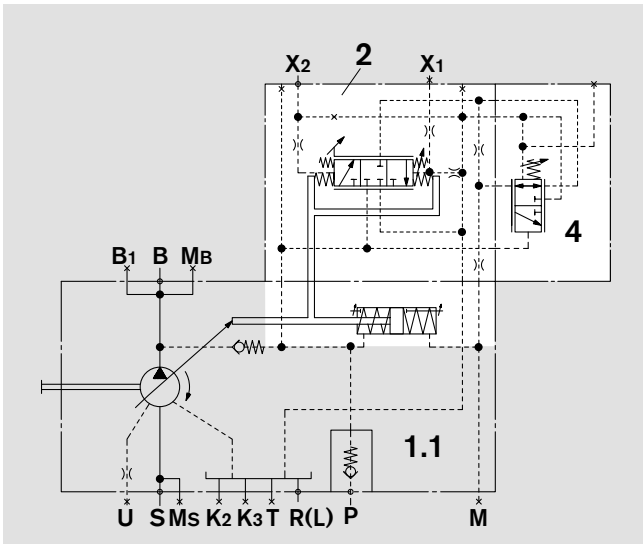


Direction of rotation counter clockwise  
(Example AA4VSO)

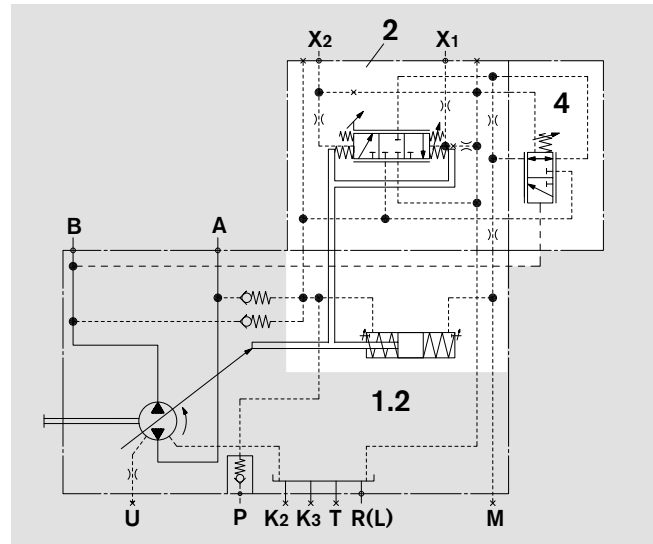


### Size 125...355

Direction of rotation clockwise  
(Example AA4VSO)



Direction of rotation counter clockwise  
(Example AA4VSG)



## Ports

- X<sub>1</sub>; X<sub>2</sub> Pilot pressure ports
- P Control pressure port
- M Gauging port control chamber pressure (Size 125...355)

## Sub-assemblies

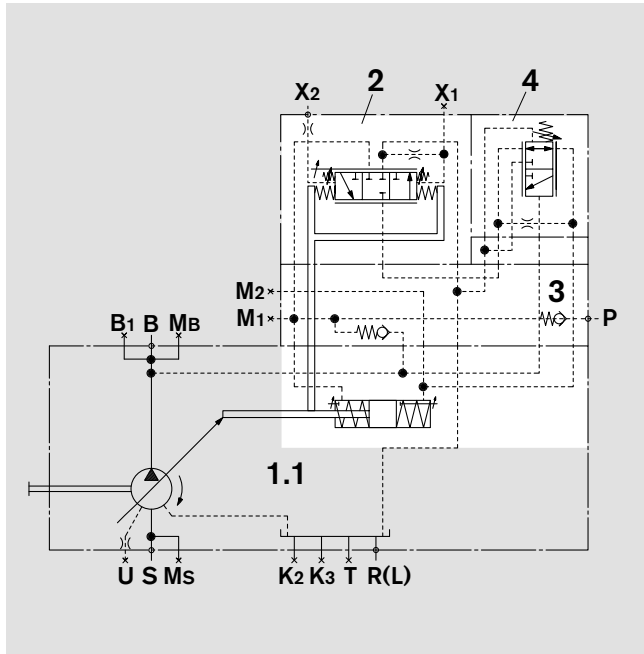
- 1 Pump with hydraulic control device
- 1.1 AA4VSO (see RA 92050)
- 1.2 AA4VSG (see RA 92100)
- 2 Pilot control unit
- 4 Pressure control valve for port B

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

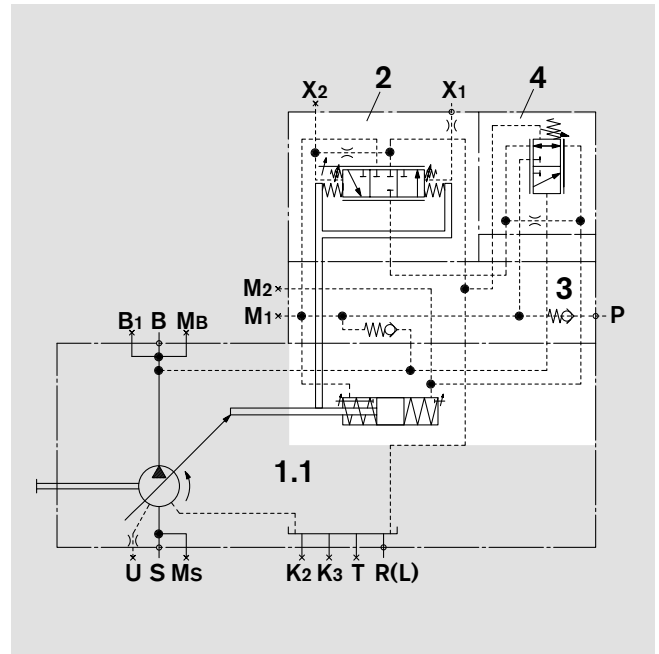
## Schematics example A4VSO

Size 500...1000

Direction of rotation clockwise



Direction of rotation counter clockwise



### Ports

- X<sub>1</sub>; X<sub>2</sub> Pilot pressure ports
- P Control pressure port
- M<sub>1</sub> Gauging port small control chamber
- M<sub>2</sub> Gauging port large control chamber

### Sub-assemblies

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

# HD.GB with remote pressure control for port B

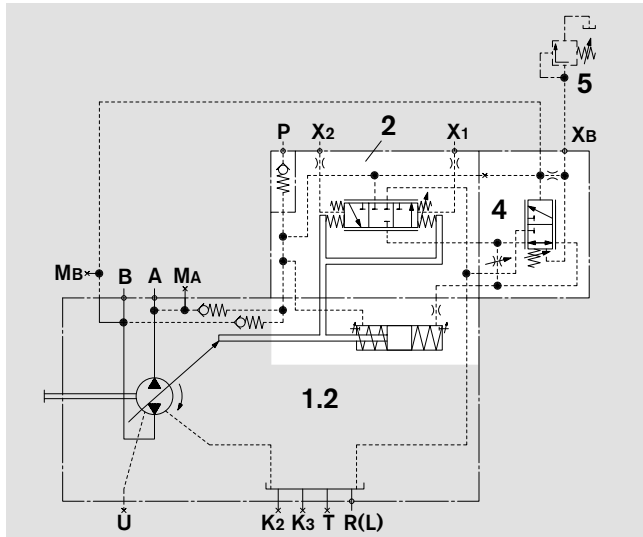
The remote pressure control is carried out via port  $X_B$ . The external pilot relief valve (item 5) is not included in the supply. Description see page 13.

Not possible for bi-directional rotation.

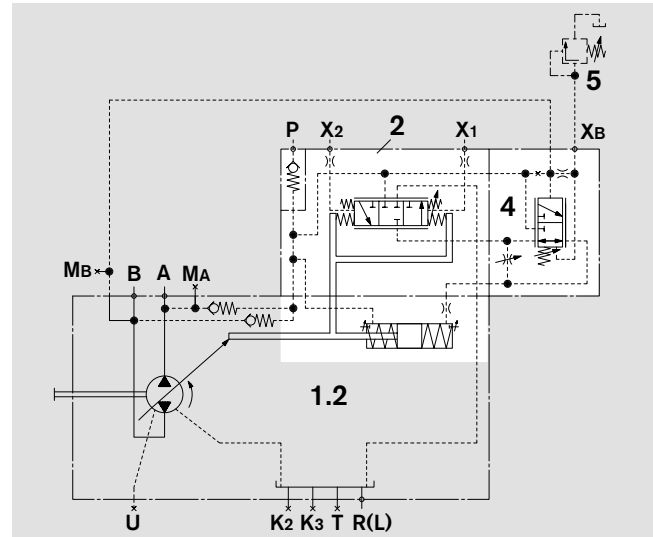
## Schematics example AA4VSG

Size 40 and 71

Direction of rotation clockwise

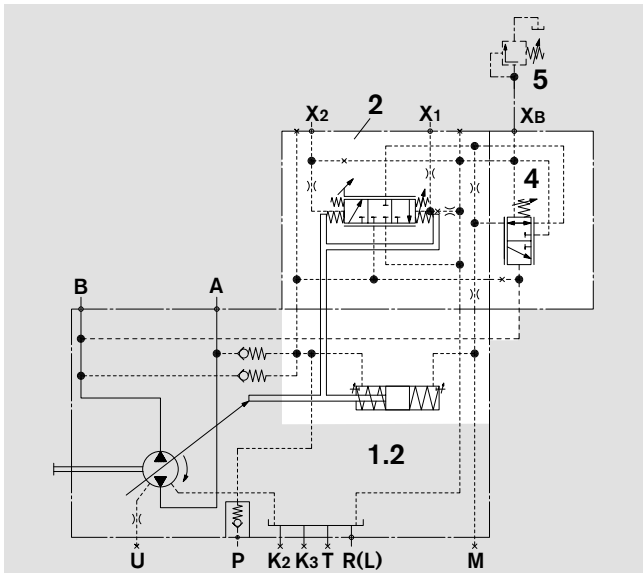


Direction of rotation counter clockwise

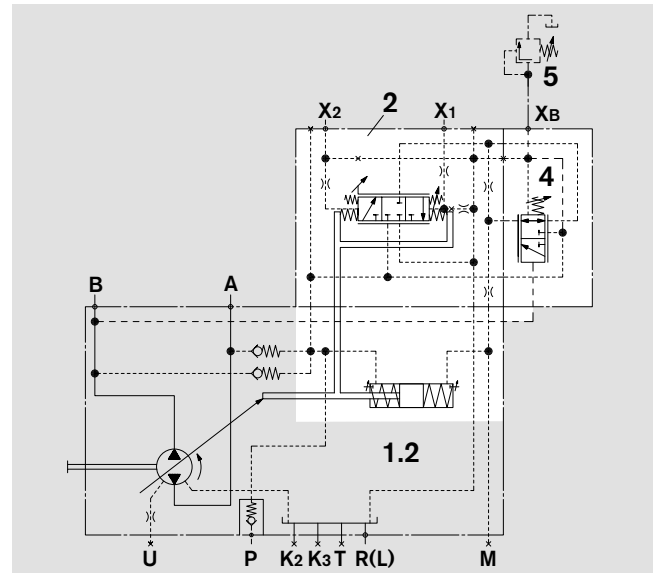


Size 125...355

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
- 1.2 AA4VSG (see RA 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 25

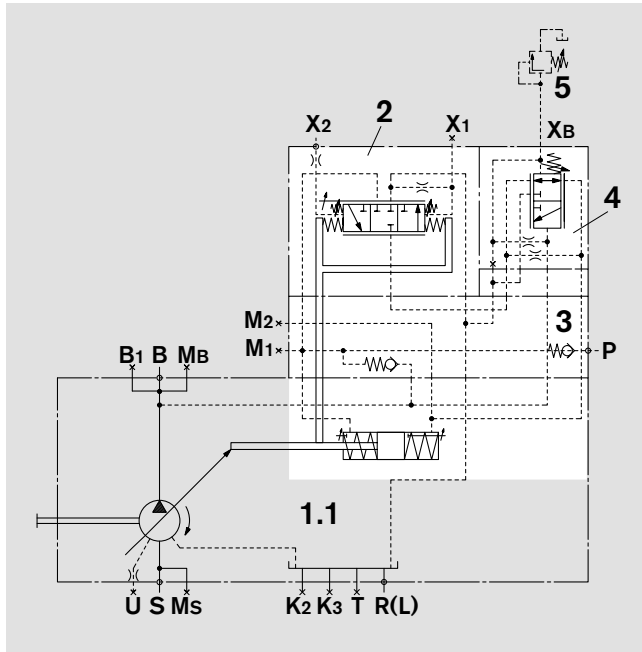


# HD.GB with remote pressure control for port B

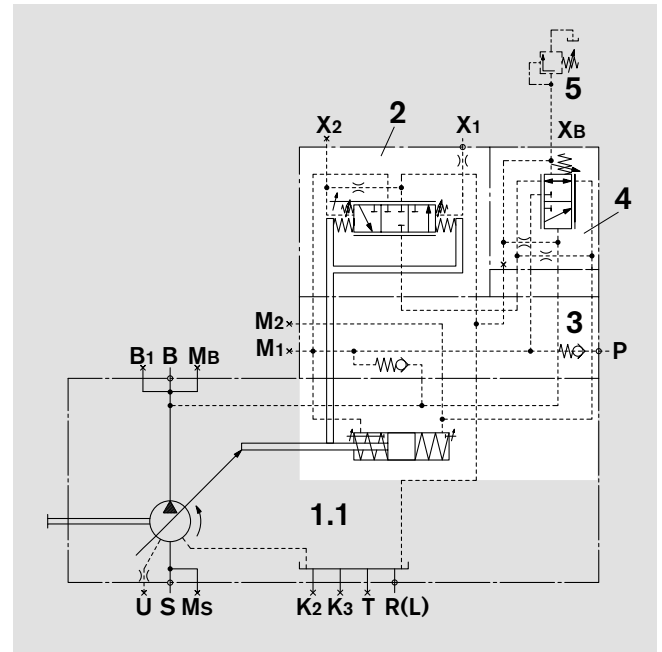
## Schematics example A4VSO

Size 500...1000

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
- $M_1$  Gauging port small control chamber
- $M_2$  Gauging port large control chamber

### Sub-assemblies

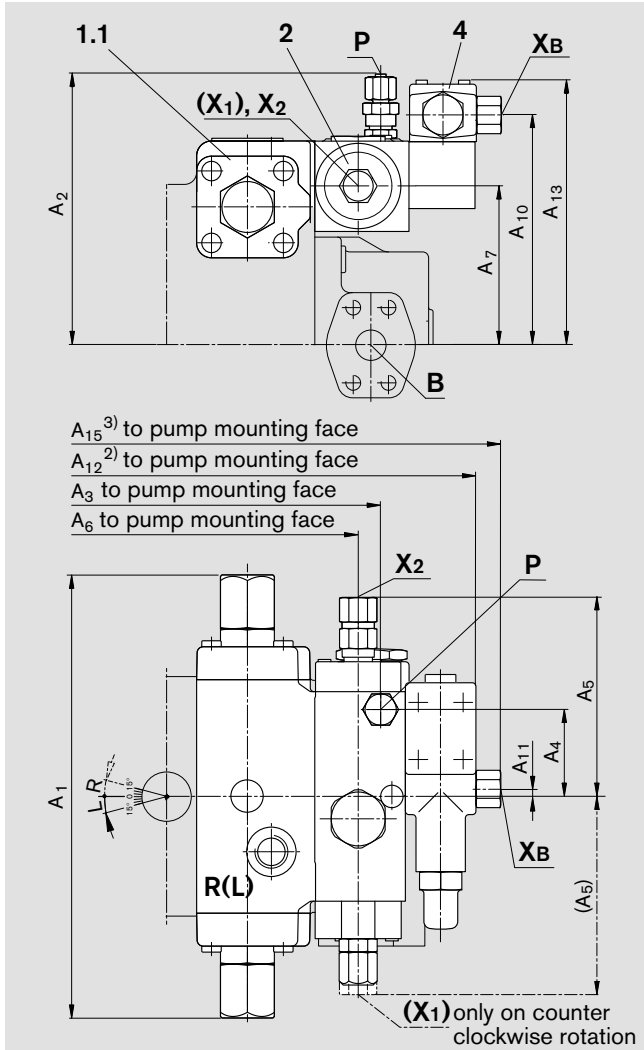
- 1 Pump with hydraulic control device
- 1.1 A4VSO (see RA 92050)
- 2 Pilot control valve
- 3 Sandwich plate
- 4 Pressure control valve for port B
- 5 External pilot relief valve (not included in supply)

# Unit dimensions HD.B / HD.GB

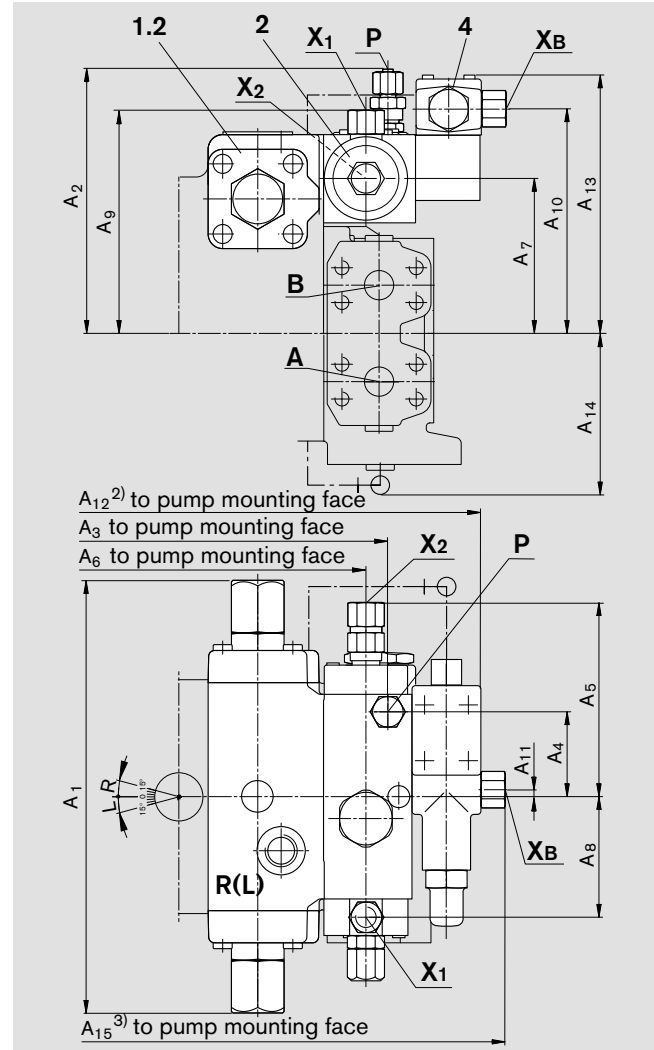
Before finalising your design please request a certified installation drawing. Dimensions in inches and (millimeters)

## Size 40 and 71

### AA4VSO



### AA4VSG



**Sub-assemblies** see page 27

### Ports

Port	Description	ISO Standard	max. tightening torques <sup>1)</sup>
X <sub>B</sub>	Pilot pressure port for remote pressure control in B	ISO 11926 9/16-18UNF-2B; 0.51 (13) deep; plugged on HDB (M14x1.5)	59 lb-ft (80 Nm)
X <sub>1</sub> ; X <sub>2</sub>	Pilot pressure ports on AA4VSO clockwise rotation only X <sub>2</sub> exists, on AA4VSO counter clockwise rotation only X <sub>1</sub> exists	ISO 11926 9/16-18UNF-2B; 0.51 (13) deep	59 lb-ft (80 Nm)
P	Control pressure port	Tube dia. 8x1.5 mm (DIN 3853 S8 Form W)	37 lb-ft (50 Nm)

### Unit dimensions

Size	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	A <sub>4</sub>	A <sub>5</sub>	A <sub>6</sub>	A <sub>7</sub>	A <sub>8</sub>	A <sub>9</sub>	A <sub>10</sub>	A <sub>11</sub>	A <sub>12</sub> <sup>2)</sup>	A <sub>13</sub>	A <sub>14</sub>	A <sub>15</sub> <sup>3)</sup>	Notes
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)	11.85 (301)	7.44 (189)	5.35 (136)	12.72 (323)	For detailed unit dimensions and tech. data on the variable pumps see the technical data sheets AA4VSO RA 92050 or AA4VSG RA 92100
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)	12.91 (328)	8.07 (205)	5.47 (139)	13.78 (350)	

<sup>1)</sup> see general notes, <sup>2)</sup> valid for HD.B, <sup>3)</sup> valid for HD.GB

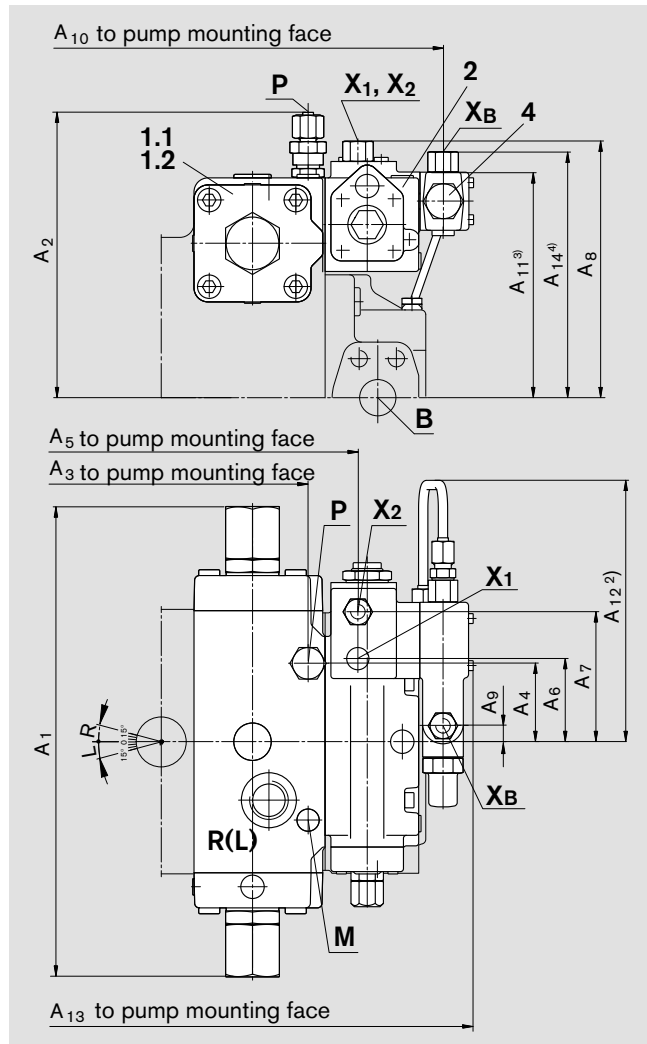
# Unit dimensions HD.B / HD.GB

Before finalising your design please request a certified installation drawing. Dimensions in inches and (millimeters)

## Size 125...355

### AA4VSO and AA4VSG

### AA4CSG in preparation, dimensions on request



### Sub-assemblies

- 1 Pump with hydraulic control device
- 1.1 AA4VSO (see RA 92050)
- 1.2 AA4VSG (see RA 92100)
- 1.3 AA4CSG (see RA 92105)
- 2 Pilot control unit
- 4 Pressure control valve for port B

### Ports

Port	Description	ISO / DIN	Dimensions	max. tightening torques <sup>1)</sup>
X <sub>B</sub>	Pilot pressure port for remote pressure control in B	ISO 11926	9/16-18UNF-2B; 0.51 (13) deep; plugged on HDB (M14x1.5)	59 lb-ft (80 Nm)
X <sub>1</sub> ; X <sub>2</sub>	Pilot pressure ports on AA4VSO in clockwise rotation X <sub>1</sub> is plugged, on AA4VSO in counter clockwise rotation X <sub>2</sub> is plugged (M14x1.5)	ISO 11926	9/16-18UNF-2B; 0.51 (13) deep	59 lb-ft (80 Nm)
P	Control pressure port		Tube dia. 8x1.5mm (DIN 3853 S8 Form W) (Size 125 a. 180) Tube dia. 12x2mm (DIN 3853 S12 Form W) (Size 250 a. 355)	37 lb-ft (50 Nm) 66 lb-ft (90 Nm)
M	Gauging port control chamber pressure	DIN 3852	M14x1.5; 0.47 (12) deep; plugged (Size 125 a. 180) M18x1.5; 0.47 (12) deep; plugged (Size 250 a. 355)	59 lb-ft (80 Nm) 103 lb-ft (140 Nm)

### Unit dimensions

Size	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	A <sub>4</sub>	A <sub>5</sub>	A <sub>6</sub>	A <sub>7</sub>	A <sub>8</sub>	A <sub>9</sub>	A <sub>10</sub>	A <sub>11</sub> <sup>3)</sup>	A <sub>12</sub>	A <sub>13</sub>	A <sub>14</sub> <sup>4)</sup>	
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)	7.56 (192)	8.82 (224)	15.51 (394)	8.43 (214)	For detailed dimensions and technical data on the variable pumps see the technical data sheets AA4VSO RA 92050, AA4VSG RA 92100 or AA4CSG RA 92105
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)	7.56 (192)	8.82 (224)	15.51 (394)	8.43 (214)	
250	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)	8.98 (228)	8.82 (224)	17.95 (456)	9.84 (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)	8.98 (228)	8.82 (224)	17.95 (456)	9.84 (250)	

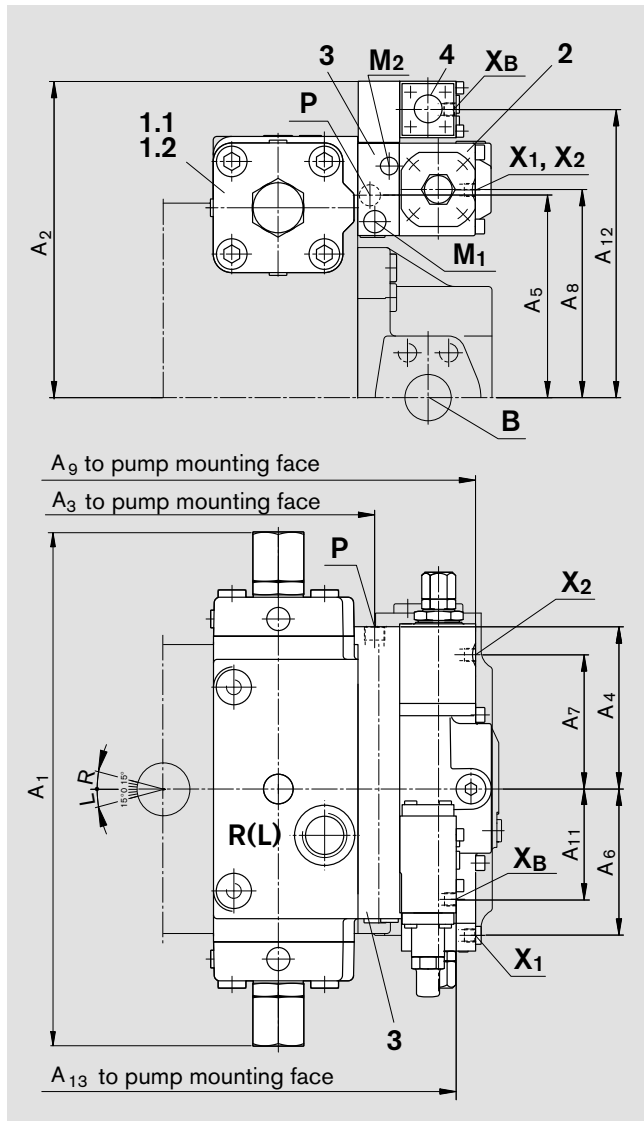
<sup>1)</sup> see general notes, <sup>2)</sup> Piping exists only on AA4VSO, <sup>3)</sup> valid for HD.B, <sup>4)</sup> valid for HD.GB

# Unit dimensions HD.B / HD.GB

Before finalising your design please request a certified installation drawing. Dimensions in inches and (millimeters)

## Size 500...1000

### A4VSO and A4VSG



### Sub-assemblies

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

### Ports

max. tightening torques <sup>1)</sup>

X <sub>B</sub>	Pilot pressure port for remote pressure control in B	DIN 3852 M14x1.5; 0.47 (12) deep; plugged on HDB	59 lb-ft (80 Nm)
X <sub>1</sub> ; X <sub>2</sub>	Pilot pressure ports on A4VSO in clockwise rotation X <sub>1</sub> is plugged, on A4VSO in counter clockwise rotation X <sub>2</sub> is plugged	DIN 3852 M14x1.5; 0.47 (12) deep	59 lb-ft (80 Nm)
P	Control pressure port	DIN 3852 M22x1.5; 0.55 (14) deep	155 lb-ft (210 Nm)
M <sub>1</sub>	Gauging port small control chamber	DIN 3852 M18x1.5; 0.47 (12) deep; plugged	103 lb-ft (140 Nm)
M <sub>2</sub>	Gauging port large control chamber	DIN 3852 M14x1.5; 0.47 (12) deep; plugged	59 lb-ft (80 Nm)

### Unit dimensions

Size	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	A <sub>4</sub>	A <sub>5</sub>	A <sub>6</sub>	A <sub>7</sub>	A <sub>8</sub>	A <sub>9</sub>	A <sub>11</sub>	A <sub>12</sub>	A <sub>13</sub>
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)

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

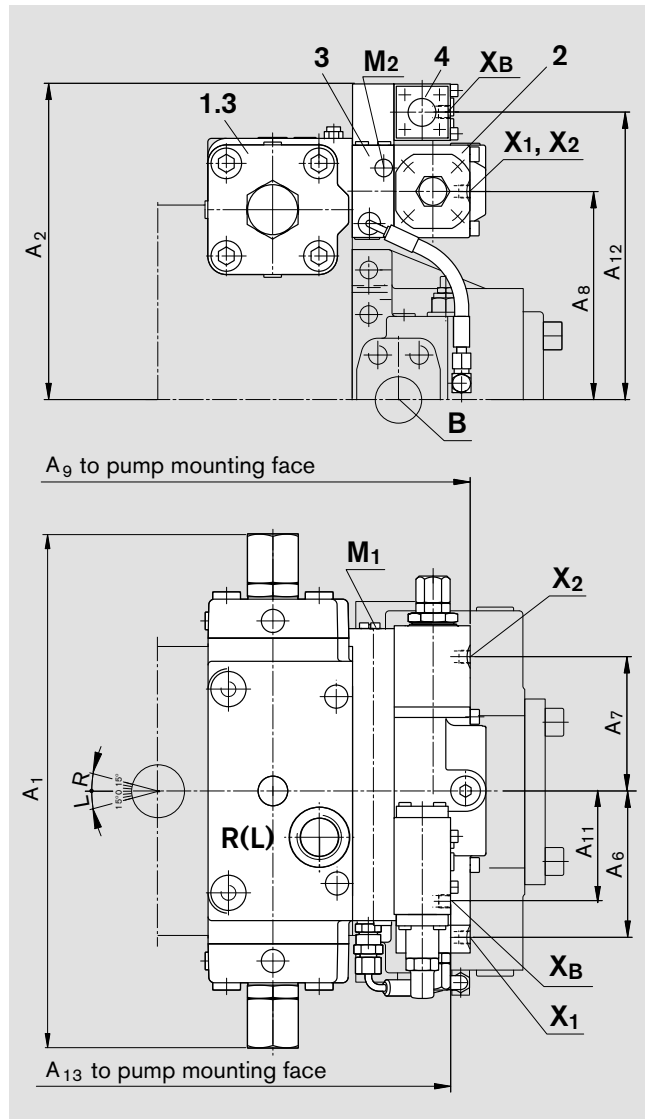
<sup>1)</sup> see general notes

# Unit dimensions HD.B / HD.GB

Before finalising your design please request a certified installation drawing. Dimensions in inches and (millimeters)

Size 500...1000

A4CSG



## Sub-assemblies

- 1 Pump with hydraulic control device
- 1.3 A4CSG (see RA 92105)
- 2 Pilot control unit
- 3 Sandwich plate
- 4 Pressure control valve for port B

## Ports

Port	Description	Standard	max. tightening torques <sup>1)</sup>
X <sub>B</sub>	Pilot pressure port for remote pressure control in B	DIN 3852 M14x1.5; 0.47 (12) deep; plugged on HDB	59 lb-ft (80 Nm)
X <sub>1</sub> ; X <sub>2</sub>	Pilot pressure ports	DIN 3852 M14x1.5; 0.47 (12) deep	59 lb-ft (80 Nm)
M <sub>1</sub>	Gauging port small control chamber	DIN 3852 M22x1.5; 0.55 (14) deep; plugged	155 lb-ft (210 Nm)
M <sub>2</sub>	Gauging port large control chamber	DIN 3852 M14x1.5; 0.47 (12) deep; plugged	59 lb-ft (80 Nm)

## Unit dimensions

Size	A <sub>1</sub>	A <sub>2</sub>	A <sub>6</sub>	A <sub>7</sub>	A <sub>8</sub>	A <sub>9</sub>	A <sub>11</sub>	A <sub>12</sub>	A <sub>13</sub>
500	21.85 (555)	13.46 (342)	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)	6.22 (158)	5.71 (145)	11.02 (280)	20.63 (524)	5.35 (136)	13.15 (334)	79.72 (501)
1000	26.38 (670)	15.51 (394)	6.22 (158)	5.71 (145)	10.94 (278)	23.23 (590)	5.35 (136)	14.06 (357)	22.32 (567)

For detailed dimensions and technical data on the variable pump see the technical data sheet A4CSG RA 92105

<sup>1)</sup> see general notes

# HD.D with pressure control 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 13.

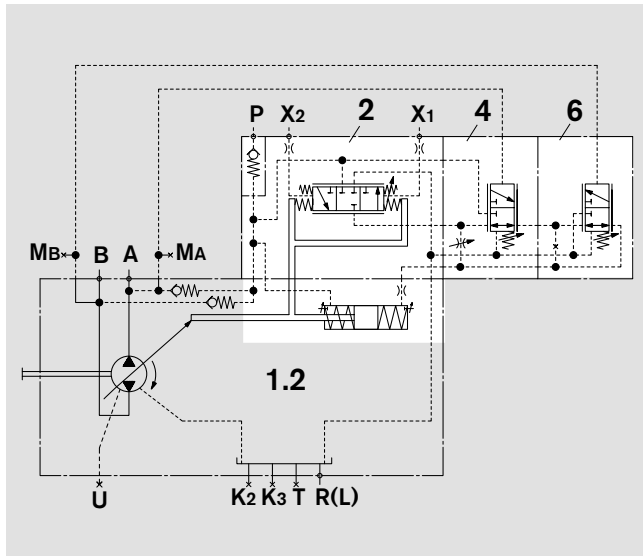
Not available on AA4VSO.

Not possible for bi-directional rotation.

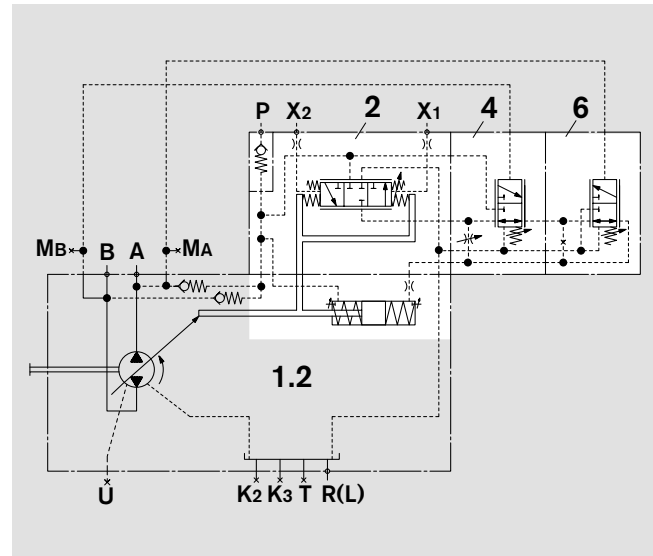
## Schematics example AA4VSG

Size 40 and 71

Direction of rotation clockwise

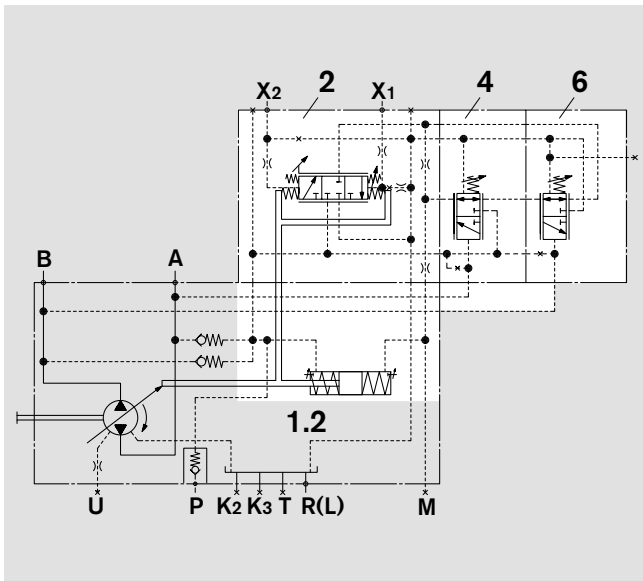


Direction of rotation counter clockwise

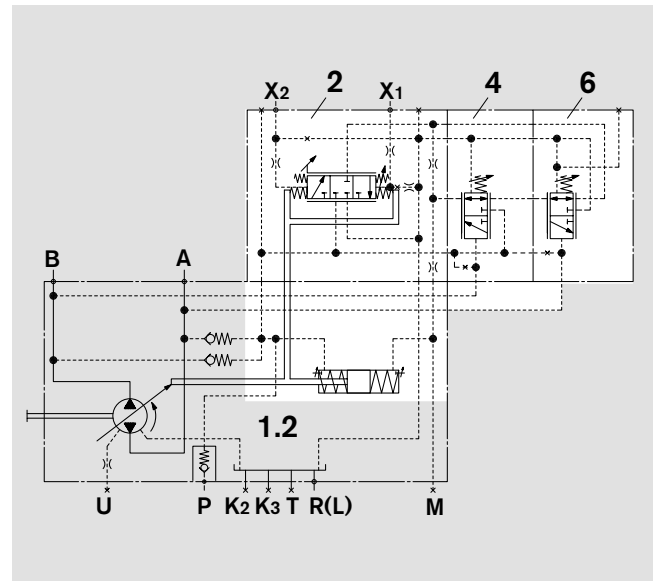


Size 125...355

Direction of rotation clockwise



Direction of rotation counter clockwise



### Ports

- X<sub>1</sub>; X<sub>2</sub> Pilot pressure ports
- P Control pressure port
- M Gauging port control chamber pressure (Size 125...355)

Size 500...1000 see page 31

### Sub-assemblies

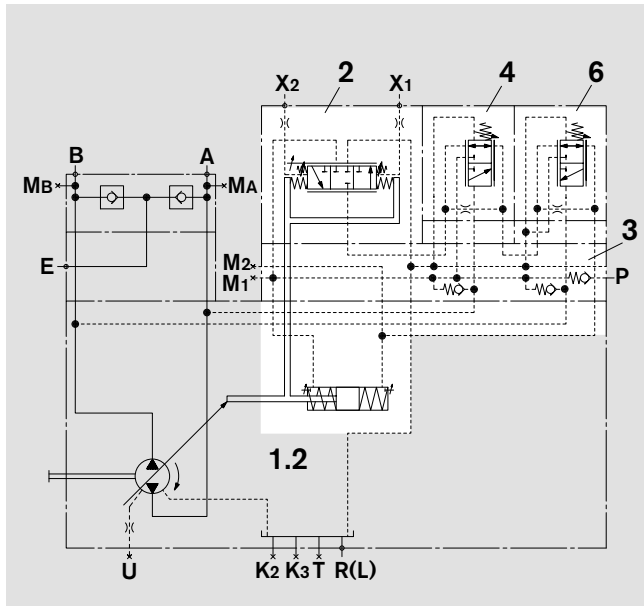
- 1 Pump with hydraulic control device
- 1.2 AA4VSG (see RA 92100)
- 2 Pilot control unit
- 4 Pressure control valve for port A  
(for port B on counter clockwise rotation)
- 6 Pressure control valve for port B  
(for port A on counter clockwise rotation)

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

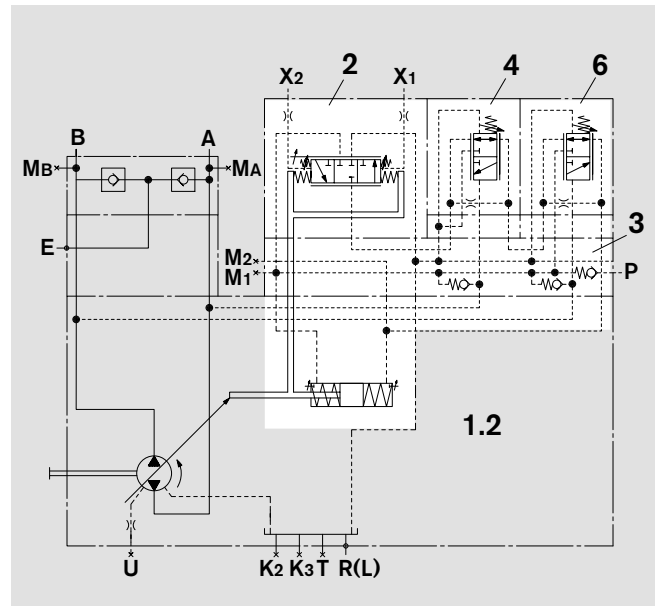
## Schematics example A4VSG

Size 500...1000

Direction of rotation clockwise



Direction of rotation counter clockwise



### Ports

- X<sub>1</sub>; X<sub>2</sub> Pilot pressure ports
- P Control pressure port
- M<sub>1</sub> Gauging port small control chamber
- M<sub>2</sub> Gauging port large control chamber

### Sub-assemblies

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

# HD.G with remote pressure control 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 13.

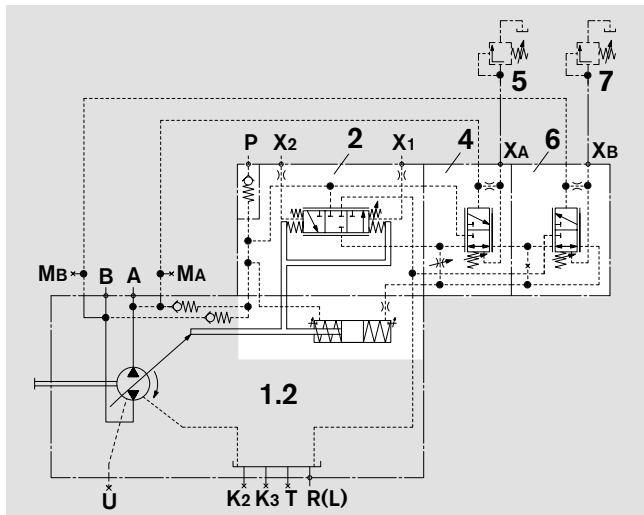
Not available on AA4VSO.

Not possible for bi-directional rotation.

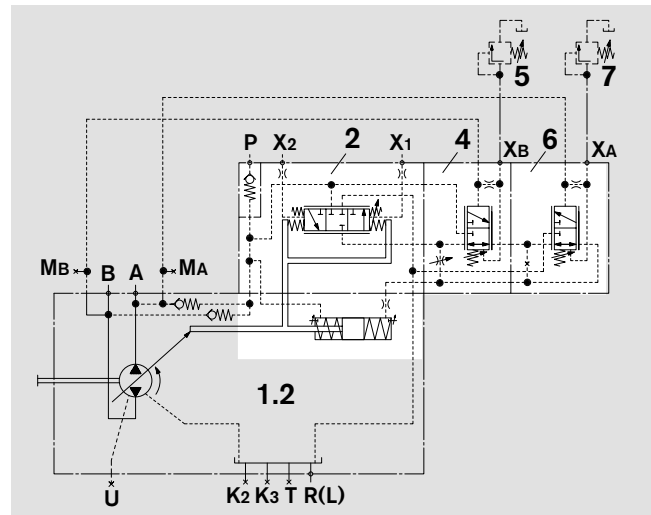
## Schematics example AA4VSG

### Size 40 and 71

Direction of rotation clockwise

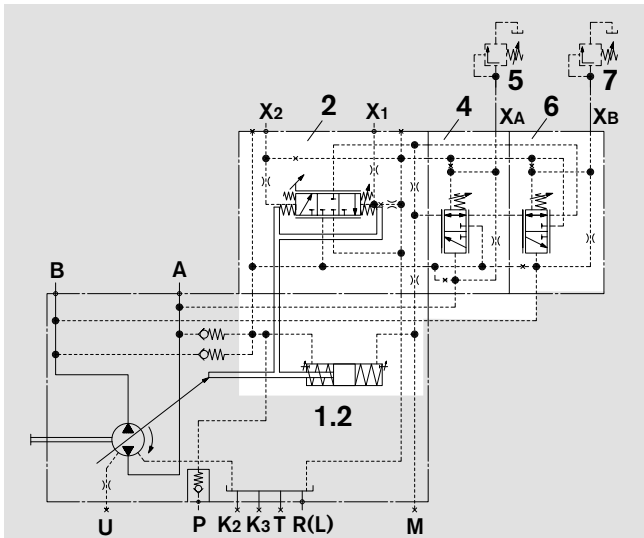


Direction of rotation counter clockwise

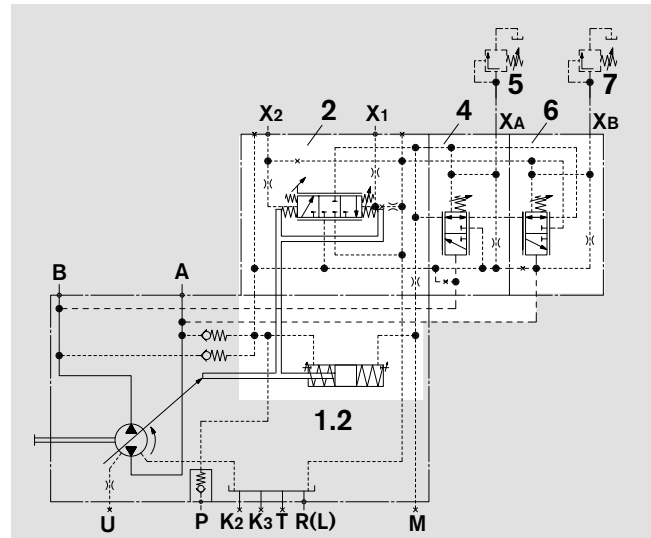


### Size 125...355

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 33

## Sub-assemblies

- 1 Pump with hydraulic control device
- 1.2 AA4VSG (see RA 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)

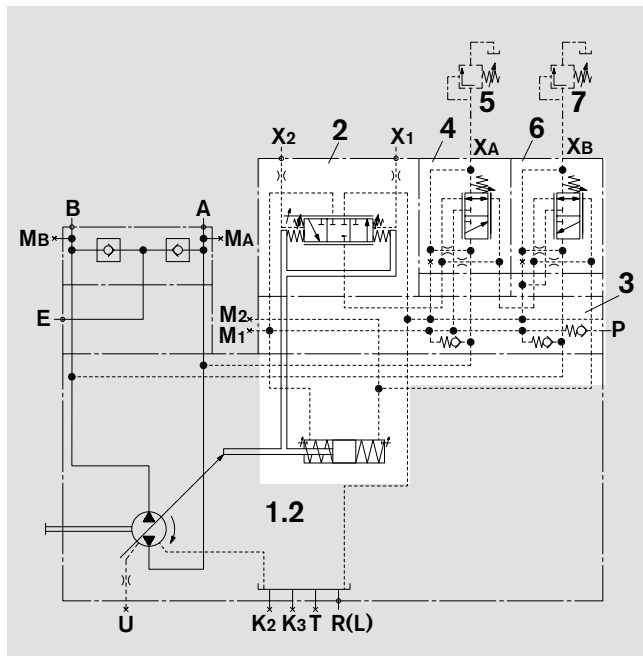


# HD.G with remote pressure control on both side for A and B

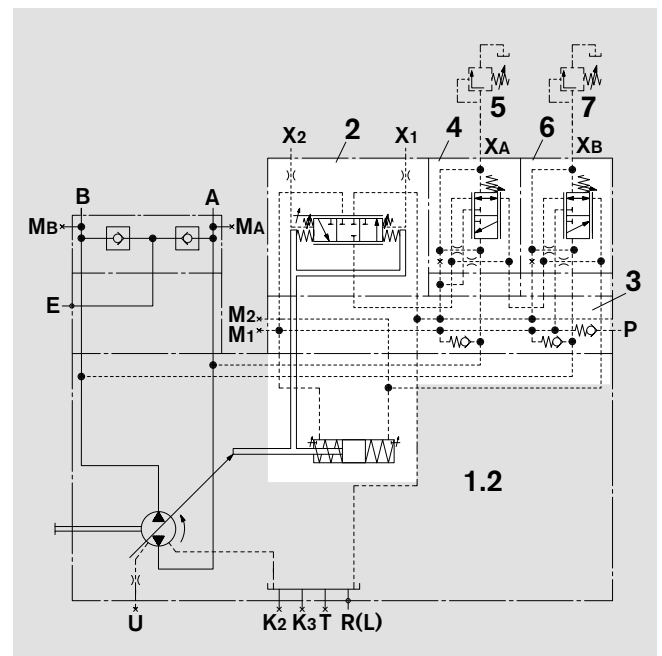
## Schematics example A4VSG

Size 500...1000

Direction of rotation clockwise



Direction of rotation counter 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

### Sub-assemblies

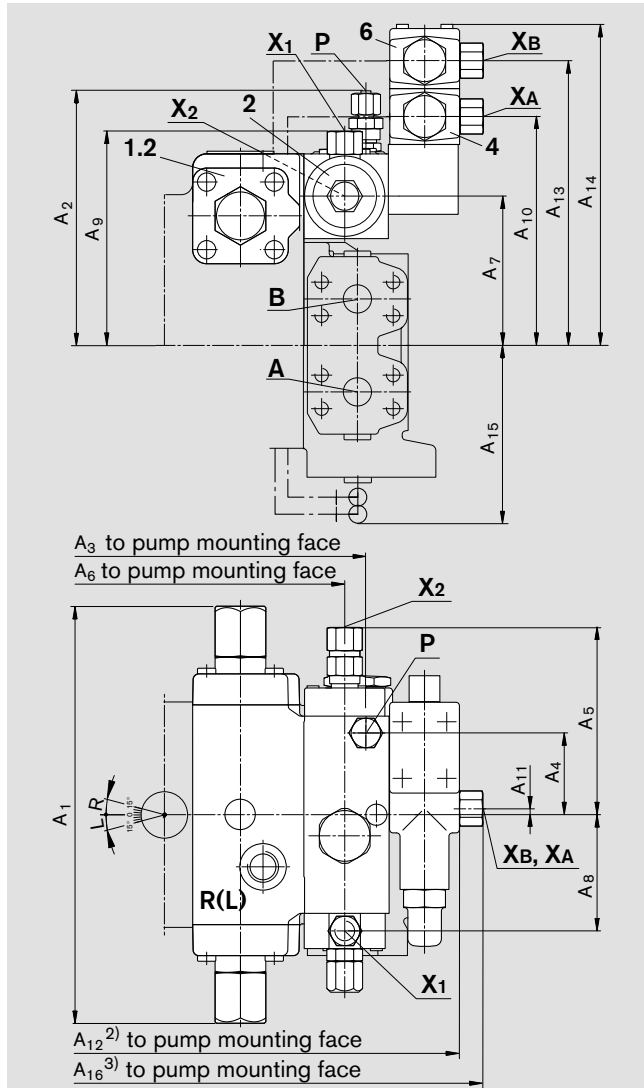
- 1 Pump with hydraulic control device
- 1.2 A4VSG (see RA 92100)
- 2 Pilot control unit
- 3 Sandwich plate
- 4 Pressure control valve for port A
- 5; 7 External pilot relief valves (not included in supply)
- 6 Pressure control valve for port B

# Unit dimensions HD.D / HD.G

Before finalising your design please request a certified installation drawing. Dimensions in inches and (millimeters)

## Size 40 and 71

### AA4VSG



### Sub-assemblies

- 1 Pump with hydraulic control device
- 1.2 AA4VSG (see RA 92100)
- 2 Pilot control unit
- 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

Port	Description	ISO 11926	Tube dia.	max. tightening torques <sup>1)</sup>
X <sub>A</sub> ; X <sub>B</sub>	Pilot pressure ports for remote pressure control	9/16-18UNF-2B; 0.51 (13) deep; plugged on HDD (M14x1.5)	8x1.5 mm (DIN 3853 S8 Form W)	59 lb-ft (80 Nm)
X <sub>1</sub> ; X <sub>2</sub>	Pilot pressure ports	9/16-18UNF-2B; 0.51 (13) deep		59 lb-ft (80 Nm)
P	Control pressure port	Tube dia. 8x1.5 mm (DIN 3853 S8 Form W)		37 lb-ft (50 Nm)

### Unit dimensions

Size	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	A <sub>4</sub>	A <sub>5</sub>	A <sub>6</sub>	A <sub>7</sub>	A <sub>8</sub>	A <sub>9</sub>	A <sub>10</sub>	A <sub>11</sub>	A <sub>12</sub> <sup>2)</sup>	A <sub>13</sub>	A <sub>14</sub>	A <sub>15</sub>	A <sub>16</sub> <sup>3)</sup>	
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)	11.85 (301)	7.99 (203)	9.02 (229)	6.50 (165)	12.72 (323)	For detailed unit dimensions and tech. data on the variable pump see the tech. data sheet AA4VSG RA 92100
71	12.68 (332)	8.23 (209)	10.31 (262)	2.28 (58)	5.31 (135)	9.76 (248)	4.80 (122)	3.25 (82.5)	6.73 (171)	7.05 (179)	0.16 (4)	12.91 (328)	8.62 (219)	9.65 (245)	6.61 (168)	13.78 (350)	

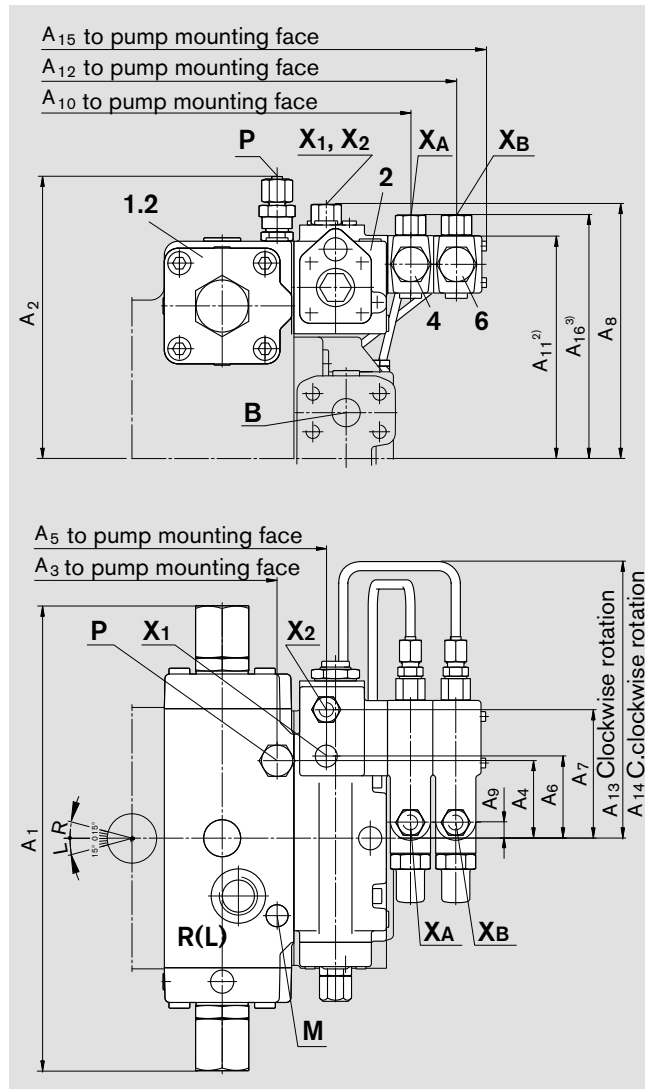
<sup>1)</sup> see general notes, <sup>2)</sup> valid for HD.D, <sup>3)</sup> valid for HD.G

# Unit dimensions HD.D / HD.G

Before finalising your design please request a certified installation drawing. Dimensions in inches and (millimeters)

## Size 125...355

### AA4VSG



### Sub-assemblies

- 1 Pump with hydraulic control device
- 1.2 AA4VSG (see RA 92100)
- 2 Pilot control unit
- 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 <sup>1)</sup>
X <sub>A</sub> ; X <sub>B</sub>	Pilot pressure ports for remote pressure control	ISO 11926 9/16-18UNF-2B; 0.51 (13) deep; plugged on HDD (M14x1.5)	59 lb-ft (80 Nm)
X <sub>1</sub> ; X <sub>2</sub>	Pilot pressure ports	ISO 11926 9/16-18UNF-2B; 0.51 (13) deep	59 lb-ft (80 Nm)
P	Control pressure port	Tube dia. 8x1.5mm (DIN 3853 S8 Form W) (Size 125 a. 180) Tube dia. 12x2mm (DIN 3853 S12 Form W) (Size 250 a. 355)	37 lb-ft (50 Nm) 66 lb-ft (90 Nm)
M	Gauging port control chamber pressure	DIN 3852 M14x1.5; 0.47 (12) deep; plugged (Size 125 a. 180) M18x1.5; 0.47 (12) deep; plugged (Size 250 a. 355)	59 lb-ft (80 Nm) 103 lb-ft (140 Nm)

### Unit dimensions

Size	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	A <sub>4</sub>	A <sub>5</sub>	A <sub>6</sub>	A <sub>7</sub>	A <sub>8</sub>	A <sub>9</sub>	A <sub>10</sub>	A <sub>11</sub> <sup>2)</sup>	A <sub>12</sub>	A <sub>13</sub>	A <sub>14</sub>	A <sub>15</sub>	A <sub>16</sub> <sup>3)</sup>	
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)	7.56 (192)	16.06 (408)	9.41 (239)	8.82 (224)	17.09 (434)	8.43 (214)	For detailed dimensions and tech. data on the variable pump see the tech. data sheet AA4VSG RA 92100
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)	7.56 (192)	16.06 (408)	9.41 (239)	8.82 (224)	17.09 (434)	8.43 (214)	
250	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)	8.98 (228)	18.50 (470)	9.41 (239)	8.82 (224)	19.53 (496)	9.84 (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)	8.98 (228)	18.50 (470)	9.41 (239)	8.82 (224)	19.53 (496)	9.84 (250)	

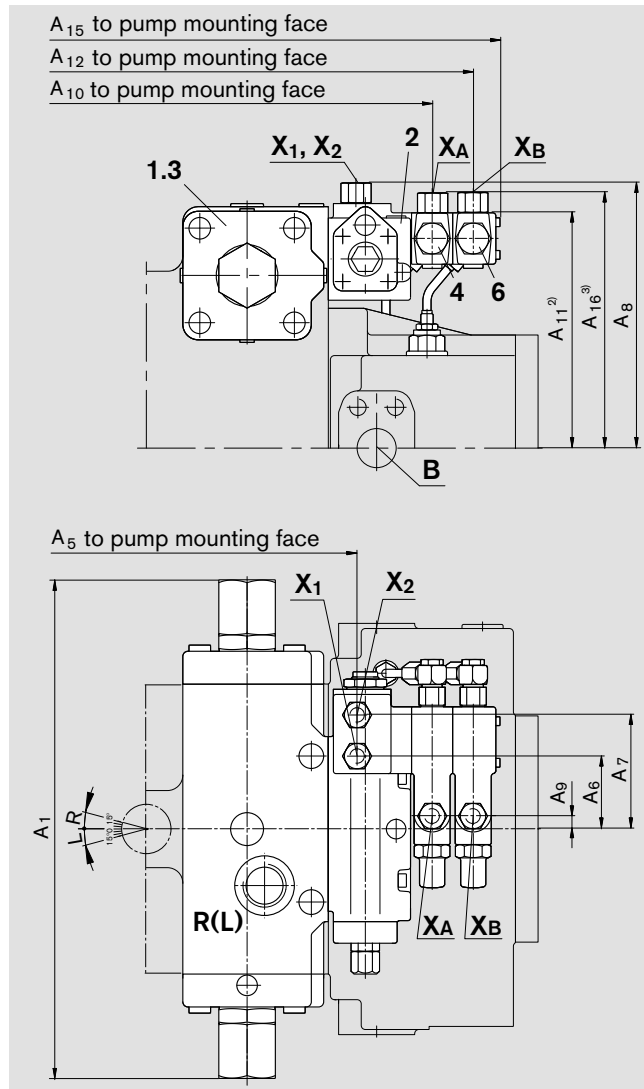
<sup>1)</sup> see general notes, <sup>2)</sup> valid for HD.D, <sup>3)</sup> valid for HD.G

# Unit dimensions HD.D / HD.G

Before finalising your design please request a certified installation drawing. Dimensions in inches and (millimeters)

## Size 125...355

### AA4CSG



### Sub-assemblies

- 1 Pump with hydraulic control device
- 1.3 AA4CSG (see RA 92105)
- 2 Pilot control unit
- 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 <sup>1)</sup>
X <sub>A</sub> ; X <sub>B</sub>	Pilot pressure ports for remote pressure control	ISO 11926	9/16-18UNF-2B; 0.51 (13) deep; plugged on HDD (M14x1.5)	59 lb-ft (80 Nm)
X <sub>1</sub> ; X <sub>2</sub>	Pilot pressure ports	ISO 11926	9/16-18UNF-2B; 0.51 (13) deep	59 lb-ft (80 Nm)
M	Gauging port control chamber pressure	DIN 3852	M14x1.5; 0.47 (12) deep; plugged (Size 125 a. 180) M18x1.5; 0.47 (12) deep; plugged (Size 250 a. 355)	59 lb-ft (80 Nm) 103 lb-ft (140 Nm)

### Unit dimensions

Size	A <sub>1</sub>	A <sub>5</sub>	A <sub>6</sub>	A <sub>7</sub>	A <sub>8</sub>	A <sub>9</sub>	A <sub>10</sub>	A <sub>11</sub> <sup>2)</sup>	A <sub>12</sub>	A <sub>15</sub>	A <sub>16</sub> <sup>3)</sup>
125	15.83 (402)	11.61 (295)	2.80 (71)	4.37 (111)	8.82 (224)	0.51 (13)	14.49 (368)	7.56 (192)	16.06 (408)	17.09 (434)	8.43 (214)
180	15.83 (402)	11.61 (295)	2.80 (71)	4.37 (111)	8.82 (224)	0.51 (13)	14.49 (368)	7.56 (192)	16.06 (408)	17.09 (434)	8.43 (214)
250	19.09 (485)	14.06 (357)	2.80 (71)	4.37 (111)	10.24 (260)	0.51 (13)	16.93 (430)	8.98 (228)	18.50 (470)	19.53 (496)	9.84 (250)
355	19.09 (485)	14.06 (357)	2.80 (71)	4.37 (111)	10.24 (260)	0.51 (13)	16.93 (430)	8.98 (228)	18.50 (470)	19.53 (496)	9.84 (250)

For detailed dimensions and technical data on the variable pump see the technical data sheet AA4CSG RA 92105

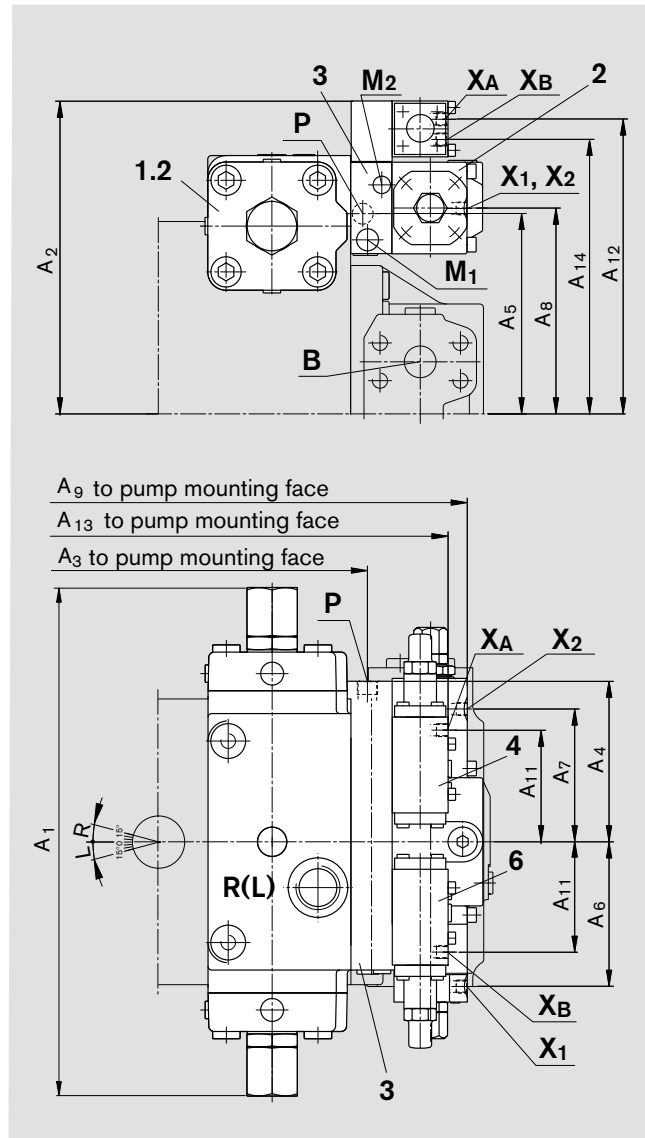
<sup>1)</sup> see general notes, <sup>2)</sup> valid for HD.D, <sup>3)</sup> valid for HD.G

# Unit dimensions HD.D / HD.G

Before finalising your design please request a certified installation drawing. Dimensions in inches and (millimeters)

Size 500...1000

A4VSG



## Sub-assemblies

- 1 Pump with hydraulic control device
- 1.2 A4VSG (see RA 92100)
- 2 Pilot control unit
- 3 Sandwich plate
- 4 Pressure control valve for port A
- 6 Pressure control valve for port B

## Ports

Port	Description	Thread	max. tightening torques <sup>1)</sup>
X <sub>A</sub> ; X <sub>B</sub>	Pilot pressure ports for remote pressure control	DIN 3852 M14x1.5; 0.47 (12) deep; plugged on HDB	59 lb-ft (80 Nm)
X <sub>1</sub> ; X <sub>2</sub>	Pilot pressure ports	DIN 3852 M14x1.5; 0.47 (12) deep	59 lb-ft (80 Nm)
P	Control pressure port	DIN 3852 M22x1.5; 0.55 (14) deep	155 lb-ft (210 Nm)
M <sub>1</sub>	Gauging port small control chamber	DIN 3852 M18x1.5; 0.47 (12) deep; plugged	103 lb-ft (140 Nm)
M <sub>2</sub>	Gauging port large control chamber	DIN 3852 M14x1.5; 0.47 (12) deep; plugged	59 lb-ft (80 Nm)

## Unit dimensions

Size	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	A <sub>4</sub>	A <sub>5</sub>	A <sub>6</sub>	A <sub>7</sub>	A <sub>8</sub>	A <sub>9</sub>	A <sub>11</sub>	A <sub>12</sub>	A <sub>13</sub>	A <sub>14</sub>	
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)	For detailed dimensions and tech. data on the variable pump see the technical data sheet A4VSG RA 92100
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)	

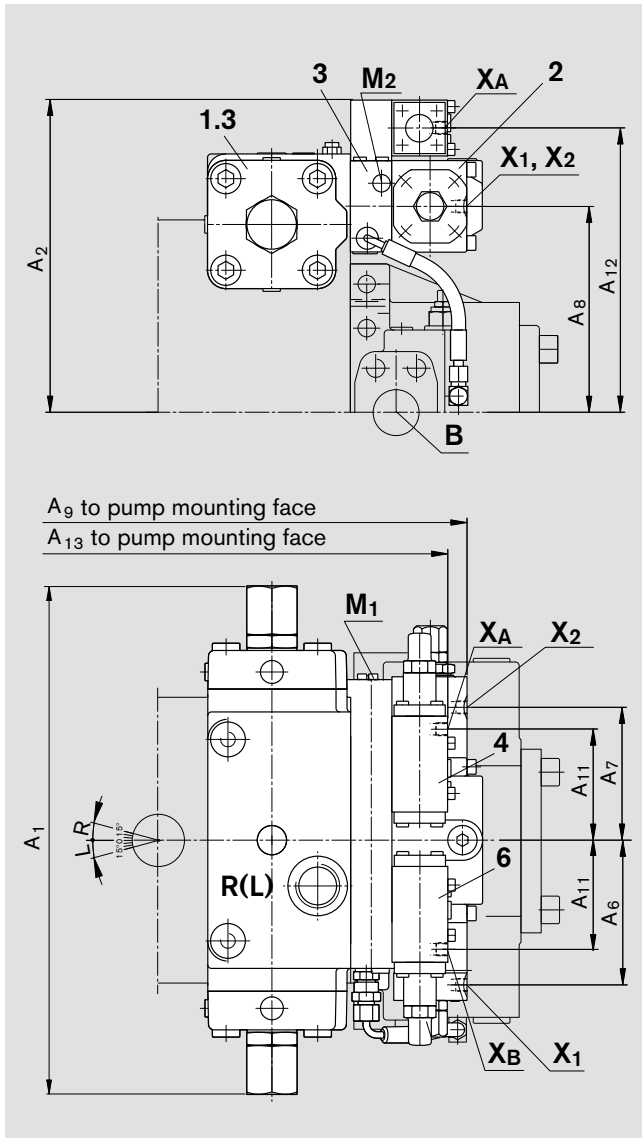
<sup>1)</sup> see general notes

# Unit dimensions HD.D / HD.G

Size 500...1000

A4CSG

Before finalising your design please request a certified installation drawing. Dimensions in inches and (millimeters)



## Sub-assemblies

- 1 Pump with hydraulic control device
- 1.3 A4CSG (see RA 92105)
- 2 Pilot control unit
- 3 Sandwich plate
- 4 Pressure control valve for port A
- 6 Pressure control valve for port B

## Ports

max. tightening torques <sup>1)</sup>

X <sub>A</sub> ; X <sub>B</sub>	Pilot pressure ports for remote pressure control	DIN 3852 M14x1.5; 0.47 (12) deep; plugged on HDB	59 lb-ft (80 Nm)
X <sub>1</sub> ; X <sub>2</sub>	Pilot pressure ports	DIN 3852 M14x1.5; 0.47 (12) deep	59 lb-ft (80 Nm)
M <sub>1</sub>	Gauging port small control chamber	DIN 3852 M22x1.5; 0.55 (14) deep; plugged	155 lb-ft (210 Nm)
M <sub>2</sub>	Gauging port large control chamber	DIN 3852 M14x1.5; 0.47 (12) deep; plugged	59 lb-ft (80 Nm)

## Unit dimensions

Size	A <sub>1</sub>	A <sub>2</sub>	A <sub>6</sub>	A <sub>7</sub>	A <sub>8</sub>	A <sub>9</sub>	A <sub>11</sub>	A <sub>12</sub>	A <sub>13</sub>
500	21.85 (555)	13.46 (342)	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)	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)	6.22 (158)	5.71 (145)	10.94 (278)	23.23 (590)	5.35 (136)	14.49 (368)	22.32 (567)

For detailed dimensions and technical data on the variable pump see the technical data sheet A4CSG RA 92105

<sup>1)</sup> see general notes

# HD1P with power control

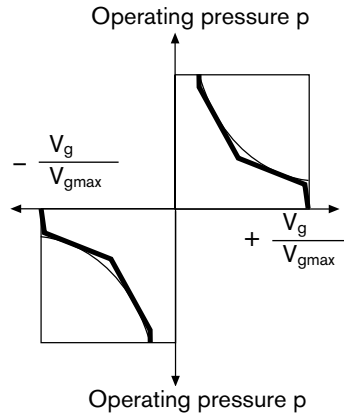
As the operating pressure rises, the pilot pressure (i.e. the command value for HD) is reduced by the power limiting valve LV 06, thereby reducing the pump displacement in such a manner, that a certain preset drive torque cannot be exceeded.

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 (A)A4CSG.

The power control curve is factory set

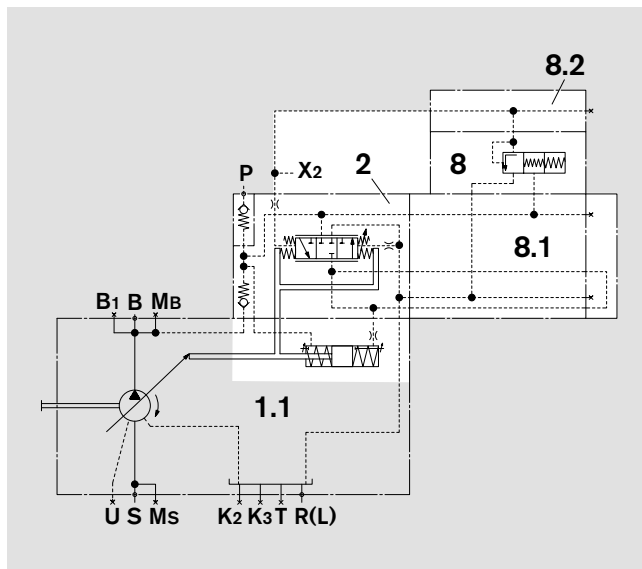
Please state in clear text when ordering e.g. 55 kW at 1500 rpm.

Examples of power control curves see RA 95546

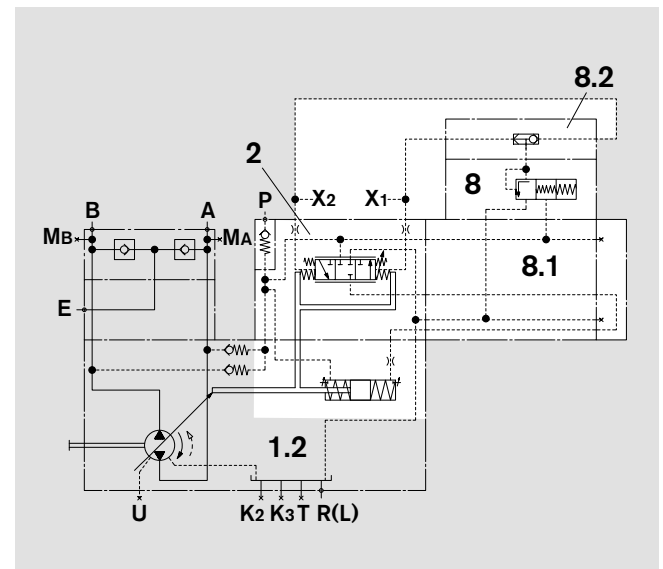
## Schematics

### Size 40 and 71

(Example AA4VSO in clockwise rotation; in counter clockwise rotation only  $X_1$  exists and is connected to the power valve)



(Example AA4VSG)



## Ports

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

## Sub-assemblies

- 1.1 AA4VSO (see RA 92050)
- 1.2 AA4VSG (see RA 92100)
- 2 Pilot control unit
- 8 Power limiting valve (see RA 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 AA4VSG)

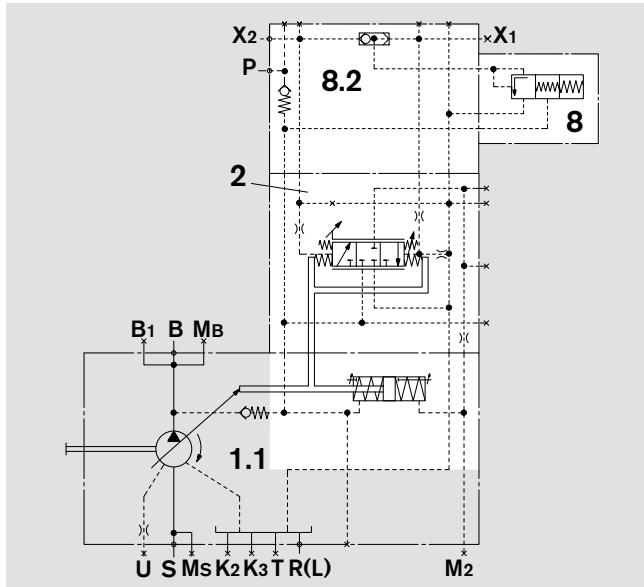
# HD1P with power control

## Schematics

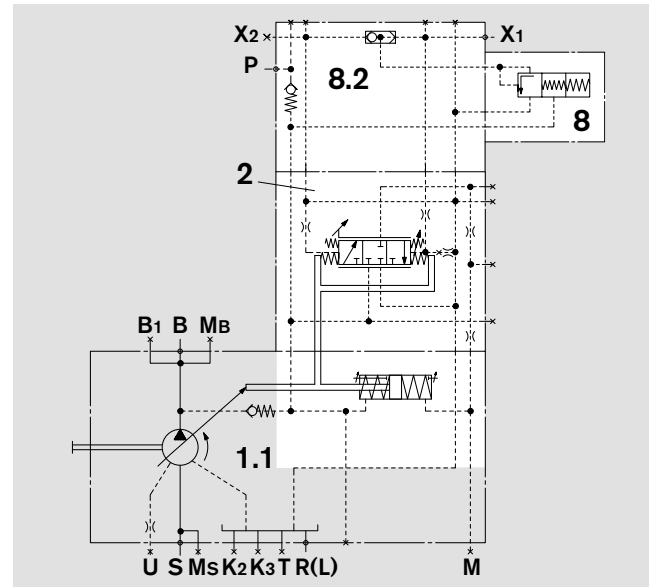
On the (A)A4VSG and (A)A4CSG both ports  $X_1$  and  $X_2$  are connected to the shuttle valve (either internally or via a T-joint) and open. On the (A)A4VSO in clockwise rotation only port  $X_2$ , and in counter clockwise rotation only port  $X_1$ , is connected to the power valve and open.

Size 125...355

Example AA4VSO clockwise rotation

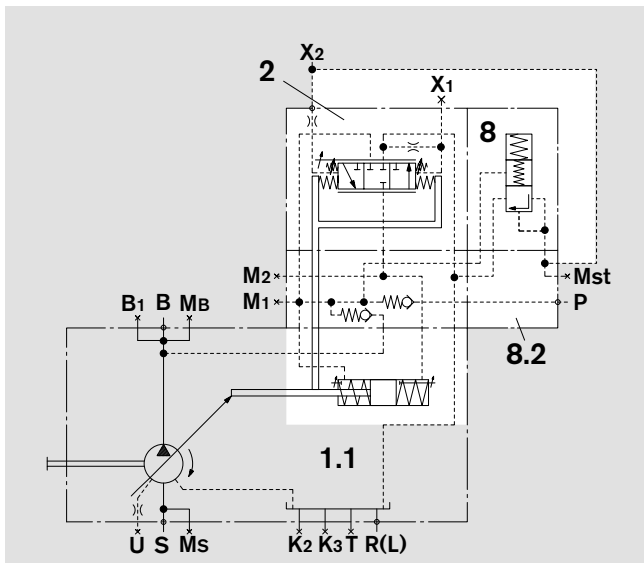


Example AA4VSO counter clockwise rotation

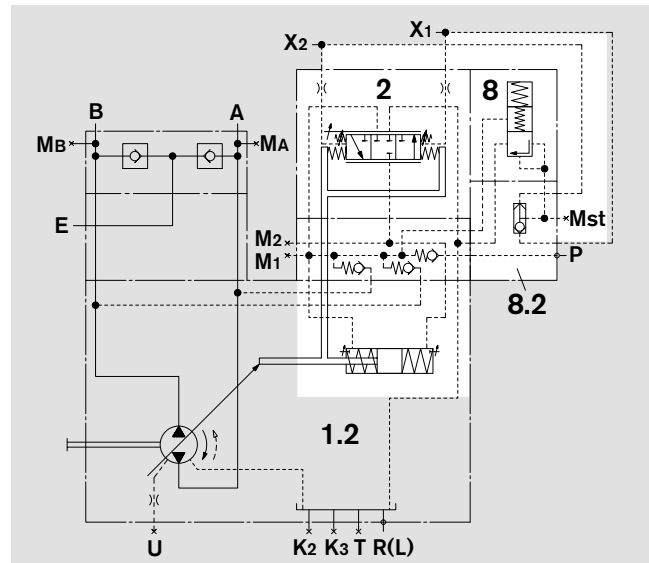


Size 500...1000

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 39

## Sub-assemblies

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

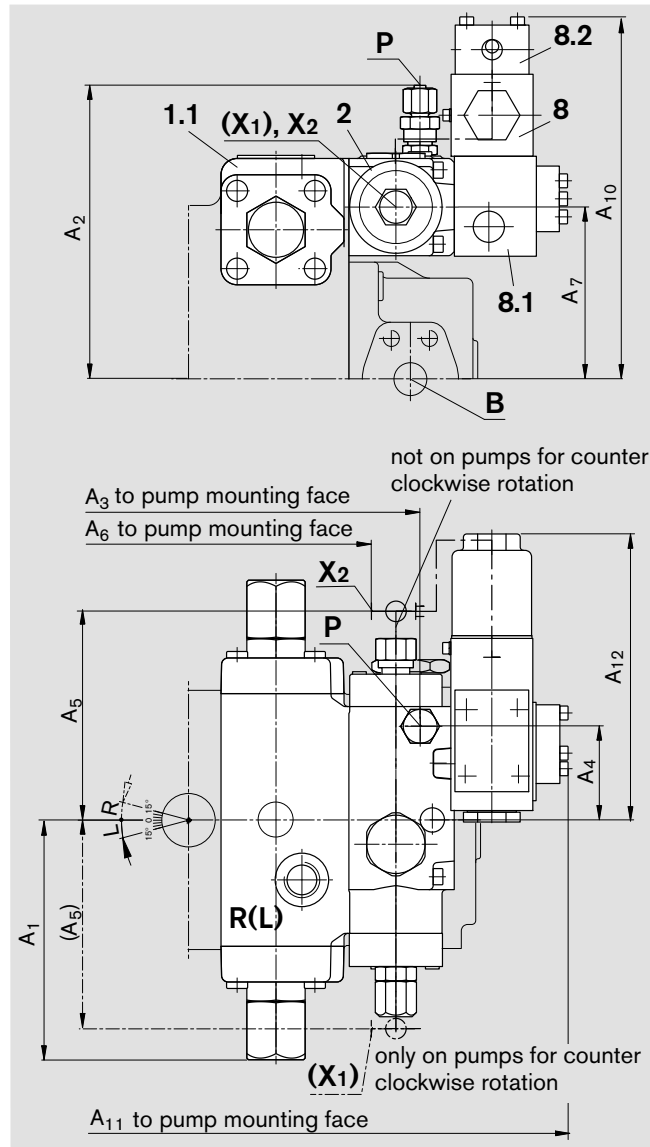


# Unit dimensions HD1P

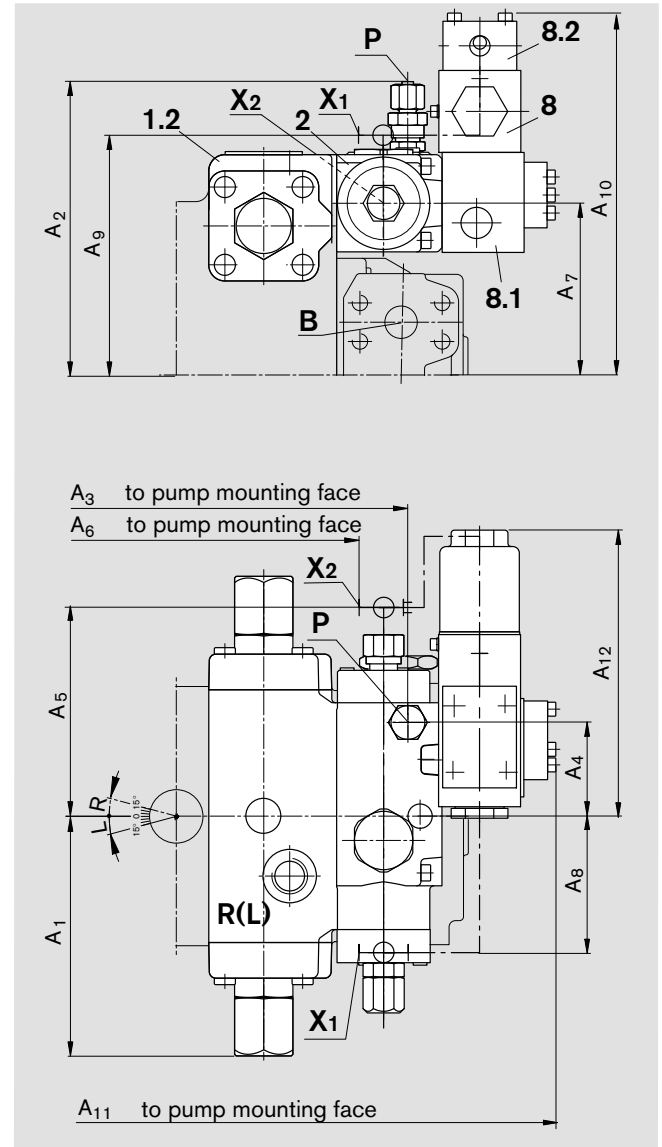
Before finalising your design please request a certified installation drawing. Dimensions in inches and (millimeters)

## Size 40 and 71

### AA4VSO



### AA4VSG



**Sub-assemblies** see page 42

### Ports

X<sub>1</sub>; X<sub>2</sub> Pilot pressure ports Tube dia. 8x1.5 mm (DIN 3853 S8 Form W)  
on AA4VSO clockwise rotation only X<sub>2</sub> exists, on AA4VSO counter clockwise rotation only X<sub>1</sub> exists

**max. tightening torques** <sup>1)</sup>

P Control pressure port Tube dia. 8x1.5 mm (DIN 3853 S8 Form W) 37 lb-ft (50 Nm)

### Unit dimensions

Size	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	A <sub>4</sub>	A <sub>5</sub>	A <sub>6</sub>	A <sub>7</sub>	A <sub>8</sub>	A <sub>9</sub>	A <sub>10</sub>	A <sub>11</sub>	A <sub>12</sub>	
40	5.83 (148)	7.60 (193)	9.25 (235)	2.28 (58)	5.04 (128)	8.58 (218)	4.17 (106)	3.25 (82.5)	6.87 (174.5)	8.74 (222)	12.80 (325)	6.89 (175)	For detailed dimensions and tech. data on the variable pumps see the technical data sheets AA4VSO RA 92050 or AA4VSG RA 92100
71	6.54 (166)	8.23 (209)	10.31 (262)	2.28 (58)	5.04 (128)	9.65 (245)	4.80 (122)	3.25 (82.5)	7.50 (190.5)	9.37 (238)	13.86 (352)	6.89 (175)	

<sup>1)</sup> see general notes

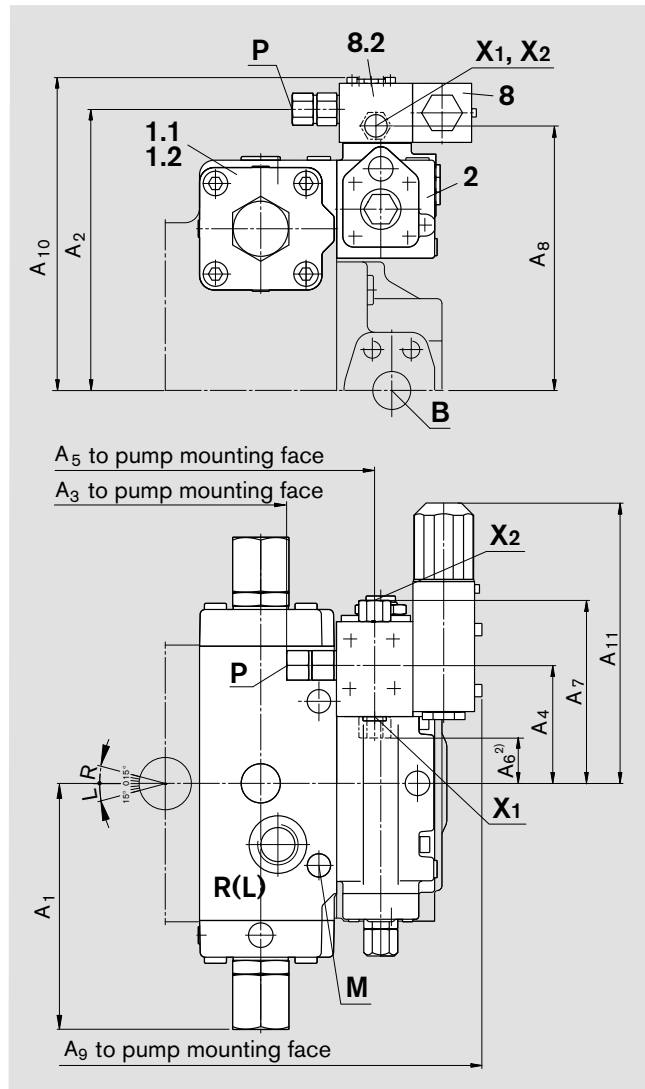
# Unit dimensions HD1P

Before finalising your design please request a certified installation drawing. Dimensions in inches and (millimeters)

## Size 125...355

AA4VSO and AA4VSG

AA4CSG in preparation, dimensions on request



### Sub-assemblies

- 1 Pump with hydraulic control device
- 1.1 (A)A4VSO (see RA 92050)
- 1.2 (A)A4VSG (see RA 92100)
- 2 Pilot control unit
- 8 Power valve (see RA 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 (A)A4VSG and (A)A4CSG)

### Ports

Port	Description	ISO 11926	Depth	max. tightening torques <sup>1)</sup>
P	Control pressure port	ISO 11926 3/4-16UNF-2B;	0.59 (15) deep	103 lb-ft (140 Nm)
X <sub>1</sub> ; X <sub>2</sub>	Pilot pressure ports	ISO 11926 9/16-18UNF-2B;	0.51 (13) deep	59 lb-ft (80 Nm)
on AA4VSO clockwise rotation X <sub>1</sub> is plugged, on AA4VSO counter clockwise rotation X <sub>2</sub> is plugged (M14x1.5)				
M	Gauging port control chamber pressure	DIN 3852 M14x1.5;	0.47 (12) deep; plugged (size 125...180)	59 lb-ft (80 Nm)
			M18x1.5; 0.47 (12) deep; plugged (size 250 a. 355)	103 lb-ft (140 Nm)

### Unit dimensions

Size	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	A <sub>4</sub>	A <sub>5</sub>	A <sub>6</sub> <sup>2)</sup>	A <sub>7</sub>	A <sub>8</sub>	A <sub>9</sub>	A <sub>10</sub>	A <sub>11</sub>
125	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)
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	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)
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)

For detailed dimensions and technical data on the variable pumps see the technical data sheets  
AA4VSO RA 92050 or  
AA4VSG RA 92100

<sup>1)</sup> see general notes

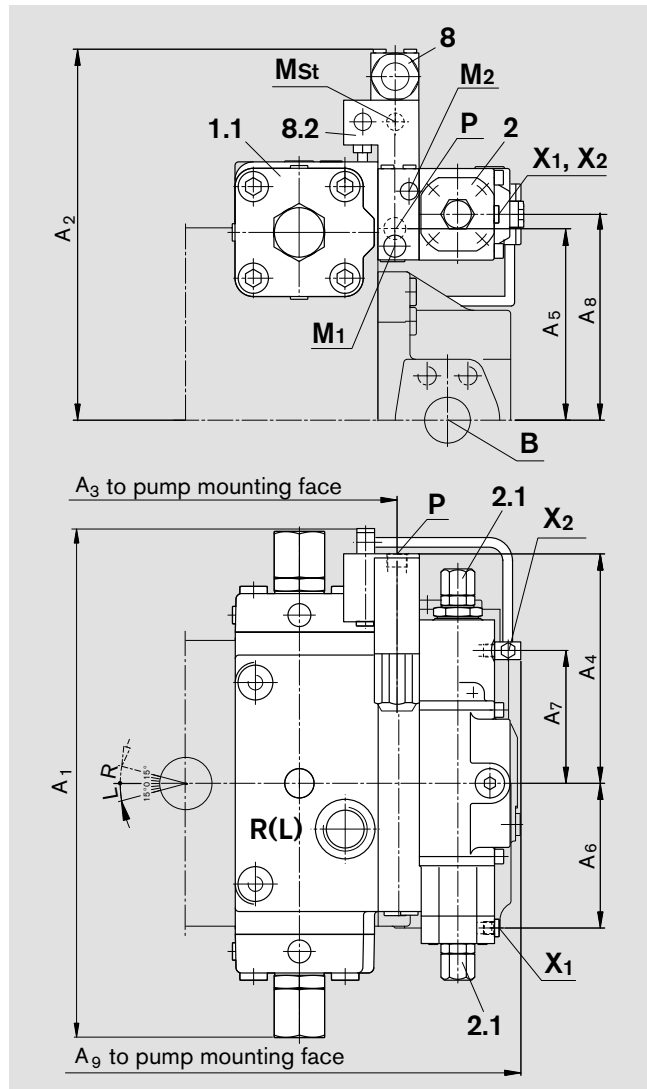
<sup>2)</sup> on A4VSO counter clockwise rotation and A4VSG

# Unit dimensions HD1P

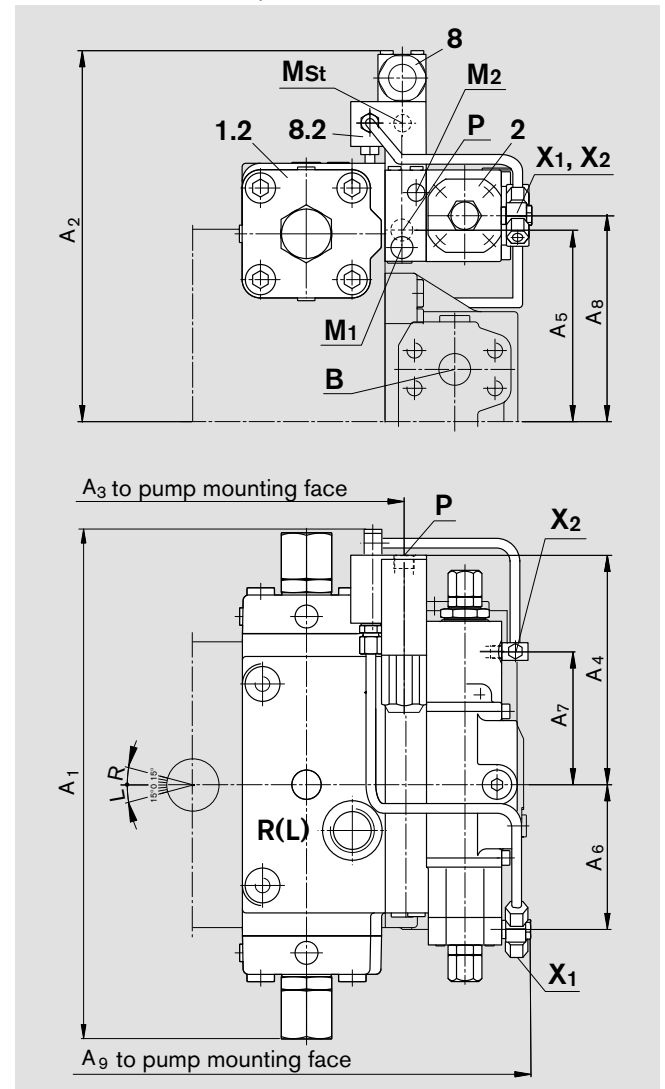
Before finalising your design please request a certified installation drawing. Dimensions in inches and (millimeters)

## Size 500...1000

### A4VSO



### A4VSG (A4CSG on request)



**Sub-assemblies** see page 42

### Ports

										max. tightening torques <sup>1)</sup>
P	Control pressure port	DIN 3852	M22x1.5; 0.55 (14) deep	155 lb-ft (210 Nm)						
X <sub>1</sub> ; X <sub>2</sub>	Pilot pressure ports	Tube dia. 8x1.5mm (DIN 3853 S8 Form W)	37 lb-ft (50 Nm)							
on A4VSO clockwise rotation X <sub>1</sub> , on A4VSG counter clockwise rotation X <sub>2</sub> M14x1.5 plugged										
M <sub>st</sub>	Gauging port pilot pressure	DIN 3852	M14x1.5; 0.47 (12) deep; plugged	59 lb-ft (80 Nm)						
M <sub>1</sub>	Gauging port small control chamber	DIN 3852	M18x1.5; 0.47 (12) deep; plugged	103 lb-ft (140 Nm)						
M <sub>2</sub>	Gauging port large control chamber	DIN 3852	M14x1.5; 0.47 (12) deep; plugged	59 lb-ft (80 Nm)						

### Unit dimensions

Size	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	A <sub>4</sub>	A <sub>5</sub>	A <sub>6</sub>	A <sub>7</sub>	A <sub>8</sub>	A <sub>9</sub>
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)

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

<sup>1)</sup> 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 RA 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 RA 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 RA 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 68°F (20°C) ( $R_{20}$ )	19,5 $\Omega$
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 RA 29164
Coil operating temperature	up to 300°F (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  $T > 68$  °F

at  $T > 20$  °C

$$R_w = \frac{R_{68} \times (391 + T_{eF})}{459}$$

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

## Technical data – hydraulic

Control pressure (in P)	$p_{min}$	psi (bar)	725 (50)
	$p_{max}$	psi (bar)	1450 (100)
Hysteresis	$\leq \pm 4$ % of $V_{gmax}$		
Repeatability	$\leq 2$ % of $V_{gmax}$		

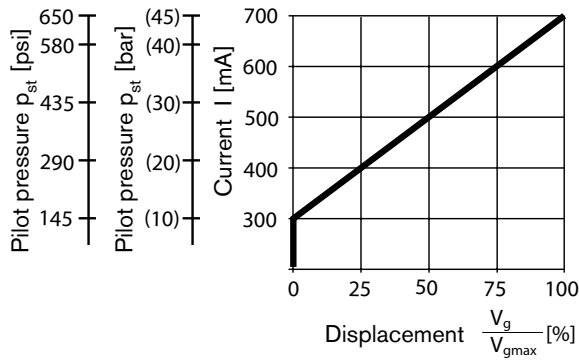
Because of the restrictions in RA 29164 the control pressure in P is limited to 725...1450 psi (50...100 bar) on the controls HD1T and HD1U.

The flow losses in the proportional valve (e.g. 1.06 gpm (4 L/min) per de-energized solenoid at  $p = 725$  psi (50 bar)) must be compensated for in the calculation of the required control oil flow in P.

# HD1T with electrical control of pilot pressure

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

### Characteristic

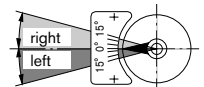


### Relation between

#### Direction of rotation – Direction of flow at actuation of solenoid

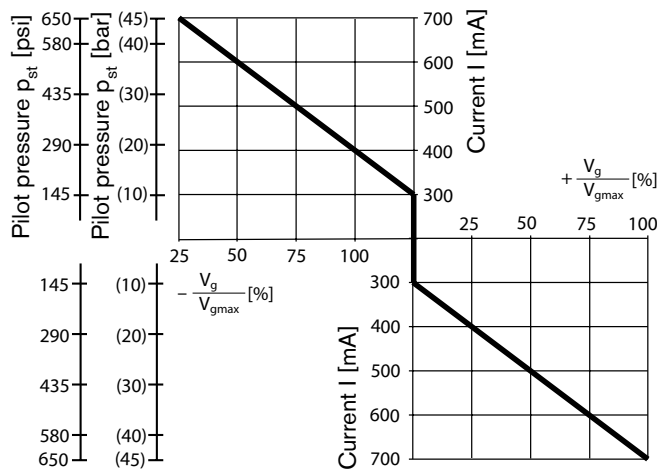
Direction of rotation	Swivel range <sup>1)</sup>	Direction of flow	Pressure outlet port
clockwise	left	S to B	B
counter clockwise	right	S to B	B

<sup>1)</sup> compare swivel angle indicator



## (A)A4VSG - closed circuit DBEP 6, Execution C

### Characteristic

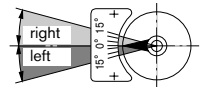


### Relation between

#### Direction of rotation – Actuation of solenoid – Direction of flow

Direction of rotation	Actuation of solenoid	Swivel range <sup>1)</sup>	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

<sup>1)</sup> compare swivel angle indicator



## (A)A4CSG with HD1T

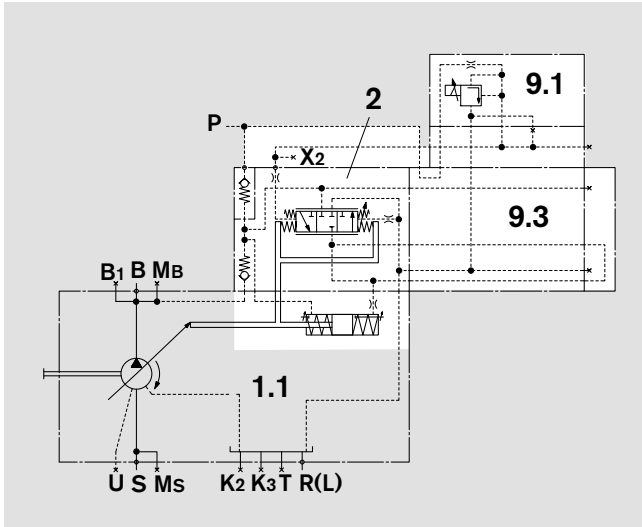
is in preparation and can be supplied on request.

# HD1T with electrical control of pilot pressure

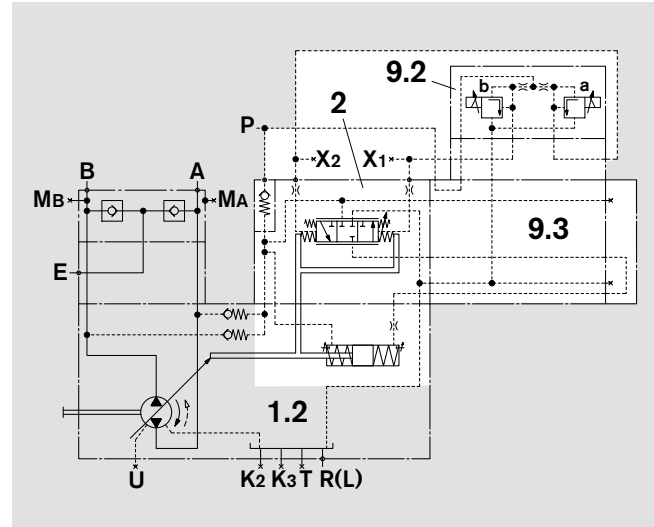
## Schematics

Size 40 and 71

Example AA4VSO in clockwise rotation, in counter clockwise rotation  $X_1$  connected to the prop. valve and  $X_2$  deleted

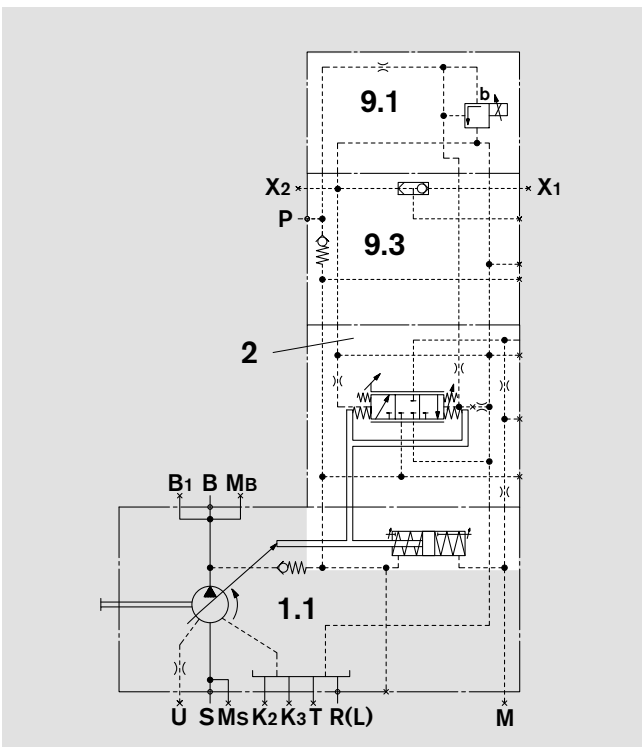


Example AA4VSG

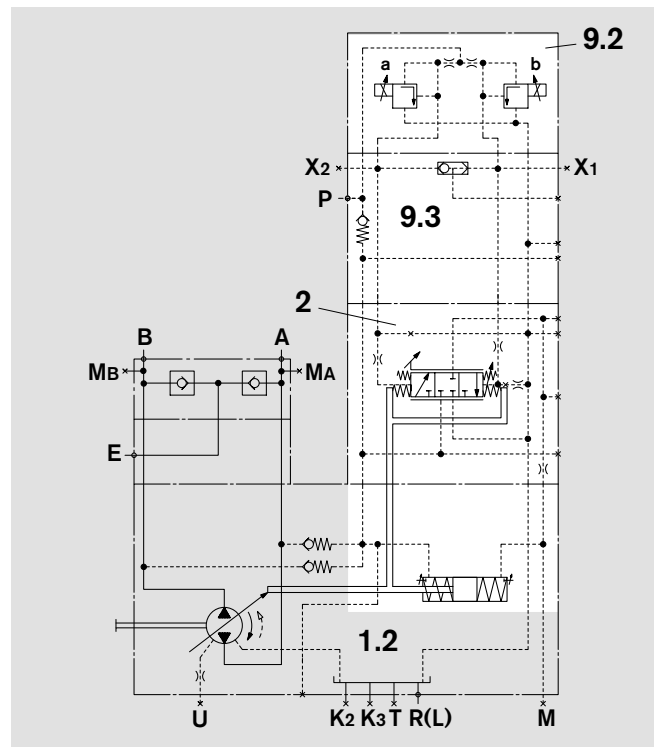


Size 125...355

Example AA4VSO in counter clockwise rotation



Example AA4VSG



## 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 47

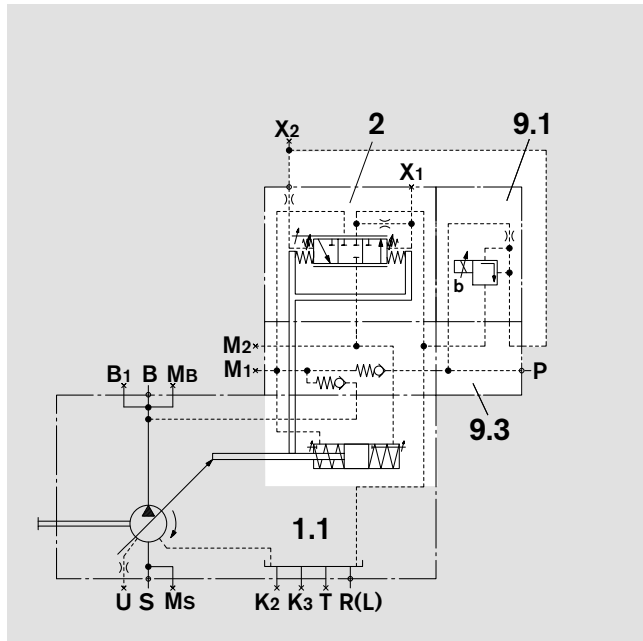
Size 500...1000 see page 47

# HD1T with electrical control of pilot pressure

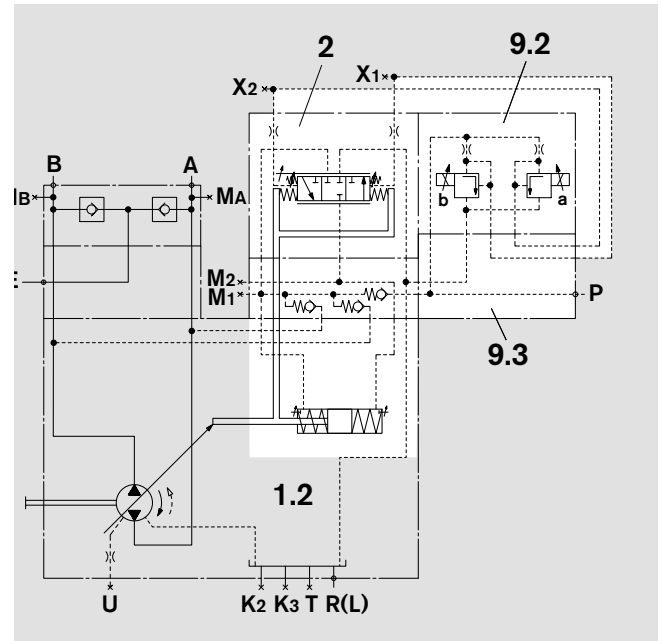
## Schematics

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)

## Sub-assemblies

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

- 9.1 Proportional-pressure relief valve (open circuit)  
DBEP6 B06-1X/45AG24NZ4M-382 with inlet orifice dia. 0.04 (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. 0.04 (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. 0.18...0.39 in (4.5...10mm)

# Unit dimensions HD1T

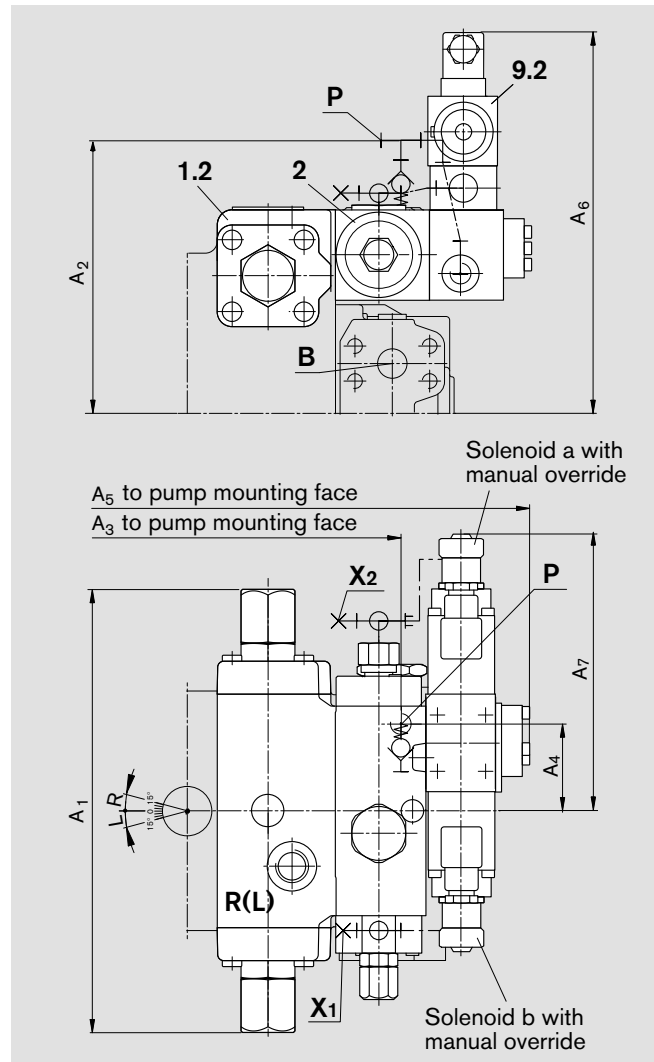
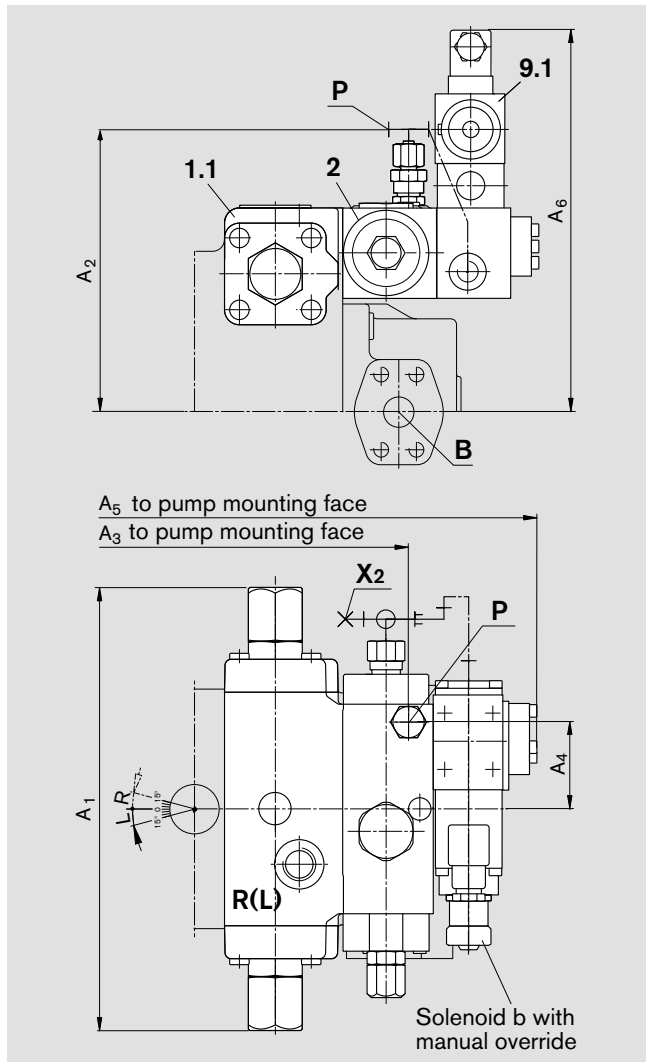
Before finalising your design please request a certified installation drawing. Dimensions in inches and (millimeters)

## Size 40 and 71

### AA4VSO in clockwise rotation

(Counter clockwise rotation on request)

### AA4VSG



**Sub-assemblies** see page 47

### Ports

P	Control pressure port	Tube dia. 8x1.5mm (DIN 3853 S8 Form W)	<b>max. tightening torques</b> <sup>1)</sup>
X <sub>1</sub> ; X <sub>2</sub>	Gauging ports pilot pressure	Tube dia. 8x1.5mm (DIN 3853 S8 Form W) closed	37 lb-ft (50 Nm)
on AA4VSO clockwise rotation only X <sub>2</sub> exists, on AA4VSO counter clockwise rotation only X <sub>1</sub> exists (dimensions on request)			37 lb-ft (50 Nm)

### Unit dimensions

Size	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	A <sub>4</sub>	A <sub>5</sub>	A <sub>6</sub>	A <sub>7</sub>	
40	11.65 (296)	8.03 (204)	9.25 (235)	2.28 (58)	12.80 (325)	10.12 (257)	7.44 (189)	For detailed dimensions and technical data on the variable pumps see the technical data sheets AA4VSO RA 92050 or AA4VSG RA 92100
71	13.07 (332)	8.66 (220)	10.31 (262)	2.28 (58)	13.86 (352)	10.75 (273)	7.44 (189)	

<sup>1)</sup> see general notes

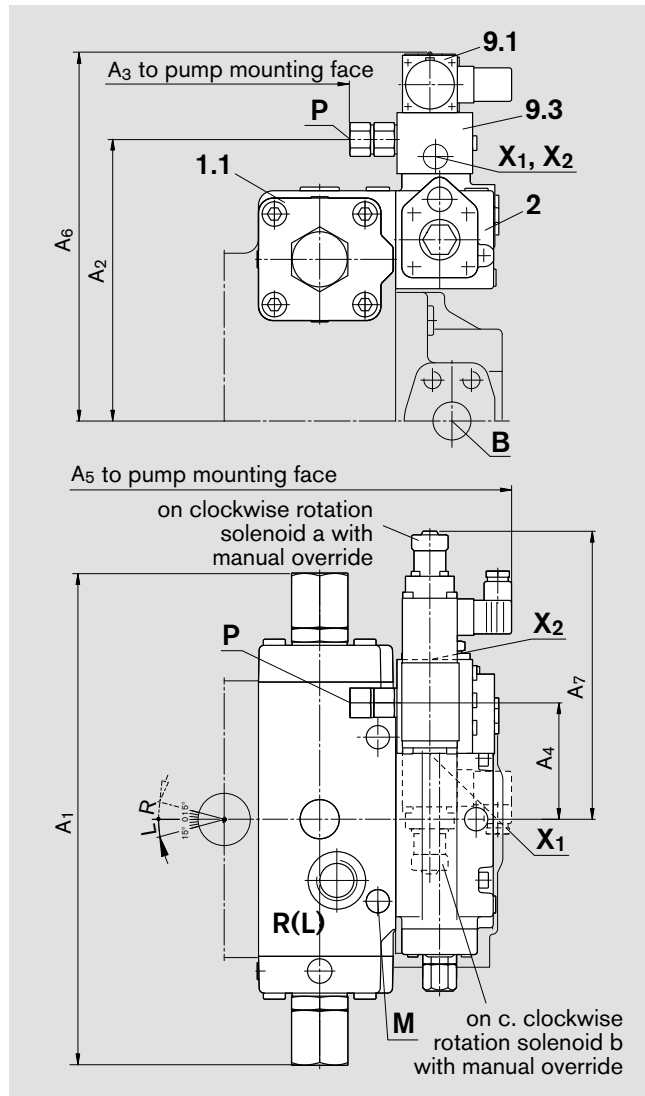


# Unit dimensions HD1T

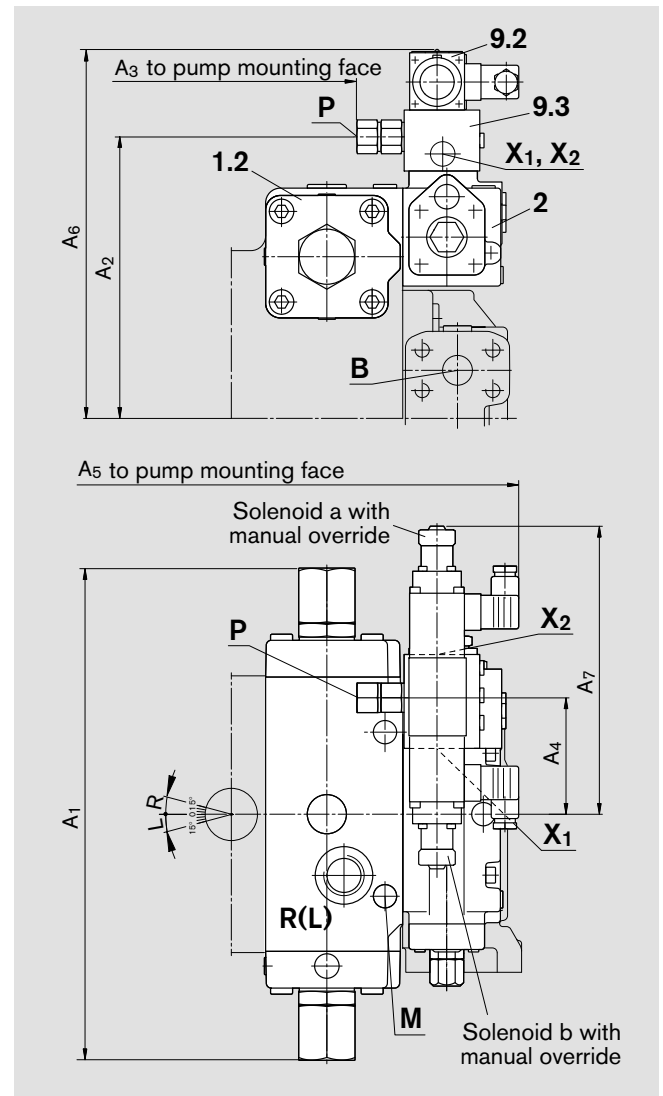
Before finalising your design please request a certified installation drawing. Dimensions in inches and (millimeters)

## Size 125...355

### AA4VSO



### AA4VSG (AA4CSG in preparation, dimensions on request)



**Sub-assemblies** see page 47

### Ports

				max. tightening torques <sup>1)</sup>
P	Control pressure port	ISO 11926 3/4-16UNF-2B; 0.59 (15) deep		103 lb-ft (140 Nm)
M	Gauging port control chamber pressure	DIN 3852 M14x1.5; 0.47 (12) deep; plugged (size 125...180) M18x1.5; 0.47 (12) deep; plugged (size 250 a. 355)		59 lb-ft (80 Nm) 103 lb-ft (140 Nm)
X <sub>1</sub> ; X <sub>2</sub>	Gauging ports pilot pressure	DIN 3852 M14x1.5; 0.47 (12) deep; plugged		59 lb-ft (80 Nm)

### Unit dimensions

Size	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	A <sub>4</sub>	A <sub>5</sub>	A <sub>6</sub>	A <sub>7</sub>
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)

For detailed dimensions and technical data on the variable pumps see the technical data sheets AA4VSO RA 92050 or AA4VSG RA 92100

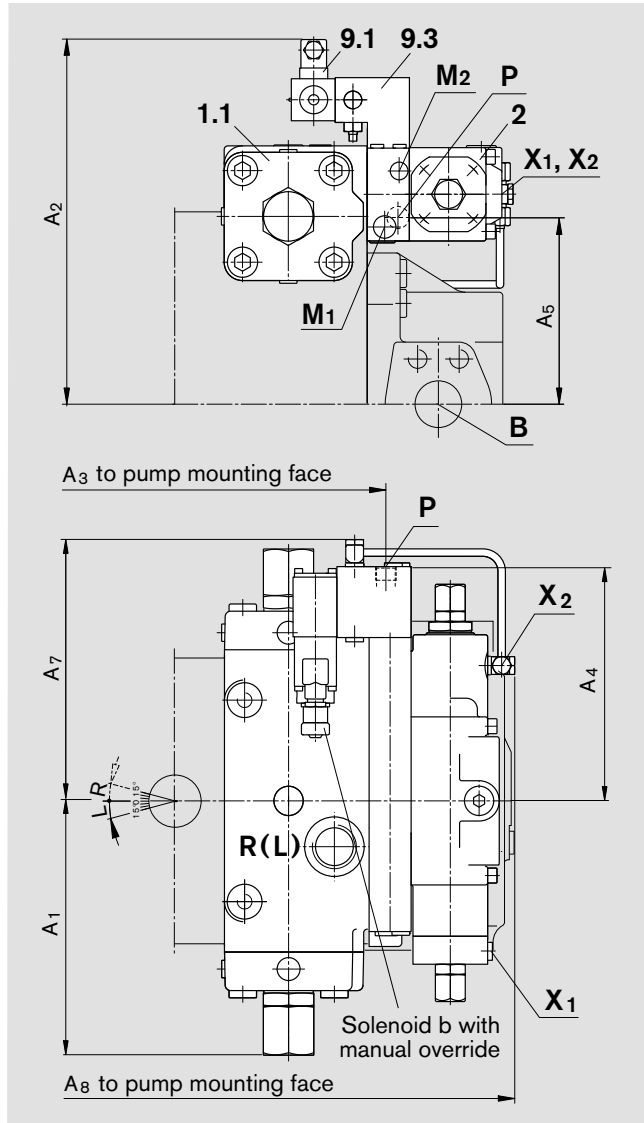
<sup>1)</sup> see general notes

# Unit dimensions HD1T

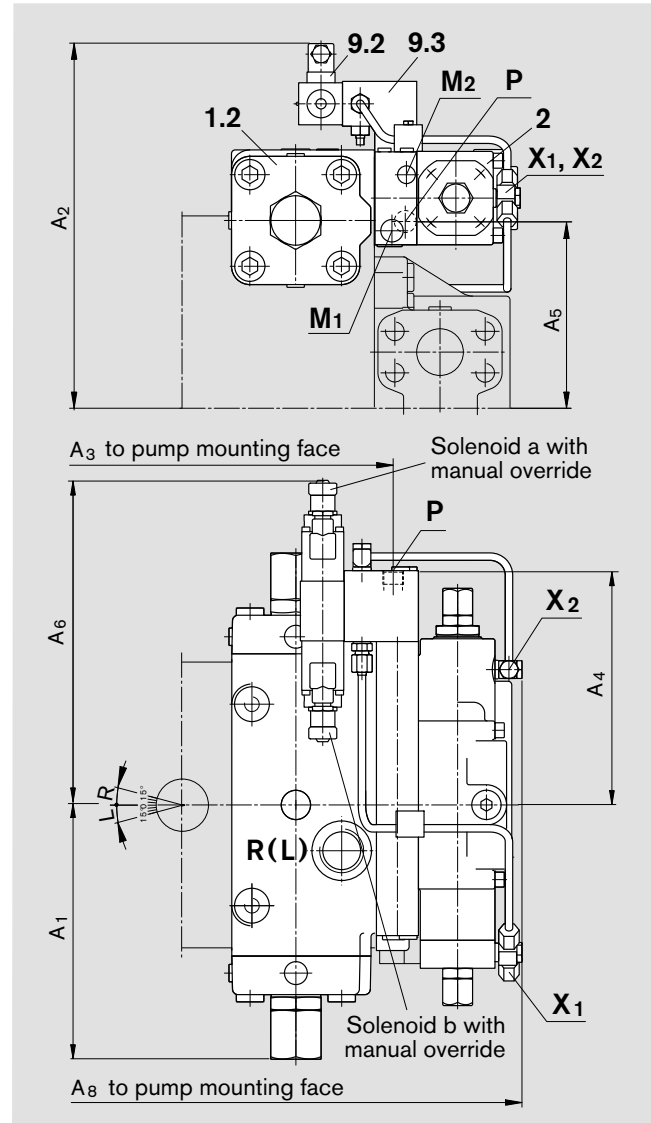
Before finalising your design please request a certified installation drawing. Dimensions in inches and (millimeters)

## Size 500...1000

### A4VSO



### A4VSG (A4CSG in preparation, dimensions on request)



**Sub-assemblies** see page 47

### Ports

Port	Description	Standard	Dimensions	max. tightening torques <sup>1)</sup>
P	Control pressure port	DIN 3852	M22x1.5; 0.55 (14) deep	155 lb-ft (210 Nm)
M <sub>1</sub>	Gauging port small control chamber	DIN 3852	M18x1.5; 0.47 (12) deep; plugged	103 lb-ft (140 Nm)
M <sub>2</sub>	Gauging port large control chamber	DIN 3852	M14x1.5; 0.47 (12) deep; plugged	59 lb-ft (80 Nm)
X <sub>1</sub> ; X <sub>2</sub>	Gauging ports pilot pressure	Tube dia. 8x1.5mm (DIN 3853 S8 Form W) (closed)		37 lb-ft (50 Nm)
	on A4VSO clockwise rot. X <sub>1</sub> , c. clockw. X <sub>2</sub>	DIN 3852	M14x1.5; 0.47 (12) deep; plugged	59 lb-ft (80 Nm)

### Unit dimensions

Size	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	A <sub>4</sub>	A <sub>5</sub>	A <sub>6</sub>	A <sub>7</sub>	A <sub>8</sub>
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)

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

<sup>1)</sup> see general notes

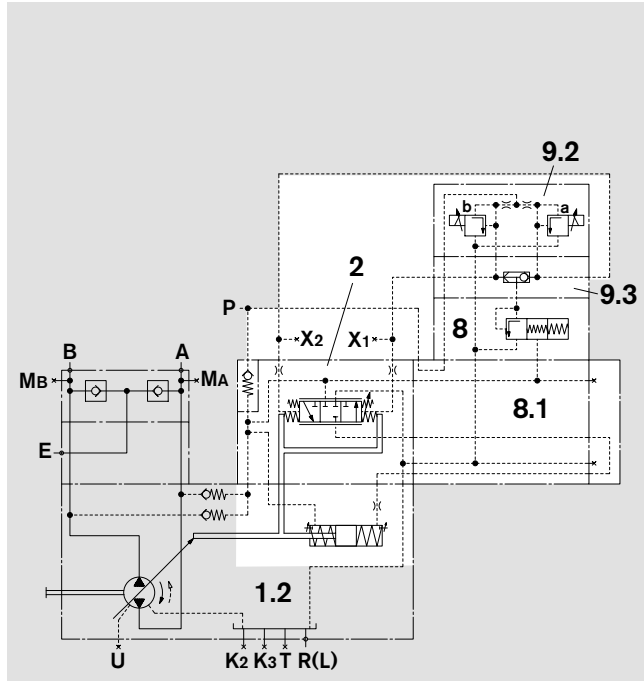
# HD1U with power control and elec. control of pilot press.

This version is a combination of HD1P (see page 39) and HD1T (see page 44)

## Schematics

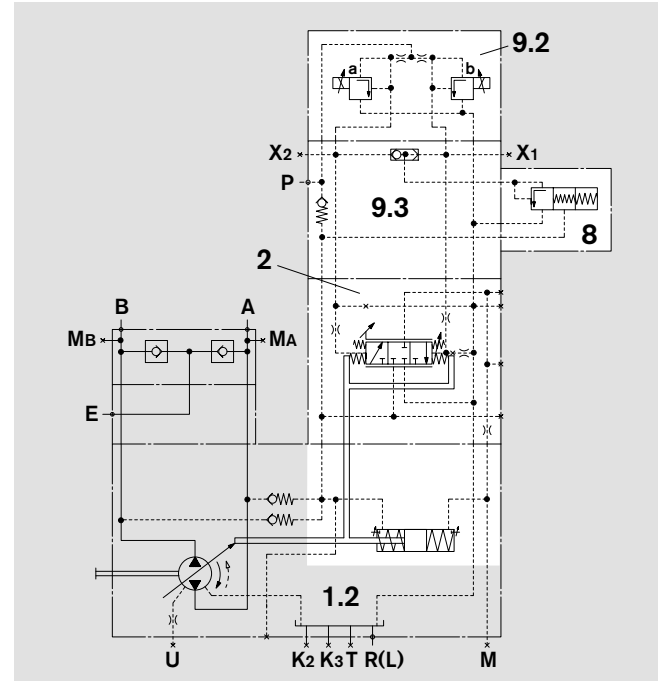
### Size 40 and 71

Example AA4VSG; on AA4VSO clockwise rotation only  $X_2$ , on AA4VSO counter clockwise rotation only  $X_1$  exists



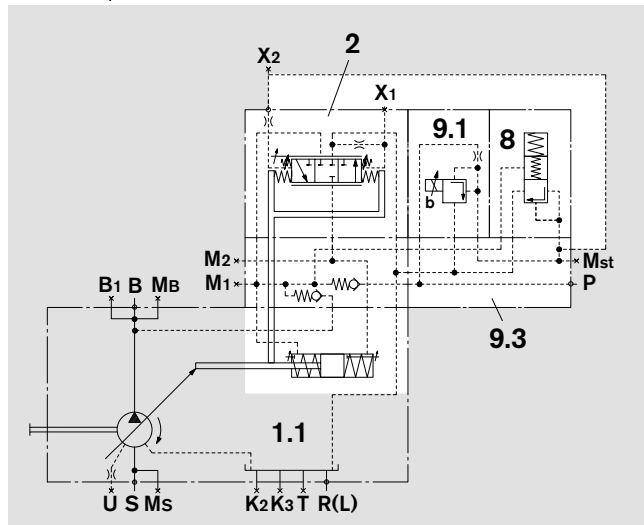
### Size 125...355

Example AA4VSG



### Size 500...1000

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



## Sub-assemblies

- 1 Pump with hydraulic control device
- 1.1 (A)A4VSO (see RA 92050)
- 1.2 (A)A4VSG (see RA 92100)
- 2 Pilot control unit
- 8 Power valve (see RA 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 (A)A4VSO)  
DBEP6 B06  
DBEP6 A06 (on size 125...355 clockwise rotation)
- 9.2\* Proportional-pressure relief valve DBEP6 C06  
(on (A)A4VSG and (A)A4CSG)
- 9.3 Sandwich plate for mounting of proportional 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)

\* detailed information see page 47

# Unit dimensions HD1U

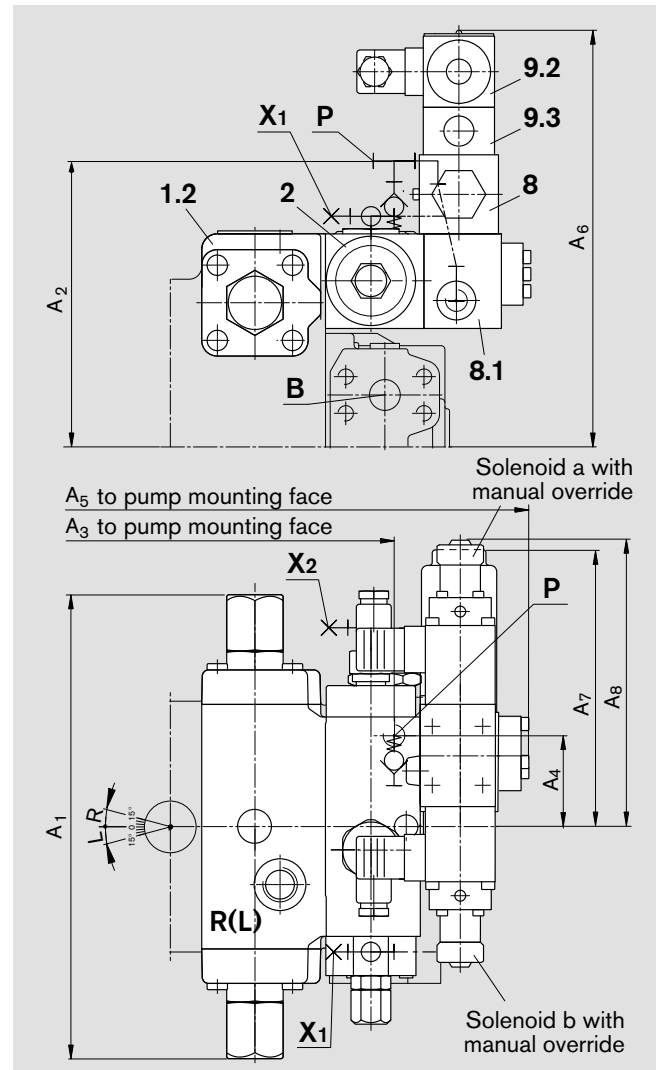
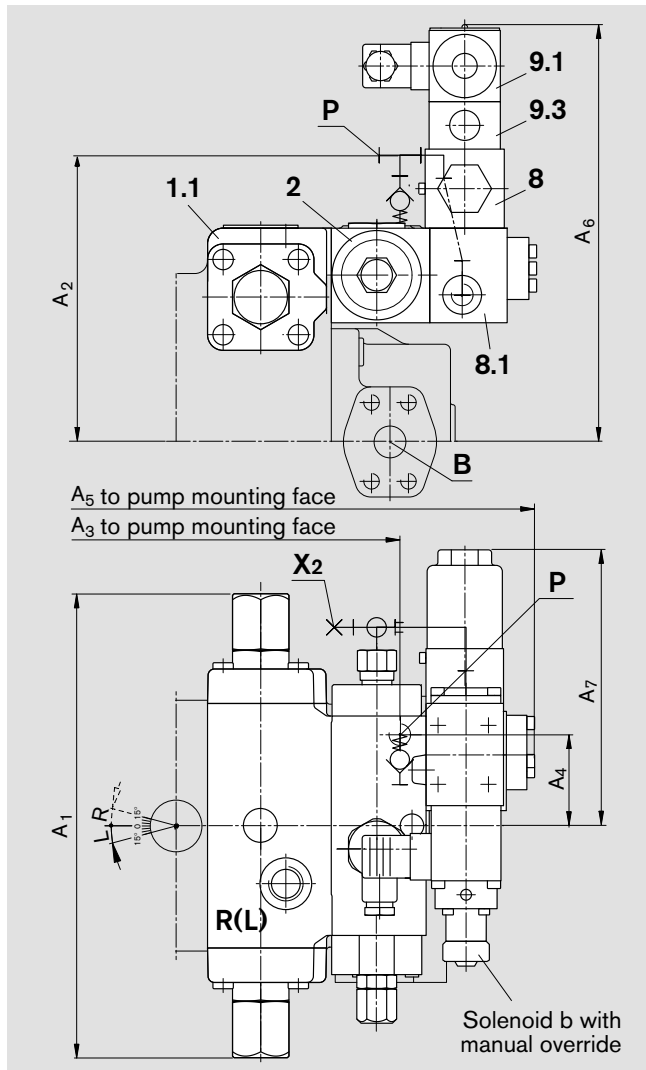
Before finalising your design please request a certified installation drawing. Dimensions in inches and (millimeters)

## Size 40 and 71

### AA4VSO clockwise rotation

(Counter clockwise rotation on request)

### AA4VSG



**Sub-assemblies** see page 51

### Ports

P	Control pressure port	Tube dia. 8x1.5mm (DIN 3853 S8 Form W)	<b>max. tightening torques</b> <sup>1)</sup>
X <sub>1</sub> ; X <sub>2</sub>	Gauging ports pilot pressure	Tube dia. 8x1.5mm (DIN 3853 S8 Form W) (closed)	37 lb-ft (50 Nm)

on AA4VSO clockwise rotation only X<sub>2</sub> exists, on AA4VSO counter clockwise rotation only X<sub>1</sub> exists (dimensions on request)

### Unit dimensions

Size	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	A <sub>4</sub>	A <sub>5</sub>	A <sub>6</sub>	A <sub>7</sub>	A <sub>8</sub>	
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)	For detailed dimensions and technical data on the variable pumps see the technical data sheets AA4VSO RA 92050 or AA4VSG RA 92100
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)	

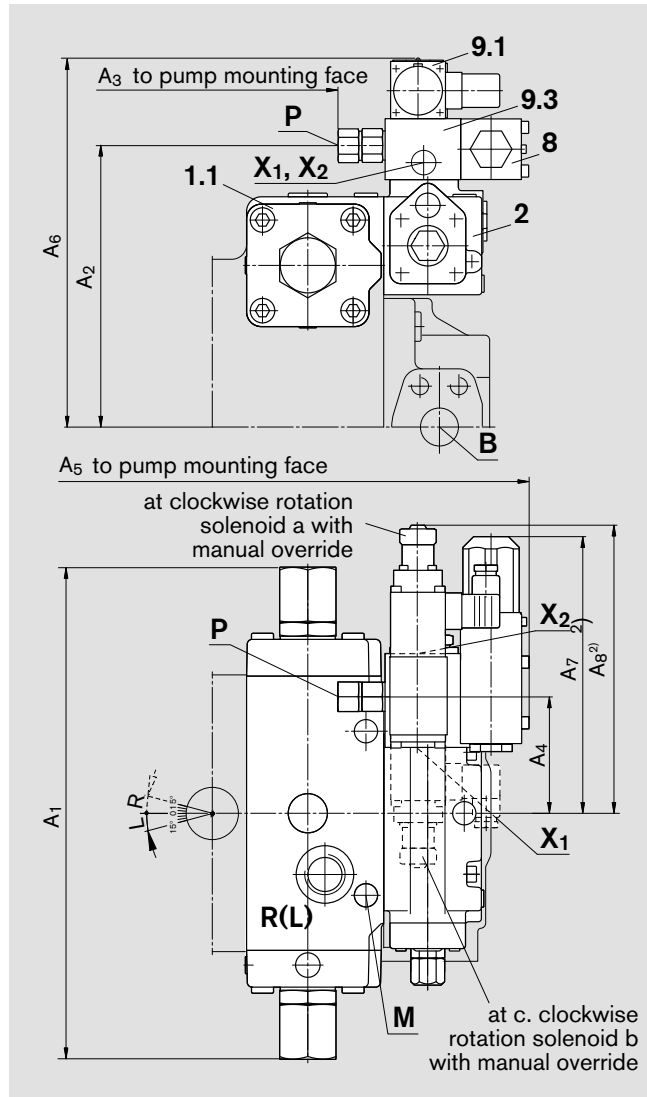
<sup>1)</sup> see general notes

# Unit dimensions HD1U

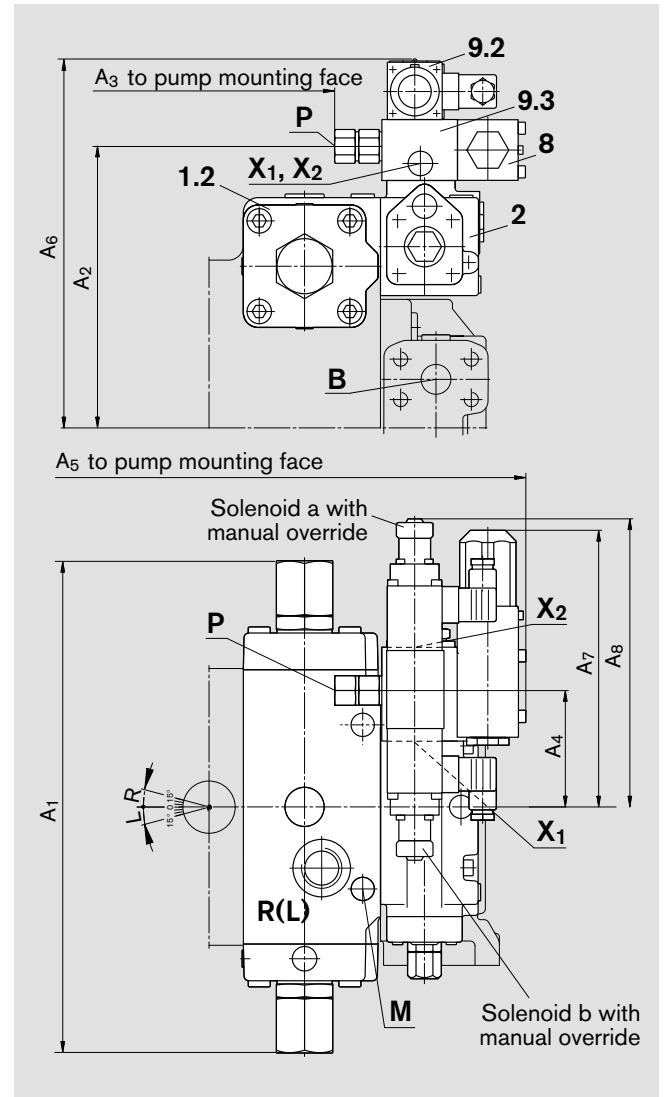
Before finalising your design please request a certified installation drawing. Dimensions in inches and (millimeters)

## Size 125...355

### AA4VSO



### AA4VSG (AA4CSG in preparation, dimensions on request)



**Sub-assemblies** see page 54

### Ports

Port	Description	Standard	Dimensions	max. tightening torques <sup>1)</sup>
P	Control pressure port	ISO 11926	3/4-16UNF-2B; 0.59 (15) deep	103 lb-ft (140 Nm)
M	Gauging port control chamber pressure	DIN 3852	M14x1.5; 0.47 (12) deep; plugged (size 125 a. 180) M18x1.5; 0.47 (12) deep; plugged (size 250 a. 355)	59 lb-ft (80 Nm) 103 lb-ft (140 Nm)
X <sub>1</sub> ; X <sub>2</sub>	Gauging ports pilot pressure	DIN 3852	M14x1.5; 0.47 (12) deep; plugged	59 lb-ft (80 Nm)

### Unit dimensions

Size	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	A <sub>4</sub>	A <sub>5</sub>	A <sub>6</sub>	A <sub>7</sub>	A <sub>8</sub> <sup>2)</sup>
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)

For detailed dimensions and technical data on the variable pumps see the technical data sheets AA4VSO RA 92050 or AA4VSG RA 92100

<sup>1)</sup> see general notes

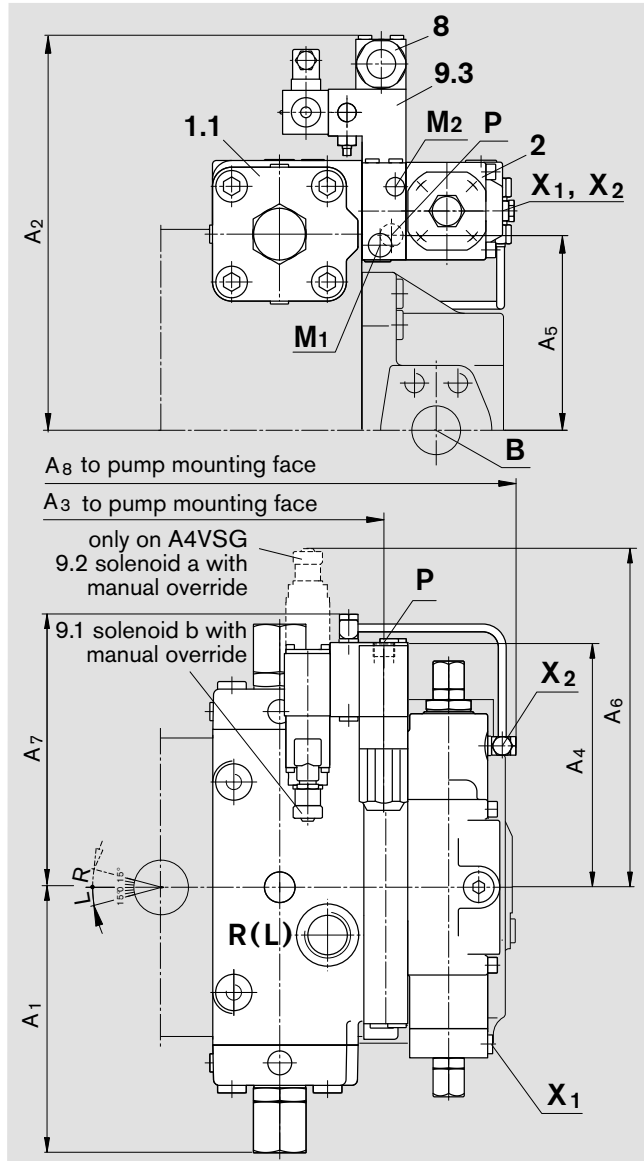
<sup>2)</sup> deleted on counter clockwise rotation, since only solenoid b exists

# Unit dimensions HD1U

Before finalising your design please request a certified installation drawing. Dimensions in inches and (millimeters)

## 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 RA 92050)
- 1.2 A4VSG (see RA 92100)
- 2 Pilot control unit
- 8 Power valve (see RA 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

Port	Description	Standard	Dimensions	max. tightening torques <sup>1)</sup>
P	Control pressure port	DIN 3852	M22x1.5; 0.55 (14) deep	155 lb-ft (210 Nm)
M <sub>1</sub>	Gauging port small control chamber	DIN 3852	M18x1.5; 0.47 (12) deep; plugged	103 lb-ft (140 Nm)
M <sub>2</sub>	Gauging port large control chamber	DIN 3852	M14x1.5; 0.47 (12) deep; plugged	59 lb-ft (80 Nm)
X <sub>1</sub> ; X <sub>2</sub>	Gauging ports pilot pressure		Tube dia. 8x1.5mm (DIN 3853 S8 Form W) (closed)	37 lb-ft (50 Nm)
	on A4VSO clockwise rot. X <sub>1</sub> , c. clockw. X <sub>2</sub>	DIN 3852	M14x1,5; 12 deep; plugged	59 lb-ft (80 Nm)

### Unit dimensions

Size	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	A <sub>4</sub>	A <sub>5</sub>	A <sub>6</sub>	A <sub>7</sub>	A <sub>8</sub>
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)

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

<sup>1)</sup> see general notes



## General notes

- The hydraulic control HD is, depending on the type of operation, suitable for open circuit ((A)A4VSO) or closed circuit operation ((A)A4VSG, (A)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 ISO 68/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.

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