

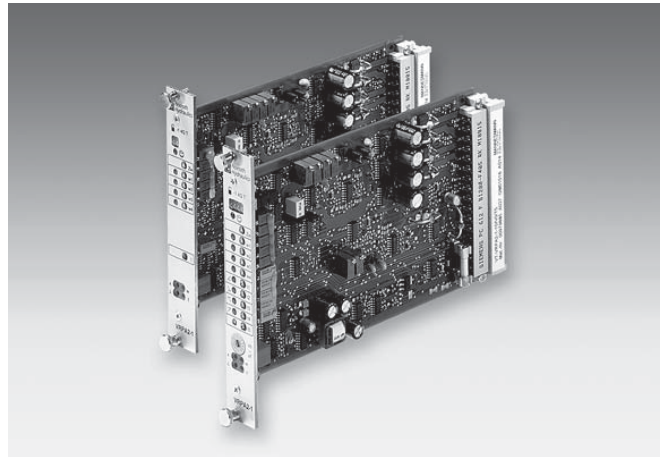
RE 30 119/02.03

Replaces: 09.02

**Analogue amplifier card
Type VT-VRPA2-.-1X/...**

Series 1X

H/A/D 6641/00



Type VT-VRPA2-.-1X/...

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Suitable card holders:

- 19" rack types VT 19101, VT 19102, VT 19103 and VT 19110 (see RE 29 768)
- Enclosed card holder type VT 12302 (see RE 30 103) with use of a blind plate 4TE/3HE (material no. 00021004)
- Open card holder type VT 3002-2X/48 (see RE 29 928)
Only for installation in control cabinet!

Power supply unit:

- Type VT-NE30-1X, see RE 29 929
Compact power supply unit 115/230 VAC → 24 VDC, 70 VA

Further information:

- Product description and commissioning instructions
VT-VRPA2-.-1X/..., see RE 30 119-B

Features

- Suitable for controlling valves with position feedback, type 4WRE, sizes 6 and 10, series 2X
- Designed as printed circuit board in Euro-format 100 x 160 mm and suitable for installation in a rack
- Command value inputs:
 - Differential input ± 10 V
 - Four callable command value inputs ± 10 V
 - Current input 4 to 20 mA
- Inversion of the internal command value signal via 24V input or by means of jumpers
- Selection of ramp time through quadrant recognition (24V input) or ramp time call-ups (24V inputs) (option T5)
- Changeover of the ramp time range by means of jumpers
- Characteristic curve correction by means of separately adjustable jump heights and maximum values
- Enable input
- Output signal "ready for operation"
- Measuring sockets that can be switched over (option T5)
- Reverse polarity protection for voltage supply
- Power supply unit with DC/DC converter without raised zero point

Preferred types

Material no.	Type
R900979887	VT-VRPA2-1-1X/V0/T1
R900979885	VT-VRPA2-1-1X/V0/T5



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Ordering code

VT-VRPA2 - - 1X / V0 / / *				
Analogue amplifier in Euro-card format				Further details in clear text ¹⁾
For controlling 4WRE 6-2X valves	= 1			T1 = With one ramp time
For controlling 4WRE 10-2X valves	= 2			T5 = With five ramp times
Series 10 to 19 (10 to 19: unchanged technical data and pin assignment)		= 1X		Basic version

¹⁾ Additional functions – e.g. output stage monitoring, actual value monitoring or ramp-ready signal on enquiry

Function

Power supply unit [1]

The amplifier card is provided with a power supply unit with making-current limiter. It supplies all the internally required positive and negative voltages. The making-current limiter prevents high making-current peaks caused by smoothing capacitors in the current output stage.

Command value preselection

The internal command value signal is generated from the sum (summation [6]) of the external command value signal applied to differential input [2] and current input [3], called signal [4] and zero point offset [5] (zero point potentiometer "Zw").

The following is valid:

Normalized value	Current input	Differential input	Comm. value meas. socket	Direction of flow
- 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 **		0 V	

**If the current input is not activated or in the case of a cable break of the command value cable, the resulting internal command value signal is 0 %.

There is no changeover between current and voltage inputs. The inputs are permanently available (see terminal assignment).

Command value call-ups [4]

Four command value signals, "w1" to "w4", can be called up. External command value voltages (command values 1 to 4) are fed forward either directly through regulated voltage outputs + 10 V and - 10 V or via external potentiometers. If the command value inputs are connected directly to the regulated voltages, the command values can be adjusted using potentiometers "w1" to "w4". If external potentiometers are used, the internal potentiometers act as attenuators or limiters.

Only one call-up is possible at a time. If several call-ups are activated simultaneously, call-up "1" has lowest priority, call-up "4" highest priority.

The active call-up is signalled by a yellow LED on the front panel.

Command value inversion [7]

The command value that was generated internally from input signals, command value call-ups and the -zero point offset signal can be inverted with the help of an external signal or jumper J1. The application of an external inversion signal is signalled by an LED ("– 1") on the front panel.

Enable function [8]

The enable function enables the current output stages and passes the internal command value signal on to the ramp generator. The enable signal is indicated by an LED on the front panel. When the enable is cut in, the internal command value changes (with any preselected command value) according to the set ramp time. This ensures that a controlled valve does not open abruptly.

Ramp generator [9]

The ramp generator limits the gradient of the control variable. The downstream step functions and amplitude attenuators do not extend or shorten the ramp time.

Jumper J2 can be used to set the ramp time to minimum (< 2 ms) (ramp off).

External ramp time adjustment

The ramp time set internally can be extended using an external potentiometer. The setting can be checked with the help of the measuring socket. In the case of a cable break, the internal presetting will be used automatically.

Characteristic curve generator [11]

The adjustable characteristic curve generator can be used to adjust the step-change height and maximum values separately for positive and negative signals in accordance with the hydraulic requirements. The actual curve shape through the zero point is not step-like, but linear.

Amplitude limiter [12]

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

Oscillator [14]

The oscillator generates the control signal for the inductive position transducer.

Demodulator [15]

The demodulator generates the actual value signal of the valve spool position from the position transducer signal. 100 % = 10 V

Position controller [17]

The position controller is optimised to the individual valve.

Current output stage [18]

The current output stage generates the clocked solenoid current for the proportional valve. The solenoid current is limited to 2.5 A to 2.8 A per output. The current output stage outputs are short-circuit-proof. In the case of an internal fault signal or missing enable, the output stages are deactivated.

Fault detection [19]

The position transducer cable is monitored for cable break and short-circuit on the primary side, and the output stages for excessive current.

[] = Cross-reference to the block circuit diagram on page 4

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

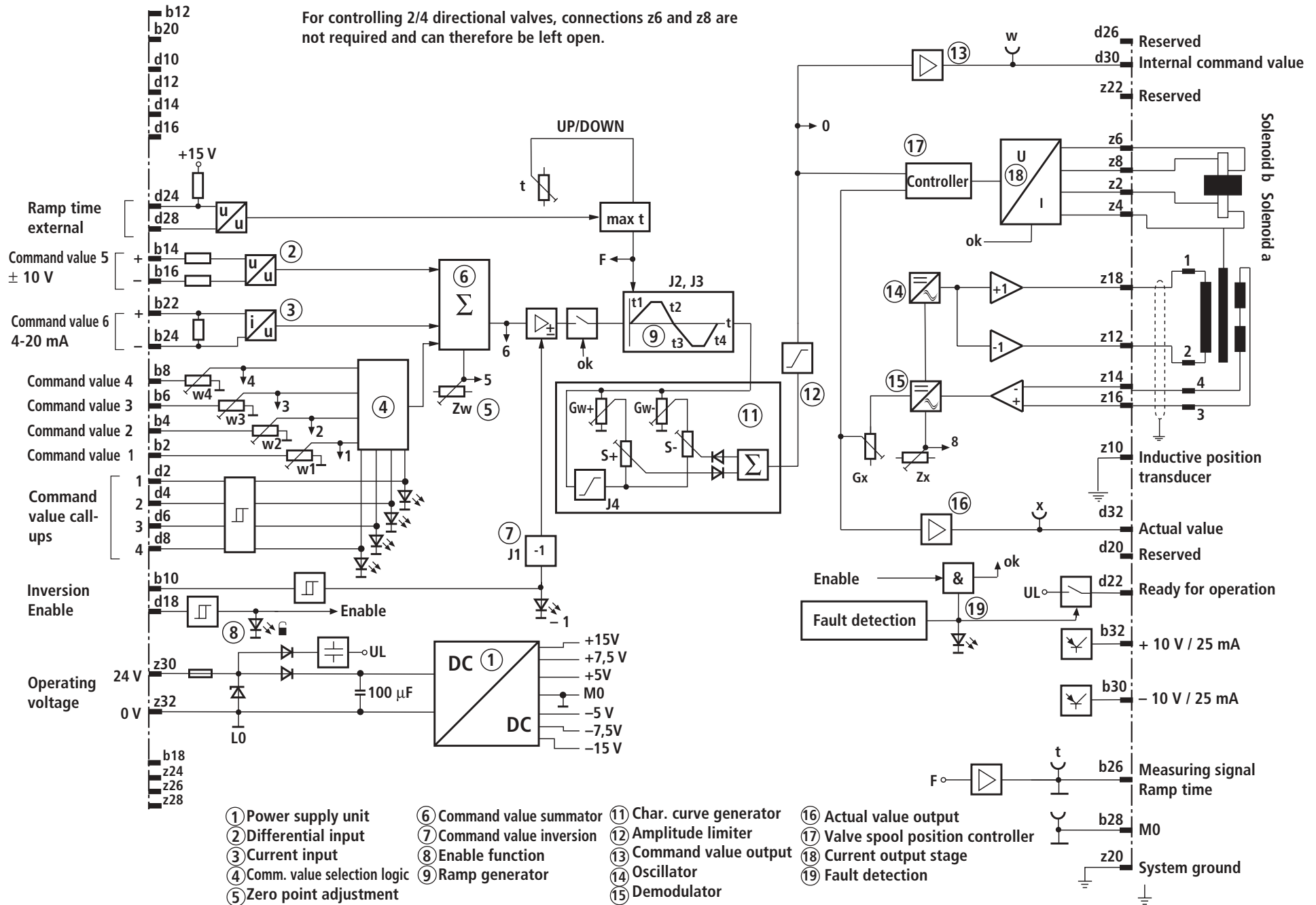
Operating voltage	U_0	24 VDC + 40 % – 20 %
Operating range:		
– Upper limit value	$u_0(t)_{\max}$	35 V
– Lower limit value	$u_0(t)_{\min}$	18 V
Power consumption	P_S	< 24 VA
Current consumption	I	< 2 A
Fuse	I_s	2 A M, can be replaced
Inputs:		
– Analogue		
• Command values 1 to 4 (potentiometer inputs)	U_i	0 to ± 10 V; $R_i > 100 \text{ k}\Omega$ (reference is M0)
• Command value 5 (differential input)	U_i	0 to ± 10 V; $R_i > 50 \text{ k}\Omega$
• Command value 6 (current input)	I_i	4 to 20 mA; load $R_i = 100 \Omega$
• Ramp time external	U_i	0 to +10 V; $R_i = 10 \text{ k}\Omega$ (internally raised to +15 V; reference is M0)
– Digital		
• Command value call-ups	U	8.5 V to $U_0 \rightarrow$ call-up activated; $R_i > 100 \text{ k}\Omega$
	U	0 to 6.5 V \rightarrow no call-up; $R_i > 100 \text{ k}\Omega$
• Ramp call-ups	U	8.5 V to $U_0 \rightarrow$ call-up activated; $R_i > 100 \text{ k}\Omega$
	U	0 to 6.5 V \rightarrow no call-up; $R_i > 100 \text{ k}\Omega$
• Quadrant recognition	U	8.5 V to $U_0 \rightarrow$ ON; $R_i > 100 \text{ k}\Omega$
	U	0 to 6.5 V \rightarrow OFF; $R_i > 100 \text{ k}\Omega$
• Command value inversion	U	8.5 V to $U_0 \rightarrow$ ON; $R_i > 100 \text{ k}\Omega$
	U	0 to 6.5 V \rightarrow OFF; $R_i > 100 \text{ k}\Omega$
• Enable	U	8.5 V to $U_0 \rightarrow$ ON; $R_i > 100 \text{ k}\Omega$
	U	0 to 6.5 V \rightarrow OFF; $R_i > 100 \text{ k}\Omega$
Adjustment ranges:		
– Zero balancing (potentiometer "Zw")		$\pm 30 \%$
– Command value (potentiometers "w1" to "w4")		0 to 110 %
– Ramp times (potentiometers "t1" to "t5")		20 ms to 5 s; can be changed over, 0.2 to 50 s
– Step-change height (potentiometers "S+" and "S–")		0 % to 50 %
– Amplitude attenuator (potentiometers "G+" and "G–")		0 % to 110 % (valid for setting of step-change height to 0 %)
Outputs:		
– Command value signal	U	$\pm 10 \text{ V} \pm 2 \%$; $I_{\max} = 2 \text{ mA}$
– Actual value signal	U	$\pm 10 \text{ V} \pm 2 \%$; $I_{\max} = 2 \text{ mA}$
– Measuring point signal (option 5)	U	$\pm 10 \text{ V} \pm 2 \%$; $I_{\max} = 2 \text{ mA}$
– Ready for operation	U	> 16 V; 50 mA (in case of fault: $U < 1 \text{ V}$; $R_i = 10 \text{ k}\Omega$)
– Regulated voltages	U	$\pm 10 \text{ V} \pm 2 \%$; 25 mA; short-circuit-proof
– Current output stages	I	0 to 2.5 A; short-circuit-proof; clocked ca. 5 kHz
– Oscillator	U	$\pm 5 V_{SS}$ per output; 10 mA
	F	5.6 kHz $\pm 10 \%$
– Measuring sockets	U	$\pm 10 \text{ V} \pm 2 \%$; $I_{\max} = 2 \text{ mA}$
Type of connection		48-pin male connector, DIN 41 612, form F
Card dimensions		Euro-card 100 x 160 mm, DIN 41 494
Front panel dimensions:		
– Height		3 HE (128.4 mm)
– Width soldering 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)

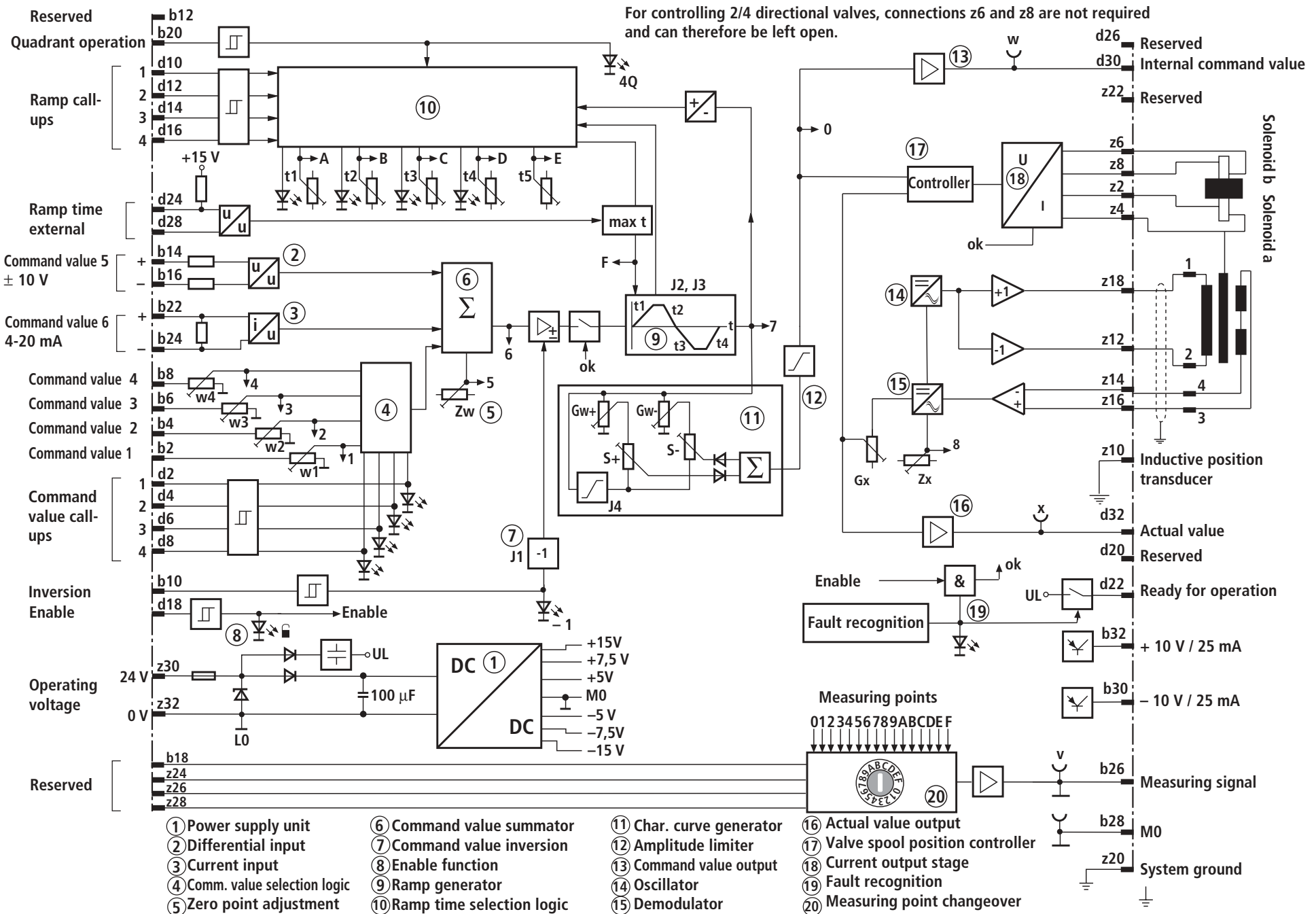


Note:

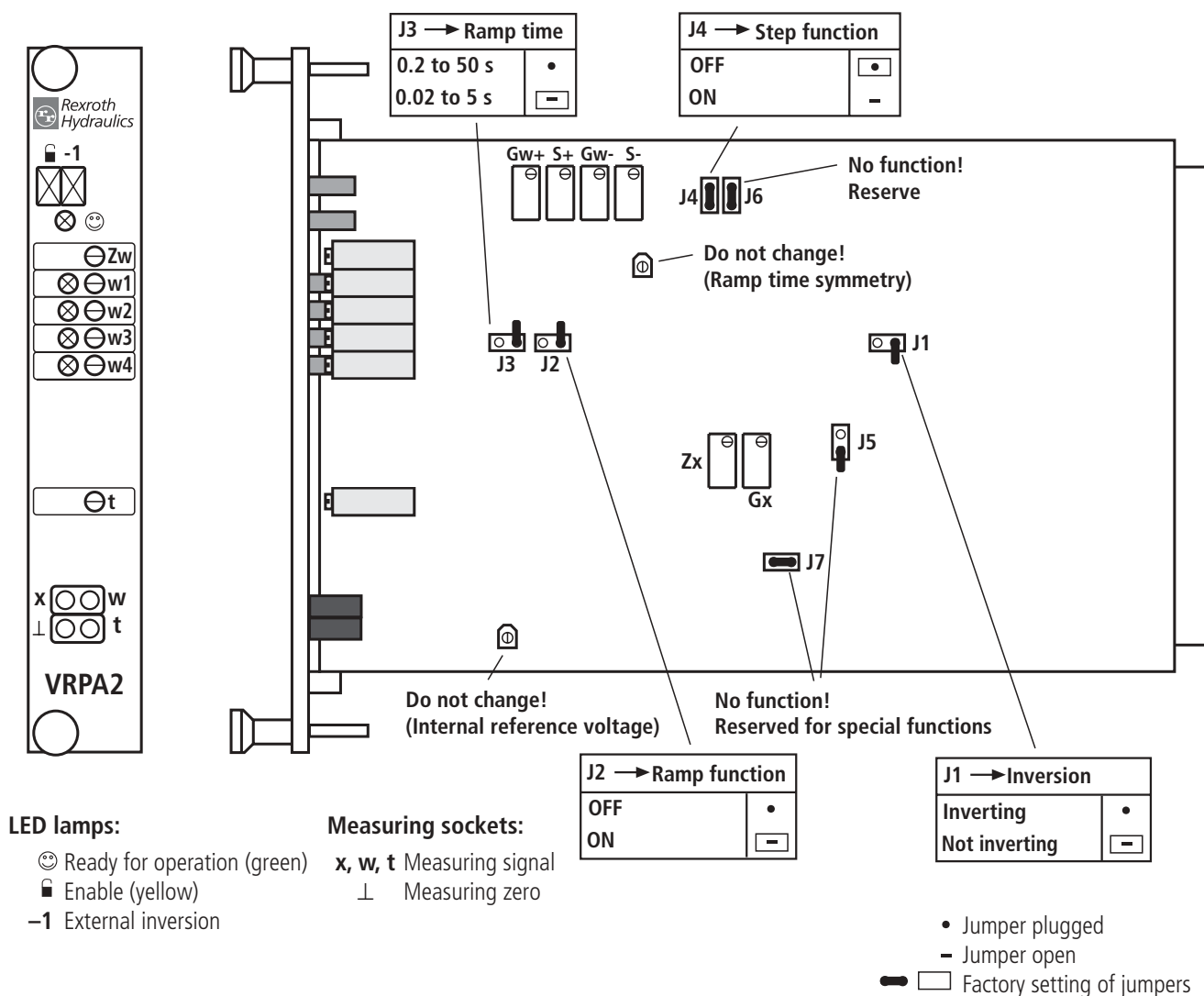
For details regarding **environment simulation tests** in the field of EMC (electromagnetic compatibility), climate and mechanical stress, see RE 30 119-U (declaration on environmental compatibility).

For controlling 2/4 directional valves, connections z6 and z8 are not required and can therefore be left open.





VT-VRPA2-.-1X/VO/T1

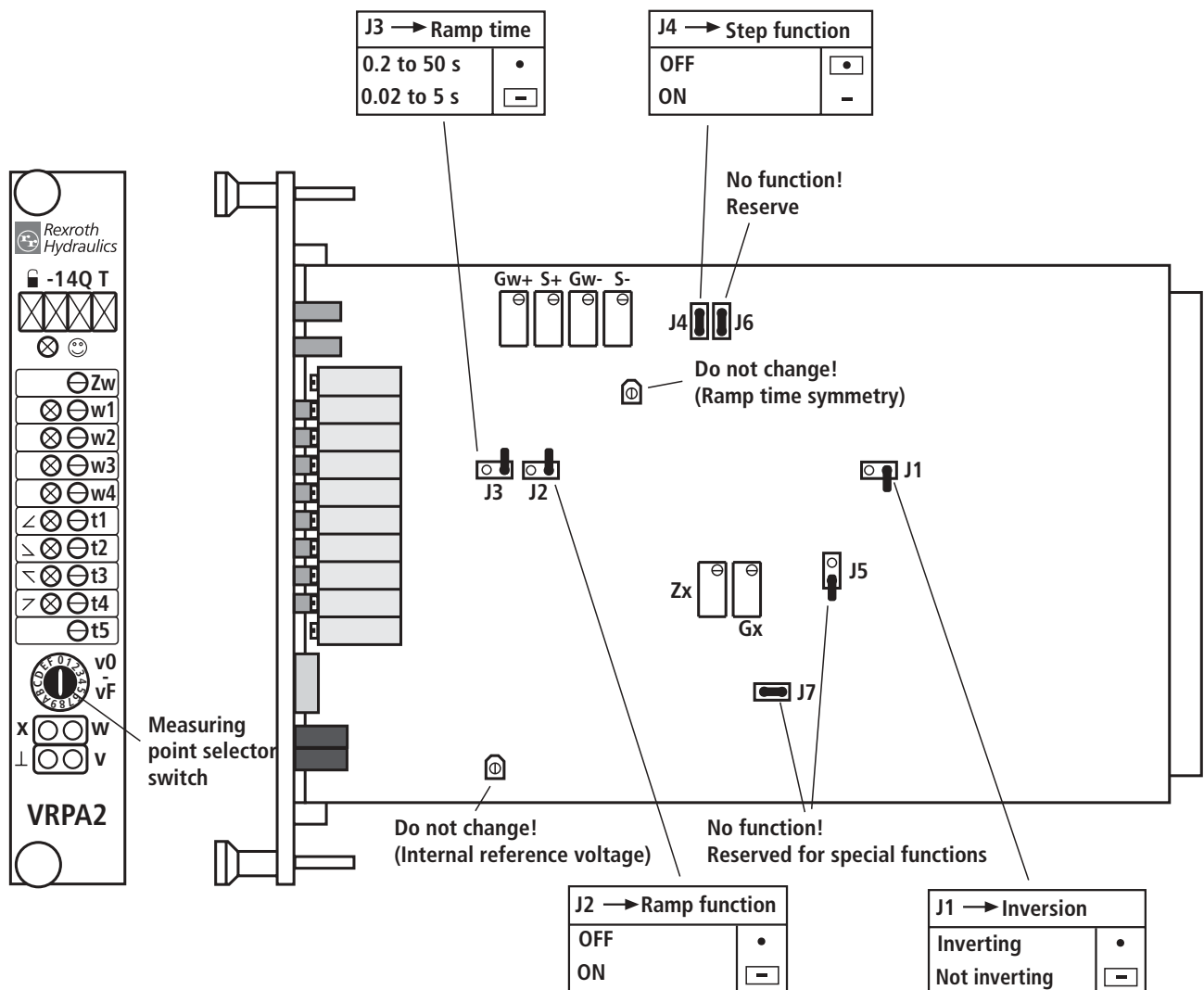


Potentiometers (some with LED lamps):

- | | |
|--------------------------------|---|
| Zw Zero point balancing | Cannot be adjusted from the front panel: |
| w1 Command value 1 | Gw+ Amplitude attenuator for positive command values |
| w2 Command value 2 | Gw- Amplitude attenuator for negative command values |
| w3 Command value 3 | S+ Step-change height for positive direction |
| w4 Command value 4 | S- Step-change height for negative direction |
| t Ramp time | |

If you change sealed potentiometer settings, the warranty will become void!

VT-VRPA2-.-1X/VO/T5



LED lamps:

- ☺ Ready for operation (green)
- Enable (yellow)
- 1 External inversion
- 4Q Quadrant recognition
- T Reserved

Measuring sockets:

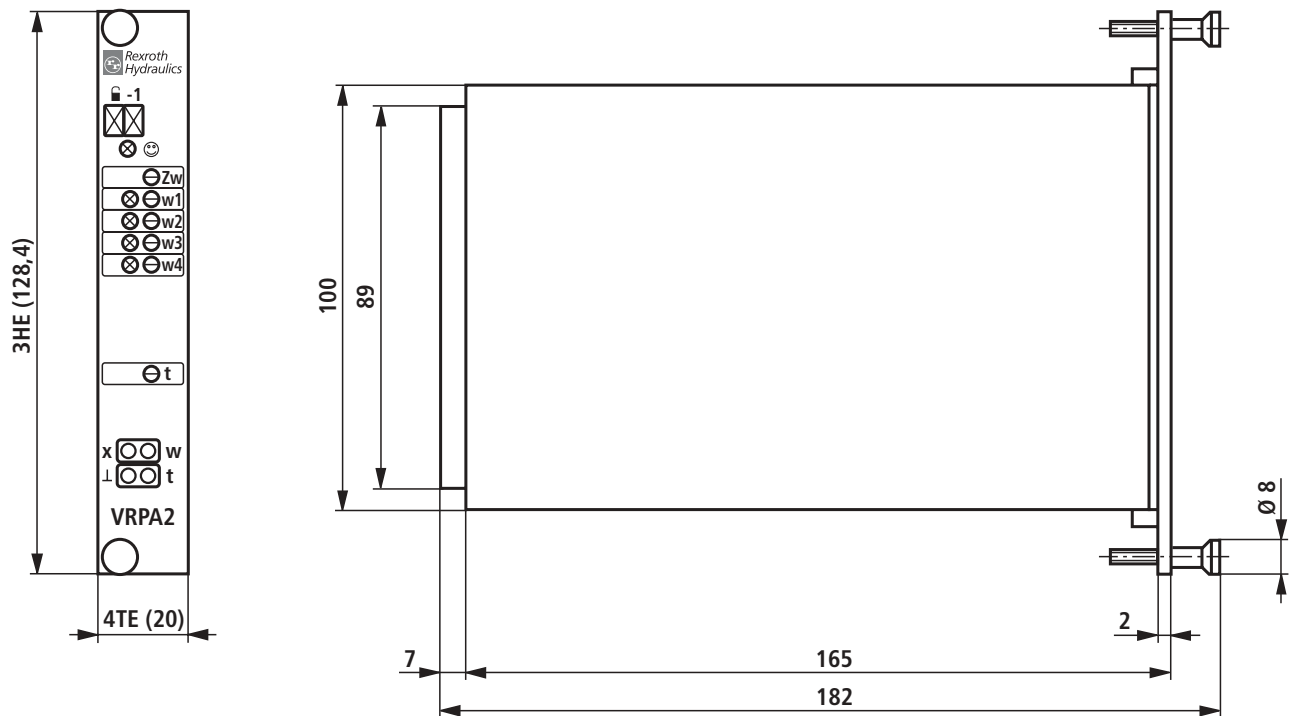
- x, w, t Measuring signal
- ⊥ Measuring zero

- Jumper plugged
- Jumper open
- ◻ Factory setting of jumpers

Potentiometers (some with LED lamps):

- Zw** Zero point balancing Cannot be adjusted from the front panel
- 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
- Gw+** Amplitude attenuator for positive command values
- Gw-** Amplitude attenuator for negative command values
- S+** Step-change height for positive direction
- S-** Step-change height for negative direction

If you change sealed potentiometer settings, the warranty will become void!



Engineering / maintenance notes / supplementary information

For further information, see "Product description and commissioning instructions VT-VRPA2-.-1X/..." (RE 30 119-B).

Bosch Rexroth AG Industrial Hydraulics

D-97813 Lohr am Main
Zum Eisengießer 1 • D-97816 Lohr am Main
Telefon 0 93 52 / 18-0
Telefax 0 93 52 / 18-23 58 • Telex 6 89 418-0
eMail documentation@boschrexroth.de
Internet www.boschrexroth.de

Bosch Rexroth Limited

Cromwell Road, St Neots,
Cambs, PE19 2ES
Tel: 0 14 80/22 32 56
Fax: 0 14 80/21 90 52
eMail: info@boschrexroth.co.uk

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