

R Y T E C

System 4[®]
Drive & Control
RY-WI[™] SYSTEM

RYTEC HIGH PERFORMANCE WIRELESS TECHNOLOGY

Installation & Owner's
Manual



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INTRODUCTION

NOTE: This manual is intended for the System 4 Drive & Control only. Installation and operation information specific to your door is detailed in the installation and owner's manuals that were shipped with the door.

The installation and operation of the System 4 Drive & Control® is not difficult, providing you follow the procedures outlined in this manual. Any unauthorized changes to these procedures, or failure to follow the steps as outlined, will automatically void our warranty. Any changes to the working parts, assemblies, or specifications as written, not authorized by Rytec Corporation, will also cancel our warranty. The responsibility for the successful operation and performance of this drive and control system lies with the owner of the door.

DO NOT INSTALL, OPERATE, OR PERFORM MAINTENANCE ON THIS DRIVE AND CONTROL SYSTEM UNTIL YOU READ AND UNDERSTAND THE INSTRUCTIONS IN THIS MANUAL.

If you have any questions, contact your Rytec representative or call the Rytec Technical Support Department at 800-628-1909. Always refer to the serial number of the door that your control system is connected to when calling the representative or Technical Support. Refer to the installation manual or the owner's manual provided with your door for the location of the serial number plate.

The wiring connections and schematics in this manual are for general information purposes only. A wiring schematic is provided with each individual door, specifically covering the control panel and electrical components of that door. That schematic was shipped inside the cardboard box containing the control panel.

DOOR SERIAL NUMBER(S)

Your **DOOR SERIAL NUMBER** information can be found in three universal locations. These are at the inside of either side column (approximately eye level), on the drive motor, and on the inside door of the System 4 control panel. (See Figure 1.)

IMPORTANT: When installing multiple doors of the same model but in different sizes, verify the serial number in the control panel with the one on the door assembly.

NOTE: Figure 2 shows a sample decal. Different model doors have serial numbers that start with different numerals.

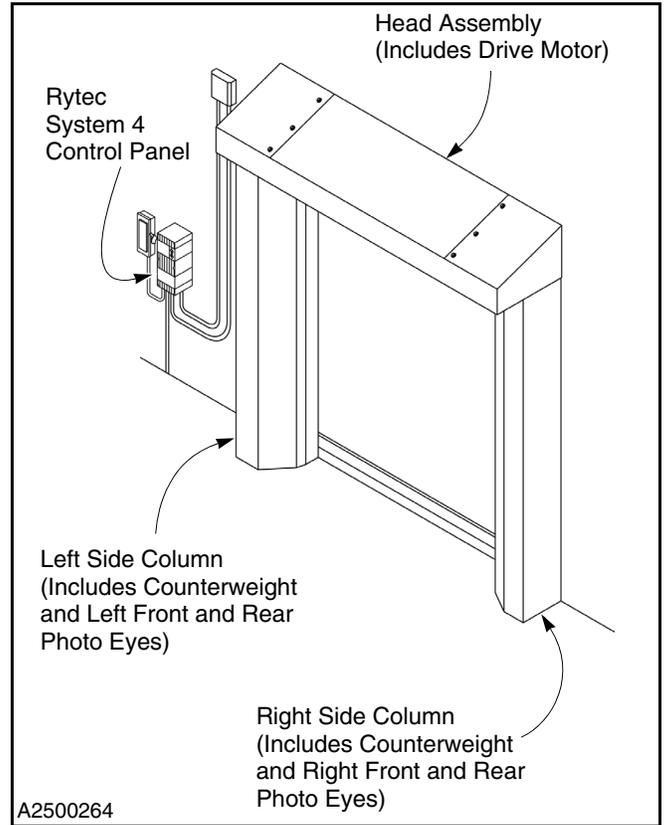


Figure 1



Figure 2

HOW TO USE MANUAL

Throughout this manual, the following key words are used to alert the reader of potentially hazardous situations, or situations where additional information to successfully perform the procedure is presented:

WARNING

WARNING is used to indicate the potential for personal injury, if the procedure is not performed as described.

CAUTION

CAUTION is used to indicate the potential for damage to the product or property damage, if the procedure is not followed as described.

IMPORTANT: *IMPORTANT* is used to relay information **CRITICAL** to the successful completion of the procedure.

NOTE: *NOTE* is used to provide additional information to aid in the performance of the procedure or operation of the door, but not necessarily safety related.

REQUIRED TOOLS AND EQUIPMENT

1. Wall anchor hardware (¼-in. diameter).
2. Carpenter's level.
3. Hammer drill and masonry drill bit sized for wall anchors (to install anchor hardware in concrete).
4. Assorted hand tools.

ADDITIONAL REQUIREMENTS

Labor and Site Requirements

1. An electrician is required for all electrical connections. (See "Electrician's Responsibilities" below.)

IMPORTANT: *All electrical work must be performed in accordance with local and state building codes.*

2. 100% accessibility to the door opening during the installation process. Traffic should not pass through the opening during the installation procedure.

Electrician's Responsibilities

1. Furnish and install fused disconnect(s).
2. Install Rytec control panel.
3. Install all necessary conduit.

NOTE: *High- and low-voltage cables must be routed in separate conduit. High voltage must use metallic conduit.*

4. Run electrical power lines to fused disconnect.
5. Run power lines from disconnect to control panel.
6. Run power and control lines from control panel to door head assembly (and defrost system, if used).
7. Install conduit from control panel to floor for floor loop activators and wire activators, if used.
8. All cables must be cut to length. No excess of high- or low-voltage cables should be present in the control panel.

SHIPPING CRATE

The control panel was shipped from the factory in a cardboard box along with the contents of your Rytec door.

NOTE: *A door-specific electrical schematic is located inside the control panel.*

SYSTEM OVERVIEW

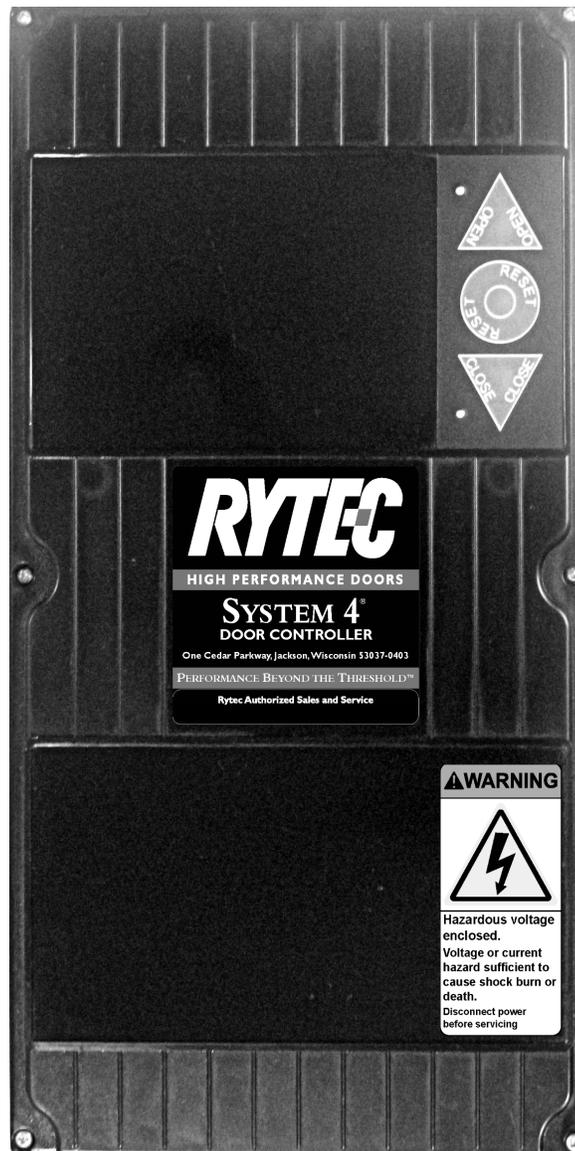
CONTROL PANEL

The Rytec System 4 Drive & Control is a solid-state, microprocessor-based control system designed exclusively to operate your Rytec high-performance door. (See **IMPORTANT** below.) It combines an AC drive with the latest in door control technology.

The AC drive system controls the drive motor through soft accelerations and soft decelerations. The operating parameters are accessed through the up (▲), down (▼), and reset (●) keys located on the keypad on the front of the control panel. A scrolling display shows all corresponding control and door status messages.

NOTE: *The RESET key also serves as the ENTER key and the STOP key.*

IMPORTANT: *The System 4 control panel allows for configurable supply voltage. Voltages can range from 200–500 volts AC. The System 4 can also be configured to receive both single- and three-phase voltages. The supply voltage MUST match the voltage and phase as listed on the electrical schematic provided with the control panel. Failure to provide the required voltage and phase may damage the controller. If voltage and phase do not match supply, contact the Rytec Technical Support Department at 800-628-1909.*



A5400011

Figure 3

IMPORTANT: All conduit entering the control panel must enter from the bottom of the panel — high voltage from the bottom left and low voltage from the bottom right. Installing conduit through the top or sides of the control panel will void the warranty.

INSTALLATION—CONTROL PANEL INSTALLATION

INSTALLATION

CONTROL PANEL INSTALLATION

IMPORTANT: The control panel must be installed in an area having a temperature range of -4°F to 149°F . If the temperatures approach these limits, contact the Rytec Technical Support Department at 800-628-1909.

The fused disconnect and the control panel must be installed within sight of the door.

NOTE: The control panel and fused disconnect are generally located adjacent to the drive end of the head assembly.

Install the System 4 control panel and the fused disconnect as shown in Figure 4. The System 4 control panel has three mounting locations on the black plastic enclosure. One is at the top of the enclosure in the center, and two are at the bottom of the enclosure. (See Figure 5.) Use these mounting locations along with user-supplied hardware to securely mount the panel at the chosen location.

IMPORTANT: The mounting surface must be structurally sound and free of mechanical shock or vibration. All conduit entering the control panel must enter from the bottom of the panel — high voltage from the bottom left and low voltage from the bottom right. Installing conduit through the top or sides of the control panel will void the warranty.

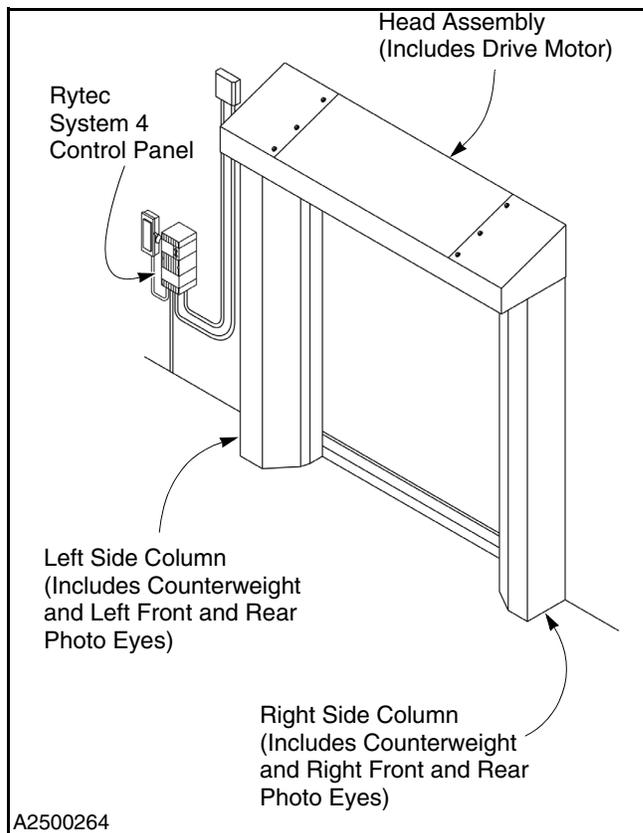


Figure 4



Figure 5

The System 4 panel door is hinged at the top for easy access to the terminal blocks. To open the door, loosen the six screws along the door face as shown in Figure 6 and lift the door slightly out to release screws. Then lift the door up as shown in Figure 7. The door can be removed from the controller by disconnecting the door electrical harness and depressing the tabs at the top of the controller to release the hinges from the controller body as shown in Figure 8.



Figure 6

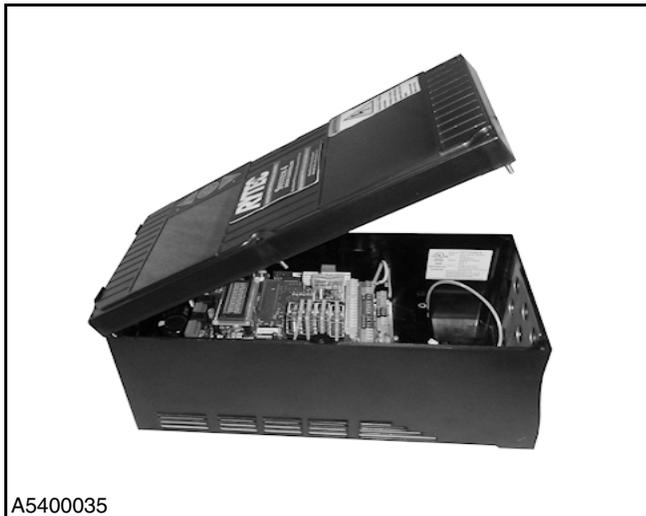


Figure 7

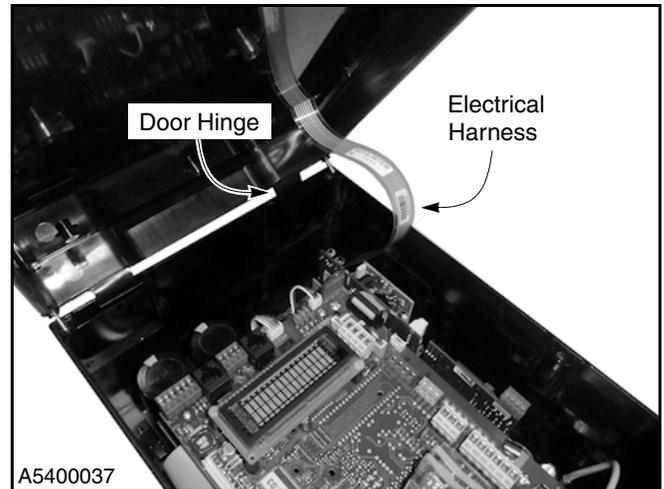


Figure 8

! WARNING

Grounding of the power supply is essential to the safety of personnel as well as the operation of the System 4 Drive & Control. A floating, ungrounded or open delta type power supply can permit dangerously high voltage between the chassis of the drive and the internal power structure components. (See Figure 9.) In many cases, this voltage could exceed the rating of the input MOV protection devices of the drive, causing catastrophic failure of the System 4 Drive & Control. In all cases, the input power to this controller must be referenced to ground. (See Figure 10.) If the service transformer cannot be grounded, an isolation transformer must be installed with the secondary of the transformer grounded. Please consult the factory for additional information regarding isolation transformers or service suitability.

INSTALLATION—CONTROL PANEL INSTALLATION

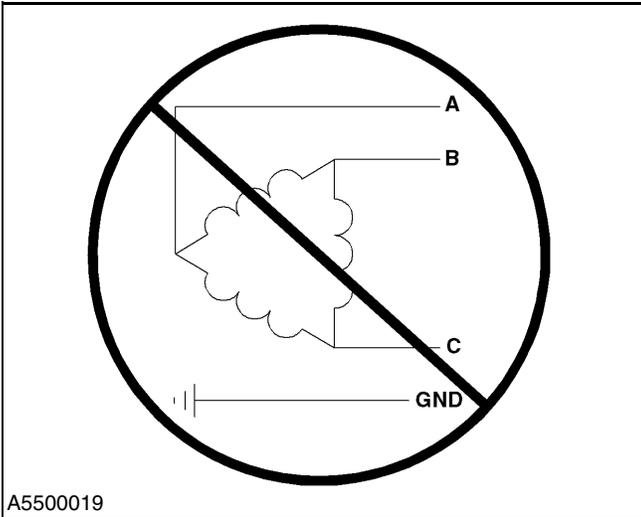


Figure 9

NOTE: Cables must be cut to length. There cannot be any excess cable present in the control panel or any excessive cable bundles present on the outside of the control panel.

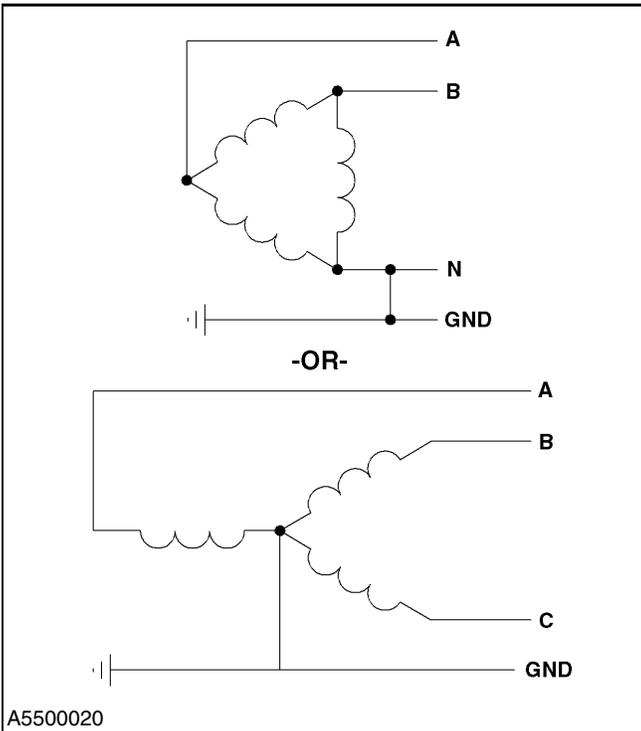


Figure 10

NOTE: All wiring from the fused disconnect to the control panel, from the control panel to the optional junction box and the door, and from the conduit between the control panel and the floor (if a floor loop is used) must be supplied by the door owner. The wiring and conduit must meet all local and state building codes. Wires leading from the door are labeled with the terminal numbers that are associated with the control panel. The high and low voltage lines must run in separate conduit — otherwise, the warranty will be void.

Use shielded wire as indicated on the schematic. If a wire cable is to be extended or spliced, a like cable must be used throughout the entire length of that cable. Likewise, if a shielded cable is to be extended or spliced, a like cable must be used throughout the entire length of that cable as well — otherwise, the warranty will be void.

IMPORTANT: All conduit entering the control panel must enter from the bottom of the panel — high voltage from the bottom left and low voltage from the bottom right. Installing conduit through the top or sides of the control panel will void the warranty.

The System 4 panel conduit connection locations are NOT knock-outs. Do NOT use impact to remove the conduit connection bosses, or damage to the panel housing can occur. A drill and suitable drill bit should be used to remove the plastic for conduit connection. (See Figure 11.)



Figure 11

IMPORTANT: If your door is to be mounted on a freezer, mount the control panel and the fused disconnect on the warm side of the wall. It may also be necessary for you to install more than one fused disconnect. To ensure the equipment is de-energized during maintenance or service, turn off all disconnects.

Protect the components inside the control panel from metal chips when installing conduit. Seal inside the conduit and panel if the conduit entering the panel is coming from an area having a different temperature (warmer or colder) than the area where the panel is located.

The schematics shown throughout this manual are for information purposes only. Due to varying requirements of each customer, a schematic has been prepared for your particular door and it must be used for this installation. That schematic was shipped inside the control panel.

⚠ WARNING

The disconnect must be in the OFF position and properly locked and tagged before wiring of the control panel begins.

IMPORTANT: All conduit entering the control panel must enter from the bottom of the panel — high voltage from the bottom left and low voltage from the bottom right. Installing conduit through the top or sides of the control panel will void the warranty.

⚠ WARNING

High voltage is present inside this control panel. Do not touch the circuit board, electrical components, or wiring inside this panel with power applied.

You must wait at least five minutes after power is turned off before you can begin work on the control panel or motor connections. The drive control inside the panel contains high-voltage capacitors, which take time to discharge once power is turned off.

A small cardboard box has been shipped with the control panel. This box contains five ferrite core filters. These ferrite core filters are to be installed on the incoming L1, L2, and L3 supply voltage wires and also on the T1, T2, and T3 motor connections. The ferrite core filters act as a filter for the incoming supply power and voltage passing to the motor. These filters help to reduce electrical noise in the power system. See Figure 12 for proper installation of the ferrite core filters.

NOTE: Failure to install the ferrite core filters as illustrated will void the manufacturer's warranty.

⚠ CAUTION

Failure to install the ferrite core filters will void the manufacturer's warranty and potentially cause irreparable damage to the System 4 control panel.

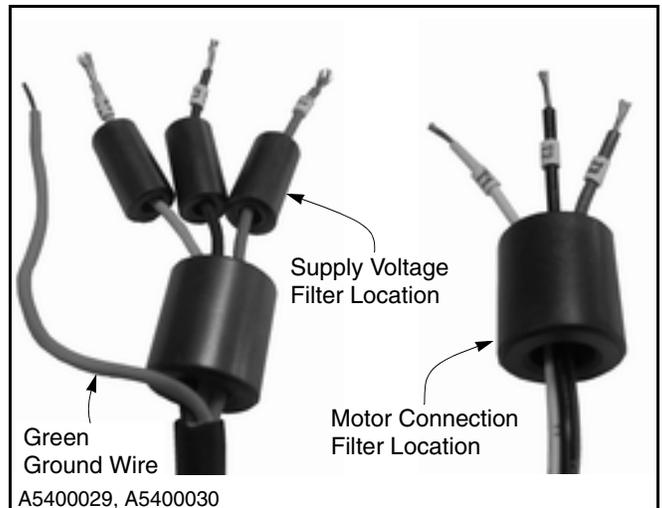


Figure 12

NOTE: It is not necessary to run the supply voltage ground wire (green wire) through the ferrite core filter.

CONTROLLER

Located inside the control panel is an electronic controller. This controller includes a scrolling display, terminal blocks and screws, and other miscellaneous electrical components. (See Figure 13.)

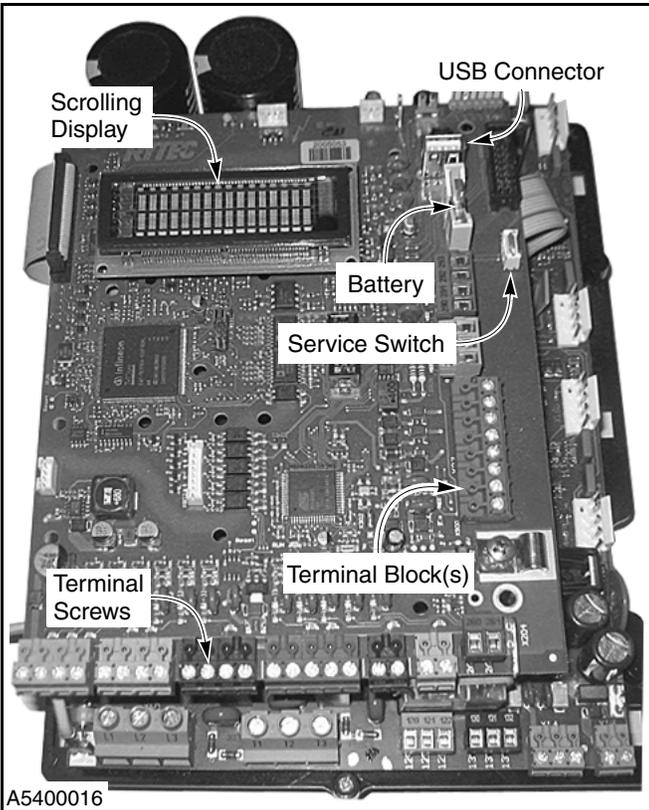


Figure 13

Scrolling Display

All door commands and door status messages appear on the scrolling display. Also displayed are the cycle counter, timer settings, alarm conditions, program settings, and other miscellaneous messages.

The display is located near the top of the controller and can be viewed through the window on the front of the control panel. (See Figure 13.)

USB Connector

The USB drive logs the function of the door and allows for programming the door using a Rytec encrypted software program. Removing the USB drive will affect the operation of the door. DO NOT remove the USB drive unless informed by the Rytec Technical Support Department to do so.

Status LEDs

Located on the controller are various light-emitting diodes (LEDs). These diodes are helpful when troubleshooting the door and control system. The LEDs indicate the operating status of the control system, the door, activators, safety devices, and any other input device connected to the control system. (See Figure 14.)

For detailed information on troubleshooting the control system using the status LEDs, see “TROUBLESHOOTING WITH STATUS LEDs” on page 56.

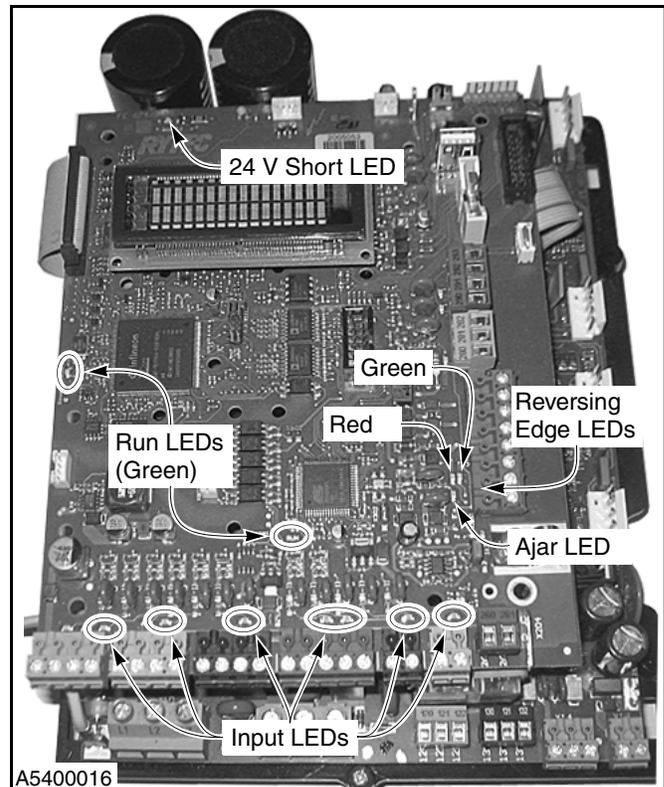


Figure 14

Plug-In Modules

For a door set up to be operated by a radio control or a floor loop, a corresponding plug-in module for each type of activator is required. The connectors for these modules are located along the right edge of the lower printed circuit board. (See Figure 15.)

SYSTEM INPUTS

⚠ WARNING

The disconnect must be in the OFF position and properly locked and tagged before performing the following procedure.

⚠ CAUTION

Input terminals 200 through 293 support +24 VDC only. All remaining input terminals are dedicated for specific devices. Connecting any other voltage or device other than those intended may result in damage to the control system.

NOTE: If the expansion board is installed in the controller, there are additional input terminals 300 through 363.

All high-voltage connections (L1, L2, and L3 supply voltage wires and T1, T2, and T3 motor connections) are made on the lower left terminal blocks. These connections need to be in metallic conduit entering from the bottom left corner of the control panel. All low-voltage connections (+24 VDC) should enter the bottom right corner of the control panel and terminate on both the top and bottom circuit boards. (See Figure 17.)

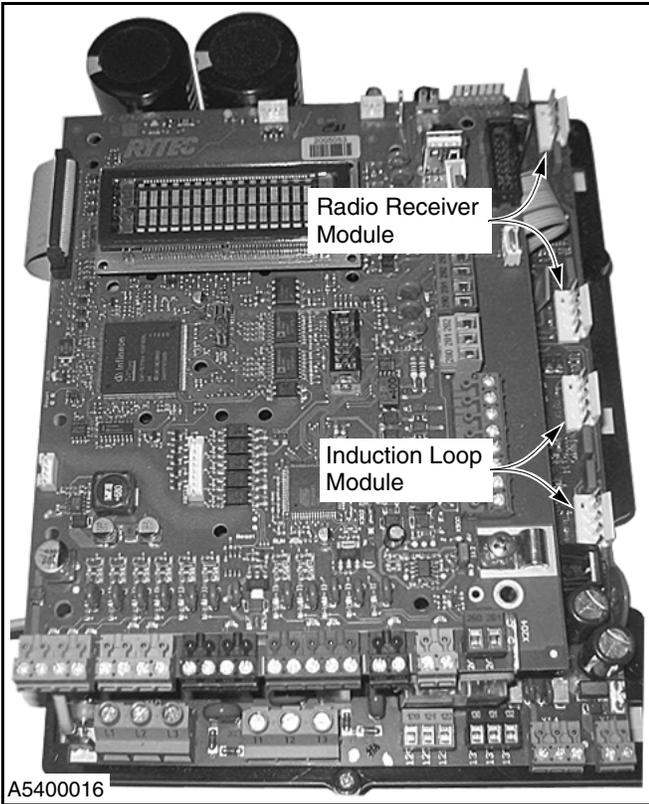


Figure 15

NOTE: The induction loop module for the System 4 (part #00122000) is different from the module for the System 3. The System 4 module is physically smaller. Therefore, the System 3 loop module will not fit in the System 4 control. (See Figure 16.)

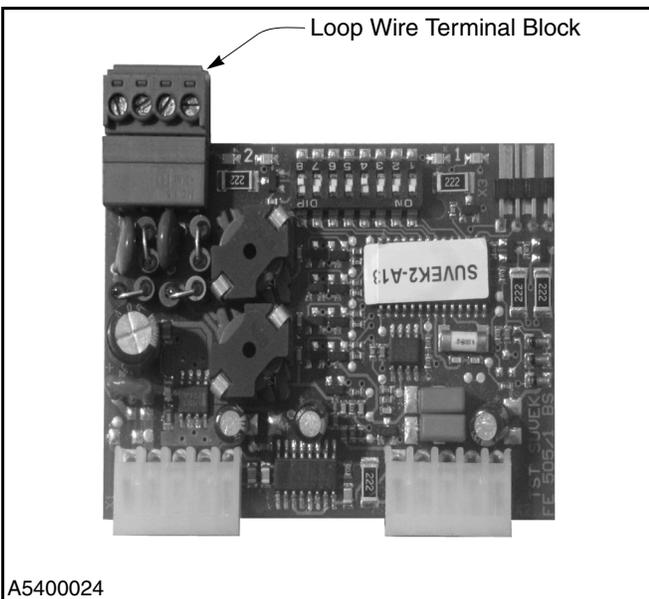


Figure 16

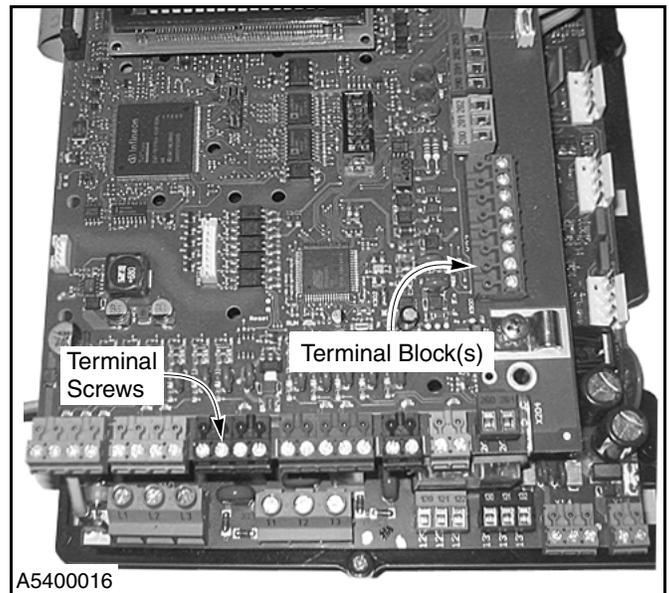


Figure 17

INSTALLATION—SYSTEM INPUTS

Power Supply Lines

Connect the power supply lines from the fused disconnect to the control panel as shown on the schematic that was shipped with the door.

IMPORTANT: High voltage power supply lines need to be installed and routed through metallic conduit.

Motor

Connect the motor wires to the control panel as shown on the schematic that was shipped with the door.

IMPORTANT: Install and route all motor wires through a metallic conduit.

NOTE: Motor cable cannot exceed 100 ft. Cut all excess cable to desired length. Reference the electrical schematic that came inside the control panel for proper grounding.

Motor Brake

Connect the motor brake to the control panel as shown on the schematic that was shipped with the door.

NOTE: The motor brake connection is a class 2 circuit (+24VDC) and must NOT be installed in conduit with any voltages exceeding +24VDC. Brake wires can be installed with other +24VDC devices, i.e., photo eyes, motion detector.

Encoder

Connect the encoder to the control panel as shown on the schematic that was shipped with the door.

NOTE: The encoder connection is a class 2 circuit (+24VDC) and must NOT be installed in conduit with any voltages exceeding +24VDC. Encoder cable can be installed with other +24VDC devices, i.e., photo eyes, motion detector.

External Emergency Stop Switches (N.C. Contacts)

Factory-installed jumper wires are provided in the E-Stop connections. Refer to the door-specific electrical schematic for information regarding E-Stop connection. E-Stop 1 terminals are located at block X24, terminals 240 and 241. E-Stop 2 terminals are at block X25, terminals 250 and 251. E-Stop 3 terminals are at block X26, terminals 260 and 261.

Breakaway Bottom Bar (Input 1 — N.C. Contact)

The breakaway bottom bar signal is incorporated with the Ry-Wi wireless reversing edge signal. The breakaway electrical connections are connected to terminals 5 and 6 on the Ry-Wi mobile unit in the bottom bar. That signal is then transmitted from the mobile unit to the antenna located on the head assembly of the door. The antenna then sends the breakaway signal down the red wire (encoder cable) to terminal 271 in the controller. See the schematic that was shipped with the door.

If the bottom bar becomes disconnected from either side column, a loss of this input will immediately stop the door and “Door Ajar” will appear on the display. (See Figure 18.)

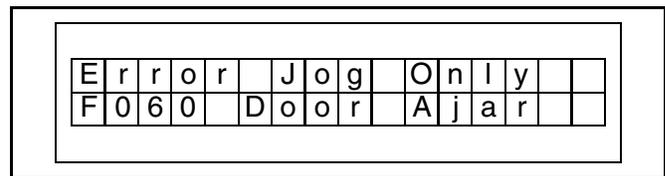


Figure 18

NOTE: If you find it necessary to reposition the bottom bar in order to reattach it, the door can be jogged up or down by pressing and holding the up (▲) or down (▼) key.

Push and hold the Stop, Reset and Enter buttons until the system resets.

Once the bar is reattached and the control system reset, the up (▲), down (▼), and reset (●) keys will automatically return to their normal operation.

Automatic Photo Eye Circuit Testing

The System 4 controller initiates an automatic test of the photo eye circuits each time the door opens. This test ensures both the front and rear photo eyes are functioning properly before the door begins to close. This test is performed on the front emitter terminal 221 and terminal 231 for the rear emitter. Due to the test that is performed on the photo eye circuit during each open cycle, it's important that no other wire connections are installed in either terminal 221 or 231.

NOTE: Additional wires in these two terminals will not allow the test to be performed and the door will remain open.

Photo Eye — Front (Input 2 — N.C. Contact)

Connect the front set of photo eyes to the control panel (terminal 222 located on block X22) as shown on the schematic that was shipped with the door.

An interruption of this input (object between photo eyes) while the door is closing will reverse the door and move it to the open position. Only after the object is removed from between the photo eyes will the door be allowed to close.

If the door was initially opened by a non-automatic activator, the door must be closed with a non-automatic activator. If the door was initially opened by an automatic activator, the door will automatically close after the auto-close delay timer (ACL1 or ACL2) times out. (See Figure 19.)

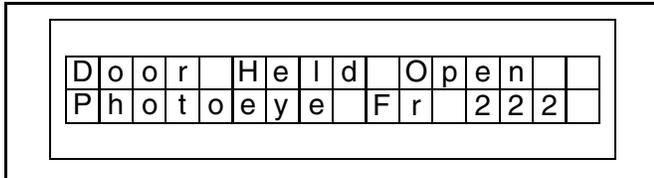


Figure 19

Photo Eye — Rear (Input 3 — N.C. Contact)

Connect the rear set of photo eyes to the control panel (terminal 232 located on block X23) as shown on the schematic that was shipped with the door.

An interruption of this input (object between photo eyes) while the door is closing will reverse the door and move it to the open position. Only after the object is removed from between the photo eyes will the door be allowed to close.

If the door was initially opened by a non-automatic activator, the door must be closed with a non-automatic activator. If the door was initially opened by an automatic activator, the door will automatically close after the auto-close delay timer (ACL1 or ACL2) times out. (See Figure 20.)

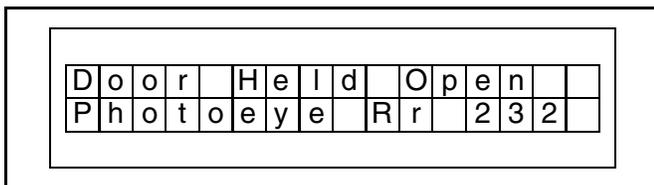


Figure 20

Alternate-Action Activator (Input 4 — N.O. Contact)

Connect the alternate-action activator to the control panel (terminals 210 and 211) as shown on the schematic that was shipped with the door.

If this input is enabled (momentary contact) with the door closed, closing, or stopped between the door limits, the door will open. When this input is enabled with the door open, the door will close. Typical activators tied to this input include pull cords, push buttons, and radio controls.

Auto-Close Activator 1 (Input 5 — N.O. Contact)

Connect auto-close activator 1 to the control panel (terminals 210 and 212) as shown on the schematic that was shipped with the door.

If this input is enabled with the door closed, closing, or stopped between the door limits, the door will open. The door will remain open as long as the input is enabled. Once the input is disabled, the auto-close delay timer (ACL1) will start. When the timer times out, the door will automatically close.

An activated timer will automatically reset when the auto input is enabled. To disable a timer, set its time delay parameter to zero (0) seconds. Parameter P:010 = 0 to turn timer off.

Typical activators tied to this input include floor loops and motion detectors. (This input is exclusive of the inputs described in “Plug-In Modules” on page 8.)

Auto-Close Activator 2 (Input 6 — N.O. Contact)

Connect auto-close activator 2 to the control panel (terminals 230 and 233) as shown on the schematic that was shipped with the door.

If this input is enabled with the door closed, closing, or stopped between the door limits, the door will open. The door will remain open as long as the input is enabled. Once the input is disabled, the auto-close delay timer (ACL2) will start. When the timer times out, the door will automatically close.

An activated timer will automatically reset when the auto input is enabled. To disable a timer, set its time delay parameter to zero (0) seconds. Parameter P:015 = 0 to turn timer off.

Typical activators tied to this input include floor loops and motion detectors. (This input is exclusive of the inputs described in “Plug-In Modules” on page 8.)

Open (Input 8 — N.O. Contact)

Connect the open input to the control panel (terminals 200 and 201) as shown on the schematic that was shipped with the door.

If this input is enabled (momentary contact) with the door closed, closing, or stopped between the door limits, the door will open. This input is ignored while the door is opening.

Close (Input 9 — N.O. Contact)

Connect the close input to the control panel (terminals 200 and 202) as shown on the schematic that was shipped with the door. If this input is enabled (momentary contact), the door will close if the door is open or stopped. This input is disabled when the door is closing and ignored if the door is closed or opening.

INSTALLATION—SYSTEM INPUTS

Stop (Input 10 — N.C. Contact)

Input 10 is equipped with a factory-installed jumper. Refer to door-specific electrical schematics for information regarding this connection.

Programmable (Inputs 11 and 12 — N.O. or N.C. Contact)

Programmable inputs (if used) are connected to the control panel (terminals 290 and 291 or terminals 290 and 292) as shown on the schematic that was shipped with the door. These inputs can be assigned various functions such as a third set of photo eyes or an air lock activator.

DC Power Supply — Photo Eyes

Connect the 24 VDC power supply for the photo eyes to the control panel as shown on the schematic that was shipped with the door.

NOTE: Reference the electrical schematic that was provided inside the System 4 control panel. The instructions in this manual pertain to most doors; however, your door may have different requirements.

The DC power +24 and –24 VDC (GND) can be found at various locations throughout the System 4 control board. For example, the front set of photo eyes is connected to terminal block X22. The +24 VDC is on terminal 220, the –24 VDC is on terminal 223, and the signal wire connects to terminal 222.

The rear set of photo eyes is connected to terminal block X23. The +24 VDC is on terminal 230, the –24 VDC is on terminal 234, and the signal wire connects to terminal 232.

The photo eye power supply is a dedicated power supply for the photo eyes. Each set of photo eyes should be connected to the specific power supply for that particular set of photo eyes. NO other electrical devices should be connected to the photo eye power supplies.

DC Power Supply — Auxiliary Device

Connect the 24 VDC power supply for an auxiliary device (such as a motion detector) to the control panel as shown on the schematic that was shipped with the door.

NOTE: Reference the electrical schematic that was provided inside the System 4 control panel. The instructions in this manual pertain to most doors; however, your door may have different requirements.

The DC power +24 and –24 VDC (GND) can be found at various locations throughout the System 4 control board. For example, terminals 200, 210, 220, 230, 270, 277, and 290 on the microcontroller board are all access points for +24 VDC connection(s).

The front set of photo eyes is connected to terminal block X22. The +24 VDC is on terminal 220, the –24 VDC is on terminal 223, and the signal wire connects to terminal 222.

The rear set of photo eyes is connected to terminal block X23. The +24 VDC is on terminal 230, the –24 VDC is on terminal 234, and the signal wire connects to terminal 232.

The photo eye power supply is a dedicated power supply for the photo eyes. Each set of photo eyes should be connected to the specific power supply for that particular set of photo eyes. NO other electrical devices should be connected to the photo eye power supplies.

Reversing Edge

Anytime the door is closing and the reversing edge (bottom edge) of the door makes contact with an object, the door will reverse direction and move to the open position. The door will remain in the open position until the control system is manually reset.

To ensure the reversing edge wiring has continuity, the control system monitors a resistor installed on the pressure switch located in the bottom bar. If the control system does not detect the correct resistance, the control system will not allow the door to close.

NOTE: The reversing edge signal is carried on the pink wire in the encoder cable. The pink wire is attached to terminal 272 on terminal block X27.

The reversing edge wires are connected to the Rytec Ry-Wi mobile unit installed in the bottom bar. If you remove the Ry-Wi cover, you will find the reversing edge connections on terminals 1 and 2 of the mobile unit. A resistance check performed on these two terminals should read 8,200 ohms or 8.2K ohms. If the resistance value is not found, one of the wires is broken or the resistor is bad.

NOTE: Reference your door-specific electrical schematic for reversing edge connections. These connections may be different for different models of doors.

IMPORTANT: After control system start-up, test the reversing edge according to the instructions provided in the owner's manual that came with the door. You must verify that the bottom bar reversing edge operates properly before placing the door into service.

Timers

The control system includes three programmable auto-close delay timers. Each timer is assigned to a specific input on the control panel and is set to delay closing the door when opened by its associated activator.

Two timers (ACL1 and ACL2) can be programmed to automatically close the door from the open position. The third timer (ACL3) can be programmed to close the door from the optional passage position. (The optional passage position is reserved for setting the open position of the door to a height other than the open position.)

See "SYSTEM PARAMETERS" on page 26 for additional information on setting the auto-close delay timers and the optional passage option.

SYSTEM START-UP

MODES OF OPERATION



Once electrical power is connected to the control system, the fused disconnect must be placed in the OFF position and properly locked and tagged before the door to the control panel can be opened.

Once the fused disconnect is placed in the OFF position, you must wait five minutes for all electricity to dissipate from the control panel — otherwise, severe electrical shock resulting in serious injury or even death may occur.



The control panel door must always be closed every time the control panel is powered up. There is a potential for serious personal injury in the case of component failure.

The System 4 Drive & Control is configured for three modes of operation: run, jog, and parameter mode.

Run Mode

Run mode includes the automatic and non-automatic modes of operation.

AUTOMATIC MODE

If a *momentary* contact activator such as a push button, pull cord, or radio control is used to activate the door:

- The door will open when the device is activated.
- A timer, internal to the control system, will start up when the door is open.
- When the internal timer times out, the door will automatically begin to close.

If a *maintained* contact activator device such as a floor loop or motion detector is used to activate the door:

- The door will open and remain open for as long as the device is active.
- Once the device becomes inactive, the internal timer will start up.
- When the internal timer times out, the door will automatically begin to close.

In the automatic mode, while the timer is running, anytime an activator such as a floor loop or motion detector is enabled, the timer will reset and the door will not be allowed to close. It is only when the timer times out that the door will begin to close. (To change the timer setting, see "SYSTEM PARAMETERS" on page 26.)

In summary, in the automatic mode, an activator is used to open the door and a timer is used to close the door.

NOTE: If an activator or photo eyes remain active this will hold the door open. Pushing and holding the down arrow will override these signals and allow you to close the door manually with the down arrow. If the signal is from an activator the door will re-open until the activator problem is resolved. The door will not re-open if the photo eye is the problem. Safety photo eyes do not open the door. However, they will hold open a door if photo eyes are out of alignment or damaged.

SYSTEM START-UP—SYSTEM CONTROLS

NON-AUTOMATIC MODE

If a *momentary* contact activator such as a push button, pull cord, or radio control is used to operate the door:

- The door will open when the device is activated.
- A similar type of device must be used to close the door.

In summary, in the non-automatic mode, an activator is used to open and close the door.

Jog Mode

Jog mode can be set by pushing and holding the Stop/Reset key and the down key at the same time until the display reads “Jog Mode”. The door can then only be operated from the control panel using the up, down, and stop keys.

To exit jog mode, repeat the process of pushing and holding the Stop/Reset and down keys at the same time until the display reads “Automatic”.

Parameter Mode

The control system includes various parameters that are used to operate your door. A number of parameters are set at the factory. Other parameters must be set in the field.

The “SYSTEM PARAMETERS” on page 26, are organized according to the Operator/Service Level authorized to access each parameter. Table 5 lists the parameters available at the Operator Level. Table 6 lists the parameters available at Service Level 2.

Display

The scrolling display shows all door status and system information messages. Figure 21 through Figure 23 detail information typically displayed during routine controller functions and system errors.

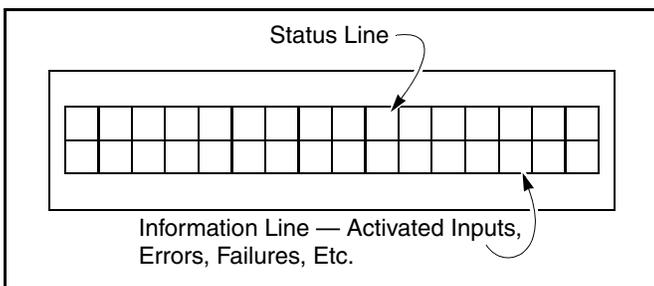


Figure 21

NOTE: If the photo eyes are activated during a door close cycle, the door will move to the open position and the display will indicate which set of eyes is activated. (See Figure 22.)

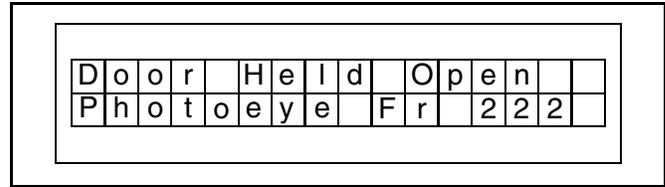


Figure 22

NOTE: If a system error is detected, the status of the door and the associated fault code will appear on the display. (See Figure 23.)

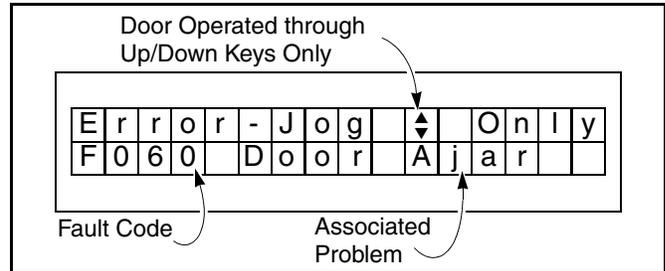


Figure 23

SYSTEM CONTROLS

All door commands and control system menus are accessed through the control panel keypad. The keypad includes three keys: up (▲), down (▼), and reset (●).

During normal operation with the door closing or closed, momentarily pressing the up (▲) key will automatically move the door to the open position. Pressing the down (▼) key will move the door to the closed position. Pressing the reset (●) key as the door is moving in either direction will immediately stop the door.

NOTE: The RESET key also serves as the ENTER key and the STOP key.

SERVICE LEVELS

In addition to operating the door, the up (▲), down (▼), and reset (●) keys are used to navigate through the control system parameters. See “Navigating Parameters” on page 17.

NOTE: The RESET key also serves as the ENTER key and the STOP key.

The “SYSTEM PARAMETERS” on page 26 are grouped into two service levels.

- Operator Level — password not required. Access limited to auto-close timers and select defrost control functions (if configured with defrost control).

- Service Level 2 — password required (password is the number 10). Access to Service Level 1 parameters as described above, activator parameters, and other miscellaneous parameters. All remaining parameters are available as read-only.

NOTE: The control counts in hexadecimal. When entering the number 10, you will see letters appear after the number 9. When you continue past the letter F, the number 10 will display.

The service switch in the control box is factory set to the ON position. This allows access to all password levels. Access to all parameters can be disabled by placing the service switch to the OFF position and locking the control panel door. Cycling power off and on places the controller in the run mode.

If the controller is in any service level and there is no keypad activity for 30 minutes, the controller will automatically reset and return to the run mode.

INITIAL START-UP



Initial system start-up is only to occur once the door and control panel have been properly installed, wired, and all preliminary door adjustments made. Failure to follow the instructions as outlined in the installation manual that was provided with your door can result in damage to the door upon initial system start-up.



When limits are established, the display will prompt you to push the down key and begin the auto-calibration process. I:500 messages will appear on the display. This is normal. The I:500 messages should disappear within 10 complete cycles. Keep hands and equipment away from the door until the auto-calibration is complete.

1. Release the brake located on the end of the motor and manually move the door to the half-open position.
2. Apply power to the control system. During the system initialization, the display will indicate that the door open and close limits must be set by displaying “! Set Limits !”. (See Figure 24.)

Then the message “Push ●” [press reset (●) key] will appear on the display.

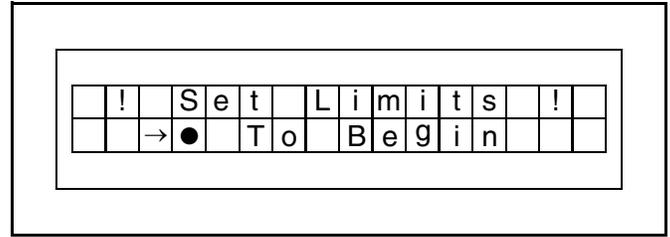


Figure 24



The door open and door close limits are to be set only after verifying that the motor (door) operates in the proper direction when the up (▲) and down (▼) keys are pressed.

3. After the reset (●) key has been pressed one time, verify the motor rotation by briefly pushing the up (▲) and down (▼) keys on the control panel.

The door should open with the up (▲) key and close with the down (▼) key. If the door does not operate in this manner, reverse two of the motor wires (not the incoming three-phase supply wires).

NOTE: Reversing the incoming supply voltage lines will not solve the problem if the motor is running in the wrong direction. The motor leads T1 and T2 must be swapped to change motor rotation. If the motor rotated incorrectly during the start-up process, the limits may need to be reset by entering P:210 and setting a value of 5.

The RESET key also serves as the ENTER key and the STOP key.

4. Now set the door open and close limits according to the instructions on the display.

If any error messages are displayed, some of the required input connections may be missing. Once the missing inputs are connected, perform the open and close limit set-up. Otherwise, refer to “FAULT CODES” on page 35.

NOTE: When establishing the open- and close-limit positions, refer to the installation manual that came with your door.

CAUTION

When limits are established, the display will prompt you to push the down key and begin the auto-calibration process. I:500 messages will appear on the display. This is normal. The I:500 messages should disappear within 10 complete cycles. Keep hands and equipment away from the door until the auto-calibration is complete.

- Once the limit-setting procedures have been completed, the door will automatically cycle until the auto-calibration is complete (typically 5–10 complete cycles). This is done to optimize performance and will allow the door to run smoothly and efficiently.

NOTE: The door will fine-tune the speed setting based on the programmed limits during the first several cycles. The informational messages I:510, I:515, I:520, and I:555 will and may appear during the first 10 cycles of the door operation. This is normal, as the controller is optimizing the operational curve of the AC drive and motor. The door may run erratically during this process. DO NOT change any speed or limit parameters during this time. If the message does not disappear from the display after 15 cycles, contact Ryttec Technical Support at 800-628-1909.

- Set ACL1 and ACL2 timers as required. (See “SYSTEM PARAMETERS” on page 26.)

Clock Setting Procedure

The System 4 control panel has been shipped with the internal clock set with the date and central time. If your time zone is different, the clock can be adjusted. To adjust the clock, see “Navigating Parameters” on page 17.

Table 1

Parameters
P:C00 = Shows the current date and time the System 4 clock is set to
P:C01 = Adjusts the hour of the clock
P:C02 = Adjusts the minutes of the clock
P:C03 = Adjusts the seconds of the clock
P:C04 = Adjusts the day and month of the clock

Parameters
P:C06 = Adjusts the year of the clock
P:C07 = Adjusts for daylight saving time

NOTE: See “CLOCK PARAMETERS” on page 34 for more information on the clock parameters.

ACCESSING PARAMETERS

NOTE: To access Operator Level and Service Level 2 parameters, the control board service switch must be in the ON position. (See Figure 25.)

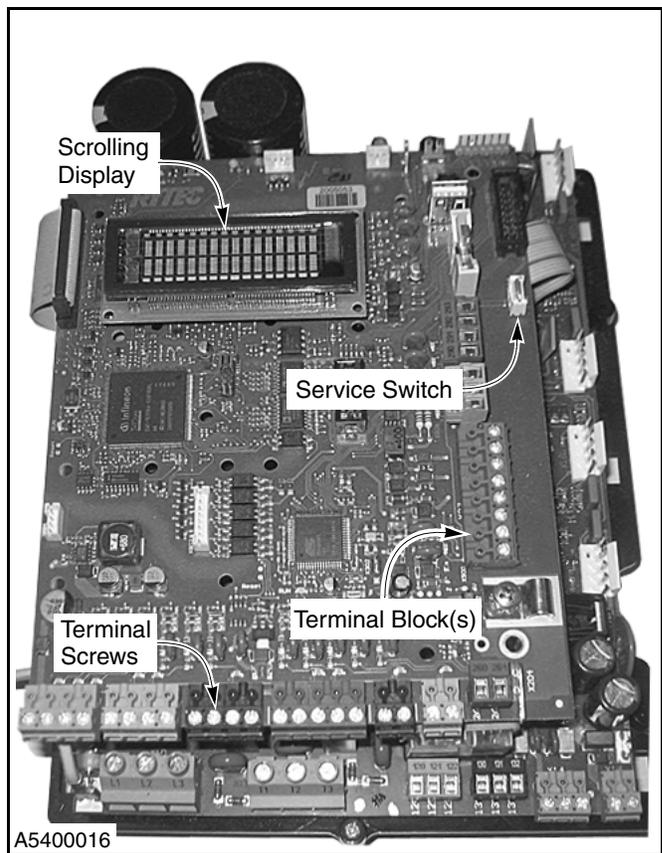


Figure 25

Parameter Messages

A scrolling display on the control panel (as shown in Figure 26) displays all parameter settings when the control system is placed in a service level (Operator Level or Service Level 2). Figure 26 details a typical parameter.

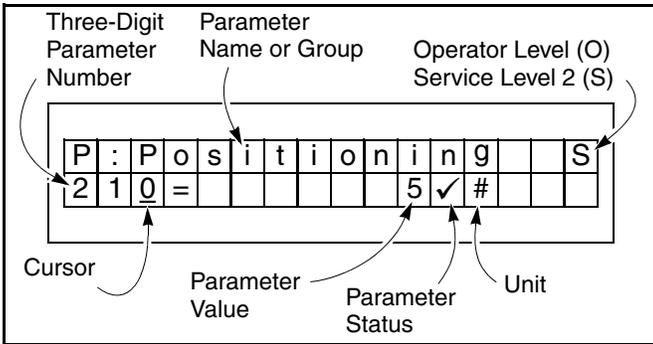


Figure 30

Accessing Service Level 2

1. Access the Operator Level. (See “Navigating Parameters” on page 17.)
2. To access Service Level 2, scroll to password parameter 999 (P.999). Then briefly press and release the reset (●) key. The cursor will jump from the three-digit parameter number over to the parameter value on the display. (See Figure 31.)

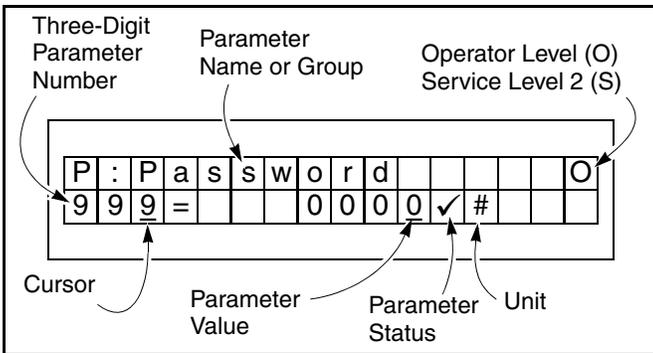


Figure 31

3. Enter the password by first pressing the up (▲) or down (▼) key until the numerical password required for the desired service level is displayed. (See Figure 32.)

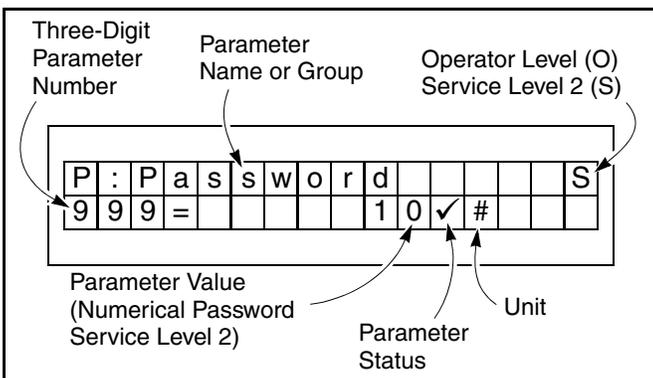


Figure 32

4. Press the enter (●) key to accept the password and enter that particular service level. A checkmark will appear to the right of the value entered. Release the enter (●) key, then press and release the enter (●) key once more. The cursor will jump back under the three-digit parameter number and a large “S” will appear on the display to indicate that Service Level 2 is accessed.

NOTE: The RESET key also serves as the ENTER key and the STOP key.

5. Press the up (▲) or down (▼) key to scroll through the list of available parameters for that particular service level. (Only the parameters associated with 25 the accessed service level, will be available.)
6. Access a displayed parameter by briefly pressing the enter (●) key. The parameter is accessed when the cursor jumps over to the currently saved value for that parameter.

Setting Door Limits (Open, Intermediate, and Close)

1. Access parameter P.210. (See “Navigating Parameters” on page 17.)
2. Press the up (▲) or down (▼) key until the desired door limit option is displayed. Pressing and holding the enter (●) key will save the displayed option.

NOTE: The RESET key also serves as the ENTER key and the STOP key.

3. Follow the instructions on the display to set the door limits.

Setting Automatic Delay Timers

1. Access the Operator Level. (See “Navigating Parameters” on page 17.)
2. Press the up (▲) or down (▼) key until the desired delay timer parameter is displayed (P.010 = ACL1, P.011 = ACL3, P.015 = ACL2).

Figure 33 shows that auto-close delay timer ACL1 is currently set with an eight (8) second delay.

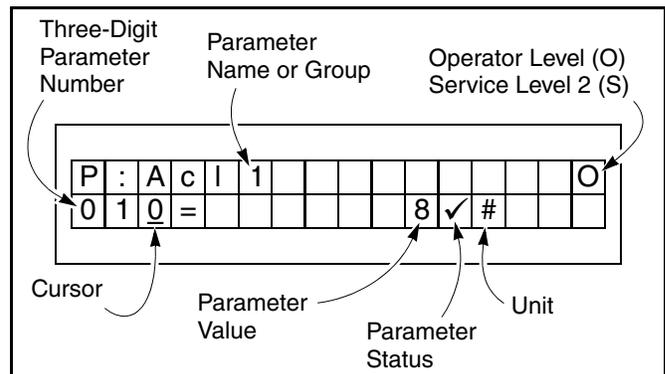


Figure 33

3. With the desired timer parameter displayed, press the enter (●) key to access that parameter. The cursor will jump over to the parameter value.

NOTE: The allowable time delay range for a timer is 0 to 9999 seconds.

The RESET key also serves as the ENTER key and the STOP key.

4. Press the up (▲) or down (▼) key to change the displayed value. Press and hold the enter (●) key to save the displayed value.

SYSTEM RESET (MANUAL RESET)

A system reset is necessary after the control system displays an error message and the problem resulting in that error message has been corrected. To reset the control system, press and hold the reset (●) key for approximately three to five seconds. If the display clears and the message reappears, the problem has not been corrected and will need further investigation.

NOTE: The RESET key also serves as the ENTER key and the STOP key.

Once the reset is complete, if the door was in the full-open or -closed position prior to the error message, the display will indicate the door type and cycle count. If the door was in a position other than the full-open or -closed position, the display will indicate the door is stopped.

After the system is reset, the door can be normally operated with the up (▲), down (▼), and reset (●) keys.

DEFROST SYSTEM

If your door is configured with an optional defrost system, the System 4 Drive & Control is designed to operate and monitor that system.

See “SYSTEM PARAMETERS” on page 26 for additional information on setting the defrost system controls.

WIRELESS REVERSING EDGE

The wireless system has two main assemblies: the mobile unit located in the bottom bar under the plastic cover and the stationary antenna located in the head assembly. (See Figure 34 and Figure 35.) All mobile units are installed at Rytec prior to shipping. The wireless antenna may or may not be installed by Rytec prior to shipping. Some Rytec models require the antenna to be installed in the field. Please reference the specific product installation manual for your model of Rytec door. The antenna has a tan-colored cable that runs to the encoder, which is mounted to the back of the motor, and a black cable from the encoder that carries the signals for the reversing edge and the breakaway back to the System 4 control board.

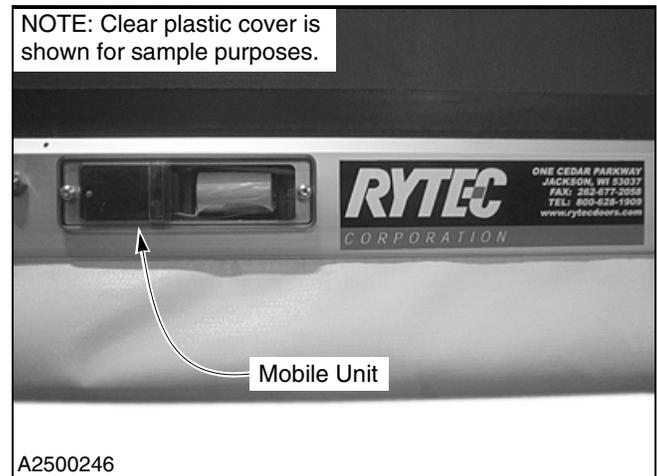


Figure 34

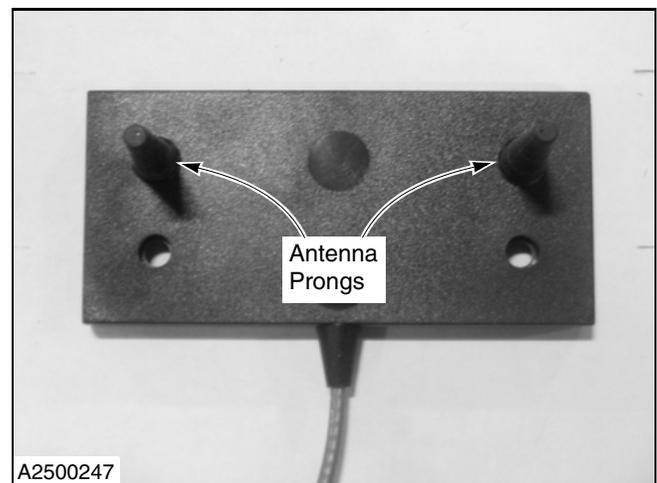


Figure 35

Attached to the electric motor is a small tan-colored cable. The tan cable is routed from inside the motor assembly, through the front head assembly, and to the mounting bracket of the front spreader. When the bracket is installed, the 2-inch prongs from the antenna will point toward the drum roll and the tan cable should exit the bottom of the antenna. (See Figure 36 and Figure 37.)

NOTE: No bends, kinks, or loops are allowed in the tan cable. The antenna is fragile and should be handled with extreme care.

Any leftover packaging material should be removed from the antenna prior to installation.

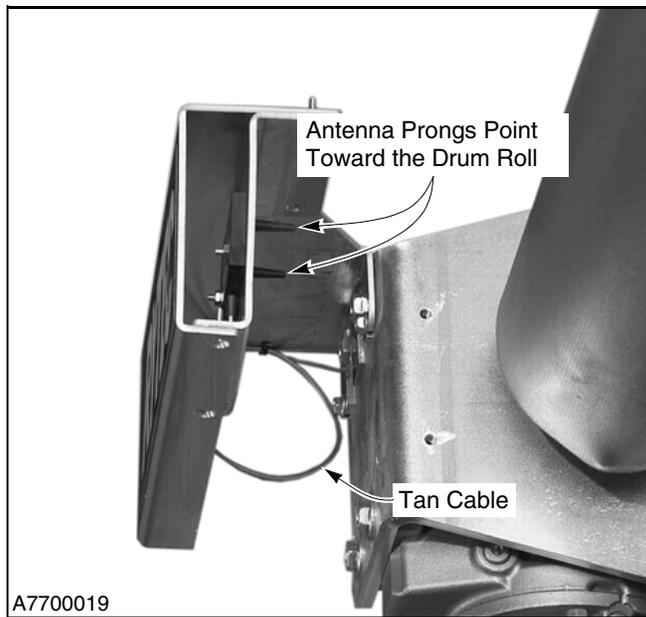


Figure 36

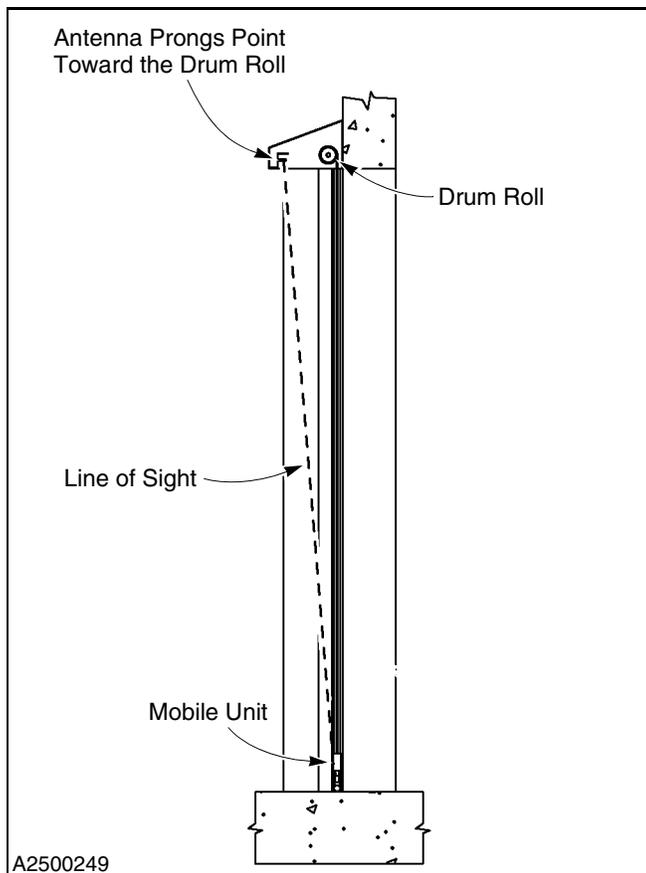


Figure 37

Parameters for Wireless System

The control system for the wireless reversing edge has been programmed at Rytec. However, field adjustments may be required. Below is a list of the applicable parameters and fault codes associated with the wireless reversing edge system.

NOTE: Do not make any changes to the wireless system until you have contacted Rytec Technical Support at 800-628-1909. Access for programming parameters can be found in the Rytec System 4 Drive & Control manual that is shipped with the door in the small parts carton.

Table 2

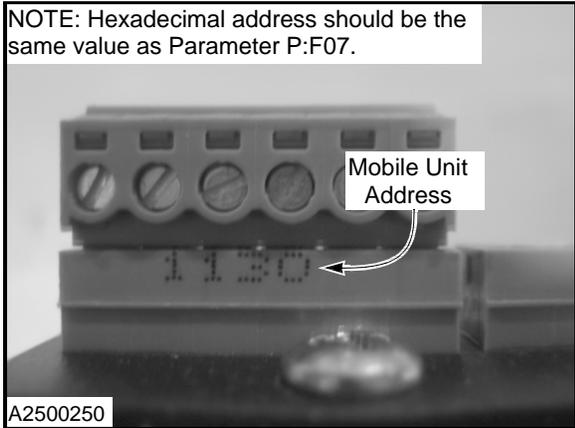
Parameters
<p>P:F00 = Activates the wireless system 1 = On, 0 = Off</p>
<p>P:F01 = Packet timeout before “edge trip” occurs Adjustment made in milliseconds = 6 ms to 250 ms <i>NOTE: 50 ms is default.</i></p>
<p>P:F05 = Channel group 1–10 Factory setting (can only be viewed in parameter mode)</p>
<p>P:F07 = Mobile unit address</p> <ul style="list-style-type: none"> • Unique to each unit • Hexadecimal number located on the transmitter unit in the bottom bar (See Figure 38.) <p><i>NOTE: Hexadecimal address should be the same value as Parameter P:F07.</i></p>  <p>IMPORTANT: <i>The hexadecimal number on the transmitter unit must be facing to the left when installed in the bottom bar. When facing the front of the door, the Rytec decal will be seen to the right of the mobile unit.</i></p> <p><i>After entering the address, it is necessary to check that the controller is connected and working with the selected mobile unit. Since the number system is hexadecimal, it is possible to have letters included in the mobile unit address. For example: 1C46, 89D3, and 65B1.</i></p>

Figure 38

Parameters

P:F09 = Battery low 3.6 volts

When battery voltage drops below the preset value, an error will be displayed = **F 857** Battery low.

If voltage falls below the preset level, F:857 will be displayed on the screen. The door will remain operational with the message displayed, but the battery will need to be changed soon. If the battery goes completely dead, F:856 will appear and the door will not function. The battery is a 3.8 Lithium and about the same size as a standard “D” size battery. Part number 00111193.

NOTE: Figure 39 shows the battery through a clear cover located in the bottom bar. Clear cover shown is a sample piece.

NOTE: Battery for wireless reversing edge: brown wire (+), blue wire (-).

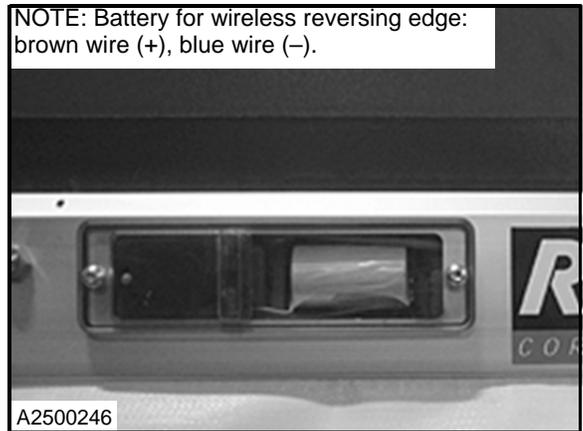


Figure 39

Table 3

Error Codes

F 856 = No communication between the stationary and mobile units for more than ten seconds

- Antenna not connected or poorly mounted
- Battery is dead
- Mobile unit address is incorrect
- No mobile unit found
- Strong electrical interference in the frequency range

F 857 = Battery monitoring

- Battery voltage falls below value in **P:F08**
- New battery is required

SYSTEM START-UP—WIRELESS REVERSING EDGE

Table 4

Encoder Cable Connections System 4 Control Panel	
<p><i>NOTE: The encoder cable is to be cut to length. DO NOT leave excessive cable inside the control panel.</i></p> <p><i>NOTE: Connections below are for the wireless reversing edge connections only. Reference the electrical schematic that was shipped in the control panel for specific connections for your particular door. Encoder connections may vary depending on door models.</i></p>	
Encoder Cable:	System 4 Control Board:
Brown (+24 VDC)	to terminal #270
Red (Ajar)	to terminal #271
Pink (Reversing Edge)	to terminal #272
Gray	to terminal #273
Blue	to terminal #274
Yellow (RS485 a)	to terminal #275
Green (RS485 b)	to terminal #276
White (Ground)	to terminal #277
<p>The encoder cable is vital for proper door operation. Trim the cable end to expose the drain wire (bare silver) but do it such a manner as not to damage the drain wire and most importantly the shield.</p> <p><i>NOTE: Shield and drain wire should be captured under the P-clip below terminals 270–277. (See Figure 40.)</i></p> <p><i>DO NOT ground to control board or motor ground.</i></p>	

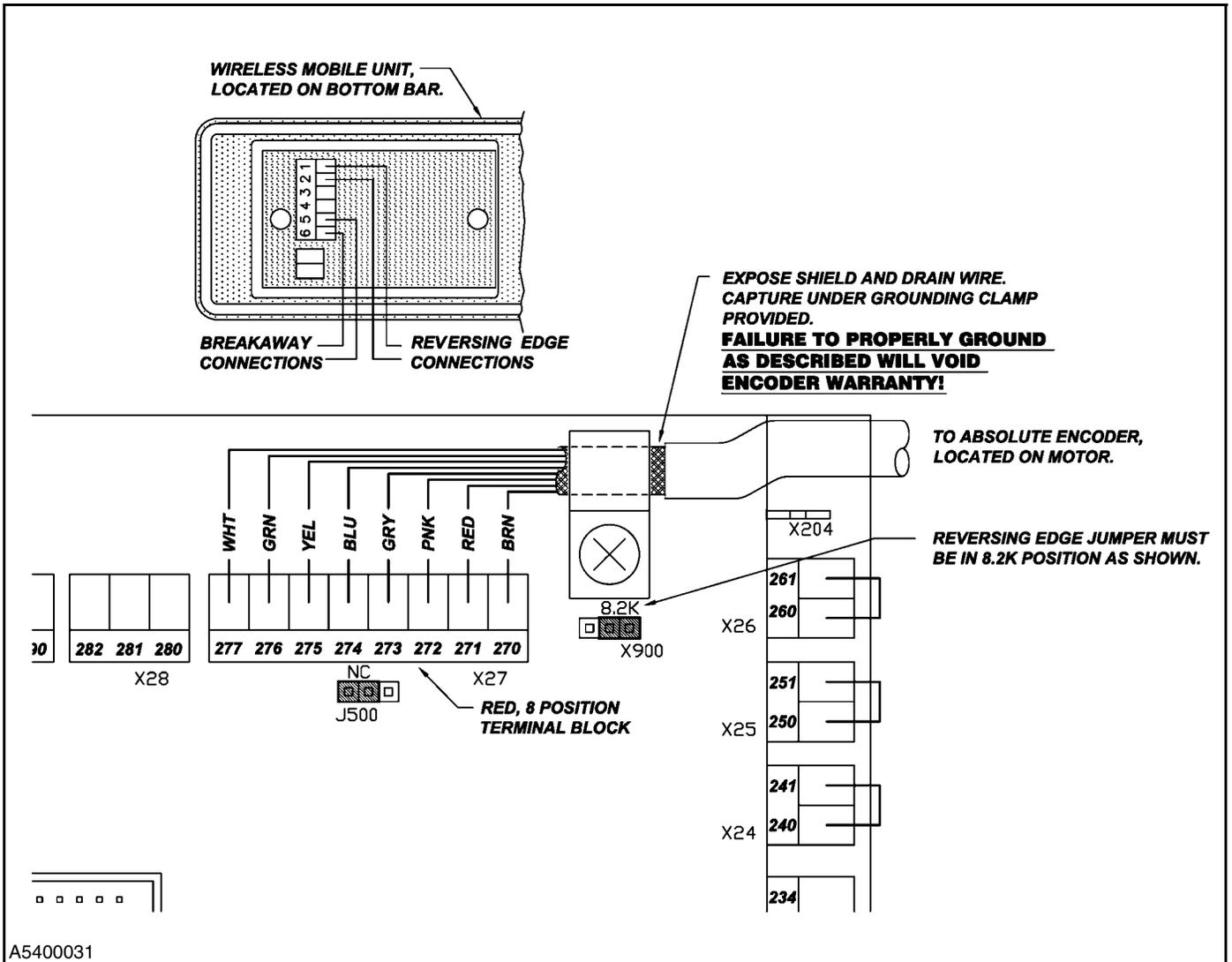
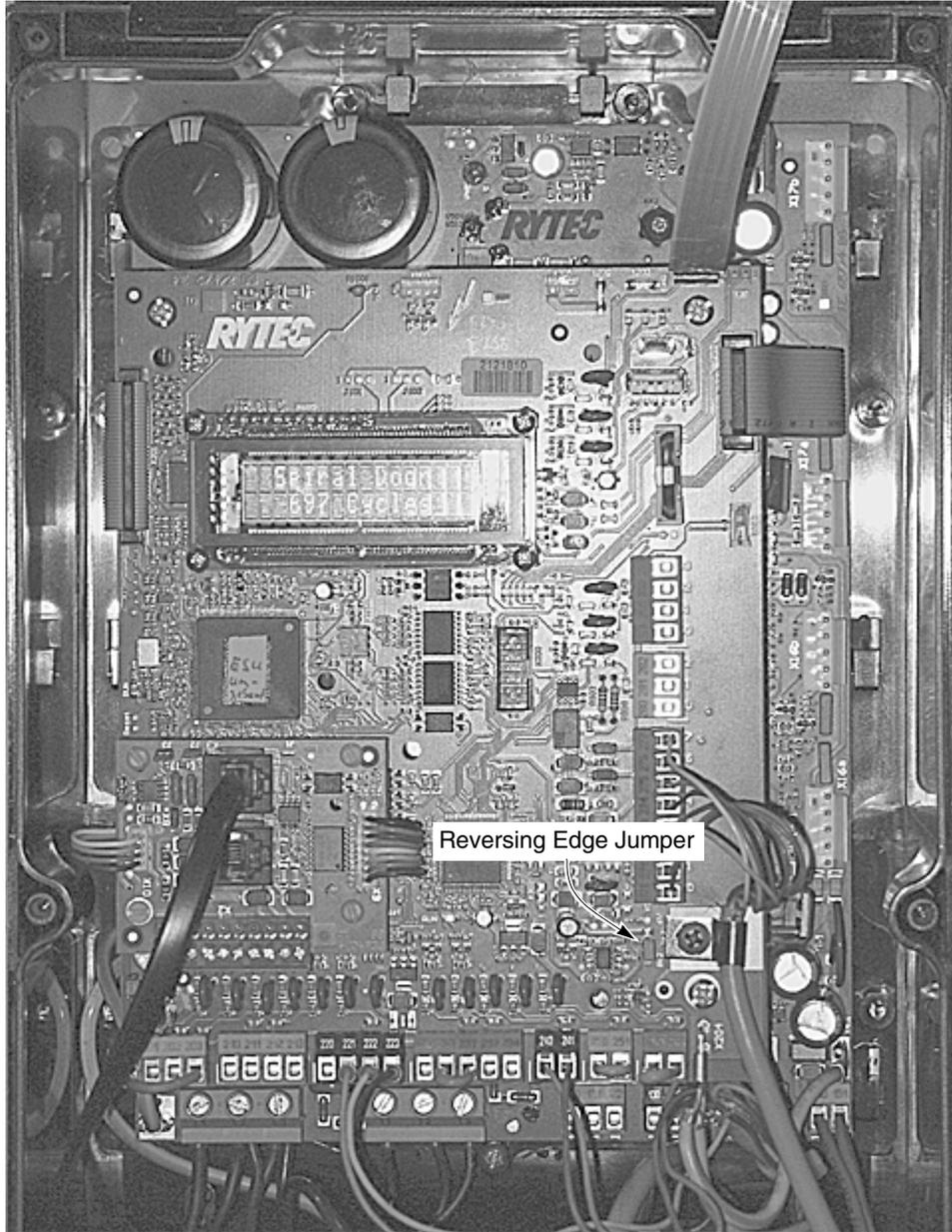


Figure 40

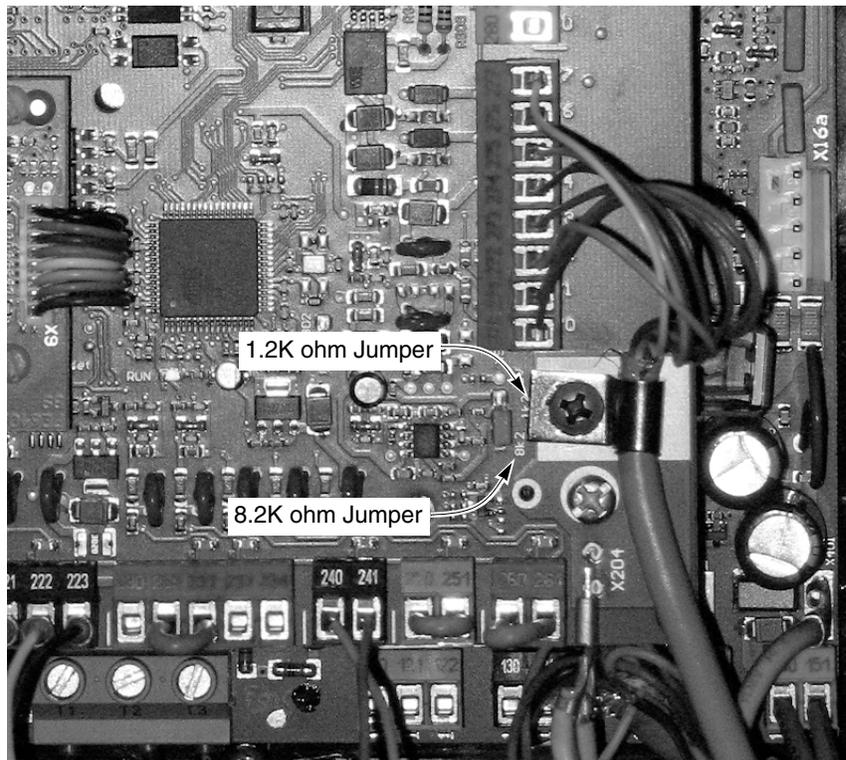


A5400014

Figure 41

NOTE: The configuration of the jumpers should have been done at Rytec prior to shipping. This information is provided just to confirm the accurate setting of the jumpers. (See Figure 41.)

Jumpers on the System 4 Control Panel



A5400014

Figure 42

NOTE: Jumper for the reversing edge should be configured for 8.2K ohms. (See Figure 42.)

Please contact Ryttec Technical Support at 800-628-1909 if there are any questions or concerns.

SYSTEM PARAMETERS—OPERATOR LEVEL PARAMETERS

SYSTEM PARAMETERS

The system parameters are grouped into two levels: "OPERATOR LEVEL PARAMETERS" and "SERVICE LEVEL 2 PARAMETERS" on page 27.

OPERATOR LEVEL PARAMETERS

Table 5 below lists the parameters available through the Operator Level. Included in this table is a description of each parameter and its available range and factory default setting.

Table 5

Parameter	Range	Operator Level Parameters (Password Not Required)	Factory Setting
P.010	0–200 seconds	Auto-close delay timer 1 — ACL1 (with activator connected to input 5 — terminals 210 and 212) 0 = Off Time door remains open after all activation and safeties are clear	10
P.011	0–200 seconds	Auto-close delay timer 3 — ACL3 (0 = off) The ACL3 timer is available for all doors. The input selected will need to be programmed to operate through the ACL3 timer.	0
P.015	0–200 seconds	Auto-close delay timer 2 — ACL2 (with activator connected to input 6 — terminals 230 and 233) 0 = Off Time door remains open after all activation and safeties are clear	5
P.050 (Defrost System Only)	0–3	Heater status 0: Off 1: On — low heat stage 1 heated blower or heat lamps 2: On — medium heat stage 1 + 2 heated blower 3: On — high heat stage 1 + 2 + 3 heated blower	0
P.051 (Defrost System Only)	0–1	Heater control (parameter P.050 must be set to on) 0: Manual 1: Automatic timer	0
P.055 (Defrost System Only)	0–3	Blower control 0: Off 1: Low speed 2: High speed 3: Automatic (blower runs at high speed when door is open)	0
P.058 (Defrost System Only)	5–600 minutes	Heater timer on time	30
P.059 (Defrost System Only)	5–600 minutes	Heater timer off time	5
P.999		Password (for accessing Service Level 2) is the number 10. Password (for accessing Service Level 1) is the number 5.	

SYSTEM PARAMETERS—SERVICE LEVEL 2 PARAMETERS

SERVICE LEVEL 2 PARAMETERS

Table 6 below lists some of the parameters available through Service Level 2. Included in this table is a description of each parameter and its available ranges and factory default settings.

At Service Level 2, the technician will be able to view all the parameters in the System 4 Control panel. However, some parameters (Safety) will require an additional Rytec level password to do the changes.

Table 6

Parameter	Range	Service Level 2 Parameters	Factory Setting
P.000	Cycles	Door cycle counter (read only)	
P.001	Cycles	Saved door cycle counter <i>NOTE: This is used to lock in the current door cycle count for entering Rytec service level passwords. Rytec level passwords are only available through the Rytec Technical Support Department at 800-628-1909.</i>	
P.005	Cycles	Maintenance counter <i>NOTE: This indicates the number of cycles remaining until door maintenance is due. This parameter works in conjunction with P.970 & P.971. The factory setting is -1, meaning not turned on. P.005 counts down one cycle from the value in P.971 each time the door operates. For example, if P.971 is set to 100 cycles, each time the door opens P.005 counts down from 100, 99, 98 etc., until it reaches 0. P.970 instructs the door what to do when the counter reaches 0. See P.970 for selections.</i>	
P.010	0–9999 seconds	Auto-close delay timer 1 — ACL1 (with activator connected to input 5 — terminals 210 and 212) 0 = Off	10
P.011	0–9999 seconds	Auto-close delay timer 3 — ACL2 (with activator connected to input 6 — terminals 230 and 233) 0 = Off	10
P.015	0–200 seconds	Auto-close delay timer 2 — ACL2 (with activator connected to input 6 — terminals 230 and 233) 0 = Off Time door remains open after all activation and safeties are clear	5
P.017	0–999 seconds	Storage of open commands <i>NOTE: Open commands can be stored with this parameter. If the door is interlocked and when the interlock is released, this timer counts down and opens the door. To turn off the storage of OPEN commands, change value of P:017 to 0.</i>	0

SYSTEM PARAMETERS—SERVICE LEVEL 2 PARAMETERS

Parameter	Range	Service Level 2 Parameters	Factory Setting
P.025	0–20 seconds	Pre-warning time before close <i>NOTE: This parameter is used for the yellow flashing warning lights. Increasing the value will increase the number of times the yellow LEDs flash previous to closing.</i>	3
P.026	0–1	Pre-warning time before opening	0
P.050 (Defrost System Only)	0–3	Heater status 0: Off 1: On — low heat stage 1 heated blower or heat lamps 2: On — medium heat stage 1 + 2 heated blower 3: On — high heat stage 1 + 2 + 3 heated blower	0
P.051 (Defrost System Only)	0–1	Heater control (parameter P.050 must be on) 0: Manual 1: Automatic timer. Timer settings found in parameters P:058 (time heater is ON) and P:059 (time heater is OFF).	0
P.055 (Defrost System Only)	0–3	Blower control 0: Off 1: Low speed 2: High speed 3: Automatic (blower runs at high speed when door is open)	0
P.058 (Defrost System Only)	5–600 minutes	Heater timer on time	30
P.059 (Defrost System Only)	5–600 minutes	Heater timer off time	5
P.210	0–5	Limit set-up 0: Off 1: Open, close, and partial set-up (partial set using P.244) 2: Open 3: Open and close 4: Partial (P.244 ignored) 5: All (partial set using P.244)	0
P.221	± 125 increments	Close-limit adjustment (For minor adjustments to the close position of the door. This adjustment resets to 0 if the limits are reset. Ten increments equals approximately 1 inch of door travel.)	0
P.231	± 60 increments	Open-limit adjustment (For minor adjustments to the open position of the door. This adjustment resets to 0 if the limits are reset. Ten increments equals approximately 1 inch of door travel.)	0
P.244	0–3	Partial position 0: Parameter off 1: Half-open position 2: Two-thirds-open position 3: Operator-established position	0

SYSTEM PARAMETERS—SERVICE LEVEL 2 PARAMETERS

Parameter	Range	Service Level 2 Parameters	Factory Setting
P.630	0–2	<p>Function keypad OPEN (Specifies the function (mode) of the OPEN key)</p> <p>0: No door function 1: Only deadman move during deadman operation 2: Deadman and automatic</p> <p><i>NOTE: This parameter is used for security purposes. For example, if the owner wants to monitor who is accessing the door via a card swipe, then the UP arrow on the control panel must be deactivated. Otherwise, simply pushing the UP arrow will allow anyone into the room. Changing parameter P:630 to 0 forces entry via the card swipe. The arrow will remain functional for navigating the parameters but will not operate the door. The same condition applies to parameter P:650 for the close key.</i></p>	2
P.640	0–2	<p>Function keypad STOP (Specifies the function (mode) of the STOP key)</p> <p>0: No door function during automatic travel 1: After pressing the STOP key, the door is stopped and waits for any command 2: After pressing the STOP key, the door is stopped and waits for a keypad command</p> <p><i>NOTE: The RESET key also serves as the ENTER key and the STOP key.</i></p>	0
P.650	0–2	<p>Function keypad CLOSE (Specifies the function (mode) of the CLOSE key)</p> <p>0: No door function 1: Only deadman move during deadman operation 2: Deadman and automatic</p>	2
P.660	0–4	<p>Floor loop detector — channel 1 function</p> <p>20: Deactivated 21: Command forwarding 22: Open command</p> <p>(Additional settings are also available under this parameter.) Locking, safety, sequence of operation are all available if needed. Contact Rytec Technical Support at 800-628-1909 to discuss specific operational sequence.</p>	1
P.670	0–4	<p>Floor loop detector — channel 2 function</p> <p>20: Deactivated 21: Command forwarding 22: Open command</p> <p>(Additional settings are also available under this parameter.) Locking, safety, sequence of operation are all available if needed. Contact Rytec Technical Support at 800-628-1909 to discuss specific operational sequence.</p>	1

SYSTEM PARAMETERS—SERVICE LEVEL 2 PARAMETERS

Parameter	Range	Service Level 2 Parameters	Factory Setting
P.683	0–3	Open position — radio channel 1 0: Full-open position 1: Partial-open position 2: Partial-open when radio is activated one time, full-open when activated a second time 3: Full-open when radio is activated twice	0
P.693	0–3	Open position — radio channel 2 0: Full-open position 1: Partial-open position 2: Partial-open when radio is activated one time, full-open when activated a second time 3: Full-open when radio is activated twice	0

Table 7

Parameter	Range	Service Level 2 Parameters	Factory Setting
<p>NOTE: All inputs have the ability to be configured in many different ways. If you are interested in configuring an input, please contact Rytec Technical Support at 800-628-1909. Please have details available on what sensor you would like to use and how you would like the sensor to perform.</p>			
<p>Contact Rytec Technical Support at 800-628-1909 for specific information regarding input configuration. The Rytec Technical Support group has performed many different input configurations and can help you determine which configuration is best suited for your environment. Please provide door serial number when contacting Rytec Technical Support.</p>			
<p>P.7x0</p> <p><i>NOTE: The "x" in P.7x0 represents the relay number. Example P:710 represents relay number 1 and P:720 represents relay number 2 and so forth. Up to eight possible relays can be used.</i></p>		<p>The System 4 Drive & Control Ry-Wi System provides two output relays and an expansion board that provides another six that can be configured a number of different ways.</p> <p>If you are interested in configuring an output relay to perform a specific function, please call Rytec Technical Support at 800-628-1909. Please be sure to have all operational details prior to contacting Rytec.</p> <p>Any and all options are available for the outputs to perform a variety of operations. The relays can be programmed to perform many different scenarios.</p>	

SYSTEM PARAMETERS—SERVICE LEVEL 2 PARAMETERS

Table 8

Parameter	Range	Service Level 2 Parameters	Factory Setting
P.910	0–25	<p>Display mode selection The following variables are displayed: 0: Control sequence is displayed, i.e., door cycles, door opening, timer, door closing. 1: [Hz] The current travel speed 2: [A] The current motor current 3: [V] The current motor voltage 4: [A] The current DC bus current 5: [V] The current DC bus voltage 6: [°C] The power stage temperature in °Celsius 7: [°F] The power stage temperature in °Fahrenheit 8: [s] The run time of the motor during the last door operation 9: [Increments] The current position 10: [Increments] The position of the reference 11: [Dig] Channel 1 value of the absolute encoder 12: [Dig] Channel 2 value of the absolute encoder 13: [V] Current reference voltage 14: Temperature inside the controller in celsius degrees 15: Temperature inside the controller in fahrenheit degrees 16: Transmission ratio from motor to encoder during opening 17: Transmission ratio from motor to encoder during closing 18: Rotation speed of the motor output shaft 19: Temperature of the encoder 20: Battery voltage of encoder 21: Number of position requisition without answer 22: Number of position requests from the board to the encoder without an answer from the encoder 23: Wireless reversing edge signal strength during door travel. Given in a percentage of signal. Percentage should remain above 90% during travel. 24: Numbers of wireless reversing edge errors during the last door cycle 25: Time of the clock in the controller.</p> <p><i>NOTE: Settings 14 and 15 are only available if optional temperature sensor is installed in the controller.</i></p>	
P.920		<p>Error history (The controller stores the last eight errors in the error history. The System 4 controller will time stamp the errors with the date and time the error occurred.) Error message 1 (most recent error) Error message 2 Error message 3 Error message 4 Error message 5 Error message 6 Error message 7 Error message 8 Clear the complete error history Exit the error memory, jump back to parameter</p>	

SYSTEM PARAMETERS—SERVICE LEVEL 2 PARAMETERS

Parameter	Range	Service Level 2 Parameters	Factory Setting
P.940	Volt	Input voltage (The real-time voltage the board is receiving. Electrical meters measure the voltage as an RMS or essentially an average; therefore, an electrical meter reading may vary by 20 volts or more. P:940 displays the voltage in real time. If the control board receives a voltage greater than 10%, its rating error F:525 will appear until the voltage drops back down within acceptable range. If this continues, a line reactor will be needed to prevent the failure. When incoming power is ungrounded, an isolation transformer may be needed. (Part number for the line reactor is 0011748 and the isolation transformer is part number 00111101.)	
P.980	0–5	<p>Operating mode (This parameter is used to set the operating mode for the controller)</p> <p>The following modes are possible:</p> <p>0: Door travels in automatic mode. 1: Door opens in automatic, closes in manual (jog) mode. 2: Door travels in jog mode open and close. 3: Jog mode only (deadman) emergency operation; and no safety inputs required for deadman operation.</p> <p style="text-align: center;"> WARNING</p> <p style="text-align: center;">All safety devices and limit switches are ignored.</p> <p>4: Endurance test with safety devices automatic OPEN and CLOSE operation. Before each new operation the hold-open time P.010 is in effect. 5: Endurance test without safety devices.</p> <p style="text-align: center;"> WARNING</p> <p style="text-align: center;">All safety devices are ignored.</p> <p><i>NOTE: The endurance test setting is lost after turning off the controller. The controller then reverts to manual mode. This will require parameter P:980 to be set to 0 before automatic operation can be preformed.</i></p>	0
P.985	0–3	Text language 0: English text 1: German text 2: Spanish text 3: French text	0
P.999		Password (for accessing Service Levels 2) is the number 10.	
P.F00	0–1	Activation of the wireless (Activate the functions of the wireless in the controller)	

SYSTEM PARAMETERS—SERVICE LEVEL 2 PARAMETERS

Parameter	Range	Service Level 2 Parameters	Factory Setting
P.F01	6–250 milliseconds	Timeout for the wireless (This sets the wireless timeout within the controller) <i>NOTE: If the mobile unit doesn't send a message within the specified time, the wireless edge will be seen as tripped.</i>	50
P.F05	1–10	Channel group (The channel group of the wireless connection) Channel is selectable 1–10. Find setting with highest percentage during door operation. Use P:910 set to 23 to display percentage during door travel. Place P:910 back to 0 when finished testing wireless signal.	1
P.F07	00000000–FFFFFFF	Mobile unit address (The address on the mobile unit is used to communicate with the encoder via the antenna in the head assembly. Each mobile unit has its own address number.)	

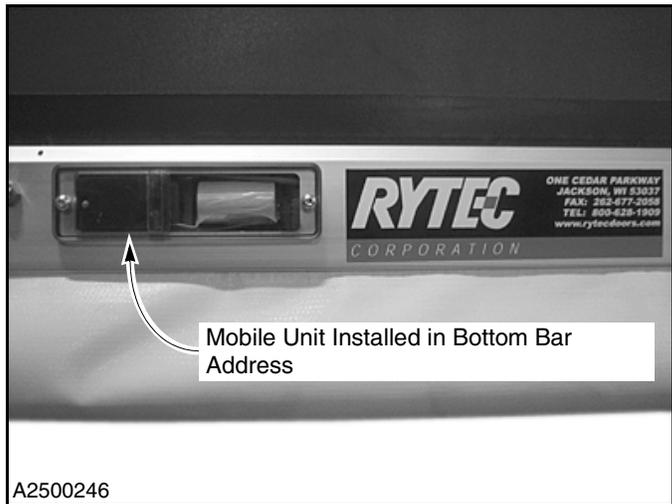


Figure 43

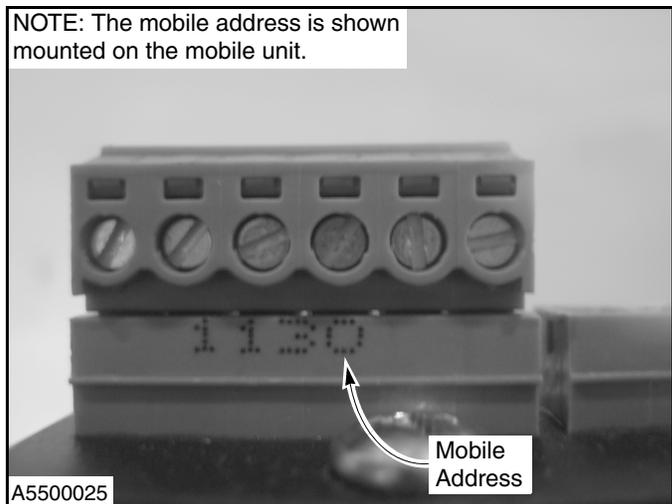


Figure 44

SYSTEM PARAMETERS—CLOCK PARAMETERS

Parameter	Range	Service Level 2 Parameters	Factory Setting
P:F08	0–3.5 Volts	Battery voltage warning level (The warning level for the battery voltage. If the battery voltage is less than the specified value, an F857 will occur.)	

CLOCK PARAMETERS

If the clock time needs to be changed to your time zone, Service Level 2 will be required. P:999 will require a

password of “10” to enable you to change the clock setting. Table 9 details the parameters used to adjust the clock setting.

Table 9

Parameter	Range	Service Level 2 Parameter
P:C00		Displays the current time and date of the System 4 clock. Clock is set at Ryttec before shipping to current date and central time.
P:C01	0–23 hours	Adjusts hours for the current time.
P:C02	0–59 minutes	Adjusts minutes for the current time.
P:C03	0–59 seconds	Adjusts seconds for the current time
P:C04	0101–1231	Adjusts day and month to current day and month.
P:C06	2000–2099	Adjusts year to current year.

FAULT CODES

GENERAL OPERATION FAULT CODES

NOTE: If you have an error not listed in the chart below, contact Rytec Technical Support at 800-628-1909.

Table 10 lists the fault codes associated with the general operation of the door. Included in this table are the available fault codes, a description of each fault code, and the suggested corrective action to clear the fault. (Door is in the error jog only mode.)

Table 10

Fault Code (Displayed Message)	Description	Corrective Action
F.000 (Beyond Opn) (beyond open)	Door opens past full-open position. 1. Motor brake faulty or improperly adjusted 2. Door position parameters incorrect	1. Repair or adjust motor brake. 2. Consult factory with door serial number.
F.005 (Beyond Clsd) (beyond closed)	Door closes past full-closed position. 1. Motor brake faulty or improperly adjusted 2. Door position parameters incorrect	1. Repair or adjust motor brake. 2. Consult factory with door serial number.
F.020 (Beyond Runt) (beyond run time)	Door open run time exceeded. 1. Blocked door 2. Sluggish motor 3. Run time set too low	1. Check mechanical operation of door. 2. Check motor. Verify that the motor is wired to proper voltage. Reference door electrical schematic for correct motor voltage — high or low. 3. Consult factory with door serial number.
F:021 (Emergency Opening Wrong Testing)	The maximum allowed run time for emergency opening has been exceeded.	1. Check incoming power L1, L2, L3. 2. Check motor. Verify that the motor is wired to proper voltage. Reference door electrical schematic for correct motor voltage — high or low. 3. Check for mechanical bind. 4. Verify motor brake is releasing. 5. Consult factory with door serial number.
F.030 (Mtr Stalled) (motor stalled)	Door travel incomplete (check incoming power at L1, L2, and L3 on the control board). 1. Blocked door 2. Jammed motor 3. Encoder incorrectly installed 4. Encoder problem 5. Low start torque or speed	1. Check mechanical operation of door. 2. Check motor and brake. 3. Check encoder mounting. 4. Check encoder operation. 5. Consult factory with door serial number. <i>NOTE: Check that cables are cut to length and that high- and low-voltage lines are in separate conduits.</i>
F.031 (Trv Direct) (travel direction)	Door moves in wrong direction. 1. Encoder wired incorrectly 2. Motor running in wrong direction 3. Motor brake releases early	1. Check encoder and encoder connections. 2. Check motor rotation. If motor rotation is incorrect, swap the T1 and T2. The limits will need to be cleared in parameter 210. <i>NOTE: The controller knows the motor was rotating backwards. You will receive an encoder fault if limits are not cleared and reset.</i> 3. Consult factory with door serial number.

SYSTEM PARAMETERS—GENERAL OPERATION FAULT CODES

Fault Code (Displayed Message)	Description	Corrective Action
F:033 (Bad position transmitter protocol)	No door travel or inconsistent travel.	<ol style="list-style-type: none"> 1. Check encoder mounting. 2. Check encoder connections. 3. Verify encoder counting, P:910 set to 9 to watch count. 4. Check incoming power. 5. Consult factory with door serial number.
F:035 (Lag error during closing)	Door does not close properly.	<ol style="list-style-type: none"> 1. Check encoder mounting and encoder hub attached. Make sure all are tight. 2. Check motor. Verify that the motor is wired to proper voltage. Reference door electrical schematic for correct motor voltage — high or low. 3. Check motor brake is functional. 4. Check for mechanical bind. 5. Consult factory with door serial number.
F:036 (Date crash detected)	Door not operating properly.	<ol style="list-style-type: none"> 1. Consult factory with door serial number.
F:040 (Defective brake)	Door moves without being activated or moves unexpectedly.	<ol style="list-style-type: none"> 1. Check for brake voltage. 2. Check mechanical aspects of motor brake. 3. Adjust brake gap.
F:043 (Pre-limit switch fault, photo eyes, or light curtain.)	The pre-limit switch for the light barrier remains active in middle or open position. The pre-limit turns the light barrier off and on in certain positions of the door travel. This fault is indicating the pre-limit is not functional.	<ol style="list-style-type: none"> 1. Check the value of parameter P:222 pre-limit close. 2. Consult factory with door serial number.
F:050 (Encoder position deviates from permissible range during synchronization.)	Open or close limit position always active. Limits activated in different positions throughout the door travel.	<ol style="list-style-type: none"> 1. Set parameter P:910 to 9 and watch encoder count during opening and close. 2. Check encoder mounting. 3. Consult factory with door serial number.
F:051 (Encoder position deviates from permissible range.)	Encoder increment count is beyond the limit band.	<ol style="list-style-type: none"> 1. Set parameter P:910 to 9 and watch encoder count during opening and close. 2. Check encoder mounting. 3. Consult factory with door serial number.
F:052 (Limit position not recognized.)	Controller does not recognize the limit position the encoder is sending.	<ol style="list-style-type: none"> 1. Set parameter P:910 to 9 and watch encoder count during opening and close. 2. Check encoder mounting. 3. Consult factory with door serial number.

SYSTEM PARAMETERS—GENERAL OPERATION FAULT CODES

Fault Code (Displayed Message)	Description	Corrective Action
F:060 (Door Ajar)	Bottom bar breakaway input activated, terminal 271.	Reassemble bottom bar or repair breakaway switch. The controller believes the door was impacted and the panel is outside the side columns. Reassemble bottom bar or repair breakaway switch. <i>NOTE: If an error reappears after resetting the error, it has not been corrected. If the door has a coil cord, a wire for the breakaway circuit may be broken inside the coil cord.</i>
F:063 (Balance Error Loop 3)	Controller receiving signal from loop 3; however, something is disturbing the signal.	<ol style="list-style-type: none"> 1. Remove any sources of EMI in area. 2. Test ground loop 3 with megohm meter for continuity and continuity to ground. 3. Consult factory with door serial number.
F:064 (Error Loop 4)	Controller receiving signal from loop 4; however, something is disturbing the signal.	<ol style="list-style-type: none"> 1. Remove any sources of EMI in area. 2. Test ground loop 4 with megohm meter for continuity and continuity to ground. 3. Consult factory with door serial number.
F:067 (Error Loop 3)	Loop 3 has either a broken wire or a short circuit between the loop wires.	<ol style="list-style-type: none"> 1. Test continuity of loop 3 with megohm meter. 2. Test continuity of loop 3 to ground with megohm meter. 3. Replace loop 3. 4. Consult factory with door serial number.
F:068 (Error Loop 4)	Loop 4 has either a broken wire or a short circuit between the loop wires.	<ol style="list-style-type: none"> 1. Test continuity of loop 4 with megohm meter. 2. Test continuity of loop 4 to ground with megohm meter. 3. Replace loop 4. 4. Consult factory with door serial number.
F:070 (Clean Pos) <i>(clean position)</i>	Clean position reached.	Door is in the “Clean” position. <ol style="list-style-type: none"> 1. Push UP arrow once to position door into the close position. 2. Push UP arrow a second time to operate the door.
F:080 (Maintenance Required)	Maintenance counter has expired.	<ol style="list-style-type: none"> 1. Perform required maintenance or planned maintenance. 2. Set P:973 to 1 to reset maintenance counter.
F:090 (Controller not parameterized)	The controller does not have the necessary minimal parameters set to operate.	<ol style="list-style-type: none"> 1. Consult factory with door serial number.

SYSTEM PARAMETERS—DOOR SAFETY/EMERGENCY FAULT CODES

DOOR SAFETY/EMERGENCY FAULT CODES

Table 11 lists the fault codes associated with the door safety/emergency system. Included in this table are the available fault codes, a description of each fault, and the suggested corrective action to clear the fault. (The door is in the emergency stop mode and will not operate.)

Table 11

Fault Code (Displayed Message)	Description	Corrective Action
F.201 (E-Stop 1)	1. Door stopped and does not operate 2. Corresponding error message displayed <i>NOTE: Terminals can be used for emergency stop push button in place of the jumper. Switch must be normally closed.</i>	1. Reset E-Stop 1. 2. Check jumper terminals 240 and 241
F.211 (E-Stop 2)	External Emergency Stop activated. 1. Door stopped and does not operate 2. Corresponding error message displayed <i>NOTE: Terminals can be used for emergency stop push button in place of the jumper. Switch must be normally closed.</i>	1. Reset E-Stop 2. 2. Check jumper terminals 250 and 251
F.212 (E-Stop 3)	External Emergency Stop activated. 1. Door stopped and does not operate 2. Corresponding error message displayed <i>NOTE: Terminals can be used for emergency stop push button in place of the jumper. Switch must be normally closed.</i>	1. Reset E-Stop 3. 2. Check jumper terminals 260 and 261
F:320 (Obstacle during open)	Door encountered an obstruction on opening. Error should not appear as this function is not utilized at this time.	Consult factory with door serial number.
F:325 (Obstacle during close)	Door encountered an obstruction on Closing. Error should not appear as this function is not utilized at this time.	Consult factory with door serial number.

SYSTEM PARAMETERS—REVERSING EDGE CIRCUIT FAULT CODES

REVERSING EDGE CIRCUIT FAULT CODES

Table 12 below lists the fault codes associated with the reversing edge circuit. Included in this table are the available fault codes, a description of each fault code, and the suggested corrective action to clear the fault. (The door is in the error jog only mode.)

Table 12

Fault Code (Displayed Message)	Description	Corrective Action
F:360 (Short circuit detected on edge input.)	Controller has detected a short in the reversing edge system. Wireless system utilizes normally open contact in conjunction with 8.2K ohm resistor. Controller measuring 0 ohms at edge input.	<ol style="list-style-type: none"> 1. Check reversing edge switch for open contact. 2. Ohm resistor, 8.2K ohms. 3. Remove reversing edge wires from mobile unit (black and red wires) and measure for 8.2K ohms. 4. Verify jumper in correct position on control board. (See Figure 42 on page 25.) 5. Consult factory with door serial number.
F:361 (Edge Trip) <i>(edge trip)</i>	Reversing edge tripped. <ol style="list-style-type: none"> 1. Bottom edge of door made contact with object in door opening 2. Short circuit in reversing edge wiring 3. Pressure switch faulty or not adjusted 	<ol style="list-style-type: none"> 1. Reset control system. 2. Check and repair wiring. 3. Check and adjust switch. <p style="margin-left: 20px;"><i>NOTE: Ohm reading on terminals 272 and 283 should read 8.2K or 8200 ohms.</i></p> <p style="margin-left: 20px;"><i>All wireless units use a 8.2K ohm resistor.</i></p>
F:362 (Redundancy error with short circuit.)	The controller has a two-step process for testing a short circuit in the edge; during this process the results were different. The results should be the same. This error typically displayed with other edge errors, F:361.	<ol style="list-style-type: none"> 1. Check reversing edge switch for open contact. 2. Ohm resistor, 8.2K ohms. 3. Remove reversing edge wires from mobile unit (black and red wires) and measure for 8.2K ohms. 4. Verify jumper in correct position on control board. (See Figure 42 on page 25.) 5. Consult factory with door serial number.
F:363 (Edge Open)	Reversing edge circuit open. <ol style="list-style-type: none"> 1. Reversing edge wiring disconnected 2. Reversing edge cable in the bottom bar may be cut or damaged 3. Reversing edge resistor is wrong value or missing 	Check all parts of reversing edge circuit including resistor. Make any necessary repairs or adjustments. Verify proper operation of reversing edge after all repairs and adjustments are made. Ohm reading is ohms at terminals. <p style="margin-left: 20px;"><i>NOTE: All resistors are 8.2K ohms. Terminals 272 and 273.</i></p>

SYSTEM PARAMETERS—REVERSING EDGE CIRCUIT FAULT CODES

Fault Code (Displayed Message)	Description	Corrective Action
F:364 (Safety edge test failed.)	The controller tests the presence of the reversing edge after each open cycle to ensure edge is present before closing. If the edge does not respond during this test, F:364 is displayed.	<ol style="list-style-type: none"> 1. Check reversing edge switch for open contact. 2. Ohm resistor, 8.2K ohms. 3. Remove reversing edge wires from mobile unit (black and red wires) and measure for 8.2K ohms. 4. Verify jumper in correct position on control board. (See Figure 42 on page 25.) 5. Consult factory with door serial number.
F:365 (Redundancy error with interruption.)	The controller has a two-step process for testing an open circuit in the edge; during this process the results were different. The results should be the same. This error typically displayed with other edge errors, F:363.	<ol style="list-style-type: none"> 1. Check reversing edge switch for open contact. 2. Ohm resistor, 8.2K ohms. 3. Remove reversing edge wires from mobile unit (black and red wires) and measure for 8.2K ohms. 4. Verify jumper in correct position on control board. See Figure 42 on page 29 for reference. 5. Consult factory with door serial number.
F:366 (Pulse frequency too high for optical edge.)	Defective optical safety edge. Rytec does not utilize optical safety edges.	Consult factory with door serial number.
F:369 (Internal safety edge incorrectly parameterized.)	The control recognizes an edge connected to the controller; however, the controller edge circuit needs to be turned on.	<ol style="list-style-type: none"> 1. P:460 needs to be set to 1. 2. Parameter change can only be accomplished with a Rytec level password. Must contact Rytec Technical Support at 800-628-1909 with door serial number for password.

SYSTEM PARAMETERS—DRIVE SYSTEM FAULT CODES (400-LEVEL CODES)

DRIVE SYSTEM FAULT CODES (400-LEVEL CODES)

Table 13 lists the fault codes associated with the drive system. Included in this table are the available fault codes, a description of each fault code, and the suggested corrective action to clear the fault.

Table 13

Fault Code (Displayed Message)	Description	Corrective Action
F:410 (Mtr OC L1) <i>(motor over current limit 1)</i>	Over current. 1. Mechanical problem 2. Motor brake not releasing 3. Motor nameplate parameters (frequency, current, etc.) incorrectly set 4. Motor torque boost incorrectly set <i>NOTE: Parameter P:140 (open boost) or P:145 (close boost) set too high.</i>	1. Check operation of door. 2. Check brake. 3. Check motor parameter settings and verify settings match listing on motor nameplate. 4. Consult factory with door serial number.
F:413 (Brake chopper under heavy load)	Brake resistor under heavy load. Door trips fault to cool down brake resistor. After the brake resistor cools down, the door will reset.	1. Confirm incoming power L1, L2, L3. 2. Ohm brake resistor, remove wires at terminals X200 and X201 from main board, reading should be 50 ohms. 3. Consult factory with door serial number.
F:420 (Over voltage DC Bus)	Brake resistor is receiving too much voltage from motor, resistor is defective, door slowing down too fast.	1. Confirm incoming power L1, L2, L3. 2. Ohm brake resistor, remove wires at terminals X200 and X201 from main board, reading should be 50 ohms. 3. Consult factory with door serial number.
F:425 (Power OV) <i>(power over voltage)</i>	High supply voltage. 1. Incoming voltage too high	Check parameter P:940 = incoming voltage to control board.
F:426 (Power Low) <i>(power low)</i>	Low supply voltage. 1. Incoming voltage too low	Check parameter P:940 = incoming voltage to control board.
F:430 (Temperature too low Limit 1)	Controller is too cold.	1. Move controller to warmer area. 2. Add heater to control panel. 3. Consult factory with door serial number.
F:435 (Temperature too high)	The control temperature is too high.	1. Mount the control in a cooler environment. 2. Install cooling fan. 3. Consult factory with door serial number.
F:440 (Over current DC bus limit 1)	Incorrect boost setting, mechanical bind.	1. Check door for mechanical binding. 2. Confirm incoming power L1, L2, L3. 3. Consult factory with door serial number.

SYSTEM PARAMETERS—DRIVE SYSTEM FAULT CODES (500-LEVEL CODES)

DRIVE SYSTEM FAULT CODES (500-LEVEL CODES)

Table 14 lists the fault codes associated with the drive system. Included in this table are the available fault codes, a description of each fault code, and the suggested corrective action to clear the fault.

NOTE: All 500-level codes are warnings indicating the maximum allowable value has been exceeded. The door will operate only in the failure error jog mode.

Table 14

Fault Code (Displayed Message)	Description	Corrective Action
F:510 (Mtr OC L2) <i>(motor over current limit 2)</i>	Over current. 1. Mechanical problem 2. Motor brake not releasing 3. Motor torque boost incorrectly set 4. Motor nameplate parameters (frequency, current, etc.) incorrectly set	1. Check operation of door. 2. Check brake. 3. Consult factory with door serial number.
F:511 (No DC Supply)	Voltage not going to the motor, may also have F:519 and 24 V error or over temperature.	1. Confirm incoming power L1, L2, L3. 2. Consult factory with door serial number.
F:512 (DC bus current faulty)	Motor not receiving voltage.	1. Confirm incoming voltage L1, L2, L3. 2. Consult factory with door serial number.
F:513 (Brake chopper over loaded)	The brake resistor is defective or missing.	1. Confirm incoming voltage L1, L2, L3. 2. Take ohm reading of brake resistor. Remove wires from terminals X200 and X201. Measure ohms, reading should be 50 ohms. 3. Consult factory with door serial number.
F:515 (Mtr OC Ext) <i>(motor over current external)</i>	Maximum motor over current. 1. Motor or motor connection problem 2. Incorrect motor parameters 3. Incorrect motor nameplate parameters	1. Check motor: Turn off power, disconnect motor leads and ground. Ohm windings T1-T2, T2-T3, and T1-T3 readings should be comparable. Also ohm each motor lead to ground, motor should not ohm to ground. 2. Consult factory with door serial number.
F:518 (Ground fault recognized)	Motor cable is shorted to ground.	1. Ohm motor windings, T1-T2, T2-T3, and T1-T3 readings should be similar. 2. Ohm T1, T2, T3 to ground. Should have no reading (open line). 3. Consult factory with door serial number.
F:519 (IGBT OC) <i>(insulated gate bipolar transistor over current)</i>	IGBT over current. 1. Faulty motor winding or motor shorted to ground 2. Incorrect motor parameters 3. Incorrect motor nameplate parameters	1. Check motor: Turn off power, disconnect motor leads and ground. Ohm windings T1-T2, T2-T3, and T1-T3 readings should be comparable. Also ohm each motor lead to ground, Motor should not Ohm to ground. 2. Consult factory with door serial number.

SYSTEM PARAMETERS—DRIVE SYSTEM FAULT CODES (500-LEVEL CODES)

Fault Code (Displayed Message)	Description	Corrective Action
F:520 (Over voltage in DC-bus Limit 2)	Brake resistor interference, defective, missing or feedback voltage from motor is too high.	<ol style="list-style-type: none"> 1. Confirm incoming voltage L1, L2, L3. 2. Take ohm reading of brake resistor. Remove wires from terminals X200 and X201. Measure ohms; reading should be 50 Ohms. 3. Consult factory with door serial number.
F:521 (Over voltage DC bus)	Motor feeds back too much power, input voltage too low.	<ol style="list-style-type: none"> 1. Confirm incoming voltage L1, L2, L3. 2. Take ohm reading of brake resistor. Remove wires from terminals X200 and X201 measure ohms; reading should be 50 Ohms. 3. Consult factory with door serial number.
F:524 (External 24 VDC supply is missing or too low)	Overload on the 24 VDC, NOT a short circuit, too much connected to the 24 VDC.	<ol style="list-style-type: none"> 1. Reduce 24 VDC devices in use. 2. Consult factory with door serial number.
F.525 (Power OV) <i>(power over voltage)</i>	High supply voltage (>+10%). Incoming voltage too high	Check incoming voltage. Check parameter P:940 = Incoming voltage to control board.
F:530 (Heat sink temperature outside of working range limit 1)	Temperature is too low for the controller.	<ol style="list-style-type: none"> 1. Move control to warmer area. 2. Add heater to control panel. 3. Consult factory with door serial number.
F:535 (Housing temperature too high)	Temperature inside the control panel is too high.	<ol style="list-style-type: none"> 1. Move control panel to cooler area. 2. Install fan inside control panel 3. Consult factory with door serial number.
F:540 (Over current in DC bus limit 2)	Motor working too hard, boost not adjusted properly, mechanical bind.	<ol style="list-style-type: none"> 1. Verify incoming supply voltage L1, L2, L3. 2. Check for mechanical bind. 3. Check if brake is releasing when attempting to operate. 4. Consult factory with door serial number.

SYSTEM PARAMETERS—DOOR POSITION FAULT CODES

DOOR POSITION FAULT CODES

Table 15 lists the fault codes associated with the position of the door. Included in this table are the available fault codes, a description of each fault code, and the suggested corrective action to clear the fault.

NOTE: The encoder is sensitive to electromagnetic interference (EMI) and many of the F:700 codes are the result of electromagnetic interferences. The encoder cable should be installed in conduit with low voltage wiring.

The encoder cable must be separated from the high-voltage wiring. All cables must be cut to length. **DO NOT** wrap up excess cable near the motor or in the control panel.

The encoder shield wire must also be grounded to the P-clip located under the System 4 board. **DO NOT** ground the encoder shield wire to the ground bus on the System 4 board. (See Figure 45.)

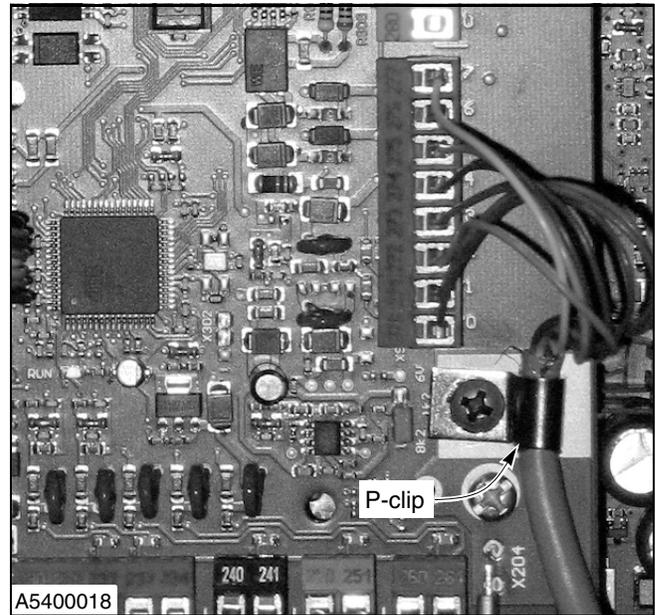


Figure 45

Table 15

Fault Code (Displayed Message)	Description	Corrective Action
F:700 (Pos Sys 1) (position system 1)	Door limits not set. 1. Set limits 2. Possible encoder failure	1. Set limit P:210. 2. Check encoder.
F:701 (CLOSE position not found in timer mode)	The close limit position was not reached or found during close.	1. Recognition time for the switch may be too low P:229. 2. Check mechanical operation of the motor brake. 3. Consult factory with door serial number.
F:702 (OPEN position not found in timer mode)	The OPEN limit position was not recognized during opening.	1. Recognition time for the switch may be too low P:239. 2. Check mechanical operation of the motor brake. 3. Consult factory with door serial number.
F:720 (Synchronization error in position sensing with incremental encoder)	Motor may be phased incorrectly, encoder not counting properly, door traveled beyond the limit switches during synchronization.	1. Check encoder for secure and proper mounting. 2. Verify encoder connections and proper grounding. 3. Consult factory with door serial number. NOTE: May also receive F:030 and F:031 errors in conjunction with F:720.

SYSTEM PARAMETERS—DOOR POSITION FAULT CODES

Fault Code (Displayed Message)	Description	Corrective Action
F:750 (Protocol Transmission Error)	Electrically noisy environment or defective hardware.	<ol style="list-style-type: none"> 1. Check encoder wiring connections and proper grounding. 2. Check motor connections and proper grounding. 3. Consult factory with door serial number.
F:751 (Synchronization FUE absolute encoder)	Electrically noisy environment or defective hardware.	<ol style="list-style-type: none"> 1. Check encoder wiring connections and proper grounding. 2. Check motor connections and proper grounding. 3. Consult factory with door serial number.
F.752 (Protocol 2)	Data transmission error. <ol style="list-style-type: none"> 1. Possible electromagnetic interference (EMI) to control system 2. Encoder problem 	<ol style="list-style-type: none"> 1. Shielded cable broken, no longer grounded, or not used where required. 2. Check encoder.
F.760 (Encoder 2)	Position of door does not correspond to position of encoder. <ol style="list-style-type: none"> 1. Possible electromagnetic interference (EMI) to control system 2. Encoder or encoder mounting problem 3. Incorrect resolution setting 	<ol style="list-style-type: none"> 1. Shielded cable broken, no longer grounded, or not used where required. 2. Check encoder. 3. Consult factory with door serial number.
F:761 (Distance Channel 1 & Channel 2 outside allowed window)	The encoder is not counting properly and values are outside the allowed settings.	<ol style="list-style-type: none"> 1. Check encoder wiring connections and proper grounding. 2. Check motor connections and proper grounding. 3. Consult factory with door serial number.
F.762	Limit switches incorrectly set. <ol style="list-style-type: none"> 1. Limit settings not valid or properly set 2. Open or partial limit settings out of range 3. Control system not initialized 	<ol style="list-style-type: none"> 1. Limits P.210 reset. 2. Reset limits. 3. Consult factory with door serial number.
F:763 (DES-B error)	The controller is not communicating with the encoder or the signals are not being received.	<ol style="list-style-type: none"> 1. Check encoder wiring connections and proper grounding. 2. Check motor connections and proper grounding. 3. Reset encoder. 4. Consult factory with door serial number.
F:766 (Internal error TST PD/PE)	Encoder not communicating or counting properly.	<ol style="list-style-type: none"> 1. Check encoder wiring connections and proper grounding. 2. Check motor connections and proper grounding. 3. Reset encoder. 4. Consult factory with door serial number.
F:767 (Over temperature TST PD)	Temperature of the encoder is too high.	<ol style="list-style-type: none"> 1. Place fan near encoder to lower temperature. 2. Reset encoder. 3. Consult factory with door serial number.
F.768	The F:768 message appears when the battery in the encoder needs to be changed.	Change battery in the encoder.

SYSTEM PARAMETERS—WIRELESS SYSTEM FAULT CODES

Fault Code (Displayed Message)	Description	Corrective Action
F:769 (Rotation speed of the PD shaft is too high. PD= Position device)	The encoder hub is turning too fast to properly count the increments.	<ol style="list-style-type: none"> 1. Mount encoder to different shaft. 2. Check encoder resolution P:202. 3. Consult factory with door serial number.
F.770 (Protocol 3)	Overflow from SSI encoder. Protocol 3 encoder.	<ol style="list-style-type: none"> 1. The current position of the door compared to the fixed closed position has exceeded the maximal allowed range of 4095 Increments. 2. Set P.202 (used resolution of the encoder) to a higher value and repeat limit setting. 3. Reset P.210 — reset limits. <p><i>NOTE: Fault F:760 may appear.</i></p>

WIRELESS SYSTEM FAULT CODES

Table 16 lists the fault codes associated with the control system. Included in this table are the available fault codes, a description of each fault code, and the suggested corrective action to clear the fault.

Table 16

Fault Code (Displayed Message)	Description	Corrective Action
F:852 (communication error between TST FSX and controller)	The control panel and the wireless encoder have not communicated for more than 1 minute.	<ol style="list-style-type: none"> 1. Check encoder wiring connections and proper grounding. 2. Check motor connections and proper grounding. 3. Check antenna for proper mounting and removal of packing materials. 4. Reset encoder. 5. Consult factory with door serial number.
F:853 (TST PE_FSBS operating voltage too low)	The operating voltage of the encoder is too low (less than 8V) and unable to send incremental signals.	<ol style="list-style-type: none"> 1. Check encoder wiring connections and proper grounding. 2. Check motor connections and proper grounding. 3. Reset encoder. 4. Consult factory with door serial number.
F.856	Wireless communication error between stationary and mobile units.	<ol style="list-style-type: none"> 1. Wrong address parametrized. 2. Mobile unit broken. 3. Battery empty. 4. Heavy wireless noise. 5. Stationary antenna broken or mounted wrong.
F.857	Battery low.	Reversing edge battery needs to be replaced. Replace with D size lithium ion battery 3.8 volts (Part number 00111193).

SYSTEM PARAMETERS—WIRELESS SYSTEM FAULT CODES

Fault Code (Displayed Message)	Description	Corrective Action
F:859 (Software Version)	The software versions of the stationary and mobile units are not compatible. The mobile unit is not communicating with the encoder.	<ol style="list-style-type: none"> 1. Check encoder wiring connections and proper grounding. 2. Check mobile unit address in the bottom bar and confirm this address is the same as entered in parameter P:F07. 3. Update EPROM or wireless software. 4. Consult factory with door serial number.
F:860 (Internal fault stationary unit)	Internal system fault within the wireless encoder unit.	<ol style="list-style-type: none"> 1. Check encoder wiring connections and proper grounding. 2. Check motor connections and proper grounding. 3. Reset encoder. 4. Consult factory with door serial number.
F:861 (Internal fault mobile unit)	Internal system fault on the mobile unit.	<ol style="list-style-type: none"> 1. Check encoder wiring connections and proper grounding. 2. Check motor connections and proper grounding. 3. Check mobile unit connections. 4. Verify mobile unit address matches P:F07. 5. Reset encoder. 4. Consult factory with door serial number.
F:862 (Internal positioning system error)	Internal error of the encoder positioning system, probably a loose encoder hub magnet.	<ol style="list-style-type: none"> 1. Check mechanical mounting of encoder. 2. Check that encoder hub is securely attached. 3. Check encoder connections and proper grounding. 4. Reset encoder. 5. Consult factory with door serial number.
F:867 (Address of mobile unit not set)	The mobile unit address has not been entered into parameter P:F07.	<ol style="list-style-type: none"> 1. Check the mobile unit address on the green plastic block of the mobile unit in the bottom bar, Verify this is the same number in P:F07. 2. Consult factory with door serial number.
F:900 (Internal Error)	The controller has not been defaulted to a door type or the default was unsuccessful.	<ol style="list-style-type: none"> 1. Consult factory with door serial number.
F:910 (No communication to expansion board possible)	The controller does not recognize the expansion board.	<ol style="list-style-type: none"> 1. Check connections of ribbon cables from main power board to expansion board. 2. Check the value of P:800. 3. Consult factory with door serial number.
F:911 (ROM Error)	Controller has the wrong EPROM or EPROM has been swapped from another board. Too much electrical noise in area or control not grounded properly.	<ol style="list-style-type: none"> 1. Check for proper grounding of supply voltage. 2. Check proper grounding of wireless encoder. 3. Consult factory with door serial number.

SYSTEM PARAMETERS—WIRELESS SYSTEM FAULT CODES

Fault Code (Displayed Message)	Description	Corrective Action
F:912 (RAM Error)	Defective hardware or electrical noise.	<ol style="list-style-type: none"> 1. Check for proper grounding of supply voltage. 2. Check proper grounding of wireless encoder. 3. Consult factory with door serial number.
F:915 (Communication error between main processor and I/O processor)	Defective hardware, electrical disturbances, or temperature too high.	<ol style="list-style-type: none"> 1. Check for proper grounding of supply voltage. 2. Check proper grounding of wireless encoder. 3. Unplug and reconnect all ribbon cables on the boards. 4. Consult factory with door serial number.
F:916 (Error reading USB stick)	Communication with USB stick is not possible, USB stick is write protected or contains unknown file.	<ol style="list-style-type: none"> 1. USB stick may need to be reformatted to FAT 32 format. 2. Consult factory with door serial number before reformatting.
F:920 (Internal 2.5V reference voltage incorrect)	Hardware defect.	Consult factory with door serial number.
F:921 (Internal 15V voltage incorrect)	Hardware defect.	Consult factory with door serial number.
F:922 (E-Stop chain not complete)	The E-Stop chain is not complete. There are 3 E-Stop terminals on the control board: position X24 terminals 240 and 241, X25 terminals 250 and 251, X26 terminals 260 and 261. One of those E-Stop jumpers is missing or external E-Stop button not wired correctly.	<ol style="list-style-type: none"> 1. Check E-Stop connections at terminals 240 and 241, 250 and 251, 260 and 261. 2. If external E-Stop button is used, contact must be normally closed. Verify contact normally closed. 3. Consult factory with door serial number.
F:923 (DC bus voltage measuring is not plausible)	Strong electrical disturbance or defective hardware.	<ol style="list-style-type: none"> 1. Check supply voltage L1, L2, L3 for proper grounding. 2. Consult factory with door serial number.
F:925 (Testing of the third shutdown method failed.)	Defective hardware.	Consult factory with door serial number.
F:926 (Bad braking current)	The expected braking current as defined by parameter P:183 was exceeded by more than 0.5 amps.	<ol style="list-style-type: none"> 1. Check value of P:183. 2. Consult factory with door serial number.
F:927 (Faulty testing TLG)	Door equipped with TLG light curtains are tested upon opening; error indicates the test was unsuccessful.	<ol style="list-style-type: none"> 1. Check wiring for the TLG light curtains. 2. Check for proper alignment of the TLGs. 3. Clean the lens of the TLGs. 4. Consult factory with door serial number.

SYSTEM PARAMETERS—WIRELESS SYSTEM FAULT CODES

Fault Code (Displayed Message)	Description	Corrective Action
F:928 (Faulty input testing)	The controller tests the safety and E-Stop inputs each time the door opens; the test was unsuccessful.	<ol style="list-style-type: none"> 1. Check wire connections of safety devices. 2. Check wire connections for the E-Stop inputs. 3. Confirm alignment of photo eyes. 4. Consult factory with door serial number.
F:929 (Faulty K stop relay)	The testing of the stop relay was unsuccessful.	<ol style="list-style-type: none"> 1. Check wire connections of all E-Stop inputs. 2. Consult factory with door serial number.
F:930 (External watchdog incorrect)	Defective hardware or noisy electrical environment.	<ol style="list-style-type: none"> 1. Check supply voltage L1, L2, L3 for proper grounding. 2. Consult factory with door serial number.
F:931 (ROM error)	Wrong EPROM, defective hardware, or noisy electrical environment.	<ol style="list-style-type: none"> 1. Check supply voltage L1, L2, L3 for proper grounding. 2. Consult factory with door serial number.
F:932 (RAM error)	Defective hardware.	<ol style="list-style-type: none"> 1. Check supply voltage L1, L2, L3 for proper grounding. 2. Consult factory with door serial number.
F:933 (Wrong frequency of CPU)	The clock frequency of the processor is wrong.	<ol style="list-style-type: none"> 1. Check supply voltage L1, L2, L3 for proper grounding. 2. Consult factory with door serial number.
F:934 (RAM test not ready)	Error appears on new controllers in the first 20 seconds after turning ON, before the RAM test begins.	<ol style="list-style-type: none"> 1. Allow the controller to perform the RAM test. 2. Do not remove USB stick or cycle power during this message; this will lengthen the test time. 3. Consult factory with door serial number.
F:935 (Stack error)	While programming a new controller the information is getting repeated, creating a stack error. The controller is unable to process the information.	Consult factory with door serial number.
F:941 (ROM error of I/O processors)	The controller is unable to access the ROM of the I/O processor.	Consult factory with door serial number.
F:942 (RAM error of I/O processors)	The controller is unable to access the RAM of the I/O processor.	Consult factory with door serial number.
F:960 (Wrong parameter checksum)	A new EPROM has been installed or the controller has not been programmed.	Consult factory with door serial number.
F:961 (Checksum from calibration values)	A new EPROM has been installed or the controller has not been programmed.	Consult factory with door serial number.

SYSTEM PARAMETERS—WIRELESS SYSTEM FAULT CODES

Fault Code (Displayed Message)	Description	Corrective Action
F:962 (Converter parameters not plausible)	A new EPROM has been installed or the controller has not been programmed.	Consult factory with door serial number.
F:963 (Ramp parameters not plausible)	A new EPROM has been installed or the controller has not been programmed.	Consult factory with door serial number.
F:964 (Program version / manufacturer code)	A new EPROM has been installed or the controller has not been programmed.	Consult factory with door serial number.
F:965 (Faulty door cycle counter with active emergency opening)	The door cycle counter doesn't count or is faulty. No emergency opening test can be performed.	Consult factory with door serial number.
F:966 (Hardware unknown)	Wrong software was programmed into the controller or the programmed software does not know the hardware version.	Consult factory with door serial number.
F:968 (Programming error with real time clock)	The clock program is not plausible.	<ol style="list-style-type: none"> 1. Set clock to current date and time. 2. If using clock to run a program, event cycle must be plausible. 3. Consult factory with door serial number.
F:969 (Internal error real time clock)	The clock has an error.	<ol style="list-style-type: none"> 1. Set clock to current date and time. 2. Consult factory with door serial number.
F:970 (Plausibility Parameter block error)	Controller not programmed, new EPROM version and one of the parameters is not plausible.	Consult factory with door serial number.

DELAY TIMERS

Table 17 lists the delay timers associated with the control system. Included in this table are the available timers and their descriptions.

Table 17

Delay Timer	Description
Acl1 = x Sec	Auto close delay timer 1. (Terminals 210 and 212)
Acl2 = x Sec	Auto close delay timer 2. (Terminals 230 and 233)
Acl3 = x Sec	Auto close delay timer 3. (Can be programmed to any output)

MISCELLANEOUS MESSAGES

DOOR MESSAGES

Table 18 lists the miscellaneous messages associated with the control system. Included in this table are the available displayed messages and a description and definition of each message.

Table 18

Displayed Message	Description
Door Held Open	Door held open. Input terminal shown in lower right of display.
Door Is Closing	Door is closing.
Door Is Open	Door open in full-open position.
Door Is Opening	Door is opening.
Door Is Stopped	Door is stopped — controller waiting for next incoming command.
Emergency Jog	Door travel possible in jog mode only — all safety and limits ignored.
Emergency Stop	One of the emergency stops is activated.
Error Jog ⚡ Only	Door fault — door travel in jog mode only.

Displayed Message	Description
Jog Mode ⚡	Manual door operation — jog mode only. To enter and exit jog mode, push stop and down arrow simultaneously.
Locked Closed	Door locked in closed position. Input terminal shown in lower right corner of display.
Partial Open Position	Door in partial-open position.
Rytec Door Type	Cycle count.
Set Limits	Start limit set-up procedure.

SPECIAL STATUS MESSAGES

Table 19 lists the special status messages associated with the control system. Included in this table are the available displayed messages and a description and definition of each message.

Table 19

Displayed Message	Description
Automatic	Denotes controller in automatic mode.
Jog Mode	Denotes controller in jog mode. To enter and exit jog mode, push stop and down arrow simultaneously.

DOOR LIMIT MESSAGES

Table 20 lists the door limit messages associated with the control system. Included in this table are the displayed messages and a description of each message.

Table 20

Displayed Message	Description
! Set Limits !	Limit set-up initialization.
→ ● To Begin	Initialize limit setting.
→⚡ To Closed Pos.	Close limit set-up.
→⚡ To Open Pos.	Open limit set-up.
→⚡ To Part. Pos.	Partial limit set-up.

MISCELLANEOUS MESSAGES—DOOR JOG MESSAGES

Displayed Message	Description
Close Limit Set	Close limit setting.
Hold ● If Ok	Save limit setting.
Open Limit Set	Open limit setting.
Part. Limit Set	Partial limit setting.

DOOR JOG MESSAGES

Table 21 lists the door jog messages associated with the control system. Included in this table are the displayed messages and a description of each message.

Table 21

Displayed Message	Description
Bynd Opn P. (beyond open position)	Door jogged past full-open position.
Jogg. Close (jog close)	Jogging door closed with down (▼) key.
Door Is Opn (door is open)	Door jogged fully open, additional door open travel not possible.
Door Is Cls (door is closed)	Door jogged fully closed, additional door close travel not possible.
Jogg. Open (jog open)	Jogging door open with (▲) key.

DOOR STATUS MESSAGES

Table 22 below lists door status messages associated with the control system. Included in this table are the displayed messages and a description of each message.

Table 22

Displayed Message	Description
I.060	Self repair after door ajar in progress.
I.080	Maintenance required soon — service counter nearly expired.

Displayed Message	Description
I.100 Open Spd. (check open speed)	Excessive door speed near full-open position. Open speed is too high; check P:310 opening speed in Hertz.
I.150 Close Spd. (check close speed)	Excessive door speed near full-closed position. Closing speed too high; check P:350 closing speed in Hertz.
I.160 Close Req. (close requested)	Continuous OPEN still active. Close requested; however, door is still receiving an open command. Look for activator sending open signal(s) request. For example, a stuck pull cord (not releasing).
I:161 Priority not active	Inputs can be prioritized. For instance, if loop is active and the down arrow was pushed, a close command is sent to the controller; however, the door remains open because the loop is the priority input. Message I:161 will be present when arrow is pushed and the loop is active.
I.170 Timed Open (timed open)	Forced opening being performed. This is performed with parameter P:018. The value is in minutes and the factory setting is 0. Entering a value will cause the door to open when the time is reached. This feature is often used in freezer door applications.

MISCELLANEOUS MESSAGES—DOOR STATUS MESSAGES

Displayed Message	Description
I:180 Waiting for keypad command	Control of the door is performed through the keypad of the control panel or selected inputs are programmed to function similar to the keypad. An example may be a guard shack. The guard controls the door from the guard shack; therefore, the I:180 message may appear when the door is waiting to close.
I:185 Wait for reset by stop keypad.	The controller is waiting to be reset by the reset button on the keypad. This can also be performed remotely by programming an input to perform as the keypad reset on the control panel.
I:186 The controller will shut down after a user reset (3 finger reset)	This message appears after a 3 finger reset. A 3 finger reset is when all 3 buttons (open, stop, and close) are pushed and held simultaneously. The controller does a shut-down and automatically resets. Additional messages will be displayed as the controller resets. Allow the controller to reset. DO NOT interrupt the reset process. This may take 3–5 minutes to reset. This reset doesn't change or alter any of the parameter settings. This process is similar to turning the power OFF and ON.
I.199 Counter Err (counter error)	Door cycle counter error.

Displayed Message	Description
I:200 Reference position corrected or recognized	This message may appear after the door has finished calibrating. The door has recognized the door is traveling differently and is trying to adjust to the new position. If message continues to appear, check encoder mounting and grounding of encoder drain wire. The error code F:030 Motor Stall will likely appear shortly after the I:200 message.
I.300 Air Locked (air locked)	Locked by another door.
I.310 Open A12 (open A12)	Door open command initiated to other door in air lock.
I.400 HD Limit (freezer only)	Hard door not open. In freezer applications, Rytec sends additional switches that turn the defrost heaters OFF if an insulated door is used on site. The switches activate and deactivate the defrost system. The electrical schematic states if the switches are not used, jumper wires must be installed for the defrost to operate. If the jumpers are not installed, the informational message "I:400 HD Limit" and "I:401 Defrost Off" will be displayed on the screen.

MISCELLANEOUS MESSAGES—DOOR STATUS MESSAGES

Displayed Message	Description
I.401 Defrost Off (freezer only)	Defrost deactivated. In freezer applications, Rytec sends additional switches that turn the defrost heaters OFF if an insulated door is used on site. The switches activate and deactivate the defrost system. The electrical schematic states if the switches are not used, jumpers wires must be installed for the defrost to operate. If the jumpers are not installed, the informational message "I:400 HD Limit" and "I:401 Defrost Off" will be displayed on the screen.
I.510 Auto Calibration	Limit switch correction finished. The 500-level messages appear on the screen after the door limits have been set. DO NOT make any corrections to the speeds or limits while the 500-level messages are present on the screen. <i>NOTE: The door may stop short of the close position and speed up and slow down during the 500 messages; this is normal. Continue operating the door until the 500-level messages leave the screen. During the 500-level messages, the controller is self-learning the optimum run curve for the door. After the 500-level messages leave the screen, you can then make corrections to the limits if necessary. This message is for all 500-level messages.</i>
I.515 Auto Calibration	Controller is preparing automatic teach-in of the limit switches.

Displayed Message	Description
I.520	Maximum speed during automatic limit switch correction is not reached.
I.555 Auto Calibration	Limit switches being corrected.
I:901 Wait for USB stick	The USB stick is initializing; allow the message to clear before beginning.
I:902 Update file not found on USB stick	The controller was told to download the new files off the USB stick; however, the USB contains no new files.
I:903 Cannot open file	The controller recognizes a new file is present; however, file format or type is incorrect.
I:904 Deleting ROM	The controller has been told to delete the ROM.
I:905 Programming ROM	The controller has been told to program the ROM.
I:906 Update file has the wrong format.	Controller recognizes a new file is present but is unable to read the file due to incorrect file or format.
I:908 RS485 encoder interface	The encoder connected via RS485 connection.
I:915 Testing Successful	The controller performs a test of the entire system, and the test was successful.
I:916 Error reading USB stick	The controller tried to read the data stored on the USB stick but is unable to read because file format is incorrect or the USB stick is write protected or full of data.
I:917 Log function is being initialized	The controller is reading and writing information to the USB stick and places the door in an idle mode until this process is completed.

MISCELLANEOUS MESSAGES

Displayed Message	Description
I:927 TLG testing not successful	The controller tests for the presence of the TLG light curtains. this message appears if the test is unsuccessful. TLG wired incorrectly, dirty, or out of alignment. Only used for Effaflex TLG light curtains.
I:928 No TLG testing done	Controller knows the TLGs are connected to the controller, but the testing process has been turned OFF.
I:940's ALL 940-94F ERRORS in relation to parameter files	The controller may display a number of the I:940 messages. The I:940 messages indicate either the parameter file cannot be loaded due to wrong type of file, write protected, storage is full, content is not valid in the parameter file, or of unknown error.

PROGRAMMABLE TEXT MESSAGES

Table 25 lists the programmable text messages associated with each input of the control system. Included in this table are the available text messages and their description.

Table 23

Text Message Number	Description
1 (Open)	Open door. (Terminals 200 and 201)
2 (Open — ACL1)	Open/close with ACL1 timer. (Terminals 210 and 212)
3 (Open — ACL2)	Open/close with ACL2 timer. (Terminals 230 and 233)
4 (A/A Op — C1)	Door open and close. (Terminals 210 and 211)
5 (Close)	Close door. (Terminals 200 and 202)

Text Message Number	Description
6 (Stop)	Stop door. (Normally closed: remove jumper terminals 200 and 203)
7 (Photoeye — Fr)	Front photo eye. (Terminal 222)
8 (Photoeye — Rr)	Rear photo eye. (Terminal 232)
9 (Photoeye — Aux)	Auxiliary photo eye.
10 (Door Ajar)	Breakaway bottom bar disconnected from side column. (Terminal 271)
11 (Blower On)	Freezer blower on.
12 (Blower High)	Freezer blower on high.
13 (Blower Auto)	Freezer blower on auto.
14 (Heater St.1)	Freezer heater stage 1 or heat lamps on.
15 (Heater St.2)	Freezer heater stage 2 on.
16 (Heater St.3)	Freezer heater stage 3 on.
17 (Heater Auto)	Freezer heater on auto.
18 (HW Interlock)	Freezer hard door interlock.
19 (Jog Mode)	"Jog Mode" displayed on screen.
20 (permanent open)	"Permanent Open" displayed on screen.
21 (crossing traffic)	"Crossing traffic" displayed on screen.
22 (Deactivation)	"Deactivation" displayed on screen.
23 (reference switch)	"Reference switch" displayed on screen.
24 (Clean Mode)	"Clean Mode" displayed on screen.
25 (Locked Close)	"Locked Close" displayed on screen.
26 (Beam Blocked)	"Beam Blocked" displayed on screen.
27 (Beam Error)	"Beam Error" displayed on screen.

TROUBLESHOOTING—TROUBLESHOOTING WITH STATUS LEDs

Text Message Number	Description
52 (Safety Edge)	“Safety Edge” displayed on screen.
56 (Deactivation intermediate stop)	“Deactivation intermediate stop” displayed on screen.

TROUBLESHOOTING

TROUBLESHOOTING WITH STATUS LEDs

If a problem occurs with the control system or the door, the controller is configured with various light-emitting diodes (LEDs) that can be helpful when troubleshooting the problem. The LEDs are grouped in various functions and indicators as detailed in Figure 46. Table 24 details the interpretation of each group of LEDs.

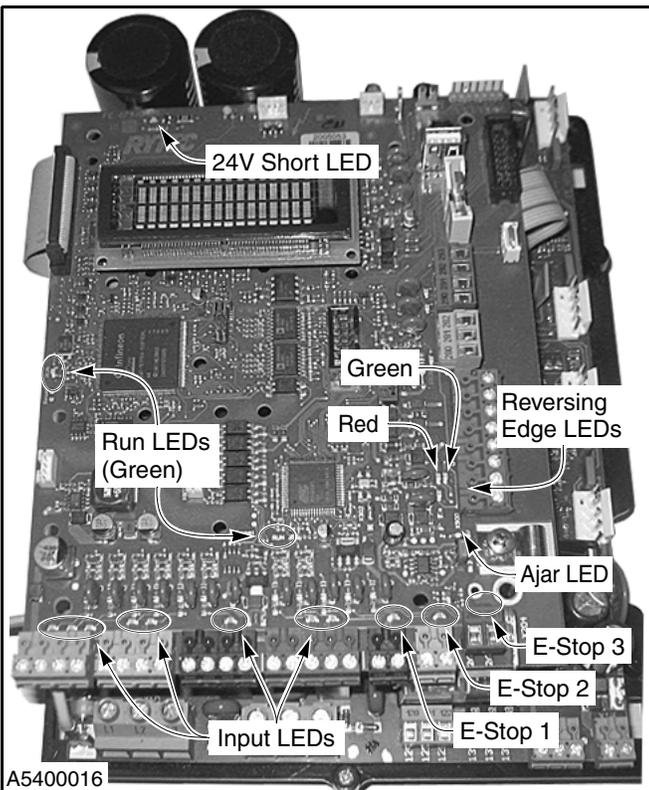


Figure 46

Table 24

LED Group	Associated LED Function
Emergency Stop Chain LEDs	<p><i>NOTE: Reference Figure 46 for LED location.</i></p> <p>1 = E-Stop 1 First External E-Stop 2 = E-Stop 2 Second External E-Stop 3 = E-Stop 3 Third External E-Stop</p> <p><i>Note: LEDs E-Stop 1, 2, and 3 must all be on for normal operation.</i></p>
Input LEDs (LEDs on = contact connection closed LEDs off = contact connection open)	
Reversing Edge LEDs (Green and red)	<p>Normal operation = red is OFF and green is ON. 0 ohms (short) = red and green are both OFF. Infinite ohms (open) = both red and green LEDs are ON.</p>
24 V Short LED Red in color <i>Note: See Figure 41 for clear bulb on main board, which also lights when 24 VDC system short = flashing LED</i> <i>Note: If the 24 V power supply is overloaded or has a defective device (such as a shorted photo eye) connected to it, the power supply will automatically power down for self-protection.</i>	
Run LED	<p>There are two green LED's. The left one flashes with the speed of the door (power to micro-board). The other flashes at a constant rate (power to main board).</p>

SPECIFICATIONS

MECHANICAL

Table 25

Enclosure Dimension L x W x H (approx.) Materials Heat Sink	Black plastic w/semi-transparent cover window 16 3/4 x 8 1/4 x 7 3/4 inches (425 x 210 x 195 mm) • includes heat sink, brake resistor, and wall brackets • excludes cable glands, optional switches, and circuit breakers Polycarbonate Macrolon (no silicone) Aluminum (natural)
Board Dimension	Approx. 10.5 x 8 x 5.5 inches (270 x 200 x 140 mm)
Mounting Brackets	Wall brackets integrated in bottom side of enclosure Vertical installation only
Weight	Approx. 11 lb. (5 kg)
Protection Class/Rating	TST FU3R-A: UL Type-4X Standard Enclosure TST FU3R-AP: open type (Pollution Degree 2 environment only)
Operating Temperature Range: Ambient Storage	Enclosed type/open type (vertically mounted) –4 to 122/149°F (–20 to 50/65°C) at 50% duty cycle of max. motor load –4 to 113/140°F (–20 to 45/50°C) at 83% duty cycle of max. motor load –4 to 104/131°F (–20 to 40/55°C) at 100% duty cycle of max. motor load –13 to 158°F (–25 to 70°C)
Relative Humidity	Up to 80% (non-condensing)
Vibration	Low vibration installation, e.g., on a concrete wall
Conduit Entry	Formed plastic conduit bosses (appropriately sized holes for conduit must be drilled in boss locations)
Internal Power Consumption	Max. 50 W Fully assembled controller w/o running motor
Approval	UL-listed power conversion equipment for USA and Canada Inverter control: UL 508C 24 V power supply output: Class 2
Marks/Stickers	TST FU3-AP: UL/UR sticker and serial number TST FU3P-A: UL sticker, serial number “WARNING High Voltage” provided by Rytex.
Clock	24-hour real-time clock with integrated gregorian calendar 4-channel electronic timer Accuracy limit: Max. 5 sec/day over full temperature range
Battery	Socket prepared for lithium coin cell CR2032 (3 V)

SPECIFICATIONS—INPUTS

INPUTS

Table 26

Power Supply (Line Voltage)	Standard 185–500 volt, single- or three-phase External Fuse: 20 amp, class CC
Emergency Stop/Safety Chain (E-Stop 1, 2, and 3) Factory Setting:	All inputs have to be connected potential free Contact ratings: 0 to 26 VDC and 10 to 200 mA <5V: inactive →logical 0 >7V: active →logical 1 Indicated by individual LEDs When safety chain is interrupted, no movement of the drive is possible, not even in jog mode. Jumpered as in TST FU3P-A
Standard Inputs (IN1–IN10) Inputs 2 and 3 are dedicated photo eye inputs and require that only specific photo eye connections are made to these two specific inputs. No other electrical connection should be made to these two photo eye inputs or power source.	24 VDC / typ. 15 mA, max. 26 VDC / 20 mA All inputs have to be connected potential free or: <5V: inactive →logical 0 >7V: active →logical 1 Indicated by individual LEDs Min. signal duration for input control commands: > 100 ms
Input for Safety Edge	For electrical safety edges with 1.2K ohm or 8.2K ohm resistance evaluation and for dynamic optical systems. 3 status conditions are indicated by LEDs: 0 ohms (short), 1.2/8.2K ohms, infinite ohms (open).
Keypad 3 Button: 2 LED Outputs:	24 VDC/typ. 15 mA Common connected to 24 V, 5-pole connector, 1/10 reference grid 24 VDC/max. 20 mA LED only Short and overload protection Mainly prepared for flashing light on keyboard
Inputs INK1 and INK2 (Alternative: digital control inputs IN11 and IN12)	24 VDC/max. 20 mA load <5 V: inactive→logical 0, >16 V: active→logical 1 indicated by individual LEDs Incremental encoder specification: <ul style="list-style-type: none"> • Maximum frequency 1 kHz • 90° offset between both input signals
Serial Interfaces RS485 A and B	Asynchronous bidirectional serial interface for electronic limit switches, wireless safety equipment, and other special equipment from RS485 level, terminated with 100 ohms
USB Host Connector: Max. Supply: Max. Cable Length: Alternative USB Device Connector: Max. Cable Length:	For USB-Memory stick w/PC compatible file organization (USB profile “Mass Storage”, Sub Class Code “SCSI Transparent Command Set” (6), Interface Protocol “Bulk Only Transfer” (5), Logical Unit Number (LUN 0), no hubs possible Type A 100 mA 7 ft. (2 m) For PC communication with protocol (service only) (communication devices simulate virtual serial port) Type B 7 ft. (2 m)

Interface Bus I Max. Distance:	TTL communication line For internal mounted I/O expansion board TST RFUxK only 4 in. (10 cm)
Interface Bus II Max. Distance:	TTL communication interface to interface converter board TST RFUxCom for communication with external mounted I/O expansion board TST RFUxK 100 ft. (30 m)
Interface Bus III Max. Distance:	TTL communication interface to interface converter board TST RFUxCom for communication with a second prepared door controller TST FURR 100 ft. (30 m)

OUTPUTS

Table 27

Supply Output I Max. Load:	Nominal value: 24 VDC \pm 5% 3.5 A (includes brake, all plug-in modules, expansion boards, and supply output II, etc.) Overload protected by self-resetting semiconductor fuse Short circuit protected by central switching regulator (switch off the complete control system supply)	
Supply Output II (Part of Supply Output I)	For electronic limit switches and safety edge evaluation Nominal value 11.3 V/max. 250 mA Overload protected, short circuit proof, and self-resetting	
Motor/Drive Output Overload: Max. Length of Motor Cable:	3 hp motor (derating for single phase supply) 5 Amps @ 480 V service voltage 10 Amps @ 230 V service voltage 20 A for 0.5 seconds (motor overload protection is provided) 100 ft. (30 m) Shielded cable is required; motor lines have to be separated from any other wires. A separate motor contactor is NOT provided. ATTENTION: High voltage on output terminals is also possible in E-STOP mode.	
Brake Output	24 VDC/2.5 A (supplied by internal power) Electrical switch (e.g, transistor based) 2-pole plugable terminal Short and overload protected Prepared for SEW brake BMG4T, 40 Nm, 56 AC/24 DC Additional noise suppression on electromechanical brake required (e.g, RC)	
Auxiliary Relays Outputs (115 V is more important than plugable terminals)	Change over contact elements Potential free 250 VAC/ $1/3$ hp 30 VDC/max. 10A/min. 10 mA Pilot duty B300, R300	250 V permitted only when connecting the same phase as the supply voltage. Contacts used once for power switching (>100 mA) can no longer switch low currents.
Brake Resistance Load	Max. 2 hp (1.5 kW) for max. 0.5 seconds Repetition rate min. every 20 seconds Brake resistor is mounted on the heat sink	
Relay Outputs	If inductive loads are switched (e.g., additional relays), they must be equipped with recovery diodes and appropriate noise suppression means (e.g, regenerate diodes, varistors, RC elements) Be careful in switching capacitive loads as they are often in external power supplies or LED lights.	

SPECIFICATIONS—PLUG-IN MODULES (OPTIONAL ITEMS)

Test Signal Output	24 VDC/min. 10 mA/max. 100 mA Resistance load only Short and overload protected Mainly prepared for test inputs on photo eyes
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PLUG-IN MODULES (OPTIONAL ITEMS)

Table 28

Plug-In Modules	TST SFSS: TST SUVEK:	2-channel radio receiver module 2-channel induction loop detector module w/terminals on board (alternative TST SUKS—second resistor evaluation or other safety equipment)
Expansion Board		TST RFUxK TST RFU3P (Freezer) is NOT provided
Communication Board		TST RFUxCOM
Display Direction Board		TST RLCCDR-A
Wireless Safety Edge		2.4 to 2.485 GHz, using frequency hopping N.O. (normally open) switch with 8.2K-ohm resistor located in the door bottom bar

ABBREVIATIONS

Table 29 lists the abbreviation of each unit of measurement referenced throughout the control system program menu and this manual.

Table 29

Unit	Abbreviation
Celsius	°C
Counter	Cnt
Current (Ampere)	A
Cycles	Cyc
Digits	Dig
Fahrenheit	°F
Gigahertz	GHz
Hertz (Frequency)	Hz
Horsepower	hp
Increments	Inc
Milliampere	mA
Megahertz	MHz
Milliseconds	Ms
Minute	Min
Number	#

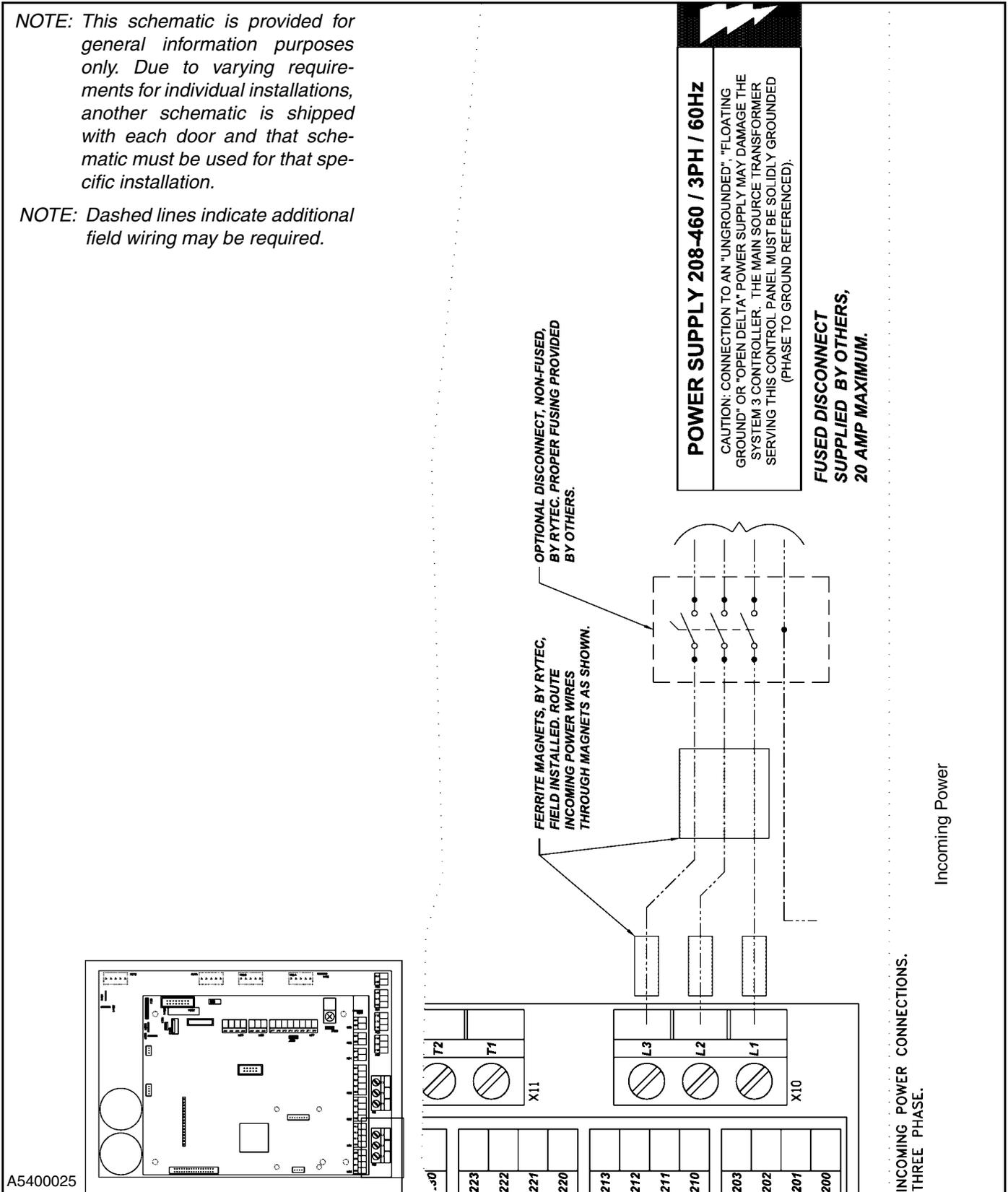
Unit	Abbreviation
Percentage	%
Seconds	Sec
Voltage (Volt)	V
Alternating Current Voltage	VAC
Direct Current Voltage	VDC

SCHEMATICS

GENERAL — INCOMING POWER

NOTE: This schematic is provided for general information purposes only. Due to varying requirements for individual installations, another schematic is shipped with each door and that schematic must be used for that specific installation.

NOTE: Dashed lines indicate additional field wiring may be required.



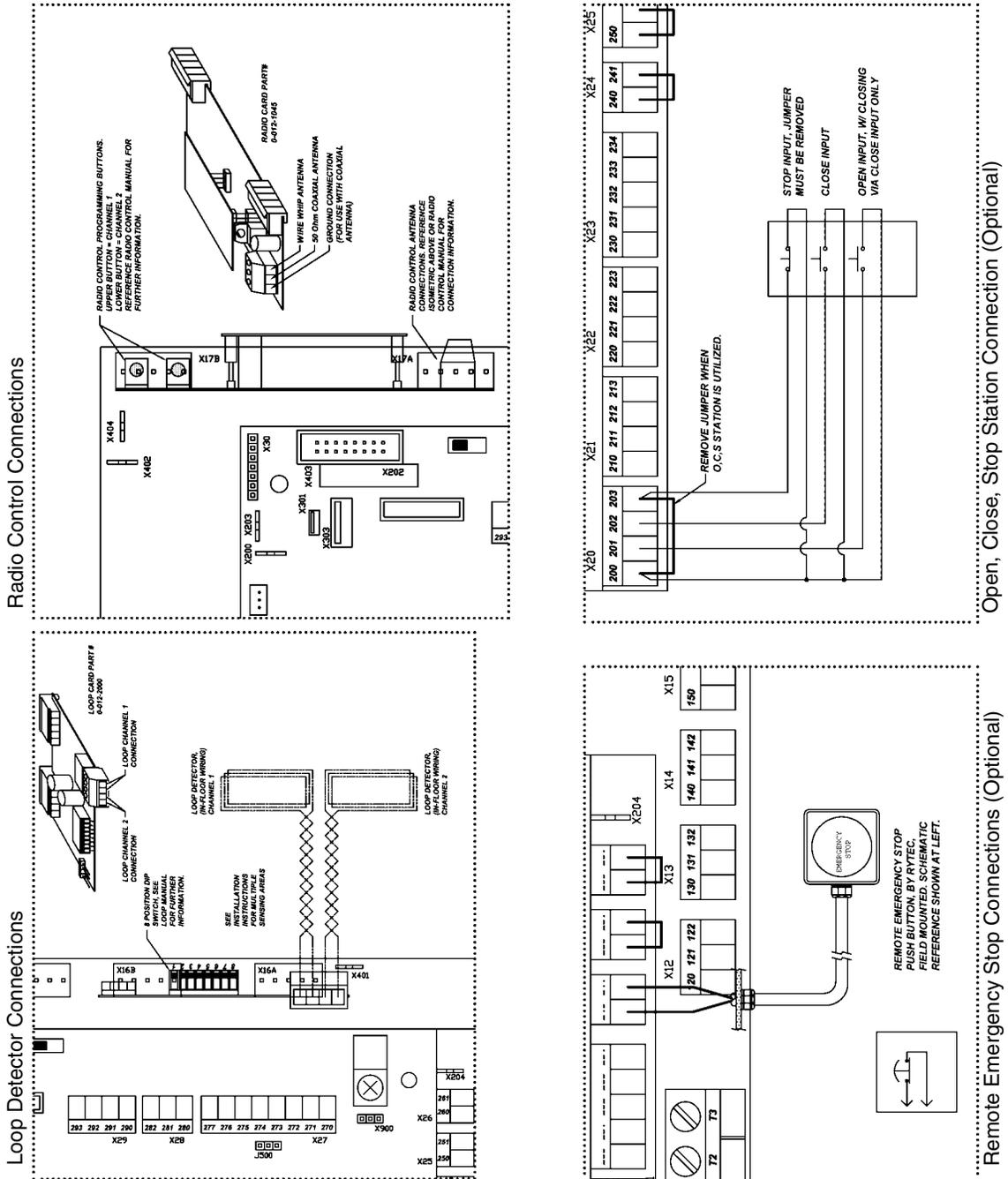
A5400025

Figure 47

GENERAL — RADIO CONTROL AND E-STOP

NOTE: This schematic is provided for general information purposes only. Due to varying requirements for individual installations, another schematic is shipped with each door and that schematic must be used for that specific installation.

NOTE: Dashed lines indicate additional field wiring may be required.



A5400027

Figure 49

GENERAL — CONTROLLER DIMENSIONS

NOTE: This schematic is provided for general information purposes only. Due to varying requirements for individual installations, another schematic is shipped with each door and that schematic must be used for that specific installation.



A5400011

Figure 51

PARTS LIST

PARTS ORDERING INFORMATION

How to Order Parts

1. Identify the parts required by referring to the following pages for part numbers and part descriptions.
2. To place an order, contact your local Rytec representative or the Rytec Technical Support Department at 800-628-1909 or 262-677-2058 (fax).
3. To ensure that the correct parts for your controller are shipped, please include the serial number of your door with the order. Refer to the owner's manual of your door to determine the location of the serial number plate. The serial number plate is generally located inside one of the side columns. (See Figure 52.)

SERIAL NUMBER(S)

Your **DOOR SERIAL NUMBER** information can be found in three universal locations. These are at the inside of either side column (approximately eye level), on the drive motor, and on the inside door of the System 4 control panel.

IMPORTANT: *When installing multiple doors of the same model but in different sizes, verify the serial number in the control panel with the one on the door assembly.*

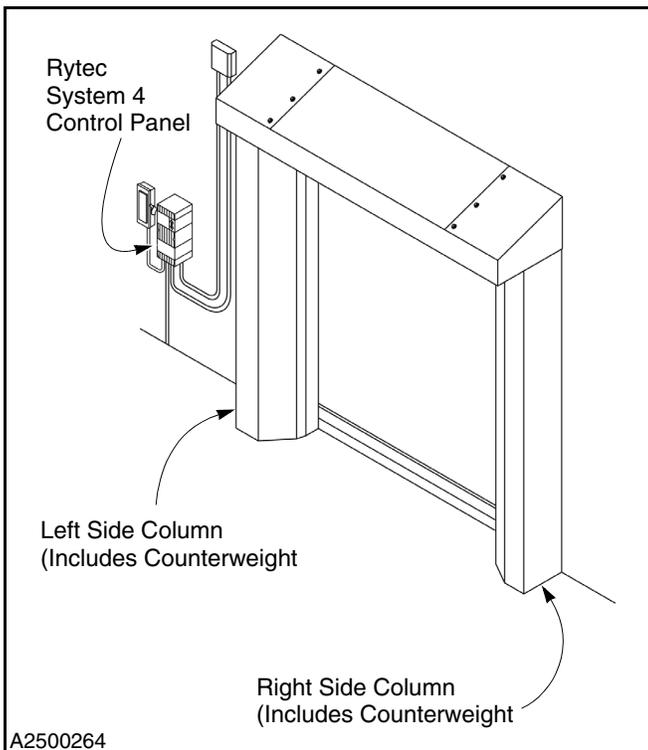


Figure 52

Substitute Parts

Due to special engineering or product enhancement, the actual parts used on your control system may be different from those shown in this manual.

If a part has been improved in design and bears a revised part number, the improved part will be substituted for the original part ordered.

Return of Parts

Rytec will not accept the return of any parts unless they are accompanied by a Return Merchandise Authorization (RMA) and incident numbers form.

Before returning any parts, you must first contact the Rytec Technical Support Department to obtain authorization and an RMA and incident numbers form.

NOTE: *You must provide the door serial number for all control panels and enclosures. The door serial number can be found on a white decal inside the control panel door.*

CONTROL PANEL — STANDARD PANEL



Figure 53

ITEM	QTY.	PART #	DESCRIPTION
1	1	Consult Factory	System 4 Control Panel Assembly, 200–500 V
2	1	00122000	Loop Module
3	1	0012161	Radio Control Receiver
4	1	00111193	Battery, D w/tabs

