![Linear ACCESS®]

AK-11
Digital Keyless Entry System

Installation and Programming Instructions

Linear®

CONTENTS

INTRODUCTION

Linear's AK-11 is a digital keyless entry system designed for access control applications. The keypad is housed in a rugged cast aluminum enclosure that can be mounted to a pedestal or bolted directly to a wall. The die-cast keys have bright, easy-to-read yellow graphics.

Up to 480 entry codes, from 1 to 6 digits in length, can be programmed. They can activate either, or both, of the relay outputs. Relay #1 has a 5 Amp capacity. Relay #2 has a 1 Amp capacity.

Two LED indicators show the status of the entry system. The left LED lights red to indicate power, then turns green when access is granted. The right LED lights yellow when the keypad is in "lockout" condition (from too many incorrect code entries). The keypad's courtesy light can be always off, always on or be programmed to illuminate from 1-4 minutes after any keypress (default 2 minutes). An internal sounder beeps when each key is pressed.

The DOOR SENSE/INHIBIT input can be used two ways. If programmed for "door sense", a switch on the door detects forced entry or door ajar situations. If programmed for "inhibit", the input can be wired to a "service" switch or automatic timer that will disable the Relay #1 when required.

The REQUEST-TO-ENTER input can be wired to a pushbutton or fire access keyswitch to provide codeless entry for authorized personnel. The "anti-passback" feature prevents using the same code twice before the programmed time elapses.

The ALARM SHUNT output activates when access is granted. This output can be wired to shunt alarm contacts on the access door/gate to prevent triggering of an alarm when authorized access occurs.

Two solid state outputs, capable of switching 100 mA to common, are programmable to signal forced entry, door ajar, lockout, alarm circuit shunting, request-to-enter, and keypad active conditions.

The AK-11 is powered from a 12-24 Volt AC or DC source. Power can be obtained from the access device or a separate power supply. The EEPROM memory retains all entry codes and programming, even without power.

SPECIFICATIONS

MECHANICAL

Case dimensions: 4.00" W x 5.50" H x 3.00" D

ELECTRICAL

Voltage: 12-24 Volts AC or DC

Current: 10 mA typical, 150 mA maximum

Outputs: Relay #1
Form "C" 5 Amps @ 24 Volts maximum

Relay #2
Form "C" 1 Amp @ 24 Volts maximum

Solid state outputs (Outputs #3 & #4)
Short-to-common 100 mA
@ 24 VDC maximum

ENVIRONMENTAL

Temperature: -22°F to 149°F (-30°C to 65°C)

Humidity: 5% to 95% non-condensing

FEATURES

✓ KEYPAD PROGRAMMABLE

✓ 480 ENTRY CODE CAPACITY

✓ 1-6 DIGIT ENTRY CODE LENGTH

✓ 4 INDEPENDENT OUTPUTS (TIMED/TOGGLED)

✓ 4 INDEPENDENT TIMERS

✓ EACH ENTRY CODE CAN BE PROGRAMMED TO ACTIVATE EITHER OR BOTH RELAYS

✓ RELAY CONTACTS ARE FORM "C" (N.O. & N.C)

✓ SOLID STATE OUTPUTS ARE OPEN COLLECTOR (SWITCH-TO-COMMON)

✓ TWO LED INDICATORS

✓ COURTESY LAMP

✓ PIEZO SOUNDER

✓ TIMED ANTI-PASSBACK (LAST 3 VALID ENTRIES)

✓ KEYPAD LOCKOUT

✓ TACTILE KEY FEEL

✓ DOOR SENSE INPUT

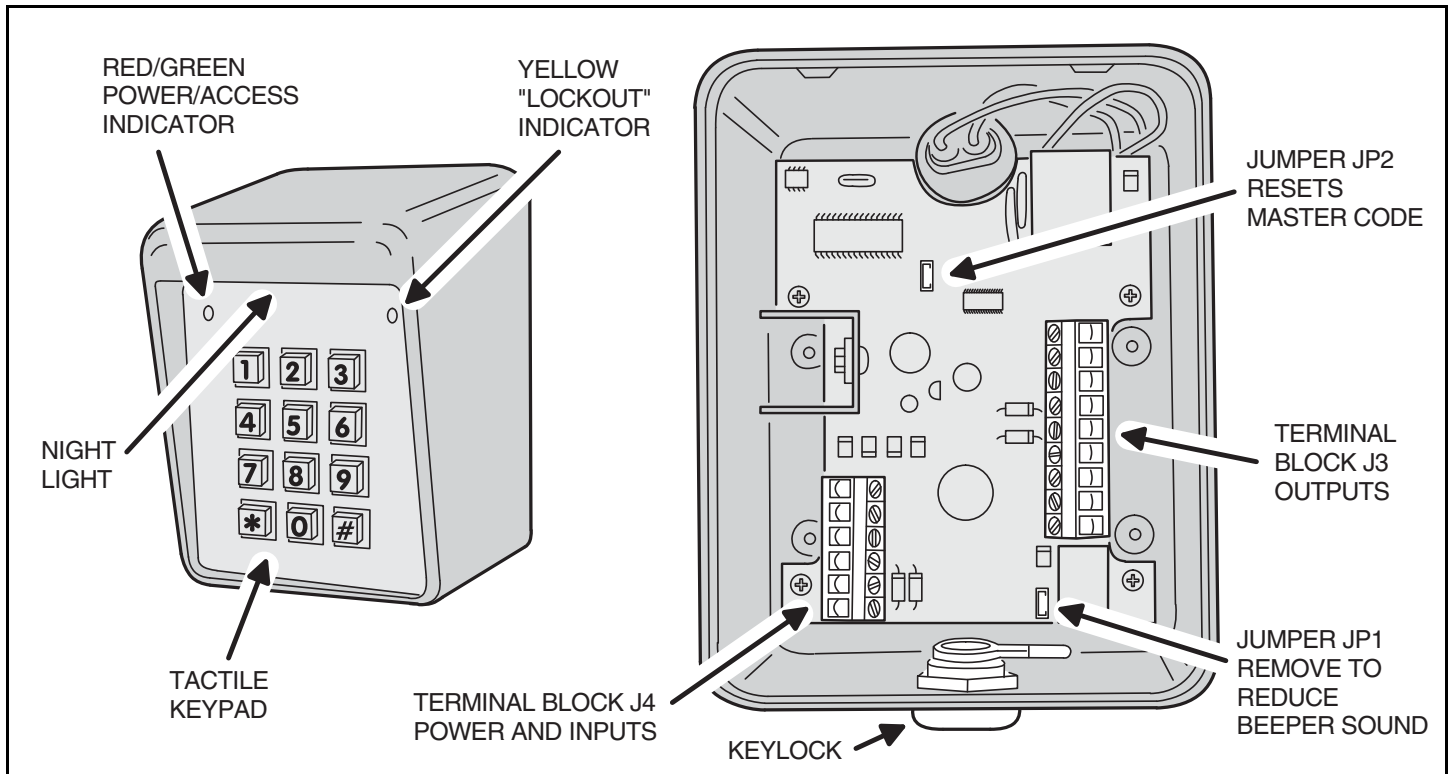✓ INHIBIT INPUT

✓ REQUEST-TO-ENTER INPUT

COMPONENT LOCATIONS

RED/GREEN POWER/ACCESS INDICATOR

YELLOW "LOCKOUT" INDICATOR

JUMPER JP2 RESETS MASTER CODE

NIGHT LIGHT

TERMINAL BLOCK J3 OUTPUTS

TACTILE KEYPAD

TERMINAL BLOCK J4 POWER AND INPUTS

KEYLOCK

JUMPER JP1 REMOVE TO REDUCE BEEPER SOUND

Figure 1. Component Locations

WIRING DIAGRAM

TYPICAL GATE INSTALLATION WIRING

AK-11

J3

N.O. 1
RELAY #1   COMMON 2
N.C. 3
OUTPUT #3 4
OUTPUT #4 5
N.O. 6
RELAY #2   COMMON 7
N.C. 8
COMMON 9 GROUND

J4

1 **+** POWER
2 **–**
3 INHIBIT
4 COMMON
5 REQUEST-TO-ENTER
6 EARTH GROUND

INHIBIT TIMER

FIRE ACCESS

REQUIRED WIRING

OPTIONAL WIRING

AUXILIARY POWER

OPEN

GATE OPERATOR

TYPICAL DOOR INSTALLATION WIRING

AK-11

J3

N.O. 1
RELAY #1   COMMON 2
N.C. 3
OUTPUT #3 4
OUTPUT #4 5
N.O. 6
RELAY #2   COMMON 7
N.C. 8
COMMON 9 GROUND

TO ALARM SYSTEM

J4

1 **+** POWER
2 **–**
3 DOOR SENSE
4 COMMON
5 REQUEST-TO-ENTER
6 EARTH GROUND

OPEN

POWER SUPPLY

ALARM CONTACT

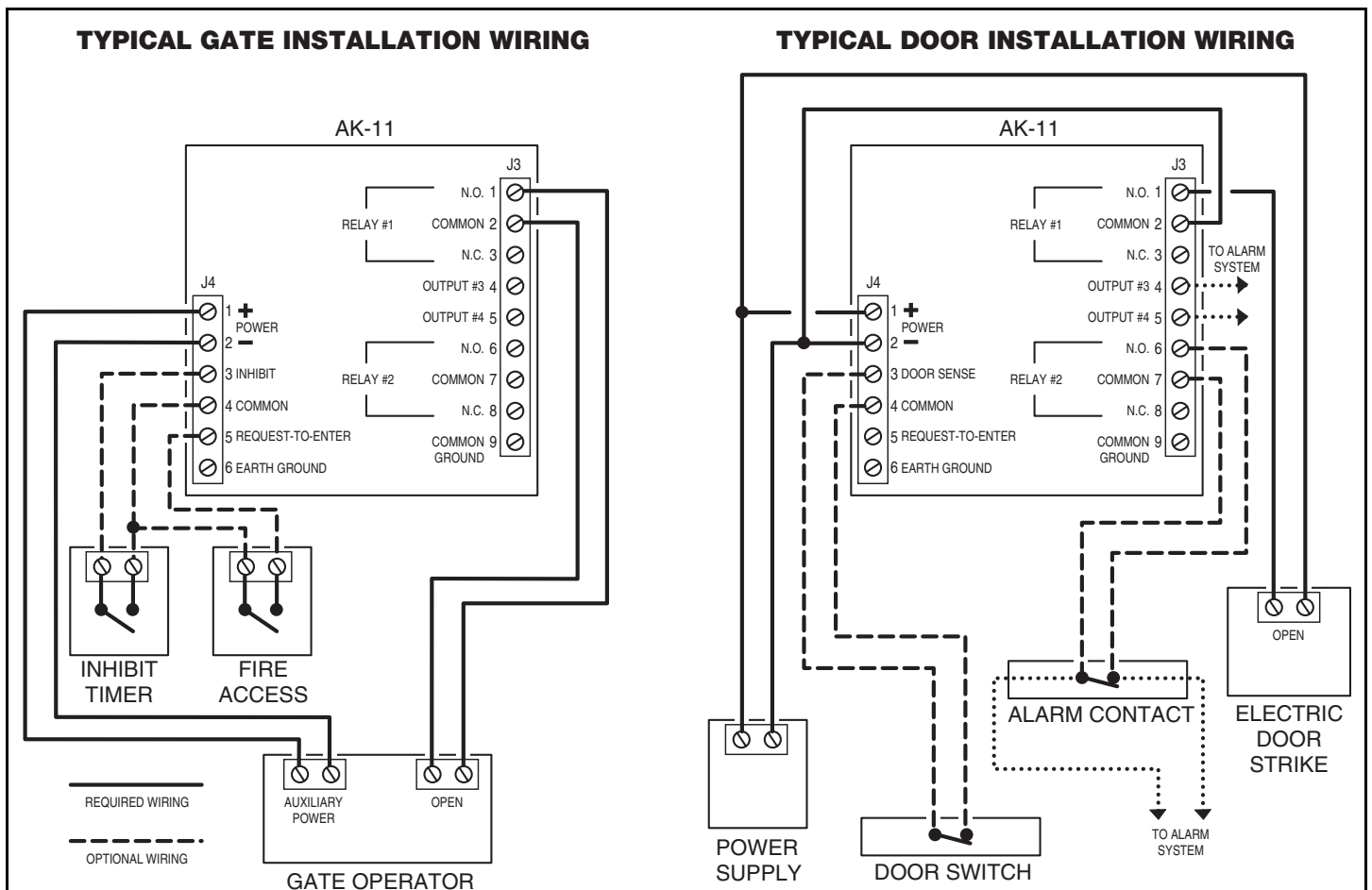DOOR SWITCH

ELECTRIC DOOR STRIKE

TO ALARM SYSTEM

Figure 2. Wiring Diagram

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INSTALLATION

To avoid damage to the unit from static discharges, connect the EARTH GROUND terminal to a good earth grounding point. Suggested wiring size is 18 AWG for earth ground and power (up to 500 feet of 18 AWG wire can be run for power, use larger wire for longer runs). Use 22 AWG or larger (depending on the load) for all other connections.

♦ *CAUTION: If the unit is AC powered, and one side of the power transformer secondary is connected to earth ground, connect the grounded side to the "-" power terminal of the unit.*

Select a location for the keypad. For door access control installations, mount the keypad near the controlled door. For gate control installations, mount the keypad in clear view of the gate, but far enough from the gate so the user cannot touch the gate from the keypad.
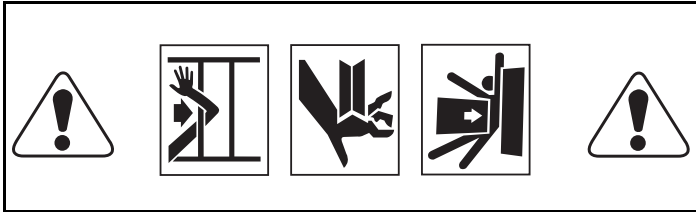
★ *WARNING: TO AVOID SERIOUS INJURY OR DEATH, MAKE SURE THAT THE UNIT IS FAR ENOUGH FROM THE GATE SO THAT THE USER CANNOT TOUCH THE GATE WHILE OPERATING THE KEYPAD. HOWEVER, THE GATE MUST BE FULLY VISIBLE FROM THE KEYPAD.*

Pedestal Mounting

The AK-11 keypad can be mounted on a standard pedestal.

☐ Use four security bolts and locking nuts to secure the keypad's backplate to the pedestal (see Figure 3).

Wall Mounting

The AK-11 keypad can be mounted directly to a wall or flat surface.

☐ Use the appropriate fasteners to secure the keypad's backplate to the mounting surface.

☐ When mounting the keypad to a concrete wall, use concrete wedge anchors or molly anchors (see Figure 4).
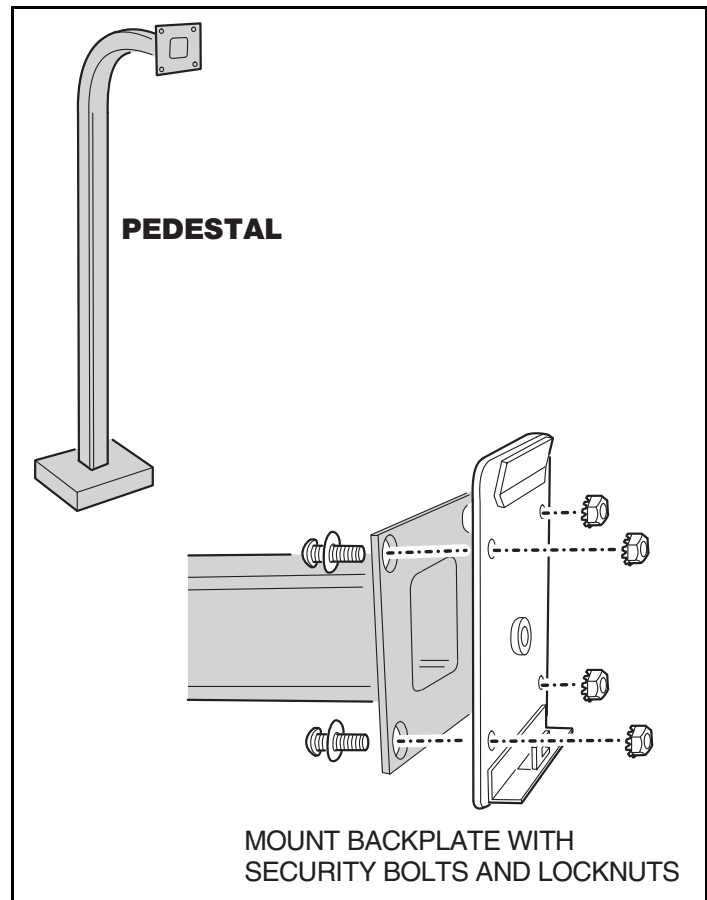
MOUNT BACKPLATE WITH
SECURITY BOLTS AND LOCKNUTS

Figure 3. Pedestal Mounting Keypad Backplate
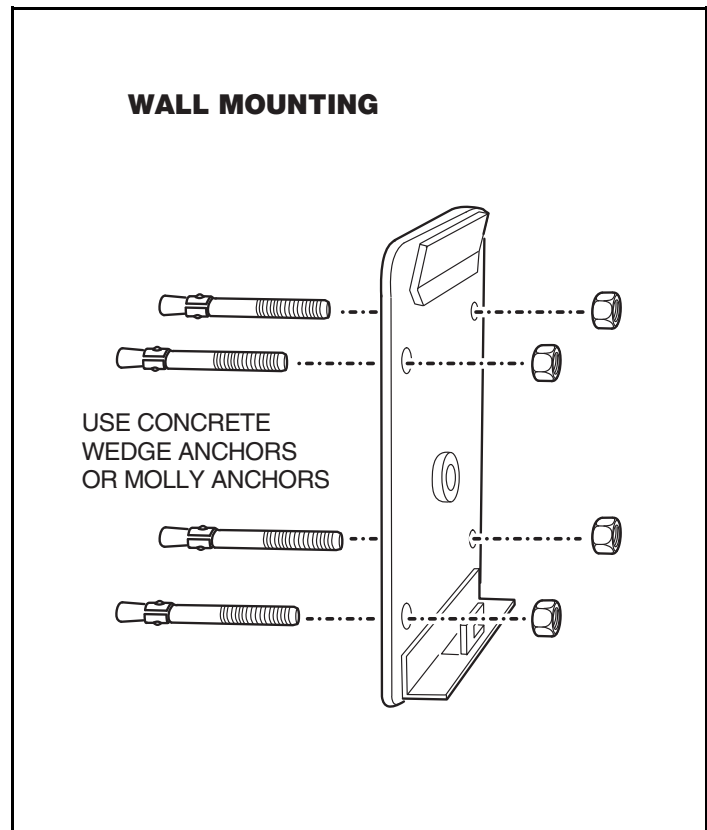
USE CONCRETE
WEDGE ANCHORS
OR MOLLY ANCHORS

Figure 4. Wall Mounting Keypad Backplate

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Gate Control

☐ Route four wires between the gate and the keypad (two for power, two for control).

☐ Connect the gate operator's auxiliary or radio power output terminals to the keypads POWER input terminals (observe wiring polarity).

☐ Connect the gate operator's OPEN terminals to the keypad's Relay #1 COMMON & N.O. terminals.

☞*NOTE: For operator wiring specifics, refer to the gate operator's wiring diagram.*

☐ If a request-to-enter pushbutton or fire access keyswitch is going to be used, route two wires from the keypad to the normally open switch. Connect the wires to the normally open switch and to the keypad's REQUEST-TO-ENTER and COMMON terminals.

☐ If an inhibit switch or timer is going to be used, route two wires from the keypad to the inhibit switch or timer relay. Connect the inhibit switch/timer terminals to the keypad's INHIBIT and COMMON terminals.

☞*NOTE: If the INHIBIT input is going to be used, it must be programmed to select that input type. See the Programming Options section of this manual.*
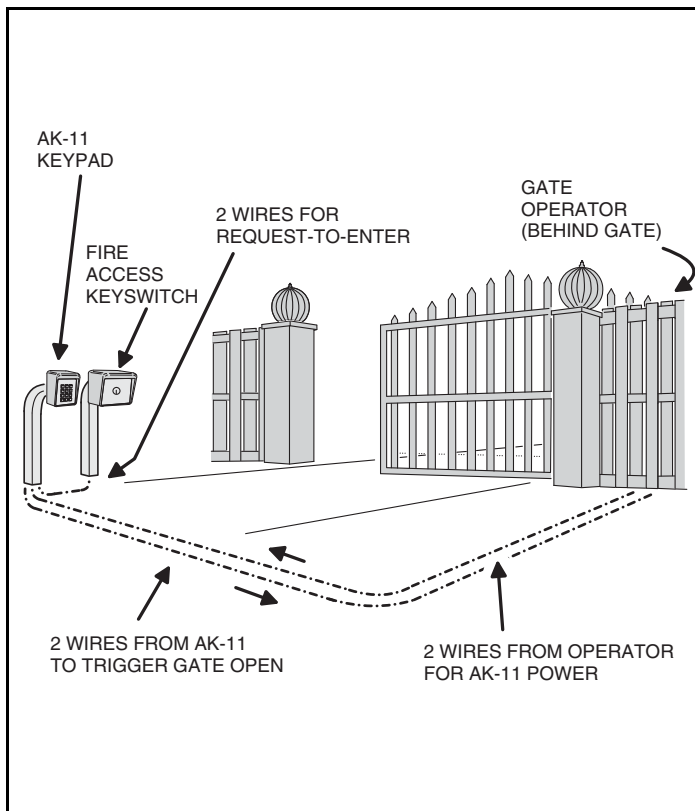
Door Control

☐ Install a low voltage electric door strike for unlocking the door.

☐ Choose a location for the power supply or transformer.

☐ Route two wires between the power supply and the keypad. Connect the power supply's output terminals to the keypad's POWER input terminals (observe wiring polarity).

☐ Route two wires between the door strike and the keypad. Connect one of the door strike wires to the keypad's Relay #1 N.O. terminal. Connect the other door strike wire to the keypad's POWER **+** terminal. Connect a wire between the keypad's POWER **-** terminal and the Relay #1 COMMON terminal.

☐ If a request-to-enter pushbutton or fire access keyswitch is going to be used, route two wires from the keypad to the normally open switch. Connect the wires to the normally open switch and to the keypad's REQUEST-TO-ENTER and COMMON terminals.

☐ To use the door sense feature to detect forced entry or door ajar conditions, install a normally closed door switch on the door and route two wires from the switch to the keypad. Connect the door switch to the keypad's DOOR SENSE and COMMON terminals.

☐ If an inhibit switch or timer is going to be used, route two wires from the switch or timer to the keypad. Connect the inhibit switch/timer terminals to the keypad's INHIBIT and COMMON terminals.

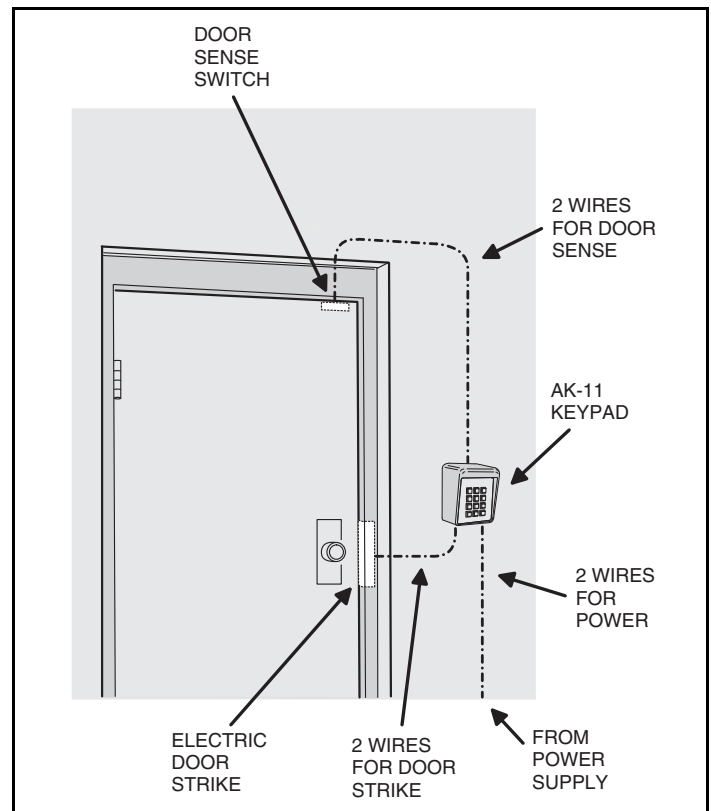☞*NOTE: Either door sense or inhibit can be used. Both features cannot be used at the same time.*

Figure 5. Gate Installation

Figure 6. Door Installation

FACTORY DEFAULTS

MASTER PROGRAMMING CODE 123456
ENTRY CODE LENGTH . . . . 4 DIGITS
REQUEST-TO-ENTER OUTPUT . . . . RELAY #1
ALARM SHUNT OUTPUT . . . . DISABLED
FORCED ENTRY OUTPUT . . . . OUTPUT #3
DOOR AJAR OUTPUT . . . . OUTPUT #4
RELAY #1 ON TIME . . . . 2 SECONDS
RELAY #2 ON TIME . . . . 2 SECONDS
SOLID STATE OUTPUT #3 ON TIME . . . . 2 SECONDS
SOLID STATE OUTPUT #4 ON TIME . . . . 2 SECONDS
DOOR SENSE/INHIBIT INPUT . . . . DOOR SENSE
KEYPAD LOCKOUT OUTPUT . . . . DISABLED
KEYPAD ACTIVE OUTPUT . . . . DISABLED
DOWNLIGHT ON-TIME . . . . 2 MINUTES
BEEPER SOUNDS WHEN KEY PRESSED . . . . YES
BEEPER SOUNDS DURING RELAY #1 . . . . NO
BEEPER SOUNDS DURING RELAY #2 . . . . NO
BEEPER SOUNDS DURING OUTPUT #3 . . . . NO
BEEPER SOUNDS DURING OUTPUT #4 . . . . NO
KEYPAD LOCKOUT COUNT . . . . . 3 TRIES BEFORE LOCKOUT
ANTI-PASSBACK TIME . . . . NO ANTI-PASSBACK

BASIC PROGRAMMING

When the AK-11 is in programming mode, both LEDs will turn off until programming begins. After a programming option number is entered the yellow LED will blink. This indicates that the AK-11 is ready to accept the new programming data. After the new data entry is complete, the green LED will light while the data is being stored. The red LED will light if any programming data is entered incorrectly, and the command will have to be fully re-entered.

Entering Programming Mode

The 6-digit Master Programming Code (default = 123456) is used to enter Programming Mode.

Press: # 9 # Master Code

Master Code = the current 6-digit Master Programming Code

Exiting Programming Mode

Press: ∗ ∗

The red LED will light when Programming Mode is exited.

☞*NOTE: The AK-11 will automatically exit Programming Mode after two minutes of inactivity.*

Re-entering a Command After a Mistake

If the red LED lights, indicating an incorrect entry, or a wrong key is pressed during programming, to clear the keypad and re-enter the command:

Press: ∗ 9

Setting Entry Code Length   Default: 4 digits

Press: 0 3 # Length

Length = 1 - 6 for entry code length

☞*NOTE: If the Entry Code Length is going to be changed from the factory default of four digits, make this change first, before programming any entry codes.*

Adding a New Entry Code

Press: 0 1 # Code # Code # Action

Code = The new entry code: 1-999999, depending on code length
Action = Relay output entry code will activate as follows:

> *1 = Relay #1, timed open*
> *2 = Relay #2, timed open*
> *3 = Both Relays, timed open*
> *10 = Relay #1, toggled*
> *20 = Relay #2, toggled*
> *30 = Both Relays, toggled*
> *12 = Relay #1 toggled; Relay #2, timed open*
> *21 = Relay #1, timed open; Relay #2 toggled*

The yellow LED will flash quickly while the AK-11 searches its memory for available space and duplicate entries. The green LED will light when the new code is stored.

If the new entry code chosen is already being used for another entry code, the red LED will light. A new *unique* code needs to be entered.

☞*NOTE: Leading zeros (zeros before the code number, i.e. 0001) do not need to be entered when programming a new entry code. The AK-11 will internally add any zeros to fill all digits determined by the entry code length setting. Leading zeros **will** have to be entered by the user when entering their code to gain access.*

Erasing a Single Entry Code

Press: 0 2 # Code # Code

Code = The entry code to delete.

The yellow LED will flash quickly while the AK-11 searches its memory for the code to erase. The green LED will light when the code is erased.

Erasing All Entry Codes

★ *WARNING: Performing this command will remove all entry codes from the memory.*

Press: 9 7 # 0 0 0 0 0 0 # 0 0 0 0 0 0

☞*NOTE: The green LED will light while the memory is being erased. This may take up to 15 seconds.*

Changing the 6-Digit Master Programming Code

Press: 9 8 # Master Code # Master Code

Master Code = The new 6-digit Master Programming Code

New master code: _____

PROGRAMMING OPTIONS

Select Door Sense or Inhibit Input
Default: Door Sense

The input on terminal block J4, terminal #3 can be programmed for DOOR SENSE or INHIBIT.

Press: 1 0 # Input

Input = 1 for Inhibit,
= 0 for Door Sense

When programmed for DOOR SENSE, if an open condition on the input occurs *before* access is granted (with an entry code or with the request-to-enter input) a FORCED ENTRY output will occur. If an open condition remains *60 seconds after* a relay activation for access, a DOOR AJAR output will occur.

When programmed for INHIBIT, a closed condition on the input will prevent relay #1 from activating when access is requested (with an entry code). This mode is typically used with an external timer to disable the access device at certain times.

Select Forced Entry Output
Default: Output #3

Sets which output activates if the Door Sense input opens before access is granted. This output is not timed.

Press: 1 1 # Output

Output = Output to Activate (0-4)
1 = Relay #1   2 = Relay #2   3 = Output #3
4 = Output #4   0 = No Output

Select Door Ajar Output
Default: Output #4

Sets which output activates if the Door Sense input stays open after access is granted. This output is not timed.

Press: 1 2 # Output

Output = Output to Activate (0-4)
1 = Relay #1   2 = Relay #2   3 = Output #3
4 = Output #4   0 = No Output

Select Keypad Lockout Output
Default: No Output

Sets which output activates when the keypad is "locked out" after too many incorrect entry code attempts. The lockout time is 60 seconds.

Press: 1 3 # Output

Output = Output to Activate (0-4)
1 = Relay #1   2 = Relay #2   3 = Output #3
4 = Output #4   0 = No Output

Select Keypad Active Output
Default: No Output

Sets which output activates when any keys are pressed. This output is timed.

Press: 1 4 # Output

Output = Output to Activate (0-4)
1 = Relay #1   2 = Relay #2   3 = Output #3
4 = Output #4   0 = No Output

Select Alarm Shunt Output
Default: No Output

Sets which output activates during the time access is granted. (Use this output to shunt alarm contacts attached to the access door.) This output may be timed or latched.

Press: 1 5 # Output

Output = Output to Activate (0-4)
1 = Relay #1   2 = Relay #2   3 = Output #3,
4 = Output #4   0 = No Output

Select Request-to-Enter Output
Default: Relay #1

Sets which output activates when the Request-to-Enter input is grounded. This output remains activated for at least the length of time specified by the On-times for the relays or outputs. If the Request-to-Enter input continues to be grounded beyond the time specified by the On-times for the relays or outputs, the output will remain activated as long as the Request-to-Enter input remains grounded.

Press: 1 6 # Output

Output = Output to Activate (0-4)
1 = Relay #1   2 = Relay #2   3 = Output #3
4 = Output #4   0 = No Output

Relay #1 On-time
Default: 2 Seconds

Sets the length of time Relay #1 activates when triggered.

Press: 2 1 # Seconds

Seconds = Output time in seconds (0-60)

Relay #2 On-time
Default: 2 Seconds

Sets the length of time Relay #2 activates when triggered.

Press: 2 2 # Seconds

Seconds = Output time in seconds (0-60)

Solid-state Output #3 On-time
Default: 2 Seconds

Sets the length of time Output #3 activates when triggered.

Press: 2 3 # Seconds

Seconds = Output time in seconds (0-60) 99 = Toggle mode

Solid-state Output #4 On-time
Default: 2 Seconds

Sets the length of time Output #4 activates when triggered.

Press: 2 4 # Seconds

Seconds = Output time in seconds (0-60)
99 = Toggle mode

Set Downlight On-Time
Default: 2 Minutes

Sets the time duration that the downlight remains on after a key press.

Press: 2 5 # Duration

0 = Always off 1 = 1 minute 2 = 2 minutes 3 = 3 minutes
4 = 4 minutes 99 = Always on

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Beep Sounds on Keystrokes   Default: Yes

Selects whether or not the keypad beeps as each key is pressed.

Press: 4 0 # Sound

Sound = 1 for Yes = 0 for No

Beep Sounds During Relay #1   Default: No

Selects whether or not the keypad beeps during Relay #1 activation.

Press: 4 1 # Sound

Sound = 1 for Yes = 0 for No

Beep Sounds During Relay #2   Default: No

Selects whether or not the keypad beeps during Relay #2 activation.

Press: 4 2 # Sound

Sound = 1 for Yes = 0 for No

Beep Sounds During Output #3   Default: No

Selects whether or not the keypad beeps during Output #3 activation.

Press: 4 3 # Sound

Sound = 1 for Yes
= 0 for No

Beep Sounds During Output #4   Default: No

Selects whether or not the keypad beeps during Output #4 activation.

Press: 4 4 # Sound

Sound = 1 for Yes
= 0 for No

Keypad Lockout Count   Default: 3 Tries

Sets the number of incorrect entry code attempts allowed before the keypad "locks out".

Press: 5 0 # Attempts

Attempts = Number of attempts before lockout (2-7)

Anti-passback Time   Default: No Anti-passback

Sets the length of time an entry code will not function after it is used.

Press: 5 1 # Minutes

Minutes = Time in Minutes (1-4)
0 = No Anti-passback

Master Reset

✦ *CAUTION: Performing a master reset will clear the entire memory of the AK-11 and return all programmable options to the factory default values. ALL ENTRY CODES WILL BE ERASED.*

STEP 1   Disconnect power from the keypad.

STEP 2   Press and hold down the ✶ and # keys.

STEP 3   Apply power to the keypad, continue holding the keys down until the red LED starts flashing.

STEP 4   Release the keys. The red and yellow LEDs will remain lit until the process is complete, then the yellow LED will go out.

Resetting the Master Code

STEP 1   Open the AK-11 case.

STEP 2   Locate jumper JP2. This jumper is used to reset the master code.

STEP 3   With power applied to the keypad, remove jumper JP2. The keypad will begin to beep, signaling that the code has been reset.

STEP 4   Replace jumper JP2.

THE MASTER PROGRAMMING CODE IS NOW 123456.

Solid State Outputs

The two solid state outputs (Output #3 & Output #4) can be programmed to activate during various conditions. These outputs can be used to activate indicators or sounders. See Figure 7 for wiring examples using the solid state outputs.
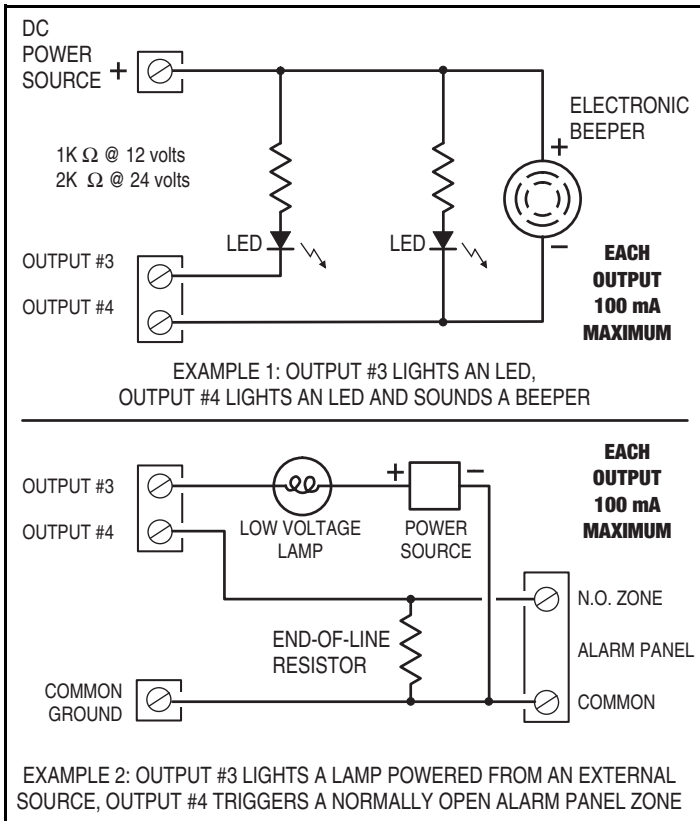

Figure 7. Using the Solid State Outputs

Beeper Sound Level

The keypad's beeper can be set to low or high level.

☐ If the keypad's beeper is too loud for the keypad's location, remove jumper JP1 (see Figure 8).
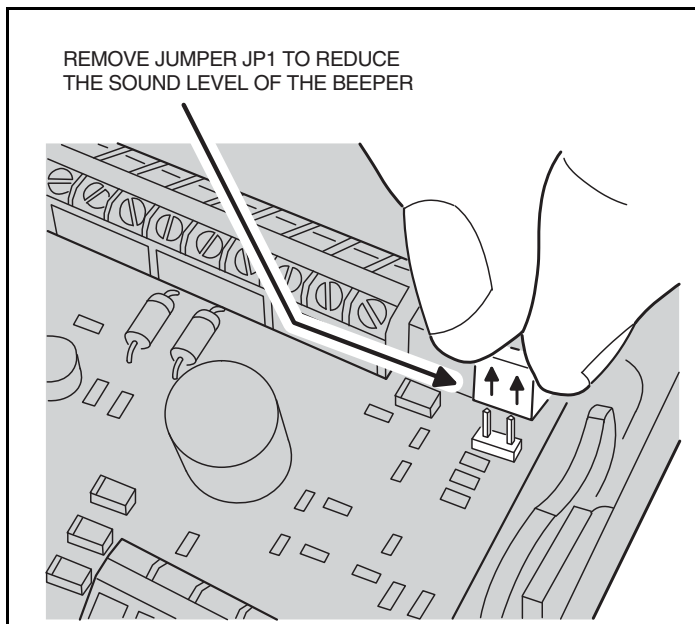

Figure 8. Removing Beeper Jumper

Locking Keypad

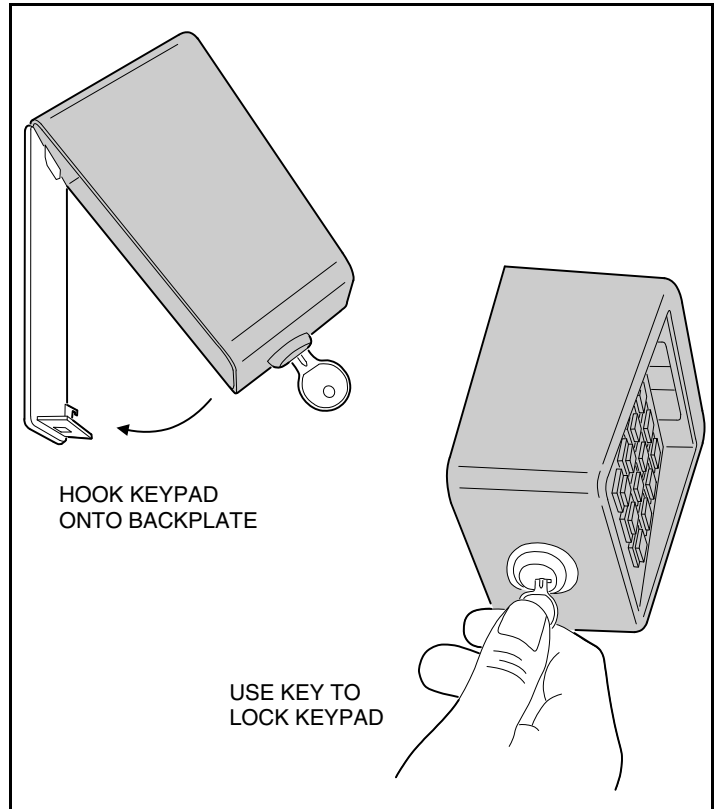After the installation is complete. Lock the keypad using the keylock (see Figure 9).

Figure 9. Locking the Keypad Case

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- ✓ Users of the AK-11 have up to 40 seconds to key in their entry code.

- ✓ Up to eight seconds are allowed between each keystroke.

- ✓ All digits of the entry code must be entered. Example: If the code is 0042, the user must enter "0 0 4 2".

- ✓ If the wrong key is pressed, pressing the ✱ key will reset the keypad. The correct code can then be re-entered.

- ✓ After a correct code is entered, the red LED will turn green and the programmed relay will activate for the programmed time.

- ✓ If the number of incorrect codes entered exceeds the keypad lockout count, the yellow LED will light, indicating that the keypad is locked out. The lockout will remain for one minute.

- ✓ After a valid code has been entered, it will be unusable until the anti-passback time expires.

RED LED TURNS GREEN WHEN ACCESS IS GRANTED

YELLOW LED WILL LIGHT DURING KEYPAD LOCKOUT IF TOO MANY INCORRECT CODES ARE ENTERED

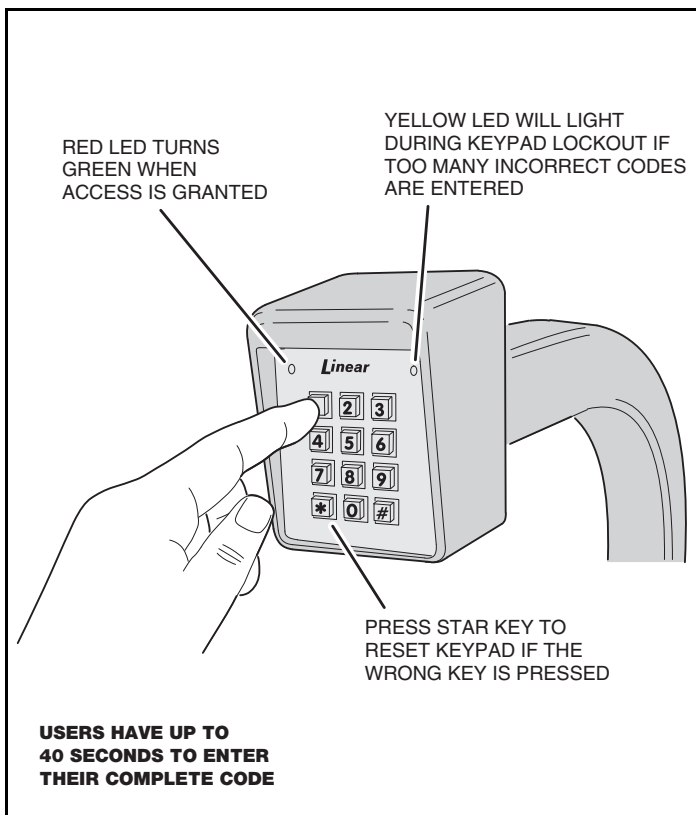PRESS STAR KEY TO RESET KEYPAD IF THE WRONG KEY IS PRESSED

USERS HAVE UP TO 40 SECONDS TO ENTER THEIR COMPLETE CODE

Figure 10. Operating AK-11