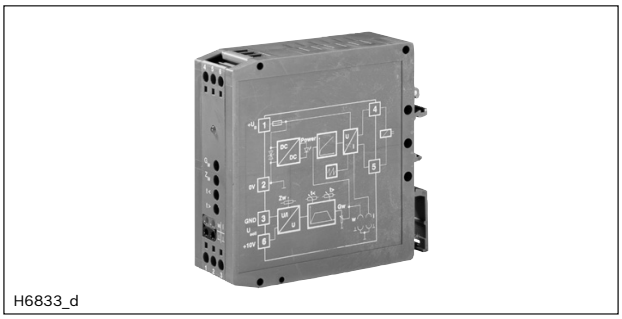
The Drive & Control Company

Rexroth
Bosch Group

Analog amplifier module

Type VT-MSPA1-1, VT-MSPA1-10, VT-MSPA1-11

RE 30223
Version: 2013-01
Replaces: 02.12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- Component series 1X

Features

- Suitable for controlling direct operated proportional pressure valves:
  - DBET-6X,
  - DBEM...-7X,
  - (Z)DRE 6...-1X,
  - 3DRE(M) 10...-7X,
  - 3DRE(M) 16...-7X,
  - ZDRE 10...-2X,
  - (Z)DBE6...-2X,
  - DRE(M) 10, 25, 32-6X
- Inverse-polarity protection of the operating voltage
- Differential input for command value voltage +10 V
- Ramp generator up and down can be set separately
- Zero point potentiometer
- 1 command value attenuator
- Characteristic curve generator
- Clocked power output stage
- LED display:
  - **Ready for operation (green)**
- Measuring sockets for:
  - Pressure command value
  - Actual current value
- Dither generator with command value- and operating voltage-dependent frequency

Contents

Ordering code

01		02		03		04		05
VT-MSPA1	**–**		**–**	**1X**	**/**	**V0**	**/**	*****

01	Analog amplifier module	**VT-MSPA1**
02	For controlling direct operated proportional pressure valves:	
	DBET-6X, DBEM...-7X	**1**
	(Z)DRE 6...-1X	**10**
	3DRE(M) 10...-7X, 3DRE(M) 16...-7X, ZDRE 10...-2X, (Z)DBE6...-2X, DRE(M) 10, 25, 32-6X	**11**
03	Component series 10 to 19 (10 to 19: Unchanged technical data and pin assignment)	**1X**
04	Standard version	**V0**
05	Further details in the plain text	*****

Functional description

Analog amplifier for controlling pressure valves without electrical feedback. The modular design allows for simple top hat rail mounting as is usual in control cabinets.

Command value input: 4
The module amplifier is controlled by means of a standard command value signal 0 to +10 V. By means of the zero point trimmer (Zw) (6), a zero point offset can be corrected.

Ramp generator: 5
In the ramp generator (5), the control output rise is limited. Using the trimmer "t <" (7), the time for the increasing command value signal is set and using trimmer "t >" (8), the time for the decreasing command value voltage is set. The adjustable time is part of the technical data.

Characteristic curve generator: 10
Using the trimmer "Gw" (9), the rated current of 1.6 A for the solenoid is set. In the characteristic curve generator (10), the command value signal is changed so that a linear command value pressure characteristic curve results.

Clock generator: 12
In the clock generator (12), a frequency for the output stage adjusted to the command value is generated.

Power output stage: 11-14
Using the control output coming from the characteristic curve generator (10) and the clock frequency, the power output stage generates a PWM signal that is fed into the solenoid. The solenoid current is recorded and, in the current controller (11), compared with the control output and the difference is compensated.

Fault recognition: 15
Monitors the solenoid conductors with regard to cable break and short circuit as well as over-current of the output stage. If there is an error, the green ready for operation display goes out.

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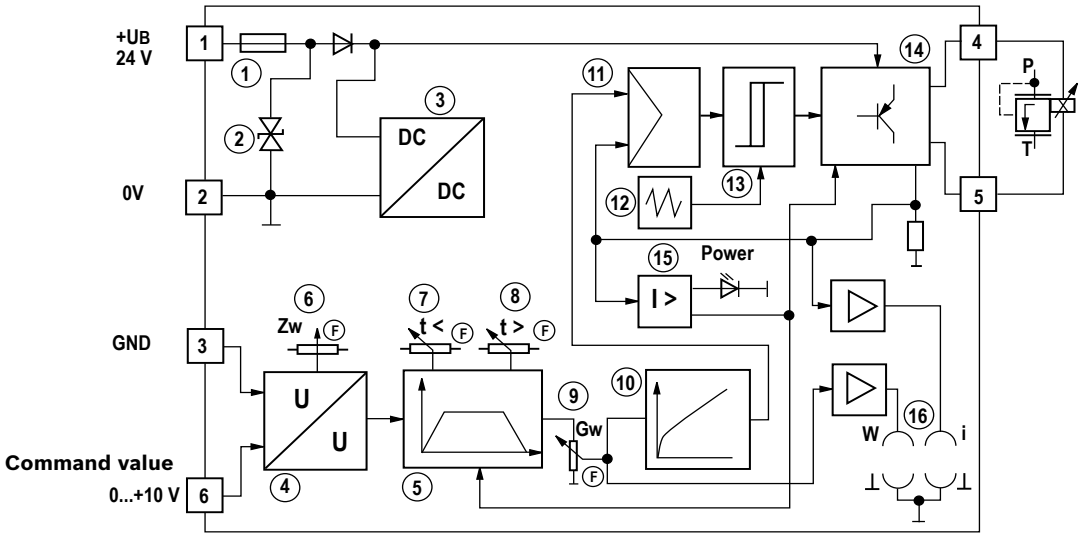
Block diagram



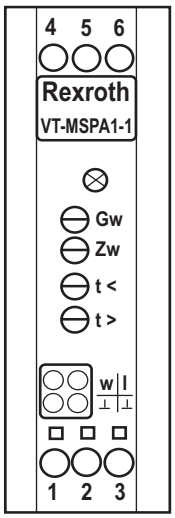
1 Fuse
2 Suppressor diode
3 Power supply unit
4 Command value input
5 Ramp generator
6 Potentiometer zero point
7 Potentiometer ramp up
8 Potentiometer ramp down
9 Potentiometer I_{max}
10 Characteristic curve generator
11 Current controller
12 Clock generator
13 Schmitt trigger
14 Output stage
15 Fault recognition
16 Measuring socket
Ⓕ On front side

Terminal assignment/device view

Terminal assignment

Terminal	
1	$+U_B$
2	Ground
3	$-U_{command}$
4	Solenoid +
5	Solenoid –
6	$+U_{command}$

Device view



Potentiometer:
"Gw" Pressure command value
"Zw" Zero point
"t <" Ramp time up
"t >" Ramp time down

Sockets:
"w" Pressure command value
"I" Actual current value
"⊥" Measurement zero

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Technical data

(For applications outside these parameters, please consult us!)

		VT-MSPA1-1	VT-MSPA1-10	VT-MSPA1-11
Operating voltage	U_B	24 VDC +40 % –10 %		
Operating range:				
– Upper limit value	$u_B(t)_{max}$	35 V		
– Lower limit value	$u_B(t)_{min}$	21 V		
Power consumption	P_{max}	< 50 VA		
Current consumption	I_{max}	< 1.3 A		
Fuse	I_s	Electronic overload protection and SMD fuse (soldered in)		
Inputs:				
– Command value (differential input)	$U_{command}$	0 to +10 V; R_e = 100 kΩ		
Outputs:	I_{min}			
– Solenoid current/solenoid resistance	I_{max}	1.9 A; R_{20} = 5.5 Ω	1.9 A; R_{20} = 5.2 Ω	1.9 A; R_{20} = 5.5 Ω
– Frequency	f	180 to 450 Hz	330 Hz ± 10 %	180 to 450 Hz
Setting ranges:				
GW: Solenoid current	I	100 mA...1.9 A		
ZW: Zero point		±25 %		
t >: / t <: Ramp	t	80 ms...5 s	210 ms...5 s	160 ms...5 s
Measuring sockets:				
– Command value "w"	U	0 to 10 V		
– Actual current value "I"	U	1 mV ≙ 1 mA solenoid current		
Type of connection		6 screw terminals		
Type of mounting		Top hat rail TH 35–7.5 according to EN 60715		
Protection class according to EN 60529		IP 20		
Dimensions (W x H x D)		25 x 79 x 85.5 mm		
Admissible operating temperature range	ϑ	0 to +50 °C		
Storage temperature range	ϑ	–25 to +85 °C		
Ground	m	0.15 kg		

Notice:
For information on the environment simulation testing for the areas EMC (electromagnetic compatibility), climate and mechanical load, see data sheet 30223-U.

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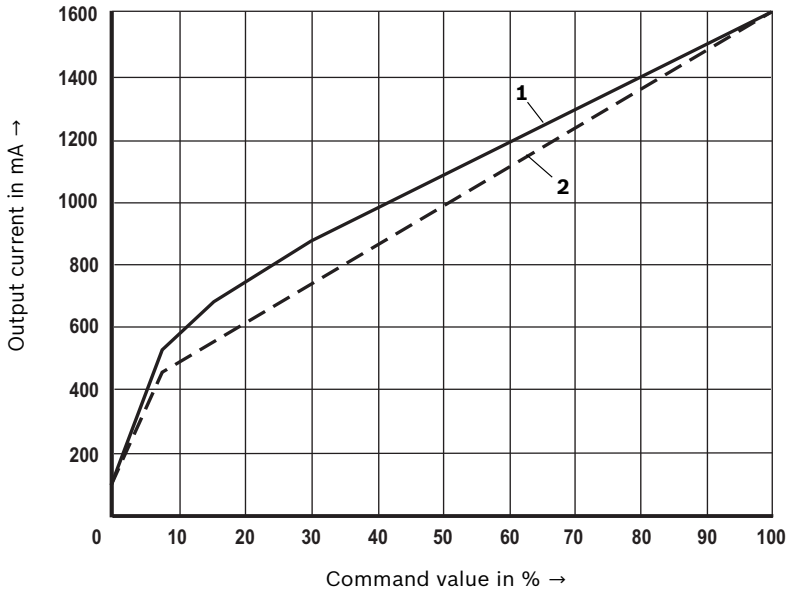
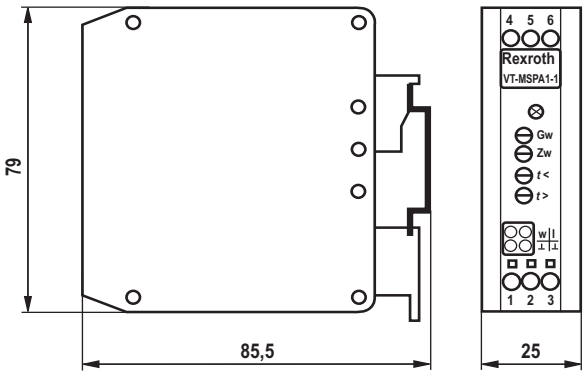
Output characteristic curve



1 = VT-MSPA1-1 and VT-MSPA1-11
2 = VT-MSPA1-10

Device dimensions (dimensions in mm)



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Project planning/maintenance instructions/additional information

- The amplifier module may only be wired when de-energized.
- The distance to radios must be sufficient (>> 1 m).
- Screen command value lines, do not lay them close to power cables, screen solenoid conductors.
- **Do not use free-wheeling diodes** in the solenoid conductors.
- With a strongly fluctuating operating voltage, it may in individual cases be necessary to use an external smoothing capacitor with a capacity of at least 2200 µF.
- Recommendation: Capacitor module VT 11110 (see data sheet 30750); sufficient for up to 3 amplifier modules.

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