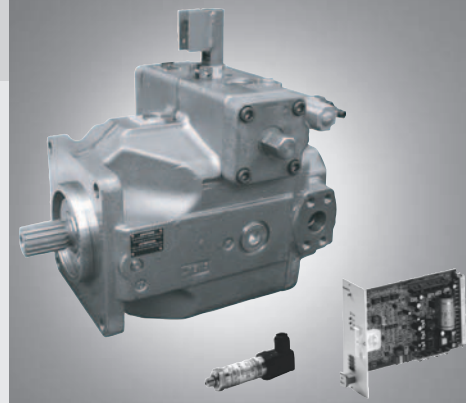


Electro-hydraulic Control system DFE1

RE 92 088/08.04 1/12
Additional to. RE 92 050

Technical data sheet

Size 125...355
Series 30
Nominal pressure 350 bar
Peak pressure 400 bar
open circuit

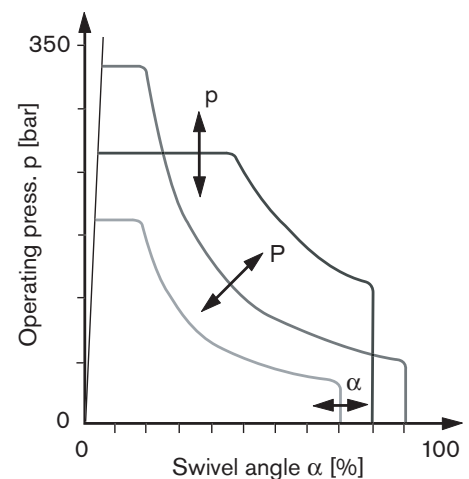


Contents

Type code - standard range	
Components	
Functional description	
DFE1	
DFE1Y	
DFE1Z	
Transition at jump in command input for swivel angle	
Quality of control	
Unit dimensions	
Safety information	

Features

2	The DFE1 control system is used for the electro-hydraulic control of
4	
5	– Pressure
6	– Flow
7	– Power (optional)
8	
8	The control system is used together with the axial piston pump
9	A4VSO in sizes 125, 180, 250, and 355 acc. to RE 92050.
10	
10	
11	



Type code - standard range

Fluid/Version

	125	180	250	355		
Mineral oil (Without prefix)	●	●	●	●		
HF-Fluids	on request					E
High speed	-	-	●	●		H

Axial piston unit

Swashplate design, variable, industrial use 350 bar, peak pressure 400 bar	A4VS
--	------

Mode of operation

Pump, open circuit	O
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Size

Displacement V_{gmax} [cm ³]	125	180	250	355
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Type of control

Electronic pressure-flow control						
internal supply of control oil, swivel range -100% to +100%	●	●	●	●		DFE1
external supply of control oil, swivel range -100% bis +100%	●	●	●	●		DFE1Y
external supply of control oil, swivel range 0 bis +100%	●	●	●	●		DFE1Z

Series

	30
--	----

Direction of rotation

looking at shaft end	clockwise	R
	c. clockwise	L

Seals

NBR Nitrile-Rubber to DIN ISO 1629 (shaft seal in FKM)	P
FKM Fluoro-Rubber to DIN ISO 1629	V

Shaft end

Cyl. with key DIN 6885	P
Splined end DIN 5480	Z

- available
- in preperation
- not available

	A4VS	O			/30	-		B	
Fluid/Version									
Axial piston unit									
Mode of operation									
Size									
Type of control									
Series									
Direction of rotation									
Seals									
Shaft end									

Mounting flange

ISO 4-hole	B
------------	---

Port for service lines

Pressure port B, Inlet port S: SAE on side 90° offset, fixing screws metric	13
Pressure port B, Inlet port S: SAE on side 90° offset, fixing screws metric	
2. Press. port B ₁ opposite B-, on delivery closed with blanking plate	25

Through drive			125	180	250	355	
Without through drive			●	●	●	●	N00
Flange ISO	Coupler for splined shaft DIN 5480	Seal					
125, 4-hole	32x2x30x14x9g	radial	●	●	●	●	K31
140, 4-hole	40x2x30x18x9g	radial	●	●	●	●	K33
160, 4-hole	50x2x30x24x9g	radial	●	●	●	●	K34
224, 4-hole	60x2x30x28x9g	radial	-	-	●	●	K35
224, 4-hole	70x3x30x22x9g	radial	-	-	-	●	K77
Flange SAE J744	Coupler for splined shaft	Seal					
82-2 (A)	5/8 in (A)	radial	●	●	●	●	K01
82-2 (A)	3/4 in (A-B)	radial	●	●	●	●	K52
101-2 (B)	7/8 in (B)	axial	●	●	●	●	K02
101-2 (B)	7/8 in (B)	radial	●	●	●	○	K68
101-2 (B)	1 in (B)	radial	●	○	●	●	K04
127-2 (C)	1 1/4 in (C)	radial	○	○	○	○	K07
127-2 (C)	1 1/2 in (C-C)	axial	●	●	●	○	K24
152-4 (D)	1 3/4 in (D)	axial	-	○	○	○	K17
with through dr. shaft, without coupler, without adapter flange, closed with cover			●	●	●	●	K99

Combination pumps

If a second Rexroth pump is to be factory mounted, then both type codes are to be connected with a „+“. Type code 1. Pump + Type code 2. Pumpe

Example: A4VSO 250 DFE1/30R - PPB13K34 + A4VSO 125 DFE1/30R - PZB13N00

If an auxiliary pump is to be factory mounted, please contact us.

Components

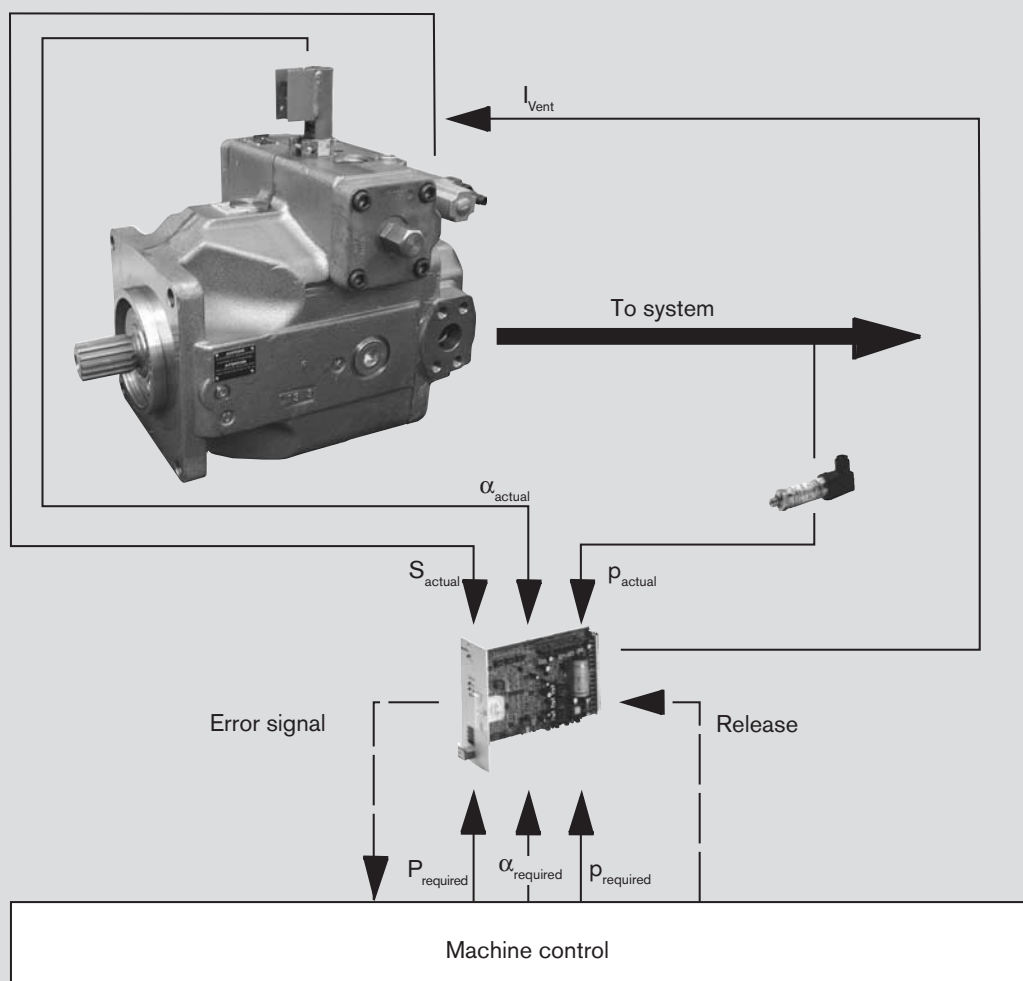
The controlsystem DFE1 comprises the following components:

- Well proven high pressure axial piston pump A4VSO in swashplate design for use in heavy duty industrial applications
- Proportional valve VT-DFP-A-2X for exact control with feedback of valve spool position (see RE 29 016)
- Inductive displacement transducer for feedback of swashplate angle
- Pressure transducer HM 12-1X for feedback of system pressure to RE 29 933 (optional, only required with pressure and power control functions, please order separately)

- Analog amplifier VT 5041-2X to RE 30 240 (please order separately)

The system contains the following features:

- Pump combinations are possible
- Control pressure internal or external via pilot pump (see page 7 and 8)
- Fast decompression of trapped fluid by letting the pump go over center as a standard (see page 6)
- Rotary group optimised for long life in standby operation



Functional description

The power, pressure and displacement control of pump A4VSO-DFE1 is accomplished by means of an electro-proportional control valve (4). A current to the proportional valve results in an oil flow to the pump's control piston (2), which determines via the displacement transducer (3) the swashplate angle (1) and thus the pump flow.

With the pump in standstill, and the control system without pressure, the bias spring will push the pump to max. displacement (V_{gmax}).

Standby pressure (DFE1):

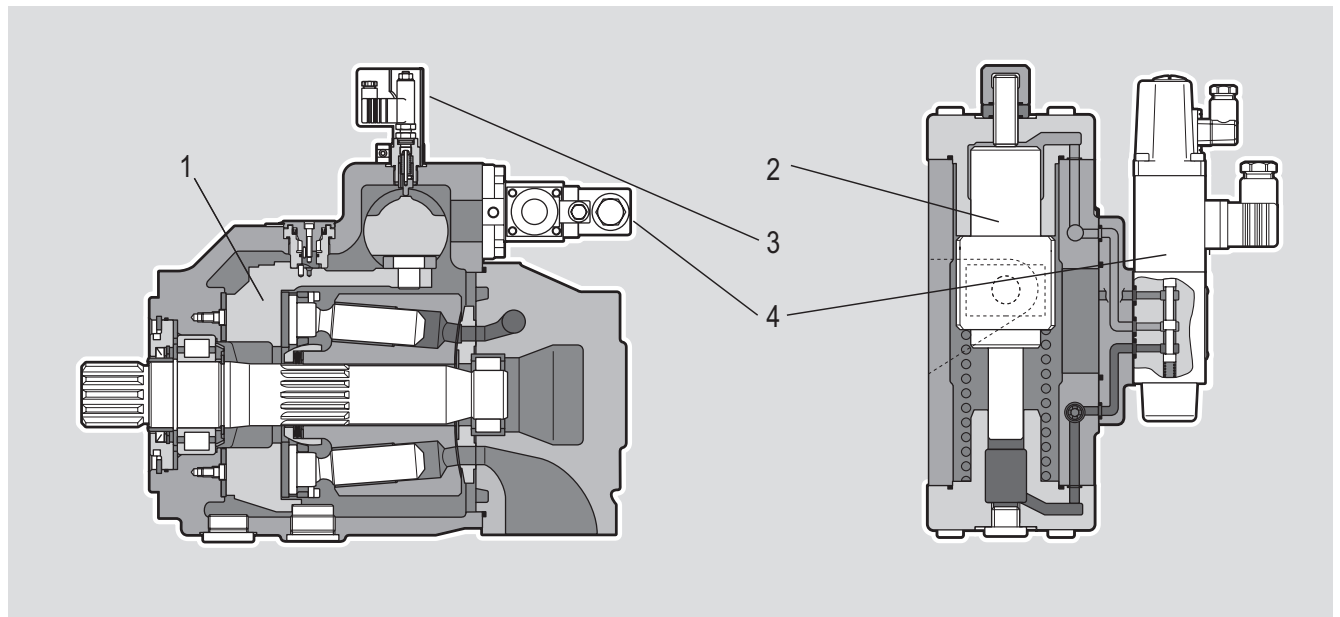
With a de-energized proportional valve and a closed pump outlet the pump will go to V_{gmin} - Standby pressure. In this condition the pressure level will reach 4 to 8 bar. The same applies also in case of an error signal or missing control release.

If the standby pressure of 4 to 8 bar is not desired, it is possible to use type DFE1Y, or DFE1Z.

The necessary oil to operate the hydraulic control system can be supplied in two different ways:

1. Internal (DFE1) from own pump outlet (page 6)
2. External (DFE1Y, DFE1Z) from separate system (page 7/8)

The proportional valve is controlled with amplifier card VT 5041-2X. This card processes all control signals which are necessary to operate pump A4VSO-DFE1. Standard are input signals for pressure and swivel angle as well as an optional signal for power control. The actual value for pressure is picked up by a pressure transducer. A displacement transducer picks up the actual pump swivel angle. The amplifier card compares these actual values with the command inputs. A minimum value generator assures the activation of the appropriate controller. The output signal of this generator is used as the input signal to the proportional valve solenoid. In order to achieve a better quality of control, the proportional valve operates as a secondary control loop.



DFE1

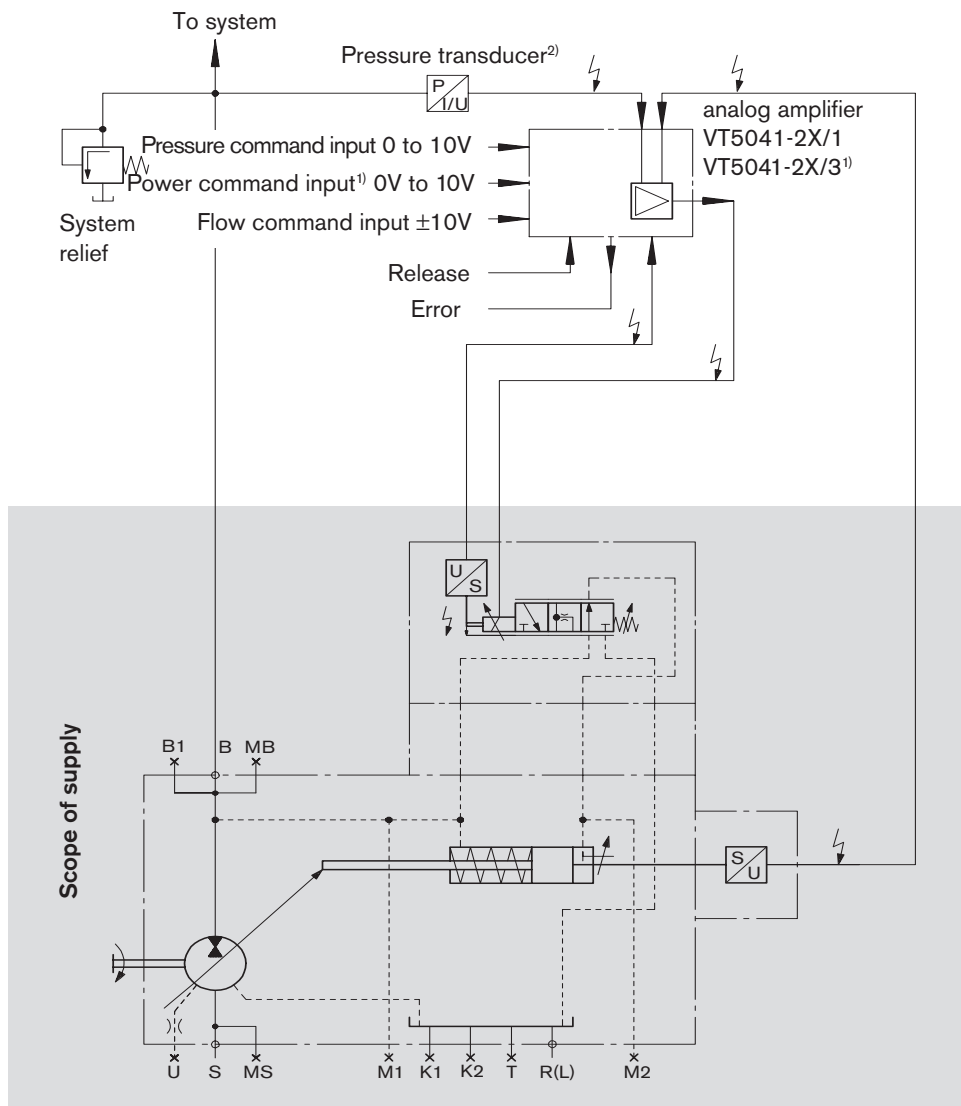
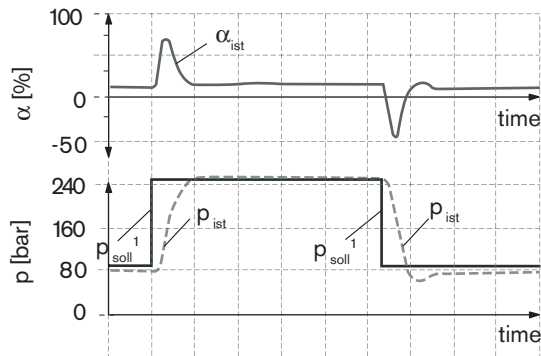
Control oil supply internal, Swivel range -100% to +100%

With DFE1 the control energy is taken out of the main pump flow. The min. pressure must be at least 4 to 8 bar. (see also point „Standby pressure“ on page 5 and „Fail safe feature“)
This min pressure is necessary for the control of flow, pressure and power. Below this pressure, the pump tends to go to max. displacement regardless of the input signals.

As a special feature the pump is able to change the direction of flow. This capability to swivel over center enables a fast decompression of trapped oil volume.

Fail safe feature

Below 4 to 8 bar the pump will stroke to larger displacement; an undesired operation with negative flow cannot occur.



¹⁾ optional, power limiting

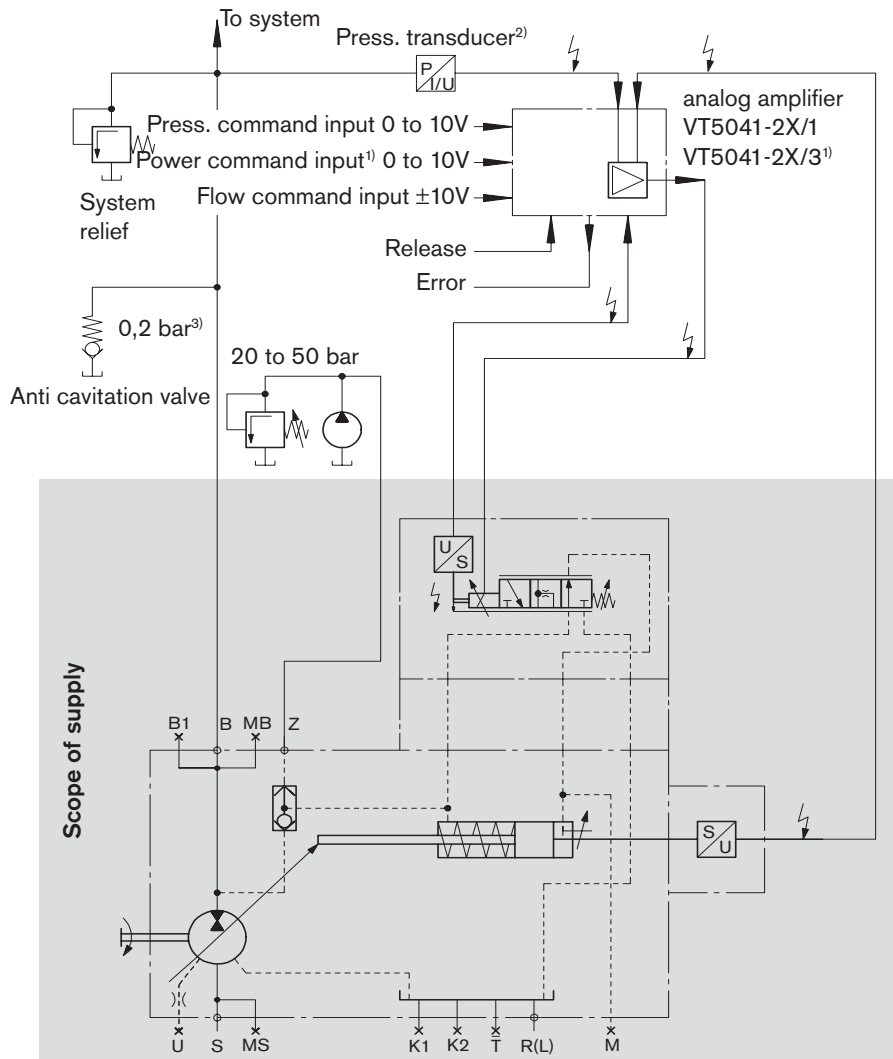
²⁾ only needed with pressure resp. power control

DFE1 Y

**External supply of control oil,
Swivel range -100% to +100%**

With DFE1Y the control energy has to be supplied externally, eg. a gear pump. An automatic change-over to internal supply is accomplished by means of a shuttle valve.

This control version features a reversal of the direction of flow, also at pressures below 4 to 8 bar. This option enables a fast decompression of trapped oil volume by swiveling over center.



Caution!

- In the case of an externally supplied control system (Swivel range $\pm 100\%$), the function, which swivels the pump to zero stroke when the output stage of the control card is de-energized is inactive.
- In the case of a de-energized output stage of the control card (e.g. in case of an error), the external control pressure pushes the variable pump's swashplate to the negative limit stop (100% flow is delivered from the system to the tank). In order to avoid cavitation the use of a checkvalve (anti cavitation valve with 0,2 bar spring) is required.
- When an error is detected, the output stage switches off and the external supply causes the pump to swivel towards the negative limit stop. Upon detection of an error message, it is essential that the machine control responds (e.g drive motor of the pump must be switched off, external supply of the control system must be interrupted).
- The command values for pressure and flow must always be greater than zero ($p_{comm} \geq 3\text{bar}$, $\alpha_{comm} \geq 5\%$), since, due to drift or inaccurate control, there is no exact "zero" pressure or "zero" swivel angle. Under unfavourable conditions, smaller command values can cause cavitation.

¹⁾ optional, Power limiting

2) only needed with press. resp. power control

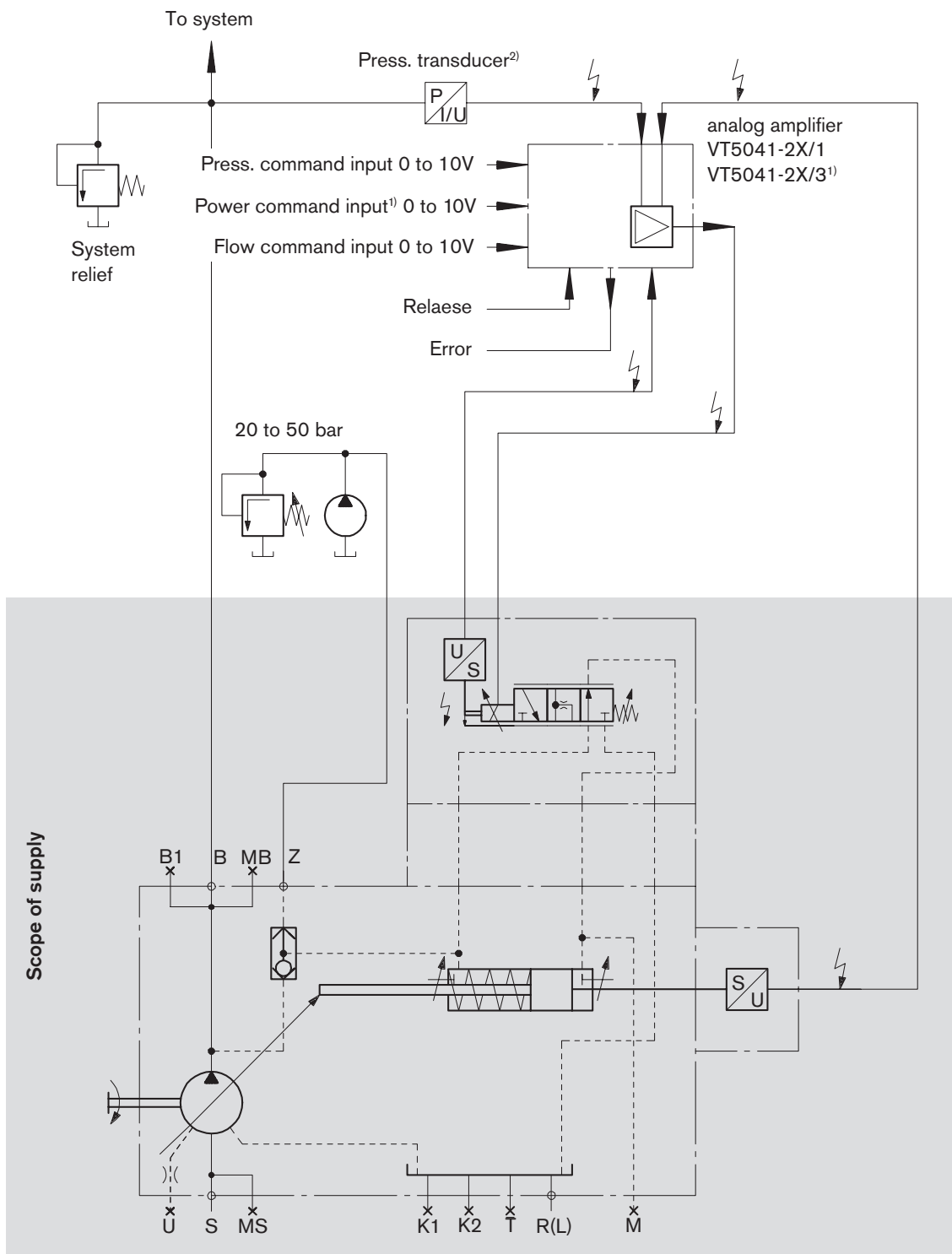
DFE1Z

**Control oil supply external,
swivel range 0 to 100%**

Version DFE1Z has an input port for external supply of control flow, e.g. from a gear pump. The DFE1Z control offers a

Q_{min} -limiting screw which prevents the unit from going over center.

Therefore, the option of fast decompression of trapped oil volume does not exist with this version.

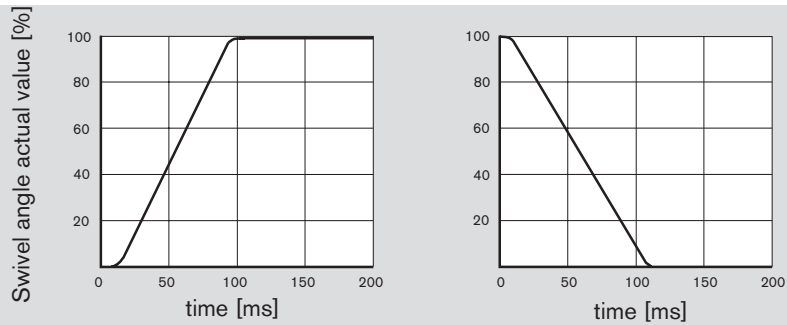


¹⁾ optional, power limiting

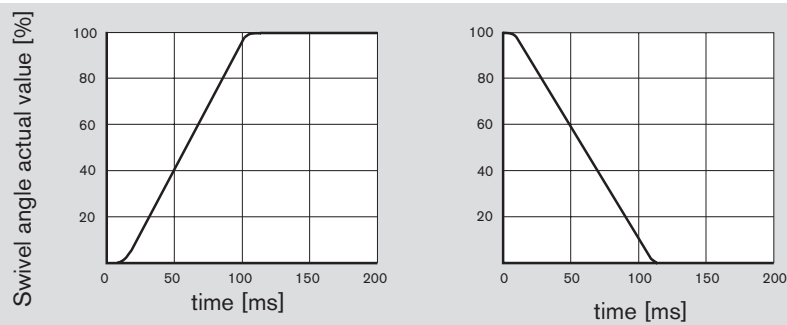
²⁾ only needed with press. resp. power control

Transition at jump in command input for swivel angle

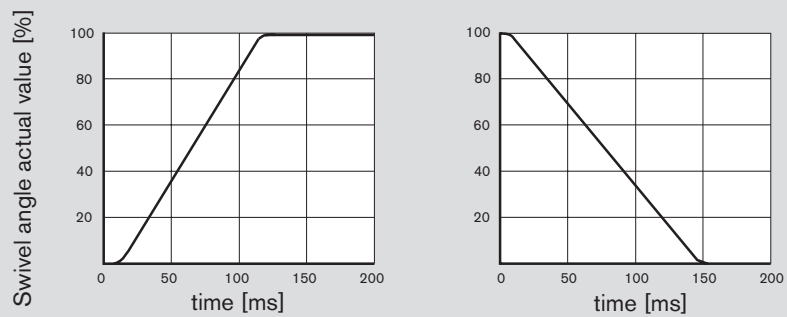
Size 125, $p = 100$ bar



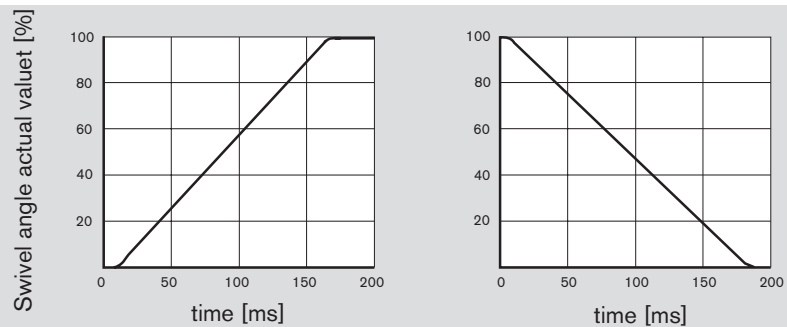
Size 180, $p = 100$ bar



Size 250, $p = 100$ bar



Size 355, $p = 100$ bar



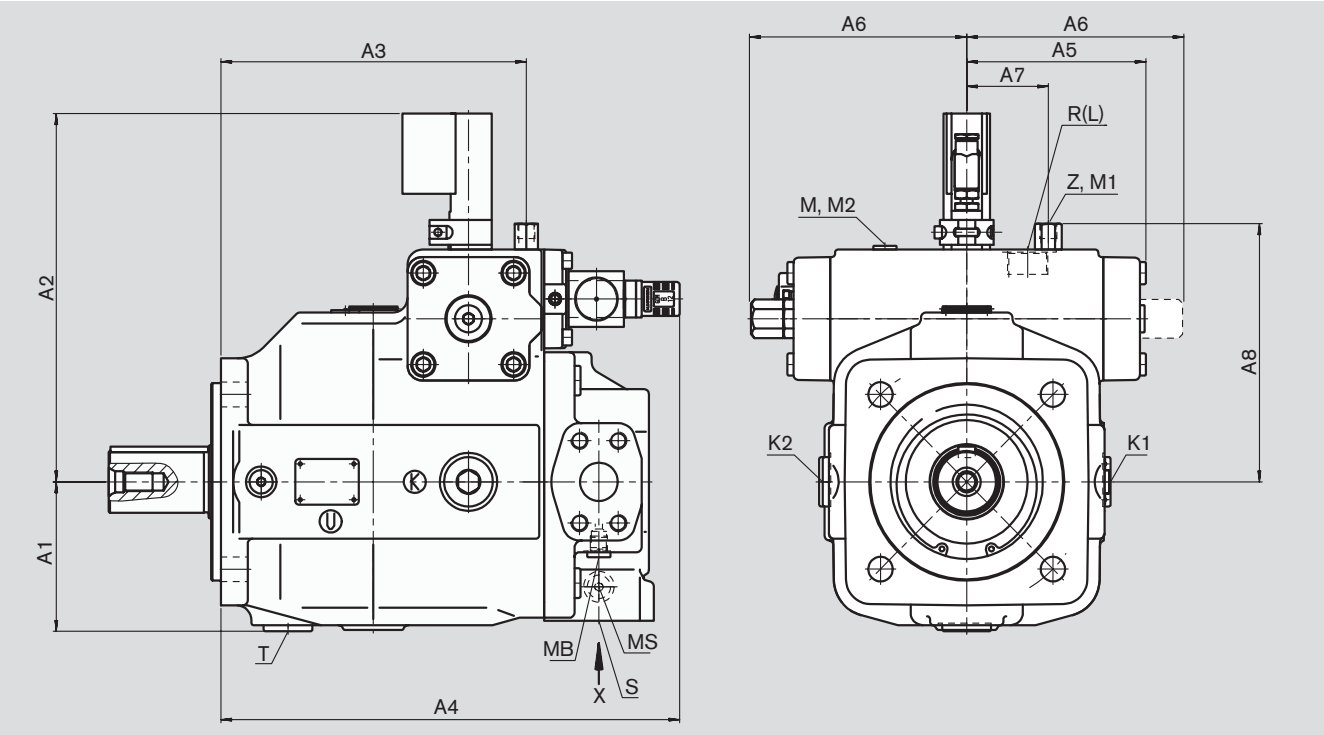
Quality of control

	Swivel angle control	Pressure control
Linearity tolerance	$\leq 1,0\%$	$\leq 1,5\%$
Hysteresis	$\leq 0,2\%$	$\leq 0,2\%$
Repeatability	$\leq 0,2\%$	$\leq 0,2\%$

(The above values are only valid when using the appropriate components acc. to the ordering code)

Unit dimensions

Sizes 125 to 355 (Shown: size 125 in clockwise rotation)



Size	A1	A2	A3	A4	A5	A6	A7	A8
125 [mm]	121	298	250,5	376	147	177	50	209
180 [mm]	121	298	250,5	376	147	177	50	209
250 [mm]	154	345	310,5	438	212	179	55	259
355 [mm]	154	345	310,5	464	212	179	55	259

Ports		125	180	250	355
Z	Control press. port	M14x1,5	M14x1,5	M14x1,5	M14x1,5
B	Pressure port [in]	1 1/4	1 1/4	1 1/2	1 1/2
T	Case drain	M33x2	M33x2	M42x2	M42x2
MB	Gauging port system pressure	M14x1,5	M14x1,5	M14x1,5	M14x1,5
MS	Gauging port inlet pressure	M14x1,5	M14x1,5	M14x1,5	M14x1,5
S	Inlet port [in]	2 1/2	3	3	4
K1, K2	Flushing port	M33x2	M33x2	M42x2	M42x2
R(L)	Oil fill or bleed port	M33x2	M33x2	M42x2	M42x2
M1, M2	Gauging port control pressure	M14x1,5	M14x1,5	M18x1,5	M18x1,5

Safety information

- Pump A4VSO was designed for operation in open loop circuits.
- Systems design, installation and commissioning require trained technicians or tradesmen.
- All hydraulic ports can only be used for the fastening of hydraulic service lines.
- Tightening torques:
The tightening torques mentioned in this data sheet are maximum values and must not be exceeded (max. values for thread).
Manufacturers information concerning the maximum permitted tightening torques of the various fittings are to be observed!
For DIN 13 mounting bolts, we recommend that tightening torques be checked on a case by case basis in accordance with VDI 2230, published 2003.
- During and shortly after operation of a pump the housing and especially a solenoid can be extremely hot, avoid being burned!

Bosch Rexroth AG
Mobile Hydraulics
Product Segment Axial Piston Units
Plant Horb
An den Kelterwiesen 14
72160 Horb am Neckar, Germany
Phone +49 (0) 74 51 - 92 0
Telefax +49 (0) 74 51 - 82 21
info.brm-ak@boschrexroth.de
www.boschrexroth.com

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Subject to change.