ZLTX Transmitter

Radio Control Equipment
Instruction Manual

MAGNETEK
By Columbus McKinnon

Part Number: 171-50000-M100 R0
June 2025

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SERVICE INFORMATION

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PRODUCT MANUAL SAFETY INFORMATION

Magnetek by Columbus McKinnon Corporation (Magnetek) offers a broad range of radio remote control products for material handling applications. This manual has been prepared by Magnetek to provide information and recommendations for the installation, use, operation and service of Magnetek's material handling products and systems (Magnetek Products). Anyone who uses, operates, maintains, services, installs or owns Magnetek Products should know, understand, and follow the instructions and safety recommendations in this manual for Magnetek Products.

The recommendations in this manual do not take precedence over any of the following requirements relating to cranes, hoists and lifting devices:

- Instructions, manuals, and safety warnings of the manufacturers of the equipment where the radio system is used,
- Plant safety rules and procedures of the employers and the owners of facilities where the Magnetek Products are being used,
- Regulations issued by the Occupational Health and Safety Administration (OSHA),
- Applicable local, state or federal codes, ordinances, standards and requirements, or
- Safety standards and practices for the overhead material handling industry

This manual does not include or address the specific instructions and safety warnings of these manufacturers or any of the other requirements listed above. It is the responsibility of the owners, users and operators of Magnetek Products to know, understand and follow all of these requirements. It is the responsibility of the employer to make its employees aware of all of the above-listed requirements and to make certain that all operators are properly trained. **No one should use Magnetek Products prior to becoming familiar with and being trained in these requirements and the instructions and safety recommendations for this manual.**

WARRANTY INFORMATION

FOR INFORMATION ON MAGNETEK'S PRODUCT WARRANTIES BY PRODUCT TYPE, PLEASE VIST WWW.CMCO.COM/MAGNETEK.

FCC WARNINGS and CAUTIONS

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.

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

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

- Any changes or modifications not expressly approved by the party responsible for compliance could void the authority to operate equipment.
- This device and its antenna must not be co-located or operating in conjunction with any other antenna or transmitter.
- End-users and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.

FCC MPE：This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment for body-worn configuration in direct contact to the phantom.

IC WARNINGS

RSS-Gen Issue 4 8.4
According to RSS-Gen Issue 4 section 8.4, user manuals for license-exempt radio apparatus shall contain the following text, or an equivalent notice, that shall be displayed in a conspicuous location, either in the user manual or on the device, or both:

(English)
This device complies with Industry Canada's license-exempt RSSs. Operation is subject to the following two conditions:

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

(French)
Le présent appareil est conforme aux CNR d'Industrie Canada applicables auxappareils radio exempts de licence.L'exploitation est autorisée aux deux conditions suivantes:

(1) l'appareil ne doit pas produire de brouillage, et
(2) l'utilisateur de l'appareil doit accepter tout brouillage adioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Industry Canada ICES-003 Compliance Label:
CAN ICES-3 (B)/NMB-3(B)

IC MPE: This equipment complies with ISED radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

Cet équipement est conforme aux limites d'exposition au rayonnement ISED établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé à une distance minimale de 20 cm entre le radiateur et votre corps

Table of Contents

1. Introduction

The ZLTX lever radio remote control systems are designed for control of industrial equipment and machinery such as overhead traveling cranes, jib cranes, gantry cranes, tower cranes, electric hoists, winches, monorails, conveyor belts, mining equipment, and all other material handling equipment where wireless control is preferred.

Each ZLTX lever system consists of a transmitter bellybox and a receiver unit. Other standard-equipped accessories include transmitter waist belt, shoulder strap, compass direction label sheets, output cable, and quick start guide.

List of notable features include:

* **Advanced Controls** – the system utilizes dual advanced microprocessor controls with 32bit CRC and Hamming Code, providing ultra-fast, safe, precise, and error-free encoding and decoding.
* **Frequency Hopping RF Transceiver** – the system will automatically search-and-lock onto a free and uninterrupted channel at every system startup or during operation when encountering radio interference. The system is also capable of two-way communication between the transmitter and receiver, as well as receiver to receiver, with system status and relay output feedbacks.
* **Zero-G Sensor Embedded** – the transmitter is embedded with a Zero-G sensor to guard against any unintended control of the crane or equipment when transmitter is thrown or dropped.
* **Wireless Remote Pairing Function** – system information can be transferred wirelessly between two transmitters or between a transmitter and a receiver without the hassle of resetting the spares.
* **Reliable Joysticks and Switches** – the in-house designed joysticks and levers are rated for more than five million operating cycles.
* **Low Power Consumption** – requires only four “AA” alkaline batteries for more than 100 hours of uninterrupted operation between replacements.
* **Durable Nylon and Fiberglass Composite Enclosures** – highly resistant to breakage and deformation even in the most abusive environments. The receiver enclosures and output cables are UL94-V0 rated. The transmitter and receiver enclosures are IP66 rated.
* **Full Compliance** – all systems are fully compliant with the FCC Part-15 Rules, IC and European Safety Standards.

2. Radio Controlled Safety

WARNINGS and CAUTIONS

Throughout this document, WARNING and CAUTION statements have been deliberately placed to highlight items critical to the protection of personnel and equipment.

WARNING – A warning highlights an essential operating or maintenance procedure, practice, etc. which if not strictly observed, could result in injury or death of personnel, or long term physical hazards. Warnings are highlighted as shown below:

WARNING

CAUTION – A caution highlights an essential operating or maintenance procedure, practice, etc. which if not strictly observed, could result in damage to, or destruction of equipment, or loss of functional effectiveness. Cautions are highlighted as shown below:

CAUTION

WARNINGS and CAUTIONS SHOULD NEVER BE DISREGARDED.

The safety rules in this section are not intended to replace any rules or regulations of any applicable local, state, or federal governing organizations. Always follow your local lockout and tagout procedure when maintaining any radio equipment. The following information is intended to be used in conjunction with other rules or regulations already in existence. It is important to read all of the safety information contained in this section before installing or operating the Radio Control System.

2.1 CRITICAL INSTALLATION CONSIDERATIONS

WARNING

PRIOR TO INSTALLATION AND OPERATION OF THIS EQUIPMENT, READ AND DEVELOP AN UNDERSTANDING OF THE CONTENTS OF THIS MANUAL AND THE OPERATION MANUAL OF THE EQUIPMENT OR DEVICE TO WHICH THIS EQUIPMENT WILL BE INTERFACED. FAILURE TO FOLLOW THIS WARNING COULD RESULT IN SERIOUS INJURY OR DEATH AND DAMAGE TO EQUIPMENT.

ALL EQUIPMENT MUST HAVE A MAINLINE CONTACTOR INSTALLED, AND ALL TRACKED CRANES, HOISTS, LIFTING DEVICES AND SIMILAR EQUIPMENT MUST HAVE A BRAKE INSTALLED. FAILURE TO FOLLOW THIS WARNING COULD RESULT IN SERIOUS INJURY OR DEATH AND DAMAGE TO EQUIPMENT.

AN AUDIBLE AND/OR VISUAL WARNING MEANS MUST BE PROVIDED ON ALL REMOTE-CONTROLLED EQUIPMENT AS REQUIRED BY CODE, REGULATION, OR INDUSTRY STANDARD. THESE AUDIBLE AND/OR VISUAL WARNING DEVICES MUST MEET ALL GOVERNMENTAL REQUIREMENTS. FAILURE TO FOLLOW THIS WARNING COULD RESULT IN SERIOUS INJURY OR DEATH AND DAMAGE TO EQUIPMENT.

FOLLOW YOUR LOCAL LOCKOUT TAGOUT PROCEDURE BEFORE MAINTAINING ANY REMOTE-CONTROLLED EQUIPMENT. ALWAYS REMOVE ALL ELECTRICAL POWER FROM THE CRANE, HOIST, LIFTING DEVICE OR SIMILAR EQUIPMENT BEFORE ATTEMPTING ANY INSTALLATION PROCEDURES. DE-ENERGIZE AND TAGOUT ALL SOURCES OF ELECTRICAL POWER BEFORE TOUCH-TESTING ANY EQUIPMENT. FAILURE TO FOLLOW THIS WARNING COULD RESULT IN SERIOUS INJURY OR DEATH AND DAMAGE TO EQUIPMENT.

THE DIRECT OUTPUTS OF THIS PRODUCT ARE NOT DESIGNED TO INTERFACE DIRECTLY TO TWO STATE SAFETY CRITICAL MAINTAINED FUNCTIONS, I.E., MAGNETS, VACUUM LIFTS, PUMPS, EMERGENCY EQUIPMENT, ETC. A MECHANICALLY LOCKING INTERMEDIATE RELAY SYSTEM WITH SEPARATE POWER CONSIDERATIONS MUST BE PROVIDED. FAILURE TO FOLLOW THIS WARNING COULD RESULT IN SERIOUS INJURY OR DEATH OR DAMAGE TO EQUIPMENT.

2.2 GENERAL

Radio controlled material handling equipment operates in several directions. Cranes, hoists, lifting devices, and other material handling equipment can be large, and operate at high speeds. Quite frequently, the equipment is operated in areas where people are working in close proximity to the material handling equipment. **The operator must exercise extreme caution at all times**. Workers must constantly be alert to avoid accidents. The following recommendations have been included to indicate how careful and thoughtful actions may prevent injuries, damage to equipment, or even save a life.

2.3 PERSONS AUTHORIZED TO OPERATE RADIO CONTROLLED CRANES

Only properly trained persons designated by management should be permitted to operate radio controlled equipment.

Radio controlled cranes, hoists, lifting devices, and other material handling equipment should not be operated by any person who cannot read or understand signs, notices and operating instructions that pertain to the equipment.

Radio controlled equipment should not be operated by any person with insufficient eyesight or hearing or by any person who may be suffering from a disorder or illness, is taking any medication that may cause loss of equipment control, or is under the influence of alcohol or drugs.

2.4 SAFETY INFORMATION AND RECOMMENDED TRAINING FOR RADIO CONTROLLED EQUIPMENT OPERATORS

Anyone being trained to operate radio-controlled equipment should possess as a minimum the following knowledge and skills before using the radio-controlled equipment.

The operator should:

- have knowledge of hazards pertaining to equipment operation
- have knowledge of safety rules for radio-controlled equipment
- have the ability to judge distance of moving objects
- know how to properly test prior to operation
- be trained in the safe operation of the radio transmitter as it pertains to the crane, hoist, lifting device or other material handling equipment being operated
- have knowledge of the use of equipment warning lights and alarms
- have knowledge of the proper storage space for a radio control transmitter when not in use
- be trained in transferring a radio control transmitter to another person
- be trained how and when to report unsafe or unusual operating conditions
- test the transmitter emergency stop and all warning devices prior to operation; testing should be done on each shift, without a load
- be thoroughly trained and knowledgeable in proper and safe operation of the crane, hoist, lifting device, or other material handling equipment that utilizes the radio control
- know how to keep the operator and other people clear of lifted loads and to avoid “pinch” points
- continuously watch and monitor status of lifted loads
- know and follow cable and hook inspection procedures
- know and follow the local lockout and tagout procedures when servicing radio-controlled equipment
- know and follow all applicable operating and maintenance manuals, safety procedures, regulatory requirements, and industry standards and codes

The operator shall not:

- lift or move more than the rated load
- operate the material handling equipment if the direction of travel or function engaged does not agree with what is indicated on the controller
- use the crane, hoist or lifting device to lift, support or transport people
- lift or carry any loads over people
- operate the crane, hoist or lifting device unless all persons, including the operator, are and remain clear of the supported load and any potential pinch points
- operate a crane, hoist or lifting device when the device is not centered over the load
- operate a crane, hoist or lifting device if the chain or wire rope is not seated properly in the sprockets, drum or sheave
- operate any damaged or malfunctioning crane, hoist, lifting device or other material handling equipment

- change any settings or controls without authorization and proper training
- remove or obscure any warning or safety labels or tags
- leave any load unattended while lifted
- leave power on the radio-controlled equipment when the equipment is not in operation
- operate any material handling equipment using a damaged controller because the unit may be unsafe
- operate manual motions with other than manual power
- operate radio-controlled equipment when low battery indicator is on

WARNING

THE OPERATOR SHOULD NOT ATTEMPT TO REPAIR ANY RADIO CONTROLLER. IF ANY PRODUCT PERFORMANCE OR SAFETY CONCERNS ARE OBSERVED, THE EQUIPMENT SHOULD IMMEDIATELY BE TAKEN OUT OF SERVICE AND BE REPORTED TO THE SUPERVISOR. DAMAGED AND INOPERABLE RADIO CONTROLLER EQUIPMENT SHOULD BE RETURNED TO MAGNETEK FOR EVALUATION AND REPAIR. FAILURE TO FOLLOW THIS WARNING COULD RESULT IN SERIOUS INJURY OR DEATH AND DAMAGE TO EQUIPMENT.

2.5 TRANSMITTER UNIT

Transmitter switches should never be mechanically blocked ON or OFF. When not in use, the operator should turn the transmitter OFF. A secure storage space should be provided for the transmitter unit, and the transmitter unit should always be placed there when not in use. This precaution will help prevent unauthorized people from operating the material handling equipment.

Spare transmitters should be stored in a secure storage space and only removed from the storage space after the current transmitter in use has been turned OFF, taken out of the service area and secured.

2.6 PRE-OPERATION TEST

At the start of each work shift, or when a new operator takes control of the crane, operators should do, as a minimum, the following steps before making lifts with any crane or hoist:

Test all warning devices.

Test all direction and speed controls.

Test the transmitter emergency stop.

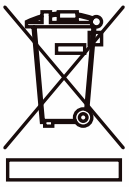
2.7 BATTERIES

WARNING

KNOW AND FOLLOW PROPER BATTERY HANDLING, CHARGING AND DISPOSAL PROCEDURES. IMPROPER BATTERY PROCEDURES CAN CAUSE BATTERIES TO EXPLODE OR DO OTHER SERIOUS DAMAGE. FAILURE TO FOLLOW THIS WARNING COULD RESULT IN SERIOUS INJURY OR DEATH AND DAMAGE TO EQUIPMENT.

2.8 USED SYMBOL DESCRIPTIONS

Danger electric shock risk



Equipment Recycling: The production and operation of this equipment requires the recycling and utilization of natural resources. There are substances that are harmful to the environment or human health. To avoid the release of such substances into the environment and to reduce the use of natural resources, it is recommended that you recycle this product through a suitable system to ensure that most of the materials are properly recycled or reused.

Earth; ground protection against electric shock in case of a fault, or the terminal of a protective earth (ground) electrode.

2.9 METHOD CLEANING PRODUCTS

Wipe the dust, smudges and stains on the surface of the product with a damp, lint-free cloth.

2.10 PRODUCT MAINTENANCE

Do not drop or damage the controller. Dropping controllers can cause delicate electronic parts to loosen and affect the functionality of the product.

2.11 POWER SUPPLY

The power supply to the receiver must be equipped with circuit breaker as the way to power off the product.

2.12 ENVIRONMENTAL CONDITIONS

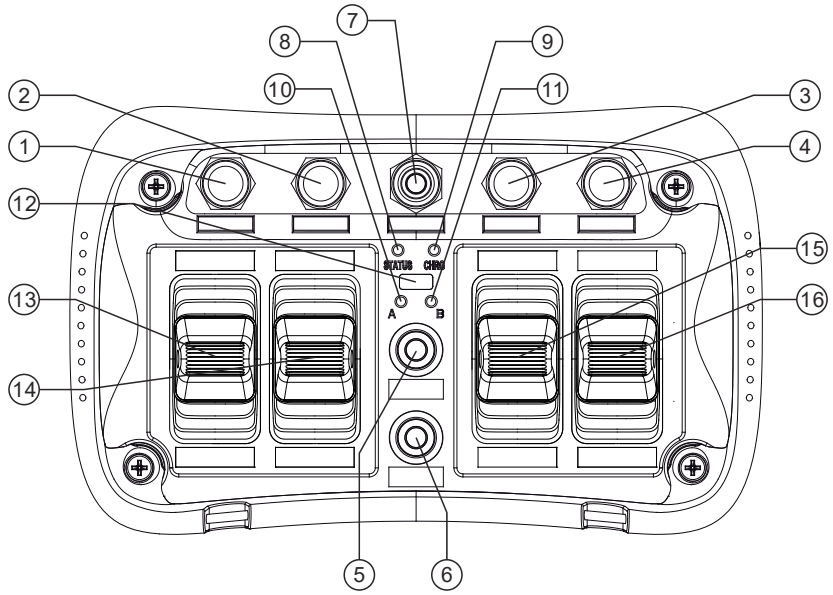
- Outdoor use.
- Altitude up to 2000 Meters (6500 feet).
- Maximum Relative Humidity 90%.
- MAINS supply voltage fluctuations up to ±10%.
- OVERVOLTAGE CATEGORY II.
- WET LOCATION, applicable.
- Applicable POLLUTION DEGREE 2 of the intended environment (in most cases)

3. General System Information

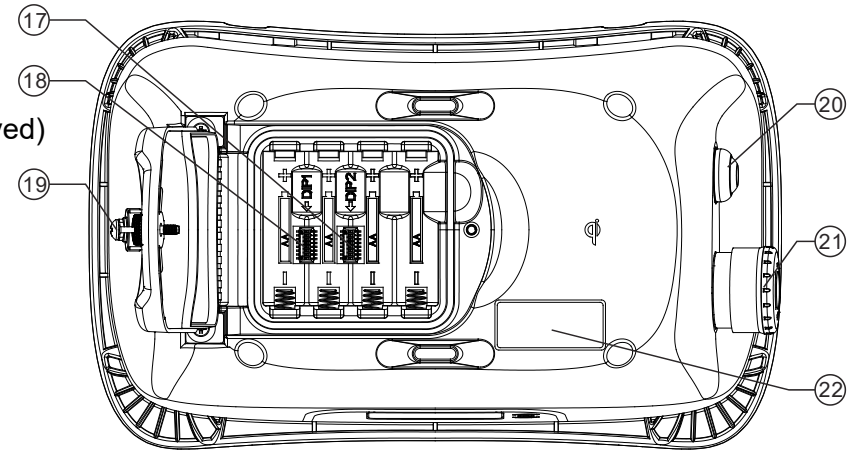
3.1 Transmitter

3.1.1 ZLTX Lever Transmitter Illustration

1. PB1 / SW1
2. PB2 / SW2
3. PB3 / SW3
4. PB4 / SW4
5. PB5
6. PB6
7. PB7 / SW7
8. System Status LED
9. Battery Charging LED
10. Function LED-A
11. Function LED-B
12. Infrared Sensors
13. Lever-1 (L1)
14. Lever-2 (L2)
15. Lever-3 (L3)
16. Lever-4 (L4)

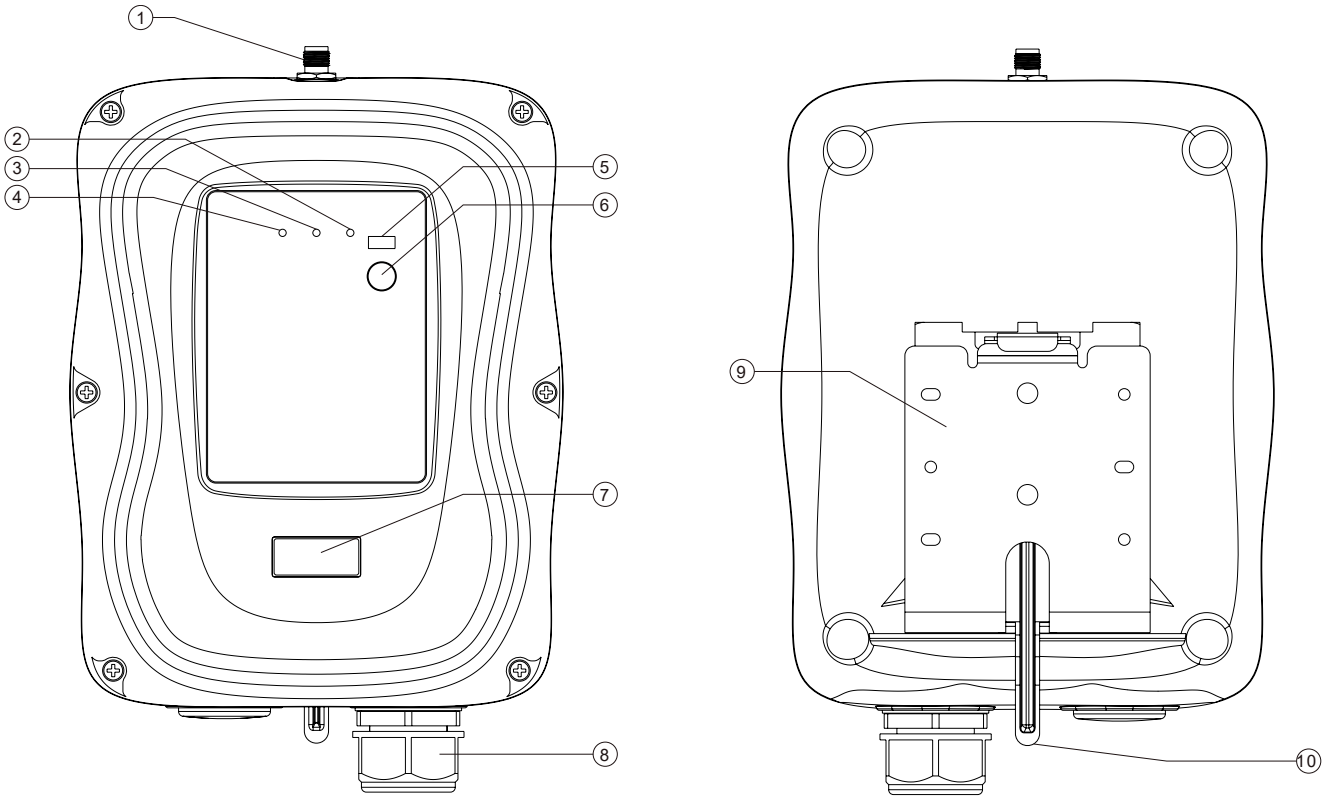


17. Function Dipswitch-2 (reserved)
18. Function Dipswitch-1
19. Plugin Charging Port
20. START button
21. STOP button
22. System Information



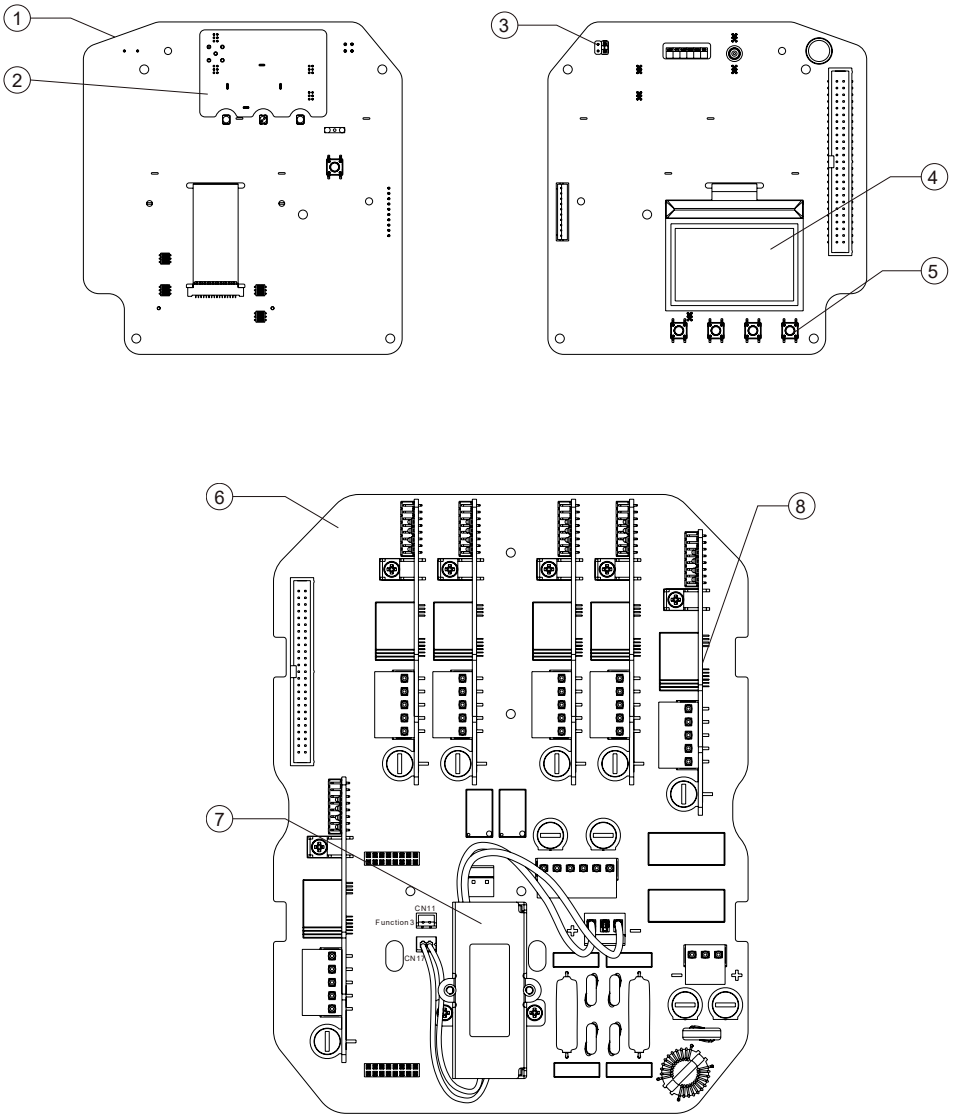
3.2 Receiver

3.2.1 External Illustration



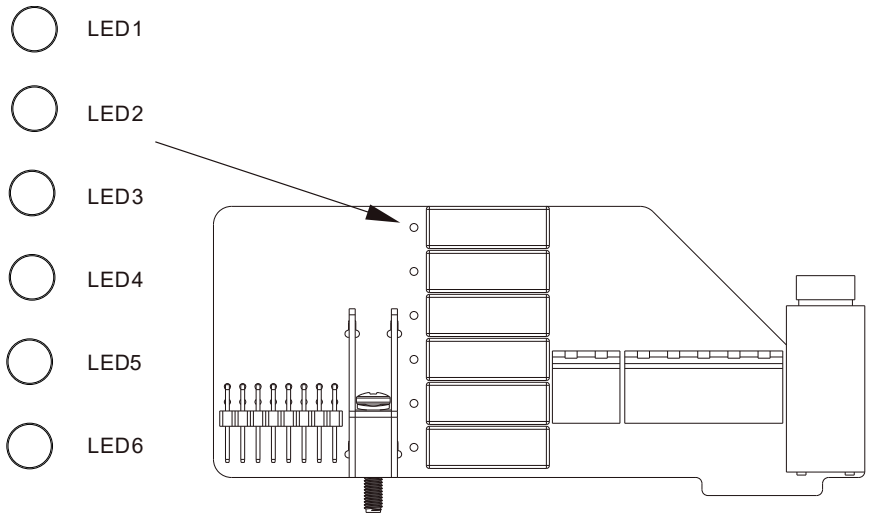
1. External Antenna Port (optional)
2. COM LED
3. System Status LED
4. Power LED
5. Infrared Sensors
6. Remote Pairing Button
7. System Information
8. Cord Grip
9. Mounting Bracket
10. Mounting Bracket Release

3.2.2 Internal Illustration

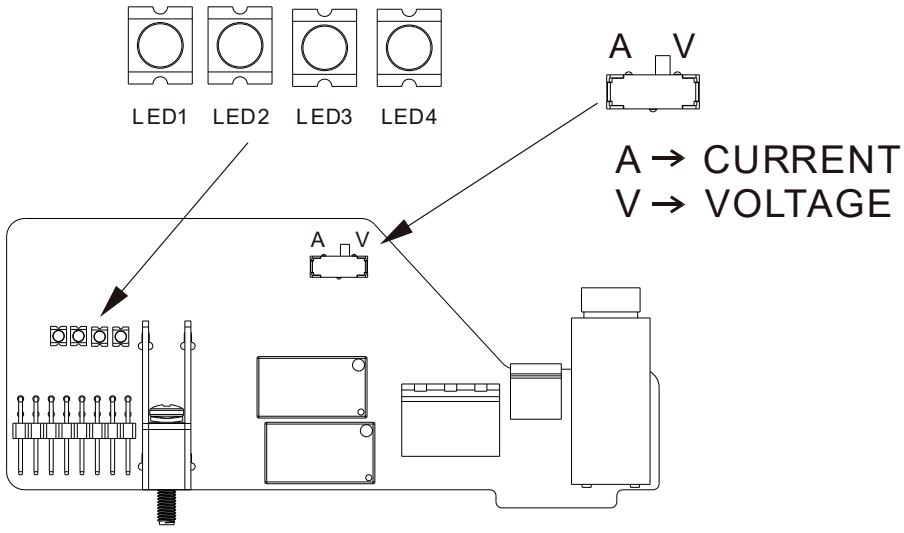


1.	Decoder Board	5.	Programming Buttons
2.	Receiving RF Board	6.	Line Filter/Digital/Analog Mother Board
3.	INT/EXT Antenna Jumpers	7.	Power Transformer
4.	LCD Screen	8.	Digital & Analog Output Modules

Digital Relay Module (K1~K6)



Analog Module

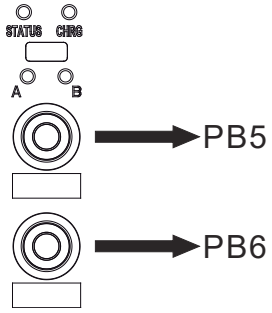


4. Function Settings

4.1 Transmitter

4.1.1 Display Transmitter Firmware Version

1) Reset the STOP button (Status LED turns green for up to 2.0 seconds, transmitter powers on).
2) Press and hold both PB5 and PB6 at the same time for up to 3.0 seconds (Status LED blinks orange). Release both PB5 and PB6 when LED-A and LED-B turn red.



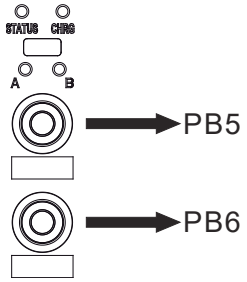
3) Entered programming mode with Status LED displays 1x orange blink for **firmware version**, remote pairing and IR programming. 2x orange blinks for transmitter channel programming, 3x orange blinks for PB1~PB7 function programming, 4x orange blinks for frequency range indication.
4) Press and hold both PB5 and PB6 at the same time for up to 3.0 seconds (LED-A and LED-B turn red). Release both PB5 and PB6 when the Status LED turns orange.
5) The Status LED now displays the transmitter firmware version with red, green and orange blinks.
6) Exit firmware version mode by pressing down the STOP button (transmitter powers off).

4.1.2 Transmitter Channel Programming

A. Unassigned Channel Scheme (no preset system channel)

When both transmitter and receiver are set to the unassigned channel scheme (no preset channel), the system automatically searches and locks onto a free and uninterrupted channel at every transmitter startup. Random access, and pitch & catch configurations cannot be set to the unassigned channel scheme.

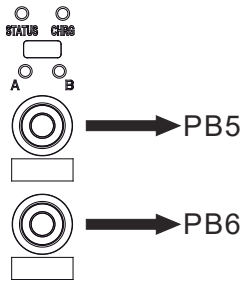
1) Reset the STOP button (Status LED turns green for up to 2.0 seconds, transmitter powers on).
2) Press and hold both PB5 and PB6 at the same time for up to 3.0 seconds (Status LED blinks orange). Release both PB5 and PB6 when LED-A and LED-B turn red.



3) Entered programming mode with Status LED displays 1x orange blink for firmware version, remote pairing and IR programming. **2x orange blinks for transmitter channel programming**, 3x orange blinks for PB1~PB7 function programming, 4x orange blinks for frequency range indication.
4) Select transmitter channel programming mode (Status LED 2x orange blinks) by pressing and holding PB6 for up to 3.0 seconds (LED-B turns red). Release PB6 when Status LED turns to 2x orange blinks.
5) Enter transmitter channel programming mode by pressing and holding both PB5 and PB6 at the same time for up to 3.0 seconds (LED-A and LED-B turn red). Let go of both PB5 and PB6 when the Status LED displays the current transmitter channel setting. A green blink represents the tens (+10), a red blink represents the units (+1), and constant orange represents unassigned channel. For example, 1x green blink followed by 5x red blinks is channel 15.
6) Change the transmitter channel to “unassigned channel” by pressing and holding both PB5 and PB6 at the same time (Status LED displays constant orange for unassigned channel). Make sure constant orange is shown on the Status LED before proceeding to the next step.
7) Transfer the unassigned channel setting to the receiver by pressing the green START button until the Status LED turns to constant green (transfer complete). Turn off the transmitter power if constant green is not shown on the Status LED after more than 5.0 seconds (transfer incomplete); the transmitter will revert back to its previous channel setting. Make sure the receiver powered on and within the operating distance during the entire process. When transmitter is set to “unassigned channel”, the receiver must also set to “unassigned channel” in order for the entire system to work.
8) Exit transmitter channel programming mode by pressing down the STOP button (transmitter power off).

B. Assigned Channel Scheme (preset system channel)

Both transmitter and receiver are assigned with a matching preset channel (channel 01~62). Random access and pitch & catch configurations must be set to the assigned channel scheme.



1) Reset the STOP button (Status LED turns green for up to 2.0 seconds, transmitter power on).
2) Press and hold both PB5 and PB6 at the same time for up to 3.0 seconds (Status LED blinks orange). Release both PB5 and PB6 when LED-A and LED-B turn red.
3) Entered programming mode with Status LED displays 1x orange blink for firmware version, remote pairing and IR programming. **2x orange blinks for transmitter channel programming**, 3x orange blinks for PB1~PB7 function programming, 4x orange blinks for frequency range indication.
4) Enter transmitter channel programming mode by press and hold both PB5 and PB6 at the same time for up to 3.0 seconds (LED-A and LED-B turn red). Let go of both PB5 and PB6 when Status LED displays the current transmitter channel setting. A green blink represents the tens (+10), a red blink represents the units (+1) and constant orange represents unassigned channel. For example, 1x green blink followed by 5x red blinks is channel 15.
5) Change transmitter channel by pressing PB5 for up to 2.0 seconds (Status LED turns red during each press) to increment the units (+1) and press PB6 for up to 2.0 seconds (Status LED turns green during each press) to increment the tens (+10). For example, press PB6 two times and then PB5 four times is channel 24 (Status LED blinks 2 greens and 4 reds). Make sure each button press does not exceed 3.0 seconds after release. Also make sure the newly selected channel indication is shown on the Status LED before proceeding to the next step.
6) Transfer the newly selected channel to the receiver by pressing the green START button until the Status LED turns to constant green (transfer complete). Turn off the transmitter power if constant green is not shown on the Status LED after more than 5.0 seconds (transfer incomplete); the transmitter will revert back to its previous channel setting. Make sure the receiver power is turned on and within the operating distance during the entire process. The transmitter and receiver channel must be the same in order for the entire system to work.
7) Exit transmitter channel programming mode by pressing down the STOP button (transmitter power off).

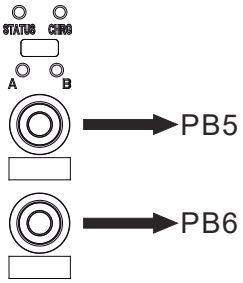
Important Note:

Step 6 illustrated above is strictly required if you are intending to change the entire system channel (both transmitter and receiver). The entire system no longer works if step 6 is skipped because the transmitter and receiver channels are now different (new vs. old). In this case you would have to redo step 1~4 and step 6 to transfer the newly selected transmitter channel to the receiver.

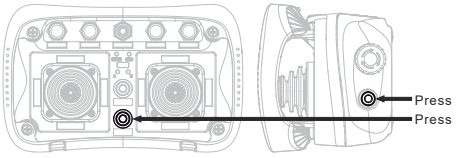
4.1.3 Remote Pairing

A. Transmitter-to-Transmitter Pairing:

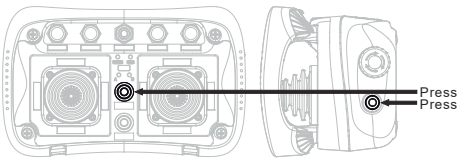
1) Reset the STOP button on both transmitters (Status LED turns green for up to 2.0 seconds, transmitter power on).
2) Press and hold both PB5 and PB6 at the same time for up to 3.0 seconds on both transmitters (Status LED blinks orange). Let go of both PB5 and PB6 when LED-A and LED-B turn red.



3) Entered programming mode with Status LED displays 1x orange blink for firmware version, **remote pairing** and IR programming. 2x orange blinks for transmitter channel programming, 3x orange blinks for PB1~PB7 function programming, 4x orange blinks for frequency range indication.
4) Press and hold both PB5 and PB6 at the same time for up to 3.0 seconds (LED-A and LED-B turn red). Let go of both PB5 and PB6 when Status LED turns orange.
5) The Status LED now displays the transmitter firmware version with red, green and orange blinks.
6) Output data (original transmitter) by first pressing and holding the green START button for up to 1.0 second, and then press and hold PB6 (Status LED off).
7) Receive data (new transmitter) by first pressing and holding the green START button for up to 1.0 second, and then press and hold PB5 (Status LED blinks green).
8) The pairing is completed when the Status LED on the new transmitter (receiving data end) turns to constant green while the two buttons on both transmitters are still pressed down. Release all buttons when done.
9) Exit remote pairing mode by pressing down the STOP button (transmitter power off).

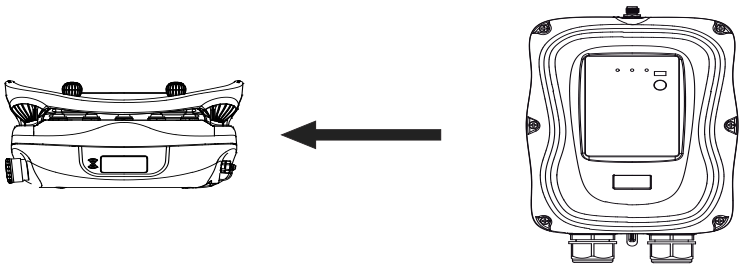


Output data – original transmitter
(press and hold START and then PB6)



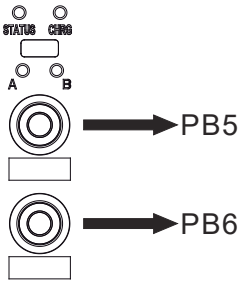
Receive data – new transmitter
(press and hold START and then PB5)

B. Receiver-to-Transmitter Pairing:

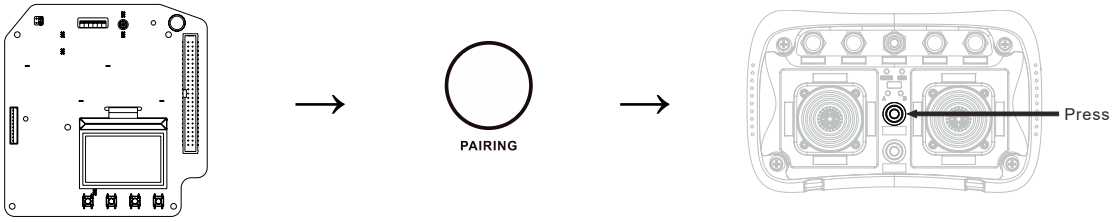


JP8 Open Method (requires pressing the PAIRING button on receiver):

1) Reset the STOP button on both transmitters (Status LED turns green for up to 2.0 seconds, transmitter power on).
2) Press and hold both PB5 and PB6 at the same time for up to 3.0 seconds on both transmitters (Status LED blinks orange). Release both PB5 and PB6 when LED-A and LED-B turn red.
3) Entered programming mode with Status LED displays 1x orange blink for firmware version, **remote pairing** and IR programming. 2x orange blinks for transmitter channel programming, 3x orange blinks for PB1~PB7 function programming, 4x orange blinks for frequency range indication.



4) Press and hold both PB5 and PB6 at the same time for up to 3.0 seconds (LED-A and LED-B turn red). Release both PB5 and PB6 when Status LED turns orange.
5) The Status LED now displays the transmitter firmware version with red, green and orange blinks.
6) Output data (receiver) by pressing and holding the PAIRING button on the receiver cover.
7) Receive data (transmitter) by pressing and holding PB5 (Status LED blinks green).
8) The pairing is completed when the Status LED on the transmitter (receiving data end) turns to constant green while PB5 on the transmitter and PAIRING button on the receiver are still pressed down. Release all buttons when done.
9) The receiver MAIN relays must be deactivated (relay open) during remote pairing.
10) Exit remote pairing mode by pressing down the STOP button (transmitter power off).



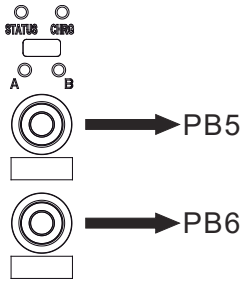
Set JP8 to “Open”

Output data – receiver
(press and hold the PAIRING button)

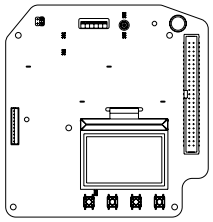
Receive data – transmitter
(press and hold PB5)

JP8 Short Method (does not require pressing the PAIRING button on receiver):

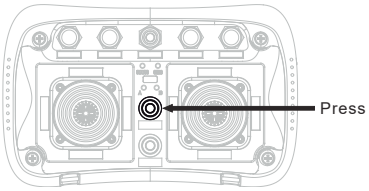
1) Reset the STOP button on both transmitters (Status LED turned green for up to 2.0 seconds, transmitter power on).
2) Press and hold both PB5 and PB6 at the same time for up to 3.0 seconds on both transmitters (Status LED blinks orange). Let go of both PB5 and PB6 when LED-A and LED-B turn red.



3) Entered programming mode with Status LED displays 1x orange blink for firmware version, **remote pairing** and IR programming. 2x orange blinks for transmitter channel programming, 3x orange blinks for PB1~PB7 function programming, 4x orange blinks for frequency range indication.
4) Press and hold both PB5 and PB6 at the same time for up to 3.0 seconds (LED-A and LED-B turn red). Let go of both PB5 and PB6 when Status LED turns orange.
5) The Status LED now displays the transmitter firmware version with red, green and orange blinks.
6) Receive data (transmitter) by pressing and holding PB5 (Status LED blinks green).
7) The pairing is completed when the Status LED on the transmitter (receiving data end) turns to constant green while PB5 on transmitter is still pressed down. Release the button when done.
8) The receiver MAIN relays must be deactivated (relay open) during remote pairing.
9) Exit remote pairing mode by pressing down the STOP button (transmitter power off).

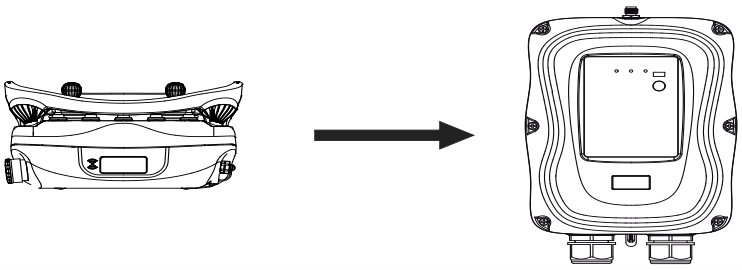


Set JP8 to “Short”



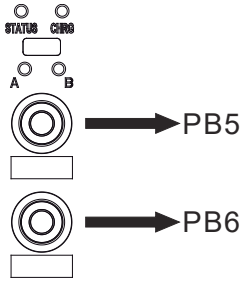
Receive data – transmitter
(press and hold PB5)

C. Transmitter-to-Receiver Pairing:

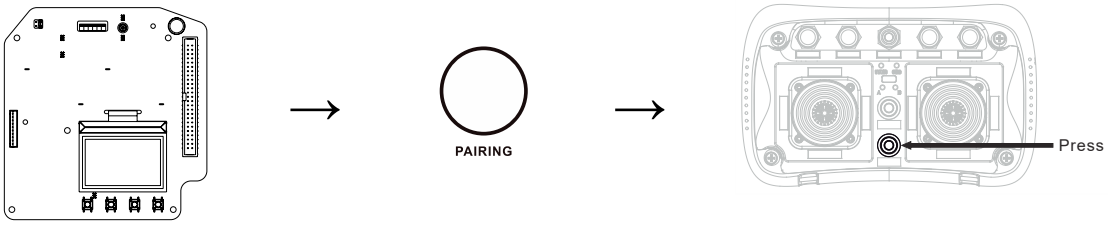


JP8 Open Method (requires pressing the PAIRING button on receiver):

1) Reset the STOP button on both transmitters (Status LED turns green for up to 2.0 seconds, transmitter power on).
2) Press and hold both PB5 and PB6 at the same time for up to 3.0 seconds on both transmitters (Status LED blinks orange). Release both PB5 and PB6 when LED-A and LED-B turn red.
3) Entered programming mode with Status LED displays 1x orange blink for firmware version, **remote pairing** and IR programming. 2x orange blinks for transmitter channel programming, 3x orange blinks for PB1~PB7 function programming, 4x orange blinks for frequency range indication.



4) Press and hold both PB5 and PB6 at the same time for up to 3.0 seconds (LED-A and LED-B turn red). Release both PB5 and PB6 when Status LED turns orange.
5) The Status LED now displays the transmitter firmware version with red, green and orange blinks.
6) Receive data (receiver) by pressing and holding the PAIRING button on the receiver cover.
7) Output data (transmitter) by pressing and holding PB6 (Status LED blinks green).
8) The pairing is completed when the Status LED on the transmitter turns to constant green while PB6 on transmitter and PAIRING button on receiver are still pressed down. Release all buttons when done.
9) The receiver MAIN relays must be deactivated (relay open) during remote pairing.
10) Exit remote pairing mode by pressing down the STOP button (transmitter power off).



Set JP8 to “Open”

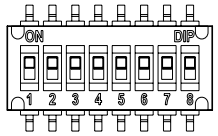
Receive data – receiver
(press and hold the PAIRING button)

Output data – transmitter
(press and hold PB6)

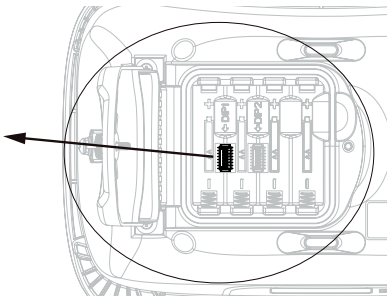
4.1.4 Transmitter Start Function Settings

When transmitter goes into sleep mode, the system is temporarily deactivated (MAIN relays open). Initiate the START command or any command to wake up the system (MAIN relays close).

	Dipswitch Settings	Function
1	xxxxxxx**0**	START Command Reactivation
2	xxxxxxx**1**	Any Command Reactivation



Function Dipswitch-1



4.1.5 Transmitter Inactivity Timer Settings

Set how long before the transmitter enters the sleep mode when not in use (no command initiated). When transmitter goes into sleep mode, the receiver MAIN relays are deactivated.

	Dipswitch Settings	Time		Dipswitch Settings	Time
1	xxx**000**xx	1 minute	**5**	xxx**100**xx	10 minutes
2	xxx**001**xx	20 seconds	**6**	xxx**101**xx	30 minutes
3	xxx**010**xx	3 minutes	**7**	xxx**110**xx	60 minutes
4	xxx**011**xx	5 minutes	**8**	xxx**111**xx	Constant On (sleep mode disabled)

4.1.6 Transmitter Output Power Settings

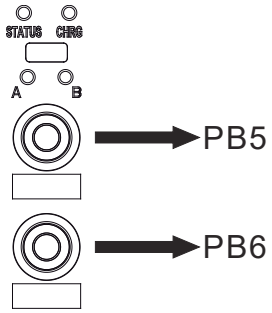
1mW offers the shortest operating range with lowest battery consumption while 10mW offers the longest operating range with highest battery consumption (manufacturer preset at 6mW).

	Dipswitch Settings	Output Power		Dipswitch Settings	Output Power
1	**000**xxxxx	1mW	**5**	**100**xxxxx	5mW
2	**001**xxxxx	2mW	**6**	**101**xxxxx	6mW
3	**010**xxxxx	3mW	**7**	**110**xxxxx	8mW
4	**011**xxxxx	4mW	**8**	**111**xxxxx	10mW

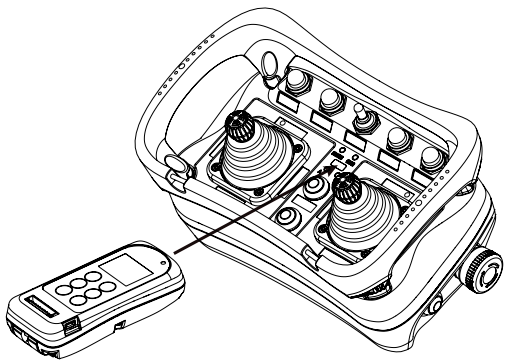
4.1.7 Infrared (IR) Programming

Other transmitter functions and settings not listed in this manual can be programmed via the IR programmer unit. These functions include the system serial number, frequency range, relay output status feedback, receiver input status feedback, infrared start function, buttons and switches configurations, and many others.

1) Reset the STOP button (Status LED turns green for up to 2.0 seconds, transmitter power on).
2) Press and hold both PB5 and PB6 at the same time for up to 3.0 seconds (Status LED blinks orange). Let go of both PB5 and PB6 when LED-A and LED-B turn red.

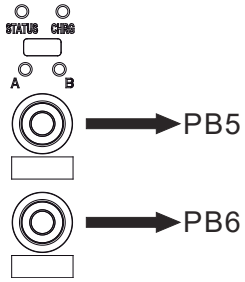


3) Entered programming mode with Status LED displays 1x orange blink for firmware version, remote pairing and **IR programming**. 2x orange blinks for transmitter channel programming, 3x orange blinks for PB1~PB7 button function programming, 4x orange blinks for frequency range indication.
4) Press and hold both PB5 and PB6 at the same time for up to 3.0 seconds (LED-A and LED-B turn red). Release both PB5 and PB6 when the Status LED turns orange.
5) The Status LED now displays the transmitter firmware version with red, green and orange blinks.
6) Proceed to infrared transmitter programming using the IR programmer unit.
7) Exit infrared programming mode by pressing down the STOP button (transmitter power off).



4.1.8 PB1 ~ PB7 Function Programming

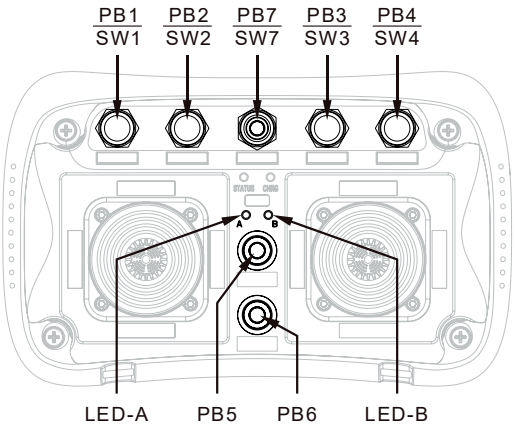
1) Reset the STOP button (Status LED turns green for up to 2.0 seconds, transmitter power on).
2) Press and hold both PB5 and PB6 at the same time for up to 3.0 seconds (Status LED blinks orange). Release both PB5 and PB6 when LED-A and LED-B turn red.
3) Entered programming mode with Status LED displays 1x orange blink for firmware version, remote pairing and IR programming. 2x orange blinks for transmitter channel programming, **3x orange blinks for PB1~PB7 function programming**, 4x orange blinks for frequency range Indication.



4) Select PB1~PB7 function programming mode (Status LED 3x orange blinks) by pressing and holding PB6 for up to 3.0 seconds twice (LED-B turned red). Release PB6 when Status LED turns to 3x orange blinks.
5) Enter PB1~PB7 function programming mode by pressing and holding both PB5 and PB6 at the same time for up to 3.0 seconds (LED-A and LED-B turn red). Let go of both PB5 and PB6 when the Status LED displays the current PB1~PB7 function settings. The Status LED displays current PB1~PB7 function setting with orange, green and red blinks. An orange blink represents the hundreds (+100), a green blink represents the tens (+010) and a red blink represents the units (+001), and constant orange represents no function (000). For example, **1** orange blink followed by **2** green blinks and **5** red blinks is pushbutton function no.125. Button function number with "0" is represented by no orange, green or red blink. For example, **1** orange blink followed by **5** red blinks is pushbutton function no.105.
6) Set PB1~PB7 function number by pressing the green START button to increment the hundreds (+100), PB6 to increment the tens (+010), PB5 to increment the units (+001), and PB5+PB6 to no function (000 - constant orange). For example, pressing the green START button one time, PB6 four times, and PB5 six times is PB1~PB7 function no.146 (Status LED blinks 1 orange, 4 greens and 6 reds)
7) Exit PB1~PB7 function programming mode by pressing down the STOP button (transmitter power off).

4.1.8.1 Toggled Button with LED Indication

Set toggled button function with LED indications. LED-A and LED-B shown inside the shaded box illustrates which LED on the transmitter lights up when the designated button is pressed.



Function Number	Display Type	PB1	PB2	PB3	PB4	PB5	PB6	PB7
1	1 Red	LED-A	Normal	Normal	Normal	Normal	Normal	Normal
2	2 Reds	Normal	LED-A	Normal	Normal	Normal	Normal	Normal
3	3 Reds	Normal	Normal	LED-A	Normal	Normal	Normal	Normal
4	4 Reds	Normal	Normal	Normal	LED-A	Normal	Normal	Normal
5	5 Reds	Normal	Normal	Normal	Normal	LED-A	Normal	Normal
6	6 Reds	Normal	Normal	Normal	Normal	Normal	LED-A	Normal
7	7 Reds	Normal	Normal	Normal	Normal	Normal	Normal	LED-A
8	8 Reds	LED-B	Normal	Normal	Normal	Normal	Normal	Normal
9	9 Reds	Normal	LED-B	Normal	Normal	Normal	Normal	Normal
10	1 Green	Normal	Normal	LED-B	Normal	Normal	Normal	Normal
11	1 Green 1 Red	Normal	Normal	Normal	LED-B	Normal	Normal	Normal
12	1 Green 2 Reds	Normal	Normal	Normal	Normal	LED-B	Normal	Normal
13	1 Green 3 Reds	Normal	Normal	Normal	Normal	Normal	LED-B	Normal
14	1 Green 4 Reds	Normal	Normal	Normal	Normal	Normal	Normal	LED-B
15	1 Green 5 Reds	LED-A	LED-B	Normal	Normal	Normal	Normal	Normal
16	1 Green 6 Reds	Normal	LED-A	LED-B	Normal	Normal	Normal	Normal
17	1 Green 7 Reds	Normal	Normal	LED-A	LED-B	Normal	Normal	Normal
18	1 Green 8 Reds	Normal	Normal	Normal	LED-A	LED-B	Normal	Normal
19	1 Green 9 Reds	Normal	Normal	Normal	Normal	LED-A	LED-B	Normal
20	2 Greens	Normal	Normal	Normal	Normal	Normal	LED-A	LED-B
21	2 Greens 1 Red	LED-A	Normal	LED-B	Normal	Normal	Normal	Normal
22	2 Greens 2 Reds	Normal	LED-A	Normal	LED-B	Normal	Normal	Normal
23	2 Greens 3 Reds	Normal	Normal	LED-A	Normal	LED-B	Normal	Normal
24	2 Greens 4 Reds	Normal	Normal	Normal	LED-A	Normal	LED-B	Normal
25	2 Greens 5 Reds	Normal	Normal	Normal	Normal	LED-A	Normal	LED-B

* Normal → Normal button function without LED indication.

* LED-A & LED-B → Transmitter toggled button with LED indication.

4.1.8.2 A/B Button Select with LED Indication

There are 5 different types of A/B select sequence available for PB1~PB4 and PB7 with LED indications. Choose one that is most suitable for your application.

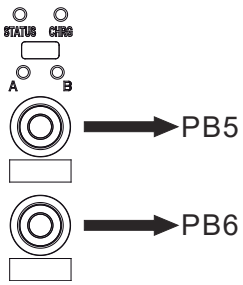
Type-A select sequence: A → B → A → B
Type-B select sequence: Off → A → B → Off → A → B
Type-C select sequence: A → B → A+B or A → B → C (refer to section 4.2.5 SW ABC setting)
Type-D select sequence: Off → A → B → A+B → Off → A → B → A+B
Type-E select sequence: A+B → A → B → A+B → A → B

Function Number	Display Type	PB1	PB2	PB3	PB4	PB7
50	5 Greens	Type-A	Normal	Norma	Norma	Norma
51	5 Greens 1 Red	Type-B	Normal	Norma	Norma	Norma
52	5 Greens 2 Reds	Type-C	Normal	Norma	Norma	Norma
53	5 Greens 3 Reds	Type-D	Normal	Norma	Norma	Norma
54	5 Greens 4 Reds	Type-E	Normal	Norma	Norma	Norma
55	5 Greens 5 Reds	Normal	Type-A	Norma	Norma	Norma
56	5 Greens 6 Reds	Normal	Type-B	Norma	Norma	Norma
57	5 Greens 7 Reds	Normal	Type-C	Norma	Norma	Norma
58	5 Greens 8 Reds	Normal	Type-D	Norma	Norma	Norma
59	5 Greens 9 Reds	Normal	Type-E	Norma	Norma	Norma
60	6 Greens	Normal	Normal	Type-A	Norma	Norma
61	6 Greens 1 Red	Normal	Normal	Type-B	Norma	Norma
62	6 Greens 2 Reds	Normal	Normal	Type-C	Norma	Norma
63	6 Greens 3 Reds	Normal	Normal	Type-D	Norma	Norma
64	6 Greens 4 Reds	Normal	Normal	Type-E	Norma	Norma
65	6 Greens 5 Reds	Normal	Normal	Norma	Type-A	Norma
66	6 Greens 6 Reds	Normal	Normal	Norma	Type-B	Norma
67	6 Greens 7 Reds	Normal	Normal	Norma	Type-C	Norma
68	6 Greens 8 Reds	Normal	Normal	Norma	Type-D	Norma
69	6 Greens 9 Reds	Normal	Normal	Norma	Type-E	Norma
70	7 Greens	Normal	Normal	Norma	Norma	Type-A
71	7 Greens 1 Red	Normal	Normal	Norma	Norma	Type-B
72	7 Greens 2 Reds	Normal	Normal	Norma	Norma	Type-C
73	7 Greens 3 Reds	Normal	Normal	Norma	Norma	Type-D
74	7 Greens 4 Reds	Normal	Normal	Norma	Norma	Type-E

* Normal → Normal button function without LED indication.
* Type A ~ E → Type of A/B select sequence with LED indication.

4.1.9 Display Frequency Band

1) Reset the STOP button (Status LED turns green for up to 2.0 seconds, transmitter power on).
2) Press and hold both PB5 and PB6 at the same time for up to 3.0 seconds (Status LED blinks orange). Release both PB5 and PB6 when LED-A and LED-B turn red.
3) Entered programming mode with Status LED displays 1x orange blink for firmware version, remote pairing and IR programming. 2x orange blinks for transmitter channel programming, 3x orange blinks for PB1~PB7 function programming, **4x orange blinks for frequency range Indication**.



4) Select frequency range indication (Status LED 4x orange blinks) by pressing and holding PB6 for up to 3.0 seconds four times (LED-B turned red). Release PB6 when the Status LED turns to 4x orange blinks.
5) Enter frequency range indication mode by pressing and holding PB5 and PB6 at the same time for up to 3.0 seconds (LED-A and LED-B turn red). Release both PB5 and PB6 when the Status LED displays the transmitter frequency band with orange, green and red blinks. An orange blink represents the hundreds (+**1**00), a green blink represents the tens (+0**1**0) and a red blink represents the units (+00**1**). For example, **8** orange blinks followed by **6** green blinks and **3** red blinks is **8**6**3**MHz.
6) Exit frequency range indication mode by pressing down the STOP button (transmitter power off).

4.1.10 Input and Output Feedback Settings

Up to 2 assigned relay outputs or 2 external inputs can be programmed into the system and fed back to the transmitter LED indicators during operation. These settings require using the IR programmer unit.

4.1.11 Infrared Function Settings

The transmitter is embedded with infrared sensors for the infrared start function. These settings require using the IR programmer unit.

4.1.12 Zero-G Sensor Settings

A Zero-G sensor is embedded in the transmitter to guard against any unintended control of the crane or equipment when a transmitter is thrown or dropped. When the sensor is triggered, the receiver MAIN relays are deactivated with the exception of the horn output that can be assigned to any of the Function output relays (K25, K26 or K30). This horn output setting requires the IR programmer unit. The Zero-G sensor trigger delay can also be set to either 0.5 or 1.0 second.

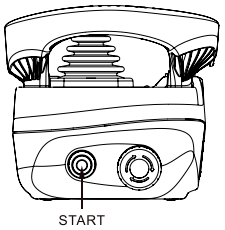
	Dipswitch Settings	Function
1	xxxxxx**0**x	Sensor Disabled
2	xxxxxx**1**x	Sensor Enabled

4.2 Receiver

4.2.1 Button Output Functions

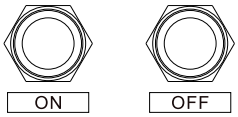
4.2.1.1 START + AUX Function

After executing the START command at transmitter startup, the same START button becomes an auxiliary function with momentary contact connected through the K25 Function output relay. There are other types of auxiliary functions made available for K25, K26 and K30 Function output relays. Refer to section 4.2.5 and sections 4.2.6.6 ~ 4.2.6.8 for Function output descriptions and programming.



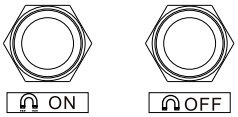
4.2.1.2 ON/OFF Button Function

The user can set PB1+PB2, PB3+PB4 or PB5+PB6 on the transmitter to behave like a mechanical ON & OFF rocker or toggle switch. ON output relay closes when ON button is pressed (OFF output relay opens) and OFF output relay closes when OFF button is pressed (ON output relay opens). Refer to section 4.2.2.1 and sections 4.2.6.13 ~ 4.2.6.15 for output descriptions and programming.



4.2.1.3 Magnet ON/OFF Button Function

The user can set PB1+PB2, PB3+PB4 or PB5+PB6 on the transmitter to control industrial magnet lift. Activate the magnet by pressing the Magnet ON button. Deactivate the magnet by first pressing and holding the Magnet ON button and then pressing the Magnet OFF button. Pressing the Magnet OFF button alone is unable to deactivate the magnet. Refer to section 4.2.2.1 and sections 4.2.6.13 ~ 4.2.6.15 for output descriptions and programming.



4.2.1.4 External Warning Function

The user can install an external warning device (rotating lights, horn, etc.) to the K26 Function output relay located inside the receiver. The user can choose which joystick direction or directions that trigger the external warning device when moved beyond 0 speed or neutral position. Refer to section 4.2.3.1 and sections 4.2.6.9 ~ 4.2.6.12 for output descriptions and programming.

4.2.1.5 Momentary Contact

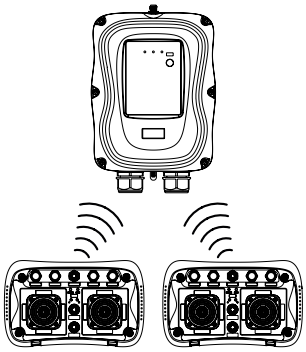
When a button is released, the corresponding output relay will open or deactivate. This type of relay action usually applies to external applications such as a horn or buzzer. Refer to section 4.2.2.1 ~ 4.2.2.3 and sections 4.2.6.13 ~ 4.2.6.16 for output descriptions and programming.

4.2.1.6 Toggled Contact

When a button is released, the corresponding output relay will maintain contact closure until the next time the user presses the same button again. This type of relay action usually applies to external applications such as lights. Refer to sections 4.2.2.1 ~ 4.2.2.3 and sections 4.2.6.13 ~ 4.2.6.16 for output descriptions and programming.

4.2.1.7 Pitch & Catch Function

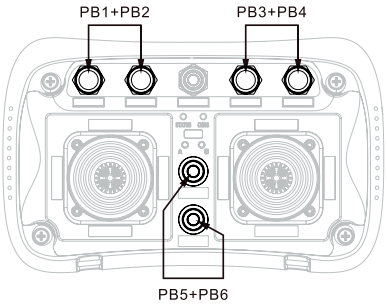
This function allows two operators controlling from opposite ends of a crane or equipment. When set to “Pitch & Catch”, make sure the 2nd transmitter is set to the next upper channel (channel X+1). For example, if the system is set to channel 01, then the 2nd transmitter must be set to channel 02 with the identical serial number. Furthermore, the receiver auto-scanning function must be set to 2-channel scanning (scans channel 01 and 02). Refer to section 4.2.2.2, section 4.2.6.5 and sections 4.2.6.13 ~ 4.2.6.16 for output descriptions and programming. The Pitch & Catch function must be set to the assigned channel scheme (refer to section 4.1.2, part B).



4.2.2 Button Output Settings

4.2.2.1 Interlocking Button Outputs

Interlocking button pair cannot be pressed simultaneously as they will cancel each other out. Refer to sections 4.2.1 and 4.2.6.13 ~ 4.2.6.15 for output descriptions and programming.

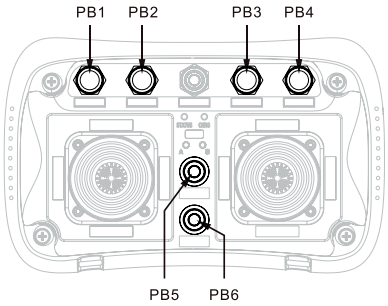


Function #	Function Descriptions (left button / right button)	# of Relays Used
00000000	Normal momentary output (all contacts open when both buttons are pressed simultaneously or one after another)	2
00011000	Normal momentary output (1st button pressed maintain contact when both buttons are pressed one after another)	2
00001100	OFF / ON	2
00010010	On + Start/Off + Start - For added safety, you must first press and hold the green START button and then the On or Off button to activate the output relay.	2
00001110	Magnet Lift On & Off	2
00010000	OFF / ON (EMS)**	2
00010100	Toggled / Toggled	2
00010110	Toggled / Toggled (EMS)**	2
00011110	Toggled / Normal (EMS)**	2

* EMS: Relay opens when STOP button is pressed down.

4.2.2.2 Non-Interlocking Button Outputs

Non-interlocking button pairs or adjacent buttons can be pressed simultaneously. It usually applies to equipment's auxiliary functions such as lights, horn or buzzer. Refer to sections 4.2.1 and 4.2.6.13 ~ 4.2.6.15 for output descriptions and programming.



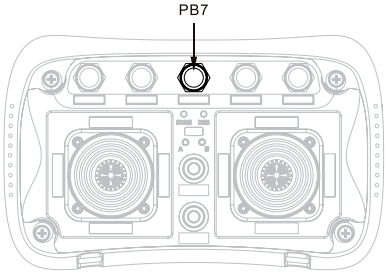
Function #	Function Descriptions (left button / right button)	# of Relays Used
10000000	Normal / Normal	2
10000010	Normal / Toggled	2
10000110	Normal / Toggled (EMS)**	2
10001000	Normal / Normal + Start*	2
10001100	Normal / Pitch & Catch	2
10010000	Toggled / Normal	2
10010010	Toggled / Toggled	2
10010110	Toggled / Toggled (EMS)**	2
10011000	Toggled / Normal + Start*	2
10011100	Toggled / Pitch & Catch	2
10110000	Toggled (EMS**) / Normal	2
10110010	Toggled (EMS)** / Toggled	2
10110110	Toggled (EMS)** / Toggled (EMS)**	2
10111000	Toggled (EMS)** / Normal + Start*	2
10111100	Toggled (EMS)** / Pitch & Catch	2
11000000	Normal + Start* / Normal	2
11000010	Normal + Start* / Toggled	2
11000110	Normal + Start* / Toggled (EMS)**	2
11001000	Normal + Start* / Normal + Start*	2
11001100	Normal + Start* / Pitch & Catch	2
11100000	Pitch & Catch / Normal	2
11100010	Pitch & Catch / Toggled	2
11100110	Pitch & Catch / Toggled (EMS)**	2
11101000	Pitch & Catch / Normal + Start*	2

* Normal + Start: For added safety, you must first press and hold the green START button and then the intended button to activate the output relay.

** EMS: Relay opens when STOP button is pressed down.

4.2.2.3 PB7 Button Outputs

Usually applies to equipment's auxiliary functions such as lights, horn or buzzer. Refer to section 4.2.1 and section 4.2.6.16 output descriptions and programming.



Function #	Function Descriptions	# of Relays Used
10000000	Normal	1
10010000	Toggled	1
10110000	Toggled (EMS)**	1
11000000	Normal + Start*	1
11100000	Pitch & Catch	1

* Normal + Start: For added safety, must first press and hold the green START button and then press the intended button to activate the output relay.

** EMS: Relay opens when STOP button is pressed down.

4.2.3 Lever Output Settings

4.2.3.1 Lever Stepped Relay Outputs

Refer to section 4.2.6.9 ~ 4.2.6.12 relay output programming.

Output Relay / Function	CN1 ~ CN6	K1	K2	K3	K4	K5	K6
Type A 00000001	at 1st Step	F1	or R1				
	at 2nd Step	F1	or R1	F/R2			
	at 3rd Step	F1	or R1	F/R2	F/R3		
	at 4th Step	F1	or R1	F/R2	F/R3	F/R4	
	at 5th Step	F1	or R1	F/R2	F/R3	F/R4	F/R5
Type B 00000011	at 1st Step	F1	or R1				
	at 2nd Step	F1	or R1	F/R2			
	at 3rd Step	F1	or R1		F/R3		
	at 4th Step	F1	or R1			F/R4	
	at 5th Step	F1	or R1				F/R5
Type C 00000101	at 1st Step	F	or R	F/R1			
	at 2nd Step	F	or R	F/R1	F/R2		
	at 3rd Step	F	or R	F/R1	F/R2	F/R3	
	at 4th Step	F	or R	F/R1	F/R2	F/R3	F/R4
Type C 00000111	at 1st Step	F	or R	F/R1			
	at 2nd Step	F	or R		F/R2		
	at 3rd Step	F	or R			F/R3	
	at 4th Step	F	or R				F/R4
Type D 00001001	at 1st Step	F1	or R1				
	at 2nd Step	F1	or R1	F2	or R2		
	at 3rd Step	F1	or R1	F2	or R2	F3	or R3
Type E 00001011	at 1st Step	F1	or R1				
	at 2nd Step			F2	or R2		
	at 3rd Step					F3	or R3

F → Forward **F1** → Forward 1st step **F2** → Forward 2nd step **F3** → Forward 3rd step

R → Reverse **R1** → Reverse 1st step **R2** → Reverse 2nd step **R3** → Reverse 3rd step

F/R1 → Forward and Reverse shared 1st step **F/R2** → Forward and Reverse shared 2nd step

F/R3 → Forward and Reverse shared 3rd step **F/R4** → Forward and Reverse shared 4th step

F/R5 → Forward and Reverse shared 5th step

Dipswitch setting with the added external warning function: xx1xxxxx

4.2.3.2 Lever Stepless Analog Outputs

Refer to sections 4.2.6.16 ~ 4.2.6.19 analog output programming.

	Minimum	Neutral	Maximum
Voltage	From 0~10V	From 0~10V	From 0~10V
Current	From 0~20mA	From 0~20mA	From 0~20mA

* No external warning function available for stepless analog outputs.

4.2.4 Jumper Functions

Refer to section 4.2.6.20 jumper function programming.

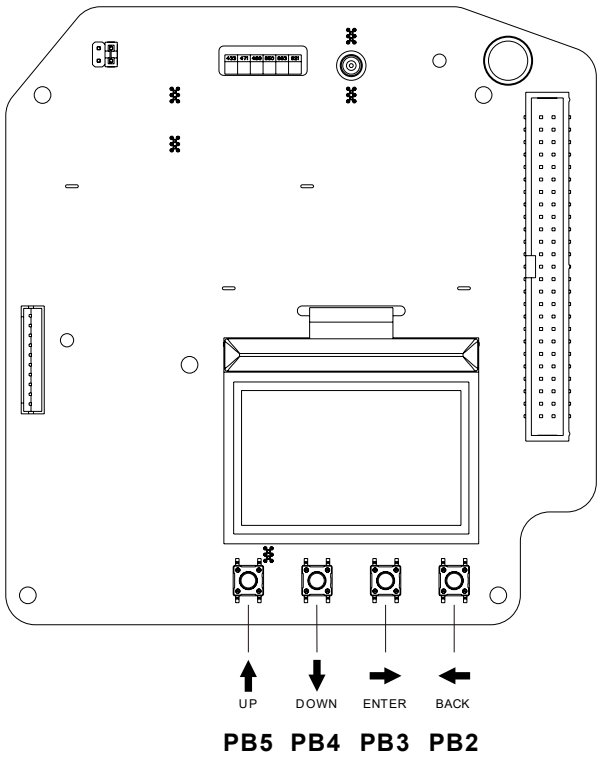
Jumper Settings	Function
JP3 (Open)	**Standard A/B selector sequence** - Output relay A activated at A position, output relay B activated at B position, both relays activated at A+B position.
JP3 (Short)	**Reversed logic A/B selector sequence** - Output relay B activated at A position, output relay A activated at B position, both relays deactivated at A+B position.
JP6 (Short)	System firmware version
JP7 (Short)	For system testing only (receiver MAIN relays disabled)
JP8 (Open)	Receiver-to-transmitter remote pairing (pressing the Pairing button required)
JP8 (Short)	Receiver-to-transmitter remote pairing (pressing the Pairing button not required)

4.2.5 Function Relay Outputs

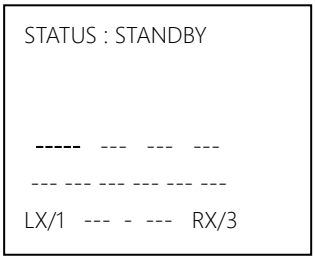
Listed below are other types of functions that can be outputted through the three Function output relays (K25, K26 and K30). Refer to sections 4.2.6.6 ~ 4.2.6.8 for function relay programming.

LV	:	Function relay closes when receiver voltage is low.
ID	:	Function relay works simultaneously with all motion commands.
NORMAL	:	START function + AUX with normal momentary output. Works the 2nd time the START button is pressed.
NORMAL2	:	START function + AUX with normal momentary output. Works the 1st time the START button is pressed.
TOGGLE	:	START function + AUX with toggled output.
TOG&E	:	START function + AUX with toggled output. The relay opens when STOP button is pressed down.
EXT	:	Function relay works simultaneously with the receiver MAIN relays.
TDM A+B	:	Function relay closes when selector switch is rotated to the A+B position and opens when rotate to A or B positions (tandem monitoring output).
HORN	:	Function relay closes for up to 3 seconds when START button is pressed at transmitter power on and then becomes a normal momentary output thereafter.
G SENSOR	:	Function relay closes when Zero-G sensor is triggered (receiver MAIN relays deactivated) and opens when receiver MAIN relays are reactivated.
RESET	:	Function relay closes when the START button is pressed and opens when let go. Works during initial transmitter startup and inactivity timer START reset.
SW1 ABC	:	Function relay closes at C position (for button or toggle switch programmed to Select A/B/C function).
SW2 ABC	:	Function relay closes at C position (for button or toggle switch programmed to Select A/B/C function).
SW3 ABC	:	Function relay closes at C position (for button or toggle switch programmed to Select A/B/C function).
SW4 ABC	:	Function relay closes at C position (for button or toggle switch programmed to Select A/B/C function).
SW7 ABC	:	Function relay closes at C position (for button or toggle switch programmed to Select A/B/C function).

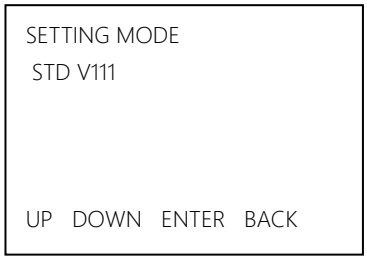
4.2.6 Programming

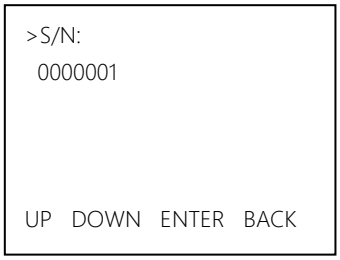


1) Turn on the receiver power (receiver in standby mode).



2) Press and hold both PB2 and PB3 for up to 3 seconds to enter system programming. The LCD screen will exit system programming after 5 minutes of inactivity.

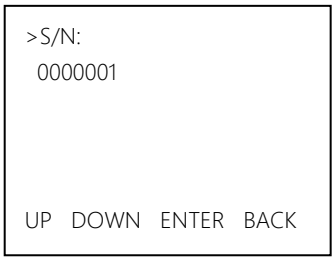




3) Press the UP/DOWN buttons to scroll through all available settings.

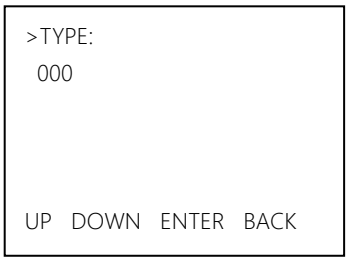
4.2.6.1 System Serial Number

For safety measures, the system serial number can only be changed via the IR programmer unit. Press the UP/DOWN buttons to scroll through other system settings



4.2.6.2 System Type Programming

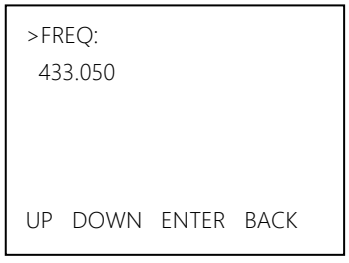
System type number is associated with functions such as the dual-crane tandem operation, multiple-receiver operation, and random-access operation.



1) Press the ENTER button to enter system type setting (cursor shown next to the 3-digit type value).
2) Press the UP/DOWN buttons to scroll and select type value as a whole (000~512).
3) Or press the ENTER button again to change the 3-digit type value individually (cursor shown under the first digit to the far left). Press the UP/DOWN buttons to scroll and select, and then the ENTER button to go to the next digit to the right. Press the ENTER button repeatedly to cycle through the 3-digit type value. Press the UP/DOWN buttons to change value.
4) Press the BACK button to return to step #1 above. Press it again to go back to System TYPE Programming (cursor shown next to TYPE).
5) Press the UP/DOWN buttons to scroll through other system settings.

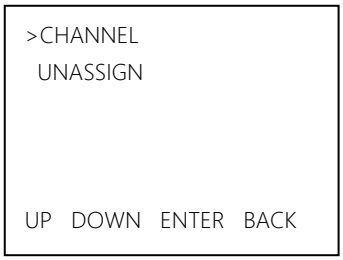
4.2.6.3 System Frequency Programming

For safety measures, the system frequency range can only be changed via the IR programmer unit. Press the UP/ DOWN buttons to scroll through other system settings



4.2.6.4 System Channel Programming

Random access, pitch & catch, t-type, and multi-receiver configurations cannot be set to unassigned channel.



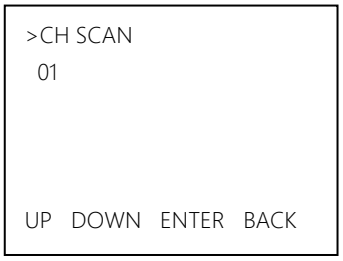
1) Press the ENTER button to enter system channel setting (cursor shown next to UNASSIGN* or the 2-digit channel value**).
2) Press the UP/DOWN buttons to scroll and select UNASSIGN or channel value as a whole (channel 1~62).
3) Or press the ENTER button again to change the 2-digit channel value digits individually (cursor shown under the first digit to the left). Press the UP/DOWN buttons to scroll and select, and then the ENTER button to go to the next digit to the right. Press the ENTER button repeatedly to cycle through the 2-digit channel value. Press the UP/DOWN buttons to change value.
4) Press the BACK button to return to step #1 above. Press it again to go back to System Channel Programming (cursor shown next to CHANNEL).
5) Press the UP/DOWN buttons to scroll through other system settings.

** Make sure the transmitter is also set to Unassigned Channel Scheme.*

*** Make sure the transmitter channel is identical to the receiver channel.*

4.2.6.5 Auto-Scanning Programming

The Auto-scanning function is required for pitch & catch and random-access operations.

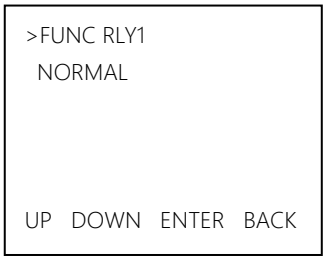


1) Press the ENTER button to enter channel scanning setting (cursor shown next to the 2-digit channel scanning value).
2) Press the UP/DOWN buttons to scroll and select the number of channels to be scanned when the receiver is in standby mode (maximum 12 channels).
3) Press the BACK button to go back to Auto-Scanning Programming (cursor shown next to CH SCAN).
4) Press the UP/DOWN buttons to scroll through other system settings.

** When set to 2-channel scanning, the receiver will scan the channel set in the receiver (channel X) and the next channel up (channel X+1). When set to 3-channel scanning, the receiver will scan the channel set in the receiver (channel X) and the next 2 channels up (channel X+1 and X+2).*

4.2.6.6 Function Relay-1 Programming

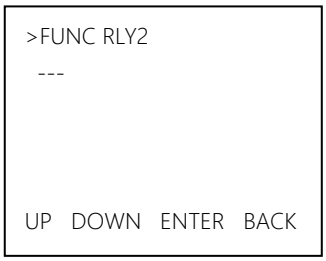
Please refer to section 4.2.5 for various types of function relay outputs available.



1) Press the ENTER button to enter function relay-1 setting (cursor shown next to NORMAL or other setting previously programmed).
2) Press the UP/DOWN buttons to scroll and select.
3) Press the BACK button to go back to Function Relay-1 Programming (cursor shown next to FUNC RLY1).
4) Press the UP/DOWN buttons to scroll through other system settings.

4.2.6.7 Function Relay-2 Programming

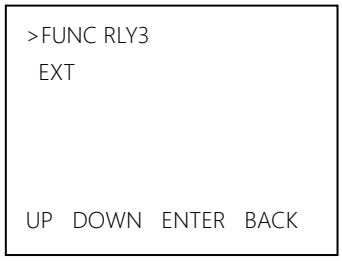
Please refer to section 4.2.5 for various types of function relay outputs available.



1) Press the ENTER button to enter function relay-2 setting (cursor shown next to --- or other setting previously programmed).
2) Press the UP/DOWN buttons to scroll and select.
3) Press the BACK button to go back to Function Relay-2 Programming (cursor shown next to FUNC RLY2).
4) Press the UP/DOWN buttons to scroll through other system settings.

4.2.6.8 Function Relay-3 Programming

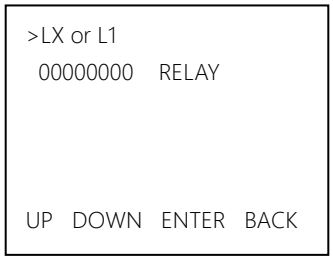
Please refer to section 4.2.5 for various types of function relay outputs available.



1) Press the ENTER button to enter function relay-3 setting (cursor shown next to EXT or other setting previously programmed).
2) Press the UP/DOWN buttons to scroll and select.
3) Press the BACK button to go back to Function Relay-3 Programming (cursor shown next to FUNC RLY3).
4) Press the UP/DOWN buttons to scroll through other system settings.

4.2.6.9 Joystick LX Axis or Lever L1 Relay Output Programming

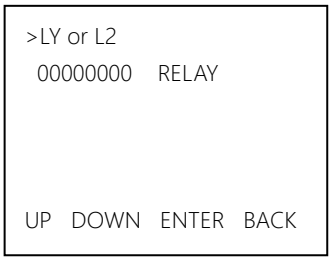
Please refer to section 4.2.3.1 for various types of relay output configurations.



1) Press the ENTER button to enter relay output type setting (cursor shown next to the 8-digit relay output type value).
2) Press the UP/DOWN buttons to scroll and select relay output type as a whole.
3) Or press the ENTER button again to change the 8-digit relay output type digits individually (cursor shown under the first digit to the far left). Press the UP/DOWN buttons to scroll and select between 0 and 1, and then the ENTER button to go to the next digit to the right. Press the ENTER button repeatedly to cycle through the 8-digit relay output type. Press the UP/DOWN buttons to change value.
4) Press the BACK button to return to step #1 above. Press it again to go back to LX or L1 Relay Output Programming (cursor shown next to LX or L1).
5) Press the UP/DOWN buttons to scroll through other system settings.

4.2.6.10 Joystick LY Axis or Lever L2 Relay Output Programming

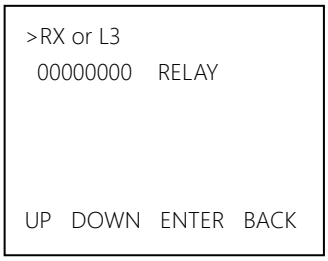
Please refer to section 4.2.3.1 for various types of relay output configurations.



1) Press the ENTER button to enter relay output type setting (cursor shown next to the 8-digit relay output type value).
2) Press the UP/DOWN buttons to scroll and select relay output type as a whole.
3) Or press the ENTER button again to change the 8-digit relay output type digits individually (cursor shown under the first digit to the far left). Press the UP/DOWN buttons to scroll and select between 0 and 1, and then the ENTER button to go to the next digit to the right. Press the ENTER button repeatedly to cycle through the 8-digit relay output type. Press the UP/DOWN buttons to change value.
4) Press the BACK button to return to step #1 above. Press it again to go back to LY or L2 Relay Output Programming (cursor shown next to LY or L2).
5) Press the UP/DOWN buttons to scroll through other system settings.

4.2.6.11 Joystick RX Axis or Lever L3 Relay Output Programming

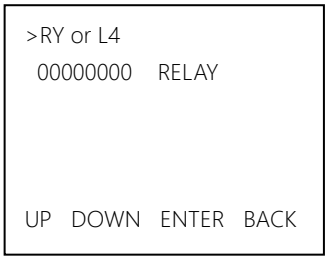
Please refer to section 4.2.3.1 for various types of relay output configurations.



1) Press the ENTER button to enter relay output type setting (cursor shown next to the 8-digit relay output type value).
2) Press the UP/DOWN buttons to scroll and select relay output type as a whole.
3) Or press the ENTER button again to change the 8-digit relay output type digits individually (cursor shown under the first digit to the far left). Press the UP/DOWN buttons to scroll and select between 0 and 1, and then the ENTER button to go to the next digit to the right. Press the ENTER button repeatedly to cycle through the 8-digit relay output type. Press the UP/DOWN buttons to change value.
4) Press the BACK button to return to step #1 above. Press it again to go back to RX or L3 Relay Output Programming (cursor shown next to RX or L3).
5) Press the UP/DOWN buttons to scroll through other system settings.

4.2.6.12 Joystick RY Axis or Lever L4 Relay Output Programming

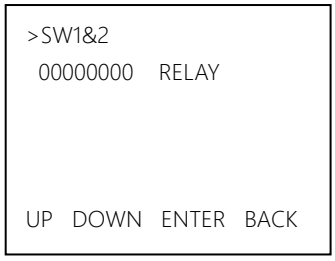
Please refer to section 4.2.3.1 for various types of relay output configurations.



1) Press the ENTER button to enter relay output type setting (cursor shown next to the 8-digit relay output type value).
2) Press the UP/DOWN buttons to scroll and select relay output type as a whole.
3) Or press the ENTER button again to change the 8-digit relay output type digits individually (cursor shown under the first digit to the far left). Press the UP/DOWN buttons to scroll and select between 0 and 1, and then the ENTER button to go to the next digit to the right. Press the ENTER button repeatedly to cycle through the 8-digit relay output type. Press the UP/DOWN buttons to change value.
4) Press the BACK button to return to step #1 above. Press it again to go back to RY or L4 Relay Output Programming (cursor shown next to RY or L4).
5) Press the UP/DOWN buttons to scroll through other system settings.

4.2.6.13 PB1&2 Relay Output Programming

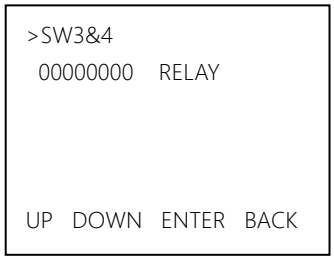
Please refer to section 4.2.2.1 and 4.2.2.2 for various types of interlocking and non-interlocking relay output configurations.



1) Press the ENTER button to enter relay output type setting (cursor shown next to the 8-digit relay output type value).
2) Press the UP/DOWN buttons to scroll and select relay output type as a whole.
3) Or press the ENTER button again to change the 8-digit relay output type digits individually (cursor shown under the first digit to the far left). Press the UP/DOWN buttons to scroll and select between 0 and 1, and then the ENTER button to go to the next digit to the right. Press the ENTER button repeatedly to cycle through the 8-digit relay output type. Press the UP/DOWN buttons to change value.
4) Press the BACK button to return to step #1 above. Press it again to go back to SW1&2 Relay Output Programming (cursor shown next to SW1&2).
5) Press the UP/DOWN buttons to scroll through other system settings.

4.2.6.14 PB3&4 Relay Output Programming

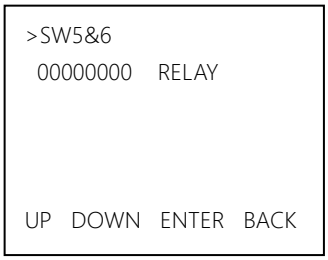
Please refer to section 4.2.2.1 and 4.2.2.2 for various types of interlocking and non-interlocking relay output configurations.



1) Press the ENTER button to enter relay output type setting (cursor shown next to the 8-digit relay output type value).
2) Press the UP/DOWN buttons to scroll and select relay output type as a whole.
3) Or press the ENTER button again to change the 8-digit relay output type digits individually (cursor shown under the first digit to the far left). Press the UP/DOWN buttons to scroll and select between 0 and 1, and then the ENTER button to go to the next digit to the right. Press the ENTER button repeatedly to cycle through the 8-digit relay output type. Press the UP/DOWN buttons to change value.
4) Press the BACK button to return to step #1 above. Press it again to go back to SW3&4 Relay Output Programming (cursor shown next to SW3&4).
5) Press the UP/DOWN buttons to scroll through other system settings.

4.2.6.15 PB5&6 Relay Output Programming

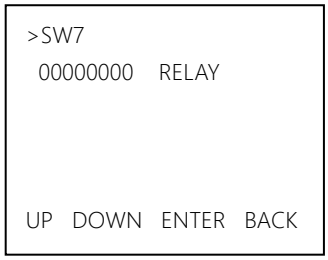
Please refer to section 4.2.2.1 and 4.2.2.2 for various types of interlocking and non-interlocking relay output configurations.



1) Press the ENTER button to enter relay output type setting (cursor shown next to the 8-digit relay output type value).
2) Press the UP/DOWN buttons to scroll and select relay output type as a whole.
3) Or press the ENTER button again to change the 8-digit relay output type digits individually (cursor shown under the first digit to the far left). Press the UP/DOWN buttons to scroll and select between 0 and 1, and then the ENTER button to go to the next digit to the right. Press the ENTER button repeatedly to cycle through the 8-digit relay output type. Press the UP/DOWN buttons to change value.
4) Press the BACK button to return to step #1 above. Press it again to go back to SW5&6 Relay Output Programming (cursor shown next to SW5&6).
5) Press the UP/DOWN buttons to scroll through other system settings.

4.2.6.16 PB7 Relay Output Programming

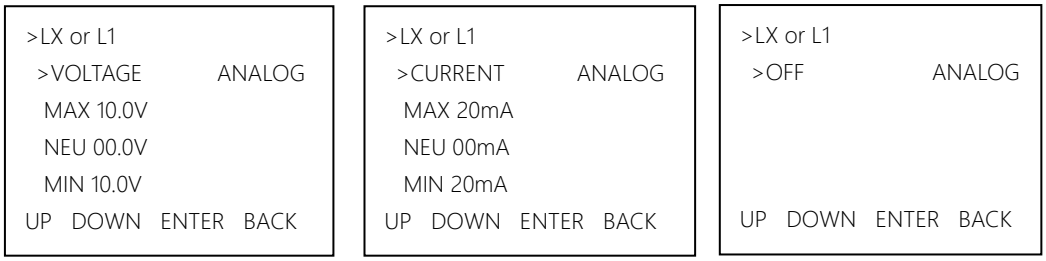
Please refer to section 4.2.2.3 for various types of relay output configurations.



1) Press the ENTER button to enter relay output type setting (cursor shown next to the 8-digit relay output type value).
2) Press the UP/DOWN buttons to scroll and select relay output type as a whole.
3) Or press the ENTER button again to change the 8-digit relay output type digits individually (cursor shown under the first digit to the far left). Press the UP/DOWN buttons to scroll and select between 0 and 1, and then the ENTER button to go to the next digit to the right. Press the ENTER button repeatedly to cycle through the 8-digit relay output type. Press the UP/DOWN buttons to change value.
4) Press the BACK button to return to step #1 above. Press it again to go back to SW7 Relay Output Programming (cursor shown next to SW7).
5) Press the UP/DOWN buttons to scroll through other system settings.

4.2.6.16 Lever L1 Analog Output Programming

Please refer to section 4.2.3.2 for various types of analog output configurations.

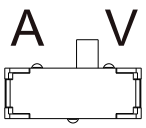


1) Press the ENTER button to enter analog output type setting (cursor shown next to VOLTAGE, CURRENT or OFF).
2) Press the UP/DOWN buttons and then the ENTER button to scroll and select between Voltage Outputs, Current Outputs or Off (analog outputs disabled).

Voltage Outputs:

3) Press the UP/DOWN buttons and then the ENTER button to scroll and select between Minimum, Neutral and Maximum voltage outputs (cursor shown under the first digit to the far left). Press the UP/DOWN buttons to scroll and select voltage value, and then the ENTER button to go to the next digit to the right. Press the ENTER button repeatedly to cycle through the 3-digit voltage value. Press the UP/DOWN buttons to change value.
4) Press the BACK button to return to step #3 above. Press it again to go back to step #1. Press it again to go back to LX or L1 Analog Output Programming (cursor shown next to LX or L1).
5) Press the UP/DOWN buttons to scroll through other system settings.

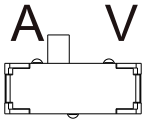
** Make sure the selector switch on analog module is set to "V" position for voltage outputs.*



Current Outputs:

6) Press the UP/DOWN buttons and then the ENTER button to scroll and select between Minimum, Neutral and Maximum current outputs (cursor shown next to the 2-digit current value). Press the UP/DOWN buttons to scroll and select current output value.
7) Press the BACK button to return to step #6 above. Press it again to go back to step #1. Press it again to go back to LX or L1 Analog Output Programming (cursor shown next to LX or L1).
8) Press the UP/DOWN buttons to scroll through other system settings.

** Make sure the selector switch on analog module is set to "A" position for current (amperage) outputs.*



4.2.6.17 Lever L2 Analog Output Programming

Please refer to section 4.2.3.2 for various types of analog output configurations.

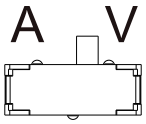
>LY or L2	>LY or L2	>LY or L2
>VOLTAGE ANALOG	>CURRENT ANALOG	>OFF ANALOG
MAX 10.0V	MAX 20mA	
NEU 00.0V	NEU 00mA	
MIN 10.0V	MIN 20mA	
UP DOWN ENTER BACK	UP DOWN ENTER BACK	UP DOWN ENTER BACK

1) Press the ENTER button to enter analog output type setting (cursor shown next to VOLTAGE, CURRENT or OFF).
2) Press the UP/DOWN buttons and then the ENTER button to scroll and select between Voltage Outputs, Current Outputs or Off (analog outputs disabled).

Voltage Outputs:

3) Press the UP/DOWN buttons and then the ENTER button to scroll and select between Minimum, Neutral and Maximum voltage outputs (cursor shown under the first digit to the far left). Press the UP/DOWN buttons to scroll and select voltage value, and then the ENTER button to go to the next digit to the right. Press the ENTER button repeatedly to cycle through the 3-digit voltage value. Press the UP/DOWN buttons to change value.
4) Press the BACK button to return to step #3 above. Press it again to go back to step #1. Press it again to go back to LY or L2 Analog Output Programming (cursor shown next to LY or L2).
5) Press the UP/DOWN buttons to scroll through other system settings.

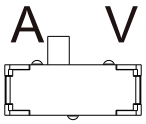
** Make sure the selector switch on analog module is set to "V" position for voltage outputs.*



Current Outputs:

6) Press the UP/DOWN buttons and then the ENTER button to scroll and select between Minimum, Neutral and Maximum current outputs (cursor shown next to the 2-digit current value). Press the UP/DOWN buttons to scroll and select current output value.
7) Press the BACK button to return to step #6 above. Press it again to go back to step #1. Press it again to go back to LY or L2 Analog Output Programming (cursor shown next to LY or L2).
8) Press the UP/DOWN buttons to scroll through other system settings.

** Make sure the selector switch on analog module is set to "A" position for current (amperage) outputs.*



4.2.6.18 Lever L3 Analog Output Programming

Please refer to section 4.2.3.2 for various types of analog output configurations.

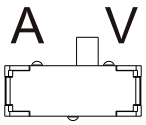
>RX or L3	>RX or L3	>RX or L3
>VOLTAGE ANALOG	>CURRENT ANALOG	>OFF ANALOG
MAX 10.0V	MAX 20mA	
NEU 00.0V	NEU 00mA	
MIN 10.0V	MIN 20mA	
UP DOWN ENTER BACK	UP DOWN ENTER BACK	UP DOWN ENTER BACK

1) Press the ENTER button to enter analog output type setting (cursor shown next to VOLTAGE, CURRENT or OFF).
2) Press the UP/DOWN buttons and then the ENTER button to scroll and select between Voltage Outputs, Current Outputs or Off (analog outputs disabled).

Voltage Outputs:

3) Press the UP/DOWN buttons and then the ENTER button to scroll and select between Minimum, Neutral and Maximum voltage outputs (cursor shown under the first digit to the far left). Press the UP/DOWN buttons to scroll and select voltage value, and then the ENTER button to go to the next digit to the right. Press the ENTER button repeatedly to cycle through the 3-digit voltage value. Press the UP/DOWN buttons to change value.
4) Press the BACK button to return to step #3 above. Press it again to go back to step #1. Press it again to go back to RX or L3 Analog Output Programming (cursor shown next to RX or L3).
5) Press the UP/DOWN buttons to scroll through other system settings.

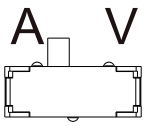
** Make sure the selector switch on analog module is set to "V" position for voltage outputs.*



Current Outputs:

6) Press the UP/DOWN buttons and then the ENTER button to scroll and select between Minimum, Neutral and Maximum current outputs (cursor shown next to the 2-digit current value). Press the UP/DOWN buttons to scroll and select current output value.
7) Press the BACK button to return to step #6 above. Press it again to go back to step #1. Press it again to go back to RX or L3 Analog Output Programming (cursor shown next to RX or L3).
8) Press the UP/DOWN buttons to scroll through other system settings.

** Make sure the selector switch on analog module is set to "A" position for current (amperage) outputs.*



4.2.6.19 Lever L4 Analog Output Programming

Please refer to section 4.2.3.2 for various types of analog output configurations.

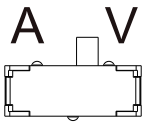
>RY or L4	>RY or L4	>RY or L4
>VOLTAGE ANALOG	>CURRENT ANALOG	>OFF ANALOG
MAX 10.0V	MAX 20mA	
NEU 00.0V	NEU 00mA	
MIN 10.0V	MIN 20mA	
UP DOWN ENTER BACK	UP DOWN ENTER BACK	UP DOWN ENTER BACK

1) Press the ENTER button to enter analog output type setting (cursor shown next to VOLTAGE, CURRENT or OFF).
2) Press the UP/DOWN buttons and then the ENTER button to scroll and select between Voltage Outputs, Current Outputs or Off (analog outputs disabled).

Voltage Outputs:

3) Press the UP/DOWN buttons and then the ENTER button to scroll and select between Minimum, Neutral and Maximum voltage outputs (cursor shown under the first digit to the far left). Press the UP/DOWN buttons to scroll and select voltage value, and then the ENTER button to go to the next digit to the right. Press the ENTER button repeatedly to cycle through the 3-digit voltage value. Press the UP/DOWN buttons to change value.
4) Press the BACK button to return to step #3 above. Press it again to go back to step #1. Press it again to go back to RY or L4 Analog Output Programming (cursor shown next to RY or L4).
5) Press the UP/DOWN buttons to scroll through other system settings.

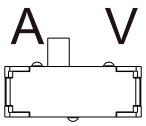
** Make sure the selector switch on analog module is set to "V" position for voltage outputs.*



Current Outputs:

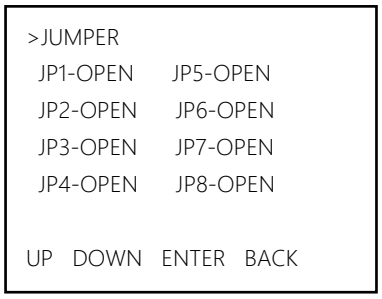
6) Press the UP/DOWN buttons and then the ENTER button to scroll and select between Minimum, Neutral and Maximum current outputs (cursor shown next to the 2-digit current value). Press the UP/DOWN buttons to scroll and select current output value.
7) Press the BACK button to return to step #6 above. Press it again to go back to step #1. Press it again to go back to RY or L4 Analog Output Programming (cursor shown next to RY or L4).
8) Press the UP/DOWN buttons to scroll through other system settings.

** Make sure the selector switch on analog module is set to "A" position for current (amperage) outputs.*



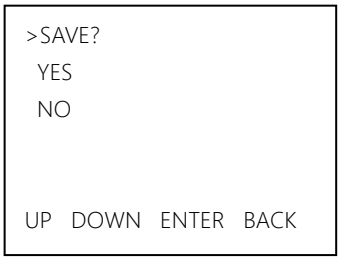
4.2.6.20 Jumper Function Programming

Please refer to section 4.2.4 for various types of jumper settings available.

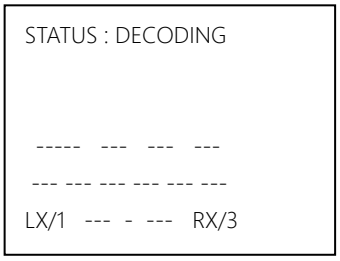


1) Press the ENTER button to enter jumper setting (cursor shown next to JP1-OPEN or other setting previously programmed).
2) Press the UP/DOWN buttons and then the ENTER button to scroll and select which Jumper to program (cursor shown next to OPEN or SHORT)
3) Press the UP/DOWN buttons to select OPEN or SHORT.
4) Press the BACK button to go back to step #1. Press it again to go back to Jumper Function Programming (cursor shown next to JUMPER)
5) Press the UP/DOWN buttons to scroll through other system settings.

4.2.6.21 SAVE Programming

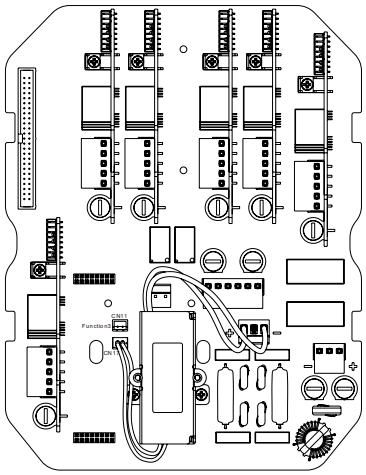


1) Press the ENTER button to enter save programming (cursor shown next to YES).
2) Press the UP/DOWN buttons to select Yes or No.
3) Press the ENTER button to execute.
4) Programming completed with LCD returned to the main screen.



4.2.7 Voltage Settings

Always verify that the power supply voltage setting is correct for your application prior to installation.



FUSE #	9~36VDC*	24~48VAC*	110~240VAC	380~460VAC*
F3, F9 and F10	5.0A	5.0A	5.0A	5.0A
F1 and F2	3.0A	3.0A	1.0A	1.0A

*** Standard offering will only include 110-240VAC transformer, if other transformers are needed, they can be purchased as spare parts and swapped out by end user**

4.2.8 System Channels Table (433~439MHz)

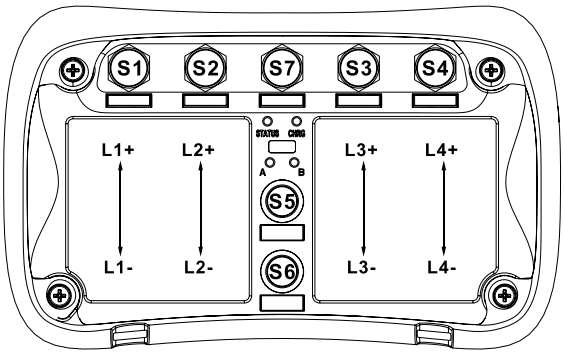
Channel	Primary/Secondary Frequency	Channel	Primary/Secondary Frequency
01	433.050/436.550	32	434.600/438.100
02	433.100/436.600	33	434.650/438.150
03	433.150/436.650	34	434.700/438.200
04	433.200/436.700	35	434.750/438.250
05	433.250/436.750	36	434.800/438.300
06	433.300/436.800	37	434.850/438.350
07	433.350/436.850	38	434.900/438.400
08	433.400/436.900	39	434.950/438.450
09	433.450/436.950	40	435.000/438.500
10	433.500/437.000	41	435.050/438.550
11	433.550/437.050	42	435.100/438.600
12	433.600/437.100	43	435.150/438.650
13	433.650/437.150	44	435.200/438.700
14	433.700/437.200	45	435.250/438.750
15	433.750/437.250	46	435.300/438.800
16	433.800/437.300	47	435.350/438.850
17	433.850/437.350	48	435.400/438.900
18	433.900/437.400	49	435.450/438.950
19	433.950/437.450	50	435.500/439.000
20	434.000/437.500	51	435.550/439.050
21	434.050/437.550	52	435.600/439.100
22	434.100/437.600	53	435.650/439.150
23	434.150/437.650	54	435.700/439.200
24	434.200/437.700	55	435.750/439.250
25	434.250/437.750	56	435.800/439.300
26	434.300/437.800	57	435.850/439.350
27	434.350/437.850	58	435.900/439.400
28	434.400/437.900	59	435.950/439.450
29	434.450/437.950	60	436.000/439.500
30	434.500/438.000	61	436.050/439.550
31	434.550/438.050	62	436.100/439.600

5. Receiver Installation

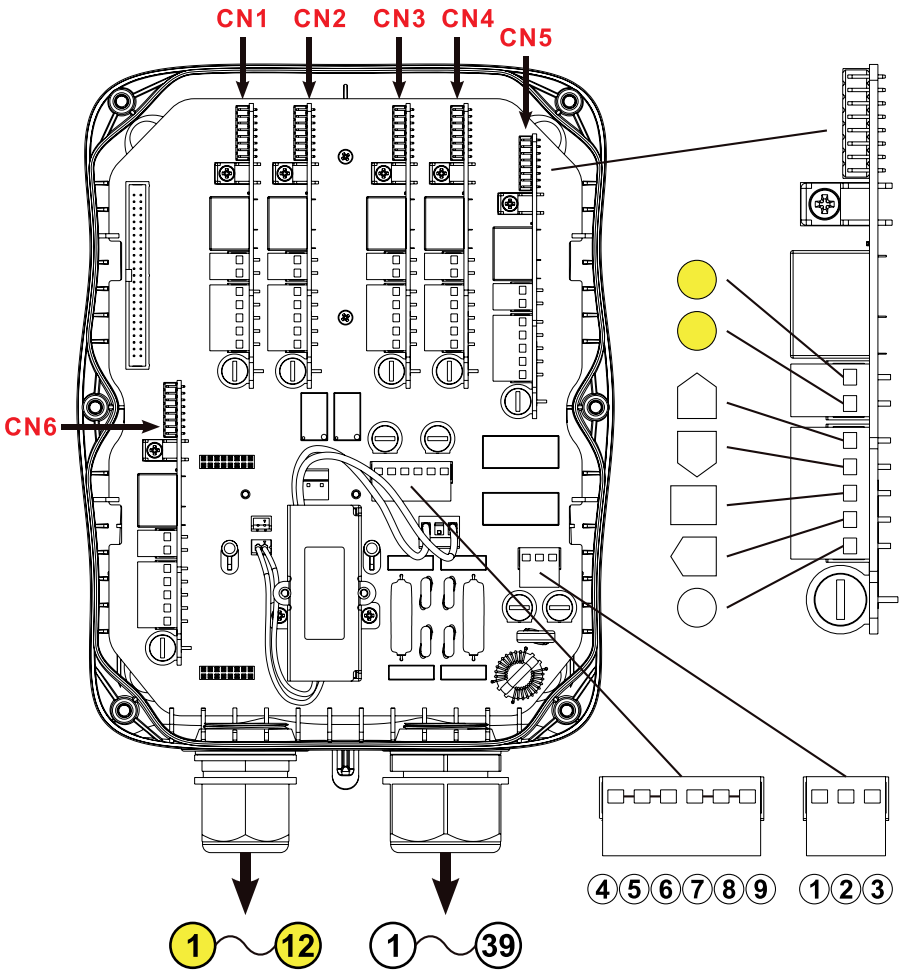
5.1 Wiring Instructions

5.1.1 Receiver Output Module Layouts

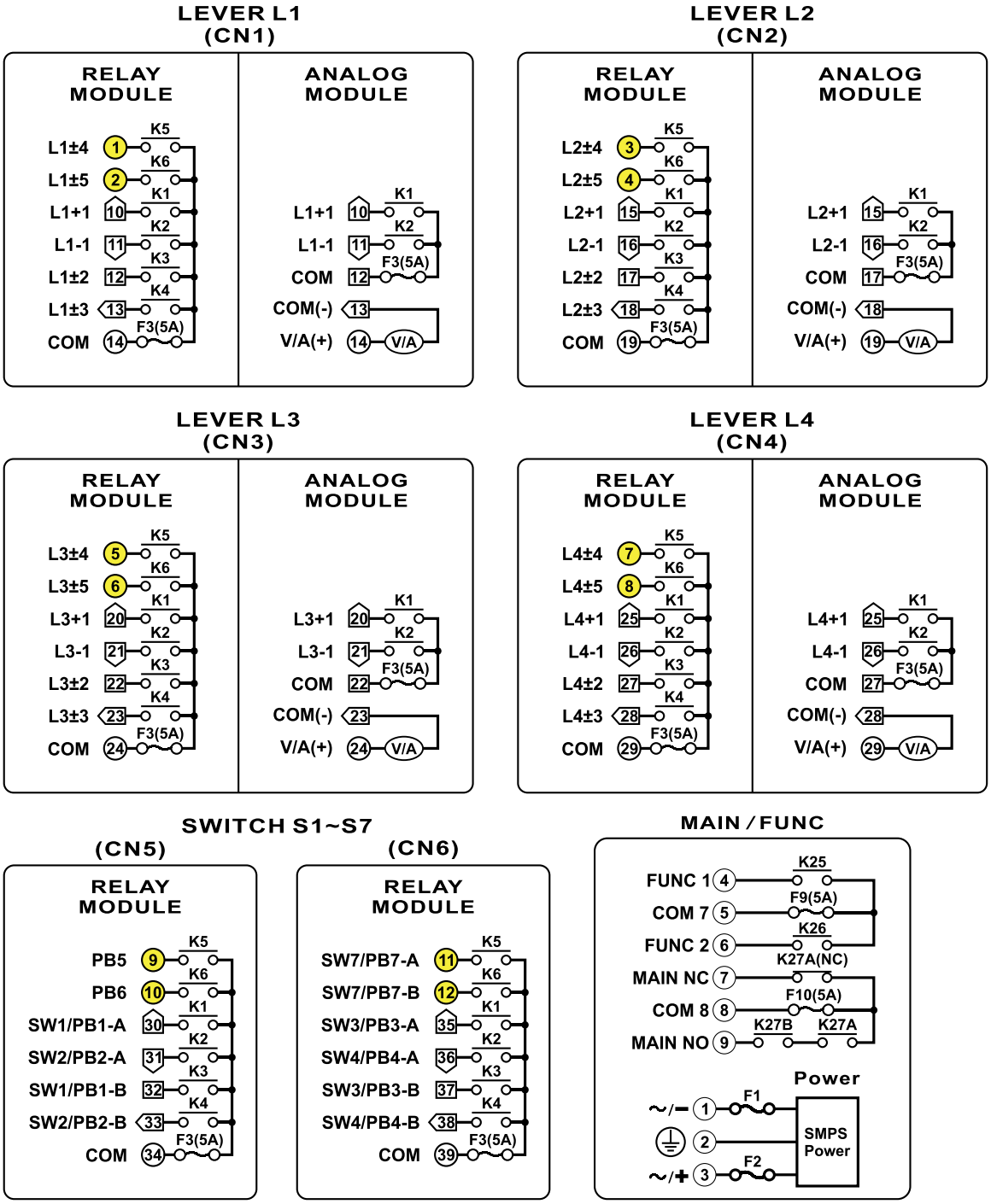
Lever Configuration



L1 → CN1 L2 → CN2 L3 → CN3
L4 → CN4 S1/S2/S5/S6 → CN5
S3/S4/S7 → CN6



5.1.2 Lever Wiring Diagrams



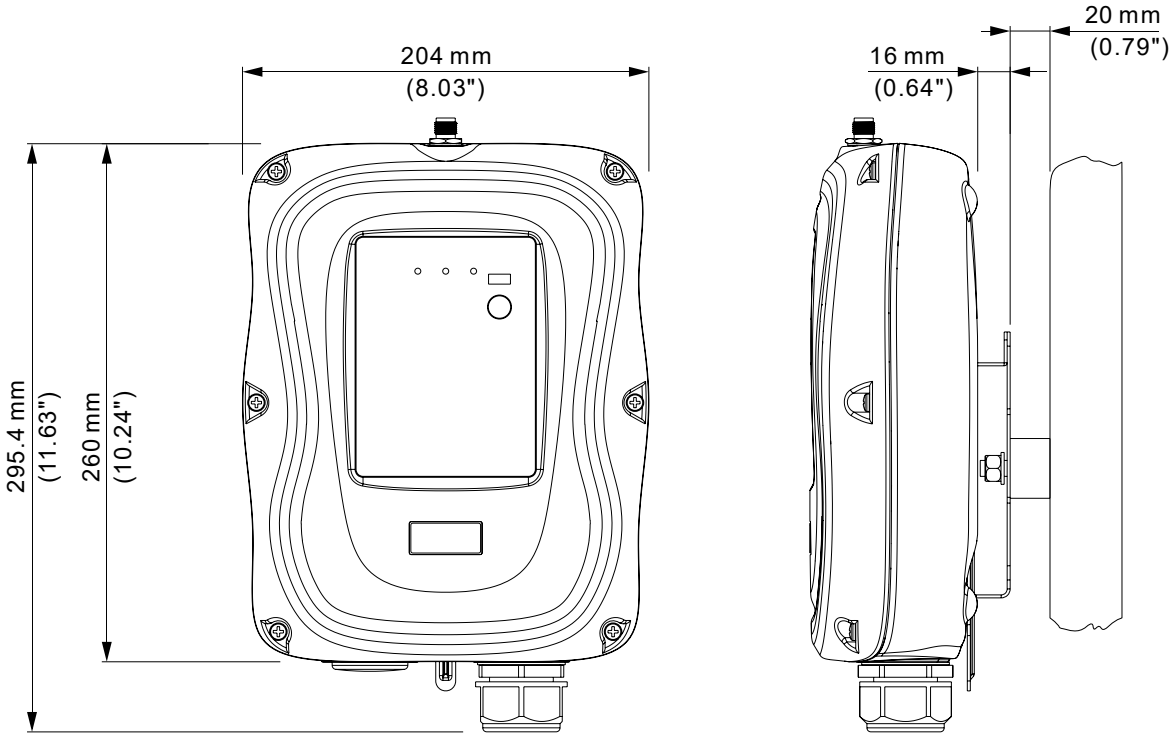
** Refer to Section 4.2.3.1 Joystick and Lever Stepped Relay Outputs if your relay output arrangements are different than the above manufacture preset (Type-A).*

** For 9~36VDC power supply, wire #1 corresponds to the negative charge (-) and wire #3 corresponds to the positive charge (+). Wire #2 or the green/yellow wire connects to AC ground.*

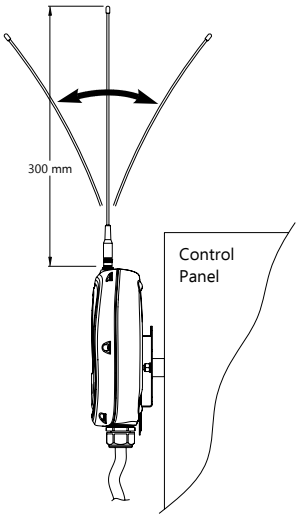
5.2 Pre-installation Precautions

1. Make sure the transmitter and receiver are configured with identical serial number and channel.
2. Make sure the receiver is not set to the same channel as any other system in use in the surrounding area.
3. Make sure the crane or equipment is working properly prior to installation.
4. Make sure the power source to the receiver is set correctly.
5. Switch off the main power source to the crane or equipment prior to installation.

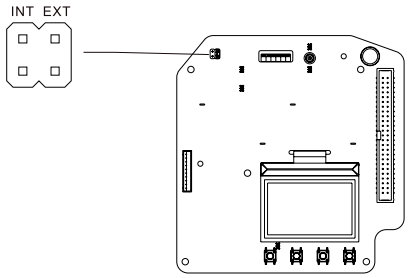
5.3 Step-By-Step Installation



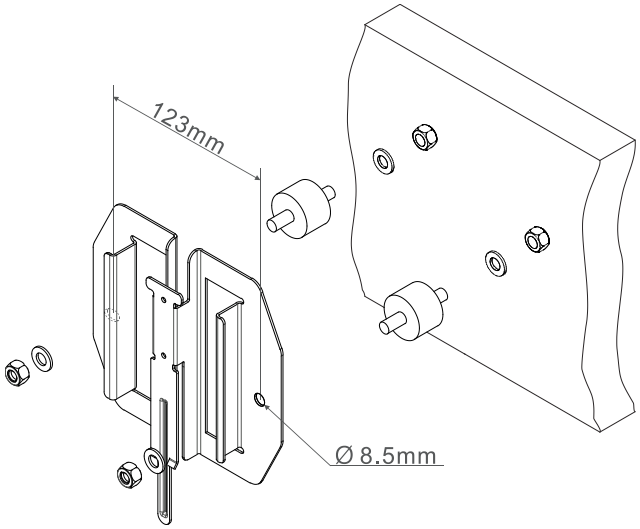
1. For best reception, the location of the receiver should be visible to the operator at all times.
2. The location selected should not be exposed to high levels of electrical noise. Mounting the receiver next to an unshielded variable frequency drive may cause radio interference. Always locate the receiver as far away from variable frequency drives and electric motors as possible.
3. Ensure the selected location has adequate space to accommodate the receiver. If an external antenna is used, to avoid the possibility of antenna damage, always locate the receiver where the antenna is free from any obstacles.



4. When installing an external antenna, make sure the MCX jack located on the decoder board inside the receiver is connected and the jumper is set to the “EXT” position.

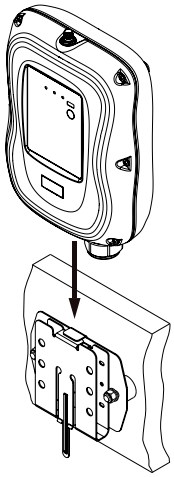


5. For better reception, make sure the receiver is in an upright position.
6. Drill two holes on the control panel, wall or location where the receiver is to be installed.
7. Make sure the mounting bracket is fully secured after installation.

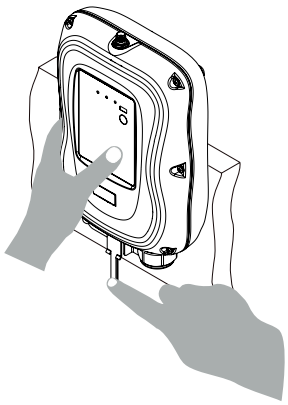


8. Slide down the receiver along the guided track to secure the receiver to the mounting bracket.
9. Remove the receiver by pressing down the bracket release and pulling the receiver upward until it clears the guided track.

Install



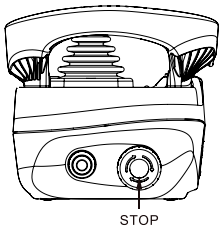
Remove



6. Operating Procedures

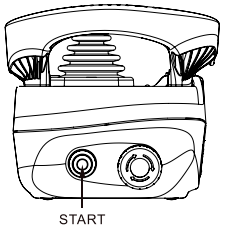
6.1 General Operation

a. Reset the STOP button located on the right side of the transmitter by pulling it outward or rotating it clockwise, the button will pop up. Transmitter power is turned on when the STOP button is elevated.



b. After the transmitter powers on, check the Status LED on the transmitter for any sign of system irregularities (refer to section 6.10.1 Transmitter Status Indications). If the transmitter is in good working order, the Status LED will display constant green for up to 2 seconds at power on (no faults detected).

c. Press and hold the START button located on the right side of the transmitter for up to 2.0 seconds (transmitter Status LED constant green) to activate the receiver MAIN relays. The transmitter Status LED will change from constant green to constant orange when receiver MAIN relays are activated (system on). The same START button becomes an auxiliary function thereafter (refer to section 4.2.1.1 START + AUX Function). Executing any transmitter command prior to pressing the START button at system startup will result in no signals transmitted (Status LED blinks orange).



d. Now initiate any command on the transmitter to begin operation. During transmitter inactivity (no command initiated), the transmitter will automatically switch to standby mode, with an orange blink on the Status LED every 4-second interval. Always turn off the transmitter power when not in use to save battery power.

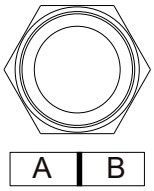
e. In case of an emergency, press down the STOP button to disconnect the receiver MAIN relays and the transmitter power (Status LED blinks 3 reds and then shuts off). To resume operation, rotate the STOP button clockwise or pull it outward, the button will pop up. Then press and hold the START button for up to 2 seconds to reconnect the receiver MAIN relays. For safety, executing the START command is strictly required every time when the transmitter is turned on or after every STOP button reset.

f. After 5 minutes of transmitter inactivity, the receiver MAIN relays are temporarily disconnected (refer to section 4.1.5 Inactivity Timer Settings). The Status LED blinks 3 reds and then shuts off. Press the START button to reactivate the receiver MAIN relays and resume operation (refer to section 4.1.4 Start Function Settings).

g. Turn off the transmitter power by pressing down the STOP button; it will disconnect the transmitter power and the receiver MAIN relays altogether.

6.2 A/B Button Select Operation

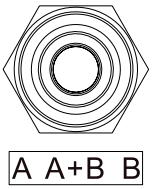
Pressing the “A/B” button repeatedly toggles between output relay A, B and A+B respectively. There are 5 different types of Select A/B sequence available (refer to section 4.1.8.2).



Standard – Output relay A activated at A position, output relay B activated at B position, both output relays activated at A+B position.

Reversed logic - Output relay A activated at B position, output relay B activated at A position, both output relays deactivated at A+B position. Refer to section 4.2.4 JP3 jumper settings.

6.3 A/B Toggle Switch Select Operation



Standard - Moving to position A activates output relay A, moving to position B activates output relay B, moving to the A+B position activates both output relays.

Reversed logic - Moving to position A activates output relay B, moving to position B activates output relay A, moving to position A+B deactivates both output relays. Refer to section 4.2.4 JP3 jumper setting.

6.4 Pitch & Catch Operation

Press the “PITCH” button for up to 2 seconds to release control of the receiver. After a 2-second grace period, press the START button for up to 2 seconds to gain control of the receiver. The 2nd operator is unable to take control of the receiver unless the 1st operator presses the “PITCH” button. Refer to section 4.2.1.7 on how to set to this function.

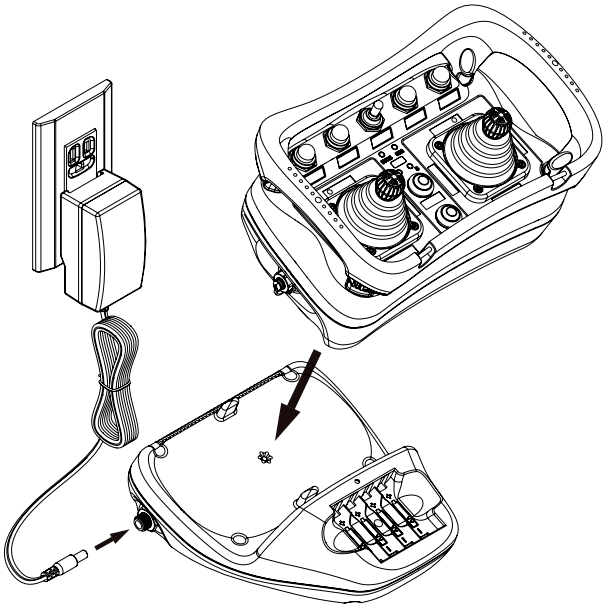
6.5 Changing Batteries

Change the transmitter batteries (“AA” alkaline battery x 4) by unscrewing the battery cover located on the backside of the transmitter. During battery installation, make sure the batteries are installed correctly, with “+” to “+” charge and “–” to “–” charge. Also make sure the screw is tightened after battery installation to avoid water, moisture, dirt, grease, and other liquid penetration. Do not use lithium-ion batteries.

6.6 Battery Charging

The transmitter is designed to accept any off-the-shelf Ni-MH rechargeable batteries. When charging both transmitter and individual batteries at the same time, the priority always goes to transmitter charging. Individual battery charging begins only after the transmitter charging is completed. Depending on the battery capacity, the average charging time is approximately 2 hours from completely drained to fully charged. Constant red on the transmitter battery charging LED (when charging the transmitter) and charging station LED (when charging individual batteries) indicates charging is in progress; constant green indicates that the batteries are fully charged; and LED off indicates no batteries are detected. Please do not use any rechargeable lithium-ion batteries as it will damage both the transmitter and the charging station.

Wireless Charging



Plugin Charing

6.7 System Status Light Indications

6.7.1 Transmitter Status Indications

Type	Display Type	Indication
1	Constant red	Voltage below 3.8V at initial power on (change batteries suggested)
2	Slow red blinks	Voltage below 3.7V during operation (change batteries suggested)
3	Constant red	Voltage below 3.6V during operation (change batteries suggested)
4	Constant red → off	Voltage below 3.5V during operation (receiver MAIN relays shut off)
5A	2 red blinks	Defective button, switch, joystick or lever internal contact detected at initial transmitter power on.
5B	No light displayed	When defective internal contact condition occurs per type 5A above, find out which internal contact is defective by initiating all buttons, switches, joysticks and levers one at a time. The Status LED shuts off if the internal contact is in good working order. The Status LED maintain 2 red blinks if the internal contact is defective.
6	3 red blinks	Zero-G sensor triggered, receiver MAIN relay deactivated.
7	4 red blinks	Transmitter is unable to lock onto the assigned channel
8	Constant green for up to 2 seconds	Transmitter power on with no faults detected
9	Blinking green	Transmission in progress
10	Blinking orange	Initiating any transmitter command prior to pressing the START button at power on
11	3 slow red blinks → off	STOP button pressed down
12	4 orange blinks	Transmitter on standby
13	2 orange blinks	Receiver MAIN relays jammed or defective
14	3 orange blinks	Decoding processors defective
15	Constant orange when START button is pressed at initial system startup	Receiver MAIN relays activated

6.7.2 Receiver Status Indications

Type	Display Type (Green & Red)	Indication
1	Fast green blinks	Decoding in process
2	Slow green blinks	Decoding on standby
3	2 red blinks	Receiver MAIN relays jammed or defective
4	3 red blinks	Decoding processors defective
5	4 red blinks	Receiving RF board defective
6	Fast red blinks	Incorrect transmitter serial number
7	Constant red	Receiver low voltage
8	No light displayed	Decoding processors defective
9	3 slow red blinks followed by slow green blinks	STOP button pressed down

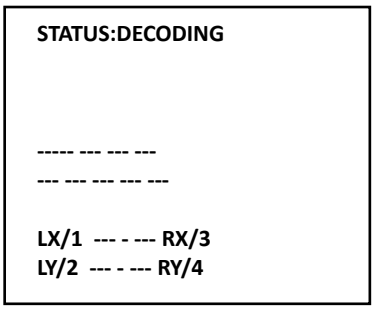
6.7.3 Receiver Power Indications

Type	Display Type (Red)	Indication
1	On	Power to receiver
2	Off	No power to receiver

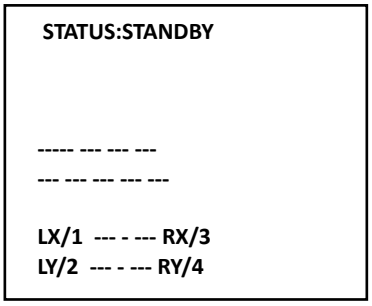
6.7.4 Receiver COM Indications

Type	Display Type (Red)	Indication
1	On	Power to relay Board
2	Off	No power to relay board

6.7.5 Receiver Status LCD Indications



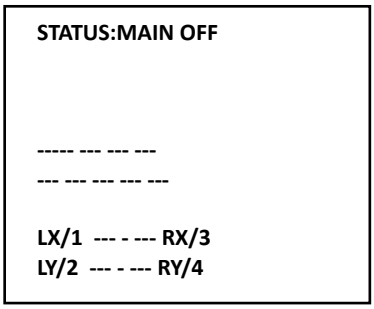
Decoding in progress



Decoding on standby

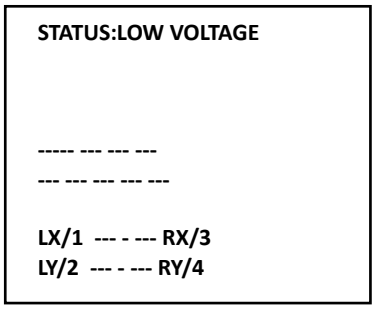
Transmitter timeout

Stop button pressed down

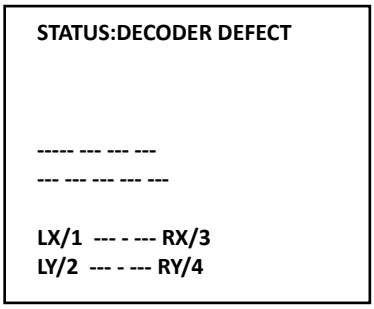


Stop button pressed down

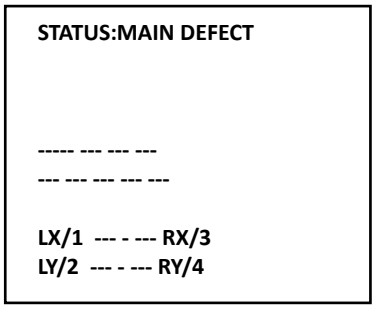
Transmitter timeout



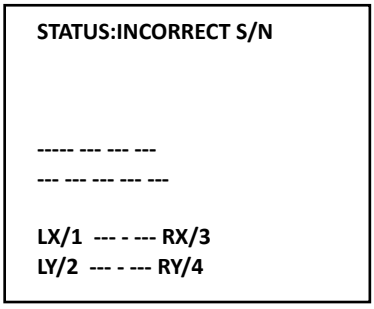
Receiver low voltage



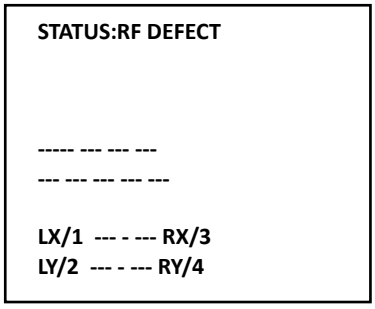
Decoder board defective



MAIN relay defective



Incorrect TX serial number



RF board defective

7. General Specifications

Frequency Range	:	433.050MHz ~ 439.600MHz
Number of Channels	:	62 channels
Channel Spacing	:	50 KHz
Modulation	:	Digital Frequency Modulation based on Manchester Code, 20bit address, 32bit CRC and Hamming Code.
Encoder & Decoder	:	Microprocessor-controlled
Transmitting Range	:	＞100 Meters (300 feet)
Hamming Distance	:	＞6
Frequency Control	:	Synthesized PLL
Receiver Type	:	Frequency Auto Scanning
Receiver Sensitivity	:	-116dBm
Spurious Emission	:	-50dB
Antenna Impedance	:	50 ohms
Responding Time	:	40mS (average)
Transmitting Power	:	6.0mW
Enclosure Type	:	NEMA4
Enclosure Rating	:	IP66
Output Contact Rating	:	250V @ 8 Amps
Transmitter Operating Voltage	:	6.0VDC
Receiver Power Consumption	:	22VA (max)
Available Receiver Voltages	:	100~240VAC
Operating Temperature	:	-25°C ~ 75°C / -13°F ~ 167°F
Transmitter Dimension	:	229mm (L) x 141.5mm (W) x 129.2mm (H)
Receiver Dimension	:	260mm (L) x 204mm (W) x 83mm (H)
Transmitter Weight	:	1,0kg / 2.2lb (include batteries)
Receiver Weight	:	2.64kg / 5.8lb (include output cable)

EU Declaration of Conformity Certificate

For the following equipment:

Product	:	Magnetek ZLTX Radio Remote Control Transmitter
Multiple Listee Model No.	:	ZLTX
Manufacturer's Name	:	Columbus McKinnon Corporation
Manufacturer's Address	:	N49W13650 Campbell Drive Menomonee Falls, WI 53051

The undersigned hereby declares on behalf of Columbus McKinnon Corporation, that the above-referenced product, to which this declaration relates, is in conformity with the provisions of the following directives:

- Radio Equipment Directive (2014/53/EU)
- Machinery Safety Directive (2006/42/EC)
- Low Voltage Directive (2014/35/EU)

The Object of the declaration described above is in conformity with Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

The standards relevant for the evaluation of the product referenced above conformity to the directive requirements are as follows:

EN ISO 13849-1: 2015
EN60204-32:2008
EN 61010-1: 2010 + A1: 2019
EN 60529
EN 62479
EN 13557: 2023 + A2:2008

EN 55032 + EN 55035
EN 300 220-1 v3.1.1
EN 300 220-2 v3.2.1
EN 301 489-1 v2.2.3
EN 301 489-3 v2.1.1

The Technical Construction File is maintained at:

Columbus McKinnon Corporation
13830 Ballantyne Corporate Place
Suite 300
Charlotte, NC 28277 USA

The European contact for technical documentation is:

STAHL CraneSystems, Ltd.
Daimlerstrasse 6
74653 Künzelsau
Germany

Per Annex II.B of the Machinery Directive (2006/42/EC):

The machinery, product, assembly or sub-assembly covered by this Declaration of Conformity must not be put into service until the machinery into which it is to be incorporated has been declared in conformity with the provisions of the applicable Directive(s). This statement is only necessary where the product is to be incorporated into a machine or system (e.g. a safety component).

Signature of Authorized Person:

Associate Product Manager, Wireless Controls
Columbus McKinnon Corporation
Date of Issuance: 4/16/2025

Distributed by Tri-State Equipment Company Inc.
www.TSOverheadCrane.com
Tel: (314) 869-7200

ZLTX Radio Remote Control
Instruction Manual
June 2025