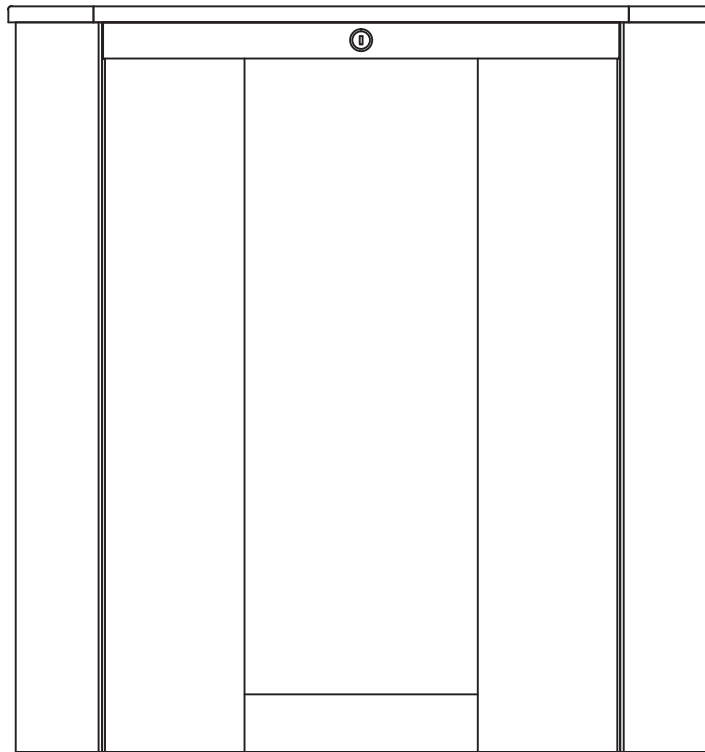


CA **Controlled Access, Inc.**
Turnstiles and ADA Gates
1535 Industrial Parkway South • Brunswick, OH 44212

BE800-R Beacon Optical Turnstile

Service & Installation Manual



Note: Successful turnstile installation depends on reading this manual.

Please keep this service manual after installation. If an installation is done by a construction company or outside installer, please pass this book along to the end user. This book is required for maintenance, troubleshooting & repairs.

Table of Contents

Theory of Operation	3
Lane Functionality	4
Pre-installation Preparation	6
Concrete Anchor Instructions	9
Installation Instructions	10
Sensor Alignment	12
Sensor Designations	13
Wiring Legend	14
Access Control & Interconnection Diagram	15
Factory Wiring Diagram	16
Beacon Settings	17
Warranty	20

Beacon Series Optical Turnstile

Theory of Operation:

The Beacon barrier optical turnstile lane is designed to control traffic with an intuitive barrier free design. This is accomplished with thru-beam type sensors to detect where a person is inside of the lane. Crossing and uncrossing certain beams at certain times will evaluate a passage to be either authorized or unauthorized.

Within each lane there are two primary zones of sensors. Each zone acts as a “limit”. Upon a valid entry (card read, push button, keypad, etc.), the unit recognizes authorization and allows passage through in the direction requested.

Should a user pass in the incorrect direction or has not been authorized for passage, an audible alarm will pulse and red x’s will flash on the LED boards. An additional solid state output during alarm scenarios also exists for integration into other security systems.

In addition to the two sensor zones mentioned previously, a third sensor zone exists for crawl-through detection. If anyone attempts to crawl through the lane under the standard sensor zones, the third sensor zone detects them and an alarm goes off.

Beacon lanes are designed to allow heavy flows of traffic. With an adjustable swipe queue, one user can request passage through the lane while another is already inside. This negates the need to wait for the lane to return to a secured status before the next person can pass.

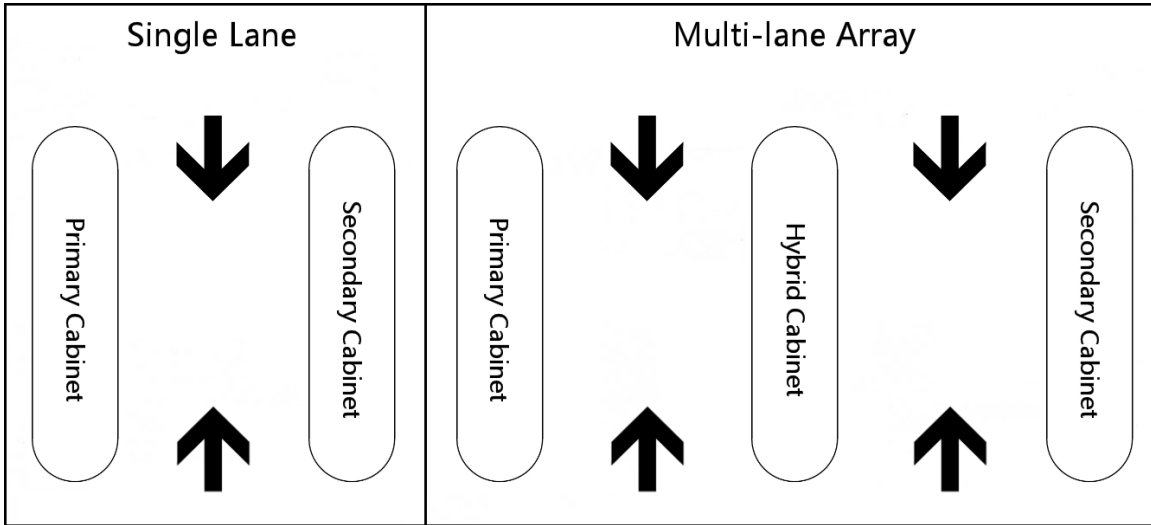
Inside the primary cabinet, a logic controller with a display screen and input buttons allow a variety of settings for the machine to be adjusted to facility preferences.

Physically, the cabinets of a Beacon lane can be positioned to create a variable passage width. A lane size can be anywhere from 22 to 38 inches. It is important to remember that the wider the width of the lane, the easier it would be for two people to pass side by side.

Lane Functionality

Lane configuration:

Each lane consists of two different types of cabinets; a primary cabinet and a secondary cabinet. A third type of cabinet exists which is a hybrid of the two, allowing for an array of lanes with fewer cabinets. In that instance, one side would be primary and the opposite would be secondary.



From the factory, each cabinet in an array is preconfigured to the requested operation and layout. Each lane has two directions of passage, each of which can be configured for controlled passage, free passage or no passage. This configuration can be changed in the field via settings on lane's logic controller located inside of the primary cabinet.

Lane Functionality (cont.)

Spacing:

Due to the strength of the optical beams, Beacon lanes can be positioned to function at multiple passage widths.

Typical installations for a standard lane run from 22-26 inches. ADA lanes should be a minimum of 36 inches. As long as each cabinet is square and level to the next, the distance between each cabinet can be whatever is needed at the site of installation.

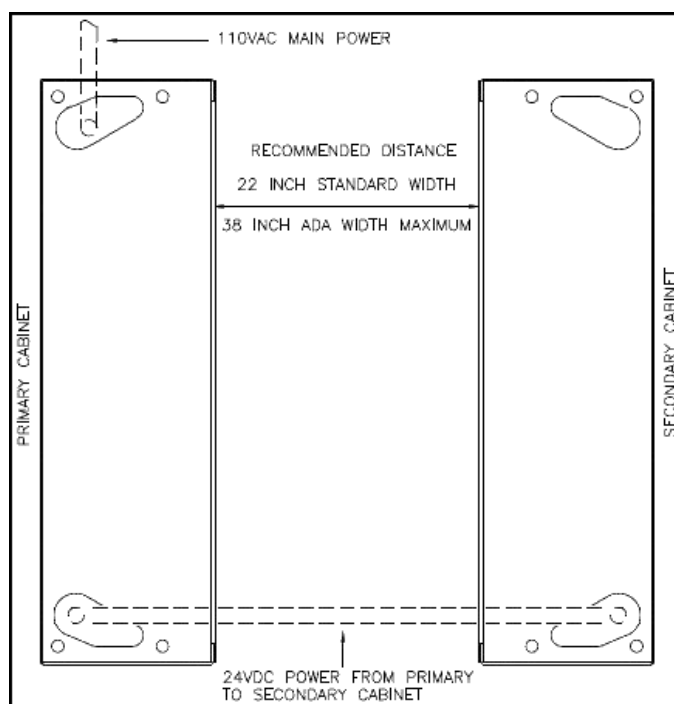
Electrical requirements:

Primary cabinets require 100-240 VAC input voltage. An internal power supply steps the voltage down to 24VDC.

Between the two cabinets in a lane, an 18 gauge 2 conductor cable is necessary in order to operate the secondary cabinet. It will be necessary to provide conduit access between the two cabinets. However, only the primary cabinet requires 100-240VAC. The secondary cabinet will obtain 24VDC from the primary cabinet.

It is recommended that the primary side of a hybrid cabinet receives 100-240VAC and the secondary side receives the 24VDC from the primary cabinet of the other lane. This is so one lane can be taken offline without affecting the other.

The primary cabinet may also require conduit access from the access control system, this is dependent on the method of installation of access control.

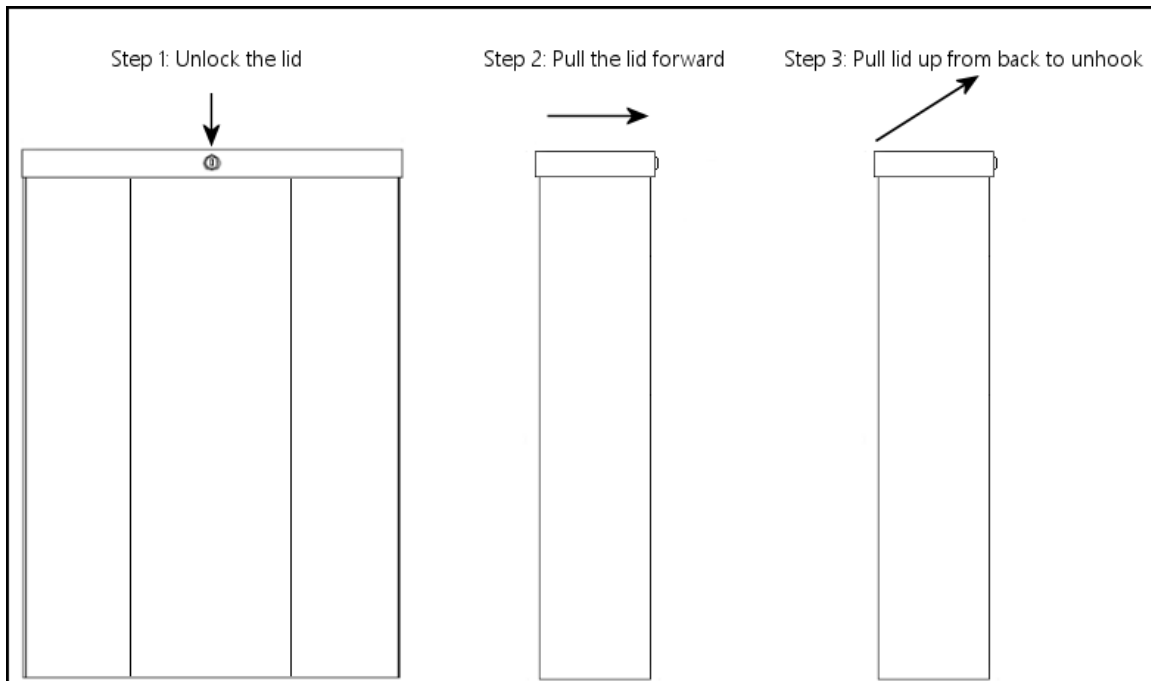


Pre-installation Preparation

Removing the lids:

Before installing a Beacon lane, it is necessary to disassemble the cabinet to reach the floor plate.

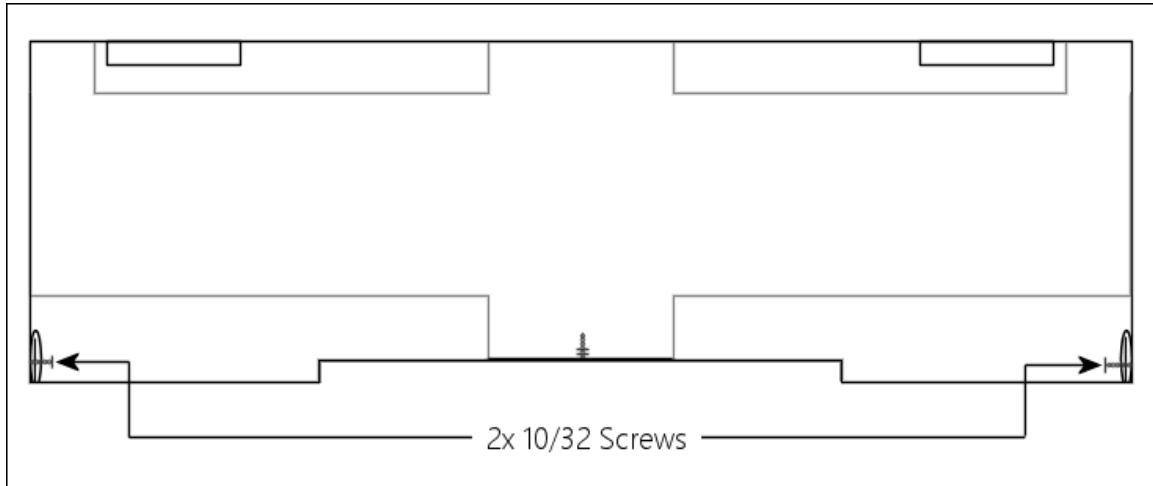
The first step is to remove the lids of each cabinet. The lids are secured with a lock on the front and hooks on the back. In order to remove the lid, unlock the front side with the provided keys. Then, pull the lid forward from the back and lift up to unhook the lid from the cabinet.



Pre-installation Preparation (cont.)

Removing the front panels:

The next step before being able to access the floor plate is to remove the front panels of the cabinets. With the lid removed, two 10/32 screws are found in the top corners of each panel. Simply remove these screws and the front panel can be removed by tilting it forward and lifting it out of the floor plate



Although it should not be necessary, the sensors can be disconnected from their cables. Each sensor is equipped with an M8 euro style quick disconnect cable. These can be disconnected so that the panels can be completely removed from the area to provide more work space. Simply unscrew the thread on the cable where it connects to the sensor and remove.

Pre-installation Preparation (cont.)

Pre-installation Alignment:

Before anchoring the cabinets to the floor, we recommend laying out the lane and testing alignment.

Place the cabinets in their approximate end location and connect the 2 conductor cable inside of the primary cabinet to the end in the secondary cabinet. Plug in the primary cabinet to AC voltage to power up the lane.

Inside of the primary cabinet, there is a series of 7 total photo cell sensors. Each of these sensors is equipped with two LED's on the rear. One of them is green and should always be lit. The other should be solid orange while the beam is uncrossed and off while the beam is crossed.

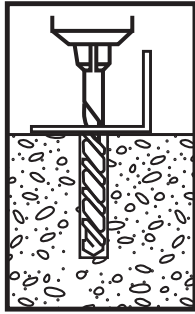
If the orange LED is blinking in any case, you will need to adjust the sensor alignment, shift the cabinets so that they are straight to each other, or shim the cabinets so that they are level.

See the sensor alignment section of this manual for advice on how to ensure the transmitter's light reaches the receiver properly.

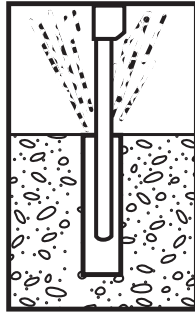
Glass Information:

To conceal the sensor array, a sheet of tinted glass is to be installed onto the front panels. This glass can create a dispersion effect to the sensor beams. It is suggested that the lane's function is tested with the glass in place to ensure alignment is sufficient for the final installation.

Wedge Type Concrete Anchor Instructions



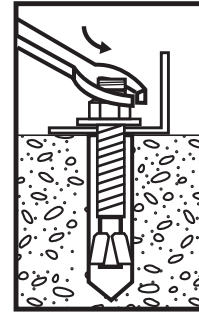
1



2



3



4

- 1** Select a carbide drill bit with a diameter equal to the anchor diameter. Drill hole at least 1/4" deeper than nominal anchor embedment.
- 2** Clean hole with pressurized air or vacuum to remove any excess dust/debris.
- 3** Using the washer and nut provided, assemble the anchor, leaving nut one half turn from the end of anchor to protect threads. Drive anchor through fixture to be fastened until washer is flush to the surface of fixture.
- 4** Expand anchor by tightening nut to the specified setting torque - see Table (approx 3 to 5 full revolutions).

Anchor Diameter & Drill Bit Size	Installation Torque Ft. lbs.*	Minimum Anchor Embedment	Minimum Hole Diameter in Fixture
3/8"	25	1-7/8"	1/2"
1/2"	45	2-1/2"	5/8"
5/8"	90	2-3/4"	3/4"

* Setting torque only applies at the time of installation.

Warning!

⚠ Use in concrete ONLY. Not recommended for use in lightweight masonry such as block or brick.

⚠ Always wear safety glasses and other necessary protective devices or apparel when installing or working with anchors.

Caution: Use of core drills is not recommended to drill holes for use with this anchor.

Do not use an impact wrench to set or tighten the anchor. Not recommended for use in concrete which has not had sufficient time to cure.

The use of carbide drill bits manufactured with ANSI B212.15 drill bit diameter requirements is recommended for installation of this anchor. Anchor spacing and edge distance (anchor installation locations) are the responsibility of the engineer of record.

Installing product in oversized holes is not recommended. Product will not set properly or achieve full designed load in oversized holes.

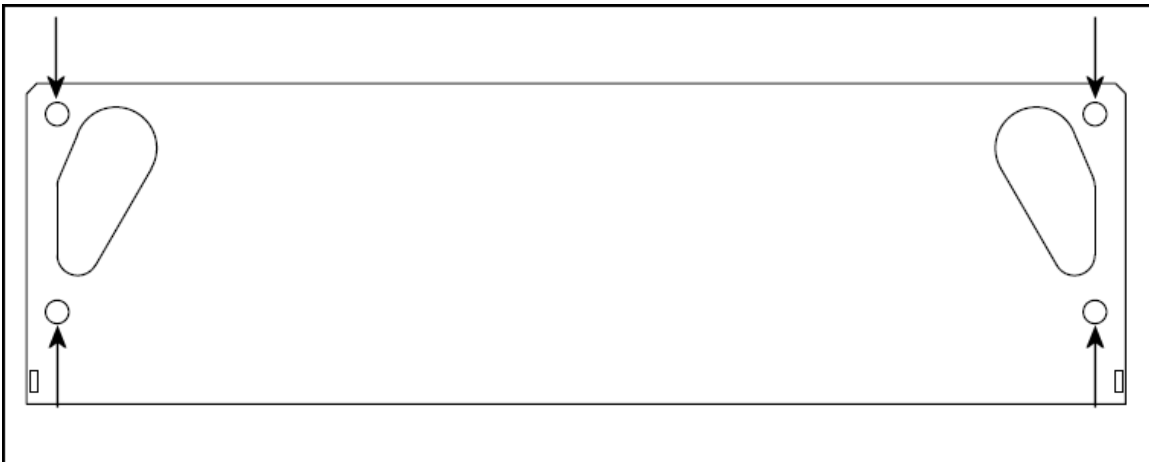
Installation Instructions

1. Floor should be level +/- 1/16". If not, each cabinet must be shimmed.



Note: Anchoring optical lanes to an uneven ground most likely will cause serious issues in unit operation.

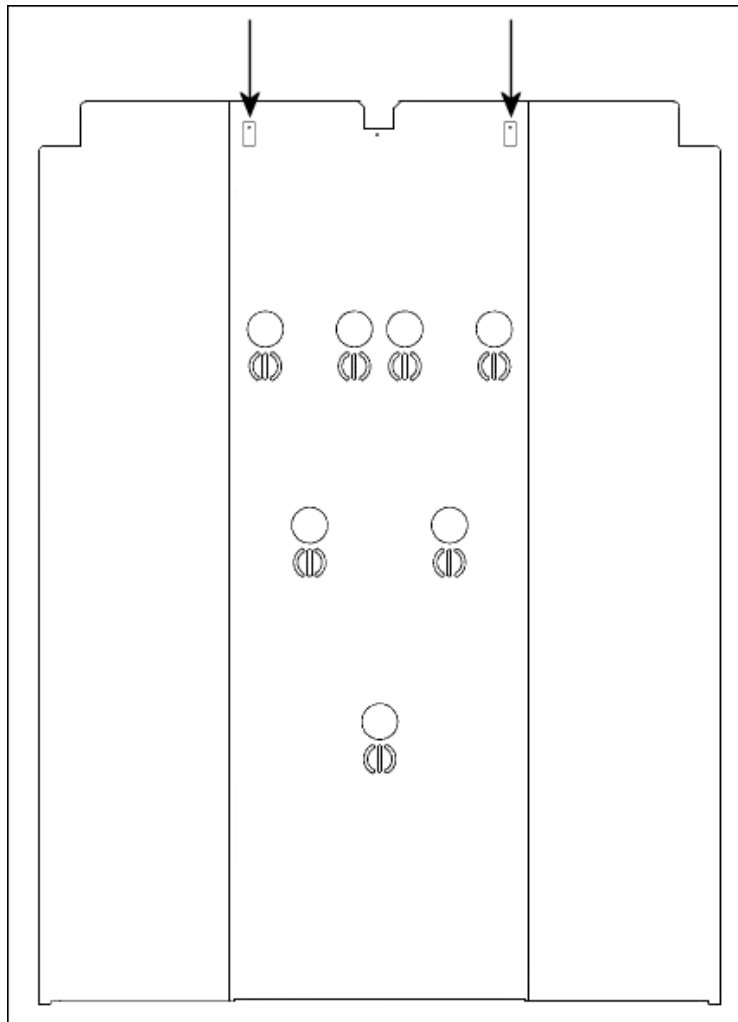
2. Install conduit for 100-240 VAC to primary cabinet, conduit for access control integration (if applicable), and a conduit in between the primary and secondary cabinet for cabling to the secondary cabinet. Lane distance can be varied from 22 to 38 inches.
3. With each cabinet in the exact position to be mounted, use a center punch to mark location of the four holes to be drilled in the floor.



Note: Make sure each cabinet is square to each other, otherwise operation will be inconsistent

3. If necessary, move cabinets out of the way. Drill four 3/8" holes 4" deep per cabinet and remove all concrete dust from the holes.
4. Place cabinet in the correct location and install SS wedge type anchors supplied. Torque the nuts to a minimum of 50 foot pounds.
5. Plug the power supply in the main cabinet into 100-240 VAC (single phase) minimum 3 amp GFI circuit.
6. The sensors we use are a thru-beam type: they require a transmitter and receiver in order to operate. In order to accomplish this, you must connect 24VDC power to the secondary cabinet. This is accomplished with a provided two conductor cable. See the wiring diagram for more information.

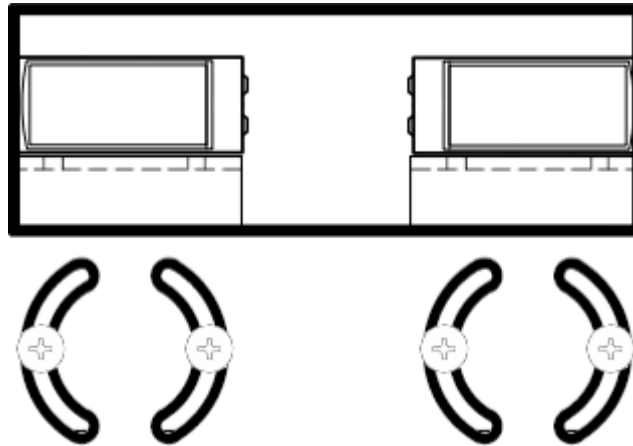
7. Connect access control as required to direction inputs on the logic controller.
See wiring diagram for more information.
8. Replace sensor panels and reconnect cables to sensors (if removed). Make any sensor adjustments necessary (see sensor alignment instructions) and test lane to ensure operation is satisfactory before replacing the front panels onto the cabinets.
9. Install the sheets of glass by remove the two screws holding the glass clips onto the front panel. Once the glass is in place, reinstall the glass clip.



Sensor Alignment

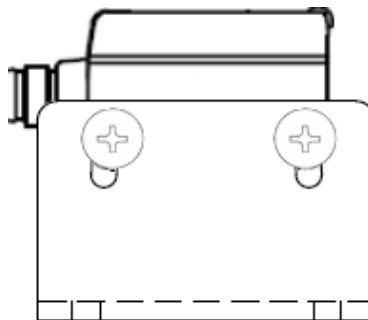
The Beacon series is equipped with visible target laser thru beam sensors. The transmitter sensors (located in the secondary cabinet) shine much like a flash light. The target from the transmitters can be visibly seen by simply placing a piece of white paper onto the target area.

Each photo cell is mounted onto a bracket which is screwed onto a panel.



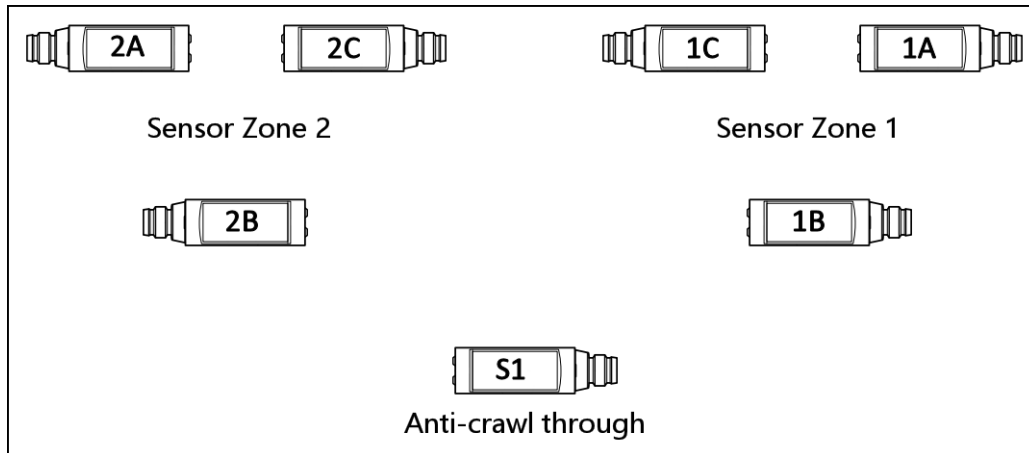
Loosening the screws holding the bracket to the panel will allow for some range of motion up and down.

The sensors can also be tilted on the brackets themselves to provide a left-to-right alignment adjustment. Simply loosen the screws holding the bracket to the sensor and tilt in the desired direction.



Note that the light from the transmitters will actually be larger than the surface area of the receivers. This makes alignment much easier. Try to center out the targets to the receiver as close as possible.

Sensor Designations



Above is a diagram which illustrates each sensor's position. There are 7 sensors on each cabinet total, separated into 3 "zones".

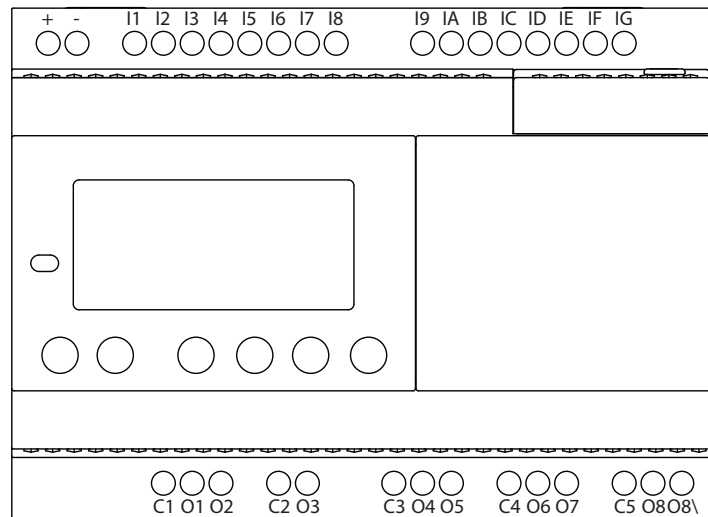
The zone designated as "Sensor Zone 1" is part of the intelligence behind whether or not authorized access has been granted. For example, if the zone 1 sensors have been tripped but direction 2 was the direction that authorization was granted, an alarm will trigger.

The zone called Sensor Zone 2 does the same thing as zone 1, but in the opposite direction.

The sensor zones have another function as well. On free flow mode, when the sensor zone for the appropriate direction is actuated, access is granted for that direction.

The third zone are sensors which prevent the arms from closing on obstruction and also serve as anti-crawl through sensors. These will detect unauthorized people who are attempting to crawl underneath the main zones.

Beacon Wiring Legend



PLC Inputs

- + - Input 24VDC +
- Input 24VDC -
- I1 - Direction 1 Input
- I2 - Direction 2 Input
- I3 - Direction 1 Override
- I4 - Direction 2 Override
- I5 - Sensor 1A
- I6 - Sensor 1B
- I7 - Sensor 1C
- I8 - Sensor S1
- I9 - Sensor 2C
- IA - Sensor 2B
- IB - Sensor 2A
- IC - Not Used
- ID - Not Used
- IE - Not Used
- IF - Not Used
- IG - Not Used

PLC Outputs

- C1 - Connect to 24VDC+
- O1- Dir 1 Yellow LED
- O2- Dir 1 Green LED
- C2 - Connect to 24VDC +
- O3 - Dir 1 Red LED
- C3 - Connect to 24VDC +
- O4 - Dir 2 Yellow LED
- O5 - Dir 2 Green LED
- C4 - Connect to 24VDC +
- O6 - Dir 2 Red LED
- O7 - Alarm (Solid State)
- C5 - Connect to 24VDC +
- O8 - Alarm (Pulsing)
- O8/ - Not Used

All inputs are PNP type transistor inputs - apply local 24VDC + to terminal for PLC to register.

Installations may use as few as one contact closure and as many as four depending on the complexity of the application.

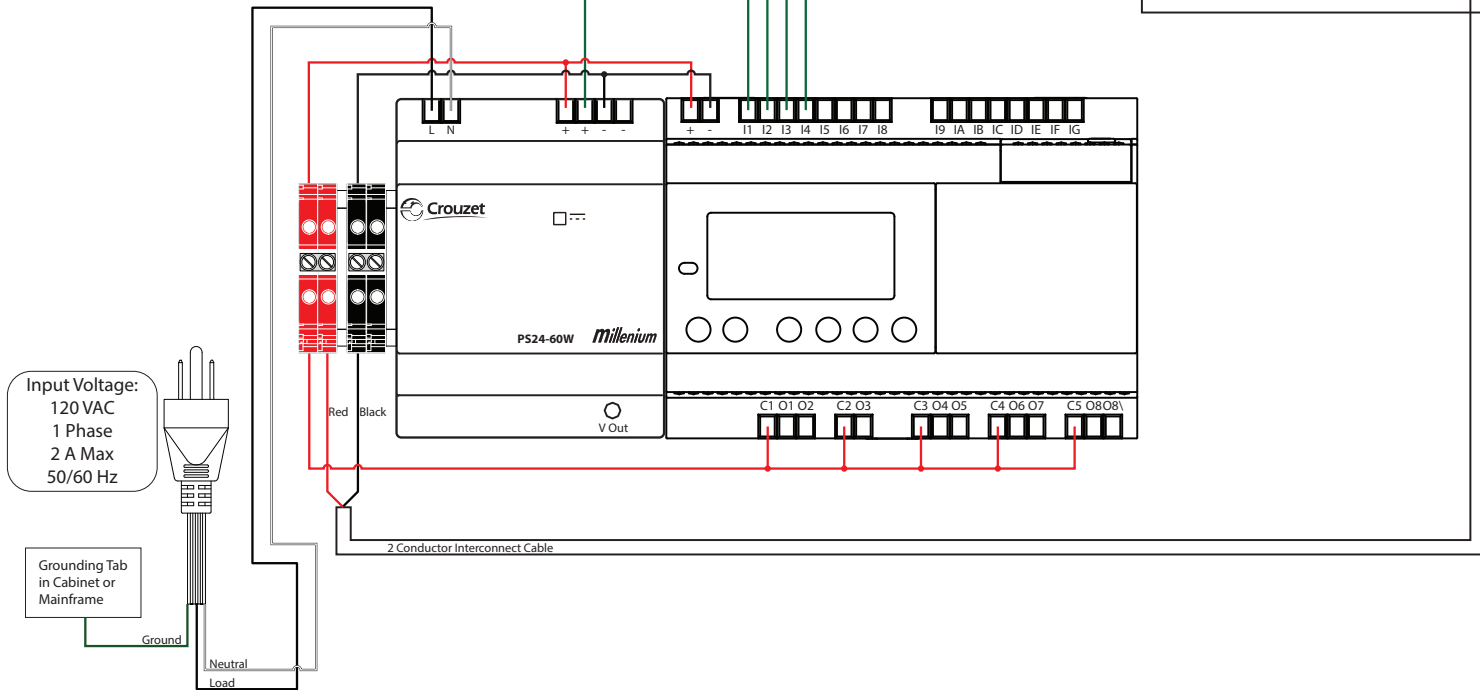
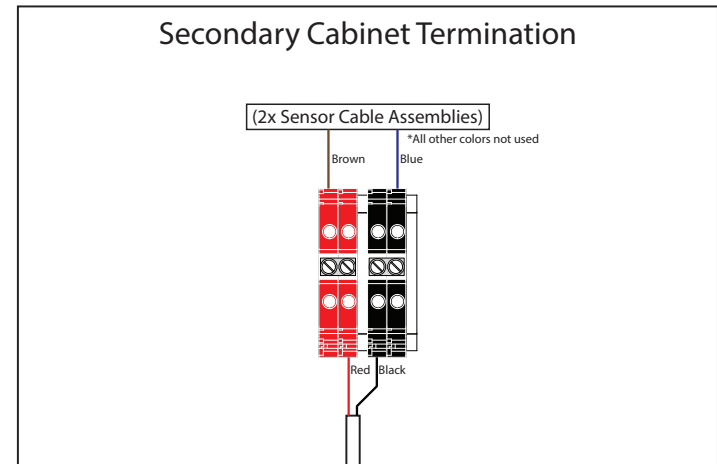
To activate multiple lanes at the same time, each lane must source it's input from the same power supply it comes from. Add ice cube relays to trigger multiple lanes together to ensure the power for the input is coming from the same power supply the PLC is.

All outputs are relay outputs. Many of these share commons. These commons are all tied to 24VDC+.

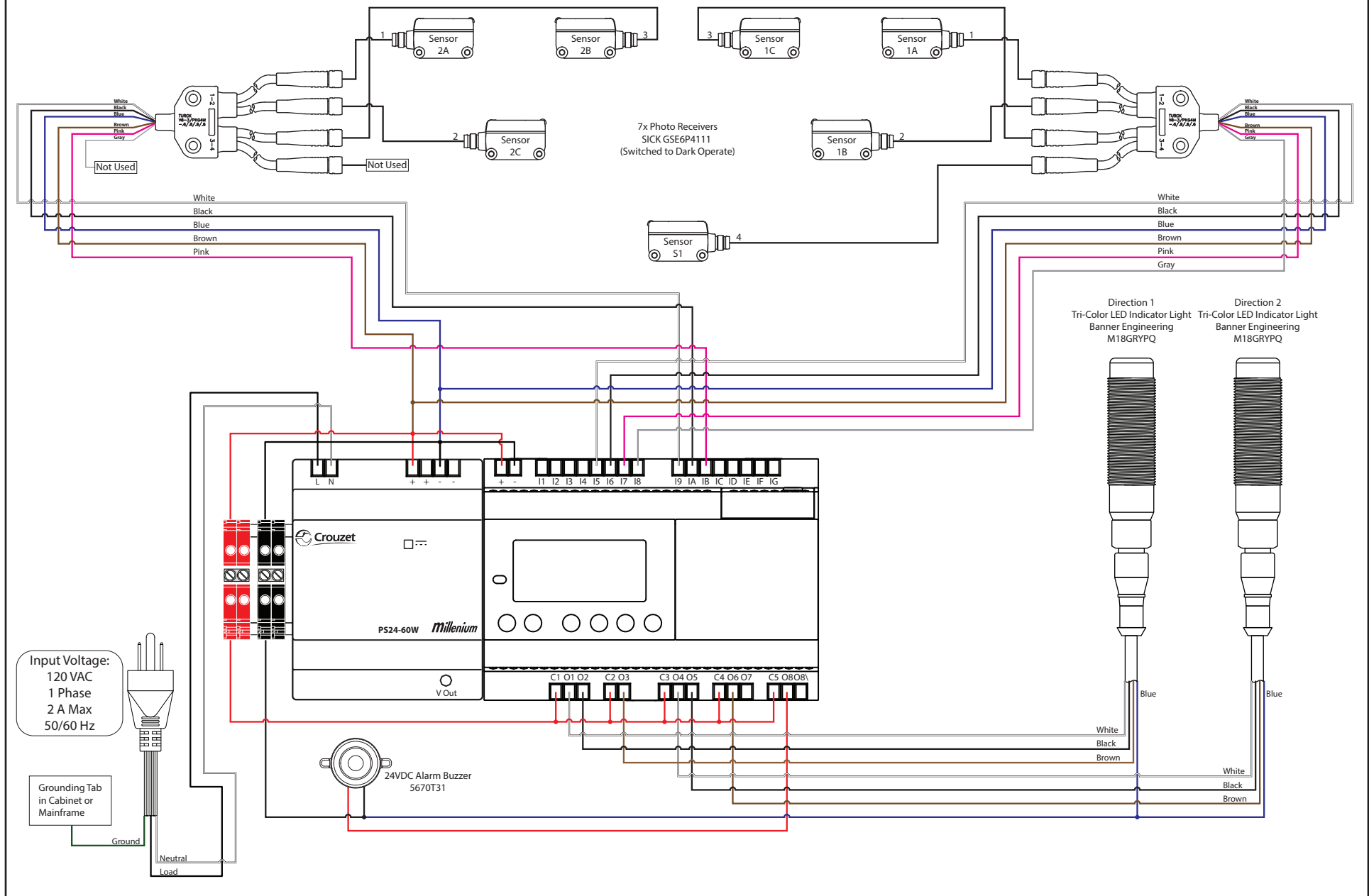
You may piggyback onto one of the common terminals to get 24VDC to operate other devices.

Other notes: Direction 1 is with the primary cabinet on your left, Direction 2 is the primary cabinet on the right.

Beacon Access Control & Interconnection Wiring Diagram



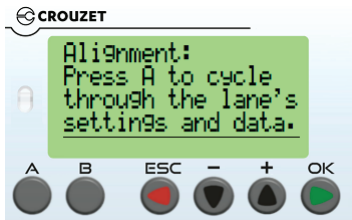
Beacon Primary Cabinet Factory Wiring Diagram



Beacon Settings & Statistics Menu

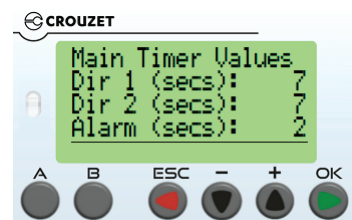
Beacons have a large number of settings that can be adjusted to accommodate many scenarios as well as a lengthy set of statistical data it logs for troubleshooting and maintenance purposes. It is important to note that all settings come from the factory preconfigured based on job specific requirements as well as typical environment usage. Most settings will never need to be adjusted but can be just in case some aspect of the installation needs tweaked.

The Home Screen



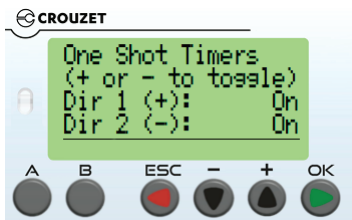
This screen is the default for Beacon units. It will automatically return to this screen after 15 minutes or by pressing the B button. The most important aspect of this screen is that it provides information on sensor alignment. Under normal circumstances, nothing should be shown after alignment. Possible readouts include 5, 6, 7, 8, 9, A and B, which correspond to each input for the photo sensors. If one or more of these is showing on the Alignment line, the corresponding sensor is out of alignment, blocked or not functioning properly.

Main Timer Values



From this screen, each directional timer can be adjusted. These timers are how long someone has to pass through the lane before it cancels and returns to the home position. Passage through the lane also cancels the timer. The default is 7 seconds for either direction. The duration of the audible alarm (after source of alarm has been cleared) to sound is also adjusted here. To adjust, press up or down to select which value to change, press OK to select, press up or down to adjust, then press OK to save. The factory suggests 7 seconds on either directional timer and 2 seconds for the alarm timer.

One Shot Timer Values



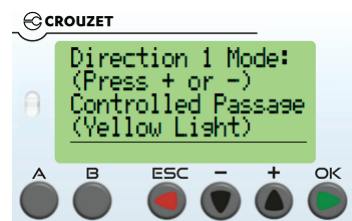
This screen allows for the two one-shot timer settings to be enabled or disabled. This setting prevents access control from holding a direction open on the standard direction inputs. Toggle Direction 1 by pressing + and Direction 2 by pressing -. This should be set to "On" in almost every installation.

Photo Sensor Filter Delay



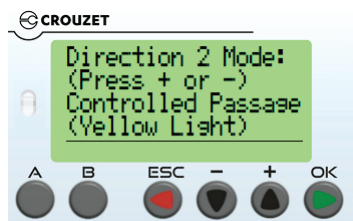
The value on this screen defines how long sensors must be blocked before registering. Lessening the timer will make the units more sensitive. Typically, a range of 1 to 3 is a good setting here. This filters out quick accidental beam crosses without allowing too much through.

Direction 1 Mode Screen



The value on this screen defines the standard operation of direction 1. It can be set to Controlled Passage (w/ yellow indicator lights), Free Passage (w/ green indicator lights) or No Passage (w/ red indicator lights). Controlled or Free are the most common settings, but if there are multiple lanes, using No Passage may help to spread traffic through multiple lanes. This is configured based on our understanding of the job requirements in the factory, but can be cycled by pressing the + button.

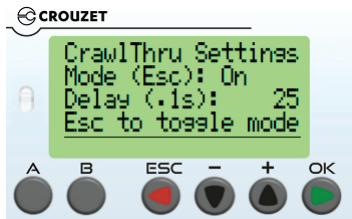
Direction 2 Mode Screen



The value on this screen defines the standard operation of direction 2. It works the same as the direction 1 setting. Press + to cycle between Controlled Passage, Free Passage or No Passage.

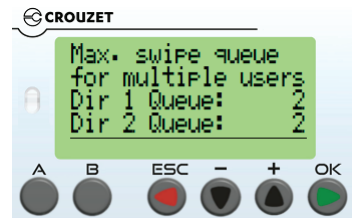
Beacon Settings & Statistics, continued

Crawl-Thru Settings



The value on this screen defines how the anti-crawl thru functionality works. If enabled, when sensor S1 is blocked for the adjustable duration shown on this window, the alarm scenario for anti-crawl thru detection is activated. Adjust the timer value by pressing OK then increasing or decreasing the setting and pressing OK again to save. Toggle this setting to disable it or enable it by pressing ESC.

Swipe Queue Settings



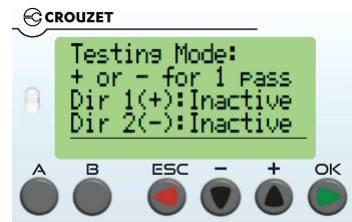
This screen allows the number of people who can swipe their card ahead of time. Most installations would benefit from a value of 2, but more secure areas may wish to reduce this to 1. Very fast paced installations may wish a value of 3, but as a person passes through another access control request is allowed.

Linger Alarm Setting



The value on this screen defines how much time someone has to get out of the path of the beams once the lane has determined someone has passed through it. Increasing this timer can be beneficial for slow moving people but the caveat is that it decreases security to do so.

Testing Mode



This screen allows for the lane to be activated in either direction based on how the lane is set up. The lane will not activate from this window if a direction is set to free passage. Press + to activate the lane in Direction 1 and - to activate the lane in Direction 2. Multiswipes are also allowed from this window based on the Swipe Queue setting.

Approach / No Swipe Alarm



This screen lists how many times the alarm went off because the arm was approached without swiping (whether while closing or while in the closed position).

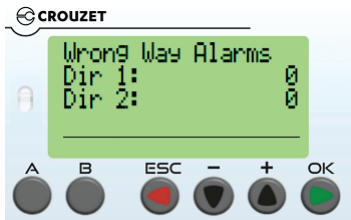
Piggyback Alarm Counter



This screen lists how many times someone attempted to piggyback through the lane on someone else's access control request without swiping themselves.

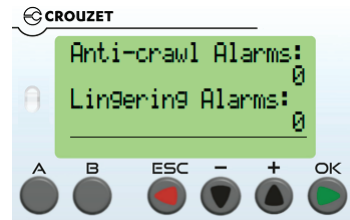
Beacon Settings & Statistics, continued

Wrong Way Alarms



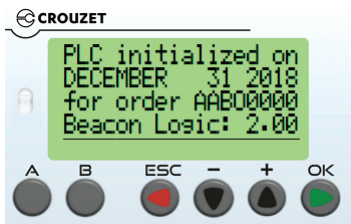
This screen lists how many times the alarm went off because someone from one side requested passage but someone on the other side went through without swiping their own badge.

Anti-crawl & Linger Alarms



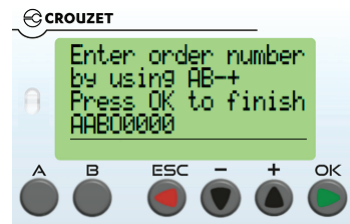
This screen lists how many times the anti-crawl through alarm or the linger in beam alarm occurred (as defined in previous settings).

Lane Specific Values



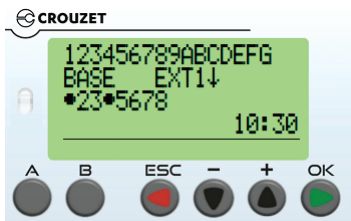
This lane shows when the PLC was activated for the project, the order number the lane was for and the logic version. This is very helpful information to technical support so the specifics to the project can be reviewed.

Factory Setup Screen



This window should never appear unless something happens to completely restart the logic. If this occurs somehow, enter the order number if known by pressing the A, B, - & + buttons to add one to each digit.

Backend Screens



A variety of different readouts and menus for the backend of the logic controller are available. It is best to avoid tinkering here to avoid accidentally resetting the logic and losing all of the project settings. Avoid holding escape and if this manages to enter any further menus, try not to "stop" and then "reset all values and start" the logic.