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1. INTRODUCTION

The Alpha 500 series are highly durable, reliable and safe industrial radio remote control systems. The versatile features of the Alpha 500 series permit their use in many different remote control applications. The systems can be used to control factory cranes, monorail systems, multiple hoists, trolleys, mining equipment, building construction equipment, automatic control systems, and many others.

The system incorporates numerous 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 advanced microprocessors with highly evolved software that has redundant error checking and correcting capabilities to ensure 100% error-free transmission, decoding, and control of all output relays. This highly evolved software includes CRC (Cyclical Redundancy Check Code) and Hamming Codes (Error Recovery) programming.
- * To insure maximum operating safety, the Alpha 500 series incorporates numerous safety features. Some of these built in safety features include transmitter pushbutton self-diagnosing; transmitter low-voltage detection and warnings, receiver self-diagnosing, MAIN deactivation during transmitter low-voltage, when the transmitter is in sleep mode, and when the transmitter power is turned off.
- * The transmitter encoder and receiver decoder both utilize advanced microprocessor control. The availability of 32,768 sets of unique ID codes + 30 distinct RF channels will ensure that only commands from the matching control transmitter can be carried out without any interference from other radio systems.
- * For added safety, the system also incorporates special type of safety MAIN contact relay or relays. If the safety MAIN relay becomes defective (fails to open or close during operation), it will signal the system to shut down immediately to avoid the possibility of any accidents occurring.
- * 30 sets of user-adjustable receiving RF channels plus special designed removable transmitting RF board for easy channel replacement and service maintenance.
- * 100% waterproofed transmitter and receiver enclosures, including the battery compartment.

The Alpha 500 series radio remote control systems consist of water-resistant IP-66 transmitters and IP-65 / IP-66 receivers. All receiver s are equipped with a 6-foot pre-wired output cable (Alpha 500 ~ 560 models). The transmitter casings are molded using industrial strength composite materials which are 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 composite materials with minimum of up to one million press cycles. For battery power savings, the transmitter is designed and manufactured with a special ultra-efficiency power-saving circuit that requires only two “AA” size alkaline batteries for more than 150 hours of continuous operation.

2. SAFETY INSTRUCTION

The Alpha 500 series are relatively simple to use, however, it is very important to observe the proper safety procedures before, during, and after operation. When used properly, the Alpha 500 series will enhance safety, productivity and efficiency in the workplace.

The following procedures should be strictly followed:

1. Check the transmitter casing and pushbuttons daily. Should any damage that could inhibit the proper operation of the transmitter be found the unit should be immediately removed from service.
2. The transmitter voltage should be checked on a daily basis. If the voltage is low (red status light blinking or completely off), the two “AA” alkaline batteries should be replaced.
3. The red emergency stop button (EMS) should be checked at the beginning of each shift to ensure it is in proper working order and the “Stop” command is being received by the receiver.
4. In the event of an emergency press down the EMS button will immediately deactivates the receiver MAIN relay. Then turned the power “off” from the main power source to the crane or equipment.
5. The transmitter power switch should be turned off after each use and should never be left in the “power on” state when the unit is unattended.
6. Do not use the same RF channel and ID code as any other system in use at the same facility or within 900 feet distance.
7. Ensure the wrist strap (Alpha 500 ~ 560 models) or the waist belt (Alpha 580 models) is worn at all time during operation to avoid accidental damage to the transmitter.
8. Never operate a crane or equipment with two transmitters at the same time with the same RF channel and ID code.

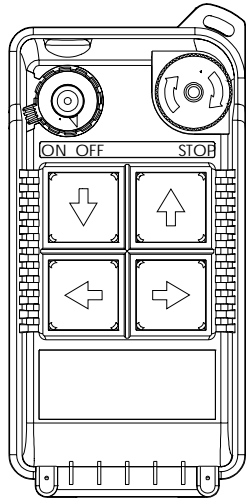
Caution!

Improper Storage of your Spare Transmitter is a Safety Hazard! During the initial installation of your remote control system the spare (second) transmitter should be tested to confirm that it is functioning properly and then the batteries must be removed and the transmitter stored in a secured place. Failure to follow this safety procedure can result in the inadvertent operation of your crane or hoist by unauthorized personnel resulting in serious injury or death!

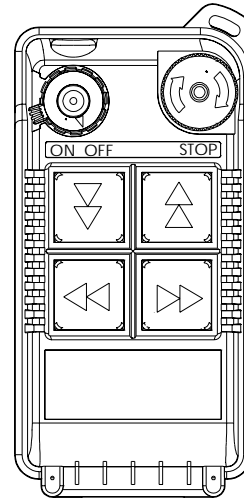
3. PUSHBUTTON CONFIGURATION

3.1 Alpha 500 & 520 Models

1. Alpha 500 : (4) one-speed pushbuttons.
2. Alpha 520 : (4) two-speed pushbuttons.

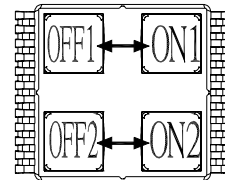
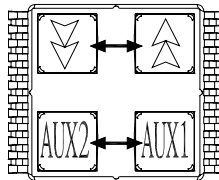
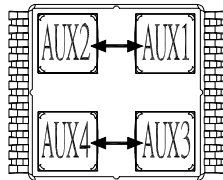
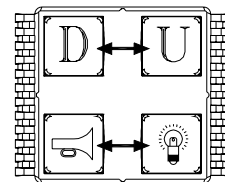
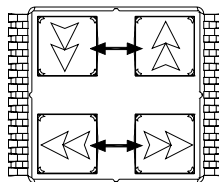
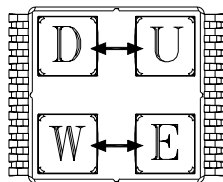


(Alpha 500)



(Alpha 520)

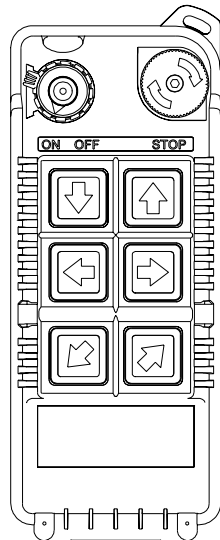
Below are some of many types of pushbutton configurations that are also available, please contact your dealer for more details.



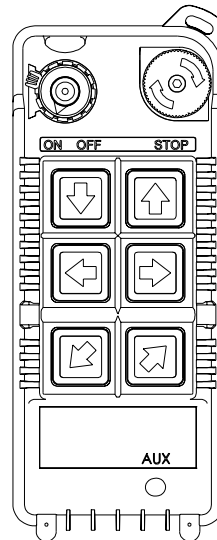
↔ Interlocked (Can also be set to non-interlocked via an optional external programmer unit).

3.2 Alpha 540 & 560 Models

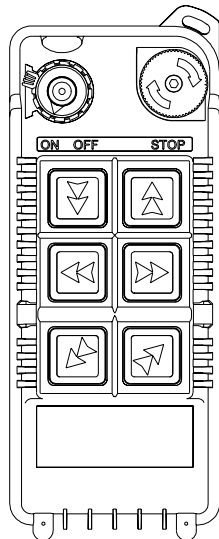
1. Alpha 540S : (6) one-speed pushbuttons.
2. Alpha 540A : (6) one-speed pushbuttons + (1) AUX micro-button.
3. Alpha 560S : (6) two-speed pushbuttons.
4. Alpha 560A : (6) two-speed pushbuttons + (1) AUX micro-button.



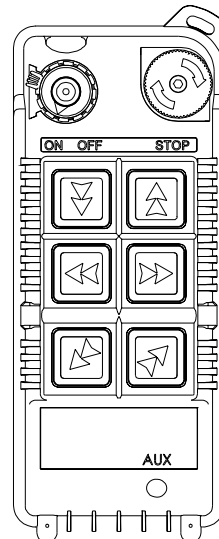
(Alpha 540S)



(Alpha 540A)



(Alpha 560S)

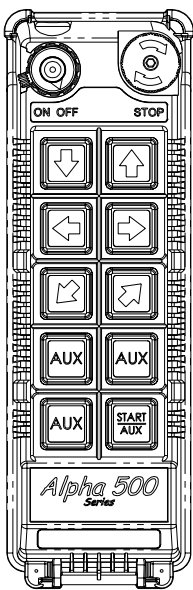


(Alpha 560A)

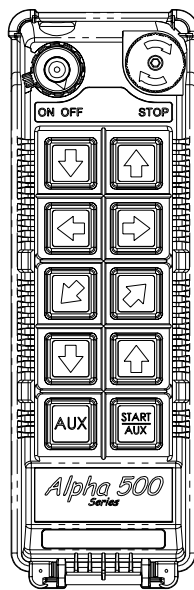
3.3 Alpha 580 Models

1. Alpha 580A-1 : (10) one-speed pushbuttons (labeled as 3 motions).
2. Alpha 580A-2 : (10) one-speed pushbuttons (labeled as 4 motions).
3. Alpha 580B : (9) one-speed pushbuttons + (1) SELECT I/II pushbutton.*
4. Alpha 580C-1 : (6) two-speed + (4) one-speed pushbuttons.
5. Alpha 580C-2 : (8) two-speed + (2) one-speed pushbuttons.
6. Alpha 580D : (10) two-speed pushbuttons + (1) AUX micro-button.
7. Alpha 580E : (6) two-speed + (3) one-speed pushbuttons + (1) SELECT I/II pushbutton.*
8. Alpha 580F : (8) two-speed + (1) one-speed pushbutton + (1) SELECT I/II pushbutton.*

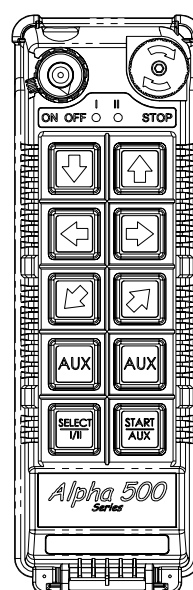
* For cranes with auxiliary hoist and trolley (changeover function).



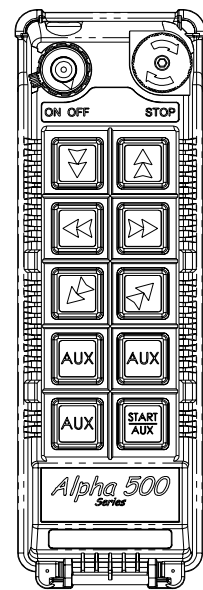
(Alpha 580A-1)



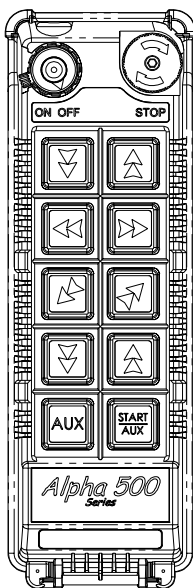
(Alpha 580A-2)



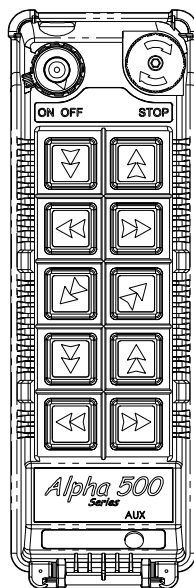
(Alpha 580B)



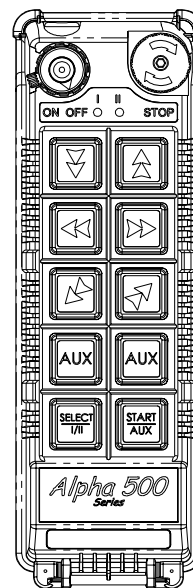
(Alpha 580C-1)



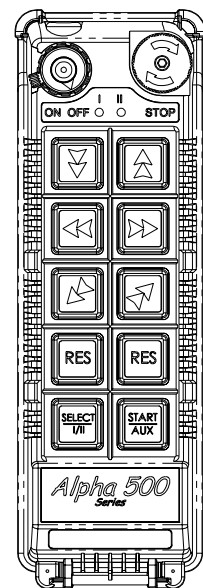
(Alpha 580C-2)



(Alpha 580D)



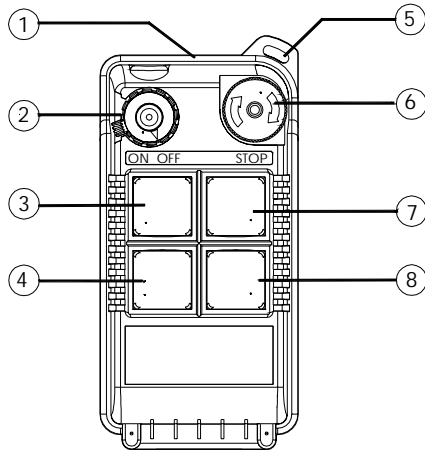
(Alpha 580E)



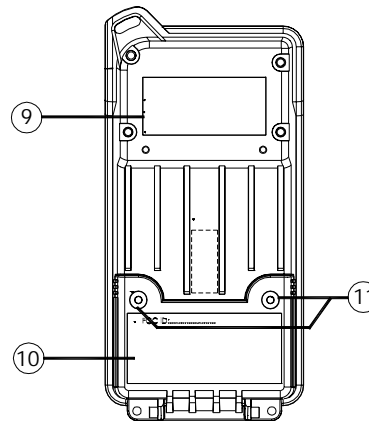
(Alpha 580F)

4. TRANSMITTER OUTLINE

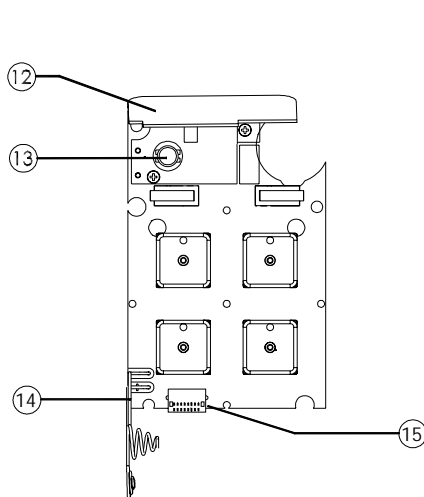
4.1 Alpha 500 & 520 Models



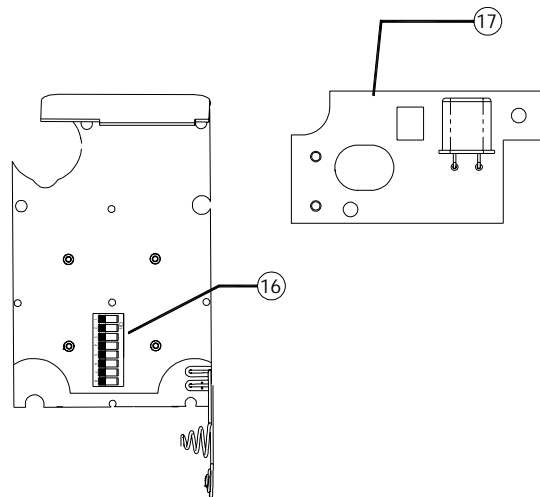
(Fig. 1) Front View



(Fig. 2) Back View



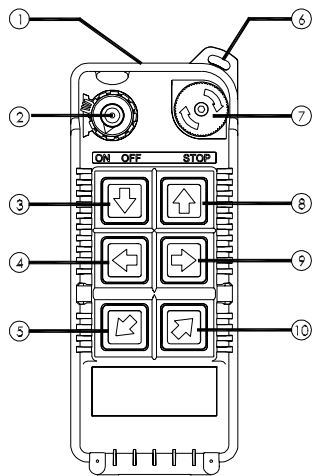
(Fig. 3) Front View



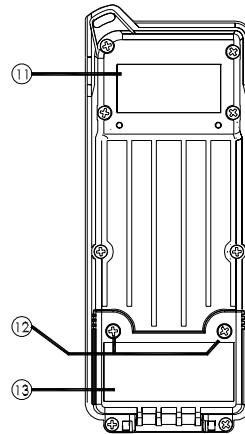
(Fig. 4) Back View

- | | | |
|-----------------------------|------------------------------|---------------------------|
| 1) Transmitter enclosure | 8) Pushbutton # 3 (→ / East) | 15) Programming port |
| 2) Power switch (ON/OFF) | 9) System information | 16) ID code dip-switch |
| 3) Pushbutton #2 (↓ / Down) | 10) Battery cover | 17) Transmitting RF Board |
| 4) Pushbutton #4 (← / West) | 11) Battery cover screws | |
| 5) Wrist strap attachment | 12) Internal antenna | |
| 6) Emergency stop (EMS) | 13) Status LED display | |
| 7) Pushbutton #1 (↑ / Up) | 14) Battery contact | |

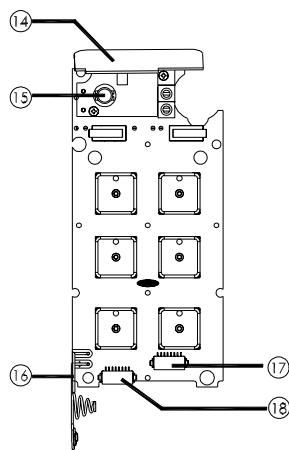
4.2 Alpha 540 & 560 Models



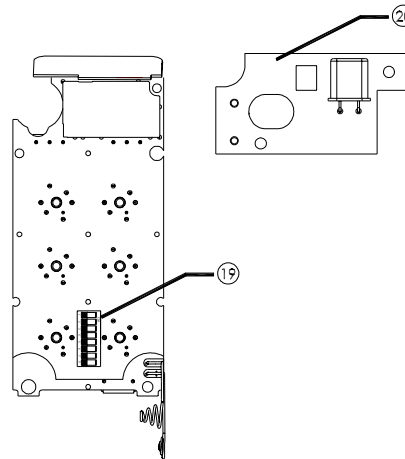
(Fig. 5) Front View



(Fig. 6) Back View



(Fig. 7) Front View

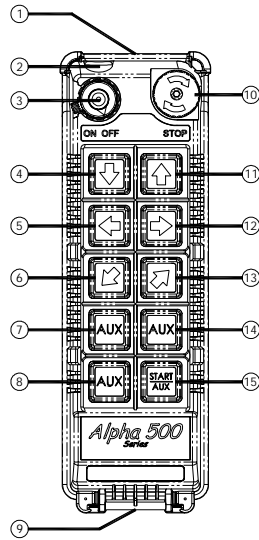


(Fig. 8) Back View

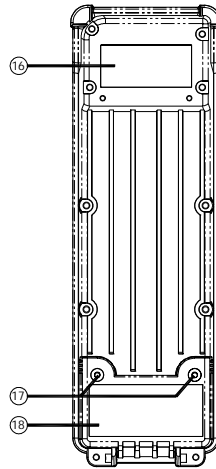
- | | | |
|------------------------------|-------------------------------|---------------------------------|
| 1) Transmitter enclosure | 8) Pushbutton #1 (↑ / Up) | 15) Status LED display |
| 2) Power switch (ON/OFF) | 9) Pushbutton #3 (→ / East) | 16) Battery contact |
| 3) Pushbutton #2 (↓ / Down) | 10) Pushbutton #5 (↗ / North) | 17) AUX micro-button connector* |
| 4) Pushbutton #4 (← / West) | 11) System information | 18) Programming port |
| 5) Pushbutton #6 (↙ / South) | 12) Battery cover screws | 19) ID code dip-switch |
| 6) Wrist strap attachment | 13) Battery cover | 20) Transmitting RF board |
| 7) Emergency stop (EMS) | 14) Internal antenna | |

* For Alpha 540A and Alpha 560A models only.

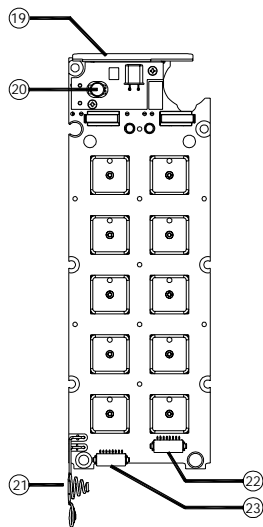
4.3 Alpha 580 Models



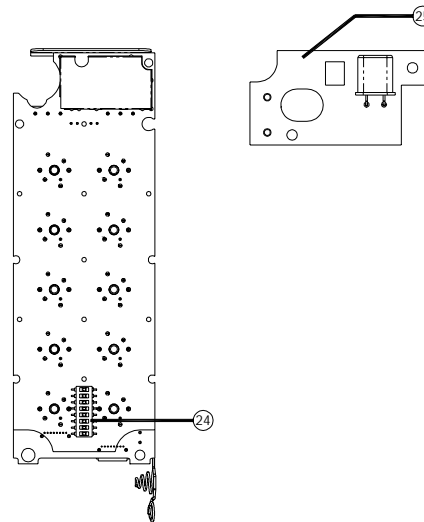
(Fig. 9) Front View



(Fig. 10) Back View



(Fig. 11) Front View



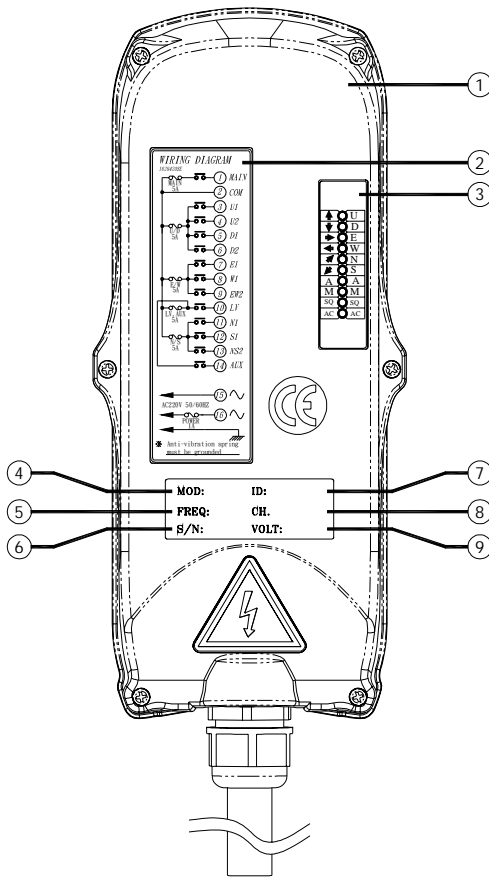
(Fig. 12) Back View

- | | | |
|------------------------------|-------------------------------|---------------------------------|
| 1) Transmitter enclosure | 9) Waist belt attachment | 17) Battery cover screws |
| 2) External antenna port | 10) Emergency stop (EMS) | 18) Battery cover |
| 3) Power switch (ON/OFF) | 11) Pushbutton #1 (↑ / Up) | 19) Internal antenna |
| 4) Pushbutton #2 (↓ / Down) | 12) Pushbutton #3 (→ / East) | 20) Status LED display |
| 5) Pushbutton #4 (← / West) | 13) Pushbutton #5 (↗ / North) | 21) Battery contact |
| 6) Pushbutton #6 (↘ / South) | 14) Pushbutton #7 (A1) | 22) AUX micro-button connector* |
| 7) Pushbutton #8 (A2) | 15) Pushbutton #9 (A3) | 23) Programming port |
| 8) Pushbutton #10 (A4) | 16) System information | 24) ID code dip-switch |
| | | 25) Transmitting RF board |

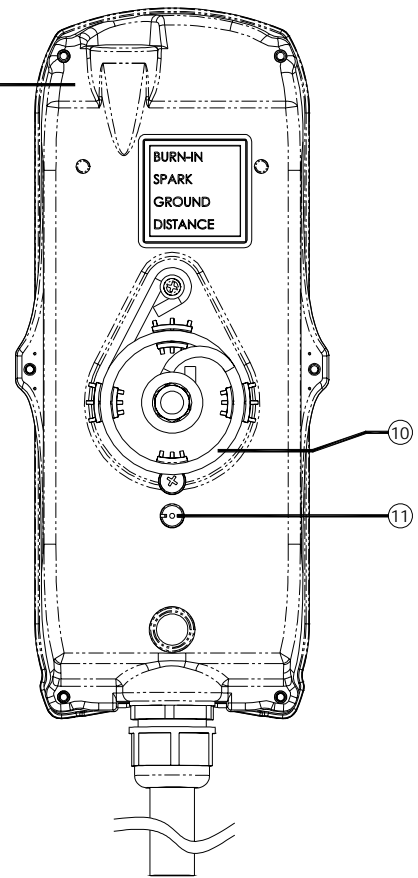
* For optional AUX micro-button or buttons.

5. RECEIVER OUTLINE

5.1 Alpha 500 ~ 560 Models External Assembly



(Fig. 13) Front View



(Fig. 14) Back View

- | | | |
|---------------------------|-------------------------|---------------------------|
| 1) Receiver enclosure | 5) System frequency | 9) Supplied voltage |
| 2) Wiring diagram | 6) System serial number | 10) Anti-vibration spring |
| 3) Receiver LED displays* | 7) System ID code | 11) Grounding (GND) |
| 4) Type model | 8) System RF channel | |

* **A** ~ AUX Relay Contact Indicator (for Alpha 540A/560A models only).

* **M** ~ MAIN and 2nd Speed Relay Contact Indicator.

Green "on" → MAIN activated (All models).

Red "on" → 2nd speed activated (for Alpha 560S/A models only).

* **SQ** ~ RF Signal Indicator (Red).

"on" → RF signal detected and received.

"off" → No RF signal detected or received.

Blinking at transmitter power "off" → Other radio interference.

* **AC** ~ Power Source Indicator (red) "on" → AC input power supplied.

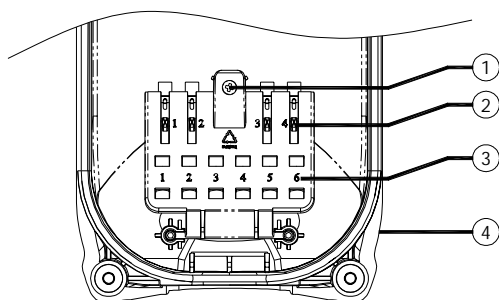
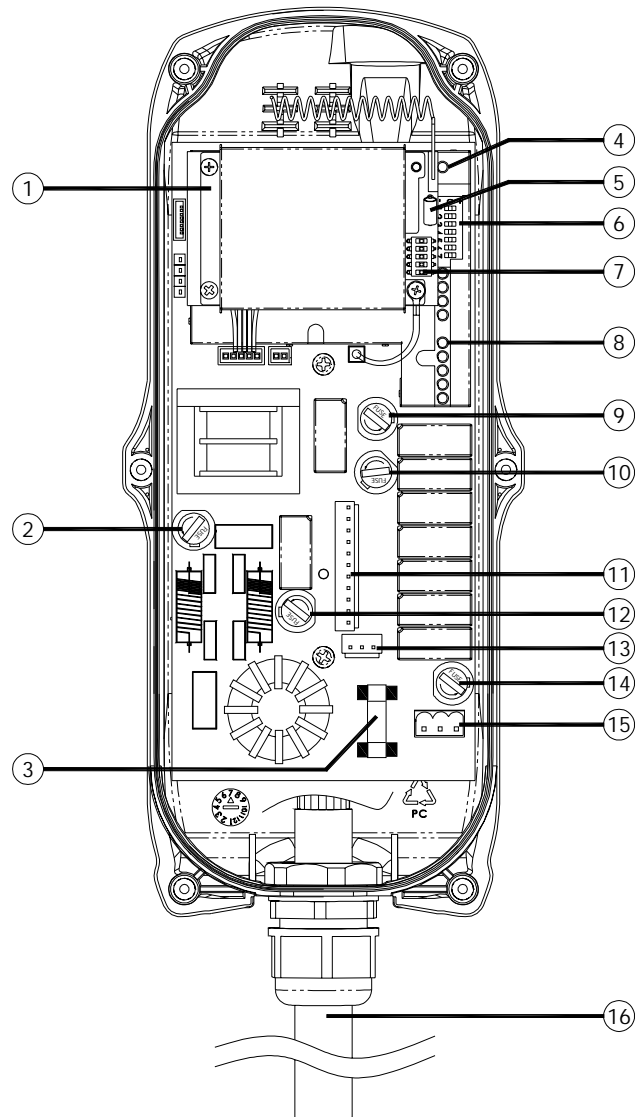
"off" → No AC input power.

5.2 Alpha 500 & 520 Models Internal Assembly

(Fig. 15) Internal Parts Assembly

- 1) Receiving RF module
- 2) Secondary power AC fuse (0.50A)
- 3) Primary power AC fuse (1.0A)
- 4) System status LED display*
- 5) External antenna port
- 6) ID code dip-switch
- 7) RF channel dip-switch
- 8) Contact relay LED display
- 9) Pushbutton #1 and #2 fuse (5.0A)
- 10) MAIN fuse (5.0A)
- 11) Contact output seat (CN3)
- 12) Low-voltage (LV) fuse (5.0A)
- 13) Contact output seat (CN4)
- 14) Pushbutton #3 and #4 fuse (5.0A)
- 15) AC power input seat (CN2)
- 16) Cable gland & output cable

* Please refer to page 32 for system status LED display information.

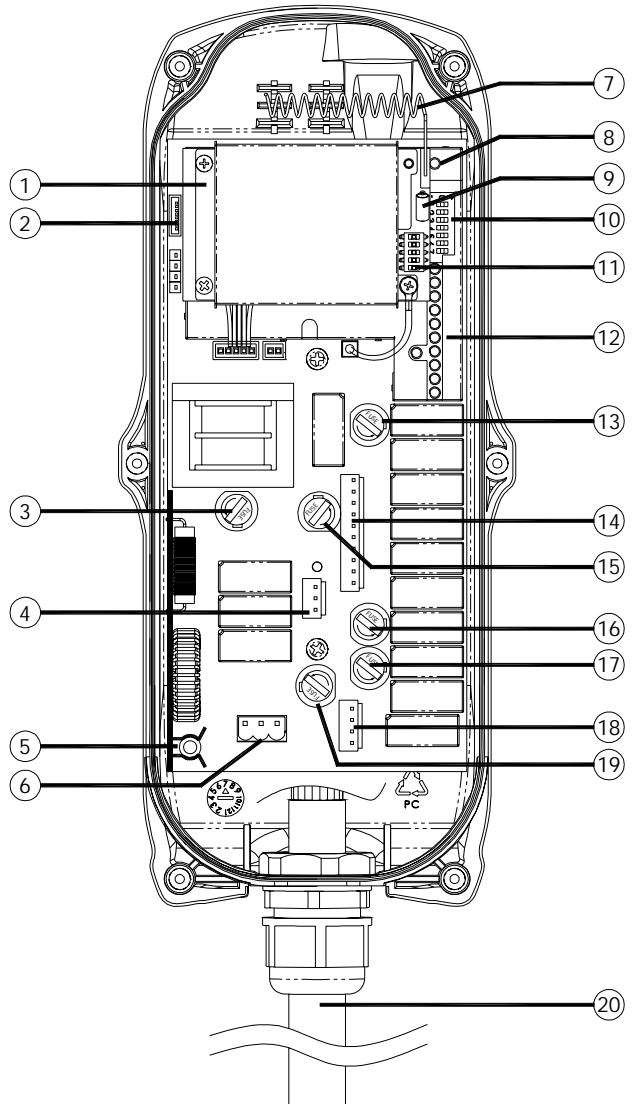


- 1) Spare fuse & jumper compartment
- 2) Spare Jumper slots
- 3) Spare fuse slots
- 4) Receiver top casing

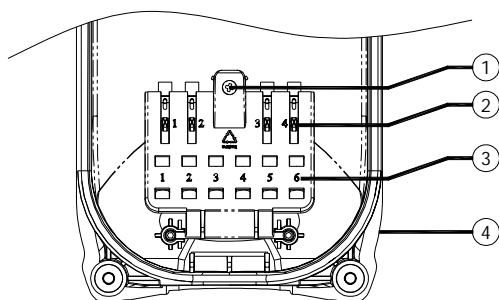
5.3 Alpha 540 & 560 Models Internal Assembly

(Fig. 16) Internal Parts Assembly

- 1) Receiving RF module
- 2) External programming port
- 3) Secondary power AC fuse (0.50A)
- 4) Contact output seat (CN8)
- 5) Primary power AC fuse (1.0A)
- 6) AC power input seat (CN2)
- 7) Internal Antenna
- 8) System Status LED display*
- 9) External antenna port
- 10) ID code dip-switch
- 11) RF channel dip-switch
- 12) Contact relay LED display
- 13) Pushbutton #1 and #2 fuse (5.0A)
- 14) Contact output seat (CN3)
- 15) MAIN contact fuse (5.0A)
- 16) Pushbutton #3 and #4 fuse (5.0A)
- 17) Pushbutton #5 and #6 fuse (5.0A)
- 18) Contact output seat (CN4)
- 19) LV & AUX fuse (5.0A)
- 20) Cable gland & output cable

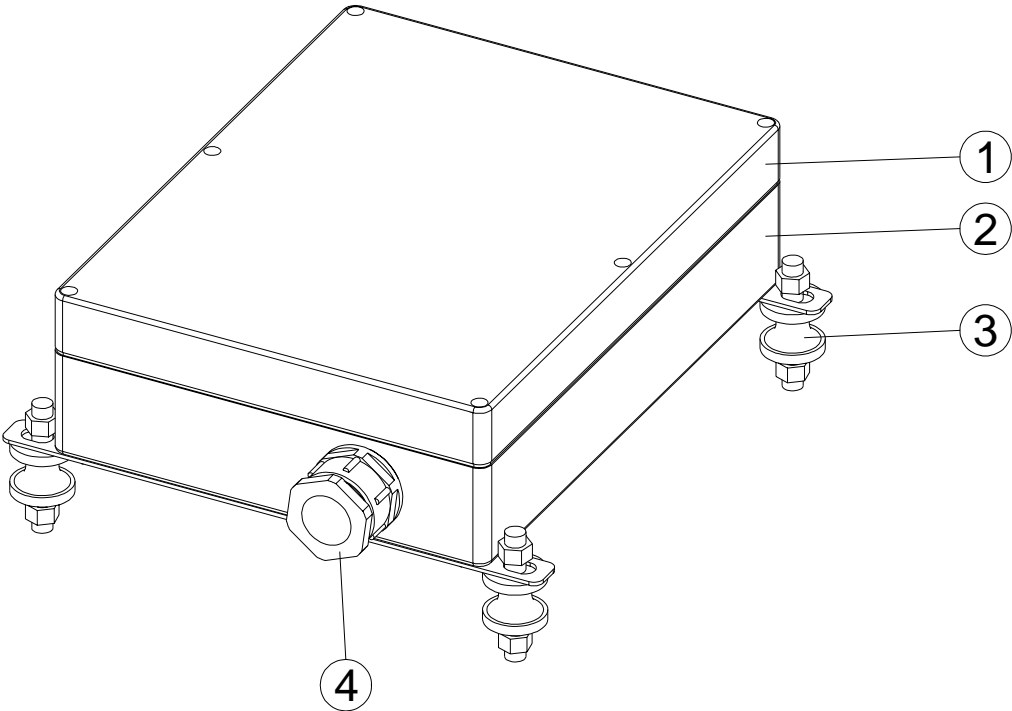


* Please refer to page 32 for system status LED display information.



- 1) Spare fuse & jumper compartment
- 2) Spare Jumper slots
- 3) Spare fuse slots
- 4) Receiver top casing

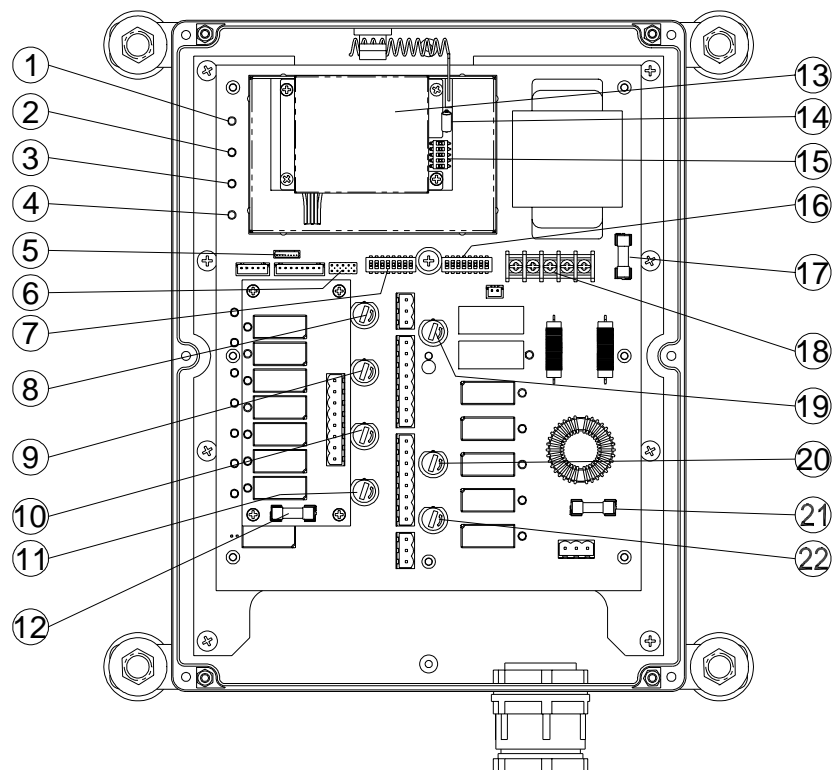
5.4 Alpha 580 Models External Assembly



(Fig. 17) External Parts Assembly

- 1) Transparent top cover
- 2) Light-gray colored base
- 3) Mounting bracket with shock absorbers
- 4) Cord grip

5.5 Alpha 580 Models Internal Assembly



(Fig. 18) Internal Parts Assembly

- | | |
|--------------------------------------|--------------------------------------|
| 1) Power LED display* | 12) Pushbutton #1 and #2 fuse (5.0A) |
| 2) SQ LED display** | 13) Receiving RF module |
| 3) Status LED display**** | 14) External antenna port |
| 4) DC power relay LED display*** | 15) RF channel dip-switch |
| 5) Programming port | 16) ID code dip-switch |
| 6) Jumper settings | 17) Secondary power fuse (0.8A) |
| 7) Function dip-switch | 18) Voltage selector seat |
| 8) Pushbutton #3 and #4 fuse (5.0A) | 19) MAIN fuse (5.0A) |
| 9) Pushbutton #5 and #6 fuse (5.0A) | 20) Pushbutton A4 fuse (5.0A) |
| 10) Pushbutton A1 and A2 fuse (5.0A) | 21) Primary power fuse (1.0A) |
| 11) Pushbutton A3 fuse (5.0A) | 22) Low-voltage (LV) fuse (5.0A) |

* **POWER** ~ AC Power Source Indicator "on" → AC input power supplied.
"off" → No AC input power.

** **SQ** ~ RF Signal Indicator "on" → RF signal detected and received.
"off" → No RF signal detected or received.

Blinking at transmitter power "off" → Other radio interference.

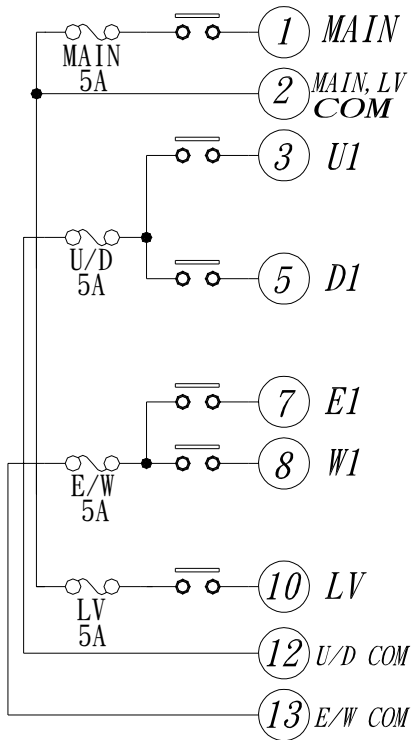
*** **RELAY_COM** ~ DC Power Source to Relays "on" → DC power to relays.
"off" → No DC power to relays.

**** **STATUS** ~ Receiver System Status LED Display → Please refer to page 32.

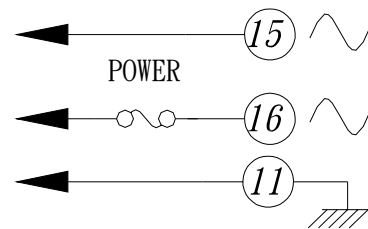
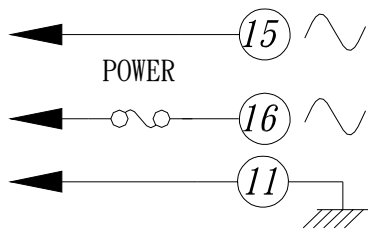
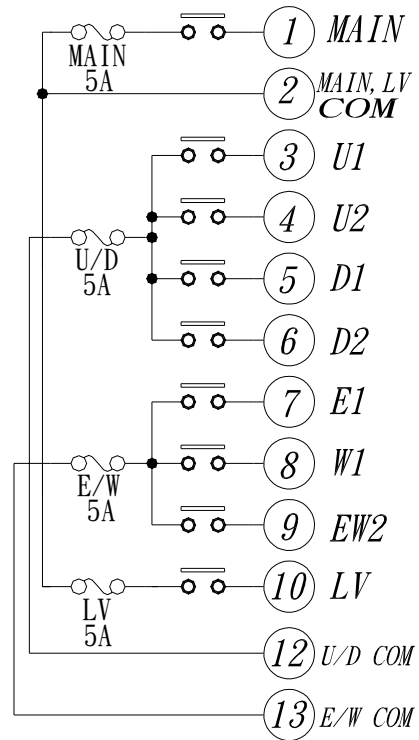
6. OUTPUT CONTACT DIAGRAMS

6.1 Alpha 500 & 520 Models

(Alpha 500)

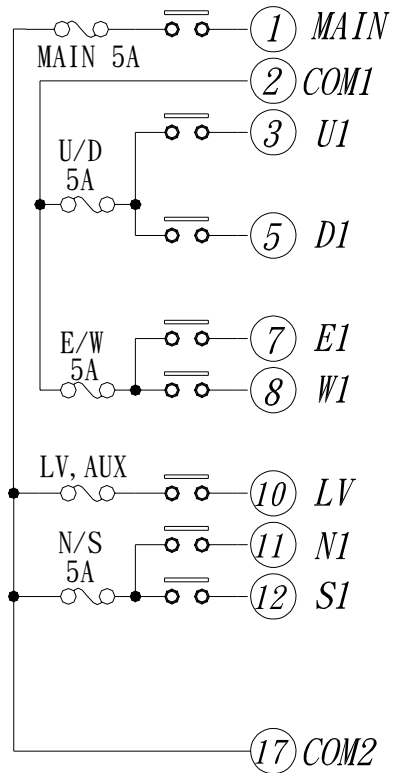


(Alpha 520)

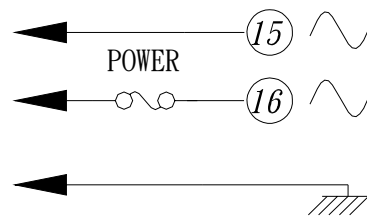
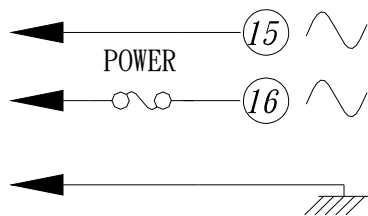
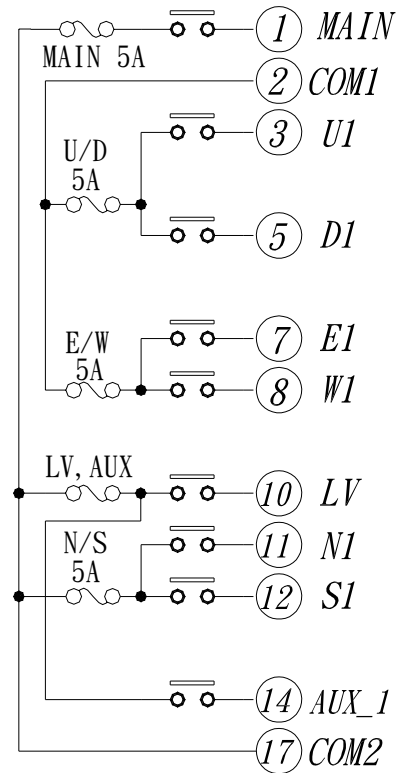


6.2 Alpha 540 Models

(Alpha 540S)

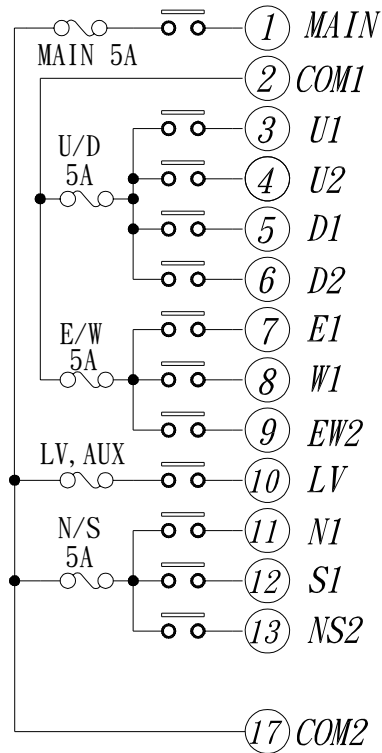


(Alpha 540A)

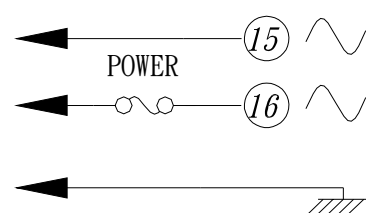
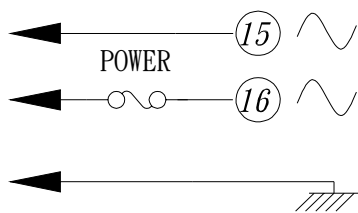
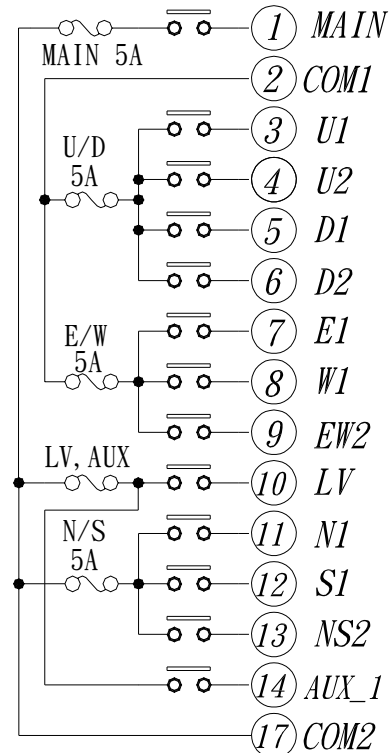


6.3 Alpha 560 Models

(Alpha 560S)



(Alpha 560A)

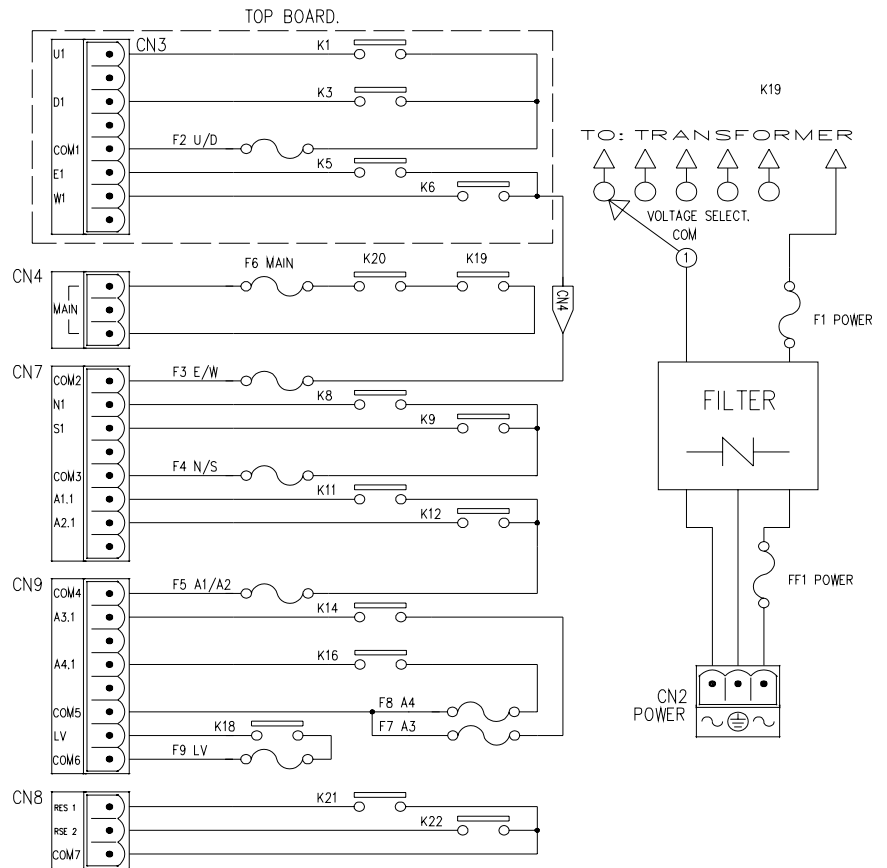


6.4 Alpha 580 Models

(Alpha 580A-1)

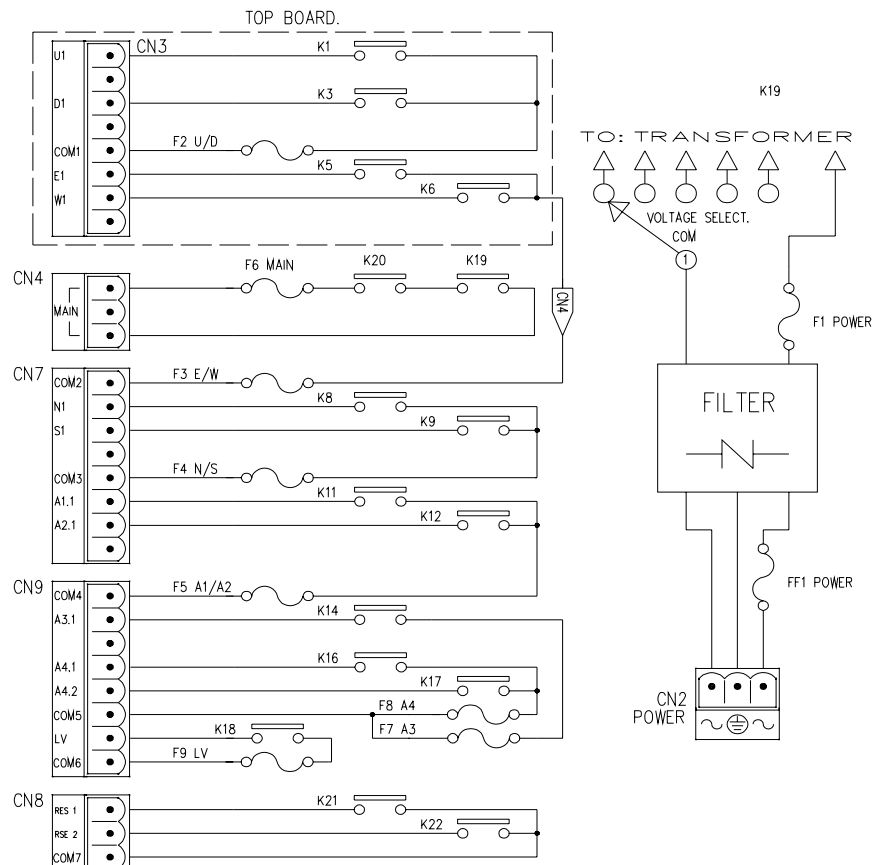
&

(Alpha 580A-2)

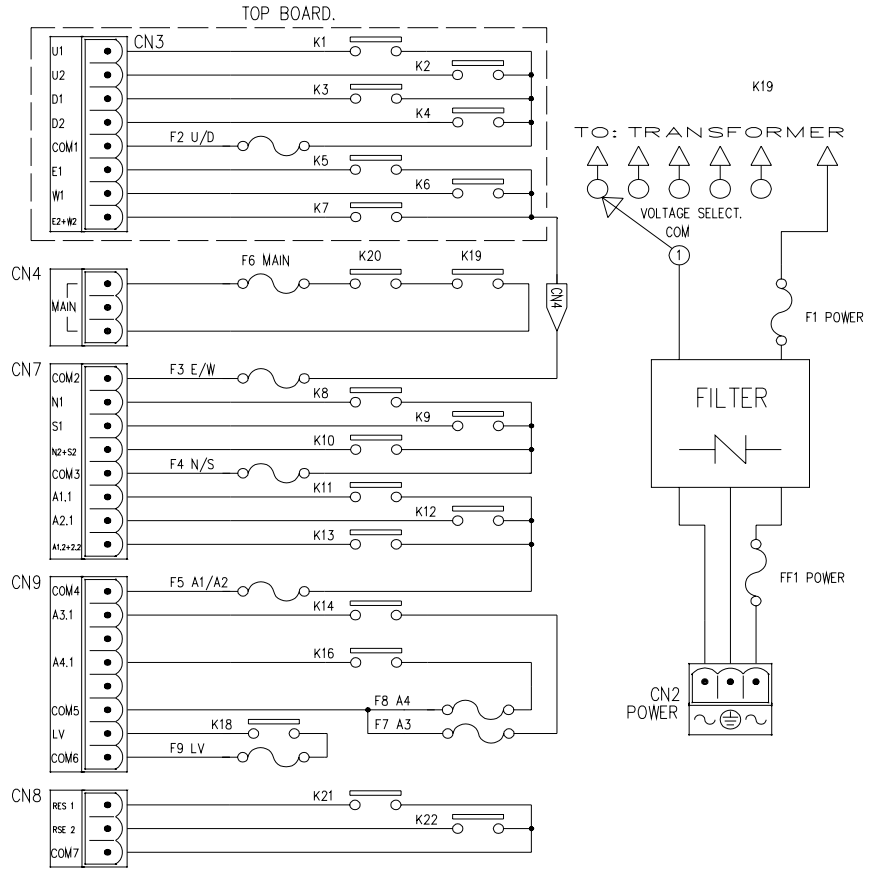


Note: The output contact diagram for both Alpha 580A-1 and Alpha 580A-2 models are identical, the only difference is the transmitter pushbutton labeling.

(Alpha 580B)

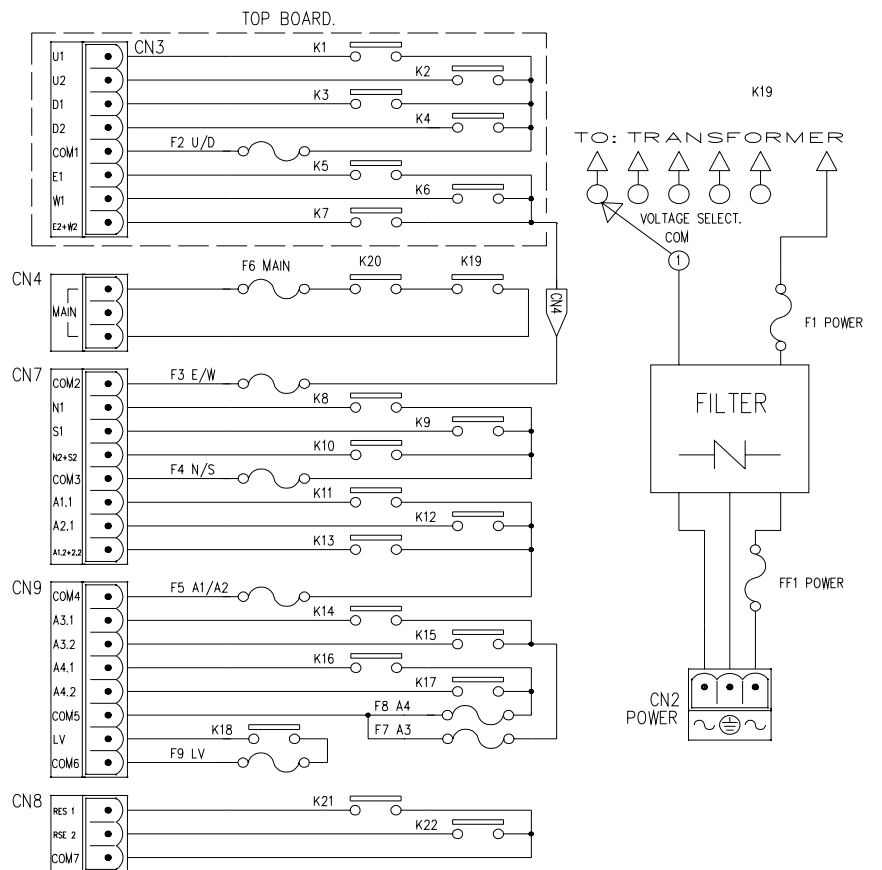


(Alpha 580C-1)
&
(Alpha 580C-2)

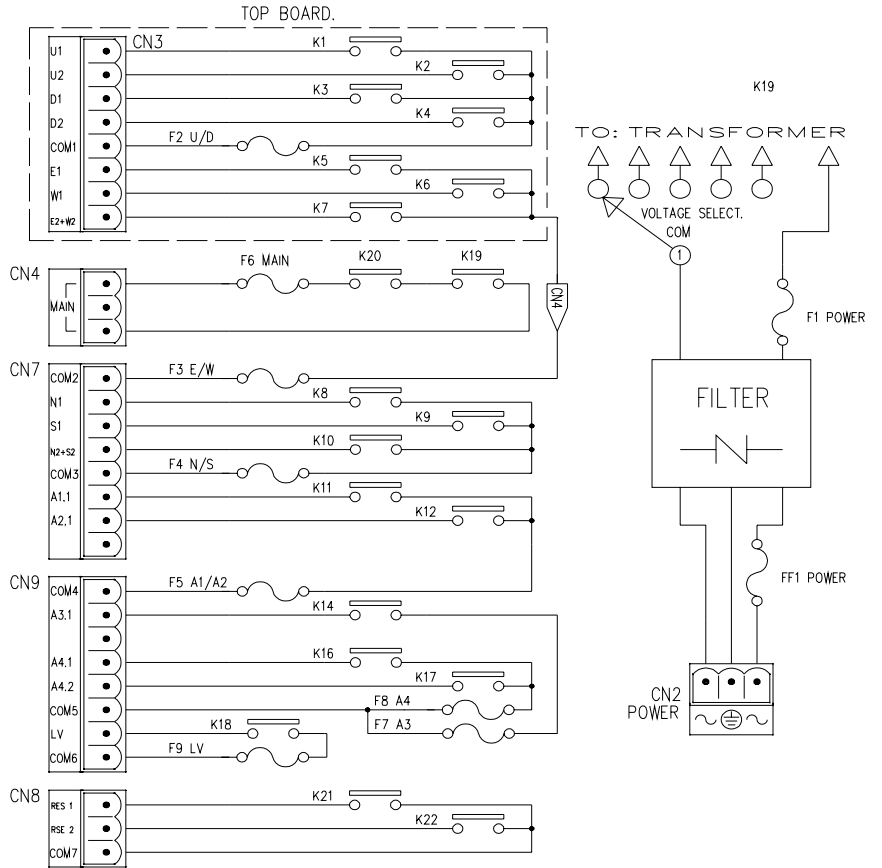


Note: For Alpha 580C-1 model, please disregard "A1.2 + 2.2" terminal output.

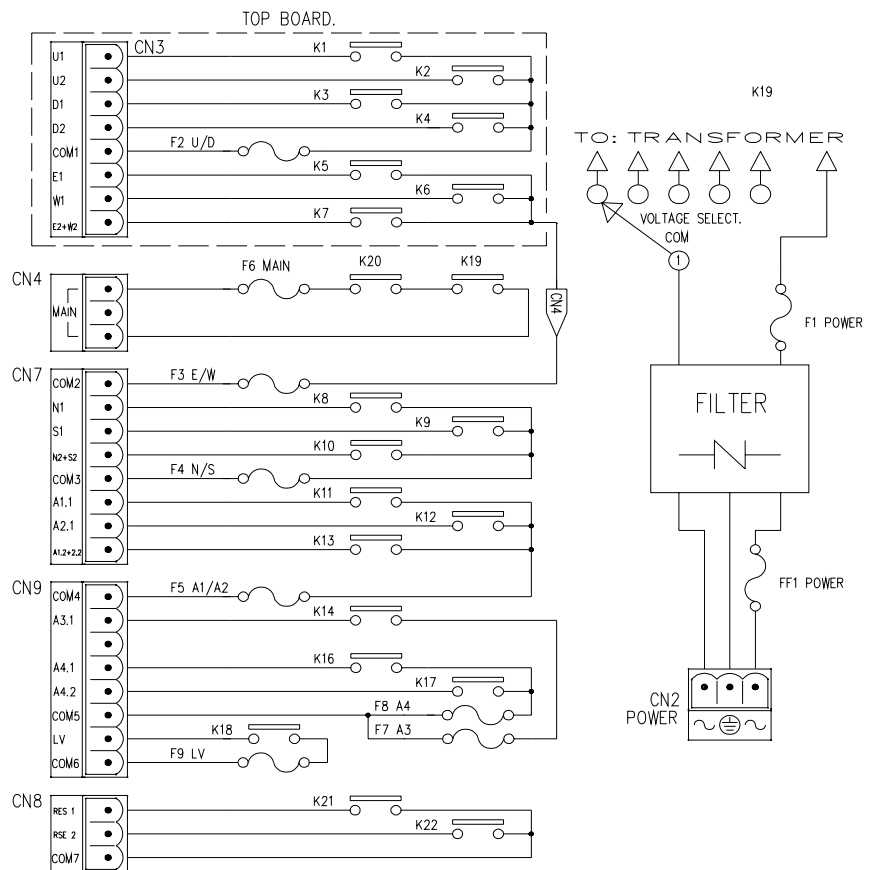
(Alpha 580D)



(Alpha 580E)

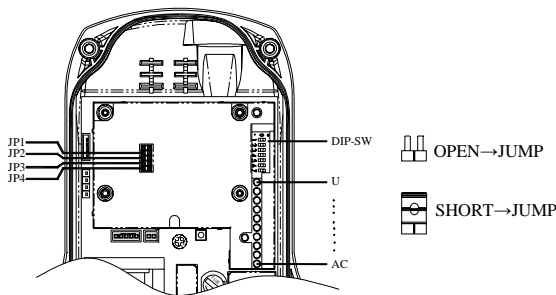


(Alpha 580F)

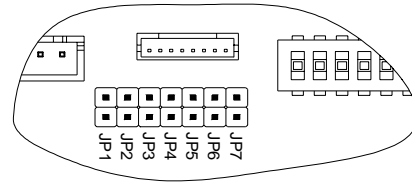


7. SYSTEM CONFIGURATIONS

7.1 How To Set Jumper Functions



(Fig. 19) Alpha 500 ~ 560 Models



(Fig. 20) Alpha 580 Models

Manufacture Settings

JP1	Open	Available for Alpha 580 models only After turning “on” the transmitter or after EMS reset, press START/AUX pushbutton to activate the receiver MAIN relay.
	Short	Preset for all models Turn “on” the transmitter power immediately activates the receiver MAIN relay. After EMS reset, turn the transmitter power “off” and then back “on” again to reactivate the receiver MAIN relay.
JP2	Open	Available for all models Receiver MAIN relay stays "on" constantly until the main power source to the crane or receiver is turned “off”.
	Short	Preset for all models After 5 minutes of transmitter non-usage (pushbuttons not depressed), receiver MAIN relay will be deactivated.
JP3	Open	Preset for all models After 1 minute of transmitter low-voltage warning, only the transmitter power will be deactivated.
	Short	Available for all models After 1 minute of transmitter low-voltage warning, the transmitter power “and” receiver MAIN relay will both be deactivated. (see note A)
JP4	Open	Preset for Alpha 540A/560A models AUX button with normal momentary relay contact.
	Short	Available for Alpha 540A/560A models only AUX button with latching/toggled relay contact.

Note A: If transmitter low-voltage condition occurs during remote operation, the transmitter handset itself will display a visual warning by blinking the status light red. Furthermore, the transmitter will also send out a low-voltage signal to the receiver to activate its low-voltage (LV) warning relay. By connecting a horn, siren or lights to the LV relay output contact the operator can be notified of a transmitter low-voltage condition. The LV relay will open and close at one-second intervals for up to a minute warning the operator of the low-voltage condition. To insure maximum safety, both the transmitter power and the receiver MAIN relay will be deactivated (depending on the jumper settings)

Note B: Every time when you change jumper settings you must first turn the receiver power off and then turn it back on so that the new settings can be stored in memory.

JP-1 setting for Alpha 500 ~ 560 models only

JP1 Open	Not applicable for the Alpha 500 ~ 560 models							
JP1 Short	Power "On"	Receiver MAIN activated	OR	Press EMS button	Receiver MAIN deactivated	Elevate EMS button	Reset transmitter power switch	Receiver MAIN activated

JP-1 setting for Alpha 580 models only

JP1 Open	Power "On"	Press START/AUX pushbutton	Receiver MAIN activated	OR	Press EMS button	Receiver MAIN deactivated	Elevate EMS button	Press START/AUX pushbutton	Receiver MAIN activated
JP1 Short	Power "On"	Receiver MAIN activated	OR	Press EMS Button	Receiver MAIN deactivated	Elevate EMS button	Reset transmitter power switch	Receiver MAIN activated	

JP-2 setting for all models

JP2 Open	Receiver MAIN stays "on" constantly until the main power source to the crane or receiver is turned "off"	
JP2 Short	After 5 minutes of transmitter non-usage (pushbuttons not depressed)	Receiver MAIN deactivated

JP-3 setting for all models

JP3 Open	Power "On"	Work in progress	Transmitter low voltage occurs	LV warning	Change batteries within 1 minute	YES	Work resumes
						NO	Transmitter unit will be deactivated
JP3 Short	Power "On"	Work in progress	Transmitter low voltage occurs	LV warning	Change batteries within 1 minute	YES	Work resumes
						NO	Both the transmitter and receiver unit will be deactivated

JP-4 settings for Alpha 540A & 560A models only

JP4 Open	AUX button with normal momentary relay contact
JP4 Short	AUX button with latching/toggled relay contact

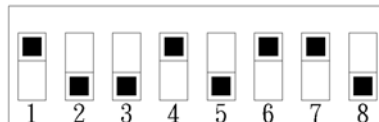
7.2 How to Set ID Codes

The ID code dip-switch is located on the backside of the transmitter encoder board and on the top side of the receiver decoder/relay board (refer to section 3~5). Example: when you change the ID code of the system please make sure that the "1" value adds up to be an "Even" number (refer to diagram below). Depending on area, models in some countries may have "Odd" numbered group ID code. Please check the ID code information located on the backside of the transmitter handset or on the face cover of the receiver unit for correct ID code setting.

Example : ID code → **10010110** → "1" x 4 = 4 → Even number → Correct setting

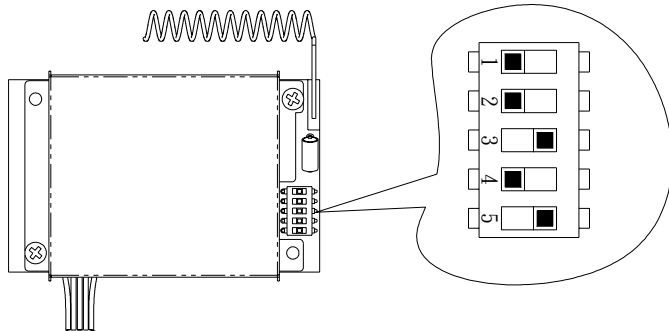
Top slot → "1"

Bottom slot → "0"



7.3 Receiver RF Channel Setting

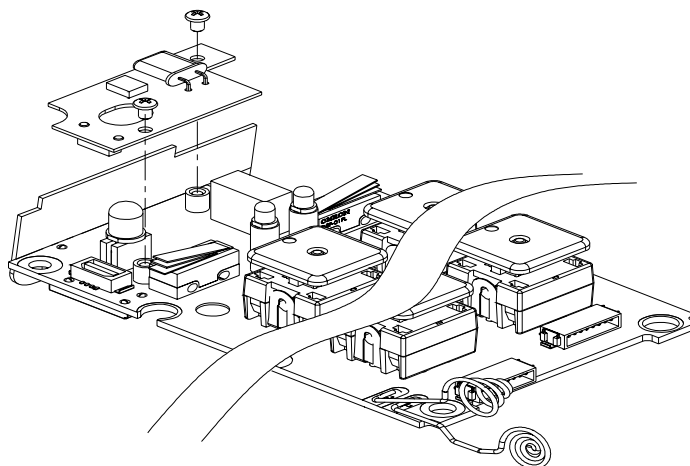
There are 30 sets of user-adjustable receiving RF channels that can be set manually via a 5-position dip-switch located to the right of the receiving RF module. Change the RF channel of the receiver unit simply by resetting these 5-position dip-switch. For the location of the receiving RF module, please refer to fig. 15, 16, and 18 on page 11, 12, and 14.



Example: For the above dip-switch setting (**00101**) counting from dip-position #1 through #5, the above RF channel would be **“205”**, which also represents frequency **“301.205 MHz”**. Please refer to the frequency (RF) channel table on page 26 or the CHANNEL → DIP label located on the receiving RF module itself.

7.4 How to Remove the Transmitting RF Board

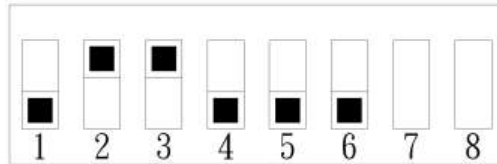
The transmitter RF channel can be easily replaced or exchanged simply by replacing the small removable RF board located atop the transmitter encoder board. The small RF board can be easily removed by unscrewing the two small bolts that secured the RF board and the encoder board together (refer to the diagram below). Please keep in mind that the RF channel of the transmitter must be identical to the receiver. If the transmitter and the receiver are in different RF channels, please readjust accordingly (refer to section 7.3 above).



7.5 Alpha 580 Models Pushbutton Function Settings

Numerous Alpha 580 models' pushbutton contact relay settings can be set via an 8-position dip-switch located on the receiver decoder/relay board (refer to fig. 18 on page 14).

Example:



DIP-1 → “0”
 DIP-2 → “1”
 DIP-3 → “1”
 DIP-4 → “0”
 DIP-5 → “0”
 DIP-6 → “0”

Top slot represents “1” value and lower slot represents “0” value.

Alpha 580 models dip-switch function table

<p>Alpha 580A-1 & Alpha 580A-2</p>	<p>DIP1 → “0” → pushbutton 1&2, 3&4, 5&6 interlocked “1” → pushbutton 1&2, 3&4, 5&6 not interlocked</p> <p>DIP2 → “0” → pushbuttons 7&8 interlocked “1” → pushbutton 7&8 not interlocked</p> <p>DIP3 → “0” → pushbutton 7&8 with momentary relay contact (DIP2 set at “1”) “1” → pushbutton 7&8 with latching/toggled relay contact (DIP2 set at “1”)</p> <p>DIP4 → “0” → pushbutton 9&10 interlocked “1” → pushbutton 9&10 not interlocked</p> <p>DIP5 → “0” → pushbutton 9 with momentary relay contact (DIP4 set at “1”) “1” → pushbutton 9 with latching/toggled relay contact (DIP4 set at “1”)</p> <p>DIP6 → “0” → 10th pushbutton with momentary relay contact (DIP4 set at “1”) “1” → 10th pushbutton with latching/toggled relay contact (DIP4 set at “1”)</p>
<p>Alpha 580B</p>	<p>DIP1 → “0” → pushbutton 7&8 interlocked “1” → pushbutton 7&8 not interlocked</p> <p>DIP2 → “0” → pushbuttons 7 with momentary relay contact (DIP1 set at “1”) “1” → pushbutton 7 with latching/toggled relay contact (DIP1 set at “1”)</p> <p>DIP3 → “0” → pushbutton 8 with momentary relay contact (DIP1 set at “1”) “1” → pushbutton 8 with latching/toggled relay contact (DIP1 set at “1”)</p> <p>DIP4 → “0” → pushbutton 9 with momentary relay contact “1” → pushbutton 9 with latching/toggled relay contact</p>

Alpha 580 models dip-switch function table (continued)

Alpha 580C-1 & Alpha 580C-2	<p>DIP1 → “0” → pushbutton 1&2 with both 1st and 2nd speed contact relay activated when pressed to 2nd speed (refer to note A) “1” → pushbutton 1&2 with both 1st and 2nd speed contact relay interlocked when pressed to 2nd speed (refer to note B)</p> <p>DIP2&3 → “00” → pushbuttons 9 with momentary relay contact “01” → pushbutton 9 with latching/toggled relay contact “10” → pushbutton 9 with 3rd speed function (refer to note C)</p> <p>DIP4 → “0” → pushbutton 10 with momentary relay contact “1” → pushbutton 10 with latching/toggled relay contact</p>
Alpha 580D	<p>DIP1 → “0” → pushbutton 1&2 with both 1st and 2nd speed contact relay activated when pressed to 2nd speed (refer to note A) “1” → pushbutton 1&2 with both 1st and 2nd speed contact relay interlocked when pressed to 2nd speed (refer to note B)</p> <p>DIP2&3 must set to “0” at all time</p>
Alpha 580E	<p>DIP1 → “0” → pushbutton 1&2 with both 1st and 2nd speed contact relay activated when pressed to 2nd speed (refer to note A) “1” → pushbutton 1&2 with both 1st and 2nd speed contact relay interlocked when pressed to 2nd speed (refer to note B)</p> <p>DIP2 → “0” → pushbuttons 7&8 interlocked “1” → pushbutton 7&8 not interlocked</p> <p>DIP3 → “0” → pushbutton 7 with momentary relay contact (DIP2 set at “1”) “1” → pushbutton 7 with latching/toggled relay contact (DIP2 set at “1”)</p> <p>DIP4 → “0” → pushbutton 8 with momentary relay contact (DIP2 set at “1”) “1” → pushbutton 8 with latching/toggled relay contact (DIP2 set at “1”)</p> <p>DIP5&6 → “00” → pushbutton 9 with momentary relay contact “01” → pushbutton 9 with latching/toggled relay contact “10” → pushbutton 9 with 3rd speed function (refer to note C)</p>
Alpha 580F	<p>DIP1 → “0” → pushbutton 1&2 with both 1st and 2nd speed contact relay activated when pressed to 2nd speed (refer to note A) “1” → pushbutton 1&2 with both 1st and 2nd speed contact relay interlocked when pressed to 2nd speed (refer to note B)</p> <p>DIP2&3 → “00” → pushbutton 9 with momentary relay contact “01” → pushbutton 9 with latching/toggled relay contact “10” → pushbutton 9 with 3rd speed function (refer to note C)</p>

Note A: This setting is ideal for majority of the crane systems (manufacture preset). When pressed to 2nd speed for the hoist travel, the 1st speed contact relay will remain engaged (closed).

Note B: This setting is ideal for a crane system with dual-motor hoist, when pressed to 2nd speed for the hoist travel the 1st speed contact relay will be disengaged (open).

Note C: During operation, when a particular command pushbutton is in the 2nd speed position (pushbutton fully pressed), pressing the 10th pushbutton once will activate the 3rd speed for that particular command pushbutton. If the operator presses the 10th pushbutton again, the command pushbutton currently in use will return to the 2nd speed position.

7.6 Frequency (RF) Channels Table

FREQUENCY	DIP-SWITCH SETTING	RF CHANNEL
301.105 MHz	00001	201
301.130 MHz	00010	202
301.155 MHz	00011	203
301.180 MHz	00100	204
301.205 MHz	00101	205
301.230 MHz	00110	206
301.255 MHz	00111	207
301.280 MHz	01000	208
301.305 MHz	01001	209
301.330 MHz	01010	210
301.355 MHz	01011	211
301.380 MHz	01100	212
301.405 MHz	01101	213
301.430 MHz	01110	214
301.455 MHz	01111	215
301.480 MHz	10000	216
301.505 MHz	10001	217
301.530 MHz	10010	218
301.555 MHz	10011	219
301.580 MHz	10100	220
301.605 MHz	10101	221
301.630 MHz	10110	222
301.655 MHz	10111	223
301.680 MHz	11000	224
301.705 MHz	11001	225
301.730 MHz	11010	226
301.755 MHz	11011	227
301.780 MHz	11100	228
301.805 MHz	11101	229
301.830 MHz	11110	230

8. RECEIVER INSTALLATION

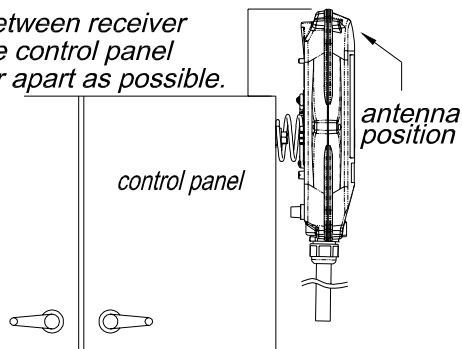
8.1 Preparation For Installation

1. Required Tools for Receiver Installation:
 - (1) Flat Head Screwdriver (-)
 - (2) Phillips Head Screwdriver (+)
 - (3) Multi-Meter
 - (4) 14mm Wrench x 2
 - (5) Power Drill with 10.5mm Drill-Bit
2. Check to ensure that your receiver is not set to the same RF channel and ID code as any other systems in operation at the same facility or within 900 feet distance.
3. Prior to installation, make sure that the crane or equipment itself is working properly.
4. Use a multi-meter to check the voltage source available and ensure the receiver voltage setting matches your power source.
5. Prior to installation, switch off the main power source to the crane or equipment.

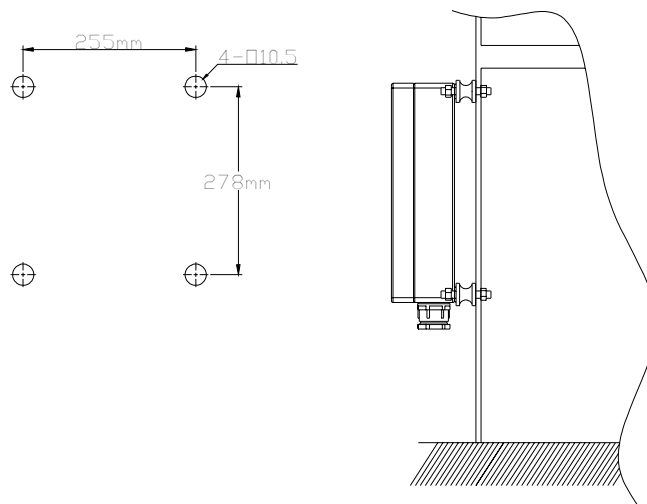
8.2 Step-By-Step Installation

1. For better reception, 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. Mounting the receiver next to an unshielded variable frequency control (inverter) may cause minor interference. Always locate the receiver unit as far away from inverter controls as possible.
3. Ensure the selected location has adequate space to accommodate the receiver enclosure.
4. Make sure 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 (refer to fig. 21 and fig. 22 on page 28).
6. If a crane or equipment's runway is longer than 300 feet, an external antenna should be added. The Alpha 500 series' receiver housing has provisions for an external factory installed antenna available as an option, contact your dealer for price and delivery.
7. Alpha 500 ~ 560 models: Drill a hole on the control panel (10.5mm).
Alpha 580 models: Drill 4 holes on the control panel (10.5mm).
8. Tightened the bolt nuts provided.
9. **If the control panel has a plastic surface, extended grounding wire should be used.**
10. For system wiring, please refer to the output contact diagrams from page 15~20.
11. Ensure all wiring is correct and safely secured and all screws are fastened.

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



(Fig. 21) Alpha 500 ~ 560 Models



(Fig. 22) Alpha 580 Models

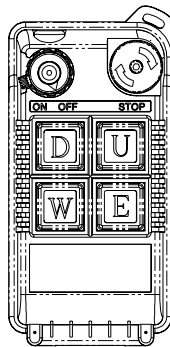
8.3 System Testing

1. Connect the power source to the receiver and test the MAIN relay output by pressing the red emergency stop button (EMS) and observe that it properly opens and closes the main line disconnect contactor.
2. Test the operation of each function to ensure it corresponds to the transmitter direction labels and/or the pendant it is replacing.
3. Test the limit switches on the hoist and/or crane and verify they are working properly.
4. If your new remote control is replacing an existing pendant, make sure it is completely disconnected to prevent unwanted control commands, i. e. snick circuits.
5. If your new remote control is replacing an existing pendant make sure it is stored in a safe location where it will not interfere with remote operation (get torn off).

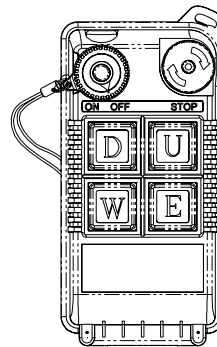
9. TRANSMITTER OPERATION

1. **Batteries** _ Make sure the two “AA” alkaline batteries are installed correctly. Use 2000mA rated alkaline-type batteries for optimum operating time between replacements. If rechargeable-type batteries are used, for optimum operating time, choose ones rated above 1600mA.
2. **Startup Procedure** _ There are two types of transmitter power key-switch available for the Alpha 500 series, the standard fixed type (refer to fig. 23) and the optional removable type (refer to fig. 24). Basically both types operate in the same fashion depending on personal preference. For the below illustrations, the optional removable-type power key is used.

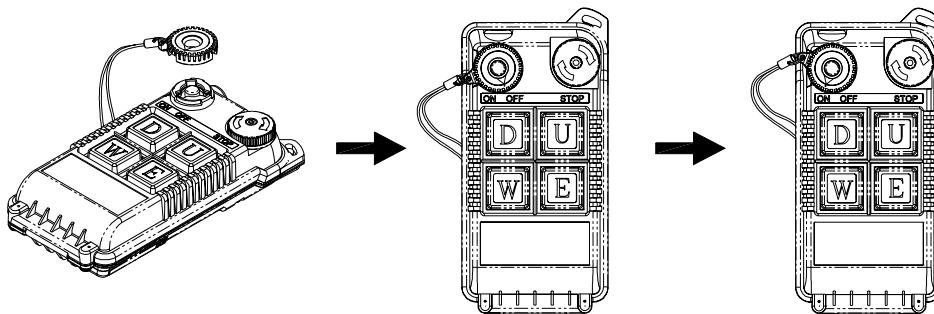
You must first make sure that the red EMS button is elevated prior to turning “on” the transmitter power key-switch, by twisting it 1/4 turn clockwise, it will pop up. Then insert the transmitter power key on to the key-switch slot located on the top left-hand corner of the transmitter handset (refer to fig. 25). To turn “on” the transmitter power, just rotate the power key clockwise to “ON” position. The Status LED located at the center of the key-switch slot will display a constant green light for up to 2 seconds when the power key is inserted and turned to “ON” position. Again, make sure the red EMS button is elevated prior to turning on the transmitter power. If the power key is turned “on” prior to elevating the red EMS button, the transmitter will be locked due to incorrect startup sequence. If this situation occurs, you must reenact the startup procedure, that is, elevate the red EMS button first then turn the power key “off” and then back “on” again.



(Fig. 23) Fixed On/Off key



(Fig. 24) Removable On/Off key



(Fig. 25) Removable On/Off key installation procedure

3. **Status Lights** _ If the transmitter Status LED displays a red blinking light that is “on” → 0.1 second and “off” → 2.0 seconds, or no light at all, this indicates that the two “AA” batteries in the transmitter must be replaced. For battery replacement please refer to instruction next page.

If the transmitter Status LED is blinking red, “on” → 2.0 seconds and “off” → 0.1 second, it means that the transmitter handset is locked due to a damaged or closed pushbutton contact. Also possibly the operator is pressing a pushbutton while going through the start up sequence. This important safety feature is designed to prevent any unexpected crane movement at system startup caused by closed or defective pushbutton contacts.

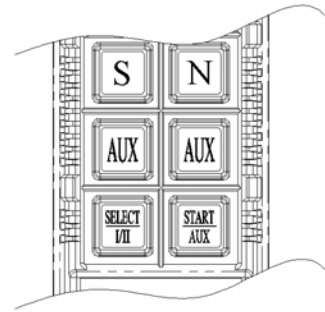
If the transmitter Status LED displays a constant red light without flashing, this indicates that the transmitter ID code is set incorrectly (refer to section 7.2 on page 22).

4. **EMS & Restarting** _ In case of an emergency, pressing down the red EMS button will send the “Stop” command which will immediately deactivates the receiver MAIN relay. When the red EMS button is pressed, the transmitter Status LED will display a blinking red light that is “on” → 0.5 second and “off” → 0.5 second, telling the operator that the “Stop” command is being sent to the receiver. To reactivate the receiver MAIN relay after pressing down the red EMS button, just elevate the red EMS button and then turn the transmitter power “off” and then back “on” again. In event of an emergency please do not turn the transmitter power “off”, always activate the EMS button first by pressing it downward prior to turning “off” the transmitter power. When the transmitter power is turned “off” the EMS function is ineffective.
5. **Shutting Off the Transmitter** _ To disconnect the transmitter power, just turn the power key to “off” position. It is strongly recommended that, prior to disconnecting the transmitter power, always initiate the emergency stop command by pressing the red EMS button downward, this will deactivate the receiver MAIN relay altogether. When the red EMS button is depressed, also make sure to turn the transmitter power “off” afterward or else the transmitter will continued to send the “Stop” command to the receiver until the battery power is completely drained.
6. **Receiver Main Relay Deactivates in 5 Minutes** _ Your receiver MAIN relay is programmed to drop (open) the “Main Line Disconnect Contactor” after 5 minutes of inactivity, that is 5 minutes after the last pushbutton is released. Pressing any pushbutton will close the MAIN relay and start the timing sequence over again. But, if your crane or hoist is equipped with VFD drive this can sometimes cause an unacceptable delay. In this situation we suggest you remove the JP2 jumper (refer to JP2 setting on page 21), this way the receiver MAIN relay will remain closed until the “Stop” command is received or when the power source to the receiver is turned “off”.
7. **Models with 3-Stage SELECT Function** _ When the transmitter power key is turned on, LED-I will light up indicating only the main hoist and/or trolley is activated. To activate the auxiliary hoist and/or trolley, just press the SELECT button one time, the LED display will switch from LED-I to LED-II, indicating only the auxiliary hoist and/or trolley is activated. Press the SELECT button again to have both main and auxiliary hoist and/or trolley activated at the same time (both LED-I and LED-II lit). When both LED-I and LED-II are lit, pressing any pushbutton will result in simultaneous movement for the main and auxiliary hoist and/or trolley.

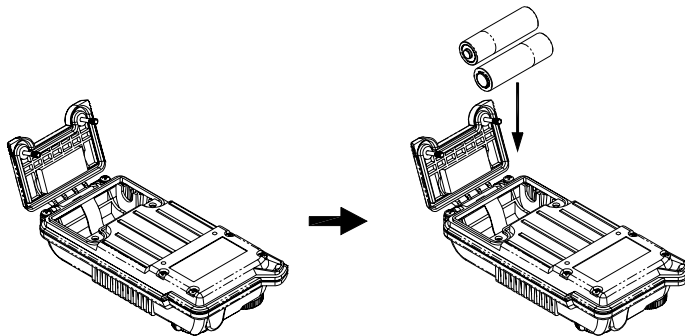
Example: Both main and auxiliary hoist will go up at the same time when “UP” (↑) pushbutton is pressed.

To switch back to the main hoist and/or trolley, just press the SELECT button again. Please note that each time the transmitter power is turned “off”, the SELECT setting will default back to LED-I with main hoist and/or trolley active.

- 1) Transmitter power on → LED-I "lit" → Main hoist and/or trolley activated.
- 2) Press SELECT button → LED-II "lit" → Auxiliary hoist and/or trolley activated.
- 3) Press SELECT button again → both LED-I & LED-II "lit" → Both main and auxiliary hoists and/or trolleys activated with duplicate movements.
- 4) Press SELECT button again → SELECT mode returned to LED-I with main hoist and/or trolley activated.



8. **Interlocking Pushbuttons** _ Each set of motion is interlocked to its self so no conflicting commands can take place. For example, pressing the hoist UP (↑) and DOWN (↓) button simultaneously will result in no command being sent.
9. **Battery Changing** _ To change batteries, just unscrew the battery cover located on the backside of the transmitter handset with a (+) head screwdriver. When changing new batteries, make sure that the batteries are installed correctly. The marking inside the battery compartment will tell you which side is positive (+) and which side is negative (-). After changing the batteries, make sure all screws are tightened.



10. **Initial Startup Code** _ Please note that the receiver unit must received an “Initial Startup Code” from the transmitter in order for it’s MAIN relay to be energized. What this means is that the transmitter can only activate the receiver MAIN relay as long as the operator is within the receiving range. For example, if the operator turns on the transmitter in a different area of the facility beyond 300 feet from the receiver location, then he will not be able to initiate the crane when he approached within 300 feet from the receiver. If this happens the operator would have to resent the initial startup code by turning the transmitter power “off” and then “on” again.

10. TROUBLE SHOOTING

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

PROBLEM	POSSIBLE REASON	SOLUTION
Transmitter does not communicate with the 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 with the receiver.	Low or no transmitting power from the transmitter unit.	Turn “on” the transmitter with EMS elevated. If the status LED shows blinking red 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 the power indicator (AC) is still not lit, please check the receiver for any open fuse.
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.
Transmitter does not communicate with the receiver.	Transmitter is turned on with the EMS activated (pressed down).	Elevate the EMS first and then turn the power switch off and then on again.

Receiver System Status LED Display

(Refer to fig.15/16/18 on page 11/12/14)

TYPE	LED INDICATION	PROBLEM AND SOLUTION
1	Constant red light.	EEPROM error – reprogramming required.
		Incorrect receiver ID code setting (see note below).
2	ON → 1.0 second OFF → 1.0 second	ID code not matched on both the transmitter and receiver unit, please readjust accordingly.
3	Dim or no light.	Under-voltage, check the main power-supply.
4	ON → 2.0 seconds OFF → 0.1 second	MAIN contact relay jammed or defective.
5	ON → 0.1 second OFF → 2.0 seconds	System normal with transmitter pushbutton either in neutral or in transmitter power “off” position.
6.	ON → 0.1 second OFF → 0.1second	System normal with transmitter pushbutton in non-neutral position (pushbutton depressed).

Note: Please refer to section 7.2 on page 22 for correct ID code setting.

11. SYSTEM SPECIFICATION

Transmitter Unit

Frequency Range	:	301 MHz
Transmitting Range	:	250 ~ 300 feet
Hamming Distance	:	6
Channel Spacing	:	25KHz
Frequency Control	:	Quartz Crystals
Frequency Drift	:	< 5ppm @ -13°F ~ 158°F
Frequency Deviation	:	< 1ppm
Spurious Emission	:	- 50dB
Transmitting Power	:	0.3mW
Emission	:	F1D
Antenna Impedance	:	50 ohms
Enclosure Rating	:	IP-66
Source Voltage	:	3.0V (“AA” alkaline batteries x 2)
Current Drain	:	10 ~ 18mA
Operating Temperature	:	-13°F ~ 158°F
Dimension (500~520 Models)	:	14.0 x 6.8 x 3.3 (cm)
(540~560 Models)	:	17.3 x 6.8 x 3.3 (cm)
(580 Models)	:	21.3 x 6.8 x 3.3 (cm)
Weight (500~520 Models)	:	7.0oz (include batteries)
(540~560 Models)	:	8.5oz (include batteries)
(580 Models)	:	10.0oz (include batteries)

Receiver Unit

Frequency Range	:	301 MHz
Channel Spacing	:	25KHz
Hamming Distance	:	6
Frequency Control	:	Synthesizer (PLL)
Frequency Drift	:	< 5ppm @ -13°F ~ 158°F
Frequency Deviation	:	< 1ppm
Sensitivity	:	-120dBm
Antenna Impedance	:	50ohms
Data Decoder Reference	:	Quartz Crystals
Responding Time	:	40ms (Normal)
Enclosure Rating	:	IP-65 (Alpha 500 ~ 560 Models) IP-66 (Alpha 580 Models)
Source Voltage	:	AC 110 ~ 120V @ 50/60 Hz. (others available)
Power Consumption	:	11VA
Operating Temperature	:	-13°F ~ 158°F
Output Contact Rating	:	250V @ 10A
Dimension (500~560 Models)	:	31.0 x 13.4 x 7.2 (cm)
(580 Models)	:	30.0 x 23.0 x 8.6 (cm)
Weight (500~520 Models)	:	3.6lb (include output cable)
(540~560 Models)	:	4.0lb (include output cable)
(580 Models)	:	7.5lb (no output cable)

12. PARTS LIST

1.	301 MHz Transmitting RF Board (All Models)	BTX301
2.	Encoder Board (Alpha 500)	BEN500
	Encoder Board (Alpha 520)	BEN520
	Encoder Board (Alpha 540S)	BEN540S
	Encoder Board (Alpha 540A)	BEN540A
	Encoder Board (Alpha 560S)	BEN560S
	Encoder Board (Alpha 560A)	BEN560A
	Encoder Board (Alpha 580A-1)	BEN580A1
	Encoder Board (Alpha 580A-2)	BEN580A2
	Encoder Board (Alpha 580B)	BEN580B
	Encoder Board (Alpha 580C-1)	BEN580C1
	Encoder Board (Alpha 580C-2)	BEN580C2
	Encoder Board (Alpha 580D)	BEN580D
	Encoder Board (Alpha 580E)	BEN580E
	Encoder Board (Alpha 580F)	BEN580F
3.	301 MHz Receiving RF Module (All Models)	BRX301
4.	Decoder/Relay Board (Alpha 500)	BDR500
	Decoder/Relay Board (Alpha 520)	BDR520
	Decoder/Relay Board (Alpha 540S)	BDR540S
	Decoder/Relay Board (Alpha 540A)	BDR540A
	Decoder/Relay Board (Alpha 560S)	BDR560S
	Decoder/Relay Board (Alpha 560A)	BDR560A
	Decoder/Relay Board (Alpha 580A-1)	BDR580A1
	Decoder/Relay Board (Alpha 580A-2)	BDR580A2
	Decoder/Relay Board (Alpha 580B)	BDR580B
	Decoder/Relay Board (Alpha 580C-1)	BDR580C1
	Decoder/Relay Board (Alpha 580C-2)	BDR580C2
	Decoder/Relay Board (Alpha 580D)	BDR580D
	Decoder/Relay Board (Alpha 580E)	BDR580E
	Decoder/Relay Board (Alpha 580F)	BDR580F
5.	Transmitter Enclosure (Alpha 500 & 520 Models)	BCT500
	Transmitter Enclosure (Alpha 540S & 560S Models)	BCT560S
	Transmitter Enclosure (Alpha 540A & 560A Models)	BCT560A
	Transmitter Enclosure (Alpha 580A, C, D Models)	BCT580A
	Transmitter Enclosure (Alpha 580B, E, F Models)	BCT580B
6.	Receiver Enclosure (Alpha 500 & 520 Models)	BCR500
	Receiver Enclosure (Alpha 540 & 560 Models)	BCR560
	Receiver Enclosure (Alpha 580 Models)	BCR580

7.	Double-Step Pushbutton (All Models)	B50001
	Single-Step Pushbutton (All Models)	B50002
8.	EMS Red Cap (All Models)	EMS01
9.	Wrist Strap (Alpha 500 ~ 560 Models)	WS01
	Waist Belt (Alpha 580 Models)	WB01
10.	Pushbutton Rubber Boot (Alpha 500 & 520 Models)	PRB01
	Pushbutton Rubber Boot (Alpha 540 & 560 Models)	PRB02
	Pushbutton Rubber Boot (Alpha 580 Models)	PRB03
11.	Pushbutton Direction labels (All Types)	DL01
12.	Transformer (12/24VDC – Alpha 500 ~ 560 Models)	T24VDC
	Transformer (24VAC – Alpha 500 ~ 560 Models)	T24VAC
	Transformer (48VAC – Alpha 500 ~ 560 Models)	T48VAC
	Transformer (110/120VAC – Alpha 500 ~ 560 Models)	T120VAC
	Transformer (220/230 VAC – Alpha 500 ~ 560 Models)	T230VAC
	Transformer (380VAC – Alpha 500 ~ 560 Models)	T380VAC
	Transformer (12/24VDC – Alpha 580 Models)	SSB-2601
	Transformer (AC 110V~120V & 220V~230V – Alpha 580 Models)	SSB-2603
	Transformer (AC 350V~380V & 400V~460V – Alpha 580 Models)	SSB-2604
	Transformer (AC 24V/32V/46V/48V – Alpha 580 Models)	SSB-2665
13.	Regular Output Contact Relay (All Models)	RLY01
	Safety MAIN Contact Relay (All Models)	RLY02
14.	Protective Vinyl Casing (Alpha 500 ~ 560 Models)	VPC01
	Protective Vinyl Casing (Alpha 540 ~ 560 Models)	VPC02
15.	Leather Pouch (Alpha 500 ~ 520 Models)	LP500
	Leather Pouch (Alpha 540 ~ 560 Models)	LP560
16.	6-foot Output Cable with 1 Common Circuit (Alpha 500 ~ 560 Models)	OC500
	6-foot Output Cable with 1 Common Circuit (Alpha 540 ~ 560 Models)	OC501
	6-foot Output Cable with 2 Common Circuits (Alpha 540 ~ 560 Models)	OC502
	6-foot Output Cable with 3 Common Circuits (Alpha 500 ~ 520 Models)	OC503
	6-foot Output Cable with 4 Common Circuits (Alpha 540 ~ 560 Models)	OC504
17.	Receiver Mounting Spring + Hardware (Alpha 500 ~ 560 Models)	RMS500
	Receiver Shock Absorbers + Mounting Hardware (Alpha 580 Models)	RSA580
18.	Optional External 301 MHz Antenna (All Models)	ANT301
19.	BNC Jack for External Antenna Connection (Alpha 500 ~ 560 Models)	BNC500
	BNC Jack for External Antenna Connection (Alpha 580 Models)	BNC580
20.	BNC Lead Wire for External Antenna Connection	BLW500
21.	6-foot Coaxial Cable for External Antenna Connection (All Models)	CC500
22.	Removable Transmitter Power Key (All Models)	KEY01