

New PR 5437 temperature transmitter

The next generation

Leveraging our innovative technology



3000 – High density design with doubling of A/D channels and unique wire breakage detection



7501 – Very low power HART modem, enhanced firmware, patent pending technologies



4104 – New high resolution A/D conversion technique with fast settling and adaptive filter



5337 – World's first HART 7 transmitter



PR 5437

Redefining the head mount transmitter

The PR 5437, setting the new standard for head mount transmitters.

- ✓ Most accurate
- ✓ Most stable
- ✓ Most flexible
- ✓ Fastest response time
- ✓ More approvals
- ✓ Full SIL assessment
- ✓ Patented technologies
- ✓ Unique features
- ✓ HART 7 (HART 5)



Specification comparison vs 5335/7

Highlights

2-8x
Higher



Accuracy:
< 0.05°C*

40%
Better



Temperature coefficient:
< 0.005% / °C

14x
Faster



Response time:
70 ms

Specification comparison vs 5335/7

Highlights

50%
Increase



Power supply:
7.5...48 VDC

66%
Increase



Galvanic isolation:
2.5 kVAC

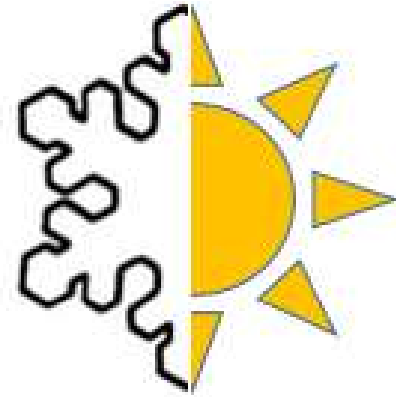
Superior specifications

Wider ambient temperature range: -50°C...+85°C

In response to increasingly hostile process environments the PR 5437 is capable of operating in ambient temperatures between -50°C...+85°C.

Advantages:

- Installation closer to measuring point in a wider range of ambient temperatures.
- Potential cost savings on cabling and enclosures.
- Applicable to more applications.



Superior specification

Very high accuracy

The 5437 is capable of extremely high measurement accuracy, and makes it truly the most accurate transmitter in the market across a full sensor span.

Please refer to product manual for accuracy data and calculations.



Example : PT100 sensor, configured from -200°C to $+850^{\circ}\text{C}$:

$$Pr100_{Basic\ Accuracy} = 0.04^{\circ}\text{C}$$

$$Output_{Analog\ Accuracy} = 0.0016\text{mA}$$

$$Total_{Accuracy\ (mA)} = \frac{Basic_{accuracy}}{Configured_Span_{INPUT}} * 16.0\text{ mA} + Output_{Analog\ Accuracy}$$

$$Total_{Accuracy\ (mA)} = \frac{0.04^{\circ}\text{C}}{850^{\circ}\text{C} - (-200^{\circ}\text{C})} * 16.0\text{ mA} + 0.0016\text{ mA} = \underline{0.0022\text{ mA}}$$

$$Total_{Accuracy\ (\%)} = \frac{Total_{Accuracy\ (mA)}}{16.0\text{ mA}} * 100\%$$

$$Total_{Accuracy\ (\%)} = \frac{0.0022\text{ mA}}{16.0\text{ mA}} * 100\% = \underline{0.01381\%}$$

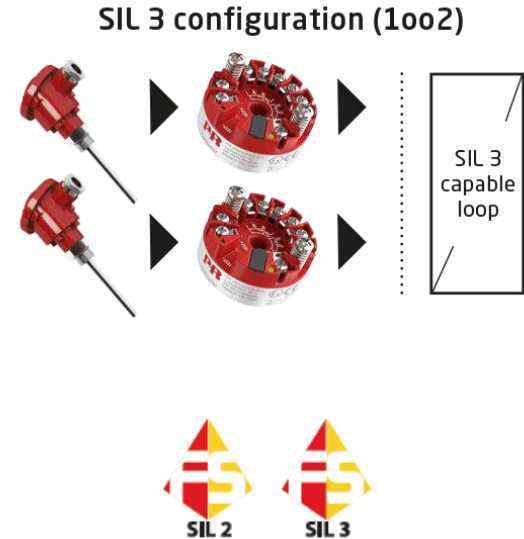
Superior specifications

Full functional safety assessment: SIL 2 / SIL 3 capable

The PR 5437 carries a full assessment to SIL 2 / SIL 3 hardware and software for easy integration into safety instrumented systems.

Advantages:

- Full assessment to SIL 2 in 1oo1 / SIL 3 in 1oo2 configurations.
- Hardware & software designed in accordance with IEC 61508-2010 Ed2.
- SIL 3 firmware means 2 x 5437 can be used in a 1oo2 configuration to achieve SIL 3.
- IEC EN 61326-3-1 for stable functional safety performance in high EMI installations.

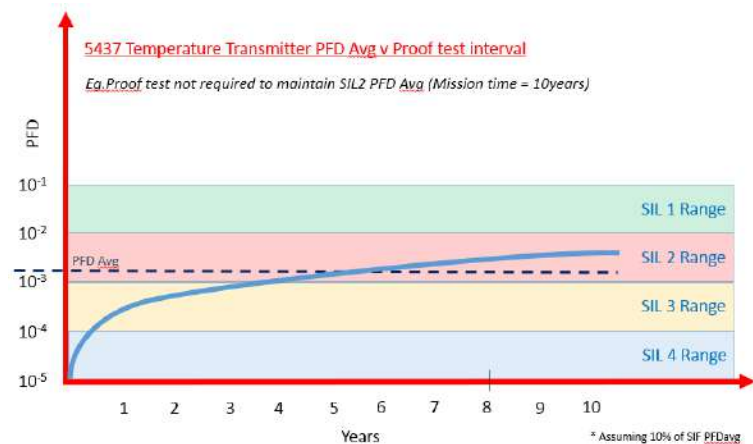
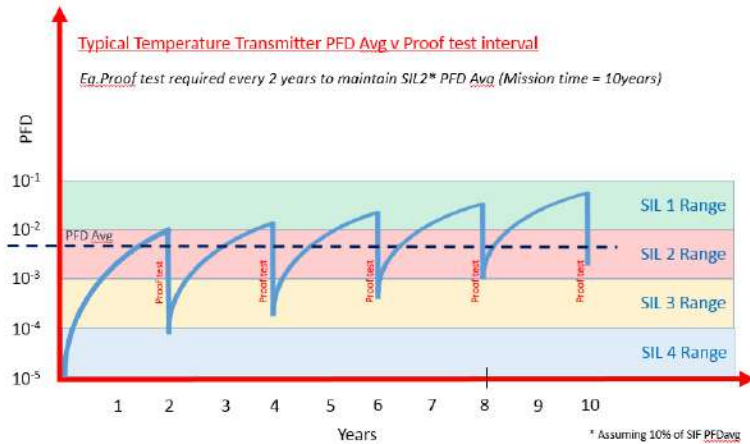


Superior specifications

Proof test > Mission time

PFD values of the PR 5437 mean that the device is within the allowable range for SIL 2 up to a mission time of 15 years, hence a proof test is not required**.

Mission time:	10 years	15 years
Resulting PFD _{AVG} :	1.15E-3	1.72E-3



**Note: Careful consideration must be made of the failure rates of other components in the loop.

Superior specifications

True dual sensor inputs – No compromise on sensor type

With a unique high density 7 terminal design, the PR 5437 is capable of accepting up to 2 x 4 wire RTD inputs.

Advantages:

- No compromise on sensor for highest accuracy applications.
- Widest range of dual input combinations for ultimate flexibility.
- Higher SFF (Safe Failure Fraction) values across the widest range of sensor combinations, retain highest SIL level*.

Dual Sensor Configurations	
Sensor 1	Sensor 2
RTD 2, 3, 4 W	RTD 2, 3, 4 W
TC	(int. CJC) TC
TC	(ext. CJC 2, 3, 4 W) TC
TC	(int. CJC) RTD 2, 3, 4 W
TC	(ext. CJC 2, 3 W) RTD 2, 3, 4 W
Potentiometer 3, 4, 5 W	Potentiometer 3, 4 W
Voltage	Voltage

*Refer to FMEDA for further details and relevant values

Superior specifications

No compromise on sensor type!

The widest range of sensor types, ensures the most appropriate sensor can be chosen for each application.

Input Type	Selection
RTD*	Pt X: Pt10...10000 / Ni X: Ni10...10000 / Cu X: Cu5...1000
Thermocouple	Types: B, E, J, K, L, N, R, S, T, U, W3, W5, LR
Lin Resistance	0...100 kOhms
Potentiometer	10...100 kOhms
Voltage	+/- 800 mV, -0.1 V...+1.7 V

* RTD Standards Pt: IEC, JIS, GOST / Ni: DIN, GOST / Cu: ECW, GOST

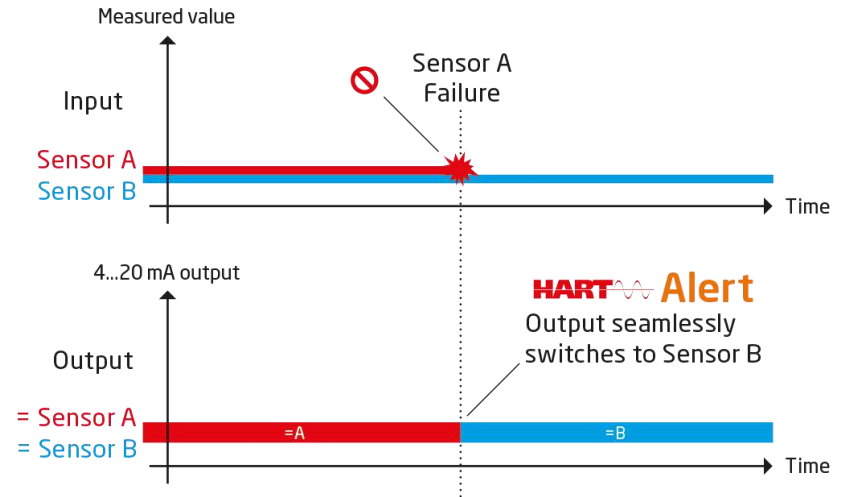
Sensor redundancy

Improving process uptime and availability

The PR 5437 includes a sensor redundancy function to reduce potential downtime due to sensor errors.

Advantages:

- Seamless switch to backup sensor in case of failure.
- NE107 compliant alert via HART allowing maintenance to be scheduled on faulty sensor.
- Maintains process, preventing downtime and potential loss of production or yield.
- Potential safety or environmental issues are avoided in the event of a sensor failure.



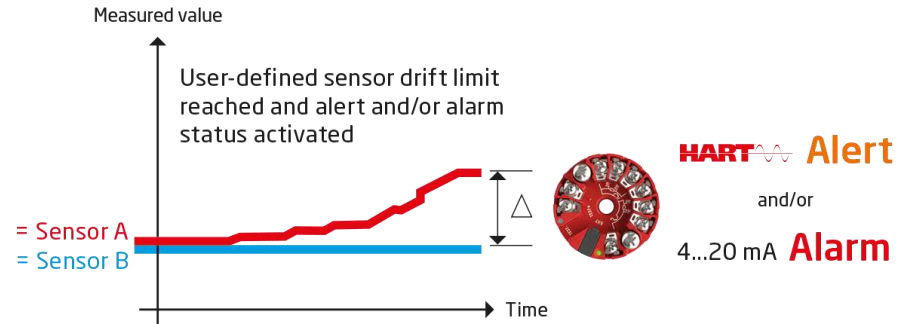
Sensor drift detection

Maintaining process accuracy

The PR 5437 includes a sensor drift detection function to ensure accuracy and integrity of process values.

Advantages:

- User specifies acceptable sensor drift limits.
- NE107 compliant alert via HART and / or analog output error can be selected to inform the user and to schedule maintenance.
- Ensures process is not influenced by inaccurate values or sensor aging potentially affecting yields or production quality.












Process optimization and reporting

Improving process control and visibility

Runtime metering of sensor inputs and transmitter electronics temperature, indicates time spent within predefined temperature ranges.

Advantages:

- Min. / max. tracking records process extremes.
- Metering of ambient operating temperatures.
- Scheduled maintenance is improved, saving costs.
- Process optimization through improved statistical data analysis.

Electronics		
Range 1:		0 s
Range 2:		0 s
Range 3:		0 s
Range 4:		0 s
Range 5:		1234 s
Range 6:		0 s
Range 7:		0 s
Range 8:		0 s
Range 9:		0 s

Electronics Ranges		
Threshold 1 - 2:		-50.00 degC
Threshold 2 - 3:		-30.00 degC
Threshold 3 - 4:		-10.00 degC
Threshold 4 - 5:		10.00 degC
Threshold 5 - 6:		30.00 degC
Threshold 6 - 7:		50.00 degC
Threshold 7 - 8:		70.00 degC
Threshold 8 - 9:		85.00 degC

Programmable sensor limits

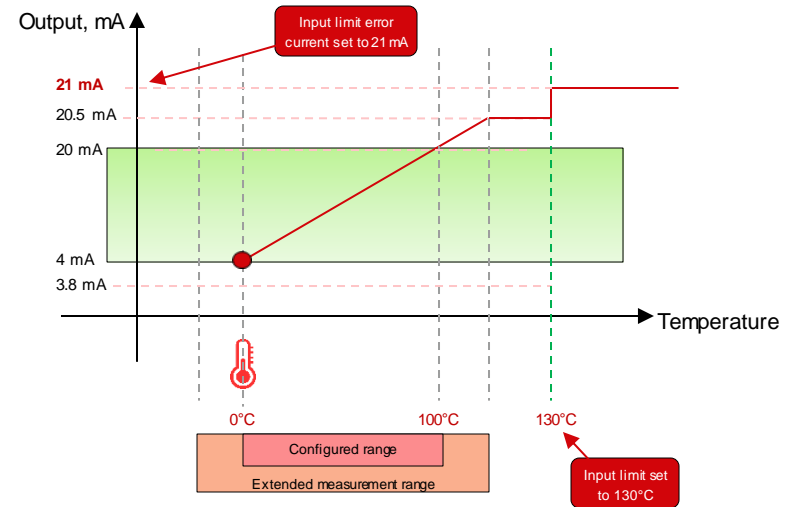
Improving process control and visibility

Programmable sensor limits enable out of range sensor inputs and outputs to be identified and actioned.

A unique user defined error current is assigned to out of limit measurements, allowing identification of process critical deviations of input or output.

Advantages:

- Signals extended out of range sensor inputs which may be caused by process runaway.
- Can identify if process material has been exposed to critical temperatures which make the material unusable.
- Can improve process alarm management strategy.



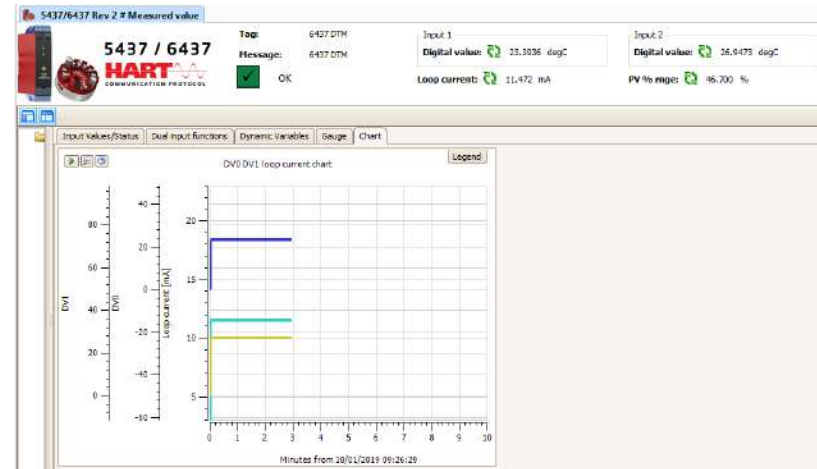
Typical example showing behavior on an upper input limit of 130°C

FDT compliant DTM (Device Type Manager)

In conjunction with a relevant frame application such as (PACTware, AMS, FDT container etc.), the DTM offers a rich graphical interface to the many features of the device.

- Parameterization
- Live measured values
- Device status
- Device diagnostics
- Dynamic variables
- Runtime meters
- Trends and charts

DTM screenshot



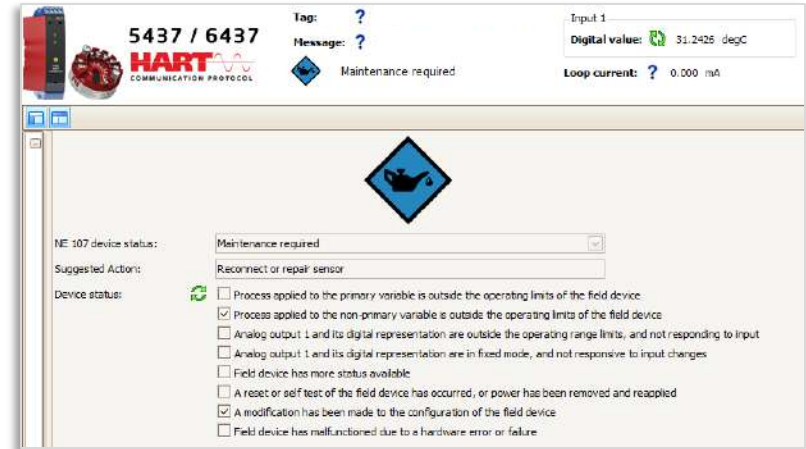
Diagnostics: NE107






Self monitoring and diagnosis of field devices

The PR 5437 is NE107 compliant, allowing users to take advantage of standardized error reporting and diagnostics.

Advantages:

- Enables reliable integration into asset management systems.
- Fully utilize intelligent device management.
- Optimize preventative maintenance scheduling and improve fault diagnosis.
- More intuitive dashboards, faceplates etc.



				
Normal Signal status is normal	Failure E.g. sensor failure	Maintenance required E.g. sensor drift detected	Check function E.g. device configuration invalid	Out of specification E.g. internal device temperature too high

Design optimization

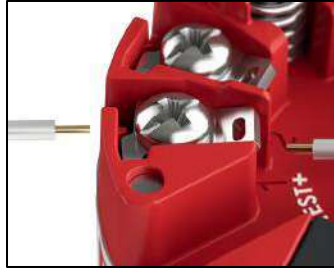
Responding to our customers

The PR 5437 optimizes design for ease of installation and troubleshooting.

Advantages:



1/4" center hole to accommodate wider selection of sensor / probe diameters e.g. spring loaded.



Possibility to wire the transmitter from either the outside or inside of the terminals.



4...20 mA test pins for loop current inspection while not disturbing the loop.



Dual color status LED to NE44 (heartbeat, sensor and functional errors).



Hardware (jumper) setting of write protect and transmitter burnout.

Patented technologies

Innovative

Performance of the PR 5437 is supported by PR patented technologies, which enable simultaneous error detection and power supply support for 3 high accuracy sensors (incl. CJC).

Advantages:

- Rapid response to sensor / wire breakage with simultaneous fast signal measurement.
- Low power, high efficiency power supply able to support 3 sensors while maintaining maximum stability and accuracy.



Futureproof concept

A foundation for further opportunities

In order for the PR 5437 to take advantage of emerging technologies, an expansion port is included for potential future peripherals and connectivity.

Advantages:

- Potential upgrades e.g. wireless, display, redundant output etc.
- Protection of investment



Configuration options



PC with
Loop Link



PC with
HART modem



Portable
communicators

FieldCare

FieldMate

AMS
Suite

PRM



DCS / PLC
Field device management

Approvals

Approvals & standards

The PR 5437 has the most comprehensive list of approvals to date including EU-RO marine approval.

Advantages:

- Global compliance to overcome potential objections, important for machine builders and projects.
- EU-RO marine approval has greater recognition across worldwide bodies.
- Compliant with NAMUR standards NE21, NE43, NE44, NE89, NE95 and NE107.
- The 5437A can be mounted in zone 2 and 22 / Class I, Division 2, Groups A, B, C, D.
- The 5437D can be mounted in zone 0, 1, 2 and zone 20, 21, 22 including M1 / Class I, Division 1, Groups A, B, C, D.

Type	Inputs	SIL Approval	Marine Approval
5437A	Single Input (4 terminals)	:1 SIL	:S Yes
5437D	Dual Input (7 terminals)	:2 No SIL	: - No



NE95 – PR 5437 has passed the chemical industry's quality test

The 5437 has been type-tested by **Bilfinger Maintenance GmbH** in accordance with **NE95** and thus meets the stringent requirements of the chemical industry.

The **NE95** recommendation covers a number of tests to prove device capability including:

- Extensive device testing
- Assembly and maintenance appraisal
- Functional safety and explosion protection appraisal
- Application appraisal

PR 5437 meets the requirements of NAMUR. NAMUR is an international association of user companies (established in 1949) and represents their interests concerning automation technology. NAMUR numbers over 150 member companies.



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Questions?