

# **Installation & Operation Manual**

## **F21-12D1** *Industrial Radio Remote Controller*



TELECRANE

Lee's Hi-tech Ent. Co., Ltd.

**Model: F21-12D1**

**FCC ID: LWNF21-12D1**

## **FEDERAL COMMUNICATIONS COMMISSION**

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.

### **NOTE**

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. 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:

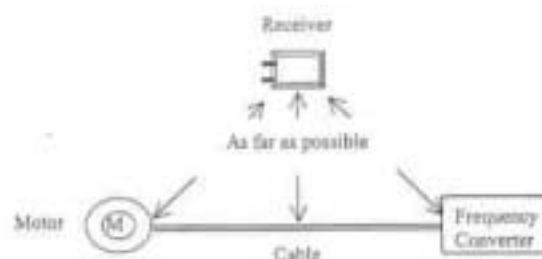
- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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

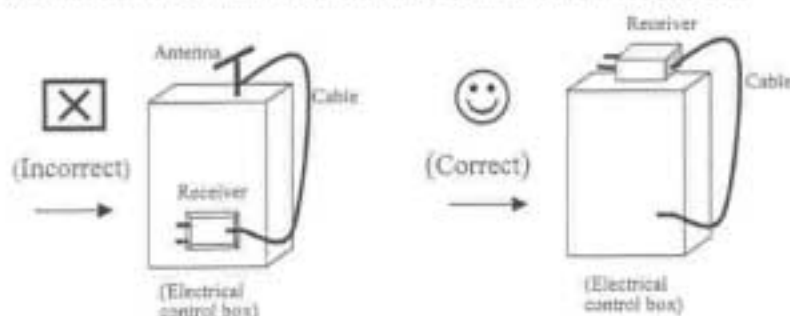
### Chapter 3. Installation and Function Setting

#### 3-1 Precautions during installation

1. Observe all safety precautions when climbing the crane.
2. Turn off the main power source of cranes before installation to avoid electric shock.
3. Receiver must be installed in the way that it will not touch any part of the building during the operation.
4. Receiver must be fastened safely.
5. Two external antennas must be used when receiver is installed in a metal box.
6. Before installation, inspect the crane's safety devices, and make sure everything is in proper working condition.
7. Make sure you understand the crane circuits and power distribution as well as the function setting of remote controller, to avoid incorrect wiring.
8. To avoid any interference, the Receiver must be away from motors, frequency converter and power cable (shown as below).



9. The Receiver should be installed on the top of the electrical control box. To mount the receiver inside the electrical control box is not correct.



### 3-2 Transmitter Installation Instructions

#### 3-2-1 Installation of batteries in the transmitter:

Insert batteries in proper direction into battery cover. Insert the battery cover into transmitter. Transmitter will sound two long sound (“— —”); “—” indicates 0.5 second sound and the short interval lasts 0.5 second) to indicate proper installation.

#### 3-2-2 Installation of function setting software in the transmitter:

When change a new transmitter or change remote controller's function settings (such as change receiver's function settings, or channel dip switch settings), one must follow the procedures below (please refer to section 3-4) to install the function setting software in the transmitter, in order to pair the transmitter and receiver.

### 3-3 Receiver Installation Instructions

#### 3-3-1 Preparation for Installation

1. Provide all necessary tools.
2. Select a proper location.
  - a. Select a stable place.
  - b. Select a place where you can see the Receiver or Antenna.
  - c. Select a place where there is no spark, e.g. keep away from motors, relays, magnetic switch and power cables.
  - d. Keep away from high-voltage wiring and device.
  - e. **The Receiver's box must be at least 3 cm away from the other obstacles.**



#### 3. Installation of proper power source

The input power source for receiver can be 48VAC, 50/60 Hz or 110VAC, 50/60 Hz. **After power source is confirmed, one must connect the connector of initial coil of transformer to the relay module properly.**

#### 3-3-2 Installation Sequence

1. Turn off the main power for crane.
2. Attach the template (provided) for the receiver to a proper place.
3. Drill the holes for screws, install receiver and then fix the receiver with 6mm  $\phi$  screw nut on vibration-Resistant.
4. Attach 2 sets of cable-assembly (provided) to the receiver and tighten the cables.

5. Connect cables to the control circuit of crane according to the receiver's wiring table and control contacts diagram.

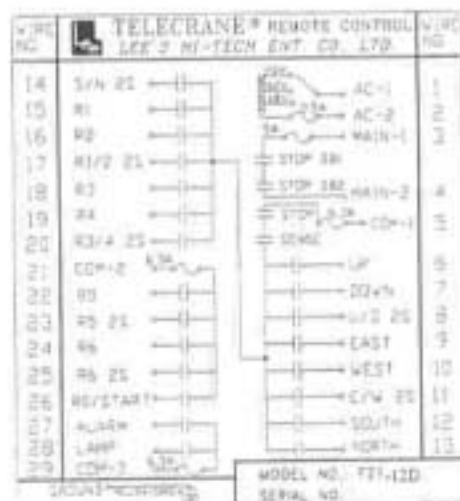
**Note:**

- 1) Inspect and make sure that all wires are connected correctly.
- 2) Earth ground for roomette controller and crane must be properly connected to ensure safety.
6. Secure the cables between the receiver and crane so that cable cover (wrapper) will not wear out due to the vibration of the crane.
7. Open the top cover of the receiver and turn Relay module's Run/Test switch to "Test" position.
8. Turn on the main power for crane.
9. Operate the transmitter to test every function and make sure they are all correct (read by LED indicator).

**Note:** When Run/Test switch is set at "Test" position, relay will not function, but LED will display.

10. Turn Run/Test switch to "Run" position and secure the top cover to the receiver with screws.
11. This completes the installation of receiver.

### 3-3-3 Control Contacts Diagram



### 3-3-4 Installation of function setting software in the receiver:

When change a new receiver or change remote controller's function settings (for example: direct loading of function setting software from PC or maintenance kit into the transmitter). One must follow the procedures below (please refer to section 3-4) to install the function setting software in the receiver, in order to pair the receiver and transmitter.

### 3 - 4 Setting of Function:

Function setting can be used to set the "Power-On" mode, the function of R5 pushbutton, inching time, acceleration-delayed time, and alarm mode as follows:

#### 1. Use of SW1 and SW2 to set the "Power-On" mode

Dip Switch		Remark
Sw1	Sw2	
OFF	OFF	Any pushbutton Power-On
ON	OFF	Start pushbutton Power-On
OFF	ON	E.U. standard Power-On
ON	ON	<p>Software Power-On: It uses software to set the activity of transmitter and receiver according to the operator's need.</p> <ol style="list-style-type: none"> <li>Any pushbutton Power-On? Or Start pushbutton Power-On?</li> <li>Transmitter is in the continuous mode? Or non-continuous mode?</li> <li>Transmitter Auto Power-Off? Duration of non-operation before Auto Power-Off?</li> <li>Receiver Auto power-off? Duration of non-operation before Auto Power-Off?</li> </ol> <p><b>Note:</b> Pre-setting at factory: (1) Start pushbutton Power-On (2) Continuous mode (3) Transmitter Auto Power-Off after 180 seconds of non-operation, no "emergency stop" signal before Auto Power-Off (4) Receiver Auto Power-Off after 2 hours of non-operation.</p>

- **Note:** When change Power-On mode, you must write the setting from the receiver to the transmitter.

2. Use of SW3 and SW4 to set the function of R5 pushbutton.

Dip Switch		Remark
Sw3	Sw4	
OFF	OFF	R5 pushbutton setting: "Normal" function.
ON	OFF	R5 pushbutton setting: "Toggle" function.
OFF	ON	R5 pushbutton setting: "Inching" function.
ON	ON	R5 pushbutton setting: "Acceleration" function.

3. Use of SW5 to set "Inching Time"

SW5 = OFF  $\Rightarrow$  Inching Time = 0.2 sec.

SW5 = ON  $\Rightarrow$  Inching Time set by software based on operator's need.

**Note:** Factory setting is 0.2sec

4. Use of SW6 and SW7 to set Acceleration delayed time

Dip Switch		Remark
Sw6	Sw7	
OFF	OFF	No Acceleration delayed
ON	OFF	Acceleration delayed time : 1 second
OFF	ON	Acceleration delayed time : 3 seconds
ON	ON	Acceleration delayed time set by software based on operation's need. <b>Note:</b> Factory setting is 2 seconds.

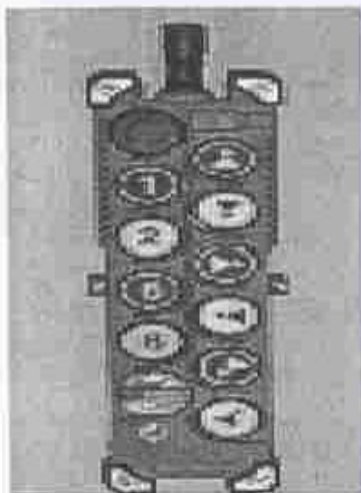
5. Use of SW8 to set the copying direction

SW8 = OFF  $\Rightarrow$  Copy the function (channel) setting software from RECEIVER to TRANSMITTER.

SW8=ON  $\Rightarrow$  Copy the function (channel) setting software from TRANSMITTER to RECEIVER.

### Chapter 3 F21-12D1 Standard Accessories

When you get a standard and full set of F21-12D1 system, it includes the following item.:



(1) Transmitter, one unit.

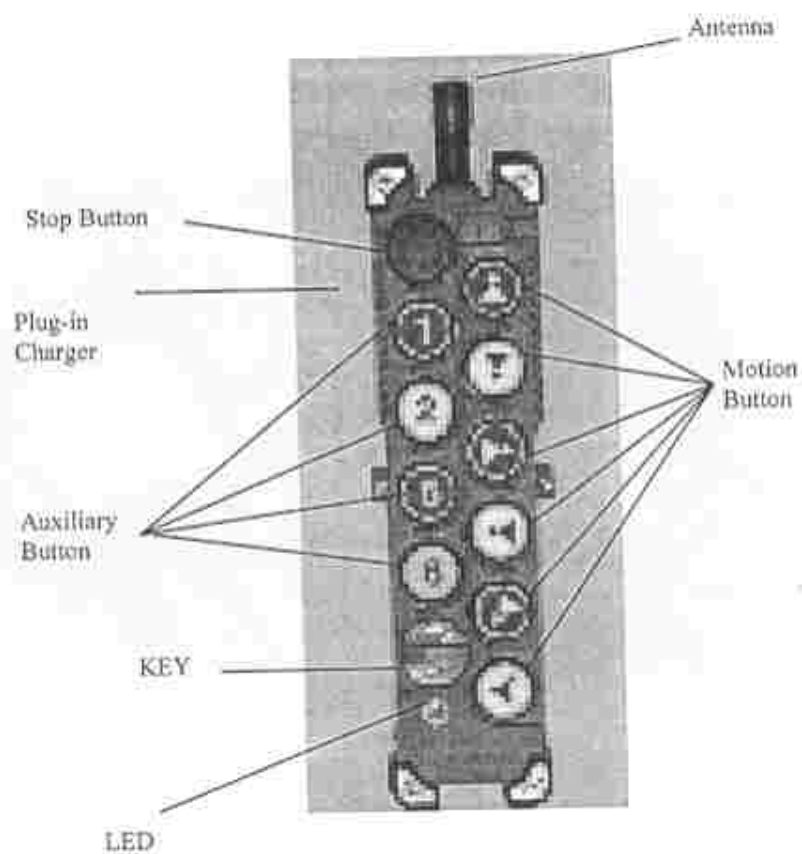


(2) Receiver, one unit.

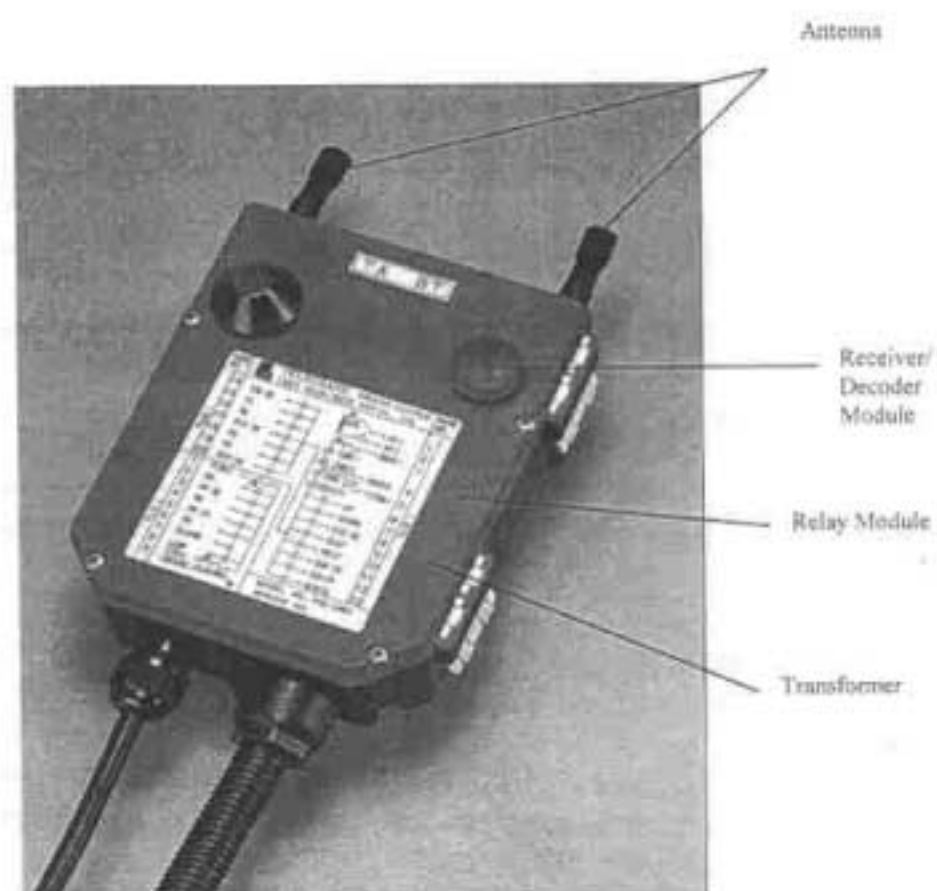


## Chapter 4 Operation

### 4-1 F21-12D1 Transmitter's parts



#### 4-2 F21-12D1 Receiver's parts



#### 4-3 General Operation

1. Remove the cover of battery box.
2. Install 4 Fresh AA-size batteries in the battery box. Make sure the "+" and "-" directions are correct.
3. Attach back the battery cover.

**Note:** Transmitter will sound two-long sound to indicate the correct installation.

4. Turn on the power according to the "Power-On Modes" (please refer to 4-4-1).

**Note:** LED indicator will flash with red color if proper procedures are not followed.

5. Operate transmitter by pressing each pushbutton.
6. After operation, perform the following procedures in sequence: (1) Press EMS mushroom, (2) rotate key counter-clock-wise to the "OFF" position, (3) remove key and keep it in a safe place, (4) remove batteries if not used for a long period.

**Note:** Transmitter has power indicating functions with LED display.

← "Green color": Sufficient power to operate transmitter. (In order to save power, one can program to turn off LED display when power is sufficient.)

- ① ↑ "Yellow color": Power is depleting, warring sound occurs every 4 seconds (can be switched off and sound interval can be set by software). Operation must be stopped immediately (for example: down the goods to ground) to replace batteries.

- ② → "Red color": Insufficient power. In addition to red LED, warring sound will continue and transmitter is no longer functionable. Transmitter will send out an emergency stop signal to the receiver due to insufficient power. Operator should avoid this situation in order to maintain the safety of operation.

#### 4 – 4 Special Functions Operation

##### 4-4-1 Power-On operation

Power-on means that the Main-Relay on receiver will energize as soon as receiving the control data from transmitter and then receiver keep in condition of standby for continuous control. There are 4 different ways of "Power-On mode" could be setting.

##### A. Any pushbutton Power-On Mode

1. Rotate "EMS" mushroom clockwise 45° and pull out.
2. Turn security key clockwise to "ON" position.
3. Press any pushbutton on the transmitter (or A, B switch). This will turn on the power as well as execute the function of pushbutton.

##### B. "Start" pushbutton Power-On Mode

1. Rotate "EMS" mushroom clockwise 45° and pull out.
2. Turn security key clockwise to "ON" position.
3. Press "Start" pushbutton on the transmitter to turn on power.

**Note:** When setting is on "Any pushbutton power-on" or "Start pushbutton power-on", the transmitter is in the "non-continuous" mode (i.e. pushbutton must be pressed to operate the function), it can save power.

##### C. E.U. standard Power-On Mode

1. Rotate "EMS" mushroom clockwise 45° and pull out.
2. Turn security key clockwise to "ON" position.
3. Press "Start" pushbutton on the transmitter to turn on power.
4. After 3 minutes of non-operation, transmitter will send out an emergency stop signal to the receiver. When this occurs, one must turn the magnetic key counter-clockwise to the "OFF" position, then turn the key clockwise to the "ON" position, and press "Start" pushbutton to turn on the power.

**Note:** When setting is on "E.U. standard" Power-on Mode, the transmitter is in the continuous mode.

##### D. Software Power-On Mode

This "Power-On" mode is controlled by the software. It consists of (1) Whether the receiver Power-Off automatically when no operation for a

period of time. (2) Whether a password is required to turn on power. (3) Whether an "emergency stop" signal will be sent out... etc.

#### 4-4-2 Acceleration / Deceleration Operation

1. "R5" pushbutton is the acceleration pushbutton; "R6" pushbutton is the deceleration pushbutton.
2. When a motion is in the second speed, quick touch of acceleration pushbutton will double the speed. Repeated touch of acceleration pushbutton will increase the speed up to 6 times.
3. To reduce the speed, touch the deceleration pushbutton. Repeated touch of deceleration pushbutton will reduce to the second speed.

**Note:**

- (1) When accelerate/decelerate, the motion pushbutton must be depressed and held in the second speed. If motion pushbutton is released, there will be no acceleration/deceleration and speed will return to zero.
- (2) Press "R6" pushbutton will perform the "Alarm" function if the speed is reduced to the second speed.

#### 4-4-3 Inching Operation

1. "R5" pushbutton is set for "inching" pushbutton.
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 press inching pushbutton.

## Chapter 5. Inspection and Maintenance

### 5 – 1 Inspection

Daily inspection is important and will ensure the safety of operation. Inspection should include “emergency stop” and other safety devices and functions. If there is any doubt, operation must be stopped immediately and problems must be solved before resume of operation.

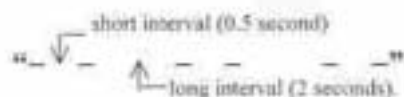
### 5 – 2 Maintenance

This remote controller is equipped with self –diagnostic device. During the operation and the change of batteries, self –diagnostic device will activate the warning alarm if any malfunction is detected. Operator must understand the malfunction signals and notify the maintenance personnel. Malfunctions and warning alarm are listed as follows:

**Note:** When dip switch setting is on “Simple alarm mode”, alarm signals are shown on the list; when dip switch setting is on “Morse alarm mode”, please refer to Technician’s Manual.)

Malfunction Part	Error message	Alarm Signal	Remark
Transmitter	Encoder Module malfunction	—	Alarm lasts 0.5 second repeats every 2 seconds
	RF Module malfunction	— —	Refer to Note below
	Insufficient power to operate transmitter	— — —	Refer to Note below
Receiver	Relay Module malfunction	—	Alarm lasts 0.5 second repeats every 2 seconds
	Receiver/Decoder Module malfunction	— —	Refer to Note below
	Power failure	— — —	Refer to Note below

**Note:** Each “—” indicates 0.5 second alarm. Each short interval lasts 0.5 second, and long interval lasts 2 seconds. For example, the error message of RF Module Malfunction:



## Part 2. Technician's Manual

### Chapter 1 General Characteristic

#### 1 – 1 General Specifications

- Operation Frequency----- : 433.05 ~ 434.79MHz (set by software)
- Hamming Distance ----- :  $\geq 4$
- I.D. Code----- : More than  $2^{32}$  sets (set by factory, never repeated)
- Temperature Range----- :  $-20^{\circ}\text{C} \sim +65^{\circ}\text{C}$
- Channel Spacing----- : 12.5KC or integral multiple (set by software)
- Maximum Operation Range----- : Up to 100 Meters
- Structure----- : glass-fiber
- Protection Degree----- : IP 65

#### 1 – 2 Transmitter Specifications

- Power Supply----- : Four 1.5volts Alkaline or Rechargeable Batteries (AA Size)
- RF Power----- :  $< 7.85\text{mW}$  (3m)
- Modulation----- :  $\leq \pm 2.5\text{KHz}$ ; NBFM
- Pushbutton Type----- : Two step mechanical switch
- Dimensions----- : 186x61x51mm (LxWxH)
- Weight----- : about 360g (including batteries)

#### 1 – 3 Receiver Specifications

- Power Supply----- : 48/110VAC (50/60Hz),  $\pm 10\%$
- Sensitivity----- :  $-110\text{dBm}$  (Data Error Rate  $< 10^{-3}$ )
- Harmonic Ratio----- :  $\leq 65\text{dB}$
- Output Relays----- : 10A/250VAC; 8A/30VDC
- Dimensions----- : 200x162x107mm (LxWxH)
- Weight----- : about 1640g(excluding wire cable)