

# NEON Temperature Transmitter Ex Variant

## Datasheet

This document applies to version 2 of the:  
NEON Temperature Transmitter (DS-TT-02-XX)





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## 1 Description

IMI TWTG's NEON technology represents a standardised approach to collecting data points from operational environments. This creates a general approach to integrated data collection within existing IT ecosystems.

The NEON product range supports all industrial customers moving towards LoRaWAN as the Industrial IoT network of the future.

The LoRaWAN network provides industrial operations with a secure solution that can scale up tens of thousands of sensors. It can cover entire sites with only a few gateways while the low-power approach extends the lifetime of our NEON product range.

The future of asset performance management is changing. It is becoming ever more digitised with data collected from Industrial IoT sensors providing insight and knowledge.

The NEON Temperature Transmitter is designed to be implemented within minutes and to transmit the signal for monitoring purposes by being connected to an industrial thermocouple or RTD. The device can be connected to a thermocouple via an M12 connector with an extension cable. It uses on-board intelligence to determine average values over user-determined time scales to provide insights that can be used directly within existing systems.

## 2 Features

### NEON product family

- Fully LoRaWAN compatible
- End-to-End encryption & cryptographic algorithms from field to software
- 100% ownership of data
- ATEX / IECEx Zone 0, HazLoc Class 1 Division 1
- Battery powered for easy deployment
- Installation within live environments (continuous operation)
- Integration with existing data backends or DCS
- Visualisation via IMI's SolidRed Suite or any other IoT platform
- Provision of Life cycle Support

### NEON Temperature Transmitter - Ex Variant

- Sensor:  
Thermocouple probe compatible  
RTD (PT100) compatible
- Measuring range:  
-270 °C .. 1820 °C (-454 °F .. 3308 °F)  
depending on the type sensor element
- Wireless protocols:  
LoRaWAN 868 MHz, 915 MHz and 923 MHz
- Dimensions:  
100 mm x 70 mm x 45 mm ( $L \times W \times H$ )



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Revision History

| Revision | Date       | Description                                                                                                                                                                                                                                            |
|----------|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A1       | 29-07-2022 | Concept version                                                                                                                                                                                                                                        |
| A2       | 05-10-2022 | Updated product specifications and ratings<br>Added French warnings                                                                                                                                                                                    |
| A3       | 24-11-2022 | Updated FCC/ISED declaration                                                                                                                                                                                                                           |
| A4       | 21-02-2023 | Updated UI                                                                                                                                                                                                                                             |
| A6       | 12-06-2023 | Updated Product Dimensions                                                                                                                                                                                                                             |
| A7       | 22-08-2023 | Added 2-Wire                                                                                                                                                                                                                                           |
| A8       | 19-09-2023 | Added Magnet Kit & updated output power                                                                                                                                                                                                                |
| B1       | 07-11-2024 | Unified user manuals                                                                                                                                                                                                                                   |
| B2       | 20-12-2024 | Added ANATEL declaration                                                                                                                                                                                                                               |
| B3       | 17-06-2026 | IMI branding<br>Added <i>Order matrix</i><br>Added Anatel and Inmetro certification logos<br>Updated temperature ranges for thermocouples and RTDs to match industry standards<br>Updated transmitter and sensor functionality to match protocol TT v5 |

### 3 Specifications

| Product name |                                           |
|--------------|-------------------------------------------|
| Product name | NEON Temperature Transmitter - Ex Variant |

#### 3.1 Product specifications transmitter

| Environmental conditions transmitter            |                                                                                                                                             |
|-------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Operating temperature range                     | −40 °C .. 70 °C (−40 °F .. 158 °F)                                                                                                          |
| Operating humidity range                        | 0% RH .. 100% RH                                                                                                                            |
| Storage temperature range                       | 10 °C .. 30 °C (50 °F .. 86 °F)                                                                                                             |
| Water and dust resistance                       | IP66                                                                                                                                        |
| Altitude                                        | Up to 3000 m (9842 ft)                                                                                                                      |
| Usage                                           | Indoor and outdoor                                                                                                                          |
| Mechanical                                      |                                                                                                                                             |
| Enclosure material                              | Molded plastic                                                                                                                              |
| Weight Transmitter (including mounting bracket) | 330 g (11.64 oz)                                                                                                                            |
| Dimensions                                      | 106 mm × 86 mm × 57 mm (4.17" × 3.39" × 2.24")                                                                                              |
| Maximum cable length                            | Limited by equipment output parameters                                                                                                      |
| Installation                                    |                                                                                                                                             |
| Transmitter                                     | Band clamp or bolts (not included)                                                                                                          |
| Power supply                                    |                                                                                                                                             |
| Battery rated voltage                           | 3.6 V                                                                                                                                       |
| Battery rated capacity                          | 17 Ah                                                                                                                                       |
| Battery                                         |                                                                                                                                             |
| Battery type (replaceable)                      | 1x Type D                                                                                                                                   |
| Battery life                                    | 10 years                                                                                                                                    |
| Conditions                                      | at 25 °C (77 °F);<br>with default measurement intervals;<br>depending on average ambient temperature, type of<br>sensor and network quality |
| Connectivity                                    |                                                                                                                                             |
| Protocol                                        | LoRaWAN (private LoRaWAN)<br>1.0.4 / RP2-1.0.3                                                                                              |
| Frequency band                                  | 868 MHz, 915 MHz and 923 MHz compatible                                                                                                     |
| Maximum RF output power                         | +14 dBm                                                                                                                                     |
| Transmitter features                            |                                                                                                                                             |
| Time synchronisation                            | Time synchronisation for multiple sensors<br>Accuracy 12mSec                                                                                |

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|                                 |                                                 |
|---------------------------------|-------------------------------------------------|
| Firmware update over air        | In accordance with LoRa Alliance specifications |
| Provisioning                    |                                                 |
| Data matrix code/ Serial number | Serial number (read only)                       |
| NFC                             | Serial number (read only)                       |

### 3.2 Supported sensors

| Firmware features                        |                                                                          |
|------------------------------------------|--------------------------------------------------------------------------|
| Temperature sensor type configuration    | Type of thermocouple, single RTD, dual RTD (default thermocouple type K) |
| Independent event-based message triggers | 1. Timer<br>2. Button press<br>3. Above<br>4. Below                      |
| Adjustable Measurement interval          | Flexible, 1 minute resolution, (either relative or absolute)             |
| Adjustable Message interval              | Always, or on condition                                                  |
| Units                                    | °C<br>°F (through USC codec)                                             |

| Functional specifications |                                                                                                        |
|---------------------------|--------------------------------------------------------------------------------------------------------|
| Input                     | M12 Connector; 4 Pins, A coded, female (use the assessed connectors for the thermocouple installation) |

| Thermocouples                                           |                                     |
|---------------------------------------------------------|-------------------------------------|
| Sensor Type (<T/Cs>)                                    | Input range:                        |
| B                                                       | 0°C to 1820°C (32°F to 3308°F)      |
| E                                                       | -270°C to 1000°C (-454°F to 1832°F) |
| J                                                       | -210°C to 1200°C (-346°F to 2192°F) |
| K                                                       | -270°C to 1372°C (-454°F to 2502°F) |
| N                                                       | -270°C to 1300°C (-454°F to 2372°F) |
| R                                                       | -50°C to 1768°C (-58°F to 3214°F)   |
| S                                                       | -50°C to 1768°C (-58°F to 3214°F)   |
| T                                                       | -270°C to 400°C (-454°F to 752°F)   |
| Accuracy (value whichever is greater)                   | +/- 0.1% of span                    |
| Temperature effects / 10°C (value whichever is greater) | +/- 0.5 % of span                   |
| Open circuit monitoring                                 | Yes                                 |
| Calibration                                             | Factory calibrated                  |
| Cold junction compensation                              | Integrated digital measurement      |

| Resistance Temperature Detector (RTD)                   |                                                |
|---------------------------------------------------------|------------------------------------------------|
| Sensor Type (<T/Cs>)                                    | Input range:                                   |
| PT100                                                   | -200°C to 850°C (-328°F to 1578°F)             |
| Accuracy (value whichever is greater)                   | +/- 0.1% of span                               |
| Temperature effects / 10°C (value whichever is greater) | +/- 0.05 % of span                             |
| Interface                                               | Three-wire system (Reference current <-1.0 mA) |

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|                          |     |
|--------------------------|-----|
| Open circuit monitoring  | Yes |
| Short circuit monitoring | Yes |

### 3.3 Certifications

| Certifications          |                                                                                                                                                                                           |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ATEX/IECex rating       | Ex II 1G Ex ia IIC T4 Ga                                                                                                                                                                  |
| ATEX/IECEx standards    | EN/IEC 60079-0:2018<br>EN 60079-11:2012<br>IEC 60079-0:2017<br>IEC 60079-11:2011                                                                                                          |
| ATEX/IECEx certificates | 22ATEX0004X / DEK22.0004X                                                                                                                                                                 |
| cFMus Rating            | IS Class I, Division 1, Group ABCD T4<br>Class I, Zone 0 AEX/Ex ia IIC T4 Ga                                                                                                              |
| cFMus standards         | FM Class 3600<br>FM Class 3610<br>FM Class 3810<br>ANSI/UL 60079-0<br>ANSI/UL 60079-11<br>CAN/CSA-C22.2 No. 61010-1<br>CAN/CSA-C22.2 No. 60079-0<br>CAN/CSA-C22.2 No. 60079-11            |
| cFMus certificates      | FM22US0061X / FM22CA0043X                                                                                                                                                                 |
| CE                      | EN 300 220-1 V3.1.1<br>EN 300 220-2 V3.2.1<br>EN 301 489-1 V2.2.3<br>EN 301 489-3 V2.1.1<br>EN 61010-1:2010 + A1:2019 + A1:2019/AC:2019<br>EN 62311:2020<br>EN 60529:1911+A1:2000+A2:2013 |
| UKCA                    | Radio Equipment Regulation 2017                                                                                                                                                           |
| INMETRO standards       | ABNT NBR IEC 60079-0:2020 Versão Corrigida:2024<br>ABNT NBR IEC 60079-11:2013 Versão Corrigida:2017                                                                                       |
| INMETRO certificates    | DEK25.0008X                                                                                                                                                                               |
| WEEE                    | Directive 2033/108/EC                                                                                                                                                                     |
| RoHS                    | 2011/65/EU                                                                                                                                                                                |

## 4 Order matrix

| Temperature transmitter |                                                                            | XX | 0 | X | 1 | X |
|-------------------------|----------------------------------------------------------------------------|----|---|---|---|---|
| Use case                | Transmitter only (default configuration, sensors to be ordered separately) | TT |   |   |   |   |
| Ex approval             | Yes                                                                        |    | 0 |   |   |   |
| LoRa Region             | EU868                                                                      |    |   |   | 1 |   |
|                         | US915                                                                      |    |   |   | 2 |   |
|                         | AS923-1                                                                    |    |   |   | 3 |   |
|                         | AS923-2                                                                    |    |   |   | 4 |   |
|                         | AS923-3                                                                    |    |   |   | 5 |   |
|                         | AS923-4                                                                    |    |   |   | 6 |   |
|                         | AU915                                                                      |    |   |   | 7 |   |
|                         | IN865                                                                      |    |   |   | 8 |   |
| Hardware variant        | Hardware Version 2                                                         |    |   |   |   | 1 |
| Firmware variant        | Protocol V4                                                                |    |   |   |   | 4 |
|                         | Protocol V5                                                                |    |   |   |   | 5 |

### 4.1 Temperature sensors

The NEON Temperature Transmitter can be supplied with customized temperature sensor elements, such as thermocouples or single/dual RTDs, to meet specific application requirements. Please contact our sales team for further information on sensor customization and availability.

### 4.2 Accessories

| Description                                 | Order code |
|---------------------------------------------|------------|
| Temperature sensor connector (f) - straight | TCC-F02    |

### 4.3 Spare parts

| Description                                                                    | Order code |
|--------------------------------------------------------------------------------|------------|
| Battery replacement kit<br>- including 1 battery assembly, 4 O-rings, 1 gasket | BATT-DS-02 |

# Process Automation

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