

Installation & Operation Manual

F21-6D1 *Industrial Radio Remote Controller*



TELECRANE

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

Model: F21-6D1

FCC ID: LWNF21-6D1

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 2. System Configuration

2-1 Transmitter Unit

Transmitter unit consists of Encoder Module and Transmitter RF Module, for transmitting "control data" to the receiver for remote control applications.

2-1-1 Encoder Module:

A micro control unit (MCU) is used for the main processing, MCU reads the pushbutton data and combines with the ID Code, Hamming Code, and Function Setting. After producing control data by encoding, it generates TXFSK signal to transmitter's RF module via FSK circuit.

2-1-2 Transmitter RF Module:

The sequence of RF module is shown as follows: Encoder→TXFSK→modulates a RF carrier → amplification → antenna.

This RF Module uses Phase Locked Loop (PLL), Voltage Controlled Oscillator (V.C.O.) with lowest side-band noise, SMT advanced technologies. It has power-saving, high efficiency, high reliability and low harmonic NBFM transmitting circuit.

2-1-3 Parts Name and Illustration

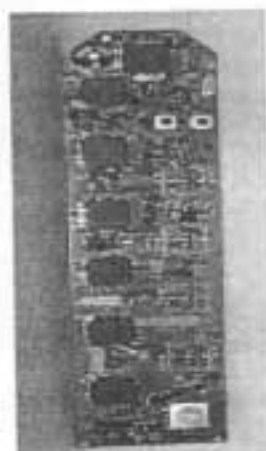


Figure 2-1-1 Encoder Module JJ-9822



Figure 2-1-2 Transmitter RF Module LR-9359

2-2 Receiver Unit

Receiver unit consists of Receiver/Decoder Module and Relay Module. This unit receives the control data from the transmitter, decodes the data, generates control command, and drives relay circuit to control the motions of cranes (or the lifting machine).

2-2-1 Receiver/Decoder Module:

This module consists of Receiver /Decoder Module, LED Board, SQ Lamp Board, high frequency receiver circuit and micro control unit. Its main functions are to receive RF signal from transmitter, to detect and correct the received data message, to decode and to send commands to the relay module. This module has high-receiving gain, high-signal selectivity, high-image rejection rate, and low-noise figure. In addition, this module uses special design of "Diversity Reception" and "Frequency Deviation Direction Indicator" (FDDI) to eliminate communication dead spot and the adverse effect of environmental change, such as temperature.

2-2-2 Relay Module:

This module receive and process control commands to drive corresponding relay in order to control the motion of cranes (or the lifting machine). The operation safety is especially important. This module consists of relay contact jammed-detection circuit, relay coil test circuit, relay operating voltage test circuit, and the protection circuit for micro control unit, to ensure operation safety.



Figure 2-1-2 Transmitter RF Module LR-9359

2-2 Receiver Unit

Receiver unit consists of Receiver/Decoder Module and Relay Module. This unit receives the control data from the transmitter, decodes the data, generates control command, and drives relay circuit to control the motions of cranes (or the lifting machine).

2-2-1 Receiver/Decoder Module:

This module consists of Receiver /Decoder Module, LED Board, SQ Lamp Board, high frequency receiver circuit and micro control unit. Its main functions are to receive RF signal from transmitter, to detect and correct the received data message, to decode and to send commands to the relay module. This module has high-receiving gain, high-signal selectivity, high-image rejection rate, and low-noise figure. In addition, this module uses special design of "Diversity Reception" and "Frequency Deviation Direction Indicator" (FDDI) to eliminate communication dead spot and the adverse effect of environmental change, such as temperature.

2-2-2 Relay Module:

This module receive and process control commands to drive corresponding relay in order to control the motion of cranes (or the lifting machine). The operation safety is especially important. This module consists of relay contact jammed-detection circuit, relay coil test circuit, relay operating voltage test circuit, and the protection circuit for micro control unit, to ensure operation safety.

2-2-3 Parts Name and Illustration



Figure 2-2-1 "Receiver/Decoder" Module SU-0208

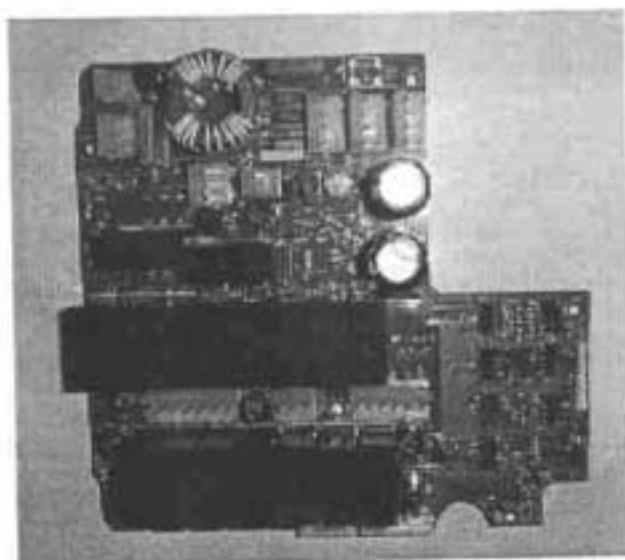
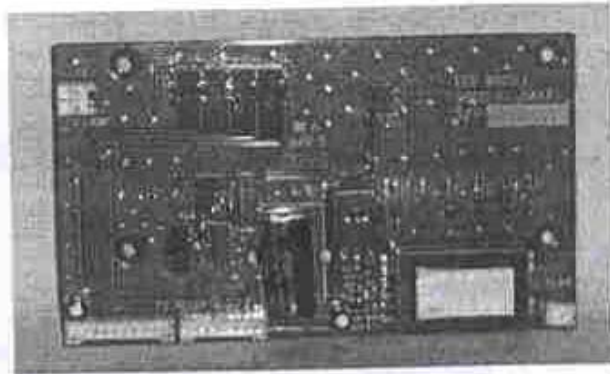


Figure 2-2-2 Relay Module CL-0A46



LED Board (LL-0A47)

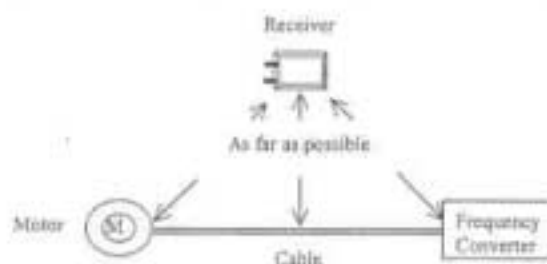


SQ Lamp Board

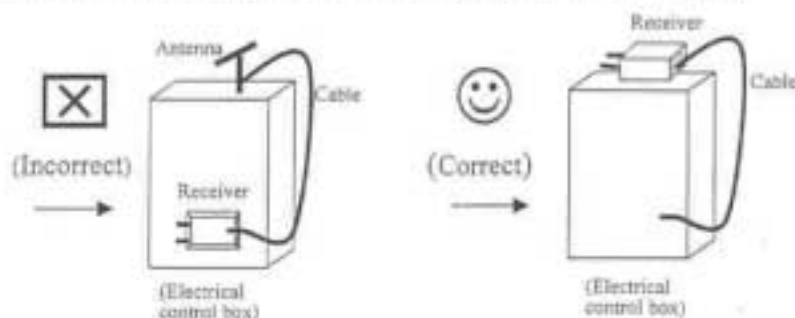
Chapter 3. Installation and Function Setting

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 ϕ 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.

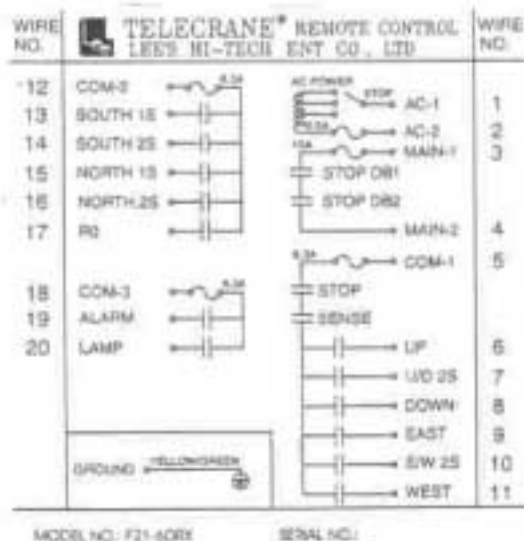
Note:

- 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




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 South 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"> Any pushbutton Power-On? Or Start pushbutton Power-On? Transmitter is in the continuous mode? Or non-continuous mode? Transmitter Auto Power-Off? Duration of non-operation before Auto Power-Off? Receiver Auto power-off? Duration of non-operation before Auto Power-Off? <p>Note: 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.

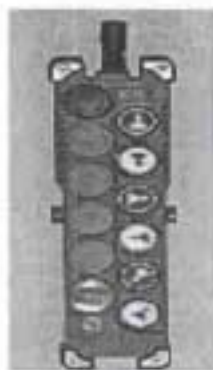
2. Use of SW8 to set the copying direction

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 F21-6D1 Standard Accessories

When you get a standard and full set of F21-6D1 system, it includes the following item.:



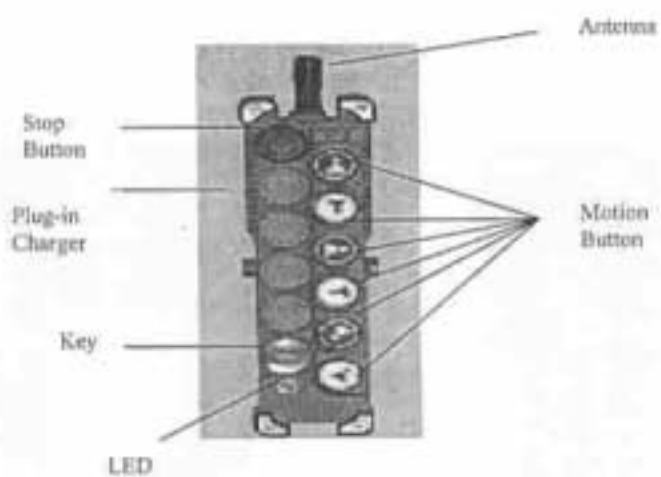
(1) Transmitter, one unit.



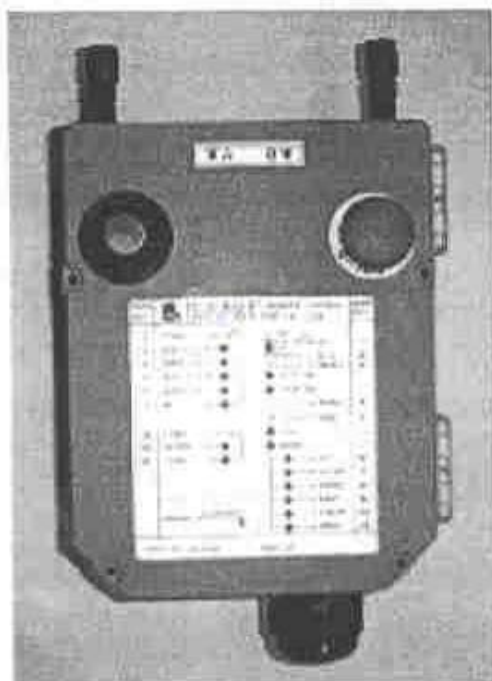
(2) Receiver, one unit.

Chapter 4 Operation

4-1 F21-6D1 Transmitter's parts



4-2 F21-6D1 Receiver's parts



Part 2. Technician's Manual

Chapter 1 General Characteristic

1 – 1 General Specifications

- Operation Frequency-----: 433.05 – 434.79MHz (set by software)
- Hamming Distance -----: ≥ 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
- 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-----: -110dBm (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)