



**TELECRANE**  
LEE'S HI-TECH ENT. CO., LTD.

## F21-2S/2D/4S/4SB/4D/E1/E1B

Industrial Radio Control

Installation & Operation Manual



### F21 Series



### Radio Control





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## Chapter 1. Warranty

### *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.

### *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 proven 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.

### **Excluded Items**

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

### **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. Attention & Precaution

### **Attention**

- ⊙ Never dismantle the equipment by any unauthorized personnel, or it may be damaged.
- ⊙ After finishing operation of TELECRANE shut off main power to the crane, power to receiver, and remove transmitter key. If the transmitter's power is controlled by a rotary key switch, turn the key to "OFF" position first, then remove it.
- ⊙ The crane should be equipped with main power relay, limit switch and other safety devices.

### **Precaution**

- A. To avoid any interference, the Receiver must be away from motors, frequency converter and power cable as far as possible.
- B. The Receiver should be installed on the top of the electrical control box. Don't mount the receiver inside the electrical control box.
- C. There are 4.3 billion ID Codes for each complete unit with an unique one prior to shipment. To avoid any interference, please manage the remote controls with the different ID Codes at a working site when installing.
- D. It is not allowed to use the same series models with the same frequency in the range of 200 meters.

### **Procedures of emergency**

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

- A. Press EMS button.
- B. Turn the rotary key switch to the "OFF" position and remove the magnetic key out of the transmitter.
- C. Switch off the main power of crane.
- D. Advise the distributor to find out the reason.

## Chapter 3. Installation & Operation

### General Operation

- A. Remove the cover of battery box.
- B. Install Fresh AA-size batteries in the battery box. Make sure the “+” and “-” directions are correct.
- C. Turn on the power according to the “Power-On Modes”.  
**Note:** LED indicator will flash in red color if proper procedures are not followed.
- D. Operate transmitter by pressing each pushbutton.
- E. After operation, perform the following procedures in sequence:
  - (1) Press EMS mushroom, (2) rotate key counter-clockwise to the “OFF” position, (3) remove key and keep it in a safe place, (4) remove batteries if not used for a long period.

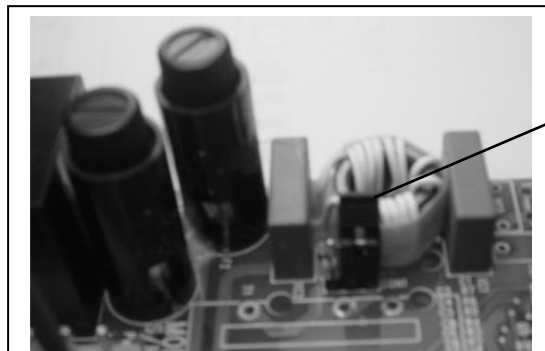
### Transmitter Batteries

The AA size alkaline batteries are required for the transmitter. DO NOT use rechargeable batteries. The LED will flash green when the battery power is sufficient. The LED will flash red when the battery power is low, and it is required to replace with fresh batteries immediately.

### Receiver Power Supply

There are two type of receiver decoder/relays board for DC and AC power supply.

- A. The voltage range for the DC power supply is DC12 ~ 24V.
- B. There are five different transformer with different voltages for the AC power supply containing AC24/48, 48/110, 48/220, 110/220 and 220/380V, each transformer has two kind of voltage which will be selected by a Jumper set at HI or LO position on the pc board as shown on the following Fig.



JUMPER is used as a voltage selector

Please find on the following, if the Jumper is set at HI position, the voltages can be AC48, 110, 220, 220 or 380V; if the Jumper is set at LO position, the voltage can be AC24, 48, 48, 110 and 220V.

TRANSFORMER JUMPER	AC 24/ 48 V	AC 48/110 V	AC 48/220 V	AC 110/220 V	AC 220/380 V
LO	AC 24 V	AC 48 V	AC 48 V	AC 110 V	AC 220 V
HI	AC 48 V	AC 110 V	AC 220 V	AC 220 V	AC 380 V

### Changing the Frequency

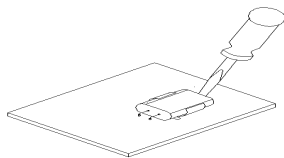
There are two different PC board for using in two different frequency range were called VHF and UHF. For each frequency range, by changing the Crystal of the transmitter and receiver can obtain the required frequency/channel.

**NOTE: Do not replace the crystal for VHF into the UHF PC board and vice versa. The indication for VHF or UHF is shown on the PC Board with a check mark “v”.**

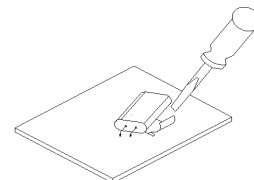
#### INSTRUCTIONS:

- (1) Pry up the crystal unit with a flat screwdriver.
- (2) Remove the crystal unit from the system.
- (3) Use a needle nose pliers to straighten both pins of the new crystal unit.
- (4) Insert the new crystal unit vertically into the PC board.
- (5) Press the new crystal down into the socket.

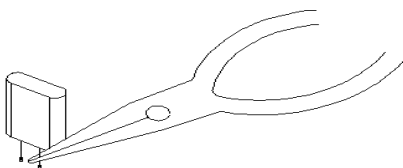
(1)



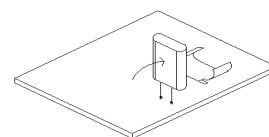
(2)



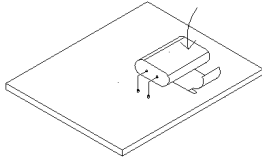
(3)



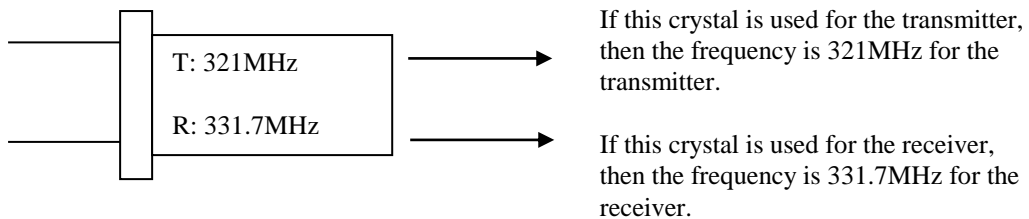
(4)



(5)



The frequencies shown on the same Crystal for the transmitter and receiver will be different as below:



## Replacing the Fuse

Press the fuse cover and turn counter-clockwise with flat screwdriver to open up the fuse cover, then remove the old fuse. Insert the new correct fuse into the cover first, place this fuse along with cover into the fuse holder base, and press the fuse cover and turn clockwise with flat screwdriver.

## LED Malfunction Alert

- A. TX red LED is flashing quickly when any function pushbutton is pressed, then the problem could be:
  - (a) One of the pushbutton is jammed.
  - (b) The EMS mushroom has not been released.
  - (c) The system is not properly powered on according to the instructions. If a problem on the above is found, please contact the distributor for repair.
- B. TX LED will flash slowly if the memory of the transmitter is defective. Please contact the distributor for repair.
- C. RX Error LED will flash slowly if the memory of the receiver is defective. Please contact the distributor for repair.



## **Troubleshooting**

- A. If TX LED remains with “ON” in red , please remove the batteries and insert again.
- B. If the RX does not respond at all, please turn off the power supply for 20 seconds and then turn it on again to the receiver.

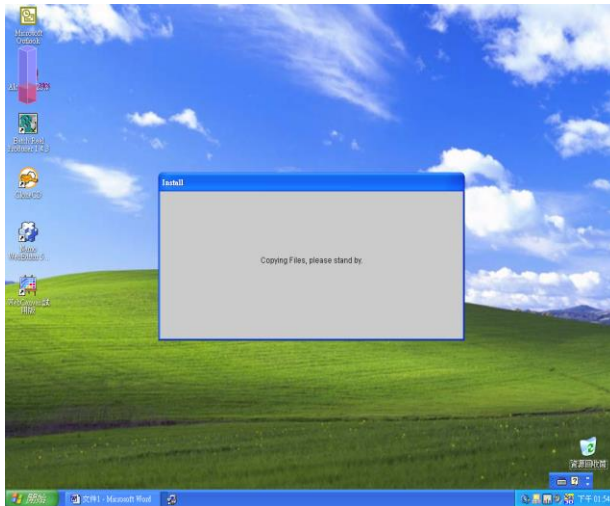
## Chapter 4. Software Installation

1-1. The installation function will run automatically after inserting the software program CD into CD ROM.

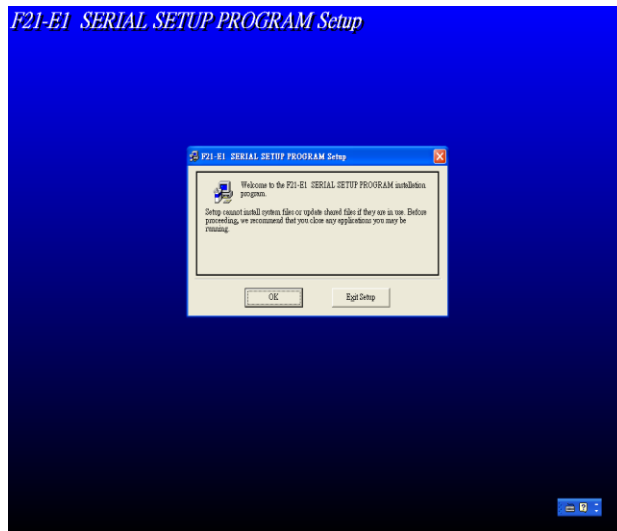
Note: If the installation function doesn't work automatically, please click "SETUP.EXE" in "My Computer" to complete the software program installation.

1-1-1. The software installation process is illustrated below:

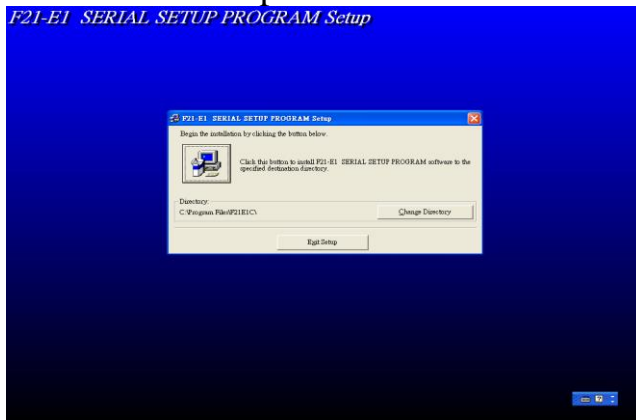
a. The installation function runs automatically.



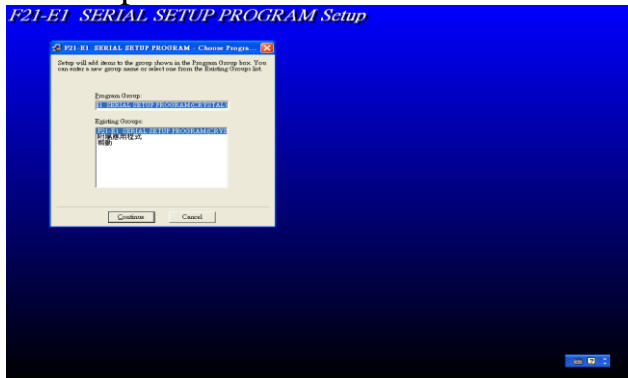
b. Click "OK" and continue the installation.



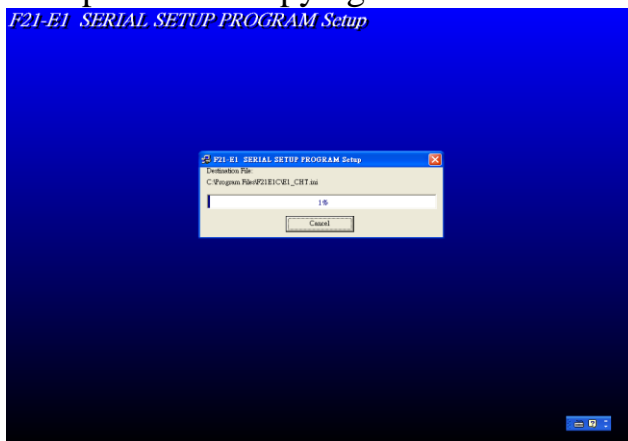
c. Click the Computer-like “icon” and continue the installation.



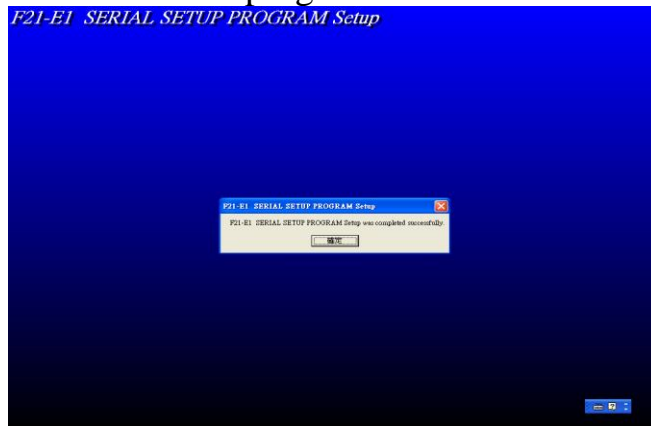
d. Select a title from “Existing Group” or renew a title in “Program Group” and click ”Continue”.



e. In process of copying all files of the installation program.



f. The software program installation is completed.

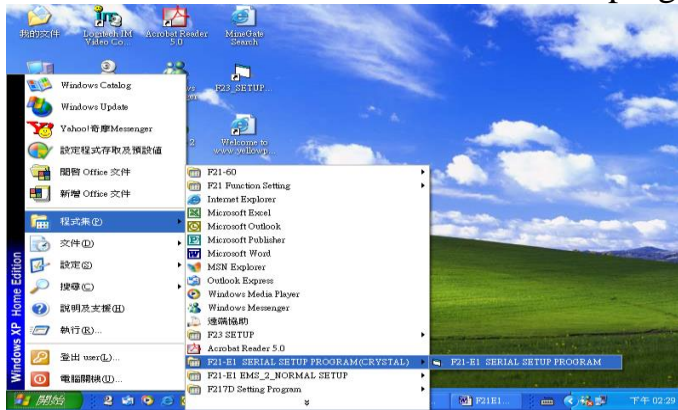


## 1-2. Preparation and Precaution

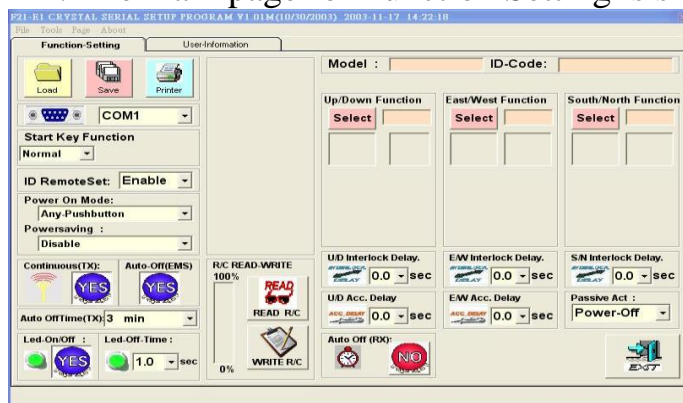
- a. Connect one of the end 25-pin interface (program) cable with the RS232 port on PC/Laptop. (Note: it isn't the PRINT port.) Using the adapter or extending wire cable if necessary. The other end of the 6-pin interface (program) cable will be connected with the Transmitter or Receiver when reading and writing the data.
- b. Make sure the power supplied to the Transmitter and Receiver has been switched off before the interface (program) cable is connected with.
- c. Click the function block to select the required function when the arrow cursor becomes a hand-like icon. In addition, it isn't available if the function block is shown as an icon in gray.
- d. Select the correct COM PORT when using the software program on PC or Laptop at first time, for instance, COM 1 or COM 2.
- e. Click the left button on the mouse to select the required function and don't forget to write it to the Transmitter or Receiver to update the data, or save it in a disk for keeping in file.
- f. Do not remove the interface (program) cable during software program setting.

## Chapter 5. Software Instruction

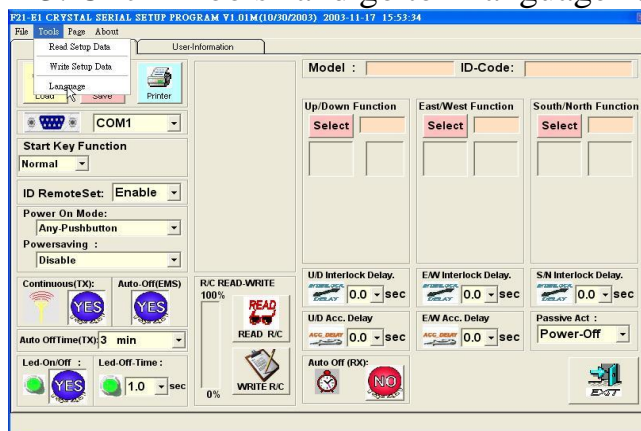
1-1. Click “start” go to “program” and select “F21-E1 SERIAL SETUP PROGRAM (CRYSTAL)” and click “F21-E1 SERIAL SETUP PROGRAM” to enter the software program.



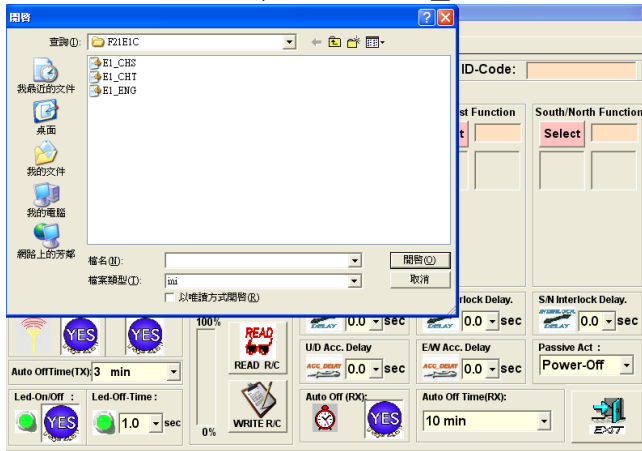
1-2. The main page for Function Setting is shown as below.



1-3. Click “Tools” and go to “Language” to select other one if necessary.



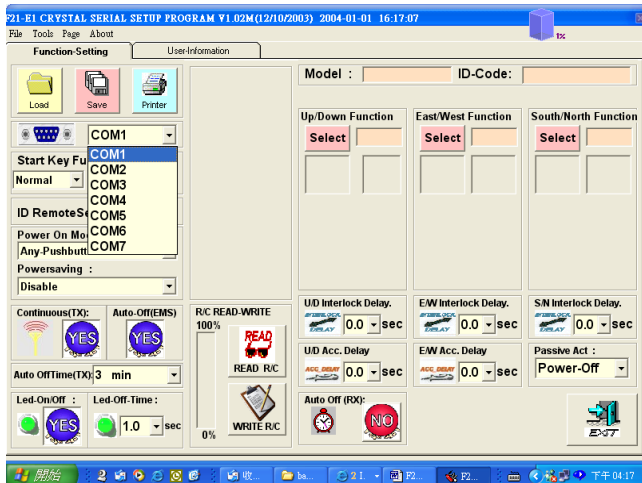
1-4. For instance, select “E1\_CHT.ini”.



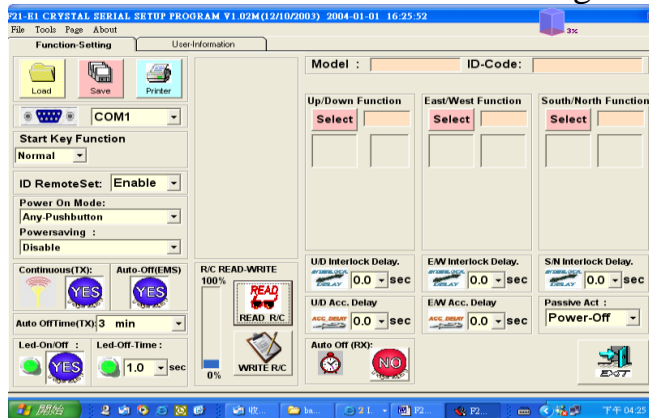
1-5. The words of Software program are shown in Chinese.



1-6. Select the correct COM PORT.



1-7. It is shown as below after clicking “Read R/C”.



1-8. “Read R/C” is completed.



1-9. The message will pop up if one of the following item is occurred.

- a. At an incorrect COM PORT
- b. Interface (program) cable is disconnected.
- c. Interface (program) cable is loose.
- d. Interface (program) cable is broken.
- e. Transmitter or receiver malfunctioned.





1-10. After clicking “Write R/C”, the message will pop up. To select “YES” to continue or “NO” to stop writing the data.



1-11. In process of writing the data.



1-12. “Write R/C” is completed.





1-13. “File”: Select “load”, “save”, “printer” or “exit”.

1-14. “Tools”: Select “Read setup data”, “Write setup data” or “Language”.

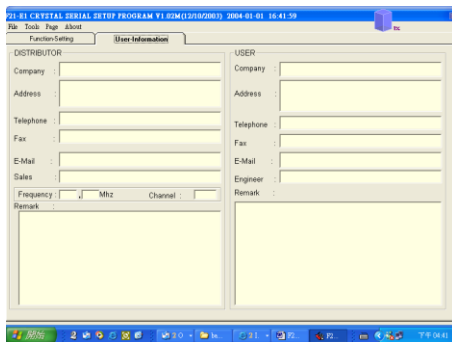
1-15. “Page”: Select “Setup Page” or “User Page”.

1-16. “About”: Check the version of the software program.

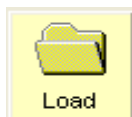
1-17. “Function Setting”: Read or write the data.



1-18. “User Information”: Check or record the user’s information.



1-19. “Load”: Open the existing files.



1-20. “Save”: Save the updated data.



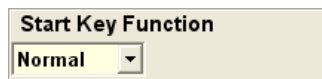
1-21. “Printer”: Print out an in-use page.



1-22. “Com Port”: Click and select a Com Port on PC/Laptop the Interface (program) cable is connected with.



1-23. “Start Key Function”: Select “Normal”, “Toggle”, “Inching” or “EMS(STOP)”.



- a. “Normal”: The relative relay is “ON” when the pushbutton (rotary key switch) is pressed (turned) and held; and relay is “off” when the pushbutton (rotary key switch) is released.
- b. “Toggle”: The relay is operated by pressing (turning) and releasing; press (turn) and release again to turn off the relay.
- c. “Inching”: Press (turn) and hold inching pushbutton (rotary key switch) and press motion pushbutton to perform inching motion. Once pushbutton (rotary key switch) is pressed (turned) then the relative relay will be

conducted within a certain time, in order to operate with short and precision movement.

- d. “EMS(STOP)”: This function is only selected by F21-2S/2D. If set “EMS(STOP), the “Power On Mode” must be set as “Any Pushbutton”; if not, the magnetic key substitutes for the function of “EMS(STOP)”.

1-24. “ID RemoteSet”: “Enable” or “Disable”.



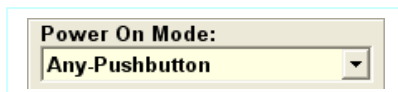
- a. “Enable”: ID Code Remote setting allows you to overwrite only ID code of Receiver when Receiver or Transmitter is damaged. Before remote setting, one must make sure both TX and RX are in same frequency channel. By using remote setting, Receiver ID Code will be overwriting by the Transmitter.

Note:

- (1) All radios of same model within its radio operating distance, might be affected by ID code remote setting.
- (2) Transmitter ID code remote setting overwrite the ID code of receiver only.
- (3) Receiver will not accept ID code remote setting signal 4 minutes after main power being turned ON.

- b. “Disable”: ID Code Remote setting is not available. So it is required to use Copier or PC/Laptop to read and write the same ID code and functions to the Transmitter or Receiver.

1-25. “Power On Mode”: “Any Pushbutton” or “Start pushbutton/Key”.

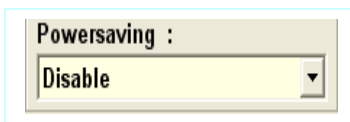


- a. “Any Pushbutton”: Pull out EMS button (mushroom) and remain Rotary key switch in “on” position (for F21-2S/2D/4SB/E1B, release EMS(STOP) button and insert Magnetic key in its slot in the Transmitter), the receiver will be “Power On” once any pushbutton on transmitter is pressed.

- b. “Start pushbutton/Key”: Pull out EMS button (mushroom) and turn Rotary key switch to “on” position (for F21-2S/2D/4SB/E1B, release EMS(STOP) button and insert Magnetic key in its slot in the Transmitter), the receiver will be “Power On” once Rotary key switch is turned to “start” position (for F21-2S/2D/4SB/E1B, once Start pushbutton is pressed).

Note: “Power On” means that the coil of the MAIN relay energizes and the contact of the MAIN relay activates at the same time in the receiver.

1-26. “Powersaving”: “Enable” or “Disable”.



- a. “Enable”: It is suitable for a particular application if a number of Remote Controls having same frequency and different ID codes used at a working site. In addition, by using firmware to control frequency transmission cycle period to reduce power consumption of transmitter.

Note: the operating distance will be decreased when the “Power Saving” mode is activated.

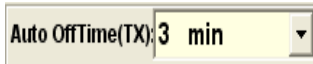
- b. “Disable”: It is suitable for a common (standard) application.

1-27. “Continuous(TX)”: “YES” or “NO”.



- a. “YES”: Once Transmitter is powered on, it will continuously send the signal until it is powered off.
- b. “NO”: After Transmitter is powered on, it will send the signal only when the pushbutton is pressed for saving Transmitter’s battery power.

1-28. “Auto Off Time(TX)”: This function is only available when the “YES” mode of “Continuous(TX)” is selected.



- a. The transmitter will power off itself after a given idle time for saving Transmitter’s battery power.
- b. Whether the transmitter will send the signal to power off the MAIN relay in the receiver or not, that would be verified by the function of “Auto Off(EMS) set on “YES” or “NO”.

1-29. “Auto Off(EMS)”: “YES” or “NO”.



- a. “YES”: The transmitter will send the signal to power off the MAIN relay in the receiver after a given idle time. To power on again according to “Power On Mode”.
- b. “NO”: The transmitter will not send the signal to power off the receiver after a given idle time.

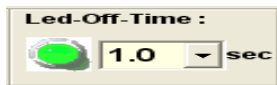
1-30. “LED On/Off”: “YES” or “NO”.



- a. “YES”: The transmitter’s green LED glows according to “LED Off Time” when transmitting. If a warning such as an insufficient battery power occurs, the transmitter’s red LED will glow at the first priority.

b. "NO": The transmitter's green LED won't glow when transmitting. But the transmitter's red LED will glow if an warning occurs.

1-31. "LED Off Time": This function is only available when the "YES" mode of "LED On/Off" is selected. The interval time can be selected from 0 ~ 4 seconds and the LED glowing time is fixed at 0.4 second a time.



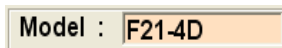
1-32. "READ R/C": Read the data from transmitter or receiver on PC or Laptop for verifying or renewing.



4-33. "WRITE R/C": Write the data set to the transmitter or receiver.



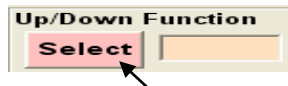
1-34. "Model": Display model number after reading the data.



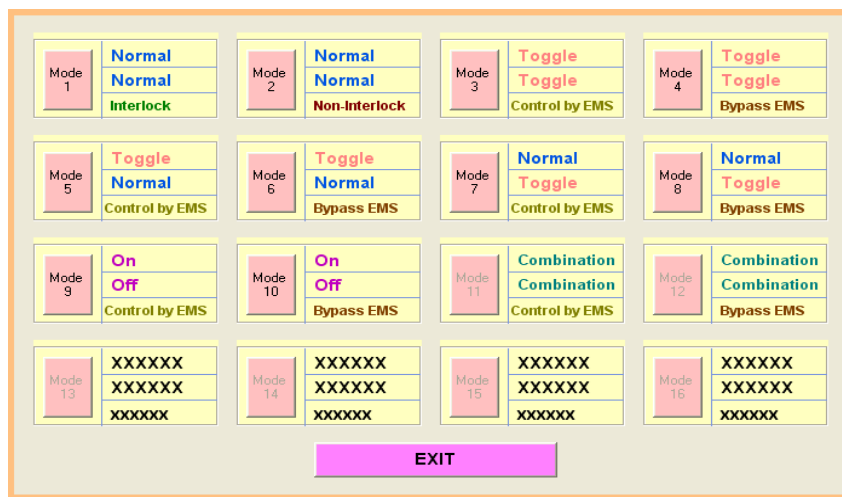
1-35. "ID Code": Display ID Code after reading the data which is an unique code for each Remote Control, both transmitter and receiver won't work if they have different ID codes.



1-36. “Select”: After clicking “Select”, the function modes will appear for selecting.



1-37. The function modes contain “Normal”, “Interlock”, “Non-Interlock”, “Toggle”, “Control by EMS”, “Bypass EMS”, “On”, “Off” and “Combination” etc.



- a. ”Normal”: The relative relay is “ON” when the pushbutton (rotary key switch) is pressed (turned) and held; and relay is “off” when the pushbutton (rotary key switch) is released.
- b. “Interlock”: The correspondent relay to the two pushbutton are interlocked, it is not possible to operate two opposite functions at same time.
- c. “Non-Interlock”: The correspondent relays to the two pushbutton can activate at the time.
- d. “Toggle”: The relay is operated by pressing (turning) and releasing the pushbutton (rotary key switch); press (turn) and release again to turn off the relay.
- e. “Control by EMS”: The correspondent relay to pushbutton is controlled by an emergency stop signal.
- f. “Bypass EMS”: The correspondent relay to pushbutton is not controlled by an emergency stop signal and will

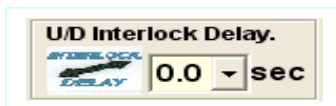
remain its status as well.

- g. “On & Off”: Both pushbuttons are used to operate the same relay. Press the “On” pushbutton to activate and the “Off” pushbutton to de-activate the same relay.
- h. “Combination”: When 2 pushbuttons are being pressed simultaneously, it would result for an additional relay output (as toggle) to suit some of the special application such as lighting system. (No any extra pushbutton required to save the space and cost)

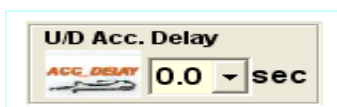
**Note: 1. “Combination” setting is prohibited for magnetic devices.**

**2. Click “EXIT” back to the front main page.**

1-38. “Interlock Delay”: This function is available when the “Interlock” mode (Mode 1) is selected. It is the delay time between 2 opposite pushbuttons being press one after another. i.e. while Crane is moving one direction (forward), moving opposite direction (backward) immediately would be dangerous specially 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.



1-39. “Acc. Delay”: This function is only available for F21-2D/4D to select the interval time between 1-speed and 2-speed relay to prevent the Crane directly runs to highest speed to damage the motor.

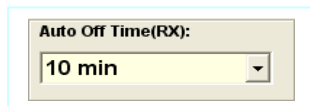


1-40. “Passive Act”: This function ensures safe operations, including when there are disturbances that may affect the normal operating conditions. This assures that when the machine operates, the control is not subject to temporary and unexpected stops. Possible short interferences are bypassed. The passive act can be selected in 2 modes as below.



- a. “Power Off”: If the interferences are larger than the pre-set time, the receiver will turn off all the relays under “Normal” function and “Control by EMS” including MAIN relay. The receiver must be restart to operate again, follow the “Power On” procedure to restart the system.
- b. “Relay Off”: If the interferences are larger than the pre-set time, the receiver will turn off all the relay under “Normal” function except the MAIN relay.

1-41. “Auto Off (RX)”: If select “YES”, the Receiver MAIN relay will be turned off automatically after a given idle time. Normally, this function is cooperated with “NO” mode of “Continuous (TX)” to prevent any unintentional radio.



1-42. “Auto Off Time (RX)”: This function is available when “YES” mode of “Auto Off (RX)” is selected. It allows you to select the time to execute “Auto Off (RX)” or you can select “Not-Execute”.



1-43. “EXIT”: Click “EXIT” to close software program.



Remark: 1. After function settings is done, respectively write the same to both Transmitter and Receiver.  
2. Save function-setting and user-information prior to shipment.

## Chapter 6. Supplement

### **Independent COM Line**

The new F21 crystal series provides the option of independent (separate) COM lines for each model as below:

- \*\*F21-E1/E1B: 4 independent COM lines (Up/Down, East/West, South/North and R0)
- \*\*F21-4D: 3 independent COM lines (Up/Down & U/D 2S, East/West & E/W 2S and R0)
- \*\*F21-4S/4SB: 3 independent COM lines (Up/Down, East/West and R0)
- \*\*F21-2D: 3 independent COM lines (Up 1S & 2S, Down 1S & 2S and R0)
- \*\*F21-2S: 3 independent COM lines (Up, Down and R0)

### **Swapping COM & MAIN**

According to the standard wiring diagram, all relays including the MAIN relay will be turned off when the EMS is pressed. However, it won't work correctly when a pushbutton is programmed as a "Toggle" or "On/Off" function with "Bypass EMS". Therefore, the MAIN and COM must be swapped.

### **Changing R0/Start N.O. into N.C.**

The N.O. (Normally Open) is a default output. If a N.C. (Normally Closed) is necessary, to remove the wire No.11 (R0/Start, pink color) and then insert it into the wire No.12 position on the wire cable connector.

### **ID Code Remote Setting**

ID Code Remote setting allows you to overwrite ID code of receiver when Receiver or Transmitter is damaged. Before remote setting, one must make sure both TX and RX are in same model and frequency channel. By using remote setting, receiver ID code will be overwriting by the transmitter.

**Prior to remote setting, please follow the instruction below:**

- (a) Make sure both TX and RX are same model and in the same frequency channel.



- (b) To avoid any interference during remote setting, place the transmitter to RX as close as possible.
- (c) Turn off the RX power completely (MAIN SWITCH) for 20 seconds and turn it on again.
- (d) Complete the remote setting within 4 minutes after turning on the RX. The RX will NOT accept the remote setting signal after 4 minutes.

**Instruction:**

1. Depress the TX Emergency Stop or remove the magnetic key (for F21-E1B/4SB without a Mushroom style stop button that stays depressed, please hold down the STOP pushbutton)
2. Press UP pushbutton and hold it.
3. Press DOWN pushbutton 4 times and release “STOP & UP” pushbutton when red LED flash.
4. Start the system as usual.

**Note:**

- (1) By following the procedures above, all radios of same model within its radio operating distance might be affecting by ID code remote setting.
- (2) ID code remote setting only transmits data of ID code only.
- (3) Receiver will not accept ID code remote setting signal 4 minutes after main power being turned ON.