

# Interfacing to the 4-20mA Output

The NeoFox includes a non-isolated 4-20 mA current sink that can be used to transmit oxygen, temperature, or tau data. It is extremely important that you set up the interface for this output correctly, or else irreparable damage to the NeoFox unit can occur.

The figure below shows a complete 4-20 mA loop and its 3 main components: the NeoFox unit, an ammeter, and a voltage supply. In the diagram, the NeoFox unit is shown on the left and the customer's interface circuitry (voltage supply and ammeter) is on the right. Although they are drawn close together, the NeoFox unit and the customer's interface circuitry may be physically located far apart, connected by a 2-wire cable.

## Typical 4-20 mA Interface

### 4-20 mA Loop Voltage Supply

As a simple current sink, NeoFox does not provide its own power for the current loop. The user must provide an isolated power supply between 11 V and 30 V (measured at the input to the NeoFox unit) to power the loop. This power supply **must be** completely separate from the NeoFox and its power supply; the grounds of the Neofox and the supply **cannot be connected together**.

Most customers will use separate AC adapters to power their NeoFox unit and their interface circuitry. Usually this will result in the two circuits floating with respect to each other so that the circuit will work properly. However, it is important to note that NeoFox has a grounded metal case that is connected to its circuit ground and its USB shell. Hence, customers who connect the NeoFox's case ground to their interface circuit's case ground will find that the measurements are not correct. Some common situations that could lead to unintended ground connections are the following:

# A

*Neofox  
Unit*

**PIN 4**

**PIN 3**

*Loop  
Voltage  
Supply  
Ammeter*

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- Mounting both devices on a common metal surface (such as a DIN rail)
- Connecting both devices to a single computer or USB hub
- Using the same measurement device to measure the 0-5V output and the 4-20mA output. (The 0-5V output is referenced to the NeoFox circuit ground.)
- Using the same measurement device to communicate with NeoFox via RS232 and to measure the output of the 4-20 mA output. (RS232 is only available in NeoFox GT models, which are available by request).

Users should be aware of any possible connections between NeoFox and their interface circuits when setting up their hardware.

### 4-20 mA Isolation

Some users (especially those in industrial settings) may need to use an isolated 4-20 mA loop. Unfortunately, the current sink on the NeoFox unit is not isolated and is not suitable for use in environments which may cause the loop voltage to exceed 30V. However, there are a number of thirdparty products available that can convert the output of the NeoFox into an isolated 4-20 mA loop transmitter.

Some suitable products include:

- LPI-1
- Manufacturer: A Pi (<http://www.api-usa.com>)
- Suggested Vendor: Mod-tronic. (<http://www.mod-tronic.com>)
- Part Number: LPI-1
- Datasheet: [http://www.api-usa.com/pdf/api/api\\_lpi-1\\_lpi-2.pdf](http://www.api-usa.com/pdf/api/api_lpi-1_lpi-2.pdf)
- 931S-A1A1N-IP1
- Manufacturer: Rockwell Automation
- Suggested Vendor: Varies by geographic region
- Part Number: 931S-A1A1N-IP1
- Datasheet:

<http://www.ab.com/en/epub/catalogs/12768/229240/229268/10202439/10202445/tab3.html>

- 931S-C1A2D-OP\*
- Manufacturer: Rockwell Automation
- Suggested Vendor: Varies by geographic region
- Part Number: 931S-C1A2D-OP
- Datasheet:

<http://www.ab.com/en/epub/catalogs/12768/229240/229268/10202439/10202445/tab9.html>

\*This part can be used to convert the 0-5V output of the NeoFox into a 4-20mA signal.

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