

EXHIBIT 5

Installation and Operating Instructions

Para. 2.1033(b)(3)



Retlif Testing Laboratories

Test Report No. R-8027
FCC ID: OFS506SERIES

Alpha 500 Series

Operation Manual

Fomotech International Corp.

TABLE OF CONTENTS

	Page
1. INTRODUCTION	2
2. SAFETY INSTRUCTION	3
3. PUSHBUTTON CONFIGURATION	
3.1 Alpha 500/520	4
3.2 Alpha 540/560	5
3.3 Alpha 540/560T "Select" Settings	6
4. TRANSMITTER OUTLINE	
4.1 Alpha 500/540	7
4.2 Alpha 540/560	8
5. RECEIVER OUTLINE	
5.1 Alpha 400/520/540/560	9
5.2 Alpha 500/520 Internal Assembly	10
5.3 Alpha 540/560 Internal Assembly	11
6. OUTPUT CONTACT DIAGRAM	
6.1 Alpha 500/520 Wiring Diagram	12
6.2 Alpha 540 Wiring Diagrams	13
6.3 Alpha 560 Wiring Diagrams	14
7. SYSTEM SETTING CONFIGURATION	15
8. RECEIVER INSTALLATION	
8.1 Preparation For Installation	16
8.2 Step By Step Installation	16
8.3 System Testing	17
9. TRANSMITTER OPERATION	18-19
10. TROUBLE SHOOTING	20
11. SYSTEM SPECIFICATION	21-22
12. PARTS LIST	23

1. INTRODUCTION

The Alpha 500 Series are highly reliable industrial remote control systems. The versatile features of the Alpha 500 Series permit its use in many different remote control applications. They can be used to control cranes, hoists, trolleys, mining equipment, building construction equipment, automatic control systems, and many others.

The Alpha 500 Series Radio Control System incorporates redundant safety circuits that guaranty maximum security and ensure the system is resistant to outside interference. The major features of the Alpha 500 Series are as follow:

- * The system uses an advanced microprocessor at both the transmitter and the receiver unit which utilizes highly evolved software that have redundant error checking and correcting capabilities to ensure 100 % error-free transmission, decoding, and control of the output relays. These highly evolved software include CRC (Cyclic Redundancy Check codes) and Hamming Codes.
- * To insure maximum operating safety, the Alpha 500 Series incorporate many safety features. Some of these safety features include receiver self-diagnosing, transmitter pushbutton self-diagnosing, transmitter low voltage detection and warning, and receiver MAIN auto shut down during transmitter low voltage, system out of range, and radio interference.
- * The encoder/decoder system utilizes advanced microprocessor. The availability of 32,768 sets of unique ID code will ensure that only commands from the matching control transmitter can be carried out without any interference from other radio systems. A special programmable integrated circuit is used to insure the unit cannot simultaneously command conflicting movements.
- * Full SMT design for stability.

The Alpha 500 Series Radio Control System consists of a transmitter handheld, a receiver unit, and a six-foot output cable. The transmitter casing is molded using an industrial strength plastic material which is impervious to dust, water, oil, acids, alkaline, heat and sunlight as well as being resistant to deformation due to long term use in harsh environments. The pushbuttons are also constructed from industrial strength materials with a minimum of up to one million cycles. For power saving, the transmitter unit uses a special high efficiency power saving circuit that requires only two AA size batteries.

2. SAFETY INSTRUCTION

The Alpha 500 system is relatively simple to use. However, it is very important to observe the proper safety procedures during operation. When use properly the Alpha 500 will enhance productivity and efficiency in the workplace.

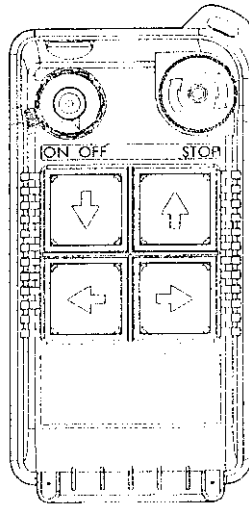
The following instructions should be strictly followed:

1. Make a daily check of the transmitter casing and pushbuttons. Should it appear that anything could inhibit the proper operation of the transmitter unit, it should be immediately removed from service.
2. The transmitter voltage should be checked on a daily basis. If the voltage is low, the two AA alkaline batteries should be replaced.
3. The emergency stop pushbutton (EMS) should be checked at the beginning of each shift to ensure they are in the proper working order.
4. In the event of an emergency, activate the emergency stop pushbutton immediately. Then turned the power off from the main power source of the equipment.
5. The power switch should be turned off after use and should never left the power on when the unit is unattended.
6. Do not use the same RF channel and ID code as any other unit in use at the same facility.
7. Ensure the wrist strap is worn at all time during operation to avoid accidental dropping.

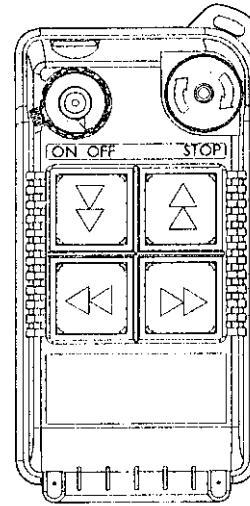
3. PUSHBUTTON CONFIGURATION

3.1 Alpha 500/520

1. Alpha 500 : Up to 2 motions, single speed, EMS.
2. Alpha 520 : Up to 2 motions, dual speed, EMS.

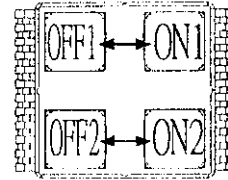
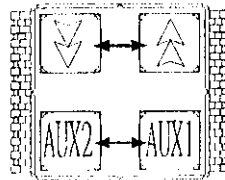
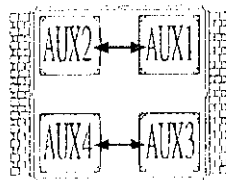
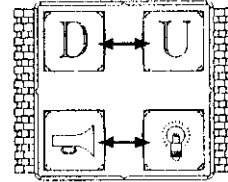
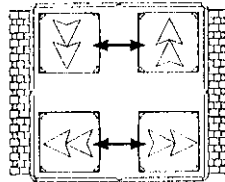
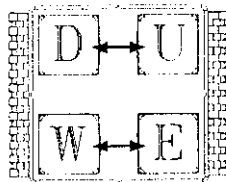


(Alpha 500)



(Alpha 520)

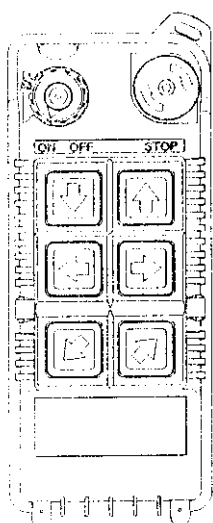
Standard pushbutton configurations are U&D/E&W and arrow symbols interlocked to one another. The pushbuttons can also be set to non-interlocked via external programmer. Below are many types of pushbutton configuration that are also available upon request.



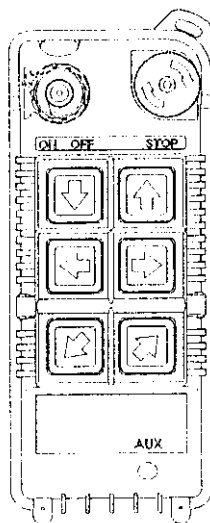
↔ Interlocked to each other

3.2 Alpha 540/560 With Different Options

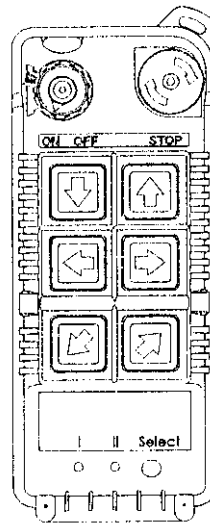
1. Alpha 540 : Up to 3 motions, single speed, EMS.
2. Alpha 540A : Up to 3 motions, single speed, AUX, EMS.
3. Alpha 540T : 4~5 motions, single speed, selector pushbutton for auxiliary hoist and/or trolley, EMS.
4. Alpha 560 : Up to 3 motions, dual speeds, EMS.
5. Alpha 560A : Up to 3 motions, dual speeds, AUX, EMS.
6. Alpha 560T : 4~5 motions, dual speeds, selector pushbutton for auxiliary hoist and/or trolley, EMS.



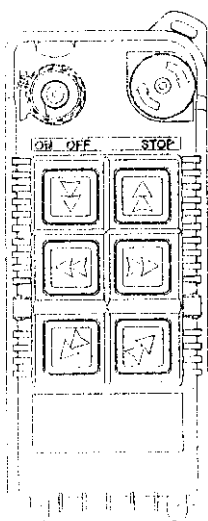
(Alpha 540)



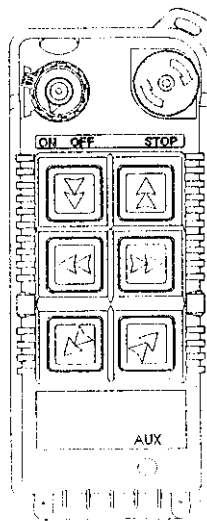
(Alpha 540A)



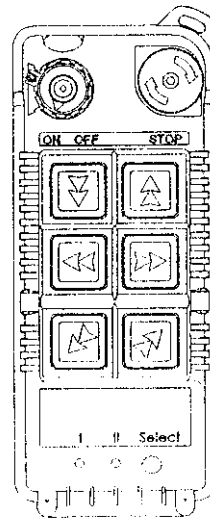
(Alpha 540T)



(Alpha 560)



(Alpha 560A)



(Alpha 560T)

3.3 Alpha 540/560T Select Settings

For Crane systems with main and auxiliary hoist, press "Select" pushbutton in sequence to choose between the two hoists.

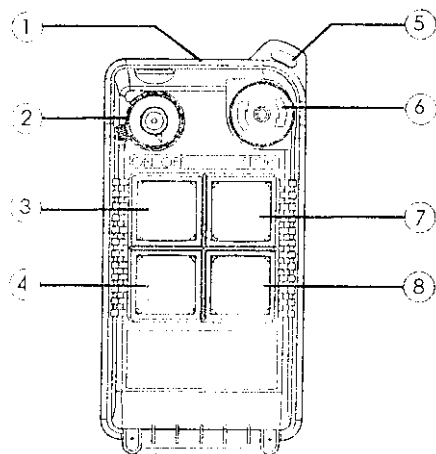
- 1) Power "ON" → LED I "ON" → Only main hoist is accessible (I).
- 2) Press Select → LED II "ON" → Only auxiliary hoist is accessible (II).
- 3) Press Select → LED I & II "ON" → Both main and auxiliary hoist are accessible with duplicate movements (I + II).
- 4) Press Select again → Select mode returned to LED I with only the main hoist accessible.

For cranes systems with main and auxiliary trolley and hoist, press "Select" pushbutton in sequence to choose between two trolleys and hoists.

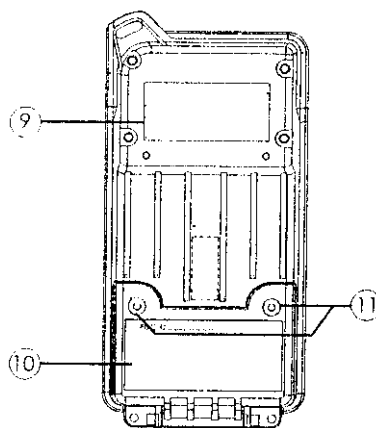
- 1) Power "ON" → LED I "ON" → Only main trolley and hoist are accessible (I).
- 2) Press Select → LED II "ON" → Only auxiliary trolley and hoist are accessible (II).
- 3) Press Select → LED I & II "ON" → Both main and auxiliary trolley and hoist accessible with duplicate movements (I + II).
- 4) Press Select again → Select mode returned to LED I with only the main trolley and hoist accessible.

4. TRANSMITTER OUTLINE

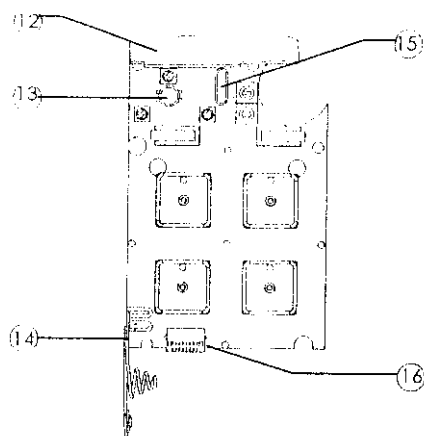
4.1 Alpha 500/520



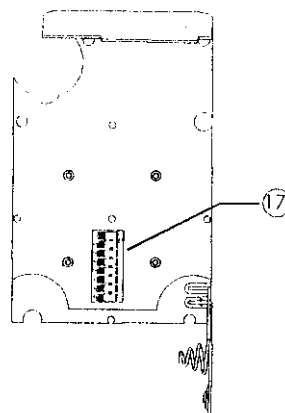
(Fig. 1) Front View



(Fig. 2) Back View



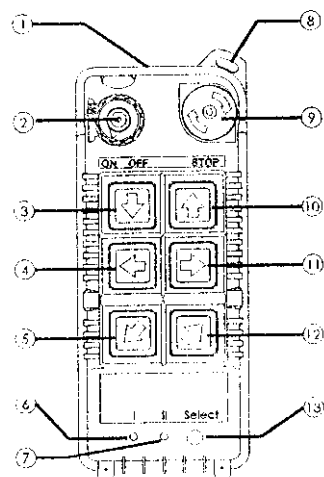
(Fig. 3) Front View



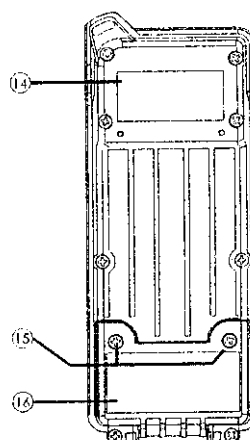
(Fig. 4) back view

- | | | |
|--------------------------|-----------------------|------------------------|
| 1) Transmitter enclosure | 8) Pushbutton # 3 | 15) TX quartz crystal |
| 2) Power switch (ON/OFF) | 9) System information | 16) Programming port |
| 3) Pushbutton #2 | 10) Battery cover | 17) ID code dip-switch |
| 4) Pushbutton #4 | 11) Battery screws | |
| 5) Strap ring | 12) Antenna | |
| 6) Emergency stop (EMS) | 13) Status LED | |
| 7) Pushbutton #1 | 14) Battery contact | |

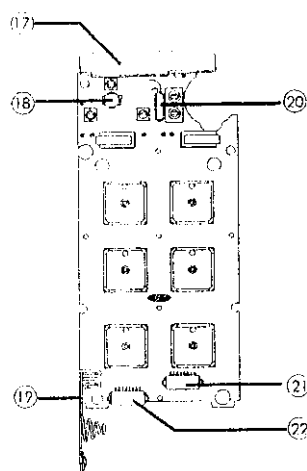
4.2 Alpha 540/560



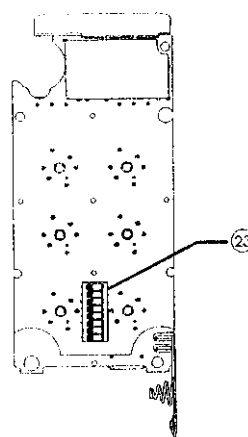
(Fig. 5) Front View



(Fig. 6) Back View



(Fig. 7) Front View



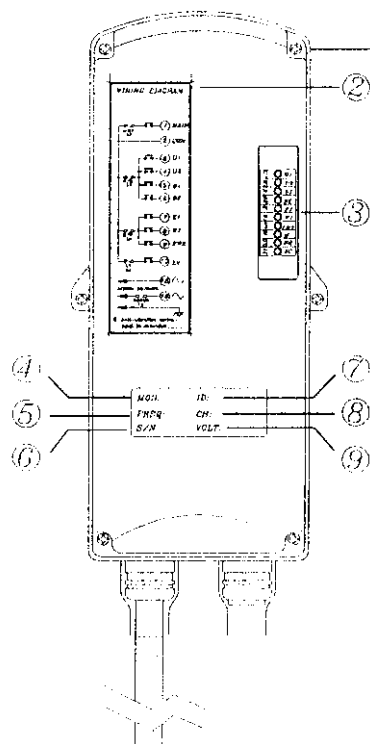
(Fig. 8) Back view

- | | | |
|------------------------------------|-------------------------|--------------------------------|
| 1) Transmitter enclosure | 9) Emergency stop (EMS) | 17) Antenna |
| 2) Power switch (ON/OFF)* | 10) Pushbutton #1 | 18) Status LED |
| 3) Pushbutton #2 | 11) Pushbutton #3 | 19) Battery contact |
| 4) Pushbutton #4 | 12) Pushbutton #5 | 20) TX quartz crystals |
| 5) Pushbutton #6 | 13) Select pushbutton* | 21) Select/AUX connector port* |
| 6) Main hoist and/or trolley* | 14) System information | 22) Programming port |
| 7) Auxiliary hoist and/or trolley* | 15) Battery screw | 23) ID code dip-switch |
| 8) Strap ring | 16) Battery cover | |

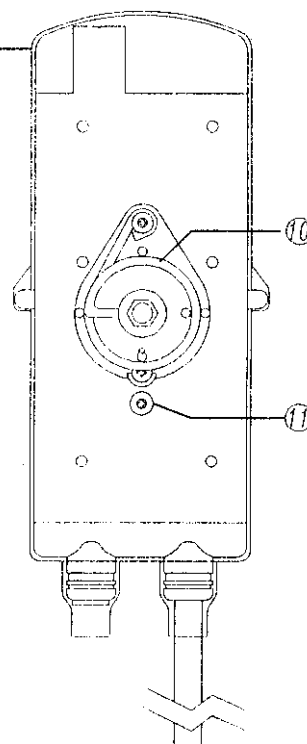
* For T models only.

5. RECEIVER OUTLINE

5.1 Alpha 500/520/540/560



(Fig. 9) Front View



(Fig. 10) Back View

- | | |
|-------------------------------|----------------------------|
| 1) Receiver enclosure | 6) Serial number (S/N) |
| 2) Wiring diagram | 7) Security code (ID) |
| 3) Contact relay LED display* | 8) Frequency channel (CH) |
| 4) Model (MOD) | 9) Supplied voltage (VOLT) |
| 5) Frequency (FREQ) | 10) Anti-shock spring |
| | 11) Grounding (GND) |

* A ~ AUX. Contact Relay

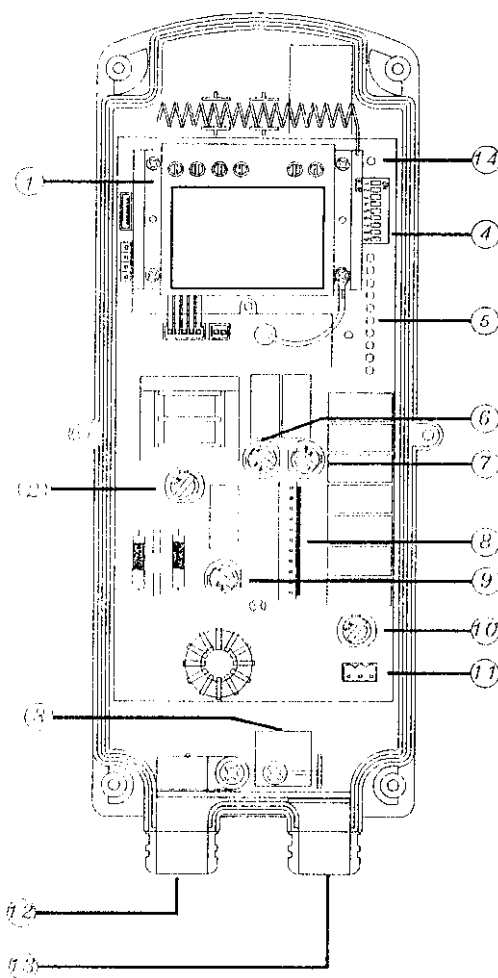
* M ~ MAIN Contact Relay and Alpha 540/560 2nd Speed Contact Relay.
 Green "ON" → Main contact relay activated.
 Red "ON" → 2nd speed contact relay activated.

* SQ ~ RF Signal Indicator.

Blink red light "ON" → Frequency signals received.
 "OFF" → No frequency signals received.

* AC ~ Power Source Indicator.

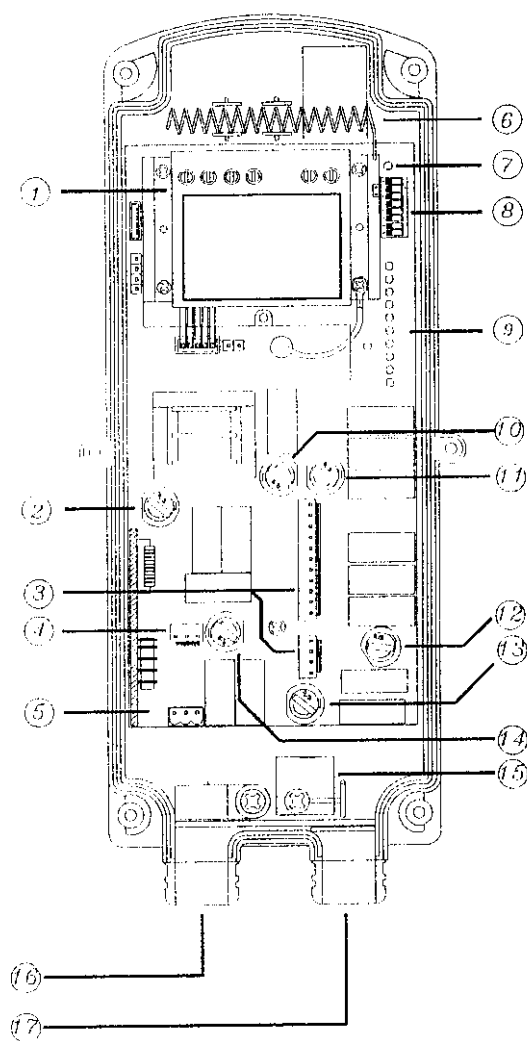
5.2 Alpha 500/520 Internal Assembly



(Fig. 11) Internal Parts Assembly

- | | |
|------------------------------|----------------------------------|
| 1) RX module | 8) Contact output seat (CN3) |
| 2) Power fuse (AC) | 9) Low voltage warning fuse (LV) |
| 3) Spare fuse & jumpers | 10) East / West fuse |
| 4) ID code dip-switch | 11) AC power input seat (CN2) |
| 5) Contact relay LED display | 12) Output mouth |
| 6) MAIN fuse | 13) Reserved output mouth |
| 7) Up / Down fuse | 14) System status LED display |

5.3 Alpha 540/560 Internal Assembly

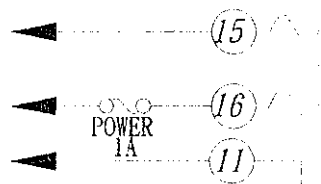
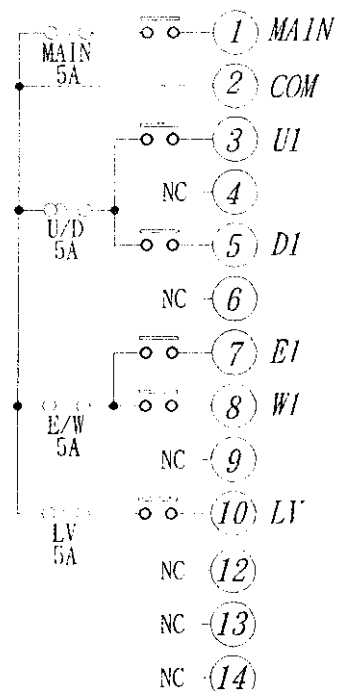


(Fig. 12) Internal Parts Assembly

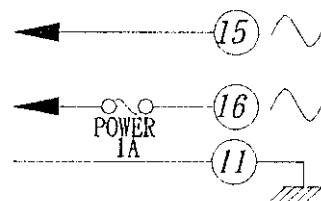
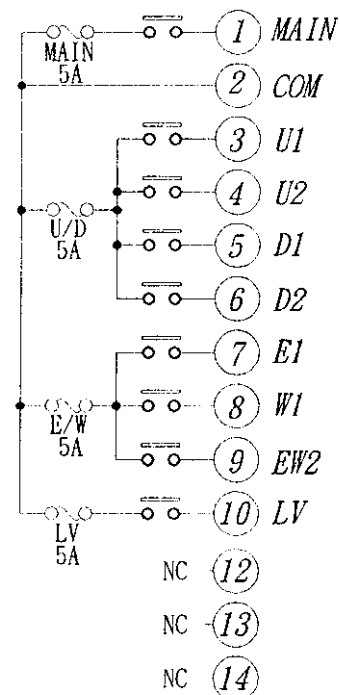
- | | |
|----------------------------------|---------------------------------|
| 1) RX module | 9) Contact relay LED display |
| 2) Power fuse (AC) | 10) MAIN contact fuse |
| 3) CN3, CN4 (Contact output) | 11) Up / Down fuse |
| 4) CN5 (Reserved contact output) | 12) East / West fuse |
| 5) CN2 (AC power connector) | 13) North / South fuse |
| 6) Antenna | 14) Low voltage fuse (LV) |
| 7) System status LED display | 15) Spare fuse & jumpers |
| 8) ID code dip-switch | 16) Output cable mouth |
| | 17) Reserved output cable mouth |

6. OUTPUT CONTACT DIAGRAM

6.1 Alpha 500/520 Wiring Diagram



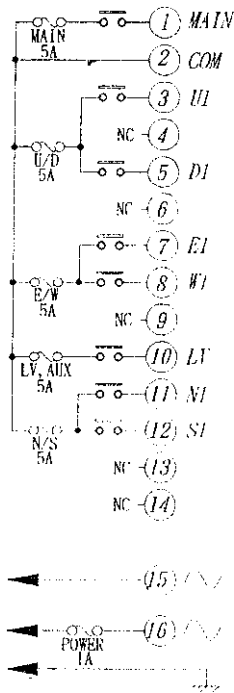
(Alpha 500)



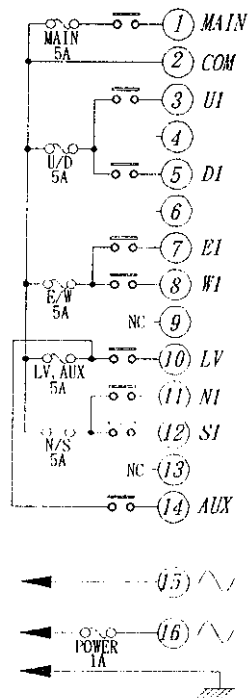
(Alpha 520)

* NC -> No connection

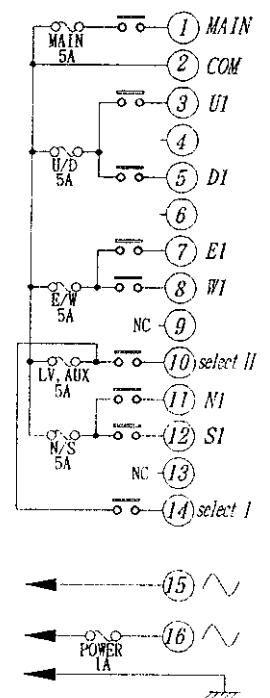
6.2 Alpha 540 Wiring Diagrams



(Alpha 540)

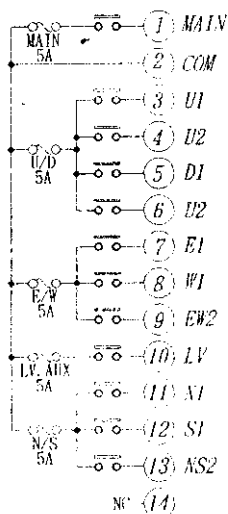


(Alpha 540A)

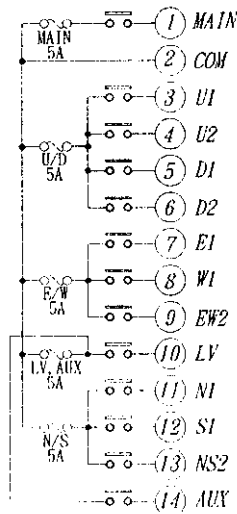


(Alpha 540T)

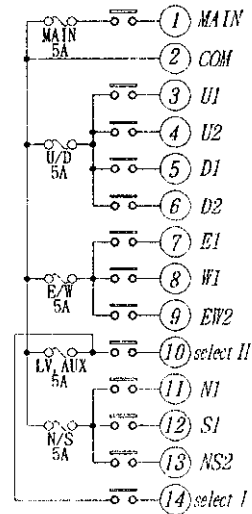
6.3 Alpha 560 Wiring Diagrams



(Alpha 560)

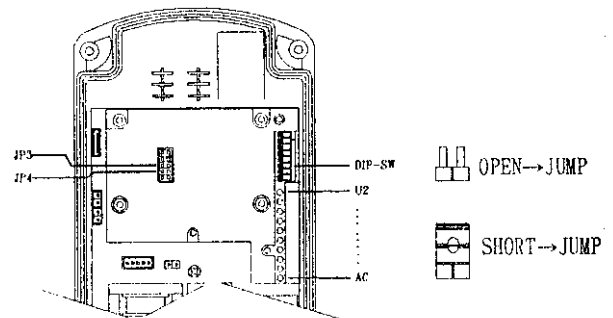


(Alpha 560A)



(Alpha 560T)

7. SYSTEM SETTING CONFIGURATION



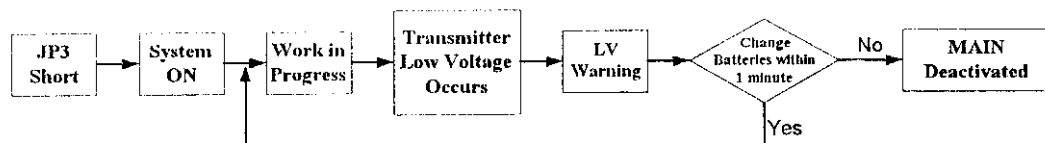
How To Set Jumper Functions

Manufacture settings. * *T models do not have LV relay for external connection and AUX.*

JP3	Open	Low voltage warning only; receiver MAIN will not be deactivated.
	Short	After one minute of low voltage warning, the transmitter power and the receiver MAIN will be deactivated. (see note A)
JP4	Open	AUX with normal key function.
	Short	AUX with toggle key function.

Note A: In case of transmitter low voltage, the transmitter unit will send a low voltage signal (LV) to the receiver. After one minute of LV warning, the transmitter unit and the receiver MAIN will be deactivated. Within that one minute of LV warning, the LV relay from the receiver unit will be activated. By connecting a horn, light, or siren to this LV relay will ensure that the operator will definitely notice the LV warning even in hard to see or hear environments. After changing a set of new batteries, the transmitter unit and the receiver MAIN will be reactivated automatically. Via external programmer, you can also set this LV relay to act as a start-up warning. The LV relay will also activate itself when the system is turned to "ON" to begin work. This type of LV relay activation is ideal in cautioning other persons in the work area that the system is now active. The duration of this start-up warning is 1-2 seconds long.

JP3



JP4



8. RECEIVER INSTALLATION

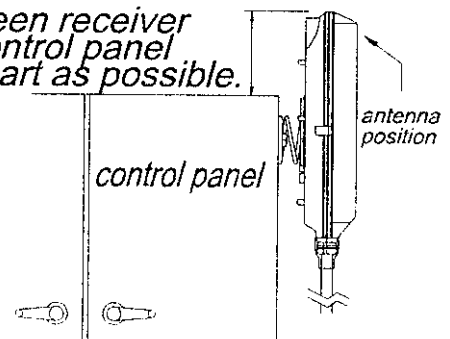
8.1 Preparation For Installation

1. Required Tools:
 - (1) Flat Head Screwdriver (-)
 - (2) Phillips Head Screwdriver (+)
 - (3) Multi-Meter
 - (4) 14mm Wrench x 2
 - (5) 10.5mm Drill-Bit
2. Ensure receiver is not set to the same channel and ID code as any other units in operation at the same facility.
3. Prior to installation, make sure that the crane system itself is working properly.
4. Use the multi-meter to check the voltage source available and ensure receiver voltage setting is correct for this voltage.
5. Prior to installation, switch off the main power source to the equipment.

8.2 Step By Step Installation

1. The location selected should have the antenna visible from all areas where the transmitter is to be used.
2. The location selected should not be exposed to high levels of electrical noise.
3. Ensure the selected location has adequate space to accommodate the receiver enclosure.
4. Make sure that the receiver unit is in upright position (vertical).
5. The distance between the antenna and the control panel should be as far apart as possible (see diagram next page).
6. Drill a hole on the control panel (10.5mm)
7. Tightened the two screws provided.
8. If the control panel has a plastic surface, extended grounding wire should be used.
9. For system wiring, please refer to the output contact diagram on page 8 or on the receiver enclosure.
10. Ensure all wiring is correct and safely secured and all screws are tight.

The distance between receiver antenna and the control panel should be as far apart as possible.



8.3 System Testing

1. Connect the power source to the receiver and test the operation of each function to ensure it operates in the same manner as the pendant controller.
2. Ensure the receiver MAIN can be properly controlled by the remote control.
3. Ensure the limit switches on the equipment that limit the travel of all movements are working properly.
4. Ensure the pendant controller is located in a safe location where it would not interfere with remote operation.

9. TRANSMITTER OPERATION

1. Make sure the (2) alkaline batteries are installed correctly. Do make sure to use alkaline type batteries.
2. Turn "ON" the power switch located on the top left hand corner of the transmitter unit. The status LED on the face of the transmitter unit will display a green blinking light at every 2-second interval for up to 40 seconds. After 40 seconds, if transmitter pushbuttons are not pressed, the green light will disappear thus temporarily deactivating the transmitter power and the receiver MAIN. The transmitter power and the receiver MAIN can only be re-activated again when the operator presses the transmitter pushbuttons at anytime. Do make sure that the red EMS pushbutton is in its elevated position.

This important safety feature is used to ensure that the transmitter unit and the receiver MAIN will be in "power off" position in situations when the operator forgets to turn off the transmitter power, or the transmitter unit is left unattended in the work area.

If the status LED displays a red blinking light (ON → 0.1 sec. and OFF → 2.0 sec.) or no light at all, then you must replace a set of new batteries before operation. If the red blinking light is ON → 2.0 sec. and OFF → 0.1 sec., then the transmitter unit has a defected or jammed pushbutton contact (return for repair).

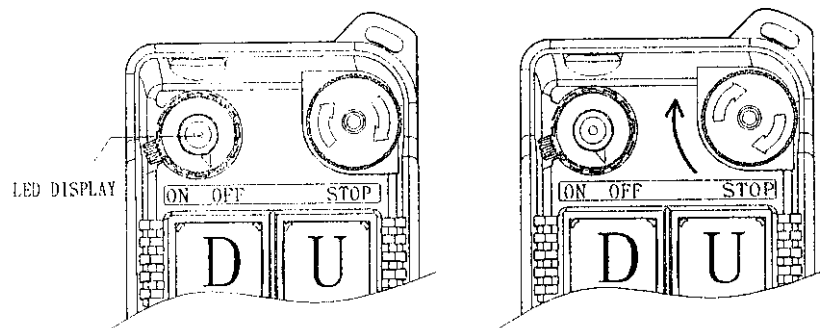
3. Alpha 540/560 T model → When the transmitter unit is turned on, the LED-I will light up to indicate only the main hoist and/or trolley is accessible. If you want to access the auxiliary hoist and/or trolley, press the "Select" pushbutton, the indicating light will now switched from LED-I to LED-II, which indicates only the auxiliary hoist and/or trolley is accessible. Press "Select" again to have both main and auxiliary hoist and/or trolley accessible at the same time (both LED-I and LED-II lit). To switch back to the main hoist and/or trolley, just press the "Select" once again. (Please refer to section 3.3)

Note: Every time when the transmitter unit is turned off and then on again or after EMS reset, the "Select" setting will resets itself to LED-I (main hoist and/or trolley)

4. Alpha 540/560 T model → "Select" setting can not be changed while other command pushbuttons are active. To insure maximum safety, "select" settings (I, II, I+II) can only be changed when all command pushbuttons are in their neutral position.

5. In case of an emergency, press down the red EMS pushbutton will immediately deactivates the transmitter power and the receiver MAIN. To reactivate the system again, turn the EMS pushbutton clockwise so that the red button will elevate to its non-active position.
6. Please note that conflicted movements are interlocked to one another for safety purpose. Pressing conflicted commands at the same time will result in a non-transmission. Via external programmer, pushbuttons can also be set at a non-interlocked state.

The data of the Alpha 500 Series are carried out by the power-saving PCDT method of transmission (*Pause Continuous Data Transmission*). The duration of each PCDT transmission is 40-second long. During this 40 seconds of PCDT transmission, the transmitter unit will only send out "zero position command" to the receiver unit if the operator gives no active commands. If no active commands are given after 40 seconds, the transmitter unit and the receiver MAIN will be deactivated (standby). The transmitter unit and the receiver MAIN can only be reactivated again when the receiver unit receives an active command from the transmitter unit. If other radio interference or system out of range occurred during operation, to insure operating safety, the receiver MAIN will also be temporarily deactivated.



10. TROUBLE SHOOTING

Should the operator find the equipment not operating normally, please check the chart below for simple trouble shooting steps.

SYMPTOM	REASON	SOLUTION
Transmitter does not communicate to receiver.	Transmitter and the receiver are not on the same RF channel (SQ lamp not lit) or ID code.	Ensure the correct transmitter is in use. The labels on the receiver and the transmitter will identify the RF channel and ID code in use.
Transmitter does not communicate to receiver.	Low or no transmitting power from the transmitter unit.	Turn "ON" the power of the transmitter unit and EMS in "up" position. If the status LED only shows red blinking light or no light at all, then turn the power "OFF" and replace the two alkaline AA batteries.
No power to the receiver (AC power indicator on the receiver unit not lit).	Blown fuse or no input power connection.	Ensure power input to the receiver unit is correct. If power indicator (AC) is still not lit, please check the receiver for any burned fuses.
Outputs do not operate correctly.	Receiver configuration is not set properly or output wiring is incorrect.	Please refer to section 6 and 7 to ensure receiver is correctly wired and configured for your application.

Receiver System Status LED Display (Fig. 11 or 12):

TYPE	LED INDICATION (Red)	REASON
1	Constant red light without flashes	EEPROM error, manufacture reprogramming required.
2	ON → 1 second OFF → 1 second	Incorrect ID code, please readjust accordingly.
3	No lights at all.	Under-voltage, check the main power supply.
4	ON → 2 seconds OFF → 0.1 second	System error, manufacture reprogramming required.

11. SYSTEM SPECIFICATION

Radio Transmitter



Frequency Range	:	301 - 480 MHz
-Transmitting Range	:	150 feet
	:	300 feet (optional external antenna)
Hamming Distance	:	4
Channel Spacing	:	25KHz
Frequency Control	:	Quartz Crystals
Frequency Drift	:	< 5ppm @ -20°C ~ +70°C
Frequency Deviation	:	< 1ppm @ 25°C
Spurious Emission	:	- 50dB
Transmitting Power	:	~1mW
Emission	:	F1D
Antenna Impedance	:	50 ohms
Enclosure	:	IP-66
Source Voltage	:	3.0VDC (AA Alkaline Batteries X 2)
Current Drain	:	10 ~ 20 mA
Operating Temp.	:	-20°C ~ +70°C
Dimension (Alpha 500/520)	:	134mm X 68mm X 30.5mm
Dimension (Alpha 540/560)	:	166mm X 67.5mm X 30mm
Weight (Alpha 500/520)	:	200g (include batteries)
Weight (Alpha 500/520)	:	250g (include batteries)
Impact Durability	:	50G

Receiver Unit

Frequency Range	:	301 ~ 480 MHz
Channel Spacing	:	25KHz
Hamming Distance	:	4
Frequency Control	:	Quartz Crystals
Frequency Drift	:	< 5ppm @ -20°C ~ +70°C
Frequency Deviation	:	< 1ppm @ 25°C
Sensitivity	:	0.4 μ V
Antenna Impedance	:	50 ohms
Data Decoder Reference	:	Quartz Crystals
Responding Time	:	40mS (Normal)
Enclosure	:	IP-65
Source Voltage	:	120 VAC, 50/60 Hz.
Power Consumption	:	11VA
Operating Temp.	:	-20°C ~ +70°C
Output Contact Rating	:	250V @ 10A
Dimension	:	310mm X 134mm X 72mm
Weight (Alpha 500/520)	:	1625g (including cable)
Weight (Alpha 540/560)	:	1700g (Including cable)

12. PARTS LIST

1.	TX Module/Encoder Board (Alpha 500)	BEN50
	TX Module/Encoder Board (Alpha 520)	BEN52
	TX Module/Encoder Board (Alpha 540)	BEN54
	TX Module/Encoder Board (Alpha 540A)	BEN54A
	TX Module/Encoder Board (Alpha 540T)	BEN54T
	TX Module/Encoder Board (Alpha 560)	BEN56
	TX Module/Encoder Board (Alpha 560A)	BEN56A
	TX Module/Encoder Board (Alpha 560T)	BEN56T
2.	RX Module (All models)	BRX10S
3.	Decoder/Relay Board (Alpha 500)	BDR50
	Decoder/Relay Board (Alpha 520)	BDR52
	Decoder/Relay Board (Alpha 540)	BDR54
	Decoder/Relay Board (Alpha 540A)	BDR54A
	Decoder/Relay Board (Alpha 540T)	BDR54T
	Decoder/Relay Board (Alpha 560)	BDR56
	Decoder/Relay Board (Alpha 560A)	BDR56A
	Decoder/Relay Board (Alpha 560T)	BDR56T
4.	Transmitter Enclosure (Alpha 500/520)	BCT50
	Transmitter Enclosure (Alpha 540/560)	BCT54
	Transmitter Enclosure (Alpha 540A/560A)	BCT54A
	Transmitter Enclosure (Alpha 540T/560T)	BCT54T
5.	Receiver Enclosure (All models)	BCR50
6.	Pushbutton (Single speed)	B50002
	Pushbutton (Dual speed)	B50001
7.	TX Quartz Crystal (301MHz.)	EQ-01010
-	RX Quartz Crystal (301MHz.)	EQ-01006
8.	Transformer (120 VAC)	EV-00013