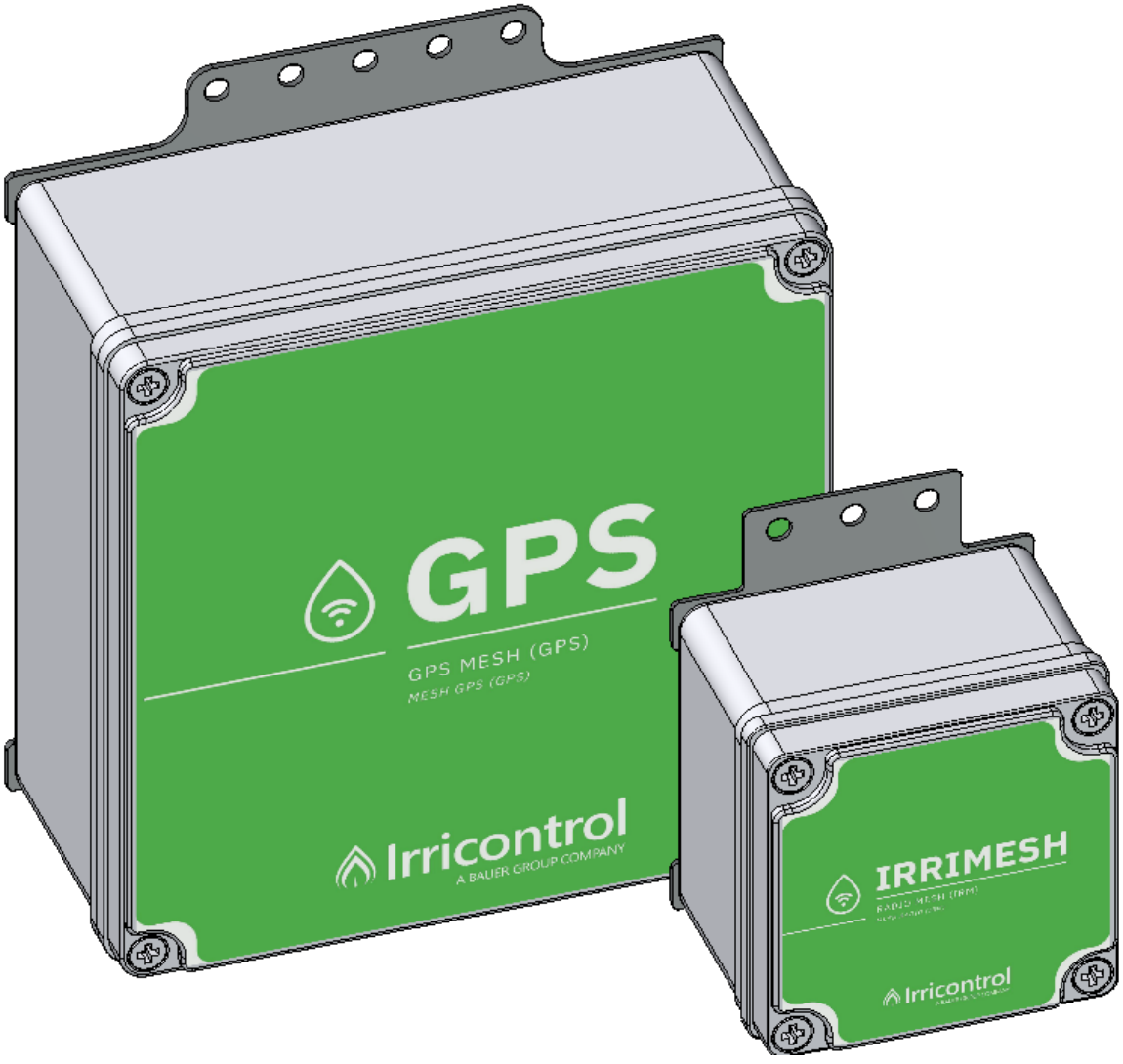
Installation, Operation and Maintenance

MANUAL



GPS KIT

v. 00

MANUFACTURER:

IRRICONTROL CONTROLE INTELIGENTE DE IRRIGACAO S.A

CNPJ: 26.941.490/0002-03

Rua Eislében Cereja Correa Fonseca, 117 - Lote 01-A Quadra Galpão 02 - Parte A

Distrito Industrial, São João da Boa Vista - São Paulo, Brasil

Zip Code: 13877-776

Phone: +55 (019) 3634-1212

Email: contato@irricontrol.com.br

Website: www.irricontrol.com.br

TECHNICAL SUPPORT:

In case of problems or additional questions, contact Irricontrol Technical Support using the following channels:

Irricontrol Platform: Available on the Google Play Store (Android) and App Store (Apple).

Phone: +55 (019) 2112-9856

Email: suporte@irricontrol.zendesk.com

A dedicated section is also available on the **Irricontrol Knowledge Platform (Zendesk)**, where customers can access the digital version of this manual, additional product information, and possible updates.

Zendesk can be accessed through the following link:

https://irricontrol.zendesk.com/hc/en-us

DATE	REVISION	DESCRIPTION	REVISED BY	APPROVED BY
01.2026	00	- Start of the document.	a.fernandes	l.óboli

Irricontrol
A BAUER GROUP COMPANY

CONGRATULATIONS! You have just acquired an IRRICONTROL product!

Our solutions allow the entire irrigation process to occur in a more efficient, sustainable, and controlled way. Enjoy the benefits of smart irrigation.

Share this idea! **#ForAGreenWorld**

NOTES

This document uses notes to organize and highlight critical information related to the operation and maintenance of the equipment. The notes are categorized according to their purpose, as described below:

SUPPLEMENTARY NOTE – Provides additional information that helps in understanding or performing a task but is not essential for the safety or functionality of the equipment.

WARNING NOTE – Draws attention to potential equipment damage or critical details that may impact system performance.

DANGER NOTE – Highlights situations that pose risks to the physical safety or life of the operator. These notes must be strictly followed to prevent serious injury or death.

SCHEDULING NOTE – Specifies recommended time intervals for tasks such as preventive maintenance or operational adjustments.

Pay attention to these notes throughout the manual, as they are designed to enhance understanding and ensure safety and efficiency when using the equipment.

Irricontrol
A BAUER GROUP COMPANY

SUMMARY

Irricontrol
A BAUER GROUP COMPANY

LIST OF FIGURES

1. Introduction

This manual provides the necessary information for the installation, operation, and maintenance of the Kit GPS, manufactured by Irricontrol. It is essential that all individuals involved in any of these stages carefully study this manual before starting any procedure. Keep it in a safe, known, and accessible location so that the entire team can consult it whenever needed.

All information contained in this manual is based on the most up-to-date data available for Irricontrol's product portfolio at the time of printing. Due to the continuous development of its equipment, the company reserves the right to modify the contents of this manual without prior notice and disclaims any responsibility for consequences arising from such changes. To keep customers informed, the company maintains a section on its knowledge base and on the Irricontrol/Zendesk Platform, where updates and other relevant information about the equipment are published.

The images included in this manual are for illustrative purposes only and may differ from the actual equipment. Their inclusion is intended to facilitate the understanding of the equipment and its operation.

To ensure clarity, and given the wide range of possibilities, this manual does not cover every conceivable situation related to operation and maintenance. Should further clarification be required, Irricontrol technical support may be contacted.

2. Warranty

Irricontrol offers a warranty for its entire product line, covering manufacturing defects and malfunctions. In such cases, the company is committed to providing full support by performing repairs and/or replacements, either partially or fully, at Irricontrol's discretion.

For the warranty to be valid and enforceable, it is essential that all conditions and rules described and agreed upon in the **WARRANTY TERMS** are fully observed.

We recommend consulting the **PURCHASE AND SALE AGREEMENT** for further details and information regarding duration, coverage, claim procedures, exclusions, and the documentation required to initiate the warranty process.

It is recommended to properly file all documents related to the equipment purchase, such as the INVOICE and WARRANTY TERMS. This will expedite any warranty service process.

The information contained in this manual does not replace, add to, or modify any agreement established by the PURCHASE AND SALE AGREEMENT and/or WARRANTY TERMS.

Modifying or replacing any components of the product may cause malfunction and affect the product warranty. Therefore, it is always recommended to consult the manufacturer or an authorized representative before carrying out such interventions.

3. Technical Data Sheet

DESCRIPTION	INFORMATION			
Product Name	GPS Kit			
Manufacturer Code (SKU) [1]	2779, 2804, 2805, 2907, 2908, 2948, 2949, 5320, 5998, 6656, 6758, 7033, 7046, 7120, 7121, 7122, 7123, 7124, 7125, 7518, 7519, 7520, 7522, 7941, 7942, 7943, 7944, 7964, 7965, 7966, 7967, 7968, 7969, 7988, 7989			
Short Description	Equipment responsible for indicating the position of the last pivot tower and for monitoring the operating pressure. The data is transmitted to the controller and to the Irricontrol Platform via radio.			
Protection Rating (IP)	IP65			
Materials and Finish	Plastic boxes with label.			
Connector Type	Female terminal block and WAGO connectors.			
Installation Environment	External			
Weight [1]	~ 3 to 6 kg			
Included Accessories	GPS, Irrimesh with cable and female terminal block, antennas with cables, GPS power cable, brackets, Mounting Kit, plastic cable ties, and Manual.			
Optional Accessories	Pressure sensor, reducing tee, nipple, and thread seal tape.			
Communication Radio	Model [2]	DIGI XBEE-PRO 900HP (XBP9B-DMST-012)	DIGI XBEE SX 868 (XB8X-DMUS-001)	DIGI XBEE XR 868 (XB-8XR-DMUT-101)
	Operating Frequency	902 to 928 MHz	863 to 870 MHz	863 to 870 MHz
	RF Data Rate	10 kbps or 200 kbps (software selectable)	10 kbps or 80 kbps (software selectable)	10 kbps or 80 kbps (software selectable)
	Receive Current	29 mA	40 mA	26 mA
	Transmit Current	215 mA	55 mA	76 mA
	Receiver Sensitivity	-101 dBm (200 kbps) -110 dBm (10 kbps)	-106 dBm (80 kbps) -113 dBm (10 kbps)	-107 dBm (80 kbps) -112 dBm (10 kbps)
	Output Power	Up to 24 dBm (250 mW)	Up to 13 dBm ERP	Up to 13 dBm ERP
	Supply Voltage	2.1 to 3.6 VDC	2.4 to 3.6 VDC	2.1 to 3.6 VDC
	Operating Temperature	-40 °C to +85 °C	-40 °C to +85 °C	-40 °C to +85 °C
	Modulation	FHSS (Frequency Hopping Spread Spectrum)	FHSS (Frequency Hopping Spread Spectrum)	FHSS (Frequency Hopping Spread Spectrum)
	Networking Topologies	DigiMesh, Point-to-Point, Point-to-Multipoint, Peer-to-Peer	DigiMesh, Repeater, Point-to-Point, Point-to-Multipoint, Peer-to-Peer	DigiMesh, Repeater, SX protocol compatible
	Digital I/O	15 digital I/O pins	13 digital I/O pins	13 digital I/O pins
	Analog Inputs	4 analog inputs (10-bit ADC)	4 channels 10-bit	4 channels 10-bit
	Sleep Current	2.5 µA	1.8 µA	1.5 µA
	Maximum Line-of-Sight Range	Up to 15,5 km with 2.1 dBi antenna	Up to 14.5 km with 2.1 dBi antenna	Up to 14.5 km with 2.1 dBi antenna
	Internal Module Encryption	AES-128 (Digi internal security layer)	AES-128 (Digi internal security layer)	AES-256 (Digi internal security layer)
	Certifications	FCC, IC, CE/RED (Europe), RCM, RoHS	CE/RED, RoHS	CE/RED (Europe), RoHS
Pressure Sensor	Model		MGG-TP-IP68 / 21 Y	
	Sensor Type		Piezoresistive, stainless steel AISI 316L	
	Measurement Range		0-10 BAR	
	Overpressure		2 × F.S.	
	Output Signal		4-20 mA	
	Power Supply		10-30 VDC	
	Protection Rating		IP68	
Packaging	Cardboard box (423 × 413 × 240 mm)			
Manufacturer / Technical Contact	Irricontrol Controle Inteligente de Irrigação LTDA / Luiz Roque			

ITEM	GPS	IRRIMESH
Input Voltage	90 - 240 VAC	3.3 VDC
Input Current	~ 0.5 A	~ 0.1 A
Output Voltage	12 V	
Output Current	~ 1.3 A	-
Output Power	15.6 W	-
Dimensions (H × W × D)	200 × 200 × 95 mm	100 × 100 × 75 mm
Fuse	Glass - 2A - 250V - 5 × 20 mm	Not applicable.

[1] Depending on the version purchased (type of support) and installation region.
[2] Defined according to the installation region.

4. Product Overview

The GPS Kit is one of Irricontrol's Automation and Telemetry solutions, consisting of the GPS and Irrimesh radio, and optionally, a pressure sensor.

The GPS is a device installed on the last pivot tower, responsible for providing the precise real-time position of the center pivot. By combining the geographic coordinates of the pivot center with the position of the last tower, both obtained via satellite, it is possible to accurately calculate the pivot's rotation angle relative to its central point. This functionality enables detailed operational monitoring, the configuration of specific irrigations for different field sections (zones), angle-based indicators, and other applications.

The Irrimesh, on the other hand, is a radio device installed at the pivot center, connected to the control cabinet controller. It is designed to act as a communication node between the center pivots, the Irricontrol Platform, and the other devices included in Irricontrol's Automation and Telemetry solution, including the GPS.

Like the other devices in the solution, the GPS and Irrimesh use mesh communication technology, in which the radios of the devices function both as receivers and transmitters of data. This creates an interconnected network, allowing efficient information exchange without relying on a central point.

The coverage and performance of the mesh network depend on the signal study carried out during the design phase. Physical obstacles, distance between devices, and interference can affect communication.

Changes to the environment after the design phase, such as the construction of new structures or vegetation growth, may create unplanned obstacles and affect communication.

Figure 1 highlights the positioning of the GPS and Irrimesh within the solution and their relationship with the other devices.

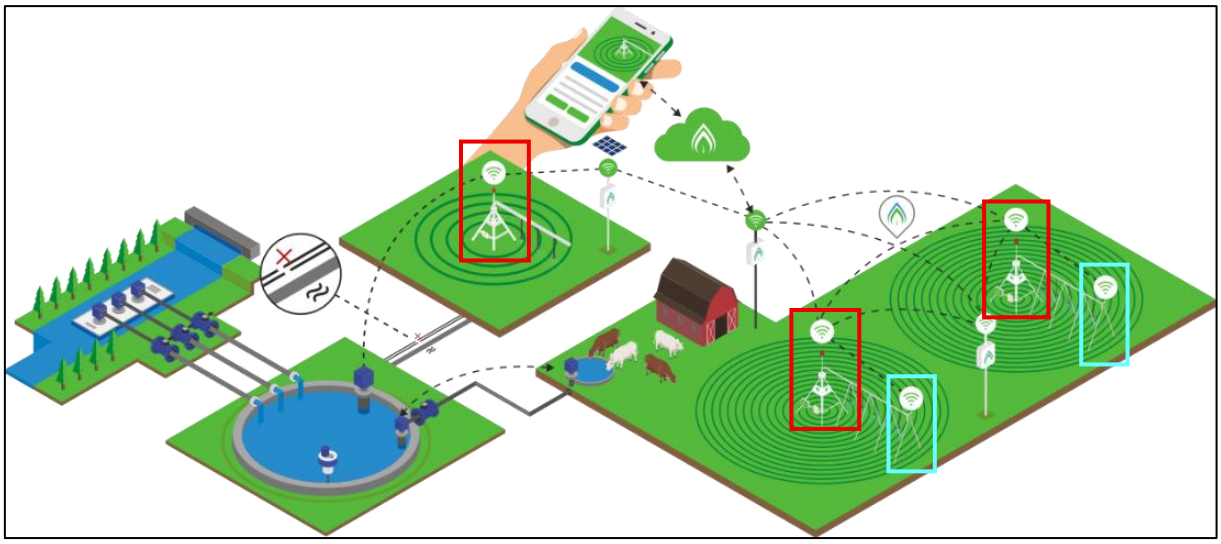


Figure 1 - GPS (in blue) and Irrimesh (in red) in the Irricontrol Automation and Telemetry solution.

The pressure sensor, installed on the last pivot tower, is responsible for monitoring the pressure at that tower. The data is received and transmitted by the GPS, integrated with the pivot cabinet controller via Irrimesh, and sent to the Irricontrol Platform for analysis and monitoring.

The GPS provides an accuracy of up to 5 meters, ensuring reliable readings suitable for the efficient operation of irrigation pivots.

5. Product Composition

The items included with each of the products in the GPS Kit (GPS, Irrimesh, and pressure sensor) are listed below.

Before starting the installation, all items must be checked, and any damage or missing parts must be immediately reported to the authorized dealer or directly to Irricontrol.

- **GPS:**

ITEM	CODE	DESCRIPTION	QTY.
A	-	GPS	1.00
B	2265	FLEX PP CABLE - 3 CONDUCTORS 1MM	7 m
C	5277	MOBILE ANTENNA UHF 5/8 WAVE 900 MHZ NMO BASE (AP3900)	1.00
D	6766	COAXIAL CABLE WITH NMO CONNECTOR 1M 95% SMA REVERSE MALE - AP56757	1.00
E	2372	GPS BRACKET - MODEL J	1.00
F	7478	ANTENNA BASE SUPPORT GLV	1.00
G	2377	HEX HEAD BOLT, ZINC PLATED 6 × 20 (METRIC)	4.00
H	5409	HEX LOCK NUT M6, ZINC PLATED	4.00
I	2456	HEX HEAD BOLT 3/8 × 1.1/2 RI ZB (IMPERIAL)	1.00
J	2159	HEX NUT, ZINC PLATED 3/8" (IMPERIAL)	1.00
K	2135	NYLON CABLE TIE 2.5×160MM	5.00

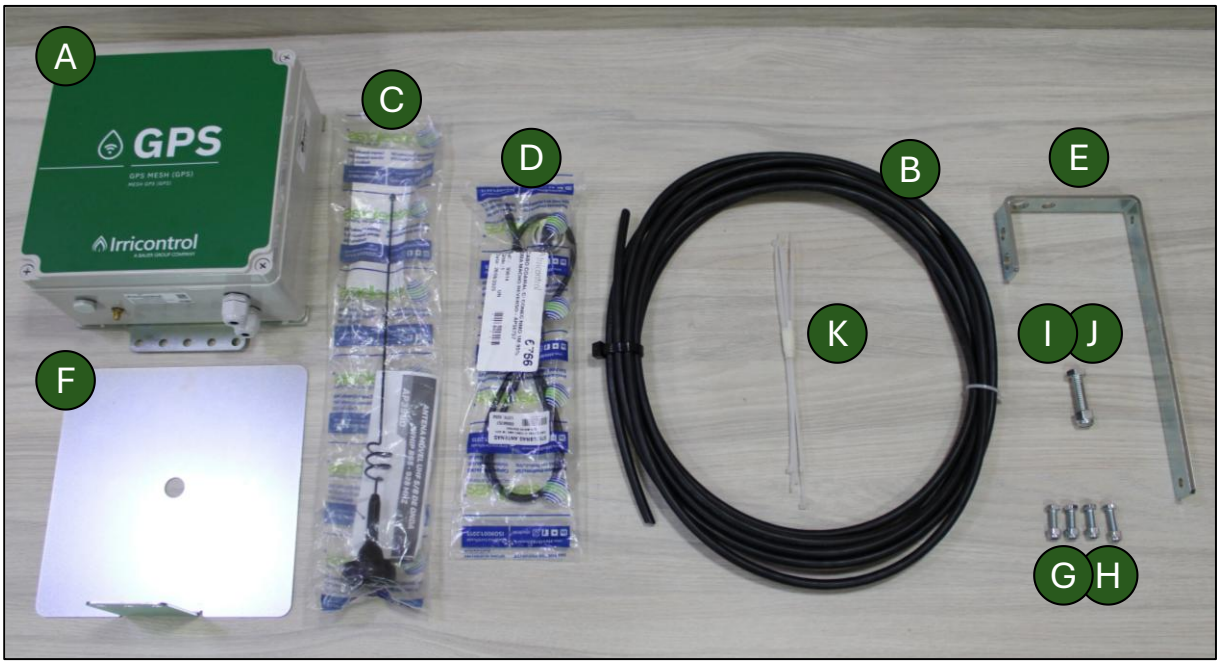


Figure 2 - Components - GPS.

- **Irrimesh:**

ITEM	CODE	DESCRIPTION	QTY.
A	-	IRRIMESH	1.00
B	2108	SLEEVE CABLE WITHOUT SHIELDING - 6 CONDUCTORS, 26 AWG	5 m
C	5277	MOBILE ANTENNA UHF 5/8 WAVE 900 MHZ NMO BASE (AP3900)	1.00
D	6766	COAXIAL CABLE WITH NMO CONNECTOR 1M 95% SMA REVERSE MALE - AP56757	1.00
E	7478	ANTENNA BASE SUPPORT GLV	1.00
F	2320	IRRIMESH SMARTCONNECT BRACKET - MODEL J [1]	1.00
G	2377	HEX HEAD BOLT, ZINC PLATED 6 × 20 (METRIC) [1]	4.00
H	5409	HEX LOCK NUT M6, ZINC PLATED [1]	4.00
I	2456	HEX HEAD BOLT 3/8 × 1.1/2 RI ZB (IMPERIAL) [1]	1.00
J	2159	HEX NUT, ZINC PLATED 3/8" (IMPERIAL) [1]	1.00
K	2156	U-BOLT CLAMP [2]	2.00
L	2135	NYLON CABLE TIE 2.5×160MM	5.00

[1] For SmartConnect G2 cabinets.
[2] For Nexus G2 cabinets.

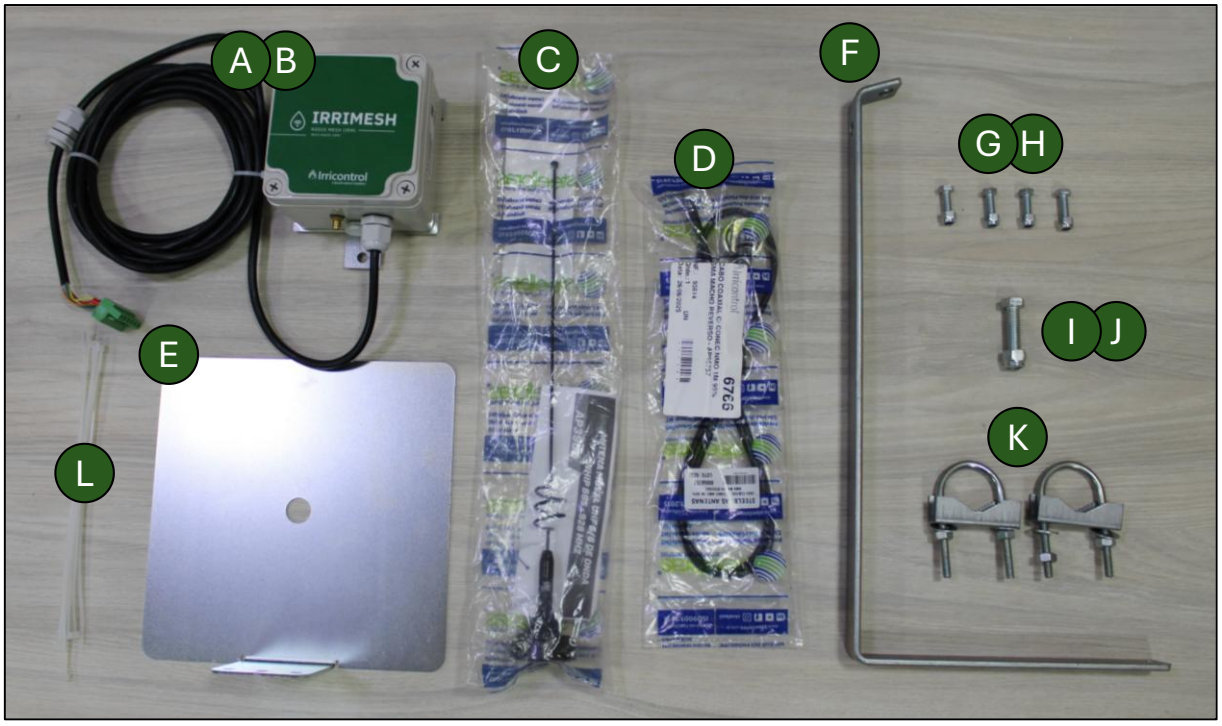


Figure 3 - Components - Irrimesh.

- **Pressure Sensor:**

ITEM	CODE	DESCRIPTION	QTY.
A	2440	PRESSURE TRANSMITTER SERIES 21Y - 10BAR 7M	1.00
B	2274	GALVANIZED REDUCING TEE - 3/4"-1/2"	1.00
C	2275	GALVANIZED NIPPLE - 3/4"	1.00
D	2276	THREAD SEAL TAPE	1.00

Figure 4 - Components - Pressure Sensor.

6. Installation

6.1. Mechanical Installation

This section describes the step-by-step procedure for the correct mechanical installation of the GPS, Irrimesh, and pressure sensor.

Tighten the bolts and nuts firmly, ensuring there are no gaps and that all mechanical components remain stable.

6.1.1. Irrimesh

The Irrimesh must be installed on the pivot's central tower, and its mounting varies depending on the pivot brand. On Bauer pivots, the device is attached to the central tower structure using a mounting bracket. On other pivots that use the Nexus G2 cabinet for automation, the device is mounted on the cabinet's installation tube.

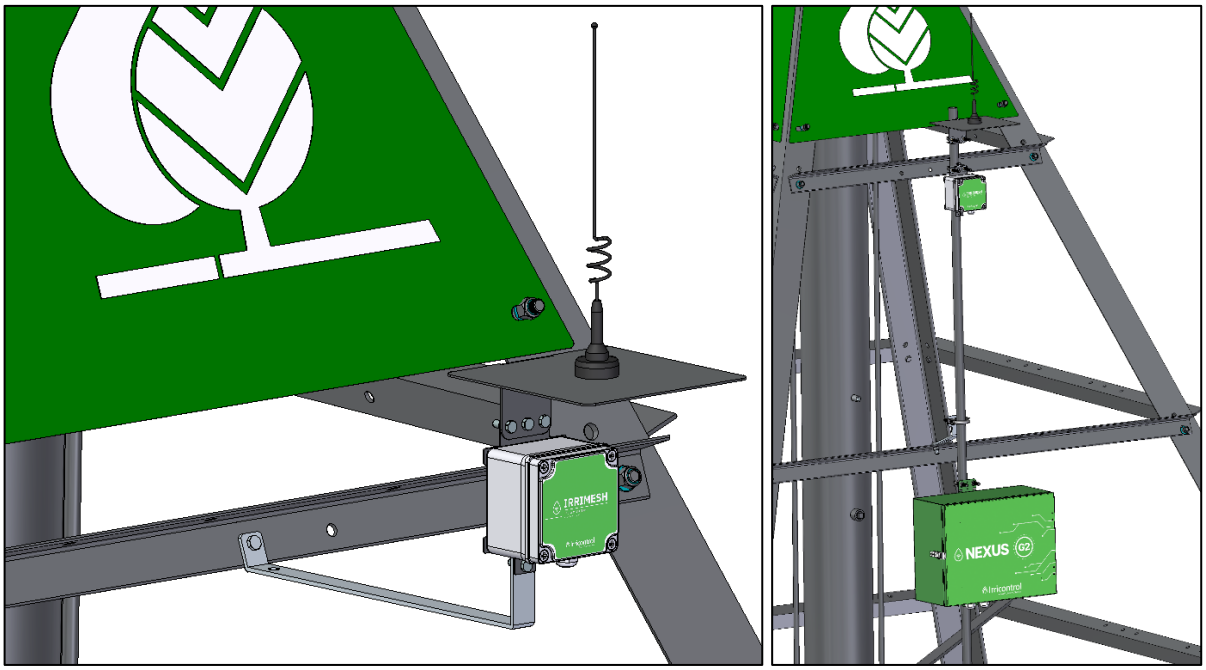


Figure 5 - Irrimesh installation on the pivot's central tower - Bauer and multi-brand pivots.

Install the device in a location with visibility to the other modules of the solution.

Position the Irrimesh at a height sufficient to ensure the device cable can reach the pivot control cabinet.

6.1.1.1. Pivôs Bauer

A. Attach the IRRIMESH SMARTCONNECT BRACKET – MODEL J and the ANTENNA BASE BRACKET GLV to the Irrimesh plastic box, using 4 HEX HEAD BOLT, ZINC PLATED 6 × 20 (METRIC) and 4 HEX LOCK NUT M6, ZINC PLATED.

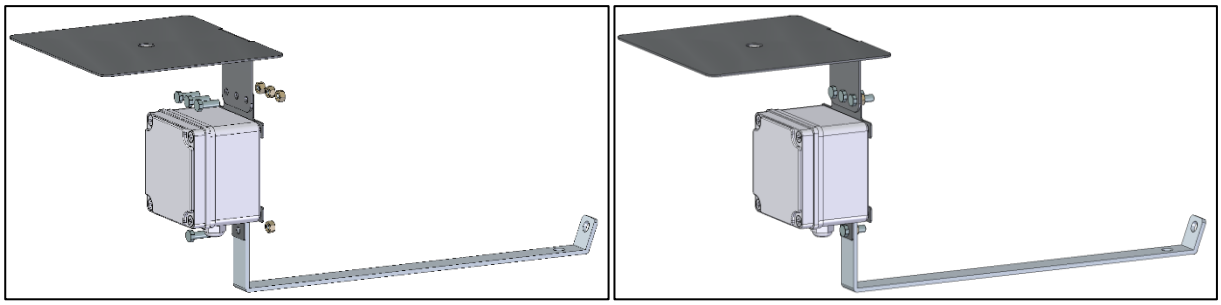


Figure 6 - Mounting the Irrimesh on the J Bracket and Antenna Base Bracket (Bauer Pivots).

B. Install the antenna on the bracket. To do this, position the NMO base (metal threaded part) over the hole in the bracket.

C. Insert the antenna cable NMO connector from underneath the hole and thread it onto the NMO base.

D. Thread the antenna onto the NMO base.

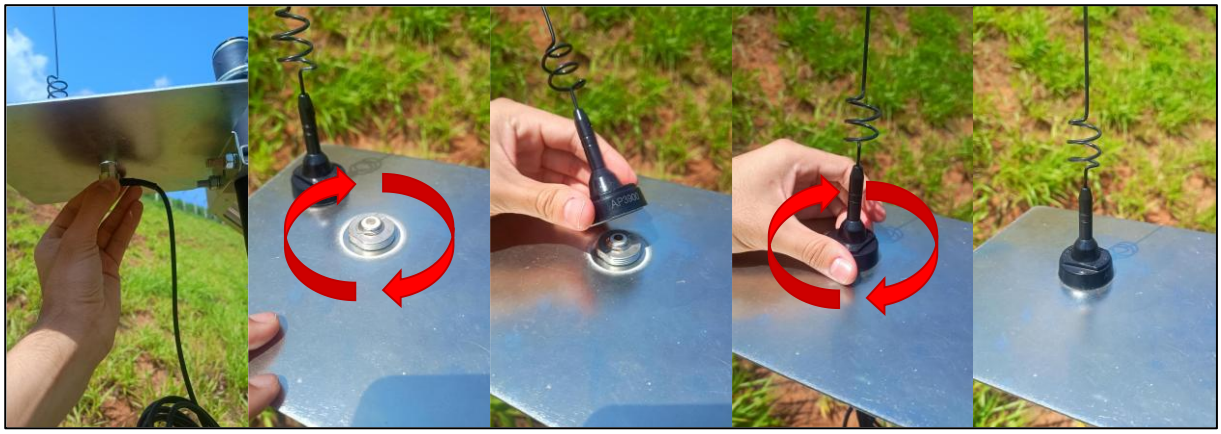


Figure 7 - Antenna Installation on the support.

The NMO base must be installed with the side containing the sealing O-ring facing downward, in contact with the bracket, to ensure proper sealing.

E. Screw the other end of the antenna cable (male SMA connector) into the female SMA connector located at the bottom of the Irrimesh's plastic box.

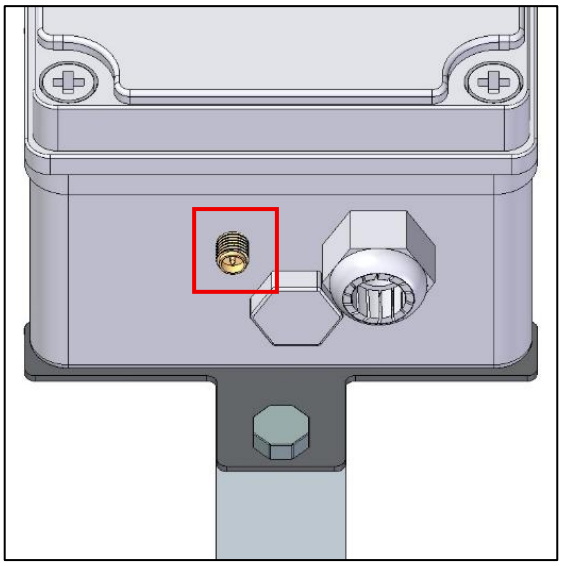


Figure 8 - Antenna connector on the Irrimesh.

Keep metal or conductive objects away from the antenna and always ensure it is pointing upward.

Avoid sharp bends in the antenna cable and ensure that all connections are properly seated, without twisting or excessive tension, to prevent communication issues.

F. Finally, secure the assembly to the top of the pivot's central tower structure using 1 HEX HEAD BOLT 3/8 × 1.1/2 RI ZB (IMPERIAL) and 1 HEX NUT, ZINC PLATED 3/8" (IMPERIAL).

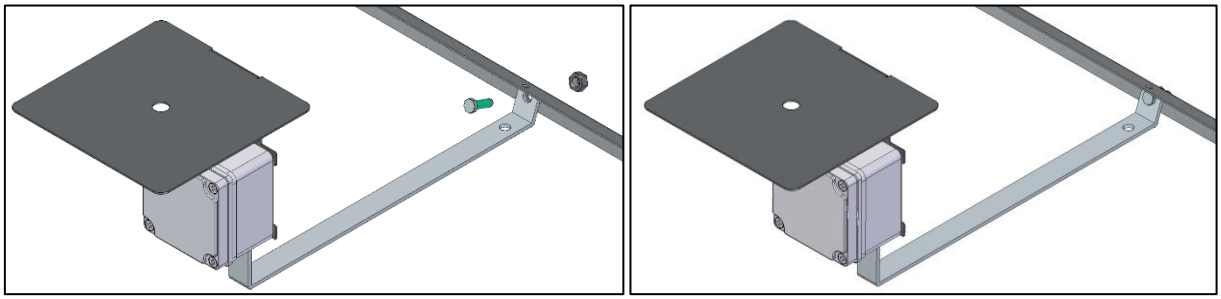


Figure 9 - Mounting the Irrimesh on the pivot's central tower (Bauer Pivots).

The mounting point of the Irrimesh bracket on the Bauer pivot central tower may differ from the illustrations in this manual, depending on availability.

Ensure that the chosen installation point for the Irrimesh is elevated while also allowing the device cable to reach the inside of the control cabinet.

6.1.1.2. Multi-Brand Pivots

A. Attach the Irrimesh plastic box and the ANTENNA BASE BRACKET GLV to the top of the Nexus G2 cabinet installation tube using two U-BOLT CAMPLES.

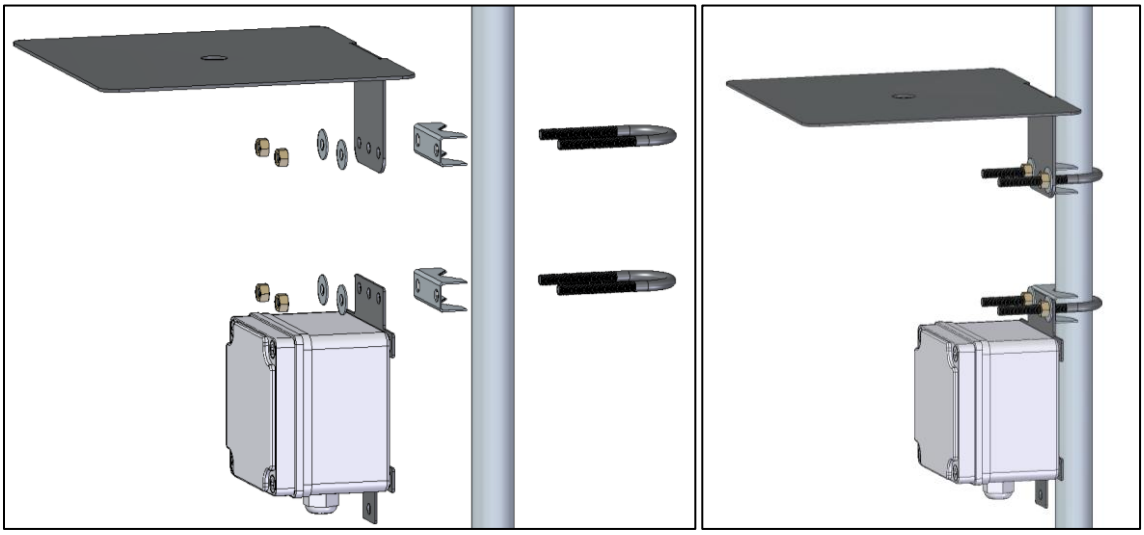


Figure 10 - Irrimesh and Antenna Base Bracket Installation on Multi-Brand Pivots.

B. Install the antenna following the instructions in the previous section.

6.1.2. GPS

The GPS must be installed on the structure of the last pivot tower, at the top and in a centralized position, as shown in Figure 11.

Figure 11 - GPS Installation on the Last Pivot Tower.

The higher the GPS is installed, the better the communication quality with the other radios.

To do this:

A. Attach the GPS BRACKET - MODEL J and the ANTENNA BASE BRACKET GLV to the GPS plastic box using 4 HEX HEAD BOLT, ZINC PLATED 6 × 20 (METRIC) and 4 HEX LOCK NUT M6, ZINC PLATED.

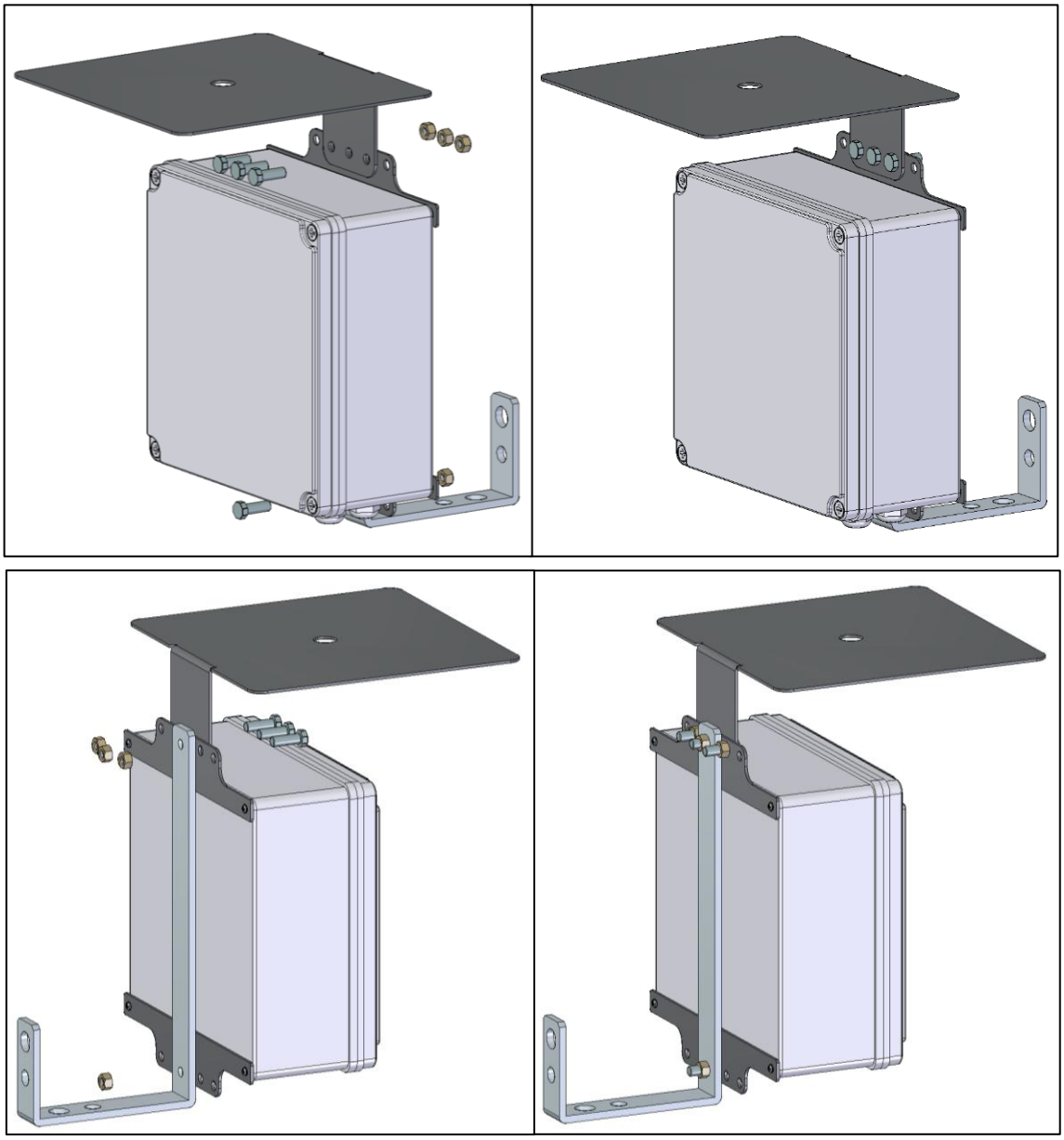


Figure 12 - Mounting the J Bracket and Antenna Base Bracket on the GPS.

B. Install the antenna on the bracket. To do this, position the NMO base (metal threaded part) over the hole in the bracket.

C. Insert the antenna cable NMO connector from underneath the hole and thread it onto the NMO base.

D. Thread the antenna onto the NMO base.

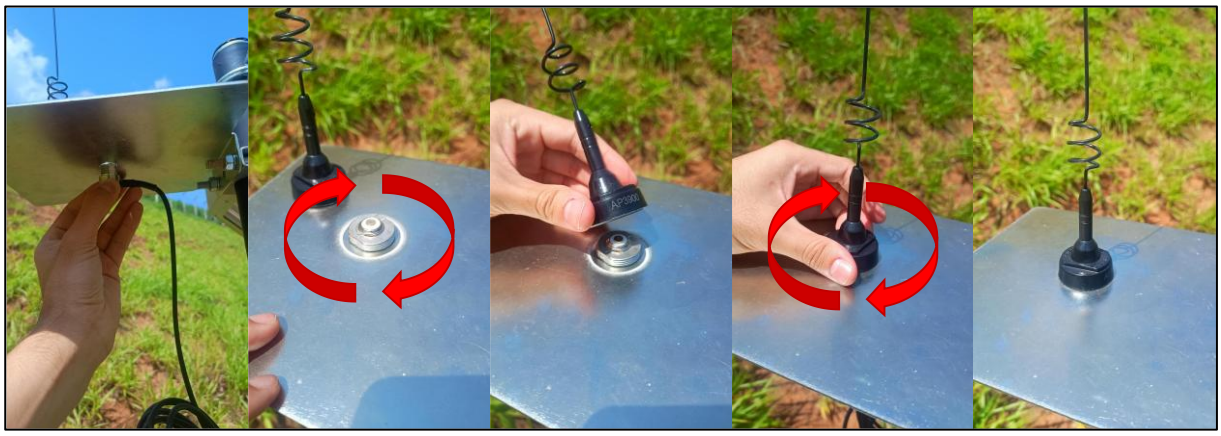


Figure 13 - Antenna Installation on the support.

The NMO base must be installed with the side containing the sealing O-ring facing downward, in contact with the bracket, to ensure proper sealing.

E. Screw the other end of the antenna cable (male SMA connector) into the female SMA connector located at the bottom of the GPS's plastic box.

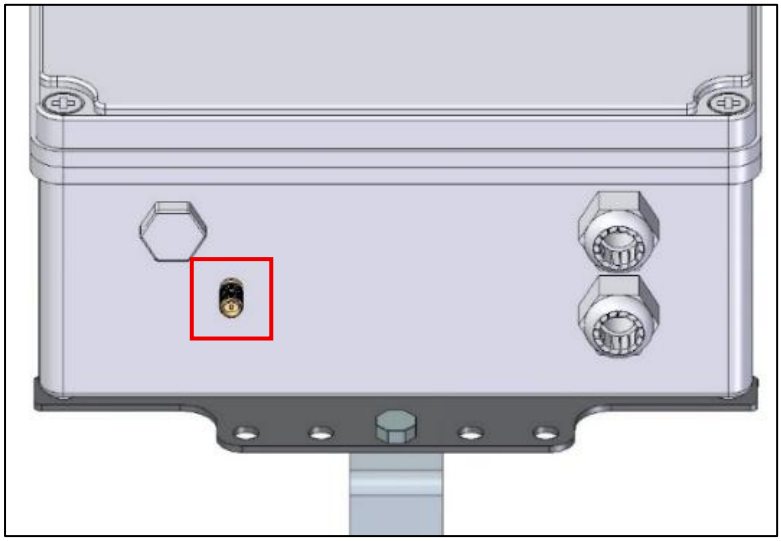


Figure 14 - Antenna connector on the GPS.

Keep metal or conductive objects away from the antenna and always ensure it is pointing upward.

Avoid sharp bends in the antenna cable and ensure that all connections are properly seated, without twisting or excessive tension, to prevent communication issues.

F. Finally, secure the assembly at the top and center of the last pivot tower structure. There are two mounting options depending on the type of hole in the beam: side or top. Use 1 HEX HEAD BOLT 3/8 × 1.1/2 RI ZB (IMPERIAL) and 1 HEX NUT, ZINC PLATED 3/8" (IMPERIAL).

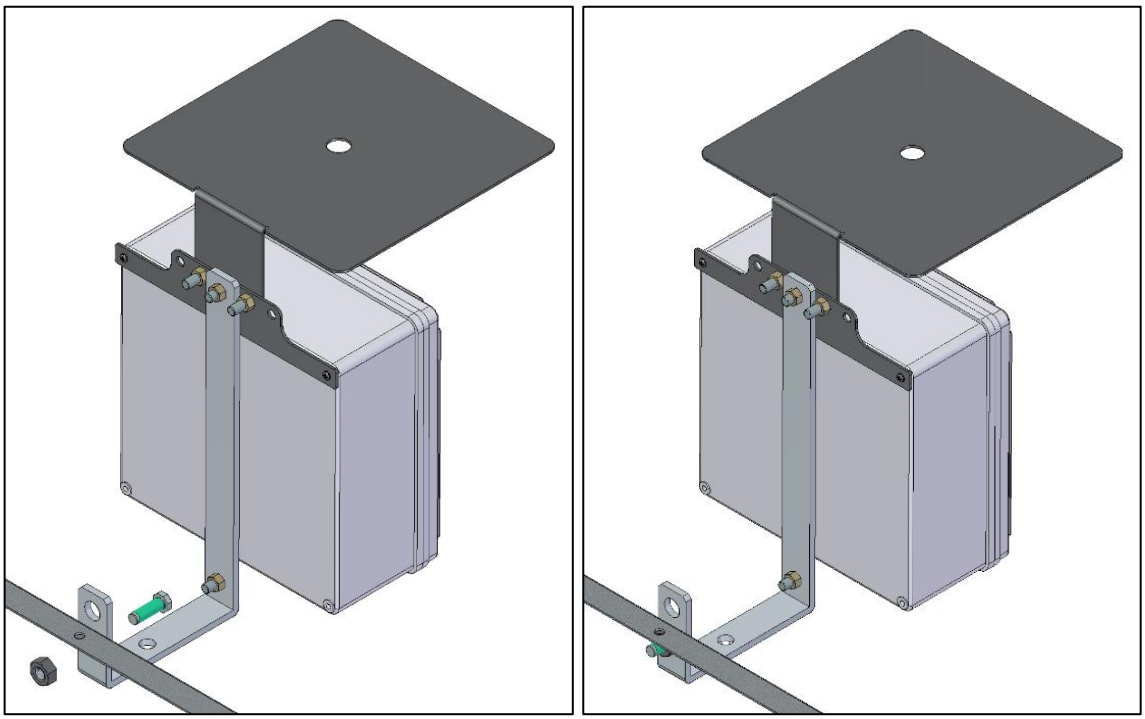


Figure 15 - GPS Mounting on the Pivot Beam's Side Face.

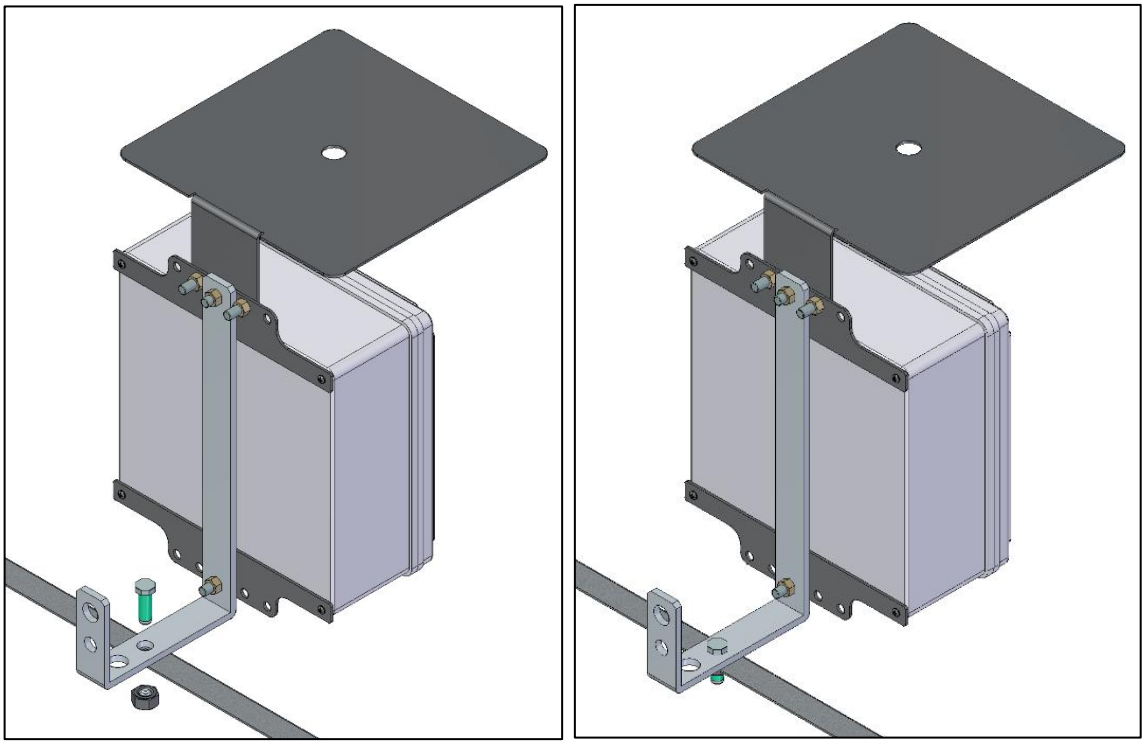


Figure 16 - GPS Mounting on the Pivot Beam's Top Face.

6.1.3. Pressure Sensor

The pressure sensor must be installed on the sprinkler pipe closest to the last tower, using a reducing tee for adaptation. To do this:

A. Apply thread seal tape to the threads of the pressure sensor and the nipple.

B. Locate the sprinkler closest to the last tower and disconnect the elbow that connects it to the pivot pipe.

Figure 17 - Sprinkler closest to the last tower disconnected from the pivot pipe.

C. Apply thread seal tape to the thread that connects the sprinkler elbow to the pivot pipe.

D. Connect one end of the reducing tee to the thread that attaches the sprinkler to the pivot pipe and the other end to the nipple.

Figure 18 - Connection of the reducing tee and pressure sensor nipple to the pivot pipe.

E. Connect the sprinkler elbow to the nipple thread.

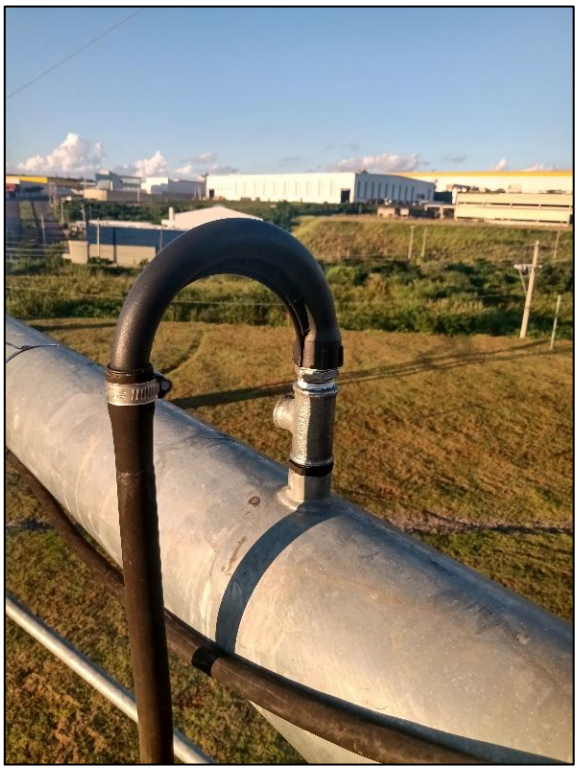


Figure 19 - Connection of the sprinkler elbow to the nipple.

F. Connect the pressure sensor to the remaining end of the reducing tee.

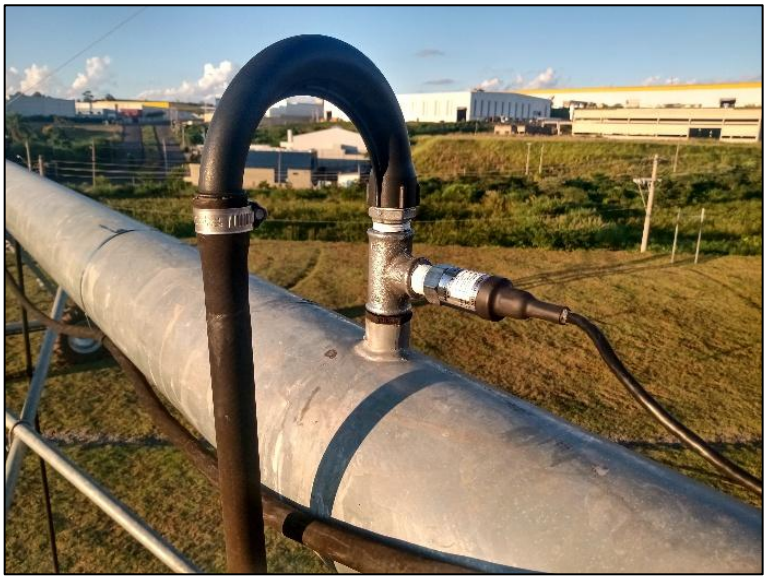


Figure 20 - Mechanical Installation of the Pressure Sensor.

⚠ Under no circumstances should objects be inserted into the pressure sensor hole. Doing so may permanently damage the sensor's sensitive element and compromise its operation.

6.2. Electrical Installation

This section provides the necessary guidelines for the correct electrical installation of the GPS Kit, ensuring both safety and proper product operation.

6.2.1. Irrimesh

The Irrimesh cable must be connected to the pivot control cabinet controller. To do this:

A. Check that the wires at both ends of the Irrimesh cable are connected to the terminals following the color order shown in the figure below.

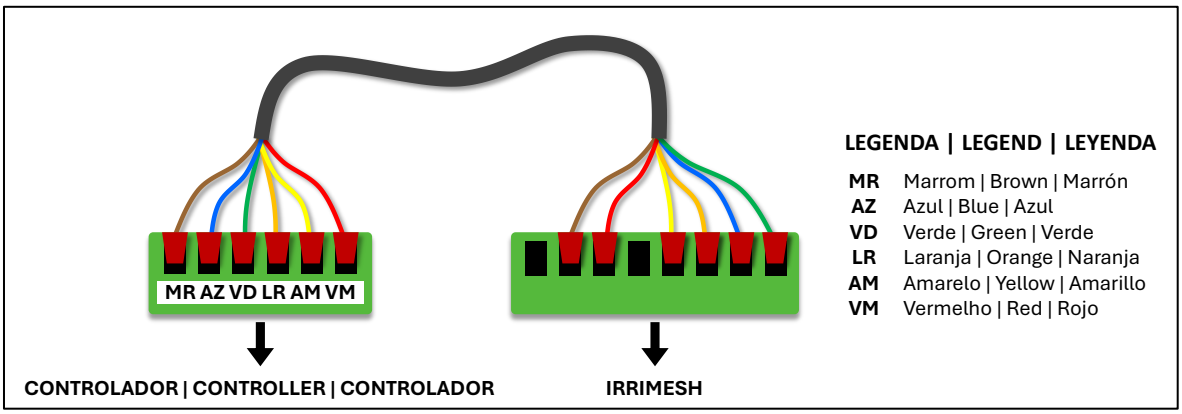


Figure 21 - Connection of the Irrimesh cable to the terminal connector.

B. Access the inside of the pivot control cabinet.

C. Connect the 6-pin connector of the Irrimesh cable to the back of the control cabinet controller. The figure below illustrates this connection for SmartConnect G2 and Nexus G2 cabinets.

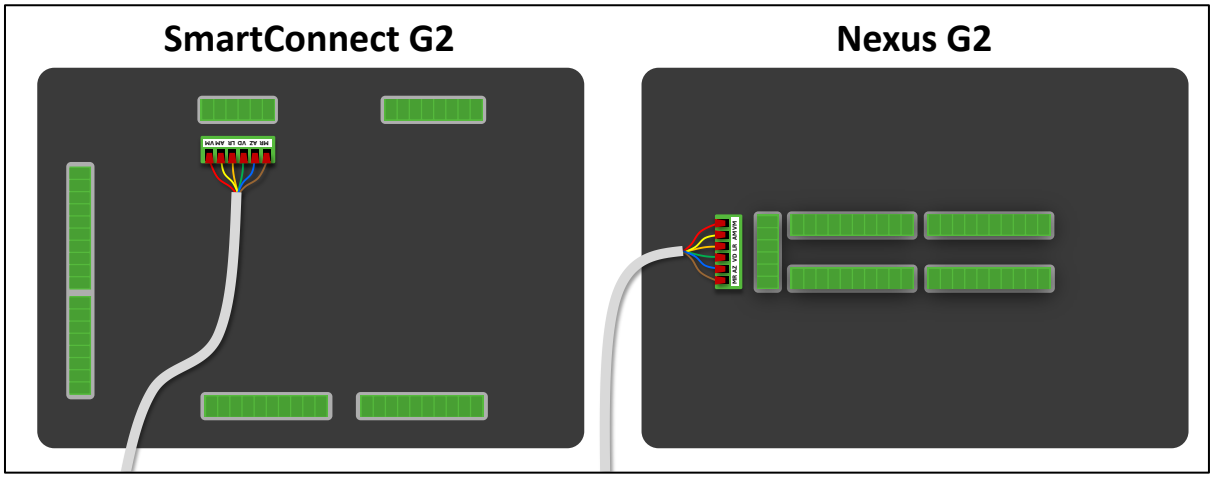


Figure 22 - Irrimesh Connection to the Control Cabinet Controller.

6.2.2. GPS

The electrical installation of the GPS involves only the power supply, which is provided by the last tower's control box. To do this:

A. Remove the lid of the GPS plastic box by unscrewing the screws counterclockwise, and remove the plastic cover of the last tower's control box by unlocking the side latches.

Figure 23 - Opening the plastic box and removing the cover of the control box.

The opening must be done carefully to avoid damaging the screws. It is recommended to always use tools that are compatible with the model and size of the box screws.

The opening can be performed using either a Philips screwdriver or a power drill with a Philips bit. If a power drill is used, the torque and speed must be properly adjusted to prevent unwanted wear on the screws.

B. Locate the FLEX PP CABLE - 3 CONDUCTORS 1MM, intended for the GPS power supply.

C. Insert one end of the 3-conductor cable through one of the cable glands at the bottom of the GPS and connect it to the power supply using the 2-way WAGO connectors, as shown in the following table.

3-CONDUCTOR CABLE	GPS POWER CABLE
Black	Red (Phase)
Blue	Green (Ground)
White	White (Neutral)

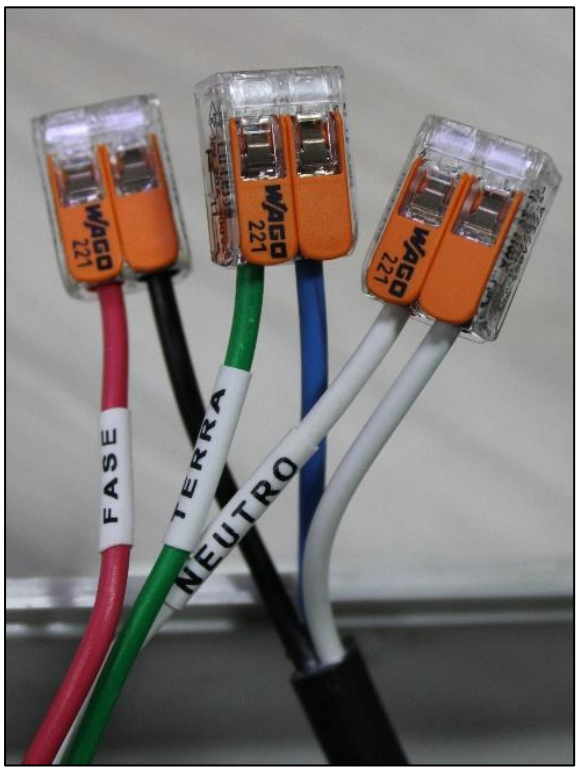


Figure 24 - Connection of the power cable conductors to the GPS.

D. Pass the other end of the cable through one of the cable glands at the bottom of the last tower's control box and connect it to the pivot cables' terminals according to the following correspondence:

GPS WIRE	PIVOT WIRE
Red (Phase)	Safety Return
Green (Ground)	Ground
White (Neutral)	Neutral

The table below shows the color correspondence for the Safety Return and Neutral wires for some pivot brands, and Figure 25 illustrates the connection of the power cable to the last tower's control box on a Bauer pivot.

MARCA DO PIVÔ	CABO	
	SEGURANÇA RETORNO	NEUTRO
BAUER ™	Roxo	Rosa
IRRIGABRAS ™	Marrom	Branco
VALLEY ®	Amarelo	Branco
LINDSAY ™	Marrom	Branco
CARBORUNDUM ™	Marrom	-
KREBS ™	Branco	Verde

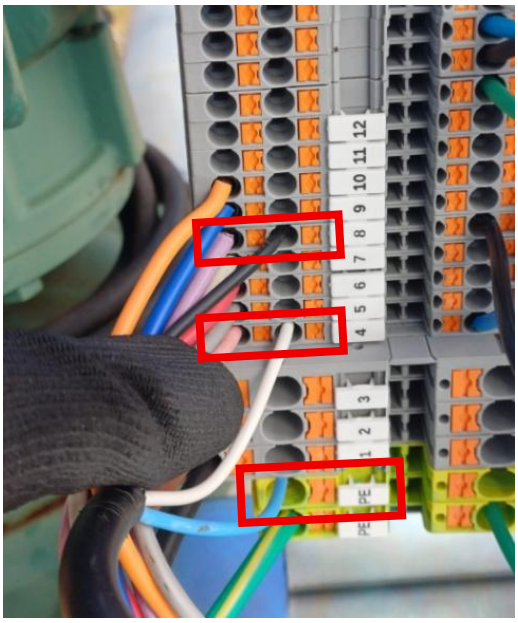


Figure 25 - GPS power cable connection to the last tower's control box on a Bauer pivot.

The wire colors shown for some pivot brands may vary slightly depending on the equipment model and/or production batch.

Some pivot brands require the installation of a contactor in the last tower's control box for the GPS installation. For more details, refer to **ANNEX 1 – INSTALLATION OF A CONTACTOR IN THE LAST TOWER FOR THE GPS**.

The GPS electronic board includes a Shield that protects the device against lightning strikes and extreme voltage fluctuations. If replacement is required, refer to **ANNEX 2 – ADDITIONAL INFORMATION ABOUT THE IMANAGE SHIELD**.

6.2.3. Pressure Sensor

The pressure sensor must be connected to the GPS as shown in the following table:

PRESSURE SENSOR WIRE	GPS WIRE
Blue	Blue (12 V)
Black	Black (“SINAL” - SIGNAL)

Figure 26 - Pressure sensor connection to the GPS.

At the end of the electrical installation, close the GPS plastic box with the lid, tightening the four screws evenly with the proper torque, and reinstall the plastic cover of the last tower’s control box using the side latches.

Figure 27 - Closing the GPS plastic box and the control box.

Before closing the GPS plastic box, record the equipment’s radio serial number (ID), which is located on the label attached to the XBee module.

Apply a torque of approximately 4 to 5 Nm to the four screws of the plastic box. This value must not be exceeded to avoid premature wear of the threads and/or damage to the box itself.

This torque setting is based on the parameters of the DeWalt screwdriver model DCD7781, adjusted to position 1 and speed 1.

7. Parameter Configuration

The GPS Kit parameter configuration includes registering the radio numbers of the GPS and Irrimesh, entering the coordinates of the pivot center and last tower, and performing the configuration upload process to verify device recognition.

These configurations can be performed through the Irricontrol Platform or, if platform access is unavailable, directly via the pivot control cabinet controller.

The registration step on the platform must be carried out exclusively by authorized technicians and/or Irricontrol personnel.

The screenshots shown in this manual refer to the web version of the Irricontrol Platform. The mobile version may present slight variations.

For more information about the operation of the Irricontrol Platform, refer to the support materials available on the Irricontrol Knowledge Platform (Zendesk).

7.1. Parameter Configuration on the Irricontrol Platform

7.1.1. Equipment Registration

The registration of the GPS and Irrimesh on the Irricontrol Platform must be done when registering a new pivot on the farm. To do this:

A. Access the interior of the devices to obtain the radio serial number (ID) of the GPS and Irrimesh, available on the label attached to the XBee module, as illustrated below.

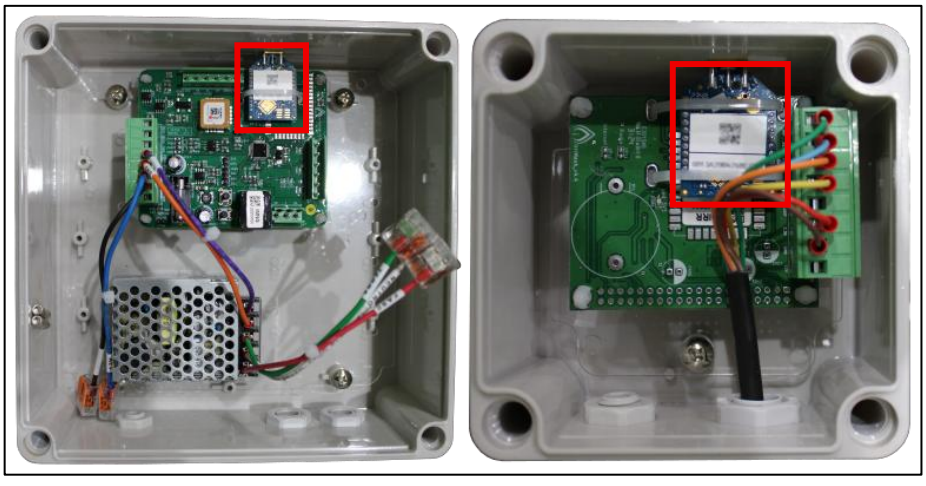


Figure 28 - XBee module label of the GPS and Irrimesh.

B. On the platform, access the farm where the GPS Kit was installed.

C. On the farm page, select the “Register Equipment” option and choose “SmartConnect or Nexus”.

D. Fill in the fields with the appropriate information:

- **Controller Radio:** Irrimesh ID.
- **GPS Radio:** GPS ID.

E. Select the “CREATE” option.

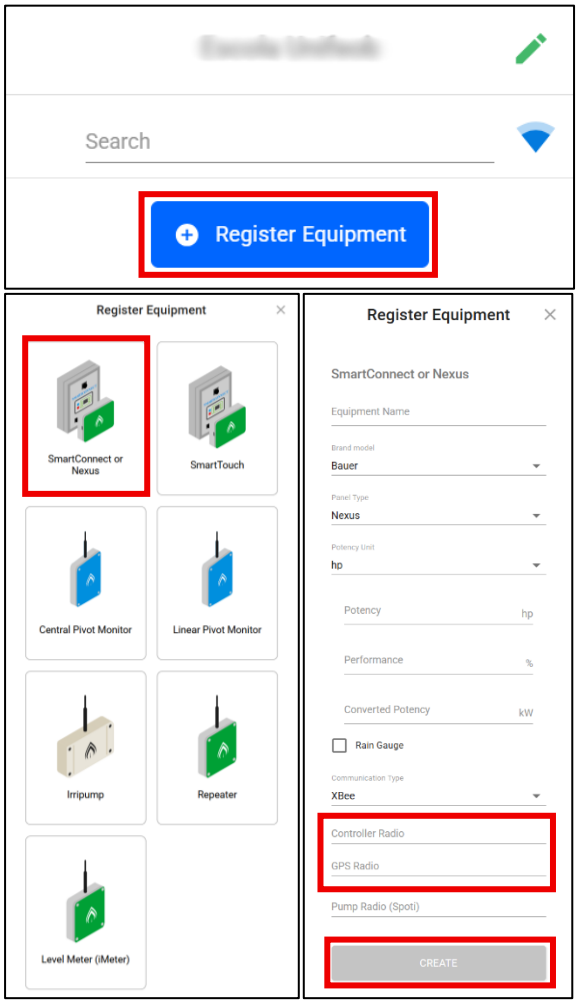


Figure 29 - Registration of the GPS and Irrimesh radio numbers on the platform.

In the “Communication Type” field, select the “Xbee” option, which is the technology used by the GPS Kit.

If it is necessary to register any of the radios after the pivot registration or to change already registered numbers, access the pivot’s edit page.

7.1.2. Coordinates of the Pivot Center and Start Reference

For the devices to operate correctly, it is necessary to enter the geographic coordinates (latitude and longitude) of the pivot center and the initial reference of the last tower (the "zero-degree" point) on the platform. To do this:

A. Using a geolocation tool, obtain the geographic coordinates of the pivot center and the initial reference of the last tower, as illustrated in the figure below.

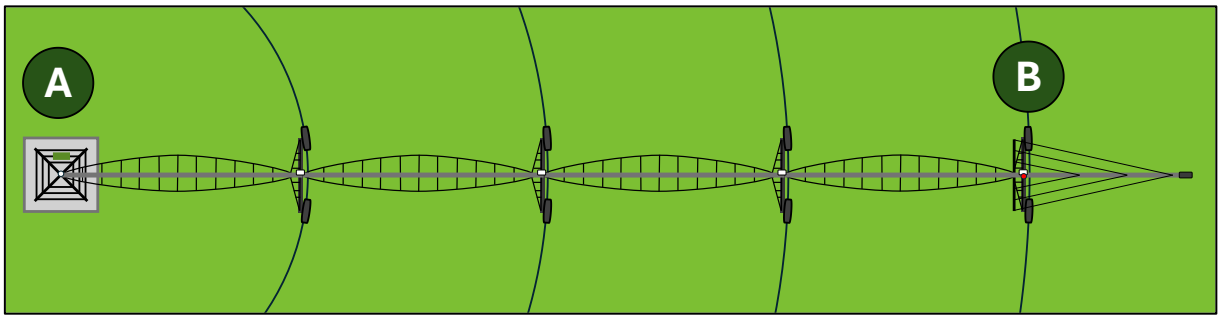


Figure 30 - Pivot center (A) and start reference of the last tower (B).

It is recommended to use Google Earth or similar tools to obtain geographic coordinates.

Even if the pivot is equipped with an end boom, the geographic coordinate of the start reference must be collected at the pivot's last tower.

B. Access the edit page of the pivot where the devices were installed.

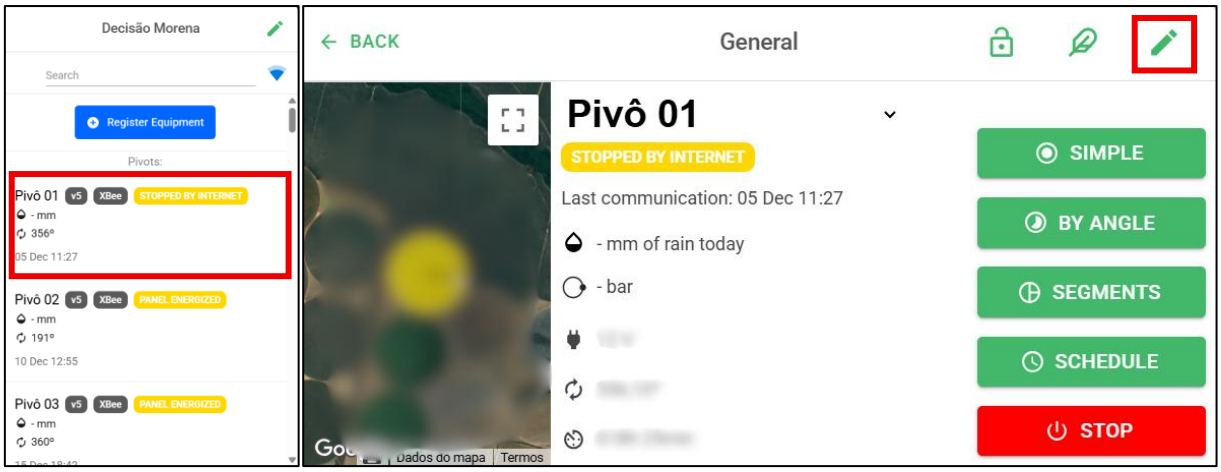


Figure 31 - Access to the pivot edit page.

C. On the LOCATION tab, fill in the “Center” field with the pivot center coordinates and the “Start Reference” field with the coordinates of the pivot’s last tower.

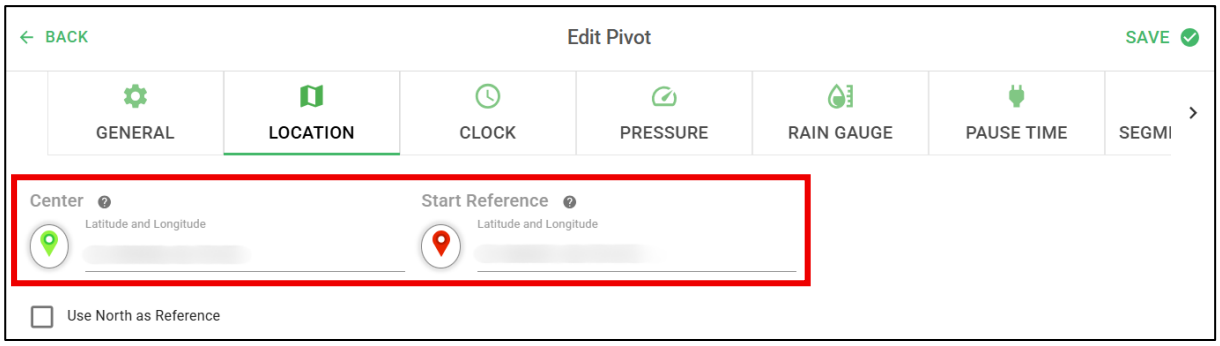


Figure 32 - Entering the pivot center and start reference coordinates.

The “Use North as Reference” option, if selected, indicates that the northern coordinates will be used as the start reference coordinates.

D. Click “SAVE”.

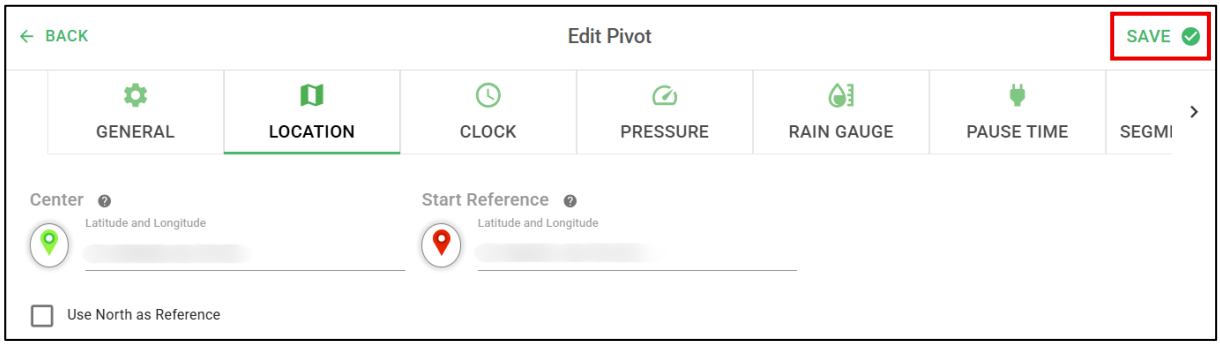


Figure 33 - Pivot center and start reference coordinates - SAVE.

7.1.3. Configuration Upload

After registering the GPS and Irrimesh radios, it is recommended to perform the configuration upload on the Irricontrol Platform. This process reestablishes communication between the Central and the platform with the other farm devices and ensures that the newly registered equipment is recognized.

The Central is the device responsible for mediating communication between the devices that make up the Irricontrol Telemetry and Automation solution and the Irricontrol Platform.

If the pivot uses a SmartConnect G2 cabinet, ensure it is operating in digital mode to perform the configuration upload process. To do this, verify that the cabinet’s “DIGITAL/ANALOG” selector switch is set to “DIGITAL”.

To perform this procedure:

A. Send a dry operation command (forward or reverse) to the pivot where the devices were installed.

> The GPS is only recognized by the platform after the pivot's above-ground section is powered on, which occurs only when a movement command is sent.

B. Access the pivot's edit page.

C. On the GENERAL tab, click "SAVE".

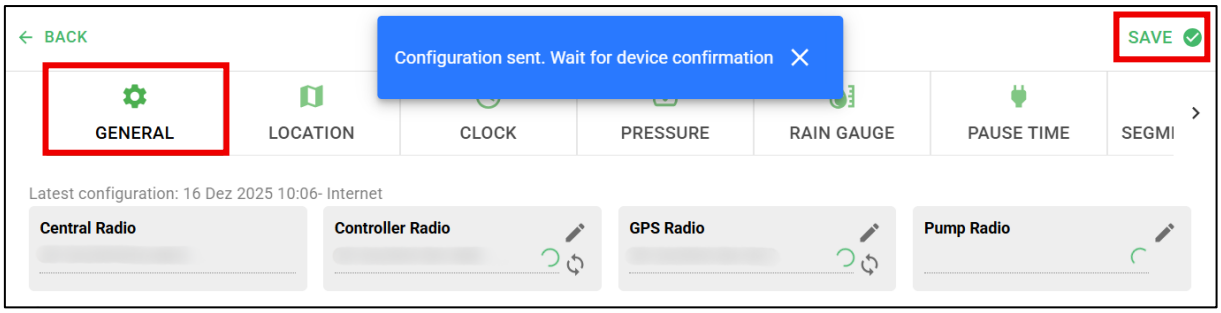


Figure 34 - Configuration Upload - In Progress.

D. Wait and observe the status of the "GPS Radio" and "Controller Radio" fields:

- One check (✓): The configuration has been sent to the device, but the platform has not received confirmation of communication.
- Two blue checks (✓✓): The configuration has been sent to the device, and the platform has received communication confirmation. This indicates that the GPS, Irrimesh, and Central are communicating properly.

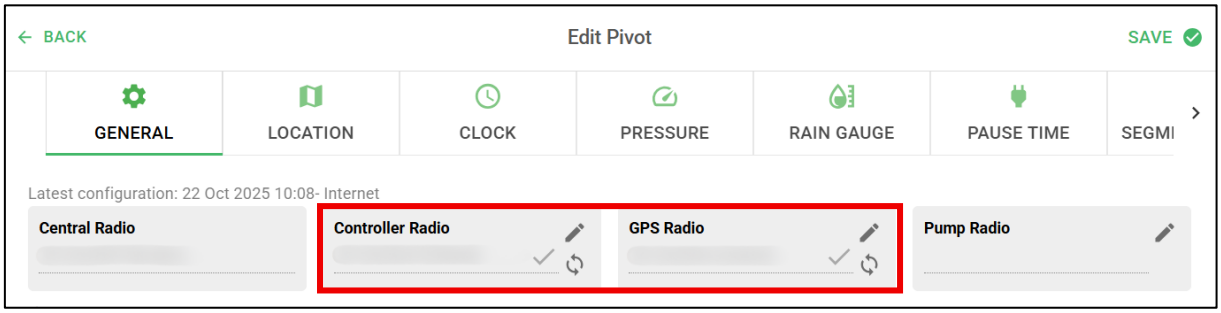


Figure 35 - Configuration Upload Unsuccessful.

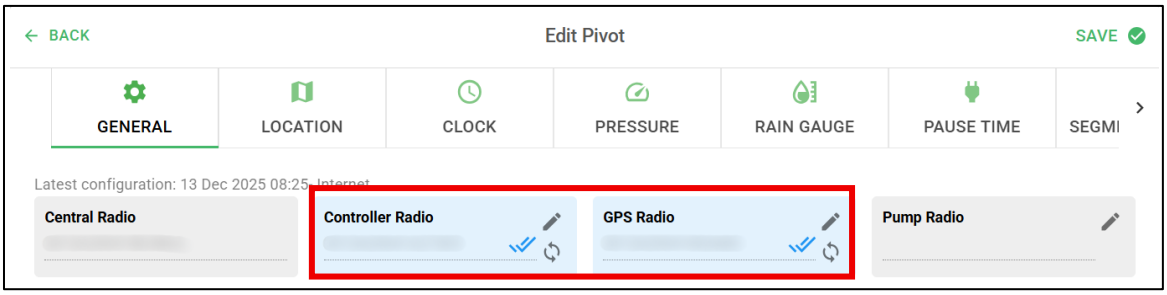


Figure 36 - Configuration Upload Successful.

If the configuration upload fails, refer to section **9. Failures and Possible Causes** for potential reasons and solutions.

E. After a successful configuration upload, keep the pivot in motion for at least 10 minutes until its coordinates/angle start being displayed on the Irricontrol Platform and the controller.

7.2. Parameter Configuration on the Controller

If platform access is unavailable, the GPS Kit parameter configuration must be performed via the pivot control cabinet controller.

7.2.1. Equipment Registration

A. On the controller, access the “RADIO” option in the parameters section.

B. On the first page (1/2), go to the “GPS” field and enter the GPS radio serial number (ID) using the characters available on the screen.

The GPS radio serial number (ID) is available on the label attached to the XBee module inside the device, as shown in Figure 28.

C. Press the confirmation character (✓).

Figure 37 - Registration of the GPS radio serial number.

If it is necessary to delete any entered number, select the delete character (◀).

The Irrimesh radio number (CONTROL) is automatically recognized by the controller after connecting the Irrimesh cable to its rear and cannot be changed.

7.2.2. Pivot Center and Start Reference Coordinates

Next, enter the geographic coordinates of the pivot center and the start reference of the last tower, as shown in Figure 30. To do this:

A. On the controller, access the "GPS COORDINATES" option in the parameters section.

B. On the first page (1/2), enter the geographic coordinates of the pivot center (CENTER LATITUDE/LONGITUDE).

Figure 38 - Geographic coordinates of the pivot center.

C. On the second page (2/2), set the start reference of the pivot's last tower. In the NORTH REFERENCE field, select either YES or NO:

- YES - The northern coordinates will be used as the start reference coordinates.
- NO - Enter the geographic coordinates of the start reference (REFERENCE LATITUDE/LONGITUDE).

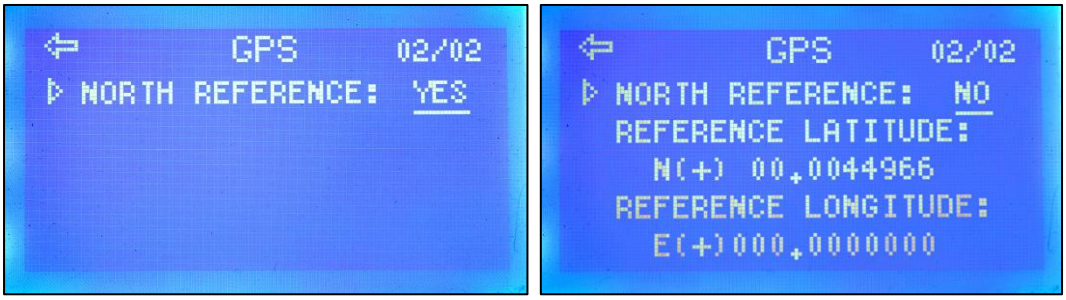


Figure 39 - Geographic coordinates of the pivot's last tower start reference.

7.2.3. Configuration Upload

Finally, send a configuration to the GPS. This process verifies the device recognition by the controller. To do this:

A. On the controller, access the “RADIO” option in the parameters section again.

B. On the second page (2/2), select the “START GPS CONFIG.” option and confirm the message.

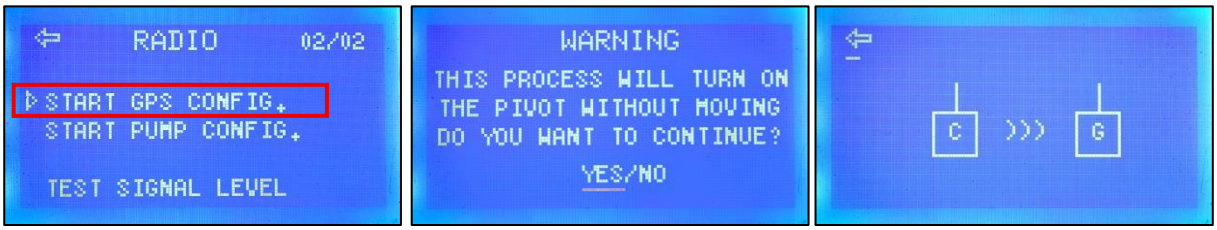


Figure 40 - GPS Configuration Upload.

C. Wait and check the result:

- × - The GPS was not recognized by the controller.
- ✓ - The GPS was recognized by the controller.

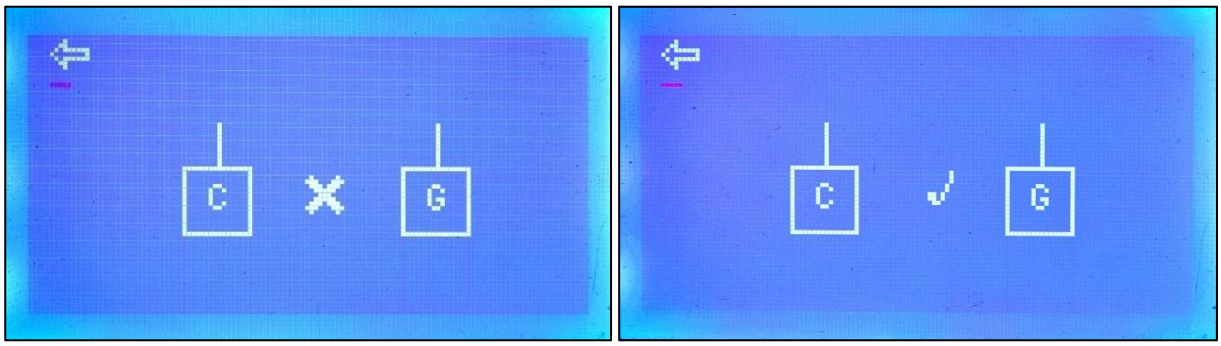


Figure 41 - Result of the GPS Configuration Upload.

If the configuration upload fails, refer to Section **9. Failures and Possible Causes** for potential reasons and solutions.

D. After a successful configuration upload, keep the pivot in motion for at least 10 minutes until its coordinates/angle start being displayed on the Irricontrol Platform and the controller.

8. Tests

All products manufactured and sold by Irricontrol Controle Inteligente de Irrigação S/A undergo rigorous quality tests to ensure their full functionality. However, due to the characteristics of field installation and the need for integration with other devices, it is necessary that, after being installed and parameterized, the GPS Kit undergo new tests.

This section presents the recommended tests to verify that the GPS and Irrimesh have been correctly installed, parameterized, and are being recognized by the Central/Platform Irricontrol. It is recommended to perform these tests after product installation, whenever any modifications are made, and/or in case of failures.

8.1. Configuration Upload

The configuration upload, described in section **7. Parameter Configuration**, is a way to verify whether the Irrimesh and GPS are communicating with the Central/controller.

On the Irricontrol Platform, this communication is validated if the “GPS Radio” and “Controller Radio” fields on the pivot edit page show two blue checks. On the controller, perform the “START GPS CONFIG.” test available in the “GPS COORDINATES” option in the parameters section.

If the test is unsuccessful, refer to **9. Failures and Possible Causes** for potential reasons and solutions.

8.2. Device Scan

The device scan is a function within the platform that searches for the radio signals of the devices in the Irricontrol Telemetry and Automation system. In other words, this procedure, like the configuration upload, also verifies which devices are communicating with the Central.

If the pivot uses a SmartConnect G2 cabinet, ensure it is operating in digital mode to perform the configuration upload process. To do this, verify that the cabinet's "DIGITAL/ANALOG" selector switch is set to "DIGITAL".

To perform it:

A. Send a dry operation command (forward or reverse) to the pivot where the devices were installed.

The GPS is only recognized by the platform after the pivot's above-ground section is powered on, which occurs only when a movement command is sent.

B. Open the left side menu and access the "Devices" option.

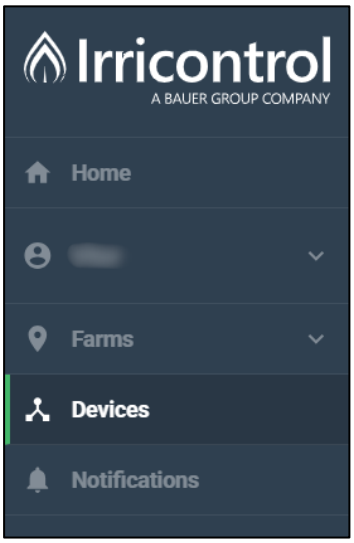


Figure 42 - Device Scan - Accessing the "Devices" page.

C. At the top of the opened page, click the "Show GPS" button.

D. Then, click "SEARCH RADIOS" to start the scan.

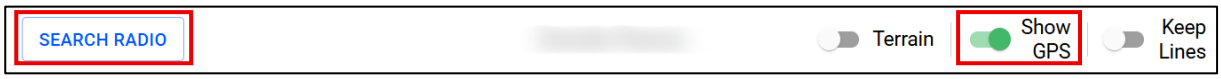


Figure 43 - Device Scan - Search Radios.

E. Wait until the percentage reaches 100%.

Figure 44 - Device Scan - In Progress.

A. There are two ways to check the status of the devices after the scan:

- On the map, check the color of the circle representing the GPS (last tower - end of the pivot radius) and the Irrimesh (central tower - center of the pivot radius):

  - Red**:** The device was not located by the Central.

  - Green: The device was located by the Central.

Figure 45 - Scan Result (map).

- In the left side menu, check the icons of the pivot where the devices were installed. The GPS and the Irrimesh are represented by a target icon and an ON/OFF button icon, respectively.

  - Gray icon: The device was not located by the Central.

  - Colored icon: The device was located by the Central.

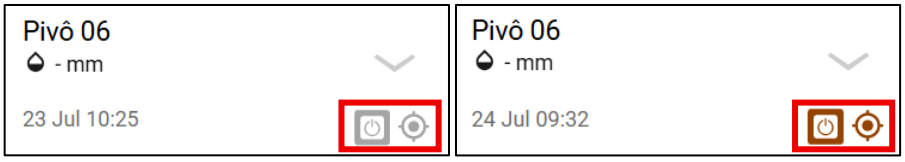


Figure 46 - Scan Result (side menu).

The color of the icons representing the GPS and Irrimesh, when located by the Central during the scan process, may vary depending on the pivot's status.

If the configuration upload fails, refer to Section **9. Failures and Possible Causes** for potential reasons and solutions.

8.3. Irrimesh Recognition by the Controller

The Irrimesh installation must also be validated by checking whether the controller recognizes the device. This confirmation is indicated by the presence of the following elements on the controller interface:

- Circular icon displayed on the main screen.
- “RADIO” option visible in the parameters section.
- Irrimesh radio number visible in the “ABOUT” parameter.

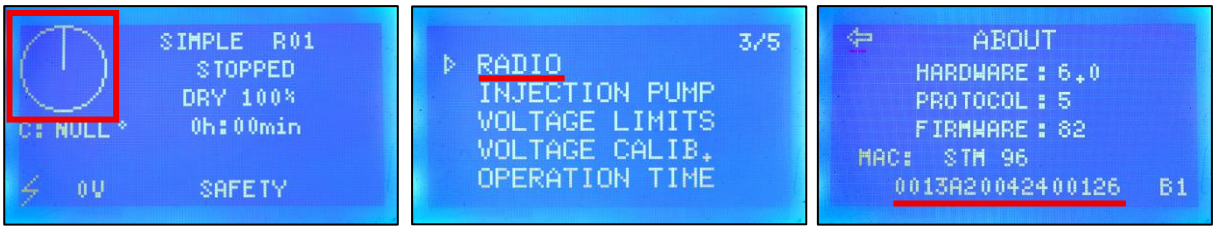


Figure 47 - Irrimesh Installation Validation.

If these points are not verified, refer to Section **9. Failures and Possible Causes** for potential reasons and solutions.

9. Failures and Possible Causes

Due to the technical characteristics of the GPS Kit and the environment in which it is installed, the equipment is subject to various factors that may cause operational failures. These can occur due to local conditions, operational errors, or, in exceptional cases, product-related issues.

This section lists the most common failures, their causes, and how to resolve them for both the GPS and the Irrimesh.

If it is not possible to identify the causes of the failures and/or if the error persists, please contact Irricontrol Technical Support for further assistance.

9.1. GPS does not communicate with the Central/Irricontrol Platform

The Irricontrol Platform does not receive confirmation from the GPS during the configuration upload (just one check in the “GPS Radio” field on the pivot edit page) and/or the device is not recognized during the scan procedure.

POSSIBLE CAUSES	SOLUTION
Pivot stopped	Check if the pivot is in motion: GPS communication with the Central/Platform only occurs when the aerial part is energized, which depends on sending a movement command.
Incorrect/inadequate electrical connections	- Review all electrical connections of the GPS. - Check if the **phase** of the GPS power cable is connected to the pivot’s **Return Safety** cable. - Check if the **neutral** of the GPS power cable is connected to the pivot’s **Neutral** cable. - Tighten the connectors.
Cable damaged by rodents and/or birds	- Replace the damaged cable.
Burned power supply	- Measure the power supply output (should be 12 VDC). - Contact Technical Support for replacement.
Blown fuse	- Check the fuse on the GPS Imanage board. - If blown, replace the fuse (Glass Fuse 2A - 250V), available on one of the internal walls of the GPS plastic box.
GPS antenna improperly positioned or defective	- Check if the antenna is in a vertical position. - Check if the antenna cable is properly screwed into the GPS box. - Replace the antenna with a spare or from another properly functioning device for testing. - Contact Irricontrol Technical Support.
Defective Xbee radio	- Contact Irricontrol Technical Support.
Problems with the GPS electronic board (Imanage)	- Contact Irricontrol Technical Support.
Burned GPS board Shield	- Inspect the Shield integrity. - Replace the Shield with a new one, following the instructions in **ANNEX 2 – ADDITIONAL INFORMATION ABOUT THE IMANAGE SHIELD.**

9.2. Pivot angle not updated on the Irricontrol Platform

During pivot movement, the angle is not updated with each GPS update received by the platform.

POSSIBLE CAUSES	SOLUTION
GPS failure	- Clear the GPS memory: press the "USER BUTTON" on the GPS board for approximately 5 seconds and wait for the LEDs to blink. - Send a configuration to the pivot.
Last pivot tower jammed: tower spinning freely	- Check the operation of the pivot's last tower. - Contact Irricontrol Technical Support.
Burned GPS board Shield	- Inspect the Shield integrity. - Replace the Shield with a new one, following the instructions in **ANNEX 2 – ADDITIONAL INFORMATION ABOUT THE IMANAGE SHIELD**.

9.3. Irrimesh not communicating with the Central/Irricontrol Platform

The Irricontrol Platform does not receive confirmation from the Irrimesh during configuration sending (just one check in the "Controller Radio" field on the pivot edit page) and/or the device is not recognized during the device scan procedure.

POSSIBLE CAUSES	SOLUTION
De-energized control cabinet (controller display off)	- For SmartConnect G2 cabinets, check if the "DIGITAL/ANALOG" selector switch is set to "DIGITAL", which powers the controller. - Verify that the cabinet is properly energized and that its components are functioning correctly.
Incorrect/inadequate electrical connections	- Review all electrical connections of the Irrimesh. - Tighten the connectors.
Cable damaged by rodents and/or birds	- Replace the damaged cable.
Irrimesh not recognized by the controller	Refer to topic **9.4. Irrimesh not recognized by the controller**.
Irrimesh antenna improperly positioned or defective	- Check if the antenna is in a vertical position. - Check if the antenna cable is properly screwed into the Irrimesh box. - Replace the antenna with a spare or from another properly functioning device for testing. - Contact Irricontrol Technical Support.
Issues with the Irrimesh electronic board	- Verify if the 3V3 LED is on. - If the farm has more than one pivot, swap Irrimesh units between pivots to test communication. **Note:** In this case, the Irrimesh radio serial number must be updated on the platform. - Contact Technical Support.

9.4. Irrimesh not recognized by the controller

Controller interface does not display the elements that validate the installation of the Irrimesh, as presented in section **8.3. Irrimesh Recognition by the Controller**.

POSSIBLE CAUSES	SOLUTION
Inadequate connection of the Irrimesh cable wires to the terminals	- Check all electrical connections of the Irrimesh. - Retighten the connectors.
Improper fitting of the Irrimesh cable terminals	- Verify if the terminals are correctly connected both on the Irrimesh and on the controller.
Cable damaged by rodents and/or birds	- Replace the damaged cable.
Issues with the Irrimesh electronic board	- Verify if the 3V3 LED is on. - If the farm has more than one pivot, swap Irrimesh units between pivots to test communication. **Note:** In this case, the Irrimesh radio serial number must be updated on the platform. - Contact Technical Support.

9.5. Absence of pressure information on the Irricontrol Platform

The GPS does not transmit to the platform the data obtained by the pressure sensor.

POSSIBLE CAUSES	SOLUTION
GPS failure	- Clear the GPS memory: press the “USER BUTTON” on the GPS board for approximately 5 seconds and wait for the LEDs to blink. - Send a configuration to the pivot.
Pressure sensor issues	- Use a signal generator to analyze the integrity and operation of the sensor. - Check for leaks in the pivot piping or in the pivot “gooseneck” (sprinkler hose).
Pumping system issues	- Verify the pump operation and the condition of the electrical connections. - Check for leaks, blockages, or air intake in the pipelines. - Confirm that the water level is adequate for pump operation.
Burned GPS board Shield	- Inspect the Shield integrity. - Replace the Shield with a new one, following the instructions in **ANNEX 2 – ADDITIONAL INFORMATION ABOUT THE IMANAGE SHIELD**.

10. Additional Information and Precautions

This section contains essential additional information and precautions for the use and maintenance of your equipment. These guidelines are crucial to ensure not only optimal performance but also durability and safety. Attention to these complementary details contributes to a better user experience and maximizes the benefits of your investment.

10.1. Product Serial Number

The equipment's serial number is essential for product control and traceability. It allows the individual identification of the unit, facilitating technical support, maintenance history records, and possible warranty processes.

The serial number label is located on the product packaging (cardboard box) and on the outside of the plastic box, near the cable glands.

Figure 48 - Location of the labels with the GPS Kit serial number.

This number must always be provided when opening after-sales service requests, requesting technical support, or addressing any matter related to the product.

10.2. Product Storage

To preserve the integrity of the equipment until installation, it is essential to ensure proper storage and handling. Always follow the instructions provided on the equipment packaging.

- Keep away from heat and moisture.
- This side up.

Handle with care - Fragile.

Figure 49 - Product Storage Instructions.

The boxes should be stored in a dry, well-ventilated, and preferably covered area, following all instructions provided on the packaging. Failure to comply with these guidelines may compromise the integrity of the equipment.

10.3. Disposal of the Product and/or Components

At the end of the product's life cycle, or in the event of component replacement, proper environmentally responsible disposal must be ensured in accordance with current legislation (e.g., National Solid Waste Policy – Law No. 12,305/2010).

- **Electronic items (boards, cables, modules, power supplies, connectors):** Must be taken to authorized collection points or companies specialized in electronic waste recycling to prevent soil and water contamination by heavy metals.
- **Batteries and accumulators:** Should never be disposed of in regular trash. Take them to designated battery collection points in accordance with CONAMA Resolution No. 401/2008.
- **Plastics and polymer materials (cabinets, supports, connectors):** Should be separated and sent for recycling according to material classification.
- **Metals (supports, screws, fasteners):** Can be directed to scrap metal recycling.
- **Packaging:** Should be disposed of in selective collection, whenever available, according to the material type (cardboard, plastic, etc.).

Improper disposal of electronic components can cause significant environmental impacts and is subject to legal penalties.

10.4. Periodic Maintenance

Performing periodic maintenance is essential to maintain the product's good performance and ensure its durability and safety. This section provides guidance on when to perform maintenance, which procedures to follow, and how to ensure all components are in perfect working condition. Adopting this maintenance routine contributes to system longevity, prevents unexpected failures, and guarantees operational continuity.

10.4.1. Replacement of the CR2032 3V Battery

The CR2032 3V battery is fixed to the bottom side of the GPS electronic board. If replacement is required, follow the steps below:

A. De-energize the equipment.

B. Access the inside of the unit's plastic box.

C. Unscrew the XBee radio threaded connector.

D. Release the electronic board from the acrylic plate, which is fastened by plastic spacers.

E. Access the bottom side of the electronic board.

F. Replace the CR2032 3V battery with a new one.

G. Re-attach the electronic board and close the plastic box.

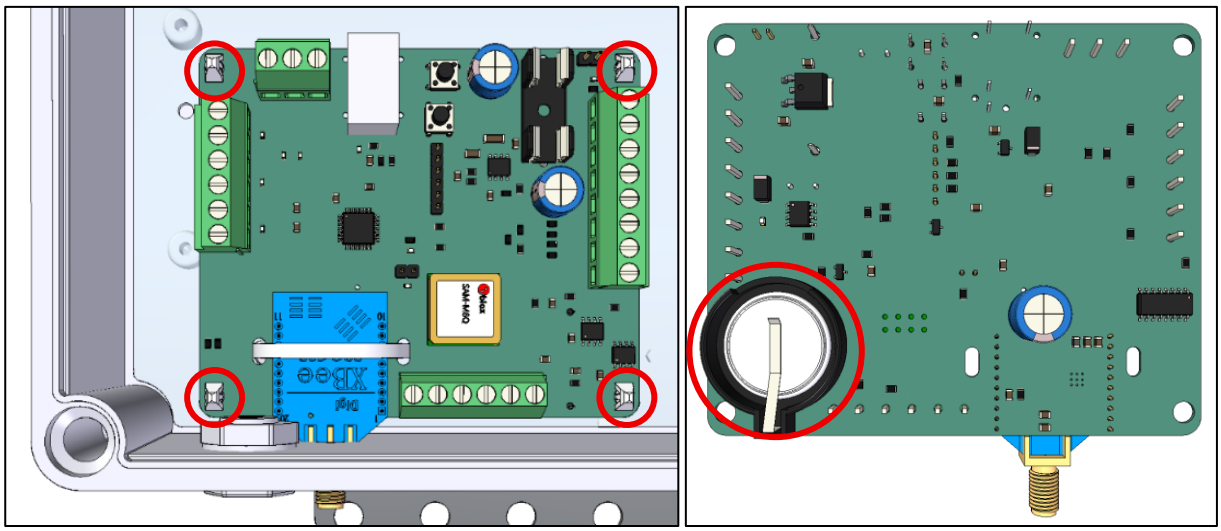


Figure 50 - CR2032 3V Battery.

In some cases, it may be necessary to remove the XBee radio to allow the electronic board to be removed from the acrylic plate. In this case, cut the plastic cable ties and, at the end of the procedure, refasten the assembly.

The manufacturer recommends replacing the CR2032 3V battery every 2 years. However, Irricontrol advises checking its condition periodically, such as during the off-season or whenever system maintenance is performed.

Irricontrol is not responsible for malfunctions or additional costs resulting from operating the equipment with a weak or discharged CR2032 3V battery.

10.4.2. Cleaning the Interior of the Equipment

The inside of the equipment must remain free of dust, moisture, and debris to prevent damage to internal components, avoid short circuits, and extend its service life. Use a soft, dry cloth to remove dirt, and avoid applying chemical products, water jets, or metallic objects.

The frequency of this procedure should be defined according to the local conditions where the equipment is installed (level of exposure to dirt) and the availability of qualified personnel. It may also be performed whenever system maintenance is carried out.

10.4.3. Checking the Silica Gel

All Irricontrol modules are supplied with silica gel inside, responsible for absorbing internal moisture and preventing condensation and damage to electronic components.

Therefore, always keep the silica gel inside the equipment. In addition, periodically check whether it is still active and replace it as necessary to ensure continued moisture absorption.

The frequency of this procedure must be established according to the local conditions where the equipment is installed (level of exposure to moisture and condensation). It may also be performed whenever system maintenance is carried out.

10.4.4. Checking the Seals

To prevent the entry of moisture, dirt, animals, or other contaminants that could damage the equipment, it is important to ensure that the plastic boxes of GPS and Irrimesh are properly sealed.

Whenever the boxes are opened, check that the external covers are properly closed, ensuring the correct tightening of the screws. Additionally, ensure that all cable glands are securely fastened.

ANNEX 1 – INSTALLATION OF A CONTACTOR IN THE LAST TOWER FOR THE GPS

In some pivots, the safety signal returns to the control cabinet as neutral. In these cases, it is necessary to add a contactor in the control box of the last tower for the GPS installation.

This contactor must be 110 V for 110 V pivots and 220 V for 220 V pivots. In addition, it must have at least one normally open (NO) contact and one normally closed (NC) contact. For 110 V pivots, the CWCA0-22-00V15 contactor is recommended.

To do this:

A. Remove the plastic cover of the control box of the last tower to access its interior by releasing the side latches.

B. Mount the contactor inside the control box of the last tower, positioning it according to the available internal space.

C. Connect the pivot reverse cable to contacts A1 and 13 (NO) of the contactor.

D. Connect the pivot forward cable to contact 21 (NC) of the contactor.

E. Connect the pivot neutral cable to contact A2 of the contactor.

F. Connect the GPS phase cable to contacts 14 and 22 (NC) of the contactor.

G. Connect the GPS neutral cable to contact A2 of the contactor.

H. Reinstall the plastic cover of the control box of the last tower, securing it using the side latches.

The following figure shows the schematic of these connections.

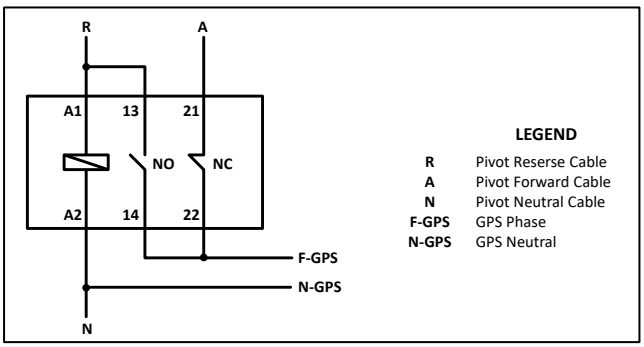


Figure 51 - Schematic of the contactor installation in the last tower for the GPS.

For Bauer pivots, this step is not required, as the system already meets the installation requirements of the GPS Kit.

ANNEX 2 – ADDITIONAL INFORMATION ABOUT THE IMANAGE SHIELD

This annex provides guidance on the equipment's Shield, a protection module connected to the GPS (Imanage) electronic board. The Shield is responsible for protecting the equipment against lightning strikes and extreme voltage fluctuations.

Board Integrity Verification

A. Remove the Shield from the Imanage board.

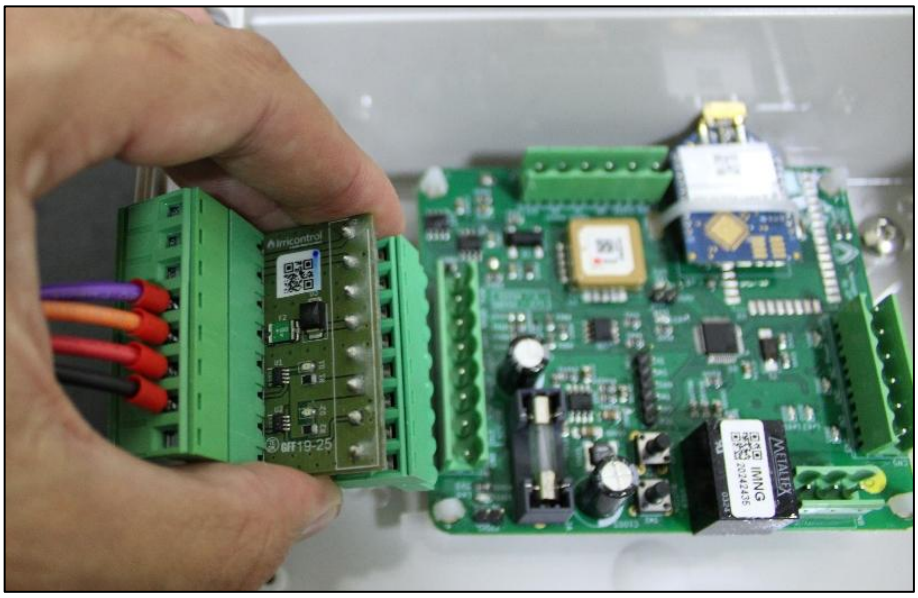


Figure 52 - Removal of the Shield from the board.

B. Disconnect the 8-pin terminal from the Shield.

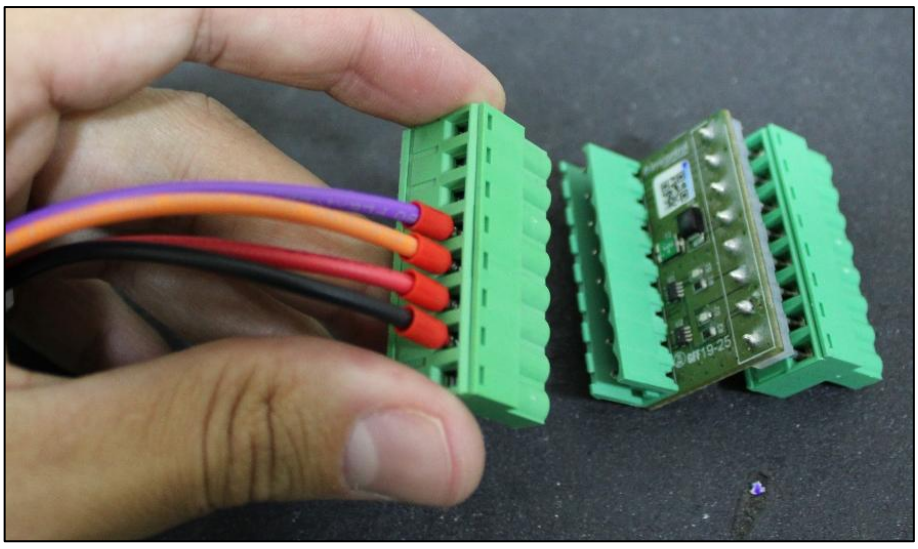


Figure 53 - Disconnection of the 8-pin terminal from the Shield.

C. Connect the 8-pin terminal directly to the Imanage board.

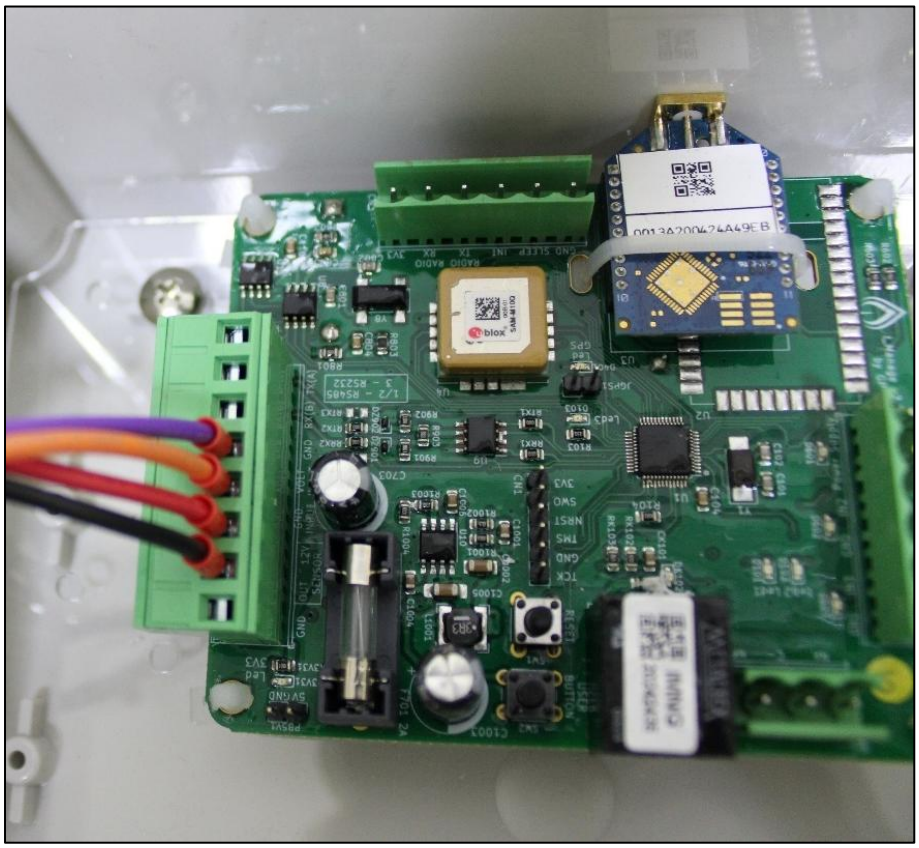


Figure 54 - Terminal connected directly to the board, without the Shield.

D. Keep all other electrical connections in place and check the operation of the board:

- If the board resumes normal operation, it is understood that the Shield has acted correctly as a protection device and must be replaced.

When required, replacement of the Shield is mandatory. The absence of this module compromises the protection of the equipment and may result in permanent damage not covered by the product warranty.

- If the board continues to malfunction, replacing only the Shield will not be sufficient, and the complete replacement of the Imanage board + Shield assembly will be required.

If complete replacement of the Imanage board + Shield assembly is required, contact the nearest authorized dealer or Irricontrol Technical Support.

Shield Replacement

A. Disconnect the 8-pin connector from the Imanage board and connect it to the new Shield.

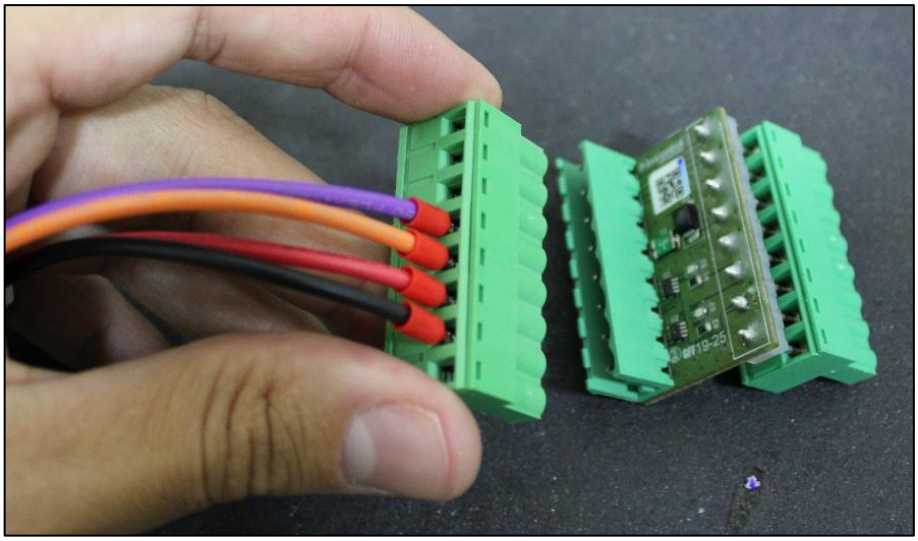


Figure 55 - Connection of the 8-pin connector to the new Shield.

B. Connect the new Shield on the Imanage board.

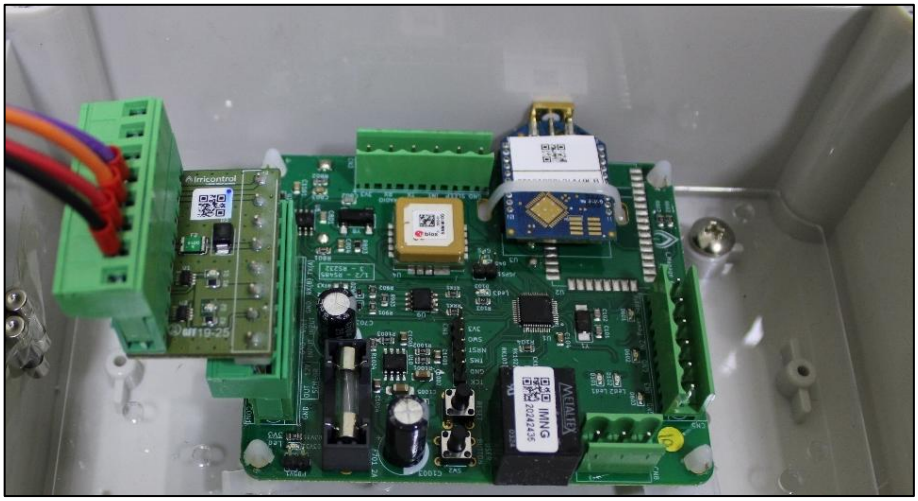


Figure 56 - Installation of the new Shield on the Imanage board.

To avoid assembly errors, ensure that the Shield is correctly connected to the single 8-pin terminal available on the Imanage board, observing its proper orientation and fit.

Irricontrol

A BAUER GROUP COMPANY