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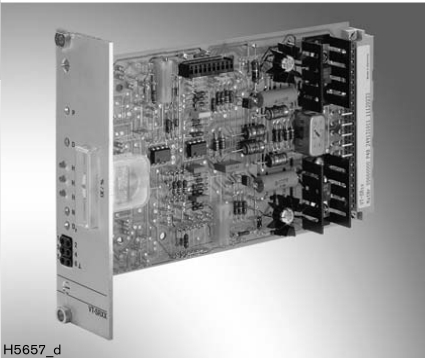| Electric Drives and Controls | Hydraulics | Linear Motion and Assembly Technologies | Pneumatics | Service |

Rexroth
Bosch Group

Electrical amplifier for the control of servo valves with electrical position feedback

Type VT-SR1

Series 1X

H5657_d

Table of contents

Features

The amplifier VT-SR1 is suitable for the control of 2-stage servo valves with electrical position feedback (type 4WS2EE …).

– Valve current controller
– Main spool position controller
– Dither signal generator
– Inverse pulsed output stage
– Oscillator/demodulator
– Enable circuit using relays
– Measuring instrument for displaying the servo valve current
– Polarity protection for the supply voltage

Optional accessories:

– PID controller [1] with controller switching
– Relay with a potential free 2-way contact (28 V / 2 A)
– Voltage controller ±15 V for the controller and position transducer electronics

[1] The D component only acts on the actual value (velocity feedback).

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2/6   **Bosch Rexroth AG** │ Hydraulics   VT-SR1 │ RE 29979/07.05

Ordering code

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VT — SR1 —1X/      *
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Amplifier for servo valves with electrical position
feedback; type 4WS2EE (all nominal sizes)

Series 10 to 19   = 1X
(10 to 19: unchanged technical data
and connection allocation)

	Further details in clear text [2]
	Valve type code
0 =	Without ±15 V voltage controller
1 =	With ±15 V voltage controller

2) E.g. With/without PID controller, with/without
    reserve relay K3
    For the additional PID controller, the controller technical
    data must be stated.

Suitable card holders:
  – Type VT 3002-2X/32, see RE 29928
    Single card holder without power supply

Suitable power supply:
  – Type VT-NE31-1X, see RE 29929
    Compact power supply unit 115/230 VAC → ±24 VDC, 7 VA

Function

The amplifier VT-SR1 operates using an inverted pulse output stage with bipolar transistors. The output from this output stage may be switched on and off by means of an enable circuit (relay K2). The enable is indicated by the lighting up of LED „H2" on the front plate. The switching voltage for all relays is set to either 0 V or $+U_B$ using jumpers J12 and J13 (works setting $+U_B$).

The output stage comprises of an I controller with connected dither signal generator. The amplitude of the dither signal is set using R7. A PD controller is used to control the pilot stage (command value current). The actual value current feedback is displayed at the same time by the instrument on the front plate.

The oscillator/demodulator is used to determine the spool position. It is designed as a plug-in card. The parameters of which are matched to the corresponding valve type.

The command value position and the actual value position are fed to the PD controller. The D component **only** effects the actual value (velocity feedback).

The zero point may be set on the front plate by means of R3 ("NP").

The necessary symmetrical operating voltage $\pm U_B$ is protected against reverse polarity. If the card does not include a voltage controller to supply the closed loop controller and position transducer electronics, then an additional stabilised auxiliary voltage $\pm U_M$ must be available. The auxiliary voltage connection is protected against reverse polarity up to a maximum current of 1 A.
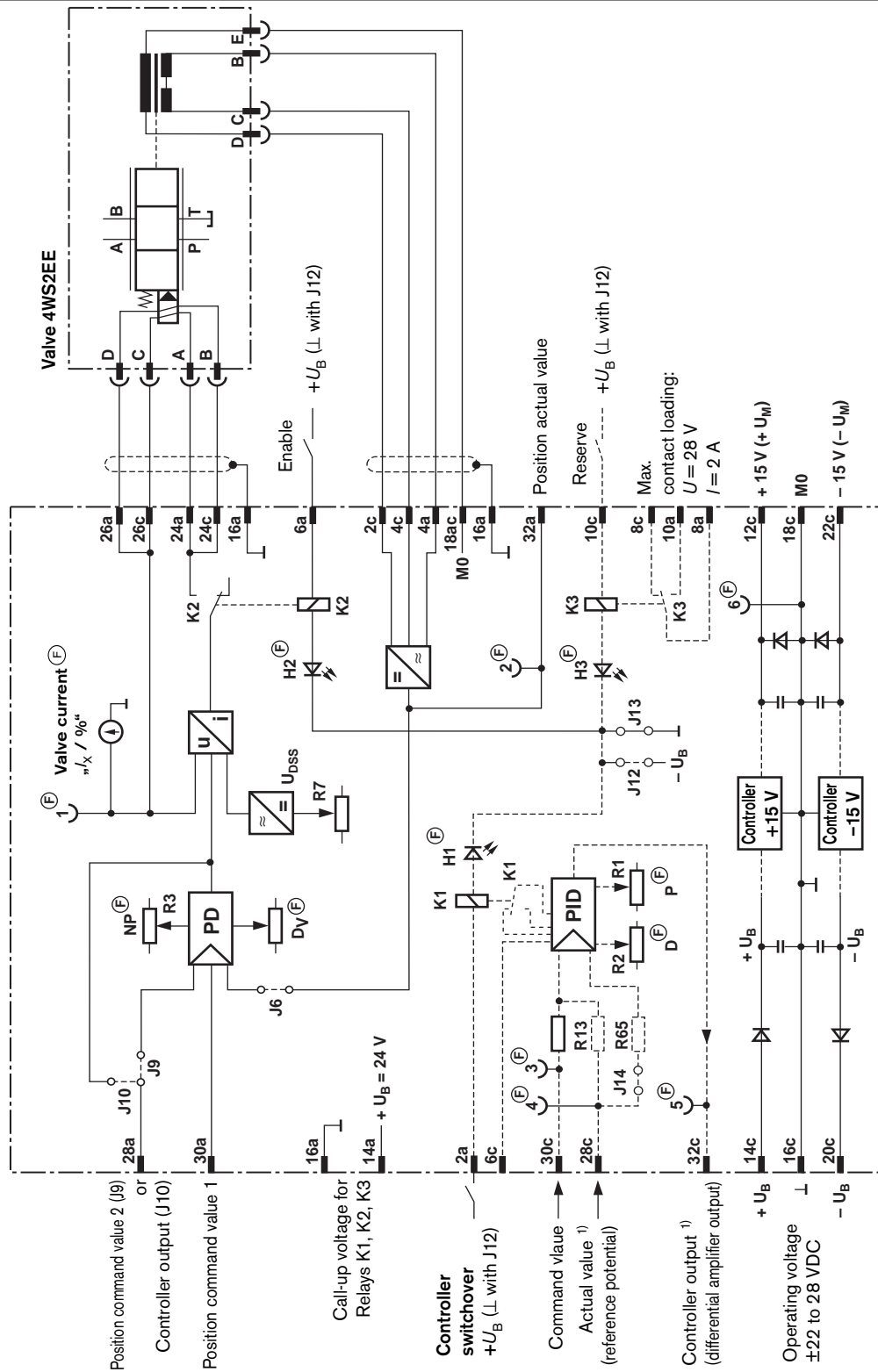
The amplifier may be optionally equiped with a PID controller (the D component **only** effects the actual value signal) with selectable PI component and a reserve relay with a potential free 2-way switch. Using this controller, an additional closed loop control circuit (e.g. for a closed loop drive control) may be superimposed. The P and D components may be set on the front plate. The switched status of the controller is displayed by LED "H1" and the relay by LED "H3" (the LED's lights up when the relay is closed). The PID controller is set up in accordance with the customer specifications and hence must be stated in clear text on the order. These amplifiers are allocated a special type code on delivery. The reserve relay may be loaded up to 28 V and 2 A.

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

Operating voltages:		
With voltage controller	U_B	±24 VDC
– Upper limiting value	$u_B(t)_{max}$	±28 VDC
– Lower limiting value	$u_B(t)_{min}$	±22 VDC
Without voltage controller	U_B; U_M	±24 VDC; ±15.0 VDC
– Upper limiting value	$u_B(t)_{max}$; $u_M(t)_{max}$	±28 VDC; ±15.2 VDC
– Lower limiting value	$u_B(t)_{min}$; $u_M(t)_{min}$	±22 VDC; ±14.8 VDC
Current consumption (without valve) at $U_B = ±24$ V [1]	I	< 150 mA
Inputs:		
– Command value 1 (main spool position)	U_e	0 to ±10 V ($R_e = 50$ kΩ)
– Command value 2 (main spool position) with J9	U_e	0 to ±10 V ($R_e = 50$ kΩ)
– Actual value (main spool position)	U_e	0 to ±10 V ($R_e = 50$ kΩ)
– Enable	U_e	+24 V with J13; 0 V with J12 ($R_e = 700$ Ω; relay circuit)
– Controller switching	U_e	+24 V with J13; 0 V with J12 ($R_e = 700$ Ω; relay circuit)
– Reserve relay	U_e	+24 V with J13; 0 V with J12 ($R_e = 700$ Ω; relay circuit)
Outputs:		
– Stabilised output voltage [1]	U_M	±15 V ±2 %; 150 mA
– Valve current	I_{max}	±60 mA
– Command value valve current (with J10)	U_a	−10 V $\triangleq$ +60 mA (measuring output)
– Relay selection voltage	U	+24 V (+U_B)
Dither signal	f	340 Hz ±5 % ($I_{SS} = 3$ mA)
Oscillator frequency	f	2.5 kHz / 5 kHz (dependent on the valve type)
Relay data:		
– Nominal voltage	U	+26 V
– Response voltage	U	> 13 V
– Release voltage	U	1.3 V to 6.5 V
– Switching time	t	< 4 ms
– Coil resistance (at 25 °C)	R	700 Ω
Connection type		32-pin blade connector, DIN 41612, form D
Card dimensions		Euro-card 100 x 160 mm, DIN 41494
Front panel dimensions:		
– Height		3 HE (128.4 mm)
– Width, conductor side		1 TE (5.08 mm)
– Width, component side		7 TE
Permissible ambient temperature range	J	0 to +50 °C
Storage temperature range	J	−20 to +70 °C
Weight	m	0.3 kg

[1] In version **with** voltage controller

Block circuit diagram / connection allocation

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Engineering / maintenance guidelines / additional information

– The amplifier card must only be removed or inserted when de-energised!

– Command value signals must only be switched using relays with gold plated contacts
   (small voltages, small currents)!

– Only use contacts with a loadability of approx. 40 V; 50 mA for switching card relays (enable, controller switching, reserve).

– Always screen the command and actual value cables; leave one end of the screen open, connect on the card side to ground (⊥)!

– Do not lay signal cables in the vicinity of power cables!

– Recommendations: 1. Also screen the solenoid cables (connect one end to ⊥)!
                         2. Use cable type LiYCY 1.5 mm^2 for lengths up to 50 m long. Longer lengths on request!

Note: Electrical signals (e.g. actual value) taken via valve electronics must not be used to switch off
                   the machine safety functions!
                   (This is in accordance with the regulations to the European standard "Safety requirements of fluid
                   technology systems and components - hydraulics", prEN 982.)

Unit dimensions (dimensions in mm)