Industrial Door

C6150 Microprocessor Control

For door operators with Version 4 software

Field Quick-Start Instructions
and
Common Questions and Answers

H604
5/96

Horton
AUTOMATICS

SERIES 6000 SLIDE DOOR OPERATOR
with C6150 Control and Version 4 Software

SECTION 1: QUICK-START INSTRUCTIONS

To get this operator up and running, do the following:

1. After completing the mechanical installation, proceed as follows:

   a. Wire the motor/encoder assembly to the control. The terminal strip on the back of the motor includes connections for both the motor and encoder. Follow the wiring diagram provided (Drawing #11190). The motor is wired to CN4 on the C6475 board inside the control; the encoder to CN7 on the C6465 board.

   b. Wire the close monitor reed switch to the control. The terminal strip for the reed switch is located on the motor bracket. Connect the wires to terminals #10 and #11 of CN2 on the C6465 board. Push the door fully closed, then attach the monitor switch magnet and bracket to the operator belt so that switch and magnet face each other when the door is fully closed.

2. Check the incoming power for proper voltage **(120VAC only!!)** and connections. Pin **1** of connector CN1 on the C6475 board is to be wired to the HOT side of the AC line (normally black-US or brown-international). Pin **2** of CN1 is for the NEUTRAL side of the AC line (normally white-US or blue-international). Pin **3** of CN1 is frame ground (green-US or green/yellow-international).

3. If you do not plan to use a 3-button station or an emergency stop switch, a jumper must be present between pins 15 and 16 of CN2, the main input connector. This wiring is normally done for you at the factory.

4. Set reversing sensitivity adjustment R9 fully counter-clockwise. Do not wire any motion detectors, safety beams, or other accessory devices at this time.

5. **Caution**, door will move! Move the door manually to a position in mid-stroke. Set slide switch S5 in the control to the **ON** position, and while holding down the **SET** button in the control, apply AC power.

   a. The display should wink the version number in two parts (as in 4. then 03). The control will then check for the presence of a monitored lock. If no lock is present, or the lock does not have a monitor switch, **nL** (**n**o **L**ock) will display briefly. *If a Horton C9910 in-line lock is installed, it will be taken care of in step 11 later. The **nL** indication is no cause for concern.*

   b. Next, the display should indicate **FC** (for first run - **F**inding **C**lose stop), and the door should fully close at slow speed. *If the door moves in the open direction instead, immediately turn off power and reverse the motor leads, either at the motor, or at pins 1 & 2 of connector CN4 on the C6475 board, then repeat step 5.*

   c. When the door has fully closed, the yellow CLM (close monitor) indicator should come on, the display should switch to **FO** (for first run - **F**inding **O**pen stop), and the door should drive fully open at slow speed.

(Step 5 continued)

d. After a brief delay, the display should show **tS** (total Stroke), followed by the stroke found in inches. *If instead of **tS** the display shows **EP**, this indicates that the encoder is "phased" improperly for the installation. Remove control power, reverse the **green** and **white** encoder leads (either at the encoder, or at the control), and repeat step 5.*

e. After **tS** is indicated, followed by the measured stroke, **dS** should display, indicating that the stroke and other factory default parameters are now stored in permanent memory. Finally, the display should switch to **d1**, and after a one second time delay, the door will start closing normally. *If the display switches to **OS** after **dS** and the door refuses to move from the open position, look at the green TOG SW indicator on the left side of the control. If it's off, insure that switch SW5 is in the **ON** position.*

6. Depressing the **DOWN** button on the C6150 control will now actuate the door to open, time delay, and close at the factory selected default settings. Inspect for smooth operation, free of any binds, excessive noise, etc. Upon subsequent power-up or reset, the control will not need to open the door again to re-learn the stroke; it will simply close the door at reduced speed while indicating **FC** (for first run - **F**inding **C**lose stop). The door is then ready to operate.

7. If any speeds or other settings need to be changed, follow this procedure:

   a. Move switch S5 to the **OFF** position. The display will show **OS** (for **O**pen **S**peed), the first parameter that can be adjusted.

   b. Refer to the chart on page H604.3 and scroll through the parameter list using the **UP** and **DOWN** buttons until you find the parameter you wish to change. When you've found it, press and hold the **SET** button. The display will now change to show the current value or setting of the parameter. While holding the **SET** button down, press or hold **UP** or **DOWN** to modify the setting. When the **SET** button is released, the display once again shows the parameter you just changed. You may then change another parameter, or turn switch S5 back on to check the change(s) you just made. The chart also shows the factory default settings for each parameter.

8. If you changed any adjustments, after you are satisfied with all control settings, insure that switch S5 is **ON**. Press and hold the **SET** button on the control until **dS** (data Saved) displays. All of your settings are now stored in the control's memory. You must perform this step if you changed any settings, otherwise the control will go back to the factory default settings after a reset or power failure!

9. Set the reversing sensitivity as desired using adjustment R9. Do NOT leave this adjustment at minimum!!

10. Install all accessory devices and wire them to CN2. If an external on/off toggle switch is added, reset switch S5 in the control to the **EXT** position. Check all devices for proper operation.

11. *If you have a Horton C9910 in-line brake for door locking*, wire the brake to terminals #4 and #5 of connector CN4 on the C6475 power supply board (polarity does not matter). Follow steps **7** and **8** above to set parameters **LL** and **HL** to <u>on</u> for the control to recognize the lock. Check for proper door locking and make mechanical brake adjustments if required.

This concludes the electrical installation and set-up.

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The following chart shows all of the adjustable parameters. Refer to steps **7** and **8** on page H604.2 to make any necessary changes.

CODE	PARAMETER	FACTORY PRESET VALUE	ADJUSTS
OS	Open Speed	10	0-15
CS	Close Speed	12	0-15
OC	Open Check	6	0-15
CC	Close Check	6	0-15
OU	Open cUshion	4	0-15
CU	Close cUshion	4	0-15
d1	delay time 1 (full)	1 sec	1-199
d2	delay time 2 (partial)	1 sec	1-199
d3	delay time 3 (safety)	3 sec	1-199
CP	open Check Point	75% of stroke	50-90% **tS**
PO	Partial Open position	8"	8"- **tS**"
tS	total Stroke	(as determined by learn cycle)	20-199"
ct	cycle test	oF (no)	oF/on
AS	AutoSeal	oF (no)	oF/on
St	Stop OK on first run	on (yes)	oF/on
Hd	Heavy-duty door/motor	oF (no)	oF/on
PF	Power Fail	OP (power fail OPen)	OP/CL
Sn	Safety nosings	oF (no)	oF/on
Cb	Close braking	on (yes)	oF/on
br	brake on recycles	on (yes)	oF/on
SL	SLow open speeds	oF (use regular open speeds)	oF/on
tC	turboCharge open speeds	oF (use regular open speeds)	oF/on
rA	reduced Acceleration	oF (use standard acceleration)	oF/on
3t	3-button station	oF (standard switches, not 3-button)	oF/on
LL	Lock present	oF (on if monitored lock found)	oF/on
SA	Fail-SAfe lock	oF (fail-secure/on if fail-safe lock found)	oF/on
UL	Unmonitored Lock	oF (monitored lock)	oF/on
HL	Horton in-line Lock	oF (standard lock, not in-line type)	oF/on
LO	Lock Open	oF (lock in closed position only)	oF/on
rP	reverse on encoder Pulses	on (Version 4.02 & up only)	oF/on
JS	Jam Sensing	on (Version 4.03 & up only)	oF/on

Note: a double dash (--) is a reserved parameter that is not implemented.

SECTION 2: OTHER DISPLAY CODES
(Version 4 software)

The following initialization, error, and diagnostic codes may also be displayed at various times:

⁼⁼	Control is braking door.
dS	Setup data stored.
Id	Door is closed and idle (waiting for actuate signal).
LA	Door is latched in full open position.
PC	Partial open check (when partial opening is activated).
nL	No automatic lock found.
IL	Interlocking active - contact on CN2, pin 20 inhibiting door open.
nL	No lock found (or lock does not have monitor switch).
SE	Fail secure automatic lock (with monitor switch) found.
SA	Fail safe automatic lock (with monitor switch) found.
FC	First run - finding fully closed position.
FO	First run - finding fully open position.
J1	Jam sensed - door not moving at beginning of open or close cycle.
Pd	Pedestrian (actuating or safety device) stopping "learn" cycle.
nS	No close monitor microswitch found when expected.
UF	Unlock failure of (monitored) automatic lock.
LF	Lock failure of (monitored) automatic lock.
EF	Encoder failure.
LP	Loss of pulses from encoder.
EP	Encoder phasing wrong.
Et	Encoder test starting.
CL	Close direction pulse received during encoder test.
OP	Open direction pulse received during encoder test.
SF	Stroke determination failure (measured stroke outside limits).
dF	Data storage failure.
bF	Battery failure (when optional battery pack is installed).
dd	Dimple type door option in use (jumper W4 installed).
dE	Dimple error - door unable to climb out of dimple.

SECTION 3: COMMON QUESTIONS & ANSWERS
(Version 4 software)

***** QUESTIONS ABOUT CONTROL SET-UP *****

Q1-1 How do I reset the stroke stored in the control?

A1-1 Instruct the control to do a full 'learn' cycle by pressing and holding the **SET** button down while momentarily pressing **RESET**, or hold the **SET** button down while powering up the control. The control will restore all the factory default settings, learn the new stroke, and store all the information.

Q1-2 Can the control re-learn the stroke without changing any of my other settings?

A1-2 Yes. In Version 4.01 & later, holding both the **SET** and **UP** buttons while momentarily pressing **RESET** or powering up will retain all of your present settings except for the stroke.

Q1-3 How do I verify the stroke that a particular control is set to?

A1-3 Locate the **tS** parameter in the parameter list, and press **SET** to view it. The stroke will be displayed in inches. The total stroke can also be modified via the **UP** and **DOWN** buttons, but it's not recommended - we suggest letting the control determine the stroke automatically with a full learn cycle instead.

Q1-4 What are the default settings in the parameter list when I force the control to do a full learn cycle?

A1-4 Refer to the chart on page **H604.3**, which shows all the defaults.

Q1-5 I changed some settings, but everytime I reset the control or there's a power loss, the control goes back to its original settings! What's going on?

A1-5 You must remember to <u>save</u> the settings you decided on before you leave the jobsite! To save your new settings into permanent memory, either the toggle circuit must be on, or switch S5 must be in the **ON** position (door must be in normal operation). Push <u>and hold</u> the **SET** button until the display shows **dS**. Your new settings are now stored. Data is only stored when the door arrives at the fully closed or open positions; also, note that normal door operation is disabled until the **SET** button is released.

Q1-6 I would like to move the point where the door goes into open check.

A1-6 Locate the **CP** (**C**heck **P**oint) parameter and modify it. This parameter is in inches of stroke and can be set from 50% to 90% of the total stroke learned on startup.

Q1-7 I changed the total stroke manually, and the control also moved my check point. Why?

A1-7 This is normal, and is done to properly re-locate the open check point. You should have set the total stroke first, or allowed the control to automatically learn it, <u>then</u> reset the open check point to your desired value.

Q1-8 I changed some parameters and really messed things up. How do I get back where I started?

A1-8 Assuming that you haven't saved the new "messed up" parameters, simply pressing **RESET** will restore all of the settings you had before you started tinkering. If you did a data save, your original parameters are lost, and you will have to do a complete learn cycle to get back to a parameter set that at least works in your door.

Q1-9 The door goes through its full learn cycle, then the control starts flashing **SF** until reset. Why?

A1-9 This code indicates a '**S**troke **F**ailure' - some encoder pulses were found, but not enough. Check the encoder and associated wiring carefully, and verify that the encoder wheel and other mechanical parts are not slipping. The minimum stroke this control will accept is 20" if Horton's standard 10:1 gear drive and 3.183" drive pulleys are in use.

Q1-10 When I power up the control, the door closes slowly on its first run, then the display starts flashing **nS**. What gives?

A1-10 This stands for '**n**o **S**witch' - the close monitor switch is not supplying a "door fully closed" indication to the control. Check your switch, its mechanical adjustments, and its wiring. Note that when a C6150 control is used, a close monitor switch must be provided. This is an added requirement compared to the earlier C6160/C6160W control.

Q1-11 My door seemed to set up properly, but then it refused to close and the display is showing **St**. What's wrong?

A1-11 This is the **St**op code - the pushbutton "stop" input (SW-D, pin 16 of CN2) is active. This is a normally closed input - pin 16 must be jumpered to common (pin 15) for the door to work if a stop button isn't installed.

Q1-12 There's a red LED marked +100 next to the display that comes on when some parameters are accessed.

A1-12 This LED shows that you must add 100 inches (or seconds) to the display value. Think of it as a third '1' digit in front of the other two.

Q1-13 I installed a very heavy door (over 400 pounds), and/or am using a 1/2hp heavy-duty motor, and the braking seems very abrupt. Why?

A1-13 The standard braking on the C6150 control is optimized for light to medium weight doors with 1/4hp standard motors, and will suffice for the vast majority of applications. When installing a very heavy door or using a 1/2hp motor, you should set the **Hd** (**H**eavy **d**uty) bit to the on position. This will change the braking to a more gentle curve and minimize wear and tear on the door and operator. Note that with the different braking, you may have to move the check point back and/or slow the door down a little to achieve smooth operation.

Q1-14 I can't get the toggle switch that I added to work. It doesn't do anything.

A1-14 Locate slide switch S5 on the control board underneath the **UP**, **DOWN**, and **SET** buttons. It is a three-position slide switch which must be set to **EXT** (**EXT**ernal switch) for an outside toggle switch to work. The other two settings of the slide switch override the external switch and force the door **OFF** or **ON**.

Q1-15 I installed a switch for partial opening operation and set the **PO** parameter for 36", but I'm getting 72" of partial opening on my bi-part operator. Why?

A1-15 All measurements in the C6150 control are based on inches of stroke, not inches of door opening. The 36" setting will yield a 36" door opening on single-slide operators - but for bi-part doors, you would set **PO** to 18".

Q1-16 I installed a stop button and wired it to pin 16 as shown on the drawing. When I push it and **St** displays, how do I get the door to run again?

A1-16 To recover from a stop signal, you may actuate the door with any of the standard inputs - partial open with delay, full open with delay, or latch - and the door will continue opening as if nothing had happened. You may also momentarily depress the **DOWN** button (service aid) to continue opening. Finally, actuating the "close" input (SW-C, pin 14 of CN2) or turning the toggle switch circuit off and back on again will continue the close cycle.

Q1-17 I want to add an emergency stop switch. How can I do this?

A1-17 It depends on the switch type. All stop switches should have normally closed (NC) contacts. If you have a momentary switch, wire it between pins 15 and 16 of CN2. This is input SW-D as described above. If you have a "mushroom" palm switch or other switch that has maintained contacts, Horton recommends wiring it into the toggle circuit at pins 8 and 9 of CN2. In this case, the slide switch in the control box must be set to **EXT**. The door will stop when the switch contact is broken, and will remain disabled until the contact is restored.

Q1-18 My customer wants a three-button (open/close/stop) garage door type control box. Is this possible?

A1-18 This feature is built in as well. Find the **3t** (**3**-button) station option and turn it on. Wire the pushbuttons as follows: open to pin 2 of CN2; close to pin 14; and stop to pin 16. The other side of all switches goes to common. **Note**: The 'stop' button must be normally closed - this is standard in three-button stations.

Q1-19 I installed a door with a three-button station, but all I get is a time delay following opening, then the door starts closing again.

A1-19 You forgot to turn on the **3t** option.

Q1-20 How do the actuate inputs work on the C6150?

A1-20 The actuator system is very versatile and will meet the requirements for the vast majority of field installations. Basically, three actuate lines are available: latch, momentary full open with time delay **d1**, and momentary partial open with time delay **d2**. A full open input takes priority over a partial open input, and a latch input takes top priority. If the door has been opened to the partial open position and a full open input comes along, the door moves immediately to the full open position, executes delay **d1**, and closes. If the door is in the partial open position and a latch input arrives, the door moves immediately to the full open position and latches open - code **LA** will display. There are also optional input lines for close and stop which are discussed more fully above.

Q1-21 I need two delay times, one for full open and one for partial. Is this possible without extra equipment?

A1-21 No problem. Time delay **d1** is used for full open, and **d2** for partial open. Either may be set independently from 1-199 seconds.

Q1-22 When does the delay start?

A1-22 When the door reaches the partial- or full-open position and all the actuators have dropped out.

Q1-23 How is a safety beam trip (or reverser signal) handled in the C6150?

A1-23 The safety beam (or reverser) moves the door back to the last position used, either partial or full open, then executes time delay **d3** and attempts to re-close the door.

Q1-24 I have a door or gate with a very long stroke, and would like a little more speed during opening. I already have the **OS** parameter maxed out at 15.

A1-24 Find the **tC** (**t**urbo**C**harge) option and turn it on. This selects an even higher speed bank for these installations. **Caution:** This operator is extremely powerful with **tC** on!!

Q1-25 I have a very small door, and even an open speed of '0' is too fast. Can I do anything about this?

A1-25 Yes, find the **SL** (**SL**ow speed) parameter and turn it on. This shifts the open speed range down to "low gear" for these installations. Note that you'll probably have to go back and increase the open speed setting after enabling **SL** - these speeds are quite slow. Also note that **SL** takes priority over **tC**.

Q1-26 I'm satisfied with the speeds I've selected, but the door seems to "take off" too abruptly (bumps anti-rise and/or jumps belt cogs).

A1-26 After insuring that belt tension is properly set, try locating the **rA** (**r**educed **A**cceleration) parameter and turning it on. This cuts the start-up acceleration in half and is better suited to some installations.

Q1-27 There seems to be a bit of hesitation when the door recycles open during closing. Why?

A1-27 To minimize wear and tear on both control and operator, we have chosen to default the **br** (**br**ake on **r**ecycles) option to on in Version 4 software. This means that when a recycle is requested, the control actually brakes the door before recycling open. This prolongs belt and door life and is the preferred setting; however, if traffic requirements make this intolerable, **br** can be turned off and the recycles will be virtually identical to those of our other products.

Q1-28 I have safety nosings on this installation, and every time the nosings compress together as the door closes, they generate a false obstruction signal.

A1-28 Find the **Sn** (**S**afety **n**osings) parameter and turn it on. This will disable the safety beam/nosing input when the control switches to close cushion and will prevent this.

Q1-29 This is a door with a dimple track. What parameters do I need to change?

A1-29 Dimple door handling has been significantly improved in the C6150 control. To enable the dimple track option, find a small black jumper block covering two right-hand pins vertically near W4. Remove this block and place it horizontally over the two pins marked **W4** instead.

When W4 is covered with the block, the control ignores loss of pulse situations while it clears the dimple in the open direction. A standard open speed of '3' is used for dimple climb-out. The door has a maximum of 6 seconds to climb out of the dimple; when it passes the 4.5" point, it accelerates to the open speed setting (if greater than '3') and continues a standard open cycle. On the first startup run, if W4 is installed, **dd** (dimple door) displays until the control pulls the door up out of the dimple on the first run; then **FO** displays as usual while the door finishes its "learn" cycle. On Version 4.03 & later, **dd** also appears during normal operation when the door is climbing out of the dimple.

If the C6150 control cannot pull the door out of the dimple, it flashes **dE** (dimple Error) for 5 seconds while it cools off; it then tries again.

***** QUESTIONS ABOUT THE BUILT-IN DIAGNOSTICS *****

Q2-1 How do I run the encoder test?

A2-1 To run the test, press and hold the **DOWN** button while momentarily pressing **RESET** or powering up the control. The display will show **Et** (Encoder test). You may now release the **DOWN** button. As you slowly push the door, the display will wink **OP** if the door is opening, or **CL** if it's closing. You should push the door in both directions at least a few inches to confirm normal encoder operation. To exit the encoder test, press **RESET**.

Q2-2 Is there a way to manually cycle the door without using a jumper wire?

A2-2 Yes. Any time that the toggle switch input is active and the door is ready to run, the **DOWN** button is configured to simulate a detector input. This allows manually testing door operation. You may also set the **ct** option to cycle test the door repetitively if desired. Furthermore, if the door was latched open by the pull chain input (**LA** is showing on the display), the **DOWN** button will switch from latched open to delay mode and allow normal closing after delay d1.

***** QUESTIONS ABOUT LOCKS AND DOOR LOCKING *****

Q3-1 I want to add a lock. What should I do?

A3-1 The "typical" lock for an industrial door is Horton's C9910 in-line brake lock; however, locks are supported in a variety of ways in the C6150. You may also use Horton's locks for standard S2001 operators, magnetic locks, bi-stable (two coil) locks, or even screw-bolt type locks. If a standard Horton in-line brake lock is to be used, follow step **11** on page **H604.3** to set the control properly.

Q3-2 What are the advantages and disadvantages of Horton's C9910 brake lock?

A3-2 The C9910 is a convenient way to add a fail-safe lock to the door operator. It is a 90V unit that is supplied by the same circuitry in the control that operates the motor, so no external transformer supply is needed for the lock. Also, the lock is mechanically "in series" between the motor and the gear drive, making installation easy. The two disadvantages of this locking scheme are (a) somewhat longer reaction time for the brake to unlock when an open cycle is requested compared to other locks, and (b) a very high frequency whine emitting from the brake itself (about 11 KHz) that is present at all times when the brake is engaged (this noise is normally not even heard, but it could be distracting in very quiet locations).

Q3-3 I'm using the C9910 brake lock, but my LOCK light never comes on. Is this normal?

A3-3 Yes. If the C9910 is in use, the regular LOCK output (and light) is not needed and is disabled.

Q3-4 If I add a magnetic or other non-Horton lock, how do I do it?

A3-4 The C6150 comes standard with a relay to drive non-Horton locks. These relay contacts are brought out to CN8 on the control board, and are clearly marked. Horton recommends using an external transformer to power your lock. Wire the lock and its power supply in series with the appropriate relay contact (typically, you will use the "normally closed" or NC contact for magnetic locks, and the "normally open" or NO contact for bolt locks). You must set the **LL** option to <u>on</u> so the control knows that a lock is present, and also set the **UL** (**U**nmonitored **L**ock) option to <u>on</u> since the lock doesn't have a monitor switch. The control will insert a fixed 3/4-second delay to allow the lock to clear before it attempts to open the door. During this delay, **UL** will display.

Q3-5 Is there a way to tell the control that it now has a lock without losing all of my preset speeds, check point, options, etc.?

A3-5 Yes, if you've already set other parameters and don't want to lose this information, look up the lock parameters **LL**, **SA**, **UL**, **bL**, and **HL**, and set them manually for the type of lock you're using. Normally, only parameters **LL** and **HL** will be <u>on</u> if a C9910 brake lock is added. (The control "knows" that this type of lock is always unmonitored, so parameter **UL** doesn't matter.) *Don't forget to do a data save after you change the parameters!!!*

Q3-6 I added a lock, and the door binds up against it.

A3-6 You forgot to tell the control that it now has a lock to deal with. See the answers above and re-configure the control.

Q3-7 My door binds against its lock, and I get a **UF** on the display.

A3-7 This means "**U**nlock **F**ailure." The control is most likely looking for a non-existent lock monitor switch. If the lock does <u>not</u> have a monitor switch, you must turn the **UL** parameter on so the control knows the lock is unmonitored.

Q3-8 My customer wants a bi-stable (two-coil) lock. Is this possible?

A3-8 Yes - although Horton does not recommend bi-stable locks, the control will support them. Consult Horton to order the proper kit for this type of lock before installation. Set both option parameters **LL** and **bL** to on. Note that bi-stable locks must have a monitor switch for proper operation. Also note that the control cannot determine the presence of a bi-stable lock on power-up; you must manually set this option. Finally, fail-safe and fail-secure have no meaning for a bi-stable lock, so the **SA** parameter does nothing.

Q3-9 My door has both a battery pack and a lock, and I have the **PF** parameter set for power fail close. Will the door lock after closing?

A3-9 It depends on the lock type. Magnetic locks and Horton's C9910 in-line brake lock obviously are fail-safe and will leave the door unlocked, since there's no power to operate the electromagnet. With a fail-secure or bi-stable lock, the door will always lock after closing.

Q3-10 I have an inexpensive lock, and it buzzes (or burns out!) if the door is latched open for extended periods. What can I do?

A3-10 Find the **LO** (**L**ock **O**pen) option and turn it on. This drops the lock when the door is latched open and prevents this problem. When the door is unlatched to close, it will first re-energize the lock, then start closing.

***** QUESTIONS ABOUT THE OPTIONAL BATTERY PACK *****

Q4-7 Which battery pack, self-monitored or standard, does Horton recommend?

A4-7 We strongly recommend that you stick with the standard version of battery pack unless there is a compelling reason not to. There are a variety of reasons as follows:

1. U.S. door operators typically use mechanical protection (e.g. breakouts) as the primary means for safety-to-life concerns - the battery pack operation is secondary.

2. ANSI standards for automatic doors in the U.S. do NOT require periodic testing of battery packs.

3. The battery manufacturers have stated that regular periodic testing is not only unnecessary, but it actually shortens the life expectancy of the batteries.

4. Eliminating the self-test circuitry reduces complexity (and hence, price). Finally, reliability is also enhanced, since there are fewer components.

Q4-1 I added a battery pack for power failure protection. Is there anything else I have to do besides plug it into CN3?

A4-1 You should set the **PF** parameter in the configuration to either **OP** if you want power fail open, or **CL** if you want power fail close.

Q4-2 Do the batteries continue to drain after the door completes its cycle on power failure?

A4-2 No.

Q4-3 My door is stuck open, and the display is flashing **bF**.

A4-3 You have a self-monitoring style battery pack, and the batteries may be defective; or, if the pack was just installed, the batteries may need to be charged. The orange 'FAIL' LED on the battery pack will also be lit when **bF** shows. Push the **FAIL RESET** button in the battery pack assembly to attempt to clear the condition. The **FAIL** indicator may or may not go out. If it goes out, do a manual battery test as explained below to determine whether the failure was due to a remotely possible 'glitch' or is really indicating a battery failure. If necessary, replace the batteries or the complete assembly.

Q4-4 Can the batteries be tested manually?

A4-4 Yes. If you have the unmonitored version of the pack circuitry, simply unplug power to the control, or turn off the breaker supplying power to the door. The display should switch to **PF** within 1 second, and the door should open or close, depending on whether the **PF** option bit is set to **OP** or **CL**. After the door arrives at the proper position, the entire control should go dead until power is restored. When power is restored, the red CHARGE indicator on the pack circuit board will glow for 4-6 minutes, then will dim and go out completely (this assumes that the batteries were fully charged when you performed the test).

If you have the self-monitoring version of the pack circuitry, press and hold the TEST button on the pack circuit board until the yellow TEST indicator comes on, then release it. The pack is now self-testing to insure that enough battery power is present to open or close the door for one cycle. If all is well, the TEST indicator will go out after about 15 seconds, and the red CHARGE indicator will come on. It will glow for 5-7 minutes, then will dim and go out completely (this assumes that the batteries were fully charged when you performed the test).

Q4-5 How often is the battery pack tested?

A4-5 In the self-monitoring pack, the batteries are tested immediately upon power-up and at least once every hour thereafter.

Q4-6 What happens if the pack test fails?

A4-6 A battery failure will move the door to the full open position. The door will stay open and the display will flash **bF** until the failure is corrected.

*** MISCELLANEOUS QUESTIONS ***

Q5-1 I arrived at the jobsite for troubleshooting, and the C6150 is flashing **nS**. The switch seems OK, and the yellow close monitor LED lights when the switch is tripped. What else could be wrong?

A5-1 Anytime that **nS** flashes, the door is not arriving at the fully closed position. Check for a mechanical jam at some point in door closing. Also, this will normally never happen if the reversing sensitivity is adjusted properly - the door will recycle instead when the obstruction is encountered. Find and correct the cause of the obstruction, then check the reversing sensitivity.

Q5-2 When the door starts opening, it slows down almost immediately, then slowly increases speed and eventually shuts off. The display flashes **EF** momentarily. Why?

A5-2 This display means 'Encoder Failure.' The position encoder is not connected, or is defective. Check your encoder wiring and run the quick encoder test.

Q5-3 When I try to store values, my control starts blinking **dF** and quits working until reset.

A5-3 The control has failed and must be replaced.

Q5-4 I keep blowing fuse F1. What could be wrong?

A5-4 The first thing to do in this situation is pull the motor/brake plug from connector CN4. Replace the fuse with a slow-blow 5A 5x20mm fuse (T5A). Power up the control again, and see if the new fuse holds with CN4 disconnected. If the fuse blows again, the control should be replaced. If the fuse holds, check the motor and motor harness assembly for a defective motor or a short between motor and frame ground. Also inspect the brake and its wiring, if one is present. If everything seems OK, check for mechanical binding or excessive friction in the operator and door itself (guides, track, wheels, etc.) **Caution**, disconnect power and wait 30 seconds before servicing the control fuses!

NOTE: If fuse F1 continues to blow at totally random intervals, there is a good possibility that the door is being locked manually without turning off the toggle circuit first. If Version 4.02 or earlier is installed, upgrading to a later version will normally circumvent this problem with the new jam sensing feature. See question 5-17 for more details.

Q5-5 The LIMIT light is coming on. Why?

A5-5 Any time that the LIMIT light comes on, it indicates that the control is protecting the drive system against excessive current. If door operation is reasonably normal, check for mechanical binds and other conditions that might cause excessive friction. It is also possible for the LIMIT light to come on briefly during normal operation of very large doors, especially with 1/2hp motors. If this is the case, brief flashes of the LIMIT light are no cause for concern.

If door operation is <u>not</u> normal and the LIMIT light is coming on, check the motor for a shorted armature or a frame short to ground. Also inspect for pinched or frayed motor wires. If the installation has a Horton brake lock, check its wiring and its coil as well, since it is also driven off the motor supply and could be drawing excessive current.

Q5-6 How do I know what software version I have?

A5-6 Reset the control. The version number will be displayed sequentially in two parts, as in 4. and then 03 (Version 4.03).

Q5-7 I installed a control with a non-Horton operator (Seino chain drive, for example). The displayed stroke is wrong, yet everything seems to operate properly. Is there a problem?

A5-7 All computations in the C6150 control are correct only when used with Horton's belt drive operator, where 1 pulse = 0.125". The control will work properly with other operators, but the inch measurements will not be correct in these cases.

Q5-8 Why is an open speed of '0' faster than a close speed of '5'?

A5-8 The control is working properly. In order to get maximum adjustment range and limit maximum closing speed, an open speed of '15' is approximately 140VDC, but a close speed of '15' is only around 80VDC.

Q5-9 I accidentally shorted the +24VDC control output to ground, and the whole control went dead. What do I check?

A5-9 Fuse F2 on the C6475 power supply assembly protects the low-voltage wiring. Replace it with a slow-blow 3.15A 5x20mm fuse (T3.15A) - Buss type GDC3.15, or equal. Also, if you have a battery pack, fuse F1 on the battery pack will be blown. Replace it with the same type fuse. **Caution**, disconnect power and wait 30 seconds before servicing the control fuses!!

Q5-10 How do I tell which connections on the C6150 control are common?

A5-10 Any terminal number with a period after it (4. 7. 9. 11. 15. 21.) is a common connection. These are all tied together internally.

Q5-11 How do I tell which connections are for power?

A5-11 The two +24V power terminals (1 & 5) have a small "DC power" symbol (⎓) next to them for your convenience.

Q5-12 Is the control common tied to ground inside the control?

A5-12 Not directly. To protect against noise, there is an AC path (10KΩ in parallel with 0.1μF, for those who are technically minded) from control common to frame ground, but if you install a beam set or motec that has its case grounded, or accidentally short from common to the door frame, everything will still work normally.

Q5-13 Is there a battery that saves the door parameters? Do I need the optional battery pack to save the parameters?

A5-13 To both questions, no. Control parameters are saved in a special chip called an E^2PROM, which does not require a battery. When you save your parameters in the E^2PROM, they will be retained for the lifetime of the control.

Q5-14 What are the input characteristics?

A5-14 All inputs are well protected against EMI and random triggering, and are +5VDC levels. For an input to operate, the resistance must typically drop below 780Ω. A large amount of hysteresis protects against jittering - for the same input to release once it's triggered, the resistance must rise above 1800Ω or so. Typical current requirement per input is 8mA, and the inputs will not respond for about 2.5mS following activation. These requirements are well suited to the vast majority of applications with dry contact signals (e.g. mechanical switches, motecs, card readers, safety beams).

Q5-15 I need interlocked operation of two or more doors with C6150 controls. Is this supported?

A5-15 Yes. First, jumper pins 20 and 22 of CN2 on each control to be interlocked. Next, run a two-wire bus cable between each control - this connection and common. (All of the control pin 20s and pin 22s will be connected together, and all of the control commons as well). When a door is actuated, all the orange SW-H "busy" indicators in every control will light. If an actuate signal for any other door is presented, its display will indicate IL (InterLocking busy) and it will not open until the door that is currently open finishes closing. At this time, the SW-H "busy" indicators will go out, and any door may be opened. Note that this is "Level II" interlocking, where additional door requests are <u>not</u> memorized, but are simply ignored when a door is already open. If Level III true memory interlocking is desired, it is also available as an extra-cost option - consult the Horton factory for details.

Q5-16 What do the W1-W4 pins (J1) do on the control?

A5-16 Only W4 is currently used. Normally, there will be one spare jumper block installed over two ground pins (right hand pins) on W1-W4. This is the same as having no jumper blocks installed and is the default configuration for standard doors. If this block is removed and is placed over the W4 pins, dimple door operation is enabled (see discussion on dimple doors above). Positions W1-W3 are currently used only for factory testing and have no function.

Q5-17 The door begins opening, then immediately stops and flashes **J1**, followed by **d1**. It then cushions back closed after the sensors drop out. Why?

A5-17 Beginning in Version 4.03, the **J1** (**J**am **1**) error appears any time that the door is starting to open or close and encounters a loss of mechanical motion for more than 0.1 second. This feature provides protection against blowing fuse F2 when the door has been locked manually (thumb turn, etc.) without turning off the toggle switch circuit. Other possible causes of the **J1** code appearing include a defective or unplugged position encoder, a slipping encoder wheel, open motor, or no power to the motor circuit.

It is possible for this feature to cause problems if the open or close speeds are turned down enough to be extremely slow, although extensive testing at the plant has not revealed any difficulties. If a situation does come up where you are getting false **J1** indications, the **JS** (**J**am **S**ensing) parameter may be turned oF to defeat this feature. **JS** defaults to on in Version 4.03 software.

The **J1** error is normally self-resetting; however, note that if any motion detectors or safety beams are held actuated after the error occurs, the door may have to be pushed open following manual unlocking, to let the first customer (or owner) in. When the detection devices time out, everything will be back to normal.

NOTE 1: If the C6150 control is retrofitted to an earlier operator that uses a 3ppr "paddle wheel" encoder, the **JS** parameter will probably need to be turned oF. These encoders do not generate pulses quickly enough to prevent timing out the software and generating a false **J1** indication. If the customer persists in trying to run the door with it locked, your only recourse is to replace the motor/gear drive with an updated assembly having the 8ppr encoder. You may then leave the **JS** parameter on to protect against the situation.

NOTE 2: If dimple door operation is selected with jumper W4 (see question 1-29), jam sensing is automatically ignored regardless of the status of the **JS** parameter, due to the dimple in the track.