






1. Before You Begin

-  Ensure the installation of the system meets applicable state and national electrical code requirements.
-  The installation of the system should only be performed by a qualified installer.
-  When connecting the device to an external power supply, do not exceed the defined voltage: 9-30 Vdc max.
-  Contains no user serviceable parts. Unauthorized modification to device or supplied accessories may damage devices and void warranty.
-  This product is NOT intended for use in hazardous locations.
-  Do NOT install or mount on an application with high vibration.
-  The WIO® System must be installed within an enclosure that requires a tool to access. This is to prevent inadvertent disconnection of any of the power wiring, signal wiring or communication cables.

Go to www.wio.oleumtech.com to view or download the full User Guide for detailed installation and other helpful information.

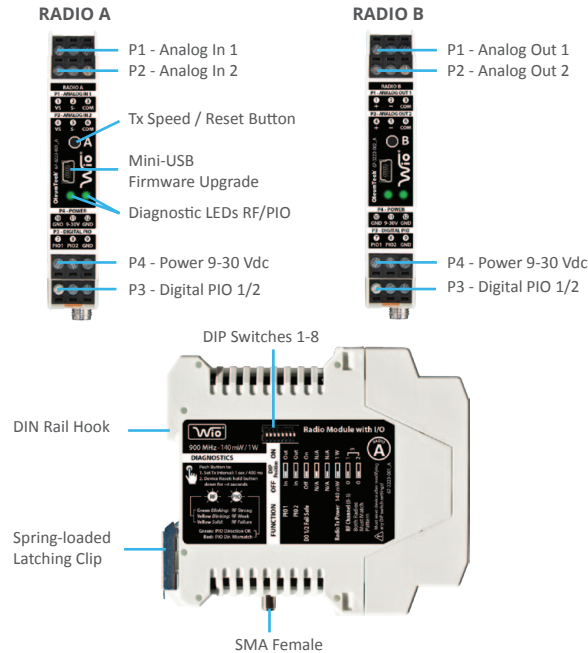
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2. Required Items

- BR-xxxx-RM4 Radio Kit with Onboard I/O
- (2) 9-30 Vdc power sources
- Technician's screwdriver (flathead)
- (2) 35 mm standard DIN rails (35 x 7.5 mm)
- (2) NEMA 4X-type enclosures for outdoor installation
- (2) antennas (must match system's RF type)
- (2) low loss antenna cables, SMA to N (male)
- (2) low loss antenna cables, N to N (male) (optional)
- (2) lightning arrestors (strongly recommended for outdoors)
- Weatherproofing tape/sealant material
- Wire (solid/stranded AWG 28-12 gauge)

3. Hardware Overview

- Operating temperature range: -40 °C to 80 °C








4. RF Transmission (Tx) Speed / Device Reset

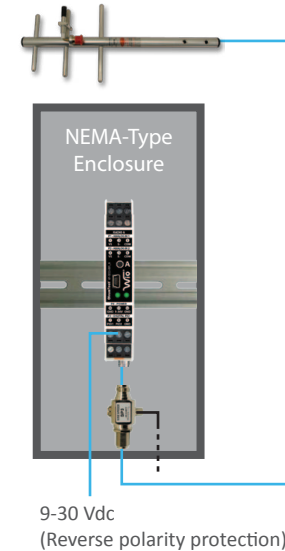
1. The system offers two Tx speeds: 1 sec (def.) or 400 ms. Use the Tx button to switch between speeds.
2. Device reset: hold down the Tx button for ~4 seconds until the LEDs are extinguished. Power cycling will also reset the device.

5. LED Diagnostics



1. RF Diagnostics
 -  Flashing Green: Good RF signal: -40 dB (best) to -94 dB. LED flashing speed also indicates Tx speed.
 -  Flashing Yellow: Weak RF signal: Worse than -94 dB.
 -  Solid Yellow: RF failure.
2. Digital PIO Diagnostics
 -  Solid Green: Indicates both PIO directions are setup correctly.
 -  Solid Red: Indicates when one or both PIO directions are setup incorrectly. Check PIO DIP switches.

6. Installation



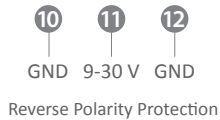
- Install antennas 10 ft above the ground.
- Antennas must match the system's Radio Frequency (RF).
- Directional antennas must be pointing at each other.
- Use low loss antenna cables and connectors.
- Installing lightning arrestors are strongly recommended.
- Make a hole at the bottom of the enclosure to run wires and cables.
- Weatherproof all exterior connections and seal all openings to the enclosure.

7. RF Best Practices

1. Perform a RF survey prior to installation.
2. Use high quality antennas and low loss cables and fittings for achieving the best possible wireless performance.
3. Having a clear line of sight between antennas (Fresnel zone) is ideal for achieving best RF signal quality.
4. When setting up and installing antennas, avoid walls, tall buildings, trees, and other solid obstructions for improving RF signal quality.
5. Install antennas at least 10 ft above ground when possible.
6. When using directional antennas, be sure to point the antennas at each other and be sure to use correct antenna orientation.
7. Be sure to install omni-directional antennas in vertical position or perpendicular to the ground.
8. Be sure that there are no loose connections. Securely tighten all cable connections and wire terminals.
9. Be sure to waterproof all exterior cable connection using high quality sealing tape.
10. Once the WIO System is up and running, use the left LED to diagnose RF health.

8. Power Wiring

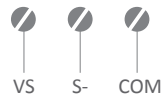
Power - P4



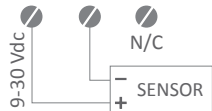
9. Analog 4-20 mA Inputs, Radio A

Only Radio A is equipped with analog inputs.

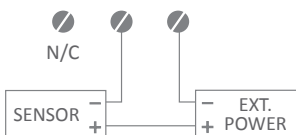
1. 4-20 mA input wiring - P1 and P2



2. Internal Loop Power



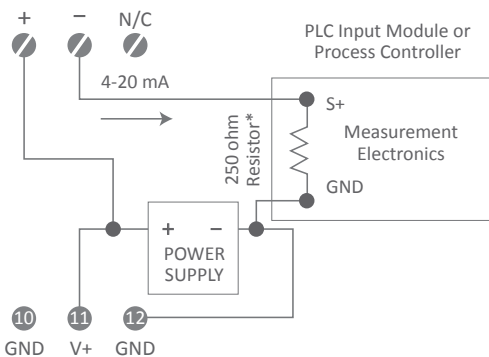
3. External Loop Power



10. Analog 4-20 mA Outputs, Radio B

Only Radio B is equipped with analog outputs.

4-20 mA output wiring - P1 and P2



VS/External Power (min) = 7 Vdc + Max Current (Amp) * Rloop
Rloop = Total Loop Impedance

*A 250 ohm Resistor may be required depending on the design of the third-party 4-20 mA input module.

11. Digital Programmable I/O (PIO)

This system is equipped with two digital programmable I/O. Using dedicated DIP switches 1 and 2, you can control the signal directions independently. If Radio A = Input, Radio B = Output and vice versa. Otherwise, PIO LED will turn red indicating signal direction error.

Factory default PIO settings: Radio A = DI ; Radio B = DO
Note that DIP switch positions for In/Out are reversed on Radio Module A and B.



Must reset device after modifying any DIP switch settings. Be sure to set Fail Safe output mode: Off (default) or On.

1. Digital/discrete input wiring



Accepts Dry Contact (Internal 3.3 Vdc Pull-Up), Open-Drain (NPN) and Level Output (0 - 30 Vdc Max.).
Input Voltage Threshold:
Signal "H", Vi > 1.85 Vdc
Signal "L", Vi < 1.03 Vdc

2. Digital/discrete output wiring

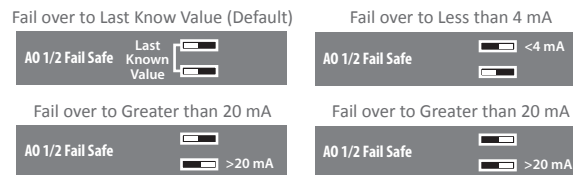


Open Drain (NPN) Outputs
Inductive Load (Sink Current): 1A/30 Vdc Max.
Voltage Level Output:
Internal Pull-Up: Signal "H", Vo = 3.3 Vdc
Signal "L", Vo = 0.2 Vdc
Accepts Optional External Pull-Up, 30 Vdc Max.
Requires 10 K Resistor

12. Fail Safe Output Operation

This system allows you to control the output states when RF communication failure occurs. When RF is lost for ten consecutive seconds or more, the system will automatically drive outputs to their predetermined fail safe states. Use the dedicated DIP switches to control the fail over behaviors.

1. Analog fail safe modes (DIP 4 and 5 on Radio B)
Applies to both outputs.



2. Digital fail safe modes (DIP 3)
Applies to both outputs.



13. Transmit Power Setting - 900 MHz Only

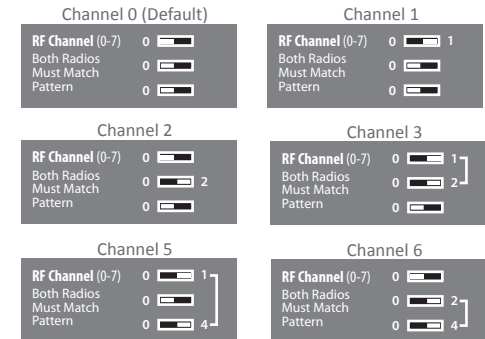
The 900 MHz system is equipped with two adjustable transmission output settings. Use DIP switch 6 to select output power. Both Radio Modules must match power. 140 mW (default) or 1 W

14. RF Channel - 900 MHz / 2.4 GHz Only

900 MHz and 2.4 GHz systems offer multiple RF channels to create better RF isolation for better performance. Use dedicated DIP switches to set RF channel. 900 MHz system offers channels 0-3 while 2.4 GHz system offers 0-7 channels.



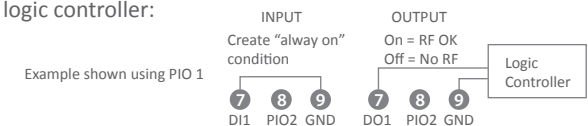
The RF channel or DIP pattern on both Radio Modules must match. Some examples of how to set RF channel:



Must reset device after modifying any DIP switch settings.

15. Using PIO to Monitor RF Health

Using the following logic, you can utilize either PIO channels to monitor the RF health of the system from a connected logic controller:



1. Select a PIO channel.
2. Set the PIO signal direction using DIP switches.
3. Set DO fail safe output mode to off on the output side.
4. On the Radio Module with PIO set as input, place a jumper wire to tie DI to the ground terminal to create "always on."
5. Tie the output to a logic controller or any device monitoring the DO state.
6. During normal operating conditions, the DO will be on.
7. When the RF communication is lost, the system will de-energize the output to notify the change in condition.