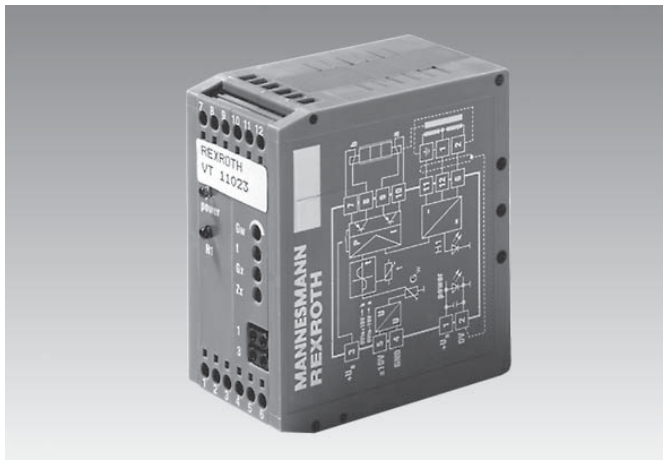
RE 29 739/07.03

Replaces: 10.95

Electric amplifier modules for the closed loop control of proportional directional valves with electric positional feedback Types VT 11023, VT 11024, VT 11074 and VT 11075, Series 1X

Series 1X



H/A 5310/95

Type VT 11 023 (from series 15)

Overview of contents

Functional description

The amplifier module is clipped onto carrier rails such as those commonly installed in electronic control cabinets. The electric connection is via a terminal strip.

The amplifier module contains the electronic components for the control of two proportional solenoids. Depending on the command value polarity solenoid "a" or "b" is controlled. The actual value (position of valve spool) is signalled by an inductive transducer measuring system and compared to the externally signalled command value. Occurring differences between actual and command value are levelled out.Through the connection of a positive voltage ($U_F > 8,5$ V) at terminal 3 the controller and the output stage are released.

The following may be set via an external trimming potentiometer:
– the ramp time up to ca. 5 s
– a command value reduction in the range from 0 % to 100 %
– the zero point of the position transducer

Features

The amplifier modules VT 11 023, VT 11 024, VT 11 074 and VT 11 075 are used for the closed loop control of direct operated proportional directional valves with electric positional feedback (type 4WRE: sizes 6 and 10).

– Differential input
– Adjustable ramp generator (max ramp time 5 s)
– Step function generator (only with VT 11 023 and VT 11 024)
– Two pulsed current output stages
– Controller for the valve spool position
– Polarity safeguard for the voltage supply
– Oscillator and demodulator for the inductive positioning signalling
– Controller release
– Cable break recognition
– LED-displays: "power" – internal supply voltage (green)
"H1" – multifunction indicator (orange)

Ordering code

VT 11 0_ _ –1X/ *

Amplifier module
for proportional directional valves type 4WRE6 **= 23**
for proportional directional valves type 4WRE10 **= 24**
for proportional directional valves type 4WRE6[1] **= 74**
for proportional directional valves type 4WRE10[1] **= 75**

Further details in clear text

1X = Series 15 to 19 [1]
(15 to 19: unchanged technical data and terminal connection)

[1] with V spool

[2] Compatible with units of series 10 to 14, when terminal 6 was not connected to ground (0V) in these units (see project instructions page 4).

Technical data (For applications outside these stated values, please consult us!)

Operating voltage		U_B	+ 24 VDC + 40 % –10 %
Function range:			
– upper limit value		$u_B(t)_{max}$	+ 35 V
– lower limit value		$u_B(t)_{min}$	+ 21 V
Max. current consumption		I	2 A
Fuse		I	3 A; sluggish; after release self-activating
Inputs:			
– Differential input (command value input)		U_e	0 to ± 10 V; R_e = 50 kΩ (standard) [1]
– Release			
• active		U_F	8,5 V < U_F < 40 V
• inactive		U_F	< 6,5 V
– Demodulator input (positional measuring system)		R_e	> 50 kΩ
Ramp time (setting range)		t	10 ms to 5 s
Outputs:			
– Output stage			
• Solenoid current/resistance	VT 11023	I_{max}	1,8 A; $R_{(20)}$ = 5,4 Ω
	VT 11024	I_{max}	2,2 A; $R_{(20)}$ = 10 Ω
	VT 11074	I_{max}	1,8 A; $R_{(20)}$ = 5,4 Ω
	VT 11075	I_{max}	2,2 A; $R_{(20)}$ = 10 Ω
• Pulse frequency		f	freely pulsating up to ca. 1,5 kHz
– Driver for the inductive transducer			
• Oscillator frequency		f	5,8 kHz ± 10 %
• Max. capacity		I	30 mA
• Voltage amplitude (U_{SS})		U_a	5 V per output
• Max. stroke of transducer	VT 11023	s	2,8 mm
	VT 11024	s	4,0 mm
	VT 11074	s	2,8 mm
	VT 11075	s	4,0 mm
– Test points			
• Command value w		U_w	0 to ± 5 V
• Actual position value x		U_x	0 to ± 5 V
Type of connection			12-pin terminal strip
Housing dimensions (W x H x D)			40 x 79 x 85,5 mm
Permissible temperature range		t	0 to 50 °C to DIN/IEC 68-2, T1, T2, T14 and T30 [2]
Storage temperature range		t	– 25 to + 85 °C to DIN/IEC 68-2, T1 and T2 [2]
Disturbance resistance			Class 3 to prEN 50082 T2 [2]
Mechanical loadability			to DIN/IEC 68-2, T6, T24 and T27 [2]
Weight		m	0,14 kg

[1] Current input on request

[2] Further details on request

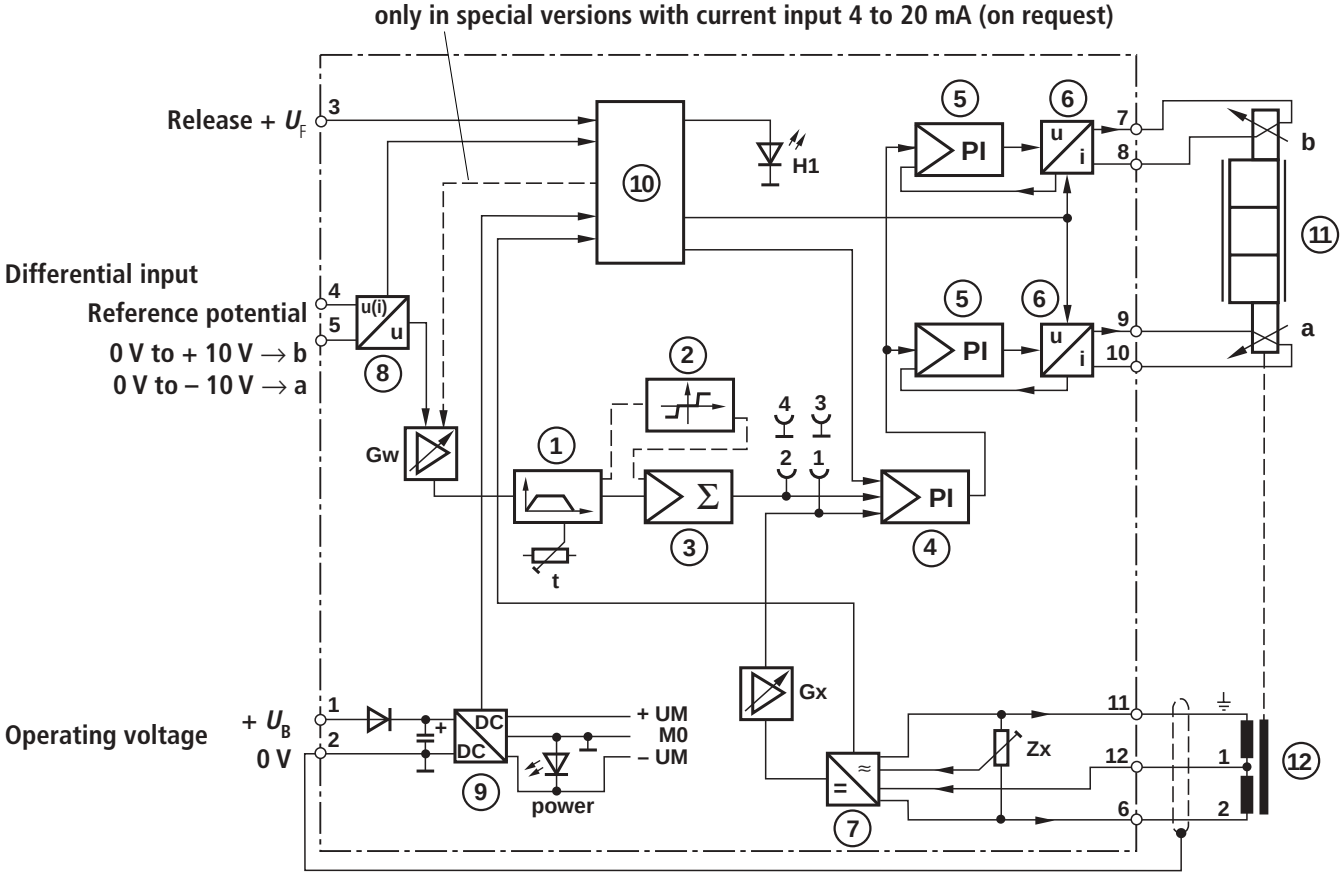
Response in case of error

Error →	Missing release (U_F < 6,5 V)	Cable break transducer	Asymmetry of internal supply voltage	Cable break current input [1]
Response of Electronics →	**E**, **R**, **A**	**E**, **R**, **A**	**E**, **R**, **A**	**S**, **A**

[1] only in special versions with current input 4 to 20 mA (on request)

Meaning of abbreviations:
E = Output stage is switched off (solenoids are moved into currentless state)
R = Controller is switched off
S = Command value is set to 0%
A = Multifunction display is illuminated

Block circuit diagram/ VT 11023, VT 11024, VT 11074 and VT 11075 (from series 15)



1 Ramp generator
2 Step function generator (only with VT 11 023 and VT 11 024)
3 Summator
4 Controller for spool position
5 Current controller
6 Output stage
7 Oscillator/Demodulator
8 Differential amplifier
9 Power supply
10 Monitoring
11 Proportional valve
12 Position transducer

1 Actual value 0 to ± 5 V
2 Command value 0 to ± 5 V
3 Measuring zero
4 Measuring zero

H1 Multifunction display
Zx Zero point position transducer
Gw Command value reduction
Gx Actual value adjustment
t Ramp time

Positive command value causes current increase in solenoid "b" and flow from P to A and from B to T.
Negative command value causes current increase in solenoid "a" and flow from P to B and from A to T.

Terminal connection

Operating voltage	+ U_B	1	7		Connection solenoid "b"
	0 V	2	8		
Release	U_F	3	9		Connection solenoid "a"
Differential input	Reference potential	4	10		
	$\pm U_{Com}$	5	11	⏚	Position transducer connection
Position transducer connection	2	6	12	1	

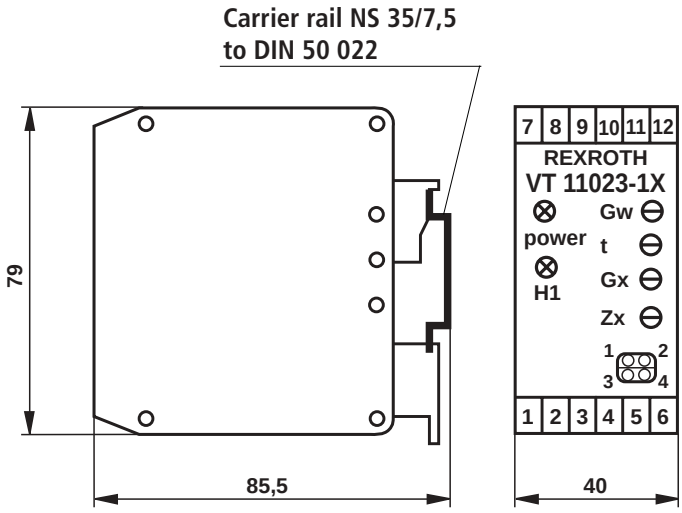
Connection cable (recommendation):

– Position transducer → 3-strand cable, single screened, cross section max. 1,5 mm²
– Solenoid connection → 2 or 4-strand cable, single screened, cross section max. 1,5 mm²
– Differential input → 2-strand, single screened

Project / Maintenance instructions / Additional information

- The amplifier module may only be connected when switched off!
- Do not connect earth terminal of inductive transducer to ground!
- Do not connect terminal 6 to ground, earth or screen; otherwise function disturbance may occur!
  (This was also not allowed with units of series 10 to 14, but did not lead to function disturbances.)
- Always screen command value lines and lines of the inductive transducer separately, screen open at valve;
  connect screen to 0 V operating voltage (terminal 2) on module side only, in order to avoid coupling!
- Do **not** lay lines near power cables!
- Do **not** use **free wheel diodes** in the solenoid lines!
- The distance to arial lines, radio sources and radar equipment must be at least 1 m!
- Because of the load current of the integrated smoothing capacitor external fuses must have slow characteristics!
- **Warning:**
  - When using the differential input (command value as voltage signal) **both inputs** must always be switched on or off **simultaneously**!
  - When assembling this module amplifier a minimum distance of 2 cm on both sides must be guaranteed!
  - The actual value adjustment (potentiometer "Gx") is calibrated by the factory and must not be altered!

Unit dimensions (Dimensions in mm)



H1:	Multifunction indicator (see page 2)
power:	Internal supply voltage
Gw:	Command value reduction
t:	Ramp time
Gx:	Actual value adjustment
Zx:	Zero point position transducer
Test point **1**:	Actual value 0 to ± 5 V
Test point **2**:	Command value 0 to ± 5 V
Test point **3**:	Measuring zero
Test point **4**:	Measuring zero

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