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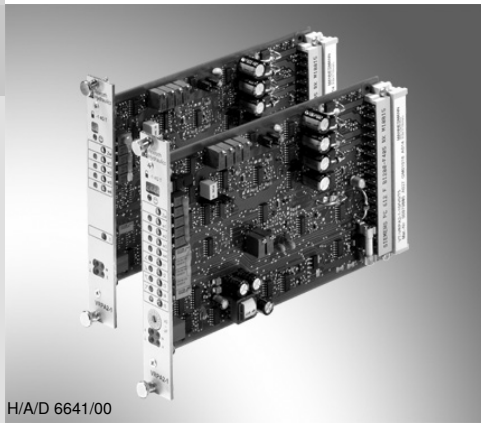
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Find the *Bosch Rexroth VT-VSPA2-1-20/VO/T1* at our website: *Click HERE*

Analog amplifier card

RE 30110/05.12 1/10
replaces: 05.11

Type VT-VSPA2-1-2X/…



H/A/D 6641/00

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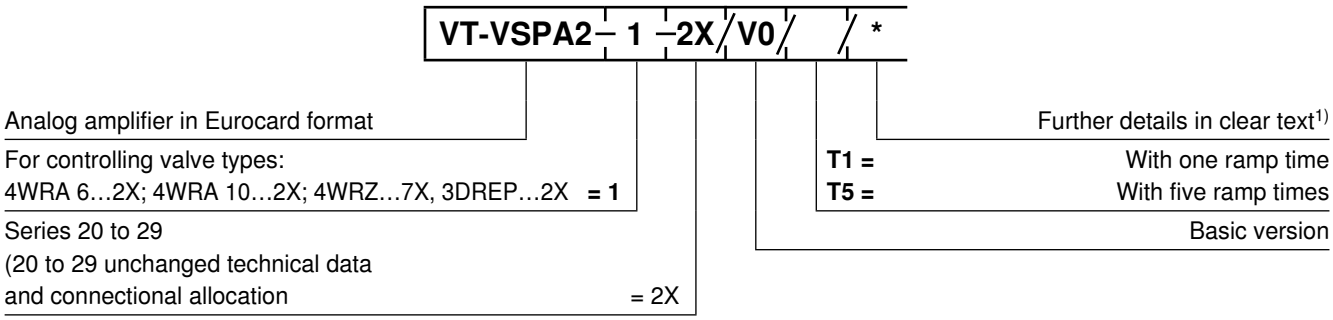
Note:

When using amplifier card VT-VSPA2-1-2X as substitute for VT 3000-3X, VT 3006-3X, VT 3013-3X, VT 3014-3X, VT 3017-3X, VT 3018-3X, VT 3026-3X, VT-VSPA2-1-1X/... or VT-VSPA2-50-1X/…, observe the notes on configurations and settings given in supplementary information 30110-Z.

Features

- Suitable for controlling valve types 4WRA nominal sizes 6 and 10…2X, WRZ…7X and 3DREP…2X
- Built-up in the form of a board in the Euro-format 100 x 160 mm and is suitable for mounting into a rack
- Command value inputs:
  - Differential input ± 10 V
  - Four command value inputs, ±10 V that can be called up
  - Current input 4 to 20 mA
- Inverting the internal command value signal via the 24 V input or jumper
- Selecting the ramp time via quadrantal recognition (24V input) or ramp time call-ups (24V inputs) (option T5)
- Switching over the ramp time range via jumpers
- Characteristic curve correction by separately adjustable jump heights and maximum values
- Enable input
- ”Ramp on/off“ input
- Output signal ”operational“
- Switchable measuring socket (option T5)
- Polarity protection for the supply voltage
- Power supply with DC/DC convertor without a raised zero point

Ordering details



1) E.g. Output stage monitoring or command value reached signal on request

Suitable card holders:

- 19“ rack types VT 19101, VT 19102, VT 19103 and VT 19110 (see data sheet 29768)
- Enclosed card holder type VT 12302 (see data sheet 30103) with use of a blind plate 4TE/3HE (material no. R900021004)
- Open card holder type VT 3002-2X/48F (see data sheet 29928)
  Only for installation in control cabinet!

Function

Power supply [1]

The amplifier card has a power supply with an inrush current limiter. This supplies all of the internal positive and negative supply voltages. The inrush current limiter prevents inrush current peaks caused by the smoothing capacitors in the current output stage.

Applied command value

The internal command value signal is formed from the sum of the external command value being applied to the differential input [2] and the command values being applied to the summator [6] and the ramp generator.

The following is valid:

Standard value	Current input	Differential input	Com. value socket	Flow direction
–100%	4 mA	–10 V	–10 V	P to B, A to T
0 %	12 mA	0 V	0 V	
100 %	20 mA	10 V	10 V	P to A, B to T
0 %	< 1 mA[1)]		0 V	

[1)] If the current input is not switched or with current command value a cable break results in an internal command value signal 0 %.

No switching takes place between the current and voltage inputs. The inputs are permanently available (see pin allocation).

Command value call-ups [4]

Four command value signals „w1“ to „w4“ can be called-up. The external command value voltages (command values 1 to 4) are either directly applied via the controlled voltage outputs +10 V and –10 V or via an external potentiometer. If the command value inuts are directly applied to the controlled volatages then the settings are done on potentiometers „w1“ to „w4“. When using external potentiometers then the internal potentiometers act as attenuatators or limiters.

Only one call-up at the same time is possible. If more than one call-up is activated at the same time then call-up „1“ has the lowerst priority and call-up „4“ the highest priority.

The active call-up is displayed via a yellow LED on the front plate.

Command value inversion [7]

The internally generated command value which is formed from the input signals, command value call-ups and zero point off-set signal can be inverted by means of an external signal or via jumper J1. The inversion is displayed via a LED („– 1“) on the front plate.

Enable function [8]

With the enable function the current output stages are released and the internal command value signal is switched to the ramp generator. The enable signal is displayed on the front panel by means of a LED. If the enable is withdrawn, the internal
command value (with an applied command value) changes with the set ramp time. The valve being controlled therefore does not open suddenly.

Ramp generator [9]

The ramp generator limits the rate of adjustment variable increase. The subsiqent jump functions and amplitude attenuation are not lengthed or shortened by the ramp time.

With a ramp ”on/off“ signal or mit with jumper J2 the ramp time is set to a minimum (< 2 ms) (ramp off).

External ramp time adjustment

With an external potentiometer it is possible to lengthen the internally set ramp time. The setting can be checked with the aid of the measuring socket. In the case of a cable break the internal setting is automatically valid.

Note on the adjustment and measurement of the ramp time:

Value at measuring socket „t “	U_t in V	5	3	2
current ramp time (±20 %)	*t* in ms	20	33	50

U_t in V	1	0.5	0.3	0.2	0.1	0.05	0.03	0.02
t in ms	100	200	333	500	1000	2000	3333	5000

Characteristic curve generator [10]

With the adjustable characteristic curve generator it is possible to separately adjust the maximum values for the positive and
negative signals so that they can be matched to suit the hydraulic requirements. the actual movement of the characteristic curve through the zero point is not in the form of a jump but is linear.

Amplitude limiter [11]

The internal command value is limited to approx. ±110 % of the nominal range.

Clock generator [13]

The clock generator produces the clock frequency for the output stages. The clock signal can be switched, via a jumper, into one of three basic frequency ranges.

Current output stage [16]

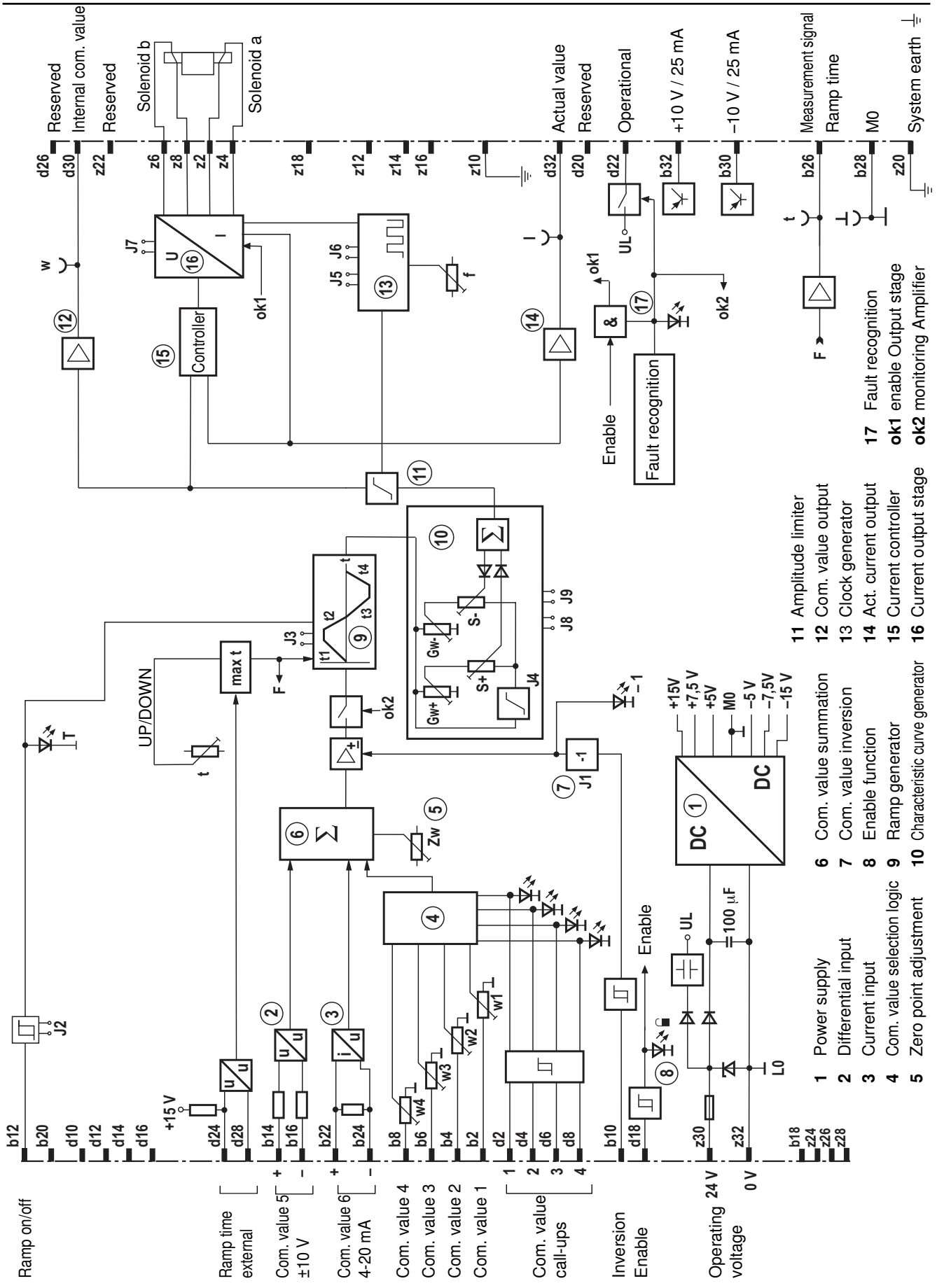
The current output stage produces the clocked solenoid current for the proportional valve. The solenoid current is limited to 2.7 A per output. The output stage outputs are short circuit-proof. The output stages are de-energised in the case of an internal fault signal or missing enable.

Fault recognision [17]

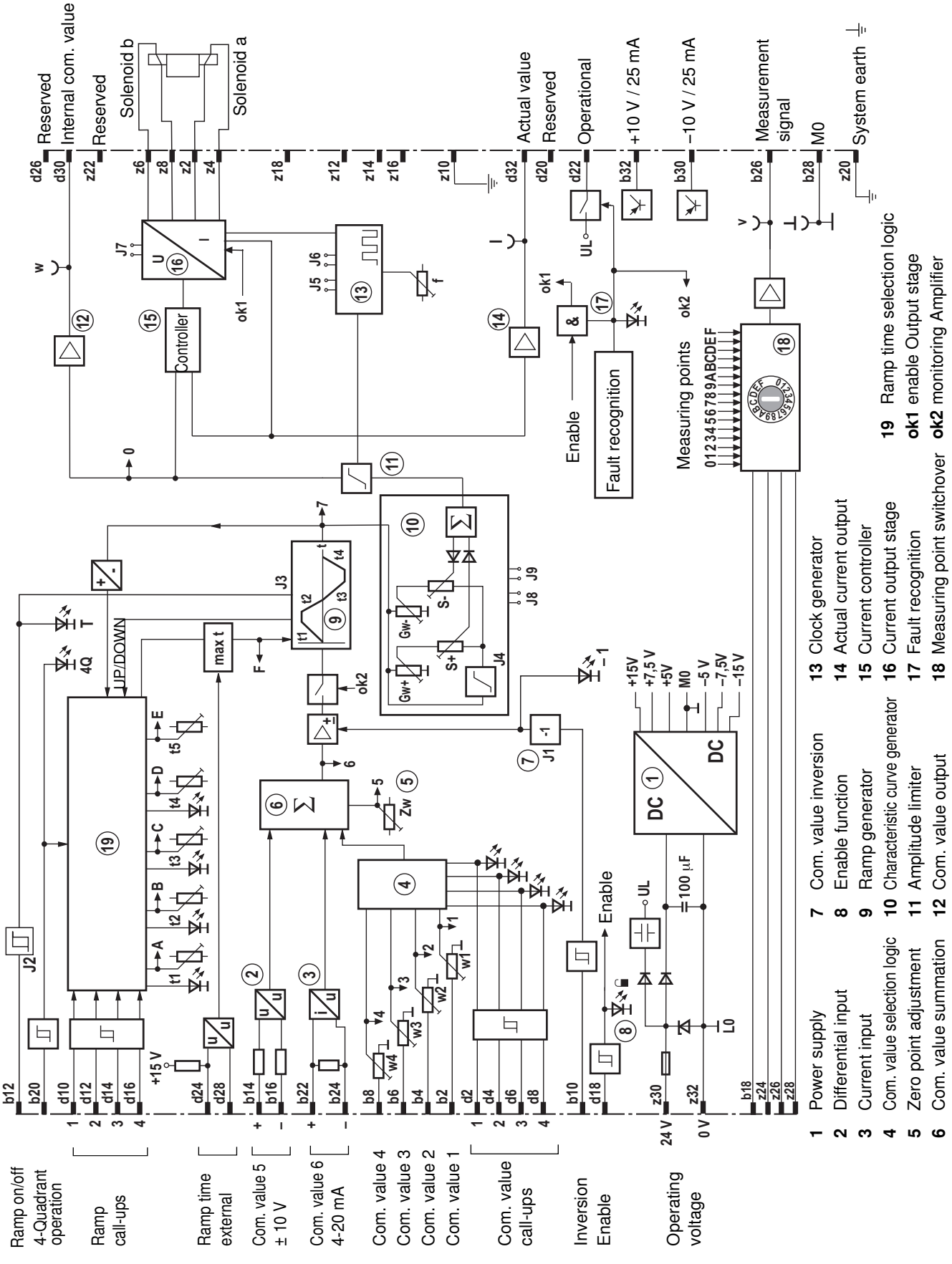
Monitors via current the output stage.

[ ] = Cross reference to the block circuit diagram on pages 4 and 5

Block circuit diagram / connection allocation; VT-VSPA2-1-2X/V0/T1



Block circuit diagram / connection allocation; VT-VSPA2-1-2X/V0/T5



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

Operating voltage	U_B	24 VDC + 40% – 20%
Functional range:		
– Upper limiting value	$U_B\,(t)_{max}$	35 V
– Lower limiting value	$U_B\,(t)_{min}$	18 V
Power consumption	P_S	< 50 VA
Current consumption	I	< 2A
Fuse	I_S	2 A medium slow, replacable
Inputs:		
– Analog		
• Com. value 1 to 4 (potentiometer inputs)	U_e	0 to ±10 V; R_e > 100 kΩ (ref. is M0)
• Com. value 5 (differential input)	U_e	0 to ±10 V; R_e > 50 kΩ
• Com. value 6 (current input)	I_e	4 to 20 mA; load R_B = 100 Ω
• External ramp time	U_e	0 to + 10 V; R_e = 10 kΩ (raised internally to +15 V; ref. is M0)
– Digital		
• Command value call-ups	U	8.5 V to U_B –> call-up actuated; R_e > 100 kΩ
	U	0 to 6.5 V –> no call-up; R_e > 100 kΩ
• Ramp call-up (option T5)	U	8.5 V to U_B –> call-up actuated; R_e > 100 kΩ
	U	0 to 6.5 V –> no call-up; R_e > 100 kΩ
• Quadrant recognision	U	8.5 V to U_B –> ON; R_e > 100 kΩ
	U	0 to 6.5 V –> OFF; R_e > 100 kΩ
• Command value inversion	U	8.5 V to U_B –> ON; R_e > 100 kΩ
	U	0 to 6.5 V –> OFF; R_e > 100 kΩ
• Enable	U	8.5 V to U_B –> ON; R_e > 100 kΩ
	U	0 to 6.5 V –> OFF; R_e > 100 kΩ
• Ramp	U	8.5 V to U_B –> ON; R_e > 100 kΩ
	U	0 to 6.5 V –> OFF; R_e > 100 kΩ
Setting ranges		
– Zero compensation (potentiometer „Zw“)		±30%
– Command value (potentiometers „w1“ to „w4“)		0% to 110%
– Ramp times (potentiometers „t1“ to „t5“)		20 ms to 5 s; switchable 0.2 to 50 s
– Jump height (potentiometers „S+“ and „S–“)		0% to 50%
– Amplitude attenuation (potentiometers „G+“ and „G–“)		0% to 110% (valid when setting the jump height from 0%)
Outputs		
– Command value signal	U	±10 V ± 2 %; I_{max} = 2 mA
– Actual value signal	U	±2.5 V ± 2 %; I_{max} = 2 mA (mV ≙ mA)
– Measuring point signal (option 5)	U	±10 V ± 2 %; I_{max} = 2 mA
– Operational	U	> 16 V; 50 mA (with a fault: U < 1 V; R_i = 10 kΩ)
– Controlled voltages	U	±10 V ± 2 %; 25 mA; short circuit-proof
– Current output stage	I	0 to 2.5 A; short circuit-proof
– Measurement sockets Command value signal		±10 V ± 2 %; I_{max} = 2 mA
Actual value signal		±2.5 V ± 2 %; I_{max} = 2 mA (mV ≙ mA)

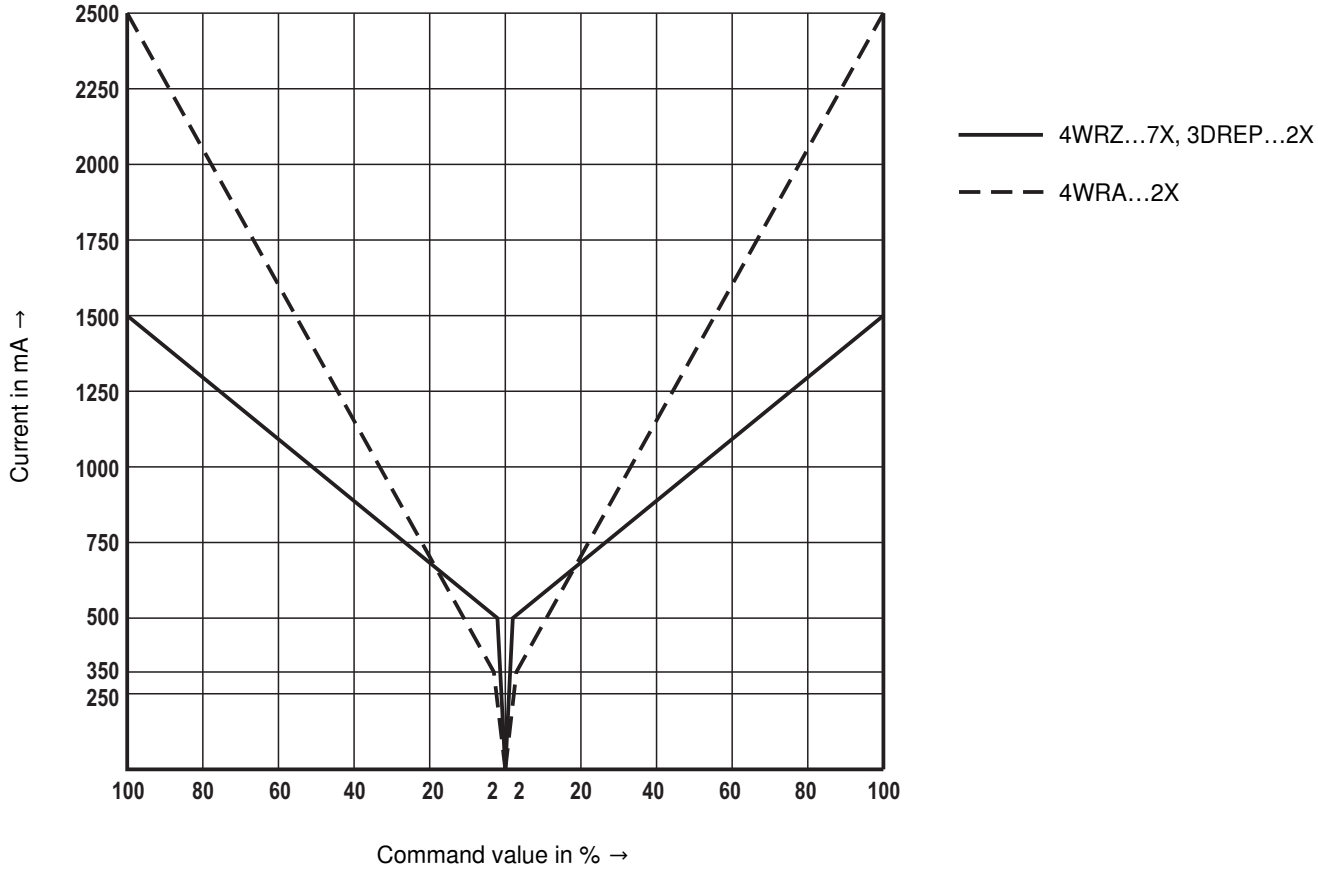
Technical data (continued)

Clock frequency		
– WRA6	f	300 to 370 Hz (at 24 V U_B and 0 V $U_{com.}$ = 370 Hz)
– WRA10	f	180 to 410 Hz (at 24 V U_B and 0 V $U_{com.}$ = 410 Hz)
– WRZ	f	170 Hz
– 3DREP	f	170 Hz
Connection type		48-pin blade connector, DIN 41612, form F
Card dimensions		Eurocard 100 x 160 mm, DIN 41494
Front plate dimensions		
– Height		3 HE (128.4 mm)
– Width soldered side		1 TE (5.08 mm)
– Width component side		3 TE
Permissible operating temperature range	ϑ	0 to 50 °C
Storage temperature range	ϑ	–25 °C to +85 °C
Weight	m	0.17 kg (net)

Note!

For details regarding the **environmental simulation test** covering EMC (electro-magnetic compatibility), climate and mechanical loading see data sheet 30110-U.

Characteristic curves



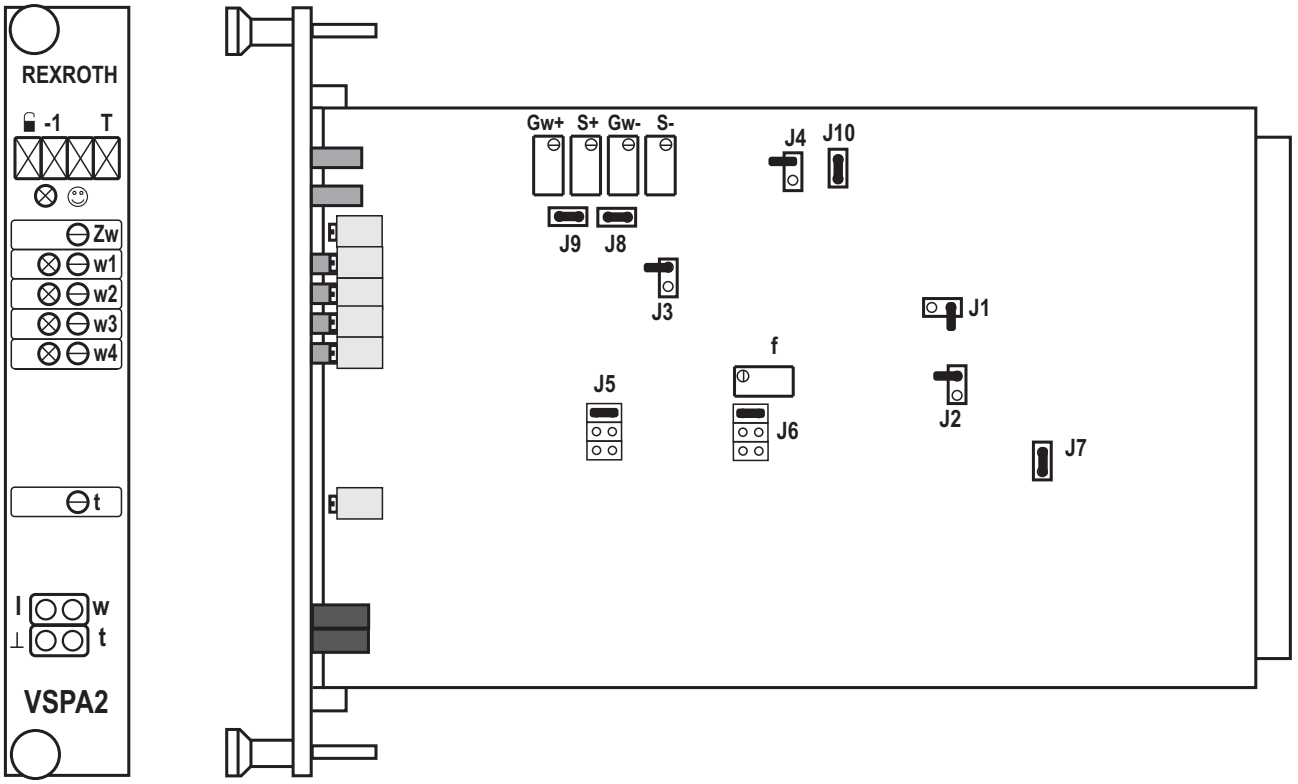
Display / adjustment element T1

J3 ramp time	
0.2 to 50 sec.	▬
0.02 to 5 sec. •	○○

J8, J9 jump height	J8	J9
4WRA6 and 10…2X	○○	○○
4WRZ…7X, 3DREP…2X •	▬	▬

J4 Jump function	
Off	▬
On •	○○

J1 inversion	
Inverted	▬
Not inverted •	○○



LED displays:

- ☺ Operational (green)
- 🔓 Enable (yellow)
- –1 External inversion

Measurement sockets:

I, w, t Measurement signal

⊥ Measurement zero

J5, J6 clock frequency	J5	J6
4WRA6…2X	▬ ○○ ▬	▬ ○○ ▬
4WRA10…2X	○○ ▬ ▬	○○ ▬ ▬
Universal, 4WRZ…7X 3DREP…2X	▬ ○○ ○○	▬ ○○ ○○

J2 ramp function	
Off	▬
On •	○○

J7 max. current setting	
4WRZ…7X, 3DREP…2X •	▬
4WRA…2X	○○

•	=	Factory jumper setting
▬	=	Jumper closed
○○	=	Jumper open

Potentiometer (partially with LED display):

Zw	Zero point alignment
w1	Command value 1
w2	Command value 2
w3	Command value 3
w4	Command value 4
t	Ramp time

adjustable on the board:

Gw+	Amplitude attenuation for positive command values
Gw–	Amplitude attenuation for negative command values
S+	Jump heights for a positive direction
S–	Jump heights for a negative direction
f	Clock frequency output stage

Adjusting the locked potentiometers invalidates any guarantee claims!

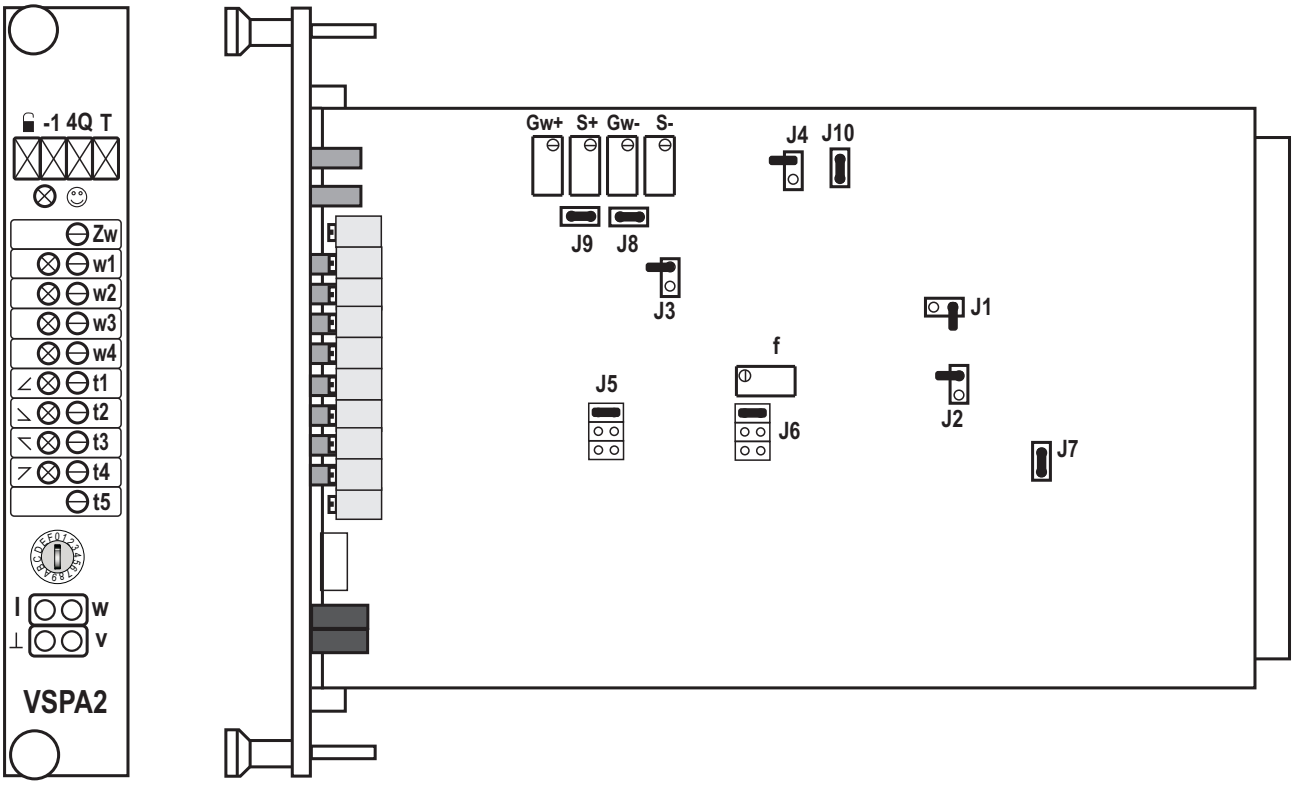
Display / adjustment element T5

J3 ramp time	
0.2 to 50 sec.	▬
0.02 to 5 sec. •	○○

J8, J9 jump height	J8	J9
4WRA6 and 10…2X	○○	○○
4WRZ…7X, 3DREP…2X •	▬	▬

J4 jump function	
Off	▬
On •	○○

J1 inversion	
Inverted	▬
Not inverted •	○○



LED displays:

☺ Operational (green)

Enable (yellow)

–1 External inversion

Measurement sockets:

I, w, t Measurement signal

⊥ Measurement zero

(For further information see document 30110-B)

J5, J6 clock frequency	J5	J6
4WRA6 2X	○▬○	○▬○
4WRA10 2X	▬○○	▬○○
Universal, 4WRZ…7X 3DREP…2X	▬▬○	▬▬○

J2 ramp function	
Off	▬
On •	○○

J7 max. current setting	
4WRZ…7X •	▬
4WRA…2X 3DREP…2X	○○

•	=	Factory jumper setting
▬	=	Jumper closed
○○	=	Jumper open

Potentiometer (partially with LED display):

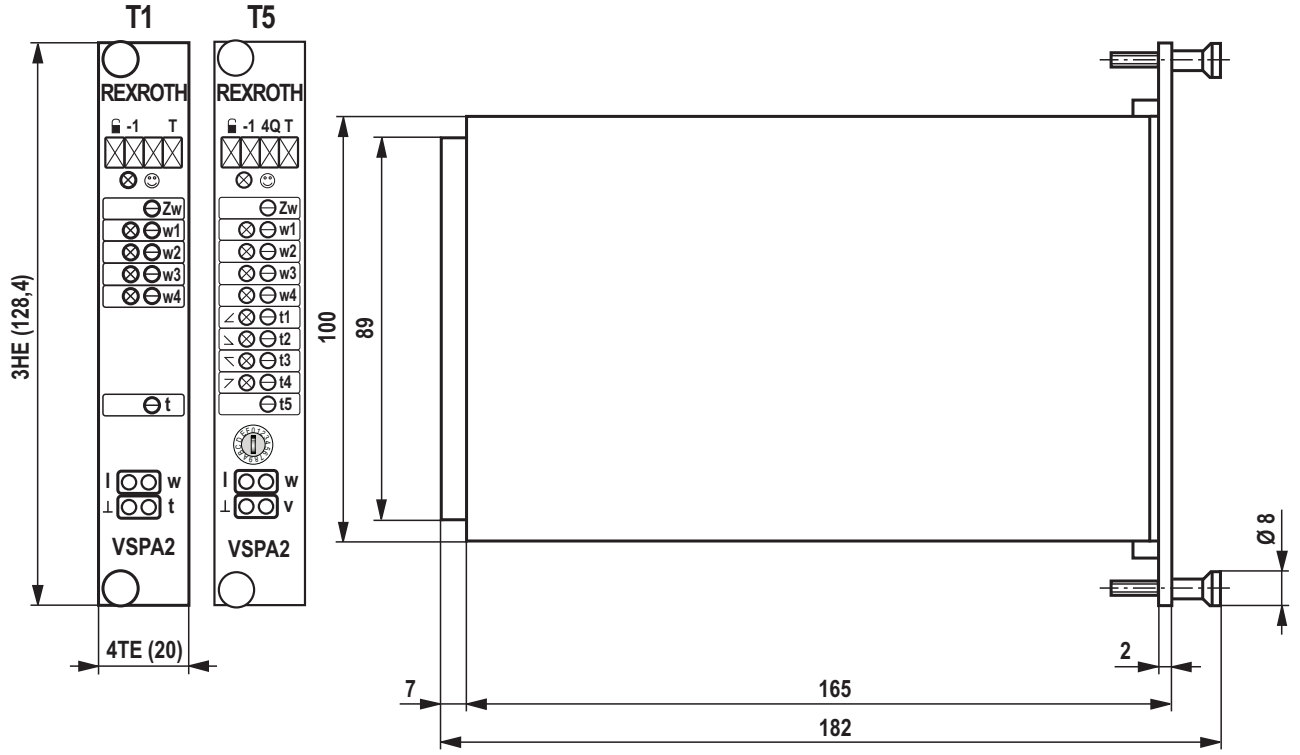
Zw	Zero point alignment
w1	Command value 1
w2	Command value 2
w3	Command value 3
w4	Command value 4
t1	Ramp time 1
t2	Ramp time 2
t3	Ramp time 3
t4	Ramp time 4
t5	Ramp time 5

adjustable on the board:

Gw+	Amplitude attenuation for positive command values
Gw–	Amplitude attenuation for negative command values
S+	Jump heights for a positive direction
S–	Jump heights for a negative direction
f	Clock frequency output stage

Adjusting the locked potentiometers invalidates any guarantee claims!

Unit dimensions (dimensions in mm)



Engineering / **maintenance guidelines** / **additional information**

For further information see document 30110-B.

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