Product manual
5802

Compact RTD temperature transmitter
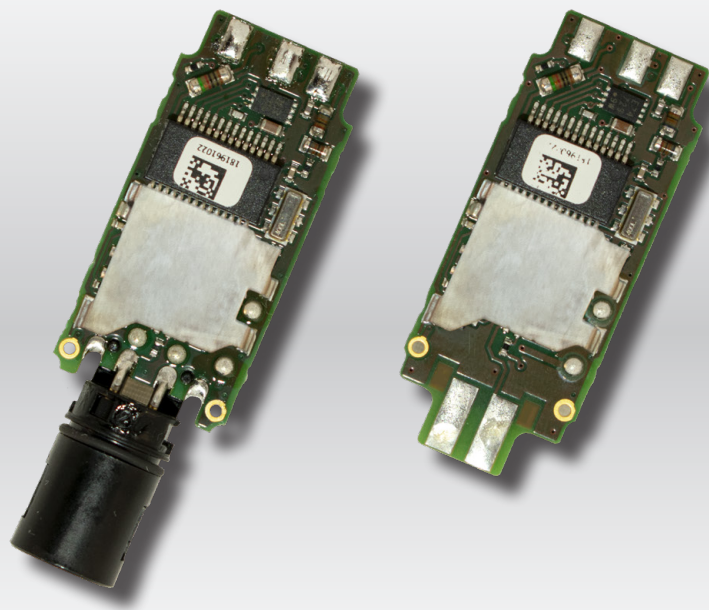
No. 5802V102-UK
From serial no.: 191043001

PR
electronics

6 Product Pillars
to meet your every need

Individually outstanding, unrivalled in combination

With our innovative, patented technologies, we make signal conditioning smarter and simpler. Our portfolio is composed of six product areas, where we offer a wide range of analog and digital devices covering over a thousand applications in industrial and factory automation. All our products comply with or surpass the highest industry standards, ensuring reliability in even the harshest of environments and have a 5-year warranty for greater peace of mind.
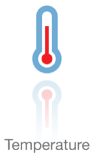
Temperature

Our range of temperature transmitters and sensors provides the highest level of signal integrity from the measurement point to your control system. You can convert industrial process temperature signals to analog, bus or digital communications using a highly reliable point-to-point solution with a fast response time, automatic self-calibration, sensor error detection, low drift, and top EMC performance in any environment.

I.S. Interface

We deliver the safest signals by validating our products against the toughest safety standards. Through our commitment to innovation, we have made pioneering achievements in developing I.S. interfaces with SIL 2 Full Assessment that are both efficient and cost-effective. Our comprehensive range of analog and digital intrinsically safe isolation barriers offers multifunctional inputs and outputs, making PR an easy-to-implement site standard. Our backplanes further simplify large installations and provide seamless integration to standard DCS systems.

Communication

We provide inexpensive, easy-to-use, future-ready communication interfaces that can access your PR installed base of products. All the interfaces are detachable, have a built-in display for readout of process values and diagnostics, and can be configured via push-buttons. Product specific functionality includes communication via Modbus and Bluetooth and remote access using our Portable Plant Supervisor (PPS) application, available for iOS and Android.

Multifunction

Our unique range of single devices covering multiple applications is easily deployable as your site standard. Having one variant that applies to a broad range of applications can reduce your installation time and training, and greatly simplify spare parts management at your facilities. Our devices are designed for long-term signal accuracy, low power consumption, immunity to electrical noise and simple programming.

Isolation

Our compact, fast, high-quality 6 mm isolators are based on microprocessor technology to provide exceptional performance and EMC-immunity for dedicated applications at a very low total cost of ownership. They can be stacked both vertically and horizontally with no air gap separation between units required.

Display

Our display range is characterized by its flexibility and stability. The devices meet nearly every demand for display readout of process signals and have universal input and power supply capabilities. They provide a real-time measurement of your process value no matter the industry and are engineered to provide a user-friendly and reliable relay of information, even in demanding environments.

Compact RTD temperature transmitter 5802

Table of contents

Compact RTD temperature transmitter
5802

- RTD or Ohm input

- Accuracy: Better than 0.1% of selected range

- 2- / 3-wire RTD connection

- Programmable sensor error value

- Output 4...20 mA, with or without M12 connector

Application

- Linearized temperature measurement with Pt100...Pt1000, or Ni100...Ni1000 sensor.
- Conversion of linear resistance variation to a standard analog current signal.

Technical characteristics

- Within a few seconds the user can program PR5802 to measure temperatures within all RTD ranges defined by the norms.
- The RTD and resistance inputs have cable compensation for 3-wire connection.

Mounting / installation

- For tube mounting, e.g. M18 barrel housing or customer specific housing.
- The unit is tested with an M12 connector, mounted in a steel housing and molded with Silgel 612 silicone molding compound. This is PR electronics' recommended method to comply with specifications and EMC data.

Order

Type	M12 connector	Output pins	PCB only
5802A1A2	No*	1-2	Yes
5802A2A2	Yes	1-2	Yes
5802A1A3	No*	1-3	Yes
5802A2A3	Yes	1-3	Yes

* Prepared for customer-mounted M12 connector.

NB: Please note that minimum order quantity per type is 40 pcs. and that only order quantities divisible by 40 are accepted.

Accessories

5909	=	Loop Link USB interface and PReset Software
8509	=	M12 interface cable for 5909 Loop Link (only for 5802A2Ax)

Electrical specifications

Environmental conditions:
Operating temperature . . . . -40°C to +85°C
Storage temperture . . . . -40°C to +85°C
Humidity. . . . . < 95% RH (non-cond.)

Mechanical specifications:
Dimensions, PCB only (H x W x D). . . . . 5.0 x 15.50 x 38.0 mm
Dimensions, incl. M12 connector (H x W x D) . . . . 9.5 x 15.50 x 47.70 mm
Weight approx. . . . . 2.65 g 5802A1xx
Weight approx. . . . . 4.05 g 5802A2xx
Recommended solder wire . . . . Stannol type S-Sn95Ag4Cu1 / Kristall 400
(lead-free)

Common specifications:
Supply voltage, DC. . . . . 8.0...35 VDC
Internal power dissipation . . . . 25 mW...0.8 W
Voltage drop . . . . 8.0 VDC
Warm-up time. . . . . 5 min.
Programming . . . . Loop Link
Signal / noise ratio. . . . . Min. 60 dB
Response time (programmable) . . . . 0.33...60 s
Signal dynamics, input . . . . 19 bit
Signal dynamics, output . . . . 16 bit
Effect of supply voltage variation. . . . . ≤ 0,005% of span / VDC

Accuracy, the greater of general and basic values:

General values		
Input type	Absolute accuracy	Temperature coefficient
All	≤ ±0.1% of span	≤ ±0.01% of span / °C

Basic values		
Input type	Basic accuracy	Temperature coefficient
RTD	≤ ±0.3°C	≤ ±0.01°C/°C
Lin. R	≤ ±0.2 Ω	≤ ±20 mΩ / °C

EMC - immunity influence. . . . . < ±0.5% of span

The unit is tested with an M12 connector, mounted in a steel housing and molded with Silgel 612 silicone molding compound. This is PR electronics' recommended method to comply with specifications and EMC data.

Input specifications:

RTD input types:

RTD type	Min. value	Max. value	Min. span	Standard
Pt100	-200°C	+850°C	25°C	IEC 60751
Ni100	-60°C	+250°C	25°C	DIN 43760
Lin. R	0 Ω	10000 Ω	30 Ω	-----

Max. offset . . . . 50% of selec. max. value
Cable resistance per wire (max.). . . . . 10 Ω
Sensor current . . . . > 0.2 mA, < 0.4 mA
Effect of sensor cable resistance (3-wire) . . . . < 0.002 Ω / Ω
Sensor error detection . . . . Yes

Output specifications:
Signal range. . . . . 4...20 mA
Min. signal range . . . . 16 mA
Updating time . . . . 135 ms
Load resistance. . . . . ≤ (Vsupply - 8) / 0.023 [Ω]
Load stability . . . . < ±0.01% of span / 100 Ω
Sensor error detection:
Programmable . . . . 3.5...23 mA
NAMUR NE43 Upscale . . . . 23 mA
NAMUR NE43 Downscale. . . . . 3.5 mA

of span = of the presently selected range

Observed authority requirements:
RoHS 2011/65/EU

Connections

Input:

RTD/Lin. R, 3-wire
At 2-wire connection,
terminals 13 and 14
must be shorted.

Lin R.

RTD

16	14	13

| 4 | | 3 |

Output:

2-wire installation

2	1

mA −

+
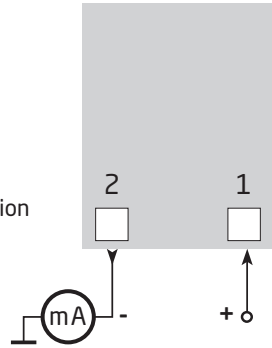
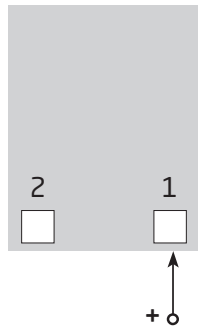## 5802xxx2 connection

Input:

RTD/Lin. R, 3-wire
At 2-wire connection,
terminals 13 and 14
must be shorted.

Lin R.

RTD

16	14	13

Output:

2-wire installation

| 4 | | 3 |

mA −

Output:

2-wire installation

2	1

+

5802xxx3 connection

Block diagrams

RTD/Lin. R, 3-wire
At 2-wire connection, terminals 13 and 14 must be shorted.

5802xxx2

RTD/Lin. R, 3-wire
At 2-wire connection, terminals 13 and 14 must be shorted.

5802xxx3
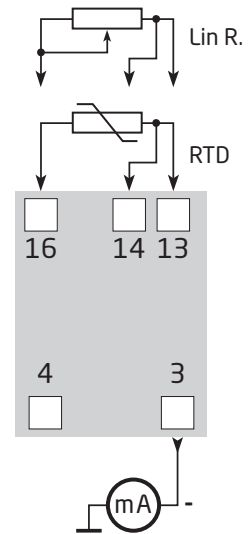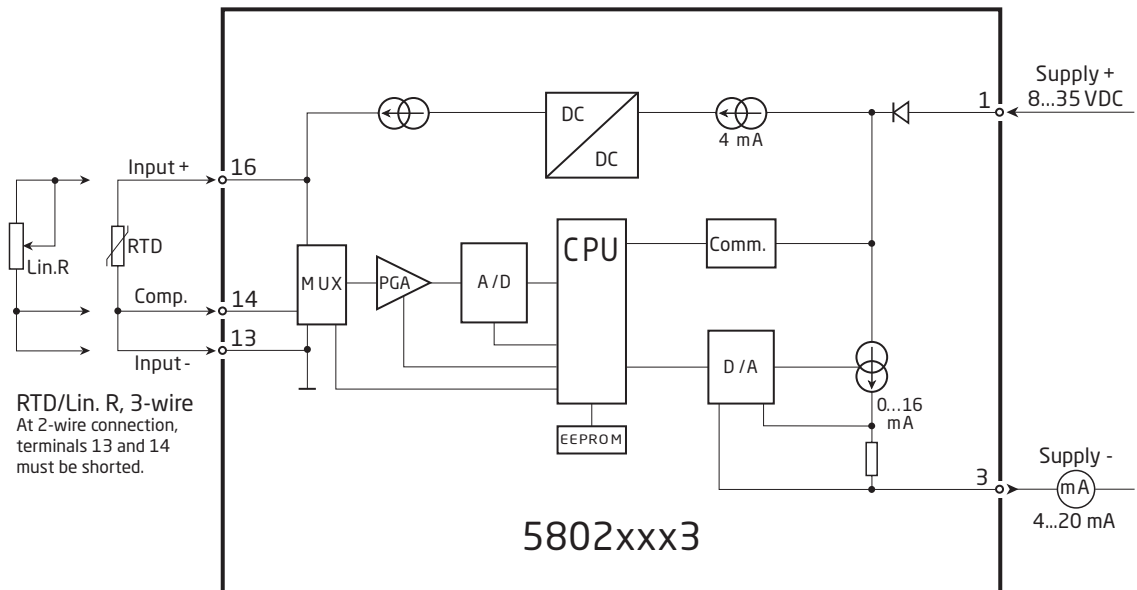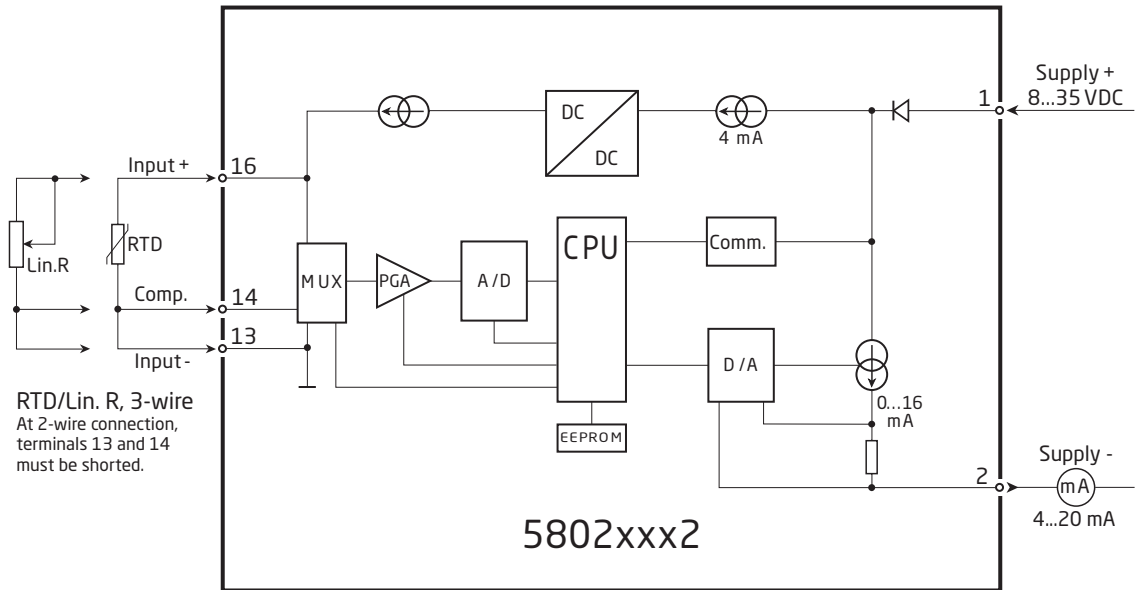
Soldering of wires

Lead-free solder type S-Sn95Ag4Cu1 /Kristall 400 from STANNOL is PR electronics' recommended method to comply with specifications and EMC data.

Soldering iron

Good results should be obtained using a range of tip temperatures. However, the optimum tip temperature and heat capacity required for a hand soldering process is a function of both soldering iron design and the nature of the task and care should be exercised to avoid unnecessarily high tip temperatures for excessive times. A high tip temperature will increase any tendency to flux spitting and it may produce some residue darkening.

The soldering iron tip should be properly tinned and this may be achieved using Stannol Kristall cored wire. Severely contaminated soldering iron tips should first be cleaned and pre-tinned using Stannol Tippy, then wiped on a clean, damp sponge before re-tinning with Kristall cored wire.

Soldering process

Stannol Kristall flux cored wires contain a careful balance of resins and activators to provide clear residues, maximum activity and high residue reliability, without cleaning in most situations. To achieve the best results from Stannol Kristall solder wires, recommended working practices for hand soldering should be observed as follows:

1. Apply the soldering iron tip to the work surface, ensuring that it simultaneously contacts the base material and the component termination to heat both surfaces adequately. This process should only take a fraction of a second.
2. Apply Kristall flux cored solder wire to a part of the joint surface away from the soldering iron and allow to flow sufficiently to form a sound joint fillet - this should be virtually instantaneous. Do not apply excessive solder or heat to the joint as this may result in dull, gritty fillets and excessive or darkened flux residues.
3. Remove solder wire from the workpiece and then remove the iron tip.
4. The total process will be very rapid, depending upon thermal mass, tip temperature and configuration and the solderability of the surfaces to be joined.

Cleaning

Stannol Kristall flux cored solder wires have been formulated to leave pale flux residues and to resist spitting and fuming. Should residue quantity be an important consideration, Stannol X39B flux cored wire may be specified if a halide free product is required. Stannol Kristall 502, 505 and 511 offer good activity and consequently cored wire flux contents and hence residue levels may be reduced in comparison with equivalent conventional products.

Should cleaning be required, this is best achieved using Stannol Flux-Ex 200B or Stannol Flux-Ex 500 solvent cleaner. Other proprietary solvent or semi-aqueous processes may be suitable but saponification is not recommended.


Correct handling of PR 5802 PCB

No ESD sensitive PCB or component should be removed from its protective packaging except in a static-controlled location.

Best practices and standards for appropriate ESD protection should be in place for the workplace when unpacking and handling the PR 5802 PCB for installation and service.

Programming

5802 can be configured in with PR electronics A/S' communications interface Loop Link and PReset PC configuration software.

For programming please refer to the drawing below and the help functions in PReset.
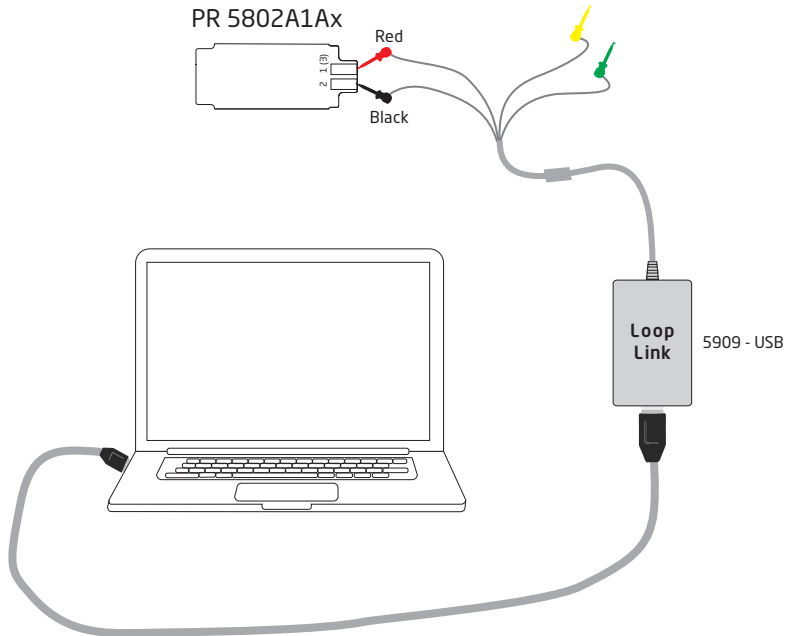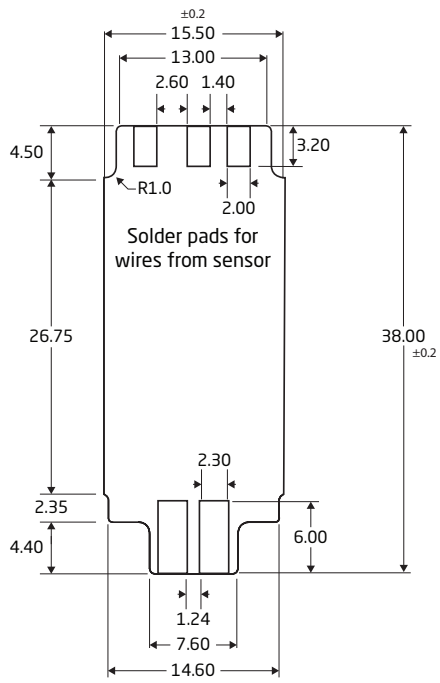

Please note: In order to connect Loop Link to devices with attached M12 connector (5802A2Ax), the PR 8509 interface cable is needed (order separately).
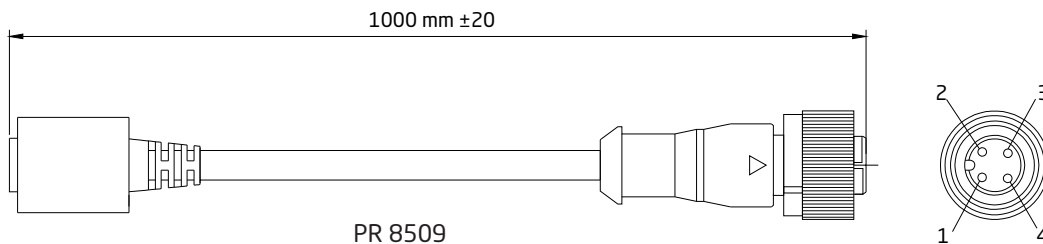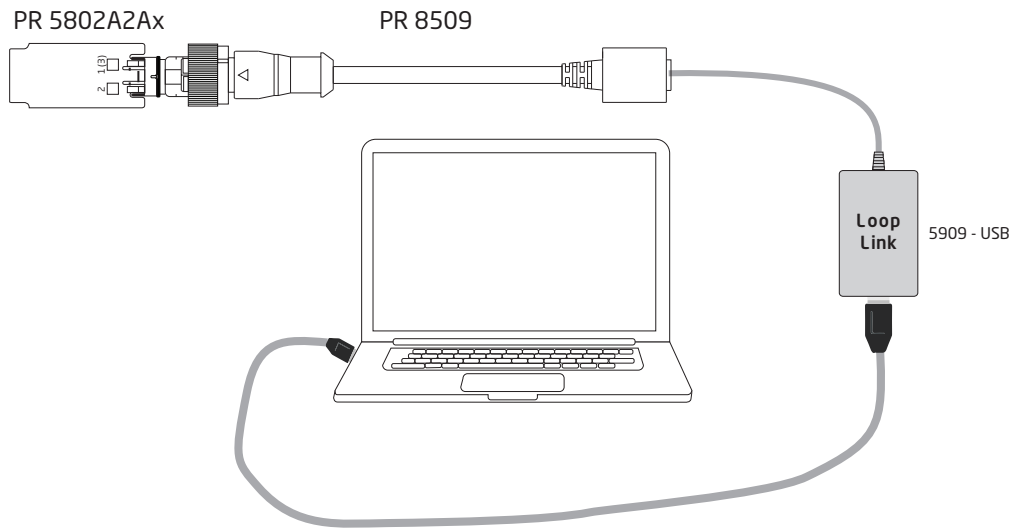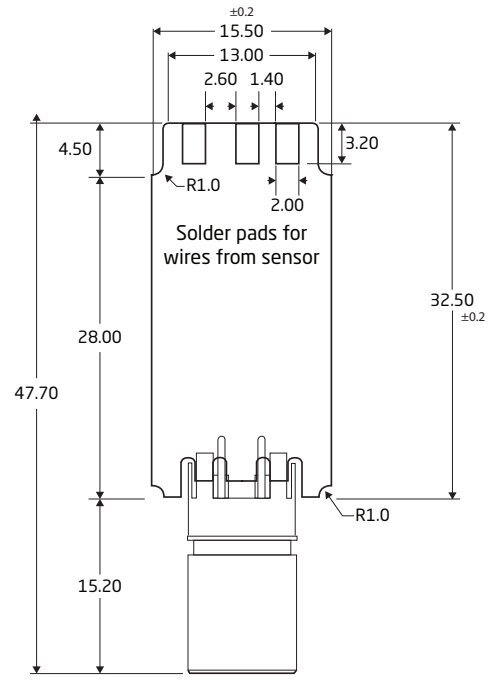
Mechanical specifications

5802A1Ax:

5802A2Ax:

Solder pads for wires from sensor

Solder pads for wires from sensor

4-pin male right-angle M12 connector
(code A)

Document history

The following list provides notes concerning revisions of this document.

Rev. ID	Date	Notes
100	1911	Initial release of the product.
101	2126	Updated with solder wire instructions.
102	2151	Updated with ESD handling instructions.

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all over the world

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We are committed to your satisfaction and provide PERFORMANCE MADE SMARTER all around the world.

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PR electronics is the leading technology company specialized in making industrial process control safer, more reliable and more efficient. Since 1974, we have been dedicated to perfecting our core competence of innovating high precision technology with low power consumption. This dedication continues to set new standards for products communicating, monitoring and connecting our customers' process measurement points to their process control systems.

Our innovative, patented technologies are derived from our extensive R&D facilities and from having a great understanding of our customers' needs and processes. We are guided by principles of simplicity, focus, courage and excellence, enabling some of the world's greatest companies to achieve PERFORMANCE MADE SMARTER.