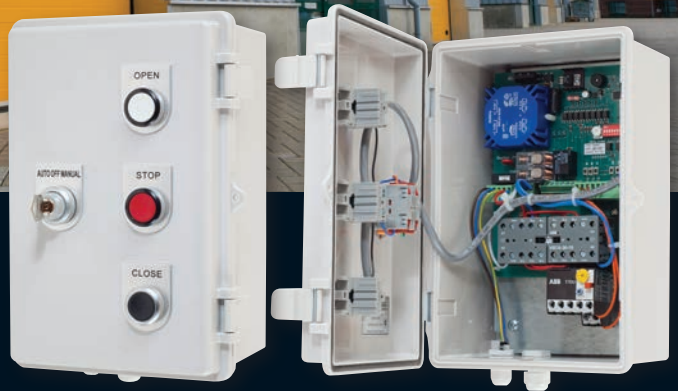**VERSION 3**

240S3
240S4

Universal Controller for 240VAC Motors

used on Light Commercial Doors, Industrial Roller Shutters, Sectional Doors, Garage and Sliding Doors

Features

- Adjustable auto close
- Auto-reset thermal protection
- External key switch for safety and security
- Dead man controls for open and close buttons
- Automatic ground and travel distance calibration
- Photocell, pedestrian and wireless remote control inputs
- Supports NC or NO limit switch inputs or travel timer setup
- Aux relay output to control courtesy lights and other accessories
- 24VDC output to supply external accessories such as loop detectors, swipe cards etc
- Customised models available upon request

Description

The 240S3E and 240S4E industrial controller uses German designed ABB contactors and thermal overloads to control the 240VAC motor. The 240S3E is for 240VAC motors using 3 wires and the 240S4E is for 240VAC motor using 4 wires.

A toroidal transformer is used to power the control card and contactors. Using a toroidal transformer offers the following advantages:

- Excellent efficiency and low leakage losses reducing your electricity consumption
- High isolation which protects the electronics from noisy power lines
- Low magnetic field radiation and no acoustic noise enabling the controller to pass EMC and other stringent radiation tests

This is the quality you should demand when using 240VAC motor controllers.

Important warning and safety instructions

All installations and testing must be done only after reading and understanding all instructions carefully. All wirings should be done only by trained technical personnel. Failing to follow instructions and the safety warnings may result in serious injury and/or damage to property.

Elsema Pty Ltd shall not be liable for any injury, damage, cost, expense or any claim whatsoever to any person or property which may result from improper use or installation of this product.

Risk in the goods purchased shall unless otherwise agreed in written pass to the buyer upon delivery of the goods.

Part Numbers:

Part Number	Description	Application
240S3E	This controller is suitable for 240VAC **3-Wire motors** up to 3kW (4.0HP). Includes: • IP66 rated plastic enclosure • UP / DOWN / STOP external push buttons • External key switch	Light Commercial Doors, Heavy Duty Cycle Roller Shutters, Sectional Doors, Garage and Sliding doors
240S4E	This controller is suitable for 240VAC **4-Wire motors** up to 3kW (4.0HP). Includes: • IP66 rated plastic enclosure • UP / DOWN / STOP external push buttons • External key switch	Light Commercial Doors, Heavy Duty Cycle Roller Shutters, Sectional Doors, Garage and Sliding doors

Key switch

AUTO: When the key is in the AUTO position the controller (motor) can be operated by :

- Wireless remote control if the receiver is installed
- Push button input on the circuit board which can be used to connect external push buttons, swipe card, loop detectors or keypads
- Pedestrian access input on the circuit board which can be used to connect external push buttons, swipe card, loop detectors or keypads
- Stop button on the front of the case

In AUTO mode the Open and Close button on the front of the case are disabled.

OFF: When the key is in the OFF position, the controller (motor) does not work. The push buttons and the wireless remotes are disabled.

MANUAL: When the key is in the MANUAL position the controller (motor) will only operate with the push buttons that are on the front panel. Wireless remote controls are disabled.

Any figures or estimates given for performance of goods are based upon the company's experience and is what the company obtains on tests. The company will not accept liability for failure to comply with the figures or estimates due to the nature of variable conditions affecting for example Radio Remote Controls.

Please keep this setup instruction for future reference.

Block Diagrams
240S3E - used with 240VAC 3 wire motor

Buzzer

Ground
Antenna

Receiver

Dip switch

Auto Close

Open
Close

RUN
Prog1
Prog2

Relay

A B C

D E

LED's

Manual
Auto
Common

Key Switch
Input

FUSE

Earth
Active
Neutral

240Volts
AC Supply

Output NO
Output C
Open Limit
Common
Close Limit

Push Button

Common
Common

PED Access
Photo Beam
DC Output +
DC Output -

Normally Closed
User can change to
Normally Open

Adjust pot to 20% higher
than motor current

Overload Reset

T1 T2 T3

Motor Neutral

Active 1 → M ← Active 2

Motor Capacitor*

Check motor specifications before connecting. Some motors have internal capacitors

240VAC Supply	Supply connection to power the 240S3E
Auxiliary Output	Used to connect a lock or courtesy light. Relay Contacts, Common and Normally Open
Limit Switch	If limit switches are used connect them to this terminal. Factory Default Normally Closed
Push Button	Used to connect an external push button to operate the gate or door. Normally open input.
Common	Common terminal for all inputs
Pedestrian Access	Used to connect an external push button to open gate or door partially for pedestrian access. Normally Open input.
Photo Electric Beam	Used to connect a photo electric beam. Factory Default is Normally Closed input. User can change to Normally Open.
DC Output	24VDC / 150mA. Use to supply accessories. (Use Elsema Reg12 to convert this output to 12VDC)
ABB Contactor	ABB industrial grade contactor with mechanical and electrical interlock.
Thermal Overload	Thermal overload with adjustable overload setting range of 6-9Amps
Motor A1	Used to connect active (A1) of a 3 wire 240VAC motor
Neutral	Used to connect motor neutral
Motor A2	Used to connect active (A2) of a 3 wire 240VAC motor
Slide Switch	Used to access the control card features.
Input Status LEDs	Indicates inputs status.
Tact Switches	Test button for inputs in RUN mode and used to access the features in program mode. A = Push Button B = Open Only C = Close Only D = Stop E = Pedestrian Access
Auto Close trimpot	Used to adjust the Auto Close time.
Dip Switch	Used to access the control card features.
Open, Close LEDs	Indicates Opening or Closing cycle.
Enter button	Used to change features in programming mode.
Receiver	Used to connect Elsema's receivers to operate the control card with a remote control. Use Elsema's Pentacode series.
Antenna	Used to connect an external antenna for the plug in receiver.
Buzzer	Indicates that change of features was successful.
Fuse	Slow blow 15 Amps fuse.

Block Diagrams

240S4E - used with 240VAC 4 wire motor

Polarity of motor connection

	Forward Direction	Reverse Direction
Neutral/Active (11)	Active	Neutral
Active/Neutral (14)	Neutral	Active
Active1 (12)	Active	Active
Neutral1 (13)	Neutral	Neutral

240VAC Supply	Supply connection to power the 240S4E
Auxiliary Output	Used to connect a lock or courtesy light. Relay Contacts, Common and Normally Open
Limit Switch	If limit switches are used connect them to this terminal. Factory Default Normally Closed
Push Button	Used to connect an external push button to operate the gate or door. Normally open input.
Common	Common terminal for all inputs
Pedestrian Access	Used to connect an external push button to open gate or door partially for pedestrian access. Normally Open input.
Photo Electric Beam	Used to connect a photo electric beam. Factory Default is Normally Closed input. User can change to Normally Open.
DC Output	24VDC / 150mA. Use to supply accessories. (Use Elsema Reg12 to convert this output to 12VDC).
ABB Contactor	ABB industrial grade contactor with mechanical and electrical interlock.
Thermal Overload	Thermal overload with adjustable overload setting range of 6-9Amps
Motor Neutral/Active	Active or neutral depending on motor direction.
Motor Active 1	Used to connect active 1 of a 4 wire 240VAC motor.
Motor Neutral 1	Used to connect neutral 1 of a 4 wire 240VAC motor.
Motor Active/ Neutral	Active or neutral depending on motor direction.
Slide Switch	Used to access the control card features.
Input Status LEDs	Indicates inputs status.
Tact Switches	Test button for inputs in RUN mode and used to access the features in program mode. A = Push Button B = Open Only C = Close Only D = Stop E = Pedestrian Access
Auto Close trimpot	Used to adjust the Auto Close time.
Dip Switch	Used to access the control card features.
Open, Close LEDs	Indicates Opening or Closing cycle.
Enter button	Used to change features in programming mode.
Receiver	Used to connect Elsema's receivers to operate the control card with a remote control. Use Elsema's Pentacode series.
Antenna	Used to connect an external antenna for the plug in receiver.
Buzzer	Indicates that change of features was successful.
Fuse	Slow blow 15 Amps fuse

Setup Instructions

Electrical Wiring

DANGER Mains voltage
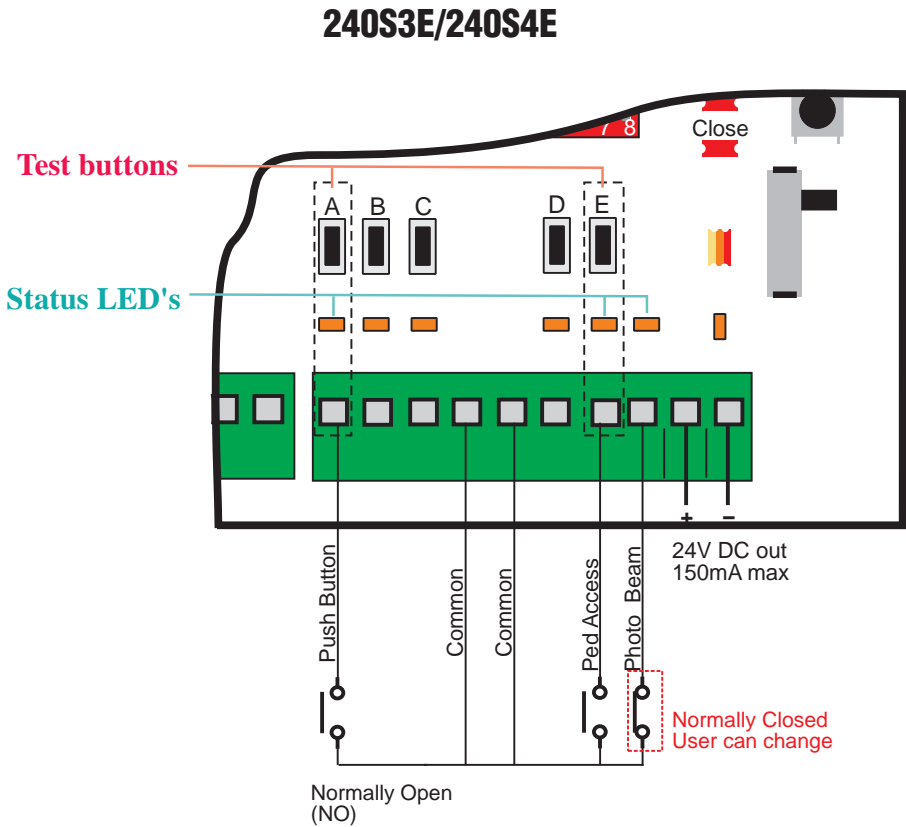
Always switch off power before doing any wiring.

Make sure that all the wiring is completed and that the motor is connected to the control card. **Recommended wire strip length should be 10mm for all connections to the plug in terminal blocks.**

Inputs and Outputs Diagram

The diagram below shows the inputs and outputs available, their factory default settings, status LED's and the test button for each input.

240S3E/240S4E

Test buttons

Status LED's

A B C D E

Close

Push Button

Common

Common

Ped Access

Photo Beam

24V DC out
150mA max

Normally Closed
User can change

Normally Open
(NO)

Open, Close and Remote Control Inputs

The open and close push buttons are factory default setting to operate as press and hold. This means the user will need to keep pressing the input for the gate/door to operate.

The remote control inputs are factory default setting to operate as latching. This means the user presses the remote button once and the gate/door will fully open or fully close.

The press and hold and latching functions can be changed by following the steps and table below:

1. Set dipswitch 7 and 8 "ON" and 1 to 6 "OFF"
2. Set the mode switch to program mode 1
3. Set dipswitch 1, 2, 3 and 4 as shown in the table below

	Dip switch 1	Dip switch 2	Dip switch 3	Dip switch 4
Open Button	On = Press and Hold Off = Latching			
Close Button		On = Press and Hold Off = Latching		
Remote Button 1			On = Press and Hold (Button 1 Open Only) Off = Latching	
Remote Button 2				On = Press and Hold (Button 2 Close Only) Off = Latching

Orange text indicates factory default setting

4. Press the Enter button.
5. Buzzer will beep to confirm the change was successful
6. Set all dip switches off and the mode switch to Run.

If the remote control is to be used for Open Only and Close Only function then the dip switch 2 should be set as "On" in normal Run mode.

Photoelectric Beam Polarity

To change the photoelectric beam polarity, follow these steps:

1. Set dip switch 6 and 8 "ON"
2. Set dip switch 1 to 5 and 7 "OFF"
3. Set mode switch to program mode 1, the run LED will turn red
4. Press button "A" for normally open or button "C" for normally closed
5. Buzzer will beep to confirm the change was successful
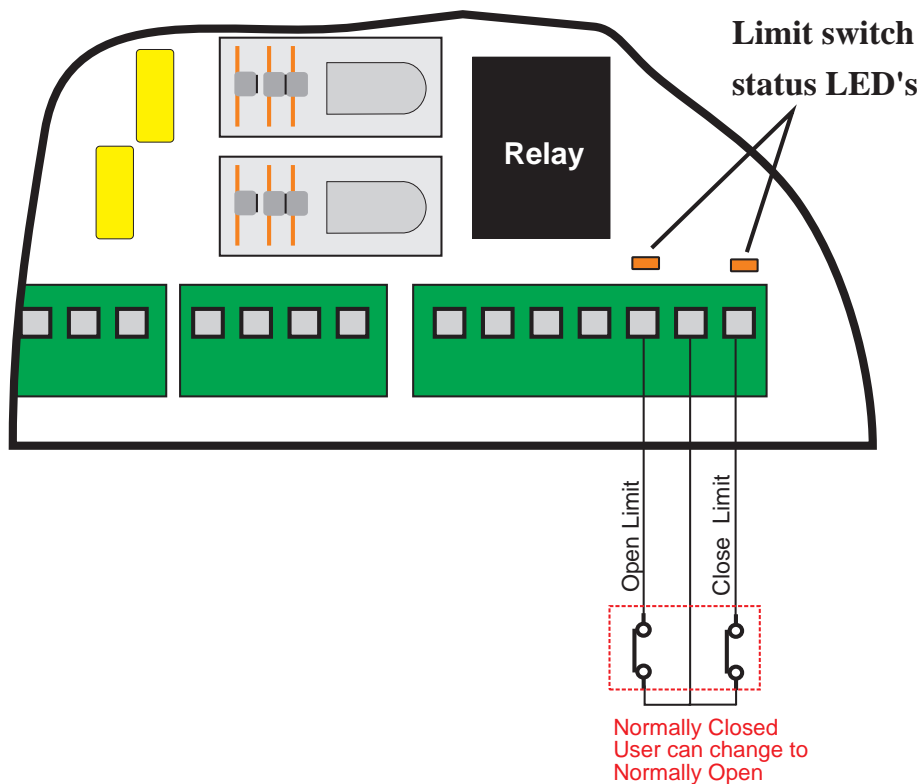6. Set mode switch to Run

Limit Switch

– Internal Limit Switches
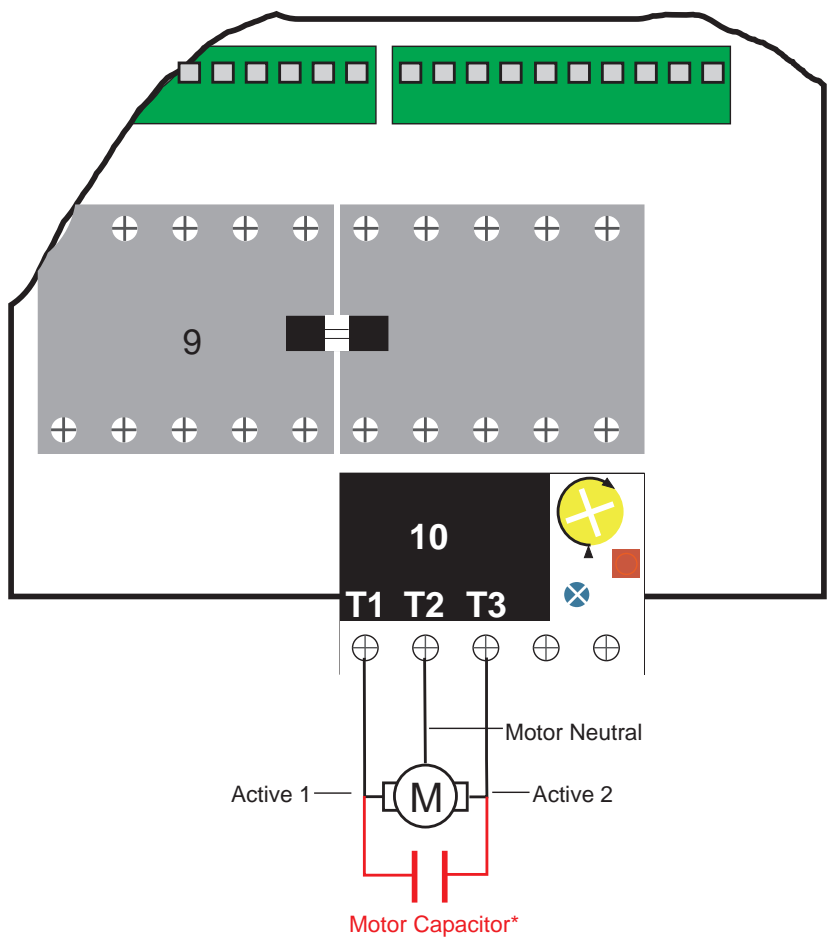
Internal motor limit switches are usually connected in series with the motor wires and they do not require any connection to the control card. Use travel timer to setup motor travel distances.

– External Limit Switches Connected to the Control Card

If you are using external limit switches make sure they are connected to the control card as shown in the diagram below. Check the limit switch status LED's are indicating the correct status of the limit switches. LED "ON" means limit switch is activated.

Limit switch status LED's

Relay

Open Limit

Close Limit

Normally Closed
User can change to
Normally Open

To change the limit switch polarity from normally closed to normally open, follow these steps:

1. Set dip switch 8 "ON"
2. Set dip switch 1 to 7 "OFF"
3. Set mode switch to program mode 1, the run LED will turn red
4. Press button "A" for normally open limits or button "C" for normally closed limits
5. Buzzer will beep to confirm the change was successful
6. Set mode switch to Run

Supply and Motor Wiring Diagram

Connect the supply and 240VAC motor as shown in the diagram below. If the motor does not have an internal starting capacitor the board has provision to connect the capacitor.

⚠ DANGER Mains voltage

Warning

Make sure that the mains power is always switched off before doing any wiring.

240S3E

T1 T2 T3

Motor Neutral

Active 1 — M — Active 2

Motor Capacitor*

*Check motor specifications before connecting a motor capacitor. Some motors have internal capacitors

240S4E

Polarity of Output Power Lines

	Forward Direction	Reverse Direction
Active/Neutral	Active	Neutral
Neutral/Active	Neutral	Active
Active1	Active	Active
Neutral1	Neutral	Neutral

Setup Travel Timer

Use travel timer setup if one of the following applies:

- Using internal motor series limit switches.
- Using linear motors or motors with a mechanical clutch.
- Using external limit switches and need more than 90 second travel time.

Do not use travel timer setup if you are using external limit switch inputs (Limit switches connected to the control card) and the total travel time from open to close is **less than 90 seconds**.

The travel timer can be programmed using the Push Button input, Remote Control input, Open Only Button input and Close Only Button input.

Travel Timer Steps:

1. Close the door/gate fully and power up the control board
2. Set dip switch 7 "ON"
3. Set dip switch 1 to 6 and 8 "OFF"
4. Set mode switch to Program mode 1, the run LED will turn red
5. Press the Enter button, the open LED will start flashing
6. Press and hold the push button input or the remote control, door will start opening
7. Release the push button or remote when the door/gate reaches the fully open position
8. Press the Enter button, the close LED will start flashing
9. Press and hold the push button input or the remote control, door/gate will start closing
10. Release the push button or remote when the door/gate reaches the fully close position
11. Press the Enter button, the buzzer will beep for 2 sec to indicate learning is successful
12. Set mode switch to Run Mode or change dip switch to exit learn mode

Setup Pedestrian Access Travel Timer

Pedestrian access opens the gate/door for a short time to allow someone to walk through the gate/door but does not allow a vehicle access. The factory default pedestrian access travel timer is 3 seconds. To change the default time, follow the steps below.

1. Close the door/gate fully and power up the control board
2. Set dip switch 6 "ON"
3. Set dip switch 1 to 5 and 7, 8 "OFF"
4. Set mode switch to program mode 1, the run LED will turn red
5. Press the Enter button, the open LED will start flashing
6. Press and hold the push button input or the remote control, door/gate will start opening
7. Release the push button or remote when the door/gate reaches the pedestrian access open position
8. Press the Enter button, the close LED will start flashing

9. Press and hold the push button or the remote control, door/gate will start closing

10. Release the push button or remote when the door/gate reaches the fully close position

11. Press the Enter button, the buzzer will beep for 2 seconds to indicate learning is successful

12. Set mode switch to Run Mode or change dip switch to exit Pedestrian Access Learn mode

Courtesy Light and Lock Time

Dip switch 6 allows you to setup the AUX relay output to either a light or lock output.

Dip switch 6 "OFF" in Run mode => AUX Relay output is courtesy light

Dip switch 6 "ON" in Run mode => AUX Relay output is lock

Courtesy Light

Courtesy light time is as follows:

• On power up light is on for 60 seconds

• Light stays on for 60 seconds after the end of each run cycle.

Controlling the Courtesy Light with a Remote Control

Button 2 of the remote can be set to operate the courtesy light by selecting dip switch 7 on. This will over ride the close function of button 2 of the remote if selected.
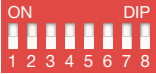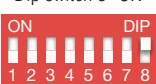
Lock Time

When the auxiliary relay is programmed as a lock output the relay is activated for a set time on the opening and closing cycle. The factory default lock time is 2 seconds.

To change the default lock time follow these steps:

1. Set mode switch to Program Mode 1

2. Set dip switch 6 and 7 "ON"

3. Press Button A for the required duration of the lock time

4. Release Button A

5. Buzzer will beep to indicate lock time has been changed

6. Switch off all dip switches

7. Set mode switch to Run mode

Dip Switch Functions

Feature	Dip Switch settings	Description
Auto Close	Dip switch 1 "ON"	Auto close is a feature that automatically closes the gate/door after a preset time has counted down to zero. Adjust the auto close trimpot to change time between 3 – 60 seconds.
Remote Control Open Only and Close Only	Dip switch 2 "ON"	By default the remote control allows the user to open and close the gate/door with button 1. This mode disables closing for the remote control on button 1 and moves the closing function to button 2 of the remote control.
Security Close	Dip switch 3 "ON"	Gate/door will close as soon as the vehicle has passed through the photoelectric beam.
Photoelectric Beam	Dip switch 4 and 5 "OFF"	Photoelectric beam stops and opens gate/door on close cycle
Photoelectric Beam (Special Security Close)	Dip switch 4 "ON" and 5 "OFF"	Photoelectric beam stops gate/door on close cycle
Photoelectric Beam	Dip switch 4 "OFF" and 5 "ON"	Photoelectric beam stops gate/door on open and close cycle
Photoelectric Beam	Dip switch 4 and 5 "ON"	Photoelectric beam stops and closes gate/door on open cycle
Auxiliary Relay Courtesy Light or Lock	Dip switch 6 "ON"	Dip switch 6 "OFF" - AUX Relay output is courtesy light Dip switch "ON" - AUX Relay output is lock
Auxiliary Relay 2 Channel Courtesy Light	Dip switch 7 "ON"	Button 2 of the remote will switch "ON" the courtesy light for 60 secs
Auxiliary Relay Strobe Light	Dip switch 8 "ON"	Aux Relay output is strobe light output. Relay is only activated when the gate/door is moving. Dip switch 8 "ON" overrides courtesy light and lock.

Test Buttons and status LED's

Each input has a built-in test button and a status LED. The test buttons are located behind the terminal blocks of each input. The status LED is next to the input test buttons.

Fuse

The standard fuse included with the board is a slow blow 15 Amps (5 x 20mm).

Resetting to Factory Default

This will reset the controller card back to its factory default settings.

1. Set dip switch 6, 7, 8 "ON"
2. Set dip switch 1 to 5 "OFF"
3. Set mode switch to program mode 2, the run LED will turn orange
4. Press Enter button for 5 seconds the buzzer will beep to confirm the resetting was successful
5. Set mode switch to Run mode.

Accessories

Key FOB Remote

The latest Penta series key fob remote with mini receivers ensures your gates or doors are secure.

Visit http://www.elsema.com/key-fob.htm for more details.

PentaCODE® Series

PentaFOB® Series

Photoelectric beam

The photoelectric beam is usually used as a safety device to control automatic gates and doors. Elsema has several types of photoelectric beams including retro-reflective and through beam with IP-66 ratings for outdoor use.

PE24
(Through-beam type)

PE1500
(Retro-reflective type)

Vehicle Loop Detectors

The digital technology of the loop detectors is used to detect metal objects such as motor vehicles, motor bikes or trucks. Loop detectors have become a popular tool having innumerable applications in policing, right from surveillance operations to traffic control. Automation of gates and doors has become a popular usage of the loop detector. The digital technology of the loop detector enables the equipment to sense a change in the inductance of the loop as soon as it detects the metal object in its path.

MD12-1
(1 Channel)

MD12-2
(2 Channel)

MD2010

LD30-12

Also available with 240VAC Supply Connection

NOTES

ELSEMA
GATE & DOOR CONTROLS