CENTURION

DIAGNOSTICS MADE EASY

D-Series Operators

HOW TO USE THIS GUIDE

The purpose of this guide is to equip users with the necessary skills for accurately diagnosing and resolving any technical challenges which may be encountered while working on the **D-Series operators**.

The document is divided into different sections, each referring to a specific **D-Series operator**, and each section is further divided into the different symptoms typical to the operator in question.

Furthermore, diagnostic messages are categorised according to the stage of operation during which they are most likely to occur, be it during setup or normal operation. A category also exists for 'Information Screens'.

The information screen or indication will in each case be presented first, followed by a list of possible symptoms associated with the operator in question, possible cause(s) of the diagnostic message and, lastly, all the possible means of resolving the problem will be documented. This system provides the user with a simple means of cross-referencing when performing troubleshooting and diagnostic exercises.

Icons used in this guide

DIAGNOSTIC INDICATION

This is the audible or visual feedback provided by the operator.

Audible feedback

The feedback provided by the controller's onboard buzzer.

Symptom

Refers to the physical behaviour of the operator. For example, a gate not responding to a valid trigger would be a symptom.

Cause

The underlying reason for an operator behaving a certain way.

Solution(s)

The course of action needed to resolve a fault and return the device to normal operation.

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SLIDING GATE OPERATORS

The **D-Series** range of operators, which includes the **D5-Evo**, **D10** and **D10 Turbo**, gives useful feedback of fault conditions via an intelligent controller and LCD display. As discussed in the introduction to this guide, the **symptom** will be presented first, after which **all possible information screens** associated with the symptom(s) in question will be given and can then be cross-referenced with the **'Possible cause'** and **'Solution'** sections.

PRELIMINARY CHECKS

The following is a list of standard checks to be performed prior to undertaking any of the advanced diagnostic exercises contained within this document.

In the event that any fault condition is experienced, systematically go through the list to ensure that all of the minimum site requirements are met.

1. Ensure that the following LEDs are illuminated at all times:
   a. Safety Open
   b. Safety Close
   c. Lck/Stp
2. Check that operator is engaged.
3. Check all drive connections into the controller, i.e. battery and motor wires.
4. Check that there is a tight fit of the battery leads onto the battery terminals.
5. Check that Mains Present icon is solid.
6. Check that the origin magnet on the gate passes as close as possible to the sensor - approximately 13mm apart.

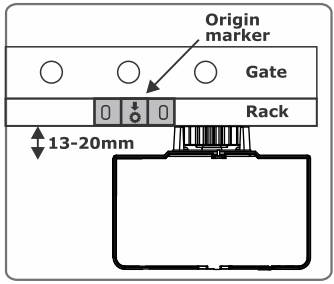


FIGURE 1

7. Check the charge rate of the battery without the battery connected:
   a. 13.8V for D5-Evo
   b. 27.6V for D10/Turbo
8. Test battery voltage under load; should be no lower than:
   a. 11V DC for D5-Evo
   b. 22V DC for D10/Turbo

   Look at the date stamp on the battery and make sure that the battery is well within its usable life of three to four years from the date on the battery.
9. Check all visible fuses.
10. Check DOSS and sensor connections.
11. Push the gate open and closed manually and check that the gate is running freely and that there are no tight spots in the movement of the gate.
12. Check the state of the gate wheels, examining both the condition of the bearings and the wear on the rolling face of the wheel.
13. Check the condition of the gate rail and ensure that it is perfectly straight.
14. Check for excessive build-up of dirt on the gate rail which might affect its free movement, and ensure that there is no vegetation or anything else obstructing the movement of the gate.
15. Make sure that the rack mesh is within specification along the entire travel of the gate - the rack mustn't press down onto the pinion at any point.
16. Check that the gate aligns properly with its closed catch bracket when closing.
17. Make sure that the gate is fitted with an adequate Endstop that will stop the full force of the gate when opening.
18. Make sure that the gate's guide-rollers adequately support the gate in the upright position and allow free movement of the gate along its entire length of travel.
19. Check that the gearbox is securely mounted and properly aligned to the movement of the gate (i.e. parallel to the gate).

TYPICAL DIAGNOSTIC MESSAGES FOUND ON THE D-SERIES CONTROLLERS

DIAGNOSTIC MESSAGES DURING SETUP

Symptom: Unable to complete Gate Setup

Possible causes

The sensor is receiving dual pulses from the origin magnet due to one of the following causes:

- Sensor positioned too far from origin
- Sensor and origin positioned at different heights
- More than one magnet on gate
- Magnetised item on rack
- Incorrect orientation of the electric motor is causing induction
- Missing pins in origin enclosure
- Faulty harness
- Faulty origin sensor

Solutions

- Ensure that the sensor is as close as possible to the origin - ideally the gap should be approximately 13mm. Refer to Figure 1 on page 2
- Sensor and origin should be positioned at the same height
- Ensure that there is only one magnet on the gate
- Ensure that there are no items such as metal bars on the rack that could have become magnetised
- Orientate the electrical motor so that the wires are facing away from the controller
- Replace faulty origin sensor

Symptom: Unable to complete Gate Setup

Possible causes

The error indication signifies that the sensor is not receiving a valid pulse from the gate-mounted origin magnet, or the controller is not receiving a signal from the sensor:

- The distance is too great between the origin sensor and the magnet
- The magnet and sensor are mounted at different levels
- Incorrect orientation of magnet
- The gate is getting stuck at a certain point before the magnet has passed the sensor
- Faulty origin sensor

Solutions

- Check the information screen on page 47 – it should display the position of the magnet (left/right) when the magnet is passing the sensor
- Ensure that the magnet and sensor are mounted at the same level
- Ensure that there is an audible 'click' whenever the magnet passes the origin sensor
- Ensure that the arrow on the magnet is facing the operator – there should be a repelling action when the magnet is brought near the sensor
- Move the magnet closer to the origin sensor. Refer to Figure 1 on page 2
- Replace the origin sensor

Symptom: Unable to complete Gate Setup

Possible causes

- Mechanical Endstops have not been installed
- Oil in DOSS chamber
- DOSS faulty or disconnected

Solutions

- Install physical Endstops in order to induce the stall needed to stop the motor
- Ensure that the harness is connected on both the controller and DOSS side
- Check for evidence of oil on the encoder by following the procedure documented below:
  - Remove the DOSS and carrier so that the encoder wheel is clearly visible
  - Disengage the gearbox
  - Place your finger on the wheel
  - Move the gate a metre or so in both directions
  - Check your finger for oil

Symptom: Unable to complete Gate Setup

Possible causes

- Mechanical Endstops are not securely fitted
- Poor meshing between rack and pinion due to excessive gap, missing teeth, etc.
- Faulty DOSS sensor

Solutions

- Ensure that Endstops are sturdy and do not move
- Ensure that gap between rack and pinion is approximately 3mm
- Check for missing teeth on rack

DIAGNOSTIC MESSAGES DURING NORMAL OPERATION

Symptom: Gate does not open/close
This error indication applies to D10 and D10 Turbo only

Audible feedback

- Five beeps periodically for 30 seconds

Possible causes

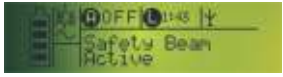
- The maximum current that should be drawn by each D-Series controller is:
  - D10: 300mA (momentarily); 200mA (continuous)
  - D5-Evo: 3A (momentarily); 1A (continuous)
- This error indication is displayed in the event of excess current being drawn
- Too many auxiliary components connected to 12V auxiliary output
- One specific auxiliary device that is faulty, typically having a short circuit
- Charging voltage significantly higher than 28V DC due to faulty charger or controller

Solutions

- Ensure that the battery charging voltage is no higher than 28V DC. Refer to Appendix A on page 44 for a description of how to test battery and charging voltages

- Disconnect and reconnect auxiliary components one by one in order to isolate the problem

Symptom: Gate does not open/close



Audible feedback

- One beep periodically for 30 seconds

Possible causes

- Beam interrupted
- Beam test inadvertently enabled
- IR beams faulty, misaligned or disconnected
- Damaged Safe Common input

Solutions

- Ensure that no people or objects are in the path of the beam
- Ensure that the Safety Open and Safety Close LEDs are illuminated – if not, the inputs can be permanently bridged to Com – or the controller can be reset to factory defaults
- Disable the Beam Test feature under Menu 6: IR Beams
- Ensure that the safety beams are in working order
- Replace faulty controller

Symptom: Gate will only move for a very short distance before termination of operation

Audible feedback

- Five beeps periodically for 30 seconds

Possible causes

- Poor/intermittent motor wire connection
- Faulty electric motor
- Controller hardware problem

Solution

- Check connection of motor wires to controller
- Replace faulty electric motor
- Replace faulty controller

Symptom: Gate does not open/close

Audible feedback

- Five beeps periodically for 30 seconds

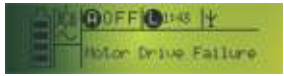
Possible causes

- DOSS physically disconnected
- Poor connection on DOSS or controller side
- Faulty harness
- Faulty DOSS
- Faulty controller

Solutions

- Ensure that the DOSS is clipped firmly into its carrier and that the harness is plugged in on both the DOSS and controller side
- Check for bad connections
- Replace DOSS harness
- Replace DOSS unit
- Replace faulty controller

Symptom: Gate does not open/close



Audible feedback

- Five beeps periodically for 30 seconds

Possible causes

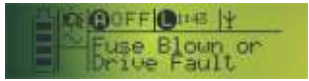
- Intermittent or loose connection between motor and controller
- The H-bridge on the controller is damaged, possibly a blown FET
- The electric motor is faulty or has been disconnected

Solutions

- Check drive connections
- Check that the MOTOR, FUSE and DRIVE cells are all ticked in the information screen. An 'x', question mark or anything other than a tick indicates a fault. In the case of a damaged H-bridge, the display will typically indicate the part of the bridge that is damaged (i.e. Q1Q3, Q2Q4, etc.)
  For an explanation of the information screens found on the D-Series range of controllers, refer to Appendix B on page 50
- Ensure that the electric motor terminals are connected to the controller

- Check the function of the electric motor by referring to the information screen described earlier, or test the motor by connecting the motor terminals straight onto the battery. If the motor does not run, the commutator is most probably faulty
- In the event of a Drive Fault, the controller must be repaired by an authorised workshop

Symptom: Gate does not open/close



Audible feedback

- Five beeps periodically for 30 seconds

Possible causes

- The 30A ATO motor fuse has been blown or removed
- Faulty controller

Solutions

- The MOTOR, FUSE and DRIVE cells should all be ticked in the information screen. For an explanation of the different information screens, please refer to Appendix B on page 50
- Check the continuity of the fuse with a multi-meter - set the meter to 'ohms' or audio output
- If the fuse keeps blowing if replaced, the controller is faulty and must be replaced

Symptom: Gate does not open/close, or gate runs a short distance and stops

Audible feedback

- Four beeps periodically for ten seconds

Possible causes

The error message will be displayed whenever no DOSS pulses are registered while the motor is supposed to be running

- The operator is encountering a fixed obstruction
- The operator is jammed into an Endstop
- The gearbox is disengaged (D5-Evo only)
- Loose drive connection (battery or motor terminal)
- Oil in DOSS chamber
- Faulty DOSS
- Sticky motor brushes

Solutions

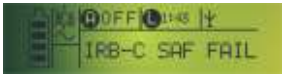
- Ensure that the gate is running smoothly and that there is nothing physically obstructing the gate, e.g. dirt or stones on the rail, rack pressing down on the pinion, bad rack joints, etc.
- Connect the motor wires straight onto the battery to drive the gate in the opposite direction and release it from the Endstop
- Engage the gearbox by turning the thumbwheel anti-clockwise
- Ensure that drive connections are secure
- Check for evidence of oil on the encoder by following the procedure below:
  - Remove the DOSS and carrier so that the encoder wheel is clearly visible
  - Disengage the gearbox

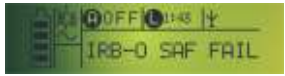
- Place your finger on the wheel
- Move the gate a metre or so in both directions
- Check your finger for oil

- Replace faulty DOSS
- Arrange service with an authorised workshop

Symptom 1: Gate does not close from the fully open position

Symptom 2: Gate does not open from the fully closed position





Audible feedback

- Five beeps periodically for 30 seconds

Possible causes

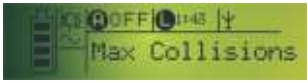
- The Beam Test feature has been inadvertently activated
- The safety beam transmitter has been wired to normal common – as opposed to safe common – with the Beam Test enabled
- The incorrect operating profile for the region has been selected. The UL325 and CE profiles will always perform a beam test before allowing the gate to run
- Beams not aligned
- Damaged Safety Common input
- Incorrect beam wiring
- Faulty closing/opening beams

Solutions

- Perform a Factory Reset operation, bridge Safety Open to Com or refit the beams if they have been disconnected
- Disable the Beam Test feature under Menu 6: IR Beams
- Connect the transmitter negative to Safety Common

- Ensure that you select the correct profile for the region the operator is being installed in, e.g. ZA (Menu 10: General Settings)
- Check beam alignment
- Replace the beams
- Ensure that the beams are correctly wired and that the connections are secure. Refer to the wiring diagrams on pages 53 and 54
- Replace faulty controller

Symptom: Gate does not open/close, or gate runs a short distance and stops



Audible feedback

- Four beeps periodically for ten seconds

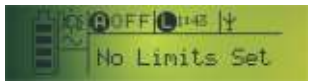
Possible causes

- The operator is encountering an obstruction and has reached the pre-set number of allowable collisions
- Gate rack resting on pinion
- Seized gate wheels
- The controller collision force is set too sensitively
- Number of allowable collisions set to a low value, e.g. 1
- Damaged encoder wheel
- Tight gearbox
- Oil on DOSS
- Faulty DOSS harness
- Loose drive connections
- Gearbox not fully engaged
- Faulty DOSS sensor
- Faulty electric motor

Solutions

- Ensure that the gate is running smoothly and that there is nothing physically obstructing the gate, e.g. dirt or stones on the rail, rack pressing down on pinion, bad rack joints, etc. There should be a 2 - 3mm gap between the rack and the pinion
- Increase the Collision Force (Menu 2: Safety)
- Increase maximum collisions value to a higher number, typically 4
- Have the operator serviced by an authorised workshop
- Check for evidence of oil on the encoder by following the procedure below:
  - Remove the DOSS and carrier so that the encoder wheel is clearly visible
  - Disengage the gearbox
  - Place your finger on the wheel
  - Move the gate a metre or so in both directions
  - Check your finger for oil
- Replace faulty DOSS harness
- Check battery and motor terminal connections
- Ensure that operator is fully engaged
- Replace faulty DOSS sensor
- Replace faulty electric motor

Symptom: Gate does not open/close



Audible feedback

- Three short beeps for five seconds

Possible cause

- The End-of-travel Limits have not been established

Solution

- Set the Gate Travel Limits by accessing the Setting Limits Menu (Menu 1: Setting Limits) and following the onscreen prompts

Symptom: Gate does not open/close

Audible feedback

- Three short beeps periodically for 30 seconds

Possible causes

- Poor connection between battery and controller
- The battery voltage is low or the battery is faulty or disconnected
- Faulty controller

Solutions

- Ensure that the battery terminals are properly connected on both the controller and battery side
- Measure the battery voltage – it should be no lower than 11V DC for the D5-Evo or 22V DC for the D10/D10 Turbo when placed under load. Refer to Appendix A on page 44 for an explanation of how to accurately test battery voltage
- Check for corrosive build-up around the battery terminals and clean if necessary
- Replace the battery
- Ensure that the 'Mains Present' icon is solid
- Measure the charger's output voltage. It should be about 14V for the D5-Evo and 27V for the D10/D10 Turbo
- Replace faulty controller

Symptom: None

Audible feedback

- 4KHz tone for 30 seconds

Possible causes

- The safety beams have been interrupted for the pre-set period of time with the Ambush Alarm feature enabled
- Inadvertent activation of the Ambush Alarm feature

Solutions

- Clear any obstruction from the path of the beams
- If the lenses are unobstructed, check the wiring between the beams and the controller (refer to the wiring diagrams on pages 53 and 54), as well as between the IRB transmitter and receiver
- Ensure that the beams are properly aligned
- Disable the Ambush Alarm feature in Menu 6: IR Beams

Symptom: None

Audible feedback

- 4KHz tone for 30 seconds

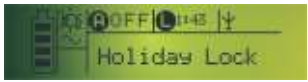
Possible causes

- The safety beams have been interrupted with the gate in the fully closed position
- Inadvertent activation of the Break-in Alarm feature

Solutions

- Clear any obstructions from the path of the beams
- If the lenses are unobstructed, check the wiring between the beams and the controller, as well as between the IRB receiver and transmitter
- Ensure that the beams are properly aligned
- Disable the Break-in Alarm feature in Menu 6: IR Beams

Symptom: Gate does not open from fully closed position



Audible feedback

- One beep periodically for 30 seconds

Possible cause

- The Holiday Lockout feature has been enabled

Solutions

- Ensure that the green Lck/Stp LED is lit
- Press the transmitter button or switching device that invoked Holiday Lockout Mode
- Bridge the Lck input to Com or reset the controller to factory defaults (Menu 10: General Settings)
- Check for any Auto-activations pertaining to Holiday Lockout. Refer to the Time-barring and Auto-activation matrix, a depiction of which is given in Appendix B, page 50

SWING GATE OPERATORS

The **VECTOR2,** while technically part of the **D-Series** range, has its own unique set of diagnostic messages and as such is discussed separately in this guide.

PRELIMINARY CHECKS

The following is a list of standard checks to be performed prior to undertaking any of the advanced diagnostic exercises contained within this document. In the event that any fault condition is experienced, systematically go through the list to ensure that all the minimum site requirements are met.

1. Check all drive connections, i.e. battery and motor wires; check connections on the controller and any junction points between the actuator and the controller.
2. Test battery voltage under load; should be no lower than 11V DC.
3. Check all visible fuses.
4. Check that the Mains Present icon is solid.
5. Check DOSS and sensor connections to the controller.
6. Always check the operation of the safety beams. On the VECTOR2 controller, the beam LEDs mirror the state of the beam receiver relay. However, if the controller is in the Default state, the LEDs may be off even though the controller tested the beams as 'ok'. In the event that the gates do not open/close, ensure that the beams are functioning properly.
7. Check that actuactor(s) is/are engaged.
8. Ensure that A and B dimensions of the rear mounting bracket are within specification.
9. Origin clamps must not be fitted for outward swinging gates, and solid Endstops must be fitted.
10. Ensure that the gates are properly balanced.
11. Ensure that the hinges support the gate(s) adequately and allow free movement of the gate.
12. Check that there is no vegetation obstructing the movement of the gate.
13. An electric lock is to be fitted to gates wider than two meters

14. Check that there is an adequate loop in the VECTOR2 cable between the operator and the controller/junction box.
    The loop should have a radius of approximately 350mm.
15. Ensure that both actuators are the same version (e.g. v2).
16. Ensure that the Wall Bracket is securely anchored.
17. Ensure that the actuator's maximum stroke is being utilised.
18. Ensure that your gate and operator are equipped to deal with wind loading. Refer to Appendix D - the Wind Loading tables on page 57 for more detail.

TYPICAL DIAGNOSTIC MESSAGES FOUND ON THE VECTOR2 CONTROLLER

DIAGNOSTIC MESSAGES DURING SETUP

Symptom: Unable to complete Gate Setup

Possible causes

- Operator gearbox disengaged
- 'DBL' has been selected for a single-leaf installation
- Loose connection on the sensor terminals
- A and B dimensions are not according to specification
- Crimped or cut cables
- Intermittent connection between DOSS and harness
- The operators in a double leaf installation are different versions, resulting in excess current draw from one operator's encoder sensor
- DOSS failure
- Faulty controller
- Faulty actuator

Solutions

- Ensure that the gearbox is engaged by turning the actuator override key fully clockwise
- Ensure that 'SGL' is selected when prompted to select the number of leaves (if it is indeed a single-leaf installation)
- Ensure that all connections outside of the unit are secure and that the cable has not been crimped, cut or otherwise damaged
- Ensure that the harness is still securely plugged into the encoder and has not been pulled and yanked loose - as this connection is internal to the actuator, it is preferable to replace it; the operation of the encoder can be tested as follows:
  - Set your multimeter to read DC voltage
  - Place the negative lead on Common and the positive lead on the purple wire
  - Slowly move the gate by hand (the actuator must be disengaged)
  - Read the voltage between common (black) and the purple wire
  - Pulses should be evident by the voltage moving between +0V and +4.5V
  - Repeat for blue wire
- Ensure that both operators in a double leaf installation are the same version (e.g. v2)
- Replace faulty DOSS encoder/controller/actuator

DIAGNOSTIC MESSAGES DURING NORMAL OPERATION

Symptom: Gate does not open/close, or gate runs a short distance and stops

Audible feedback

- Four beeps periodically for ten seconds

Possible causes

This error message will be displayed whenever no DOSS pulses are registered while the motor is supposed to be running.

- The operator is encountering a fixed obstruction
- Excessive wind loading
- The operator is jammed into an Endstop
- The gearbox is disengaged
- Loose drive and/or sensor connection (battery or motor terminal)
- The operators in a double-leaf installation are different versions, resulting in excess current draw from one operator's encoder sensor
- Faulty DOSS

Solutions

- Ensure that nothing is physically hindering the trajectory of the gate(s)
- Ensure that the A and B dimensions of the actuator's rear mounting bracket are according to specification
- If the gates are outward opening, ensure that the origin clamps are not fitted
- Engage operator by turning the key fully clockwise
- Check for loose drive and/or sensor connections on the controller or any junctions between the actuator and the controller

- Ensure that both operators in a double leaf installation are the same version (e.g. v2)
- Replace DOSS encoder

Symptom: Gate does not open/close, or gate moves a short distance and stops

Audible feedback

- Four beeps periodically for ten seconds

Possible causes

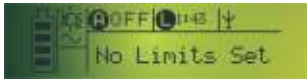
- The operator is encountering an obstruction and has reached the pre-set number of allowable collisions
- The controller collision force is set too sensitively
- Number of allowable collisions set to a low value, e.g. 1
- Excessive wind loading
- Damaged encoder
- The operators in a double-leaf installation are different versions, resulting in excess current draw from one operator's encoder sensor
- Faulty DOSS harness
- Loose drive and/or sensor connections
- Gearbox not fully engaged

Solutions

- Ensure that the gate is running smoothly and that there is nothing physically hindering the trajectory of the gate
- Increase the collision force (Menu 2: Safety)
- Increase maximum collisions value to a higher number, typically 4
- Ensure that both operators in a double leaf installation are the same version (e.g. v2)

- Replace faulty DOSS harness
- Check battery, motor terminal and sensor connections; check connections on the controller at any junction points between the operator and the controller
- Ensure that operator is fully engaged by turning the key fully clockwise
- Replace faulty DOSS encoder
- As the encoder is mounted inside the actuator, it is preferable to replace the actuator

Symptom: Gate does not open/close



Audible feedback

- Three short beeps for five seconds

Possible cause

- The End-of-travel Limits have not been established

Solution

- Set the Gate Travel Limits by accessing the Setting Limits Menu (Menu 1: Setting Limits) and following the onscreen prompts

Symptom: Gate moves a short distance and reverses direction

Audible feedback

- None

Possible causes

This error message denotes the fact that the operator is trying to resolve a perceived collision due to one or more of the following reasons:

Solutions

- Ensure that nothing is physically hindering the trajectory of the gate
- Ensure that A and B dimensions of the actuator's rear mounting bracket are according to specification
- If the gates are outward opening, ensure that the origin clamps are not fitted; the gate must open against a solid Endstop
- Engage actuator by turning the key fully clockwise
- Check all sensor wire connections and joints
- Ensure that the length of the gate leaf is within specification
- Increase the Ramp-up and Ramp-down distances (Menu 5: Run Profile)
- Reset Gate Limits

Symptom: Gate does not open/close

Audible feedback

- Three beeps periodically for 30 seconds

Possible causes

- Poor connection between battery and controller
- The battery voltage is low or the battery is faulty or disconnected
- Faulty controller

Solutions

- Ensure that the battery terminals are properly connected
- Measure the battery voltage – it should be no lower than 11V DC when placed under load. Refer to Appendix A for an explanation of how to accurately test battery voltage
- Check for corrosive build-up around the battery terminals and clean if necessary
- Replace the battery
- Ensure that the 'Mains Present' icon is solid
- Replace faulty controller

GENERAL INFORMATION/ALERT SCREENS

Symptom: None

Audible feedback

- 4KHz tone until beams are cleared

Possible causes

- The safety beams have been interrupted for the pre-set period of time with the Ambush Alarm feature enabled
- Inadvertent activation of the Ambush Alarm feature

Solutions

- Clear any obstruction from the path of the beams
- If the lenses are unobstructed, check the wiring between the beams and the controller (refer to the wiring diagrams on pages 53 and 543), as well as between the IRB transmitter and receiver
- Ensure that the beams are properly aligned
- Disable the Ambush Alarm feature in Menu 6: IR Beams

Symptom: None

Audible feedback

- 4KHz tone for 30 seconds

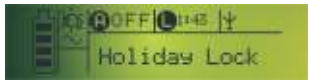
Possible causes

- The safety beams have been interrupted with the gate in the fully closed position
- Inadvertent activation of the Break-in Alarm feature

Solutions

- Clear any obstructions from the path of the of the beams
- If the lenses are unobstructed, check the wiring between the beams and the controller, as well as between the IRB receiver and transmitter
- Ensure that the beams are properly aligned
- Disable the Break-in Alarm feature in Menu 6: IR Beams

Symptom: Gate does not open from fully closed position



Audible feedback

- One beep periodically for 30 seconds

Possible cause

- The Holiday Lockout feature has been enabled

Solutions

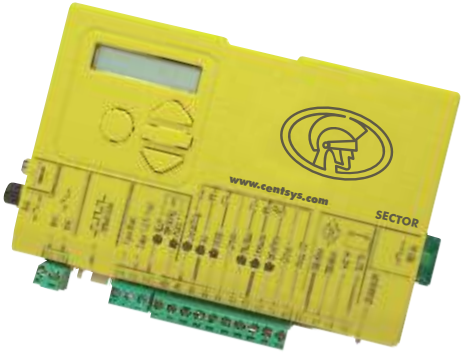
- Ensure that the green LCK LED is lit
- Press the transmitter button or switching device that invoked Holiday Lockout Mode
- Bridge the LCK input to Com or reset the controller to factory defaults (Menu 10: General Settings)

TRAFFIC BARRIERS

The **SECTOR,** while technically part of the **D-Series** range, has its own unique set of error codes and as such is discussed separately in this guide.

PRELIMINARY CHECKS

The following is a list of standard checks to be performed prior to undertaking any of the advanced diagnostic exercises contained within this document. In the event that any fault condition is experienced, systematically go through the list to ensure that all the minimum site requirements are met.



1. Ensure that the following LEDs are illuminated at all times:
   - ILP
   - Lck/Stp
2. Check all drive connections, i.e. battery and motor wires.
3. Test battery voltage under load, it should be no lower than 11V DC.
4. Check all visible fuses.
5. Ensure that the barrier is firmly bolted onto its plinth.
6. Ensure that the pole is firmly held by the pole coupler.
7. If a loop has been fitted – check for continuity.
   The impedance should be $<5\Omega$.
8. Check DOSS connections.
9. Ensure that the orientation of the spring corresponds with the orientation of the boom pole.

TYPICAL DIAGNOSTIC MESSAGES FOUND ON THE SECTOR CONTROLLER

DIAGNOSTIC MESSAGES DURING SETUP

Symptom: Unable to complete Barrier Setup

Possible causes

- DOSS is faulty or disconnected
- The gearbox is slipping

Solutions

- Replace the faulty DOSS or reconnect the unplugged connections
- Contact an authorised agent to service gearbox
- Tighten the drive-arm or contact an authorised agent

Symptom: Unable to complete Barrier Setup

Possible cause

- The two Endstops are moving

Solution

- Use a Phillips screwdriver to sufficiently tighten the open and closed Endstops. They should not move at all when subjected to force

Symptom: Boom does not raise/lower, or barrier runs a short distance and stops

Audible feedback

- Five beeps periodically for 30 seconds

Possible causes

This error indication is displayed in the event of excess current being drawn

- Incorrect spring orientation
- Incorrect spring tension
- Too many auxiliary components connected to 12V auxiliary output
- The maximum current that should be drawn by the SECTOR traffic barrier controller is 3A (momentarily) or 1A (continuous)
- One specific auxiliary device that is faulty, typically having a short circuit
- Charging voltage significantly higher than 14V DC due to faulty charger or controller

Solutions

- Ensure that the orientation of the spring corresponds with the orientation of the boom pole. Refer to the SECTOR manual for further details
- Check the spring balance by referring to the Spring Tension Diagnostic screen, and correct if necessary
- Ensure that the battery charging voltage is no higher than 14V DC. Refer to Appendix A on page 44 for a description of how to test battery and charging voltages
- Disconnect and reconnect auxiliary components one by one in order to isolate the problem

Symptom: Boom does not raise/lower, or barrier runs a short distance and stops

Audible feedback

- Four beeps periodically for ten seconds

Possible causes

This error message will be displayed whenever no DOSS pulses are registered while the motor is supposed to be running.

- The operator is encountering a fixed obstruction
- Loose drive connection (battery or motor terminal)
- Blown fuse
- DOSS unclipped from gearbox
- Faulty DOSS
- The gearbox is slipping
- The primary drive-arm is loose on the output shaft

Solutions

- Ensure that nothing is hindering the trajectory of the boom pole
- Ensure that drive connections are secure
- Check 30A ATO fuse
- Ensure that DOSS is firmly clipped into the gearbox
- Replace faulty DOSS
- Contact local authorised agent to service gearbox
- Tighten the primary drive-arm or contact local authorised agent

Symptom: Boom pole will only move for a very short distance before termination of operation

Audible feedback

- Five beeps periodically for 30 seconds

Possible cause

- Controller hardware problem

Solution

- Replace faulty controller

Symptom: Boom does not raise/lower

Audible feedback

- Five beeps periodically for 30 seconds

Possible causes

- DOSS physically disconnected
- Poor connection on DOSS or controller side
- Faulty harness
- Faulty DOSS
- Faulty controller

Solutions

- Ensure that the DOSS is clipped firmly into its carrier and that the harness is plugged in on both the DOSS and controller side
- Check for bad connections
- Replace DOSS harness
- Replace DOSS unit
- Replace faulty controller

Symptom: Boom does not raise/lower

Audible feedback

- Five beeps periodically for 30 seconds

Possible causes

- Loose drive connections
- Faulty electric motor
- The H-bridge on the controller is damaged, possibly a blown FET
- The electric motor is faulty or has been disconnected

Solutions

- Check drive connections (motor and battery) and secure if necessary
- Replace faulty electric motor
- Check that the MOTOR, FUSE and DRIVE cells are all ticked in the information screen. An 'x', question mark or anything other than a tick indicates a fault. In the case of a damaged H-bridge, the display will typically indicate the part of the bridge that is damaged (i.e. Q1Q3, Q2Q4, etc.). For an explanation of the diagnostic screens found on the **D-Series** range of controllers, refer to Appendix B on page 50

- In the event of a Drive Fault, the controller must be repaired by an authorised workshop
- Ensure that the electric motor terminals are connected to the controller
- Check the function of the electric motor by referring to the information screen described above, or test the motor by connecting the motor terminals straight onto the battery. If the motor does not run, the commutator is most probably faulty

Symptom: Barrier may continue to operate but movement will be accompanied by audible error indication

Audible feedback

- Three beeps periodically while boom is moving

Possible cause

- The spring tension is incorrect; it is too tightly wound

Solution

- A handy information screen, including graphic representation, can be found by scrolling upwards on the controller. Refer to Appendix B, on page 52 for further information. This will show you exactly how many turns are needed and in which direction (i.e. clockwise or counter-clockwise)

Symptom: Barrier may continue to operate but movement will be accompanied by audible error indication

Audible feedback

- Three beeps periodically while boom is moving

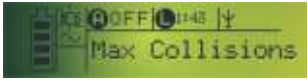
Possible cause

- The spring tension is incorrect; it is too loosely wound

Solution

- A handy information screen, including graphic representation, can be found by scrolling upwards on the controller. Refer to Appendix B on page 51 for further information. This will show you exactly how many turns are needed and in which direction (i.e. clockwise or counter-clockwise)

Symptom: Boom does not raise/lower or barrier runs a short distance and stops



Audible feedback

- Four beeps periodically for ten seconds

Possible causes

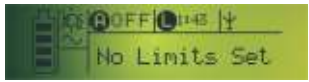
- The operator is encountering an obstruction and has reached the pre-set number of allowable collisions
- The controller collision force is set too sensitively
- Number of allowable collisions set to a low value, e.g. 1

- Faulty DOSS harness
- Loose drive connections
- Faulty DOSS
- Faulty or disconnected electric motor

Solutions

- Ensure that nothing is physically hindering the trajectory of the boom
- Increase the Collision Force (Menu 2: Safety)
- Increase maximum collisions value to a higher number, typically 4
- Replace faulty DOSS harness
- Check battery and motor terminal connections
- Replace faulty DOSS
- Ensure that the blue and black motor wires are connected to the controller. If they are and the barrier still won't operate, it might be necessary to replace the electric motor. Refer to the MOTOR information screen discussed in Appendix B on page 50 to determine whether the motor is read by the controller

Symptom: Boom does not raise/lower



Audible feedback

- Three shorts beeps for five seconds

Possible causes

- The End-of-travel Limits have not been established

Solution

- Set the Gate Travel Limits by accessing the Setting Limits Menu (Menu 1: Setting Limits) and following the onscreen prompts

Symptom: Boom does not raise/lower

Audible feedback

- Three beeps periodically for 30 seconds

Possible causes

- Poor connection between battery and controller
- The battery voltage is low or the battery is faulty or disconnected
- Faulty controller

Solutions

- Ensure that the battery terminals are properly connected
- Measure the battery voltage – it should be no lower than 11V DC when placed under load. Refer to Appendix A on page 44 for an explanation of how to accurately test battery voltage
- Check for corrosive build-up around the battery terminals and clean if necessary
- Replace the battery
- Ensure that the 'Mains Present' icon is solid
- Replace faulty controller

Symptom: None

Audible feedback

- 4KHz tone for 30 seconds

Possible causes

- The closing loop has been activated while the boom is lowered
- Inadvertent activation of the Break-in Alarm feature

Solutions

- Remove any metal objects from the closing loop
- Check the loop wiring and impedance (should typically be <5Ω)
- Disable the Break-in Alarm feature in Menu 6: Loop Detector

Symptom: Boom does not raise from fully lowered position

Audible feedback

- One beep periodically for 30 seconds

Possible cause

- The Holiday Lockout feature has been enabled

Solutions

- Ensure that the green Lck LED is lit
- Press the transmitter button or switching device that invoked Holiday Lockout Mode
- Bridge the Lck input to Com or reset the controller to factory defaults (Menu 10: General Settings)
- Check for any Auto-activations pertaining to Holiday Lockout. Refer to the Time-barring and Auto-activation matrix, a depiction of which is given in Appendix B on page 50

Symptom: None

Audible feedback

- 4KHz tone until closing loop is cleared

Possible causes

- The closing loop has been activated for the time specified in Menu 6.5.1.2: Presence Time
- Inadvertent activation of the Presence Alarm feature

Solutions

- Remove any metal objects from the closing loop
- Check the loop wiring and impedance (should typically be <5Ω)
- Disable the Presence Alarm feature in Menu 6: Loop Detector

APPENDICES

APPENDIX A
LOW BATTERY VOLTAGE CONDITION

APPENDIX A
LOW BATTERY VOLTAGE CONDITION

APPENDIX C
WIRING DIAGRAMS

APPENDIX D
WIND LOADING TABLES

APPENDIX A

LOW BATTERY VOLTAGE CONDITION

Status light flashes three times - LCD indicates Battery-Low (on operators with LCD interfaces).

If the battery voltage is less than 10.5V DC under load (D10/D10 Turbo = 21V DC), the unit will not operate at all. For any other voltage, the battery could still be the cause of the problem. Check that the battery is being properly charged.

- Check the 'Mains Present' icon on the main diagnostic screen or scroll to the battery charger diagnostic screen and check the charging voltage – right-hand voltage. This should indicate approximately 14V (**D10/D10 Turbo** = 28V)
- Check that the mains power is turned on (measure between 90V and 240V AC on the mains connector)
- Check that the red LED on the side of the charger is lit
- Check the charger's supply fuse
- Check that the white battery charger connector is making proper contact with the controller
- Check the condition of the battery leads, terminals and connectors. Look for and correct all loose connections and signs of corrosion
- The battery might be discharged. Measure the battery voltage with the charger connected; if the voltage is below 13.5V, then the battery is discharged. The number of cycles per hour may be excessive, thus discharging the battery
- The charger may be faulty. Disconnect the battery and measure the voltage on the battery leads. It must be between 13.6V and 13.8V (**D10/D10 Turbo** = 27.5V DC). If not, replace the charger
- The battery might be old, and might have to be replaced. If in doubt test as follows:
  - Check that the battery is charged, by ensuring that the battery voltage is above 13.5V with the charger connected. (If the battery is in a good condition it would probably pass the test without being fully charged)
  - Disconnect the charger from the battery

- Remove the DC motor leads from the DC controller
- Apply the DC motor leads directly to the battery, while measuring the battery voltage
- It should not be less than 10.5V DC under load (**D10/D10 Turbo** = 21V DC under load)

APPENDIX B

EXPLANATION OF INFORMATION SCREENS

The following screens can be accessed by using the triangular up and down buttons. The information is very useful when doing fault finding to provide the user with better feedback of the various diagnostic conditions or when acquiring general operational information.

Voltages

- Charger voltage - should be approximately 14V DC for the **D5-Evo/SECTOR/VECTOR2** and 27V DC for the **D10/D10 Turbo**
- Battery voltage - the unit will not operate if the voltage falls more than 3V DC under load. A quick way of checking the battery's voltage under load is to apply a force in the opposite direction to the movement of the gate; the battery voltage should never drop more than 2V DC
  The system will enter Battery-low state at 10V DC (**D5-Evo/VECTOR2/SECTOR**) or 21.0V DC (**D10/D10 Turbo**) and will shut down, allowing the batteries to charge

Speed

- This display indicates the speed at which the gate/**SECTOR** is travelling in metres per minute; the speed of the **SECTOR** is indicated in degrees per minute
- Say, for example, that the gate has been set to run at maximum speed, but this information screen indicates that it is not running at maximum speed, it is an indication that the gate is heavy or it might be time to change the wheels

Current/Collision Count and Lost

- This screen will display the instantaneous current drawn during operation; typically it should be between 6A and 8A for the **D5-Evo**, between 3A and 6A for the **D10** and around 2A for the **SECTOR**. Note that the current drawn by the various operators could vary greatly depending on the load. A heavy gate would naturally result in more current being drawn. The maximum current draw is limited to 15A
  This screen will help determine whether the gate is running properly or not. If the current drawn is much higher than 6A, it could be an indication that the gate weight is excessive or something is obstructing the free movement of the gate. Check for dirt on the rail and ensure that the wheels move freely; the maximum current may be zeroed at any stage by pressing the oblong pushbutton on the controller
- **ColCnt** – indicates the number of collisions encountered during a specific cycle. The counter will reset to zero after every successful cycle
- **Lost** – if a system encounters six consecutive collisions, it will enter a realignment procedure to try and determine the true positions of its Endstops and Origin Marker

Position Count

- **Open, Close and Current** - compares the open/close count in the fully open/closed position with the current count in these positions; it should be within ten counts. For example, if the gate is in the fully closed position and the Closed Count displays 5, but the Position Count is 16, it indicates a problem. See the point that follows:

- If not, it is safe to assume that the encoder sensor is not counting the pulses accurately or that electrical noise is present around the DOSS system. Equipment such as GSM modules, switch mode chargers or other electrical devices with high electrical noise could contribute to problems in this area

Magnet position

- The display will indicate the position of the magnet relative to the position of the motor. When the display is contradicting the fact, it is an indication that the magnet polarity is incorrect.

PWM

- This is an indication of the percentage of battery power that the controller is able to deliver to the motor.
  The heavier the gate, the lower this percentage is likely to be. If the system is running at full speed but only 80% of battery power is being delivered to the battery, it might be time to change the gate wheels

Operations/Power Ups

- The **OPS screen** acts as a trip counter and counts and stores the number of operations completed over a period of time.
- For example, the diagnostic screen above indicates that the gate in question has completed 2880 cycles (open and closed) in total

- **P UP** – Indicates the total number of times that the controller has had the power cycled (power removed and reapplied)
- Both these counters can be reset by removing the power to the controller, holding in all four buttons and reapplying power
- **PO** – Power-on-reset has occurred. This reset condition occurs if the control card is powered up from a completely powered down state, meaning that no power is connected to the control card and the super-cap is completely discharged
- **BO** – A Brown-out-reset has occurred. Generally this condition occurs if the voltage to the microprocessor drops below some critical threshold value. The device is held in reset in such situations to prevent abnormal operation. If this flag is set on its own, it's a good indicator that there may be something wrong with the electrical supply to the operator. The system should be checked by a qualified service technician. During a power-on-reset (see above), the BO flag is always set simultaneously with the PO flag. This is completely normal, and should not cause concern
- **SW** – A Software-reset has occurred. This flag is set in the event of abnormal software execution, device failure, or after the system powers up following recovery from Sleep Mode. The device enters sleep when all power is removed from the controller, but the super-cap continues to power the real-time clock circuitry. If the control card is powered up before the super-cap discharges and the time is lost, the system will generate a software reset and set the SW flag
- **WD** – A Watchdog-reset has occurred. This flag is set in the event of abnormal software execution, or some form of device failure. The system should be checked by a qualified service technician if the event is flagged repeatedly
- **MC** – A Master-Clear-reset has occurred. This flag is set in the event of abnormal software execution, or some form of device failure. The system should be checked by a qualified service technician if the event is flagged repeatedly
- **SL** – The device has entered and recovered from Sleep Mode. This flag is infrequently set, as it is cleared during a device reset which usually follows the exit from Sleep Mode. It is not relevant to normal controller operation, and should not be a cause for concern if it does happen to be set

Drive, Fuse and Motor

- **DRIVE** – This indicates whether all the transistors present in the H-bridge are operational
- **FUSE** – Fuse in working condition
- **MOTOR** – Motor is connected

Example

- The screen pictured above indicates a faulty H-bridge, blown fuse and a motor in an unknown state

Serial Number and Firmware Version

- **M** and **C** – Indicates the software version loaded on the controller
- **SN** – Serial Number of controller
- **E** – Displays the EEPROM version number

Input Matrix

- This screen aids in indicating which inputs are active
- **RF** – This row determines whether any inputs (in this case RF inputs) are being activated by RF functionality. If any cell in this row has an ellipse icon in it, the respective RF input is currently being activated. The activation may arise from a latched remote control transmission, or from a currently active pulsed remote control transmission
- **AA** – This row determines whether a physical input is being activated by an Auto Activation Time-Period

- Any cell with an ellipse icon in it indicates that the respective input is active due to some currently active Auto Activation Time-period
- **TB** – This row determines whether a physical input is inhibited from affecting the control card by a time-barring Time-period. Any cell with an ellipse icon in it indicates that the respective physical input is prevented from affecting the controller
- **TRG** – The trigger input column
- **FRX** – The free-exit input column
- **PED** – The pedestrian input column
- **LCK** – The Holiday Lockout input column
- **LIT** – The Courtesy Light LIT input column

Example

- The screen pictured above shows that an Auto Activation is present for the Free-exit function

Remote Control Information

- **ID No** – Displays the identification number of the last remote used to trigger the system
- **LB** – A black dot will appear in this field if the battery of the remote being activated is nearing the end of its functional life
- **PL** – Will indicate the type of input/output (pulsed or latching)
- **TB** – A dot in this field indicates that the remote is time-barred
- **Button** – Indicates which remote button was used for the last valid trigger
- **1/500** – Indicates the memory usage, i.e. how many buttons have been learned into the controller's memory
- The field towards the centre of the display will indicate what function the particular remote button has been assigned to activate, i.e. TRG, FRX, LCK, etc.

Example

- The screen pictured above indicates that the last transmitter button to be pressed had the ID number 737 and it was a pulsed input activating the TRG input. Button one of the transmitter was used and only three transmitter buttons out of the possible 500 programmable buttons have been used

SECTOR Spring tension screen

- This screen indicates how many turns of the spring tensioning nut are needed and which way it should be turned, i.e. clockwise or counter-clockwise

APPENDIX C
WIRING DIAGRAMS

Wiring diagram for i5 Opening Safety Beams

The image used is for illustrative purposes only.
The actual controller may differ from this image.

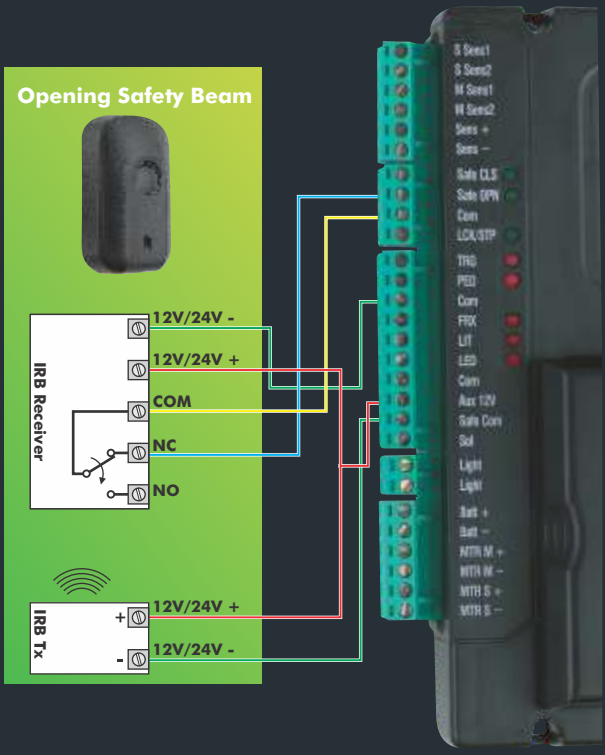


FIGURE 2

APPENDIX C
WIRING DIAGRAMS

Wiring diagram for i5 Closing Safety Beams

The image used is for illustrative purposes only.
The actual controller may differ from this image.

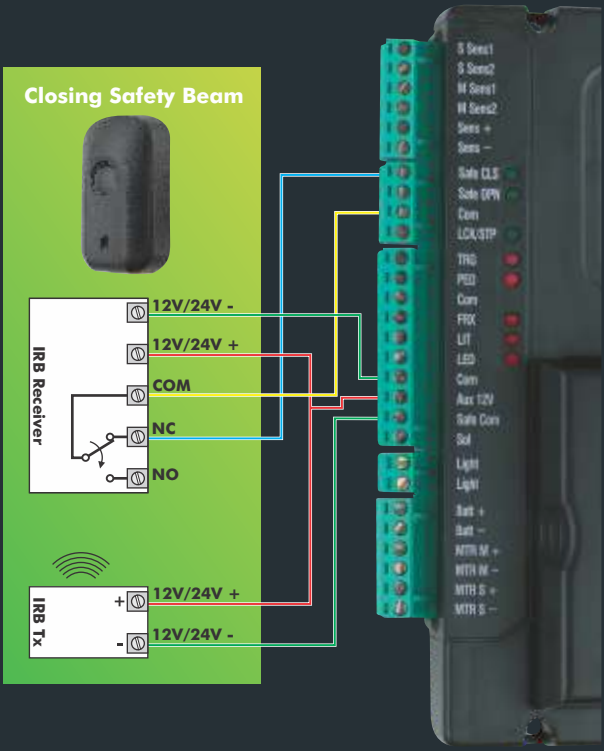


FIGURE 3

APPENDIX C
WIRING DIAGRAMS

Wiring diagram for Various Inputs

The image used is for illustrative purposes only.
The actual controller may differ from this image.

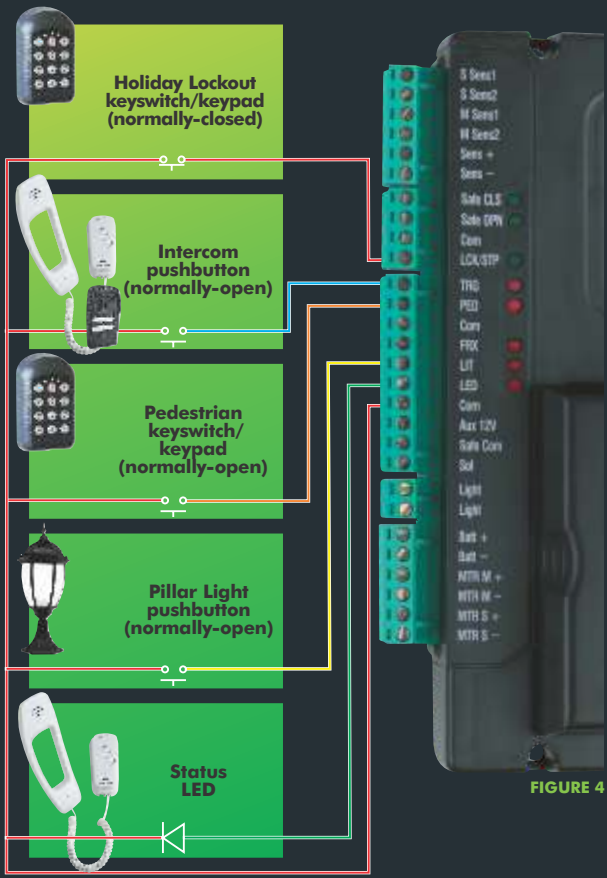


FIGURE 4

APPENDIX C

WIRING DIAGRAMS

Wiring diagram for VECTOR2 Master and Slave Motors

The image used is for illustrative purposes only.
The actual controller may differ from this image.

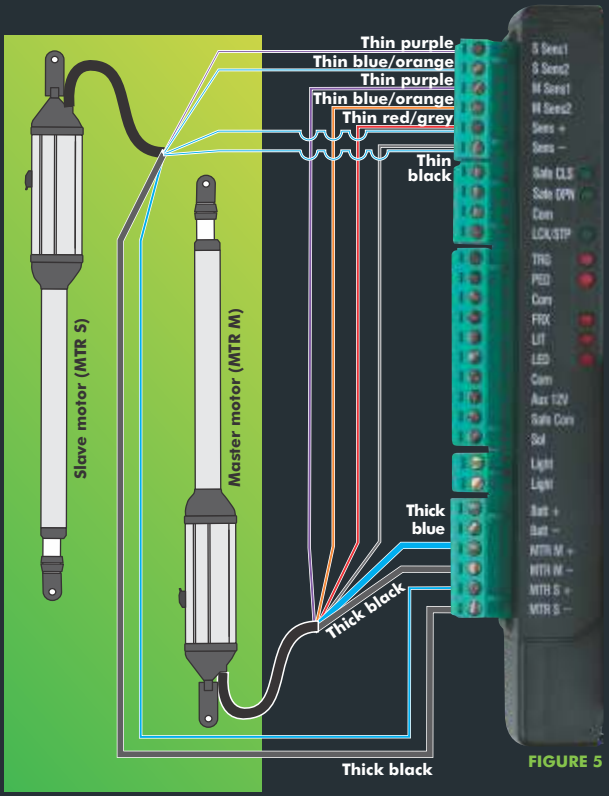


FIGURE 5

APPENDIX D

WIND LOADING TABLES

Wind speeds for which VECTOR2 motor will still operate the gate (for V400 or V500 motor)

For a 25% covered gate: (Palisades, etc.) x 1.8m high

Value of A or B dimensions once installed✣	Up to 1.5m	Up to 2m	Up to 2.5m	Up to 3m★	Up to 3.5m★	Up to 4m★
100mm	94km/h	48km/h	44km/h	41km/h	37km/h	37km/h
140mm	119km/h	65km/h	57km/h	51km/h	46km/h	46km/h
180mm	138km/h	78km/h	67km/h	60km/h	53km/h	53km/h
220mm	156km/h	89km/h	76km/h	67km/h	60km/h	60km/h
260mm	171km/h	99km/h	84km/h	74km/h	65km/h	65km/h
300mm	186km/h	108km/h	91km/h	80km/h	71km/h	71km/h
340mm	199km/h	116km/h	98km/h	86km/h	76km/h	76km/h

For a 100% covered gate: (Fully clad gates, etc.) x 1.8m high

Value of A or B dimensions once installed✣	Up to 1.5m	Up to 2m	Up to 2.5m	Up to 3m★	Up to 3.5m★	Up to 4m★
100mm	47km/h	33km/h	24km/h	22km/h	20km/h	19km/h
140mm	59km/h	43km/h	32km/h	28km/h	26km/h	23km/h
180mm	69km/h	50km/h	39km/h	34km/h	30km/h	27km/h
220mm	78km/h	57km/h	44km/h	38km/h	34km/h	30km/h
260mm	86km/h	63km/h	49km/h	42km/h	37km/h	33km/h
300mm	93km/h	68km/h	54km/h	46km/h	40km/h	35km/h
340mm	100km/h	74km/h	58km/h	49km/h	43km/h	38km/h

★ An electric lock must be fitted ✣ Refer to the VECTOR2 Installation Manual for installation details

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0.07.A.0049_05122013