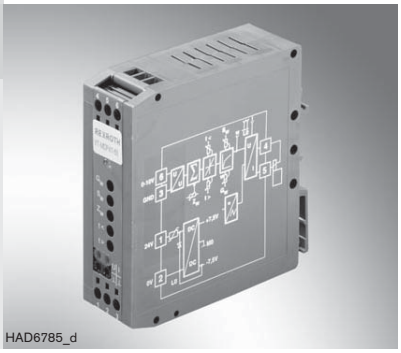
Analogue amplifier module

RE 30225/02.07 1/4
Replaces: 01.04

Type VT-MSPA1-50

Component Series 1X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Suitable power supply unit:

– Type VT-NE30-2X, see RE 29929
compact power supply unit 115/230 VAC → 24 VDC, 108 W

Features

– Suitable for controlling of one proportional solenoid; especially of direct operated proportional directional valves in screw-in cartridge valve technology
– Differential input
– One pulsed output stage
– Ramp generator; ramp times „up“ and „down“ separately adjustable
– Reverse polarity protection for power supply
– Adjustable maximal current
– Adjustable current step
– Zero point potentiometer
– Measuring sockets for actual value and command value of current
– LED lamp „Ready for operation“ (green)

Ordering code

VT-MSPA1-50-1X/V0/ *

Analogue amplifier in modular design for controlling of one proportional solenoid

for proportional solenoids with one solenoid for 2.5 A

Component Series 10 to 19 = **1X**
(10 to 19: unchanged technical data and pin assignment)

Basic version

Further details in clear text

Functional description

General

The amplifier module is to be snapped onto top hat rail according to EN 60715. The electrical connection is by means of screw terminals. The module is operated using 24 VDC.

The internal power supply unit provides all internally required positive and negative supply voltages. As soon as the power supply unit is in operation, the green LED („Ready for operation“) lights up.

Command value preselection

The internal command value signal is generated by the sum [3] of the external command value signal applied to differential input [2] and the zero point offset (zero point potentiometer „Zw“).

Ramp generator [4]

The ramp generator limits the gradient of the control variable. Due to the characteristic curve generator connected downstream, the ramp time is not extended or shortened. The ramp time can be set separately for “up” and “down” ramps with the help of potentiometers (“t <“ and “t >“).

Characteristic curve generator [5]

The adjustable characteristic curve generator can be used to adjust the step-change height and maximum values to the hydraulic requirements.

Clock-pulse generator [6]

The clock pulse generator generates the clock frequency and feeds it to the output stage.

Current output stage [7]

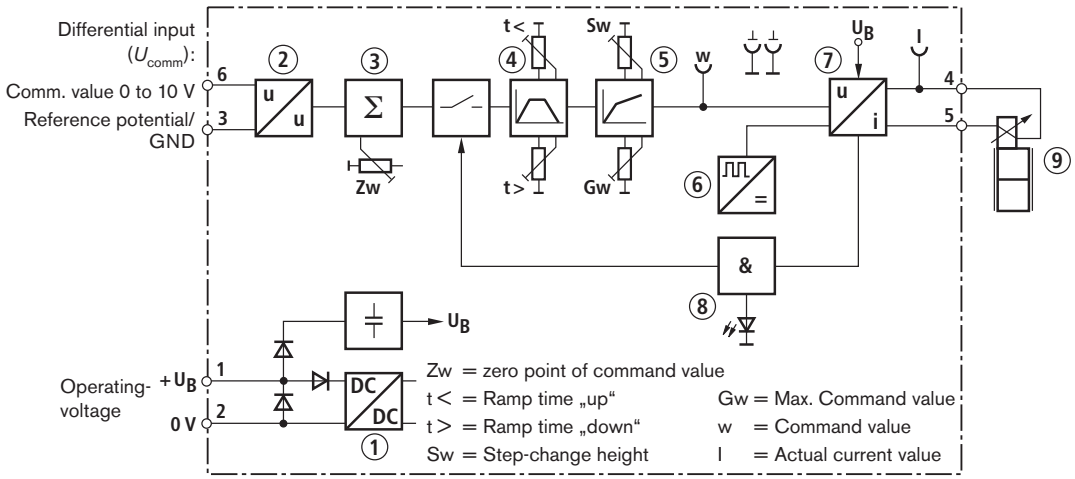
The current output stage generates the pulsed solenoid current for the proportional valve. The solenoid current is 2.5 A. The output stage output is short-circuit-proof.

Fault detection [8]

The solenoid cables are monitored for cable break and short-circuit and the output stage for overcurrent. In the case of an error, the green LED flashes.

[ ] = Cross-reference to the block circuit diagram

Block circuit diagram / Pin assignment



1 Power supply unit
2 Differential amplifier
3 Command value summator
4 Ramp generator
5 Characteristics curve generator
6 Clock-pulse generator
7 Current output stage
8 Command detection
9 Proportional valve

Terminal assignment

Operating-voltage	$+U_B$	1		4	Proportional solenoid
	0 V	2		5	
	Reference potential	3		6	$\pm U_{comm}$

Terminals 3 and 6: Differential input

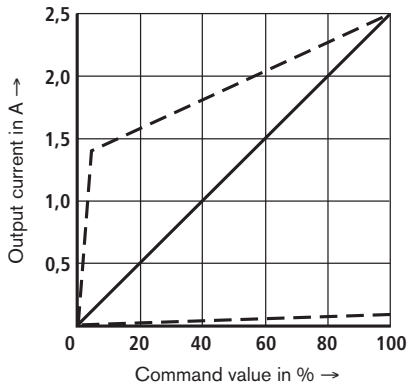
Technical Data (For applications outside these parameters, please consult us!)

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
Current consumption (at U_B= 24 V)	I_{max}	2 A
Power consumption	P_S	max. 50 VA
Fuse		Electronic overload protection of the output stage
Inputs:		
– Command value (differential input)	U_{Comm}	0 to +10 V; R_e approx. 100 kΩ
Adjustment ranges:		
– Zero point of command value (potentiometer „Zw“)		±10 %
– Max. command value (potentiometer „Gw“)		0 to 110 %
– Ramp times (potentiometer „t <“ and „t >“)		approx. 50 ms to ca. 5 s
– Step-change height (potentiometer „Sw“)		0 to 50 %
Outputs:		
– Current output stage		
• Solenoid current / resistance	I_{max}	2.5 A; $R_{(20)}$ = 2 Ω
• Clock-pulse frequency	f	360 Hz ±15%
– Measuring socket		
• Command value „w“	U	0 to 10 V
• Actual current value „I“	U	0 to 2.5 V (mV ≙ mA)
Type of connection		6 threaded terminals
Type of mounting		Top hat rail TH 35 – 7.5 to EN 60715
Insulation		IP 20 to EN 60529
Dimensions (W x H x D)		25 x 79 x 85.5 mm
Permissible operating temperature range	ϑ	0 to +50 °C
Storage temperature range	ϑ	−20 to +70 °C
Weight	m	0.13 kg

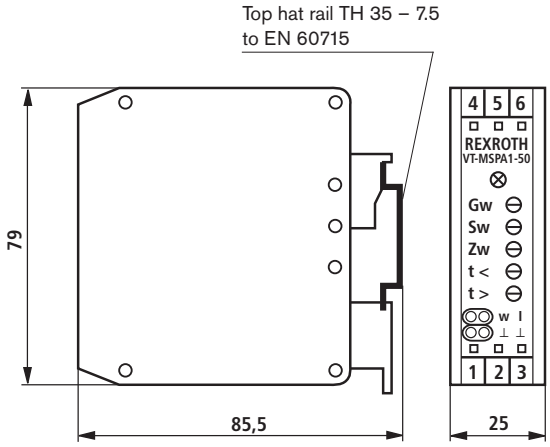
☞ **Note!**

For details on environment simulation tests in the fields of EMC (electromagnetic compatibility), climate and mechanical stress, see RE 30225-U (declaration on environmental compatibility).

Output curve



Unit dimensions (in mm)



Potentiometer:

Gw Max. command value

Sw Step-change height of internal command value

Zw Zero point of command value

t < Ramp time for increasing command values

t > Ramp time for decreasing command values

Measuring socket:

w Command value

I Actual current value

⊥ Reference potential

Engineering notes / Maintenance notes / Supplementary information

- The amplifier module may only be wired when disconnected from the power supply!
- The distance to radio sources must be adequate (>> 1 m)!
- Shield command value cables, do not lay in the vicinity of power cables!
- Do not connect freewheel diodes in the solenoid lines!
- In the case of heavy fluctuations in the operating voltage, it may become necessary to install an external smoothing capacitor having a capacitance of at least 2200 µF.
  Recommendation: Capacitor module type VT 11073 (see RE 29750); sufficient for up to 3 amplifier modules
- For solenoid cables up to 50 m long, use cable type LiYCY 1.5 mm². In the case of greater lengths, please consult us!
- The inputs of the differential amplifier must always be switched on or off simultaneously!
- Use relays with gold-plated contacts for passing on command values (small voltages, small currents)!
- Use only instruments $R_i > 100$ kΩ for taking measurements on the module!
- For adjusting the potentiometers, use a screw driver with a blade width of 2.5 mm to 3.5 mm!
- Adjustment of step-change heights:
  1. Turn potentiometer “Sw“ to the left-hand limit stop
  2. Preselect a command value of 0.5 V using zero point potentiometer “Zw” (measuring socket “w“)
  3. Set the required step-change height using potentiometer ”Sw”; check the value in measuring socket “w”
  4. Apply 0 V to the differential input
  5. Set 0 V in measuring socket “w” using the “Zw” potentiometer (zero point balancing)