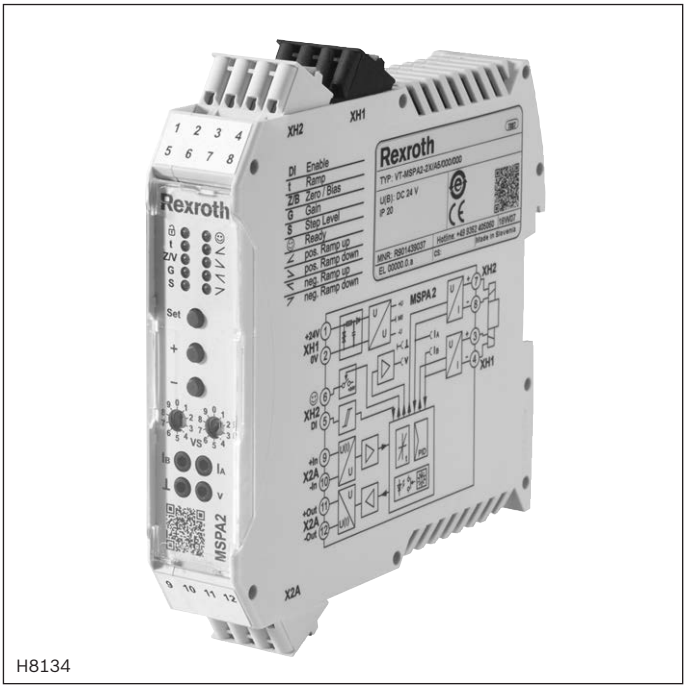
Valve amplifier for proportional valves without electric position feedback

Type VT-MSPA

RE 30232
Edition: 2018-04
Replaces: 2017-11



H8134

- Component series 2X
- Suitable for controlling proportional valves and pump controls without electric position feedback
- Easy valve selection of the Bosch Rexroth valves for the industrial hydraulics
- Characteristic curves of the valves stored in the device
- Valve optimization via push-buttons
- All valve parameters adjustable

CE

Features

- Command value input 0 ... ±10V or 4 ... 20mA
- Reverse polarity protection of the operating voltage
- Ramp generator up and down is separately adjustable
- Zero point setting
- Command value adjustment
- Characteristic curve generator
- Clocked power output stage
- Output short-circuit-proof
- LED status displays
- Measuring sockets for: actual current value, internal current command/setting

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Ordering code

01	02	03	04				05
VT-MSPA		**–**	**2X**	**/**		**/**	**000**	**/**	**000**	*****

01	Valve amplifier for proportional valves without position feedback, analog, modular design	**VT–MSPA**
02	For proportional valves with 1 solenoid	**1**
	For proportional valves with 2 solenoids	**2**
03	Component series 20 to 29 (20 to 29: unchanged technical data and connections)	**2X**
04	Voltage command value (1 solenoid 0 ... +10V / 2 solenoids 0 ... ±10V)	**A5**
	Current command value (4 ... 20mA)	**F5**
05	Further details in the plain text	*****

Available variants:

TYPE VT-MSPA1

Type	Material no.
VT-MSPA1-2X/A5/000/000	R901439034
VT-MSPA1-2X/F5/000/000	R901439036

TYPE VT-MSPA2

Type	Material no.
VT-MSPA2-2X/A5/000/000	R901439037
VT-MSPA2-2X/F5/000/000	R901439038

Accessories (can be ordered separately)**:**

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

Assignment switch position - valve type

TYPE VT-MSPA1

Switch position	Valve type 1 solenoid
0-0	no valve
0-1	4WRA6...-2X
0-2	4WRA10...-2X
0-3	4WRZ...-7X
0-4	3DREP6...-2X
0-5	4WRPH6...-2X (SO855)
0-6	DBEP6...-1X
0-7	DBET-6X...G24...
0-8	DBET-6X...G24-8...
0-9	DBETX-1X...G24-25...
1-0	DBETX-1X...G24-8...
1-1	(Z)DBE6-2X...
1-2	DBEM10...-7X...G24...
1-3	DBEM10...-7X...G24-8...
1-4	DBEM20...-7X...G24...
1-5	DBEM20...-7X...G24-8...
1-6	DBEM30...-7X...G24...
1-7	DBEM30...-7X...G24-8...
1-8	(Z)DRE6...-1X...
1-9	ZDRE10...-2X...G24...
2-0	ZDRE10...-2X...G24-8...
2-1	DRE...10...-6X...G24...
2-2	DRE...10...-6X...G24-8...
2-3	DRE...20...-6X...G24...
2-4	DRE...20...-6X...G24-8...
2-5	DRE...30...-6X...G24...
2-6	DRE.30...-6X...G24-8...
2-7	3DRE...-7X...G24...
2-8	3DRE...-7X...G24-8...
2-9	3FREX6...-1X...G24-25...
3-0	3FREX10...-1X...G24-25...
3-1	3DREP6...-2X... (SO674)
3-4	–
3-5	–
3-6	–
3-7	Pump control 1 (0.7 A) EP2 (A7VO)
3-8	Pump control 2 (0.6 A) ED72 (A10VSO/31) ER72 (A10VSO/31)
3-9	Pump control 3 (0.6 A) EP2 (A10VSO/52, 53) EK2 (A10VSO/52, 53) L4 (A15VSO...) E2 (A15VSO...) EP2,6(A6VM)
9-6	Universal (0.8 A)
9-7	Universal (1.6 A)
9-8	Universal (2.5 A)

TYPE VT-MSPA2

Switch position	Valve type 2 solenoids
0-0	no valve
0-1	4WRA6...-2X
0-2	4WRA10...-2X
0-3	4WRZ...-7X
0-4	3DREP6...-2X
0-5	3DREP6...-2X (SO674)
0-6	DBEP6...-1X
0-7	–
0-8	–
0-9	–
1-0	–
1-1	–
1-2	–
1-3	–
1-4	–
1-5	–
1-6	–
1-7	–
1-8	–
1-9	–
2-0	–
2-1	–
2-2	–
2-3	–
2-4	–
2-5	–
2-6	–
2-7	–
2-8	–
2-9	–
3-0	–
3-1	–
3-4	–
3-5	–
3-6	–
3-7	Pump control 1 (0.74 A) EP (A4CSG)
3-8	–
3-9	–
9-6	Universal (0.8 A)
9-7	Universal (1.6 A)
9-8	Universal (2.5 A)

Functional description

General
The amplifier modules are intended for assembly on top hat rails. The electrical connection is established via 3 tension spring plug-in connectors. The supply voltage is 24V DC.

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/B" in the standard – setup adjustable

For pressure valves, a positive command value results in a pressure increase at the valve.
For valves 4W..., the following applies:
Via solenoid B, a command value of 0 ... +10 V or 12 ... 20 mA results in a flow in the valve from P to A and from B to T.
Via solenoid A, a command value of 0 ... –10 V or 12 ... 4 mA results in a flow in the valve from P to B and from A to T. In the expert setup, it is possible to invert the command value **[5]** (see RE 30232-B).
In normal operation, the "internal command value" can be measured at the "v" measuring socket.

Ramps
A ramp limits the incline of the command value.
You can choose between a single ramp **[6]** (one time for all ramps, default value) and a 4Q / 2Q ramp **[7]** (different times for the possible ramps). The 4Q / 2Q ramp times are set in the expert setup. The characteristic curve generator **[9]** does not influence the ramp time.

Command value attenuator "G" [8]
By means of the command value attenuator, the command value can be reduced.

Characteristic curve generator [9]
In the characteristic curve generator, the pre-set valve characteristic curve can be adjusted to the actual hydraulic and control-technical conditions.
The following can be adjusted in the expert setup:
- Pilot current "B"
- Step "S"
- Maximum current "G" (with VT-MSPA2 separately possible for solenoid A and B)

Current controller [10]
The solenoid current is recorded, compared to the command value in the current controller and the difference is compensated.

Clock generator [11]
The clock generator creates the clock frequency "f" of the output stage. With Rexroth valves, the clock frequency sometimes changes dependent on the command value and/or the operating voltage.

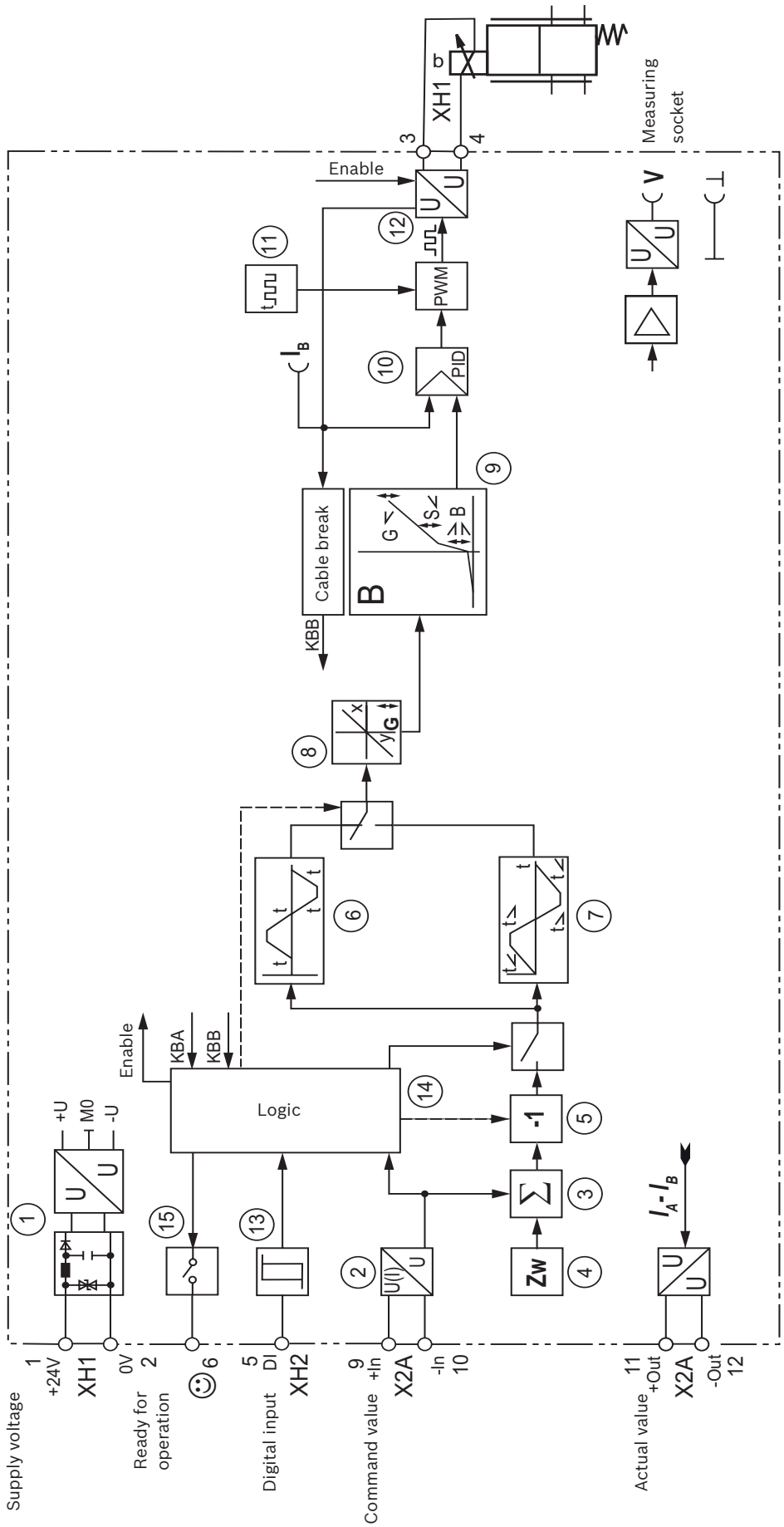
Power output stage [12]
The power output stage creates the clocked solenoid current for the proportional valve. The solenoid current is limited to the maximum admissible current per output, depending on the set valve. The output stages are short-circuit-proof. With an internal interference signal or in case enable is missing, the output stage will be switched off.

Digital input [13]
The input DI can be set to four different functions:
- 1. Enable (factory setting)
- 2. VT-MSPA1 [1)] without function (permanent enable)
- 2. VT-MSPA2 command value inversion (permanent enable)
- 3. Ramp on/off (permanent enable)
- 4. Single or quadrant ramp (permanent enable)

Digital output [15]
Device notifies ready for operation if there is no cable break, no internal error and UB >=UB_{min}.

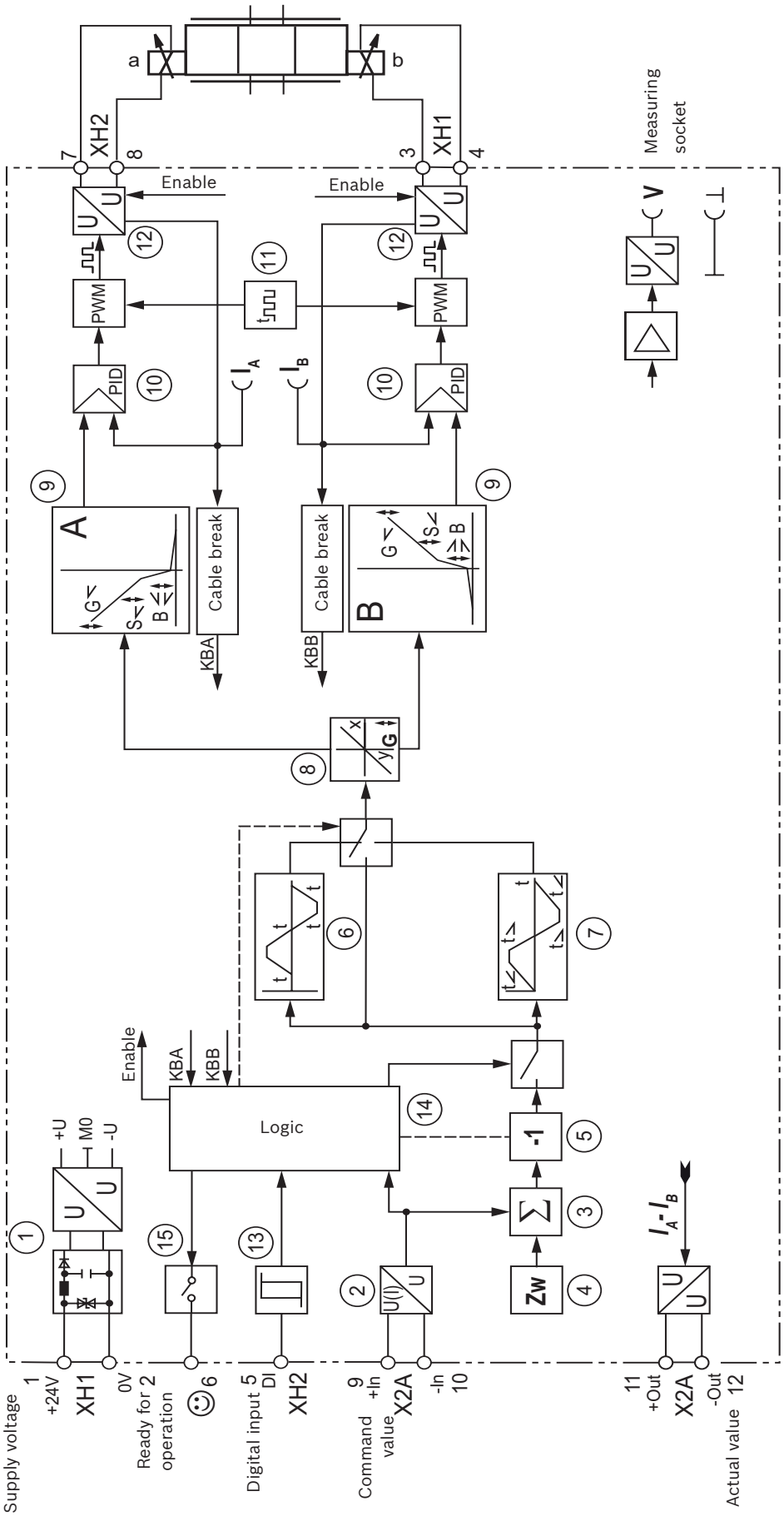
[1)] Behavior with valve 4WRP...SO855 as with VT-MSPA2

Block diagram VT-MSPA1...



1 Power supply unit
2 Differential amplifier
3 Command value summing device
4 Zero point setting
5 Inverter
6 Single ramp
7 4-quadrant ramp
8 Command value attenuator
9 Characteristic curve generator
10 Current controller
11 Clock generator
12 Output stage
13 Enable or inverter or ramp off or 4Q ramp
14 Switching logics/fault recognition
15 Digital output

Block diagram VT-MSPA2...



1 Power supply unit
2 Differential amplifier
3 Command value summing device
4 Zero point setting
5 Inverter
6 Single ramp
7 4-quadrant ramp
8 Command value attenuator
9 Characteristic curve generator
10 Current controller
11 Clock generator
12 Output stage
13 Enable or inverter or ramp off or 4Q ramp
14 Switching logics/fault recognition
15 Digital output

Technical data

general			
Component series			2X
Design			Module
Voltage supply			
Operating voltage	▶ Nominal	V	24; +40 % ... –20 %
	▶ Lower limit value [1]	V	18
	▶ Upper limit value	V	36
	▶ 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	– 1 solenoid (0 ... 100%)	mA	4 ... 20
		V	0 ... +10
	– 2 solenoids (0 ... ±100%)	mA	4 ... 20
		V	0 ... ±10
	▶ Voltage (differential input)	kΩ	200 (input resistance)
	▶ Current input	Ω	100 (load resistance)
Analog output			
Voltage output [2]	Solenoid current „IA“	V	0 ... -2.5 (mV ≙ mA)
	„IB“	V	0 ... 2.5 (mV ≙ mA)
	▶ Minimum load impedance	Ω	1000
Digital input			
On (active) [3]		V	11 ... U_B
Off (inactive)		V	–3 ... 5
Solenoid outputs			
Maximum solenoid current		A	2.7
Clock frequency setting range [4]		Hz	95 ... 505
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 [5]		%	70 ... 110
Ramp time up / down		s	0.01 ... 30
Step level		%	0 ... 50
Measuring sockets			
Command value/setting	"v"	V	0 ... ±10
Actual current value	"IA"	V	0 ... ±2.5 (mV ≙ mA)
	"IB"	V	0 ... ±2.5 (mV ≙ mA)
Reference potential	"⊥"		
Additional notes			See "Operating instructions"

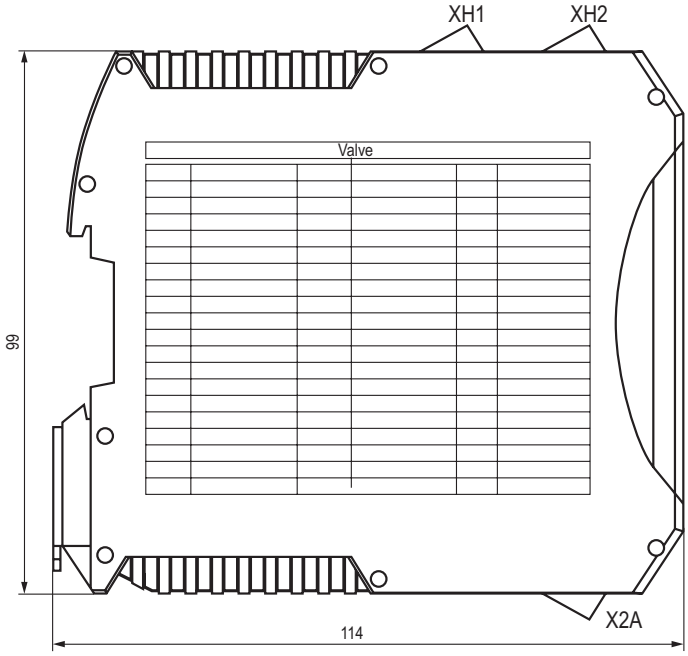
1) With valves with a maximum solenoid current of 0.8 A, the lower limit value is 21 V
2) Maximal value depending on the selected valve
3) R_E > 50 k
4) Depending on the selected valve
5) Applies to a command value of 100 %

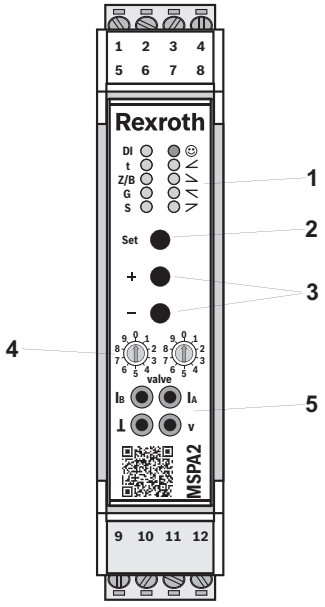
Technical data

Supplementary information		
Start-up time	s	< 1
Type of connection		12 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 1 cm.
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 CE according to the RoHS directive
Electro-magnetic compatibility (EMC)	▶ EN 61000-6-2	
	– EN 61000-4-2 ESD	4 kV CD / 8 kV AD with BWK B
	– EN 61000-4-3 HF radiated V/m	10 (80 ... 6000 MHz) with BWK A
	– EN 61000-4-4 Burst kV	2 (5 kHz and 100 kHz) with BWK B
	– EN 61000-4-5 Surge kV	0.5 (2 Ω/12 Ω) to operating voltage, 1 kV (42 Ω) to signal with BWK B
	– EN 61000-4-6 HF conducted V_{eff}	10 (150 kHz ... 80 MHz) with BWK A
	– EN 61000-4-8 Magnetic field 50/60 Hz A/m	100 with BWK A
	▶ EN 61000-6-3 / EN 61000-6-4	
	– EN 55016-2-1 Interference voltage MHz	0.15 ... 30 (class A, EN 55022)
	– EN 55016-2-3 Radio interference field strength MHz	30 ... 6000 (class B, EN 55022)

Dimensions

(dimensions in mm)





Terminal assignment

		Connector	Terminal
Operating voltage	$+U_B$	XH1	1
	0 V	XH1	2
+ solenoid B		XH1	3
– solenoid B		XH1	4
Digital input		XH2	5
Ready		XH2	6
+ solenoid A [1)]		XH2	7
– solenoid A [1)]		XH2	8
+ command value		X2A	9
– command value		X2A	10
+ actual value		X2A	11
– actual value		X2A	12

1) Only with VT-MSPA2

Device view

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
Valve type selection

5 Measuring sockets for connecting a measuring instrument

Status description LEDs

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

Description of the LED display [1]	
DI	Enable [2]
t	Ramp
Z/B	Zero point / pilot current
G	Command value attenuator
S	Step level command value
☺	Ready for operation
◿	1st quadrant (positive command value rising)
◺	2nd quadrant (positive command value falling)
◸	3rd quadrant (positive command value rising)
◹	4th quadrant (positive command value falling)

1) A detailed description is contained in the operating instructions 30232-B

2) Function of the digital input can be adjusted in the setup

Project planning / maintenance instructions and additional information

Product documentation for VT-MSPA..-2X:

- Data sheet 30232
- Operating instructions 30232-B
- CE declaration of conformity (available from Bosch Rexroth upon request)
- General information on the maintenance and commissioning of hydraulic components: Data sheet 07800 / 07900
- Documentation on the Internet: www.boschrexroth.com/VT-MSPAx

☞ **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.

☞ **Notes:**

- 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 operating instructions 30232-B)
  - For digital inputs and outputs as well as command and actual value, the max. admissible cable length for unshielded cables is 30 m. With longer cable lengths, shielded cables are to be used.
  - The distance to radios must be sufficient (> 1m).
  - 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.
- The upper and lower ventilation slots must not be concealed by adjacent devices in order to provide for sufficient cooling.

Notes

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