Amplifier module for controlling 1) the explosion-proof proportional directional valves 4WRA...XE, 3DREP 6...XE and 4WRZ...XE

Type VT-MSPA2-200

Component series 1X

Table of contents

<table>
<thead>
<tr>
<th>Content</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Features</td>
<td>1</td>
</tr>
<tr>
<td>Ordering code</td>
<td>2</td>
</tr>
<tr>
<td>Functional description</td>
<td>2</td>
</tr>
<tr>
<td>Block diagram</td>
<td>3</td>
</tr>
<tr>
<td>Technical Data</td>
<td>4</td>
</tr>
<tr>
<td>Characteristic curves</td>
<td>5</td>
</tr>
<tr>
<td>Terminal assignment</td>
<td>6</td>
</tr>
<tr>
<td>Device view / unit dimensions</td>
<td>6</td>
</tr>
<tr>
<td>Important notes / setting information</td>
<td>7</td>
</tr>
</tbody>
</table>

Features

- Amplifier module is not subject to the directive 94/9/EC (ATEX directive)
- In connection with the Rexroth monitoring module 1) VT-MUXA2-2 suitable for controlling proportional directional valves without electric position feedback, types 4WRA...XE, 3DREP 6...XE and 4WRZ...XE
- Command value input ±10 V (differential input)
- Ramp generation with separately adjustable ramp time "up/down"
- Characteristic curve correction by means of separately adjustable step heights
- Release input
- Reverse polarity protection for the voltage supply
- Power supply with DC/DC converter without raised zero point for the internal supply
- LED displays:  • Ready for operation (green)  • Release (yellow)

1) For the operation of the valve in the explosive area, additional safety measures are required. Here, we recommend using the Rexroth monitoring module VT-MUXA2-2. In this connection, observe data sheet 30290.
Ordering code

Analog amplifier in modular design
For controlling the explosion-protected valves
4WRA...XE (component series 2X),
3DREP 6...XE (component series 2X)
and 4WRZ...XE (component series 7X) = 200
Component series 10 to 19 = 1X
(10 to 19: Identical technical data and ports)

Further details in the plain text

0 = Basic version
V0 = Basic version

Functional description

General
The amplifier modules are snapped onto top hat rails according to EN 60715. The electrical connection is established via screw terminals. The modules are operated with 24 V direct voltage.

( ) = Assignment to the block diagram on page 3

Power supply unit (1)
The amplifier modules have a power supply unit with switch-on current limitation. This unit supplies all internally required positive and negative supply voltages. The switch-on current limitation prevents high switch-on current peaks.

Command value provision
The internal command value signal is generated from the external command value signal available at the differential input (2).
A positive command value results in a current increase in the "b" solenoid and thus a flow in the valve from P → A and from B → T.
A negative command value results in a current increase in the "a" solenoid and thus a flow in the valve from P → B and from A → T.

Release function (10)
The release function enables the power output stage and forwards the internal command value signal to the ramp generator. The release signal is displayed by an LED on the front plate. If the release is connected, the internal command value is changed (with any kind of command value specification) by the set ramp time. Thus, a controlled valve does not open abruptly.

Ramp generator (3)
The ramp generator limits the rise of the actuating variable. The downstream step functions do not extend or shorten the ramp time.
Notes for setting and measuring the ramp time:

<table>
<thead>
<tr>
<th>Value at measuring socket &quot;t &lt;&quot; or &quot;t &gt;&quot;</th>
<th>Uᵢ in V</th>
<th>t in ms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current ramp time (±20 %)</td>
<td></td>
<td>5  3   2</td>
</tr>
<tr>
<td>Uᵢ in V</td>
<td>1 0.5 0.3 0.2 0.1 0.05 0.03 0.02</td>
<td></td>
</tr>
<tr>
<td>t in ms</td>
<td>100 200 333 500 1000 2000 3333 5000</td>
<td></td>
</tr>
</tbody>
</table>

The following applies:
\[ t = \frac{100 \text{ Vms}}{Uᵢ} \]

Example: Measured \[ Uᵢ = 5 \text{ V} \]
Results in \[ t = \frac{100 \text{ Vms}}{5 \text{ V}} = 20 \text{ ms} \]

Characteristic curve generator (4)
Using the adjustable characteristic curve generator, the step height for positive and negative signals can be set separately, adjusted to the hydraulic requirements. The actual development of the characteristic curve through the zero point is not stepped but linear. (Characteristic curve see page 5)

Amplitude limiter (5)
The command value is limited to ca. ±110 % of the nominal range.

Current controller (6)
The current is controlled according to the command value.

Power output stage (7)
The power output stage creates the clocked solenoid current for the proportional valve. The rated solenoid current is 1000 mA per output. The output stage outputs are short-circuit-proof. The output stages are de-energized in case of an internal fault signal or if the release is missing.

Clock generator (8)
The clock generator creates the clock frequency \( f \) of the output stages.
\[ f = 150 \text{ Hz} \ldots 400 \text{ Hz}, \text{adjustable by means of the potentiometer } "f" \text{ (preset to 240 Hz)} \]

Fault detection (10)
The solenoid line is monitored for cable break as well as overcurrent of the output stage.

Command value inversion (11)
The command value created internally from the input signal and the zero point offset signal can be inverted by an external signal.

Monitoring and limitation of the solenoid current (12)
The VT MUXA2-2 module provides for the monitoring and limitation of the solenoid current. The functioning is described in data sheet 30290.