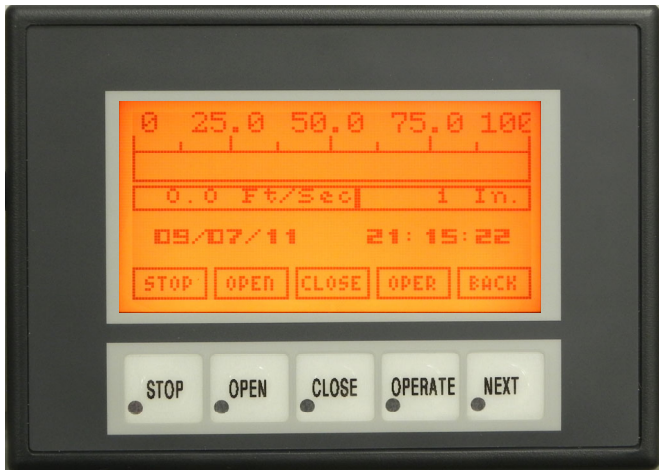
V PROGRAMMER & TROUBLESHOOTING MANUAL



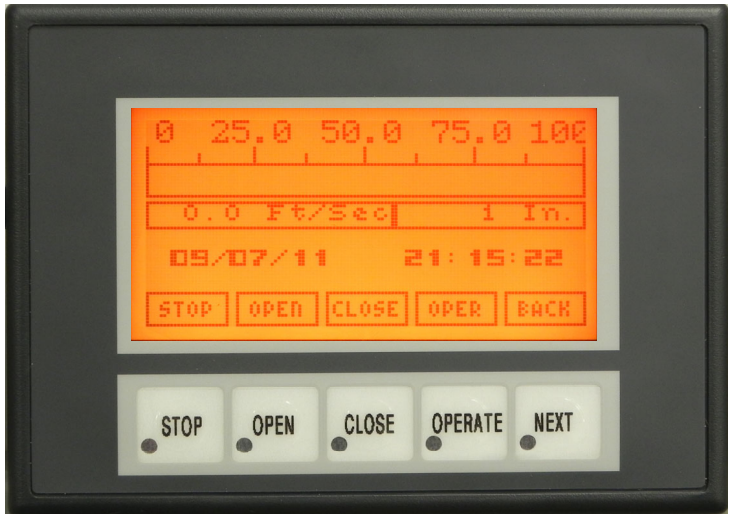
V PROGRAMMER

VM1220 & VM1420

Intertek
5000479

100122

VMPGMR Vmag Programmer



The V Programmer allows the technician to customize the gate operation to the user's preference and aid in troubleshooting. The programmer is not included with Vmag operators and should only be available to factory authorized installers and their trained customers.

Vmag Operators are listed through ETL and meet the UL325 standard for gate operators.

UL325 Standard VERY IMPORTANT

Vmag highly recommends gate installations conform to this standard. If security requirements mandate deviation from UL325 the installer should obtain a release stating the user is aware that the operation no longer meets UL325.

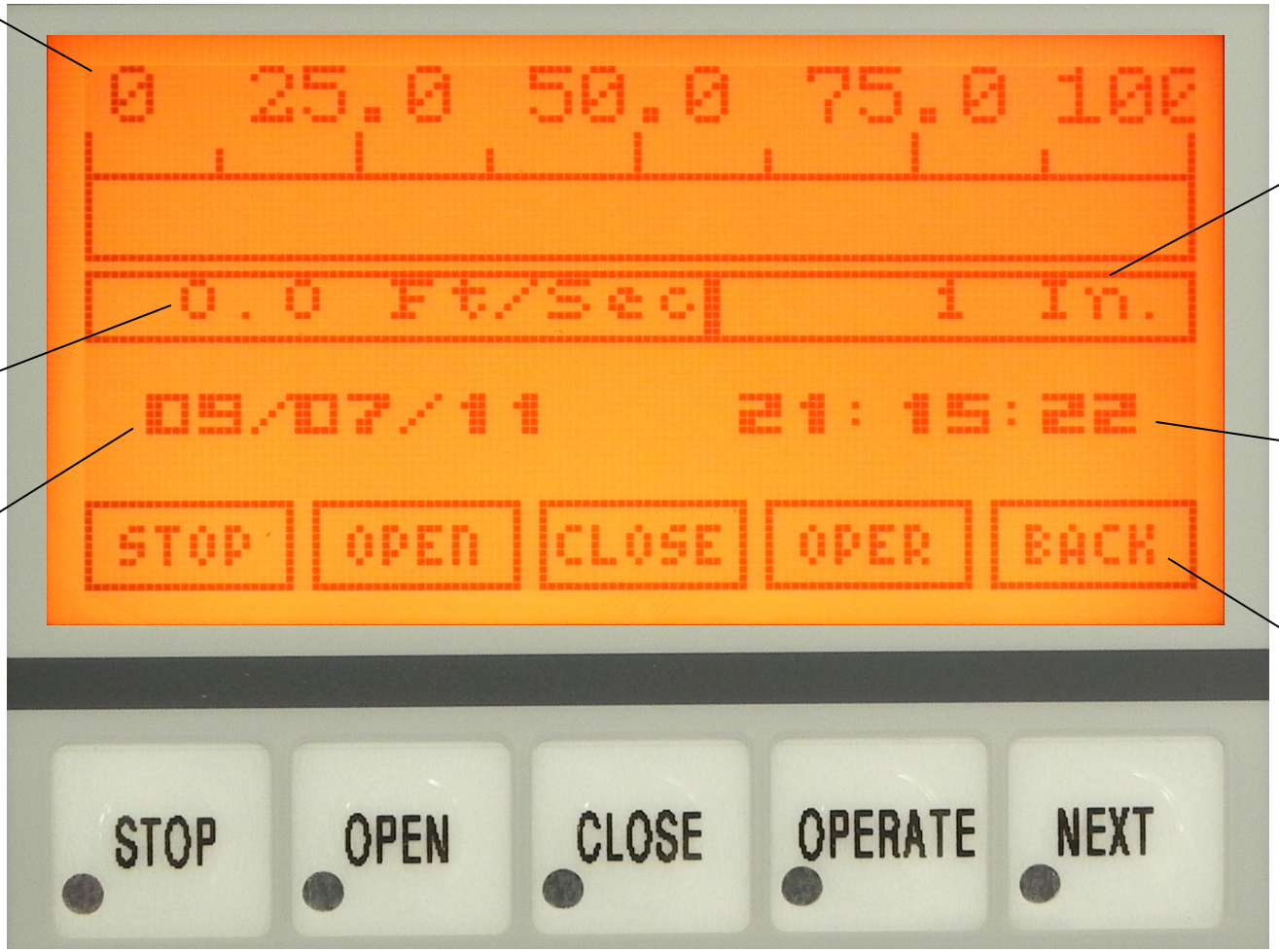
Although UL325 does not limit slide gate speed on CLASS III & IV installations, caution should be exercised when faster than standard speeds (1-2 ft/sec) are required for throughput and/or as a security measure. Although the Vmag operator is capable of high speeds, the speed should be limited to accommodate the customer's requirement for proper throughput and/or security levels. Most customers are satisfied with 40% to 60% high speed. The closing speed should be increased in steps over time to allow the users to get accustomed to the higher speed.

Consideration should be given for additional safety devices and warning signs. As per UL325 all Vmag Operators are intended for vehicular traffic only. Other means of access should be available for authorized pedestrian traffic.

HOME SCREEN

Percent of Open or close

Displays position of gate.



Gate Position

Displays the position of gate (in inches) from fully closed.

Speed of Gate

Approximate speed of gate measured in feet per second.

Date

24 Hour Clock

Touch **BACK** for previous screen

STOP Gate

Stops gate

OPEN Gate

Opens gate when activated.

Auto close will be disabled

CLOSE Gate

Closes gate

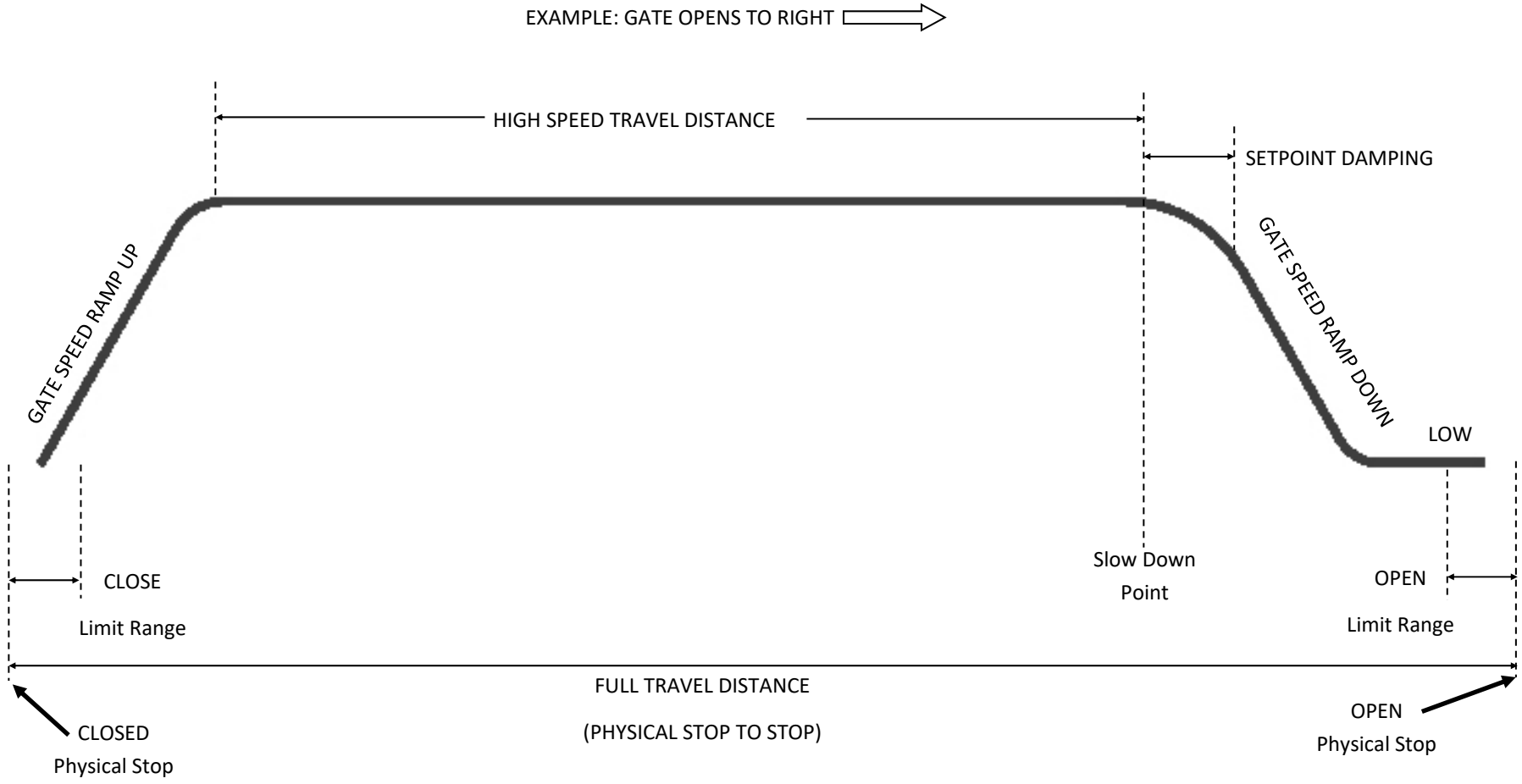
OPERATE Gate

Sequentially opens, stops and closes gate.

Press **NEXT** for next screen

Button functions are active on all screens

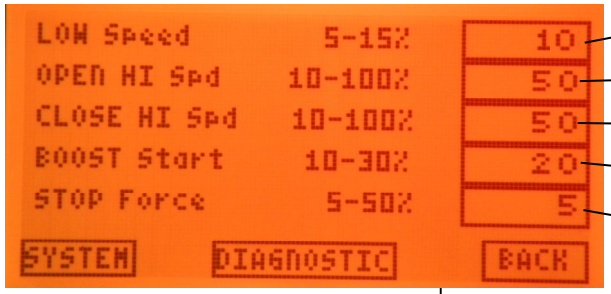
VMAG OPERATION PROFILE



Fields in boxes are editable. Fields without boxes cannot be edited. Some editable fields are updated by the PLC.

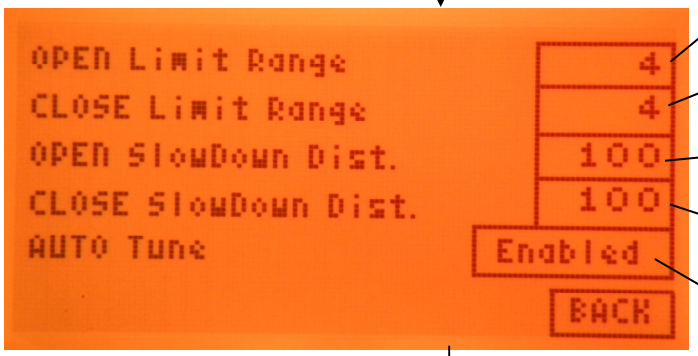
Press **NEXT** from HOME **SCREEN**

Screen 1



Press **NEXT**

Screen 2



Press **NEXT**

Next page

Descriptions that are highlighted in yellow are defaults set at the factory and normally do not need to be changed.

Low Speed - *Final speed gate travels to limits once gate slows down (see pg. 4). Range 5-15% default 10*

OPEN HI Spd 10-100% *Range 10-100% default 50*

CLOSE HI Spd 10-100% - *Range 10-100% default 50*

BOOST Start - *Setpoint for BOOST start speed. Range 10-30% default 20*

STOP Force - *Power setting to stop gate. Heavier gates will require a higher setting. Gate should stop as quick as possible without backing up. Range 5-50% default 15*

OPEN Limit Range - *The distance in inches from full open stop that the operator interprets the gate as being OPEN (see pg. 4). Range 2-24" default 2"*

CLOSE Limit Range - *The distance in inches from full closed stop that the operator interprets the gate as being CLOSED (see pg. 4). Range 2-24" default 2"*

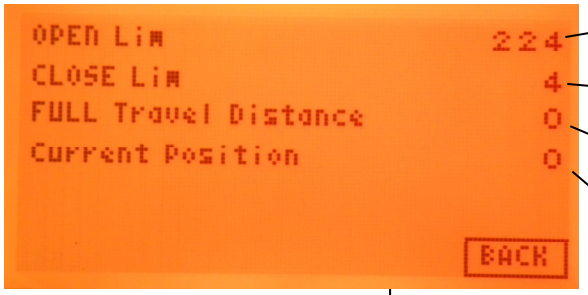
OPEN Slowdown Dist. - *The distance in inches from full open stop that the operator starts to slow down (see pg. 4). Default 100*

CLOSE Slowdown Dist. - *The distance in inches from full closed stop that the operator starts to slow down (see pg. 4). Default 100*

AUTO Tune - *Enable or disables the AUTO Tune feature. Auto tune continually adjusts the open and close slow down points to compensate for changes in wind and load. Default enabled*

Screen 3

Press **NEXT**



Press **NEXT**

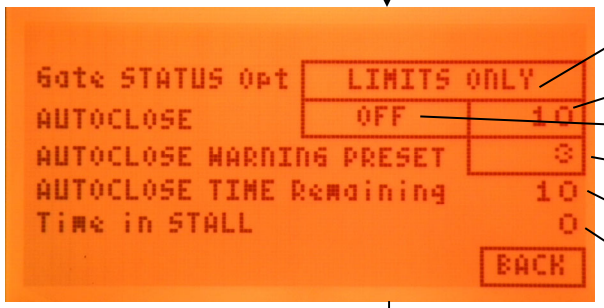
OPEN Lim - *Gate position where an 'Open Limit' is considered activated.*

CLOSE Lim - *Gate position where a 'Closed Limit' is considered activated.*

FULL Travel Distance - *Distance in inches that is recorded during the calibration cycle. This value equals the distance in inches from the OPEN to CLOSE physical stops..*

Current Position - *Displays the current position of the gate in inches from the CLOSE stop*

Screen 4



Press **NEXT**

Next page

LIMITS ONLY - *CLOSE or OPEN status active when gate is inside of the preset limits.*

LIMITS & STOPPED - *CLOSE & OPEN status active once power is removed from motors.*

Time to Close - *Sets the timer to close value in seconds. Range = 0 - 9999 seconds*

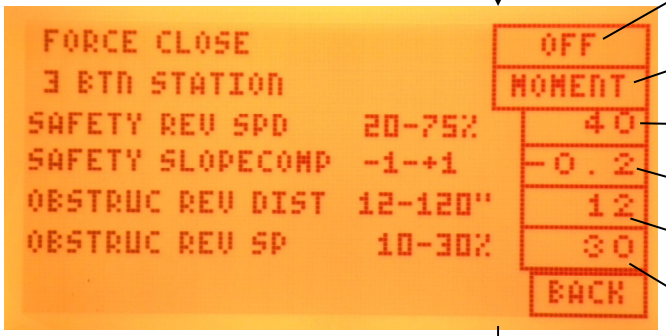
AUTOCLOSE - *Enables or disables the autoclose timer.*

AUTOCLOSE WARNING PRESET - *Warning time in seconds before gate will begin to close. For use with audible or visual warning device.*

AUTOCLOSE TIME Remaining - *Displays the count down to gate starting to close*

Time In STALL - *Displays actual time in seconds if gate does not move but motors are powered, 10s max.*

Screen 5



Press **NEXT**

FORCE CLOSE - *Used in conjunction with a magnetic or mechanical lock for fail safe mode. Forces gate to close all the way to the physical CLOSE stop.*

3 BTN STATION - *Sets the three button station for MOMENTARY or MAINTAINED operation.*

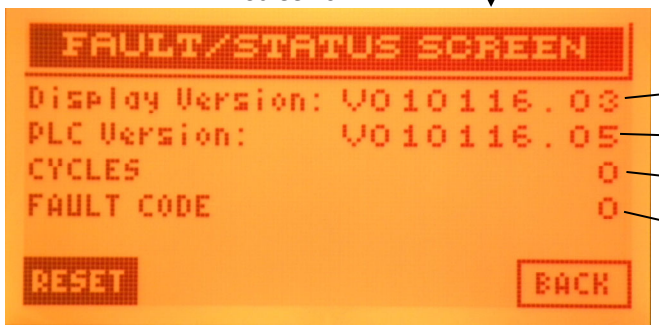
SAFETY REVERSE SPD 20-75% - *Sets the reverse speed for inputs that will cause the gate to reverse direction in mid travel (subject to certain conditions).*

SAFETY SLOPECOMP -1- +1 - *Fine tunes the slow down distance for a safety reverse*

OBSTRUC REV DIST 12-120" - *Sets gate reverse travel distance when an obstruction is sensed.*

OBSTRUC REV SP 10-30% - *Sets reverse speed when an obstruction is sensed. Value is a percentage of full speed.*

Screen 6



Display Version - *Displays the firmware version of the programmer*

PLC Version - *Displays the firmware version of the PLC (programmable logic controller)*

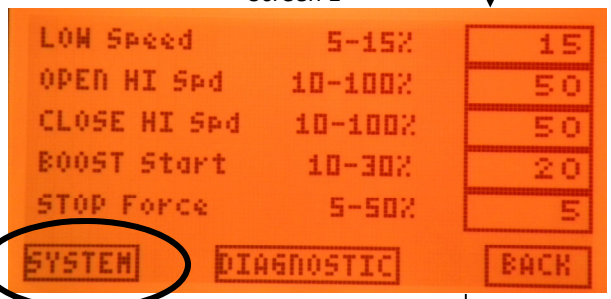
CYCLES - *Displays the total number of complete cycles.*

FAULT Code - *Displays the current FAULT code*

RESET
Clears any FAULT condition.

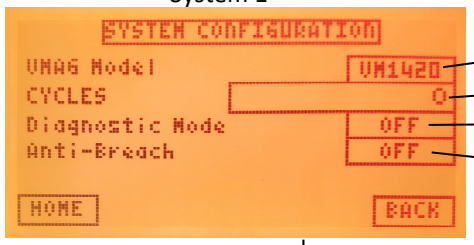
Press **NEXT** twice

Screen 1



Tap SYSTEM

System 1



VMAG Model - *Sets the correct parameters for the Vmag model number*

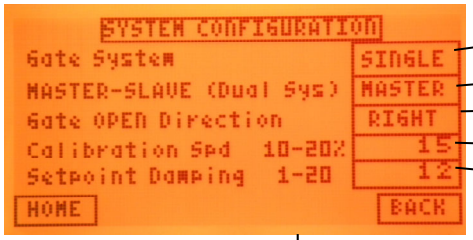
CYCLES - *Total cycles logged*

DIAGNOSTIC MODE - *For troubleshooting only. Must be OFF for UL325 compliance.*

Anti-Breach - *Prevents manual opening of gate in the event of a lock pin not engaging or use of a magnetic or mechanical lock for fail safe installation.*

Press **NEXT**

System 2



Gate System - *Single / Dual*

MASTER / SLAVE - *Sets operator as Master or Slave*

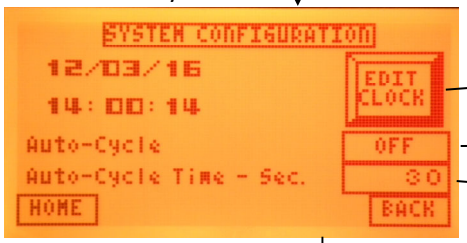
Gate OPEN Direction - *Sets direction of opening (viewed from the secured side)*

Calibration Spd 10-20% - *Sets the calibration speed*

Setpoint Dampening 1-20 - *Smooths changes in gate speed when slowing down. The higher value increases damping distance (see pg.4).*

Press **NEXT**

System 3



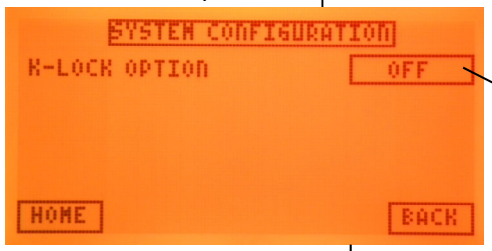
EDIT CLOCK - *Allows user to set the date & time*

Auto - Cycle - *Used for testing by manufacturer*

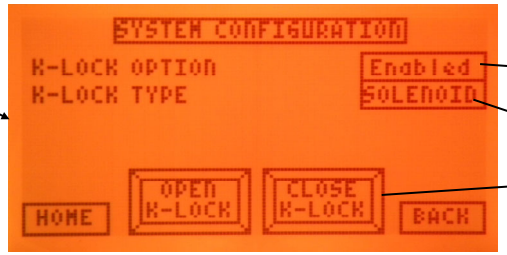
Auto - Cycle Time - Sec. - *Used for testing by manufacturer*

Press **NEXT**

System 4



K-LOCK OPTION - *Enabled for gates using solenoid or actuator mechanical locks.*



FORCE CLOSE must be enabled

When K-LOCK OPTION is enabled this screen will appear.

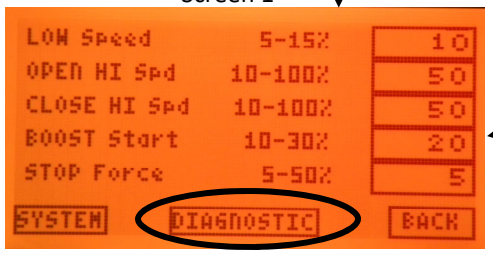
Set required K-LOCK TYPE Solenoid / Actuator

Test using the CLOSE & OPEN

Press **NEXT**

Returns to screen 1

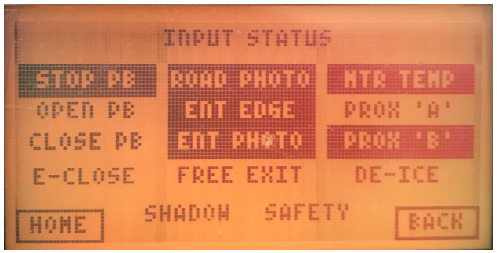
Screen 1



Press **NEXT**

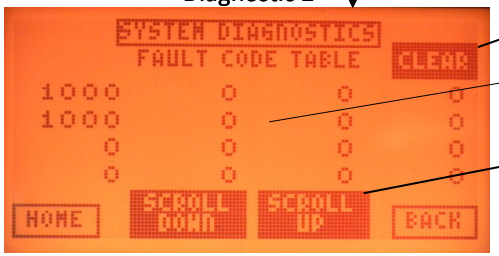
Returns to screen 1

Tap DIAGNOSTICS



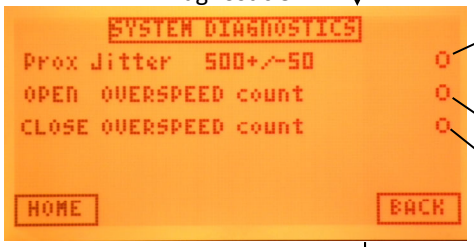
Press **NEXT**

Diagnostic 2



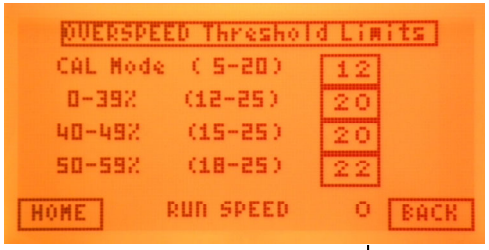
Press **NEXT**

Diagnostic 3



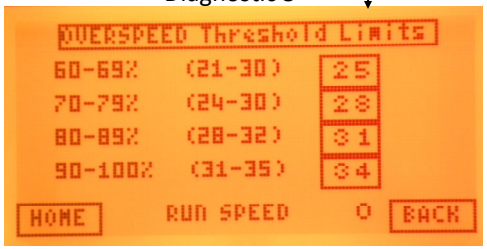
Press **NEXT**

Diagnostic 4



Press **NEXT**

Diagnostic 5



Press **NEXT** to return to screen 2

INPUT STATUS - *Highlights active inputs.* **STOP PB, ENTRAP** & **MTR TEMP** *are normally activated.*

Used for identifying access control and safety devices that may be keeping the gate from moving or closing.

CLEAR - *Clears the fault table*

FAULT CODE TABLE - *Records the last 16 faults (see page 13 for fault code description) Most recent fault appears in the first column at the top*

SCROLL UP / SCROLL DOWN - *Displays the date & time of any faults that are shown. Date/Time will display at the top of the screen where the words 'FAULT CODE TABLE' appears in this photo.*

Prox Jitter 500+/-50 - *Displays the variance between the proximity sensors. Once sensors are set with a feeler gauge to 0.040" this should read no more than 505 & no less than 495. If the variance exceeds 500 +/- 20 the operator will generate a fault code 601* 'PROXIMITY ADJUSTMENT WARNING'

If the variance exceeds 500 +/- 50 the operator will indicate a fault condition 600 and shut down.

OPEN OVERSPEED count - *Displays the count used to determine if an over speed condition exists during opening.*

CLOSE OVERSPEED count - *Displays the count used to determine if an over speed condition exists during closing.*

OVERSPEED Threshold Limits - *If the gate speed exceeds the threshold limit an over speed condition is detected and will stop the gate.*

<u>These values are preset and should not be changed without approval from Vmag.</u>

TROUBLESHOOTING

Vmag gate operators are designed and manufactured to provide many years of reliable service. Most issues with existing or new installs can be easily identified. There are three areas that can create problems:

1. Gate & Gate hardware
2. Access control devices
3. Vmag troubleshooting (normally associated with adjustments or loose hardware)

GATE & GATE HARDWARE

Does the gate roll smoothly? Turn off the operator, release and lock down the manual release lever, roll the gate slowly one complete cycle to verify that there is no binding. Binding can occur when the gate hardware (rollers) are either worn out and need to be replaced or slippage of the truck brackets resulting in mis-alignment between the rollers and track. Gates that are powder coated black may warp with temperature changes. This could result in binding at certain times of the day. This can normally be resolved by readjusting the gate trucks and verifying proper cam roller tension.

ACCESS CONTROL

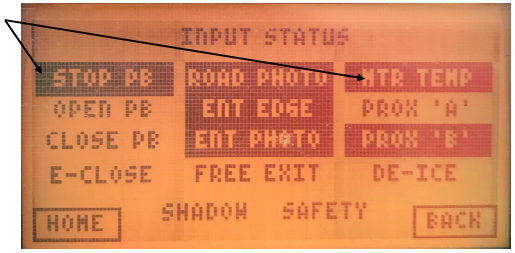
Card readers, keypads, loop detectors, photo beams and two or three button control stations can prevent the gate from opening or closing. If any or these devices are preventing normal operation, the Vmag programmer or the PLC LEDs will indicate which device requires troubleshooting.

OPERATOR TROUBLESHOOTING

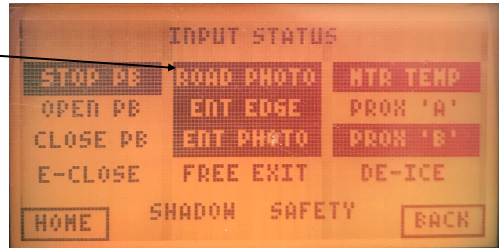
Gate will not respond to controls:

If the operator has power and the inverter displays 'RDY' or "Ready" plug the programmer into the PLC. Press **NEXT** and tap the **DIAGNOSTIC** window. The first page will indicate which inputs are active *(highlighted).* The **STOP PB** and **MTR TEMP** should be active as shown below. The **PROX 'A'** and **PROX 'B'** may or may not be activated depending on the position of the gate.

Must be highlighted or operator will not work. Inverter will display **Inh** *(inhibit)*



Indicates that entrapment devices are normal (UL325 2016 only)



Any other input that is active will prevent normal operation and will require troubleshooting the related device. Card readers, keypads and free exit loop detectors will normally be connected into the **FREE EXIT** input. If more than one device is connected into the same input remove all devices from that input, then re-connect one device at a time until that input is highlighted indicating the defective device. *Continued…….*

Continued …….

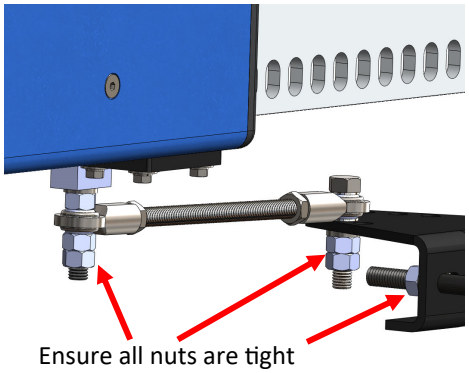
The inverter displays **'INH'** or **'Inhibit'**

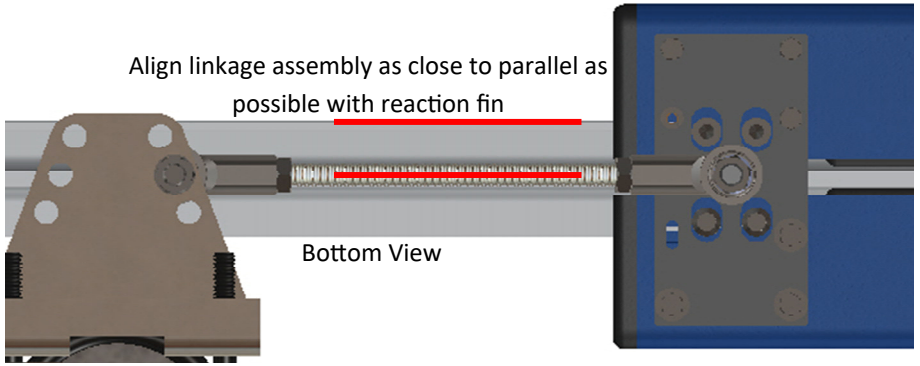
1. Go to the first page of **'DIAGNOSTICS'**.
2. If **'STOP PB'** is not highlighted on new installations verify that the jumper is installed on TB2-25 and -26 if a stop push button is not being used. If a stop button is being used verify that the push button is normally closed and working properly.
3. If the **'MTR TEMP'** is not highlighted verify proper wiring and connection of the motor thermal switches at TB1-MT1, MT-2 and MT-3 as per the installation manual.
4. If both **'STOP PB'** and **'MOTOR TEMP'** are not highlighted check the fuse at TB3-6

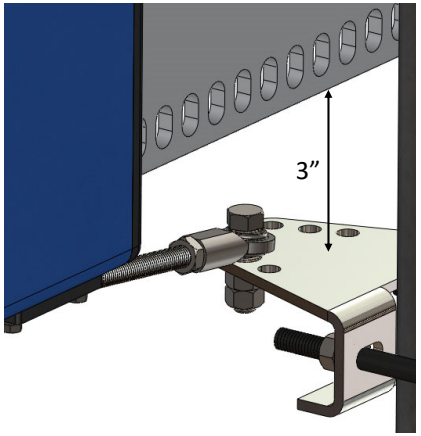
Gate does not open or close consistently resulting in stopping too short or hitting hard.

Motors shake when operating.

Verify the gate hardware is in good condition *(see **Gate & Gate Hardware**)* on first page.

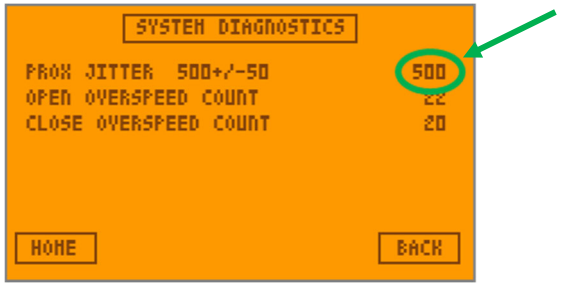






Top of post bracket should be 3" from the bottom of the reaction fin

Plug the programmer into the PLC, press **NEXT** then tap the diagnostics screen. Press **NEXT** twice for the following page.



Prox Jitter value displays a variance between the proximity switches. This value should be as close to **500** as possible.

Run the gate at normal speed open and close while watching the **Prox Jitter** value. If this value is more than **502** and/or less than **498** the proximity switches should be re-adjusted. This value may vary a little when the gate slows down before stopping.

If the variance exceeds 500 +/- 50 the operator will indicate a fault condition **600** and shut down.

Proceed to the next page for **Sensor Adjustment.**

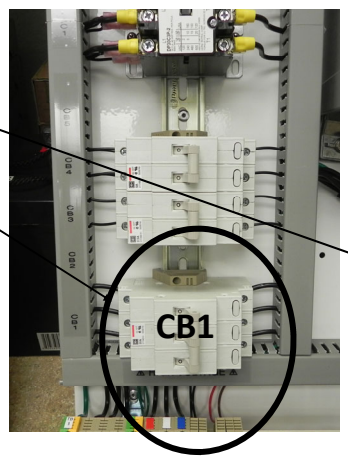
SENSOR GAP ADJUSTMENT

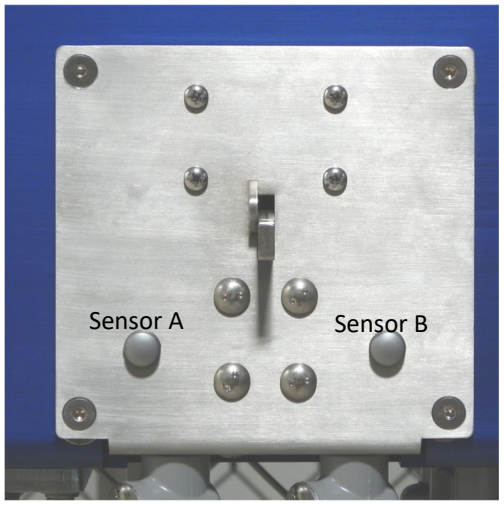
As of December 1st, 2021 operator proximity sensors require a 0.27” air gap. These shipments will include a 0.027” feeler gauge.

All operators prior to December 1st, 2021 proximity sensors require a 0.040” air gap and additional 1/4 turn clockwise.

1. Turn off **CB1** power to the operator.
   Turn **Keep Alive** OFF *(if installed)*

2. Manually move gate halfway open.
3. Lift the plastic caps off of the adjustment screws.
4. Insert 0.027” feeler gauge between sensor **A** and the reaction fin.
5. Rotate clockwise to increase sensor gap.
   Rotate counter clockwise to decrease sensor gap.
   Set the **A** proximity sensor at 0.027”
   6. Repeat for sensor **B**
7. Replace caps, restore power and test.

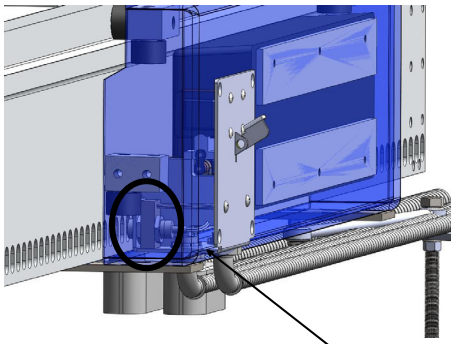


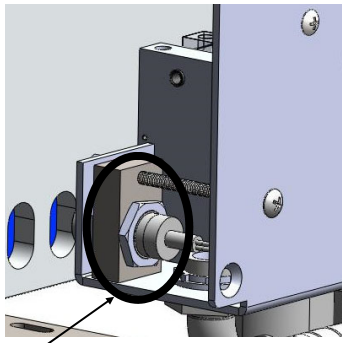


Re-check the **PROX JITTER** on the programmer. The value should be 500 $^{+}/_{-}$ 2
If the Prox Jitter value is still a little out from 500 $^{+}/_{-}$ 2 perform the following:

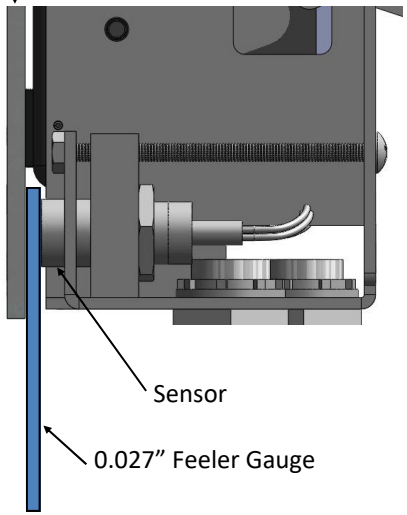
Leave the power on. Turn sensor **B** $^{1}/_{4}$ turn clockwise and retest. If the Jitter value is 500 $^{+}/_{-}$ 2 the gate should run properly. If the Jitter value is worse:

Turn sensor **B** $^{1}/_{2}$ turn counter clockwise and retest. Make small adjustments until the Prox Jitter is 500 $^{+}/_{-}$ 2

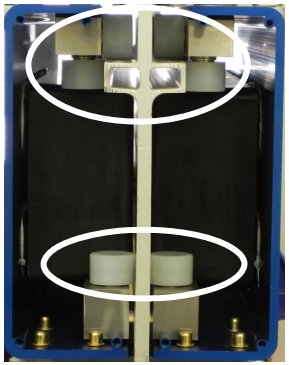




Sensor



BOTTOM CAM ROLLER ADJUSTMENT



Top Cam Rollers

Bottom Cam Rollers

There are four bottom cam rollers in the motor assembly. All four cam rollers must be in contact with the reaction fin. If the cam rollers are not in contact with the reaction fin the prox sensors may not count consistently creating incorrect gate position in the PLC. **If the bottom cam rollers are too tight the gate will have too much resistance which will result in a fault code 700 and/ or 701 COLLISION DETECTION.**

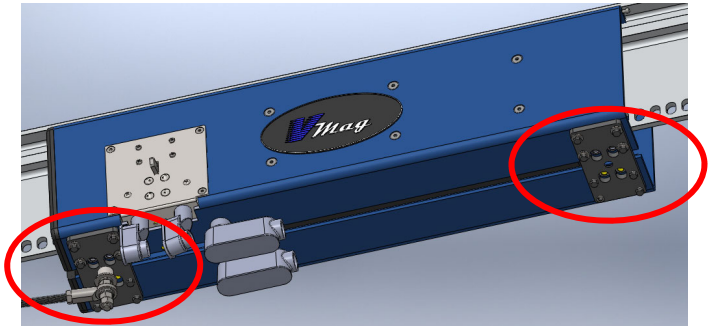
If the bottom cam rollers are too loose you will see 601 fault codes on the programmer and the gate may not work consistently.

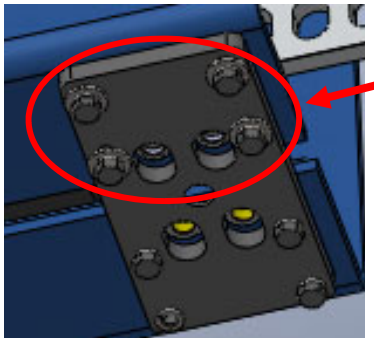
1. Turn power **OFF**.
2. Remove the four black end caps on the motor assembly.
3. Turn each of the four bottom cam rollers by hand.

   The cam rollers must be in contact with the fin but not too difficult to turn by hand.

If the cam rollers are too tight or too loose perform the following procedure:

1. Loosen the four front 1/4" hex bolts on each of the motor brackets.

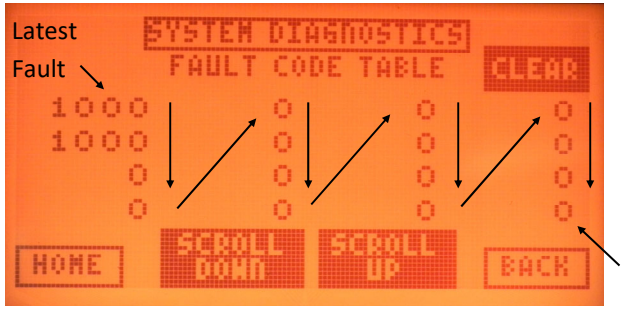




Loosen the four front bolts on each bracket. Do not loosen the rear bolts.

2. Adjust the motor assemblies to ensure all four **bottom** cam rollers are making contact with the front and back side of the reaction fin. Tighten the four front bolts on each side and recheck cam roller tension. Re-adjust if necessary. Use of a bar clamp will aid in fine adjustment of cam rollers.
3. Torque all bolts to 8 foot pounds.
4. Replace the four end caps and perform the **Sensor Gap Adjustment** procedure on the previous page.

FAULT CODES



The **FAULT CODE TABLE** is in the **SYSTEM DIAGNOSTCS** page of the programmer.

This table displays the last 16 faults.

From the home screen press **NEXT** then tap the **DIAGNOSTICS** window then press **NEXT**.

FAULT order starts at the top left column down then over to top of next column. **SCROLL DOWN** to see date & time fault occurred.

Fault codes in **RED** will result in a hard shutdown requiring a manual reset.

CODE # Description

100 UL325 HARD SHUTDOWN *(requires manual reset)*

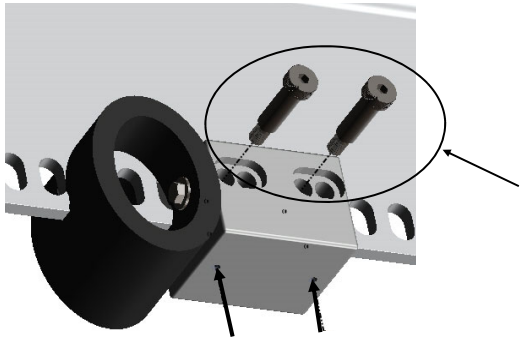
This fault occurs when the operator senses two entrapment inputs in the same cycle. As per UL325 the operator must go into a hard shut down and can only be reset manually. If this action is not an actual entrapment, the devices that are connected into TB2-15,-16,-16A , –16B will require troubleshooting.

200 WEDGED LOCKPIN during OPENING *(requires manual reset)*

201 WEDGED LOCKPIN during CLOSING *(requires manual reset)*

These faults normally occur if one or both of the Vstops or Heavy Duty stops are not set properly. If the standard Vstops are installed perform the following adjustment procedure:

Test the operator. If the lock pin wedges on the open or close position move the shoulder bolts to the other set of holes. You will have to move the Vstop one direction or the other 1/2” to line up the second set of holes.



Bottom set screws

NOTE: When the stop bumper is touching the motor housing end cap, the lock pin should drop freely into one of the reaction fin holes. (Not between the holes).

1. Turn power **OFF**.
2. Loosen the two bottom set screws with a 1/8” hex wrench.
3. Loosen the two shoulder bolts with a 1/4” hex wrench.
4. While holding the Vstop in place insert the two shoulder bolts into the other set of holes.
5. Slide the Vstop either direction until the Shoulder bolts seat in the same reaction fin holes as before.
6. Tighten the shoulder bolts and the snug up the bottom set screws.
7. Retest operator.

210 **K-LOCK OPEN Limit Failure *(requires manual reset)***

211 **K-LOCK CLOSE Limit Failure *(requires manual reset)***

} These faults pertain to 'ACTUATOR' type lock only. Not 'SOLENOID' type.

The K-Lock is an option used on crash gates that use a physical lock with limit switches. The operator will not start opening or closing if the limit switch does not activate.

300* **UL325 Entrapment Device Activated while OPENING**

301* **UL325 Entrapment Device Activated while CLOSING**

If one of the entrapment devices (Edge or Photobeam) is activated during opening or closing this fault will appear.

302 **Photobeam across drive (non UL325) failed during the ENTRAPMENT Monitor Test *(requires manual reset)***

303* **UL325 NON-CONTACT Device Type B1 opening photobeam failed during the ENTRAPMENT Monitor Test *(requires manual reset)***

304* **UL325 CONTACT Device Type B2 (edge switch) failed during the ENTRAPMENT Monitor Test *(requires manual reset)***

Any one of these faults will create a hard shutdown as per UL325 2016. The devices will require troubleshooting and repair before the operator may be put back into operation.

* If the fault log table displays a **300/301** in conjunction with a **303/304** then that indicates one of the entrapment devices was triggered during gate operation.

400 **MOTOR STALL TIMEOUT during OPENING**

401 **MOTOR STALL TIMEOUT during CLOSING**

If the gate initially moves, then stops, and no collision or other safety devices were detected, these codes will be generated after ten seconds. Normally related to bad sensor counts or a mechanical failure (bind) with the gate or gate hardware. Verify that the post bracket has not slipped horizontally on the controller stand post.

500 **MOTOR HIGH TEMP *(requires manual reset)***

This fault occurs when one or both motors exceed an internal temperature of 150^{o} C. The inverter display will read INH (inhibit). This can occur with a bad connection in the motor thermal wiring or F6 fuse is blown.

600 PROXIMITY ADJUSTMENT Fault *(requires manual reset)*

One or both of the proximity sensors has failed or the Prox Jitter value is beyond acceptable limits. See page 9

601 PROXIMITY ADJUSTMENT Warning

The Prox Sensors require adjustment or hardware is loose. See page 9

602 OVERSPEED DETECTION *(requires manual reset)*

The speed of the gate exceeded the pre-set upper limit for the **OPEN** or **CLOSE** high speed setting.

Possible causes:

1. Extremely high winds accelerated the gate when opening or closing.
   Reduce the high speed setting 5-10%.
   Increase the overspeed threshold for the selected speed.
2. Bind in the gate movement.
3.. Encoder slipping
   Ensure the lock assemble screws are reasonably tight. Remove the motor
   assembly end covers and verify that the bottom cam rollers are making contact with the reaction fin.
4. Encoder failure
   Although extremely rare, this possibility could exist.
   Perform the following:
      To verify that the encoder is functioning properly:
      1. Press the **M** button on the inverter keypad. The top number will start flashing
      2. Press the up arrow until the top number reads location **0.041**
      3. Manually move the gate left. The inverter should display negative values.
      4. Manually move the gate right .The inverter should display positive values.

   If this test fails re-check the encoder wiring (especially a new installation).

700 COLLISION DETECTED during OPENING

701 COLLISION DETECTED during CLOSING

These faults occur when the inherent entrapment detection senses an obstruction.

Possible causes:

1. Gate and or trucks creating a bind in gate movement. The gate may roll fine by hand but will bind at the operation speed.
2. The bottom cam rollers are too tight (see page 13).
3. Proximity sensors are not set properly (there could also be **600** and **601** error codes)
4. Actual collision on opening as a result of edge switch and or photo beam failure.
5. Motor assembly may be oscillating during speed changes in normal travel. Check post bracket & motor linkage nuts for tightness.
6. Hand rotate the motor linkage arm (all thread rod). If it appears to easily twist or rotate without resistance the ball rod ends are probably worn. The linkage arm should be replaced.

800 BAD CALIBRATION

The operator was not able to calibrate properly during the learn mode.

Possible causes:

1. Proximity sensors not wired correctly on a new installation
2. Proximity sensors not adjusted correctly. Re-check proximity sensor gap.
3. Binding in gate movement. Turn power off and manually move the gate slowly open and close to detect location and source of binding. If no binding is detected check the bottom cam rollers for proper tension (see page 13).

900 INVERTER Fault

The PLC detected that the inverter lost power or has faulted.

Possible causes:

1. Power is dropped due to outage or generator switchover and 'Keep Alive' option is installed. Once power is restored operator will function normally.
2. Inverter is not functioning properly and has generated a 'TRIP' fault. Contact Vmag 210-495-3000

1000 PLC RESET

This fault occurs when the main power drops out or the PLC is re-cycled.

1001 PLC running on optional 'Keep Alive' batteries

When the 'Keep Alive' option is installed this fault will occur indicating that the main power has dropped out.

1101 DUAL GATE COMM ERROR – Primary Failed reading SECONDARY INPUT Status

1102 DUAL GATE COMM ERROR – Primary Failed reading SECONDARY OUTPUT Status

1103 DUAL GATE COMM ERROR – Primary Failed reading SECONDARY CONTROL RELAY Status

1104 DUAL GATE COMM ERROR – SECONDARY detected Loss of Communications

These faults occur when the primary and secondary controllers have lost communication.

Possible causes:

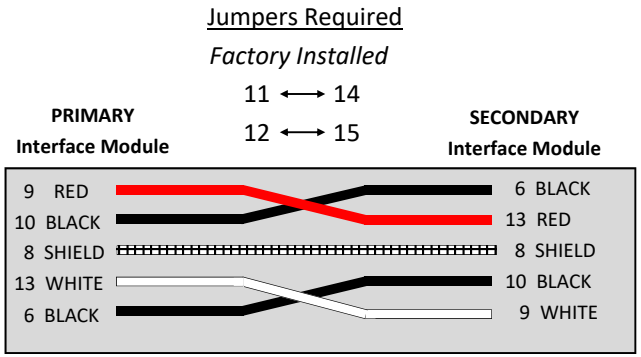
1. Cable wired incorrectly. Check cable connections at both ends.
2. Cable damaged. Visually inspect cable run. Ohm cable for continuity check.
3. No power or power reset on Primary or Secondary side.

Initial Dual Gate Setup

Using the programmer go into SYSTEM

Set the master (PRIMARY) side to **DUAL/MASTER (PRIMARY)** & the slave **(SECONDARY)** side to **DUAL/SLAVE (SECONDARY)** with the programmer

If the auto close feature is required, the **AUTO CLOSE** timer must be **ENABLED** on both gates. The **PRIMARY** determines the close time.



1200 PLC BACKUP BATTERY LOW

This fault will not affect the operation of the gate. Replace PLC battery located on the left side at the top of the PLC with CR2354