

***FLEX**EPV*

Instruction Manual



Service Information

Your New Radio Remote Control System

Thank you for your purchase of ARC Flex EPV radio remote control system. Without a doubt, our Flex EPV system is the ultimate solution for providing precise, undeterred, and safe control of your material.

If your product ever needs modification or service, please contact our representative in your country or at the following location:

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PRODUCT MANUAL SAFETY INFORMATION

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

The recommendations in this manual do not take precedence over any of the following requirements relating to cranes, hoists lifting devices or other material handling equipment which use or include ARC Products:

- 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 ARC Products are being used.
- Safety standards and practices for the industries in which ARC Products are used.

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 the ARC 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 ARC Products prior to becoming familiar with and being trained in these requirements and the instructions and safety recommendations in this manual.**

WARRANTY INFORMATION

For information on ARC's product warranties, please contact ARC representative nearest to you or visit www.advanced-radiotech.com.

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.

(b) For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

- 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 aux appareils 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 radioélectrique 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

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1. Introduction

The **Flex EPV** 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 **Flex EPV** system consists of a transmitter handset and a receiver unit. Other standard-equipped accessories include transmitter waist belt, pushbutton labels, LED labels, prewired output cable and instruction manual CD.

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 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 and as well as receiver to receiver with system status and relay output feedbacks.
- * **Programmable Transmitter Access Card (TAC)** – the optional transmitter access card feature (TAC) further guard against any unauthorized personnel from operating the transmitter. The TAC can also be individually programmed unlocking any specific function or functions on the transmitter allowing a more experienced or qualified user to operate. Not available on the 4-button Flex 4EPV model.
- * **Zero-G Sensor Imbedded** – 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 Pushbuttons** – the inductive-type step/stepless pushbuttons are rated for more than five million press cycles. The defined snap-action steps provide positive tactile feedback even wearing gloves.
- * **Low Power Consumption** – requires only two “AA” alkaline batteries for more than 100 hours of uninterrupted operation between replacements.
- * **Durable Nylon and Fiberglass Composite Enclosures** – highly resistance 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 complied with the FCC Part-15 Rules, IC and European Safety Standards.
- * **Other Optional Accessories and Features** – transmitter magnet mount, transmitter belt clip, transmitter lanyard, transmitter rubber guard, transmitter padded casing, transmitter shoulder strap, 2 and 3 positions rotary switches, miniature indicator light and horn kits, wire and wireless charging stations, plugin charger, external antenna kit, tandem function, random access function, multiple-receiver function, and many others.

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 ARC 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 DESCRIPTION



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. Drop controllers can cause delicate electronic parts to loosen and affect the use of functions.

2.11 POWER SUPPLY

The POWER front end must be equipped with circuit breaker as the way to power off the product.

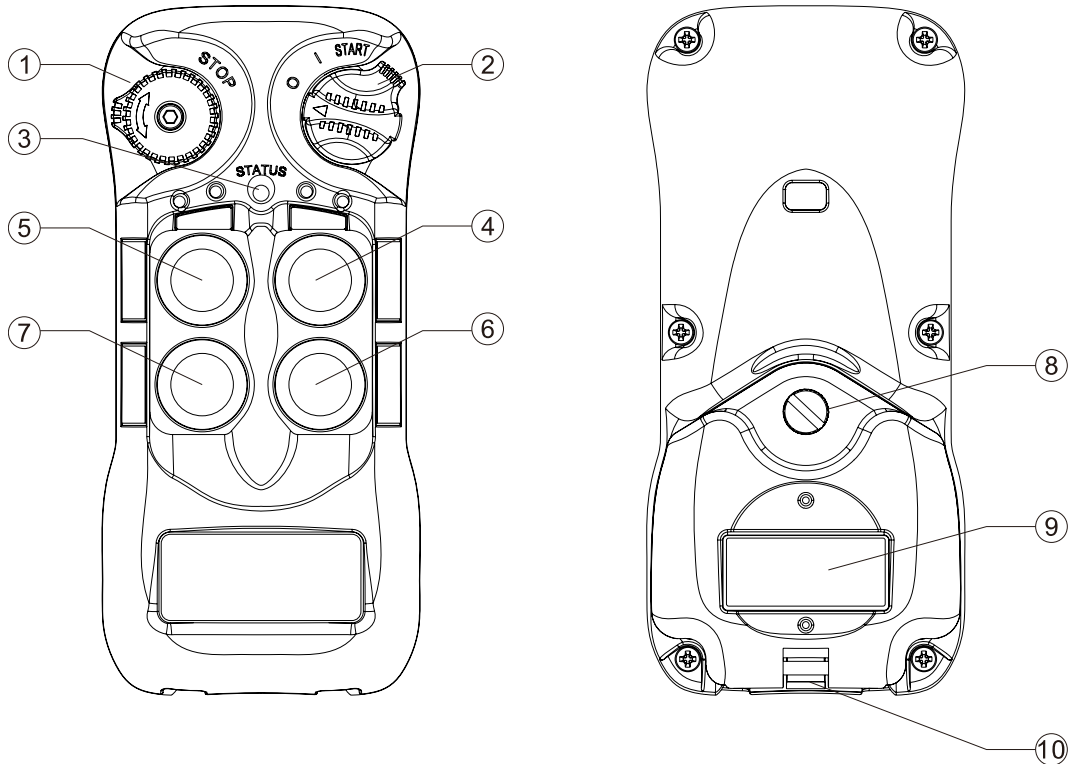
2.12 ENVIRONMENT CONDITION

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

3. General System Information

3.1 Transmitter

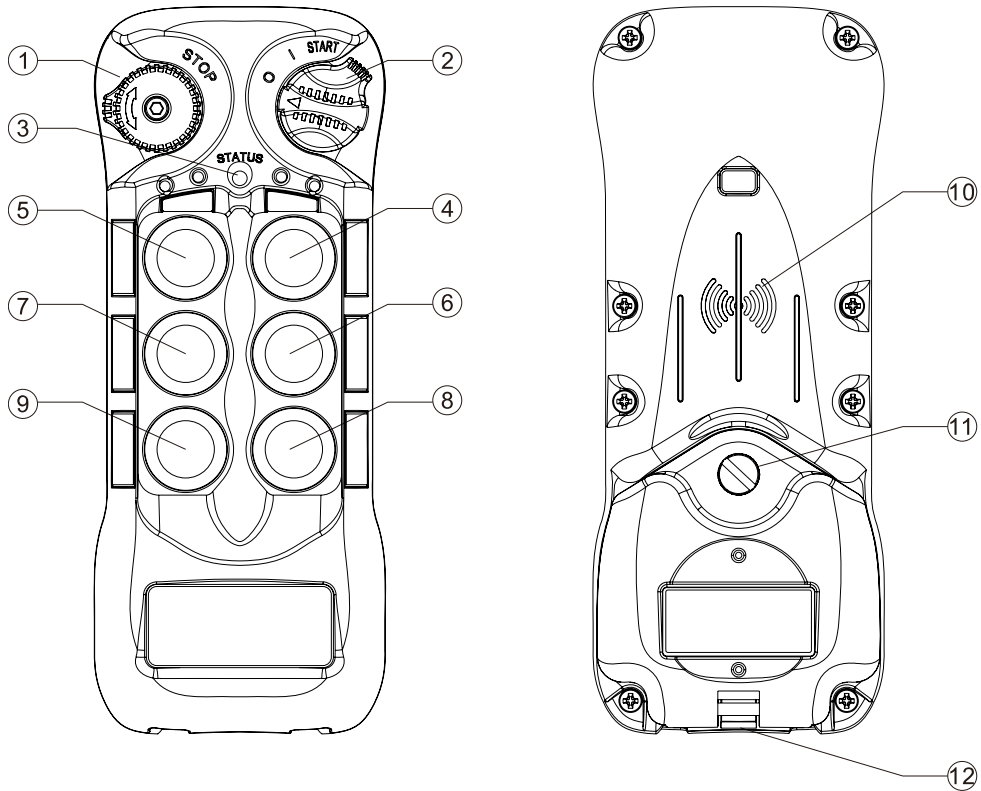
3.1.1 Flex 4EPV External Illustration



- 1. STOP Button
- 2. Power Key Switch
- 3. Status LED Indicator
- 4. Pushbutton 1 (PB1)
- 5. Pushbutton 2 (PB2)
- 6. Pushbutton 3 (PB3)

- 7. Pushbutton 4 (PB4)
- 8. Battery Cover Screw
- 9. System Information
- 10. Lanyard and Waist Belt Attachment Slot

3.1.2 Flex 6EPV External Illustration

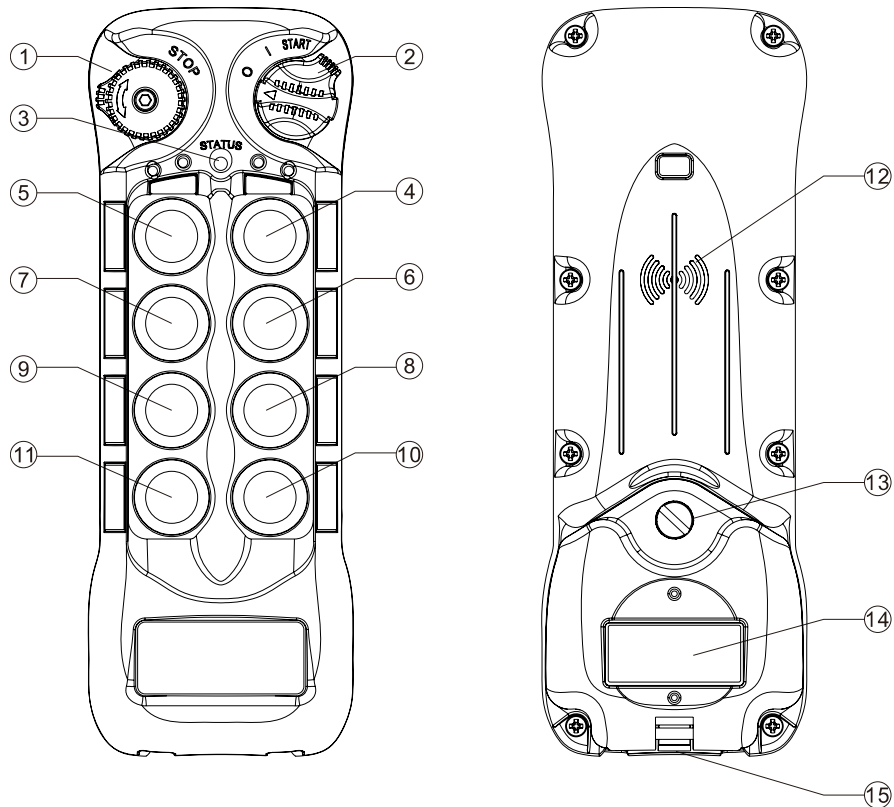


1. STOP Button
2. Power Key Switch
3. Status LED Indicator
4. Pushbutton 1 (PB1)
5. Pushbutton 2 (PB2)
6. Pushbutton 3 (PB3)

7. Pushbutton 4 (PB4)
8. Pushbutton 5 (PB5)
9. Pushbutton 6 (PB6)
10. TAC* and Wireless Charging Slot
11. Battery Cover Screw
12. Lanyard and Waist Belt Attachment Slot

* Transmitter Access Card

3.1.3 Flex 8EPV External Illustration

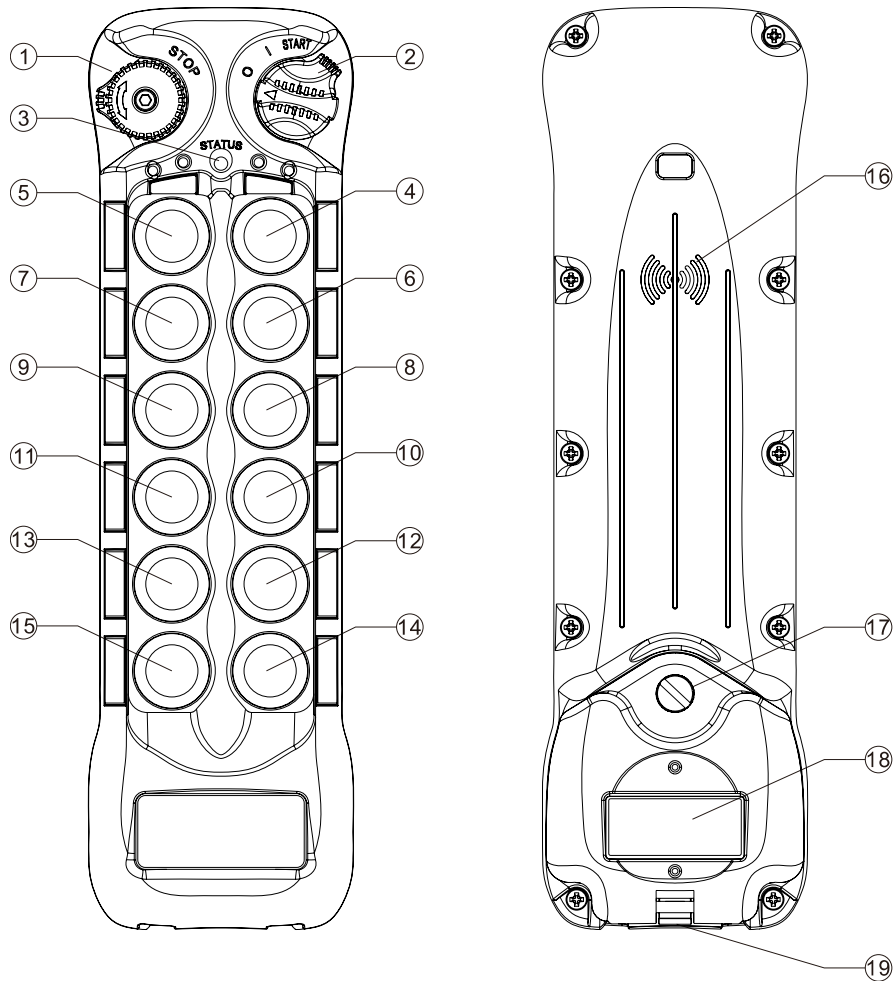


- | | | | |
|----|----------------------|-----|---------------------------------|
| 1. | STOP Button | 9. | Pushbutton 6 (PB6) |
| 2. | Power Key Switch | 10. | Pushbutton 7 (PB7) |
| 3. | Status LED Indicator | 11. | Pushbutton 8 (PB8) |
| 4. | Pushbutton 1 (PB1) | 12. | TAC* and Wireless Charging Slot |
| 5. | Pushbutton 2 (PB2) | 13. | Battery Cover Screw |
| 6. | Pushbutton 3 (PB3) | 14. | System Information |
| 7. | Pushbutton 4 (PB4) | 15. | Lanyard and Waist Belt |
| 8. | Pushbutton 5 (PB5) | | Attachment Slot |

* Transmitter Access Card

Note: Flex 8EPV-AB and 8EPV-T models are with A/B/A+B rotary switch on PB8 slot.

3.1.4 Flex 12EPV External Illustration



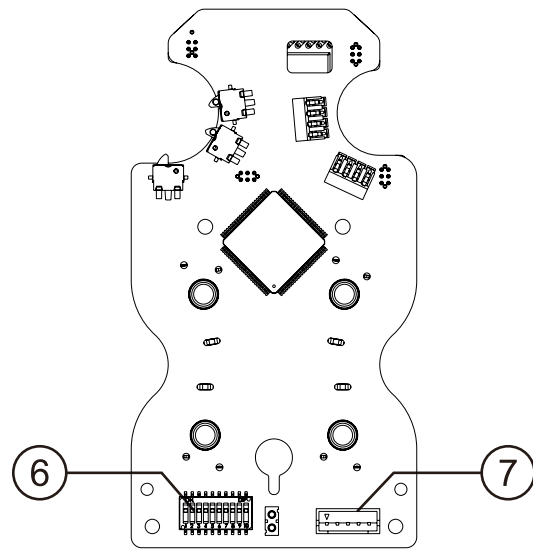
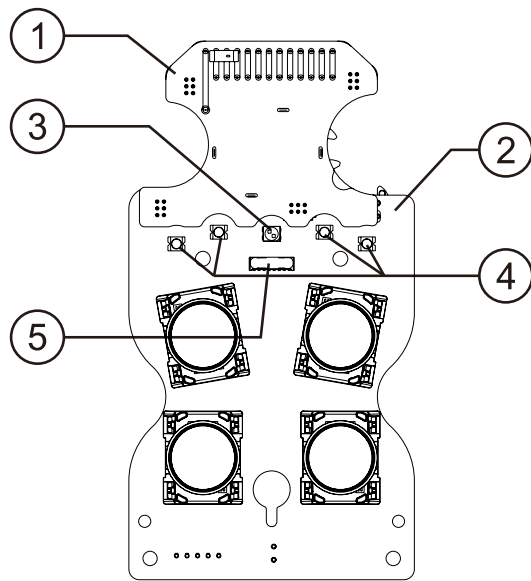
1. STOP Button
2. Power Key Switch
3. Status LED Indicator
4. Pushbutton 1 (PB1)
5. Pushbutton 2 (PB2)
6. Pushbutton 3 (PB3)
7. Pushbutton 4 (PB4)
8. Pushbutton 5 (PB5)
9. Pushbutton 6 (PB6)
10. Pushbutton 7 (PB7)

11. Pushbutton 8 (PB8)
12. Pushbutton 9 (PB9)
13. Pushbutton 10 (PB10)
14. Pushbutton 11 (PB11)
15. Pushbutton 12 (PB12)
16. TAC* and Wireless Charging Slot
17. Battery Cover Screw
18. System Information
19. Lanyard and Waist Belt Attachment Slot

* Transmitter Access Card

Note: Flex 12EPV-AB and 12EPV-T models are with A/B/A+B rotary switch on PB12 slot.

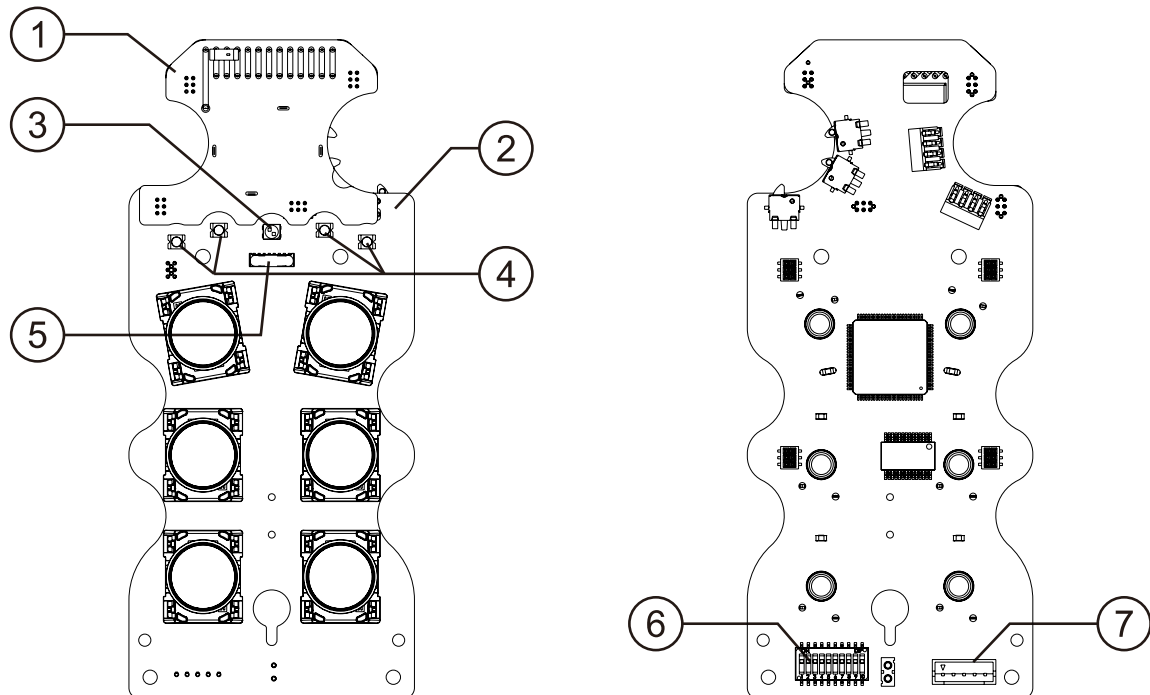
3.1.5 Flex 4EPV Internal Illustration



1. RF Transceiver Board
2. Encoder Board
3. Status LED Indicator
4. LED 1/2/3/4 Indicators

5. Infrared Sensors
6. Function Dipswitch
7. Programming Port

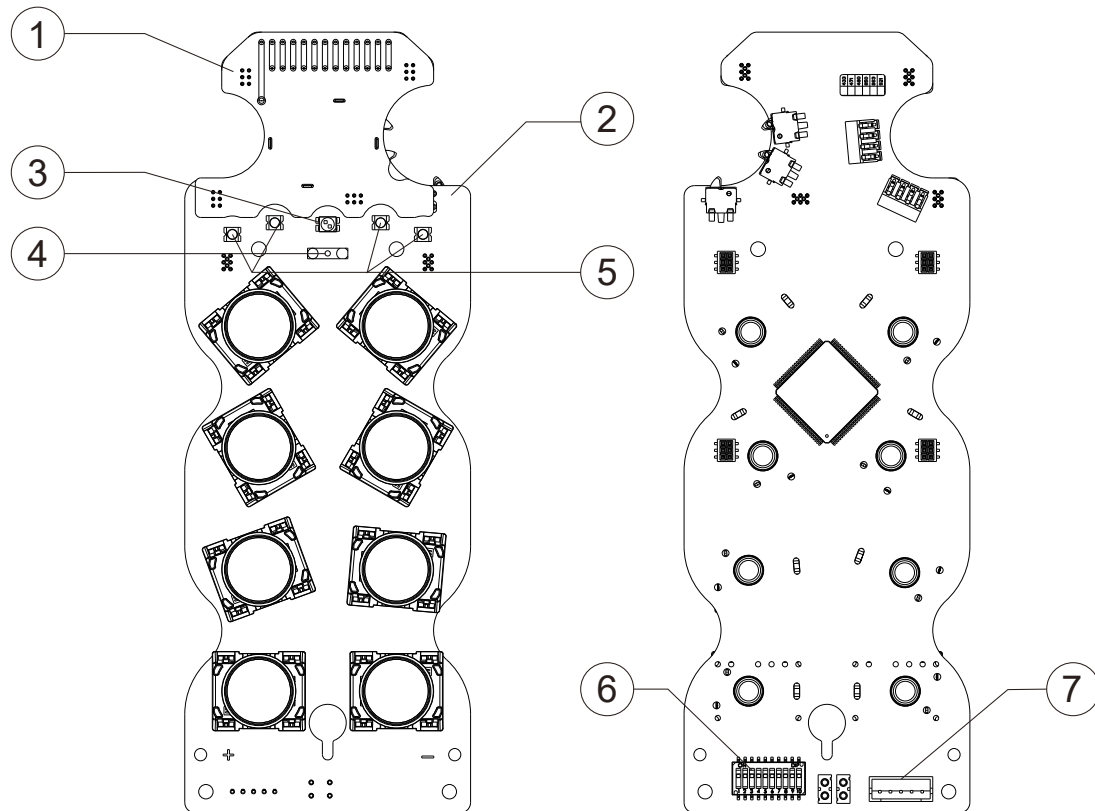
3.1.6 Flex 6EPV Internal Illustration



1. RF Transceiver Board
2. Encoder Board
3. Status LED Indicator
4. LED 1/2/3/4 Indicators

5. Infrared Sensors
6. Function Dipswitch
7. Programming Port

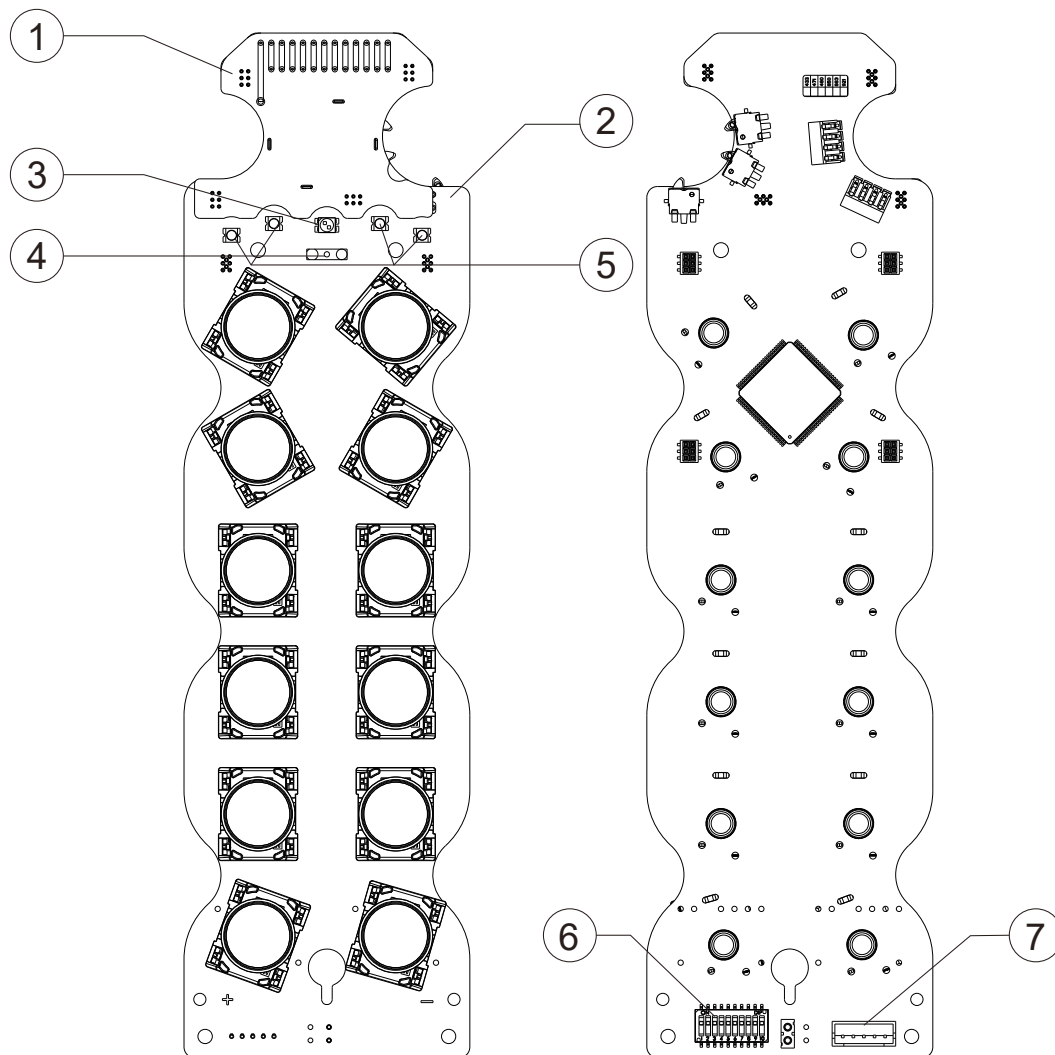
3.1.7 Flex 8EPV Internal Illustration



- | | | | |
|----|----------------------|----|------------------------|
| 1. | RF Transceiver Board | 5. | LED 1/2/3/4 Indicators |
| 2. | Encoder Board | 6. | Function Dipswitch |
| 3. | Status LED Indicator | 7. | Programming Port |
| 4. | Infrared Sensors | | |

Note: Flex 8EPV-AB and 8EPV-T models are with A/B/A+B rotary switch on PB8 slot.

3.1.8 Flex 12EPV Internal Illustration

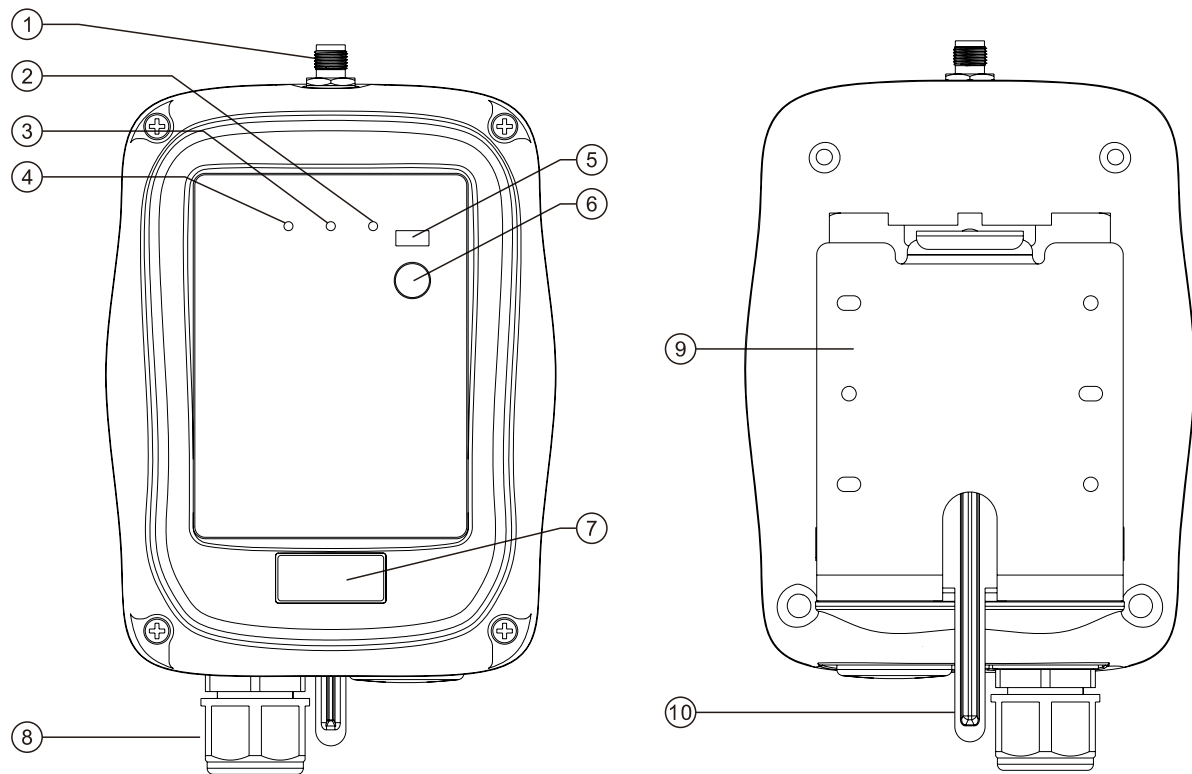


- | | | | |
|----|----------------------|----|------------------------|
| 1. | RF Transceiver Board | 5. | LED 1/2/3/4 Indicators |
| 2. | Encoder Board | 6. | Function Dipswitch |
| 3. | Status LED Indicator | 7. | Programming Port |
| 4. | Infrared Sensors | | |

Note: Flex 12EPV-AB and 12EPV-T models are with A/B/A+B rotary switch on PB12 slot.

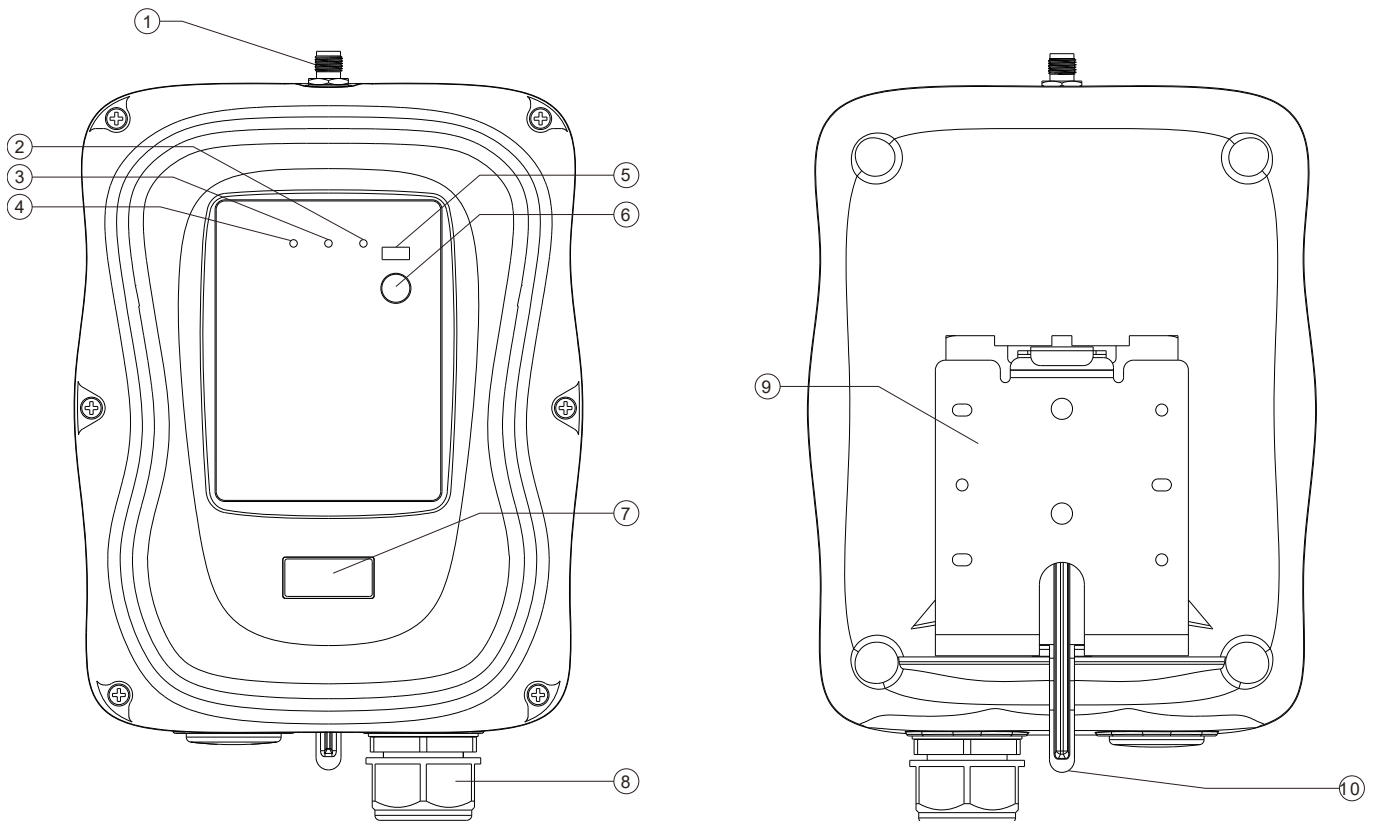
3.2 Receiver

3.2.1 Flex 4EPV and 6EPV External Illustration



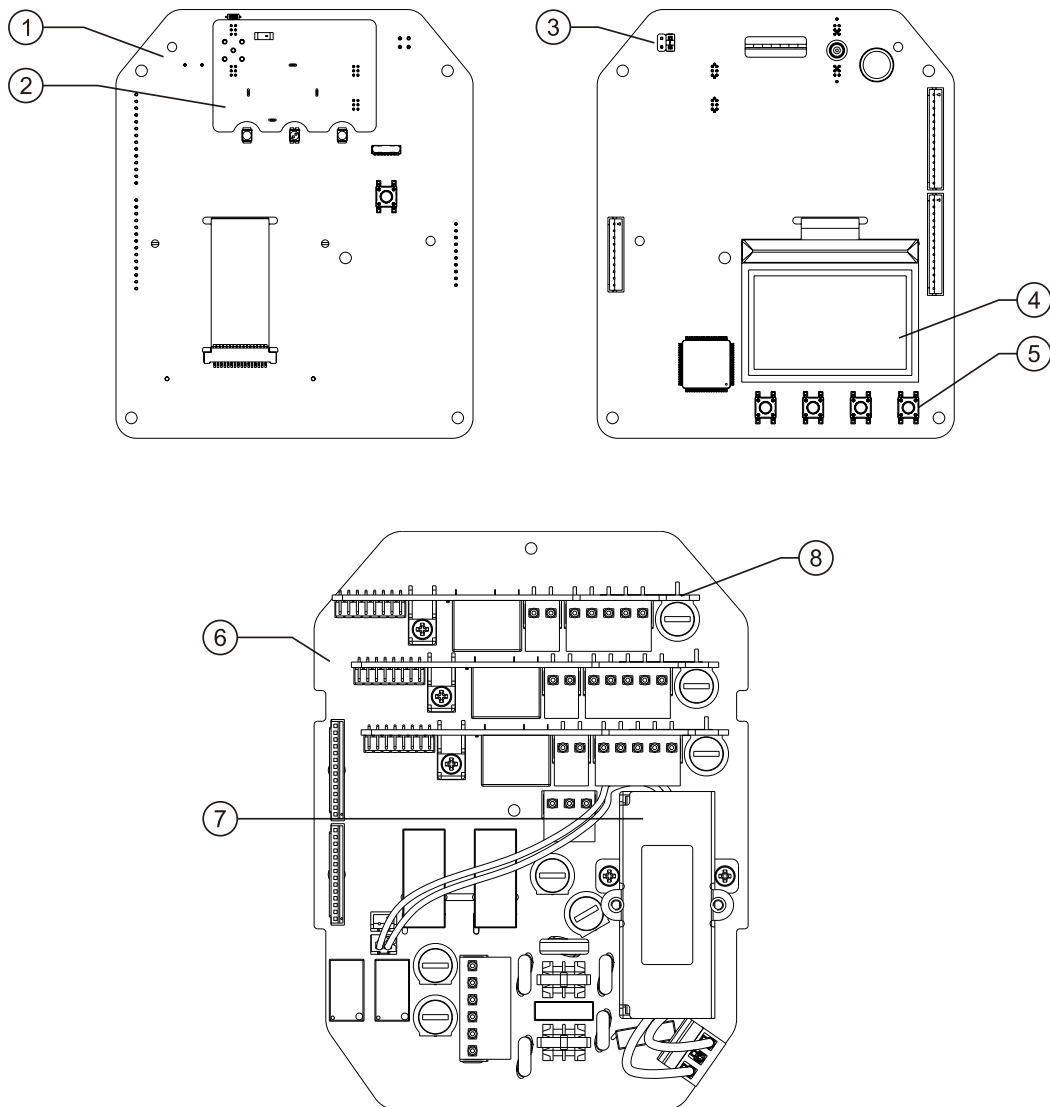
- | | | | |
|----|----------------------------------|-----|--------------------------|
| 1. | External Antenna Port (optional) | 6. | Remote Pairing Button |
| 2. | COM LED Indicator | 7. | System Information |
| 3. | Status LED Indicator | 8. | Cord Grip |
| 4. | Power LED Indicator | 9. | Mounting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

3.2.2 Flex 8EPV and 12EPV External Illustration



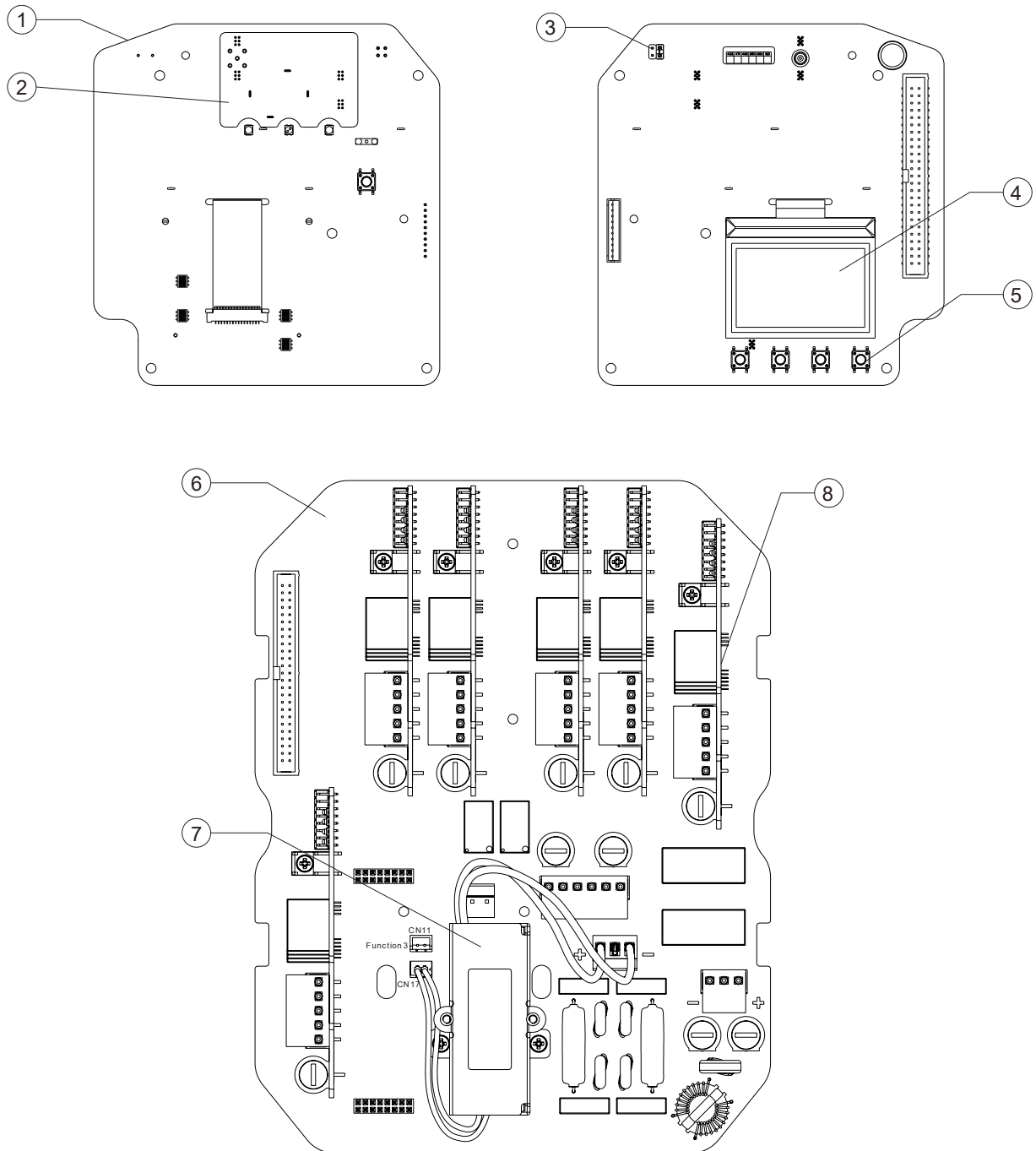
- | | | | |
|----|----------------------------------|-----|--------------------------|
| 1. | External Antenna Port (optional) | 6. | Remote Pairing Button |
| 2. | COM LED Indicator | 7. | System Information |
| 3. | Status LED Indicator | 8. | Cord Grip |
| 4. | Power LED Indicator | 9. | Mounting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

3.2.3 Flex 4EPV and 6EPV Internal Illustration

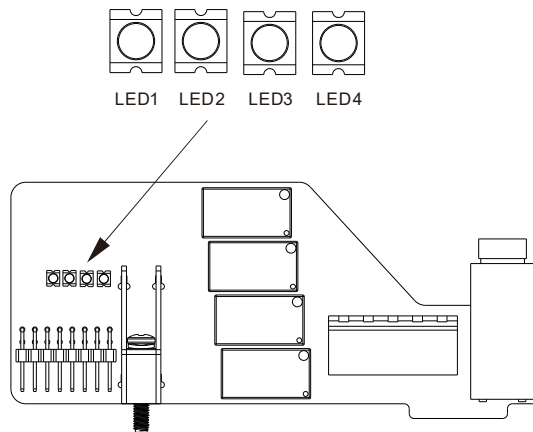


- | | | | |
|----|-------------------------|----|---|
| 1. | Decoder Board | 5. | Programming Buttons |
| 2. | RF Transceiver Board | 6. | Line Filter/Digital/Analog Mother Board |
| 3. | INT/EXT Antenna Jumpers | 7. | Power Transformer |
| 4. | LCD Screen | 8. | Digital & Analog Output Modules |

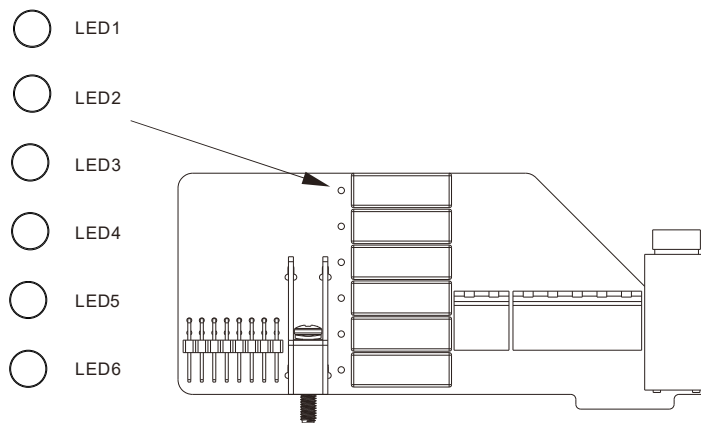
3.2.4 Flex 8EPV and 12EPV Internal Illustration



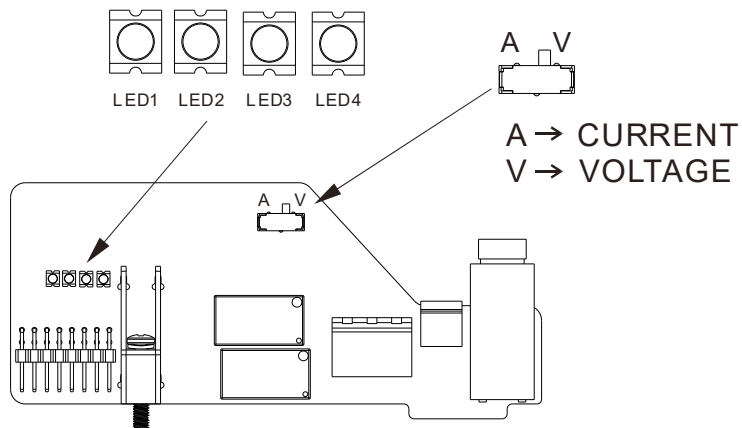
- | | | | |
|----|-------------------------|----|---|
| 1. | Decoder Board | 5. | Programming Buttons |
| 2. | RF Transceiver Board | 6. | Line Filter/Digital/Analog Mother Board |
| 3. | INT/EXT Antenna Jumpers | 7. | Power Transformer |
| 4. | LCD Screen | 8. | Digital & Analog Output Modules |



2-Step Relay Module (for 1-step and 2-step pushbutton pair)



3-Step Relay Module (for 3-step pushbutton pair)



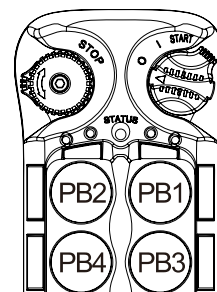
Analog Module (for stepless pushbutton pair)

4. Function Settings

4.1 Transmitter

4.1.1 Transmitter Firmware Version

- 1) Rotate the power switch key to OFF (0) position.
- 2) With the STOP button elevated, press and hold PB1 and PB3 at the same time.
- 3) Rotate the power switch key to ON (1) position.
- 4) Let go PB1 and PB3 at the same time. The Status LED displays firmware version with red, green and orange blinks.
- 5) Exit Firmware Version mode by rotate the power switch key to OFF (0) position.

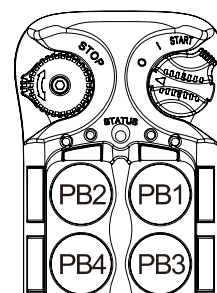


4.1.2 Transmitter Channel Settings

A. Unassigned Channel Scheme (no preset system channel)

When both transmitter and receiver is set to unassigned channel scheme (no preset channel) the system automatically search and lock onto a free and uninterrupted channel at every transmitter startup. **Tandems, random access, pitch & catch, t-type, and multi-receiver configurations cannot set to unassigned channel scheme.**

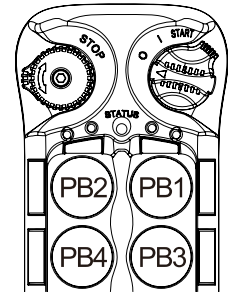
- 1) Rotate the power switch key to OFF (0) position.
- 2) With the STOP button elevated, press and hold PB1 and PB2 at the same time.
- 3) Rotate the power switch key to ON (1) position.
- 4) Let go PB1 and PB2 at the same time (entered Channel Setting mode). The Status LED displays current channel setting with red and green blinks. A green blink represents the tens (+10) and a red blink represents the units (+1). For example, 1 green blink followed by 5 red blinks is channel 15. Channel unassigned is represented by constant orange on the Status LED.
- 5) Change transmitter channel to “channel unassigned” by pressing PB4 one time (Status LED displays constant orange). Make sure constant orange is shown on the Status LED before proceeding to the next step below.
- 6) Transfer “channel unassigned” setting to the receiver by rotate and hold the power switch key at START position 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 10 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. When transmitter is set to “channel unassigned” the receiver must also set to “channel unassigned” in order for the entire system to work.
- 7) Exit Channel Setting mode by rotate the power switch key to OFF (0) position.



B. Assigned Channel Scheme (preset system channel)

Both transmitter and receiver is assigned with a matching preset channel (channel 01~62). **Tandems, random access, pitch & catch, t-type, and multi-receiver configurations must set to assigned channel scheme.**

- 1) Rotate the power switch key to OFF (0) position.
- 2) With the STOP button elevated, press and hold PB1 and PB2 at the same time.
- 3) Rotate the power switch key to ON (I) position.
- 4) Let go PB1 and PB2 at the same time (entered Channel Setting mode). The Status LED displays current channel setting with red and green blinks. A green blink represents the tens (+10) and a red blink represents the units (+1). For example, 1 green blink followed by 5 red blinks is channel 15. Channel unassigned is represented by constant orange on the Status LED.
- 5) Change transmitter channel by pressing PB1 to increment the units (+1) and PB2 to increment the tens (+10). For example, press PB2 two times and then PB1 four times is channel 24 (Status LED blinks 2 greens and 4 reds). Make sure the newly selected channel is shown on the Status LED before proceeding to the next step below.
- 6) Transfer the newly selected channel to the receiver by rotate and hold the power switch key at START position 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 10 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. **Skip step 6 if changing receiver channel is not required.**
- 7) Exit Channel Setting mode by rotate the power switch key to OFF (0) position.



Note: When selecting a new channel, make sure each button press does not exceed 3 seconds.

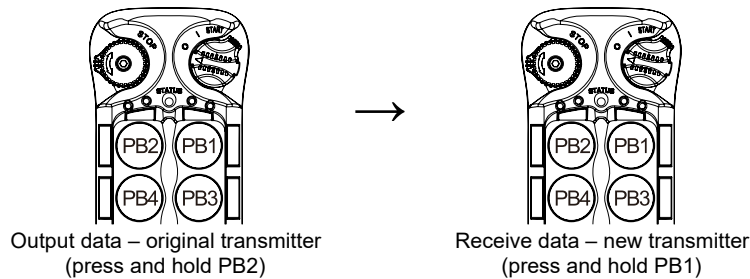
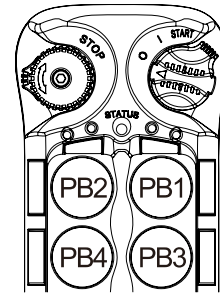
Important Note:

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:

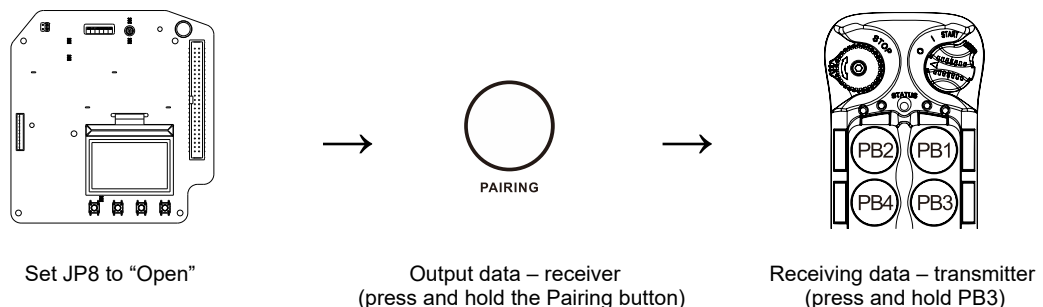
- 1) Rotate the power switch key to OFF (0) position.
- 2) With the STOP button elevated, press and hold PB1 and PB3 at the same time.
- 3) Rotate the power switch key to ON (1) position.
- 4) Let go PB1 and PB3 at the same time (entered Remote Pairing mode). The Status LED displays firmware version with red, green and orange blinks.
- 5) Output data (original transmitter) by press and hold PB2 (Status LED off).
- 6) Receive data (new transmitter) by press and hold PB1 (Status LED blinks green).
- 7) When the Status LED (receiving data end) turns to constant green while both pushbuttons are still pressed down the pairing is completed.
- 8) Exit Remote Pairing mode by rotate the power switch key to OFF (0) position.



Note: During remote pairing make sure the distance between the two transmitters is within 1 meter.

B. Receiver-to-Transmitter Pairing:

JP8 Open Method: After the transmitter enters the Remote Pairing mode, output receiver data by press and hold the PAIRING button located on the receiver cover and receive data by press and hold PB3 on the transmitter, both at the same time. When the transmitter Status LED turns to constant green while both pushbuttons are still pressed down the pairing is completed. Refer to section 4.2.3 and section 4.2.6.22 JP8 description and programming. **During pairing process, the receiver MAIN relays must be deactivated (relay open).**



JP8 Short Method (press Pairing button not required): After the transmitter enters the Remote Pairing mode, press and hold PB3 on the transmitter until the Status LED turns to constant green the pairing is completed. **Make sure the pairing process is executed within distance of 10 meters from one another and no other active receivers nearby. During pairing process, the receiver MAIN relays must be deactivated (relay open). For tandem systems make sure the receiver is not locked to any of its existing transmitters.**

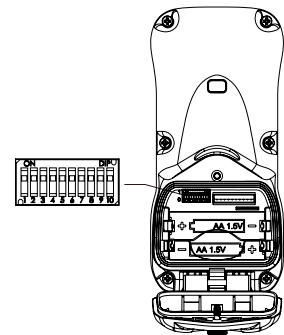
C. Transmitter-to-Receiver Pairing:

JP8 Open Method: After the transmitter enters the Remote Pairing mode, output transmitter data by press and hold PB4 on the transmitter and receive data by press and hold the PAIRING button on the receiver cover, both at the same time. When the transmitter Status LED turns to constant green while both pushbuttons are still pressed down the pairing is completed. Refer to section 4.2.3 and section 4.2.6.22 JP8 descriptions and programming. **During pairing process, the receiver MAIN relays must be deactivated (relay open).**

4.1.4 Transmitter Start Function Settings

When transmitter goes into sleep mode the system is temporarily deactivated (MAIN relays opened). Execute the START command or press any pushbutton to wake up the system (MAIN relays closed).

	Dipswitch Settings	Function
1	xxxxxxxx0	START Reactivation
2	xxxxxxxx1	Any Button Reactivation



4.1.5 Transmitter Inactivity Timer Settings

Set how long the system enters the sleep mode when the transmitter is not in use (pushbutton not pressed). When transmitter goes into sleep mode the receiver MAIN relays are deactivated.

	Dipswitch Settings	Time		Dipswitch Settings	Time
1	xxx000xxxx	1 minute	5	xxx100xxxx	10 minutes
2	xxx001xxxx	20 seconds	6	xxx101xxxx	30 minutes
3	xxx010xxxx	3 minutes	7	xxx110xxxx	60 minutes
4	xxx011xxxx	5 minutes	8	xxx111xxxx	Constant On (sleep mode disabled)

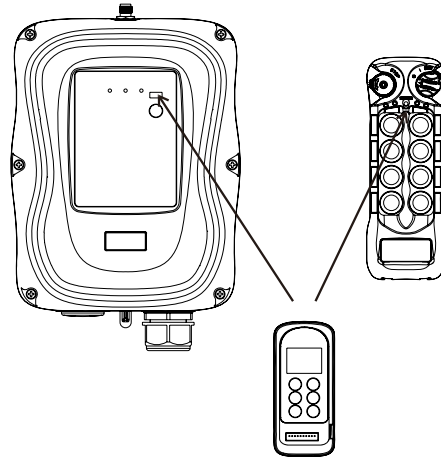
4.1.6 Transmitter Output Power Settings

1mW offers the shortest operating range with lowest battery consumption while 10mW offers the longest operating range with highest battery consumption (manufacture preset at 2mW).

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

4.1.7 Infrared Programming

Other custom functions and settings not listed in this manual can be programmed via the infrared IR programmer unit, such as the system serial number, system frequency range, transmitter output power (up to 25mW), transmitter access card (TAC), receiver relay output status feedback, receiver input status feedback, new and updated functions, and many others. Please contact ARC representative for more details.

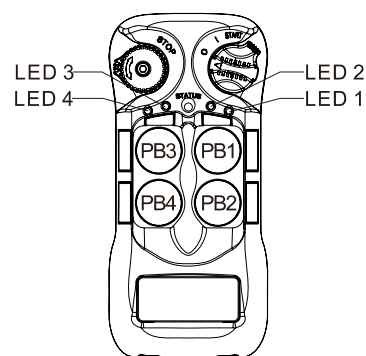


4.1.8 Pushbutton Function Settings

- 1) Rotate the power switch key to OFF (0) position.
- 2) With the STOP button elevated, press and hold PB3 and PB4 at the same time.
- 3) Rotate the power switch key to ON (I) position.
- 4) Let go PB3 and PB4 at the same time (entered Pushbutton Function mode).
- 5) The Status LED displays current pushbutton 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. Pushbutton 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 pushbutton function number by pressing PB3 to increment the hundreds (+100), PB2 to increment the tens (+010), PB1 to increment the units (+001), and PB4 to reset (000 - constant orange). For example, press PB3 one time, PB2 four times, PB1 six times is pushbutton function no.146 (Status LED blinks 1 orange, 4 greens and 6 reds)
- 7) Exit Pushbutton Function mode by rotate the power switch key to OFF (0) position.

4.1.8.1 Toggled Pushbutton with LED Indication

Set pushbutton toggled function with LED indications. LED 1 ~ 4 shown inside the shaded box illustrates which LED on the transmitter lights up when the designated pushbutton is pressed.



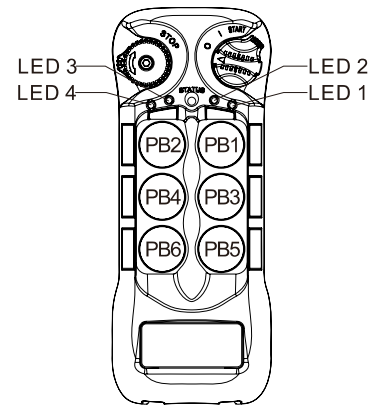
Flex 4EPV Model

Function Number	Display Type	PB1	PB2	PB3	PB4
1	1 Red	Normal	Normal	Normal	LED 4
2	2 Reds	Normal	Normal	LED 3	LED 4
3	3 Reds	Normal	LED 2	LED 3	LED 4
4	4 Reds	LED 1	LED 2	LED 3	LED 4

* PB1...PB4 → Pushbutton number.

* Normal → Normal momentary contact.

* LED 1 ~ LED 4 → Pushbutton toggled function with designated LED indication.



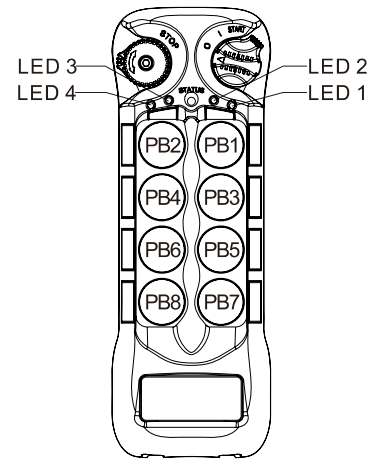
Flex 6EPV Model

Function Number	Display Type	PB1	PB2	PB3	PB4	PB5	PB6
1	1 Red	Normal	Normal	Normal	LED 4	Normal	Normal
2	2 Reds	Normal	Normal	LED 3	LED 4	Normal	Normal
3	3 Reds	Normal	LED 2	LED 3	LED 4	Normal	Normal
4	4 Reds	LED 1	LED 2	LED 3	LED 4	Normal	Normal
7	7 Reds	Normal	Normal	Normal	Normal	Normal	LED 2
8	8 Reds	Normal	Normal	Normal	Normal	LED 1	LED 2

* PB1...PB6 → Pushbutton number.

* Normal → Normal momentary contact.

* LED 1 ~ LED 4 → Pushbutton toggled function with designated LED indication.



Flex 8EPV Model

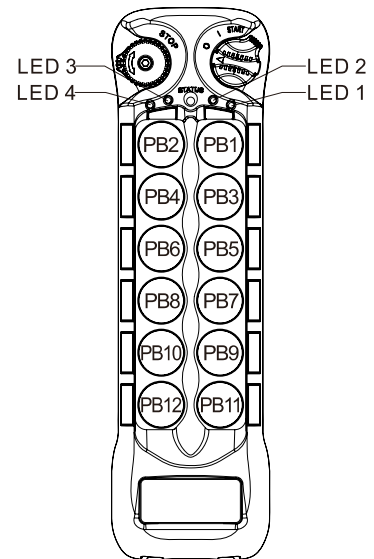
Function Number	Display Type	PB1	PB2	PB3	PB4
1	1 Red	Normal	Normal	Normal	LED 4
2	2 Reds	Normal	Normal	LED 3	LED 4
3	3 Reds	Normal	LED 2	LED 3	LED 4
4	4 Reds	LED 1	LED 2	LED 3	LED 4

Function Number	Display Type	PB5	PB6	PB7	PB8
5	5 Reds	Normal	Normal	Normal	LED 4
6	6 Reds	Normal	Normal	LED 3	LED 4
7	7 Reds	Normal	LED 2	LED 3	LED 4
8	8 Reds	LED 1	LED 2	LED 3	LED 4

* PB1...PB8 → Pushbutton number.

* Normal → Normal momentary contact.

* LED 1 ~ LED 4 → Pushbutton toggled function with designated LED indication.



Flex 12EPV Model

Function Number	Display Type	PB1	PB2	PB3	PB4
1	1 Red	Normal	Normal	Normal	LED 4
2	2 Reds	Normal	Normal	LED 3	LED 4
3	3 Reds	Normal	LED 2	LED 3	LED 4
4	4 Reds	LED 1	LED 2	LED 3	LED 4

Function Number	Display Type	PB5	PB6	PB7	PB8
5	5 Reds	Normal	Normal	Normal	LED 4
6	6 Reds	Normal	Normal	LED 3	LED 4
7	7 Reds	Normal	LED 2	LED 3	LED 4
8	8 Reds	LED 1	LED 2	LED 3	LED 4

Function Number	Display Type	PB9	PB10	PB11	PB12
13	1 Green + 3 Reds	Normal	Normal	Normal	LED 4
14	1 Green + 4 Reds	Normal	Normal	LED 3	LED 4
15	1 Green + 5 Reds	Normal	LED 2	LED 3	LED 4
16	1 Green + 6 Reds	LED 1	LED 2	LED 3	LED 4

* PB1...PB12 → Pushbutton number.

* Normal → Normal momentary contact.

* LED 1 ~ LED 4 → Pushbutton toggled function with designated LED indication.

4.1.8.2 A/B Pushbutton Select with LED Indication

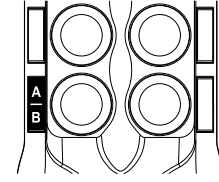
There are 4 different types of A/B selector sequence available. Choose one that is most suitable for your application.

Type-A selector sequence : A → B

Type-B selector sequence : Off → A → B

Type-C selector sequence : A → B → A+B

Type-D selector sequence : Off → A → B → A+B



Flex 4EPV Model

Function Number	Display Type	PB1	PB2	PB3	PB4
29	2 Greens + 9 Reds	Normal	Normal	A/1&2	Normal
30	3 Greens	Normal	Normal	B/1&2	Normal
31	3 Greens + 1 Red	Normal	Normal	C/1&2	Normal
32	3 Greens + 2 Reds	Normal	Normal	D/1&2	Normal
33	3 Greens + 3 Reds	Normal	Normal	Normal	A/3&4
34	3 Greens + 4 Reds	Normal	Normal	Normal	B/3&4
35	3 Greens + 5 Reds	Normal	Normal	Normal	C/3&4
36	3 Greens + 6 Reds	Normal	Normal	Normal	D/3&4
37	3 Greens + 7 Reds	Normal	Normal	A/1&2	A/3&4
38	3 Greens + 8 Reds	Normal	Normal	A/1&2	B/3&4
39	3 Greens + 9 Reds	Normal	Normal	A/1&2	C/3&4
40	4 Greens	Normal	Normal	A/1&2	D/3&4
41	4 Greens + 1 Red	Normal	Normal	B/1&2	B/3&4
42	4 Greens + 2 Reds	Normal	Normal	B/1&2	C/3&4
43	4 Greens + 3 Reds	Normal	Normal	B/1&2	D/3&4
44	4 Greens + 4 Reds	Normal	Normal	C/1&2	C/3&4
45	4 Greens + 5 Reds	Normal	Normal	C/1&2	D/3&4
46	4 Greens + 6 Reds	Normal	Normal	D/1&2	D/3&4

* PB1...PB4 → Pushbutton number.

* Normal → Normal momentary contact.

* A/1&2 ~ D/3&4 → A/B pushbutton select function with designated LED indication.

Flex 6EPV Model

Function Number	Display Type	PB1	PB2	PB3	PB4	PB5	PB6
115	1 orange + 1 Green + 5 Reds	Normal	Normal	Normal	Normal	Normal	A/1&2
116	1 orange + 1 Green + 6 Reds	Normal	Normal	Normal	Normal	Normal	B/1&2
117	1 orange + 1 Green + 7 Reds	Normal	Normal	Normal	Normal	Normal	C/1&2
118	1 orange + 1 Green + 8 Reds	Normal	Normal	Normal	Normal	Normal	D/1&2

* PB1...PB6 → Pushbutton number.

* Normal → Normal momentary contact.

* A/1&2 ~ D/1&2 → A/B pushbutton select function with designated LED indication.

Flex 8EPV Model

Function Number	Display Type	PB5	PB6	PB7	PB8
47	4 Greens + 7 Reds	Normal	Normal	A/1&2	Normal
48	4 Greens + 8 Reds	Normal	Normal	B/1&2	Normal
49	4 Greens + 9 Reds	Normal	Normal	C/1&2	Normal
50	5 Greens	Normal	Normal	D/1&2	Normal
51	5 Greens + 1 Red	Normal	Normal	Normal	A/3&4
52	5 Greens + 2 Reds	Normal	Normal	Normal	B/3&4
53	5 Greens + 3 Reds	Normal	Normal	Normal	C/3&4
54	5 Greens + 4 Reds	Normal	Normal	Normal	D/3&4
55	5 Greens + 5 Reds	Normal	Normal	A/1&2	A/3&4
56	5 Greens + 6 Reds	Normal	Normal	A/1&2	B/3&4
57	5 Greens + 7 Reds	Normal	Normal	A/1&2	C/3&4
58	5 Greens + 8 Reds	Normal	Normal	A/1&2	D/3&4
59	5 Greens + 9 Reds	Normal	Normal	B/1&2	B/3&4
60	6 Greens	Normal	Normal	B/1&2	C/3&4
61	6 Greens + 1 Red	Normal	Normal	B/1&2	D/3&4
62	6 Greens + 2 Reds	Normal	Normal	C/1&2	C/3&4
63	6 Greens + 3 Reds	Normal	Normal	C/1&2	D/3&4
64	6 Greens + 4 Reds	Normal	Normal	D/1&2	D/3&4

* PB5...PB8 → Pushbutton number.

* Normal → Normal momentary contact.

* A/1&2 ~ D/3&4 → A/B pushbutton select function with designated LED indication.

Flex 12EPV Model

Function Number	Display Type	PB9	PB10	PB11	PB12
65	6 Greens + 5 Reds	A/1&2	Normal	Normal	Normal
66	6 Greens + 6 Reds	B/1&2	Normal	Normal	Normal
67	6 Greens + 7 Reds	C/1&2	Normal	Normal	Normal
68	6 Greens + 8 Reds	D/1&2	Normal	Normal	Normal
69	6 Greens + 9 Reds	Normal	A/3&4	Normal	Normal
70	7 Greens	Normal	B/3&4	Normal	Normal
71	7 Greens + 1 Red	Normal	C/3&4	Normal	Normal
72	7 Greens + 2 Reds	Normal	D/3&4	Normal	Normal
73	7 Greens + 3 Reds	A/1&2	A/3&4	Normal	Normal
74	7 Greens + 4 Reds	A/1&2	B/3&4	Normal	Normal
75	7 Greens + 5 Reds	A/1&2	C/3&4	Normal	Normal
76	7 Greens + 6 Reds	A/1&2	D/3&4	Normal	Normal
77	7 Greens + 7 Reds	B/1&2	B/3&4	Normal	Normal
78	7 Greens + 8 Reds	B/1&2	C/3&4	Normal	Normal
79	7 Greens + 9 Reds	B/1&2	D/3&4	Normal	Normal
80	8 Greens	C/1&2	C/3&4	Normal	Normal
81	8 Greens + 1 Red	C/1&2	D/3&4	Normal	Normal
82	8 Greens + 2 Reds	D/1&2	D/3&4	Normal	Normal

Function Number	Display Type	PB9	PB10	PB11	PB12
83	8 Greens + 3 Reds	Normal	Normal	A/1&2	Normal
84	8 Greens + 4 Reds	Normal	Normal	B/1&2	Normal
85	8 Greens + 5 Reds	Normal	Normal	C/1&2	Normal
86	8 Greens + 6 Reds	Normal	Normal	D/1&2	Normal
87	8 Greens + 7 Reds	Normal	Normal	Normal	A/3&4
88	8 Greens + 8 Reds	Normal	Normal	Normal	B/3&4
89	8 Greens + 9 Reds	Normal	Normal	Normal	C/3&4
90	9 Greens	Normal	Normal	Normal	D/3&4
91	9 Greens + 1 Red	Normal	Normal	A/1&2	A/3&4
92	9 Greens + 2 Reds	Normal	Normal	A/1&2	B/3&4
93	9 Greens + 3 Reds	Normal	Normal	A/1&2	C/3&4
94	9 Greens + 4 Reds	Normal	Normal	A/1&2	D/3&4
95	9 Greens + 5 Reds	Normal	Normal	B/1&2	B/3&4
96	9 Greens + 6 Reds	Normal	Normal	B/1&2	C/3&4
97	9 Greens + 7 Reds	Normal	Normal	B/1&2	D/3&4
98	9 Greens + 8 Reds	Normal	Normal	C/1&2	C/3&4
99	9 Greens + 9 Reds	Normal	Normal	C/1&2	D/3&4
100	1 orange	Normal	Normal	D/1&2	D/3&4

* PB9...PB12 → Pushbutton number.

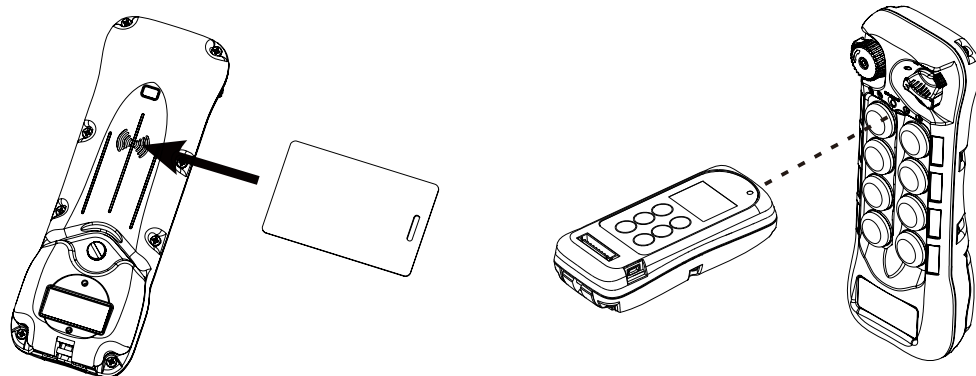
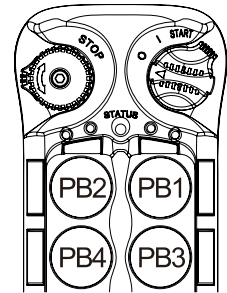
* Normal → Normal momentary contact.

* A/1&2 ~ D/3&4 → A/B pushbutton select function with designated LED indication.

4.1.9 Transmitter Access Card (TAC) Settings

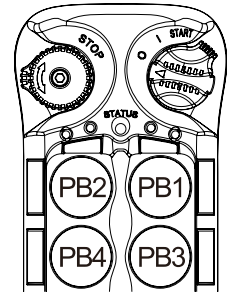
Follow the instruction below on how to program the TAC into the transmitter. The infrared IR programmer unit is required to complete the programming. Please contact ARC representative for more details.

- 1) Rotate the power switch key to OFF (0) position.
- 2) With the STOP button elevated, press and hold PB1, PB2, PB3 and PB4 at the same time.
- 3) Rotate the power switch key to ON (I) position.
- 4) Let go PB1, PB2, PB3 and PB4 at the same time, the Status LED displays orange fast blinks (entered TAC mode).
- 5) Placed the access card over the RFID marking located on the backside of the transmitter.
- 6) Status LED with 1 second green means the access card is being programmed into the transmitter.
- 7) Status LED with 1 second orange means the access card is already programmed into the transmitter.
- 8) Status LED with 1 second red means unable to store any more access cards. Each transmitter can only store up to 16 access cards.
- 9) Use the infrared IR programmer unit to extract all access card information stored inside the transmitter for further programming. Other than restricting any unauthorized personnel from using the transmitter, it can also be individually programmed unlocking any specific function or functions on the transmitter allowing a more experienced or qualified user to operate, such as the magnet lift, tandem operation, entering restricted areas, etc...
- 10) Exit TAC mode by rotate the power switch key to OFF (0) position.



4.1.10 Display Frequency Band

- 1) Rotate the power switch key to OFF (0) position.
- 2) With the STOP button elevated, press and hold PB2 and PB4 at the same time.
- 3) Rotate the power switch key to ON (1) position.
- 4) Let go PB2 and PB4 at the same time (entered Frequency Band Display mode).
- 5) The Status LED displays the preset transmitter frequency band 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). For example, 8 orange blinks followed by 6 green blinks and 3 red blinks is 863MHz.
- 6) Exit Frequency Band Display mode by rotate the power switch key to OFF (0) position.



4.1.11 Input and Output Feedback Settings

Up to 4 assignable relay outputs and 4 external inputs can be programmed into the system and feedback to the transmitter LED indicators during operation. These settings require using the infrared IR programmer unit. Please contact ARC representative for more details. The external inputs function is not available on the Flex 4EPV and 6EPV models.

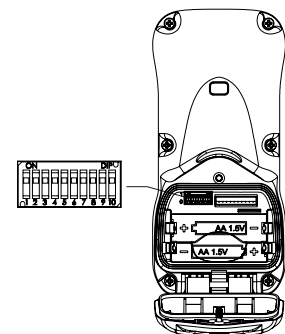
4.1.12 Infrared Function Settings

The transmitter is embedded with infrared sensors for infrared start function. These settings require using the infrared IR programmer unit. Please contact ARC representative for more details. The infrared start function is not available on the Flex 4EPV and 6EPV models.

4.1.13 Zero-G Sensor Settings

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. When 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 infrared IR programmer unit. Please contact ARC representative for more details.

	Dipswitch Settings	Function
1	xxxxxxx0x	Sensor Disabled
2	xxxxxxx1x	Sensor Enabled



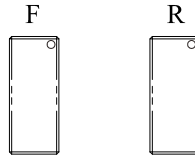
4.2 Receiver

4.2.1 Output Relay Configurations

4.2.1.1 Output Relay Types

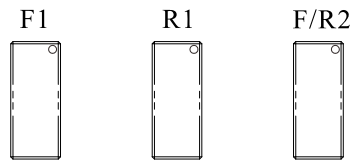
1. 2 output relays per motion – single speed only

Output relays with Forward (F) and Reverse (R) 1st speed only.



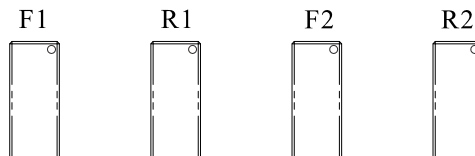
2. 3 output relays per motion – shared 2nd speed output relay

Output relays with Forward 1st speed (F1), Reverse 1st speed (R1) and Forward/Reverse 2nd speed (F/R2). Forward and Reverse 2nd speed (F/R2) shared the same output relay.



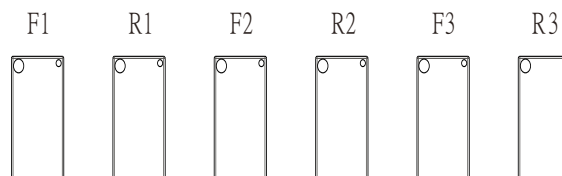
3. 4 output relays per motion – separate 1st and 2nd speed output relays

Output relays with Forward 1st speed (F1), Reverse 1st speed (R1), Forward 2nd speed (F2) and Reverse 2nd speed (R2). Forward and Reverse 2nd speed are separate output relays.



4. 6 output relays per motion – separate 1st, 2nd and 3rd speed output relays

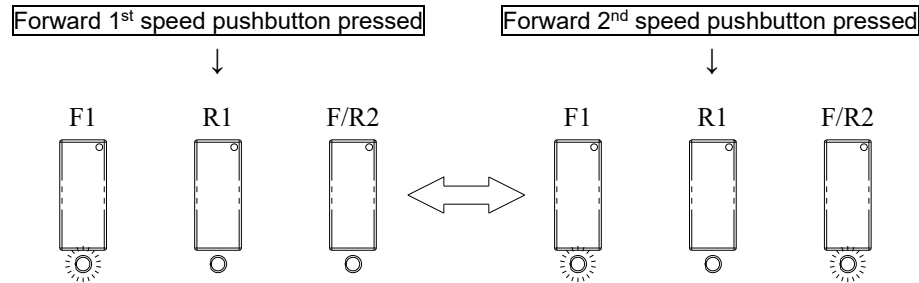
Output relays with Forward 1st speed (F1), 2nd speed (F2), 3rd speed (F3) and Reverse 1st speed (R1), 2nd speed (R2) and 3rd (R3).



4.2.1.2 Output Relay Actions (2-Step Pushbuttons)

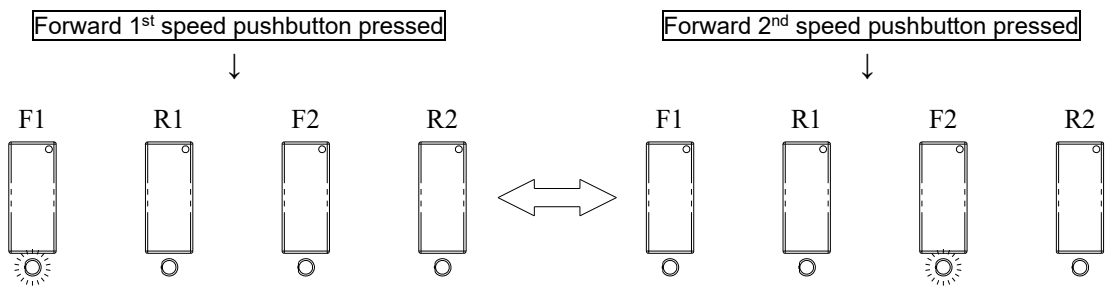
1. 3 output relays configuration with Closed/Closed contact at 2nd speed

F1 (or R1) output relay closed at 1st speed and F1 + F/R2 (or R1 + F/R2) output relays closed at 2nd speed. Refer to section 4.2.2.1 and section 4.2.6.10 ~ 4.2.6.15 output relay descriptions and programming.



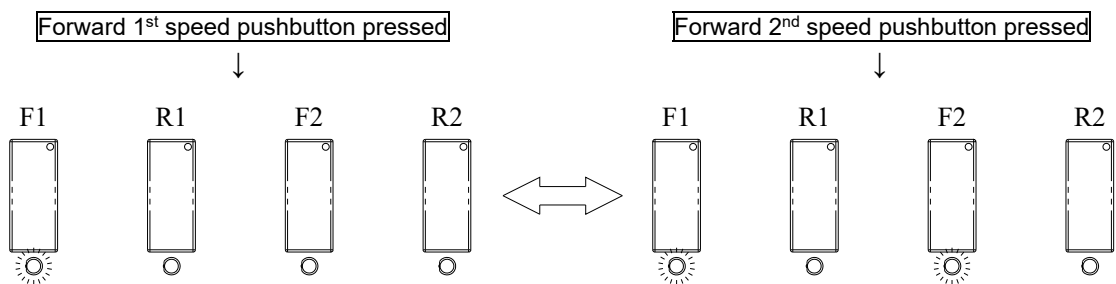
2. 4 output relays configuration with Opened/Closed contact at 2nd speed

F1 (or R1) output relay closed at 1st speed and F2 (or R2) output relay closed at 2nd speed. Refer to section 4.2.2.1 and section 4.2.6.10 ~ 4.2.6.15 output relay descriptions and programming.



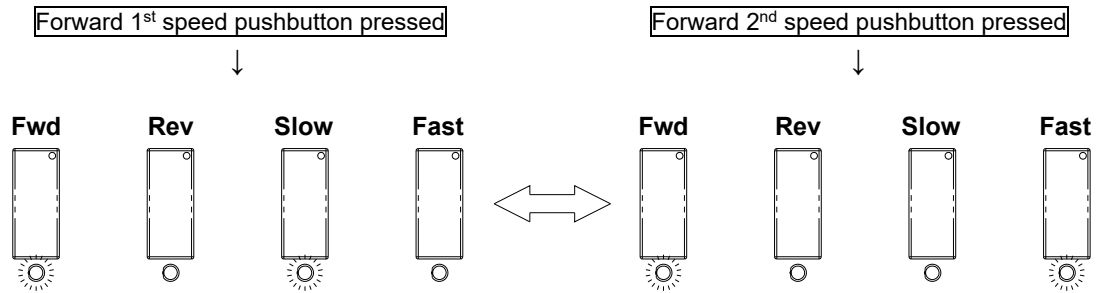
3. 4 output relays configuration with Closed/Closed contact at 2nd speed

F1 (or R1) output relay closed at 1st speed and F1 + F2 (or R1 + R2) output relays closed at 2nd speed. Refer to section 4.2.2.1 and section 4.2.6.10 ~ 4.2.6.15 output relay descriptions and programming.



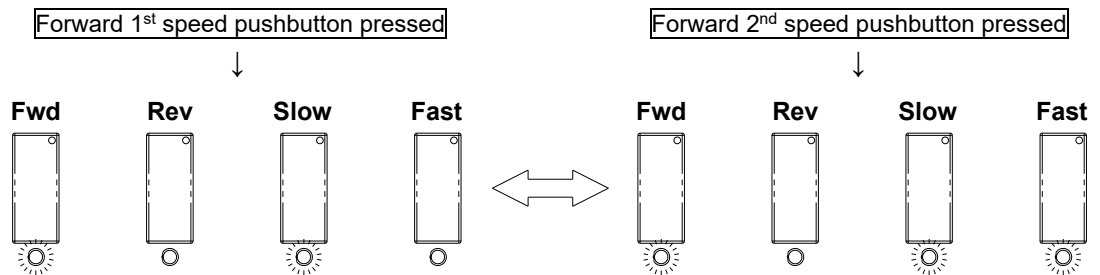
4. 4 output relays configuration with Slow and Fast output relays (Type A)

Fwd (or Rev) + Slow output relays closed at 1st speed and Fwd (or Rev) + Fast output relays closed at 2nd speed. Refer to section 4.2.2.1 and section 4.2.6.10 ~ 4.2.6.15 output relay descriptions and programming.



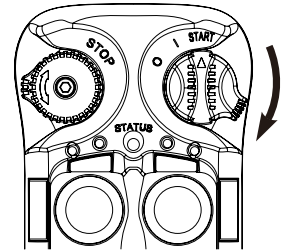
5. 4 output relays configuration with Slow and Fast output relays (Type B)

Fwd + Slow (or Rev + Slow) output relays closed at 1st speed and Fwd + Slow + Fast (or Rev + Slow + Fast) output relays closed at 2nd speed. Refer to section 4.2.2.1 and section 4.2.6.10 ~ 4.2.6.15 output relay descriptions and programming.



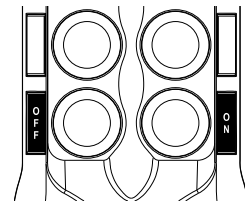
4.2.1.3 START + AUX Function

After executing the START command at transmitter startup, the same START position becomes an auxiliary function with momentary contact connected through K25 Function output relay. There are other types of auxiliary functions made available for K25, K26 and K30 Function output relays. Refer to section 4.2.4 and section 4.2.6.6 ~ 4.2.6.8 Function output relay descriptions and programming. Please contact ARC representative if your application requires other types of auxiliary function connected to these Function output relays.



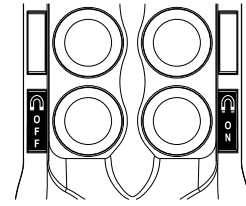
4.2.1.4 ON/OFF Pushbutton Function

The user can set any of the two adjacent pushbuttons on the transmitter to behave like a mechanical ON & OFF rocker or toggle switch. ON output relay closes when ON pushbutton is pressed (OFF output relay opens) and OFF output relay closes when OFF pushbutton is pressed (ON output relay opens). Refer to section 4.2.2.1 and section 4.2.6.10 ~ 4.2.6.15 output relay descriptions and programming.



4.2.1.5 Magnet ON/OFF Pushbutton Function

The user can set any of the two adjacent pushbuttons on the transmitter to control industrial magnet lift. Activate the magnet by pressing the Magnet ON pushbutton. Deactivate the magnet by first press and hold the Magnet ON pushbutton and then press the Magnet OFF pushbutton. Pressing the Magnet OFF pushbutton alone is unable to deactivate the magnet. Refer to section 4.2.2.1 and section 4.2.6.10 ~ 4.2.6.15 output relay descriptions and programming.



4.2.1.6 Brake Function (for 2-Step Pushbuttons only)

When the transmitter pushbutton is released from 2nd speed up to 1st speed, both 1st and 2nd speed output relays will open for up to 1 second and then with 1st speed output relay closed thereafter. Refer to section 4.2.2.1, section 4.2.5 and section 4.2.6.9 ~ 4.2.6.15 brake and output relay descriptions and programming.

4.2.1.7 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 pushbutton pair (or pairs) triggers the external warning device when pressed. Refer to section 4.2.2.1 ~ 4.2.2.2 and section 4.2.6.10 ~ 4.2.6.15 output relay descriptions and programming.

4.2.1.8 Momentary Contact

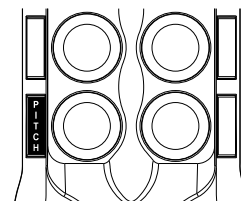
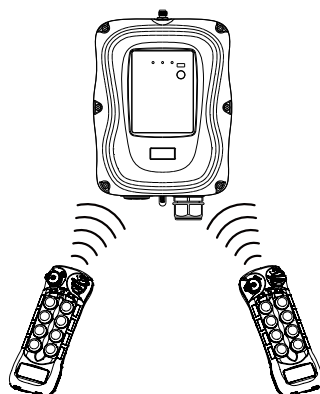
When pushbutton is released the corresponding output relay will open or deactivate. This type of relay action usually applies to external applications such as horn and buzzer. Refer to section 4.2.2.4 and section 4.2.6.10 ~ 4.2.6.15 output relay descriptions and programming.

4.2.1.9 Toggled Contact

When pushbutton is released the corresponding output relay will maintain contact or closure until next time the user presses the same pushbutton again. This type of relay action usually applies to external application such as lights. Refer to section 4.2.2.4 and section 4.2.6.10 ~ 4.2.6.15 output relay descriptions and programming.

4.2.1.10 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 newly added 2nd transmitter must be set to channel 02 with identical serial number. Furthermore, the receiver auto-scanning function must set to 2-channel scanning (scans channel 01 and 02). Refer to section 4.2.2.4 and section 4.2.6.10 ~ 4.2.6.15 output relay descriptions and programming. Pitch & Catch function must set to assigned channel scheme (refer to section 4.1.2 part B).



4.2.2 Output Settings

4.2.2.1 Interlocking 1 & 2-Step Pushbutton Outputs (Relays)

Interlocking pushbutton pair cannot be pressed simultaneously as it will cancel each other out (requires 2-step relay module). Refer to section 4.2.1 and section 4.2.6.10 ~ 4.2.6.15 output relay descriptions and programming.

Function #	Function Descriptions (left button / right button)	# of Relays Used
00000000	Single speed only	2
00000010	4 output relays Closed/Closed relay action at 2 nd speed (separate 2 nd speed output relays)	4
00000100	3 output relays Closed/Closed relay action at 2 nd speed (shared 2 nd speed output relay)	3
00000110	4 output relays Opened/Closed relay action at 2 nd speed (separate 2 nd speed output relays)	4
00001000	Forward (or Reverse) + Fast output relays engaged at 2 nd speed	4
00001010	Forward (or Reverse) + Slow + Fast output relays engaged at 2 nd speed	4
00001100	OFF / ON	2
00010010	On + Start/Off + Start - For added safety, you must first rotate and hold the power switch key at START position and then press the On or Off pushbutton 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
00100000	Single speed + External warning*	2
00100010	4 output relays Closed/Closed relay action + External warning*	4
00100100	3 output relays Closed/Closed relay action + External warning*	3
00100110	4 output relays Opened/Closed relay action + External warning*	4
01000010	4 output relays Closed/Closed relay action + Brake	4
01000100	3 output relays Closed/Closed relay action + Brake	3
01000110	4 output relays Opened/Closed relay action + Brake	4
01100010	4 output relays Closed/Closed relay action + Brake + External warning*	4
01100100	3 output relays Closed/Closed relay action + Brake + External warning*	3
01100110	4 output relays Opened/Closed relay action + Brake + External warning*	4

* External warning function requires installing an external warning device such as horn and lights to the K26 Function output relay.

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

4.2.2.2 Interlocking 3-Step Pushbutton Outputs (Relays)

Below chart and settings are various types of shared (F/R) and separate (F or R) acceleration relay closure at 1st, 2nd and 3rd steps. Refer to section 4.2.1 and section 4.2.6.10 ~ 4.2.6.15 output relay descriptions and programming.

Output Relay Function #	CN1 ~ CN6	K1	K2	K3	K4	K5	K6
00000001 (requires 3-step relay module)	at 1 st Step at 2 nd Step at 3 rd Step	F1 F1 F1	or R1 or R1 or R1	F/R2 F/R2	F/R3	Not Used	Not Used
00000011 (requires 3-step relay module)	at 1 st Step at 2 nd Step at 3 rd Step	F1 F1 F1	or R1 or R1 or R1	F/R2	F/R3	Not Used	Not Used
00000101 (requires 3-step relay module)	at 1 st Step at 2 nd Step at 3 rd Step	F F F	or R or R or R	F/R1 F/R1 F/R1	F/R2 F/R2	F/R3	Not Used
00000111 (requires 3-step relay module)	at 1 st Step at 2 nd Step at 3 rd Step	F F F	or R or R or R	F/R1	F/R2	F/R3	Not Used
00001001 (requires 3-step relay module)	at 1 st Step at 2 nd Step at 3 rd Step	F1 F1 F1	or R1 or R1 or R1	F2 F2	or R2 or R2	F3	or R3
00001011 (requires 3-step relay module)	at 1 st Step at 2 nd Step at 3 rd Step	F1	or R1	F2	or R2	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/Reverse shared 1st step **F/R2** → Forward/Reverse shared 2nd step
F/R3 → Forward/Reverse shared 3rd step

Dipswitch setting for 3-step pushbutton output + external warning: xx1xxxxx

4.2.2.3 Interlocking Stepless Pushbutton Outputs (Analog)

Refer to section 4.2.6.16 ~ 4.2.6.21 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 pushbutton outputs.

4.2.2.4 Non-Interlocking 1 & 2-Step Pushbutton Outputs (Relays)

Non-interlocking pushbutton pair can be pressed simultaneously. It usually applies to equipment's auxiliary functions such as lights, horn or buzzer (requires 2-step relay module). Refer to section 4.2.6.10 ~ 4.2.6.15 output relay 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
11111110	4 output relays Closed/Closed relay action at 2 nd speed (separate 2 nd speed output relays)	4

* Normal + Start: For added safety, must first rotate and hold the power switch key at the START position and then press the intended pushbutton to activate the output relay

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

4.2.3 Jumper Functions

Refer to section 4.2.6.22 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)

4.2.4 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 section 4.2.6.6 ~ 4.2.6.8 function relay programming.

---	:	START function only.
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 2 nd time the START function is initiated.
NORMAL2	:	START function + AUX with normal momentary output. Works the 1 st time the START function is initiated.
TOGGLE	:	START function + AUX with toggled/latching output.
TOG&E	:	START function + AUX with toggled/latching output. The relay opens when STOP button is pressed down and transmitter power off.
S/P	:	FUNCTION relay closes when START command is executed and opens only when transmitter power is turned off.
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 command is initiated at transmitter power on and then becomes normal momentary outputs thereafter.
G SENSOR	:	FUNCTION relay closes when Zero-G sensor is triggered (receiver MAIN relays deactivated) and opens when receiver MAIN relays are reactivated.
TANDEM C	:	FUNCTION relay closes when tandem receiver C is selected or activated.
RESET	:	FUNCTION relay closes when rotate to START position and opens when let go. Works during initial transmitter startup and inactivity timer START reset.
SW8 ABC	:	FUNCTION relay closes at C position (for pushbutton and rotary select ABC function).
SW12 ABC	:	FUNCTION relay closes at C position (for pushbutton and rotary select ABC function).

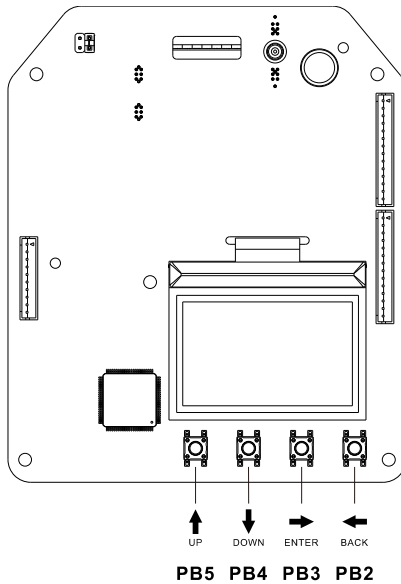
4.2.5 Brake Functions

Listed below are types of brake functions with various 1st and 2nd speed relay actions. Refer to section 4.2.6.9 brake function programming. For 2-step/speed pushbuttons only.

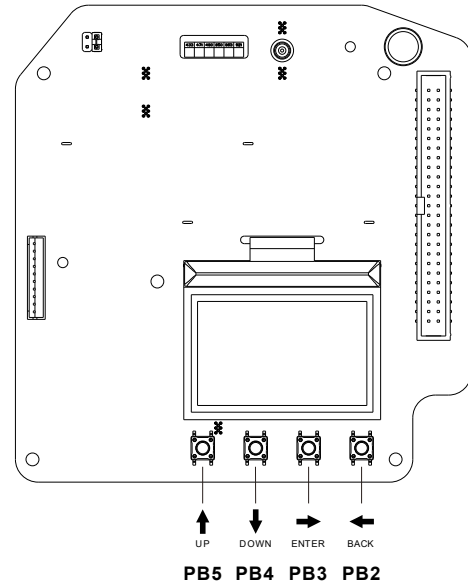
DEMAG-1	:	When releasing pushbutton from 2 nd speed up to 1 st speed, the 1 st speed output relay will open for up to 1.0 second and then closes again.
DEMAG-2	:	When pushbutton is pressed down to 2 nd speed directly from 0 speed, the 1 st speed output relay will maintain closure for up to 0.4 second before 2 nd speed output relay closes. When pushbutton is released from 2 nd speed up to 0 speed, the 1 st speed output relay will maintain closure for up to 0.5 second before going to 0 speed.
DEMAG-3	:	When releasing pushbutton from 2 nd speed up to 1 st speed, both 1 st and 2 nd speed output relays are opened. Release pushbutton to 0 speed and then press down to 1 st speed to reengage the 1 st speed output relay.
P&H	:	When releasing pushbutton from 2 nd speed up to 0 speed, the 1 st speed output relay will maintain closure for up to 0.1 second before going to 0 speed.

4.2.6 Programming

4EPV & 6EPV



8EPV & 12EPV



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

STATUS	2: --	1: --
STANDBY	4: --	3: --
	6: --	5: --
	8: --	7: --
	10: --	9: --
	12: --	11: --

- 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.

SETTING MODE
STD V111
UP DOWN ENTER BACK

>S/N:
0000001
UP DOWN ENTER BACK

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

4.2.6.1 System Serial Number (S/N)

For safety measure, system serial number can only be changed via the IR programmer unit. Please contact ARC representative for more details. Press the UP/DOWN buttons to scroll through other system settings

>S/N:
0000001

UP DOWN ENTER BACK

4.2.6.2 System Type Programming (TYPE)

System type number is associated with functions such as the dual-crane tandem operation, multiple-receiver operation, and random-access operation. Please contact ARC representative for more details.

>TYPE:
000

UP DOWN ENTER BACK

- 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 (FREQ)

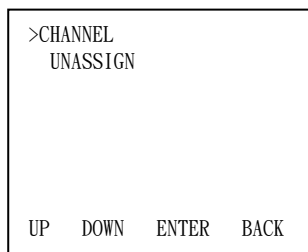
For safety measure, system frequency range can only be changed via the IR programmer unit. Please contact ARC representative for more details. Press the UP/DOWN buttons to scroll through other system settings

>FREQ:
433.050

UP DOWN ENTER BACK

4.2.6.4 System Channel Programming (CHANNEL)

Tandems, random access, pitch & catch, t-type, and multi-receiver configurations “cannot” set to unassigned channel.



The screenshot shows a rectangular menu box. At the top, the text ">CHANNEL" is on the first line and "UNASSIGN" is on the second line. The cursor is positioned to the left of "UNASSIGN". At the bottom of the box, there are four buttons labeled "UP", "DOWN", "ENTER", and "BACK" from left to right.

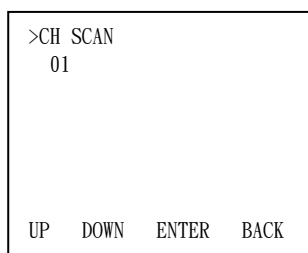
- 1) Press the ENTER button to enter system channel setting (cursor shown next to UNASSIGN* or the 2-digit channel value**).
- 2) Press the UP/DOWN buttons to scroll and select UNASSIGN or channel value as a whole (channel 1~62).
- 3) Or press the ENTER button again to change the 2-digit channel value 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 (CH SCAN)

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



The screenshot shows a rectangular menu box. At the top, the text ">CH SCAN" is on the first line and "01" is on the second line. The cursor is positioned to the left of "01". At the bottom of the box, there are four buttons labeled "UP", "DOWN", "ENTER", and "BACK" from left to right.

- 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 (FUNC RLY1 - K25)

Please refer to section 4.2.4 for various types of function relay outputs available.

>FUNC RLY1
NORMAL

UP DOWN ENTER BACK

- 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 (FUNC RLY2 - K26)

Please refer to section 4.2.4 for various types of function relay outputs available.

>FUNC RLY2

UP DOWN ENTER BACK

- 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 (FUNC RLY3 - K30)

Please refer to section 4.2.4 for various types of function relay outputs available.

>FUNC RLY3
EXT

UP DOWN ENTER BACK

- 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 Brake Function Programming (BRAKE)

Please refer to section 4.2.5 for various types of brake functions available. For 2-step/speed pushbuttons only.

>BRAKE			
DG1			
UP	DOWN	ENTER	BACK

- 1) Press the ENTER button to enter brake function type setting (cursor shown next to DG1 or other setting previously programmed).
- 2) Press the UP/DOWN buttons to scroll and select.
- 3) Press the BACK button to go back to Brake Function Programming (cursor shown next to BRAKE).
- 4) Press the UP/DOWN buttons to scroll through other system settings.

4.2.6.10 PB1 & PB2 Relay Output Programming (PB1&2 RELAY)

Please refer to section 4.2.2 for various types of relay actions available. This function requires transmitter pushbuttons (in pairs) configured to 1, 2 or 3-step pushbuttons and their designated receiver outputs equipped with the 2-step or 3-step relay modules.

>PB1&2 RELAY			
00000000			
UP	DOWN	ENTER	BACK

- 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 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 PB1 & PB2 Relay Output Programming (cursor shown next to PB1&PB2 RELAY).
- 5) Press the UP/DOWN buttons to scroll through other system settings.

4.2.6.11 PB3 & PB4 Relay Output Programming (PB3&4 RELAY)

Please refer to section 4.2.2 for various types of relay actions available. This function requires transmitter pushbuttons (in pairs) configured to 1, 2 or 3-step pushbuttons and their designated receiver outputs equipped with the 2-step or 3-step relay modules.

>PB3&4 RELAY
00000000

UP DOWN ENTER BACK

- 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 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 PB3 & PB4 Relay Output Programming (cursor shown next to PB3&PB4 RELAY).
- 5) Press the UP/DOWN buttons to scroll through other system settings.

4.2.6.12 PB5 & PB6 Relay Output Programming (PB5&6 RELAY)

Please refer to section 4.2.2 for various types of relay actions available. This function requires transmitter pushbuttons (in pairs) configured to 1, 2 or 3-step pushbuttons and their designated receiver outputs equipped with the 2-step or 3-step relay modules.

>PB5&6 RELAY
00000000

UP DOWN ENTER BACK

- 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 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 PB5 & PB6 Relay Output Programming (cursor shown next to PB5&PB6 RELAY).
- 5) Press the UP/DOWN buttons to scroll through other system settings.

4.2.6.13 PB7 & PB8 Relay Output Programming (PB7&8 RELAY)

Please refer to section 4.2.2 for various types of relay actions available. This function requires transmitter pushbuttons (in pairs) configured to 1, 2 or 3-step pushbuttons and their designated receiver outputs equipped with the 2-step or 3-step relay modules.

>PB7&8 RELAY
00000000

UP DOWN ENTER BACK

- 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 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 PB7 & PB8 Relay Output Programming (cursor shown next to PB7&PB8 RELAY).
- 5) Press the UP/DOWN buttons to scroll through other system settings.

4.2.6.14 PB9 & PB10 Relay Output Programming (PB9&10 RELAY)

Please refer to section 4.2.2 for various types of relay actions available. This function requires transmitter pushbuttons (in pairs) configured to 1, 2 or 3-step pushbuttons and their designated receiver outputs equipped with the 2-step or 3-step relay modules.

>PB9&10 RELAY
00000000

UP DOWN ENTER BACK

- 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 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 PB9 & PB10 Relay Output Programming (cursor shown next to PB9&PB10 RELAY).
- 5) Press the UP/DOWN buttons to scroll through other system settings.

4.2.6.15 PB11 & PB12 Relay Output Programming (PB11&12 RELAY)

Please refer to section 4.2.2 for various types of relay actions available. This function requires transmitter pushbuttons (in pairs) configured to 1, 2 or 3-step pushbuttons and their designated receiver outputs equipped with the 2-step or 3-step relay modules.

>PB11&12 RELAY			
00000000			
UP	DOWN	ENTER	BACK

- 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 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 PB11 & PB12 Relay Output Programming (cursor shown next to PB11&PB12 RELAY).
- 5) Press the UP/DOWN buttons to scroll through other system settings.

4.2.6.16 PB1 & PB2 Analog Output Programming (PB1&2 ANALOG)

This function requires transmitter pushbuttons (in pairs) configured to proportional stepless pushbuttons and their designated receiver outputs equipped with the analog module.

```
>PB1&2 ANALOG
VOLTAGE
  MAX 10.0V
  NEU 00.0V
  MIN 10.0V

UP  DOWN  ENTER  BACK
```

```
>PB1&2 ANALOG
CURRENT
  MAX 20mA
  NEU 00mA
  MIN 20mA

UP  DOWN  ENTER  BACK
```

```
>PB1&2 ANALOG
OFF

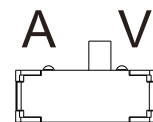
UP  DOWN  ENTER  BACK
```

- 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 PB1 & PB2 Analog Output Programming (cursor shown next to PB1&PB2 ANALOG).
- 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 PB1 & PB2 Analog Output Programming (cursor shown next to PB1&PB2 ANALOG).
- 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 PB3 & PB4 Analog Output Programming (PB3&4 ANALOG)

This function requires transmitter pushbuttons (in pairs) configured to proportional stepless pushbuttons and their designated receiver outputs equipped with the analog module.

```
>PB3&4 ANALOG
VOLTAGE
MAX 10.0V
NEU 00.0V
MIN 10.0V

UP DOWN ENTER BACK
```

```
>PB3&4 ANALOG
CURRENT
MAX 20mA
NEU 00mA
MIN 20mA

UP DOWN ENTER BACK
```

```
>PB3&4 ANALOG
OFF

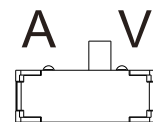
UP DOWN ENTER BACK
```

- 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 PB3 & PB4 Analog Output Programming (cursor shown next to PB3&PB4 ANALOG).
- 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 PB3 & PB4 Analog Output Programming (cursor shown next to PB3&PB4 ANALOG).
- 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 PB5 & PB6 Analog Output Programming (PB5&6 ANALOG)

This function requires transmitter pushbuttons (in pairs) configured to proportional stepless pushbuttons and their designated receiver outputs equipped with the analog module.

```
>PB5&6 ANALOG
VOLTAGE
MAX 10.0V
NEU 00.0V
MIN 10.0V

UP DOWN ENTER BACK
```

```
>PB5&6 ANALOG
CURRENT
MAX 20mA
NEU 00mA
MIN 20mA

UP DOWN ENTER BACK
```

```
>PB5&6 ANALOG
OFF

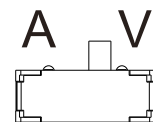
UP DOWN ENTER BACK
```

- 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 PB5 & PB6 Analog Output Programming (cursor shown next to PB5&PB6 ANALOG).
- 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 PB5 & PB6 Analog Output Programming (cursor shown next to PB5&PB6 ANALOG).
- 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 PB7 & PB8 Analog Output Programming (PB7&8 ANALOG)

This function requires transmitter pushbuttons (in pairs) configured to proportional stepless pushbuttons and their designated receiver outputs equipped with the analog module.

```
>PB7&8 ANALOG
VOLTAGE
  MAX 10.0V
  NEU 00.0V
  MIN 10.0V

UP  DOWN  ENTER  BACK
```

```
>PB7&8 ANALOG
CURRENT
  MAX 20mA
  NEU 00mA
  MIN 20mA

UP  DOWN  ENTER  BACK
```

```
>PB7&8 ANALOG
OFF

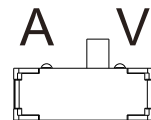
UP  DOWN  ENTER  BACK
```

- 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 PB7 & PB8 Analog Output Programming (cursor shown next to PB7&PB8 ANALOG).
- 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 PB7 & PB8 Analog Output Programming (cursor shown next to PB7&PB8 ANALOG).
- 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 PB9 & PB10 Analog Output Programming (PB9&10 ANALOG)

This function requires transmitter pushbuttons (in pairs) configured to proportional stepless pushbuttons and their designated receiver outputs equipped with the analog module.

>PB9&10 ANALOG			
VOLTAGE			
MAX 10.0V			
NEU 00.0V			
MIN 10.0V			
UP	DOWN	ENTER	BACK

>PB9&10 ANALOG			
CURRENT			
MAX 20mA			
NEU 00mA			
MIN 20mA			
UP	DOWN	ENTER	BACK

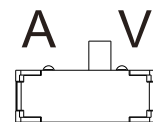
>PB9&10 ANALOG			
OFF			
UP	DOWN	ENTER	BACK

- 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 PB9 & PB10 Analog Output Programming (cursor shown next to PB9&PB10 ANALOG).
- 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 PB9 & PB10 Analog Output Programming (cursor shown next to PB9&PB10 ANALOG).
- 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.*



4.2.6.21 PB11 & PB12 Analog Output Programming (PB11&12 ANALOG)

This function requires transmitter pushbuttons (in pairs) configured to proportional stepless pushbuttons and their designated receiver outputs equipped with the analog module.

>PB11&12 ANALOG			
VOLTAGE			
MAX 10.0V			
NEU 00.0V			
MIN 10.0V			
UP	DOWN	ENTER	BACK

>PB11&12 ANALOG			
CURRENT			
MAX 20mA			
NEU 00mA			
MIN 20mA			
UP	DOWN	ENTER	BACK

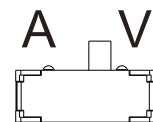
>PB11&12 ANALOG			
OFF			
UP	DOWN	ENTER	BACK

- 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 PB11 & PB12 Analog Output Programming (cursor shown next to PB11&PB12 ANALOG).
- 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 PB11 & PB12 Analog Output Programming (cursor shown next to PB11&PB12 ANALOG).
- 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.*



4.2.6.22 Jumper Function Programming

Please refer to section 4.2.3 for various types of jumper settings available.

>JUMPER	
JP1-OPEN	JP5-OPEN
JP2-OPEN	JP6-OPEN
JP3-OPEN	JP7-OPEN
JP4-OPEN	JP8-OPEN
UP DOWN ENTER BACK	

- 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.

4.2.6.23 SAVE Programming

>SAVE?	
YES	
NO	
UP DOWN ENTER BACK	

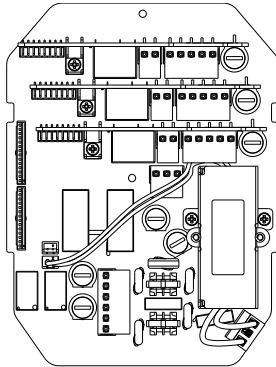
- 1) Press the ENTER button to enter save programming (cursor shown next to YES).
- 2) Press the UP/DOWN buttons to select Yes or No.
- 3) Press the ENTER button to execute.
- 4) Programming completed with LCD returned to the main screen.

STATUS	2: --	1: --
STANDBY	4: --	3: --
	6: --	5: --
	8: --	7: --
	10: --	9: --
	12: --	11: --

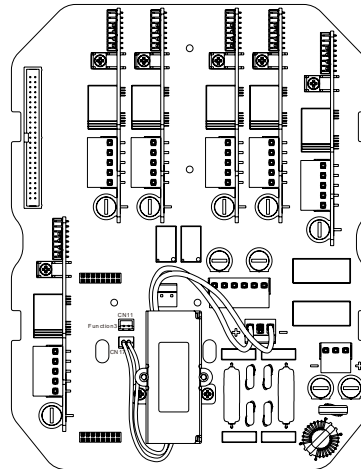
4.2.7 Voltage Settings

Always check the voltage setting is correct for your application prior to installation.

4EPV & 6EPV



8EPV & 12EPV

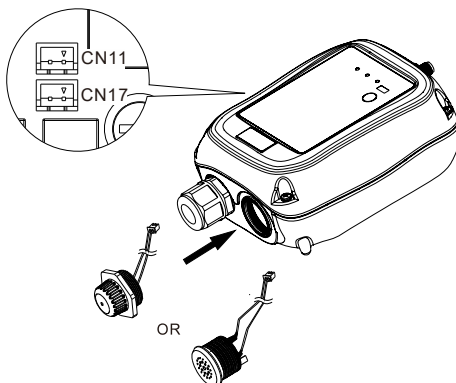


FUSE #	9~36VDC	24~48VAC	110~240VAC	380~460VAC
F3, F9 and F10	5.0A	5.0A	5.0A	5.0A
F1 and F2	3.0A	3.0A	1.0A	1.0A

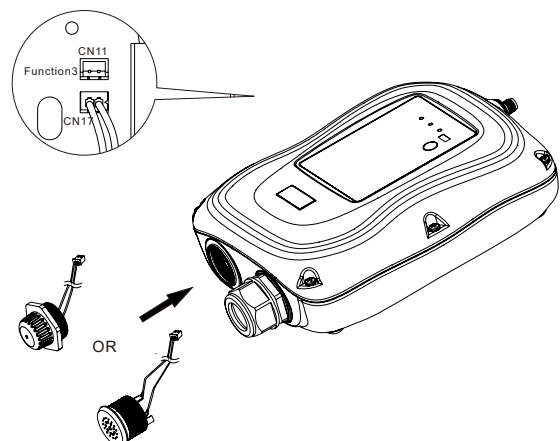
4.2.8 Indicator Light and Buzzer Installation

The miniature indicator light and buzzer can be easily fitted onto the receiver enclosure. The indicator light or the buzzer works simultaneously with the receiver MAIN relays (manufacture preset). When receiver MAIN relays are activated the indicator light or the buzzer is also activated, or vice versa. Make sure the indicator light or the buzzer is connected to the K30 Function output relay CN11 port located on the line filter/digital/analog mother board inside the receiver. Please contact ARC representative if you would like the indicator light or the buzzer work differently than described above. Refer to section 4.2.4 and section 4.2.6.6 ~ 4.2.6.8 Function relay descriptions and programming

4EPV & 6EPV



8EPV & 12EPV



4.2.9 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

4.2.10 System Channels Table (863~869MHz)

Channel	Primary/Secondary Frequency	Channel	Primary/Secondary Frequency
01	863.050/866.550	32	864.600/868.100
02	863.100/866.600	33	864.650/868.150
03	863.150/866.650	34	864.700/868.200
04	863.200/866.700	35	864.750/868.250
05	863.250/866.750	36	864.800/868.300
06	863.300/866.800	37	864.850/868.350
07	863.350/866.850	38	864.900/868.400
08	863.400/866.900	39	864.950/868.450
09	863.450/866.950	40	865.000/868.500
10	863.500/867.000	41	865.050/868.550
11	863.550/867.050	42	865.100/868.600
12	863.600/867.100	43	865.150/868.650
13	863.650/867.150	44	865.200/868.700
14	863.700/867.200	45	865.250/868.750
15	863.750/867.250	46	865.300/868.800
16	863.800/867.300	47	865.350/868.850
17	863.850/867.350	48	865.400/868.900
18	863.900/867.400	49	865.450/868.950
19	863.950/867.450	50	865.500/869.000
20	864.000/867.500	51	865.550/869.050
21	864.050/867.550	52	865.600/869.100
22	864.100/867.600	53	865.650/869.150
23	864.150/867.650	54	865.700/869.200
24	864.200/867.700	55	865.750/869.250
25	864.250/867.750	56	865.800/869.300
26	864.300/867.800	57	865.850/869.350
27	864.350/867.850	58	865.900/869.400
28	864.400/867.900	59	865.950/869.450
29	864.450/867.950	60	866.000/869.500
30	864.500/868.000	61	866.050/869.550
31	864.550/868.050	62	866.100/869.600

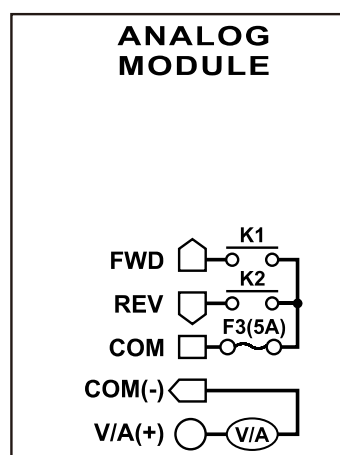
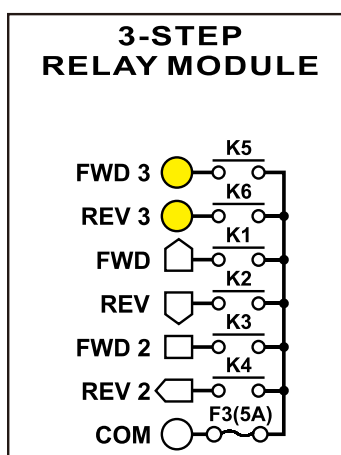
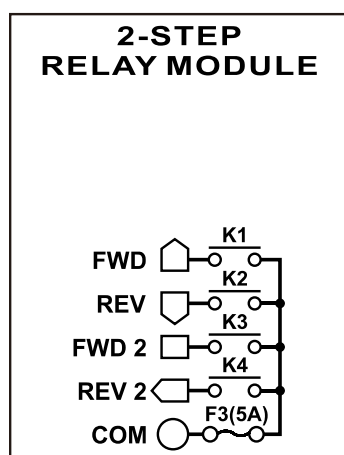
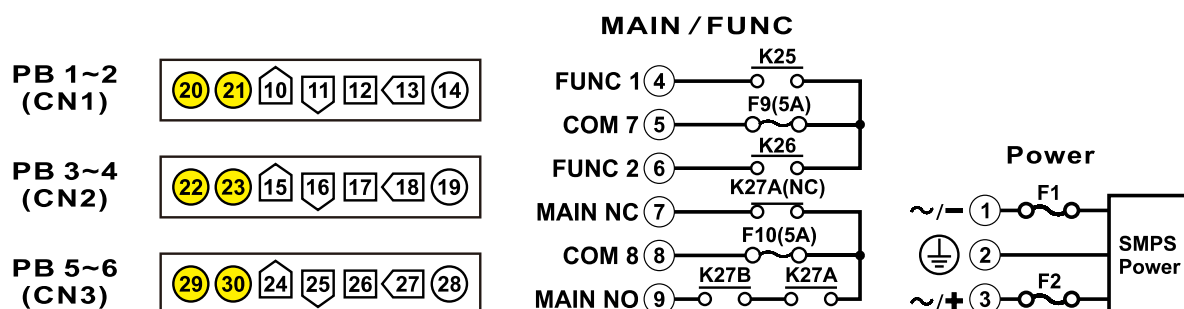
4.2.11 System Channels Table (921~927MHz)

Channel	Primary/Secondary Frequency	Channel	Primary/Secondary Frequency
01	921.000/924.500	32	922.550/926.050
02	921.050/924.550	33	922.600/926.100
03	921.100/924.600	34	922.650/926.150
04	921.150/924.650	35	922.700/926.200
05	921.200/924.700	36	922.750/926.250
06	921.250/924.750	37	922.800/926.300
07	921.300/924.800	38	922.850/926.350
08	921.350/924.850	39	922.900/926.400
09	921.400/924.900	40	922.950/926.450
10	921.450/924.950	41	923.000/926.500
11	921.500/925.000	42	923.050/926.550
12	921.550/925.050	43	923.100/926.600
13	921.600/925.100	44	923.150/926.650
14	921.650/925.150	45	923.200/926.700
15	921.700/925.200	46	923.250/926.750
16	921.750/925.250	47	923.300/926.800
17	921.800/925.300	48	923.350/926.850
18	921.850/925.350	49	923.400/926.900
19	921.900/925.400	50	923.450/926.950
20	921.950/925.450	51	923.500/927.000
21	922.000/925.500	52	923.550/927.050
22	922.050/925.550	53	923.600/927.100
23	922.100/925.600	54	923.650/927.150
24	922.150/925.650	55	923.700/927.200
25	922.200/925.700	56	923.750/927.250
26	922.250/925.750	57	923.800/927.300
27	922.300/925.800	58	923.850/927.350
28	922.350/925.850	59	923.900/927.400
29	922.400/925.900	60	923.950/927.450
30	922.450/925.950	61	924.000/927.500
31	922.500/926.000	62	924.050/927.550

5. Receiver Installation

5.1 Wiring Diagram

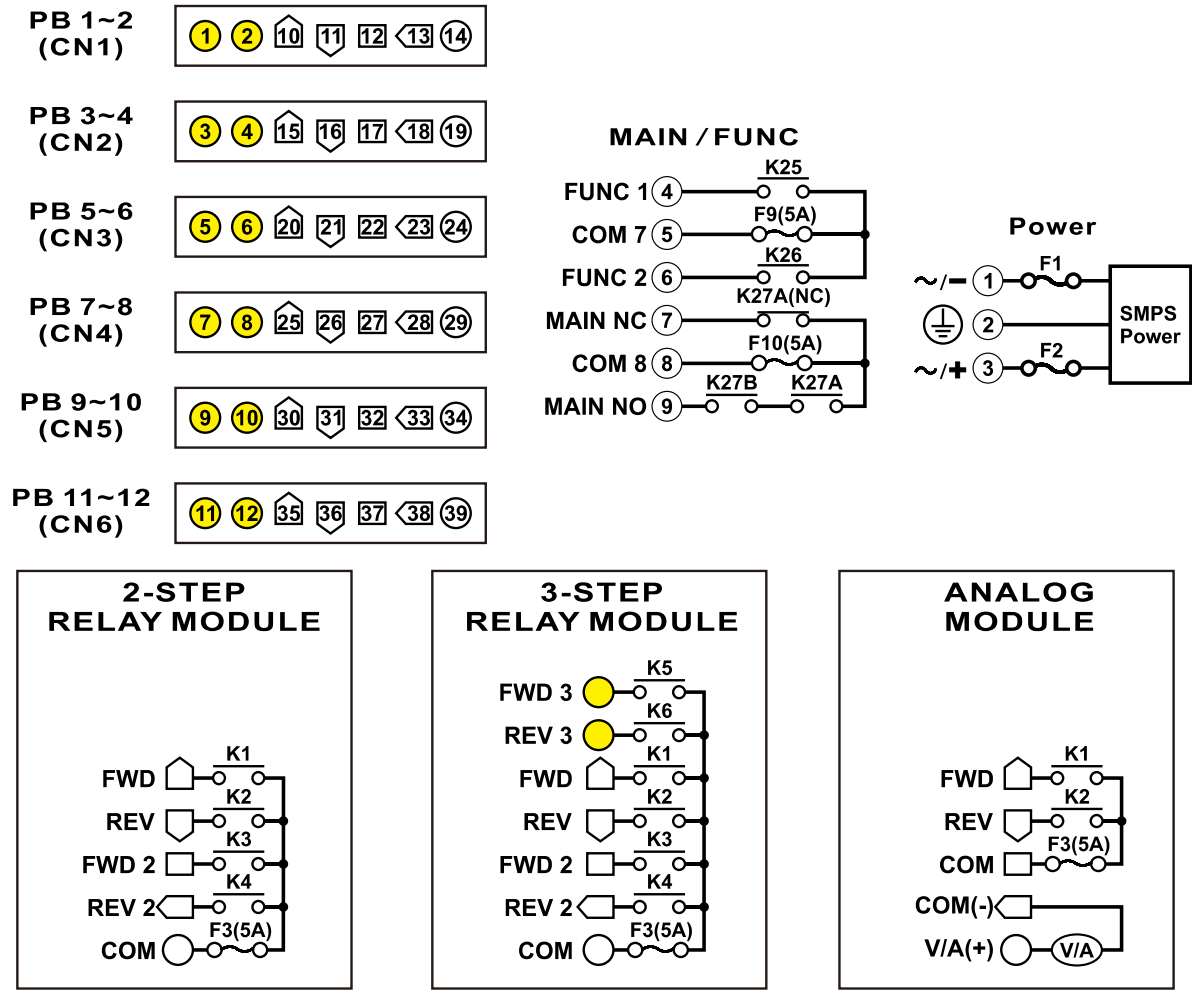
Flex 4EPV & 6EPV Models



- FWD-3 and REV-3 motions on 3-step relay module.
- ⬆ FWD motion on 2-step / 3-step relay modules and analog module.
- ⬇ REV motion on 2-step / 3-step relay modules and analog module.
- FWD-2 motion on 2-step / 3-step relay modules and FWD/REV COM on analog module.
- ◁ REV-2 motion on 2-step / 3-step relay modules and V/A COM (-) on analog module.
- COM for 2-step / 3-step relay modules and V/A (+) on analog module.

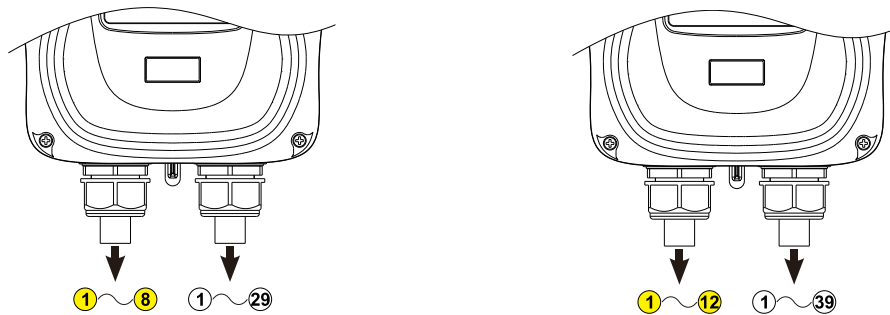
* For 9~36VDC power supply, wire #1 corresponds to the negative charge (-) and wire #3 corresponds to the positive charge (+). Wire #2 or green/yellow wire is for AC ground.

Flex 8EPV & 12EPV Models



Flex 8EPV Cable Wire Arrangement

Flex 12EPV Cable Wire Arrangement



- FWD-3 and REV-3 motions on 3-step relay module.
- ◻ FWD motion on 2-step / 3-step relay modules and analog module.
- ◻ REV motion on 2-step / 3-step relay modules and analog module.
- ◻ FWD-2 motion on 2-step / 3-step relay modules and FWD/REV COM on analog module.
- ◻ REV-2 motion on 2-step / 3-step relay modules and V/A COM (-) on analog module.
- COM for 2-step / 3-step relay modules and V/A (+) on analog module.

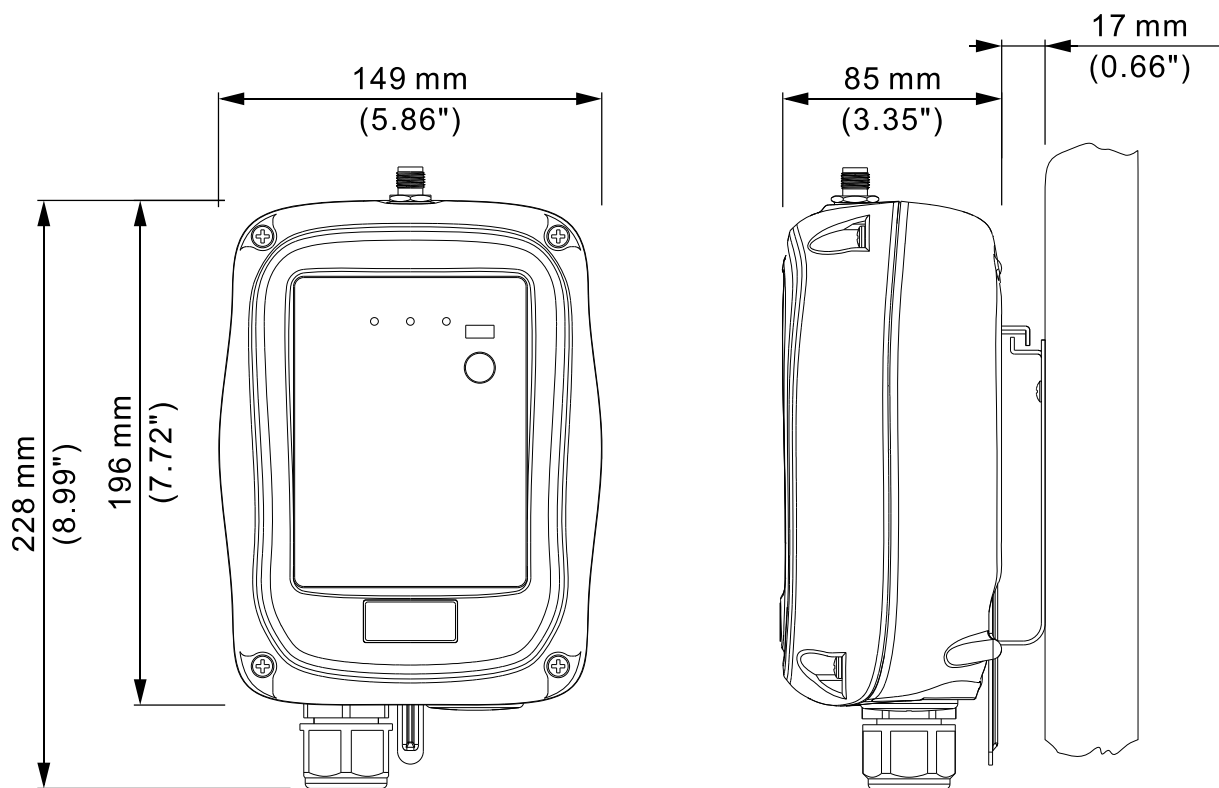
* For 9~36VDC power supply, wire #1 corresponds to the negative charge (-) and wire #3 corresponds to the positive charge (+). Wire #2 or green/yellow wire is for AC ground.

5.2 Pre-installation Precautions

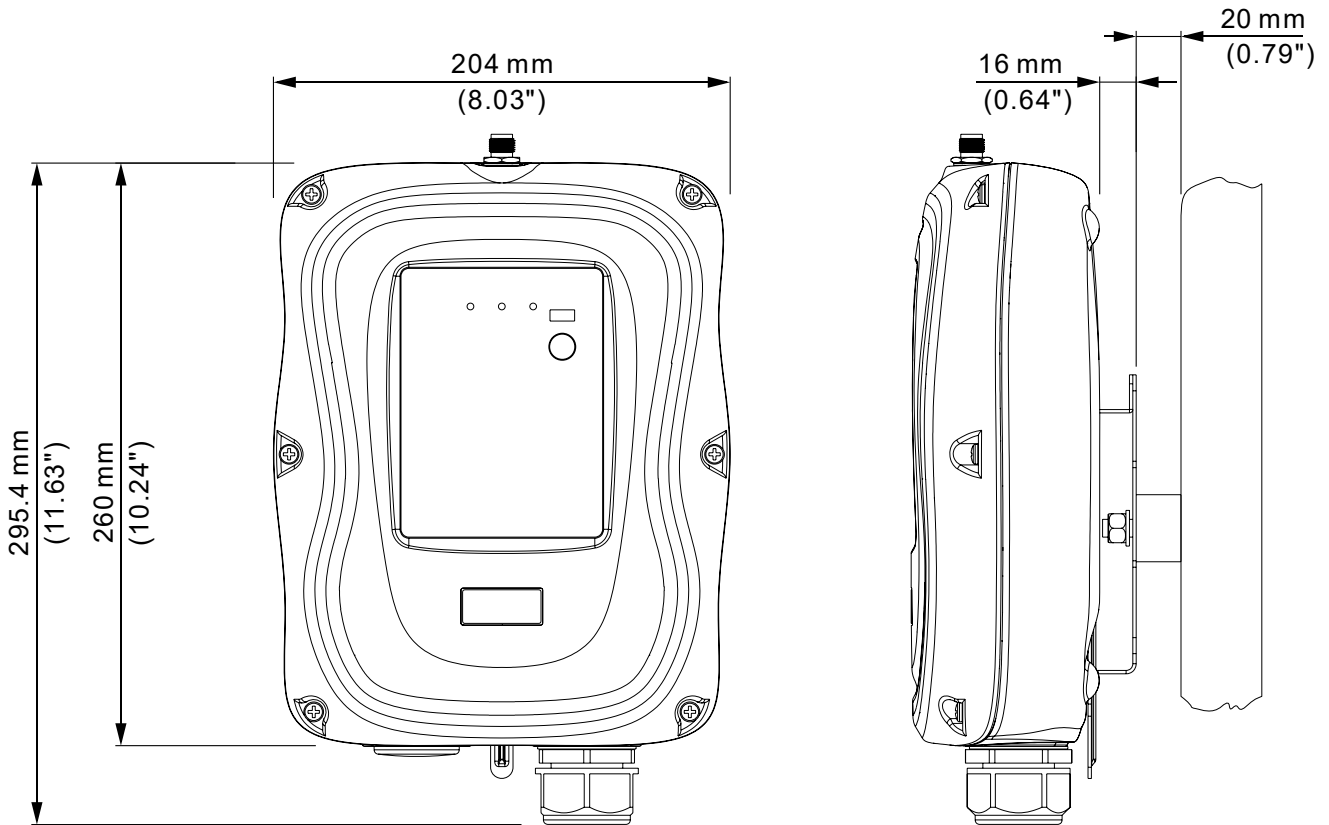
1. Make sure the transmitter and receiver are with identical serial number and channel.
2. Make sure the receiver is not set to the same channel as any other systems in use in the surrounding area.
3. Make sure the crane or equipment is working properly prior to installation.
4. Make sure the power source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

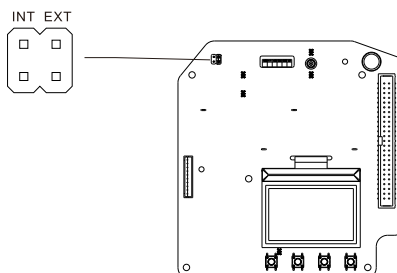
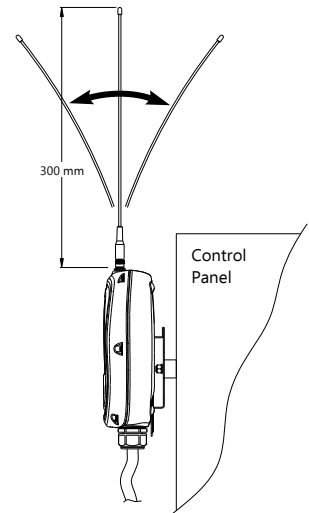
Flex 4EPV & 6EPV Models



Flex 8EPV & 12EPV Models

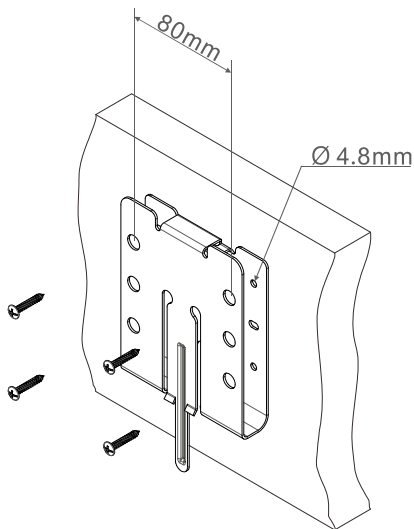


1. For best reception the location of the receiver should be visible to the operator at all time.
2. The location selected should not be exposed to high levels of electric noise. Mounting the receiver next to an unshielded variable frequency drive may cause radio interference. Always locate the receiver as far away from variable frequency drive and electric motor 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 jumper set to "EXT" position.

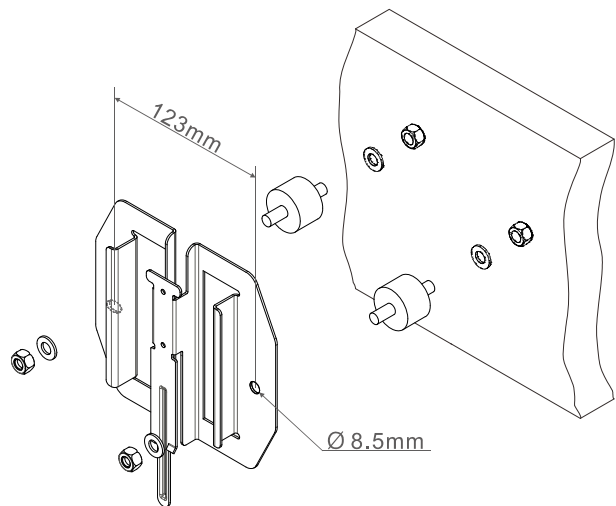


5. For better reception, make sure the receiver is in an upright position.
6. Flex 4EPV & 6EPV models: Drill four holes on the control panel, wall or location where the receiver is to be installed.
7. Flex 8EPV & 12EPV models: Drill two holes on the control panel, wall or location where the receiver is to be installed.
8. Make sure the mounting bracket is fully secured after installation.

Flex 4EPV & 6EPV Models

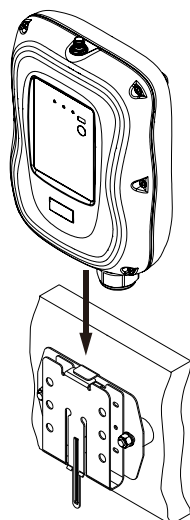


Flex 8EPV & 12EPV Models

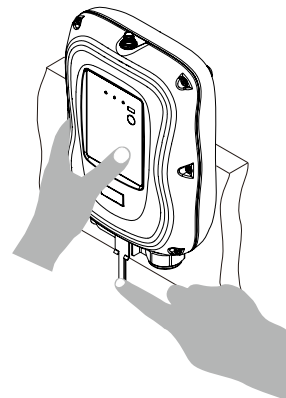


9. Slide down the receiver along the guided track to secure the receiver to the mounting bracket.
10. Remove the receiver by pressing down the bracket release and pull the receiver upward until it clears the guided track.

Install



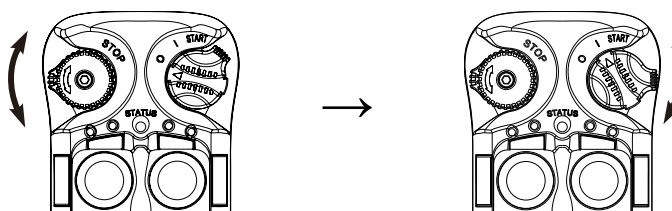
Remove



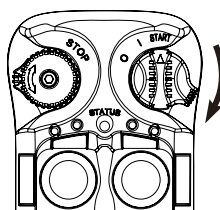
6. Operating Procedures

6.1 General Operation

- a. Reset the STOP button located on the top left-hand corner of the transmitter by rotating it clockwise or counter clockwise, the button will pop up. Turn on the transmitter power by inserting the power switch key and rotate to ON (I) position.



- b. After turning on the transmitter power, 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. Rotate the power switch key further to the START position and hold it there for up to 2 seconds (Status LED constant green). When the receiver MAIN relays are activated, the Status LED will change from constant green to constant orange (system on). The power switch key will retract back to the ON (I) position when let go. The same START position becomes an auxiliary function thereafter (refer to section 4.2.1.3 START + AUX Function). Pressing any pushbutton prior to executing the START command at system startup will result in no signals transmitted (Status LED blinks orange).

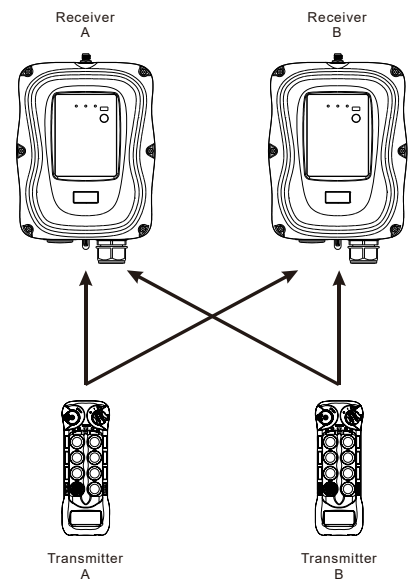


- d. Now press any pushbutton on the transmitter to begin operation. During transmitter inactivity (pushbuttons not pressed), the transmitter will automatically switch to standby mode, with an orange blink on the Status LED every 4-second interval. Always turn off the transmitter power when not in use to save battery power.
- e. In case of an emergency, press down the STOP button to disconnect the receiver MAIN relays (Status LED blinks 3 reds and then shuts off). To resume operation, rotate the STOP button clockwise or counter clockwise, the button will pop up. Then execute the START command 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.

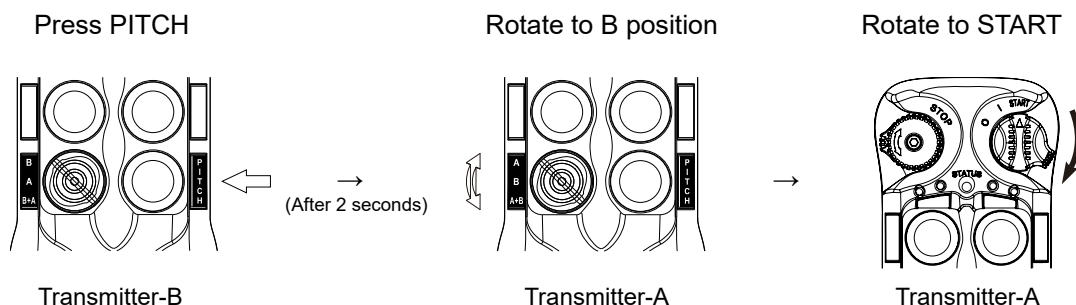
- f. After 5 or 30 minutes of inactivity (pushbutton not pressed), the receiver MAIN relays are temporarily disconnected (refer to section 4.1.5 Inactivity Timer Settings). The Status LED blinks 3 reds and then shuts off. Press any pushbutton or execute the START command to resume operation (refer to section 4.1.4 Start Function Settings).
- g. Turn off the transmitter power by rotating the power switch key counter clockwise to Off (0) position; it will disconnect the transmitter power and the receiver MAIN relays altogether. Turn it further counter clockwise to release the key.

6.2 Master/Master Tandem Operation (Tandem models)

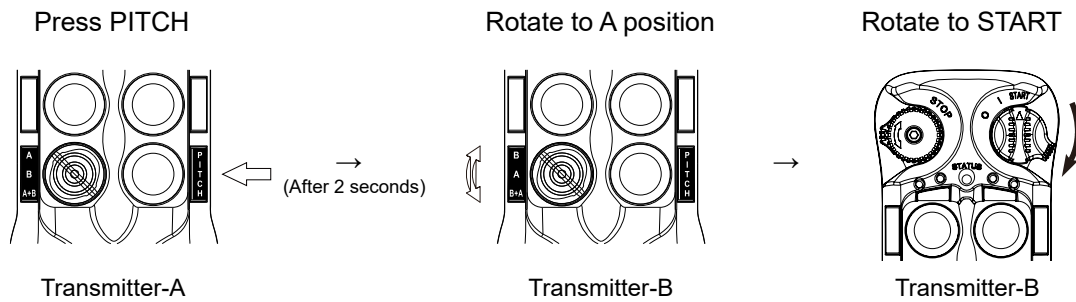
- a. To gain control of one or both receivers, first rotate the selector switch to either A, B or A+B position and then execute the START command to activate the receiver MAIN relays inside receiver A, receiver B, or both receivers (depending on the selector switch position). In order to gain control of a receiver, the PITCH pushbutton on the other transmitter must be pressed prior to your takeover. For example, in order for transmitter-A to gain control of receiver-B, transmitter-B must first release its control of receiver-B by first rotate the selector switch to B position and then press the PITCH pushbutton for up to 2.0 seconds. This action releases transmitter-B control of receiver-B. Transmitter-A is then able to take control of receiver-B by first rotate the selector switch to B position and then execute the START command. Make sure the START command is executed 2.0 seconds after transmitter-B presses the PITCH pushbutton (refer to diagram below).



Master Transmitter-A Takeover Procedure



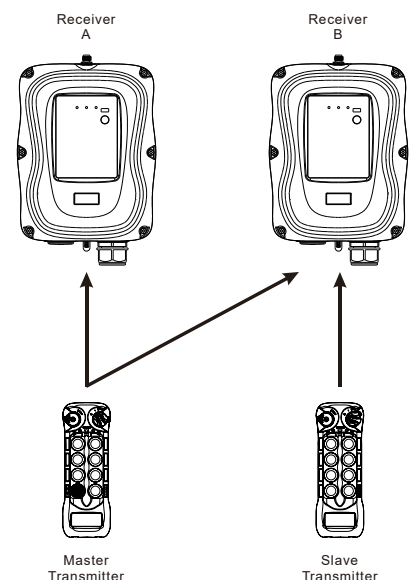
Master Transmitter-B Takeover Procedure



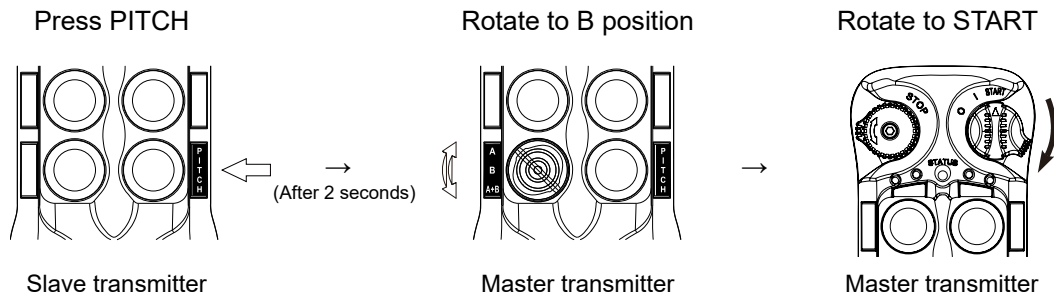
- b. Once the transmitter is locked on to both receivers, rotate the selector switch to either A, B, or A+B position for independent or simultaneous operation.
- c. At beginning of each shift prior to turning on the transmitter power, always check if the selector switch is correctly positioned for the intended receiver or receivers.
- d. For safety, there is a 2-second grace period followed after executing the PITCH command. What this means is that after PITCH pushbutton is pressed, executing the START command on the other transmitter within this 2-second grace period is ineffective. In order to gain control of the other receiver you must first wait for up to 2 seconds after the other transmitter presses the PITCH pushbutton and then for you to execute the START command thereafter.

6.3 Master/Slave Tandem Operation (Tandem models)

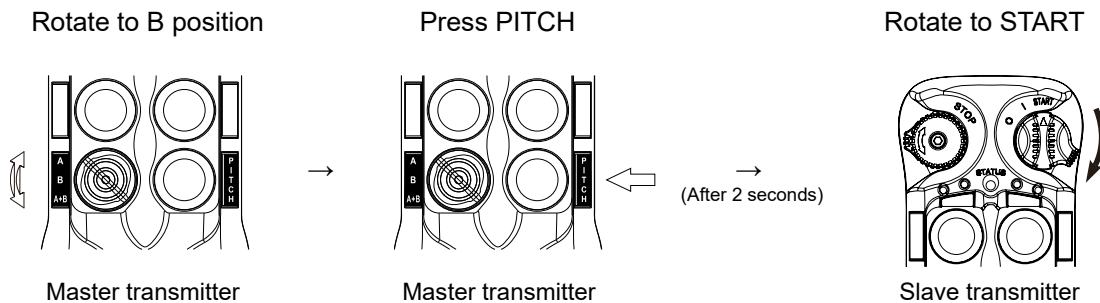
- a. To gain control of one or both receivers, first rotate the selector switch to either A, B or A+B position and then execute the START command to activate the receiver MAIN relays inside receiver A, receiver B, or both receivers (depending on the selector switch position). In order to gain control of a receiver, the PITCH pushbutton on the other transmitter must be pressed prior to your takeover. For example, in order for Master transmitter to gain control of the Slave receiver (receiver-B), Slave transmitter must first release control of its receiver (receiver-B) by pressing the PITCH pushbutton for up to 2.0 seconds. This action releases Slave transmitter control of its receiver (receiver-B). Master transmitter is then able to take control of the Slave receiver (receiver-B) by first rotate the selector switch to B position and then execute the START command. Make sure the START command is executed 2.0 seconds after Slave transmitter presses the PITCH pushbutton (refer to diagram below).



Master Transmitter Takeover Procedure



Slave Transmitter Takeover Procedure



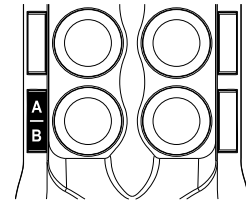
- Once the transmitter is locked on to both receivers, rotate the selector switch to either A, B, or A+B position for independent or simultaneous operation.
- At beginning of each shift prior to turning on the transmitter power, always check if the selector switch is correctly positioned for the intended receiver or receivers.
- For safety, there is a 2-second grace period followed after executing the PITCH command. What this means is that when PITCH pushbutton is pressed, executing the START command on the other transmitter within this 2-second grace period is ineffective. In order to gain control of the other receiver you must first wait for up to 2 seconds after the other transmitter presses the PITCH pushbutton and then for you to execute the START command thereafter.

6.4 A/B Pushbutton Select Operation

Press the “A/B” pushbutton repeatedly toggles between output relay A, B and A+B respectively. There are 4 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.

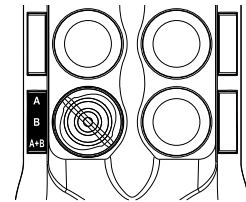
Reversed logic – Output relay A activated at B position, output relay B activated at A position, both output relays deactivated at A+B position. Refer to section 4.2.3 and 4.2.6.22 JP3 jumper function descriptions and programming.



6.5 A/B Rotary Select Operation (AB models)

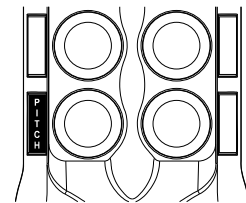
Standard – Rotate to A position activates output relay A, rotate to B position activates output relay B, rotate to A+B position activates both output relays.

Reversed logic – Rotate to A position activates output relay B, rotate to B position activates output relay A, rotate to A+B position deactivates both output relays. Refer to section 4.2.3 and 4.2.6.22 JP3 jumper function descriptions and programming.



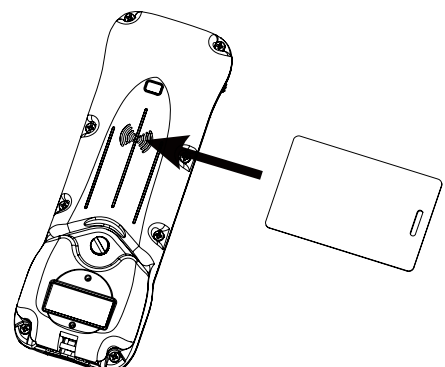
6.6 Pitch & Catch Operation

Press the “PITCH” pushbutton for up to 2 seconds to release control of the receiver. After 2-second grace period, rotate the power switch key to START position 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” pushbutton. Refer to section 4.2.1.10, section 4.2.2.4 and section 4.2.6.10 ~ 4.2.6.15 pitch and catch descriptions and programming.



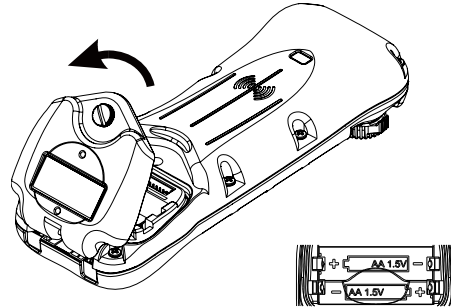
6.7 Transmitter Access Card (TAC) Operation

After turning on the transmitter power, place the TAC directly over the RFID marking located on the backside of the transmitter. A 2-second green on the Status LED represents access card accepted. Status LED with red blinks represents invalid access card. Then rotate the power switch key to the START position for up to 2 seconds to begin operation. TAC is not required after every transmitter inactivity restart, only during initial transmitter power on.



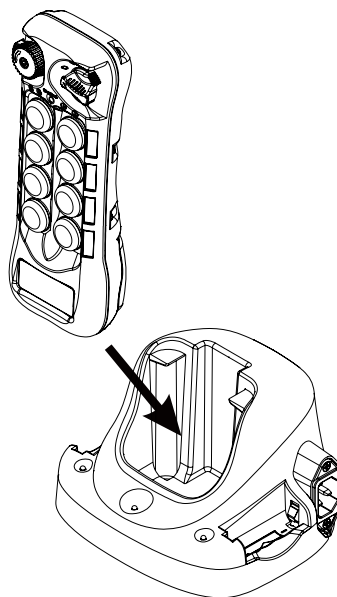
6.8 Changing Batteries

Changing transmitter batteries (“AA” alkaline battery x 2) 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.



6.9 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 the transmitter charging. The individual battery charging begins only after the transmitter charging is completed. Depending on the battery capacity the average charging time is approximately 3 hours from completely drained to fully charged. Constant red on the LED represents charging in progress, constant green represents batteries fully charged, and LED off represents no batteries detected. Please do not use any rechargeable lithium-ion batteries as it will damage both the transmitter and the charging station. Please refer to the charging station instruction manual for other useful features such as the rubber safety belt, removable mounting bracket and external light indication.



6.10 System Status Indications

6.10.1 Transmitter Status LED Indications

Type	Display Type	Indication
1	Constant red	Voltage below 1.8V at initial power on or during operation
2	Constant red → 3 red blinks → off	Voltage below 1.75V during operation (receiver MAIN relays shut off)
3	1 red blink followed by a 2-second pause	Voltage below 1.85V during operation (change batteries suggested)
4A	2 red blinks followed by a 2-second pause	Defective or jammed pushbutton detected at initial power on
4B	No light displayed	When defective pushbutton condition occurs (2 red blinks, type 4A above), find out which pushbutton is defective by pressing all of them one at a time. If the pushbutton is in good working order when pressed, the Status LED is off. If the Status LED maintained 2 red blinks, then the pushbutton is defective.
5	4 red blinks followed by a 2-second pause	Transmitter is unable to lock onto the assigned channel
6	Constant green for up to 2 seconds	Transmitter power on with no faults detected
7	Blinking green	Transmission in progress
8	Blinking orange	Pressing any pushbutton prior to executing the START command at power on
9	3 slow red blinks → off	STOP button pressed down
10	4 orange blinks	Transmitter on standby
11	2 orange blinks followed by a 2-second pause	Receiver MAIN relays jammed or defective
12	3 red blinks followed by a 2-second pause	Encoding processor defective
13	3 orange blinks followed by a 2-second pause	Decoding processors defective
14	Constant orange when the power switch key is rotated and hold at the START position at initial system startup	Receiver MAIN relays activated

6.10.2 Receiver Status LED 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

6.10.3 Receiver Power LED Indications

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

6.10.4 Receiver COM LED Indications

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

6.10.5 Receiver Status LCD Indications

STATUS	2: --	1: --
DECODING	4: --	3: --
	6: --	5: --
	8: --	7: --
	10: --	9: --
	12: --	11: --

Decoding
in progress

STATUS	2: --	1: --
STANDBY	4: --	3: --
	6: --	5: --
	8: --	7: --
	10: --	9: --
	12: --	11: --

Decoding
on standby

STATUS	2: --	1: --
POS	4: --	3: --
INITIATED	6: --	5: --
	8: --	7: --
	10: --	9: --
	12: --	11: --

Transmitter
power off

STATUS	2: --	1: --
EMS	4: --	3: --
INITIATED	6: --	5: --
	8: --	7: --
	10: --	9: --
	12: --	11: --

Stop button
pressed down

STATUS	2: --	1: --
POS EMS	4: --	3: --
INITIATED	6: --	5: --
	8: --	7: --
	10: --	9: --
	12: --	11: --

Transmitter
power off +
stop button
pressed down

STATUS	2: --	1: --
LOW	4: --	3: --
VOLTAGE	6: --	5: --
	8: --	7: --
	10: --	9: --
	12: --	11: --

Receiver
low voltage

STATUS	2: --	1: --
MAIN	4: --	3: --
DEFECT	6: --	5: --
	8: --	7: --
	10: --	9: --
	12: --	11: --

Main relay
defective

STATUS	2: --	1: --
RF	4: --	3: --
DEFECTIVE	6: --	5: --
	8: --	7: --
	10: --	9: --
	12: --	11: --

RF board
defective

STATUS	2: --	1: --
INCORRECT	4: --	3: --
S/N	6: --	5: --
	8: --	7: --
	10: --	9: --
	12: --	11: --

Incorrect TX
serial number

STATUS	2: --	1: --
DECODER	4: --	3: --
DEFECT	6: --	5: --
	8: --	7: --
	10: --	9: --
	12: --	11: --

Decoder board
defective

7. General Specifications

Frequency Range	:	433.050MHz ~ 439.600MHz 863.050MHz ~ 869.600MHz 921.000MHz ~ 927.550MHz
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	:	2.0mW
Enclosure Type	:	NEMA4
Enclosure Rating	:	IP66
Output Contact Rating	:	250V @ 8 Amps
Transmitter Operating Voltage	:	3.0VDC
Receiver Power Consumption	:	22VA (max)
Available Receiver Voltages	:	9~36VDC 24~48VAC 100~240VAC 380~460VAC
Operating Temperature	:	-25°C ~ 75°C / -13°F ~ 167°F
Transmitter Dimension (4EPV)	:	152mm (L) x 70mm (W) x 44mm (H)
Transmitter Dimension (6EPV)	:	175mm (L) x 70mm (W) x 44mm (H)
Transmitter Dimension (8EPV)	:	198mm (L) x 70mm (W) x 44mm (H)
Transmitter Dimension (12EPV)	:	244mm (L) x 70mm (W) x 44mm (H)
Receiver Dimension (4EPV & 6EPV)	:	196mm (L) x 149mm (W) x 85mm (H)
Receiver Dimension (8EPV & 12EPV)	:	260mm (L) x 204mm (W) x 83mm (H)
Transmitter Weight (4EPV)	:	249g / 8.8oz (include batteries)
Transmitter Weight (6EPV)	:	270g / 9.5oz (include batteries)
Transmitter Weight (8EPV)	:	292g / 10.3oz (include batteries)
Transmitter Weight (12EPV)	:	341g / 12.0oz (include batteries)
Receiver Weight (4EPV)	:	1.50kg / 3.3lb (include output cable)
Receiver Weight (6EPV)	:	1.55kg / 3.4lb (include output cable)
Receiver Weight (8EPV)	:	2.25kg / 5.0lb (include output cable)
Receiver Weight (12EPV)	:	2.64kg / 5.8lb (include output cable)

CE EU Declaration of Conformity CE

(RED, LVD & Machinery)

For the following equipment:

Product : Flex EPV Series Radio Remote Control System
Multiple Listee Model No. : Flex 4EPV, 6EPV, 8EPV and 12EPV
Manufacturer's Name : Advanced Radiotech Corporation
Manufacturer's Address : No.3, South 1st Road, Cianjhen District,
Kaohsiung 80681, Taiwan

We hereby declare, that all major safety requirements, concerning the CE Mark Machinery Directive 2006/42/EC, Low Voltage Directive 2014/35/EU (LVD) and Radio Equipment Directive of 2014/53/EU (RED) are fulfilled, as laid out in the guideline set down by the member states of the EEC Commission.

The standards relevant for the evaluation of the electrical safety requirements are as follow:

RED (EMC) : EN 301 489-17 V2.2.1 + EN 301 489-3 V1.6.1
RED (RF) : EN 300 220-1 V2.4.1 + EN 300 220-2 V2.4.1
LVD : EN 60950:2006+A1+A11+A12
MACHINERY : EN 60204-32:2008, EN ISO 13849-1:2015 (PLd)
EN 13557:2003+A2:2008
OTHERS : EN 60529 (IP66), EN 62479, EN 55032 + EN 55024

Test reports issued by:

RED (EMC) : SGS
RED (RF) : SGS
LVD : SGS
MACHINERY : SGS
OTHERS : SGS

Person responsible for making this declaration:



Tom Jou / President

Name and signature of authorized person