# Sensor Connections

The Sensor Connections guide lists most common Banner and non-Banner sensors and how to wire them to the DX80 devices.

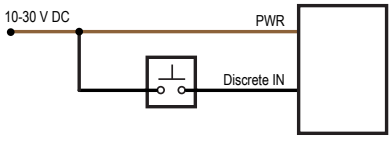
This reference guide lists typical connections. If you have additional questions about a specific sensor or its connection instructions, please contact Banner Engineering or the manufacturer of the sensor you are using.

# Discrete Inputs

**Discrete Sensors.** Neither the inputs nor the outputs on the DX80 devices are isolated. Under certain operating conditions, externally powered sensors may need to have ground in common with the DX80 device to which they are connected. The power sources do not have to be the same.

## Discrete Inputs, Sourcing

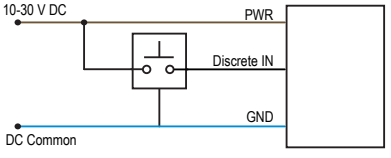
*Two-wire sensors*




Wiring diagram for a sourcing (PNP), two-wire sensor powered using the Sure Cross device terminal block.

The sensor's power source might need to be the same as the Sure Cross device's power source.

*Three-wire sensors*

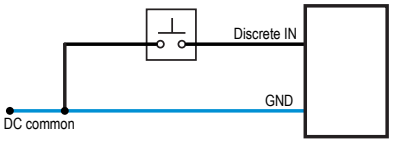



Wiring diagram for a sourcing (PNP), three-wire sensor powered using the Sure Cross device terminal block. Under certain conditions, the dc commons between the sensor and the Sure Cross device might need to be connected.

The sensor's power source might need to be the same as the Sure Cross device's power source.

## Discrete Inputs, Sinking

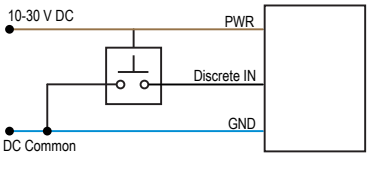
*Two-wire sensors*




Wiring diagram for a sinking (NPN) two-wire sensor powered using the Sure Cross device terminal block.

Under certain conditions, the DC commons between the sensor and the Sure Cross device might need to be connected.

*Three-wire sensors*




Wiring diagram for a sinking (NPN) three-wire sensor powered using the Sure Cross device terminal block.

Under certain conditions, the DC commons between the sensor and the Sure Cross device might need to be connected.

Original Instructions
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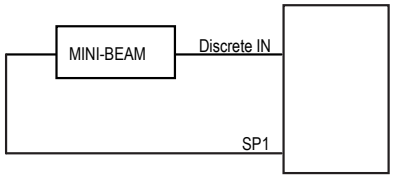
## Discrete Inputs, MINI-BEAM

*MINI-BEAM*

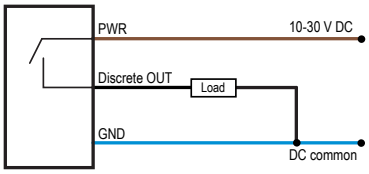



Two-wire MINI-BEAM sensor using a FlexPower Node and powered using the Node's switch power.

# Discrete Outputs

## Discrete Outputs

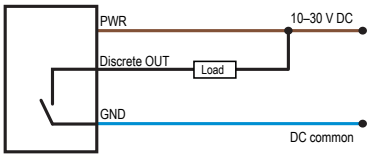
*Sourcing (PNP)*




Wiring diagram for a sourcing (PNP) two-wire output load powered using the Sure Cross device terminal block.

Under certain conditions, the DC commons between the load and the Sure Cross device might need to be connected.

*Sinking (NPN)*




Wiring diagram for a sinking (NPN) two-wire output.

Under certain conditions, the DC commons between the load and the Sure Cross device might need to be connected.

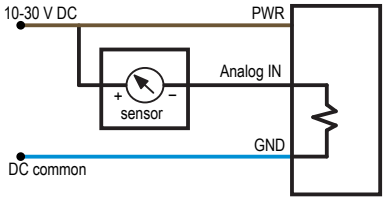
The sensor's power source might need to be the same as the Sure Cross device's power source.

# Analog Inputs

**Analog Sensors.** For analog sensors, the ground/dc common of the sensor should be connected to the ground of the DX80 device. For best results, Banner recommends that the power source for the sensor and DX80 device is the same.

## Analog Inputs, Powered using Sure Cross Device Terminals

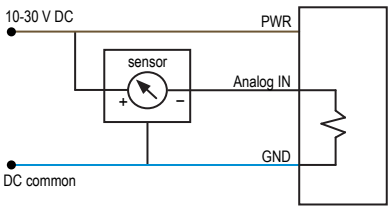
*Two-wire sensors*




Two-wire analog sensor powered from a 10–30 V DC power Sure Cross device using the PWR terminal.

Do not exceed analog input ratings for analog inputs. Only connect sensor outputs to analog inputs.

*Three-wire sensors*




Three-wire analog sensor powered from 10–30 V DC power Sure Cross device using the PWR terminal.

Do not exceed analog input ratings for analog inputs. Only connect sensor outputs to analog inputs.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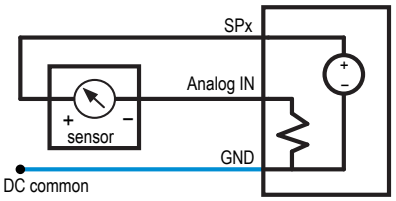
## Analog Inputs, Powered from Switch Power

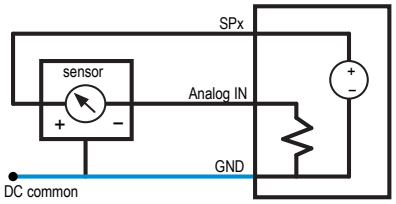
*Two-wire sensors*




Two-wire analog sensor or two-wire NAMUR proximity sensor using a FlexPower Node and powered using the Node's switch power.

Do not exceed analog input ratings for analog inputs. Only connect sensor outputs to analog inputs.

*Three-wire sensors*



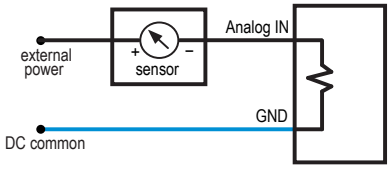

Three-wire analog sensor using a FlexPower Node and powered using the Node's switch power.

Do not exceed analog input ratings for analog inputs. Only connect sensor outputs to analog inputs.

## Analog Inputs, Powered Externally

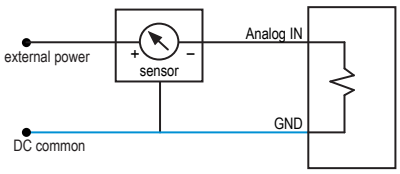
Do not exceed analog input ratings for analog inputs. Only connect sensor outputs to analog inputs.

*Two-wire sensors*




Two-wire analog sensor using a FlexPower Node but the sensor is powered externally (not from the Sure Cross device).

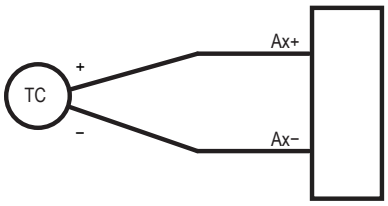
*Three-wire sensors*




Three-wire analog sensor using a FlexPower Node but the sensor is powered externally (not from the Sure Cross device).

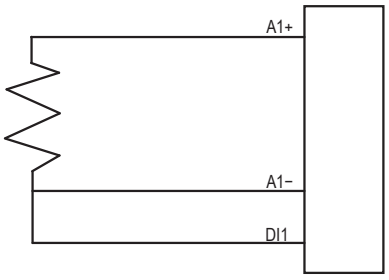
## Analog Inputs, Temperature Sensors

*Thermocouple*




| TC Type | - Wire | + Wire |
|---|---|---|
| J | red | white |
| K | red | yellow |
| R | red | black |

*RTD*




This wiring diagram applies to a standard three-wire RTD sensor.

When using thermocouple and RTD sensors, the quality of the power supply influences the accuracy of the signal.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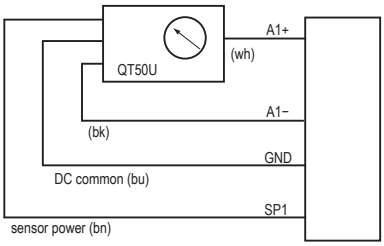
## Analog Inputs, QT50U Long-Range Ultrasonic Sensor

*QT50U Ultrasonic sensor*



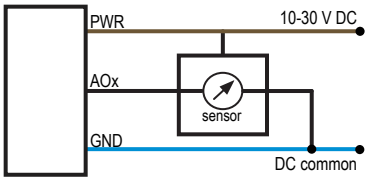

Four-wire QT50U sensor, using a FlexPower Node, and powered using the Node's switch power terminal. The QT50U output is set to 4–20 mA.

Do not apply power to the Ax+ connection.

# Analog Outputs

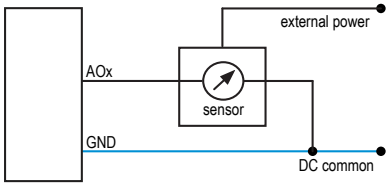
## Analog Outputs, Three-Wire Sensors

*Powered from the Sure Cross terminals*




Three-wire analog output device powered by the Sure Cross device.

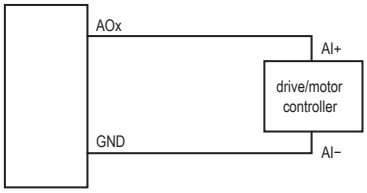
*Powered externally*




Three-wire analog output device powered externally (not from the Sure Cross device).

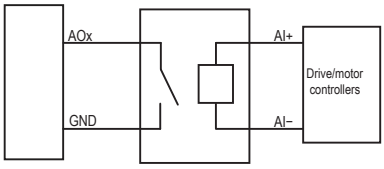
## Analog Outputs, Drive Motor Controllers

*AI- referenced to ground*




When the AI- can be referenced to ground, use this wiring diagram for drive/motor controllers.

*AI- not referenced to ground*




When the AI- cannot be referenced to ground, use this wiring diagram for drive/motor controllers.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