

DORADO

Model B-8 Barrier Gate

Equipped with Model 1400 Controller

**Installation & Maintenance
MANUAL**

PROUDLY MADE IN THE *USA

DORADO Parking Systems

5414 Victoria Circle

Firestone, CO 80504

PHONE: 303-464-8159

FAX: 303-485-8707

TECH SUPPORT: 303-944-7734

Before Installation!

Take the time to read this manual

The 1400 controller is an extremely versatile gate controller with a variety of options and is capable of handling the simplest one-way traffic situations to the most complicated two way traffic situations all with a minimal need for external wiring, and quickest set-up time.

Any parking controller on the market can be initially somewhat complicated to use for the first time. While we certainly do not mind providing technical support to any of our users, we do kindly ask that users do take a few moments to familiarize themselves with the pertinent information contained in this manual.

Prevent ESD damage (Electro Static Discharge)

Before touching any part of the 1400 controller or any loop detectors make sure to touch the controller back panel. This simple step will greatly reduce the possibility of ESD damage to the components on the 1400 controller and loop detectors.

ESD damage is usually not readily apparent; damaged ICs will often still work correctly for several hours to over a year until they eventually fail. ESD damage WILL result in an otherwise unneeded service call wasting YOUR time and money.

Do not use an oversized arm

We have performed extensive testing on various gearboxes to determine the maximum arm length of our various models of gates. Our 12' arm model *can* lift a 16' arm, but will cause the gearbox to wear out in a very short amount of time, resulting in YOUR wasted time and money.

Gates and trailers don't mix!

Lawn crews often tow a trailer to haul their equipment; unfortunately these types of trailers often use a metal frame with a wooden floor. This prevents the trailer from being detected by the loop detectors and depending on how fast the lawn crew vehicle travels through the gate, can result in the gate arm closing on the trailer as it is passing through the gate.

Suggested solutions to this problem is the addition of a Safety Photo Sensor or a button mounted next to the exit lane, which activates a timed relay (15 seconds). The N/O outputs of the relay are connected to one of re-open inputs. This way a vehicle with a trailer has about 30 seconds to travel under the gate arm before it closes.

Table of Contents

Section 1. Main Power Requirements.....	4
Section 2. Installation.....	4
2.1 Before Installing the Gate Checklist	
2.2 Installing Anchor Bolts	
2.3 Placing the Gate	
2.4 Main Power Connections	
2.5 Adjust the Open and Close Position Switches	
2.6 Using the Lot Full Sign Relay	
Section 3. Controller Panel Diagram.....	6
Section 4. Alphanumeric Display.....	7
4.1 Alphanumeric Messages	
4.2 Alphanumeric Message Chart	
Section 5. Fuses and Fuse Indicators.....	8
5.1 Fuse Indicator LEDs	
5.2 F1: Main Power, 5A, 250V, Slow-Blow, Type 3AG	
5.3 F2: Logic Power, 1A, 250V, Slow-Blow, Type 3AG	
5.4 F3: Loop Power, 1A, 250V, Slow-Blow, Type 3AG	
5.5 F4: Input Power, 1A, 250V, Slow-Blow, Type 3AG	
5.6 F5: Field Power, 1A, 250V, Slow-Blow, Type 3AG	
Section 6. Relay Outputs.....	8
6.1 Relay A	
6.2 Relay B	
6.3 Vend A Count Output	
6.4 Vend B Count Output	
Section 7. Motor Up/Down LED Indicators.....	9
Section 8. Using the Display Count Function.....	9
Section 9. Using the Display Settings Function.....	9
Section 10. Field Inputs.....	10
10.1 Field Input Operation	
10.2 Field Input Chart	
10.3 Vend A/SBO Input	
10.4 Vend B Input	
10.5 Close Input	
10.6 Lot Full Input	
10.7 Open On Steady Input 1 and 2	
10.8 Re-Open Inputs 1 and 2	
Section 11. On-board Loop Detector Inputs.....	12
11.1 On-board Loop Operation	
11.2 On-board Loop Relay A	
11.3 On-board Loop Relay B	
11.4 On-board Loop Function Chart	
11.5 Close Loop Notes	
11.6 Loop1 Notes	
11.7 Loop2 Notes	
Section 12. Mode Operations.....	13
12.1 Mode 1: 1-Way Traffic	
12.2 Mode 2: 2-Way Traffic	
12.3 Mode 3: SBO (Single Button Operation)	
12.4 Mode 4: MSBO (Manual Single Button Operation)	
12.5 Mode Selection	

Section 13. Option Operations.....	14
13.1 Option 1: Open on Loop1 detect	
13.2 Option 2: Accept 'Vend B' on lot full	
13.3 Option 3: Vend memory	
13.4 Option 4: 60-Second timer	
13.5 Option Selection	
13.6 Option Table	
Section 14. Example Lane Configurations.....	16
14.1 Using safety devices.	
14.2 On-board vs. External loop detectors	
14.3 Understanding what a counting device is	
14.4 Understanding what arming is	
14.5 What if I don't see my exact lane configuration?	
14.6 Free Exit (or Free Entry)...17	
14.7 Ticket Dispenser Entry...19	
14.8 Entry with a Card, with Requested Entry...21	
14.9 Entry with a Card, with Free Exit...23	
14.10 Entry with a card, with Exit with a Card...25	
14.11 Toll Booth Exit, with Card exit...27	
Section 15. Master/Slave Gate Wiring.....	28
15.1 Master/Slave Gate Configuration	
15.2 Safety Device Wiring	
15.3 Mode 1 or 2	
15.4 Mode 3 or 4	
Section 16. Troubleshooting.....	30
16.1 F1 Blowing / GFI Keeps Popping	
16.2 F1 Blowing / Motor Thermal Reset Button Popping	
16.3 No Indicator LEDs / Alphanumeric Display.	
16.4 F2-F5 Blowing	
16.5 Arm Wont Raise or Lower	
16.6 Gate Arm Traveling Continuously for 15 seconds and Stopping	
16.7 What the Message 'FM' Means	
16.8 Checking the Filed Inputs for Proper Connection	
16.9 Checking the On-Board Loop Detectors for Proper Operation	
Section 17. Using Test Mode.....	33
17.1 Test Mode Message Chart	
Section 18. General Maintenance and Mechanical adjustments.....	34
18.1 Nuts and Screws	
18.2 Gearbox Oil	
18.3 Open and Close Position Switches	
18.4 V-Belt adjustment	
18.5 Bushings	
18.6 Maintenance Chart	
Section 19. Glossary.....	36
Section 20. Basic Ticket Dispenser Operation and Connections.....	37
Section 21. Warranty Statement.....	38

1. Main Power Requirements

For 110V operation a 15-amp circuit is required, this amount of power is enough to operate the gate plus provide extra power for most accessories. It is paramount the power is properly grounded.

2. Installation

Caution!

Check local electrical codes before installing main power and grounding.
Only licensed electricians are to install high voltage supplies.

Caution!

Main power must be supplied in its own conduit. Interference will be induced on any other signal and/or loop wires installed in the same conduit.

Caution!

When wiring the main power observe and check all ground connections. The 1400 controller has been designed to be resistant to power surges and nearby lightning strikes. Failure to properly ground this unit will result in a greatly reduced ability to withstand such surges.

2.1 Before mounting the gate checklist

Before mounting the gate check that the following items have been completed:

- ☐ Main power is ready to be installed, power turned off, and the wires are properly capped and protected against damage.
- ☐ Loops have been installed, the loop wires do not run next to any other wires, and are protected against damage.
- ☐ If using a slave gate, a sufficient amount of wiring contacts are present between the master and slave gate.
- ☐ All other signal wires are installed and protected against damage

2.2 Installing anchor bolts

- Remove the gate from its plywood shipping base, taking care not to damage the mounting gasket found under the gate.
- Use good quality ½" diameter anchor bolts, 6" length minimum.
- Using the gate gasket as a template, mark the position of mounting holes.
- Drill out the mounting holes using a ½" drill to the appropriate depth in order to leave at least 1½" to 2" of the bolt above the concrete pad.

2.3 Placing the gate

- Place the gate gasket.
- Place the gate cabinet, taking care not to damage the threads of the installed anchors or crush any wires.
- Put the washers into place over the studs and hand-tighten the nuts.
- Before final tightening, temporarily affix the gate arm to check for alignment
- Complete the installation by tightening the anchor bolt nuts to a torque of 40 Ft/Lbs.

2.4 Main Power Connections

To make the power connections, first remove the wing nuts that hold the power panel to the side of the gate cabinet. Lift the power panel off of the mounting studs. Behind the bottom portion of the faceplate you will see three wire connection terminals, connect the power wires to these terminals.

When wiring main power, observe the Line, Neutral and Ground Lines are properly connected. Failure to do so may result in personal injury and/or equipment destruction.

- Connect the Line wire (Black) to the terminal marked 'L'.
- Connect the Ground wire (Green) to the terminal marked 'G'.
- Connect the Neutral (White) to the terminal marked 'N'.

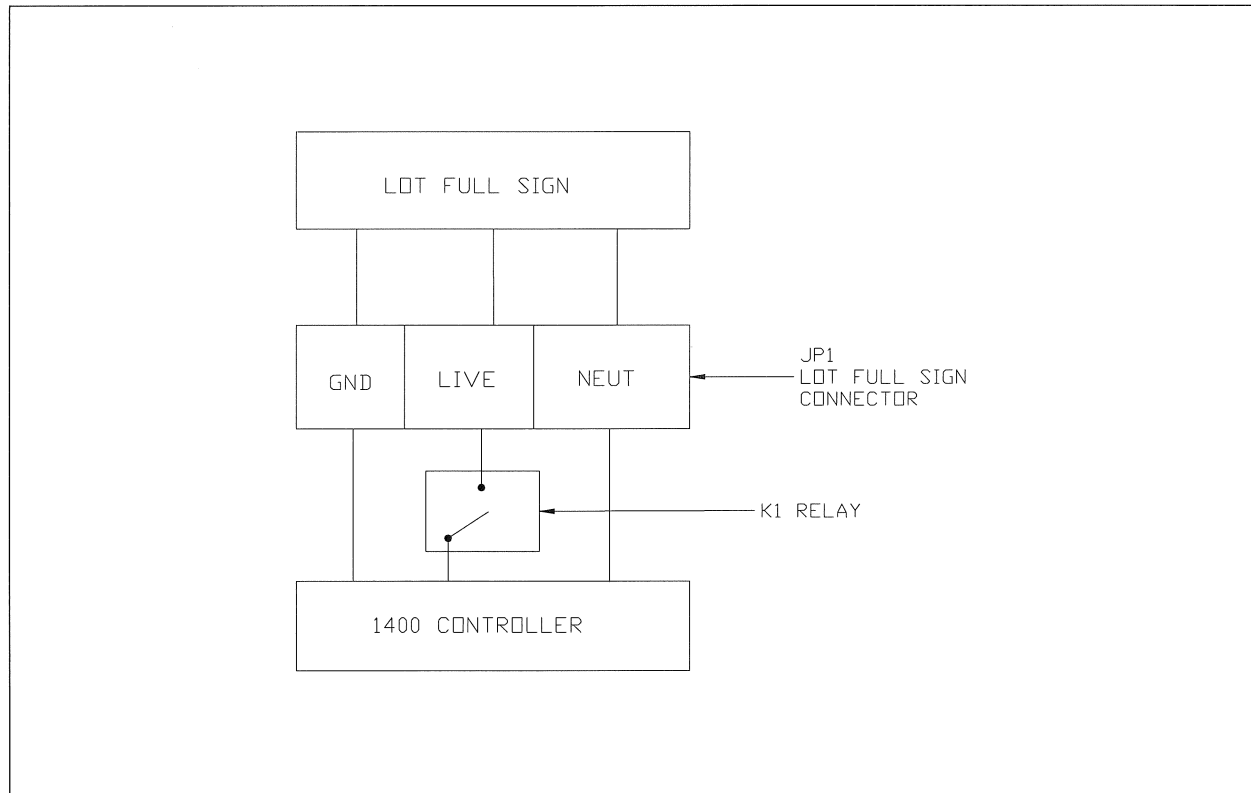
After the connections have been made, re-affix the power panel into place.

2.5 Adjust the open and close position switches

To adjust the open and close stops, loosen the appropriate thumbscrew to adjust the position of the position switch cams. Make sure to re-tighten the cams after adjustment.

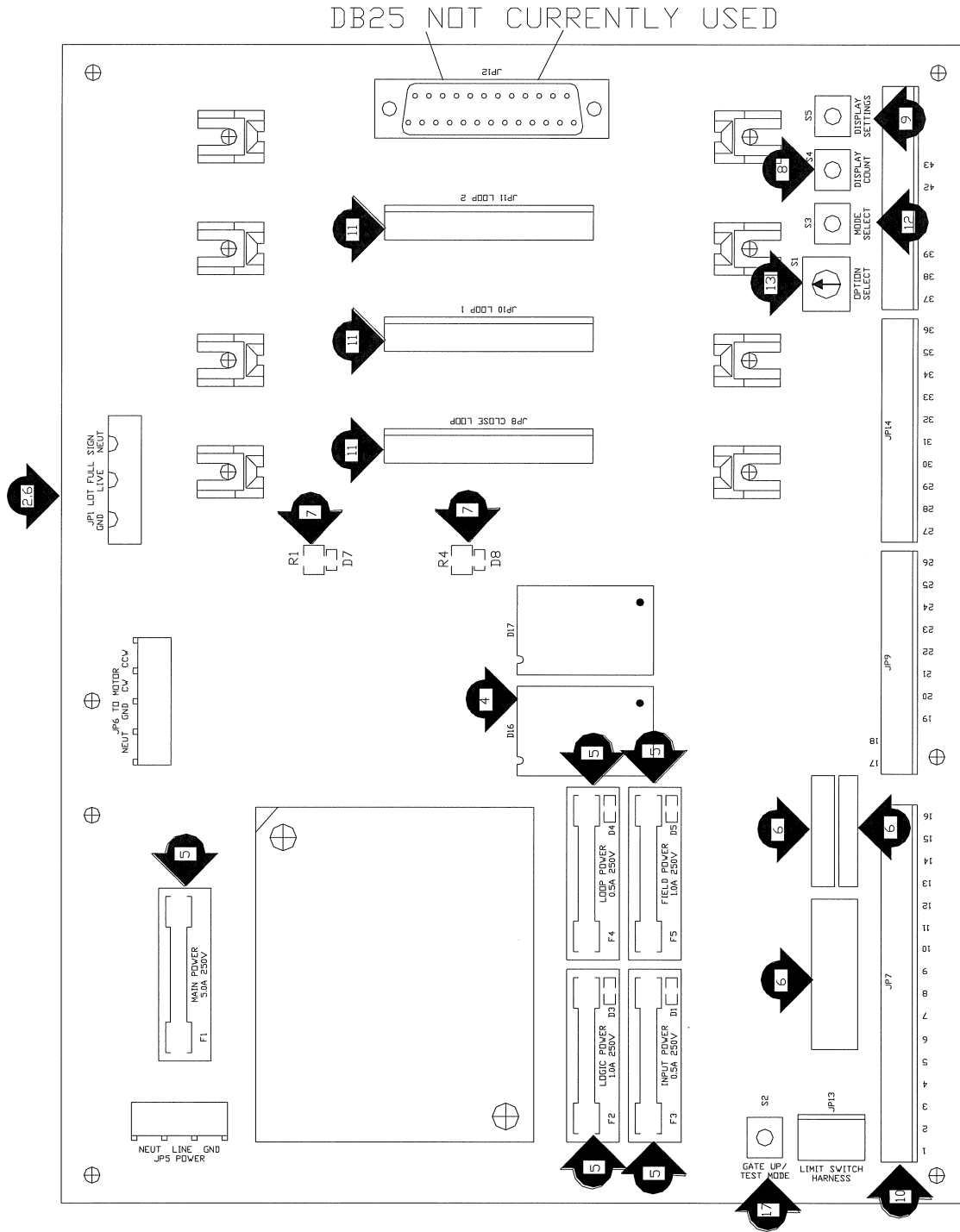
2.6 Using the Lot Full Sign Relay

This relay is activated when the 'Lot Full Input' is activated, this relay will supply 115VAC at up to a 3-amp load.



3. Controller Panel Diagram

Arrows indicate what section to go to learn about the 1400 controller functions



4. Alphanumeric Display

4.1 Alphanumeric Messages

The alphanumeric display on the 1400 controller is the key interface for the user. Upon each active input, it will provide a two-character display, indicating what the last valid input was. While most messages are mentioned elsewhere in this manual, this chart identifies all messages.

To distinguish between certain numbers and letters some characters may look a little different than expected:

- The letter 'S' appears to be a reversed 'Z'.
- The letter 'O' has no hash marks.
- The Number '0' has hash marks.

4.2 Alphanumeric Message Chart

Characters		Message Description	See Section(s)
1 st	2 nd		
C	A, B, C	Controller is in 'Display Count' mode	8
C	L	Last input was from Close Loop	11
F	M	Indicates a fault in the motor circuit; motor was energized for 15 seconds but never moved or a possible gate position switch problem	16
L	1	Last input was from Loop1; displayed when the option 'Open on Loop1' is active. Also, may be displayed when using the display function	11,9
L	2	Last input was from or Loop2; displayed when in mode1 and Loop2 re-opened the gate as an optional safety loop. Also, may be displayed when using the display settings function	
M	1-4	Indicates mode selection	12,9
N	L	Indicates no loop detectors were installed on the 1400 controller. (JP8, JP10 or JP11)	9
O	1-F	Indicates option selection	13,9
R	1-4	Indicates board is running in mode 1-4 respectively	
R	L	Indicates installed loop detectors are currently being detected; part of the normal power-up and start of test mode cycle.	
R	O	Last input was to one of the re-open inputs	10
S	1-8	Indicates the controller is performing self-checks; part of the normal power-up cycle; if the 1400 controller stops and continuously self-resets at this point, the board must be returned for service.	
S	9	In the final stage of power-up, controller is seeking a close position switch input; if there is not an active close position input present, the controller will run the motor for up to 15 seconds attempting to close the gate and get a close position input. If the gate arm won't move or never sees a close input, the controller will display 'FM' and suspend operation.	
T	C	Indicates the gate has closed due to the 60-second timer (when this option is used)	13
T	M	Indicates the controller has been switched to test mode	17
V	A, B	Indicates the gate has opened upon an input to Vend A/SBO or Vend B respectively.	10

5. Fuses and Fuse Indicators

Caution!

Turn off main power to the 1400 controller before replacing fuses. Failure to do so may result in personal injury and/or equipment damage.

Caution!

Replace fuses with only the same rating and type as specified. Failure to do so may result in personal injury and/or equipment damage.

5.1 Fuse Indicator LEDs

F2-F5 have an indicating LED next to the respective fuse. If the LED is glowing, then the fuse is good. If the LED is dark, the fuse needs replaced.

5.2 F1 Main Power, 5A, 250V, Slow-Blow, Type 3AG

For both 115 and 220VAC configurations: use a 5 Amp, 250V, Slow-Blow type 3AG Fuse.

This is the main power fuse of the 1400 Controller; a faulty, worn or overloaded motor most often causes this fuse to blow. Other causes may include faulty main power wiring or an overloaded 'Lot Full Sign' relay (K1).

5.3 F2: Logic Power, 1A, 250V, Slow-Blow, Type 3AG

This fuse supplies protection to the 5V digital portion of the controller. Tool damage to the controller board, a dangling wire, or exposure to harsh environmental conditions will cause this fuse to blow. If this fuse does blow, check for any of these conditions on the controller PCB, particularly around surface-mounted ICs before re-applying power.

5.4 F3: Loop Power, 1A, 250V, Slow-Blow, Type 3AG

This fuse supplies protection to the loop detectors that may be installed in JP8, JP10 and JP11. It also supplies power to the DB-25 connector JP12. A defective loop detector, tool damage to the board, or a dangling wire may cause this fuse to blow. If this fuse does blow check for any of these conditions on the controller PCB, particularly around the connection pins of the mentioned slots.

5.5 F4: Input Power, 1A, 250V, Slow-Blow, Type 3AG

This fuse supplies protection for accidental wiring to grounds or voltages to external devices. If this fuse does blow, check, disconnect, and check for any errors in wiring to external devices.

5.6 F5: Field Power, 1A, 250V, Slow-Blow, Type 3AG

This fuse supplies protection against shorting/overloading of any device(s) hooked up the 12-Volt power connection located on pins 1&2 of the 1400 controller.

6. Relay Outputs

6.1 Interlock Relay A

The relay points 7 and 8 are a normally closed set of contacts; these points are closed when the gate is closing or closed.

6.2 Interlock Relay B

The relay points 10 and 11 are a normally closed set of contacts; these points are closed when the gate is closing or closed.

The relay points 9 and 11 are a normally open set of contacts; these points become closed when the gate is opening or open.

6.3 Vend A Count Output

Vend A is a set of normally open contacts. This relay will close for .4 seconds on each car passing over the close loop when the gate has opened on a Vend A.

6.4 Vend B Count Output

Vend B is a set of normally open contacts. This relay will close for .4 seconds on each car passing over the close loop when the gate has opened on a Vend B.

7. Motor Up/Down LED indicators

These LEDs indicate when the appropriate triac (Q1 & Q2) are being energized and supplying power to the motor. The LED labeled D7 indicates when the gate arm should be raising; The LED labeled D8 indicates when the gate arm should be lowering.

8. Using the Display Count Function

The display count function is used to retrieve the following counts (up to 9,999,999):

- 'CC' Cycle count, this is the number of times the gate has cycled open.
- 'CA' Vend A count, this is the number of vehicles that have passed through the gate using Vend A.
- 'CB' Vend B count, this is the number of vehicles that have passed through the gate using Vend B.

To retrieve the of cycle count:

- Press the Display Count button, the alphanumeric display will show 'CC'.
- Press the button again to display the first 2 of 7 digits.
- Press the button again to display the next two digits of the seven-digit count.
- Press the button again to display the next two digits of the seven-digit count.
- Press the button again to display the last digit of the seven-digit count.

Example.

- First push of display count button causes the display to show 'CC', indicating a Cycle Count.
- On the next push of the button, the display shows '12'.
- On the next push of the button, the display shows '34'.
- On the next push of the button, the display shows '56'.
- On the next push of the button, the display shows '7'

This means the gate has cycled 1.234.567 times.

After retrieving the total cycle count, another button press will cause the Alpha Numeric display to show 'CA' and will continue to display the Vend A count.

After retrieving the total cycle count, another button press will cause the Alpha Numeric display to show 'CB' and will continue to display the Vend B count.

At any time during this operation, push any other button to exit the display count function, or simply wait ten seconds and the gate will return to its normal running mode.

9. Using the Display Settings Function

This button is used to check the current Mode and Option settings, and also check for the basic function of the on-board loop detectors:

Push this button once, the alphanumeric will display 'M' followed by the currently select mode setting. Push this button again, the alphanumeric display 'O' followed by the currently selected option setting.

More pushes of this button will display any on-board Loops detectors as detected by the controller:

- 'NL' indicates the controller detected no on-board loop detectors.
- 'CL' indicates the controller detected a loop detector installed in the Close Loop slot.
- 'L1' indicates the controller detected a loop detector installed in the Loop1 slot.
- 'L2' indicates the controller detected a loop detector installed in the Loop2 slot.

At any time during this operation, push any other button to exit the display count function, or simply wait a few seconds and the gate will return to its normal running mode.

10. Field Inputs

Field inputs consist of any inputs that require wiring to an external device such as an access control system, ticket dispenser, external loop detector, and safety edge.

10.1 Field Input Operation

- Field inputs must be activated for 100mSec to guarantee activation.
- All Field inputs are made by a dry closure contact between the two pin numbers identified for the input.
- Most field inputs are activated on a closure.
- The close input is activated when the input is made, **and then released**, as in the case of a vehicle passing over a close loop.
- Upon activation of an input, the alphanumeric display will show a message confirming the input made. If an input is made to a non-active input, no message will be displayed, nor will any action take place.

Input name	Connector pin numbers	Alphanum. display message	Function description	Mode specific notes			
				Mode 1	Mode 2	Mode 3	Mode 4
<i>Vend B input</i>	5-6	VB	This is the secondary open input; activation to this input most often comes from an access system.	Always active except when <i>Lot Full input</i> is active and the option 'Accept Vend B input on lot full' is not enabled.			INPUT IS NEVER ACTIVE IN THESE MODES
<i>Close input</i>	19-20	CI	This is the secondary close input; activation to this input most often comes from a loop detector not mounted in the Clos Loop slot of the 1400 controller.	ALWAYS ACTIVE			INPUT IS NEVER ACTIVE IN THESE MODES
<i>Lot Full input</i>	21-22	LF	Activation of this input will: -Energize the lot full sign connector. -Disable the <i>Vend A / SBO input</i> . -Optionally disable the <i>Vend B input</i> .	ALWAYS ACTIVE			INPUT IS NEVER ACTIVE IN THESE MODES
<i>Vend A/SBO input</i>	17-18	VA	This is the primary open input; activation to this input most often comes from a ticket dispenser in modes 1 and 2.	Always active except when <i>Lot Full input</i> is active			This input is used to both open and close the gate in these modes.
<i>Open On Steady input 1</i>	23-24	OS	Activation of this input will cause the gate to open and keep it open as long as an input to either of these points remains. Most often, a key switch used for emergency access supplies this input.	ALWAYS ACTIVE			ALWAYS ACTIVE
<i>Open On Steady input 2</i>	37-38						
<i>Re-Open input 1</i>	25-26	RO	These inputs points are to be used with the normally open outputs of safety equipment such as safety edges and proximity detectors. Upon activation, the gate will re-open for and stay open until this input is not active for 15 seconds.				This input is active as described in mode 1 and mode 2. However, an additional input to <i>Vend A/SBO input</i> is required to close the gate after an activation to this input.
<i>Re-Open input 2</i>	39-40						

11. Using the Reno® model J-12-F Loop Detectors.

Note: This section contains the necessary information for most installations; however, please refer to the documentation included with the detector for additional information such as loop size and installation.

The 1400 controller has been designed to specifically work with the Reno® model J-12-F detectors. Reno® loop detectors provides specific functionality needed to create an intelligent controller board. Additionally, we have found the Reno® loop detector to be to be the most reliable, flexible, and easy to troubleshoot with well thought out LED indicators.

11.1 Installing the Reno® model J-12-F Loop Detectors.

Before installing or removing any loop detectors in the on-board slots, to turn off power to the controller. Not only will this reduce the possibility of electronic damage, but is also required to initiate the microprocessor phase of resetting and detecting installed loop detectors. You will notice the controller displaying the message 'RL' during the normal power up sequence during this phase.

11.2 Detector Relay A and Relay B

The Reno® model J-12-F detectors have two relay outputs:

Relay A: Only the microprocessor of the 1400 controller reads the state of 'Relay A' of the loop detectors. There are no external connection points to this relay. None of the detectors switch settings effect the output of 'Relay A'.

Relay B: The 'Relay B' outputs **do** have external connection points that are used to provide functions such as arming external devices such as ticket dispensers and card readers. These N/O dry-contact connection points are referred to as *Close Loop Extra Relay*, *Loop 1 Arming Relay* and *Loop 2 Arming Relay*, the output and timing of 'Relay B' is specified by the setting of the dipswitches of the loop detectors.(see section 11.5)

11.3 On-board Loop Function Chart

The following chart describes the **primary** function of the on-board loop detectors; 'Relay B' outputs can always be used for user-defined purposes.

Note For Mode 3 and Mode 4: All loops can be installed and the 'Relay B' outputs used for user-defined purposes, but in these modes will not directly open, close or act as a re-open input.

On-board Loop detector slot	'Relay B' output connection numbers	Message displayed upon loop detection	Primary Function	
			Mode 1	Mode 2
Close Loop	27-28	CL	Closes gate (see next section for details).	
Loop1	31-32	L1	Optionally opens the gate as set with the 'Open on Loop1' option setting.	
Loop2	41-42	L2	Can be used as a re-open loop located between Loop1 and Close Loop.	Used as an entry loop, 'Relay B' output used to arm external devices.

11.4 Using the 2-second close delay.

In a 'free exit' set-up, where vehicle detection by the Loop1 detector opens the gate, there is a 2-second delay between the time a vehicle has traveled over the close loop and the gate arm begins to close. The purpose of this feature is to **help** avoid the gate arm from striking vehicles where a driver is tailgating an exiting vehicle.

In higher-security situations, or where this feature may not be desired, simply connect the *Loop1 Arming Relay* connections (pins 31-32) to the *Vend A/SBO Input* connections (pins 17-18) to override the 2-second delay.

11.5 Basic Loop Detector Operation

The following table describes the LED indicators for the Reno® model J-12-F detector:

Status	Power LED (Green)	Detect LED (Red LED next to Green)	Fail LED
Off	No or Low power.	No vehicle present.	Loop okay.
On	Normal power.	Vehicle present.	Open loop.
Flash	N/A	4 Hz = 2 Sec. Detector output delay. (Selected with switch 4.)	1 Hz = Loop shorted. 3 Hz = Prior loop failure corrected.

The following table describes the switch settings for the Reno® model J-12-F detector:

Note: As previously mentioned, 'Relay B' represents *Loop1 and Loop2 arming outputs* as well as the *Close loop extra relay output*.

Note: This table list only the switches most likely to be used, consult documentation enclosed with the loop detector for additional switch functions.

Switch	On	Off
1	Presence mode. Relay B is activated as long as a vehicle remains detected.	Pulse mode. Relay B is activated for 250mS on vehicle detection as specified by switch 2.
2	Pulse on Exit. When switch 1 is set to pulse mode, Relay B will activate upon losing vehicle detection.	Pulse on Entry. When switch 1 is set to pulse mode, Relay B will activate upon gaining vehicle detection.
3	Fault output. Overrides switches 1 and 2. Relay B output stays activated as long as a loop fault exist.	Normal Output. Relay B output activated as normal, according to switches 1 and 2.
4	Output Delay. Delays detection output for 2 seconds.	No output delay.
5	Sensitivity Boost. Particularly useful for high-bed vehicle detection, detector sensitivity is increased while a vehicle remains over the detection loop	No sensitivity boost.

12. Mode Operations

12.1 Mode 1: 1-Way Traffic

Just as it sounds, this mode is used for traffic traveling in one direction through the gate, whether used as an entry or exit (but not both entry and exit).

12.2 Mode 2: 2-Way Traffic

Also as it sounds, this mode is used when the gate is being used for traffic both entering and leaving a parking lot

12.3 Mode 3: SBO (Single Button Operation)

This mode is used when a manual input to operate the gate is required. A momentary input to the *Vend A/SBO input* will open the gate; another momentary input to this point after opened completely will close the gate.

12.4 Mode 4: MSBO (Manual Single Button Operation)

This mode similar to SBO operation except an input must be held steadily to operate the gate. A held input will raise the gate until the gate is completely opened. To close the gate the steady input must be re-applied.

Releasing the input during arm travel will stop the gate. Once an input is re-applied the gate will continue travel in same direction.

12.5 Selecting the Mode

To select the operating mode, push the button labeled 'MODE SELECT' (S3) repeatedly until the desired mode is shown on the alphanumeric display. After about six seconds of this button being released, the alphanumeric display will change to 'Rx', where x is the mode you just selected. During mode selection, all other inputs are not active.

13. Option Operations

This section describes the four options available. Options are enabled/disabled by setting the 'Option Select' rotary dial to the appropriate setting.

13.1 Open on Loop1 detection.

This option specifies whether or not to open the gate on an activation of the Loop1 detector.

- Use this option in a 'Free Exit' situation where a gate automatically opens up upon a car driving up to the gate.
- Don't use this option when a loop detector in loop1 is not utilized, or when a loop detector installed in loop1 is used to 'arm' an external device.

13.2 Accept Vend B input on Lot Full input.

This option specified whether to accept a *Vend B input* when the a *Lot Full input* is active.

- Use this option when you want to disable daily parking entry (*Vend A/SBO input*), but still provide access – controlled or leased parking entry (*Vend B input*)

13.3 Enable vend memory.

Vend memory remembers and tracks the number of *Vend A/SBO inputs* and *Vend B inputs*; while a count of vends is greater than zero:

- The gate remain open
- The vend count(s) are decremented as each vehicle passes over the Close Loop (or the Close input is activated/deactivated)
- Momentarily activates the Vend A Count output or Vend B Count output accordingly on each decrement.
- Closes when the both the both the *Vend A/SBO inputs* and *Vend B inputs* have been decrement to zero.

Note: The 'Vend A' and 'Vend B' count outputs will not necessarily trigger in the same order in which they were received. First all 'Vend A' count outputs will trigger until the 'Vend A' count is at zero, then all the 'Vend B' count outputs will trigger.

- Use this option whenever a line of incoming traffic is expected to form.
- In higher security application such as employee parking, disabling Vend memory will enforce the use of a card reader to gain access.

Note: All Vend counts will immediately be reset to zero upon activation to either of the 'Open On Steady' inputs

Note: Vend memory will count up to 255 'Vend A' and 255 'Vend B' occurrences.

13.4 60-Second close timer

This option selects whether or not to close the gate after it has been open for 60-seconds and has received no input to close the gate.

- This option is mostly personal preference, but we always recommend its use

Note: This option can be used in lieu of a close loop when security is not paramount and/or a close loop is just not practical or reliable.

13.5 Selecting the Option

- Consult the following table to find the desired combination of options you want enabled.
- The left-hand column shows the appropriate dial setting for the combinations of options.
- Rotate the 'Option Select' dial to the corresponding setting
- While rotating the option setting dial, the alphanumeric display will show the current option setting.
- After about six seconds of this dial not being rotated, the alphanumeric display will change to 'R' followed by the mode setting number.

13.6 Option setting table

'Option Select' dial setting	60-Second close timer.	Vend Memory.	Accept Vend B input on Lot Full input.	Open on Loop 1 detection.
0				
1	ON			
2		ON		
3	ON	ON		
4			ON	
5	ON		ON	
6		ON	ON	
7	ON	ON	ON	
8				ON
9	ON			ON
A		ON		ON
B	ON	ON		ON
C			ON	ON
D	ON		ON	ON
E		ON	ON	ON
F	ON	ON	ON	ON

14. Example Lane Configurations

14.1 Using safety devices

For all safety devices, tie the normally open set of contacts to either *Re-open input 1* or *Re-open input 2*. If required, it is perfectly acceptable to tie more than one safety device to a given set on input points.

14.2 On-board vs. External loop detectors

We do recommend using the on board loop detectors for ease of use, quality, and additional features of the units. However, the 1400 controller has been designed to operate just as well with external (A.K.A. customer-supplied) loop detectors. When using external loop detectors:

- The option to open on Loop1 detect will have no effect.
- Tie the normally open output of the Close Loop to the *close input*.
- Tie the normally open output Loop1 to *Vend A open/SBO input*.
- Tie the normally open output Loop2 to *Vend B input*.

14.3 Understanding what a counting device is

In most of the lane configuration diagrams, you will see counting devices. Counters are purely optional devices and don't have to be used. See section 6 for information on the *Vend A and Vend B count outputs*.

14.4 Understanding what arming is

In most of the lane configuration diagrams, you will see mention of arming ticket dispensers and access control devices. Arming is merely an input to a device that enables it. While we do strongly recommend the employment of 'arming', some ticket dispensers or access controllers may not have the provisions for such an input. Omitting the arming wiring will not have any effect on gate operation.

14.5 What if I don't see my exact lane configuration?

These diagrams have been specially selected to show the most common lane configurations while keeping the diagrams uncluttered and easy to understand. If you don't find a diagram that specifically matches your configuration, examine the lane configuration(s) that most closely follow your specific needs as a reference. For instance, if you need to use a gate with both ticket dispenser and access entry, examine both the diagrams for the entry with a ticket dispenser and entry with a card reader and wire the 1400 controller accordingly.

In all lane configurations:

- *Vend A/SBO input* is usually used for daily parking entry.
- *Vend B input* is usually used for access parking entry.

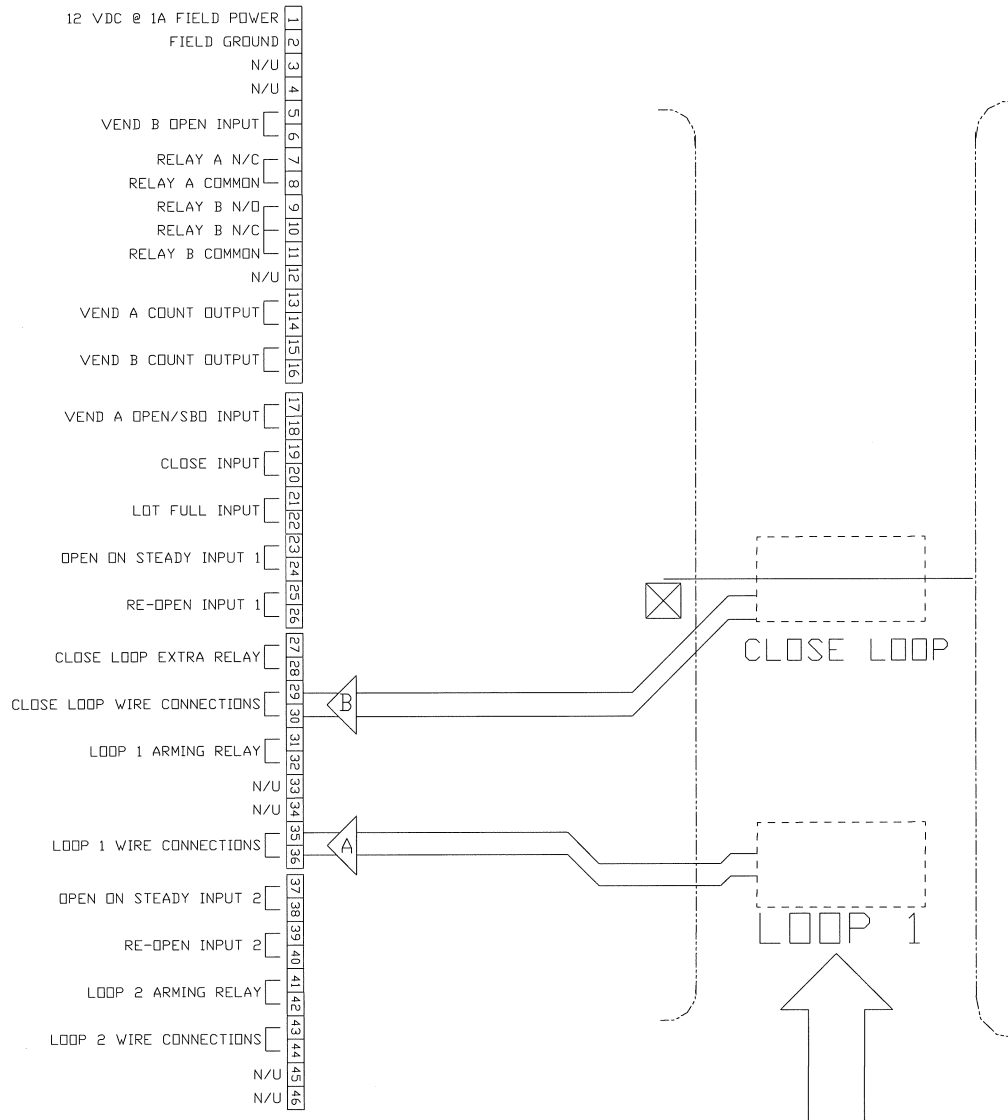
14.6 Free Exit (Free Entry)

- **Mode** set to 1.
- The option *open on Loop1 detection* should be enabled.
- Most popular option settings: (see section 13 for complete option details)

'Option Select' dial setting	60-Second close timer.	Vend Memory.	Accept Vend B input on Lot Full input.	Open on Loop 1 detection.
8				ON
9	ON			ON

Exit sequence:

- A. The detector installed in Loop1 slot detects a vehicle is present, opening the gate.
- B. The vehicle then proceeds over the Close Loop causing an activation/deactivation of the detector installed in the Close Loop slot, closing the gate.



FREE EXIT (OR FREE ENTRY)

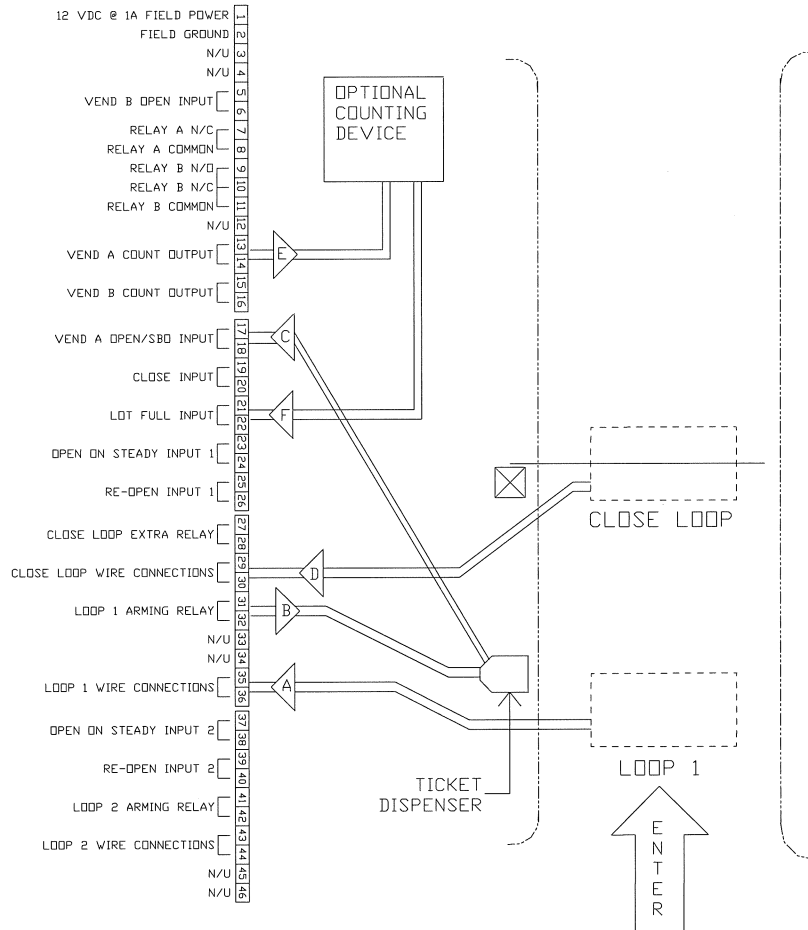
14.7 Ticket Dispenser Entry

- **Mode** set to 1.
- The option *open on Loop1 detection* should **not** be enabled.
- Refer to the loop detector documentation for the settings of the Relay B output; this detector output is used for arming. For Reno® brand detectors, flip SW1.1 on for presence output.
- Most popular option settings: (see section 13 for complete option details)

'Option Select' dial setting	60-Second close timer.	Vend Memory.	Accept Vend B input on Lot Full input.	Open on Loop 1 detection.
0				
1	ON			
2		ON		
3	ON	ON		
4			ON	
5	ON		ON	
6		ON	ON	
7	ON	ON	ON	

Ticket dispenser sequence:

- The detector installed in Loop1 slot detects a vehicle is present.
- The output from *Loop1 arming relay* arms the ticket dispenser.
- The driver then takes a ticket and the dispenser outputs a momentary close signal to *Vend A open/SBO Input*, opening the gate.
- The vehicle then proceeds over the Close Loop causing an activation/deactivation of the detector installed in the Close Loop slot, closing the gate.
- Upon each vehicle preceding over the Close Loop, a momentary activation of *Vend A count output* occurs.
- If a counting device is used, and the lot has become full, then a steady input (contact closure) to the *Lot Full Input* from the counting device will cause any inputs to *Vend A open/SBO Input* to be ignored



TICKET DISPENSER ENTRY

14.8 Entry with Card, with Requested Entry

- **Mode** set to 1.
- The option *open on Loop1 detection* should **not** be enabled.
- Refer to the loop detector documentation for the settings of the Relay B output; this detector output is used for arming. For Reno® brand detectors, flip SW1.1 on for presence output.
- Most popular option settings: (see section 13 for complete option details)

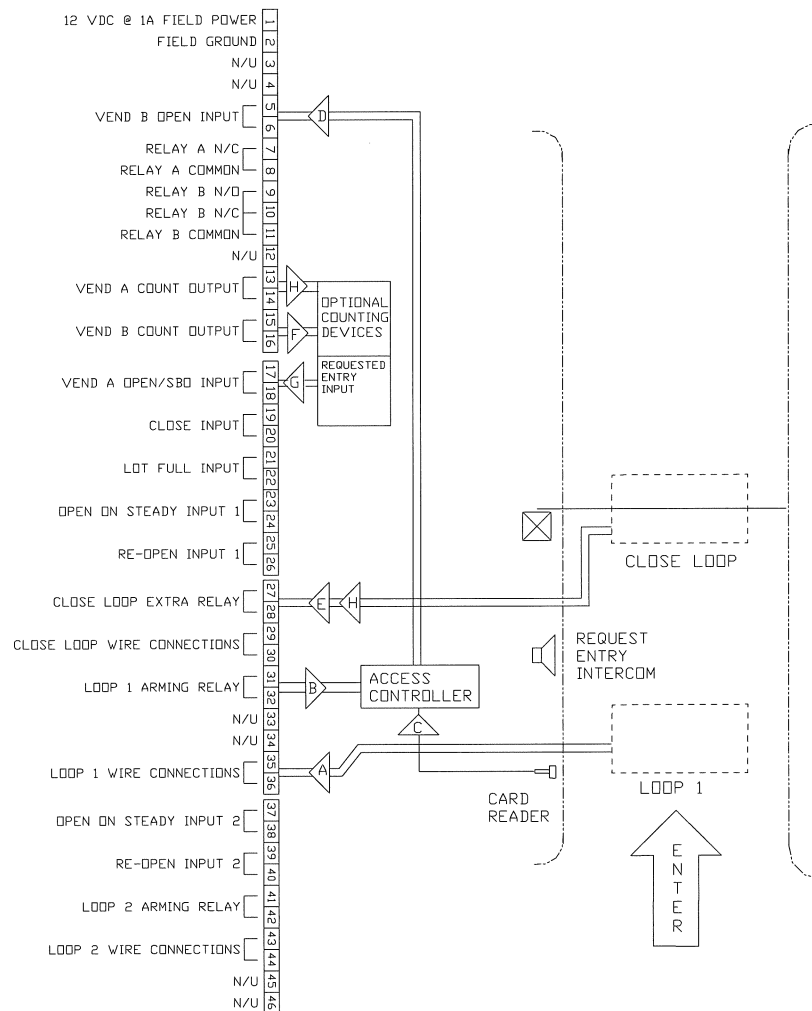
'Option Select' dial setting	60-Second close timer.	Vend Memory.	Accept Vend B input on Lot Full input.	Open on Loop 1 detection.
0				
1	ON			
2		ON		
3	ON	ON		

Card reader sequence:

- The detector installed in Loop1 slot detects a vehicle is present.
- The output from *Loop1 arming relay* arms the access controller.
- The driver presents an access card to the reader, and is validated by the access controller.
- The access controller outputs a momentary close signal to *Vend B open Input*, opening the gate.
- The vehicle then proceeds over the Close Loop causing an activation/deactivation of the loop detector installed in the Close Loop slot, closing the gate
- Upon each vehicle proceeding over the Close Loop, a momentary activation of *Vend B count output* occurs.

Requested entry sequence:

- A requested entry can be granted via a local or remote contact closure on the input *Vend A open/SBO Input*.
- Upon each vehicle preceding over the Close Loop, a momentary activation of *Vend A count output* occurs.



ENTRY WITH A CARD, WITH REQUESTED ENTRY

14.9 Entry with a Card, with Free Exit

- **Mode** set to 2.
- The option *open on Loop1 detection* should be enabled.
- Refer to the loop detector documentation for the settings of the Relay B output; this detector output is used for arming. For Reno® brand detectors, flip SW1.1 on for presence output.
- Most popular option settings: (see section 13 for complete option details)

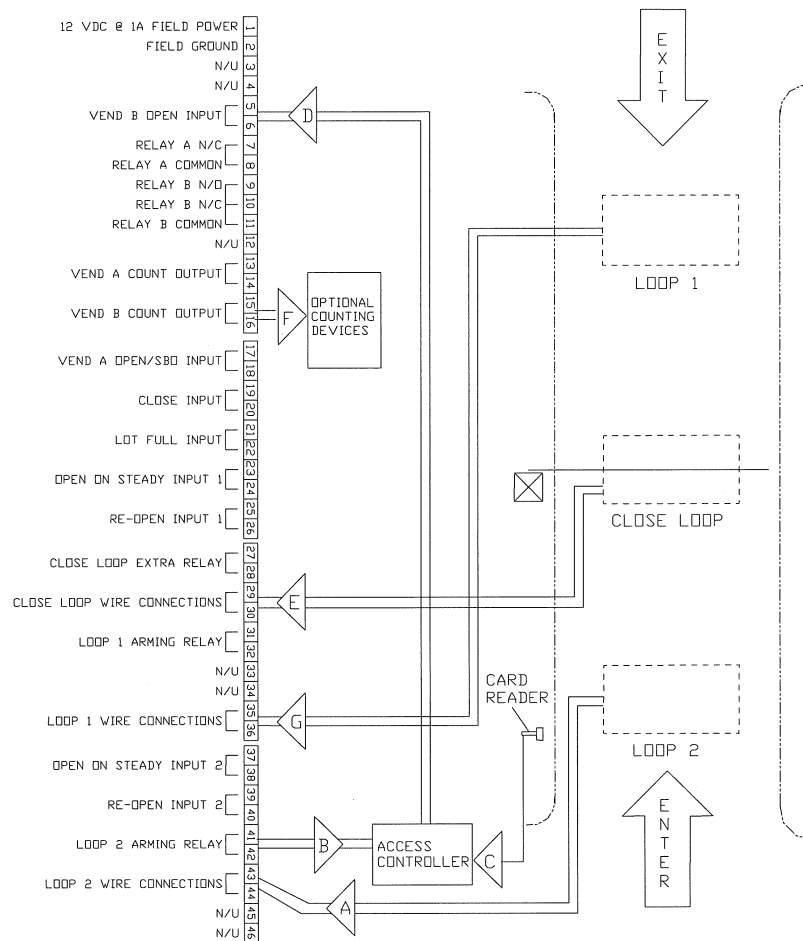
'Option Select' dial setting	60-Second close timer.	Vend Memory.	Accept Vend B input on Lot Full input.	Open on Loop 1 detection.
8				ON
9	ON			ON
A		ON		ON
B	ON	ON		ON

Card entry sequence:

- The detector installed in Loop2 slot detects a vehicle is present.
- The output from *Loop2 arming relay* arms the access controller.
- The driver presents an access card to the reader, and is validated by the access controller.
- The access controller then outputs momentary close signal to *Vend B open Input*, opening the gate.
- The vehicle then proceeds over the Close Loop causing an activation/deactivation of the detector installed in the Close Loop slot, closing the gate.
- Upon each vehicle passing over the Close loop a momentary closure output occurs on the *Vend B count output*.

Free exit sequence:

- The detector installed in Loop1 slot detects a vehicle is present, opening the gate.
- The vehicle then proceeds over the Close Loop causing an activation/deactivation of the detector installed in the Close Loop slot, closing the gate.



ENTRY WITH A CARD, WITH FREE EXIT

14.10 Entry with a Card, with Exit with a Card

- **Mode** set to 2.
- The option *open on Loop1 detection* should **not** be enabled
- Refer to the loop detector documentation for the settings of the Relay B output; this detector output is used for arming. For Reno® brand detectors, flip SW1.1 on for presence output.
- Most popular option settings: (see section 13 for complete option details)

'Option Select' dial setting	60-Second close timer.	Vend Memory.	Accept Vend B input on Lot Full input.	Open on Loop 1 detection.
0				
1	ON			
2		ON		
3	ON	ON		

Entry with a card sequence:

- The detector installed in Loop2 slot detects a vehicle is present.
- The output from *Loop2 arming relay* arms the access controller for card reader 2.
- The driver then presents an access card to the card reader 2, and is validated by the access controller.
- The access controller outputs a momentary close signal to *Vend B open Input*, opening the gate.
- The vehicle then proceeds over the Close Loop causing an activation/deactivation of the detector installed in the Close Loop slot, closing the gate
- Upon each vehicle passing over the Close loop a momentary closure output occurs on the *Vend B count output*.

Exit with a card sequence:

- The detector installed in Loop1 slot detects a vehicle is present.
- The output from *Loop1 arming relay* arms the access controller for card reader 1.
- The driver then presents an access card to the card reader 1, and is validated by the access controller.
- The access controller outputs a momentary close signal to *Vend A/SBO open Input*, opening the gate.
- The vehicle then proceeds over the Close Loop causing an activation/deactivation of the detector installed in the Close Loop slot, closing the gate
- Upon each vehicle passing over the Close loop a momentary closure output occurs on the *Vend A count output*.

14.11 Toll Booth Exit, with Card Exit

- Mode should be set to 1.
- Refer to the loop detector documentation for the settings of the Relay B output; this detector output is used for arming. For Reno® brand detectors, flip SW1.1 on for presence output.
- The option *open on Loop1 detection* should **not** be enabled.
- Most popular option settings: (see section 13 for complete option details)

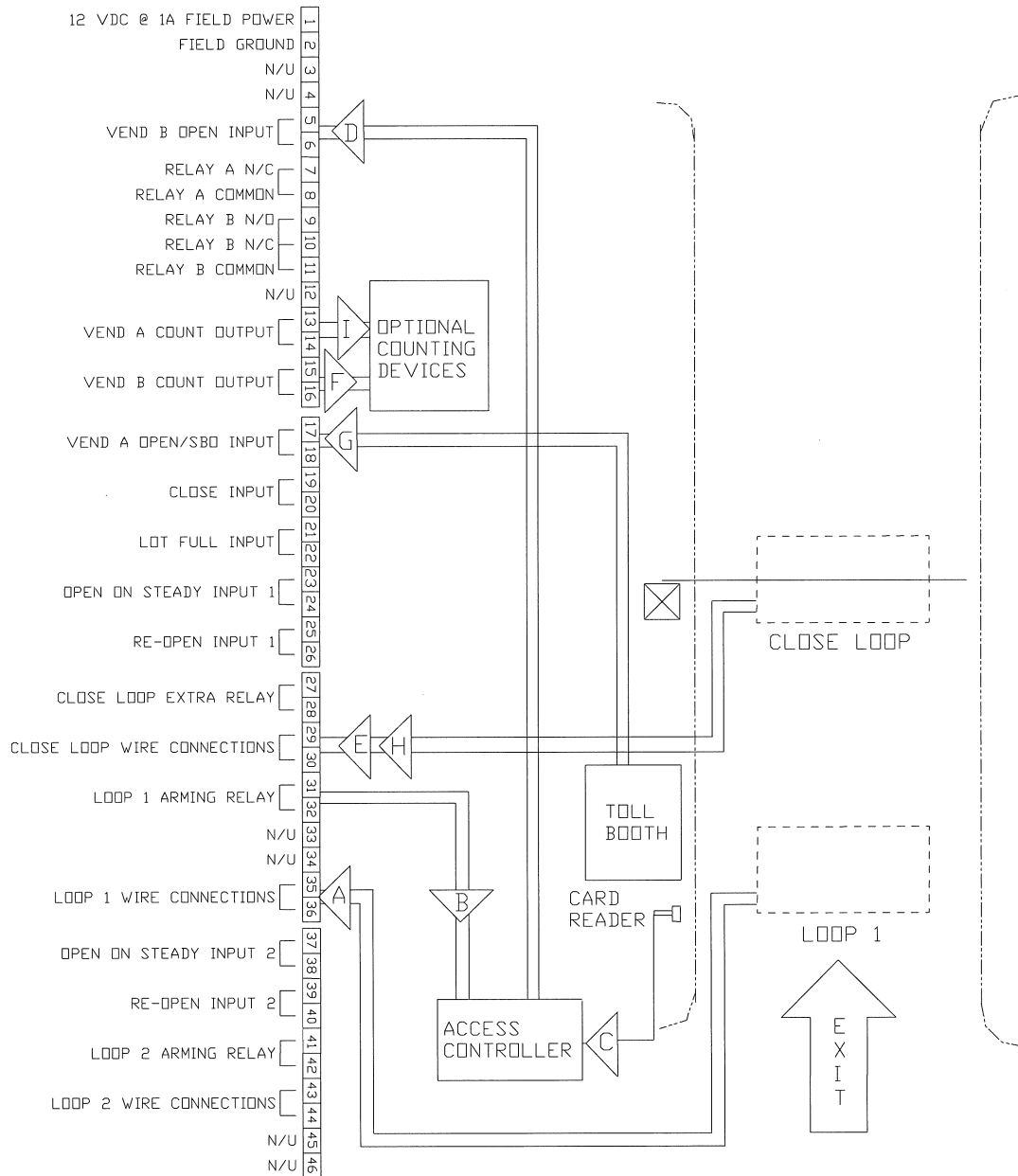
'Option Select' dial setting	60-Second close timer.	Vend Memory.	Accept Vend B input on Lot Full input.	Open on Loop 1 detection.
0				
1	ON			
2		ON		
3	ON	ON		

Card exit sequence:

- The detector installed in Loop1 slot detects a vehicle is present.
- The output from *Loop1 arming relay* arms the access controller.
- The driver then presents an access card to the reader. The access controller validates the card.
- The access controller outputs a momentary close signal to *Vend B open Input*, opening the gate.
- The vehicle then proceeds over the Close Loop causing an activation/deactivation of the detector installed in the Close Loop slot, closing the gate.
- Upon each vehicle passing over the Close loop a momentary closure output occurs on the *Vend B count output*.

Toll exit sequence:

- The tollbooth operator/equipment generates a momentary close input to the *Vend A open Input*, which opens the gate
- The vehicle then proceeds over the Close Loop causing an activation/deactivation of the detector installed in the Close Loop slot, closing the gate
- Upon each vehicle passing over the Close loop a momentary closure output occurs on the *Vend A count output*.



TOLL BOOTH EXIT, WITH CARD EXIT

15. Master/Slave Gate Wiring

- Master/slave gate configuration is designed for use in modes 1, 2 and 3. *Do not use a master/slave gate configuration in mode 4.*
- In a master/slave gate configuration the master gate will supply all the logic to run both the master and slave gate, all loop detectors should be installed in the master gate.
- Keep in mind both the master and slave gates must have its own safety equipment such as an extra-sensory link or safety edge.
- The *interlock relay B output* of the master gate is used to operate the slave gate. If your particular setup requires using this output for another purpose, simply use the *interlock relay B output* of the slave gate; it will always be in the same state as the master gate.

Master gate setup/notes

- Set the master gate to the desired mode and option settings.
- Power-up the master gate first.

Slave gate setup/notes

- Set the slave gate to **mode 1, option 0** regardless of the settings of the master gate.
- The slave gate will display four messages:
 - 'TC', only upon initial power-up after the master gate has been turned on.
 - 'VA', this input opens the gate.
 - 'CI', this input closes the gate.
 - 'RO', this input indicated either the master or slave gate has an activated *re-open input*.

Wiring

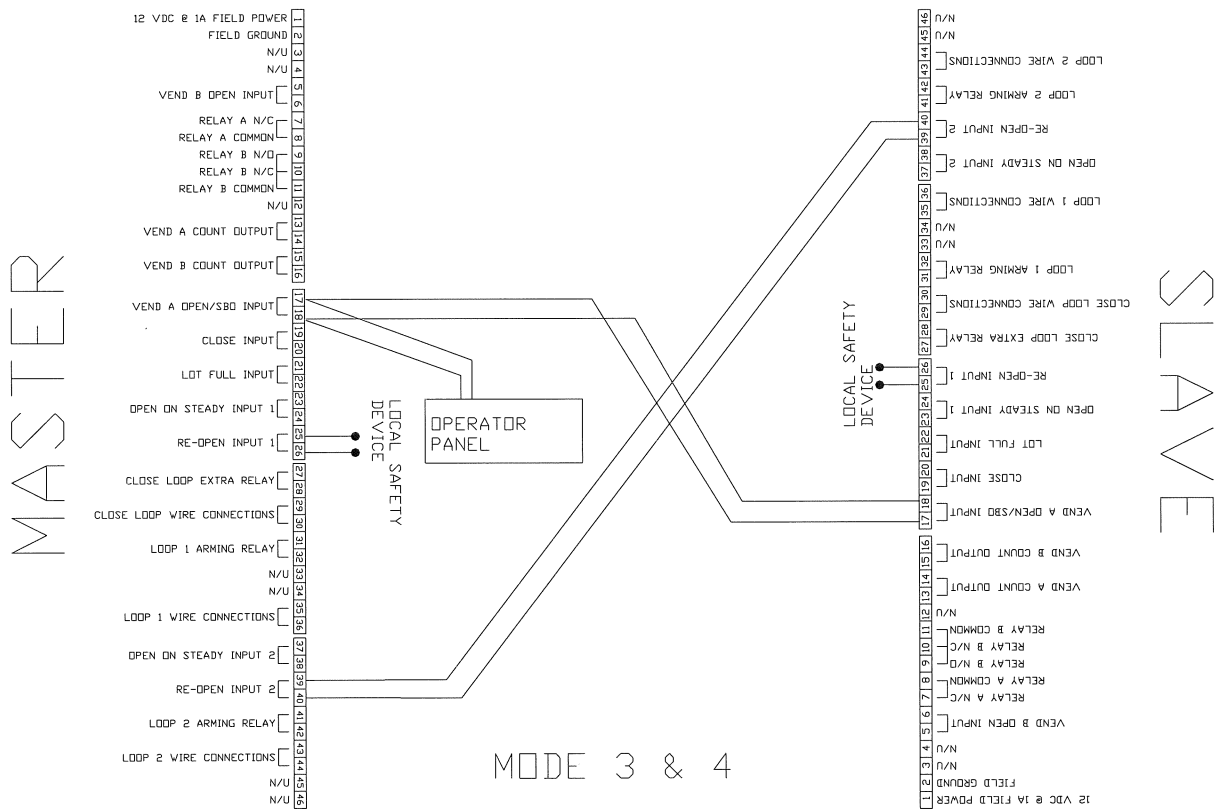
Wire the master to the slave gate using the following note, chart and diagram:

- On the slave gate, pin 18 should be jumped to pin 20.
- Take care not to cross the *re-open input* pairs, pin 39 must go to pin 39, pin 40 to 40.
- Use 18 AWG multi-strand wire or better.

Master gate connection number		Slave gate connection number(s)
11	◀Connects to▶	17
10		18 & 20
39		39
40		40

15.3 Mode 3 or 4

- Match the mode of the master and slave gate.
- Parallel the inputs to *Vend A/SBO Input*. Make sure not to cross pins between the master and the slave gate; pin 17 on the master gate should connect to pin 17 on the slave gate
- Parallel the *Re-open inputs*. Make sure not to cross pins between the master and the slave gate; pin 39 on the master gate should connect to pin 39 on the slave gate
- Wire per the following diagram



16. Troubleshooting

16.1 F1 Blowing / GFI Popping

- If this is a new installation, re-check the Line, Neutral, and Ground.
- Check for miss-connections and possible shorts.
- If heater is present, turn it off and reset the gate, the heater may need replaced.
- An overloaded gate arm will damage the gearbox and cause the main fuse to blow.

16.2 F1 Blowing / Motor Thermal Reset Button Popping / Arm wont move.

Either of these two conditions are a symptom of an excessive load required to move the arm, to prevent possible additional damage the gate should be repaired immediately. Replacing F1 with a fuse rating of greater than 5A may **temporarily** let the gate function as normal, but the gate will soon fail again until the source of the problem is fixed.

Possible causes:

- The V-Belts set too tight.
- The pulleys are not aligned vertically and/or the pulley setscrews are loose.
- The gearbox is worn/damaged as indicated by excessive slack in arm travel, or a scratchy noise is being heard when the motor is running.
- Loose bolts or worn bushings as indicated by slack between mechanical connections.
- Excessive arm load for the model of gate.
- Worn/damaged motor.

16.3 No Indicator LEDs / Alphanumeric Display

Chances are there is no power being applied to the 1400 controller.

- Verify the 1400 controller's power plug is plugged into JP5.
- Verify the switch on the power panel is switch to 'ON'.
- Verify the GFI breaker hasn't popped; reset if needed.
- Verify main power is supplied; voltage can be measured at the outlet.
- Verify F1 is not blown.

16.4 F2-F5 Blowing

Each of these fuses is dedicated to specific devices/connections; consult section 6 for details.

16.5 Arm Won't Lower

Since there are several items that will keep an arm from closing, this section has been broken down into two sections. The first section is for troubleshooting upon installation and the second section is for troubleshooting after installation.

Note: D8 will glow when the motor is being energized to close the gate:

- If there is a humming from the motor but the motor wont move; refer to section 16.2 for possible causes.
- If there is no humming from the motor, press the thermal rest button on the motor and check motor connections.

16.51 Arm won't lower upon installation:

Verify neither of the *Open On Steady inputs* is active. If active, the alphanumeric display will show 'OS'.

If *vend memory* is set to on (see table 13.6), clear any vends in memory by momentarily activating either of the *Open On Steady inputs*.

Verify there is an input to close the gate:

- If an on-board loop detector installed in the close loop slot, an activation/deactivation of the detector should close the gate as indicated by the message 'CL' being shown on the alphanumeric display.

- If the close input is used to close the gate, an activation/deactivation of this input should close the gate as indicated by the message 'Cl' being shown on the alphanumeric display.

If either 'CL' or 'Cl' is seen on the alphanumeric display and the gate won't close, then **temporarily** disconnect any safety device(s) hooked up to either of the *re-open inputs*. If one of the *re-open inputs* were activated, the gate should then close after a 15-second timer.

Verify the proper operation of the open and close position switches and harnesses, particularly the closed position switch. If the close position switch is active the 1400 controller will think the gate is already closed.

- Verify the positioning of these switches and that the appropriate switch is activated when the gate arm is opened or closed. (See Position switch notes)
- Verify the switch position wires are not broken or damaged.
- Re-seat the position switch harness plug.
- Replace switch if needed.

Position switch notes:

- The red and black wired position switch is the closed position switch, *red = closed*.
- The Green and White wired position switch is the closed position switch, *green = open*.
- The wire pairs are N/C until the switch is activated.

16.52 Arm won't move after installation:

After the initial installation, the most common reason for a gate not to close is a malfunction of the close loop due to:

- Loop wire connections becoming oxidized and making poor contact.
- Water/ice collecting around the loop, degrading the sensitivity of the loop.
- Improper sensitivity setting or loop size for vehicles passing over the close loop.
- Loop wire damaged caused by poor installation.

With a Reno® brand detector, you can check for these possible faults by observing the state 'Fail LED' found on the detector:

Off = Loop is functioning properly:

Try increasing the sensitivity/change frequency of the detector to detect vehicles not detected.

On = Loop is open:

Clip, strip, twist, and reattach wire leads.
Try a known good loop detector.
Loop may have to be replaced.

1 Hz flash = Shorted Loop:

Verify loop leads are not shorted.
Try a known good loop detector.
Loop may have to be replaced.

3 Hz flash = Prior loop failure:

This is an indication that loop properties have changed and the detector has adapted.
Try changing frequency of the detector to cancel interference of other nearby loops.
Clip, strip, twist, and reattach wire leads.
Try a known good loop detector.
Loop may have to be replaced.

If the loop detector appears to be working correctly, check the wiring and condition of the items listed in the previous section, 16.51.

16.7 The message 'FM' is shown on the alphanumeric display

The message 'FM' shown on the alphanumeric display indicates the controller has energized the motor for 15 seconds, but the arm has not been seen as moved as indicated by the open/closed switch position sensor(s).

There are three conditions that will cause this situation:

- The motor is being energized as being indicated by a humming from the motor, but will not move.
- The open position switch is not functioning properly.
- The close position switch is not functioning properly.

To determine what item is at fault, the controller will need to be reset, there is no need to manually turn the motor to open or close the gate.

Upon power up the controller will attempt to put the gate into the closed position if it is not. If the controller is restarted in this condition or the close position sensor is not functioning the controller will attempt to move the arm:

- If the motor is heard humming but won't move, then the motor and/or gearbox is the problem.
- If the arm moves up and down for 15 seconds, then the controller is not seeing the close position switch.

If the gate is restarted and does not immediately start attempting to move, then there is no problem with the close position switch; continue testing by pressing the *test mode/gate* up button once. Upon entering test mode the controller will attempt to raise the gate:

- If the motor is heard humming but won't move, then the motor and/or gearbox is the problem.
- If the arm moves up and down for 15 seconds, then the controller is not seeing the open position switch.

If the motor is not moving, consult section 16.2 for possible causes.

If the open or close position switch sensors are suspected:

- Verify the positioning of these switches and that the appropriate switch is activated when the gate arm is opened or closed. (See Position switch notes)
- Verify the switch position wires are not broken or damaged.
- Re-seat the position switch harness plug.
- Replace switch if needed.

Position switch notes:

- The red and black wired position switch is the closed position switch, *red = closed*.
- The Green and White wired position switch is the closed position switch, *green = open*.
- The wire pairs are N/C until the switch is activated.

16.9 Checking the On-board Loop Detectors for Proper Operation

Upon controller power-up or entering test mode, the controller will check for any on-board loop detectors installed in the on-board slots. Use the *Check Settings* button to determine the 1400 controllers detection of the installed on-board loop detector(s) (See section 9 for details). Furthermore, test mode can be used for testing the functionality of the on-board loop detectors (See section 17 for details).

17. Using Test Mode

Test mode provides two functions:

- Provide the means to manually raise and lower of the gate.
- Provide the means to test the functional ability of all the input points.

While in test mode, the gate arm will not move once raised.

To enter test mode, press the 'gate up/test mode' button (S2) button once.

The alphanumeric display will:

- Briefly display 'TM' while the gate arm is rising.
- Display 'RL' for a few seconds while checking for ion-board loop detectors.
- Once again display 'TM'.

While in test mode, any activation of the input points will cause the controller to display a 2-digit number. The alphanumeric display will show the last activation point until a new activation is made.

The one exception to this rule is the rotation of the option dial. Since each rotation on the switch can change up to four individual input points, a change of the option switch will change the message display to that as described in section 13.

As previously described, making a closed contact between the pair of contact points activates most inputs. The exceptions are:

- The close inputs, a normally opened set of contacts, are activated only on a close – open cycle.
- The open and close position switches, a normally closed set of contacts are activated on an open.

To exit test mode, press the 'gate up/test mode' button (S2) button once.

17.1 Test Mode Message Chart

Point Name	Location	Number displayed
'Mode Select' Button	S3	25
'Display Count' Button	S4	26
'Display Settings' Button	S5	27
Vend B input	JP7, pins 5 & 6	40
Vend A Open/SBO input	JP9, pins 17 & 18	41
Close Input	JP9, pins 19 & 20	42
Lot Full input	JP9, pins 21 & 22	43
Open On Steady Input 1	JP9, pins 23 & 24	44
Open On Steady Input 2	JP15, pins 37 & 38	
Re-Open 1 Input 1	JP9, pins 25 & 26	45
Re-Open 2 Input 2	JP15, pins 39 & 40	
Close Position switch (Red and black wires)	JP13, pins 3 & 4	46
Close Position switch (White and green wires)	JP13, pins 1 & 2	47
Close Loop Activation	JP8	50
Loop1 Activation	JP10	51
Loop2 Activation	JP11	52

18. General Maintenance and Mechanical Adjustments

Caution! Before making any mechanical adjustment to the gate, turn off power to the 1400 controller panel and unplug the main power plug JP5. Failure to do so can result in serious or fatal personal injury.

18.1 Nuts and screws

We recommend checking all nuts and screws for proper tightness after an initial 10,000 cycles and then every 3 months or 25,000 cycles, whichever occurs first.

18.2 Gearbox Oil

Warning! Do not use oil with additives, such as Mobil® SHC-460EP, such additives will corrode the brass gears inside the worm gear box.

Warning! Do not overfill worm gearbox.

Note: Worm gearbox case capacity is approximately 12 Oz.

Note: Failure to do so will result in pre-mature gear wear.

Note: Dial (800) 662-452 to locate your nearest Mobil® supply source.

Depending on operating conditions, select the following gearbox oil grades:

Normal operating conditions, constant daily operation <= 2 hours & sustained ambient temp. <= 125°
Use AGMA 7 or ISO 460 grade gearbox oil such as Mobil® SHC-634 or MobilgearSHC® 460.

Normal operating conditions, constant daily operation over hours or sustained ambient temp. > 125°
Use AGMA 8 or ISO 680 grade gearbox oil such as MobilgearSHC® 680.

For maximum gearbox lifespan, we recommend changing the gearbox oil after an initial 10,000 cycles, then every 50,000 cycles or 6 months, whichever occurs first.

We also recommend checking the oil level every 6 months or 50,000 cycles, whichever occurs first.

The level of oil can be observed by looking at the oil indicator window located on the front of the gearbox. The level of oil should match, or slightly be over the dot seen in the middle of the oil indicator window.

18.3 Open and close position switches

To adjust the open and close stops, loosen the appropriate thumbscrew and adjust the position of the cams.

We recommend applying a dab of lithium grease on the cam surface where the cams and the copper switch arm make contact. We recommend this after an initial 10,000 cycles and then every 3 months or 25,000 cycles, whichever occurs first.

18.4 V-Belt adjustment

To adjust tension, loosen the 4 mounting screws located on the base of the motor. Position the motor until the V-belts can be easily pushed in ½ " to 1" with finger pressure. Retighten the motor bolts and check tension.

The V-belts should be checked every 6 months or 50,000 cycles, whichever occurs first for proper tension. The V-belts should be replaced 500,000 cycles or 3 years, or earlier when a significant amount a fray is observed.

We recommend using Gates® brand; model 2280 V-belt. . Any industry standard #4L280 belt will suffice.

18.5 Bushings

Unlike some other companies that use undersized bushings, we expect our bushings to last the lifetime of the gate. Although not required, we do recommend applying a light coating to all bearing wear surfaces ever 12 months or 250,000 cycles, whichever occurs first.

Use a light oil such as 3-in-1® oil. Do not use spray-can types of oil; this is not the same type of oil impregnated into the bushing,

18.6 Maintenance Chart

	After the initial 10K cycles	Every 25K cycles or 3 months	Every 50K cycles or 6 months
Check functionality/adjustments of any safety equipment (Unless otherwise stated)	X	X	
Check nuts and screws are not loose.	X	X	
Check gearbox oil level	X		X
Check position of the open and close position switches	X	X	
Check V-Belt tension	X		X
Change gearbox oil (@ 12 Fluid Oz.)	X		X
Lubricate open and close position switch cams	X		X
Lubricate bushings	Annually or every 250K cycles		
Change V-Belts	Every 3 years or 500K cycles		

19. Glossary

Arming / Arming Loop: This is a strong safety factor when using card readers and ticket dispensers with a gate. In arming, an input from a loop detector detecting a vehicle over the approach loop (also called the arming loop) is connected to the device used to gain access. This input to the card reader or ticket dispenser activates the device(s) and makes it ready for use. This setup is to simply assure it is a vehicle, and not a pedestrian, bike, or motorcycle attempting to go through a parking gate.

Free Entry / Free Exit: A vehicle only has to be detected for the gate to open to enter or exit respectively a parking lot. This type of exit is most often associated with all except daily parking.

Private side: The parking lot or 'secured' side of a parking gate.

Public side: The public road side of a parking gate.

Toll exit: This type of exit involves the means to check for a validated parking and/or collection of parking fees. This type of exit can mean a manned booth, or an automated fee collection machine.

Vend A: The first of two inputs that open a gate; this input is most often used with daily parking access involving a driver taking a time ticket on entry and a toll exit.

Vend B: The second of two inputs that open a gate; this input is most often used with employee or leased parking access.

20. Basic Ticket Dispenser Operation and Connections.

The followings section describes the critical connection points to our ticket dispenser model SP and SPC. All inputs to the ticket dispenser are activated by a contact to pin #17-12VDC, whether the input is hard-wired or a connection is made by a set of N/O relay contacts.

Note: In any configuration of the ticket dispenser, the Pushbutton Operation **and** Vehicle Present input must be active, **along with** the interlock input being cycled before a ticket will be issued.

20.1 Interlock Signal This input (#14) must be made from the 1400 controller, this input insures the gate arm has cycled before issuing another ticket.

20.2 Pushbutton Operation This input (#15) can be activated by either directly tying to pin #17 to always be active, or can be wired to an optional Push-button used to issue a ticket.

20.3 Car Present Signal This input (#16) can be activated by either directly tying to pin #17 to always be active or can be wired to the Loop1 arming relay output on the 1400 controller (SW1 on the Loop1 detector should be turned on)

20.4 Wiring connection diagram

Ticket Dispenser Controller connection number		1400 Gate Controller connection number(s)
14 Interlock Signal	◀Connects to▶	8 Relay A Common
16 Car Present Signal		32 Loop1 arming relay
17 +12VDC		7 Relay A N/C and 31 Loop1 arming relay

21. Warranty Statement

DORADO Parking Systems, Inc. warrants to the original purchaser that its products are free from defects in material and workmanship under normal use and service for the following:

- > Parking Gate and Control Board -2 year from date of purchase

Unless otherwise agreed to in writing by DORADO Parking Systems, the buyer shall be responsible to assure the proper installation environment is provided, and DORADO Parking Systems assumes no responsibility for malfunctions or damage due to improper installation or misuse of products.

DORADO's obligation under this warranty shall be limited to the repair or replacement of any returned product provided that the claim must be presented within two years from the date of invoice. This warranty is in lieu of all other warranties, expressed or implied, including the warranties of merchantability, or fitness for any particular use. In no event shall DORADO Parking Systems be liable for any breach of warranty in an amount exceeding the net selling price of any defective products.

Product Returns

Equipment that fails during normal use within the warranty period (see above) will be repaired or replaced at the discretion of DORADO Parking Systems. Equipment that fails after the warranty period has expired or from external sources (such as acts of nature, misuse or abuse) will be repaired at DORADO's current labor rate after a repair estimate has been provided.

All returns for repair or replacement will adhere to the following guidelines:

- > All products returned for repair must reference a return material authorization (RMA) number, which can be obtained from DORADO Parking Systems.
- > In order to obtain a RMA number for repair or replacement, a new P.O. must be provided to DORADO.
- > The products returned must match our records in terms of quantity and description in order to insure timely processing.
- > Repaired products have a (90) ninety-day warranty commencing from date of invoice.

All returns for credit will adhere to the following guidelines:

- > Product must be UNUSED and in original packaging.
- > Product must be current, not discontinued.
- > The dealer's account must be current.
- > Supporting documents must be produced. (i.e. original customer purchase order, original DORADO invoice, original DORADO sales order) At minimum the original document number will be required.

All returns for credit will be subject to the following restocking fees:

- > 0-30 days, 10% of original purchase price
- > 31-60 days, 20% of original purchase price
- > No returns for credit over 60 days