

# INSTALLATION & OPERATION MANUAL

TELECRANE

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SAGAI-L40

## Industrial Remote Controller

Gain Electronic Co., Ltd.

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## **Chapter 1. Warranty**

### **1-1 Warranty**

Gain Electronic 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, GAIN 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 GAIN. Buyer will pay shipping charges to GAIN while GAIN will pay return shipping charges.

### **1-3 Excluded Items**

This warranty does not include consumptive parts such as batteries, fuses, joystick, buttons, and 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.

### **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. GAIN shall not be liable for any direct, indirect, special, incidental or consequential damages.

## Chapter 2. Precautions of Operation

### 2-1 Precautions:

1. Please carefully read the manual before operating this device.
2. Never dismantle the equipment by any unauthorized personnel, or equipment may be damaged.
3. This manual is for reference only. Please consult your distributor for further assistance.
4. 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.
5. After operation, shut off main power to the crane, power to receiver, and turn the key to "OFF" position and remove it.
6. Transmitter should be placed in a safe area when not in use to avoid accidental pressing of buttons.
7. The crane should be equipped with main power relay, limit switch and other safety devices.
8. Don't use equipment during lightening or high electrical interference conditions.
9. Make sure that the batteries are in good condition and power for receiver is correct.
10. Maintenance should only be done while the crane's main power is off to prevent electrical shock.
11. Operating in an industrial facility is highly dangerous; therefore, operator must have adequate training in using SAGA1 system.
12. Those who operate the machine should be healthy and have good judgment in regards to safety.
13. Although the SAGA1 transmitter is very durable and weather resistant care should be taken not to expose it to severe impact or pressure.
14. If the severe interference occurred you should stop using the equipment at once.
15. Please take the battery out when the equipment will not be used for a long time.
16. Be sure to know the "**Procedures of Emergency**" as following.

### 2-2 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 "rotary key" to "OFF" position and remove it.
3. Switch off the main power of crane.
4. Advise the distributor to check it out.

### Chapter 3. SAGA1- L40 Standard Accessories

When you get a standard and full set of SAGA1-L40 system, it includes the following items:



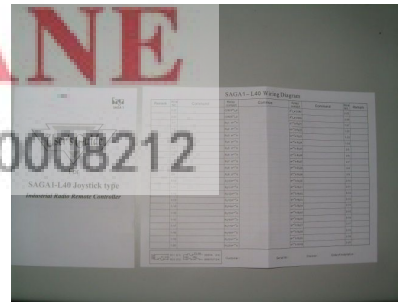
(1) Transmitter



(2) Receiver



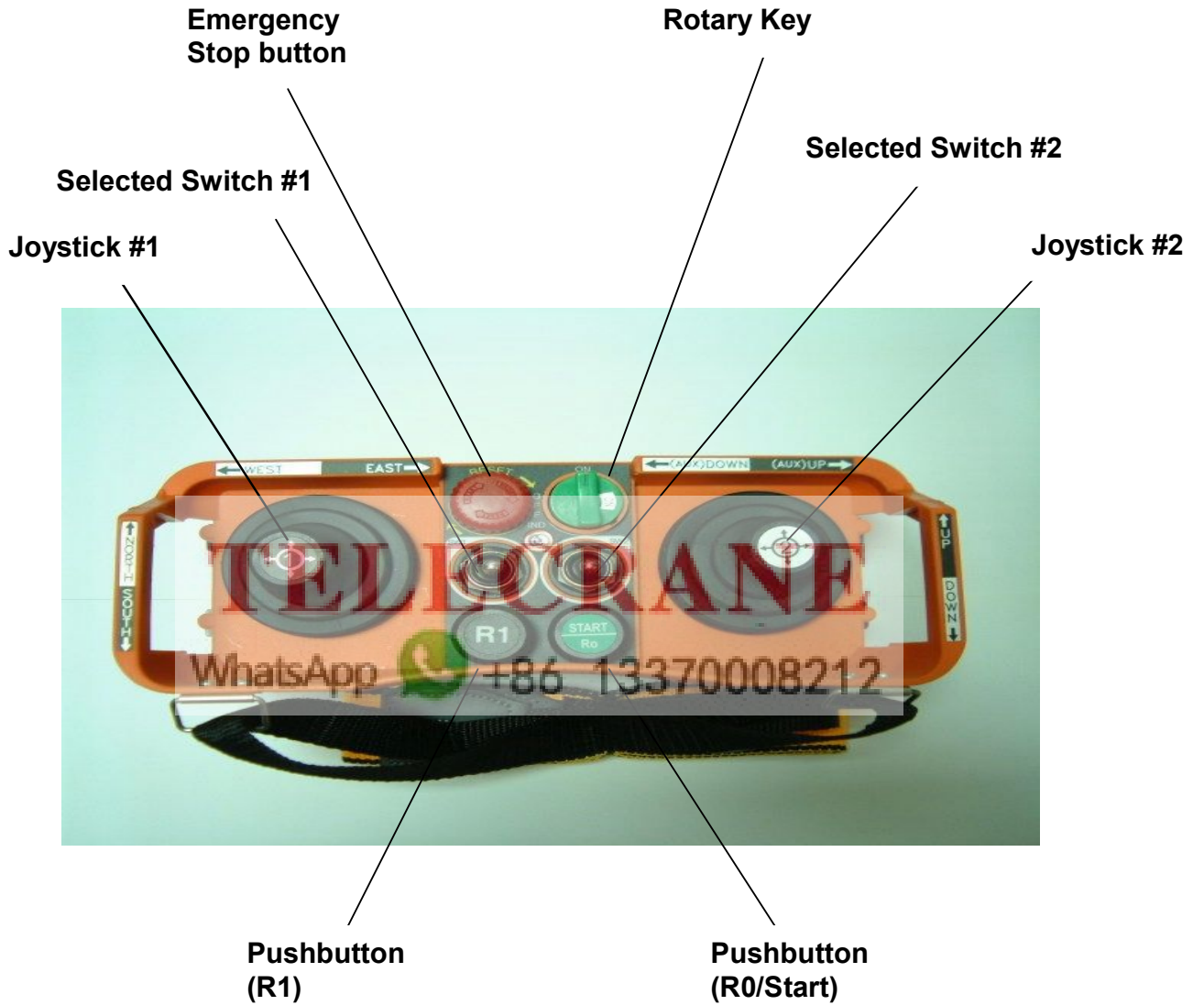
(3) Belts



(4) Manual & Wiring Diagram

# Chapter 4. Operation

## 4-1. SAGA1- L40 Transmitter



## 4-2. SAGA1-L40 Receiver

Wiring Diagram of Control Contact



Cable Assemble #2

Cable Assemble #1

### 4-3. General Operation

- 1) Turn on the main power switch of the equipment (Crane).
- 2) Install four AA size batteries in the transmitter make sure the "+" and "-" direction are correct.
- 3) Rotate "EMS" mushroom clockwise 45° and pull out.
- 4) Turn the rotary key clockwise to "ON" position, then press the "Start" pushbutton to Power-On.
- 5) Operate normally according to the function setting has done.
- 6) Please proceed the following procedure after operation.
  - a) Press EMS mushroom and turn the rotary key of the transmitter to "OFF" position to shut off the motion of the receiver and remove the key.
  - b) Switch off the main power switch of the equipment (Crane).
  - c) Remove the batteries when the equipment is not going to be in use for a long period of time.

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#### Note:

- A) Four AA size batteries are required for the transmitter. There is a 3-stage power indicating function with LED display.
- “**Green color**”: Sufficient power to operate transmitter.
- “**Yellow color**”: Power is depleting. Operation must be stopped immediately (for example: down the goods to ground) to replace batteries.
- “**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.
- B) Turn the rotary key of the transmitter to "OFF" position; it will not only shut off the motion of the receiver but also save the power. Otherwise, the transmitter will keep staying in the standby mode and causing more power consumption.



#### 4-4. The function of Copier

One can use the copier to pair a new transmitter or receiver, procedures as follows:

1. Insert the six pins female plug of copier into the male socket inside the TX or RX of SAGA1-L40.
2. For copying and saving the data from TX or RX, put on the magnetic key onto the receptor to connect; for transferring the saved data from copier to TX or RX, release the magnetic key from the receptor.
3. Press and release “1” pushbutton (or 2, 3) to copy and save the data (When magnetic key is on) from TX or RX, after the green indicator light has flashed, the transfer is finished, disconnect the plug. Proceed 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 for SAGA1- L40 (dual colors on the appearance) can also be used for existing SAGA1-L4/6/8/6B/8B/L10/L12.
3. 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 each other.

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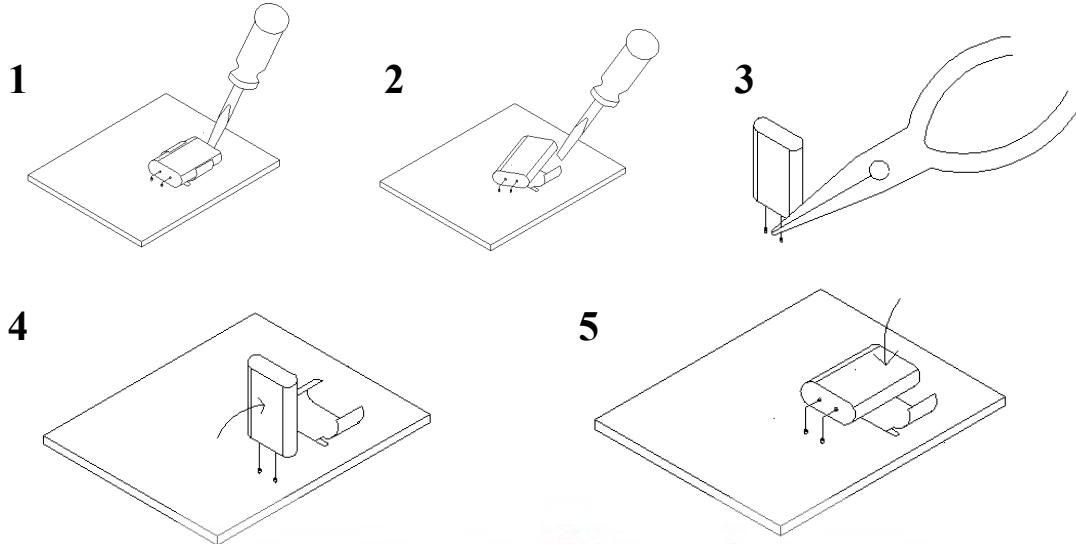
#### 4-5. Change of Frequency

It is easy to change frequency of the SAGA1-L series simply by replacing correspondent frequency crystal in both the TX and RX.

*Note: To replace a new crystal, please note that there are two kinds of frequencies (VHF and UHF) available. The indication of VHF or UHF is shown on PC board with a check mark “V” and please make sure not to replace a VHF crystal unit into UHF PC board or vice versa.*

**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.

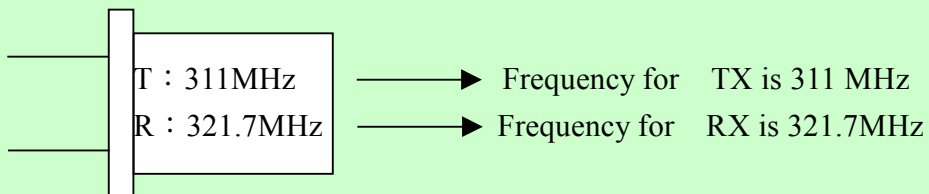


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**Attention: The frequency will be different when plugging the same crystal into the TX or RX. For example:**



#### 4-6. Receiver Voltage Selections

There are four input voltages available for the SAGA1-L40 as follows:

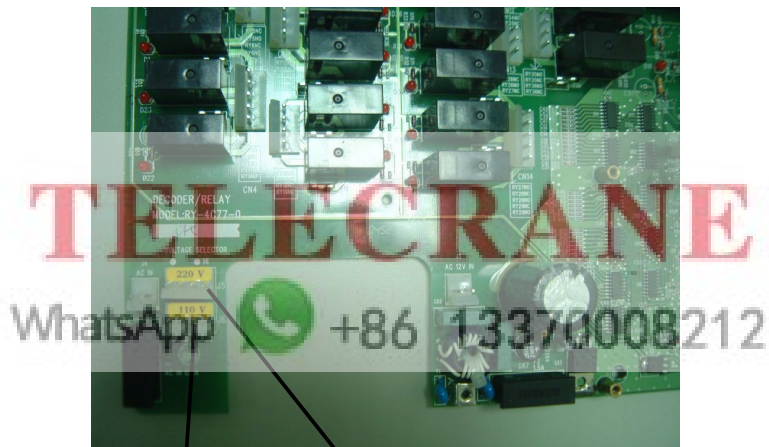
48/110VAC

48/220VAC

110/220VAC

220/380VAC.

Please disconnect the Rx's power, select the proper voltage and plug in the connector.



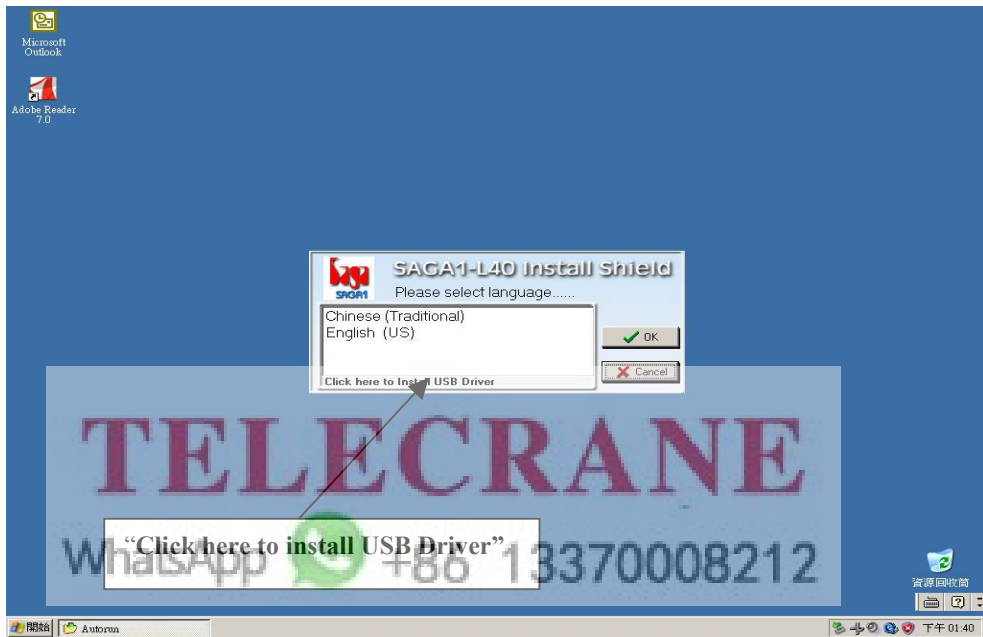
**Switch the plug to choose voltage**

## Chapter 5. PC Software Installation and Operation Guide

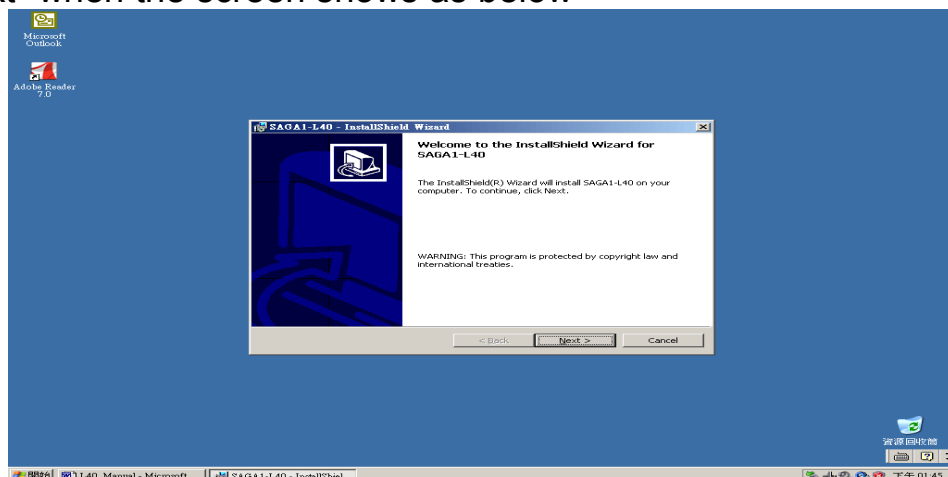
### 5-1. Software Installation:

- 1) Open CD-ROM of your computer and insert SAGA1- L40 PC software CD, the program will run automatically. Select English Version or Chinese Version then Click “Ok” to proceed installing, “Cancel” to exit.

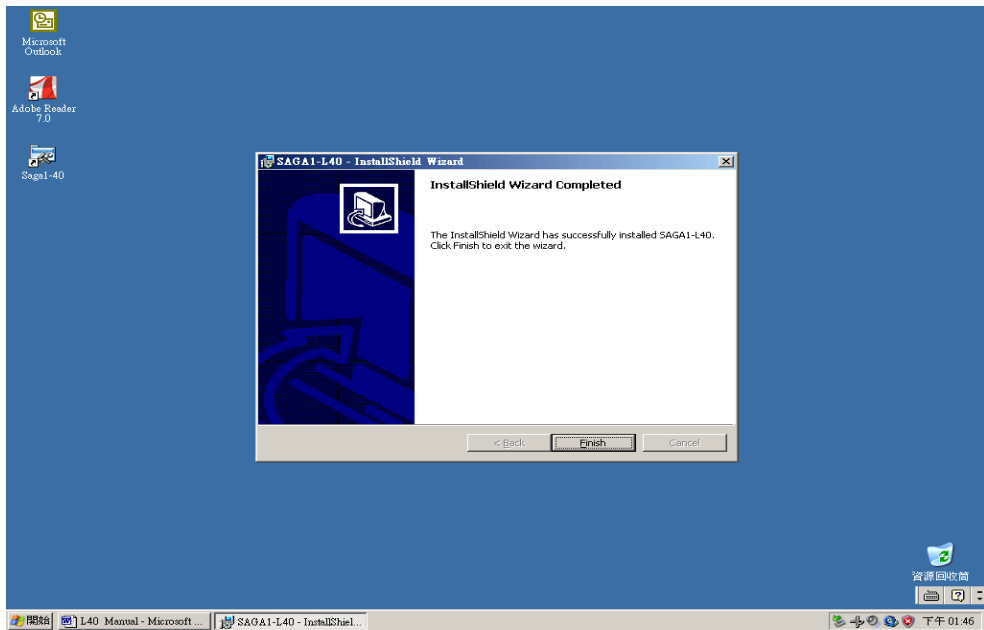
**Remark:** USB driver must be installed at first time of using USB connect cable, please click the bottom line of dialogue “ Click here to install USB Driver” to install USB driver.



- 2) Click “Next” when the screen shows as below

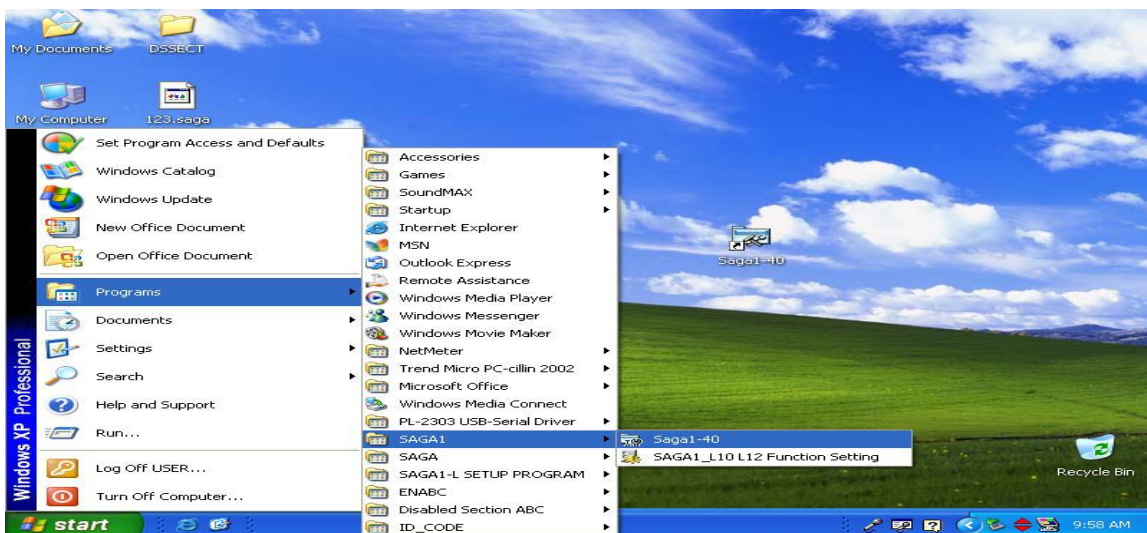


- 3) Click “Finish” to end the installation, then remove the CD from the CD-ROM. The program will add a shortcut on your desktop.



## 5-2. Software Operation and Function Setting

- 1) To activate the program, either double click on the desktop shortcut for SAGA1- L40 software, or from the “start” menu of your Windows: (Start→Programs→SAGA1→SAGA1- L40 Function Setting)



## 2) Default , Function, and Customer Info page of the program

The screenshot shows the 'SAGA1-L40 Function Setting' software interface. At the top, there are several function buttons: 'Open File', 'Save File', 'Print/Preview Connection Diagram', 'Read Data', and 'Write Data'. A box labeled 'Select Com Port/About Program' points to the top right corner. The main window displays the following information:

- Model: SAGA1-L40
- Serial No.: 40000115
- ID-Code: 40000115
- Release Date: 2005/12/09
- Remaining Relays: 10 pcs

The interface is divided into several sections:

- Tx Function Setting:** Includes Power On Mode (Start Pushbutton), Transmit Mode (Non-Continuous), Powersaving (Disable), Auto Off (Disable), Normal OP LED (On Every 1.0 sec.), and Remote Setting (Disable).
- Rx Function Setting:** Includes Passive Act (Relay-off), Passive Act Timing (0.5 sec.), Auto-off (PX) (Not-Execute), and Remote Setting (Disable).
- Switch 1 Function:** Includes Enable Sw 1A, Enable Sw 1B, Switch 1 EMS Control (1A Ctrl. by EMS, 1B Ctrl. by EMS), and Switch 1 Center (SW1 Center Off).
- Switch 2 Function:** Includes Enable Sw 2A, Enable Sw 2B, Switch 2 EMS Control (2A Ctrl. by, SW 2 Ce), and Switch 2 Center (SW 2 Cent).
- Button Function:** Includes Button Function (Normal) and EMS Control (R0 Ctrl. by EMS, R1 Ctrl. by EMS).
- R0/R1 Interlock function:** Includes R0/R1 Interlock Delay (0 sec.).

A box labeled 'Pushbutton/ Selected Switches corresponding Relay' points to the 'Corresponding Relay' table at the bottom right:

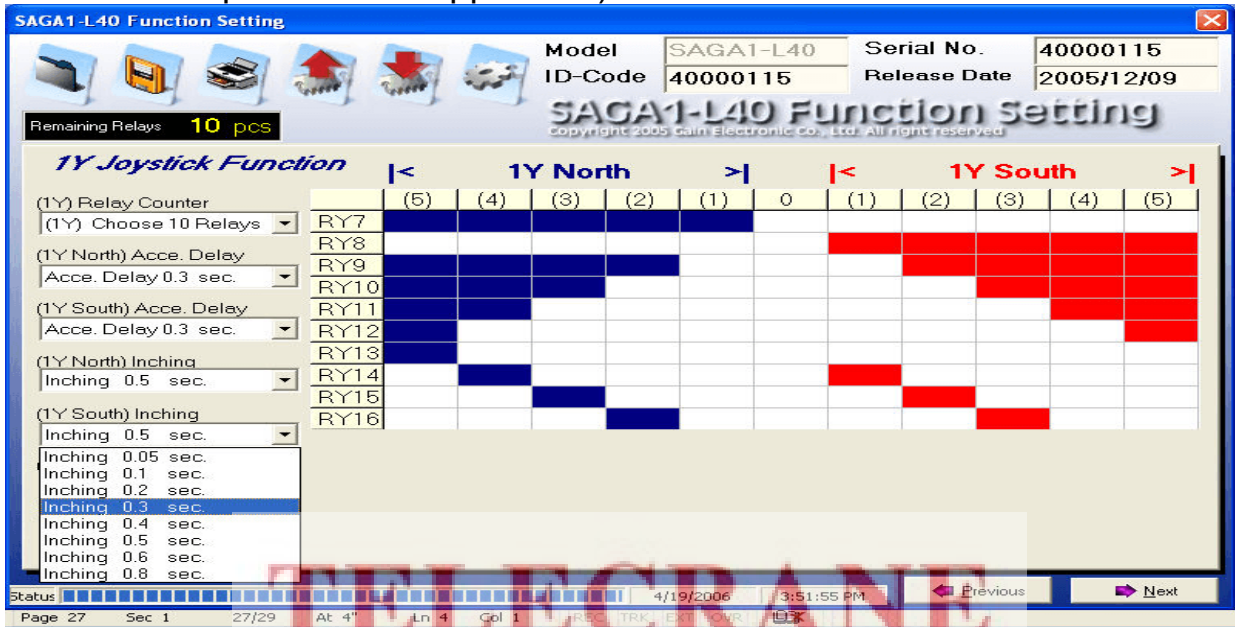
Relay	RY1	RY2	RY3	RY4	RY5	RY6
Key	R0	R1	SW 1A	SW 1B	SW 2A	SW 2B

At the bottom of the window, there is a status bar with a 'Next' button. A box labeled 'Click here to next page' points to this button.

2-1) Function page of the program

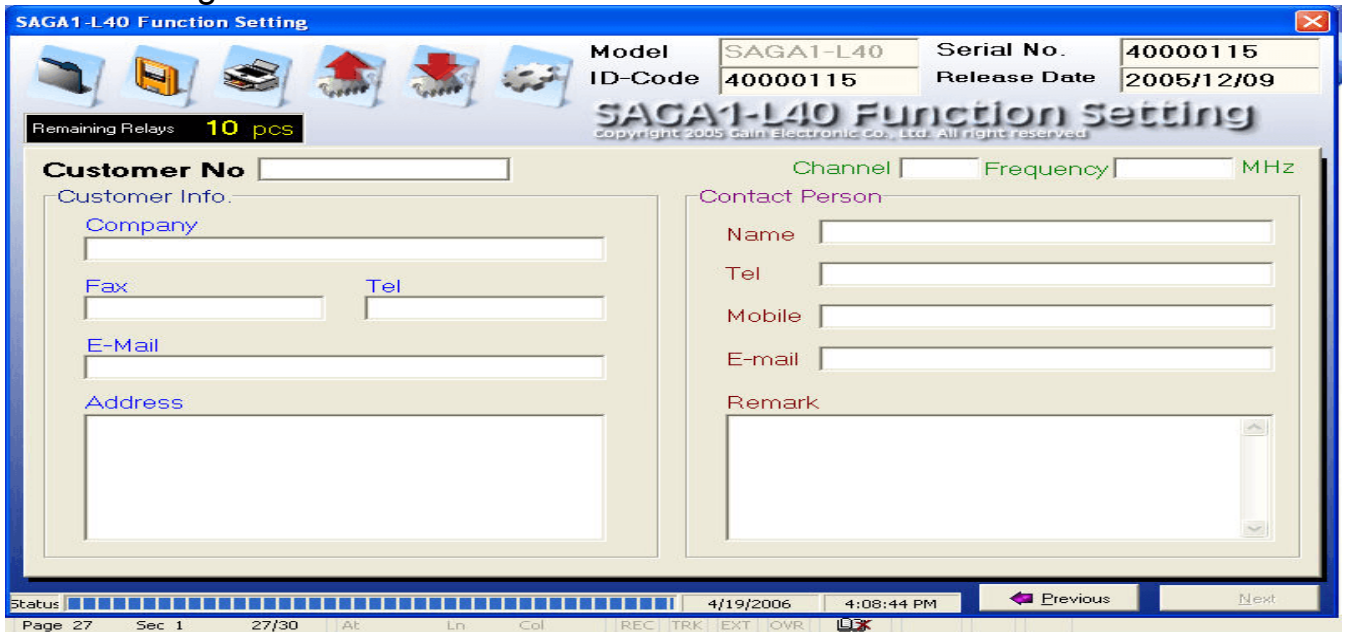
It is a functional page used to modify the settings on pushbuttons, selected switches, and joysticks.

By modifying the function page, it will meet the needs of all kind of applications, and make operating remote controller easier. (For more details please refer Appendix .)



2-2) Customer Info Page

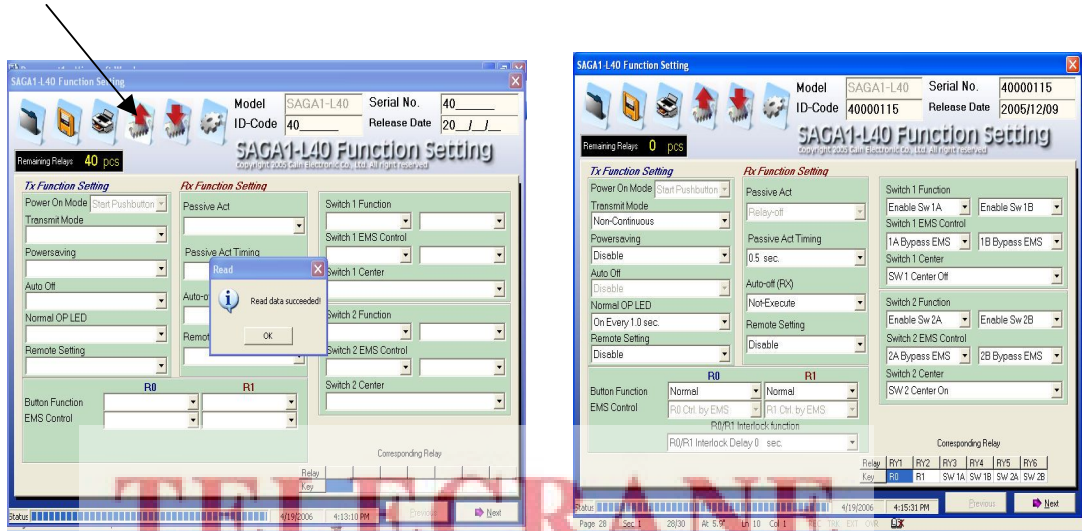
This page provides the basic information of end users & equipment as well. The data of customer info page is useful for users on equipment management and maintenance.



### 2-3) Read Data

Getting the function settings were set by factory before shipping. Use RS232 or USB cable connecting Transmitter or Receiver to the computer, click "Read Data" to retrieve the setting, then click "OK" to see the result.

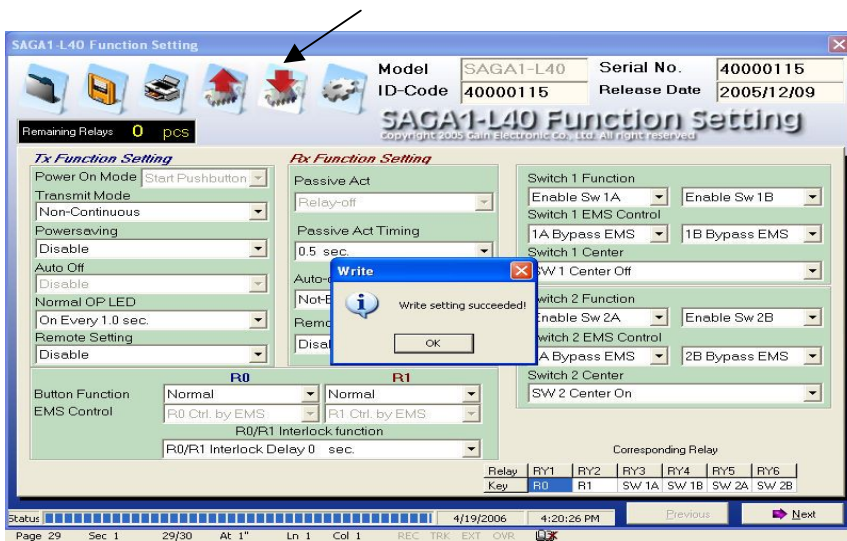
#### Read Data



### 2-4) Write Data

Updating with new data into Transmitter or Receiver. To write to another TX or RX, disconnect the cable from present TX or RX and connect to target TX or RX, click "Write Data", and then click "OK".

#### Write Data

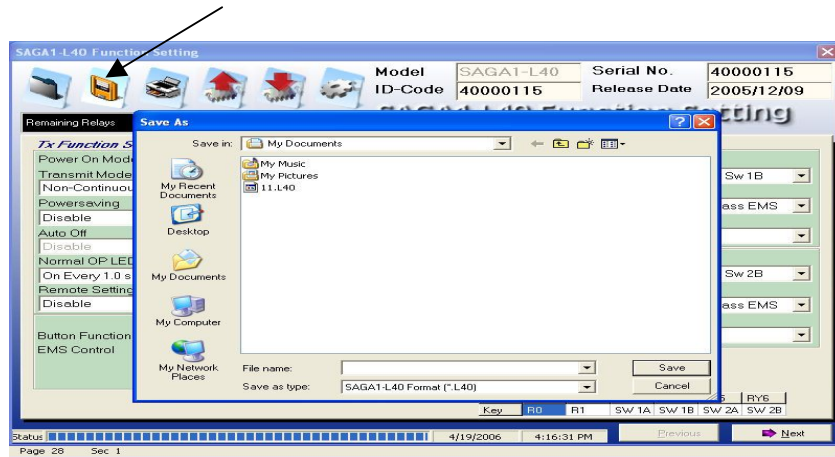




## 2-5) Save File

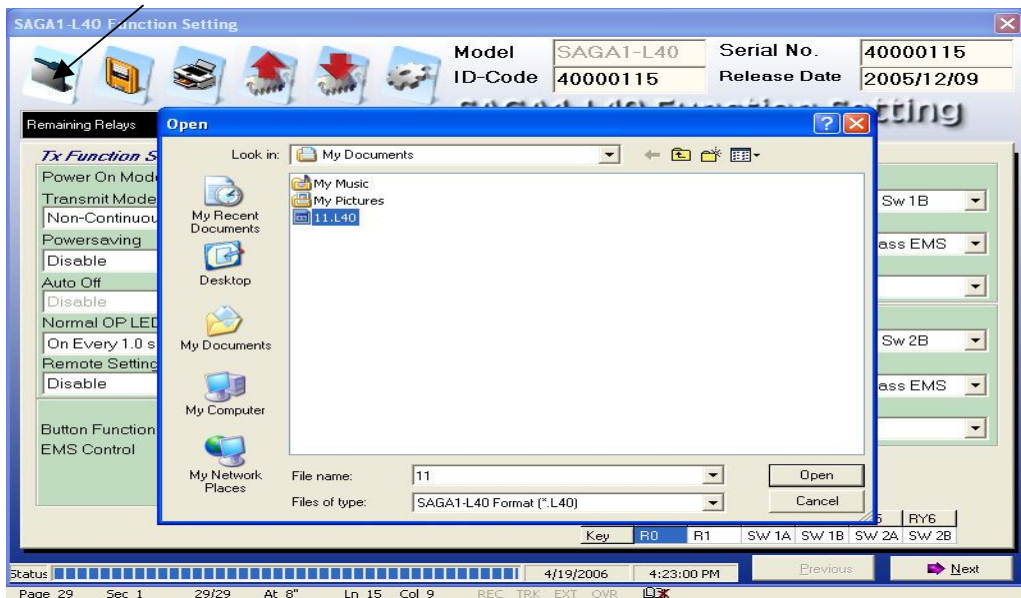
After the function setting changed (refer to Appendix), either to save the setting data to computer hard disk or write it to transmitter or receiver. To save the data, click “Save File”, after destination chosen and file name typed, click “Save”. Click “OK”

**Save File**



## 2-6) Open File

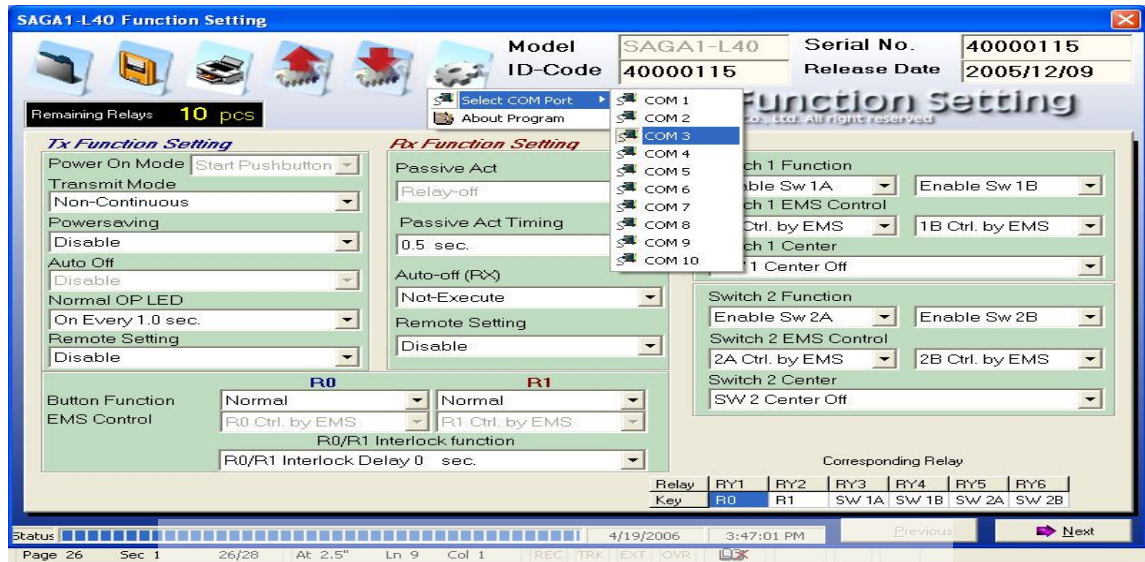
To read data from saved file. To click “Open File”, after the source file (\*.L40) chosen, click “Open”, then “OK”. **Open File**



## 2-7) Select Com Port / About Program

Select Com Port – Providing available COM port selections as Transmitter or Receiver connected with PC.

About Program- showing the current version of software is being used (reference only)



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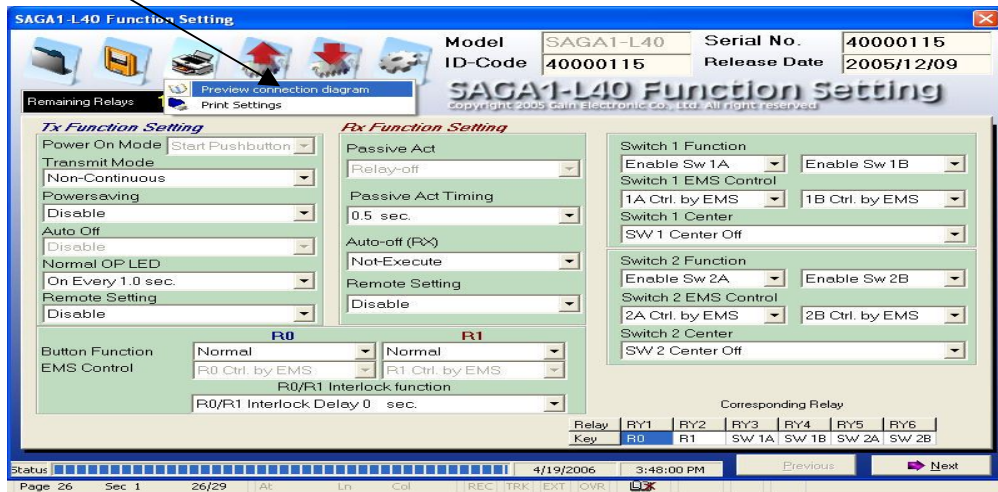
## 2-8) Print/Preview Connection Diagram

Print: allows users print out the current page showing on the monitor.

Preview Connection Diagram: As a reference for technicians before starting the wiring installation.

To print out the wiring diagram, click “Print”, and then select “ preview connection diagram”. A wiring diagram will automatically be created in accordance with the mapping relationship between relays and commands. (Shown as Fig. 2-8-1)

Preview connection diagram



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SAGA1-L40 Wiring Diagram

Remark	Wire No.	Command	Relay contact	Common	Relay contact	Command	Wire No.
	2-21		COM1		COM1		2-23
	2-22		COM2		COM4		2-24
	1-1	R0	Ry1		Ry21	North(3),South(4)	1-21
	1-2	R1	Ry2		Ry22	North(4),South(5)	1-22
	1-3	SW 1A	Ry3		Ry23	West(5)(4)(3)(2)(1)	1-23
	1-4	SW 1B	Ry4		Ry24	East(1)(2)(3)(4)(5)	1-24
	1-5	SW 2A	Ry5		Ry25	West(5)(4)(3)(2),East(2)(3)(4)(5)	2-5
	1-6	SW 2B	Ry6		Ry26	West(5)(4)(3),East(3)(4)(5)	2-6
	1-7	North(5)(4)(3)(2)(1)	Ry7		Ry27	West(5)(4),East(4)(5)	2-7
	1-8	South(1)(2)(3)(4)(5)	Ry8		Ry28	West(5),East(5)	2-8
	1-9	North(5)(4)(3)(2),South(2)(3)(4)(5)	Ry9		Ry29	West(5)	2-9
	1-10	North(5)(4)(3),South(3)(4)(5)	Ry10		Ry30	N/A	2-10
	1-11	North(5)(4),South(4)(5)	Ry11		Ry31	West(4)	2-11
	1-12	North(5),South(5)	Ry12		Ry32	East(2)	2-12
	1-13	North(5)	Ry13		Ry33	N/A	2-13
	1-14	North(4),South(1)	Ry14		Ry34	Zero,East(4)	2-14
	1-15	North(3),South(2)	Ry15		Ry35	N/A	2-15
	1-16	North(2),South(3)	Ry16		Ry36	East(3)	2-16
	1-17	North(1),South(3)	Ry17		Ry37	West(4)(2)(1),East(5)	2-17
	1-18	North(1),South(3)	Ry18		Ry38	East(4)	2-18
	1-19	North(1),South(4)	Ry19		Ry39	Up(5)(4)(3)(2)(1)	2-19
	1-20	North(2),South(4)	Ry20		Ry40	Down(1)(2)(3)(4)(5)	2-20

Fig. 2-8-1

## Chapter 6 The relationship of the relays, commands & cable outputs

### 6-1. Pushbuttons/ Selected switches; Joysticks operation

#### 1). Pushbuttons/ Selected switches

For knowing Pushbuttons and selected switches what corresponding relays are, users can directly refer to “ corresponding Relay” on function setting page.

For instance, as Fig. 6-1 shown, while R0 pushbutton pressed, RY1 will energizes; R1 pushbutton pressed, RY2 energizes; Selected Switch1A (SW1A), RY3 energizes; Selected Switch1B (SW1B) , RY4 energizes; Selected Switch2A (SW1A) , RY5 energizes; Selected Switch2B (SW2B) , RY6 energizes.

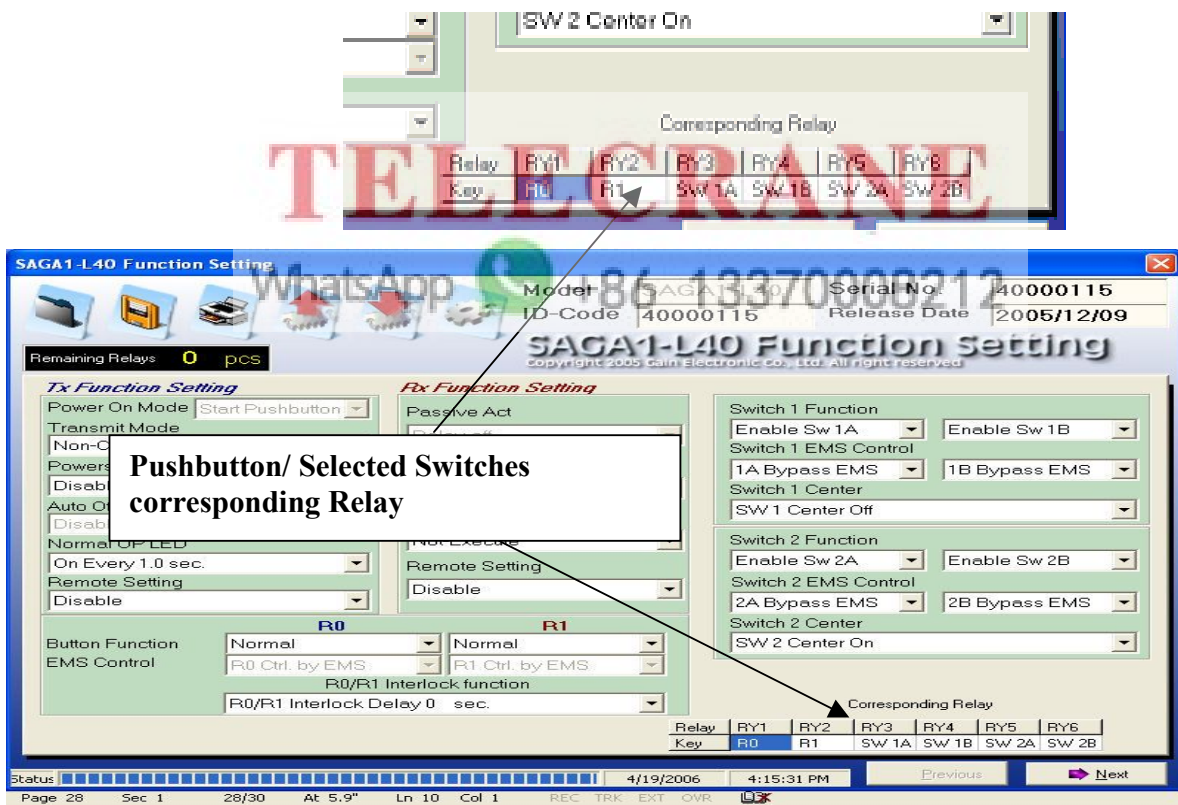


Fig. 6-1

2). Joysticks operation

In any axial movement of Joystick#1 and Joystick #2, users can manipulate the relay configuration via software that joysticks could be arbitrarily set at any speed.

For example, as Fig. 6-1-2 shown, when operating the Joystick “1Y North” to 1-speed the RY7 energizes; at 2-speed, the RY7 & RY8 energize; at 3-speed, the RY7, RY8, and RY9 energize, as the same theory as for the rest.

**Remark:** By modifying through software, each of the axis of Joystick #1 and Joystick #2 can reach maximum 16 relay outputs.

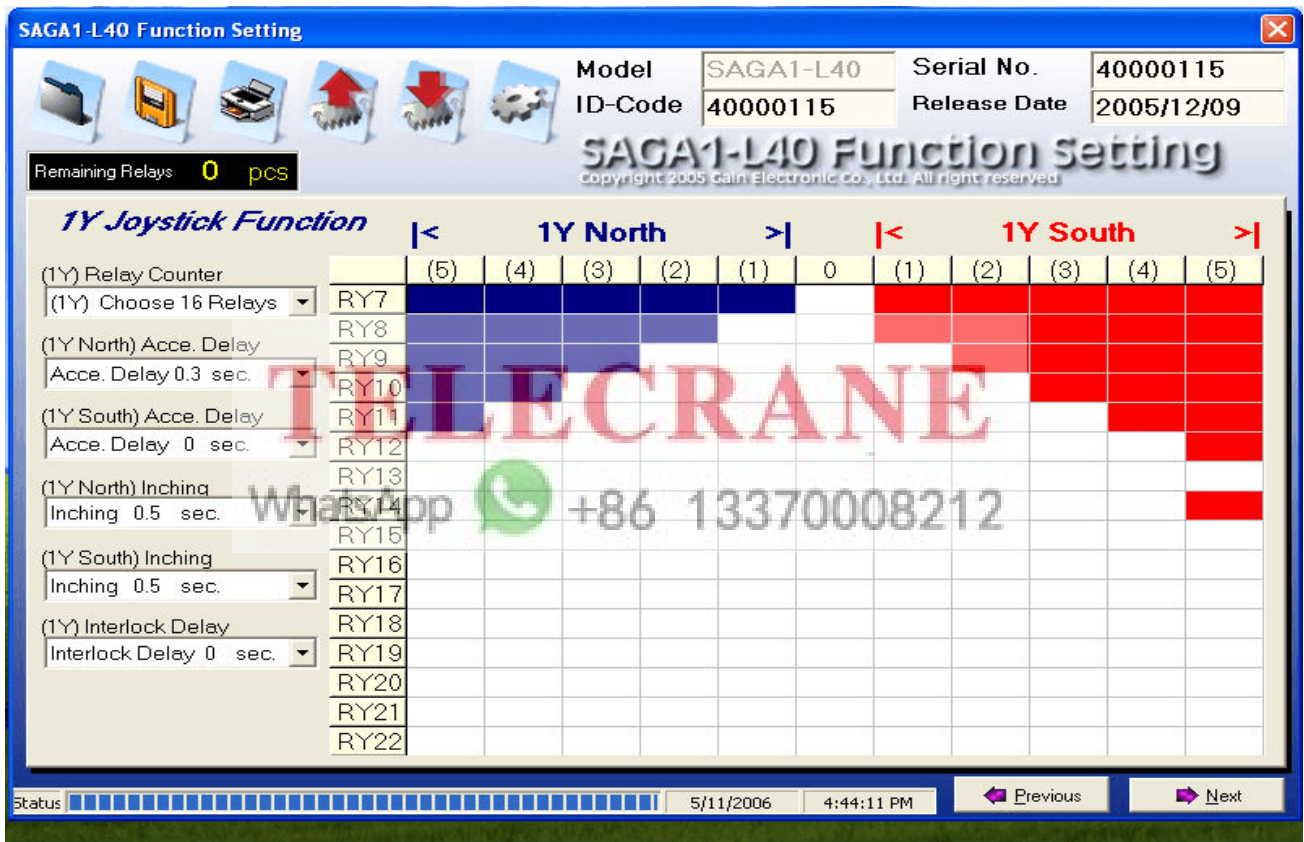


Fig. 6-1-2

**6-2. The fixed relationship between Relays and the wire number showing on cable assemblies**

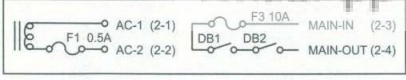
The number showing on cable assemblies corresponds with the number of the relay contacts. For example, cable assembly 1-1 (Cable #1; Wire #1) connected with Relay1; cable assembly 1-12 (Cable #1; Wire# 12) connected with Relay12; cable assembly 2-5 connected with Relay25 (Cable #2; Wire #5); cable assembly 2-20 (Cable #2; Wire #20) connected with Relay 40. (Please refer the “SAGA1- L40 wiring Diagram” as below)

### SAGA1 – L40 Wiring Diagram

Remark	Wire NO.	Command	Relay contact	Common	Relay contact	Command	Wire NO.	Remark
	2-21		COM1		COM3		2-23	
	2-22		COM2		COM4		2-24	
	1-1		Ry1		Ry21		1-21	
	1-2		Ry2		Ry22		1-22	
	1-3		Ry3		Ry23		1-23	
	1-4		Ry4		Ry24		1-24	
	1-5		Ry5		Ry25		2-5	
	1-6		Ry6		Ry26		2-6	
	1-7		Ry7		Ry27		2-7	
	1-8		Ry8		Ry28		2-8	
	1-9		Ry9		Ry29		2-9	
	1-10		Ry10		Ry30		2-10	
	1-11		Ry11		Ry31		2-11	
	1-12		Ry12		Ry32		2-12	
	1-13		Ry13		Ry33		2-13	
	1-14		Ry14		Ry34		2-14	
	1-15		Ry15		Ry35		2-15	
	1-16		Ry16		Ry36		2-16	
	1-17		Ry17		Ry37		2-17	
	1-18		Ry18		Ry38		2-18	
	1-19		Ry19		Ry39		2-19	
	1-20		Ry20		Ry40		2-20	

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Customer : Serial No : Channel : Date of Installation :

### 6-3. The Mapping relationship between Commands and Relays

The mapping relationship is one of most important aspects of relay configuration process on SAGA1- L40.

The mapping relationship existing between two objects, Relays & Commands, allows users to configure the number of relay(s) of pushbuttons, selected switches, and joysticks more effectively via manipulating its function program.

Following concepts & procedures please comprehend completely before doing the relay configuration.

- 1). The total number of relays of SAGA1- L40 and the fixed relay figure(s) on Pushbuttons & Selected Switches:

SAGA1-L40 provides totally 40 relays (RY01 to RY40). Among these 40 relays, an individual pushbutton can only be entitled one relay; Selected switches (SWA, SWB) own 2 relays respectively; Joysticks can reach maximum 16 relays on each axis.

- 2). The number of being used relay(s) of Pushbuttons and selected switches should always be determined initially.  
As the number of being used relay on pushbuttons & selected switches has been finalized, then the remaining relay(s) will be available assigned to axes of joystick #1 & Joystick #2 (1Y, 1X, 2 Y, 2X) in accordance with following priority sequence as item 3. Shown.
- 3). Listed in order of precedence in Pushbuttons, selected switches, and Joysticks:

**First Priority**

Pushbuttons: R0/Start (Highest) — R1 (Lowest)

**Second Priority**

Selected Switches: SW1A; S W1B (Highest) — SW2A; SW2B (Lowest)

**Third Priority**

Joystick #1: Y- Axis (Highest) — X- Axis (Lowest)

**Last Priority**

Joystick #2: Y- Axis (Highest) — X- Axis (Lowest)

**Remark:** Remaining relay(s) is always entitled to a higher- priority. For example: assuming only two more relays remained, Joystick #1 got a higher privilege than Joystick # 2; Y-Axis got a higher privilege than X-Axis.

- 4). Finally, a schematic “preview connection diagram” (As page-19 Fig. 2-8-1shown.) will automatically be created as a wiring reference after relay configuration and function settings have been completed.

**6-4. Illustration A**

- 1). Hypothetical Conditions:  
Pushbuttons (R1, R0/Start) & Selected Switches (SW1, SW2) are being selected, and each axis of Joystick #1 and Joystick #2 will reach 12 relays respectively.
- 2). The result of rely configuration:  
The relay configuration would be as following:  
R0/Start reaches Relay1; R1 reaches Relay2 etc... and Joystick #1 Y-Axis would reach Relay7 to Relay18; Joystick #1 X-Axis would reach Relay19 to Relay30 ; Joystick #2 Y-Axis would only reach 10 relays, Relay31 to Relay40 ; X-Axis of Joystick #2 would reach none relay due to the limit number of relays( 40 ) and its priority sequence ( X-Axis of Joystick #2 owns lower

Priority than Y-Axis of Joystik#2 ) Please refer Fig. 6-4-1, Fig.6-4-2, Fig.6-4-3, Fig.6-4-4, Fig.6-4-5.

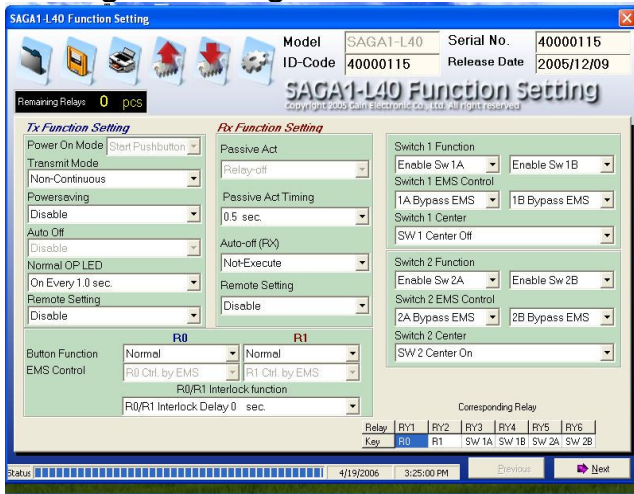


Fig. 6-4-1

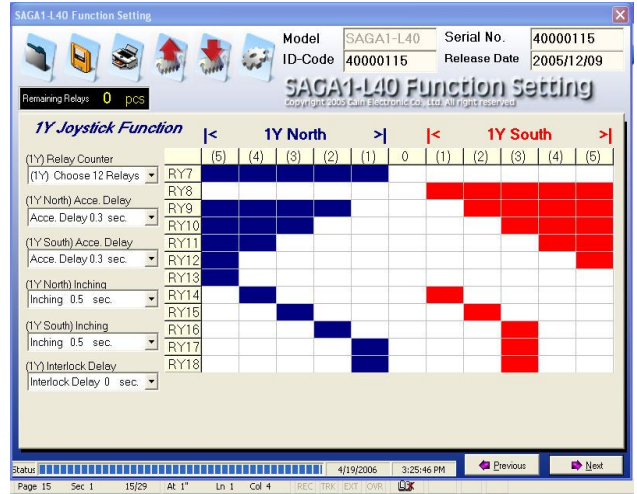


Fig. 6-4-2

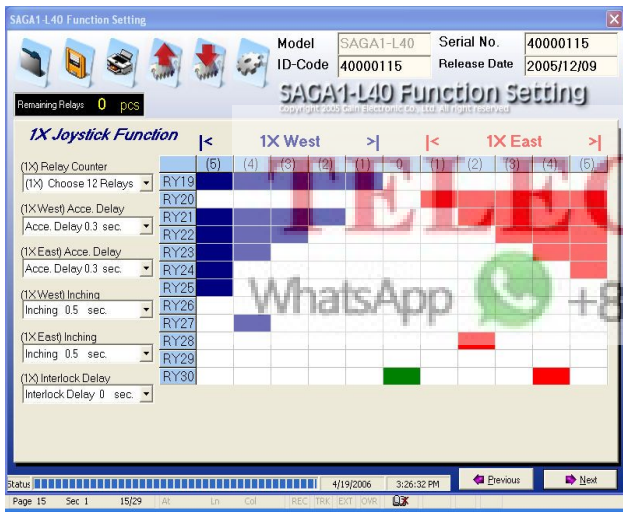


Fig.6-4-3

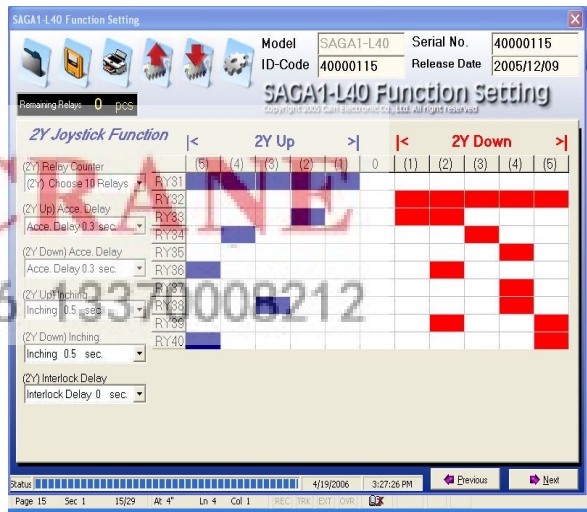


Fig.6-4-4

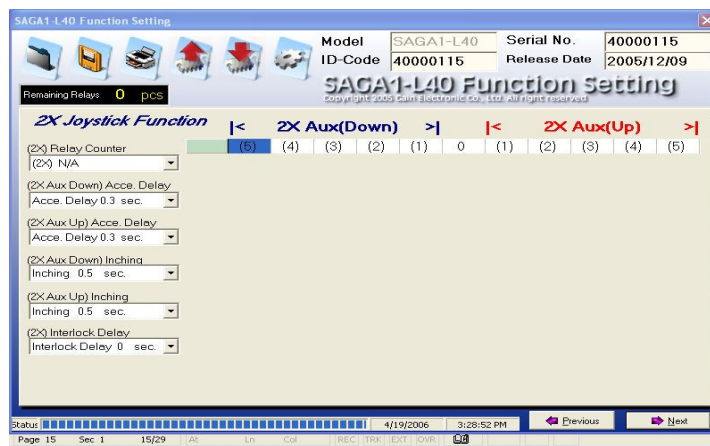


Fig.6-4-5



### 6-5. Illustration B

1). Hypothetical Conditions:

More specifically, the same scenario with **Illustration A** except selected switches wouldn't be used (4 additional relays instantly remained).

2). The result of Relay Configuration:

Joystick #2 Y-Axis would entitle two additional relays, Relay27 to Relay38, in order to satisfy the 12-relay requirement, then rest of two remaining relays would be entitled by Joystick #2 X-Axis, Relay 39 and Relay 40.

(Please refer Fig. 6-4-6, Fig.6-4-7, and Fig.6-4-8)

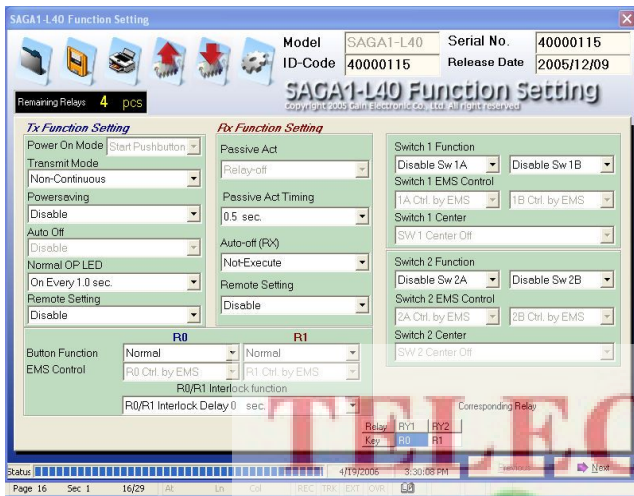


Fig. 6-4-6

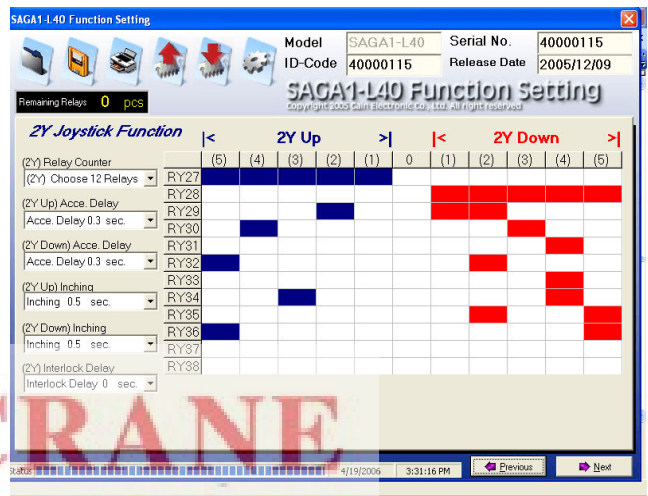


Fig.6-4-7

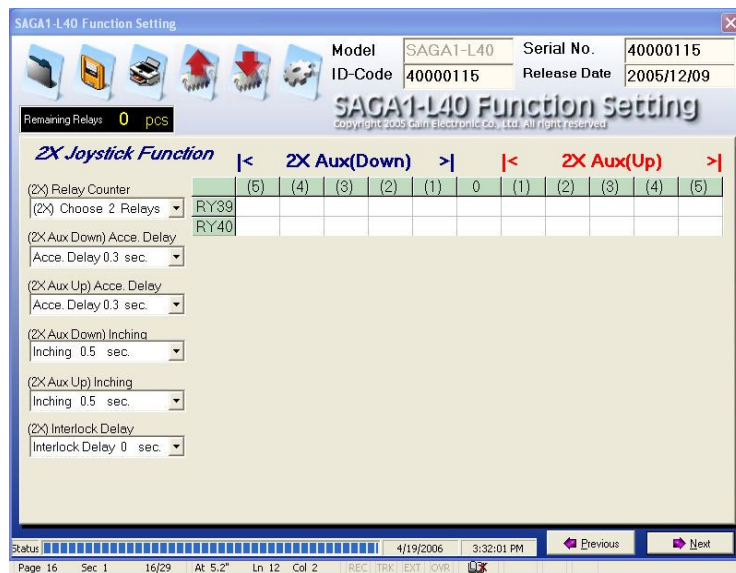


Fig.6-4-8

## APPENDIX

### A-1. Function & Relay configuration by software

#### 1). "1Y/1X/2Y/2X" Function Setting:

Item	Title	Content	Description
<u>1</u>	(1Y)/(1X)/(2Y)/(2X) Relay Counter	1. (1Y)/(1X)/(2Y)/(2X) N/A 2. (1Y)/(1X)/(2Y)/(2X) Choose 1 Relay to 16 Relays	<b>(1Y)/(1X)/(2Y)/(2X) N/A:</b> Each axis of "Joystick #1" and "Joystick #2" can reach 0. Relay configuration can be arbitrarily set by software at any speed. <b>(1Y)/(1X)/(2Y)/(2X) Choose 1 Relay to 16 relays:</b> Each axis of "Joystick #1" and "Joystick #2" can reach 1 to 16 Relay(s) configuration can be arbitrarily set by software at any speed.
<u>2</u>	(1Ynorth)/(1XWest)/(2YUp)/(2XAuxDown) Acce. Delay	Acce.Delay 0 Sec.to 4 sec._	Select the time interval for each acceleration.
<u>3</u>	(1YSouth)/(1XEast)/(2YDown)/(2XAuxUp) Acce.Delay	Acce.Delay 0 Sec.to 4 sec._	Select the time interval for each acceleration._
<u>4</u>	(1YNorth)/(1Xeast)/(2YUp)/(2XupxDown) Inching	Inching 0.05 Sec.to 0.8 Sec.	Select the time interval of each inching motion.
<u>5</u>	(1YSouth)/(1Xeast)/(2YDown)/(2xAuxUp) Inching	Inching 0.05 Sec.to 0.8 Sec.	Select the time interval of each inching motion.
<u>6</u>	(1Y)/1X)/(2Y)/(2X) Interlock Delay	Interlock Delay 0 Sec. to 4.0 Sec.	<b>Interlock:</b> If it is dangerous or improper to operate two motions at the same time, select "Interlock". Delay time means the time interval before next motion is valid.

#### 2). "SW1, SW2" Rotary switch Function Setting:

Item	Title	Content	Description
<u>1</u>	Switch1 Function	1. Enable SW1A/SW1B 2. Disable SW1A/SW1B	<b>Disable:</b> Disable SW1A/SW1B function. <b>Enable:</b> Enable SW1A/SW1B function.
<u>2</u>	Switch2 Function	1.Enable SW2A/SW2B 2.Disable SW2A/SW2B	<b>Disable:</b> Disable SW2A/SW2B function. <b>Enable:</b> Enable SW2A/SW2B function.

3	Switch1 EMS Control	1.1A/1B Control by EMS 2. 1A/1B Bypass EMS	<p><b>Control by EMS:</b> means that the relay relating to SW1A, SW1B selected switch is controlled by Emergency Stop button or emergency stop signal.</p> <p><b>Bypass EMS:</b> means that the relay relating to SW1A, SW1B selected switch will not be controlled by Emergency Stop Button or emergency stop signal.</p>
4	Switch2 EMS Control	1.2A/2B Control by EMS 2. 2A/2B Bypass EMS	<p><b>Control by EMS:</b> means that the relay relating to SW2A, SW2B selected switch is controlled by Emergency Stop button or emergency stop signal.</p> <p><b>Bypass EMS:</b> means that the relay relating to SW2A, SW2B selected switch will not be controlled by Emergency Stop Button or emergency stop signal.</p>
5.	"SW1 Center"	1. Center Off 2. Center On	<p><b>Center Off:</b> "SW1" selected switch has 3 position of A, A+B, B for selecting and different functions. If "Center Off", when select "SW1" selected switch to A or B position, then the related relay "on"; when rotate "SW1" selected switch to A+B position, then the related relay "off".</p> <p><b>Center On:</b> "SW1" selected switch has 3 position of A, A+B, B for selecting and different functions. If "Center On", when select "SW1" selected switch to A or B position, then the related relay "on"; when rotate "SW1" rotary switch to A+B position, then the related relay still "on".</p>
6.	"SW2 Center"	1. Center Off 2. Center On	<p><b>Center Off:</b> "SW2" selected switch has 3 position of A, A+B, B for selecting and different functions. If "Center Off", when select "SW2" selected switch to A or B position, then the related relay "on"; when rotate "SW2" selected switch to A+B position, then the related relay "off".</p> <p><b>Center On:</b> "SW2" selected switch has 3 position of A, A+B, B for selecting and different functions. If "Center On", when select "SW2" selected switch to A or B position, then the related relay "on"; when rotate "SW2" rotary switch to A+B position, then the related relay still "on".</p>

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### 3). "R0/R1" Pushbutton Function Setting:

Item	Title	Content		Description
1	Button Function	R0/ START	R1	<p><b>Normal:</b> The relative relay is "on" when the pushbutton is pressed and held, on the other hand the relative relay is "off" when the pushbutton is released.</p> <p><b>Toggle:</b> To press the pushbutton and release once for "on", re-press and release for "off" cyclically is called "Toggle".</p> <p><b>Inching:</b> "Inching" means once the pushbutton is pressed, relative relay will be activated within some 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.</p> <p><b>Disable:</b> Disable R1 function.</p>
2	EMS Control	1. Ctrl. by EMS 2. Bypass EMS		<p><b>Control by EMS:</b> means the corresponding relay of function pushbutton is controlled by EMS mushroom or emergency stop signal.</p> <p><b>Bypass EMS:</b> means the corresponding relay of function pushbutton will not be controlled by EMS mushroom or emergency stop signal.</p>
3	Inching Time	0.05~0.8 sec.		Select the time interval of each inching motion.
4	R0/R1 Interlock function	1. R0/R1 Interlock Delay 0~4.0 sec 2. "Non-Interlock"		<p><b>Interlock:</b> If it is dangerous or improper to operate two motions at the same time, select "Interlock". Delay time means the time interval before next motion is valid.</p> <p><b>"Non-Interlock":</b> If the motions are allowed to operate simultaneously then select "Non-Inter lock".</p>

#### 4). TX Function Setting

Item	Title	Content	Description
<u>1</u>	Transmit Mode	1. Non-continuous 2. Continuous Never off 3. 30 sec. to 10 min. off	<b>Non-continuous:</b> After “Power-On”, the Transmitter will work when operate Joystick or the pushbutton is pressed. Using this mode can save the power of Transmitter. <b>Continuous Never off:</b> Transmitter will continuously transmit signal after “Power-On” <b>Continuous due time off:</b> Transmitter will transmit signal continuously after “Power-On”, and stop sending if no pushbutton pressed within selected time.
2	Powersaving	1. Enable 2. Disable	<b>Enable:</b> 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. <b>Disable:</b> Disable this function.
3	Auto Off	4. Enable 5. Disable	<b>Enable:</b> When Transmit Mode is for continuous, it will send an EMS signal to “Power-off” the Receiver if it is set auto off in a certain time. <b>Disable:</b> Disable the function to send EMS signal to Receiver before the Transmitter is off.
4	Normal OP LED	1. On 2. On Every 0.3V~4 sec. 3. Off	<b>On:</b> LED indicator will lighten with green color when Transmitter is transmitting. It still works for warning and fault indication with first priority. <b>On Every 0.3~4 sec.:</b> LED indicator is flashing with green color every 1~4 sec. <b>Off:</b> LED indicator will not work during normal operation in order to save power. But it is still available for warning and fault indication.
<u>5</u>	Normal OP LED	1. LED-off 2. LED-on	<b>LED-off:</b> LED indicator will not work during normal operation in order to save power. But it still available for warning and fault indication. <b>LED-on:</b> LED indicator will lighten with green color when transmitter is transmitting. It's still available for warning and fault indication with first priority.

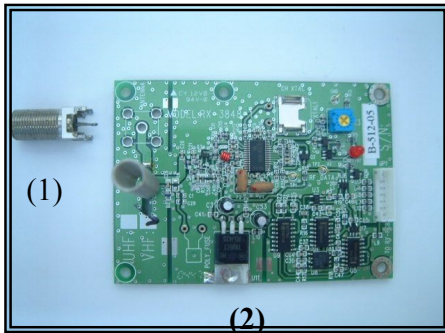
5). Rx Function Setting:

Item	Title	Content	Description
1	Passive Act	1. Relay-off 2. Power-off	<p><b>Passive Act:</b> The function of this item is used to set the reaction of Receiver when no command signal received from Transmitter in certain time (the default time is 0.5 second).</p> <p><b>Relay Off:</b> means the Main Relay is still “on” but the other relays with the function of “Normal” are all de-energized. It is not necessary to recommence the procedure of “Power-On” again to continue operating.</p> <p><b>Power-Off:</b> means the Main Relay and all of the other relays with the function of “Normal” and “Control by EMS” are going to de-energize and it is essential to recommence the procedures of “Power-On” again to continue operating.</p>
2	Passive Act Timing	0.5 ~4.0 sec	The duration working time of Receiver between passive act is activated and the power or relay is really off.
3	Auto-off (RX)	1. None-execute 2. 10 mins ~ 4 hrs Power-off	<p><b>None-execute:</b> The main relay of Receiver will remain energized unless was Power-off manually</p> <p><b>10 mins ~ 4 hrs Power-off:</b> If Receiver doesn't receive the correct control data within a certain time, then the main relay on Receiver will be de-energized automatically (i.e. Receiver Power-off). Normally this function is used with “non-continuous transmitting mode” in case operator forgot to turn off the transmitter.</p>

## A-2. Passive Antenna

### Application:

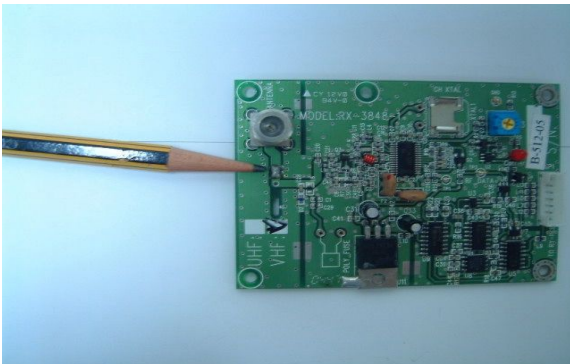
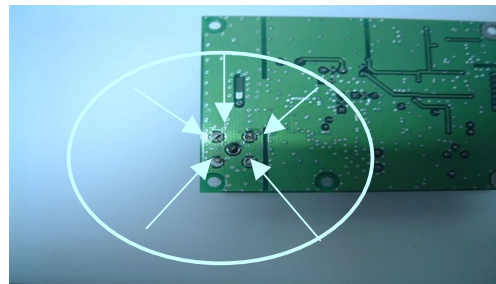
To improve radio reception quality under certain severe environmental such as tower crane, long-range conveyor, tunnel, and elevator etc, installing external passive or dipole antenna may be required.



(1) Connector

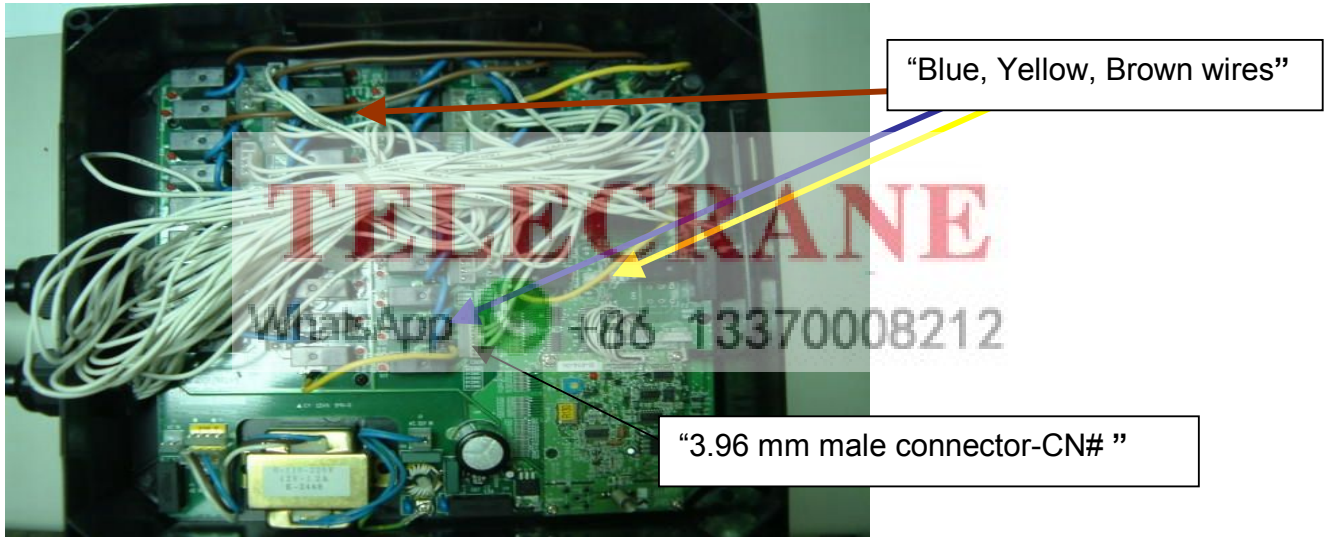
(2) Receiver RF module

1. Remove original antenna from RF module.
2. Install Connector into the RF module and place the RF module up side down, then soldering connector (4 pins) into RF module.
3. Short circuit two connecting points as bottom picture shown



### A-3. Output of COM & Relay

- 1). The CN1~CN19 (3.96 mm male connector) on the relay module is output connection for relay. The label indication on the relay module must be followed for wiring  
The standard relay is based on NO (normally open) type relay (SDT-S-112LMR). But it can be interchanged for NC/NO type relay (PCH-112D2H) as user's option.
- 2) The CN22~CN24 (3.96 mm male connector) on the relay module is output connection for COM. Both contacts of each 3.96 mm connector are shorted circuit. Simply insert the wire into either contact of each connector will do.
- 3). P1~P44 Terminal (refer to the relay module)  
The terminals between P1~P40 are for COM purposes. Use the attached 3 different length of wires jumper to configure the COM



### A-4. Wiring Diagram

When application requirement confirm, use attached wiring diagram to configure the diagram. Point out the contact of each relay and COM by using “ • ”with marker pen. Finally link up and remark the wire number and its function