REMOTE CONTROL SYSTEMS
OPERATION MANUAL

200 Series
400 Series
500 Series
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1.0 WARRANTY

Every product is thoroughly inspected and tested before it is shipped from the factory. If any problem develops within one year, return the product prepaid to the factory. If an inspection reveals that the problem is caused by defective workmanship or material, repairs will be made without charge and the product will be returned with the shipping prepaid.

Excluded Items

This warranty does not cover:

- Deterioration caused by normal wear, abuse, chemical or abrasive actions, improper maintenance or excessive heat.
- Problems resulting from repairs, modifications, or alterations made by people other than factory or ACI representatives.
- If the product has been abused or damaged due to an accident.
- If repair parts or accessories other than ACI equipment are used on the product; they are warranted only to the extent that they are warranted by the manufacturer of said parts or accessories.

Remarks

EXCEPT AS STATED HERE, ACI MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WARRANTIES FOR A PARTICULAR PURPOSE.

WARNING

Alterations or modifications of equipment and use of non-factory repair parts can lead to dangerous operation and injury.

To avoid injury:

DO NOT alter or modify equipment.
DO NOT use equipment to lift, support or otherwise transport people.
DO NOT suspend unattended loads over people.
# 2.0 SAFETY PRECAUTIONS

## 2.1 Safety Alert Symbols

Throughout this manual are steps and procedures that can prevent hazardous situations, the following symbols are used to identify the degree or level of hazard seriousness.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Danger</strong></td>
<td>Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury and property damage.</td>
</tr>
<tr>
<td><strong>Warning</strong></td>
<td>Indicates an imminently hazardous situation which, if not avoided, could result in death or serious injury and property damage.</td>
</tr>
<tr>
<td><strong>Caution</strong></td>
<td>Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or property damage.</td>
</tr>
<tr>
<td><strong>Notice</strong></td>
<td>Notifies people of installation, operation or maintenance information which is important but not directly hazard related.</td>
</tr>
</tbody>
</table>

Failure to read and comply with any of the limitations noted in this manual can result in serious bodily injury or death, and/or property damage.
2.2 Operating Precautions

2.2.1 Attention

1. Due to the complex nature of equipment, it is necessary to read the entire manual before installation.
2. Never allow any unauthorized personnel to dismantle equipment as this may cause equipment damage.
3. The equipment has been stringently tested for quality assurance before delivery from factory. However, it must not be used in extremely dangerous situations or where damage may result.
4. After operation, switch off crane main power as well as receiver unit and remove rotary key from transmitter unit.
5. Keep the transmitter in a safe place when not in use to avoid any unintentional operation.
6. The crane should be equipped with a main power relay, limit switch, and other safety devices required.
7. Do not use this device during an electrical storm or where there are conditions of high electrical interference.
8. Always check transmitter batteries and receiver input power condition before operation.
9. The installation and maintenance service is allowed only when the crane and receiver power are off to avoid electrical shock.
10. The contents of the manual may be amended by the manufacturer without notice.
11. The specification and function is subject to change without notice by manufacturer.

2.2.2 Precautions (500 Series)

1. Press EMS button and switch off main power of crane and receiver after operation. Then, remove transmitter rotary key and keep in a safe place.
2. The following may cause receiver response delay and you should stop operation immediately when these situations occur.
   a. Beyond operating range.
   b. During severe radio interference.
3. Remove transmitter batteries when not in use for a long period of time.
4. To extend product life, please follow the standard operating procedure and maintain system regularly.

2.2.3 Emergency Procedures (500 Series)

In case of emergency, please follow the procedure below:

5. Press EMS button and stop operation.
6. Switch rotary key to “OFF” position and remove it from transmitter unit.
7. Switch off crane main power.
8. Contact the authorized distributor for further assistance.
3.0 GENERAL OPERATION (500 SERIES)

3.1 Transmitter Configuration

1. Antenna
2. Emergency Stop
3. LED indicator
4. Motor Pushbutton
5. Auxiliary Pushbutton R1-R4
6. F1 Pushbutton
7. Start Pushbutton
8. Battery Cover
9. Rotary Key Switch
10. Security Key
3.1.1 Model 5008AB
3.1.2 Model 50011AB

- Emergency Stop Button
- Motion Pushbutton
- Auxiliary Pushbutton
- "B" Switch ON/OFF
- LED Indicator
- Motion Pushbutton
- Battery Cover
- Security Key
3.2 General Operation

1. Install two (2) new AA-size alkaline batteries in the battery box of MODEL 50011, then insert into battery case of transmitter; or battery chamber of 5008, and screw in transmitter's bottom cover. Make sure the "+" and "-" directions are correct.

2. Insert security key in the "OFF" position.

3. Turn on the power according to the "Power-On Modes". Note: LED indicator will flash red if proper procedures are not followed.

4. Operate transmitter by pressing each pushbutton.

5. After operation, perform the following procedures in sequence:
   (1) Press EMS mushroom,
   (2) Rotate security key or rotary key switch counterclockwise to the "OFF" position,
   (3) remove key and keep it in a safe place, (4) remove batteries if not to be used for a long period of time.

3.3 Special Functions Operation

3.3.1 Power-On Operations

Power-On means that the Main-Relay on the receiver will switch on as soon as the transmitter sends a signal and then the receiver will be on standby for continuous control. There are 2 options for "Power-On Mode":

1. Any Pushbutton Power-On Mode
   a. Rotate "EMS" mushroom clockwise 45° and pull out.
   b. Turn security key clockwise to "ON" position for 50011; Rotary key switch clockwise to "ON" for 5008.
   c. Press any pushbutton on the transmitter. This will turn on the power as well as execute the function of pushbutton.

2. "START" Pushbutton Power-On Mode
   a. Rotate "EMS" mushroom clockwise 45° and pull out.
   b. Turn security key clockwise to "ON" position for 50011; Rotary key switch clockwise to "ON" for 5008.
   c. Press "START" pushbutton on the transmitter to turn on power for 50011; Continue to turn rotary key switch to "START" position to turn on power for 5008 (the rotary key switch will return to "ON" position automatically after being released.)
3.3.2 Acceleration Operation

1. For 50011: The "START" pushbutton is acceleration pushbutton.
2. For 5008: The "START" key is the acceleration key.
3. When a motion is in the second speed, quick touch of acceleration pushbutton will accelerate the speed. Repeated touch of acceleration pushbutton will increase the speed. **Note:** When accelerating, the motion pushbutton must be depressed and held in the second speed. If motion pushbutton is released, there will be no acceleration and speed will return to zero.

3.3.3 Inching Operation

1. "Start" pushbutton is set for "inching" function.
2. Press and hold inching pushbutton.
3. Press any motion pushbutton to perform the inching motion. **Note:** The other pushbutton of transmitter must be released before pressing the inching pushbutton.
### 4.0 FUNCTION SETTINGS (DEFINED BY CUSTOMER)

#### 4.1 Pushbutton Function Setting:

**UP/DOWN, NORTH/SOUTH, EAST/WEST, R1/R2, R3/R4 Pushbutton Function Setting**

<table>
<thead>
<tr>
<th>Item</th>
<th>Title</th>
<th>Content</th>
<th>Description</th>
</tr>
</thead>
</table>
| 1    | Button Function        | 1. Normal/Normal 
2. Toggle/Toggle 
3. No/Off 
4. Normal/Toggle 
5. Dual Motor(1)/Dual Motor(1) 
6. Dual Motor(2)/Dual Motor(2) 
7. 3 Speed Accel. / 3 Speed Accel. 
9. Normal/Dual Motor(1) 
10. Normal/Dual Motor(2) 
11. Toggle/Dual Motor(1) 
12. Toggle/Dual Motor(2) 
13. Toggle/3 Speed Accel. 
14. Synthesis/Synthesis | Normal: The relative relay is "ON" when the Pushbutton is pressed and held. The relative relay is "OFF" when the Pushbutton is released.
Toggle: Press the Pushbutton and release once for "ON", re-press and release for "OFF".
**ON & OFF:** Two relative Pushbuttons are set to respectively control the same relay. If a Push- button set as "ON" is pressed and released, the relay remains conductive. At this time, the other Pushbutton can't change the situation of this relay except the Pushbutton set as "OFF".
**Dual Motor(1):** When Pushbutton is released from 2nd speed and back to 1st, the 1st speed relay is activated again til the Pushbutton is totally released.
**Dual Motor(2):** When Pushbutton is released from 2nd speed and back to 1st, the 1st speed relay is not activated but bypassed.
**3 Speed Accel.:** Use "START" to accelerate to 3 Speed
**Digital Accel.:** Use "START" to accelerate to 4 Speed
**Synthesis:** Three relays used for two dual- speed motions, the fourth relay works as independent "TOGGLE" ON and OFF function when two Pushbuttons pressed simultaneously and again. |
| 2    | Acceleration Delay     | 0-4.0 seconds                                                           | This function is used to set the time interval between acceleration relays (i.e. conduction delayed time of acceleration delay. It is suitable for accelerative operation to prevent the crane from running at a higher speed to damage the motor. |
| 3    | EMS Control            | 1. Control by EMS 
2. Bypass EMS | Control by EMS means the corresponding relay of function Pushbutton is controlled by EMS mushroom or emergency stop signal. Bypass EMS means the corresponding relay of function Pushbutton will not be controlled by EMS mushroom or emergency stop signal. |
| 4    | Interlock Function     | 1. Interlock Delay 
0-2 seconds 
2. Non-Interlocked | **Interlock:** If it is dangerous or improper to operation two motions at the same time, select "INTERLOCK". Delay time means the time interval before next motion is valid.
**Non-Interlocked:** If two motions are safe or irrelevant to operate at the same time, select "NON-INTERLOCKED". |
### Start/F1 Pushbutton Function Setting

<table>
<thead>
<tr>
<th>Item</th>
<th>Title</th>
<th>Content</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Button Function</td>
<td>START</td>
<td><strong>Inching:</strong> &quot;Inching&quot; means that once the Pushbutton is pressed, relative relay will be activated within a certain period of time to operate a short but precise movement. Press and hold inching Pushbutton and then press motion Pushbutton to perform the inching motion. <strong>Acceleration:</strong> When the motion is at the 2nd speed, quick pushing on acceleration Pushbutton will accumulate one speed each time and the relative relay will turn on accordingly. When accelerating, the motion Pushbutton must be pressed and held in the 2nd speed. If motion Pushbutton is released, there will be no acceleration and the speed will return to zero.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1. Normal</td>
<td>1. Normal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Toggle</td>
<td>2. Toggle</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Inching/Accel.</td>
<td>3. Dual Motor(1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4. Dual Motor(2)</td>
</tr>
<tr>
<td>2</td>
<td>EMS Control</td>
<td>1. Control by EMS</td>
<td><strong>Control by EMS</strong> means the corresponding relay of function Pushbutton is controlled by EMS mushroom or emergency stop signal. <strong>Bypass EMS</strong> means the corresponding relay of function Pushbutton will not be controlled by EMS mushroom or emergency stop signal.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Bypass EMS</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Inching</td>
<td>0.1-4.0 seconds</td>
<td>Select the time interval of each inching motion.</td>
</tr>
<tr>
<td>4</td>
<td>Acceleration Delay</td>
<td>0-4.0 seconds</td>
<td>Select the time interval for each acceleration.</td>
</tr>
</tbody>
</table>
## Transmitter Function Setting

<table>
<thead>
<tr>
<th>Item</th>
<th>Title</th>
<th>Content</th>
<th>Description</th>
</tr>
</thead>
</table>
| 1    | POWER-ON Mode       | 1. Any Pushbutton 
2. START Pushbutton                                                    | **Any Pushbutton:** When mushroom is released and security or rotary key is at "ON" position, the receiver will be "POWER-ON" by pressing any Pushbutton on transmitter.

**START Pushbutton:** When mushroom is released and security or rotary key is at "ON" position, the receiver will be "POWER-ON" only by pressing "START" Pushbutton on transmitter. |

| 2    | Transmit Mode       | 1. Non-Continuous 
2. Continuous 15 seconds-30 seconds OFF 
3. Continuous Never OFF | **Non-Continuous:** Once the receiver is "POWER-ON", the transmitter will transmit signal only when Pushbutton is pressed. This mode can save the power of transmitter.

**Continuous Due Time OFF:** Transmitter will transmit signal continuously during "POWER-ON" and stop sending signal if no Pushbutton is pressed within selected timeframe.

**Continuous Never OFF:** Transmitter will keep sending signal unless turned off manually. |

| 3    | Auto Off            | 1. Enable 
2. Disable                                                         | **Enable:** When Transmit Mode is set for continuous, it will send an EMS signal to "POWER-OFF" the receiver if it is set to auto off in a certain timeframe.

**Disable:** Disable the function to send EMS signal to receiver before the transmitter is off. |

| 4    | Normal OP LED       | 1. ON 
2. ON Every 1 - 4 seconds 
3. OFF                                                                 | **ON:** LED indicator will glow with green color when transmitter is transmitting. It still works for warning and fault indication with first priority.

**ON Every 1 - 4 seconds:** LED indicator is flashing with green color every 1 - 4 seconds.

**OFF:** LED indicator will not work during normal operation in order to save power. But, it is still available for warning and fault indication. |

| 5    | Powersaving         | 1. Enable 
2. Disable                                                         | **Enable:** By using firmware to control frequency transmission cycle period, thus to reduce power consumption of transmitter. Simultaneously, the operating distance will be decreased when the "POWERSAVING" mode is enabled.

**Disable:** Disable this function. |

| 6    | Remote Setting      | 1. Enable 
2. Disable                                                         | **Enable:** Allow the transmitter to do ID-Code remote setting.

**Disable:** Not allow ID-Code remote setting on transmitter. |
## Receiver Function Setting

<table>
<thead>
<tr>
<th>Item</th>
<th>Title</th>
<th>Content</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Passive Act</td>
<td>1. Relay OFF 2. POWER OFF</td>
<td><strong>Passive Act:</strong> The function of this item is used to set the reaction of receiver when no command signal is received from transmitter in certain time (the default time is 0.5 seconds). Relay OFF means the Main Relay is still &quot;ON&quot; but the other relays with the &quot;NORMAL:&quot; function are all de-energized. It is not necessary to re-commence the procedure of &quot;POWER-ON&quot; again to continue operating. POWER OFF means the Main Relay and all of the other relays with the &quot;NORMAL:&quot; and &quot;Control by EMS&quot; functions are going to de-energize and it is essential to re-commence the procedures of &quot;POWER ON&quot; again to continue operation.</td>
</tr>
<tr>
<td>2</td>
<td>Passive Act Timing</td>
<td>0.1–4 seconds</td>
<td>The duration working time of receiver between passive act is activated and the power or relay is really OFF.</td>
</tr>
<tr>
<td>3</td>
<td>Auto-OFF (RX)</td>
<td>1. None-Execute 2. 10 minutes~4 hours POWER OFF</td>
<td><strong>Enable:</strong> When Transmit Mode is set for continuous, it will send an EMS signal to &quot;POWER-OFF&quot; the receiver if it is set to auto off in a certain time-frame. <strong>Disable:</strong> Disable the function to send EMS signal to receiver before the transmitter is off.</td>
</tr>
<tr>
<td>4</td>
<td>Remote Setting</td>
<td>1. Enable 2. Disable</td>
<td><strong>Enable:</strong> Allow the receiver to do ID-Code remote setting. <strong>Disable:</strong> Not allow ID-Code remote setting on receiver.</td>
</tr>
</tbody>
</table>
### 5.0 CORRESPONDENCE BETWEEN PUSHBUTTON AND RELAY OUTPUT (500 SERIES)

- **Note:** When pushbutton is released from 2nd speed and back to 1st one, the 1st speed relay is activated again until the pushbutton is completely released.

<table>
<thead>
<tr>
<th>1. Normal/Normal</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt; Step</td>
<td></td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; Step</td>
</tr>
<tr>
<td>✗ ○ ○ ○ ○</td>
<td>✗ ✗ ○ ○ ○</td>
<td>○ ○ ○</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Toggle/Toggle</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; Step</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>✗ ○ ○ ○</td>
<td></td>
<td>○ ○ ○</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. On/Off</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; Step</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td>✗ ○ ○ ○</td>
<td></td>
<td>○ ○ ○</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Normal/Toggle</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; Step</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; Step</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>✗ ○ ○ ○</td>
<td>✗ ✗ ○ ○ ○</td>
<td>○ ○ ○</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Dual Motor(1)/Dual Motor(1)</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; Step</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; Step</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>✗ ○ ○ ○</td>
<td>○ ○ ○</td>
<td>○ ○ ○</td>
</tr>
</tbody>
</table>
6. Dual Motor(2)/Dual Motor(2)

1st Step 2nd Step
⊗ 0 0 0 0 ⊗ 0 0 0 0
1st Step 2nd Step
⊗ 0 0 0 0 ⊗ 0 0 0 0

Note: When pushbutton is released from 2nd speed and back to 1st one, the 1st speed relay is not activated but bypassed to nothing.

7.3 Speed Accel./3 Speed Accel.

1st Step 2nd Step
⊗ 0 0 0 0 ⊗ 0 0 0 0
1st Step 2nd Step
⊗ 0 0 0 0 ⊗ 0 0 0 0

3rd Step
⊗ 0 0 0 0
⊗ 0 0 0 0

Note: The second step pushbutton must be pressed and held when pushing or turning “Start” pushbutton or key to reach third speed.

8. Digital Accel./Digital Accel.

1st Step 2nd Step
⊗ 0 0 0 0 ⊗ 0 0 0 0
1st Step 2nd Step
⊗ 0 0 0 0 ⊗ 0 0 0 0

3rd Step 4th Step
⊗ 0 0 0 0 ⊗ 0 0 0 0
⊗ 0 0 0 0 ⊗ 0 0 0 0

Note: The second step pushbutton must be pressed and held when pushing or turning “Start” pushbutton or key to reach the third and fourth speed.

9. Synthesis/Synthesis

1st Step 2nd Step
⊗ 0 0 0 0 ⊗ 0 0 0 0
1st Step 2nd Step
⊗ 0 0 0 0 ⊗ 0 0 0 0

Up + Down
⊗ 0 0 0 0

Note: When Up and Down pushbuttons are pressed at the same time, the second relay works as “Toggle”, released when they are pressed simultaneously again.
6.0 ID-CODE REMOTE SETTING (500 SERIES)

The use of Copier (500 Series)

1. Insert the six (6) pins of the female plug into the male socket inside the TX or RX of the 500 Series.

2. To copy and save the data from TX or RX, put the magnetic key onto the receptor to connect. To transfer the saved data from the copier to TX or RX, release the magnetic key from the receptor.

3. Press and release the "1" pushbutton (or 2 or 3) to copy and save the data (when the magnetic key is on) from TX or RX, after the green indicator light has flashed, the transfer is finished, disconnect the plug. Complete the same procedure to transfer the data from copier to TX or RX (when magnetic key is off). Note:

   (1) Make sure the power of TX or RX is off when copying.

   (2) The copier can copy both function settings and ID-Code, but to pair the crystal is still essential to match both TX and RX for communicating with each other.

ID-Code Remote Setting (500 Series)

ID-Code remote setting allows you to pair the new TX or RX if one of them is damaged. Using ID-Code remote setting will allow both the TX and RX to have the same ID-Code.

Please make sure the following conditions are met before ID-Code remote setting:

1. Both TX and RX are of the SAME model and frequency.

2. Place the transmitter as close as possible to the receiver to avoid interference.

3. Turn off the RX power for at least 10 seconds and turn it on again.

ID-Code Remote Setting Instructions

1. Press and hold the transmitter EMS button and "UP" pushbutton.

2. Press "DOWN" pushbutton four (4) times and then release "EMS & UP" push buttons when the red light on the transmitter is flashing.

3. Start the system as you usually would.
ATTENTION:

- In case ID-Code remote setting fails, repeat the instructions above within 4 minutes.
- ID-Code remote setting is available for ID Code only. It will not change function settings.
- Within the operating distance, all same model systems on the same frequency will be paired with the transmitter’s ID Code.
- A jumper added inside the receiver is necessary to enable the ID-Code remote setting function.
7.0 RECEIVER VOLTAGE SELECTION (500 SERIES)

Receiver Voltage Selection

There are two (2) types of power voltages (DC & AC) available for the 500 Series:

1. **DC Type:** Input Voltage: 12 ~ 24 VDC Relay Contact: 10A-36 VDC

2. **AC Type:** Three (3) different AC transformers: 48/110/220V, 48/220/380V,

3. 110/220/380V. Disconnect the AX's power, select the proper voltage and plug in the connector.

7.1 Switch the plug to choose voltage

Transmitter Battery Information

Two (2) AA size alkaline batteries are required for the transmitter. The LED will flash green when the battery power is sufficient. The LED will flash red when the battery power is low.

**Note:** The operating distance will become shorter and intermittent when the battery is low (replace with new batteries when battery power is low).

**DO NOT USE RECHARGABLE BATTERIES.**
8.0 BOARD LAYOUTS

8.1 Transmitter PC Board Layout (200 & 400 Series)

- Please do not install a VHF crystal into a UHF PC board or vice versa.

VHF: 310.0325 ~ 331.1650 MHz

UHF: 425.5925 ~ 446.7250 MHz
8.2 Receiver PC Board Layouts (200 & 400 Series)

Relay Board for 200 & 400 Series
DC Type

Fuse: 20A (yellow color)

Fuse: 1.5A

DC Input

Remark: The Polarity direction of DC Input is not required when plugging in the power line connector.
The GND (ground) of the receiver must be connected with metal part of the equipment or electrical shock may occur.
If an independent COM line is required then cut the wire labeled with a white “X” as show below. The longer part of the wire will become the new COM line.

Cut the wire here.
8.3 Independent COM Line

The 200 & 400 Series offer independent COM lines as:

<table>
<thead>
<tr>
<th>Series</th>
<th>COM Lines</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>200 Series</td>
<td>2 independent COM lines</td>
<td>Up/Down, R0</td>
</tr>
<tr>
<td>400 Series</td>
<td>3 independent COM lines</td>
<td>Up/Down, East/West, R0</td>
</tr>
<tr>
<td>400 Series</td>
<td>4 independent COM lines</td>
<td>Up/Down, East/West, North/South, R0</td>
</tr>
</tbody>
</table>

Please refer to the above figures of receiver relay boards and if an independent COM line is required then cut the wire labeled with a white "X". The longer part of the wire will become the new COM line. Then you may connect this new COM line with an existing spare output wire. If no spares are available, the customer must supply the extra wire.

**CAUTION**

Replace this **Crystal** to change the frequency on the receiver.

**SQ ADJ** is used for a minimum receiving sensitivity adjustment, please don’t adjust arbitrarily. If necessary, adjusting clockwise (to receive a weaker signal) until the SQ lamp turns on, then adjusting counter-clockwise (to receive a stronger signal) until the SQ lamp turns off to keep the SQ lamp at “OFF” status before operating.

The **SQ** lamp will turn on when receiving any radio signal. If the **SQ** lamp does not turn on at “OFF” status before operating, it is considered interference. The receiving sensitivity is adjustable via the **SQ ADJ**.

There are two kinds of frequencies available; **UHF** and **VHF**. The current frequency band is marked with a check. Please do not install a VHF crystal into a UHF PC board or vice versa.

**VHF:**
310.3250~331.1650MHz

**UHF:**
425.5925~446.7250MHz

This terminal is only for auto testing by the manufacturer during production process.

The **RX** memory is defective if the **Error LED** slowly flashes red every 0.5 seconds.
9.0 FREQUENCY CHANGE (200, 400, & 500 SERIES)

The frequency of the 200, 400 & 500 Series can be changed by replacing the corresponding crystal in both the Transmitter and Receiver. Please refer to the procedure below in regard to replacing the crystal.

**CAUTION**

Note: To replace a new crystal, please note there are two kinds of frequencies available; UHF and VHF. The current frequency band is marked on the PC board with a checkmark. Please DO NOT install a VHF crystal into a UHF PC board or vice versa.

9.1 Procedures

1. Pry up the crystal with a flat screwdriver.

2. Remove the crystal from the system.

3. Use needle nose pliers to straighten both pins of the new crystal.
4. Insert the new crystal vertically into the PC board.

5. Press the new crystal down into the socket.

**CAUTION**

Attention: The Transmitter frequency will be different from the Receiver frequency.
For example:

<table>
<thead>
<tr>
<th>T: 311MHz</th>
<th>Frequency for TX is 311 MHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>R: 321.7MHz</td>
<td>Frequency for RX is 321.7 MHz</td>
</tr>
</tbody>
</table>
## 9.2 VHF Band Conversion Table

<table>
<thead>
<tr>
<th>Ch No.</th>
<th>Freq (MHz)</th>
<th>Ch No.</th>
<th>Freq (MHz)</th>
<th>Ch No.</th>
<th>Freq (MHz)</th>
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<tr>
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### 9.3 UHF Band Conversion Table

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<th>Ch No.</th>
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<th>Ch No.</th>
<th>Freq (MHz)</th>
<th>Ch No.</th>
<th>Freq (MHz)</th>
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</tr>
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</table>
9.4 Changing RO/START N.O. (normally open) INTO N.C. (normally closed)

The Ro/START key of the new 200 & 400 series provides NO and NC contact. The NO is the default setting. If a NC output is necessary, please remove the #8 wire (RO/Start, color pink) from the connector and insert it into #10 Pin.

Procedures:

- Pin #8
  - Pink color
  - Push in
  - The Ro/START is N.O.

- Reconnect it to Pin #10
  - Pin #10
  - Lift up
  - The Ro/START is N.C.
## 10.0 TROUBLESHOOTING

<table>
<thead>
<tr>
<th>Item</th>
<th>Problem</th>
<th>Cause</th>
<th>Action Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Red LED flashing quickly (every 0.2 sec.) when any motion pushbutton is pressed.</td>
<td>A) One of the push-buttons is jammed. B) The system is not properly powered according to the instructions.</td>
<td>A) Replace the pushbutton. B) Power on again according to the instructions.</td>
</tr>
<tr>
<td>2</td>
<td>TX LED flashes red and yellow reciprocally and slowly (every 0.5 sec.)</td>
<td>The memory of the TX is defective.</td>
<td>Send back to the manufacturer.</td>
</tr>
<tr>
<td>3</td>
<td>TX LED flashes red every 2 seconds when any motion pushbutton is pressed.</td>
<td>The transmitter batteries are at low power.</td>
<td>Replace the 2 AA size Alkaline batteries at once.</td>
</tr>
<tr>
<td>4</td>
<td>RX Error LED flashes red slowly (every 0.5 sec.).</td>
<td>The memory of the RX is defective.</td>
<td>Send back to the manufacturer.</td>
</tr>
<tr>
<td>5</td>
<td>The operating distance is shorter or an intermittent operation is happening.</td>
<td>It was interfered by other Radio Remote Controller or unknown signal with the same frequency.</td>
<td>Replace the crystal of both TX and RX to change the frequency.</td>
</tr>
</tbody>
</table>

Remark: The memory of the TX and RX has anti-copy function design. Any improper decoding of the firmware of the memory will cause the problems as the above items 2 and 4.

If any problem cannot be solved or if you have any questions or suggestions, please call (866) 424-6478.
11.0 WIRING DIAGRAMS

Remark:

1. The RO/START can be N.C. or N.O.
2. The fuse for the power AC48/110/220/380V is 0.25A.
   The fuse for the power DC 12/24V is 1.5A.
3. The fuse for the AC type at the COM (main) is 10A.
   The fuse for the DC type at the COM (main) is 20A.
4. The com lines have been arranged prior to shipment, if an independent com line is required, please refer to section 8.3.

Note: The polarity direction for the power of DC12/24V is not required when plugging in the power line connector.
Wiring Diagram (500 Series: Model 5008) Default wiring diagram shown. Custom programming might alter relay outputs.

Wiring Diagram (500 Series: Model 50011) Note: Default wiring diagram shown. Custom programming might alter relay outputs.
12.0 DIMENSIONS & SPECIFICATIONS

12.1 Dimensions

12.1.1 500 Series: Model 5008

Dimensions and specifications diagram with notes on dimensions and weights.
12.1.2 500 Series: Model 50011

- 120' long PVC jacket cable (0.70' dia.)
- 32 conductor, 16 AWG
- M5 (Metric) mounting screw, nut, and washers
- Vibration dampening rubber bushing (4 places)
- Weight: 6.6 lbs. (less cable)
- Weight: 1.2 lbs. (including batteries)

32 conductors, 16 AWG with fork terminals 20' of loose conductors exposed beyond PVC jacket
12.1.3 200 Series Receiver & Transmitter

200 Series Receiver  Weight: 2.4 lb (1.1 kg) Without Cable

2.32 (59.0mm)

0.30 (7.5mm)

6.34 (161.0mm)

4.88 (124.0mm)

2.91 (74.0mm)

3.06 (77.8mm)

200 Series Transmitter  Weight: 0.34 lb (0.2 kg) Including Batteries

2.15 (54.51)

4.74 (120.40)

1.08 (27.43)
12.1.4 400 Series Receiver & Transmitter

**400 Series Receiver**  
Weight: 2.4 lb (1.1 kg) - *Without Cable*

**400 Series Transmitter**  
Weight: 0.34 lb (0.2 kg) - *Including Batteries*
12.2 Specifications

12.2.1 200 Series

200 Series Remote Control transmitters are available in 2, 4, & 6 button single-speed configurations. A small compact pocket-size transmitter; fully safety-compliant, simple installation, suitable for SUV, Winch, Conveyor, Boat Lifting Equipment, Greenhouse Spreader, etc. The major application will be the vehicle market, especially for tow trucks.

2002: 2 single-step pushbuttons (Start, Stop, Up, Down)

2004: 4 single-step pushbuttons (Start, Stop, Up, Down, East, West)

2006: 6 single-step pushbuttons (Start, Stop, Up, Down, North, South, East, West)

General Specifications:
- Frequency Control: Crystal
- Low Power Indicator
- Pushbutton Jammed Detector
- Operation Range: Up to ~328 feet (100 meters)
- Operating Temperature: -49°F ~ 176°F (-45°C ~ + 80°C)
- Power Consumption: about 10mW
- Structure: Nylon and Glass Fiber
- Shock Resistant
- Function Programmable

Transmitter Specifications:
- L x W x H: 4.72" X 2.17" X 0.98" {120 X 55 X 25 mm}
- Weight: 0.34 lbs. (0.2 kg) *with batteries
- Two (2) AA size batteries

Receiver Specifications:
- L x W x H: 6.34" X 2.91" X 2.05" {161 X 74 X 52 mm}
- Weight: 2.43 lbs. (1.1 kg) *without cable
- Input Voltage: AC Type: 24/48/110/220/380V; DC Type: 12~24V
12.2.2 400 Series

400 Series has unique and outstanding features and is fully programmable. Best use: Monorail, Electric Chain Hoist, Bridge Crane and Jib Crane. 2-motion, 2-speed Model 4004 and 3-motion 1-speed Model 4008 have positive detent positions, e-stop switch, and removable key.

4004: 4 double-step pushbuttons (Up, Down, East, West)

4006: 6 single-step pushbuttons (Up, Down, North, South, East, West)

General Specifications:
Frequency Control: Crystal
Low Power Indicator
Pushbutton Jammed Detector
Operation Range: Up to -328 feet {100 meters}
Operating Temperature: -49°F ~ 176°F (-45°C ~ +80°C)
Power Consumption: about 10mW
Structure: Nylon and Glass Fiber
Shock Resistant
Function Programmable

Transmitter Specifications:
L x W x H: 6.42" X 1.93" X 1.77" {163 X 49 X 45 mm}
Weight: 0.55 lbs. {0.3 kg} *with batteries
Two (2) AA size batteries

Receiver Specifications:
L x W x H: 6.34" X 2.91" X 2.05" (161 X 74 X 52 mm)
Weight: 2.43 lbs. {1.1 kg} *without cable
Input Voltage: AC Type: 24/48/110/220/380V;
DC Type: 12~24
12.2.3 500 Series

500 Series has unique and outstanding features and is fully programmable. Best use: Overhead Crane and most Heavy Loading Equipment.

The 500 Series Model 5008 is a 2-speed transmitter with eight buttons for control of 3-4 motions. FCC 310-320 Mhz AC models only. Each kit includes receiver, one or two transmitters, four batteries, strap, legend sheet for each transmitter, spare key, spare fuse kit, and instruction manual. This radio has programmable operation.

The 500 Series Model 50011 is a 2-speed transmitter with eleven buttons for control of up to 5 motions. FCC 310-320 Mhz AC models only. Each kit includes receiver, one or two transmitters, four batteries, strap, legend sheet for each transmitter, spare key, spare fuse kit, and instruction manual. This radio has programmable operation.

5008: 8 double-step pushbuttons + Start + EMS

Transmitter Specifications:
5008
L X W X H: 6.42" X 1.93" X 1.77" (163 X 49 X 45 mm)
Weight: 0.61 lbs. (0.3 kg) *with batteries
Two (2) AA size batteries

50011
L X W X H: 10.79" X 3.03" X 1.65" (274 X 77 X 42 mm)
Weight: 1.19 lbs. (0.5 kg) *with batteries
Four (4) AA size batteries

General Specifications:
Frequency Control: Crystal
Low Power Indicator
Pushbutton Jammed Detector
Operation Range: Up to -328 feet (100 meters)
Operating Temperature: -49°F ~ 176°F (-45°C ~ +80°C)
Power Consumption: about 10mW
Structure: Nylon and Glass Fiber
Shock Resistant
Function Programmable

50011: 11 double-step pushbuttons + Start + EMS

Receiver Specifications:
5008
L X W X H: 6.58" X 6.06" X 3.47" (167 X 154 X 88 mm)
Weight: 3.09 lbs. (1.4 kg) *without cable
Input Voltage: AC Type: 24/48/110/220/380V;
DC Type: 12~24V

50011
L X W X H: 9.96" X 10.51" X 5.91" (253 X 267 X 150 mm)
Weight: 6.61 lbs. (3.0 kg) *without cable
Input Voltage: AC Type: 24/48/110/220/380V;
DC Type: 12~24