MANUFACTURING COMPANY, INC.

LXT Radio System

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Manual Type: Usage

LOR Manufacturing Company, Inc.

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Thoroughly read and understand all information presented in this manual before using this product.

Notice: The information contained in this manual is subject to change without notice.

LOR Manufacturing shall not be liable for errors contained herein or for consequential damages in connection with the furnishing, performance, or use of this material.

One Year Limited Warranty

LOR Manufacturing Company, Inc. (LOR), shall, for a term of not longer than one (1) year from date of shipment from LOR's facilities, repair or replace any item (FOB from Weidman, MI U.S.A) should it prove that the item is defective in materials or workmanship. **LOR will cover UPS Ground Shipping only for warrantable items**. Expedited shipping is solely at the customer's discretion. This warranty does not cover damage resulting from: mishandling in transit, vandalism, misuse, abuse, acts of nature, alteration or lack of reasonable care. LOR does not assume, nor is LOR responsible for any real or consequential damages from claims against the performance of our product. LOR is not liable for any cost related to loss of life, property, or revenue. Further, LOR is in no way responsible for installation of our product, and will assume no cost of re-installation or removal. This warranty is in lieu of all other warranties expressed or implied.

LOR's Radio Controls must conform to the FCC Part 15 requirements. Therefore, the range and power of our radios are within the specified limits set forth therein.

You should test your entire system daily to ensure that all components are in good working order.

No implied warranty of merchantability or fitness for a particular purpose shall extend beyond one year from date of shipment. The liability of LOR under any such implied warranty and under this limited warranty shall be limited to the repair or replacement of defective parts within one year from date of shipment from LOR's facilities. LOR shall not be liable for any incidental or consequential damages. Some states do not allow limitations of incidental or consequential damages, so the above limitations or exclusions may not apply to you. This warranty gives you specific rights, and you may also have other rights which vary from state to state.

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Read this before using this system

- Always keep this manual readily available for future reference
- Make sure the area is safe to operate equipment before turning power on
- This device complies with Part 15 of the FCC regulations. Operation is subject to the following two conditions:
  1. This device may not cause harmful interference, and
  2. This device must accept any interference received, including interference that may cause undesired operation
- If you encounter any problem or malfunction, call your equipment dealer immediately
- Contact your equipment dealer for replacement parts and/or service

Safety

Radio Control System Safety

The system is designed to accept control signals from only a single handheld unit at a time.

Safety Information

The use of this system allows the operator greater freedom of movement within the work site, increased handling accuracy while improving both efficiency and the overall safety of the operator. These benefits require the operator and support staff to maintain the system and ensure that it is in working order before it is put in use.

The correct and safe use of the system requires that the operator keep the machine being controlled in sight at all times.

Note

In the event of an emergency, depress the ”Machine Stop” button on the remote system.

Protection Devices

This system may be equipped with certain protection devices which automatically intervene whenever:

- Errors are detected within the data being sent between the base station and handheld unit
- The handheld unit and base station lose link
- The handheld unit moves out of range of the base station

In the event of the signal between the handheld unit and base station being lost the system will be put in a safe state after one cycle (< 250 ms). To re-initiate functionality of the system:

- Reset the Emergency Stop switch on the machine being controlled
- Twist the Emergency Stop switch on the handheld unit counter-clockwise to reset to functional state[1]

Unauthorized Operation

This system utilizes a pin code that must be entered by the operator before any operation can commence. The operator must use the rotary encoder on the handheld unit to enter the correct number sequence in order to unlock the system.

Dealing with Interference

This remote system operates in either the ISM 900 MHz band or the 2.4 GHz band. While it complies with Part 15 of the FCC regulations it is still possible that the system may encounter environments that are “noisy” and may cause interference. This is especially true with 2.4 GHz systems that operate in the same band as WiFi. While the remote system will generally hop to a “clean” frequency, the noise floor may be such that this may not help. The best way to mitigate interference is to move away from the source of the interference. It is recommended that the remote system be operated at least 100′ from any WiFi access points, routers, base stations, etc.

[1] In the event of the handheld unit moving out of range of the base station, move the handheld unit back within specified range before resetting.

Overall Dimensions

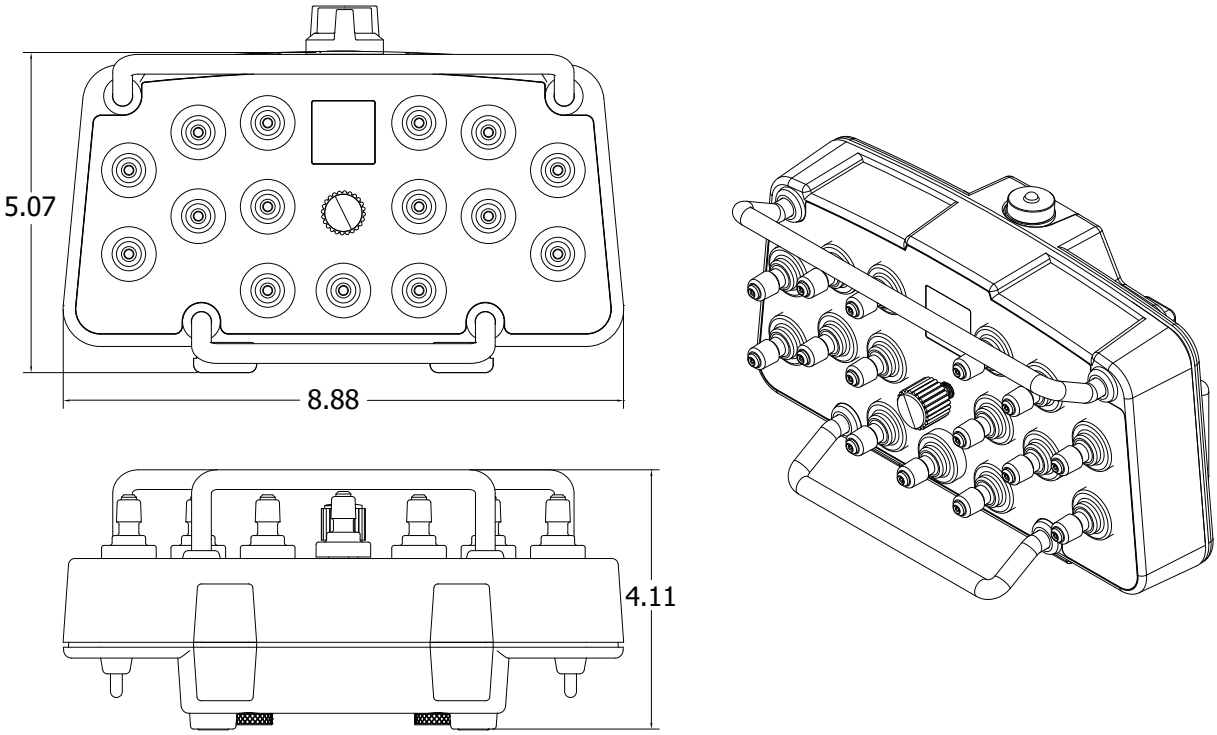


Figure 1: LXT Dimensions

Cautions and Warnings

Caution: All LOR Products must be physically disconnected from the Machine *before* welding. Failure to do this may cause damage to integrated circuit chips and other electronic components, thus voiding the warranty.

Caution: MAKE SURE MACHINERY AND SURROUNDING AREA IS CLEAR BEFORE OPERATING. Do not activate the remote system unless it is safe to do so

Warning: Disconnect all power before making any wiring connections to the Receiver

Caution: Improper operation of these controls could cause damage to equipment. Do not allow anyone to operate this equipment before completely reading the manual.

Caution: LOR Manufacturing Company, Inc. controls are intended as general purpose switches. They are not safety devices. Malfunctions may occur. LOR Manufacturing Products are used to initiate an operation where false operation could be dangerous. Point-of-Operation guarding devices must be installed and maintained to meet OSHA and ANSI Machine Safety Standards. LOR Manufacturing shall not accept responsibility for installation, application, or safety of systems.

Care & Handling

- Do not immerse the remote system in water or expose to excess amounts of water
- Do not clean the remote system under high pressure. If water or other liquids get inside the remote system, immediately dry the unit
- Clean the unit after operation. Remove any mud, dirt, concrete, etc. from the unit to prevent clogging of buttons, switches, etc. by using a damp cloth
- Do not drop the remote system
- Do not expose the remote system to extreme temperatures
- Remove the battery if the remote system is to be stored for long periods of time[2]
- Do not handle the remote system by the antenna[3]

[2] Periods in excess of 30 days
[3] Only applies to models equipped with external antenna

Specifications

Table 1: General Specifications (900 MHz)

Frequency Range	ISM 902–928 MHz
Frequency Control	7 Frequency Hopping Channels (Software Selectable)
Modulation	DSSS (Direct Sequence Spread Spectrum)
Operating Range	500′ Line of Sight
Error Correction	Automatic Error Detection and Automatic Retransmission
Operating Temperature	-40°–85°C (-40–185°F)
Humidity	Up to 90% RH, non-condensing

Table 2: General Specifications (2.4 GHz)

Frequency Range	2400–2483.5 MHz
Frequency Control	42 Frequency Hopping Channels (Software Selectable)
Modulation	Spread Spectrum
Operating Range	300′ Line of Sight
Error Correction	Automatic Error Detection and Automatic Retransmission
Operating Temperature	-40°–85°C (-40–185°F)
Humidity	Up to 90% RH, non-condensing

Table 3: Handheld System Specifications

Display	128 x 128 px Sunlight-Readable E-Ink Display
Supply Voltage	5 Alkaline Batteries[4] or 5 NiMH Rechargeable Batteries
Battery Life	~20 Hours under normal operating conditions[5]
Max. Current Consumption	< 180 mA (RF Active) < 10 mA (Idle Mode)
Digital Inputs	34 Available

Table 3: Handheld System Specifications

Analog Inputs	8 Available–0-5 VDC[6]
LED Outputs	2 Available (RF and Error)
CAN Connection	J1939 (2-wire)
Power Saving Features	RF Emissions Off Delay < 1s Sleep Mode after 3 minutes (< 1 mA) System automatically powers off after 4 hours of no activity
Antenna	Internal[7]
Dimensions	Approx. 8.75″ x 4.5″ x 4.5″
Weight	Approx. 2 lbs.
Enclosure	IP67
Approvals	**USA**: FCC **Canada**: IC **Europe**: CE **Japan**: Telec

Table 4: Stop Switch Approvals

Approbations	CB (IEC 61058) CSA ENEC (EN61058) Germanischer Lloyd UL
Declaration of Conformity	CE[8]

[4]DO NOT attempt to recharge alkaline batteries.
[5]Low Battery warning will initiate with approximately 2 hours of runtime remaining.
[6]Configurable as Digital Inputs
[7]External option available
[8]Available upon request

Parts Identification

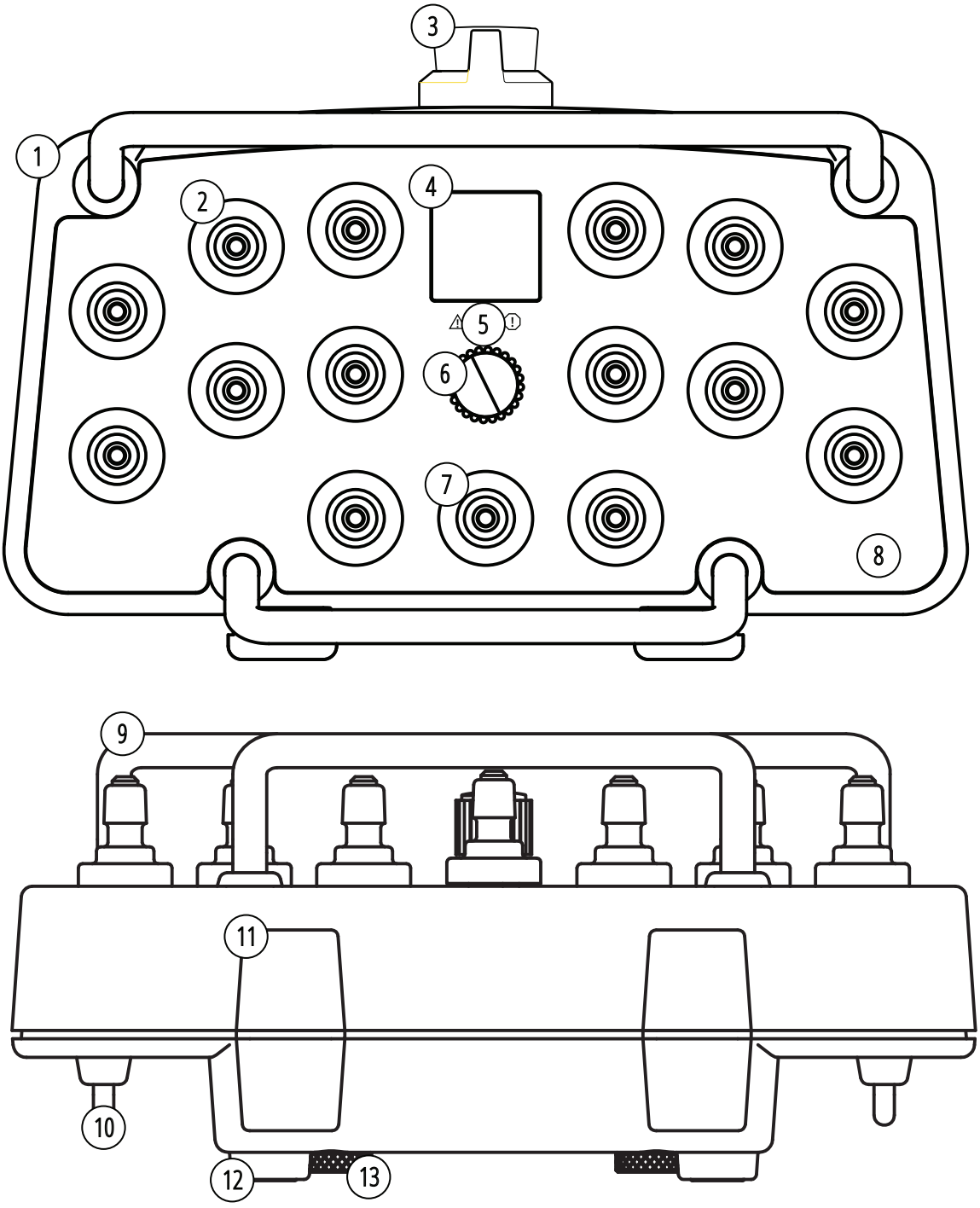


Figure 2: LXT Parts Identification

Table 5: Parts Identification

No.	Description
1	Case
2	Function Switch
3	Stop Switch[9]
4	LCD Display
5	Caution/Warning LEDs
6	Rotary Encoder
7	Power On/Off Switch
8	Custom Overlay
9	Protective Handlebar
10	Bottom Grip Bar
11	Belt Loop
12	Magnetic Mounting Point
13	Knurled Thumb Screw

[5]Location may vary

Learn Mode

In the event that you need to (re)pair a new handheld unit to a corresponding base station perform the following:

1. Power the handheld unit on
2. Hold the Power Switch in the “Off” position for approximately five (5) seconds until the Learn symbol ( ) appears
3. The system will remain in “Learn Mode” for one (1) minute
4. Activate the base station you are trying to pair
5. Learn Mode will exit automatically once pairing is complete

LXT Learn Procedure
with LXG/LXM Receiver

1

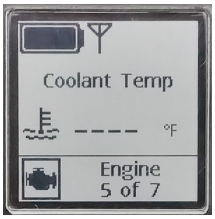
Transmitter: Put batteries in and power up

Receiver - LXG/LXM: Power up

2

Transmitter: If link symbol is not visible, proceed to next step.

Note: Disable WiFi to prevent interference



3

Transmitter: Hold power switch in the off position for 5 seconds

Receiver - LXG/LXM: Press orange "LEARN" button for three (3) seconds and release

4

Transmitter: Magnifing glass indicates the transmitter is searching for a receiver

Receiver - LXG/LXM: RF LED will alternate between red and green when searching for a transmitter

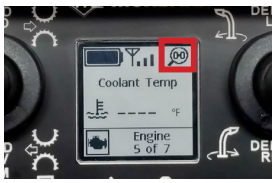
5

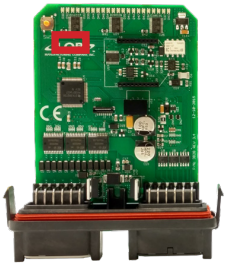
Transmitter: Link symbol indicates a solid chain link when learn is successful

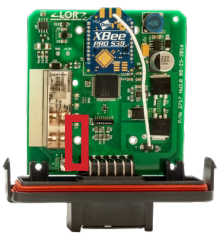
Receiver - LXG/LXM: RF LED will flash green rapidly when learn is successful

6

LED Locations:







LXT Learn Procedure
with LXR Receiver

1

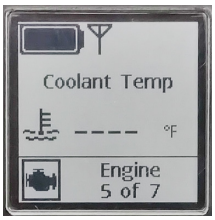
Transmitter: Put batteries in and power up

Receiver - LXR (Docking): Power up

2

Transmitter: If link symbol is not visible, proceed to next step.

Note: Disable WiFi to prevent interference



3

Transmitter: Hold power switch in the off position for 5 seconds

Receiver - LXR (Docking): Place magnetic foot of transmitter over center "chain link" symbol for three (3) seconds

4

Transmitter: Magnifing glass indicates the transmitter is searching for a receiver

Receiver - LXR (Docking): Antenna LED will alternate between red and green when searching for a transmitter

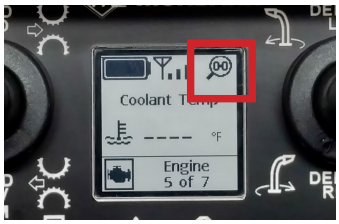
5

Transmitter: Link symbol indicates a solid chain link when learn is successful

Receiver - LXR (Docking): Antenna LED will flash green rapidly when learn is successful

6

LED Locations:



Operation

Powering the Transmitter On and Off

1. Install the batteries: Remove the battery cover on the back of the transmitter and insert five (5) “AA” alkaline or NiMH rechargeable batteries[6].
2. Turn on the transmitter by moving the power switch to the “On” position for approximately one (1) second and release.
3. Turn off the transmitter by moving the power switch to the “Off” position for approximately one (1) second and release.

> ***Caution***
>
> Do no install the batteries backwards, charge, put in fire, or mix with other battery types.
> **Replace all batteries at the same time as a complete set and do not mix and match battery types. DO NOT attempt to recharge alkaline batteries**

Figure 3: Battery Compartment

[6] If batteries are pre-installed, remove the tab labeled “Remove before use”

Figure 4: Battery Pull Tab Installed

Figure 5: Battery Pull Tab Removed

Operating the Handheld System

Once the handheld system is powered on it will recall the last page that was active before power down. To navigate the different pages of the display; rotate the rotary encoder.

To change between the different groups of pages:

1. Press the Rotary Encoder
2. Rotate the Encoder to the desired icon
3. Press the Encoder to activate the page group
4. Once in the desired page group, rotate the Encoder to reach the desired page

The following table lists the different icons used throughout the system.

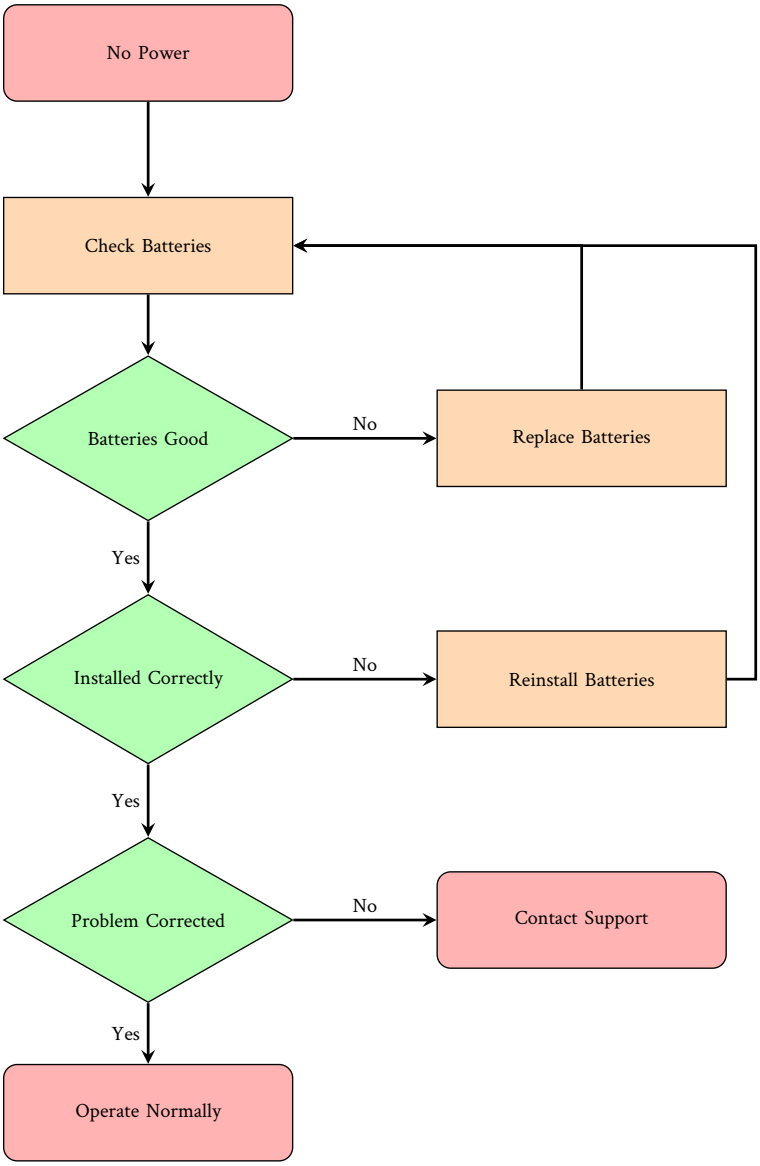
Table 6: Symbols

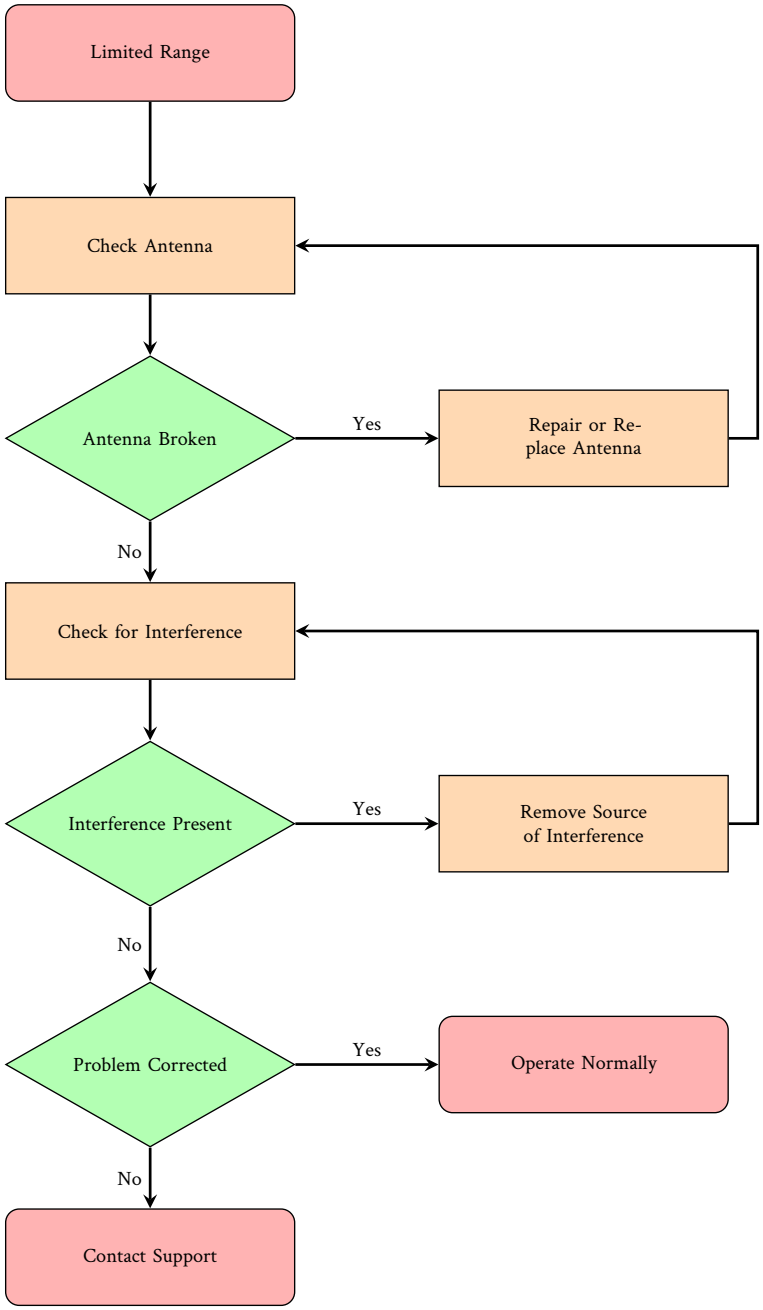
Symbol	Description
	Information Pages
	Pressure Pages: Information about system pressure readings
	Speeds Pages: Information about system speed readings
	Diagnostics Pages: Information about the status of system I/O
	Analog Input Pages: Information about the system analog inputs
	Digital Input Pages: Information about the system digital inputs
	Cooling Pages: Information about the cooling system
	Engine Input Pages: Information about the various engine parameters
	Menu: Allows access to the system menu
	Messages: Any errors or faults on the remote system or CAN Bus System
	Signal Indicator: Signal Strength Indicator
	Battery Indicator: Battery Life Indicator
	Learn Mode Indicator: Indicates when the system is in Learn Mode

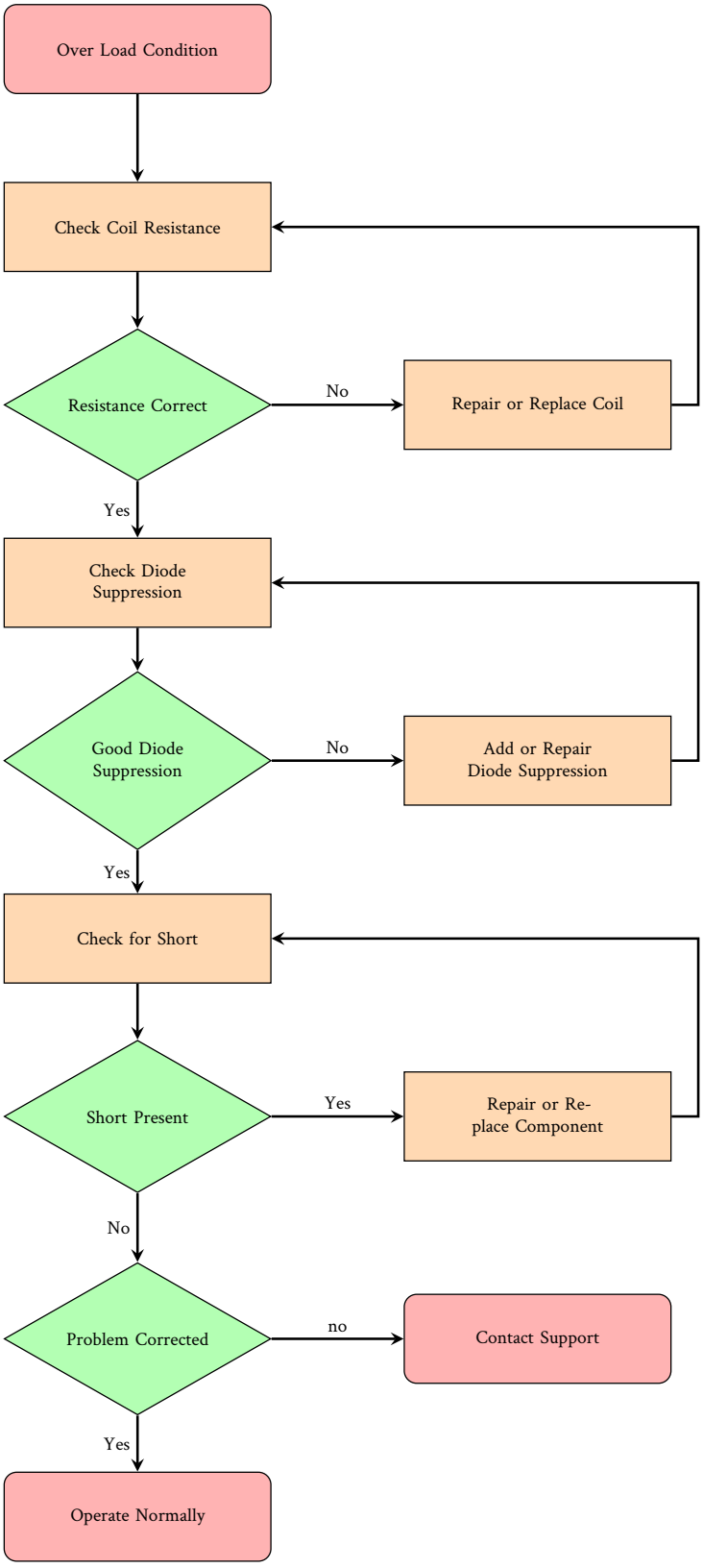
Symbol	Description
	Link Indicator: Indicates when the system is linked
	Link Indicator: Indicates system is linked but current device is not in control

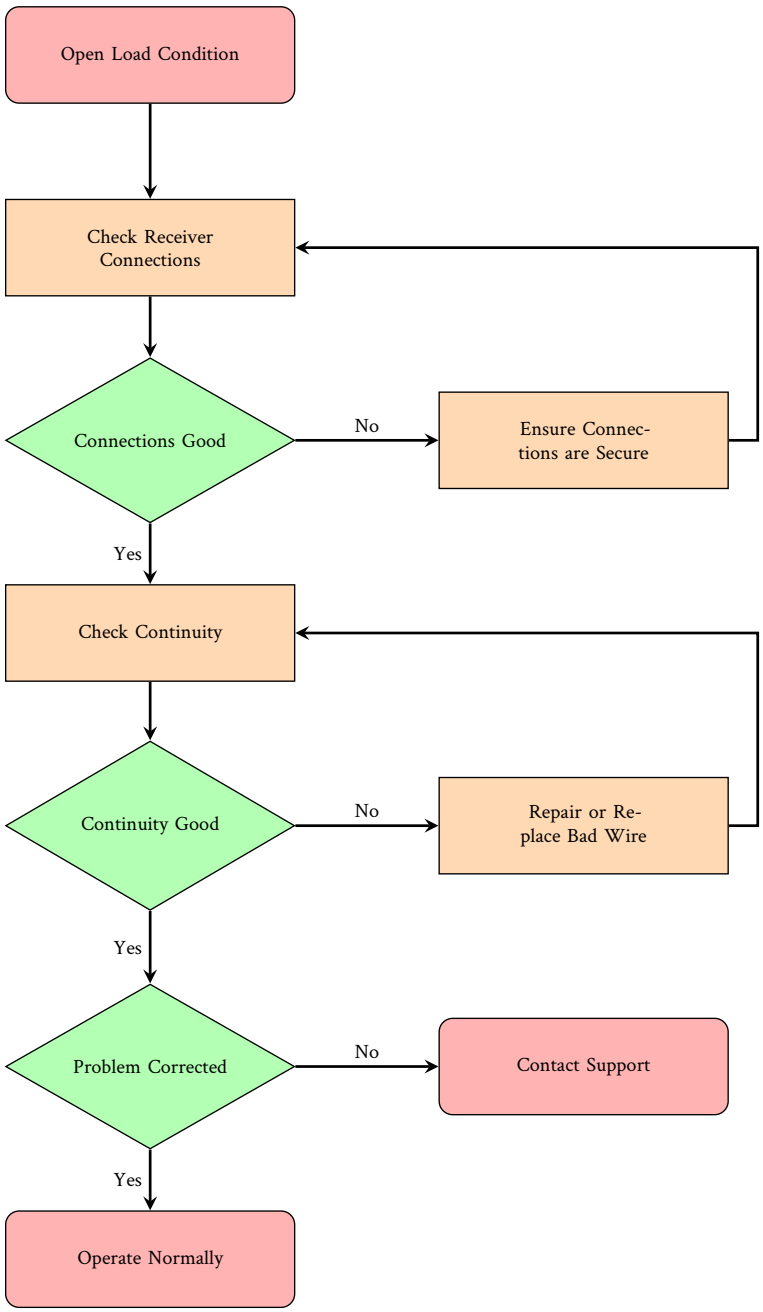
Troubleshooting

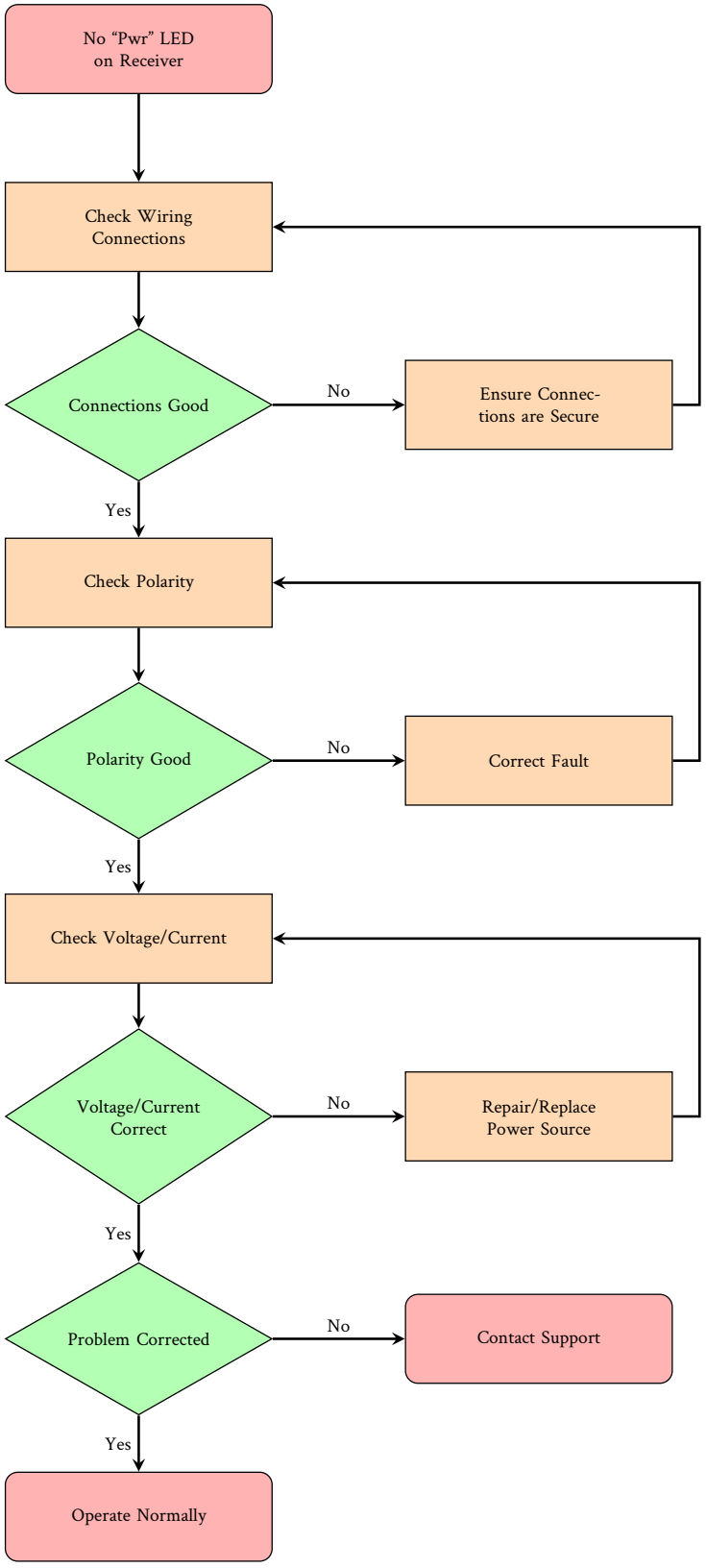
The following provides common troubleshooting steps that can be followed in the field.


No Power
Check Batteries
Batteries Good
No
Replace Batteries
Yes
Installed Correctly
No
Reinstall Batteries
Yes
Problem Corrected
No
Contact Support
Yes
Operate Normally


Limited Range
Check Antenna
Antenna Broken
Yes
Repair or Re-
place Antenna
No
Check for Interference
Interference Present
Yes
Remove Source
of Interference
No
Problem Corrected
Yes
Operate Normally
No
Contact Support


Over Load Condition
Check Coil Resistance
Resistance Correct
No
Repair or Replace Coil
Yes
Check Diode Suppression
Good Diode Suppression
No
Add or Repair Diode Suppression
Yes
Check for Short
Short Present
Yes
Repair or Replace Component
No
Problem Corrected
no
Contact Support
Yes
Operate Normally


Open Load Condition
Check Receiver Connections
Connections Good
No
Ensure Connections are Secure
Yes
Check Continuity
Continuity Good
No
Repair or Replace Bad Wire
Yes
Problem Corrected
No
Contact Support
Yes
Operate Normally


No “Pwr” LED on Receiver
Check Wiring Connections
Connections Good
No
Ensure Connections are Secure
Yes
Check Polarity
Polarity Good
No
Correct Fault
Yes
Check Voltage/Current
Voltage/Current Correct
No
Repair/Replace Power Source
Yes
Problem Corrected
No
Contact Support
Yes
Operate Normally

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