

WIO-800L

Wireless I/O



User Guide

INM WIO800L



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Safety information

Thank you for selecting a WIO-800L product for your telemetry needs. We trust it will give you many years of valuable service. To ensure your WIO-800L product enjoys a long life, double-check **ALL** your connections with the **Installation Guide** before powering on the module.

WARNING: Incorrect termination of supply wires may cause internal damage and will void warranty.

About this document

This document is the **WIO-800L Wireless I/O Installation Manual** that describes how to install your WIO-800L units and contains important information for installing your units with other equipment.

Note

If your network only contains one transmitter and receiver pair, you should also read the WIO-800L QuickStart Guides.

This document contains the following sections:

| Section | Read this section if you want to ... |
|---|---|
| Basic steps for using your unit | Learn the basic steps for installing and using your unit. |
| Factory default configuration | Understand how the transmitter sends information to the receiver. |
| Unit components | Understand the different parts of your unit. |
| Antenna installation | Learn how to install an antenna with your unit. |
| Resetting factory defaults | Reset your unit to the original factory default settings. |
| Linking transmitter and receiver units | Link your units to work as a dedicated pair. |
| Safety information | Understand important safety information related to your unit. NOTE: You must read this information before installing your unit. |
| Specifications | Know technical information about your unit. |

For more information, see the next sections.

Installing your unit

This section describes how to install your unit and contains the following sections:

| Step | Description | For more information, see ... |
|---|--|--|
| 1 – Read the safety information | Lets you understand important safety information related to your unit. NOTE: You must read this information before installing your unit. | Safety Information on page 5. |
| 2 – Get to know the unit features | Understand the basic features of your unit. | Unit components and connections on page 7. |
| 3 – Install the antenna | Learn how to install an antenna with your unit. | Installing the antenna on page 12. |
| 4 – Install the power supply | Learn how to install a power supply for your unit. | Installing the power supply on page 20. |
| 5 – Install the units | Learn how to install your unit. | Installing the unit on page 33. |
| 6 – Linking and configuring the unit | Learn how to link and configure your units to transmit and receive information. | Configuring your units on page 34. |
| 7 – Test the unit | Understand the principles for testing your units. | Testing your units on page 35. |

Note

To ensure internal surge protection works correctly, you must earth each unit using the Earth terminal.

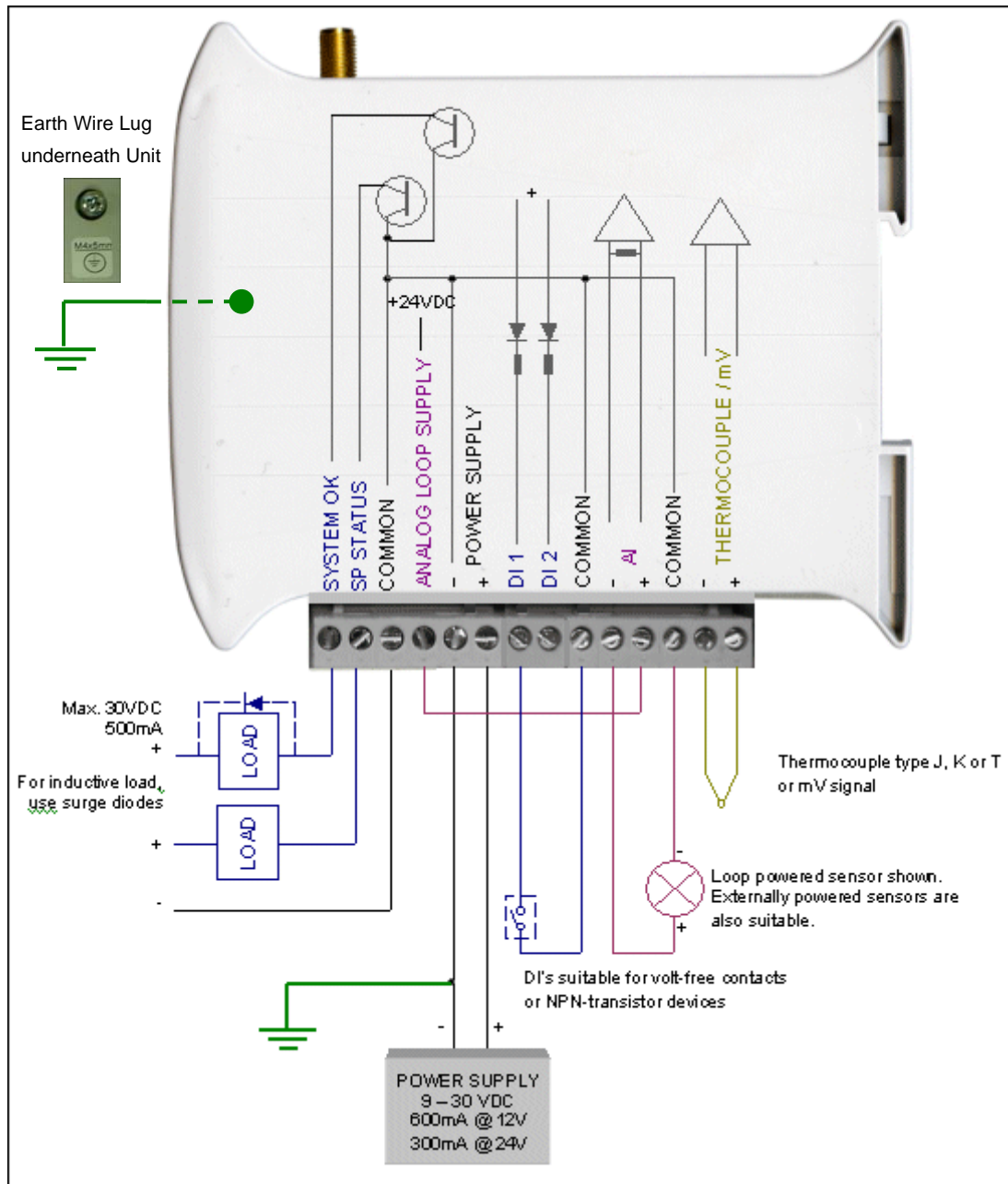
For more information, see the next sections.

Unit components and connections

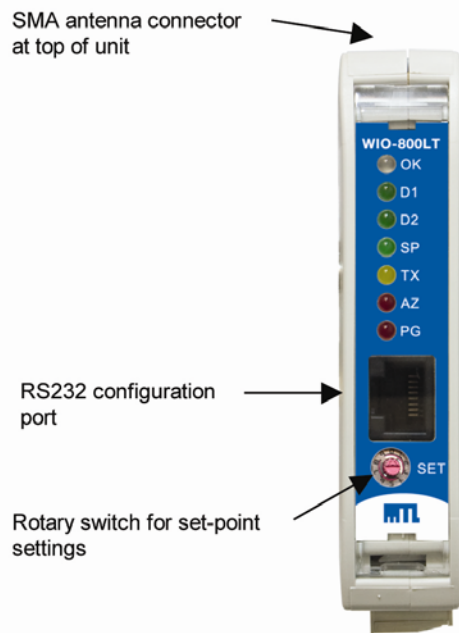
This section shows the components and terminal connections for the transmitter and receiver units.

Transmitter unit

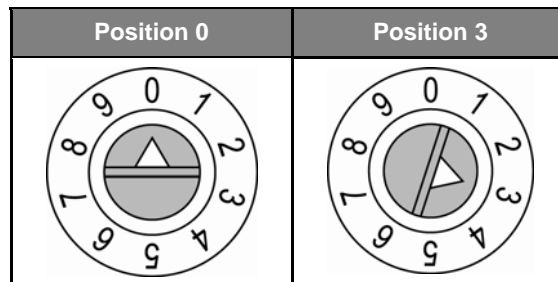
The WIO-800LT transmitter unit has the following components and terminal connections:



The front panel contains the following components:



The triangle on the rotary switch indicates the current position, for example:



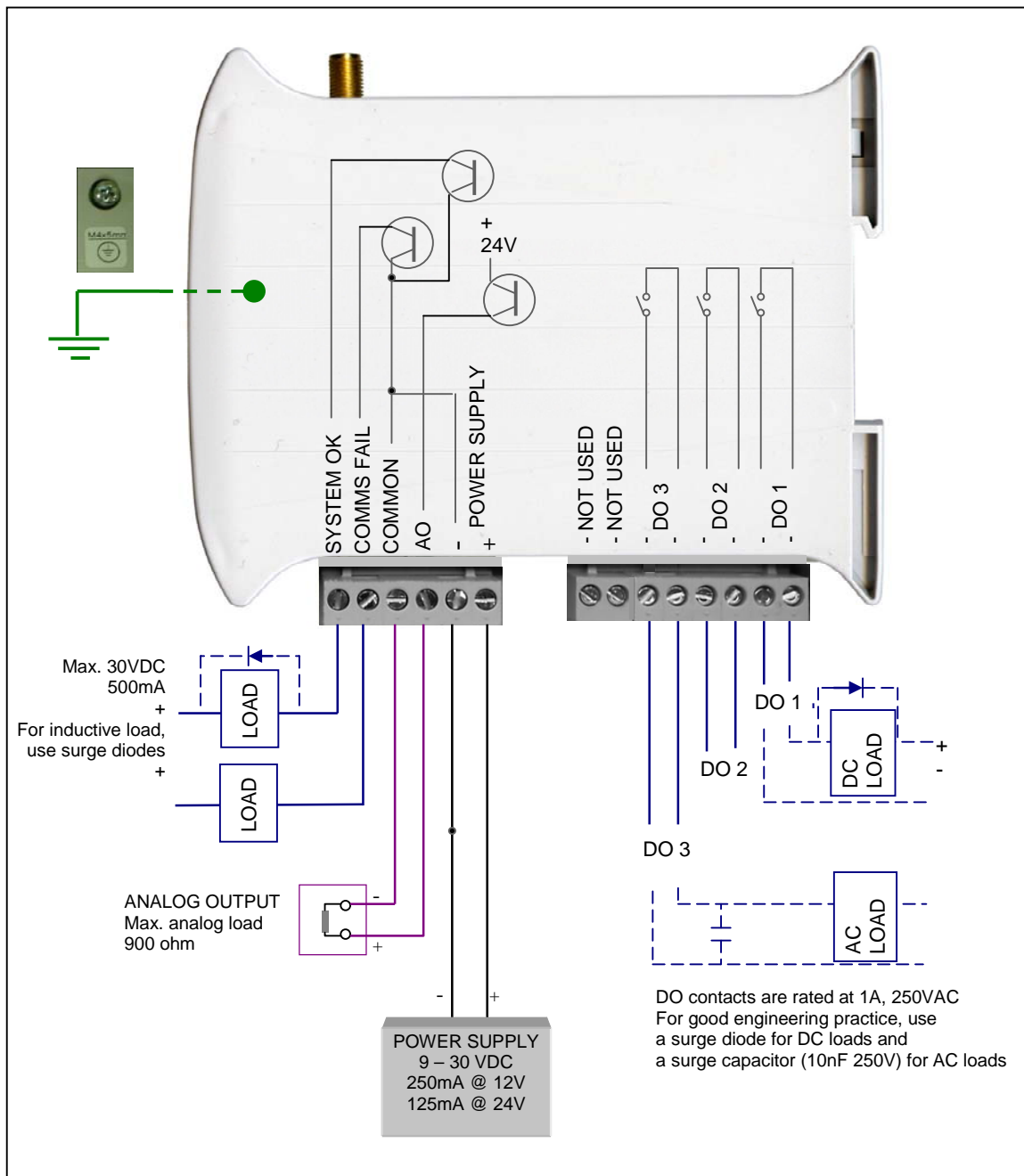
NOTE: To avoid damaging the rotary switch, use a screwdriver to change the position. The rotary switch controls the setpoint levels on the Analog and Thermocouple inputs.

The LEDs on the front panel indicate the unit status:

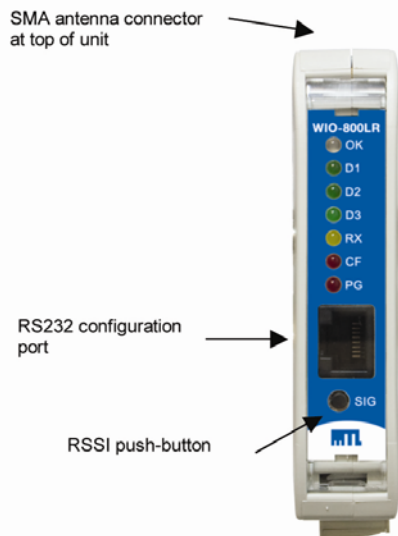
| LED Status | Indicates | |
|------------------------------|---|----------------------------------|
| None | No power supply. | |
| OK LED Green | Current status of the unit OK. | |
| OK LED Red | Fault condition detected in unit. | |
| TX Led Flashes | Transmitting Message. | |
| PG LED on | Configuration Cable Connected. | |
| Input LED ON | Input LEDs (i.e. D1, D2, SP, AZ.) light when the corresponding input is active. | |
| | D1 | Digital Input 1 is active (Low). |
| | D2 | Digital Input 2 is active. |
| | SP | Analog Setpoint is active. |
| | AZ | Analog Input is zero mA |
| All LEDs medium flash | Medium speed flash (1.6HZ) indicates the module is halfway through the configuration process. Medium flash also happens when you set the rotary switch to position 0 when powering on the unit. | |

Receiver unit

Your WIO-800LR unit has the following components and terminal connections:



The front panel contains the following components:



The LEDs on the front panel indicate the unit status:

| LED Status | Indicates | | | |
|---|---|--|-----|----------------------------|
| None | No power supply. | | | |
| OK LED Green | Current status of the unit OK. | | | |
| OK LED Red | Fault condition detected in unit. | | | |
| RX Led Flashes | Receiving Message. | | | |
| CF Led ON | Module Communication Failure Output is active. | | | |
| PG LED on | Configuration Cable Connected. | | | |
| Output LED ON | The Output LEDs (i.e. D1, D2, D3) light when the corresponding output is active. | | | |
| | D1 | Relay output D1 is ON (Contact Closed). | | |
| | D2 | Relay Output D2 is ON. | | |
| | D3 | Relay Output D3 is ON. | | |
| LEDs with RSSI Push Button Pressed | When you press the RSSI push button, the unit shows the signal strength by lighting the LEDs from the bottom to the top. Signal strength is the strength of the last message received that was addressed to this station. | | | |
| | LED | Signal Strength | LED | Signal Strength |
| | D1 | More than -85 dBm | RX | More than -100 dBm |
| | D2 | More than -90 dBm | CF | More than -105 dBm |
| | D3 | More than -95 dBm | PG | Always on during RSSI test |
| Output LED flashing quickly | If an output is in communication failure, the corresponding LED flashes at 5 Hz. | | | |
| | D1 | Relay Output D1 is in communication failure. | | |
| | D2 | Relay Output D2 is in communication failure. | | |
| | D3 | Relay Output D3 is in communication failure. | | |
| | PG | Analog output is in communications failure. | | |

Installing the antenna

This section explains how to install your antenna and contains the following sections:

| Section | Description | For more information, see ... |
|---|--|---|
| Supported antennas and cables | Details the antennas and cables you can use with the units. | Supported antennas on page 12. |
| Radio transmission distances | Details the distances for reliable operation. | Radio transmission distances on page 14. |
| Installing and earthing antennas | Details important information about installing and earthing antennas. | Installing and earthing antennas on page 15 |
| Dipole and collinear antennas | Details important information about using dipole and collinear antennas. | Dipole and collinear antennas on page 16. |
| Yagi antennas | Details important information about using Yagi antennas. | Yagi antennas on page 18. |

For more information, see the next sections.

Supported antennas

You can use the following antennas with the units:

| Antenna | Additional information | Total gain (including cable) |
|--------------------|--|------------------------------|
| WH900 | Whip antenna for mounting directly onto the module - operation up to 500m. | -6 dBi |
| ANTCFD890EL | 0 dBi Dipole antenna with 15' of Cellfoil cable and SMA connector. | 0 dBi |
| ANTSG870-6 | 6dBi Collinear omni-directional antenna with N-type connector. | 5 dBi |
| ANTYU6-870 | 10dBi Yagi directional antenna with N-type connector. | 10 dBi |
| ANTYU16-870 | 15dBi Yagi directional antenna with N-type connector. | 15 dBi |

The following table shows required cable losses for different antennas when used with the WIO-800LT in Europe:

| Antenna | Europe (transmitter) | Europe (receiver) |
|--------------------|----------------------------------|-------------------------------------|
| ANTCFD890EL | Cable Included | Cable Included |
| ANTSG870-6 | External cable with loss > 6dB | Any Cable (N-Type Male to SMA Male) |
| ANTYU6-870 | External cable with loss > 10dB | Any Cable (N-Type Male to SMA Male) |
| ANTYU16-870 | External cable with loss > 15dB. | Any Cable (N-Type Male to SMA Male) |

You must carefully select antennas for WIO-800LT modules to avoid contravening the maximum power limit on the unlicensed channel. The net gain of the antenna/cable configuration should be no more than 0dB in Europe when operating on the 869.525MHz channel.

Note

The net gain of an antenna/cable configuration is the gain of the antenna (in dBi) less the loss in the coaxial cable (in dB).

The WIO-800LR module has no limitation on antenna gain, as this module does not incorporate a radio transmitter.

The following table details the gains of some typical antennas:

| Antenna | Gain (dBi) |
|-------------------------------|------------|
| Dipole with integral 3m cable | 0 |
| Dipole without cable | 2 |
| 5dBi Collinear (3dBd) | 5 |
| 8dBi Collinear (6dBd) | 8 |
| 3 element Yagi | 5 |
| 6 element Yagi | 10 |

The following table details losses for typical cables:

| Cable | Loss (dB per 10m) at 900 MHz |
|----------|---------------------------------|
| RG58 | -5 |
| RG213 | -2.5 |
| Cellfoil | -3 |

Radio transmission distances

The unit will operate reliably over large distances depending on the:

- **Antenna type;**
- **Antenna location;**
- **Amount of radio interference;** and
- **Radio path obstructions** (e.g. hills or trees).

Typical reliable distances are:

| Area | Distance | Additional information |
|---------------|----------|--|
| Europe- 500mW | 5+ km | 10% duty cycle limitation, no overall antenna gain permitted on transmitter. |
| Europe – 5mW | 300m | Unity gain antenna configuration on transmitter, no duty cycle limit. |

To achieve these distance, you must elevate at least one site on a hill or transmission tower.

Modules will operate reliably with some radio path obstruction; however obstructions also reduce the reliable distance.

Note

You must test all obstructed paths to check the reliability of the path.

You can achieve maximum transmission distances if the radio path has “line of sight”. For example, raising antennas above intermediate obstructions including hills, trees, etc. Obstructions reduce the range; however they may not prevent a reliable path.

The closer the obstruction is to the antenna, the greater the blocking effect. For example, a group of trees around the antenna is a larger obstruction than a group of trees further away from the antenna. You can achieve longer distances by mounting one antenna on top of a hill.

Note

Due to the earth’s curvature, you must elevate antennas higher than the ground level between the antennas for longer paths (greater than 3 miles / 5 km).

The unit can tolerate larger amounts of obstructions for shorter distances. For very short distances, you can also mount the antennas inside buildings.

If two WIO-800L modules cannot communicate reliably, you can use a high gain yagi antenna on the receiver unit.

Installing and earthing antennas

You must connect an antenna to each WIO-800L module using the SMA connector at the top of the enclosure.

MTL recommends carefully taping the connections between the antenna and coaxial cable to prevent moisture ingress. Moisture ingress in the coaxial cable is a common cause of radio system problem as it greatly increases the radio losses.

MTL recommends taping the connection with three layers of tape:

| Layer | Tape |
|-------|--|
| 1 | PVC tape. |
| 2 | Vulcanising tape (e.g. 3M 23 tape). |
| 3 | Additional layer of PVC UV-stabilized insulating tape. |

The first tape layer lets you easily inspect the joint if required as you can easily remove the vulcanising seal.

Note

You must effectively earth all masts for mast-mounted antennas to avoid lightning surges. We also recommend using a coaxial surge diverter for antennas mounted outside industrial plant environments.

If the antenna is not already shielded from lightning strike by an adjacent earthed structure, you can provide shielding by installing a lightning rod above the antenna.

You should connect the antenna to the module using 50 ohm coaxial cable (e.g. RG58 or RG213) terminated with a male coaxial connector. The higher the antenna is mounted, the greater the transmission range; however as the length of coaxial cable increases so do cable losses. For use on unlicensed frequency channels, there are several types of antenna suitable for use.

If you mount antennas on elevated masts, you should effectively earth the masts to avoid lightning surges. The WIO-800L radios are fitted with surge protection.

Note

For high lightning risk areas, MTL recommends additional surge suppression devices. If the antenna is not already shielded from lightning strike by an adjacent earthed structure, you can install a lightning rod to provide shielding.

Dipole and collinear antennas

This section contains important information for using dipole and collinear antennas. For more information, see the next sections.

Dipole antennas

Unity gain dipole antennas are commonly used on unlicensed channels. The dipole antenna does not provide any gain, so the power transmitted from the antenna is the same as the power out of the module.

A dipole antenna that comes supplied with integral 15 ft cable does not require additional coaxial cable.

You should mount dipole antennas vertically, preferably no less than 1 metre away from a wall or mast for maximum performance.

Collinear antennas

Collinear antennas transmit the same amount of radio power in all directions horizontally, and are easy to install and use. They provide gain by compressing the radiated signal to a flattened disc shape, and reducing the amount of signal radiated above and below the horizontal plane.

Collinear antennas are generally used at a central site with more than one remote site, or at a repeater site.

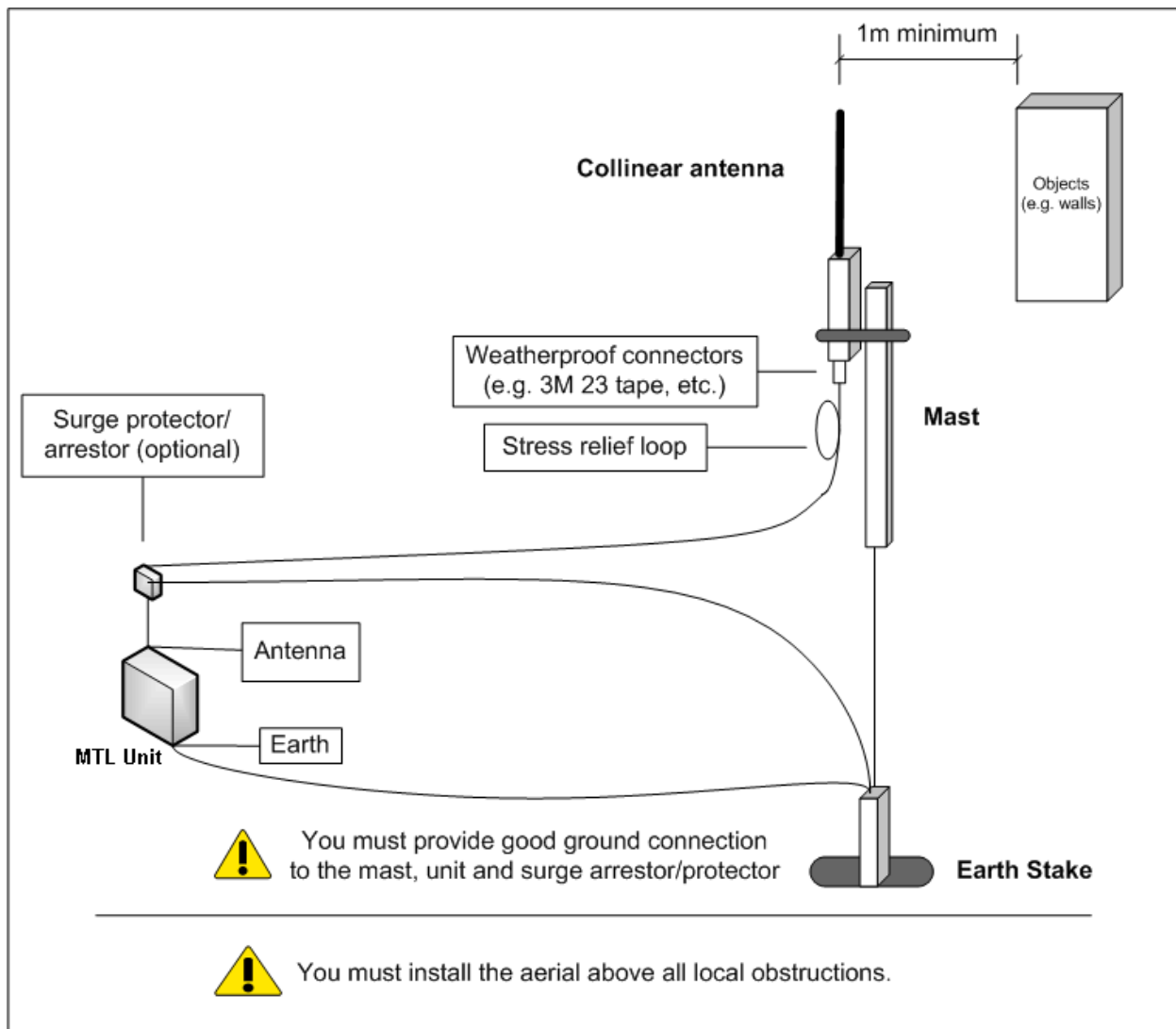
Collinear antennas are similar in appearance to dipole antennas; however the antenna is longer.

Collinear antennas are supplied without cable, and require additional coaxial cable.

You can use collinear antennas to:

- **Transmitter** – to compensate for the losses in long lengths of coaxial cable.
- **Receiver** – to increase receive sensitivity.

The following diagram shows the recommended installation for collinear and dipole antennas:



Yagi antennas

Yagi antennas are directional and have positive gain to the front of the antenna and negative gain in other directions. You can use the gain to:

- **Compensate for coaxial cable loss for transmitter unit;** and
- **Increase receiver sensitivity for receiver units.**

You should install Yagi antennas with the central beam horizontal and pointed directly in the transmission direction to benefit from the antenna gain.

Note

Yagi antennas usually have a drain hole on the folded element. You should position the drain hole at the bottom when installing the antenna.

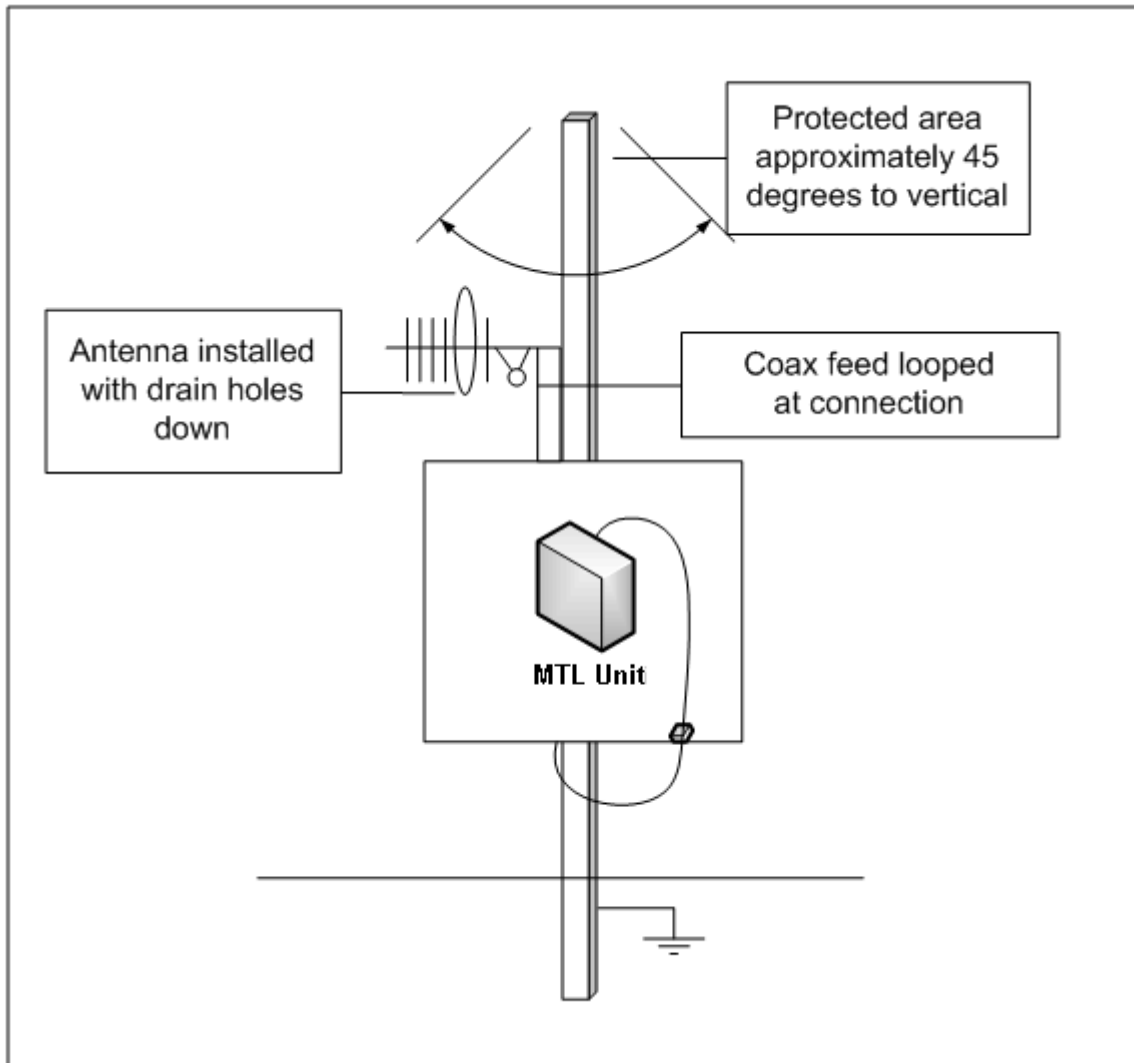
You can install Yagi antennas:

- **Vertically polarized** – with the elements in a vertical plane; or
- **Horizontally polarized** – with the elements in a horizontal plane.

The following table shows the recommended installation mode for different situations.

| If your installation has ... | MTL recommends using ... |
|---|--|
| Two stations both using Yagi antennas | Horizontal polarization for the stations. |
| Two or more stations communicating with a common station | Vertical polarization for the stations; and Dipole or collinear (i.e. non-directional) antenna for the central station. |

The following diagram shows the recommended installation for collinear and dipole antennas:



Installing the power supply

The unit works with a 9-30 VDC 0.6 Amp power supply.

The following table shows the power supply requirements.

| Power supply | WIO-800LT | WIO-800LR |
|--------------|-----------|-----------|
| 12V | 600 mA | 250 mA |
| 24V | 300 mA | 125 mA |

The power supply can be a floating supply or negatively grounded.

The transmitter provides a 24V DC regulated supply for analog loop power. The supply is rated at 35 mA and should ONLY be used for powering analog loops.

To install the power supply:

1. Connect the positive lead to **Power Supply Input**.
2. Connect the negative lead to **Ground**.

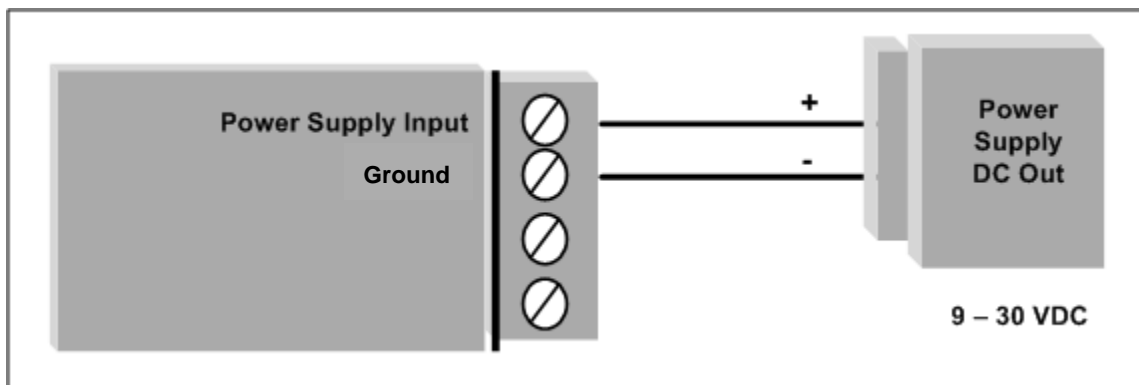
Note

To ensure internal surge protection works correctly, you must earth each unit using the Earth terminal.

You should connect the module to the same ground/earth point as the antenna mounting to avoid differences in earth potential during voltage surges.

Do NOT connect the positive side of the supply to Earth.

3. The following diagram illustrates the connection:



Inputs and outputs

The units have the following inputs and outputs:

| Input/output | WIO-800LT | WIO-800LR | Description | For more information, see ... |
|---------------------------------------|-----------|-----------|--|---|
| Digital inputs | 2 | | Suitable for Voltage free contact, NPN transistor, 0-5V signal. | Digital inputs on page 22. |
| Relay outputs | | 3 | 250VAC 1A / 30VDC 1A. | Relay outputs Important Information on page 23. |
| Status outputs | 2 | 2 | Max 30VDC, 500 mA. Indicate module status, communication failure and local setpoint status. | Status outputs on page 24. |
| Analog inputs | 1 | | 4-20 mA with over-range and under-range. 0-10 mA with over-range. | Analog input on page 25. |
| +24V Loop supply | 1 | | Provides power for 1 external current loop (up to 35 mA). | Installing the power supply on page 20. |
| Analogue setpoint | 1 | | Allows discrete setpoint to be controlled from analog input. Threshold adjustable via rotary switch. | Refer to the User Manual . |
| Thermocouple / millivolt input | 1 | | Provides measurement of E, J, K, T type Thermocouple, millivolt signals and user-defined thermocouple types. | Thermocouple input on page 28 |
| Thermocouple setpoint | 1 | | Lets you control discrete setpoint from thermocouple with threshold adjustable via rotary switch. | Refer to the User Manual . |
| Pulse inputs | 2 | | Up to 10Hz. | Pulse input on page 29. |
| Analog output | | 1 | 0-22 mA, suitable for loop powered, floating input or single-ended input device. | Analog output on page 30. |

For more information, see the next sections.

Digital inputs

The WIO-800LT module provides two digital inputs suitable for:

- **Voltage free contacts** – e.g. mechanical switches; or
- **NPN transistor devices** – e.g. electronic proximity switches; or
- **0-5V signals** - 2V – 4V Minimum range.

Note

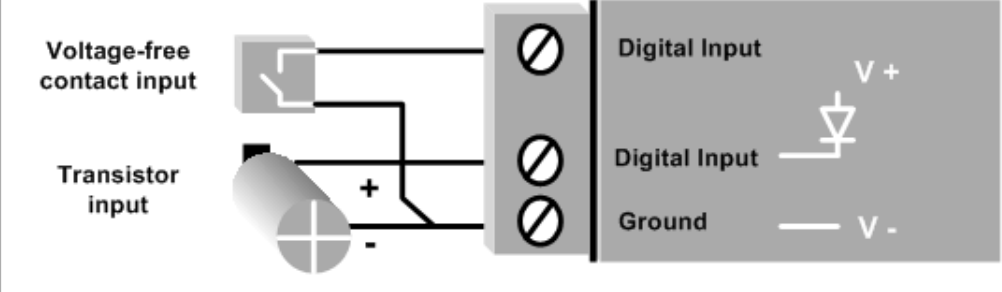
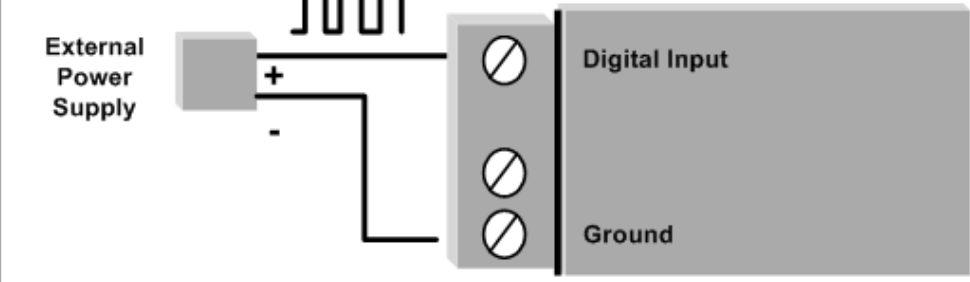
PNP transistor devices are not suitable.

The unit provides contact wetting current of approximately 5mA to maintain reliable operation of driving relays.

Each digital input is connected between the appropriate **Digital Input** terminal and **Ground**.

Each digital input circuit includes a LED indicator that lights when the digital input is active (i.e. when the input circuit is closed).

To activate the digital input, the switching device resistance must be less than 200 ohms.

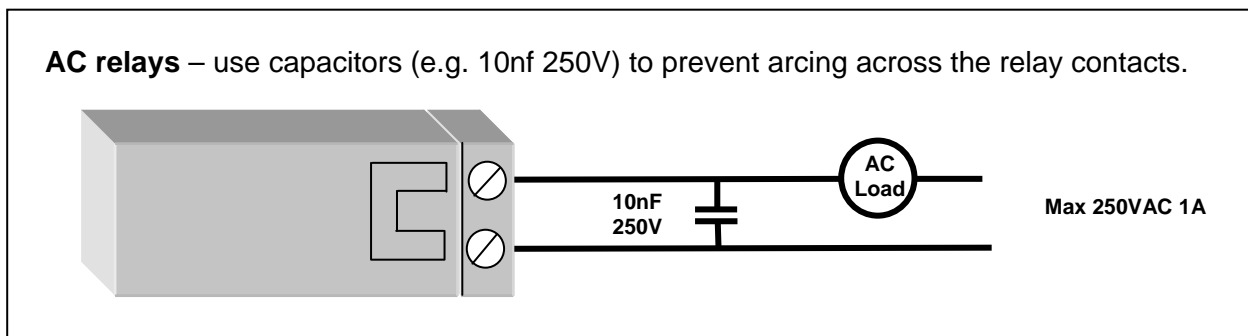
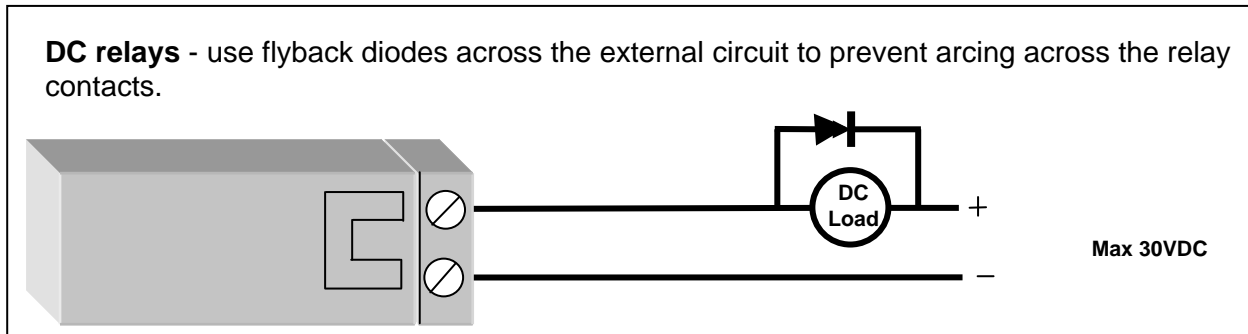
| Connection method | Example |
|---|--|
| <p>Voltage free contact</p> |  |
| <p>Active 0-5v signal device</p> |  <div data-bbox="464 1720 1369 1861" style="border: 1px solid black; border-radius: 15px; padding: 10px; margin-top: 10px;"> <p>Note Use a solid state relay if the voltage range is not suitable. Voltage Range is low: 2V (max); high: 4V (min).</p> </div> |

Relay outputs

The WIO-800LR module provides three normally open voltage-free relay contacts rated at 250VAC / 30VDC 1A.

You can use these outputs to directly control low-powered equipment or power larger relays for higher-powered equipment.

For inductive loads, MTL recommends:



You can individually configure digital outputs to turn off if no command message is received by the output for a certain period. This feature provides an intelligent watchdog for each output, so communications failure at a transmitting site causes the output to revert to a known state.

The output circuit is connected to the appropriate pair of **Digital Output** terminals. Each digital output circuit includes a LED indicator that lights when the digital output is active. The LED flashes if the watchdog alarm is active.

IMPORTANT SAFETY INFORMATION

In order to comply with Electrical Safety Standards, when connecting SELV **AND** voltages which are greater than SELV (30VAC or 60VDC) together, then Relay Output 2 must **NOT** be used in order to provide sufficient isolation between the outputs

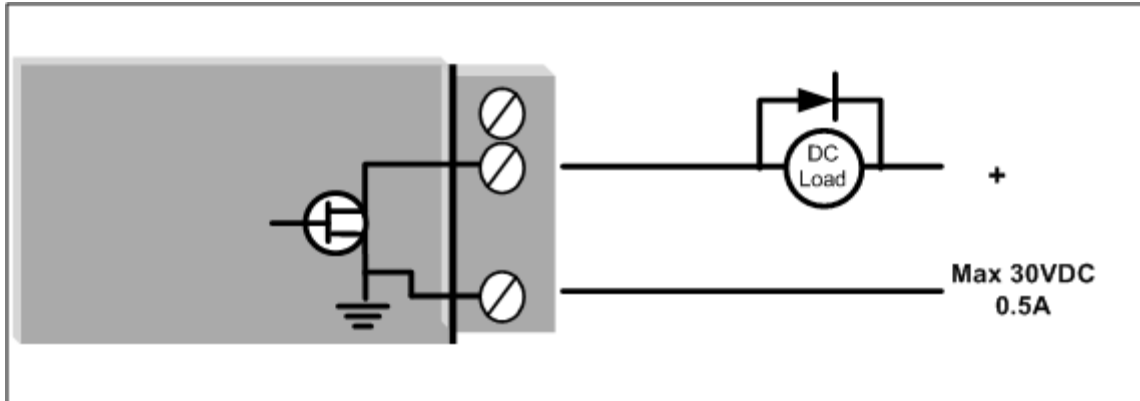
Status outputs

The unit contains the following status outputs:

- **System OK;**
- **Setpoint Output;** and
- **Communications Failure.**

Status outputs are FET output to common rated at 30VDC 500 mA.

Connect the output circuit to the appropriate Status **Output** terminal. Each status output circuit is associated with an LED indicator that lights lit when the digital output is active.



The following table details the status output behaviour:

| Status output | LED | LED status | Description |
|---|-----|------------|---|
| System OK active (both modules) | OK | Green | No fault detected |
| System OK inactive | OK | Red | Internal fault detected. Supply voltage Low Analog Loop supply overloaded |
| Setpoint Output (WIO-800LT) | SP | Green | Local setpoint attached to 4-20mA analog input. |
| Communications Failure (WIO-800LR) | CF | Red | Watchdog alarms active on digital outputs or analog outputs. |

Analog input

The WIO-800LT module provides one 0 - 20 mA DC analog input for connecting to instrument transducers (e.g. level, moisture, pressure transducers, etc.).

Note

The WIO-800LT module inputs measure down to 0mA and can also be used for zero based signals (e.g. 0 - 10 mA).

The analog input has a positive and negative terminal and can be placed at any point in the current loop, providing neither input rises above the 24 volt **Analog Loop Supply** level.

Each input has a loop resistance of less than 250 ohms and zener diode protection is provided against over-voltage and reverse voltage.

Note

You may require additional protection in high voltage or noisy environments or for long wiring runs.

A 24VDC loop supply is available on the WIO-800LT module for powering the analog transducer loops. In this situation, connect the:

- **Analog loop** - between an **Analog Input (-)** terminal and **Ground**.
- **Positive terminal** – i.e. **Analog Input (+)** to the **+24V Analog Loop Supply**.

Externally powered loops may be connected by connecting the input between "Analog Input (+)" and "Analog Input (-)" Common mode voltage may be -0.5V to 27V.

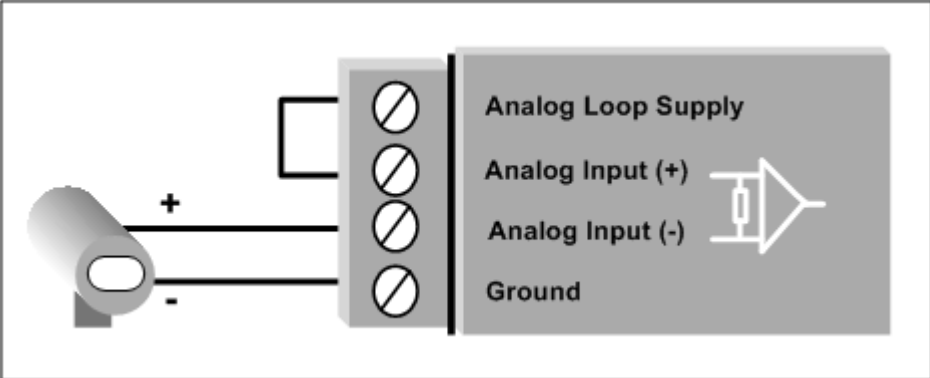
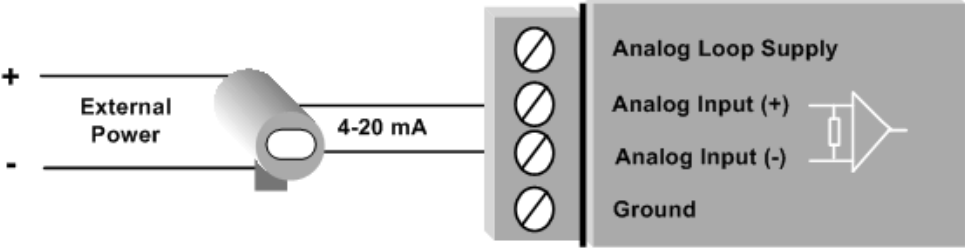
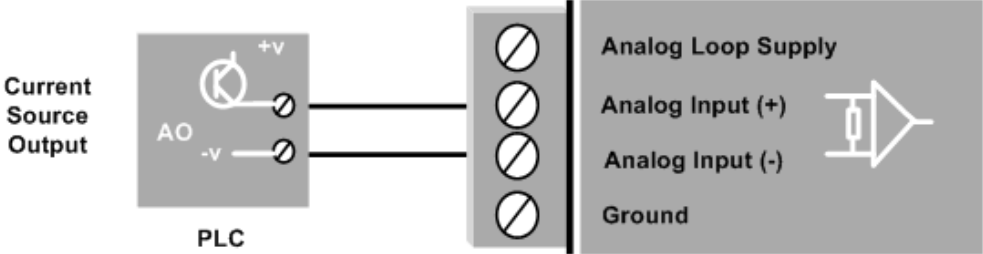
MTL recommends using shielded cable for analog I/O loops to minimize induced noise and Radio Frequency Interference (RFI).

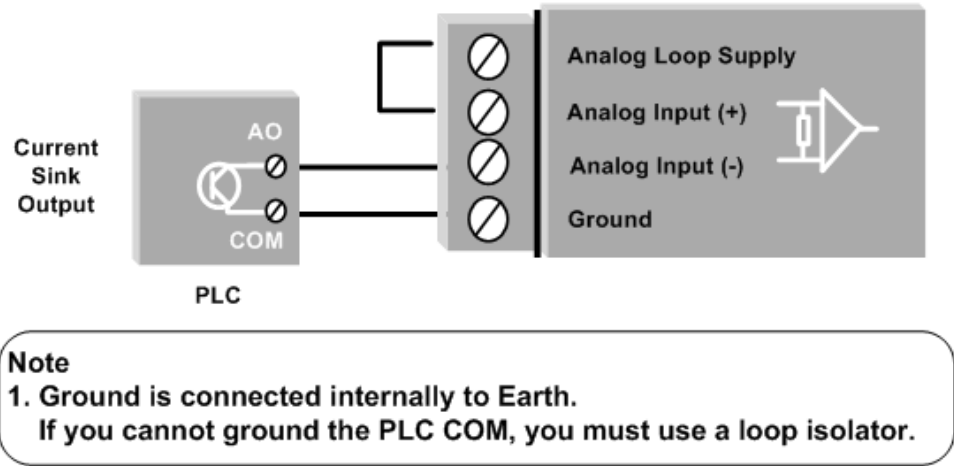
Note

You should only connect one end of the cable shield to Earth

To connect an analog signal from a PLC or DCS output to an analog input on the WIO-800LT, you must carefully check the internal circuit of the output as different devices use different ways to create an analog signal.

The following diagrams illustrate different connection methods:

| Analog signal source | Example |
|-----------------------|---|
| 2 wire transducer |  |
| 4 wire transducer |  <p data-bbox="411 1093 1305 1189">Note Analog input must be within 27V of Ground. If your terminal voltage exceeds this, you must use a loop isolator.</p> |
| Current source output |  <p data-bbox="411 1664 1377 1839">Note 1. Analog input must be within 27V of Ground. If your terminal voltage exceeds this, you must use a loop isolator. 2. Ground is connected to ground/earth. If you cannot ground the PLC COM, you must use a loop isolator.</p> |

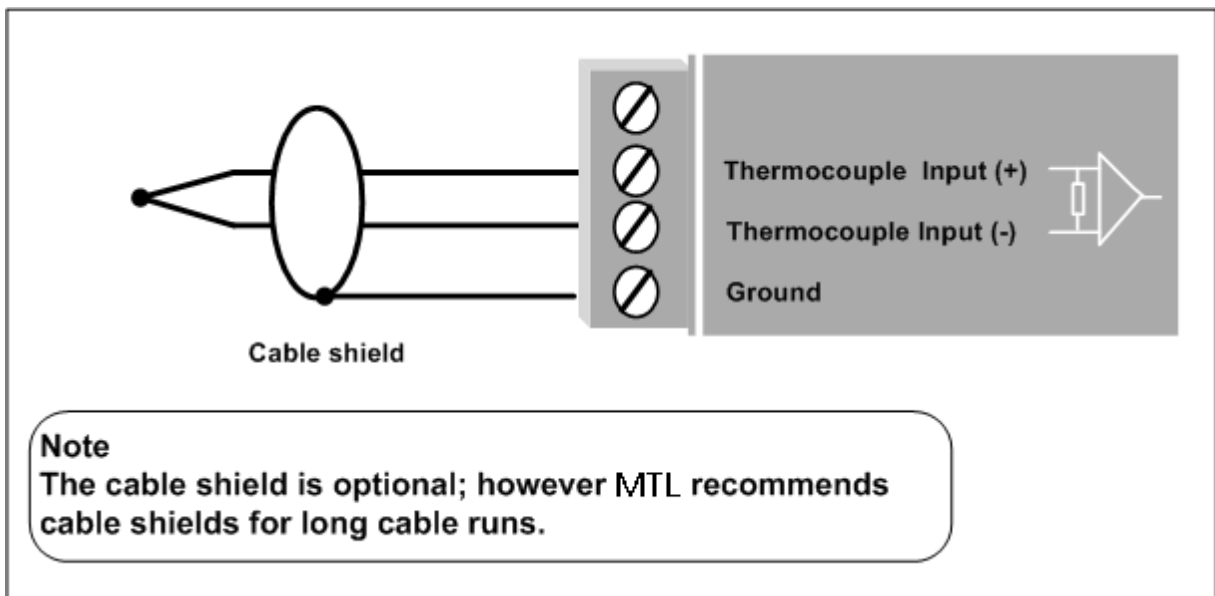
| Analog signal source | Example |
|----------------------|---|
| Current sink output |  <p>The diagram illustrates a current sink output configuration. On the left, a PLC is shown with two terminals labeled 'AO' and 'COM'. A 'Current Sink Output' symbol is connected to the 'AO' terminal. Two wires connect the 'AO' and 'COM' terminals to the 'Analog Input (+)' and 'Analog Input (-)' terminals of an analog input module. The module also has terminals for 'Analog Loop Supply' and 'Ground'. A note in a rounded box below the diagram reads: 'Note 1. Ground is connected internally to Earth. If you cannot ground the PLC COM, you must use a loop isolator.'</p> |

Thermocouple input

The WIO-800LT provides one input suitable for connection to a thermocouple or a millivolt level signal. The module provides linearization tables for J, K and T type thermocouples and also supports other types via a user linearization table.

Millivolt signals in the range -10mV to +100 mV are supported.

For more information on configuring the thermocouple input and cold-junction compensation to suit your application, refer to the **User Manual**.

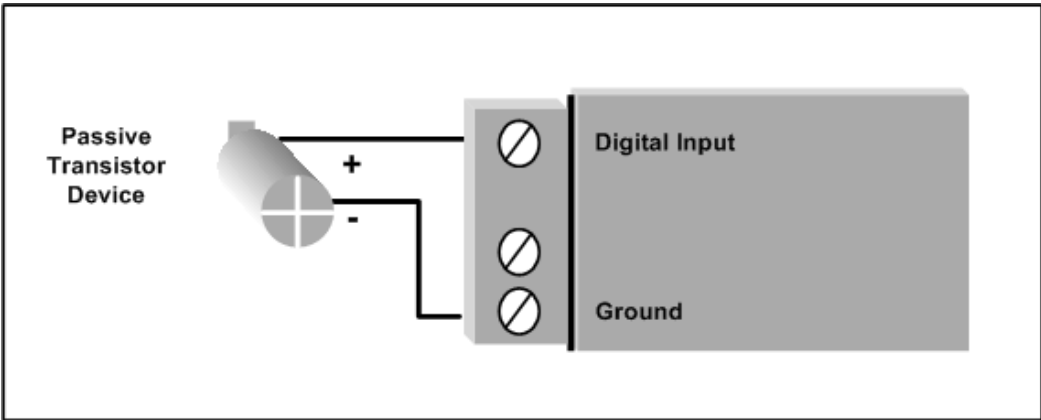
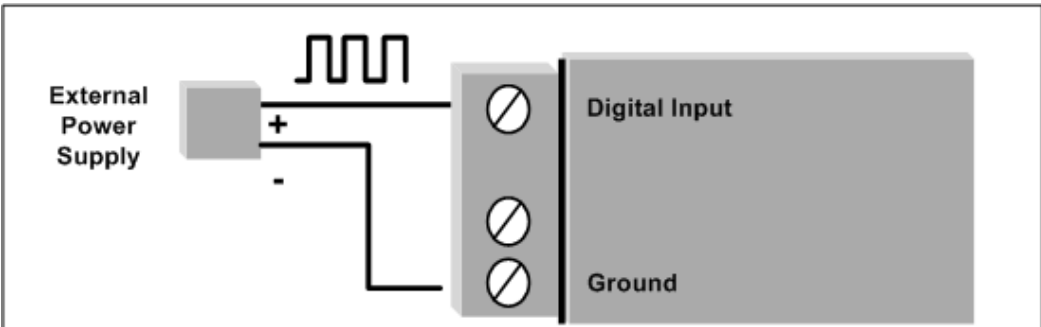


Pulse input

The WIO-800LT module lets you configure the digital inputs as pulse inputs with the following characteristics:

| Characteristic | Value |
|------------------|---------|
| Maximum rate | 10 Hz |
| Minimum off time | 20 mSec |
| Minimum on time | 20 mSec |

The following diagrams illustrate different connection methods:

| Connection method | Example |
|---------------------|--|
| Passive transistor |  <p>The diagram shows a 'Passive Transistor Device' with two terminals labeled '+' and '-'. The '+' terminal is connected to the top terminal of a 'Digital Input' port. The '-' terminal is connected to the bottom terminal of a 'Ground' port. The port has three terminals, with the top one labeled 'Digital Input' and the bottom one labeled 'Ground'.</p> |
| Active pulse device |  <p>The diagram shows an 'External Power Supply' with two terminals labeled '+' and '-'. The '+' terminal is connected to the top terminal of a 'Digital Input' port. The '-' terminal is connected to the bottom terminal of a 'Ground' port. A square wave pulse waveform is shown above the connection to the digital input. The port has three terminals, with the top one labeled 'Digital Input' and the bottom one labeled 'Ground'.</p> <div style="border: 1px solid black; border-radius: 15px; padding: 10px; margin-top: 10px;"> <p>Note Use a solid state relay if the voltage range is not suitable. Voltage Range is low: 2V (max); high: 4V (min).</p> </div> |

Analog output

The WIO-800LR module provides a 4 - 20 mA DC analog output for connecting to instrument indicators to display remote analog measurements. The analog output is a current source provided from an internally generated +24V loop supply.

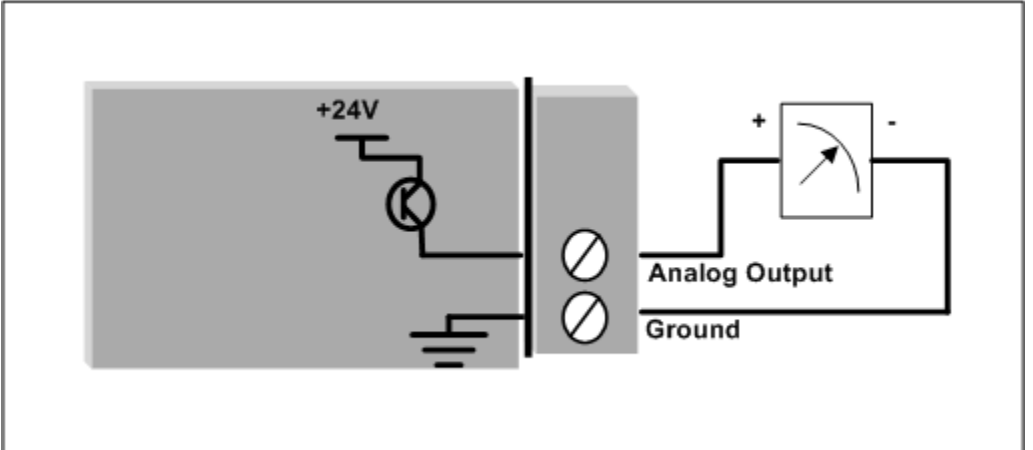
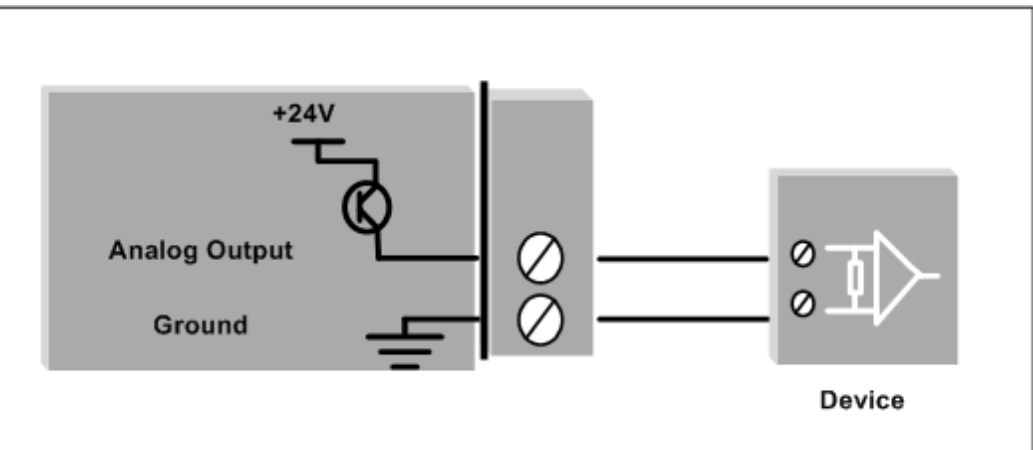
When connecting to an external device (e.g. electronic indicator, recorder, PLC / DCS input, etc.) by connecting the output between the **Analog Output** terminal (+) and the **COM** terminal (-).

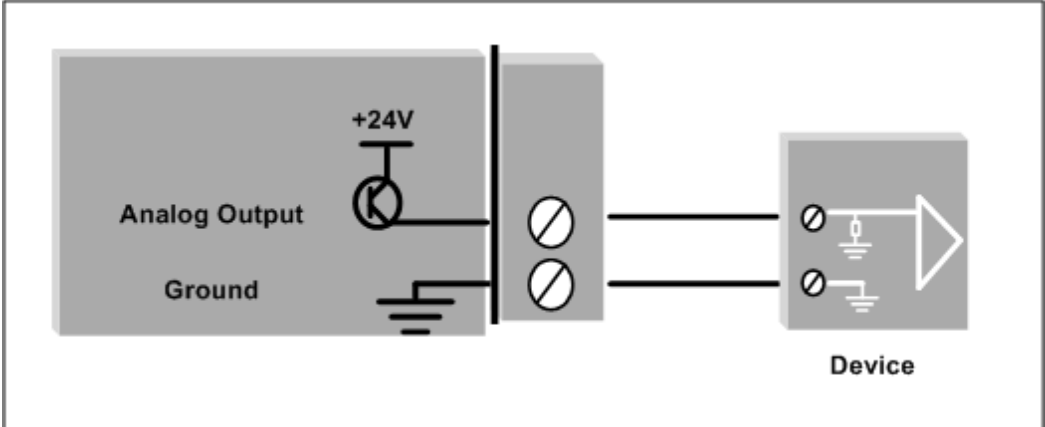
Note

Zener protection of analog outputs provides protection against short periods of over-voltage; however longer periods may result in module damage.

You can also individually configure analog outputs to turn off (i.e. 0 mA) if no command message is received to the output for a certain period.

The following diagrams illustrate different connection methods:

| Connection method | Example |
|-------------------------------------|--|
| <p>Loop powered device</p> |  |
| <p>Floating input device</p> |  |

| Connection method | Example |
|-------------------------------------|---|
| <p>To single-ended input device</p> |  <p>The diagram illustrates a connection between an Analog Output module and a single-ended input device. On the left, the Analog Output module is shown with a +24V supply and a Ground connection. The output signal line is connected to the top terminal of the Device, which also has a Ground connection. The bottom terminal of the Device is connected to the Ground of the Analog Output module.</p> |

Installing and configuring the unit

This section describes how to install and configure your unit and contains the following sections:

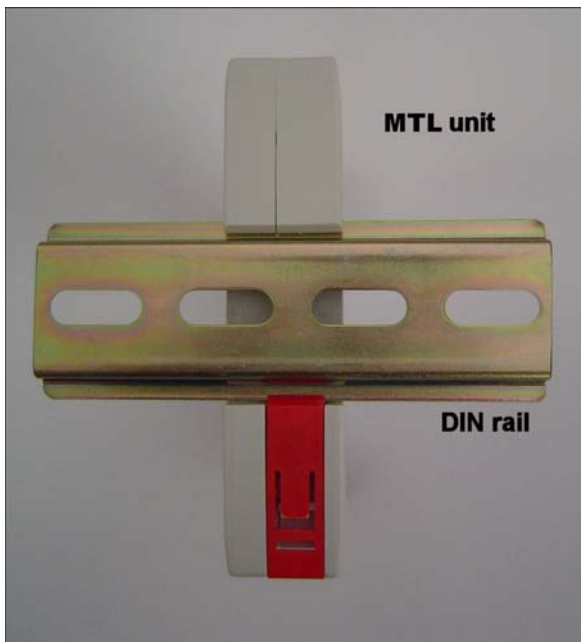
| Section | Description | For more information, see ... |
|------------------------------|--|------------------------------------|
| Installing the unit | Describes how to physically install your unit. | Installing the unit on page 33. |
| Configuring your unit | Describes the different ways to configure your unit. | Configuring your units on page 34. |
| Testing your unit | Describes MTL's recommendations for testing your unit. | Testing your units on page 35. |

For more information, see the next sections.

Installing the unit

To install the unit:

1. Connect signals to the supplied terminals.
2. Connect the radio antenna.
3. Install DIN rail to mount the module.
4. Clip the module to the DIN rail:



You can now configure your unit. For more information, Configuring your units on page 34.

Configuring your units

You can configure your network using:

- **Default factory configuration** –enables easy setup of the network as a simple send/receive; or
- **User-defined customized configuration** – enables setting of specific information about the network.

For more information on setting a user-defined customised configuration, see the **User Manual**.

For more information on setting the factory default configuration, refer to the **Quick Start Guide** included with your module.

The following table details the factory default configuration:

| Signals sent over radio | | |
|-------------------------|-------|----------------------|
| WIO-800LT(Transmitter) | Sends | WIO-800LR (Receiver) |
| Digital Input 1 | ⇒ | Digital Output 1 |
| Digital Input 2 | ⇒ | Digital Output 2 |
| Analog Setpoint | ⇒ | Digital Output 3 |
| Analog input (4-20 mA) | ⇒ | Analog output |

| Other signals | |
|------------------------------------|--|
| WIO-800LT (Transmitter) | WIO-800LR (Receiver) |
| Thermocouple Input (Not used) | Communication Failure (Comes on if no messages from WIO-800LT) |
| Setpoint Output (Local indication) | |
| System OK (On if system OK) | System OK (On if system OK) |

Testing your units

We recommend you bench test the complete system before installing a new system.

Configuration problems are easier to identify and fix when the units are next to each other.

The following table describes common problems and recommended solutions:

| If your installation has ... | You should check ... | MTL recommends ... |
|---|---|---|
| Poor radio channel communications TX LED flashes but no RX LED Output LEDs flash quickly | The antenna installation. For radio interference on the same channel. The radio path is adequate. | Higher performance antennas if the path is too long. Higher mounting points to overcome obstructions. Using an intermediate unit as a repeater. |
| Red OK LED | Power Supply voltage | Supply should be between 9 and 30VDC. |
| | Analog loop supply current | The analog loop supply is rated for 35 mA max. |
| | Module configuration | Your module configuration may be invalid. Re-load or restore factory default configuration. |
| TX LED flashes but no RX LED (bench testing) | Ensure the WIO-800LR is set to the same country and frequency band as the WIO-800LT | Register the receiver with the transmitter. (Refer to the Quick Start Guide) |
| RX LED Flashes but no outputs change | For a user-defined customized configuration, - check the configuration. | Check the configuration and re-program the modules. |
| | For default configuration, check the receiver is registered with the transmitter. | Repeat the procedure to register the receiver with the transmitter. |

For support for other testing issues, please contact MTL.

Unit specifications

This section details the specifications for each unit.

Transmitter unit

| Input/output | Number | Additional information |
|---------------------|---------------------------|--|
| Digital inputs | 2 | Dry-contact digital inputs slow-pulsed at 10Hz. All inputs are suitable for voltage free contacts (e.g. mechanical switches) or NPN transistor devices (e.g. electronic proximity switches). NOTE: PNP transistor device inputs are NOT suitable. |
| Status outputs | 2 | Separate System OK and Setpoint Status |
| Analog inputs | 1 | 0-20mA differential input; 16-bit resolution, 0.1% accuracy, 10 ohm input impedance. |
| Thermocouple inputs | 1 | J, K or T type thermocouple with on-board cold-junction compensation. Cold junction compensation accuracy $\pm 1^{\circ}$ over ambient temp range: -40° to $+60^{\circ}\text{C}$. |
| Power supply | 1 | 9-30 VDC, 0.6 Amp power supply. |
| Transmitter | 1 | 5 mW or 500 mW DFSK Fixed Frequency Transmitter. |
| Frequency | 869.525 MHz 869.875MHz | 500 mW - 5km out of plant, 1km obstructed environment. 5 mW – 1km out of plant. 300m obstructed environment |

Receiver unit

| Input/output | Number | Additional information |
|-----------------|---------------------------|--|
| Digital outputs | 3 | Voltage-free contacts rated at 250 VAC, 1A, 30VDC 1A 2 for digital inputs and 1 for setpoint. |
| Status outputs | 2 | Separate System OK and communication failure output. |
| Analog output | 1 | 16-bit resolution, 0.1% accuracy, single-ended source output. |
| Power supply | 1 | 9-30 VDC 0.25 Amp power supply. |
| Radio receiver | 1 | High sensitivity DFSK Fixed Frequency receiver. |
| Frequency | 869.525 MHz 869.875MHz | Actual frequency range depends on Paired Transmitter. |
| Sensitivity | -111 dBm | At PER 8%. |

Ancillary hardware reference information

This section contains reference information about additional hardware components you may need for your unit.

RS232 serial cable

You can connect the unit to a PC using an RS-232 serial cable to:

- **Transfer configuration information;**
- **Perform factory and field-testing.**

The serial port is an 8 pin RJ-45 plug that communicates using standard RS-232 signals:

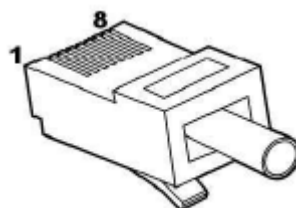
| Signal information | Value |
|--------------------|------------------------|
| Baud rate | 9600 |
| Bits | 8 bits with 1 stop bit |
| Parity | No parity |

MTL supplies a green configuration cable wired to the following pin-out:

Note

The following pin-out information is for reference only.

| RJ-45 | Required | Signal name | Normal colour | DB9 |
|-------|----------|---------------------------|----------------|-----|
| 1 | | Ring Indicator | Green / White | 9 |
| 2 | | Data Carrier Detect | Green | 1 |
| 3 | Y | Data Terminal Ready | Orange / White | 4 |
| 4 | Y | Signal Common | Blue | 5 |
| 5 | Y | Receive Data (from Modem) | Blue / White | 2 |
| 6 | Y | Transmit Data (to Modem) | Orange | 3 |
| 7 | | Clear to Send | Brown / White | 8 |
| 8 | | Request to Send | Brown | 7 |



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