5116
Programmable Transmitter
No. 5116V103-UK
From ser. no. 060069001

PR electronics A/S offers a wide range of analogue and digital signal conditioning devices for industrial automation. The product range includes Isolators, Displays, Ex Interfaces, Temperature Transmitters, and Universal Devices. You can trust our products in the most extreme environments with electrical noise, vibrations and temperature fluctuations, and all products comply with the most exacting international standards. »Signals the Best« is the epitome of our philosophy - and your guarantee for quality.

PR electronics A/S offre une large gamme de produits pour le traitement des signaux analogiques et numériques dans tous les domaines industriels. La gamme de produits s’étend des transmetteurs de température aux afficheurs, des isolateurs aux interfaces SI, jusqu’aux modules universels. Vous pouvez compter sur nos produits même dans les conditions d’utilisation sévères, p.ex. bruit électrique, vibrations et fluctuations de température. Tous nos produits sont conformes aux normes internationales les plus strictes. Notre devise »SIGNALS the BEST« c’est notre ligne de conduite - et pour vous l’assurance de la meilleure qualité.

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WARNING
This device is designed for connection to hazardous electric voltages. Ignoring this warning can result in severe personal injury or mechanical damage. To avoid the risk of electric shock and fire, the safety instructions of this manual must be observed and the guidelines followed. The specifications must not be exceeded, and the device must only be applied as described in the following. Prior to the commissioning of the device, this manual must be examined carefully. Only qualified personnel (technicians) should install this device. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

WARNING
Until the device is fixed, do not connect hazardous voltages to the device. The following operations should only be carried out on a disconnected device and under ESD safe conditions:
- General mounting, connection and disconnection of wires.
- Troubleshooting the device.

Repair of the device and replacement of circuit breakers must be done by PR electronics A/S only.

WARNING
To keep the safety distances, the relay contacts on the device must not be connected to both hazardous and non-hazardous voltages at the same time. SYSTEM 5000 must be mounted on a DIN rail according to DIN 46277. The communication connector of SYSTEM 5000 is connected to the input terminals on which dangerous voltages can occur, and it must only be connected to the programming unit Loop Link by way of the enclosed cable.
**SYMBOL IDENTIFICATION**

- **Triangle with an exclamation mark:** Warning / demand. Potentially lethal situations.
- **The CE mark** proves the compliance of the device with the essential requirements of the directives.
- **The double insulation symbol** shows that the device is protected by double or reinforced insulation.
- **Ex** devices have been approved for use in connection with installations in explosive areas.

**SAFETY INSTRUCTIONS**

**DEFINITIONS**

- **Hazardous voltages** have been defined as the ranges: 75 to 1500 Volt DC, and 50 to 1000 Volt AC.
- **Technicians** are qualified persons educated or trained to mount, operate, and also troubleshoot technically correct and in accordance with safety regulations.
- **Operators,** being familiar with the contents of this manual, adjust and operate the knobs or potentiometers during normal operation.

**RECEIPT AND UNPACKING**

Unpack the device without damaging it. The packing should always follow the device until this has been permanently mounted.

Check at the receipt of the device whether the type corresponds to the one ordered.

**ENVIRONMENT**

Avoid direct sunlight, dust, high temperatures, mechanical vibrations and shock, as well as rain and heavy moisture. If necessary, heating in excess of the stated limits for ambient temperatures should be avoided by way of ventilation.

All devices fall under Installation Category II, Pollution Degree 1, and Insulation Class II.
MOUNTING
Only technicians who are familiar with the technical terms, warnings, and instructions in the manual and who are able to follow these should connect the device. Should there be any doubt as to the correct handling of the device, please contact your local distributor or, alternatively,

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www.prelectronics.com

Mounting and connection of the device should comply with national legislation for mounting of electric materials, i.e. wire cross section, protective fuse, and location. Descriptions of input / output and supply connections are shown in the block diagram and side label.

The following apply to fixed hazardous voltages-connected devices:

The max. size of the protective fuse is 10 A and, together with a power switch, it should be easily accessible and close to the device. The power switch should be marked with a label telling it will switch off the voltage to the device.

Year of manufacture can be taken from the first two digits in the serial number.

INSTRUCTIONS FOR INTRINSICALLY SAFE INSTALLATION OF 5116B
The intrinsically safe circuits are galvanically connected to the communications interface unit.

The communications interface may only be connected temporarily, under the condition that the connectors with terminal numbers 41...44 and 51...54 are disconnected on the 5116B.

When a higher ingress protection than IP20 is required, this has to be achieved by an additional enclosure which is suitable for the applicable environmental conditions.

When two or more units are placed next to each other it has to be assured that all the terminal numbers 41...44 and 51...54 are placed on the same side and are separated from the non-intrinsically safe circuits of the units which could be mounted above or below it.

Each combination of circuits (to terminations 41...44 or to terminations 51...53 or to terminations 51...54) shall be connected via separated cables or if the combinations are in one cable shall be type A or B in accordance with EN 60079-14 Clause 12.2.2.8.
CALIBRATION AND ADJUSTMENT
During calibration and adjustment, the measuring and connection of external voltages must be carried out according to the specifications of this manual. The technician must use tools and instruments that are safe to use.

NORMAL OPERATION
Operators are only allowed to adjust and operate devices that are safely fixed in panels, etc., thus avoiding the danger of personal injury and damage. This means there is no electrical shock hazard, and the device is easily accessible.

CLEANING
When disconnected, the device may be cleaned with a cloth moistened with distilled water.

LIABILITY
To the extent that the instructions in this manual are not strictly observed, the customer cannot advance a demand against PR electronics A/S that would otherwise exist according to the concluded sales agreement.

HOW TO DEMOUNT SYSTEM 5000
First, remember to demount the connectors with hazardous voltages.

Picture 1:
Detach the device from the DIN rail by lifting the bottom lock.
PROGRAMMABLE TRANSMITTER
5116

• Input for RTD, TC, mV, Ohm, potmeter, mA and V
• 2-wire supply > 16.5 V
• Bipolar voltage input
• Output for current, voltage and 2 relays
• Universal AC or DC supply

Application
• Linearised, electronic temperature measurement with RTD or TC sensor.
• Conversion of linear resistance variation to a standard analogue current / voltage signal, i.e. from solenoids and butterfly valves or linear movements with attached potentiometer.
• Power supply and signal isolator for 2-wire transmitters.
• Process control with 2 potential-free relay contacts which can be configured for advanced functions.
• Galvanic separation of analogue signals and measurement of floating signals.

Technical characteristics
• Within a few seconds the user can program PR5116 to suit the specific application.
• By way of the front push-button the input can be calibrated to the exact span of the process. Zero drift on the process signal can be adjusted by a single press of the front buttton.
• Continuous check of vital stored data for safety reasons.
• 3-port 3.75 kVAC galvanic isolation.

Mounting / installation
• Mounted vertically or horizontally on a DIN rail. As the devices can be mounted without any distance between neighbouring units, up to 42 devices can be mounted per metre.
APPLICATIONS

Input signals:

- Potentiometer
- 2-wire transmitter
- Current
- Voltage
- Bi-polar mV
- RTD and lin. R
- Connection, wires
- TC

Output signals:

- Relays
- Analogue, 0/4...20 mA and voltage
- 2-wire transmitter output

Supply:

- 21.6...253 VAC
- or
- 19.2...300 VDC

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*NB! Please remember to order CJC connectors type 5910/5910Ex for TC inputs with internal CJC

### Electrical specifications

#### Environmental conditions

- Specifications range: -20°C to +60°C
- Calibration temperature: 20...28°C
- Relative humidity: < 95% RH (non-cond.)
- Protection degree: IP20

#### Mechanical specifications

- Dimensions (HxBxD): 109 x 23.5 x 130 mm
- Weight: 235 g
- Max. wire size: 1 x 2.5 mm² stranded wire
- Mounting on DIN rail type: DIN 46277
- Screw terminal torque: 0.5 Nm
  - 2...13.2 Hz: ±1 mm
  - 13.2...100 Hz: ±0.7 g

#### Common specifications

- Supply voltage, universal: 21.6...253 VAC, 50...60 Hz
  - or 19.2...300 VDC
- Internal consumption: ≤ 2 W
- Max. consumption: ≤ 3 W
- Fuse: 400 mA SB / 250 VAC
- Isolation voltage, test / operation: 3.75 kVAC / 250 VAC
- Communications interface: Loop Link
- Signal / noise ratio: Min. 60 dB (0...100 kHz)
- Updating time:
  - Temperature / ±mV input: 115 ms
  - mA / V / mV input: 75 ms
Response time (0…90%, 100…10%), programmable:
  - Temperature / ± mV input................................. 400 ms to 60 s
  - mA / V / mV input................................................. 250 ms to 60 s

Signal dynamics, input.............................................. 22 bit
Signal dynamics, output .............................................. 16 bit

Accuracy, the greater of the general and basic values:

<table>
<thead>
<tr>
<th>Input type</th>
<th>Absolute accuracy</th>
<th>Temperature coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>≤ ±0.05% of span</td>
<td>≤ ±0.01% of span / °C</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Input type</th>
<th>Basic accuracy</th>
<th>Temperature coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>mA</td>
<td>≤ ±4 µA</td>
<td>≤ ±0.4 µA / °C</td>
</tr>
<tr>
<td>Volt</td>
<td>≤ ±10 µV</td>
<td>≤ ±1 µV / °C</td>
</tr>
<tr>
<td>RTD</td>
<td>≤ ±0.2°C</td>
<td>≤ ±0.01°C / °C</td>
</tr>
<tr>
<td>Lin. resistance</td>
<td>≤ ±0.1 Ω</td>
<td>≤ ±10 mΩ / °C</td>
</tr>
<tr>
<td>TC type: E, J, K, L, N, T, U</td>
<td>≤ ±1°C</td>
<td>≤ ±0.05°C / °C</td>
</tr>
<tr>
<td>TC type: B, R, S, W3, W5, LR</td>
<td>≤ ±2°C</td>
<td>≤ ±0.2°C / °C</td>
</tr>
</tbody>
</table>

EMC immunity influence.......................................................... < ±0.5% of span
Extended EMC immunity:
  - NAMUR NE 21, A criterion, burst........................................... < ±1% of span

Auxiliary supplies:
Reference voltage.......................................................... 2.5 VDC ±0.5% / 15 mA
2-wire supply (pin 54..52).................................................. 28..16.5 VDC / 0..20 mA
Electrical specifications, temperature input, terminal 41, 42, 43 and 44

Max. offset ................................................................. 50% of selected max. value

TC input:

<table>
<thead>
<tr>
<th>Type</th>
<th>Min. temperature</th>
<th>Max. temperature</th>
<th>Min. span</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>400°C</td>
<td>1820°C</td>
<td>200°C</td>
<td>IEC584</td>
</tr>
<tr>
<td>E</td>
<td>-100°C</td>
<td>1000°C</td>
<td>50°C</td>
<td>IEC584</td>
</tr>
<tr>
<td>J</td>
<td>-100°C</td>
<td>1200°C</td>
<td>50°C</td>
<td>IEC584</td>
</tr>
<tr>
<td>K</td>
<td>-180°C</td>
<td>1372°C</td>
<td>50°C</td>
<td>IEC584</td>
</tr>
<tr>
<td>L</td>
<td>-100°C</td>
<td>900°C</td>
<td>50°C</td>
<td>DIN 43710</td>
</tr>
<tr>
<td>N</td>
<td>-180°C</td>
<td>1300°C</td>
<td>100°C</td>
<td>IEC584</td>
</tr>
<tr>
<td>R</td>
<td>-50°C</td>
<td>1760°C</td>
<td>200°C</td>
<td>IEC584</td>
</tr>
<tr>
<td>S</td>
<td>-50°C</td>
<td>1760°C</td>
<td>200°C</td>
<td>IEC584</td>
</tr>
<tr>
<td>T</td>
<td>-200°C</td>
<td>400°C</td>
<td>50°C</td>
<td>IEC584</td>
</tr>
<tr>
<td>U</td>
<td>-200°C</td>
<td>600°C</td>
<td>75°C</td>
<td>DIN 43710</td>
</tr>
<tr>
<td>W3</td>
<td>0°C</td>
<td>2300°C</td>
<td>200°C</td>
<td>ASTM E988-90</td>
</tr>
<tr>
<td>W5</td>
<td>0°C</td>
<td>2300°C</td>
<td>200°C</td>
<td>ASTM E988-90</td>
</tr>
<tr>
<td>LR</td>
<td>-200°C</td>
<td>800°C</td>
<td>50°C</td>
<td>GOST 3044-84</td>
</tr>
</tbody>
</table>

Sensor error current.............................................. Nom. 30 µA
CJC............................................................................. < ±1°C
Sensor error detection............................................ Yes

RTD and linear resistance input

<table>
<thead>
<tr>
<th>Type</th>
<th>Min. value</th>
<th>Max. value</th>
<th>Min. span</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pt100</td>
<td>-200°C</td>
<td>+850°C</td>
<td>25°C</td>
<td>IEC 751</td>
</tr>
<tr>
<td>Ni100</td>
<td>-60°C</td>
<td>+250°C</td>
<td>25°C</td>
<td>DIN 43760</td>
</tr>
<tr>
<td>Lin. R</td>
<td>0 Ω</td>
<td>5000 Ω</td>
<td>30 Ω</td>
<td>--------</td>
</tr>
</tbody>
</table>

Cable resistance per wire........................................ 10 Ω (max. 50 Ω with less accuracy)

Sensor current....................................................... Nom. 0.2 mA

Effect of sensor cable resistance (3- / 4-wire)........................... < 0.002 Ω / Ω

Sensor error detection............................................ Yes

mV input:

Measurement range.............................................. -2500...+2500 mV
Min. measurement range (span).......................... 5 mV
Input resistance.................................................. > 5 MΩ
Electrical specifications, mA / V input, terminal 51, 52, 53 and 54

Max. offset ................................................................. 50% of selected max. value

Current input:
Measurement range ................................................ 0...100 mA
Min. measurement range (span) ........................ 4 mA
Input resistance:
Supplied unit ........................................................ Nom. 10 Ω + PTC 10 Ω
Non-supplied unit ............................................... R_{SHUNT} = \infty, V_{DROP} < 6 V
Sensor error detection:
loop error on 4...20 mA signals ................................ Yes

Voltage input
Measurement range ................................................ 0...250 VDC
Min. measurement range (span) ........................ 5 mVDC
Input resistance ≤ 2.5 VDC .............................. Nom. 10 MΩ
> 2.5 VDC ............................................... Nom. 5 MΩ

Potentiometer input via 2.5 V ref.
Potentiometer min. ............................................... 170 Ω

Electrical specifications - OUTPUT
Max. offset ................................................................. 50% of selected max. value

Current output
Signal range ............................................................... 0...20 mA
Min. signal range (span) ........................................ 10 mA
Load (max.)................................................................. 20 mA / 600 Ω / 12 VDC
Load stability ............................................................ ≤ 0.01% of span / 100 Ω
Current limit ............................................................ ≤ 28 mA

Voltage output
Signal range ............................................................... 0...10 VDC
Min. signal range (span) ........................................ 500 mV
Load (min.) ................................................................. 500 kΩ

2-wire 4...20 mA output
Signal range ................................................................. 4...20 mA
Load stability ............................................................ ≤ 0.01% of span / 100 Ω
Load resistance ......................................................... \leq \frac{V_{\text{supply}}-3.5}{0.023 A} [\Omega]
Max. external 2-wire supply ......................................... 29 VDC
Effect of external 2-wire supply
go under variation ....................................................... < 0.005% of span / V

Sensor error detection and loop error on 4...20 mA
Programmable ............................................................... 0...23 mA
NAMUR NE43 Upscale ............................................... 23 mA
NAMUR NE43 Downsacle ............................................. 3.5 mA
Relay outputs
Max. voltage .............................................................. 250 VRMS
Max. current............................................................... 2 A / AC
Max. AC power .......................................................... 500 VA
Max. current at 24 VDC ......................................... 1 A
Sensor error detection........................................... Break / Make / Hold / None

Ex / I.S. approval - 5116B
KEMA 04ATEX1316 X............................................ II (1) GD
Ex / I.S. data for 5116B
U_m ................................................................. : 253 V
U_m, Loop Link .................................................... : 60 V

Ex / I.S. data for temperature / bipolar mV input
Terminal 41, 42, 44 and 43
U_o ................................................................. : 7.5 V
I_o ................................................................. : 2.2 mA
P_o ................................................................. : 4.2 mW
C_o ................................................................. : 6 μF
L_o ................................................................. : 1.0 H

Ex / I.S. data for unipolar mA / V input:
Terminal 51, 52 and 53
U_o ................................................................. : 7.5 V
I_o ................................................................. : 2.2 mA
P_o ................................................................. : 4.2 mW
C_o ................................................................. : 6 μF
L_o ................................................................. : 1.0 H

Ex / I.S. data when using 2-wire supply / reference voltage
Terminal 51, 52, 53 and 54
U_o ................................................................. : 28 V
I_o ................................................................. : 93 mA
P_o ................................................................. : 650 mW

<table>
<thead>
<tr>
<th></th>
<th>IIC</th>
<th>IIB</th>
<th>IIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>C_o</td>
<td>75 nF</td>
<td>645 nF</td>
<td>2 μF</td>
</tr>
<tr>
<td>L_o</td>
<td>3 mH</td>
<td>16 mH</td>
<td>31 mH</td>
</tr>
</tbody>
</table>
Approvals
EMC 2004/108/EC .................................................. EN 61326-1
LVD 2006/95/EC.................................................... EN 61010-1
PELV/SELV ........................................................... IEC 364-4-41 and EN 60742
UL, Standard for Safety ................................. UL 61010-1
EAC TR-CU 020/2011 .................................... EN 61326-1

Marine approval
Det Norske Veritas, Ships & Offshore .......... Standard for Certification No. 2.4

I.S. / Ex
ATEX 94/9/EC........................................................... KEMA 04ATEX1316 X
FM ................................................................. 3023092
EAC Ex TR-CU 012/2011 ............................... RU C-DK.GB08.V.00410

Of span = of the currently selected measurement range
CONNECTIONS

Supply:

Inputs:

- RTD, 2-wire
- RTD, 3-wire
- RTD, 4-wire
- TC, internal CJC
- TC, external CJC*
- Resistance, 2-wire
- Resistance, 3-wire
- Resistance, 4-wire

* If the device is reconfigured from temperature measurement with CJC connector to analogue measurement, the CJC connector must be demounted.

- Bipolar mV
- Voltage <= 2.5 V
- Voltage > 2.5 V

- Potentiometer
- Current
- 2-wire transmitter
CONNECTIONS

Outputs:

Current

2-wire transmitter

Voltage

Relays

- mA +

mA +

- V +

R1

R2
Graphic depiction of relay actions Increasing / Decreasing

Graphic depiction of relay action Window

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For connection of 5116B to Loop Link, please observe the instructions for intrinsically safe installation.

**ACTIVATION OF THE PROCESS CALIBRATION BUTTON**

Open the front cover and activate the switch with a pointed object, e.g. a small screwdriver. The switch is placed a little to the right of the LEDs.

For further instructions see the description of the process calibration function on page 20.
## Configuration of relay 1 & 2 in PReset

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Off</td>
<td>No relay function</td>
</tr>
<tr>
<td></td>
<td>Setpoint</td>
<td>Relay changes state at a limit on the span</td>
</tr>
<tr>
<td></td>
<td>Setpoint window</td>
<td>Relay changes state inside a range of the span</td>
</tr>
<tr>
<td></td>
<td>Sensor error indication</td>
<td>Only works for sensor error</td>
</tr>
<tr>
<td></td>
<td>Power indication</td>
<td>Relay is active when power is on</td>
</tr>
<tr>
<td><strong>Relay units for Relay 1 and Relay 2</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% of input span</td>
<td>0...100% of input span</td>
<td></td>
</tr>
<tr>
<td>Input units</td>
<td>E.g. °C, mV and mA</td>
<td></td>
</tr>
<tr>
<td>% of output span</td>
<td>0...100% of output span</td>
<td></td>
</tr>
<tr>
<td>Output units</td>
<td>mA and V</td>
<td></td>
</tr>
<tr>
<td><strong>Setpoint</strong></td>
<td>From min. to max. of relay units</td>
<td>Setpoint limit</td>
</tr>
<tr>
<td><strong>Setpoint LOW</strong> (setpoint window only)</td>
<td>From min. to max. of relay units</td>
<td>Lower setpoint in setpoint window</td>
</tr>
<tr>
<td><strong>Setpoint HIGH</strong> (setpoint window only)</td>
<td>From min. to max. of relay units</td>
<td>Higher setpoint in setpoint window</td>
</tr>
<tr>
<td><strong>Hysteresis</strong></td>
<td>From 0.1...99.9% of relay units</td>
<td>Difference between setpoint value and reset value. At setpoint window the hysteresis is outside the window.</td>
</tr>
<tr>
<td><strong>On-delay</strong></td>
<td>0..3600 s</td>
<td>Time from the signal crosses the setpoint threshold until the relay activates. Time is reset at setpoint crossing.</td>
</tr>
<tr>
<td><strong>Off-delay</strong></td>
<td>0..3600 s</td>
<td>Time from the signal crosses the hysteresis threshold until the relay deactivates. Time is reset at hysteresis crossing.</td>
</tr>
<tr>
<td><strong>Action</strong></td>
<td>Increasing</td>
<td>Activates at increasing signal</td>
</tr>
<tr>
<td></td>
<td>Decreasing</td>
<td>Activates at decreasing signal</td>
</tr>
<tr>
<td><strong>Contact</strong></td>
<td>Normally open (N.O.)</td>
<td>Contact state before limit is reached</td>
</tr>
<tr>
<td></td>
<td>Normally closed (N.C.)</td>
<td>Contact state before limit is reached</td>
</tr>
<tr>
<td></td>
<td>Open inside window</td>
<td>Relay deactivated inside setpoint window</td>
</tr>
<tr>
<td></td>
<td>Closed inside window</td>
<td>Relay activated inside setpoint window</td>
</tr>
<tr>
<td><strong>Sensor error detection</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contact open</td>
<td>Relay deactivated</td>
<td></td>
</tr>
<tr>
<td>Contact closed</td>
<td>Relay activated</td>
<td></td>
</tr>
<tr>
<td>Hold</td>
<td>Relay state as before sensor error occurred</td>
<td></td>
</tr>
<tr>
<td>Off</td>
<td>No relay function</td>
<td></td>
</tr>
</tbody>
</table>
**Process calibration 0% and 100% or only 0%**

(not for RTD and TC input)

When the option “0% and 100% calibration” is actively configured in PReset it is possible to make the following process calibrations. Please note: Input 0% and 100% should be chosen higher than the process-calibrated span.

**Process calibration 0% and 100%**

1. Apply the actual 0% value.
2. Open the front cover, activate sw. 1 and wait until the green LED lights constantly.
3. Apply the actual 100% value.
4. Activate sw. 1. The LED will start flashing again.

The input on PRetrans 5116 has now been scaled according to the actual process values.

When the option “0% calibration” is actively configured in PReset it is possible to make the following process calibration.

**0% process calibration**

1. Apply the actual 0% value.
2. Open the front cover and activate sw. 1.

The input on PRetrans 5116 has now been scaled according to the actual process values.
## ERROR FUNCTIONS

<table>
<thead>
<tr>
<th>Error reason</th>
<th>Hardware error indication</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Value on analogue output</td>
</tr>
<tr>
<td>No power supply</td>
<td>0 mA / 0 V</td>
</tr>
<tr>
<td>Sensor error</td>
<td>As configured</td>
</tr>
<tr>
<td>RAM checksum check failed *)</td>
<td>0 mA / 0 V</td>
</tr>
<tr>
<td>EEPROM checksum check failed</td>
<td>0 mA / 0 V</td>
</tr>
<tr>
<td>Main program stopped</td>
<td>0 mA / 0 V</td>
</tr>
<tr>
<td>DAC / relay program stopped</td>
<td>0 mA / 0 V</td>
</tr>
</tbody>
</table>

*) Error can be reset by power cycling the device or sending a new configuration.  
**) The green LED is controlled by the main processor.
APPENDIX

FM CONTROL DRAWING NO. 5116QF01
Control Drawing 5116QF01

Hazardous (Classified) Location

Class I, Division 1, Group A,B,C,D
Class II, Division 1 Group E, F, G
Class III, Division 1
Class I, Zone 0 and 1, Group IIC, IIB, IIA
Class II, Zone 20 and 21

Unclassified Location

or

Hazardous (Classified) Location

Class I, Division 2, Group A,B,C,D
Class I, Zone 2, Group IIC, IIB, IIA

Simple Apparatus or Intrinsically safe apparatus with entity parameters:

\[ V_{\text{max}}(U_i) \geq V_t(U_o) \]
\[ I_{\text{max}}(I_i) \geq I_t(I_o) \]
\[ P_i \geq P_o \]
\[ C_a \geq C_{\text{cable}} + C_i \]
\[ L_a \geq L_{\text{cable}} + L_i \]

The sum of capacitance and inductance of cable and intrinsic safe equipment must be less or equal to \( C_a \) and \( L_a \)

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Voc (V)</th>
<th>Isc (mA)</th>
<th>Po (mW)</th>
<th>La (mH)</th>
<th>Ca (µF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A,B</td>
<td>C,E</td>
<td>D,F,G</td>
<td>A,B</td>
<td>C,E</td>
<td>D,F,G</td>
</tr>
<tr>
<td>IIC</td>
<td>IIB</td>
<td>IIA</td>
<td>IIC</td>
<td>IIB</td>
<td>IIA</td>
</tr>
<tr>
<td>41,42,43,44</td>
<td>7.5</td>
<td>2.2</td>
<td>4.2</td>
<td>1000</td>
<td>1000</td>
</tr>
<tr>
<td>51,52,53</td>
<td>7.5</td>
<td>2.2</td>
<td>4.2</td>
<td>1000</td>
<td>1000</td>
</tr>
<tr>
<td>51,52,53,54</td>
<td>28</td>
<td>93.0</td>
<td>650</td>
<td>3</td>
<td>16</td>
</tr>
</tbody>
</table>

Installation notes:

1) The maximum non hazardous location voltage is 250Vac/dc.
2) The installation shall be in accordance with the National Electrical Code NFPA 70, Articles 504 and 505.
3) 5116B is galvanic isolated and does not require grounding
4) For installation in Div 2 or Zone 2 the 5116B must be installed in an enclosure according to ANSI/ISA S82.
5) Install in Pollution degree 2 or better
6) Use 60 / 75 °C Copper Conductors with Wire Size AWG: (26 – 14).
7) Warning: Substitution of components may impair intrinsic safety.
Displays  Programmable displays with a wide selection of inputs and outputs for display of temperature, volume and weight, etc. Feature linearization, scaling, and difference measurement functions for programming via PReset software.

Ex interfaces  Interfaces for analog and digital signals as well as HART signals between sensors / I/P converters / frequency signals and control systems in Ex zone 0, 1 & 2 and for some devices in zone 20, 21 & 22.

Isolation  Galvanic isolators for analog and digital signals as well as HART signals. A wide product range with both loop-powered and universal isolators featuring linearization, inversion, and scaling of output signals.

Temperature  A wide selection of transmitters for DIN form B mounting and DIN rail devices with analog and digital bus communication ranging from application-specific to universal transmitters.

Universal  PC or front programmable devices with universal options for input, output and supply. This range offers a number of advanced features such as process calibration, linearization and auto-diagnosis.
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