



F21-E2 Industrial Radio Remote Controller

Installation & Operation Manual



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

Preface

Thank you for choosing Telecrane F21-E2 industrial radio remote controller. This manual is used as a reference of F21-E2 remote. There are two parts for different users, operator and technician. To avoid any unexpected machine or person accident or harm occurs, before installation, start-up, and operation, please read carefully through the manual and follow the regulation and, requirement.

Safety Considerations

This product and related documentation must be reviewed to familiarize with safety markings and instructions before operation.

Safety Symbols The following symbols may be found on the remote control or throughout the remote control's documentation.



Refer to Manual

When product is marked with this symbol refer to instruction manual for additional information.



High Voltage

Indicates presence of hazardous voltage. Unsafe practice could result in severe personal injury.



Ground connection

For safety concern, it is obligated to have ground connection



Warning

Denotes a hazard. Included text gives proper procedures. Failure to follow instructions could result in severe personal injury and/or property damage.



Caution

Denotes a hazard. Included text gives proper procedures. Failure to follow instructions could result in minor personal injury and/or properly damage.

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PART ONE. OPERATOR'S MANUAL

CHAPTER 1. WARRANTY

1-1 Warranty

Lee's Hi-Tech Enterprises Co., Ltd. guarantees that this product meets its published specifications at the time of shipment from the factory. Under proper installation it should work as expected.

1-2 Warranty period

This equipment is warranted against defects in material and manufacturing for a period of one year from the date of shipment. During the warranty period, TELECRANE is responsible for necessary repairs as long as the product can be proved to be defective.

For warranty service or repair this product must be returned to a service facility designated by TELECRANE. Buyer will pay shipping charges to TELECRANE while TELECRANE will pay return shipping charges.

1-3 Excluded Items

This warranty does not include consumptive parts such as batteries, fuses, buttons, and relays. Also this warranty does not cover defects caused by improper installation, improper or insufficient maintenance, unauthorized modification, and improper operation, ignorance of environmental specifications, or improper software or interfacing.

1-4 Remarks

- ⊙ No other warranty is expressed or implied, except for the above mentioned.
- ⊙ The remedies provided herein are the buyer's sole and exclusive remedies.

TELECRANE shall not be liable for any direct, indirect, special, incidental or consequential damages.

CHAPTER 2. PRECAUTIONS OF OPERATION

2-1 Attention

- ⊙ Please carefully read the manual before installing and operating this device.
- ⊙ Due to the complex nature of this equipment it is necessary to read the entire manual before installation.
- ⊙ Never dismantle the equipment by any unauthorized personnel, or equipment may be damaged.
- ⊙ This manual is for reference only. Please consult your distributor for further assistance.
- ⊙ The equipment has been strictly tested for quality before delivery from our plant. However, this equipment must not be used in dangerous situations or where damage may result.
- ⊙ After operation, shut off main power to the crane, power to receiver, and remove transmitter key.
- ⊙ Transmitter should be placed in a safe area when not in use to avoid accidental pressing of buttons.
- ⊙ The crane should be equipped with main power relay, limit switch and other safety devices.
- ⊙ Don't use equipment during lightening or high electrical interference conditions.
- ⊙ Make sure that the batteries are in good condition and power for receiver is correct.
- ⊙ Maintenance should only be done while the crane's main power is off to prevent electrical shock.
- ⊙ The contents of this manual may be amended by the manufacturer without notice.
- ⊙ The manufacturer may introduce new functions to the equipment as necessary; therefore, the descriptions may change.

2-2 Precautions

- ⊙ Operating in an industrial facility is relatively dangerous; therefore, operator must have taken the adequate trainings in using F21-E2 system.
- ⊙ Those who operate the machine should be healthy and have good judgment in regard to safety.

- ⊙ Although the F21-E2 transmitter is so durable and resistant for the fluctuating temperature, care still need be taken to prevent it from the severe impact or pressure.
- ⊙ During operation, if the power supply of the transmitter's batteries is insufficient, the transmitter will send out EMS signal first to de-energize all of motion relays inside the receiver to stop crane's moving, and then the LED indicator on transmitter will flash in red constantly. At this moment, the batteries need to be replaced and all of four batteries should be replaced at the same time.
- ⊙ If the severe interference occurred the equipment should be stopped at once.
- ⊙ Please take the batteries out when the equipment will not be used for a long time.
- ⊙ Be sure to know the "Procedures of Emergency" as follows.

2-3 Procedures of emergency

In case of an Emergency, please follow the steps below and ask the distributor for service immediately.

1. Press "EMS" button.
2. Turn the key to "OFF" position and remove it.
3. Switch off the main power of crane.
4. Advise the distributor to find out the reason.

CHAPTER 3. STANDARD & OPTIONAL ACCESSORIES

3-1 Standard accessories

Please check out there are one transmitter and one receiver inside the carton.



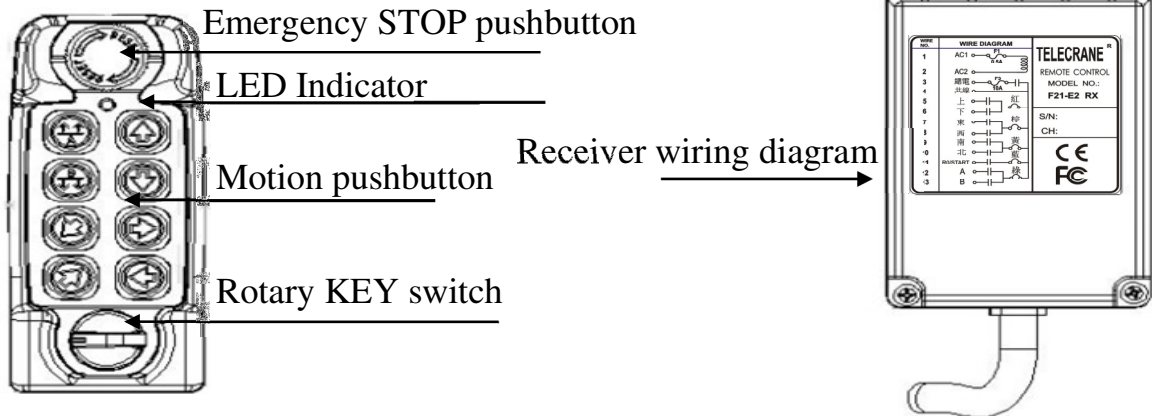
3-2 Optional accessories

F21-E2 Software CD & USB cable.



CHAPTER 4. HOW TO START

4-1 F21-E2 transmitter & receiver deployment

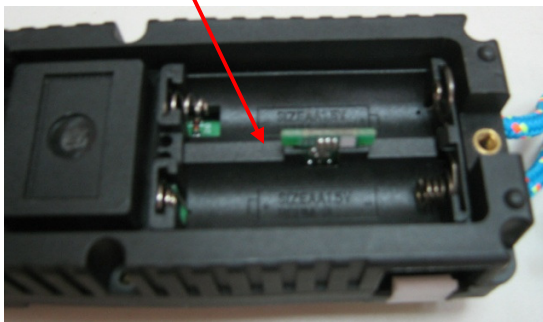


4-2 Operation

4-2-1 Pre-inspection

1. There are two e-cards for both transmitter and receiver. Please make sure the e-card is right on its position.

e-card on the transmitter



e-card on the receiver



2. Put two AA batteries on the release ribbon. And lock the battery cover.

Note: Before placing the batteries, make sure the Rotary KEY is on the OFF position

3. Turn the Rotary KEY into START position. (Or by setting the mode of power on.)

4. In accordance with the function setting of pushbutton to operate correctly.
5. After the operation, please do the following steps to turn off.
 - a) Press EMS mushroom button.
 - b) Turn the rotary key to "OFF" position
 - c) Remove the batteries when the remote is not going to be used for a long period of time.

4-2-2 Transmitter LED indicator

There is a 3-stage power indicating function with LED display.



1. "Green color": Sufficient power to operate transmitter.
2. "Yellow color": Power is depleting. Operation must be stopped immediately (for example: down the loads to ground) to replace batteries.



3. "Red color": Insufficient power. 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.

CHAPTER 5. ROUTINE INSPECTION AND TROUBLESHOOTING

5-1 Routine 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 Fault Detection

F21-E2 is equipped with simple fault detection mechanism. While start and during the operation, fault detection mechanism will indicate the faulty signals if any malfunction is detected. Operator must understand the faulty signals and notify the maintenance personnel.



5-3 LED Indication and troubleshooting

5-3-1 Fast flashing red light

1. Keys stuck.
2. EMS did not release.
3. Failure to turn on correctly.

Make sure the transmitter back to normal stage. Please re-run the boot process again.

5-3-2 Slow flashing red light

The batteries are running out, please install new ones.

5-3-3 Constant red light

Please check out the e-card is on its position or not.

PART TWO. TECHNICIAN'S MANUAL

CHAPTER 1. GENERAL CHARACTERISTIC

1-1 General Specifications

- Operation Range : Up to 100 Meters
- Temperature Range : -40°C ~ +85°C
- ID code : 43 hundred million sets(32 bits, set by factory, never repeated)
- Hamming Distance ≥ 4

1-2 Transmitter Specifications

- Power Supply : Two 1.5 volts (AA Size) Alkaline/Rechargeable batteries
- RF Power : < 10 mW
- Pushbutton: 8 single speed pushbuttons (UP/DOWN can be set as double speed control), one EMS button, one rotary key.
- Dimensions : 132x55x40mm.
- Weight : 220g (including batteries)

1-3 Receiver Specifications

- Power Supply : 24/48 、 48/110 、 48/220 、 110/220 、 220/380 VAC (50/60 Hz), 12-24 VDC, multiple choice available.
- Dimensions : 190x85x62mm.
- Weight : 950g (including RX cable)

CHAPTER 2. INSTALLATION AND FUNCTION SETTING

2-1 Precautions during installation

- Observe all safety precautions when climbing the crane.
- To avoid electric shock, please turn off the main power source of cranes before installation.
- When installing the receiver, choose the right location that is free of spark contacts, such as away from motors. Relays and, cables must avoid going near high-voltage wiring or facilities. Also need to consider the crane movement is free from any corner of the buildings.
- Receiver must be fastened securely. Or it may run into the crane, causing the receiver loose and, fall.


- Prior to installation, please check out the security equipment of the crane, and crane must be in normal working condition.
- Make sure you are fully understanding the crane circuits and power distribution as well as the function setting of remote controller (with relay output), to avoid incorrect wiring.
- Receiver cannot be installed in the electrical control box, the correct way is to install the receiver on the appropriate location (for example: the top side (or external) of control box), then have the receiver output cables into the electrical control box to make the appropriate connections.

2-2 Transmitter installation instructions

The release ribbon must be under the batteries, and then Insert batteries in proper direction into battery compartment. Attach and screw the battery cap on the bottom of the transmitter

2-3 Receiver Installation Instructions

2-3-1 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 spacing between Receiver's box and other obstacles must keep away for more than 3 cm.
3. Set appropriate power source

The input power source for receiver can be 48 VAC 50/60 Hz, 110VAC, 50/60 Hz or 220VAC, 50/60 Hz, or 380VAC, 50/60 Hz. After power source is confirmed, one must connect the connector of initial coil of transformer to the relay module properly.

2-3-2 Receiver installation order

1. Turn off the main power for crane.
2. Drill the holes for screws, install receiver and then fix the receiver with screw nut.
3. Connect the cable-assembly (provided) to the receiver and

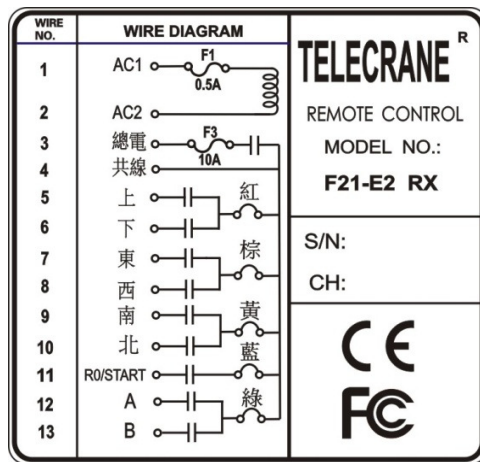
tighten the cables.

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

Note: Inspect and make sure that all wires are connected correctly.

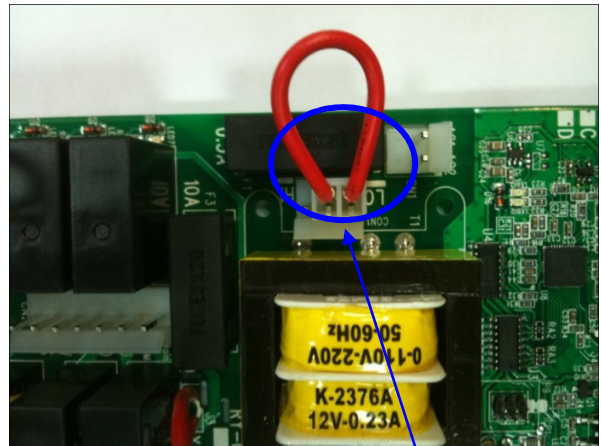
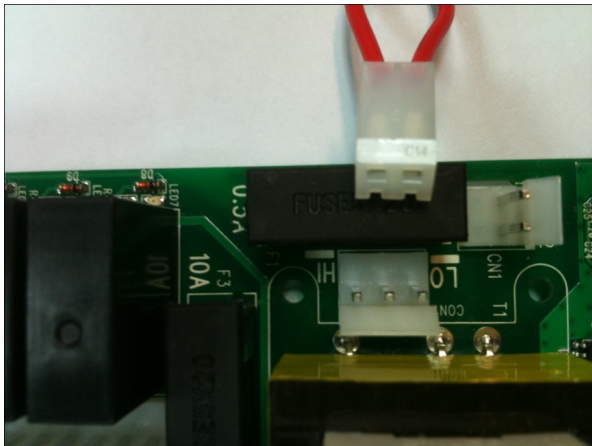
5. Secure the cable between the receiver and crane so that cable cover (wrapper) will not wear out due to the vibration of the crane.

2-3-3 Receiver wiring diagram



2-4 Receiver power transformer voltage selection and conversion

F21-E2 receiver provides with 5 kinds of Transformer (24V/48 VAC 、 48/110 VAC 、 48/220 VAC 、 110V/220 VAC 、 220V/380 VAC) that allows user to choose based on the power input on site and the designated voltage will be set when the receiver is made in factory.



Changing power supply voltage

1. Disconnect the power of receiver.
2. Remove the connector plug of the transformer from its original position.
3. Insert the connector plug into the new position.
4. Complete the procedure.

Transformer \ Jumper	24/48 VAC	48/110 VAC	48/220 VAC	110/220 VAC	220/380 VAC
LO position	24VAC	48VAC	48VAC	110VAC	220VAC
HI position	48VAC	110VAC	220VAC	220VAC	380VAC

Note:

Users are allowed to select the different power source according to the respective requirement. However, the transformer must be changed. Please check with your local distributor for replacement of the transformer if necessary.

2-5 Function Setting

This remote control system can be set according to the working condition and operator's need for the following purposes: specific pushbutton function, EMS neglected function, Auto-off time, interference neglected time...etc. This enables the remote controller to perform the most effective operation and to provide the safest operation. Please refer to the Software Function Setting in Chapter 3, next chapter.

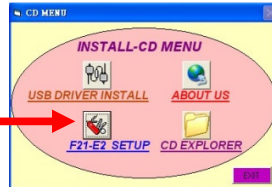
Note:

Through the USB cable, F21-E2 PC software can easily read/write the e-Card of transmitter or receiver. If you just need to copy the e-Card, the transmitter will also provide easy, quick copy function as well.

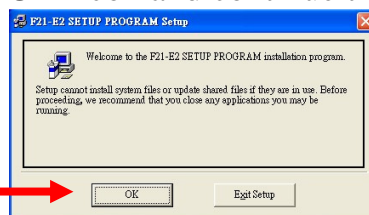
CHAPTER 3. SOFTWARE AND COPY FUNCTIONS

3-1 F21-E2 Software Installation

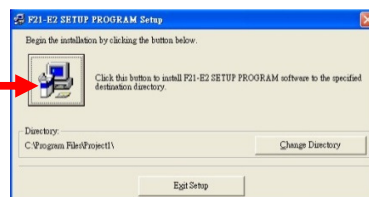
- Insert F21-E2 CD-ROM, the installation program will be executed automatically.



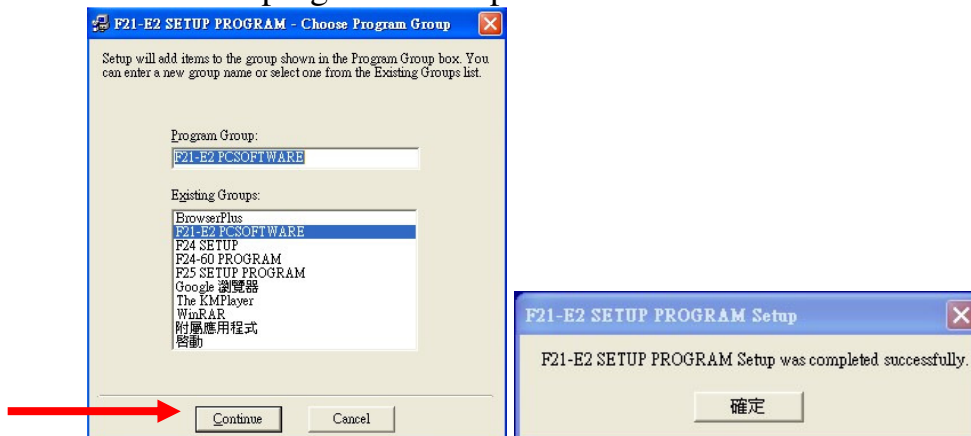
- Press the "F21-E2 SETUP" icon and continue the installation.



- Press "OK" button



- Press "Continue" button and the installation procedure of F21-E2 software program is completed.



3-2 How to start F21-E2 program

- Press "Start" button, and choose "Program"
- Select "F21-E2 PC Software"
- Then select "F21-E2 SETUP PROGRAM"

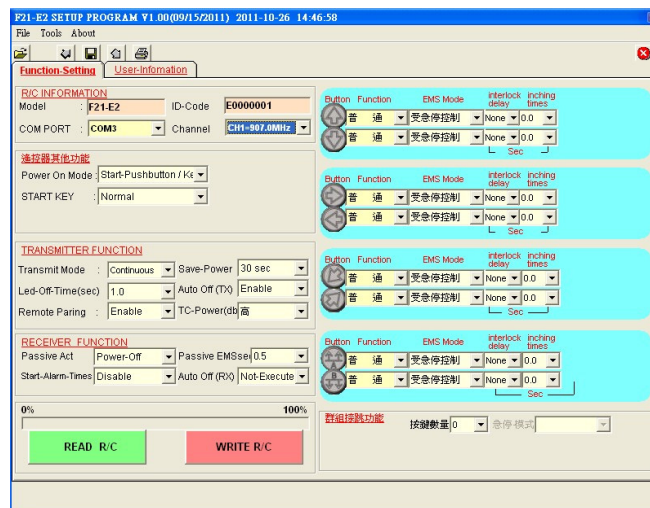
3-3 How to operate F21-E2 program

3-3-1 Read the function from e-Card.

- Pick up the e-Card from transmitter or receiver, and put into the slot at the side of USB cable.



- F21-E2 program will automatically select the correct COM port.
Note: make sure that your computer has installed USB DRIVER, if not installed, please go back to the F21-E2 software installation, and choose USB DRIVER INSTALL.



- Read function setting ◦

3-3-2 Write the new settings to e-Card

Use the F21-E2 software to read / write e-Card, please be patient to complete the implementation of the software. To avoid unexpected data corruption, do not pull out the e-Card or USB cable when perform read / write procedure.

- Put the e-Card into the slot at the side of USB cable.
- Press "Write R/C".
- After achievement, press the "OK" button.

3-3-3 Change pushbutton function setting

- a) Read data setting from e-Card.
- b) From main (Function-Setting) page, click on any button you would like to program. The pushbutton function table will drop down immediately.
- c) Select any function block from the list.
- d) To change the other pushbutton function setting, please repeat steps b) and c).

Remark:

- ◆ For further information about the function definition, please refer to the annex for more detail explanation.
- ◆ Press "EXIT" to close function table without change.

3-3-4 Saving the file

To complete function setting and customer information of the remote, please make a copy on your computer for after service and future data management ◦

- a) Press Save button
- b) Select the saving folder and file name.
- c) Then save the file.

3-3-5 Open the file

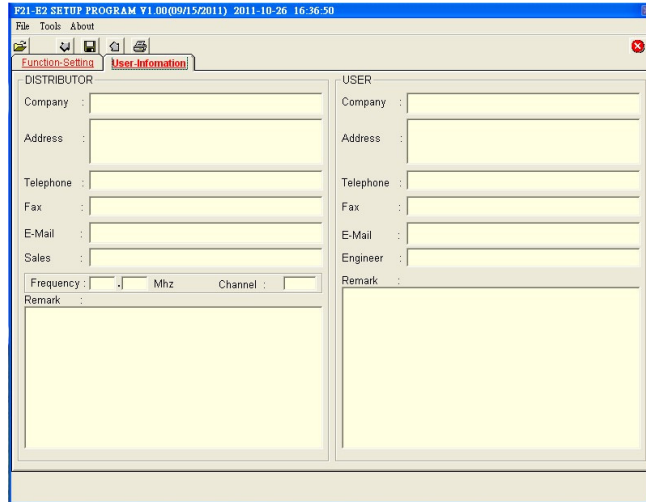
To open file (data)

- a) Press open button or select FILE, and OPEN.
- b) Select the file name then press OPEN.

3-3-6 Filing and maintenance of customer data

Customer data sheet: Allow you to store the customer information such as company name, purchasing date, address, and phone etc.

- a) Click "User-Information".
- b) Input the customer information.



3-3-7 Print

To print a file, press the print button ◦

- ◆ Note: Printing operation can only print the last page when printing. To print another page, please select the screen to another page and then press the print button ◦

3-3-8 Exit F21-E2 Program

To close the program, press the exit key.

CHAPTER 4. RAPID E-CARD COPY FUNCTIONS

Except the steps listed in the Chapter 3, you may use F21-E2 PC software to copy e-Card, F21-E2 transmitter also provides easy, quick copy feature.

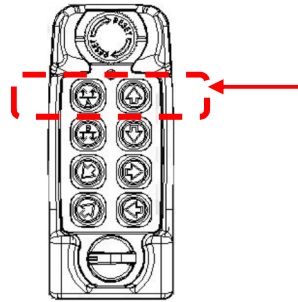
4-1 Steps of e-Card copy procedure

4-1-1 Check out the transmitter status

- a) Make sure the batteries are installed ◦
- b) Confirm the emergency stop button (EMS) Location: OFF.
- c) Check the transmitter rotary switch (KEY) to OFF position.

4-1-2 Read the e-Card

- a) Insert the e-Card which is destined to copy into the transmitter.
- b) Press simultaneously the top two action buttons, and hold still.



Keep the top two buttons,
press and hold.

- c) Turn the rotary switch (KEY) to ON position ◦
 - ◆ At this moment, the LED power indicator shows: green / red blinking.
 - ◆ It means the transmitter has completed the e-Card reading procedure.

4-1-3 Copy the e-Card

- a) Put a blank (or data can be overwritten) e-Card into the transmitter.
- b) Turn the rotary switch (KEY) to START position ◦
 - ◆ Green LED blinking → Write has been completed.
 - ◆ Red LED blinking → Write is failed; please repeat the procedure from the beginning.
 - ◆ After the copy action is ending, Return the rotary key switch (KEY) to OFF position.

4-2 Multiple e-Card copy procedure

4-2-1 and 4-2-2 Check and Read procedure are the same as the steps above. (4-1-1, 4-1-2)

4-2-3 Multiple e-Card copy

- a) Put a blank (or data can be overwritten) e-Card into the transmitter.
- b) Turn the rotary switch (KEY) to START position ◦
 - ◆ Green LED blinking → Write has been completed.
 - ◆ Back to Green/ Red LED blinking → Ready to proceed next e-Card copying.
 - ◆ After the copy action is ending, Return the rotary key switch (KEY) to OFF position.

ANNEX: GLOSSARY OF FUNCTION SETTING

Function setting	Function Explanation
Normal	The relative relay is "ON" when the pushbutton is pressed and held; and relay is "off" when the pushbutton is released.
Toggle	Maintained function: the relay is operated by pressing and releasing. Press the pushbutton and release once for "on"; press and release again to turn off the relay. For example, control of lighting.
ON/OFF	Both pushbuttons are used to operate the same relay. Press the ON pushbutton to activate the relay and press the OFF pushbutton to de-activate the relay.
Magnetic ON/OFF	Both pushbuttons are used to operate the same relay. Press the "Magnetic ON" pushbutton to activate the relay. If the operator wants to de-activate the relay, he must keep pressing the "Magnetic ON" pushbutton and then press the "Magnetic OFF" pushbutton in the meantime. The purpose is to prevent the operator from accidentally pressing the "Magnetic OFF" pushbutton and dropping the load held by the magnetic sucking disc.
ON/OFF/ON	This function will set up a pair of buttons to control two relay outputs: When the first relay turns on, if you need to change into the second relay turns on, then this setting will be forced to shut down the first one, then the operator must press the button again to turn the second relay on. This function can prevent an instant reverse motor operation, it is helpful to prevent accidental damage.
Group Toggle	Motion is the same as Toggle. The difference is when you press the same button; the relay still remains ON until another Group Toggle button is pressed. This Feature also can be programmed for different needs to setup a group of buttons to execute Toggle function. For example, control of multiple cranes. Remark: Can be setup as 4, and 6, up to 8 buttons group toggle.

Function setting	Function Explanation
Interlock	The two pushbuttons are interlocked; it's not possible to operate two opposite functions at same time.
Non-Interlock	The two pushbuttons can be operated at the same time: When the application allows operating at the same time two functions which are usually opposite to one another.
Interlock Delay Time	"Interlock Delay Time" is delay time between 2 opposite pushbuttons is being press one after another. i.e.: while crane is moving one direction (forward), moving opposite direction (backward) immediately would be dangerous especially when crane is hooking up the heavy object. The object may sway if crane does not completely stop before moving into opposite direction. Therefore the interlocked delay time could potentially prevent it. Normally, the interlocked delay time should be larger than the duration of crane stop.
Acc. Delay	This function uses to set the time interval between acceleration relay (i.e. conduction-delayed time of acceleration relay). It is suitable for accelerative operation only in order to prevent the cranes directly runs to highest speed to damage the motor.
Two speed Control	Through the software setting, F21-E2 remote controller allows to use A and B two single-speed buttons to proceed two-speed simulation control. In this way, the flexibility and cost savings can be substantial increase.
Dual motor Control	Through the software setting, F21-E2 remote controller allows to use A and B two single-speed buttons to proceed dual motor simulation control. In this way, the flexibility and cost savings can be substantial increase.
Inching	The relative relay will be conducted within a certain time, in order to operate with short and precision movement. There are two kinds of inching modes: Normal Inching: Turn the rotary key switch (KEY) to "START" position and hold it, then press the relative motion pushbutton to perform inching motion. (When " Normal Inching" is chosen.) Toggle Inching: Turn the rotary key switch (KEY) to "START" position, then it can perform inching motion.

Function setting	Function Explanation
	To release this function, just turn to "START" pushbutton again. (When “Toggle Inching” is chosen.)
Inching time	“Inching time” can be set from 0.01~2.0 seconds. This function is used to operate crane with short and precise movement (e.g. accurate position). “Inching Time” is the same as the working time for the relative relay that is controlled by executing “Inching” control function.
Transmit Mode	"Non-continuous transmitting mode": After " Power-On", the transmitter will transmit the signal only when the pushbutton is pressed. This mode can save the power of transmitter. "Continuous transmitting mode": Transmitter will continuously transmit signal once transmitter is being Power-On.
Save Power	This function is used to turn off the Transmitter after a given idle time. *Only available under “continuous transmitting” mode.
Auto-OFF(TX)	This function refers to turn off the Transmitter after a given idle time while transmitting the signal to switch off the receiver main relay. *Only available under "continuous transmitting" mode.
LED OFF-Time	This setting allows you to select the LED intermittent time to save transmitter power. i.e.: If 1 second is selected, the LED will be lighted every 1 second.
Passive EMS	This setting allows the user to select the duration for the interferences to be bypassed. If the interferences were within the duration, then the receiver is still in operation, not affected. When the interference is longer than the duration, then the receiver will stop working. Usually, this action is called "Passive EMS".
Passive Act	Refers to the operation of the receiver over a particular time (factory setting is 0.5 seconds) did not receive the correct signal. There are two modes available. When you select “ Relay-Off ” (Stop motion), only the motion relays go to OFF status. The Main relay is still

Function setting	Function Explanation
	<p>ON. As long as the correct signal received again, remote can be operated without rebooting.</p> <p>When you select "Power-Off" (Shutdown), it means that the Main relay will be OFF (non-conducting). You will need to reboot the remote system to continue operating.</p> <p>This function will be activated only if the range exceeds the maximum remote control distances or the remote has been disturbed more than 0.5 seconds</p>
AUTO OFF (RX)	<p>This function refers to turn off receiver after a given idle time. Receiver MAIN relay will be turned off automatically. Normally this function is cooperated with "non-continuous transmitting" mode to prevent any unintentional radio.</p>
Channel setting	<p>Operating frequency of your remote control.</p> <p>There are CH:XX to CH:XX available, user is allowed to select any channel which is the smallest interference channel to operate.</p>