USERS GUIDE **LO-21**
LOCKOUT RELAY

PRODUCT DESCRIPTION

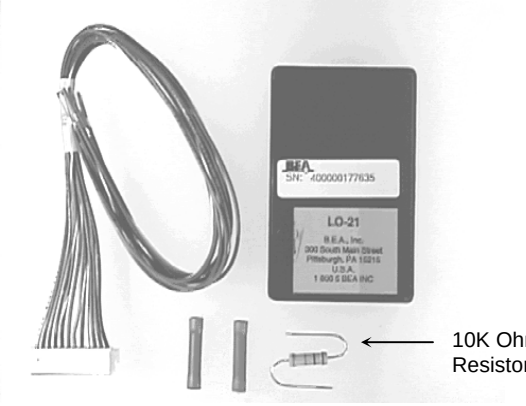
The LO-21 (PN: 10LO21) is a micro-processed lock out module designed to operate on swing door applications with BEA's Bodyguard or DK-12 overhead presence sensor. The LO-21 interprets door open or door closed position based upon motor voltage input. The motor voltage information is sent from the LO-21 to the Bodyguard or DK-12 via data lines. The LO-21 provides optional safety beam input to override the inhibit signal during closing. For example, when the safety beam path is blocked or interrupted during closing, the inhibit data will be cancelled, thus initiating a safety signal to the door control safety input.

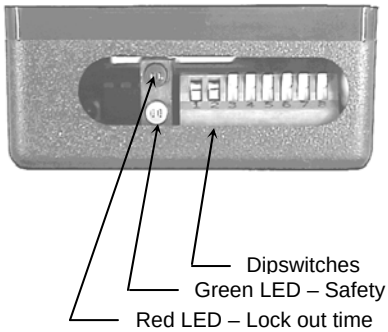
- **ANSI / BHMA 156.10-2005 requires the use of a sensor or photobeam on the swing side of the door when using a header mounted safety sensor, such as the Bodyguard or DK12. For more information reference the ANSI 156.10 standard.**

TECHNICAL SPECIFICATIONS

DESCRIPTION	SPECIFICATION
Power Supply	12-24 Volts AC / 15-24 Volts DC
Operating Frequency	4 MHz (Microprocessor)
Power Consumption	10 mA at rest, 50 mA Max.
Output	2 x SPST Relays
Max. Voltage - Relay Contact	60V DC, 120V AC
Max. Current - Relay Contacts (both)	2A DC, 0.5A AC

COMPONENT ID





SAFETY PRECAUTIONS

CAUTION

- Shut off all power going to the header before attempting any wiring procedures.
- Maintain a clean & safe environment when working in public areas.
- Constantly be aware of pedestrian traffic around the door area.
- Always stop pedestrian traffic through the doorway when performing tests that may result in unexpected reactions by the door.
- Always check placement of all wiring before powering up to insure that moving door parts will not catch any wires and cause damage to equipment.
- Ensure compliance with all applicable safety standards (i.e. ANSI A156.10) upon completion of installation.

ELECTRICAL INSTALLATION

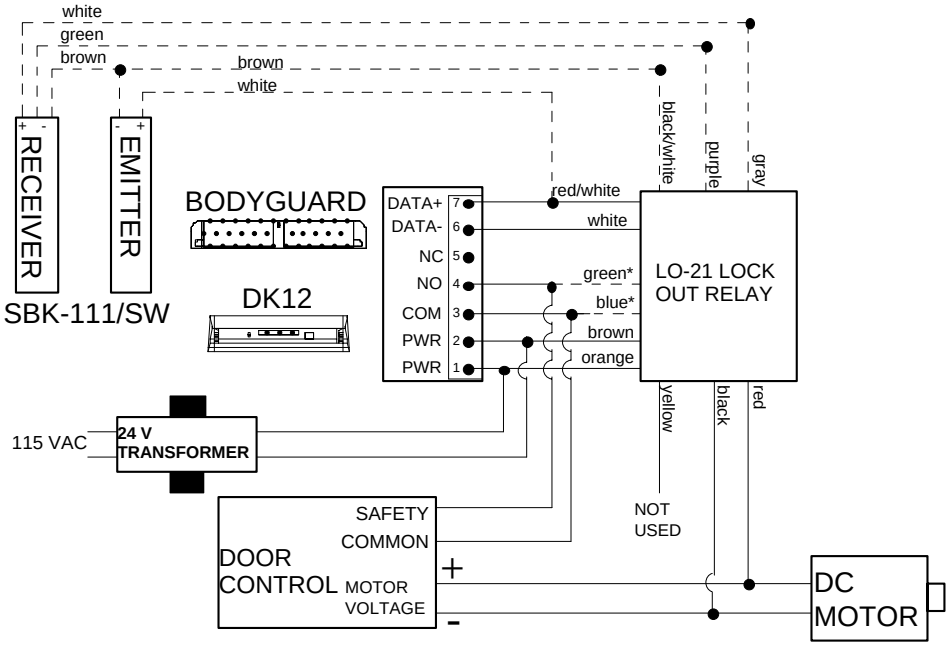
The LO-21 can be used with the BEA SBK-111 safety beams, in addition to dry contact safety beams, for retrofit purposes. Since the SBK-111's are wet output and all other safety beams have a dry output, there are some wiring differences between the two. The SBK-111 is wired as shown in the wiring diagram.

- ❑ If using dry contact safety beams, such as BEA's Microcell, remember these changes:

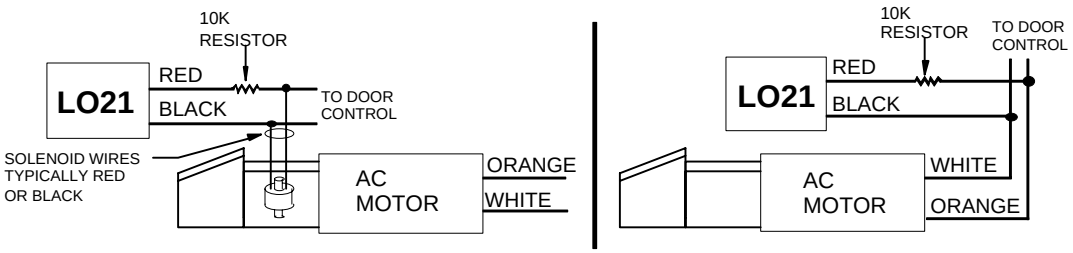
1. Power the safety beams with the same transformer that is used for the LO-21.
2. The black/ white striped wire is not used and should be taped off.
3. The gray and purple wires of the LO-21 go to the NO and COM dry contacts of the safety beams.



All LO-21 wiring must be accomplished with the module unplugged. If the red / white striped and white wires (data wires) touch each other when power is applied, damage to the unit will result.



Please note that the following provisions must be made when wiring into a unit that is hydraulically driven or has an AC motor. The red and black wires from the LO-21 must be wired to the voltage source that is driving the operator. Typically, this can be found at the AC motor, pressure relief solenoid, or selector valve. If the AC voltage at these locations is greater than 50 V AC, then a 10,000 Ohm resistor must be wired in-line with the red wire. This resistor, along with two butt connectors is provided by B.E.A. in each kit. The example below shows a typical connection for a Keane Monroe Series 2000 swing door operator. Manual operation of the door will not affect the operation of the LO-21, since there is no voltage being created to drive to LO-21 during manual movement of the door.



OPERATION

The function of the LO-21 with the BODYGUARD / DK-12 is as follows. The LO-21 provides the BODYGUARD / DK-12 with information on the position of the door by data lines. These data lines (RED/WHITE & WHITE) enable the BODYGUARD / DK-12 to be inhibited during the closing cycle of the door and to switch its pattern settings according to the position of the door. For example, when the door is in its fully open position, the RED/WHITE and WHITE wire will send a signal (approx. 12 volts DC) to the BODYGUARD / DK-12 to indicate that the door is in this position, and the BODYGUARD / DK-12 will adjust to a "door open" pattern. Once the door starts to close, the LO-21 will sense the reverse of the motor and inhibit the BODYGUARD / DK-12 (led will be off at sensor)) for the preset lock out time delay. Motor voltage going to the LO-21 will determine the status of the data going to the Bodyguard on the RED/WHITE and WHITE wire; the data (voltage) on these wires should be as follows:

CLOSED DOOR	OPEN DOOR	CLOSING DOOR
0 Volts DC	12 Volts DC	8 Volts DC

In addition to providing communication to the BODYGUARD / DK-12, the LO-21 provides a safety connection between the safety beams and the door control. The BLACK/WHITE & RED/WHITE wires provide the SBK-111 safety beams with the necessary voltage to operate. If the safety beams are blocked, the GRAY & PURPLE wires will receive a signal for the LO-21 to trigger the safety of the door control via the BLUE & GREEN wires of the LO-21. The safety signal received by the door control will hold the door in its position. If the safety beams are broken during the closing cycle, the BODYGUARD / DK-12's pattern will be adjusted to its "door closed" pattern and the safety of the door will be triggered. When the safety beam path is reestablished, the door will continue to close in safety swing until the door reaches the fully closed position, at which time activation will be possible only if there is no detection at the Bodyguard.

WITHOUT SAFETY BEAMS:

The new LO-21 provides communication through data lines to the BODYGUARD / DK-12 to inhibit the BODYGUARD / DK-12 in the closing cycle of the door, therefore the GREEN & BLUE wires of the LO-21 no longer have to be connected to the door control. This connection is no longer needed because the lockout function is being provided by the data lines instead of an Electro-mechanical relay as in the old LO-21. If the GREEN & BLUE wires are connected, no damage to the unit will result.

WITH SAFETY BEAMS:

When safety beams are installed, the LO-21 provides the safety signal to the door control when the beams have been blocked. Therefore, the GREEN & BLUE wires of the LO-21 must be wired in parallel with the BODYGUARD / DK-12 connection to the safety and common of the door control.

SET-UP INSTRUCTIONS

Upon powering the LO-21 up, check to make sure that the red light on the front of the LO-21 comes on when the door is in its closing cycle. If it does not come on, reverse the black and red wires from the LO-21 to the motor input for DC units. If the unit is AC, ensure that the AC power is being switched on and off at the point of connection for the red and black wires. Also, if using safety beams, ensure that the green light comes on and goes out when the beams are blocked and unblocked respectively. Correct any faults before proceeding.



If the Bodyguard learns a "door closed" position, but does not execute a learn for the "open door position", place the door to a hold open position. With a BEA remote control, unlock the Bodyguard, and with the door in the open position, press the Magic Wand key and then the number 2 – the Bodyguard should begin flashing green to signify a set-up. If it does not, this will be a quick indication that the improper data is being sent for the "open door" position. Check to insure that data exists on the data lines leading into the Bodyguard (see chart above). In the full open position, voltage should be approximately 12 volts DC. Voltage should be approximately 7.8 volts DC while the door is closing, and 0 volts DC once closed. If it is not, check the data lines, as well as the LO-21 to Motor wires (red & black). Refer to the Bodyguard User's Guide for further information if necessary.

Time delay is the only adjustment on the LO-21. It is changed by dipswitches 1 through 5, located on the front of the unit that can be set to achieve a 0 to 31 second delay. The time delay must be set so that the red light remains on for the entire closing cycle. As soon as the door reaches the jamb, the red light should go out. The time delay will not begin until the motor begins rotating in a direction that allows door to close. If motor rotation stops, the time delay will not stop counting down. Interruption of the time delay will only result if re-activation of the door is recognized or the SBK-111 safety beams were broken. Therefore, if the closing speed of the door is changed, the time delay on the LO-21 must also be adjusted to accommodate the time difference for the duration of the closing cycle.

DIPSWITCH SETTINGS

Red LED corresponds with lockout time, and will illuminate when the door is in a closing cycle.

Green LED illuminates upon detection signal from the lockout safety beams.



Set the dipswitches according to the chart below to achieve the desired lockout time

Time Delay (sec)	dip 1 *1 sec*	dip 2 *2 sec*	dip 3 *4 sec*	dip 4 *8 sec*	dip 5 *16 sec*
1	ON	OFF	OFF	OFF	OFF
2	OFF	ON	OFF	OFF	OFF
3	ON	ON	OFF	OFF	OFF
4	OFF	OFF	ON	OFF	OFF
5	ON	OFF	ON	OFF	OFF
6	OFF	ON	ON	OFF	OFF
7	ON	ON	ON	OFF	OFF
8	OFF	OFF	OFF	ON	OFF
9	ON	OFF	OFF	ON	OFF
10	OFF	ON	OFF	ON	OFF
11	ON	ON	OFF	ON	OFF
12	OFF	OFF	ON	ON	OFF
13	ON	OFF	ON	ON	OFF
14	OFF	ON	ON	ON	OFF
15	ON	ON	ON	ON	OFF
16	OFF	OFF	OFF	OFF	ON

Time Delay (sec)	dip 1 *1 sec*	dip 2 *2 sec*	dip 3 *4 sec*	dip 4 *8 sec*	dip 5 *16 sec*
17	ON	OFF	OFF	OFF	ON
18	OFF	ON	OFF	OFF	ON
19	ON	ON	OFF	OFF	ON
20	OFF	OFF	ON	OFF	ON
21	ON	OFF	ON	OFF	ON
22	OFF	ON	ON	OFF	ON
23	ON	ON	ON	OFF	ON
24	OFF	OFF	OFF	ON	ON
25	ON	OFF	OFF	ON	ON
26	OFF	ON	OFF	ON	ON
27	ON	ON	OFF	ON	ON
28	OFF	OFF	ON	ON	ON
29	ON	OFF	ON	ON	ON
30	OFF	ON	ON	ON	ON
31	ON	ON	ON	ON	ON

TROUBLE-SHOOTING

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Red LED does not come on during the closing cycle Or Red LED comes on in latch check	1. Red and black wires are reversed (polarity sensitive) 2. AC motor application: in-line resistor not installed 3. Faulty input power or data	1. Reverse the polarity of the motor wires 2. Install the in-line resistor on the red wire of the LO-21 (AC motors only) 3. Check voltage supply to LO-21: 12-24 Volts AC / 15-24 Volts DC 4. Check continuity on orange, brown, red and black wires
Door will not open or close (green LED is on)	1. Lockout safety beams are blocked 2. Faulty safety beam receiver or transmitter 3. Faulty power supply to safety beam 4. Faulty safety beam wiring	1. Remove any obstructions with safety beam path 2. Check all safety beam related wiring 3. Test the safety beams for proper operation
Door will not recycle open when activated during the closing cycle	1. Lockout time is not long enough. Red LED goes out before door gets fully closed. 2. Data wires are reversed at the Bodyguard / DK-12	1. Increase the lockout time. Refer to Dipswitch chart on Page 4. 2. Reverse the data wires at the Bodyguard / DK-12 3. Check continuity on the data wires (red wire and red/white striped wire)
Green LED does not come on when safety beams are blocked	1. Faulty safety beam receiver 2. Faulty connection on purple and gray wire from LO-21	1. Test beams and LO-21 with multi-meter 2. Perform continuity test on purple and gray wires
Improper voltage reading on data lines at LO-21	1. Incorrect wiring at LO-21 2. Faulty LO-21	1. Check to insure that the polarity is correct at terminals 6 & 7 on the Bodyguard. 2. If data line voltage remains constant at the LO-21 for the open and closed positions, when all wiring has been confirmed to be ok, replace faulty LO-21

COMPANY CONTACT



Do not leave problems unresolved. If a satisfactory solution cannot be achieved after troubleshooting a problem, please call B.E.A., Inc. If you must wait for the following workday to call B.E.A., leave the door inoperable until satisfactory repairs can be made. Never sacrifice the safe operation of the automatic door or gate for an incomplete solution.

The following numbers can be called 24 hours a day, 7 days a week. For more information, visit www.beainc.com.

West: 1-888-419-2564 **Mid-West: 1-888-308-8843**
South-East: 1-800-407-4545 **North-East: 1-866-836-1863**
US and Canada: 1-866-249-7937 **Canada: 1-866-836-1863**