The Drive & Control Company

Rexroth Bosch Group

Valve amplifier for proportional valves

Type VT-MSRA1-1

RE 30227
Edition: 2014-05
Replaces: 2013-08

H7282 (Similar figure)

- Component series 1X
- Analog, modular design
- Suitable for controlling direct operated proportional directional valves without electric position feedback (type 4WRPH6...-2X...-855)

Features

- Command value input ±10 V (differential input) or 4 to 20 mA
- Characteristic curve correction by means of separately adjustable step levels and separately adjustable maximum values
- Enable input
- Reverse polarity protection for the voltage supply
- Power supply with DC/DC converter without raised zero point
- LED indicators:
  - Ready for operation (green)
  - Enable (yellow)
- Ready for operation output

Table of contents

Ordering code

01	02	03	04	05	06
VT-MSRA1	– 1	– 1X	/ V0	/ 0	*

01	Valve amplifier for proportional valves, analog, modular design	**VT-MSRA1**
02	For valve type 4WRPH6...-2X...-855	**1**
03	Component series 10 to 19 (10 to 19: unchanged technical data and ports)	**1X**
04	Voltage input	**V0**
	Current input	**V001**
05	Option: Standard	**0**
06	Further details in the plain text	*

Functional description

General
The amplifier module is snapped onto top hat rails according to EN 60715. The electrical connection is established via screw terminals. The modules are operated with 24 V direct voltage.

Power supply [1]
The amplifier modules have a power supply unit with making current limiter. This unit supplies all internally required positive and negative supply voltages. The making current limiter prevents high making current peaks.

Command value provision
The internal command value signal is calculated from the total [3] of the external command value signal available at the differential input [2] and the zero point offset (zero point potentiometer "Zw").

Characteristic curve generator [4]
Using the adjustable characteristic curve generator, step level and maximum values for positive and negative signals can be set separately, adjusted to the hydraulic requirements. The actual development of the characteristic curve through the zero point is not stepped but linear.

Amplitude limiter [5]
The internal command value is limited to ca. ±110 % of the nominal range.

Current controller [6]
The solenoid current is recorded, in the current controller compared with the actuating variable and the difference is compensated.

Power output stage [7]
The power output stage creates the clocked solenoid current for the proportional valve. The solenoid current is limited to 2.7 A per output. The output stage outputs are short-circuit-proof. The output stages are de-energized in case of an internal fault signal or if the enable is missing.

Clock generator [8]
The clock generator creates the clock frequency "f" of the output stages depending on command value and operating voltage.

Enable function [9]
The enable function enables the power output stage and forwards the internal command value signal. The enable signal is displayed by an LED on the front plate.

Fault recognition [10]
The solenoid conductor is monitored for cable break as well as over-current of the output stage.

Command value inversion [11]
The command value created internally from the input signal and the zero point offset signal can be inverted by an external signal.

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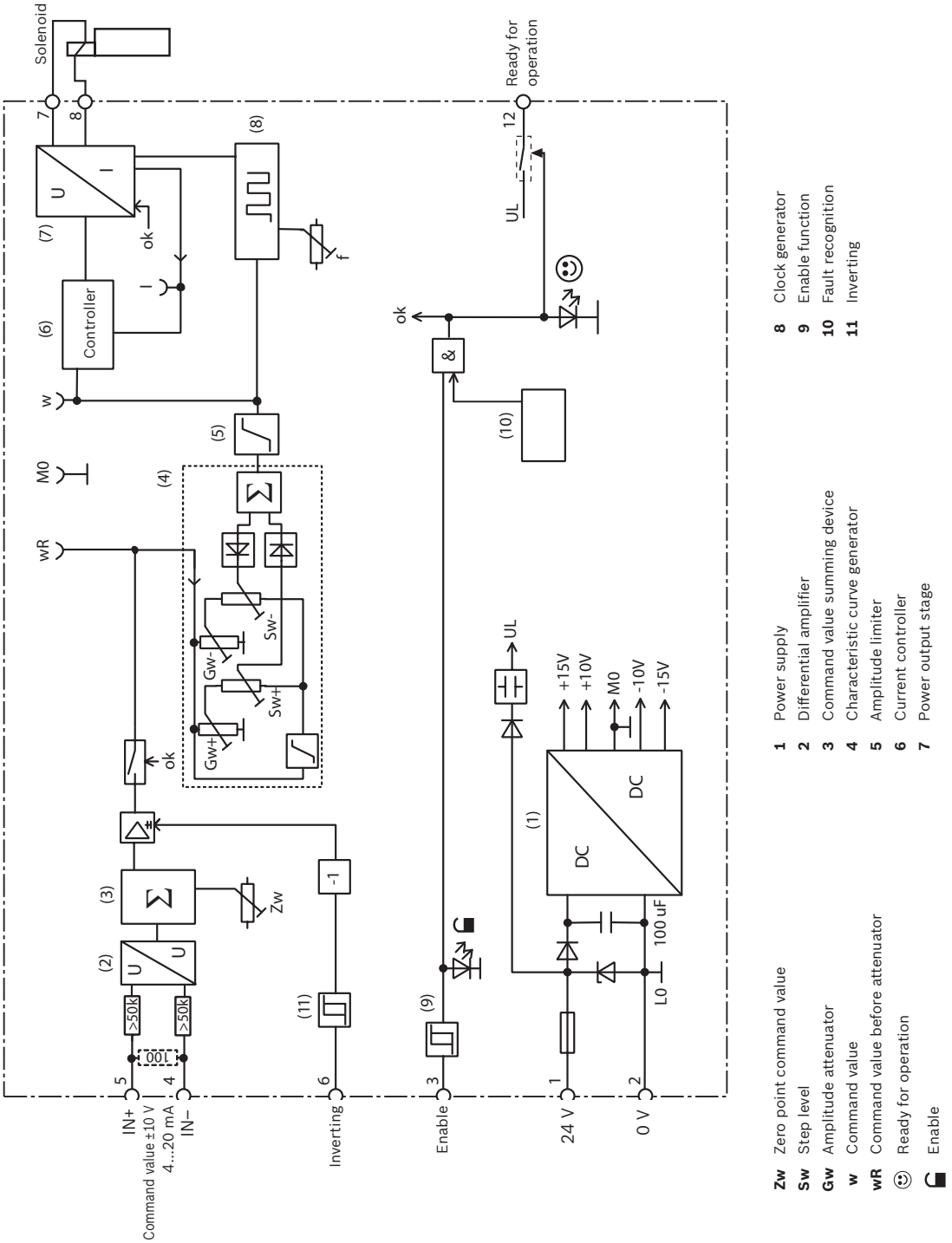
Block diagram



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

Operating voltage	U_B	24 VDC +40 % –20 %
Operating range:		
– Upper limit	$u_B(t)_{max}$	35 V
– Lower limit	$u_B(t)_{min}$	18 V
Power consumption	S	< 48 VA
Current consumption	I	< 2 A
Fuse		Thermal overload protection (with restart if the value falls below the temperature threshold)
Inputs:		
– Analog		
• Command value, voltage	U_e	0 to ±10 V; R_e > 50 kΩ (version V0)
• Command value, current	I_e	4 to 20 mA; R_e = 100 Ω (version V001)
– Digital		
• Enable ON	U	8.5 V to U_B; R_e > 100 kΩ
OFF	U	0 to 6.5 V; R_e > 100 kΩ
• Inverting ON	U	8.5 V to U_B; R_e > 100 kΩ
OFF	U	0 to 6.5 V; R_e > 100 kΩ
Setting ranges:		
– Clock frequency "f"		170 to 430 Hz (see last notice on page 6)
– Zero point command value (potentiometer "Zw")		±30 %
– Step level (potentiometer "Sw+" and "Sw–")		0 % to 50 %
– Amplitude attenuator (potentiometer "G+" and "G–")		0 % to 110 % (applies to the step level setting of 0 %)
Outputs:		
– Power output stages	I	0 to 2.7 A; short-circuit-proof; clocked
– Ready for operation	U	> 16 V, 50 mA (in case of fault U < 1 V, R_i = 10 kΩ)
– Measurement sockets		
• Actual value "I"	U	0 to 2,7 V (mV ≙ mA)
• Command value "w"	U	0 to ±10 V
Type of connection		12 screw terminals
Type of mounting		Top hat rail TH 35-7.5 according to EN 60715
Protection class according to EN 60529		IP20
Dimensions (W x H x D)		45 mm x 79 mm x 85,5 mm
Admissible operating temperature range	ϑ	0 to +60 °C
Storage temperature range	ϑ	–25 °C to +70 °C
Weight	m	0.14 kg

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Terminal assignment

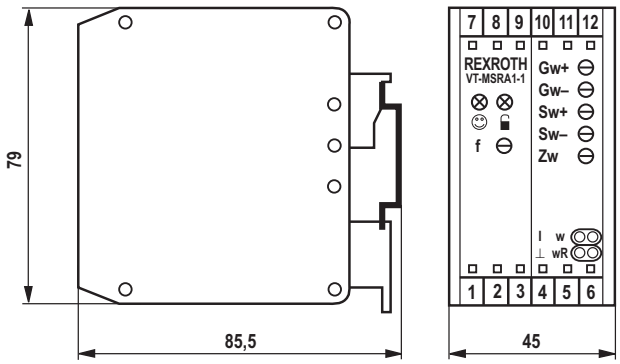
Operating voltage	$+U_B$	1	7	Solenoid
	0 V	2	8	
Enable	U_F	3	9	n. c.
Differential input	Reference potential	4	10	
	$\pm U_{command}$/ /command	5	11	n. c.
	Inverting	6	12	Ready for operation

Dimensions (dimensions in mm)

LED indicators:

Ready for operation (green)

Enable (yellow)



Potentiometer:

Gw+ Amplitude attenuator for positive command values

Gw– Amplitude attenuator for negative command values

Sw+ Step level for positive direction

Sw– Step level for negative direction

Zw Zero point command value

f Frequency setting

Measurement sockets:

I Actual current value

w Command value

wR Command value before attenuator

⊥ Measurement zero

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Project planning / maintenance instructions / additional information

- The amplifier module may only be wired in de-energized condition.
- Do not lay lines close to power cables.
- Do not use free-wheeling diodes in the solenoid lines.
- The distance to aerial lines, radios, and radar systems has to be 1 m at least.
- Always shield command value lines; connect shield to protective earth (PE) on the module side.
  Recommendation: Also shield the solenoid lines.
  For solenoid lines up to a length of 50 m, use the cable type LiYCY 1.5 mm^2.
  With greater lengths, please contact us.
- For switching command values, relays with gold contacts have to be used (low voltages, low currents).
- Only carry out measurements at the module using instruments with R_i > 100 kΩ.
- For setting the potentiometers, use a screwdriver with a blade width of 4 mm.
- With a strongly fluctuating operating voltage, it may in the individual case 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
- In the condition as supplied, the setting of the clock frequency corresponds to the requirements of the valve 4WRPH6...-2X...-855. Rotating the “f” potentiometer changes the valve hysteresis and may lead to disturbing noise developments.

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