

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
Facsimile No.: (301) 816-5151

9 March 2022

Dear Sir / Madam

Report under 10CFR21 of noncompliance

I am writing to inform you that three noncompliances to specification have been found in the following basic component manufactured by Ultra Energy at the above address with the date of discovery being 01/12/2022:

- N7030 temperature transmitter (all sub-models)

The first two defects outlined below were identified during product testing; these are dependent on component tolerances and fabrication and do not exist in all units. The third defect was identified during the safety investigation:

1. Transmitters configured to indicate a failed Resistance Temperature Device [RTD] sensor through an over-range signal in a 4-20mA current loop could return to an in-range reading when operating at a temperature close to the bottom of their specification.
2. Transmitters configured to indicate a failed Resistance RTD sensor through an under-range signal in a 4-20mA current loop could return to an in-range reading when operating at a loop voltage close to the bottom of their specification.
3. Transmitters from which the RTD sensor had been disconnected, in the presence of a very high impedance (mega-ohm range) condition at the input terminals and in a specific narrow temperature range (<10C) may output noise and not a DC signal.

The first two defects could cause a sensor which had failed to appear to be functioning, although the reading would likely be obviously false and thereby highly unlikely to result in any risk to safety. The third condition might, depending on sensor noise filtering, result in a false temperature reading which was not obvious. This however requires multiple parameters to be in the correct ranges to trigger the latent defect and is also highly unlikely to result in any risk to safety.

The number and location of these components in use or under manufacture within U.S. Nuclear Regulatory Commission jurisdiction is as follows:

IE19
NRR

Part number	Quantity	Location
N7030-P4ADP+0F+750F,TEMP. TRANSMITTER	3 **work in progress, not shipped	Oconee Nuclear Station
N7030-P3AUP+0F+400F,TEMP. TRANSMITTER	2	Quad Cities NPS
N7030 Analog Temp. Transmitter,4-20mA	2	Prairie Island Nuclear Generating Plant

The following corrective actions are being taken:

4. Customers with impacted devices have been informed of:
 - a. A reduction in specification for operating temperature and loop voltage in respect of the conditions outlined in points 1 and 2 above.
 - b. A field fix for the high impedance condition outlined in point 3 above.
 - c. All customers of the impacted devices will be informed of the issues described using an Engineering Bulletin which is attached to this letter. Please note that this bulletin refers to a device called the N7040 in addition to the N7030, because this device is impacted by the same issues. However, none of these devices have been supplied to safety-related applications within NRC jurisdiction.
5. Existing Work In Progress to manufacture impacted devices has been segregated and will be scrapped.
6. Design modifications to eliminate the identified defects will be made to the impacted devices before any further manufacture occurs. These are very minor and will not require requalification.

The corrective actions are the responsibility of our Director of Quality; Diane Steen, who is located at the address given on this letter.

We trust this matter has been resolved in full compliance to our regulatory obligations, please contact me in the event of any questions

Yours Sincerely



Gary Hawkins
Vice President Engineering

Enclosure: Engineering Bulletin for N7030 and N7040 Temperature Transmitters

Engineering Bulletin for N7030 and N7040 Temperature Transmitters

03/04/2022

Abstract

The current technical bulletin contains updates to the technical specifications of the N7030 and N7040 transmitters and field fixes for issues identified the N7030 transmitter.

N7030 is a high accuracy 4-20mA temperature transmitter with a 3 wire or 4 wire PT100 sensor. The input temperature range is customizable. The transmitter is specified for nuclear applications and has a built-in function for detecting sensor or harness failure.

N7040 is a precision 4-20mA transmitter that could be configured for a variety of thermocouples. N7040 has the same safety specifications as N7030 and the same built-in sensor failure detection functionality.

N7030 and N7040 were designed together, and they share part of the design. Some notes apply to both models, and some apply only to one specific model.

The issues listed in this bulletin were discovered during an internal production and schematic review. Only some of the shipped transmitters are affected by the issues described in this bulletin and the probability of these being manifested in the field is low, as they occur in unlikely conditions. This appears to be confirmed by the fact that we have received no customer reports of the conditions described.

The production data for all transmitters shipped to date was analyzed and the fixes to the identified problems were proven to work on all units.

Design changes have been identified to resolve these issues in future device production.

Transmitters may fail to output the maximum specified current (20mA)

Affected models: N7030 and N7040

Conditions: The issues may manifest when the transmitter terminal voltage is between 25V and 35V and the ambient temperature is below 5°C

Recommended fix: Operate the transmitters at ambient temperatures above 5°C

Product specifications for the N 7030 and N7040 are accordingly amended:

Current spec	
Temperature Limits: Operating / Storage	32°F to 158°F (0°C to 70°C) / - 40°F to 212°F (- 40°C to 100°C)
New spec	
Temperature Limits: Operating / Storage	41°F to 158°F (5°C to 70°C) / - 40°F to 212°F (- 40°C to 100°C)

Transmitters may fail to output the minimum specified current (4mA)

Affected models: N7030 and N7040

Conditions: The issues may manifest when the transmitter terminal voltage is below 14V

Recommended fix: Operate the transmitters at minimum terminal voltages above 14V

Product specifications for the N 7030 and N7040 are accordingly amended:

Current spec	
Power Supply	Single 4-20 mA loop: 12 to 48 VDC terminal Voltage. Power budget: 23mA x 48 VDC = 1104 mW maximum.
New spec	
Power Supply	Single 4-20 mA loop: 14 to 48 VDC terminal Voltage. Power budget: 23mA x 48 VDC = 1104 mW maximum.

N7030 may fail to detect some failures on RTD sensor or sensor wiring

Affected models: N7030 (RTD input)

Conditions: The sensor error detection may fail when two wires are interrupted or when RTD sensor and one connection wire are interrupted at the same time.

Recommended fix: Connect an external resistor between the transmitter terminals as described below.

Recommended resistor:

Resistor value: 10MΩ
 Manufacturer: Vishay-Dale
 Resistor PN: RN55D1005FB14

Rework procedure:

- Cut the resistor terminals 3/4" long
- Bend the resistor leads keeping 3/4" between them for the 4 wire RTD transmitter and variant and 3/8" for the 3 wire RTD variant.
- Identify the connection terminals depending on the transmitter model – see Figure 1. Pay attention to the connection points. Connecting the resistor to the wrong terminals will not restore the fault detection function.

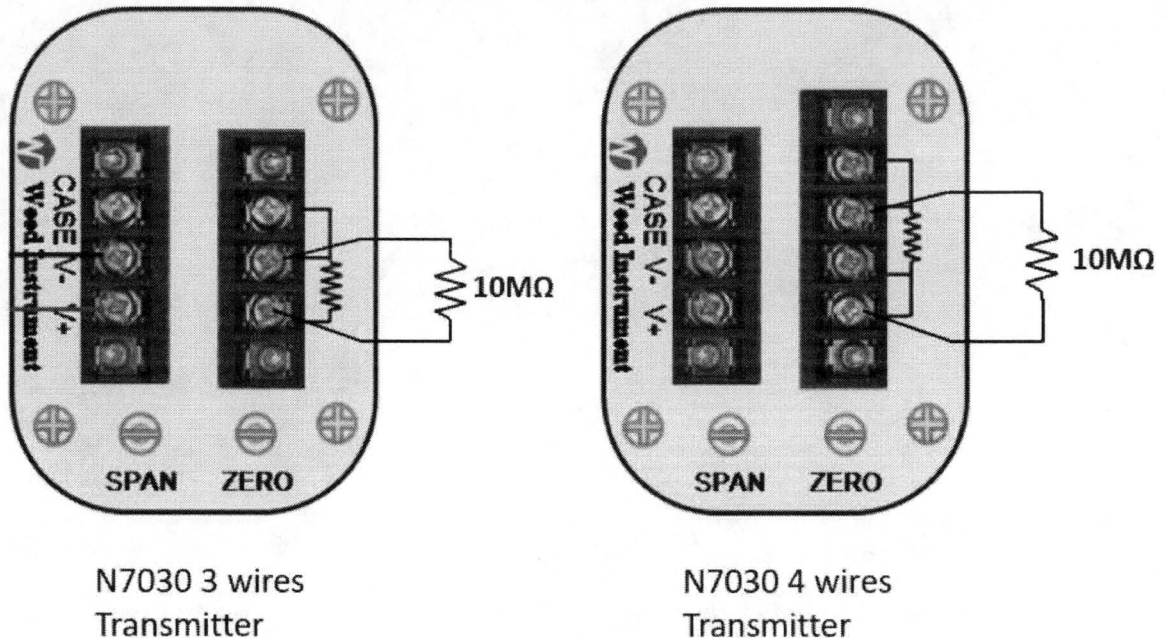


Figure 1

- Power down the transmitter. The rework could be performed with the transmitter powered ON, but it will output erratic values that could affect the control loop.
- Unscrew the connector terminals and insert the resistor leads near the connection wires
- Tighten back the connector screw terminals.
- Bent the resistor such that the resistor body or the leads will stay away from the transmitter case and from the RTD connection wires

Note: The added 10MΩ resistor will add negligible measurement error. The transmitter doesn't need to be recalibrated after this procedure.