



FerIT[®] Node and Solar Node

User Guide

Document No. FN-20
Date: 8/27/2020
Version: 1.0

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Introduction

About Rubicon Water

Our mission is to deliver and maintain innovative technology solutions that increase water use efficiency and improve supply reliability to support sustainable global food and fibre production.

Rubicon's vision is to be the market leader in delivering cost-effective, reliable and practical water management solutions to assist the world's rural water and agribusiness managers in maximising the beneficial use of water.

Purpose of this Manual

The purpose of this manual is to describe characteristics and installation requirements of the Rubicon FerIT® Node and FerIT® Solar Node.

Any deviation from Rubicon approved procedures and materials may be detrimental to the functionality and structural integrity of the FerIT and associated products. The operator may not in any way change or modify this procedure and or materials without written permission from Rubicon.

Support and Training

Rubicon Water provides support and training services that help you get the most out of your product. Contact Rubicon Support for details.

Contact Us

Contact your local Rubicon office for information. See the [Rubicon Water website](#) for contact details.

About the FerIT

The FerIT is a data monitoring, control, and communication device for on-farm applications. It is compatible with Rubicon's FarmConnect range of products and can be used with Rubicon FarmConnect software to remotely monitor and control both Rubicon products and third-party devices. It is designed to be rugged, easy to install, and easy to use.

The FerIT comes in two configurations:

- The **FerIT Node** is a low-powered data collection device designed for monitoring applications.
- The **FerIT Solar Node** is a solar powered device intended for high-power actuation and control. It contains an integrated FerIT Node and adds the ability to drive devices such as Rubicon's BladeMeter and BayDrive.

Both the FerIT Node and the FerIT Solar Node can be supplied with either a LORA or a P400 radio connection for communication with a Rubicon Gateway.

FerIT Specifications

General

Controller	
Type	ARM Cortex M4F 64Mhz
Features	RTOS, Data Logging, Internal Temperature
Short Range Radio	
Operating Frequency	2400 MHz
Range	Up to 50m
Data Rate	≥ 100kbps
Antenna	Internal
Long Range Radio	
See options in Long Range Radio Variants	
Compliance and Certification	
Australia	RCM: Medium risk device (battery powered radio emitting device)
USA	FCC: Part 15 Class B, Part 18 regulations (Industrial equipment)

Environmental

Operating Range	
Temperature	-40 to 60 °C
External Connectors, Cables	
Dust and Water Ingress	IP66
Enclosures	
Shock protection	IEC IK07
Material	UV Stabilised
Venting	Present on FerIT Solar Node

FerIT Node

Enclosure		
Dust and Water Ingress	IP66	
Power		
Battery	3.6V, 14.5 Ah LiSOCI2	
External Input	10-15V, 500mA	
Interface		
For pin outs see the wiring diagram		
Connector	M12 8pin Female A coded	
SDI-12	1200 baud, 0 to +5 V	
I ² C	100K baud, 0 to +3.3 V	
RS-485	9600 baud 8n1, Drive: 0 to +3.3 V	
12V in / out	In	10-15V, 500mA
	Out	12V, 100mA, 500mA PTC fuse
Multi-purpose in / out	Digital In	10 to 15V
	Digital Out	12V, 70mA continuous, 100mA 30s
	Analog V In	0 to 15V ±4% @ 20c, 25mV resolution
	4 to 20mA	12V, ±6% @ 20c, 0.08mA resolution

FerIT Solar Node

Enclosure		
Dust and Water Ingress	External: IP54, Vented. Internal: IP66	
Solar Panel		
Power	21V, 10W, Maximum Power Point: 17V, 500mA	
Battery		
Technology	LiFePo4	Lead Acid

Power	12.8V, 9.6Ah 25A 30s 9.6A continuous	12V, 7.2Ah 23A 30s 7.2A continuous
Termination to battery	6.3mm Quick Connect Spade	
Fuse	15A Blade	
Charging	MPPT Input: ~10-30V 2A charge – limited by solar panel	
Solar		
Panel	21V, 10W Maximum Power Point: 17V, 500mA	
Internal Connections		
Solar	DEUTSCH DT04-2P Male	
To Battery	Quick Connect 6.3mm	
To Node	M12 8pin Male A coded	
Interface - High-Power		
Connector	DEUTSCH DT04-4P Male	
Power	12V, 10A	
RS-485	9600 baud 8n1, Drive: 0 to +3.3 V	
Interface - Sensor		
Connector	M12 8pin Female A coded	
SDI-12	1200 baud, 0 to +5 V	
I ² C	100K baud, 0 to +3.3 V	
RS-485	9600 baud 8n1, Drive: 0 to +3.3 V	
12V Out	12V, 1.5A, 5A PTC fuse	
Multi-purpose In / Out	Digital In	10 to 15V
	Digital Out	12V, 70mA continuous, 100mA 30s

	Analog V In	0 to 15V $\pm 4\%$ @ 20c, 25mV resolution
	4 to 20mA	12V, $\pm 6\%$ @ 20c, 0.08mA resolution

Long Range Radio Variants

LoRa

Radio	
Operating Frequencies	Australia: 918-926 MHz North America: 902-928 MHz
Range	Up to 5km
Data Rate	Up to 12kbps
Special Features	OTA firmware updates
Antenna	3dBi Whip

P400

Radio	
Operating Frequencies	Australia: 918-926 MHz North America: 902-928 MHz
Range	Up to 8km
Data Rate	9.6kbps
Antenna	3 dBi Whip or 6 dBi Omni

FerIT Node

Components

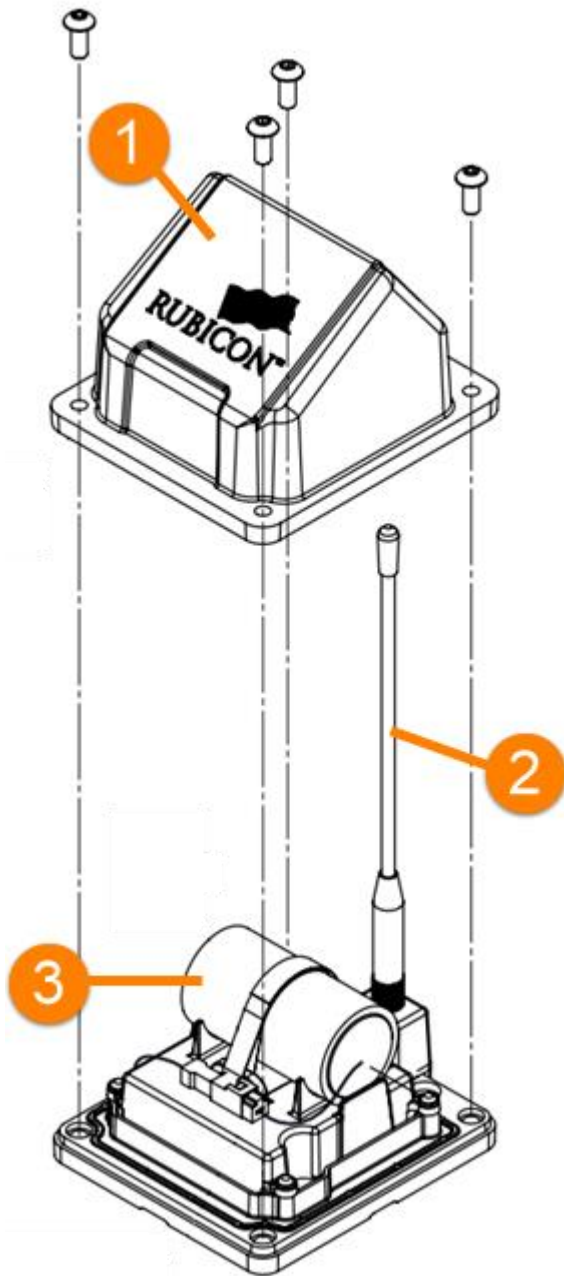


Figure 1 – FerIT Node components

1. Cover
2. Antenna
3. Battery

Dimensions

Note:

Dimensions are given in millimetres and [inches].

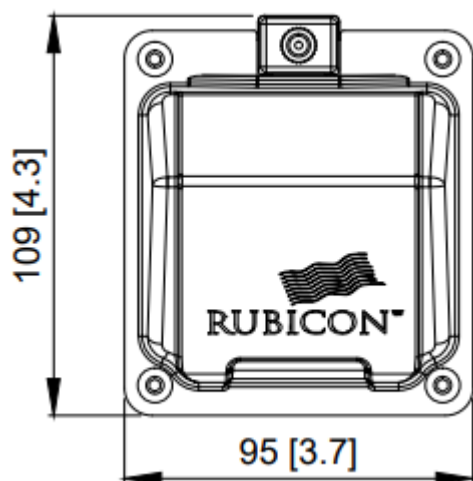


Figure 2 – FerIT Node top view

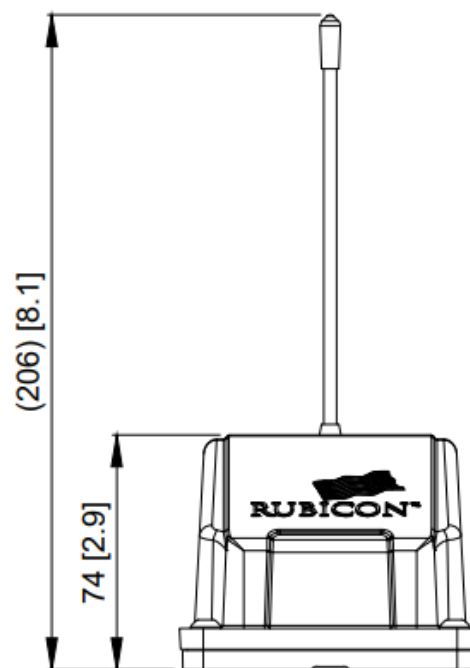


Figure 3 – FerIT Node front view

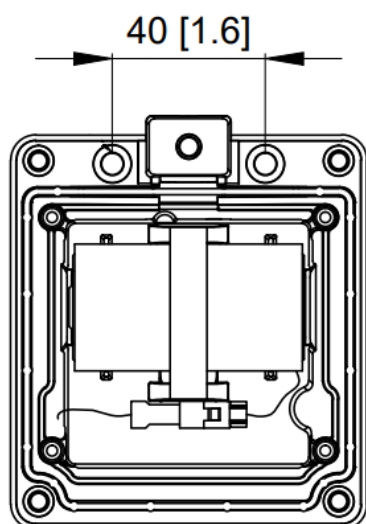


Figure 4 – FerIT Node rear mounting

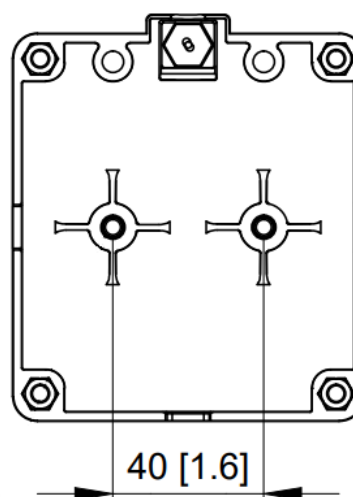


Figure 5 – FerIT Node base mounting

Electrical Wiring

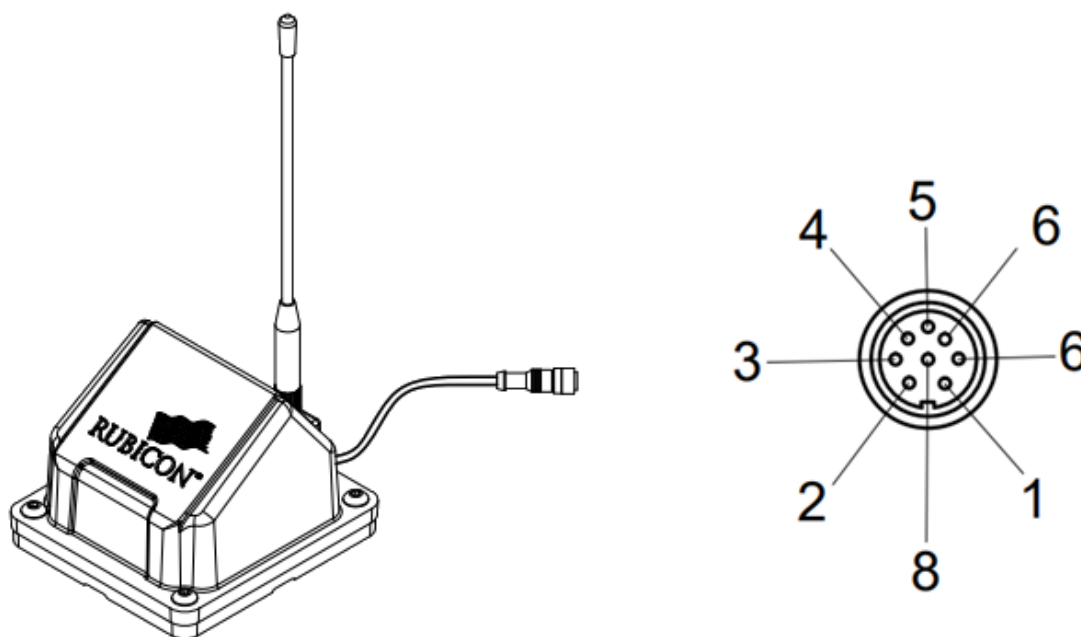


Figure 6 – FerIT Node Pinouts

Node	Sensor	Type
Pin 1	1	SDI12
Pin 2	2	12C-SCL
Pin 3	3	12C-SCA
Pin 4	4	RS485B
Pin 5	5	Vin / Vout +VE
Pin 6	6	RS485A
Pin 7	7	Digital In/Out, 4-20 mA, analog voltage in
Pin 8	8	Vin / Vout -VE

Table 1 – FerIT Node Pinouts

FerIT Solar Node

Components

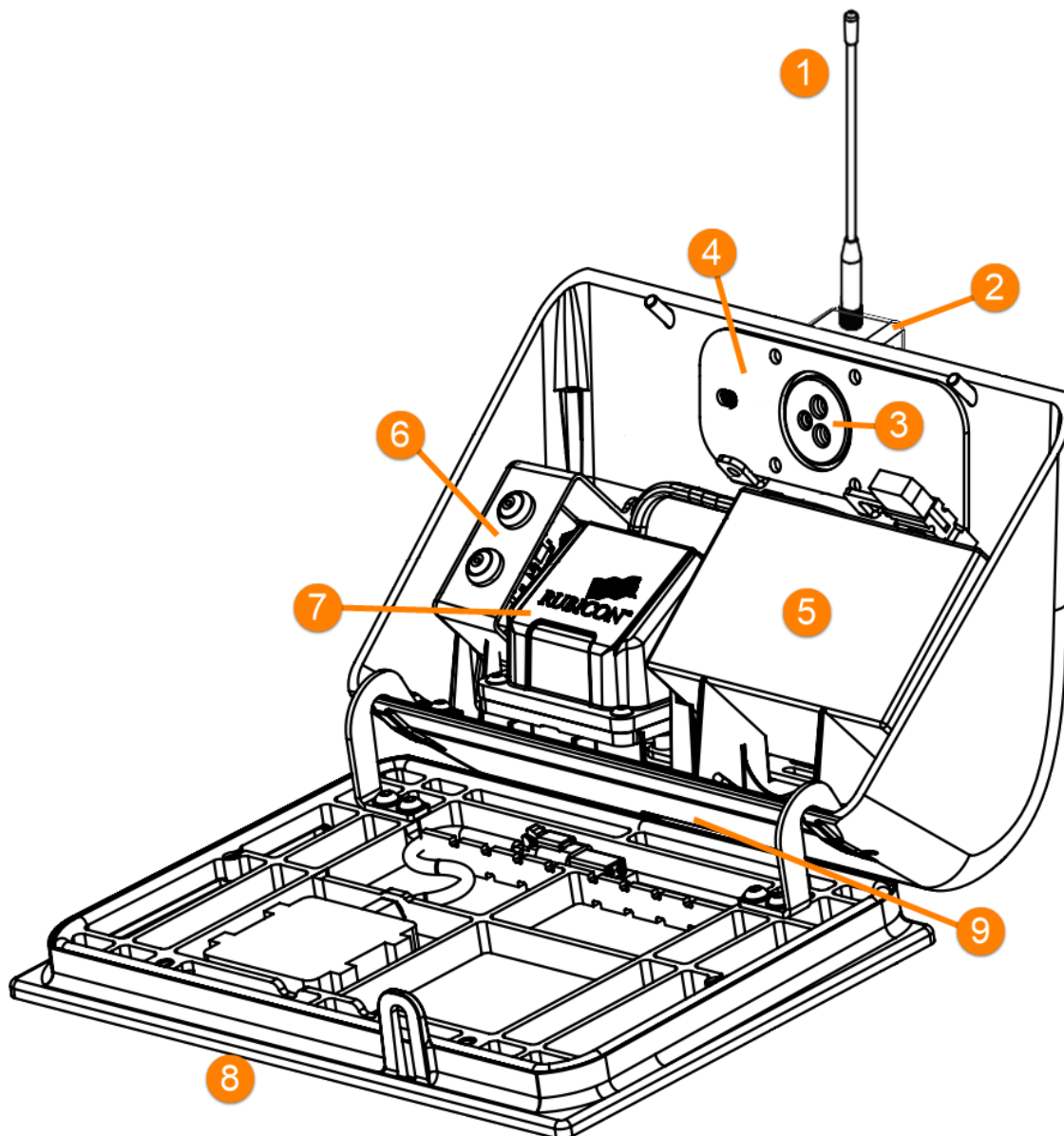


Figure 7 – FerIT Solar Node components

1. Antenna
2. Antenna mounting
3. Loom connector (rear mounting)
4. Rear mounting location
5. Battery
6. Power module
7. Integrated FerIT Node
8. Solar panel
9. Base mounting and loom connector location

Dimensions

Note:

Dimensions are given in millimetres and [inches].

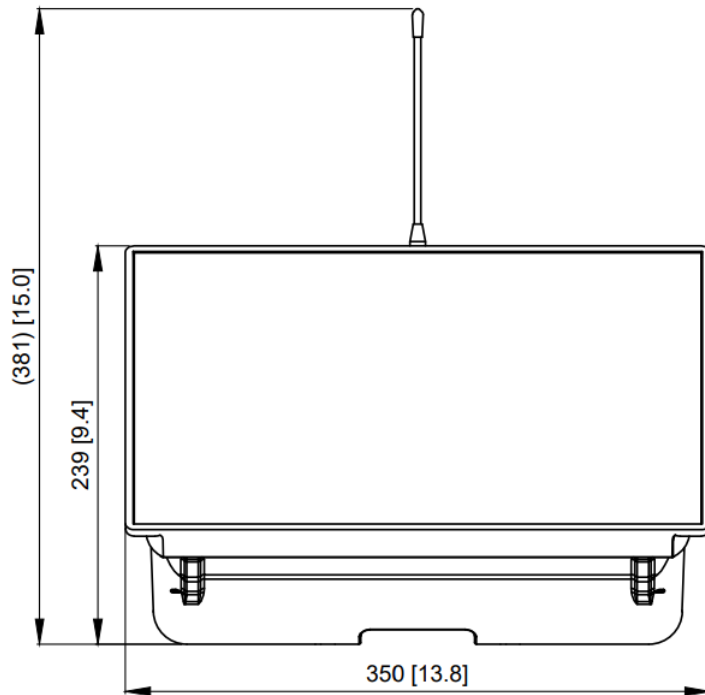


Figure 8 – FerIT Solar Node front view

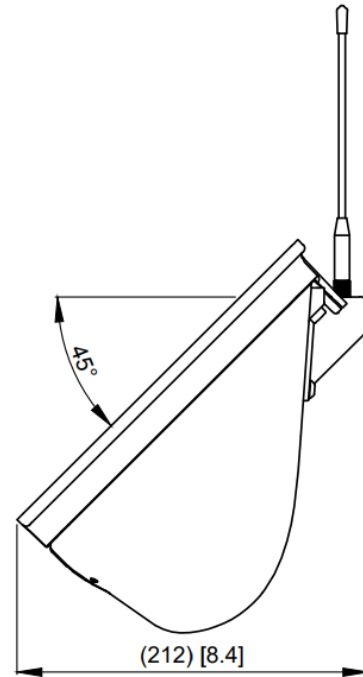


Figure 9 – FerIT Solar Node side view

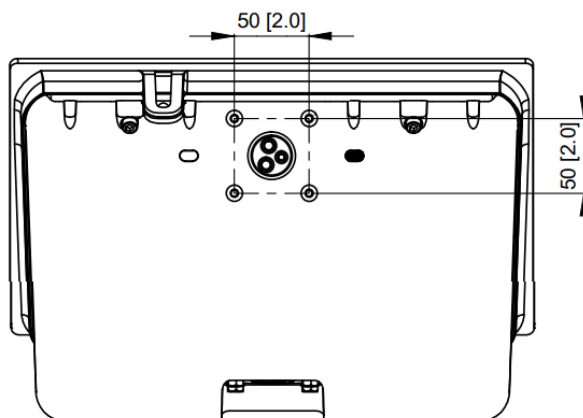


Figure 10 – FerIT Solar Node rear mounting

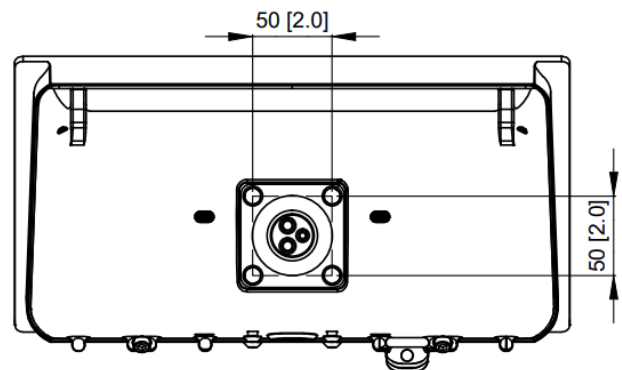


Figure 11 – FerIT Solar Node base mounting

Electrical Wiring

Power Connector

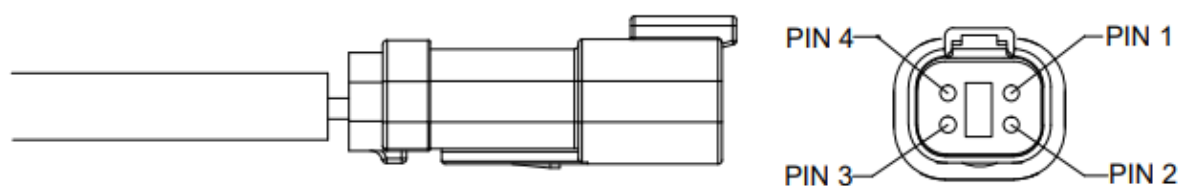


Figure 12 – FerIT Solar Node power connector pinouts

Node	Type
Pin 1	Vout +VE
Pin 2	Vout -VE
Pin 3	RS485B
Pin 4	RS485A

Table 2 – FerIT Solar Node Pinouts

Safety Precautions

Please make safety a priority when you are carrying out any work at a site. We recommend that you perform a site-specific risk assessment to identify any potential risks before commencing any work at a site.

Hazards

This topic lists identified hazards and options for dealing with them. Hazards that are specific to particular activities are also listed in the relevant topics.

Note:

If any of these hazards are present, refer to the relevant Occupational Health and Safety regulations for the region for guidance.

If there is a conflict between the instructions in this manual and an applicable national or local safety code, the national or local code must take precedence.

Identified hazards for working with the Weather Station are:

Environmental hazards

Hazards that apply to working outdoors.

**Hazard Extreme weather**

- Be aware of expected weather conditions and wear suitable clothing
- In hot weather, take sunscreen and adequate drinking water. Watch your companions for signs of dehydration.
- In cold weather, wear warm clothing and carry chains for vehicles

**Hazard: Traffic**

- Take care when exiting your vehicle and when working near traffic.
- If necessary, erect warning signs or bollards.
- Ensure that your vehicle is not a hazard to other vehicles.

**Hazard: Power lines**

Follow appropriate safety regulations when working near power lines

**Hazard: Fire**

Observe local fire restrictions.

Site hazards

Hazards that apply to working in remote or rural areas and around water.



Hazard: Heights

- Follow approved safety procedures when working with ladders or elevated platforms.
- Use a platform ladder if the FerIT is being installed at a height above 2 meters.



Hazard: Slipping

- Wear slip-resistant footwear
- Keep access-ways clear



Hazard: Dangerous animals and livestock

- If there is livestock in the area, barricade off the work area or have livestock moved
- Watch out for snakes and biting insects when lifting equipment or removing covers
- Carry a first aid kit and an EpiPen

Work hazards

Hazards that apply to working with machinery, power tools, or heavy equipment.



Hazard: Sharp objects

Wear protective clothing, boots and gloves when handling sharp objects and objects with rough surfaces, burrs and sharp edges



Hazard: Falling objects

- Wear protective clothing, helmets, boots and gloves.
- Ensure that the FerIT is securely fixed to the mast.

Safety Equipment

The following safety equipment may be required during the installation of Rubicon products.



Steel capped boots



Gloves



Safety glasses



Hi-visibility vest



Helmet



Residual current device



Dust mask or respirator



Face protection



Noise protection



Flotation device



Safety harness



First Aid kit

Installation

Installation Options

The FerIT Node and the FerIT Solar Node are mounted on a pole using a suitable mounting bracket. You can mount the FerIT to an existing pole, or use the optional star picket or ground screw mounting options. The FerIT should be mounted at least 1.5m off the ground, and above nearby crops or objects where possible.

FerIT Node Installation

The FerIT Node can be connected to a mounting bracket using one of the following options depending on the bracket design:

- Two M5 bolts on the base of the FerIT Node. This is the most common mounting option.
- Two button head bolts on either side of the antenna. Remove the FerIT Node cover to access these mounting screws.

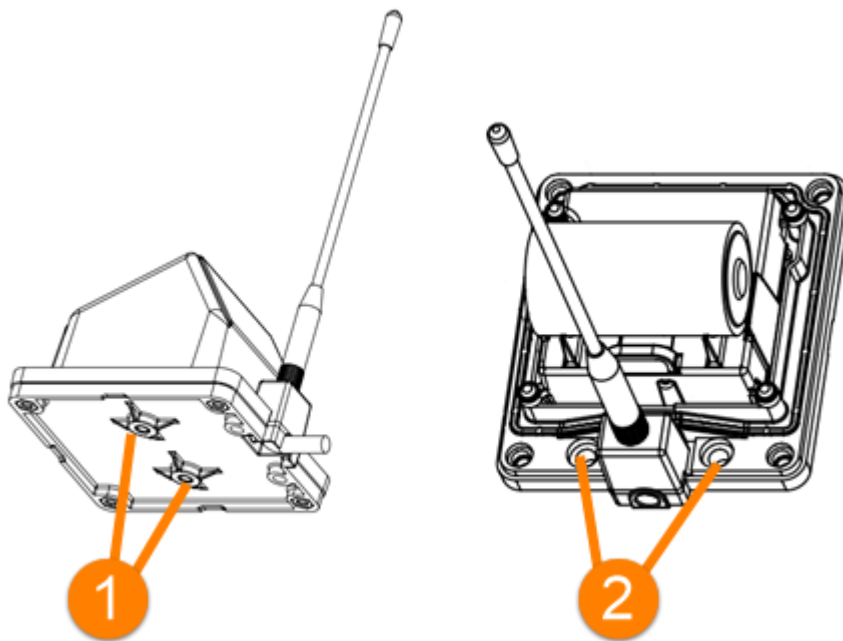


Figure 13 – FerIT Node mounting locations – (1) Base, (2) Rear

FerIT Solar Node Installation



Battery handling:

Please take care when handling the FerIT Solar Node internal battery. This may be a fire hazard if it is dropped onto a hard surface.

The FerIT Solar Node can be connected to a mounting bracket using one of the following options depending on the bracket design:

- Four M6 bolts on the base of the FerIT Solar Node. Two screw into captive nuts and two must be secured with M6 Nyloc nuts.
- Four M6 bolts on the rear of the FerIT Solar Node.

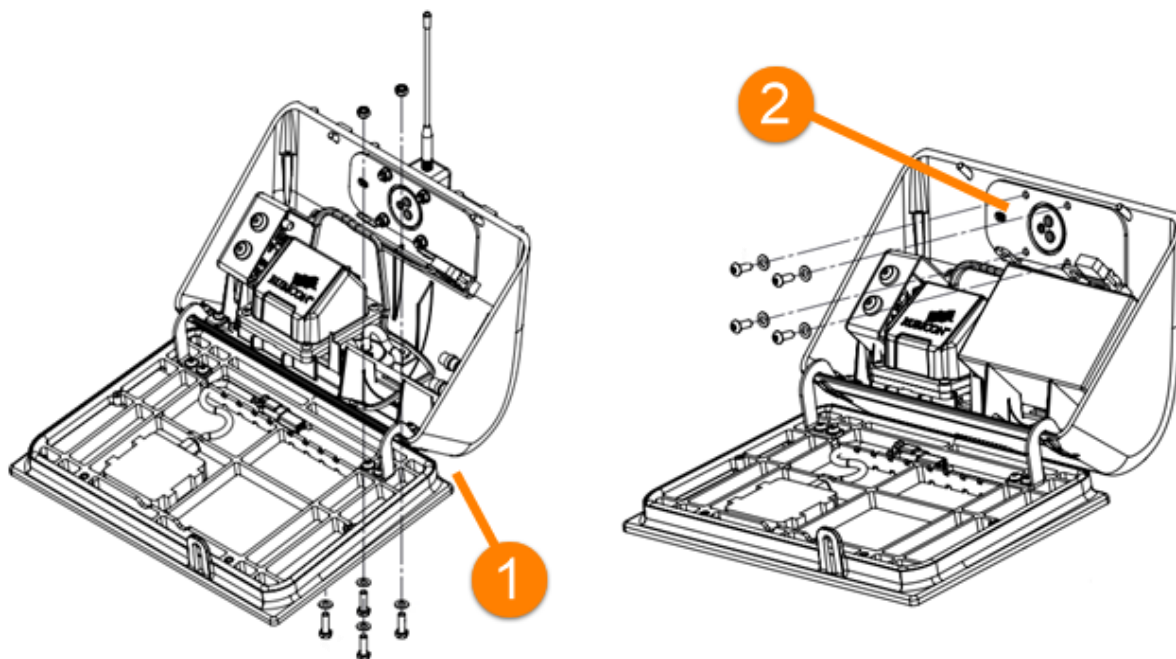


Figure 15 – FerIT Solar Node mounting locations – (1) Base, (2) Rear

Solar panel orientation

The FerIT Solar Node includes an integrated solar panel. This must face north in the southern hemisphere and south in the northern hemisphere.

Certification

FerIT Regulatory Requirements

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encourage to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

WARNING: 900MHz Operation:

To satisfy FCC RF exposure requirements for mobile transmitting devices, a separation distance of 21 cm or more should be maintained between the antenna of this device and persons during device operation. To ensure compliance, operations at closer than this distance is not recommended. The antenna used for this transmitter must not be co-located in conjunction with any other antenna or transmitter.

Approved Antenna Options

P400 Models (81338, 81343)

Type	Rubicon Part Number	Description
Omni Directional	81182	3dBi, 900MHz Whip Antenna Reverse SMA
Omni Directional	81842	6dBi, 900MHz Omni Directional N-TYPE

LoRa Models (81170, 81342)

Type	Rubicon Part Number	Description
Omni Directional	81182	3dBi, 900MHz Whip Antenna Reverse SMA

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:



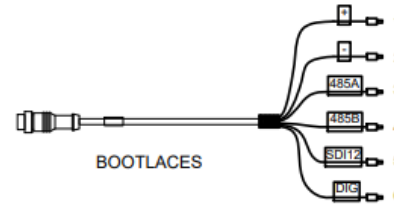
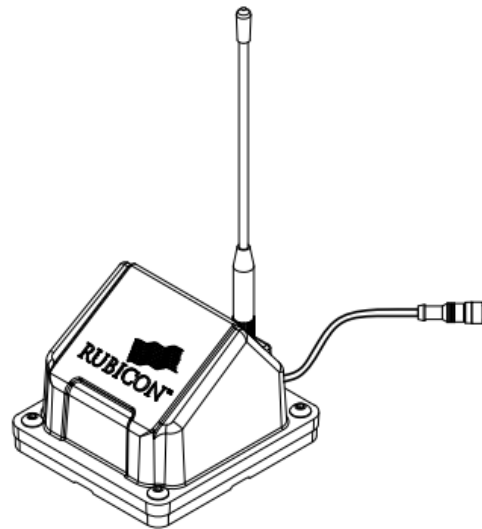
1. This device may not cause interference; and
2. This device must accept any interference, including interference that may cause undesired operation of the device.

Warning:

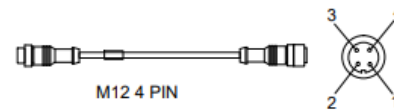
Any changes or modifications not expressly approved by Rubicon Global Pty Ltd could void the user's authority to operate this equipment.

Appendix: FerIT Wiring

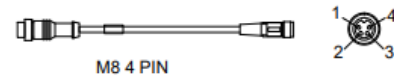
FERIT NODE



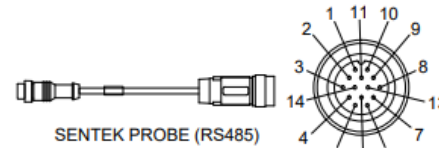
NODE	SENSOR	TYPE
Pin 1	5	SD12
Pin 2	NC	
Pin 3	NC	
Pin 4	4	RS485B
Pin 5	1	+VE
Pin 6	3	RS485A
Pin 7	6	Dig In/Out, 4-20mA, Analog Voltage In
Pin 8	2	-VE



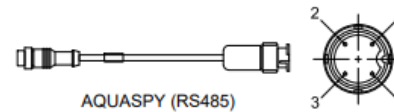
NODE	SENSOR	TYPE
Pin 1	NC	
Pin 2	NC	
Pin 3	NC	
Pin 4	3	RS485B
Pin 5	1	+VE
Pin 6	4	RS485A
Pin 7	NC	
Pin 8	2	-VE



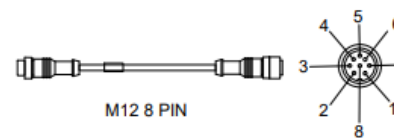
NODE	SENSOR	TYPE
Pin 1	NC	
Pin 2	NC	
Pin 3	NC	
Pin 4	4	RS485B
Pin 5	1	+VE
Pin 6	3	RS485A
Pin 7	NC	
Pin 8	2	-VE



NODE	SENSOR	TYPE
Pin 1	NC	
Pin 2	NC	
Pin 3	NC	
Pin 4	10	RS485B
Pin 5	1	+VE
Pin 6	13	RS485A
Pin 7	NC	
Pin 8	2	-VE



NODE	SENSOR	TYPE
Pin 1	NC	
Pin 2	NC	
Pin 3	NC	
Pin 4	3	RS485B
Pin 5	1	+VE
Pin 6	2	RS485A
Pin 7	NC	
Pin 8	4	-VE



NODE	SENSOR	TYPE
Pin 1	1	SD12
Pin 2	2	12C-SCL
Pin 3	3	12C-SCA
Pin 4	4	RS485B
Pin 5	5	+VE
Pin 6	6	RS485A
Pin 7	7	Dig In/Out, 4-20mA, Analog Voltage In
Pin 8	8	-VE

