OMNEX
TRUSTED WIRELESS™

IMT / OSHKOSH Military Crane

Installation / Configuration Manual

T2400 Transmitter

R2160 Receiver

D180 Expansion Module

January 30, 2007

Revision 1

DM-R2160-0007A

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NOTE: *These instructions are intended only for installing and operating the remote control equipment described here. This is not a complete Operator's Manual. For complete operating instructions, please read the Operator's Manual appropriate for your particular machine.*

Safety Precautions

READ ALL INSTRUCTIONS

CAUTION: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Failure to follow the SAFETY PRECAUTIONS may result in radio equipment failure and serious personal injury

Installation

PROVIDE A SAFETY CUTOFF SWITCH. If maintenance is required, the radio must be disconnected from power

USE PROPER WIRING. Loose or frayed wires can cause system failure, intermittent operation, machine damage, etc.

DO NOT INSTALL IN HOT AREAS. This apparatus can be damaged by heat in excess of 158°F (70°C)

Personal Safety

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

TURN OFF THE RECEIVER POWER BEFORE WORKING ON MACHINERY. Always disconnect the remote system before doing any maintenance to prevent accidental operation of the machine

Care

KEEP DRY. Do not clean the transmitter / receiver under high pressure. If water or other liquids get inside the transmitter battery or receiver compartment, immediately dry the unit. Remove the case and let the unit air dry

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.

Maintenance / Welding

DISCONNECT THE RADIO RECEIVER BEFORE WELDING on the machine the receiver is connected to. Failure to disconnect will result in the destruction of the radio receiver.

System Overview

The **ORIGA T2400 / R2160 / D180** is a portable, long range, programmable radio remote control system. Designed as a compact and easy-to-use product, this member of the **ORIGA** family puts complete control of your system where it's needed most, with the operator. It's robust, easy to install and has complete self-diagnostics. This system can be a simple cable replacement or add intelligence to make it a total control package. It's a radio, a PLC and a valve driver all in one.

The **ORIGA T2400 / R2160 / D180** system uses Frequency Hopping Spread Spectrum (FHSS) technology. FHSS devices concentrate their full power into a very narrow signal that randomly hops from frequency to frequency within a designated band. This transmission pattern, along with CRC-16 error-checking techniques, enables signals to overcome interference that commonly affects licensed radios.

The R2160 receiver is designed to be powered from a 12VDC or 24VDC system. It features 19 solid state, high-side driver input / output controls and a reliable E-Stop control.

The D180 Expansion Unit has up to fourteen current-control, PWM, or voltage outputs, or a combination of these types.

The T2400 transmitter may optionally be configured with a combination of joysticks, paddles, switches, potentiometers, feedback LED indicators, and a graphical display system. A unique ID code is used by each T2400 to ensure that no two systems will conflict on a job site.

Features

- FCC, ISC, CE approved
- License free
- Compact / weatherproof / ergonomic
- Simple "wire-and-use" installation
- Resilient to impact and shock
- Available in a 2.4 GHz frequency band
- Available with paddles and/or joysticks for proportional control
- Available with an optional pendant cable
- Factory configurable for all custom applications.

Installing the Receiver

Use the **Wiring Diagram** and the **Connector Diagram** below to connect the receiver pins directly to the appropriate contacts of the machine electronics. Output Cables can be provided with every system to simplify the wiring process. The Wire Color column below only applies to the OMNEX Output Cable configuration. Tips on mounting, power connections and filtering are also provided under **Installation Considerations**.

IMPORTANT: IO channels 1-13 must be fused externally.

Wiring

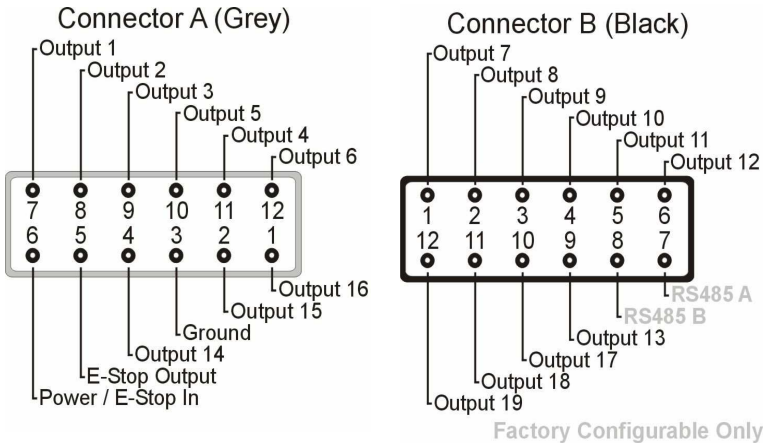
Pin-Output	Wire Colors	Functions
B7		Factory Configurable Only
B8		Factory Configurable Only
B12 - 19	Black/Red	LOAD PRESSURE (Analog Input, 0-5VDC = 0-6000PSI)
B11 - 18	White/Black	OUTER BOOM ANGLE SENSOR (Analog Input, 1.538-5.037VDC = -30° to 80°)
B10 - 17	Blue/White	INNER BOOM ANGLE SENSOR (Analog Input, 1.538-5.037VDC = -30° to 80°)
A1 - 16	Blue/Black	TILT (Digital Input)
A2 - 15	Black/White	ROTATION CCW LIMIT (Digital Input)
A4 - 14	Green/Black	ROTATION CW LIMIT (Digital Input)
B9 - 13	Red/White	OUTRIGGERS DEPLOYED (Digital Input)
B6 - 12	Orange	Unused
B5 - 11	White	Unused
B4 - 10	Green/Black/White	Unused
B3 - 9	Green	Unused
B2 - 8	Red/Black/White	Unused
B1 - 7	White/Red/Black	Unused
A12 - 6	Orange/Red	TILT DOWN (Momentary Digital Output)
A10 - 5	Orange/Black	TILT UP ((Momentary Digital Output)
A11 - 4	Blue/Red	OUTRIGGER RIGHT STOW (Momentary Digital Output)
A9 - 3	White/Red	OUTRIGGER RIGHT DEPLOY (Momentary Digital Output)
A8 - 2	Red/Green	OUTRIGGER LEFT STOW (Momentary Digital Output)
A7 - 1	Orange/Green	OUTRIGGER LEFT DEPLOY (Momentary Digital Output)
A5	Black/White/Red	Switches to Power with Link
A6	Red	Power Input (+9V to 30VDC)
A3	Black	Ground

Outputs: 19 solid state, high-side driver outputs, 5A max. each, total combined current 15A

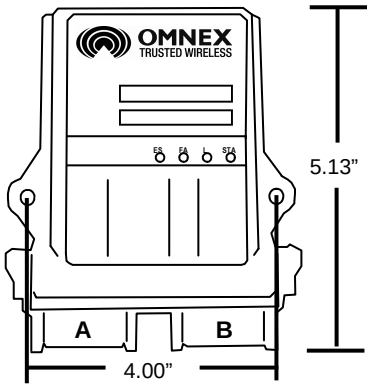
Inputs: All output pins can be factory configured as inputs.

Connector Pin Assignments

Connectors as seen from under the receiver



R2160 / D1XX Dimensions



Installing the D180 Expansion Module

Use the **Wiring Diagram** and the **Connector Diagram** below to connect the Expansion module pins directly to the appropriate contacts of the machine electronics. Output Cables are provided with every system to simplify the wiring process. The Wire Color column below only applies to the OMNEX Output Cable configuration. Tips on mounting, power connections and filtering are also provided under **Installation Considerations**.

Wiring

Pin-Output	Wire Colors	Functions
B7		Factory Configurable Only
B8		Factory Configurable Only
B12 - 19	Black/Red	Unused
B11 - 18	White/Black	Unused
B10 - 17	Blue/White	Unused
A1 - 16	Blue/Black	Unused
A2 - 15	Black/White	Unused
A4 - 14	Green/Black	Unused
B9 - 13	Red/White	Unused
B6 - 12	Orange	Unused
B5 - 11	White	Unused
B4 - 10	Green/Black/White	EXTENSION BOOM OUT (500mA—1000mA Proportional Output)
B3 - 9	Green	EXTENSION BOOM IN (500mA—1000mA Proportional Output)
B2 - 8	Red/Black/White	SECONDARY BOOM EXTEND (500mA—1000mA Proportional Output)
B1 - 7	White/Red/Black	SECONDARY BOOM RETRACT (500mA—1000mA Proportional Output)
A12 - 6	Orange/Red	ROTATION CW (500mA—1000mA Proportional Output)
A10 - 5	Orange/Black	ROTATION CCW (500mA—1000mA Proportional Output)
A11 - 4	Blue/Red	OUTER BOOM EXTEND (500mA—1000mA Proportional Output)
A9 - 3	White/Red	OUTER BOOM RETRACT (500mA—1000mA Proportional Output)
A8 - 2	Red/Green	INNER UP (500mA—1000mA Proportional Output)
A7 - 1	Orange/Green	INNER DOWN (500mA—1000mA Proportional Output)
A5	Black/White/Red	
A6	Red	Power Input (+9V to 30VDC)
A3	Black	Ground

Outputs: 14 solid state, high-side driver Current Control outputs 5A max. each, total combined current 15A

Special Functions

The CRANE TILT WARNING LED indicator turns on when the TILT input is < 6VDC.
The ROTATION CW function is disabled when the ROTATION CW input is < 6VDC.
The ROTATION CCW function is disabled when the ROTATION CCW input is < 6VDC.
All functions except OUTRIGGER LEFT and OUTRIGGER RIGHT are disabled when the OUTRIGGERS DEPLOYED input is < 6VDC.

When the SPEED switch is in the LOW position, the proportional outputs will be scaled to 45% of the full stroke.
When the SPEED switch is in the MED position, the proportional outputs will be scaled to 65% of the full stroke.
When the SPEED switch is in the HIGH position, the proportional outputs will allow 100% of the full stroke.

All transmitter indicator lights will remain off while the LIGHTS DISABLE switch is latched.

The CRANE OVERLOAD LED indicator turns on when the system is in Overload mode.

Overload mode is described in the table on the following page.

Special Functions (Continued)

Overload Truth Table (Enabled Functions = “Yes”, Disabled = “No”)

Inner Boom Angle [Degrees]	Outer Boom Angle [Degrees]	Overload Pressure [PSI]	Inner Cyl.	Secondary Cyl.	Outer Cyl.	Extension Cyl.	Rotation
{ - 30 to - 26 }	Less Than 0	4500	Extend No Retract Yes	Extend No Retract Yes	Extend No Retract Yes	Extend No Retract Yes	CW Yes CCW Yes
	0 and Greater Than 0		Extend No Retract Yes	Extend No Retract Yes	Extend No Retract Yes	Extend No Retract Yes	CW Yes CCW Yes
{ - 25 to -13 }	Less Than 0	3500	Extend No Retract Yes	Extend No Retract Yes	Extend No Retract Yes	Extend No Retract Yes	CW Yes CCW Yes
	0 and Greater Than 0		Extend No Retract Yes	Extend No Retract Yes	Extend No Retract Yes	Extend No Retract Yes	CW Yes CCW Yes
{ - 12 to + 5 }	Less Than 0	3100	Extend No Retract Yes	Extend No Retract Yes	Extend No Retract Yes	Extend No Retract Yes	CW Yes CCW Yes
	0 and Greater Than 0		Extend No Retract Yes	Extend No Retract Yes	Extend No Retract Yes	Extend No Retract Yes	CW Yes CCW Yes
{ + 6 to + 29 }	Less Than 0	3000	Extend Yes Retract No	Extend No Retract No	Extend No Retract Yes	Extend No Retract Yes	CW Yes CCW Yes
	0 and Greater Than 0		Extend Yes Retract No	Extend No Retract No	Extend Yes Retract No	Extend No Retract Yes	CW Yes CCW Yes
{ + 30 to + 44 }	Less Than 0	3100	Extend Yes Retract No	Extend No Retract No	Extend No Retract Yes	Extend No Retract Yes	CW Yes CCW Yes
	0 and Greater Than 0		Extend Yes Retract No	Extend No Retract No	Extend Yes Retract No	Extend No Retract Yes	CW Yes CCW Yes
{ + 45 to + 59 }	Less Than 0	3400	Extend Yes Retract No	Extend No Retract No	Extend No Retract Yes	Extend No Retract Yes	CW Yes CCW Yes
	0 and Greater Than 0		Extend Yes Retract No	Extend No Retract No	Extend Yes Retract No	Extend No Retract Yes	CW Yes CCW Yes
{ + 60 to + 74 }	Less Than 0	4000	Extend Yes Retract No	Extend No Retract No	Extend No Retract Yes	Extend No Retract Yes	CW Yes CCW Yes
	0 and Greater Than 0		Extend Yes Retract No	Extend No Retract No	Extend Yes Retract No	Extend No Retract Yes	CW Yes CCW Yes
{ + 75 to + 83 }	Less Than 0	4500	Extend Yes Retract No	Extend Yes Retract No	Extend No Retract Yes	Extend No Retract Yes	CW Yes CCW Yes
	0 and Greater Than 0		Extend Yes Retract No	Extend Yes Retract No	Extend Yes Retract No	Extend No Retract Yes	CW Yes CCW Yes
{ + 83 to Max }	Less Than 0	4500	Extend Yes Retract Yes	Extend Yes Retract No	Extend No Retract Yes	Extend No Retract Yes	CW Yes CCW Yes
	0 and Greater Than 0		Extend Yes Retract Yes	Extend Yes Retract No	Extend Yes Retract No	Extend No Retract Yes	CW Yes CCW Yes

Installation Considerations

NOTE: *The FCC and ISC require that the antenna be restricted to that supplied by the manufacturer and approved for use with this product. An optional 0dB coax wire antenna may be supplied. For other antenna options, please contact OMNEX Control Systems ULC*

Mounting and Installation

The receiver can be mounted by fastening two ¼" bolts through the two mounting holes in the unit's enclosure. When mounting, ensure that the receiver is oriented so that the text is reading right and the connectors pointing "down".

When selecting a mounting point for the receiver, it is recommended that the location require only a minimal length of wiring to connect it to the control panel, that it will be in a visible area where it has good exposure to the operator and that it is mounted on a surface that sustains minimal vibration. It is also recommended that the receiver have the best possible line of sight with the transmitter

Power Connections and Wiring

Whenever a power connection is made to an electronic device, it is a good practice to make both the Power (+) and Ground (-) connections directly to the Battery and avoid connecting the power from the charging side of existing wiring or making use of existing "ACC" or other peripheral connection points.

Make sure that wire of sufficient gauge and insulator type is used when connecting the outputs of the receiver to the control panel. Observe any component manufacturer's instructions and recommendations for proper integration of their product. This includes the power ratings and requirements of such components as relays, valves, solenoids, etc.

Be sure to test each of the outputs with a multi-meter prior to connecting the outputs to your end devices. This will ensure that each output has been programmed to operate in the manner required by each end device.

Filtering and Noise Suppression

Whenever a solenoid or electromagnetic switch is controlled by the receiver, it is a good practice to install a Diode across its terminals to ensure that surges and spikes do not continue back into the circuit. Appropriate 36V Bi-directional Diodes kits can be ordered under the OMNEX part number "AKIT-2492-01".

Power the Transmitter

1. **Install batteries in the transmitter**

   The transmitter is powered by a standard 9.6 volt Makita power tool battery and the proper Makita charger. Please read the operating instructions included in the MAKITA charger package.

   To remove the battery pack from the transmitter, grasp the tab on the battery door and unlatch it. The door may then be opened and the transmitter case tilted to allow the battery to slide out. The battery pack is keyed so that it is not possible to install incorrectly. To close the battery door, latch the tab until it "snaps" in place.

2. **Turn on the transmitter**

   Ensure all transmitter switches and paddles are in the neutral position. Turn on the transmitter by pressing the [Power] switch. The yellow (Active) light on the transmitter will begin to flash.

   NOTE: *The transmitter must be off for 5 seconds before it may be turned back on.*

   A. Press the POWER [ON] switch

LED States

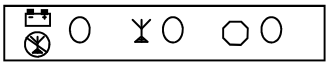
Light Legend	Solid	Slow Flash	Fast Flash	Red Light	Green Light	Yellow Light	Alternating Red & Green Light

Test the Transmitter / Receiver Link

Follow these steps to ensure that there is a Radio Link between the transmitter and receiver

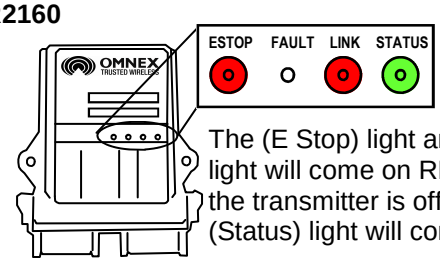
Refer to the Light Legend below for diagram details

1. Unlatch the POWER [ON] switch.



LED States

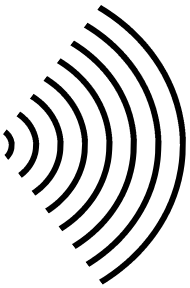
2. Power the R2160

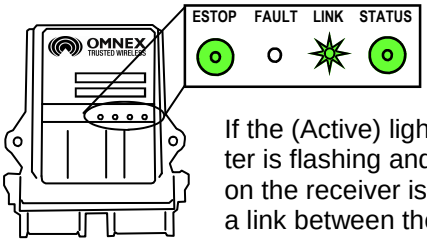


The (E Stop) light and the (Link) light will come on RED (provided the transmitter is off), and the (Status) light will come on GREEN.

3. Power the T2400

LED States





If the (Active) light on the transmitter is flashing and the (Link) light on the receiver is flashing GREEN, a link between the two exists.

4. Power Off the T2400

Unlatch the POWER [ON] switch to shut off the transmitter.

The ORIGA System is now ready for use.

If the receiver's (Link) light does not become GREEN follow the steps under **Download ID Code**.

Download ID Code (Use in case of Link Test failure)

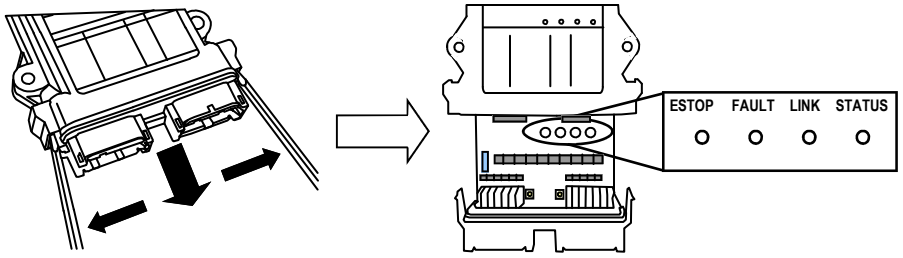
Follow these steps to download the transmitter's unique ID Code into the receiver. This will allow the receiver to establish a Radio link with a specific transmitter. Refer to **Troubleshooting Chart #4** for Tips and Considerations

NOTE: *It is necessary to download the ID code when replacing either the transmitter or the receiver.*

1. Opening the R2160

The cap is held on by two plastic tabs at opposing sides, which can be unlatched as shown using a screwdriver. Once the cap is free, the R2160 can slide open.

Use a small slotted screwdriver to press the Side Tabs inward.



NOTE: *When replacing the receiver cover, ensure the cover snaps completely into place to create a weather proof seal around the base of the receiver.*

2. Prepare T2400

A. Be sure the transmitter is powered off.

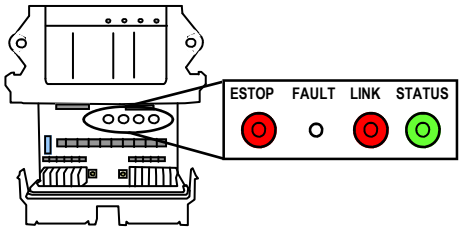
Light Legend	Solid	Slow Flash	Fast Flash	Red Light	Green Light	Yellow Light	Alternating Red & Green Light

Download ID Code (Use in case of Link Test failure)

3. Power R2160

A. Supply power to the receiver. The (E-Stop) light and the (Link) light will come on RED and the (Status) light will come on GREEN

A.



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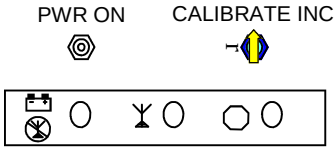
4. Power T2400 into Configuration Mode

A. Hold CALIBRATE [INC] switch.

B. Latch POWER switch [ON].

C. Release CALIBRATE [INC] switch.

A.



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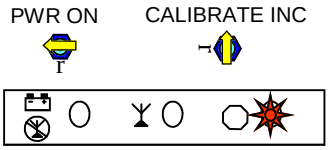
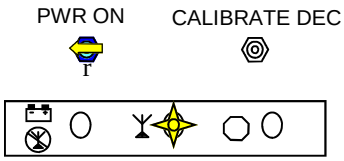


C.



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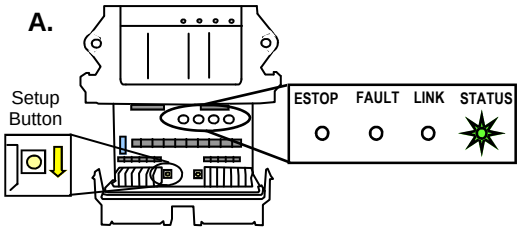
5. Put R2160 into Setup Mode

A. Press & hold [Setup] button until (Status) light goes from slow flash to fast flash

B. Release [Setup] button. (Status) light goes to solid GREEN, (Link) light turns off

A.



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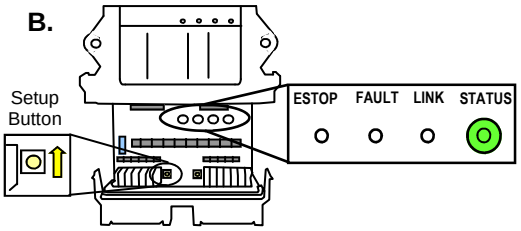

NOTE: *If left idle in Setup Mode for over 30 seconds, the receiver will time out. The (Link) light and (Status) light will flash RED rapidly. To return to Setup Mode, repeat step 5.*

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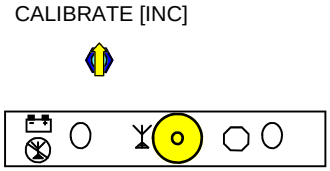
6. Download ID Code

NOTE: *When downloading a new ID to a receiver, a safety feature requires that the transmitter be in close proximity to the receiver. This will prevent a transmitter from accidentally reprogramming a different receiver in the area.*

A. Press CALIBRATE [INC]

B. (Link) light flashes GREEN. Once complete, (Link) light goes to RED as the transmitter turns off

A.



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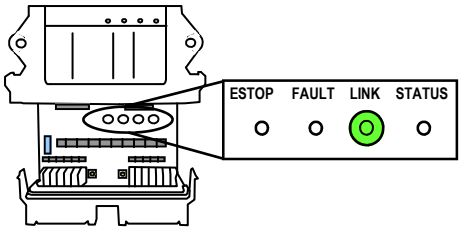

Light Legend	Solid	Slow Flash	Fast Flash	Red Light	Green Light	Yellow Light	Alternating Red & Green Light

Calibrating Proportional Controls

The transmitter's joysticks control the receiver's proportional outputs. A proportional output can be activated when a joy-stick is moved; it will become active at an increasingly high level as the joystick is pushed/pulled. The min. and max. levels of the proportional output can be calibrated by following these steps.

Refer to the **Light Legend** below for diagram details.

NOTE: *Calibration settings can be reset to factory default in steps 3 & 4 by holding the [Power] switch UP or DOWN for 5 seconds.*

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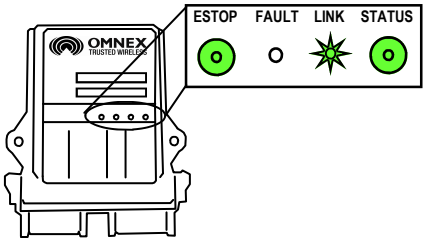
1. Power T2400, Power R2160

A. Refer to steps in "Power the Transmitter"

A.

B.



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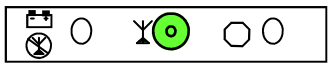
2. Setup T2400 into Calibration Mode

A. Hold [Calibrate] switch DOWN for 5 seconds until the (Battery) LED fast flashes RED

B. Release [Calibrate] switch

A.



B.

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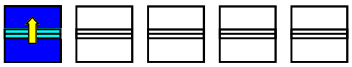
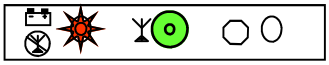
3. Set Minimum Level

A. Slightly push the paddle (function) in the direction you wish to calibrate until the (Active) LED comes on

B. Hold paddle and Press [Calibrate] switch UP to increase minimum level or DOWN to decrease it

A.





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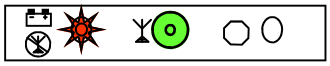

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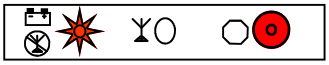
4. Set Maximum Level

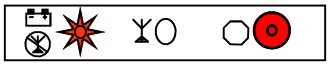
A. Fully push the paddle (function) in the direction you wish to calibrate until the (E-Stop) LED comes on.

B. Hold paddle and Press [Calibrate] switch UP to increase maximum level or DOWN to decrease it

A.



B.



Note: *Repeat steps 3 and 4 for each paddle (function) that needs to be calibrated.*

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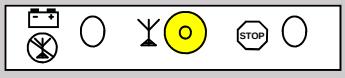
5. Power Off

A. Unlatch the POWER [ON] switch.

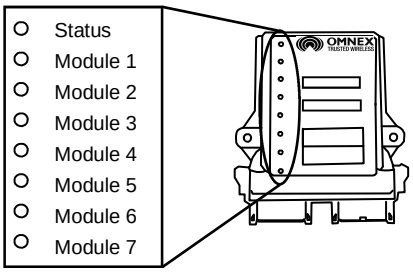
Light Legend	Solid	Slow Flash	Fast Flash	Red Light	Green Light	Yellow Light	Alternating Red & Yellow Light

Diagnostics—T2400 Transmitter

	Tether connection detected
	The Active light remain on momentarily when a function is activated (i.e. a switch or paddle is triggered). This is normal operation.
	**Normal Operation** The transmitter is in Download Mode.
	**Normal Operation** The Active light will flash 2 times per second, indicating that the transmitter is sending signals to the receiver.
	Stuck switch detected. Ensure that all switches are in a centered position. The transmitter will not power up when a function is ON.

Diagnostics - D180 Expansion Module

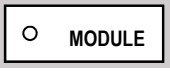
Indicator lights for the D180 Expansion Module



Status Indicator

	Module is operating properly		Low battery condition detected
	There is a fault with the module		Fuse blown
	Communication to the module is active		

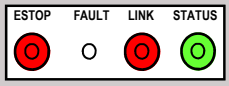
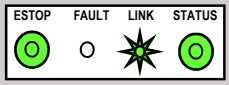
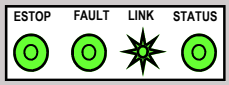
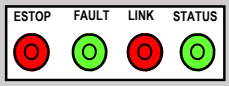
Module 1-7 Indicators

	Module is installed and operating properly		There is a short to supply
	There is a short to ground / over current		No Module installed

Light Legend	Solid	Slow Flash	Fast Flash	Red Light	Green Light	Yellow Light	Alternating Red & Yellow Light

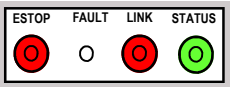
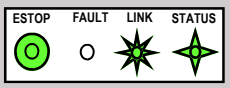
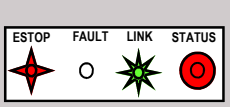
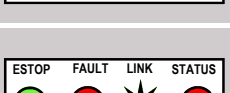
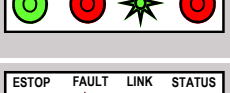
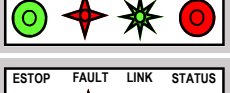
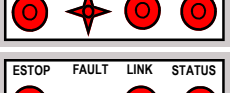
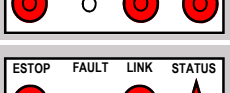
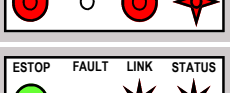
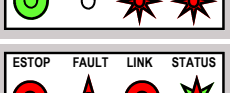
Diagnostics - R2160 Receiver

Normal Operation

	Transmitter is OFF If the transmitter is off, the receiver is operating properly.
	Transmitter is ON When the transmitter is turned on, the Link light (fast flashing) and E-Stop (GREEN) indicates the receiver is operating properly
	Transmitter is in Operation When a function is activated on the transmitter, the Fault light will turn on GREEN. This indicates the receiver is operating properly
	Transmitter is OFF When a latched function is activated then the transmitter is turned off, the Fault light will stay on GREEN. If the system was intentionally designed this way, the receiver is operating properly, if not call for service.

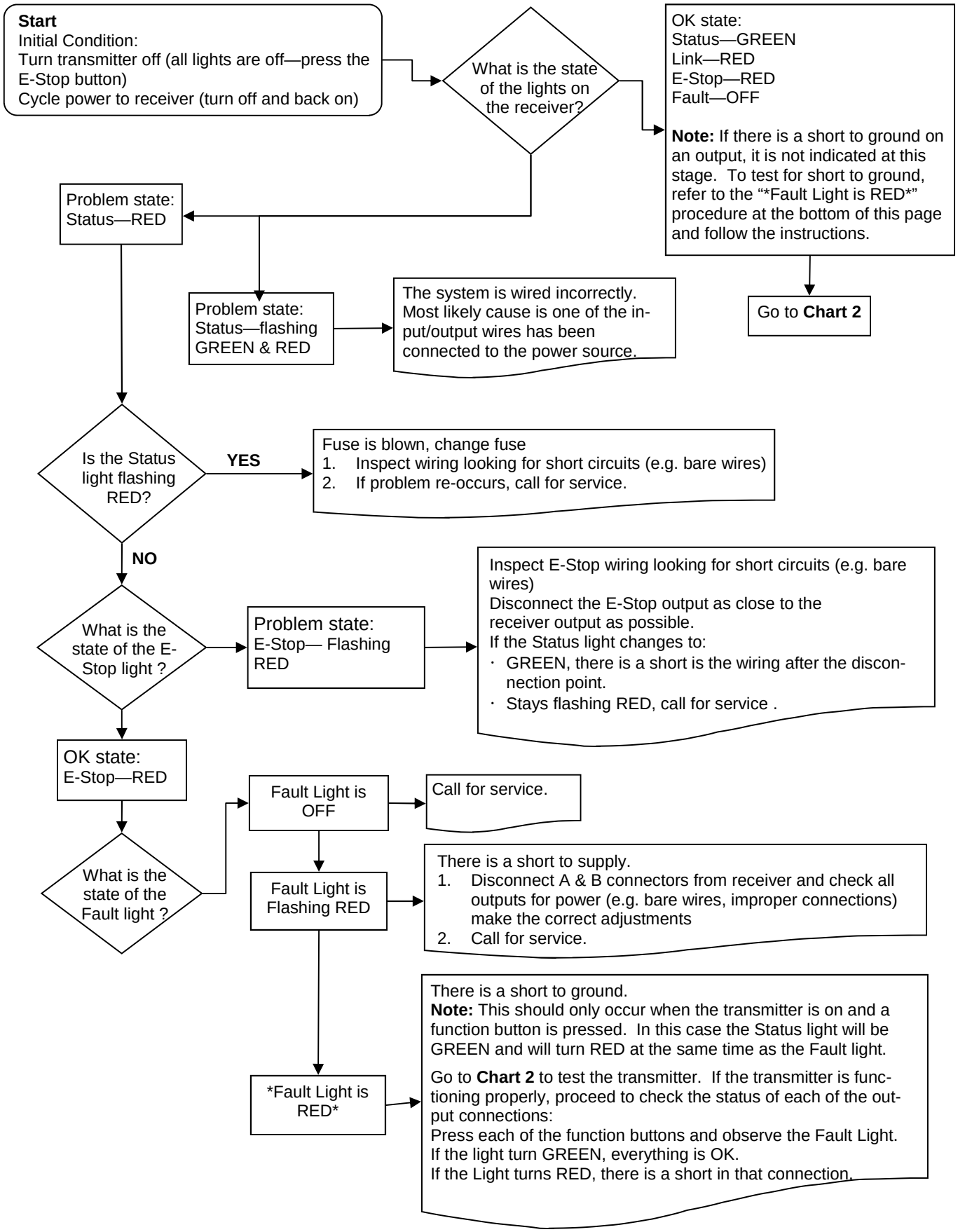
Trouble Indicators

Note: *In some cases, the indicator lights will be different depending on whether the transmitter is on or off. Please note the transmitter status in the "Description" column for each case.*

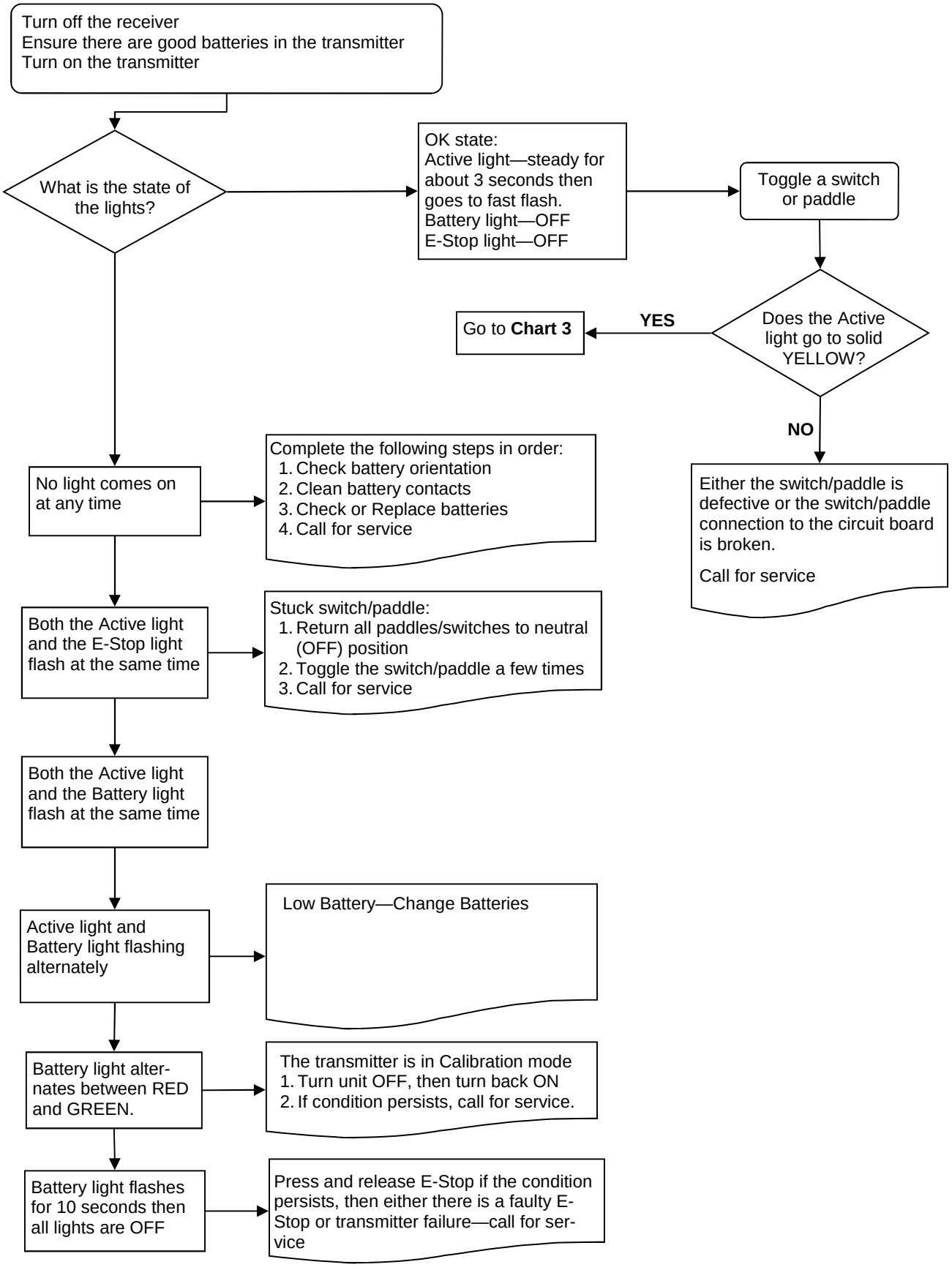
Indicator Lights	Description	Solution
	Transmitter is ON The reason is the transmitter is not communicating with the receiver.	Refer to **Troubleshooting Chart #3** for solutions
	Transmitter is ON A low battery condition has been detected.	To detect intermittent conditions caused by poor or corroded ground or power circuits, the GREEN light will continue to flash for 30 seconds after the condition has been removed.
	Transmitter is ON An internal fault with the E-Stop has been detected.	Inspect E-Stop wiring for short circuit. Disconnect E-Stop wire as close to the receiver output as possible. If the Status light changes to: · GREEN, a short occurs after disconnection point. · Stays flashing RED, send it in for service .
	Transmitter is ON A short to ground or excessive current draw on an output. It is most likely caused by a wiring fault.	Ensure transmitter is functioning properly, check status of each output connection: Press each function button and observe Fault Light. · If GREEN, everything is OK. · If RED, there is a short in that connection.
	Transmitter is ON The E-Stop output has been connected with one of the other outputs	Follow the wire and check for connections with other wires, disconnect to see if condition clears. If not, call for service.
	Transmitter is OFF A wiring short to the battery has been detected.	Refer to **Troubleshooting Chart #1** for solutions
	Transmitter is OFF The receiver has detected an internal fault.	Refer to **Troubleshooting Chart #1** for solutions
	Transmitter is OFF Blown fuse detected.	Refer to **Page 8** for instructions on how to open the receiver case to access fuse. Check wiring for shorts or bare spots. If fuses continue to blow, call for service.
	Transmitter is ON A setup failure has occurred.	Either hold the Setup button for 5 seconds to return to Setup mode or cycle power to return to the normal operating mode.
	Transmitter is OFF The receiver is powered incorrectly.	Most likely cause of this condition is that an output wire or the E-Stop wire has been connected to the power supply while the power wire is disconnected from the power supply.

Light Legend	Solid	Slow Flash	Fast Flash	Red Light	Green Light	Yellow Light	Alternating Red & Green Light

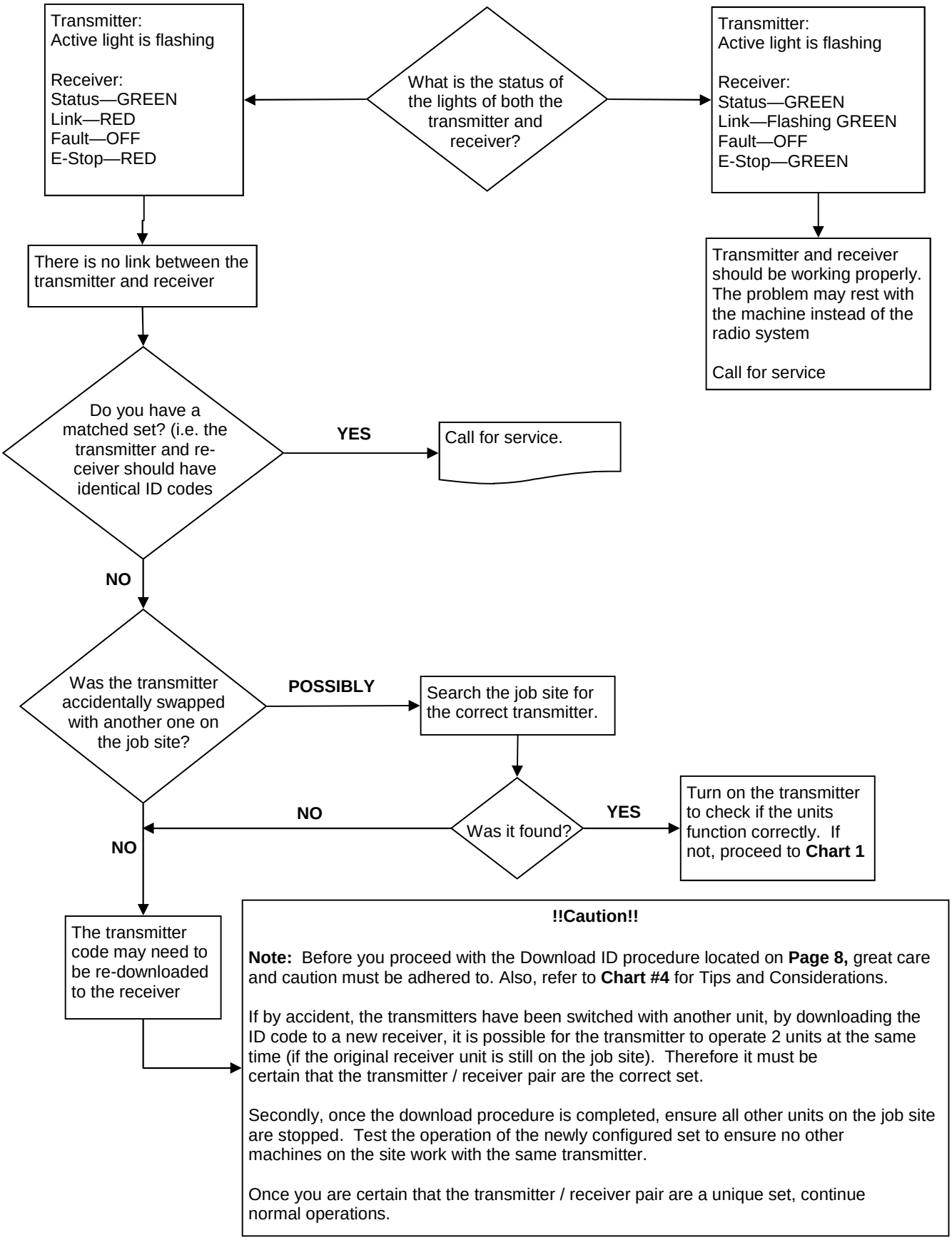
Test the Receiver—R2160



Test the Transmitter—T2400



Testing the Transmitter / Receiver Communication



!!Caution!!

Note: Before you proceed with the Download ID procedure located on **Page 8,** great care and caution must be adhered to. Also, refer to **Chart #4** for Tips and Considerations.

If by accident, the transmitters have been switched with another unit, by downloading the ID code to a new receiver, it is possible for the transmitter to operate 2 units at the same time (if the original receiver unit is still on the job site). Therefore it must be certain that the transmitter / receiver pair are the correct set.

Secondly, once the download procedure is completed, ensure all other units on the job site are stopped. Test the operation of the newly configured set to ensure no other machines on the site work with the same transmitter.

Once you are certain that the transmitter / receiver pair are a unique set, continue normal operations.

Considerations when Downloading the ID

Potential downloading issues

If testing of the receiver and transmitter both show the system as working (Chart 1 & 2), then the transmitter and receiver will both go into Download/Configuration mode.

Possible issues could arise during Step 4, the download phase of reprogramming. In this case there are 2 symptoms to look for:

1. The Link light on the receiver will not turn GREEN when the power switch is toggled on the transmitter to download
2. The receiver will "time out" indicating that it didn't receive a signal from the transmitter within the 30 seconds from the time the receiver was put into Setup Mode.

If all indications appear normal during the download phase, test the link by turning on the transmitter (note: the transmitter shuts off after transmitting the ID code in Step 4)

1. If the Link light on the receiver doesn't turn GREEN, the receiver didn't receive all of the information that was sent from the transmitter.

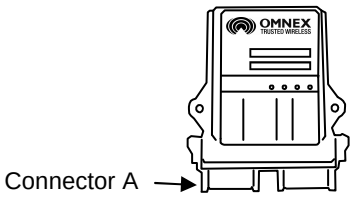
Possible Solutions

1. Try the Downloading steps again
2. If this doesn't correct the problem, send both the transmitter and receiver in for service.

Note: *you could try to determine whether the fault lies with the transmitter or receiver by completing the downloading procedure with a different transmitter. If this step works, then the fault lies with the original transmitter. If not, the fault may lie with the receiver.*

!!Caution!!

Note: Before attempting downloading with another transmitter, understand that reprogramming the receiver with another transmitter, could result in two receivers on the job site responding to the one transmitter. If the original transmitter was sent in for repair, Disconnect the receiver (disconnect connector A) to continue using the machine without remote capability and without fear of inadvertently operating the machine with the other transmitter.



Reprogramming Tips:

1. Use a pointy instrument to depress the Setup button on the receiver (i.e. a pen) as the button is relatively small
2. Follow each step as laid out in the procedure
3. Never lay the receiver circuit board down on anything metallic (there are contact points on the back which could contact the metal and damage the receiver)

Parts & Accessories

Part	OMNEX Part Number	Description
Battery Charger	B0007	12V Charger with Cigarette Lighter Plug
	B0008	120VAC Charger
Battery	B0001	T2400 Battery
Fuse	F0039	36V Bi-directional, Bussman ATC-15
Output Cable	ACAB-2493-33	R2160 / D1XX / D1XX Output Cable, Generic
Pendant Cable	ACAB-2455-01	Tether Cable, 10m
	ACAB-2455-02	Tether Cable, 8m
	ACAB-2710-01	Tether Cable, 4-12ft
Connector Kit	AKIT-2337-01	Includes Deutsch socket connectors, wedges, pins and sealing plugs
Bipolar Diode Kit	AKIT-2492-01	Motorola P6KE36CA

Pendant Cable

Pendant Coil

Specifications

	D1XX Module	R2160 Receiver
Size	5.1” x 4.7” x 1.4” (130mm x 119mm x 36mm)	5.1” x 4.7” x 1.4” (130mm x 119mm x 36mm)
Weight	0.65lbs (0.295kg)	0.65lbs (0.295kg)
Construction	High impact plastic, weatherproof	High impact plastic, weatherproof
Input Power	+9V to 30VDC	+9V to 30VDC
Battery Life	N/A	N/A
Operating Temperature Range	-40F to 158F (-40C to 70C)	-40F to 158F (-40C to 70C)
Outputs	3A (max) each (sourcing), 15A (max) each (combined)	3A (max) each (sourcing), 10A (max) each (combined)
Antenna	N/A	External
Approvals	**USA**- FCC part 15.247 **Canada**- ISC RSS 210 Issue 6, Sept. **Europe**- EN 440 **Australia-** C-Tick	

FCC Rules and Compliance

This device complies with Part 15 of the FCC Rules. 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.

FCC	Part 15.247
ISC	RSS 210 Issue 6, Sept. 2005

Warranty

OMNEX Control Systems ULC warrants to the original purchaser that the OMNEX products are free from defects in materials and workmanship under normal use and service for a period of ONE YEAR, parts (EXCLUDING: SWITCHES, CRYSTALS, OR PARTS SUBJECT TO UNAUTHORIZED REPAIR OR MODIFICATION) and labor from the date of delivery as evidenced by a copy of the receipt. OMNEX's entire liability and your exclusive remedy shall be, at OMNEX's option, either the (a) repair or (b) replacement of the OMNEX product which is returned within the warranty period to OMNEX freight collect by the OMNEX APPROVED carrier with a copy of the purchase receipt and with the return authorization of OMNEX. If failure has resulted from accident, abuse or misapplication, OMNEX shall have no responsibility to repair or replace the product under warranty. In no event shall OMNEX be responsible for incidental or consequential damage caused by defects in its products, whether such damage occurs or is discovered before or after replacement or repair and whether or not such damage is caused by the negligence of OMNEX Control Systems ULC.

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