

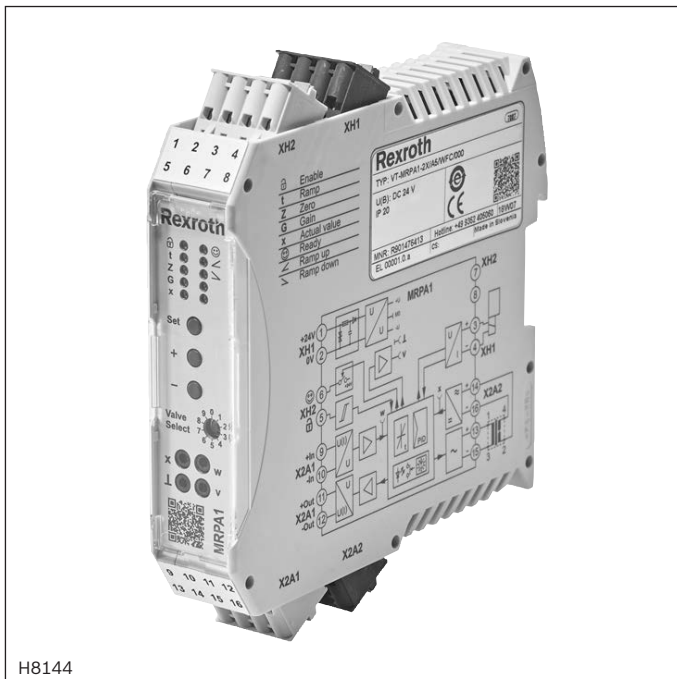
Valve amplifier for proportional directional cartridge valve of type 2WFC

Type VT-MRPA1...WFC

RE 30220

Edition: 2019-05

Replaces: 2019-02



H8144

- ▶ Component series 2X
- ▶ Suitable to control the pilot-operated proportional directional cartridge valve type 2WFC
- ▶ One amplifier for all valves of type 2WFC-1X
- ▶ Easy selection of the valves to be controlled according to sizes
- ▶ Characteristic curves of the valves stored in the device
- ▶ Valve optimization via push-buttons



Features

- ▶ Command value input 0 ... +10 V or 4 ... 20 mA
- ▶ Reverse polarity protection of the operating voltage
- ▶ Ramp generator up and down is separately adjustable
- ▶ Zero point setting
- ▶ Command value adjustment
- ▶ Position control
- ▶ Clocked power output stage
- ▶ Output short-circuit-proof
- ▶ LED status displays
- ▶ Measuring sockets for position actual value, internal command value and parameters to be set

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Ordering code

01	02	03	04	05	06	07			
VT-MRPA	1	-	2X	/	/	WFC	/	000	*

01	Valve amplifiers	VT-MRPA
02	For proportional directional cartridge valves with 1 solenoid	1
03	Component series 20 ... 29 (20 ... 29: unchanged technical data and ports)	2X
04	Voltage command value (0 ... +10 V)	A5
	Command value, current (4 ... 20 mA)	F5
05	Valve amplifier for proportional directional valve type 2WFC	WFC
06	Standard	000
07	Further details in the plain text	*

Available variants

Type	Material no.
VT-MRPA1-2X/A5/WFC/000	R901476413
VT-MRPA1-2X/F5/WFC/000	R901476414

Function

General

The amplifier module is intended for the assembly on top hat rails. The electrical connection is established via 4 tension spring plug-in connectors. The supply voltage is 24 VDC.

Power supply unit (1)

The internal power supply unit has a making current limiter to prevent current peaks. Additionally, inverse-polarity protection is integrated.

Command value, command value summing device (3)

The "internal command value" comprises:

- ▶ the "external command value", connected at the input of the differential amplifier (2)
- ▶ the zero point offset (4), "Z" adjustable in the standard - set-up

The "internal command value" can be measured at the "w" measuring socket and, in normal operation, at the "v" measuring socket.

Ramps

Ramps limit the incline of the command values. You can choose between a single ramp (5) (one time for all ramps, default value) and a 2-quadrant ramp (2Q) (6) (different times for the ramps up and down). The 2Q ramp times are set in the expert setup.

Command value attenuator "G" (7)

By means of the command value attenuator, the command value can be reduced.

Position controller (8)

The valve position is recorded, compared to the command value in the current controller and the difference is compensated.

Power output stage (9)

The power output stage creates the clocked solenoid current for the directional control valve. The solenoid current is limited to the maximum admissible current, depending on the set valve size. The output stage is short-circuit-proof. With an internal interference signal or in case enable is missing, the output stage will be switched off.

Enable input (10)

The enable input enables the output stage. The terminal has to be connected.

Logic (11)

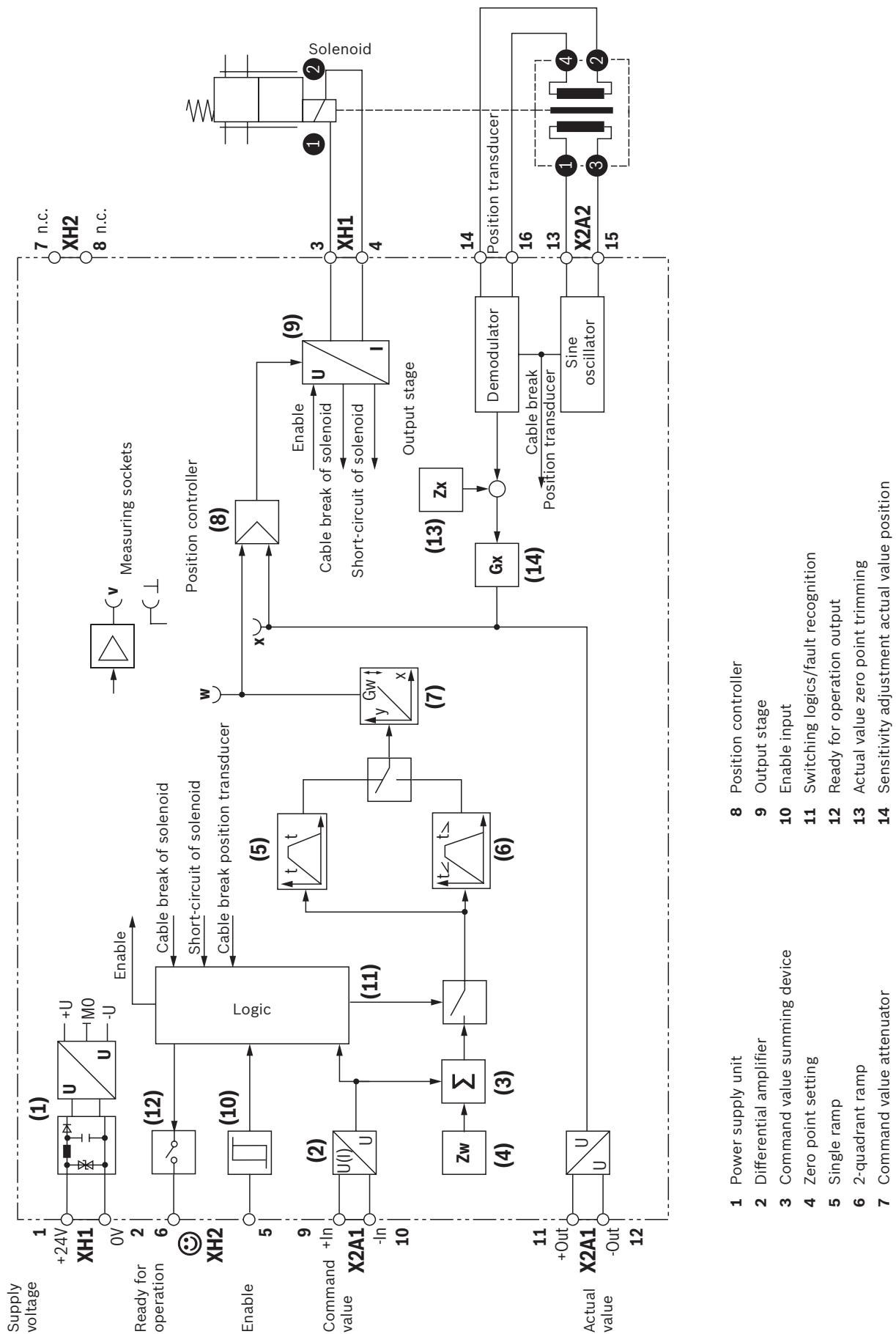
Internal logic to enable output stage, internal command value and ready for operation output.

Ready for operation output (12)

Device notifies ready for operation if there is no cable break, no internal error and $U_B \geq U_{B \min}$.

See also "block diagram" on page 3.

Block diagram



See also "Function" on page 2.

Technical data

general			
Component series		2X	
Design		Module	
Voltage supply			
Operating voltage	► Nominal	V	24; +16% ... –20%
	► Lower limit value ¹⁾	V	18
	► Upper limit value	V	28
	► Maximum admissible residual ripple (40 ... 400 Hz)	Vpp	2.5 (observe the admissible limits)
Maximum power consumption		W	< 48
Maximum current consumption		A	< 2
Maximum switch-on current		A	< 4
External fuse		A	3.15 time-lag
Analog input			
Command value	► Voltage (differential input) "A5"	V	0 ... +10
		kΩ	200 (input resistance)
	► Current input "F5"	mA	4 ... 20
		Ω	100 (load resistance, with overload protection!)
Analog output			
Position actual value	► Output range	V	0 ... 10
	► Minimum load impedance	Ω	1000
Digital input			
Enable	► On (active) ¹⁾	V	11 ... <i>U</i> _B
	► Off (inactive)	V	-3 ... 5
Solenoid outputs			
Maximum solenoid current		A	2.7
Other properties, solenoid output		Short-circuit-proof, clocked	
Cable length for 1.5 mm²		m	50
Adjustment options			
Zero point calibration		%	±10
Command value attenuator ²⁾		%	70 ... 110
Ramp time up / down		s	0.01 ... 30
Measuring sockets			
Actual value	► "x"	V	±10
Command value	► "w"	V	0 ... 10
Edition	► "v"	V	±10
Reference potential	► "⊥"		
Additional notes		See operating instructions 30220-B	

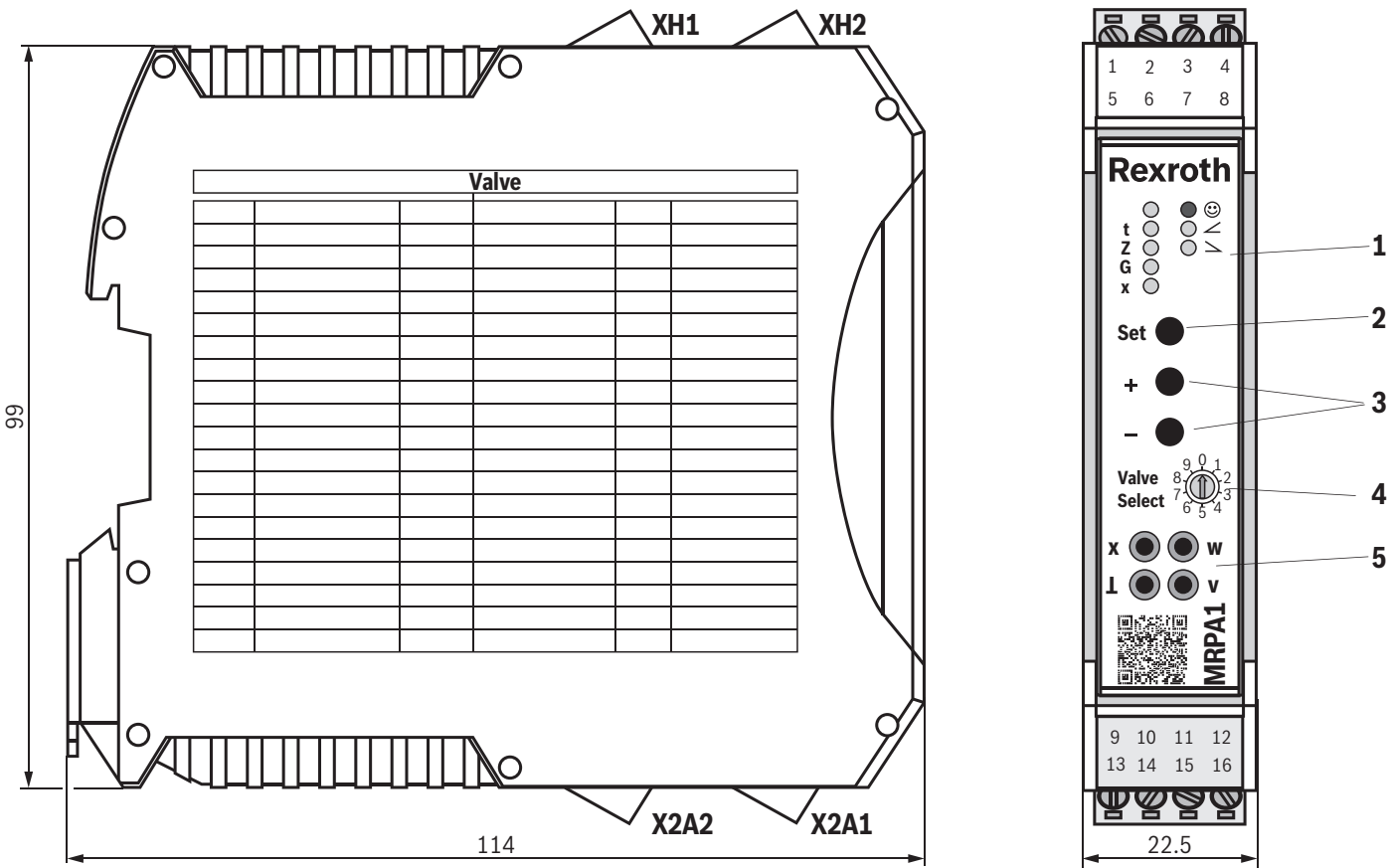
¹⁾ $R_E > 50 \text{ k Ohm}$

²⁾ Applies to a command value of 100%

Technical data

Supplementary information		
Start-up time	s	< 1
Type of connection		16 spring-type terminals, detachable
Protection class according to EN 60529		IP 20
Ambient temperature range	°C	0 ... +60
Weight	kg	0.14
Maximum admissible temperature change	°C/min	5
Transport temperature range	°C	−40 ... +70
Recommended storage temperature with UV protection	°C	+5 ... +40
Relative air humidity (without condensation)	%	10 ... 95
Maximum altitude for use	m	2000
UV resistance		Housing is only partly UV resistant. Extended exposure to radiation may cause color changes.
Transport shock according to DIN EN 60068-2-27		15 g / 11 ms / 3 axes
Sine test according to DIN EN 60068-2-6	Hz	10 ... 500 (maximum 2 g / 10 cycles / 3 axes)
Noise test according to DIN EN 60068-2-64	Hz	20 ... 500 (2.2 g RMS / 6.6 g peak / 30 min. / 3 axes)
Free fall (in original packaging)	m	1
Installation position		Vertical. For breathing of the assembly, the ventilation slots of the top and bottom side must be at least 2 cm away from covers, walls, etc. With an ambient temperature of more than 50 °C, the clearance to the next assembly must be 1cm.
Top hat rail assembly		TH35-7.5 or TH35-15 according to EN 60715
Housing material		Glass-fiber reinforced polyamide plastic
Resistance against aggressive media		Contact with conductive dusts is not admissible. Avoid contact with hydraulic fluids.
Conformity		► CE according to the EMC directive 2014/30/EU ► CE according to the RoHS directive 2011/65/EU
Electro-magnetic compatibility (EMC)	► EN 61000-6-2	
	– EN 61000-4-2 ESD	kV
	– EN 61000-4-3 HF radiated	V/m
	– EN 61000-4-4 Burst	kV
	– EN 61000-4-5 Surge	kV
	– EN 61000-4-6 HF conducted	V _{eff}
	– EN 61000-4-8 Magnetic field 50/60 Hz	A/m
	► EN 61000-6-3 / EN 61000-6-4	
	– EN 55016-2-1 Interference voltage	MHz
	– EN 55016-2-3 Radio interference field strength	MHz

Dimensions
(dimensions in mm)



- 1
Status LEDs
Display the current operating state, menu levels and error conditions
- 2
SET key
Editing the selected parameters, selection of work operation, selection of the "expert mode"
- 3
+ / - keys
Selection of the parameters and adjustment of the parameter values
- 4
Rotary switch
Selection of the valve sizes
- 5
Measuring sockets
for connecting a measuring instrument

Assignment: switch position/size

Switch position	Valve type/size
0	no valve
1	2WFC 16 ...-1X
2	2WFC 25 ...-1X
3	2WFC 32 ...-1X
4	2WFC 40 ...-1X
5	2WFC 50 ...-1X

Terminal assignment

Assignment	Connector	Terminal
Operating voltage	+U _B	XH1 1
	0 V	XH1 2
+ Solenoid B		XH1 3
– Solenoid B		XH1 4
Enable		XH2 5
Ready		XH2 6
n.c.		XH2 7
n.c.		XH2 8
+ Command value		X2A1 9
– Command value		X2A1 10
+ Actual value		X2A1 11
– Actual value		X2A1 12
+ OSC		X2A2 13
+ SIG		X2A2 14
– OSC		X2A2 15
– SIG		X2A2 16

Status description LEDs

Indicator light	Operating state	Display mode	Meaning
"Enable" LED (yellow) 	Normal operation	Permanent light on/off	Enable input status
	Setup	Flashing	Standard setup active
	Setup	Off	Expert setup active
"Ready" LED (red/green) 	Normal operation	Permanent light, green	Module ready for operation
	Normal operation	Permanent light, red	Error
	Normal operation and setup	Flashing light, red-green	Valve setting changed
	Normal operation and setup	Flashing light, red	Inadmissible valve number
	Normal operation	Off	Module not ready for operation
	Setup	Flashing light, green	Expert setup active

Description of the LED display ¹⁾

	Enable
t	Ramp
Z/B	Zero point / pilot current
G	Command value attenuator
x	Actual value
	Ready for operation
∠	1st quadrant (positive command value rising)
∩	2nd quadrant (positive command value falling)

¹⁾ A detailed description is contained in the operating instructions 30220-B

Accessories (separate order)

	Material no.
Shield set for the installation with shielded lines	R961011117

Project planning and maintenance instructions

Maintenance instructions:

- ▶ The devices have been tested in the plant and are supplied with default settings.
- ▶ Only complete devices can be repaired.
- ▶ Repaired devices are returned with default settings. User-specific settings must be made by the machine end-user once again.

Notice:

- ▶ In especially EMC-sensitive environments, additional measures must be taken (depending on the application, e.g. shielding, filtration)
- ▶ **Wiring information**
 - Maximum possible spatial separation between signal and load lines.
 - Do not lead signal lines through magnetic fields.
 - If possible, install signal lines without intermediate terminals.
 - Do not install signal lines in parallel to the load lines.
 - Connect cable shields (see the operating instructions 30220-B)
 - Lines for digital inputs and outputs can be laid in an unshielded manner.
 - Lines for command and actual values as well as the solenoid conductors must generally be laid in a shielded and/or twisted shielded manner.
 - The distance to radios must be sufficient (> 1 m).
 - With a strongly fluctuating operating voltage, in individual cases, it may 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.
- ▶ The upper and lower ventilation slots must not be concealed by adjacent devices in order to provide for sufficient cooling.

Further information

- ▶ Valve amplifier for proportional directional valve type 2WFC
- ▶ CE Declaration of Conformity
- ▶ Installation, commissioning and maintenance of proportional valves
- ▶ Assembly, commissioning and maintenance of hydraulic systems

Operating instructions 30220-B
upon request
Data sheet 07800
Data sheet 07900

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