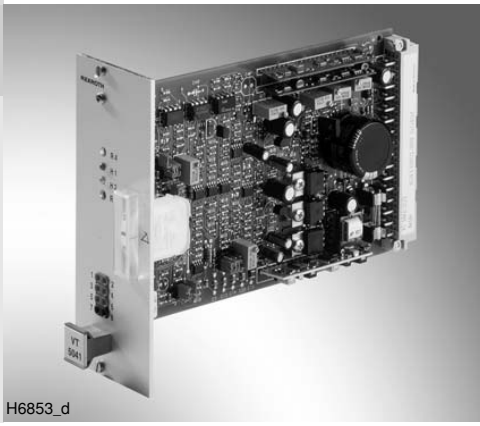
External control electronics for the SYDFE1 control of A10VSO axial piston pumps
Analogue amplifier, configurable

RE 30241/01.10 1/8
Replaces: 08.06

Type VT 5041



H6853_d

From Component series 25

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Card holder:

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

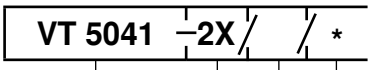
Power supply unit:

– Type VT-NE32-1X, see RE 29929
Compact power supply unit 115/230 VAC → 24 VDC
  • Output 1 (60 W) for supplying amplifier card type VT 5041
  • Output 2 (25 W) for supplying pressure transducers; e.g. types HM 12 or HM 13, see RE 29933

Features

– Integral part of the SYDFE1 pressure and flow control system (Component series 1X, 2X and 3X) for controlling A10VSO... axial piston unit with SYDFE1 control
– Implementation of the electronic functions of the SYDFE1 control; pressure and swivel angle control; optional power limiter
– Circuitry of the pressure controller can be matched to existing hydraulic fluid volumes (actuator plus lines)
– Differential amplifier inputs
– Controller for valve spool position
– Minimum value generator for pressure and swivel angle controller
– Self-clocking output stage
– Pressure-related leakage compensation (can be switched of)
– Polarity reversal protection for power supply
– Switchable actual pressure value input (current, voltage, range)
– LED lamps on the front panel:
  • Error / no enable „H1“
  • Internal supply voltage „H2“
– Indicator instrument for actual swivel angle value on the front panel (optional)
– Power limiter with internal or external command value feed-forward (optional)

Ordering code



External control electronics for the SYDFE1 control of A10VSO axial piston pumps

Component series 25 to 29 **= 2X**
(25 to 29: unchanged technical data and pin assignment)

Additional functions:
– Without power limiter, without indicator instrument **= 1**
– With power limiter, with indicator instrument **= 3**

Further details in clear text

Preferred types

Material no.	Type
R900749982	VT5041-2X/1
R900749983	VT5041-2X/3

Functional description

VT 5041-2X analogue amplifiers are designed as plug-in cards in Euro-format. As a standard, they are provided with one command value input each for pressure and swivel angle [1] (power limiter, optional). The actual pressure value is sensed by a pressure transducer. A position transducer on the pump acquires the actual swivel angle value. The acquired actual values are processed in an amplifier [10 and 12] and compared with the injected command values. Minimum value generator [4] ensures that only the controller assigned to the relevant working point is automatically activated. The output signal of minimum value generator [4] becomes the command value for the closed control loop of the valve.

The optional power limiter is automatically activated by the feed-forward of a suitable command value. The power command value can be provided internally or externally. If required, it acts directly on swivel angle controller [3] via a minimum value generator [13].

The actual valve value (position of the valve spool) is acquired by an inductive position transducer. Oscillator/demodulator circuit [10] processes the signal. Valve spool position controller [5] determines and processes the system deviation. The output signal of valve controller [5] forms the command value for self-clocking current output stage [6], which controls the proportional solenoid of the valve.

The amplifier card has a failure notification output at which there is a voltage of 0 V in case of failure. Simultaneously, the „H1“ LED lights up and the output stage is de-energized.

The following events trigger an error message:

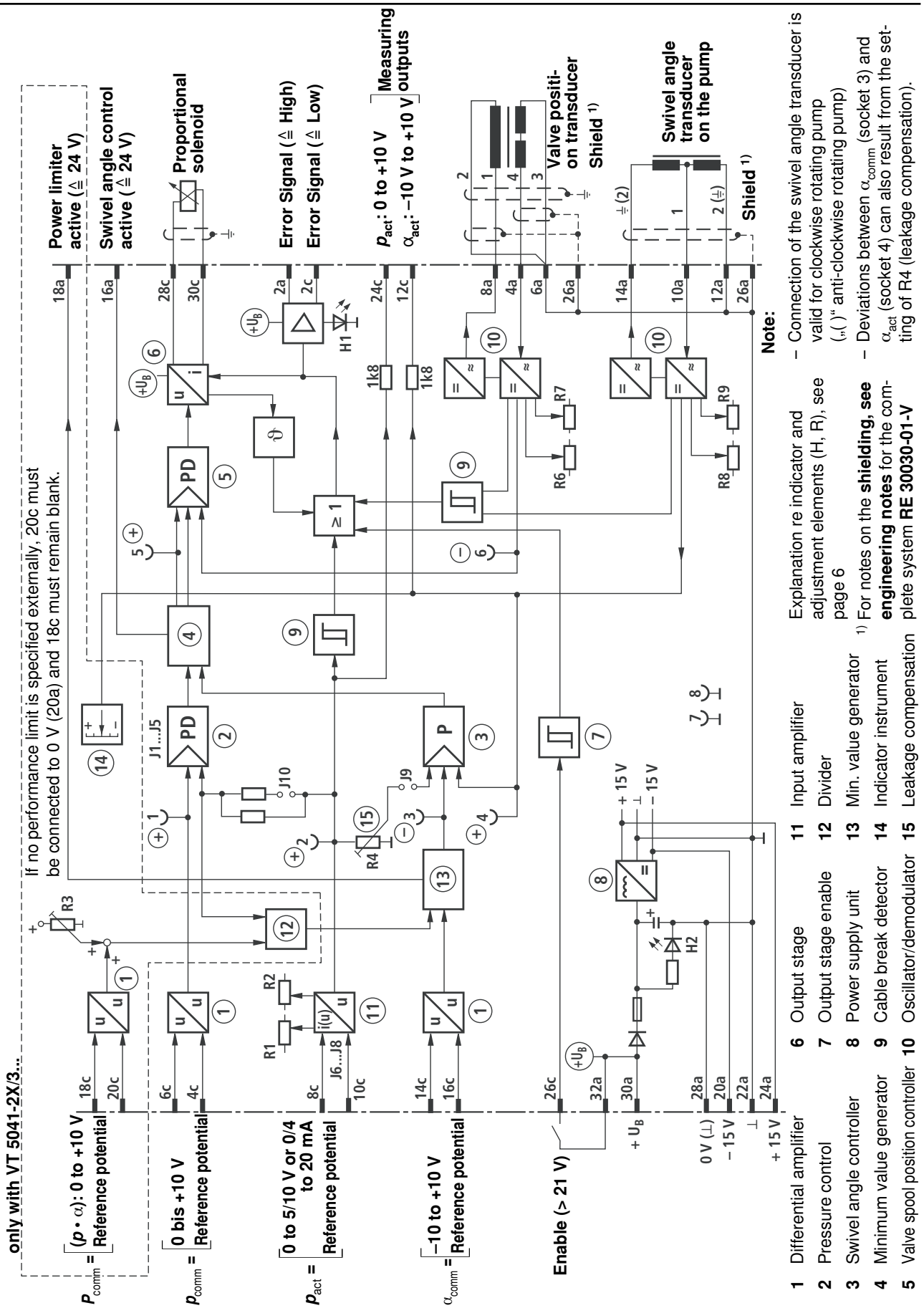
– Actual pressure value greater than permissible system pressure (socket 2 p_{act} > 10 V)
– Enable signal missing at connection 26c
– Excessive temperature of the output stage
– Cable braek or range of swivel angle feedback exceeded
– Cable braek or range of valve spool position feedback exceeded
– Cable braek „proportional solenoid“
– Cable braek „pressure transducer“ (only in conjunction with setting 4 to 20 mA)

In the case of an error, the output stage is deactivated and the valve spool pushed by a spring to its mechanical end position. The error can only be acknowledged by a reset of the enable signal.

The pressure-related pump leakage can be compensated for via the swivel angle control loop using potentiometer [15].

[ ] = Cross-reference to block circuit diagram on page 3

Block circuit diagram / pin assignment



1 Differential amplifier
2 Pressure control
3 Swivel angle controller
4 Minimum value generator
5 Valve spool position controller
6 Output stage
7 Output stage enable
8 Power supply unit
9 Cable break detector
10 Oscillator/demodulator
11 Input amplifier
12 Divider
13 Min. value generator
14 Indicator instrument
15 Leakage compensation

Explanation re indicator and adjustment elements (H, R), see page 6

– Connection of the swivel angle transducer is valid for clockwise rotating pump („( )" anti-clockwise rotating pump)

1) For notes on the **shielding, see engineering notes** for the complete system **RE 30030-01-V**

– Deviations between α_{comm} (socket 3) and α_{act} (socket 4) can also result from the setting of R4 (leakage compensation).

Technical Data (For applications outside these parameters, please consult us!)

Operating voltage	U_B	24 VDC +40 % –10 %
Operating range:		
– Upper limit value	$u_B(t)_{max}$	35 V
– Lower limit value	$u_B(t)_{min}$	21 V
Power consumption	P_S	35 VA
Current consumption	I_{nom}	0.6 A (I_{max} = 1.25 A)
Fuse	I_F	1.6 A T
Inputs:		
– Command calues (pressure, swivel angle)	U_i	0 to 10 V; R_e = 100 kΩ
– Actual value (pressure)	U_i I_e	0 to 5 V or 0 to 10 V; R_e = 100 kΩ 0 to 20 mA or 4 to 20 mA; R_e= 500 Ω
– Power selection $(p \bullet \alpha)_{comm}$ (**only** with VT 5041-2X/3...)	U_i	0 to 10 V; R_e > 100 kΩ
– Enable	U_e	> 21 V (use relay with contact for currents < 10 mA)
Outputs:		
– Output stage		
• Solenoid current / resistance	I_{max}	2.5 A; $R_{(20)}$ = 2 Ω
– Drivers for inductive transducers:		
• Oscillator frequency	f	ca. 5 kHz
• Voltage amplitude (U_{SS})	U_a	10 V
– Signal voltage		
• Actual value (pressure, swivel angle)	U	0 to 10 V
• Swivel angle control active	U	U_b – 1 V
• Power limiter active (**only** with VT 5041-2X/3...)	U	U_b – 1 V
– Auxiliary voltages	U	±15 V ±3 %; 10 mA
– Error signal		
• L-active	U_o	≥ U_B – 5 V; 10 mA (short-circuit-proof); error at U_o < 1 V
• H-active	U_o	< 1 V; error at ≥ U_B – 5 V; 10 mA
– Measuring sockets		
• Pressure command value (p_{comm}) „1“	U	+10 V = 100 %
• Actual pressure value (p_{act}) „2“	U	+10 V = 100 %
• Swivel angle command value (α_{comm}) „3“	U	–10 V = 100 %
• Actual Swivel angle value (α_{act}) „4“	U	+10 V = 100 %
• Spool position command value (s_{comm}) „5“	U	±10 V = ±100 %
• Actual spool position value (s_{act}) „6“	U	±10 V = ±100 %
Type of transducer:		
– for pump		IW 9 (throttle circuit; ±4 mm; 3-wire connection)
– for valve		DM2 (transformer circuit; ±0.6 mm; 4-wire connection)
Type of connection		32-pin male connector, DIN 41612, form D
Card dimensions		Euro-card 100 x 160 mm, DIN 41494

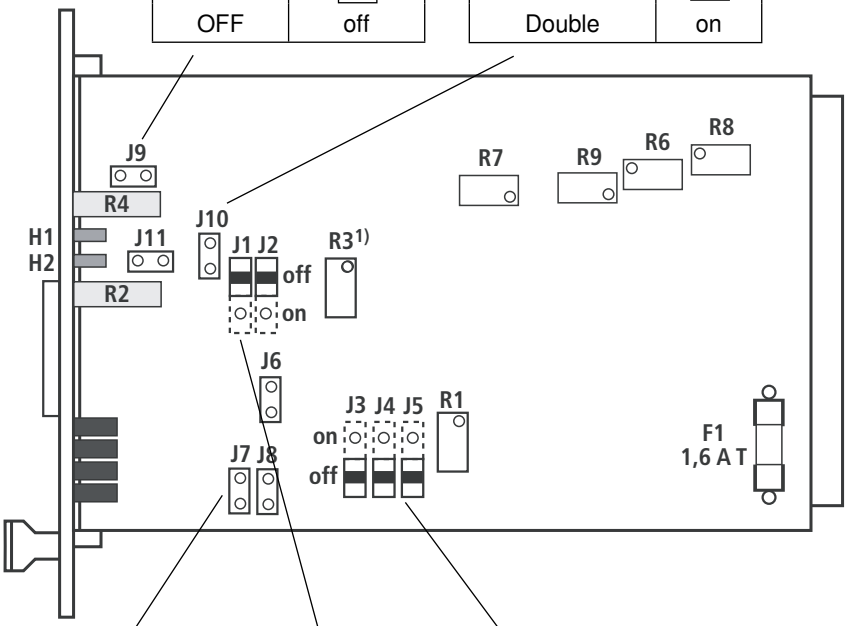
Technical Data (continuation)

Card dimensions:		
– Height		3 HE (128.4 mm)
– Width circuit board conductor side		1 TE
– Width component side		
• VT 5041-2X/1...		5 TE
• VT 5041-2X/3...		9 TE
Permissible operating temperature range	ϑ	0 to 50 °C
Storage temperature range	ϑ	–20 to +70 °C
Weight		
• VT 5041-2X/1...	m	0.19 kg
• VT 5041-2X/3...	m	0.21 kg

Indicator / adjustment elements: VT 5041-2X/1 and VT 5041-2X/3 **from Serie 25**

Leakage comp.	Jumper **J9**
ON	[on]
OFF	off

Gain of act. pressure value	Jumper **J10**
Single	[off]
Double	on



Actual pressure value for changover			
Input signal	Jumper position		
	J6	**J7**	**J8**
0 to 10 V	[off]	[off]	[off]
0 to 5 V	off	off	on
0 to 20 mA	on	off	off
4 to 20 mA	on	on	off

D-component of the pressure controller			
Hydraulic fluid volume (in litre) in the system (actuators plus lines)	Jumper position		
	J3	**J4**	**J5**
≤ 5,0	[off]	[off]	[off]
7.5	off	on	off
10.0	on	on	off
15.0	on	off	on
20.0	off	on	on
25.0	on	on	on

[ ] **… Factory setting of jumpers**

Potentiometers:

R1 Zero point of actual pressure value

R2 Actual pressure value adjustment
factory setting:
right-hand limit stop = max. gain

R3 [1] Power command value
→ is added to an externally provided command value factory setting: left-hand limit stop = max. power

R4 Leakage compnesation
(factory setting: left-hand limit stop = min. compensation

R6 Zero point of valve position transducer

R7 Amplitude of valve position transducer (factory setting)

R8 Zero point of swivel angle transducer

R9 Amplitude of swivel angle transducer

LED lamps

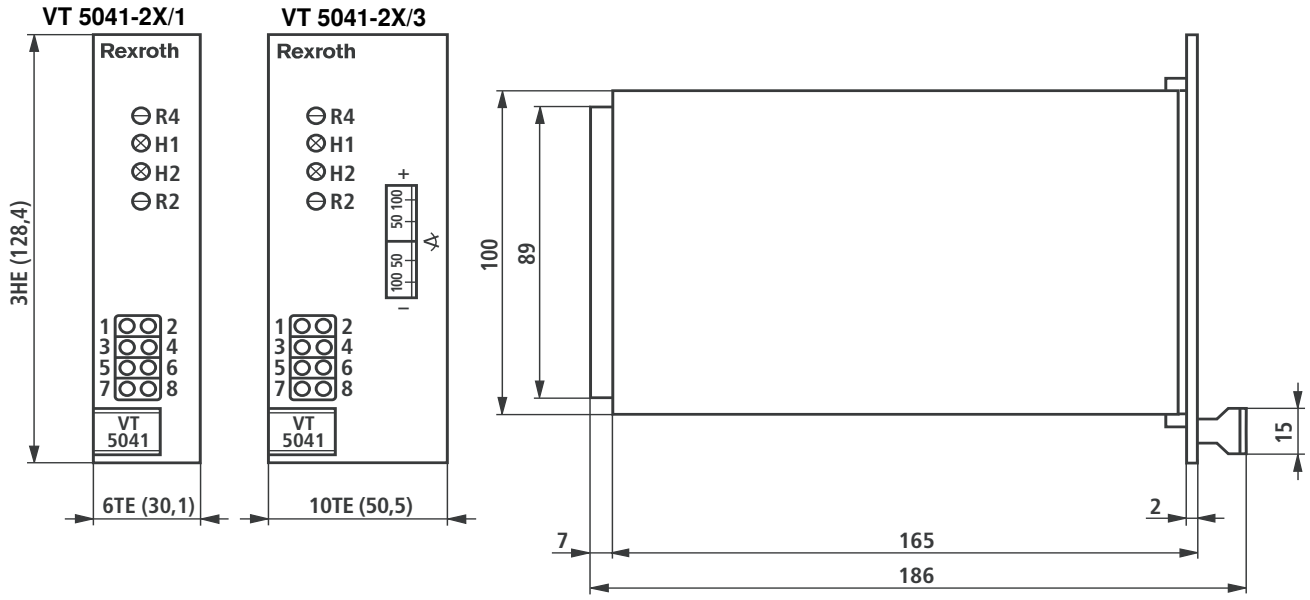
H1 Error / no enable (red)

H2 Internal voltage supply (green)

[1] **only** with VT 5041-2X/3

P-component of the pressure controller			
P-gain	Jumper position		
	J1	**J2**	**J11**
2	on	on	on
2.4	on	off	on
2.7	on	on	off
3	off	on	on
3.4	on	off	off
4	[off]	[off]	[on]
4.8	off	on	off
8	off	off	off

Unit dimensions (Dimensions in mm)



Potentiometers:

„R2“ → Matching of amplitude p_{act} (pressure transducer)

„R4“ → Leakage compensation

LED lamps:

„H1“ → Error / no enable

„H2“ → Internal supply voltage

Measuring socket:

„1“ → Pressure command value p_{comm}

„2“ → Actual pressure p_{act}

„3“ → Swivel angle command value α_{comm}

„4“ → Swivel angle actual value α_{act}

„5“ → Spool position command value S_{comm}

„6“ → Actual spool position value S_{act}

„7“ and „8“ → Reference potential / ground

Supplementary information

Note:

Electrical signals processed by control electronics (e.g. actual value) must not be used for activating safety-relevant machine functions! (See also uropean standard “Safety requirements for fluid power systems and components – hydraulics“, EN 982).

Notes

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