

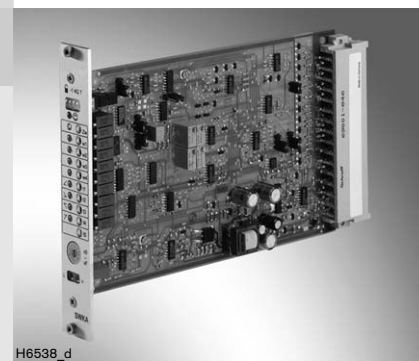
Analog Command Value Card

RE 30255/06.05
Replaces: 11.02

1/8

Type VT-SWKA-1

Series 1X



H6538_d

Table of contents

Contents	Page
Features	1 and 2
Ordering code	2
Functional description	3
Block circuit diagram / pin allocation	4
Technical data	5 and 6
Indicator / adjustment elements	7
Unit dimensions	8
Engineering / Maintenance notes / Supplementary information	8

Features

- Analog command value card (without power part) for controlling valves with integral electronics
→ For controlling valves without integral electronics, a suitable additional amplifier is required.
- Suitable for generating, combining and normalizing command value signals
- Configuration and parameterization of the command value card by means of potentiometers
- Command value inputs:
 - Differential input ± 10 V
 - 4 callable command value inputs ± 10 V
 - Current input 4 to 20 mA (standard 0 to 100 %; can be changed over ± 100 %)
- Control variable output:
 - Voltage ± 10 V
 - Current 4 to 20 mA (standard 0 to 100 %; can be changed over ± 100 %)
- Inversion of internal command value signal using 24V input or jumper
- Ramp time selection by quadrant recognition (24V input) or ramp time call-ups (24V inputs)
- Ramp time range can be changed over by means of jumpers

Features (continued)

- Characteristic curve correction by means of separately adjustable step-change heights and maximum values
- Enable input
- Output signal "ramp ready" as auxiliary process variable
- Output signal "ready for operation"
- Switchable measuring socket
- Reverse voltage protection for voltage supply

Further information:

- VT-SWKA-1 product description and commissioning instructions, see RE 30255-B

Suitable card holders:

- 19" rack types VT 19101, VT 19102, VT 19103 and VT 19110 (see RE 29768)
- Closed card holder VT 12302 (see RE 30103) with blind plate insert 4TE/3HE (material no. R900021004)
- Open card holder VT 3002-2X/48 (see RE 29928)
For control cabinet installation only!

Suitable power supply units:

- Type VT-NE30-1X, see RE 29929
Compact power supply unit 115/230 VAC → 24 VDC, 70 VA
- Type VT-NE31-1X, see RE 29929
Compact power supply unit 115/230 VAC → 24 VDC, 7 VA
- Type VT-NE32-1X, see RE 29929
Compact power supply unit 115/230 VAC → 24 VDC, 60 VA (smoothed) and 24 VDC, 25 VA (regulated)

Ordering code

VT-SWKA-1-1X/V0/0/*	
Analog command value card Series 10 to 19 (10 to 19: unchanged technical data and pin allocation)	Further details in plain text Basic version Basic version
= 1X	= 0
	V0 =

Functional description

General

The command value card is designed as printed circuit board in Euro-format 100 x 160 mm and is suitable for installation in a rack. A power supply unit [1] provides the internally required positive and negative supply voltages. As soon as the power supply unit is in operation and no error is present, the green LED on the front panel lights up and the "ready for operation" signal is set.

Current input [3]

There is no changeover between current and voltage input. Both inputs are permanently available (see terminal allocation). The input signals are internally normalized and added. The zero point and the range of values of the current input can be changed over by means of jumper J5.

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 preselected either directly via the regulated voltage inputs +10 V and -10 V or via external potentiometers. If the command value inputs are connected directly to the regulated voltages, the command values are adjusted by means of 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 selected simultaneously, call-up "1" has lowest priority, call-up "4" highest priority.

A yellow LED on the front panel indicates, which call-up is active.

Command value inversion [7]

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

Enable function [8]

The enable function cuts the enable signal of the ramp generator in or out. When the enable is cut in or out, the control variable changes at any command value according to the set ramp time. This prevents a controlled valve from opening or closing suddenly. If an error signal is present, the input signal of the ramp generator is also set to 0 %. An LED on the front panel signals that an enable signal is applied.

Ramp generator [9]

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

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

External ramp time adjustment

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

Ramp status signal [11]

The status signal "ramp ready" indicates that the control variable has reached the requested final value. This signal (24V output) facilitates the synchronization of higher-level sequence controls with the valve function or the controlled hydraulic function.

Characteristic curve generator [12]

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

Amplitude limiter [13]

The control variables (current output and voltage output) are limited to approx. $\pm 110\%$ of the nominal range.

Fault recognition [14]

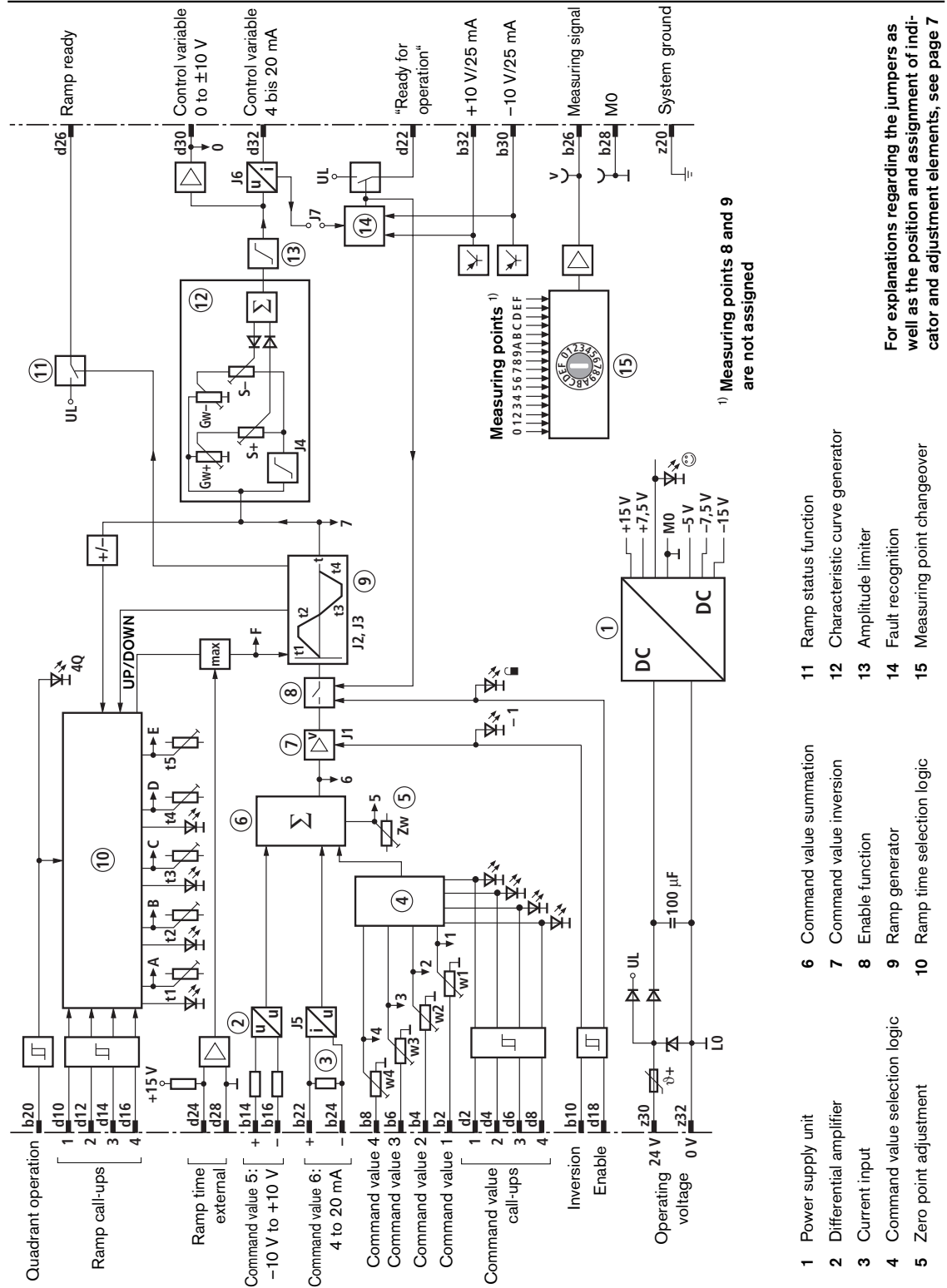
This feature monitors internal operating voltages, voltage outputs and, if jumper J7 (1-2) is plugged, the current output for cable break. When no fault is present, the green "ready for operation" LED lights up and the output "ready for operation" is set to 24 V (operating voltage).

Measuring points [15]

A measuring socket is provided on the front panel to allow the verification of the settings of command value call-ups, ramp times and further, internal signals. The measuring points can be selected using the measuring point selector switch that is also provided on the front panel. The signal of the measuring socket is also connected to the blade connector (b26).

[] = Reference to the block circuit diagram on page 4

Block circuit diagram / pin allocation



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

Operating voltage	U_B	24 VDC +40 % -20 %
Operating range:		
– Upper limit value	$U_B(t)_{max}$	35 V
– Lower limit value	$U_B(t)_{min}$	18 V
Power requirement	P_S	< 7 VA
Current consumption	I	< 0.3 A
Fuse		Thermal overload protection; auto-activating when triggered
Inputs:		
– Analog		
• command values 1 to 4 (potentiometer inputs)	U_e	0 to ± 10 V; $R_e = 100$ k Ω (reference is M0)
• command value 5 (differential input)	U_e	0 to ± 10 V; $R_e > 50$ k Ω
• command value 6 (current input)	I_e	4 to 20 mA; load $R_B = 100$ Ω (zero point can be changed over)
• ramp time external	U_e	0 to +10 V; $R_e = 10$ k Ω (internally raised to +15 V; reference is M0)
– Digital		
• command value call-ups	U	8.5 V to U_B \rightarrow call-up activated U 0 to 6.5 V \rightarrow no call-up
• ramp call-ups	U	8.5 V to U_B \rightarrow call-up activated U 0 to 6.5 V \rightarrow no call-up
• quadrant recognition	U	8.5 V to U_B \rightarrow ON U 0 to 6.5 V \rightarrow OFF
• command value inversion	U	8.5 V to U_B \rightarrow ON U 0 to 6.5 V \rightarrow OFF
• enable	U	8.5 V to U_B \rightarrow ON U 0 to 6.5 V \rightarrow OFF
Adjustment ranges:		
– Zero point adjustment (potentiometer "Zw")		± 30 %
– Command values (potentiometers "w1" to "w4")		0 to 110 %
– Ramp times (potentiometers "t1" to "t5")		20 ms to 5 s (can be changed over using J3)
– Step-change height (potentiometers "S+" and "S-")		0 % to 50 % (step-change height reached at ca. 2 % command value injection)
– Amplitude attenuator (potentiometers "G+" and "G-")		0 % to 110 % (valid when step-change height is set to 0 %)

Technical data

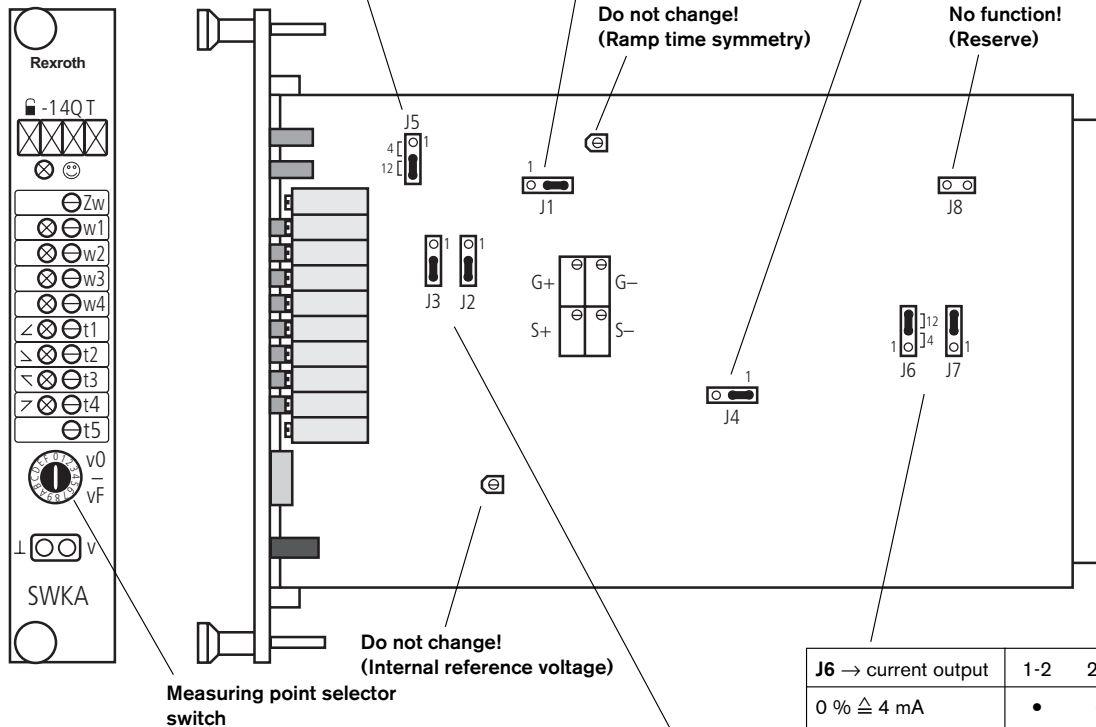
Outputs:		
– Analog signals		
• control variable	voltage	$U \pm 10 \text{ V} \pm 2 \%$; $I_{\text{max}} = 2 \text{ mA}$
	current	$I \text{ 4 mA to 20 mA} \pm 2 \%$; $R_{\text{B,max}} = 500 \Omega$ (zero point can be changed over)
• measuring signal		$U \pm 10 \text{ V} \pm 2 \%$; $I_{\text{max}} = 2 \text{ mA}$
– Digital signals		
• ramp ready		$U > 16 \text{ V}$; 50 mA → ready $U < 1 \text{ V}$; $R_i = 10 \text{ k}\Omega$ → ramp active
• ready for operation		$U > 16 \text{ V}$; 50 mA (in the event of a fault: $U < 1 \text{ V}$; $R_i = 10 \text{ k}\Omega$)
– Regulated voltages		
• measuring sockets		$U \pm 10 \text{ V} \pm 2 \%$; 25 mA
• measuring signal “v”		
(depending on position of measuring point selector switch)		$U \pm 10 \text{ V} \pm 2 \%$; $I_{\text{max}} = 2 \text{ mA}$
Type of connection		48-pin blade connector, DIN 41612, form F
Card dimensions		Euro-card 100 x 160 mm, DIN 41494
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 0.15 kg

**Note:**

For details regarding **environment simulation tests** in the fields of EMC (electromagnetic compatibility), climate and mechanical stress, see RE 30255-U (declaration on environmental compatibility).

Indicator / adjustment elements

J5 → current input	1-2	2-3	J1 → inversion	1-2	2-3	J4 → Step function	1-2	2-3
0 % \triangleq 4 mA	•	-	inverting	•	-	OFF	•	-
0 % \triangleq 12 mA	-	•	not inverting	-	•	ON	-	•



LED lamps:

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

Potentiometers (some with LED lamp):

- Zw Zero point adjustment
- 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

Cannot be adjusted on the front panel:

- G+ Amplitude attenuator for positive command values
- G- Amplitude attenuator for negative command values
- S+ Step-change height for positive direction
- S- Step-change height for negative direction

Measuring sockets:

- v Measuring signal
- ⊥ Measurement zero

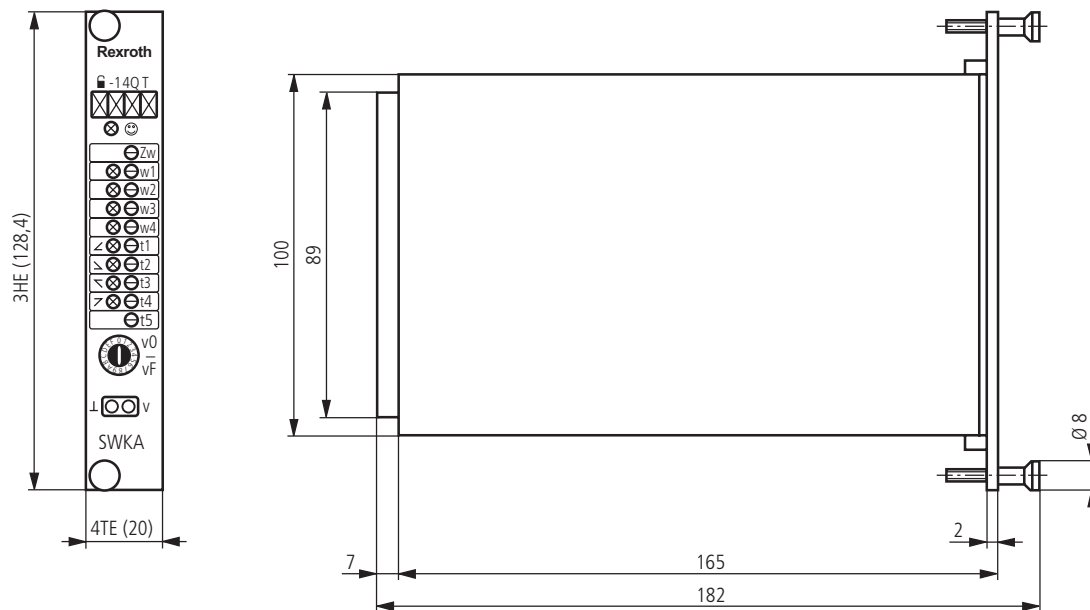
J6 → current output	1-2	2-3
0 % \triangleq 4 mA	•	-
0 % \triangleq 12 mA	-	•
J7 → cable break monitor	1-2	2-3
ON	•	-
OFF	-	•

J2 → Ramp function	1-2	2-3
OFF	•	-
ON	-	•
J3 → Ramp time		
Ten-fold	•	-
Single	-	•

- ... Connection made
- ... Connection broken
- ☐ ... Factory setting of jumpers

For further information and notes, see product description and commissioning instructions RE 30255-B!

Unit dimensions (Dimensions in mm)



Engineering / Maintenance notes / Supplementary information

- The command value card may only be withdrawn or plugged in when disconnected from the power supply!
- Never install cables near power cables!
- The distance to antenna cables, radio equipment and radar systems must be at least 1 m!
- Use relays with gold-plated contacts for switching command values (small voltages, small currents)!
- Always shield command value cables; connect shield to protective earth (PE) on the card side!

Note:

- When using the **differential input**, **both inputs** must always be switched on or off **simultaneously!**
- Electrical signals processed by control electronics (e.g. signal "ready for operation") must not be used for activating safety-relevant machine functions!
(See European standard "Safety requirements for fluid power systems and components – hydraulics", EN 982)

For further information, see "product description and commissioning instructions VT-SWKA-1" (RE 30255-B).

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