

**MANNESMANN
REXROTH**

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

RE
29 739/10.95
 Replaces: 02.90

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).

Characteristics:

- 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)



H/A 5310/95
 VT 11 023 (from series 15)

Function 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 ($U_F > 8,5 \text{ V}$) 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

Ordering code

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

VT 11 0__ -1X/ *

1X =

Further details in clear text
 Series 15 to 19¹⁾
 (15 to 19: unchanged technical data and terminal connection)

¹⁾ with V spool

¹⁾ 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 application outside these parameters please consult us!)

Operating voltage	U_B	+ 24 VDC + 40 % -10 %
Function range: – upper limit value – lower limit value	$u_B(t)_{\max}$ $u_B(t)_{\min}$	+ 35 V + 21 V
Max. current consumption	I	2 A
Fuse	I	3 A; sluggish; after release self-activating
Inputs: – Differential input (command value input) – Release • active • inactive – Demodulator input (positional measuring system)	U_e U_F U_F R_e	0 to ± 10 V; $R_e = 50$ k Ω (standard) ¹⁾ $8,5$ V < U_F < 40 V < 6,5 V > 50 k Ω
Ramp time (setting range)	t	10 ms to 5 s
Outputs: – Output stage • Solenoid current/resistance VT 11023 VT 11024 VT 11074 VT 11075 • Pulse frequency – Driver for the inductive transducer • Oscillator frequency • Max. capacity • Voltage amplitude (U_{SS}) • Max. stroke of transducer VT 11023 VT 11024 VT 11074 VT 11075 – Test points • Command value w • Actual position value x	I_{\max} I_{\max} I_{\max} I_{\max} f f I U_a s s s s U_w U_x	1,8 A; $R_{(20)} = 5,4$ Ω 2,2 A; $R_{(20)} = 10$ Ω 1,8 A; $R_{(20)} = 5,4$ Ω 2,2 A; $R_{(20)} = 10$ Ω freely pulsating up to ca. 1,5 kHz 5,8 kHz ± 10 % 30 mA 5 V per output 2,8 mm 4,0 mm 2,8 mm 4,0 mm 0 to ± 5 V 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

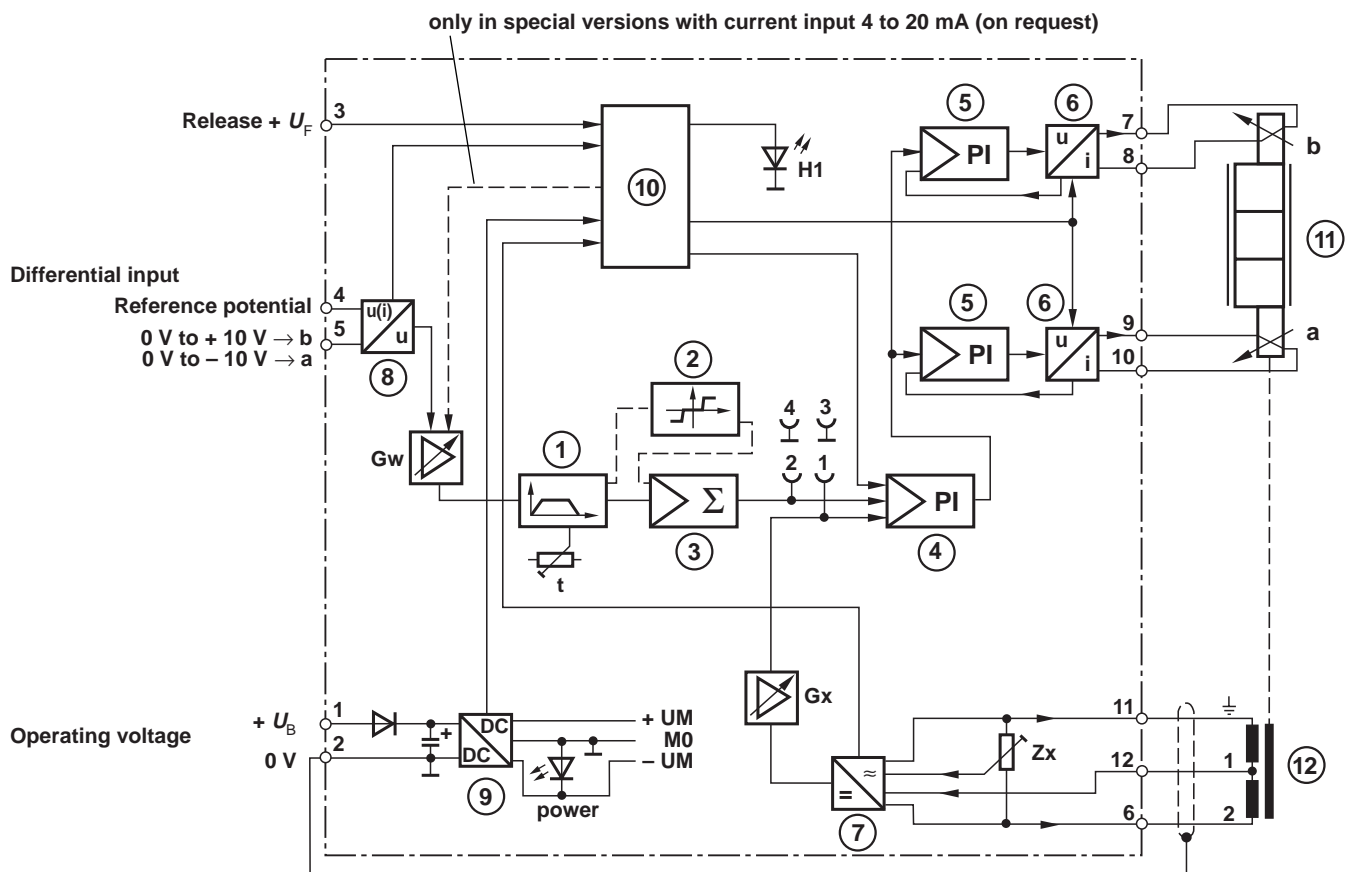
Response in case of error

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 | 6 Output stage | ↓ Actual value 0 to ± 5 V | H1 Multifunction display |
| 2 Step function generator (only with VT 11 023 and VT 11 024) | 7 Oscillator/Demodulator | ⋮ Command value 0 to ± 5 V | Zx Zero point position transducer |
| 3 Summator | 8 Differential amplifier | ⋮ Measuring zero | Gw Command value reduction |
| 4 Controller for spool position | 9 Power supply | ⋮ Measuring zero | Gx Actual value adjustment |
| 5 Current controller | 10 Monitoring | ⋮ Measuring zero | t Ramp time |
| | 11 Proportional valve | | |
| | 12 Position transducer | | |

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	

Connection cable (recommendation):

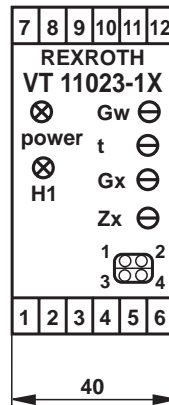
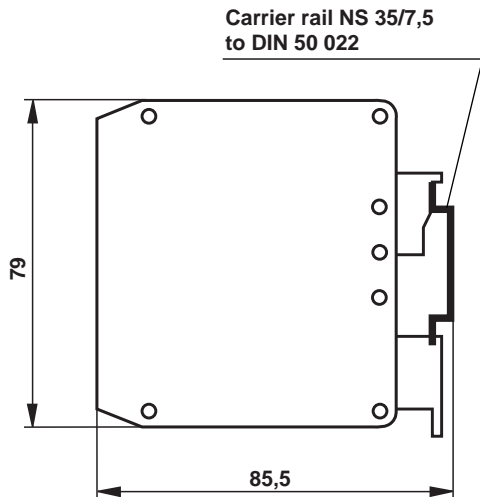
- Position transducer → 3-strand cable, single screened, cross section max. 1,5 mm²
- Solenoid connection → 2 or 4-strand cable, single screened, cross section max. 1,5 mm²
- Differential input → 2-strand, single screened

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



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