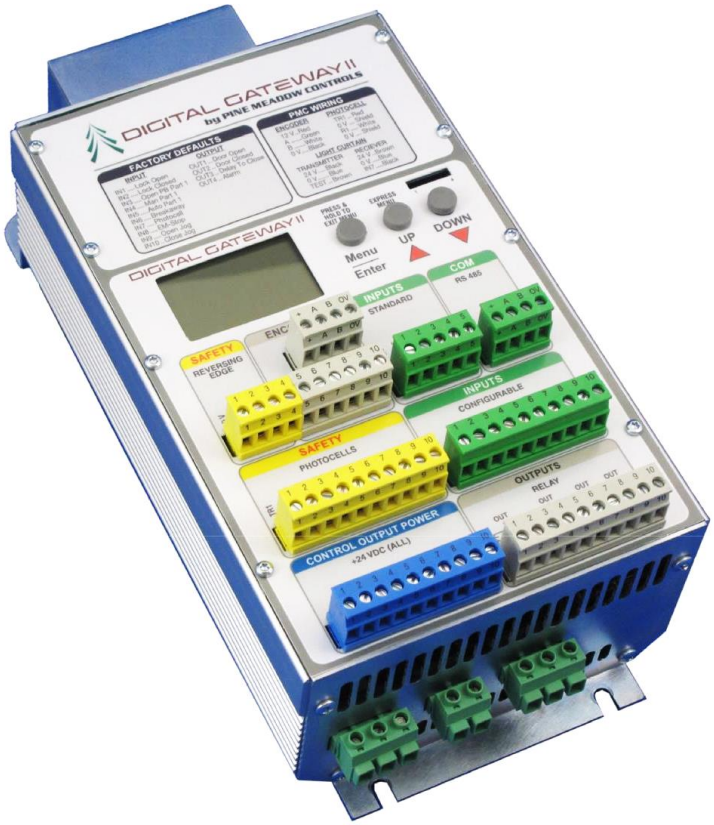
Digital Gateway II®

Universal Door Controller

Installation Manual



Revision 2.0.1

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Disclaimer

Every effort has been made to ensure that the information in this manual is accurate and correct. BTR Controls, Inc. cannot be held liable for damage and/or injury due to any omission or error.

The Digital Gateway II® Controller and associated products must be installed by a qualified person familiar with the products and the door or gate using this product. BTR Controls, Inc. assumes no liability for damage and/or injury due to improper installation or programming.

The Digital Gateway II® Controller is manufactured, tested and sealed at the factory. Tampering or breaking the factory seal immediately voids the warranty and removes BTR Controls, Inc. from liability associated with damage and/or injury.

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Chapter 1 Introduction

1. Overview

The Digital Gateway II® (DGII®) Controller from BTR Controls, Inc. is a comprehensive logic and variable speed drive designed specifically for industrial doors and gates. It includes a compact, touch-safe enclosure. When used in conjunction with the BTR CONTROLS, INC. encoder, it becomes a closed -loop system offering maximum performance and energy savings from the electric motor.

The DGII is designed for high speed doors and gates, and provides inverter speed adjustment and control as well as monitoring and responding to external inputs.

The DGII has a comprehensive range of parameters to obtain optimum door performance. Fault diagnosis is provided for the installer and end user, simplifying troubleshooting and corrective action.

The DGII has a bright, graphical display that provides easily-understood messages. A comprehensive set of functions and numerous input and output channels meet most installation requirements without requiring costly options.

This manual provides instructions for installing and programming the Digital Gateway II® Door Controller. This manual is intended for use by installers and door and gate manufacturers only. It is not intended for the end user.

2. Disclaimer

Every effort has been made to ensure that the information in this manual is accurate and correct. BTR Controls, Inc. cannot be held liable for damage and/or injury due to any omission or error.

The DGII® controller and associated products must be installed by a qualified person familiar with the product and the door or gate to be controlled using this product. BTR Controls, Inc. assumes no liability for any damage and/or injury due to improper installation or programming.

The DGII® controller is manufactured, tested and sealed at the factory. Breaking the seal or tampering with the device voids the warranty and removes BTR Controls, Inc. from any liability associated with damage and/or injury.

3. Safety Information Summary

WARNING

HAZARDOUS VOLTAGE PRESENT! BEFORE INSTALLING OR SERVICING THIS EQUIPMENT, ALWAYS DISCONNECT MAIN POWER AND FOLLOW PROPER LOCK-OUT TAG-OUT PROCEDURES. LOCK THE DISCONNECT IN THE OPEN POSITION.

WARNING

THE METAL PORTION OF ANY TERMINAL BLOCK MAY HAVE HIGH VOLTAGE PRESENT EVEN AFTER POWER HAS BEEN REMOVED FROM THE DGII® CONTROLLER. WAIT AT LEAST 5 MINUTES AFTER REMOVING POWER TO TOUCH ANY TERMINAL WITHIN THE DGII® ENCLOSURE.

WARNING

TO HELP ENSURE PERSONNEL SAFETY, FOLLOW ALL APPLICABLE LOCAL BUILDING CODES AND ELECTRICAL CODES WHEN INSTALLING OR SERVICING THIS EQUIPMENT.

WARNING

TO HELP ENSURE PERSONNEL SAFETY, FOLLOW ALL APPLICABLE LOCAL BUILDING CODES AND ELECTRICAL CODES WHEN INSTALLING OR SERVICING THIS EQUIPMENT.

WARNING

FOLLOW ARC FLASH LABELING REQUIREMENTS AS SPECIFIED IN THE LATEST EDITION OF NFPA 70E, "STANDARD FOR ELECTRICAL SAFETY IN THE WORKPLACE." SEE ARTICLES 130.3(C) AND 130.7(E)(1). ADDITIONAL LABELING REQUIREMENTS ARE INCLUDED IN ARTICLE 110.16 OF THE 2008 VERSION OF THE NATIONAL ELECTRIC CODE (NEC).

WARNING

THE INSTALLER AND USER OF THIS CONTROLLER ARE RESPONSIBLE FOR COMPLIANCE WITH ALL APPLICABLE LOCAL CODE REQUIREMENTS, INCLUDING UL325, AUGUST 2011.

WARNING

AN APPROVED PHOTOEYE AND/OR REVERSING EDGE MUST BE CONNECTED FOR THE DOOR OR GATE TO OPERATE IN A NORMAL CONDITION. THE DGII® CONTROLLER IS PROGRAMMED TO ALLOW ONLY CONSTANT PRESSURE OPEN OR CLOSE FUNCTIONS IF NO APPROVED SAFETY DEVICE IS INSTALLED.

WARNING

INSTALLATION, START-UP AND MAINTENANCE OF THE DGII® DOOR CONTROLLER AND ASSOCIATED DOOR OR GATE PRODUCTS MUST BE PERFORMED BY QUALIFIED PERSONNEL FAMILIAR WITH THE EQUIPMENT. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY AND/OR DAMAGE TO ASSOCIATED EQUIPMENT.

WARNING

DO NOT MAKE CHANGES OR MODIFICATIONS TO THE DGII® CONTROLLER. DOING SO VOIDS THE WARRANTY AND MAY RESULT IN FAILURE OR IMPROPER OPERATION.

WARNING

THE MOUNTING LOCATION FOR THE DGII® CONTROLLER MUST PROVIDE SUFFICIENT USER ACCESS AND COMPLY WITH NFPA® 70, THE NATIONAL ELECTRICAL CODE.

WARNING

POWER WIRING USED FOR THE DGII® CONTROLLER AND ASSOCIATED DOOR SHALL COMPLY WITH NFPA 70®, ALSO REFERRED TO AS THE NATIONAL ELECTRICAL CODE.

WARNING

ALL SAFETY DEVICES MUST BE WIRED ACCORDING TO THE MANUFACTURER'S SPECIFIC INSTRUCTIONS. FAILURE TO COMPLY MAY RENDER THE DGII® CONTROLLER INOPERABLE AND/OR CAUSE EQUIPMENT DAMAGE OR PERSONNEL INJURY.

WARNING

ALWAYS DISCONNECT THE MAINS SUPPLY BEFORE WORKING WITH THE DOOR OR THE CONTROLLER. SAFETY EDGES MUST BE USED IN CONJUNCTION WITH THE DGII® CONTROLLER. THE SAFETY EDGE MUST COMPLY WITH BSEN 12978. USE ONLY THE DEDICATED SAFETY EDGE INPUTS ON THE SAFETY REVERSING EDGE TERMINAL BLOCK.

WARNING

BEFORE APPLYING POWER TO THE DGII® CONTROLLER, VERIFY THAT THE SERVICE VOLTAGE IS THE SAME AS THE SUPPLY VOLTAGE RATING FOR THE MODEL BEING INSTALLED. THE DGII® CONTROLLER MAY BE DAMAGED IF THE SERVICE VOLTAGE IS NOT COMPATIBLE.

WARNING

A SHIELDED CABLE MUST BE USED BETWEEN THE MOTOR AND THE DGII® CONTROLLER. THE CABLE MUST BE CONNECTED AS SHOWN IN THIS MANUAL.

WARNING

THE DGII® CONTROLLER WILL NOT OPERATE IF ITS INTERNAL +24V POWER SUPPLY IS SHORT-CIRCUITED. THE DISPLAY GOES BLANK AND THE CONTROLLER WILL BE INACTIVE. REMOVING THE SHORT ALLOWS POWER TO BE REACTIVATED WITHOUT DAMAGE.

WARNING

THE DGII® CONTROLLER IS PROTECTED BY A RESETTABLE FUSE. IF THIS FUSE OPENS FOR ANY REASON, REMOVE POWER FROM THE DGII®, WAIT 30 SECONDS FOR THE FUSE TO AUTOMATICALLY RESET, THEN REAPPLY POWER TO THE DGII® AND ALLOW IT TO GO THROUGH ITS POWER-ON SEQUENCE. IF THE FUSE OPENS AGAIN, REPLACE THE DGII® CONTROLLER AND RETURN IT TO BTR CONTROLS, INC. FOR INSPECTION.

WARNING

TO HELP PREVENT OVERHEATING, DO NOT MOUNT THE CONTROLLER IN DIRECT SUNLIGHT.

NOTE: Settings shown throughout this manual are examples only.

4. Product Description

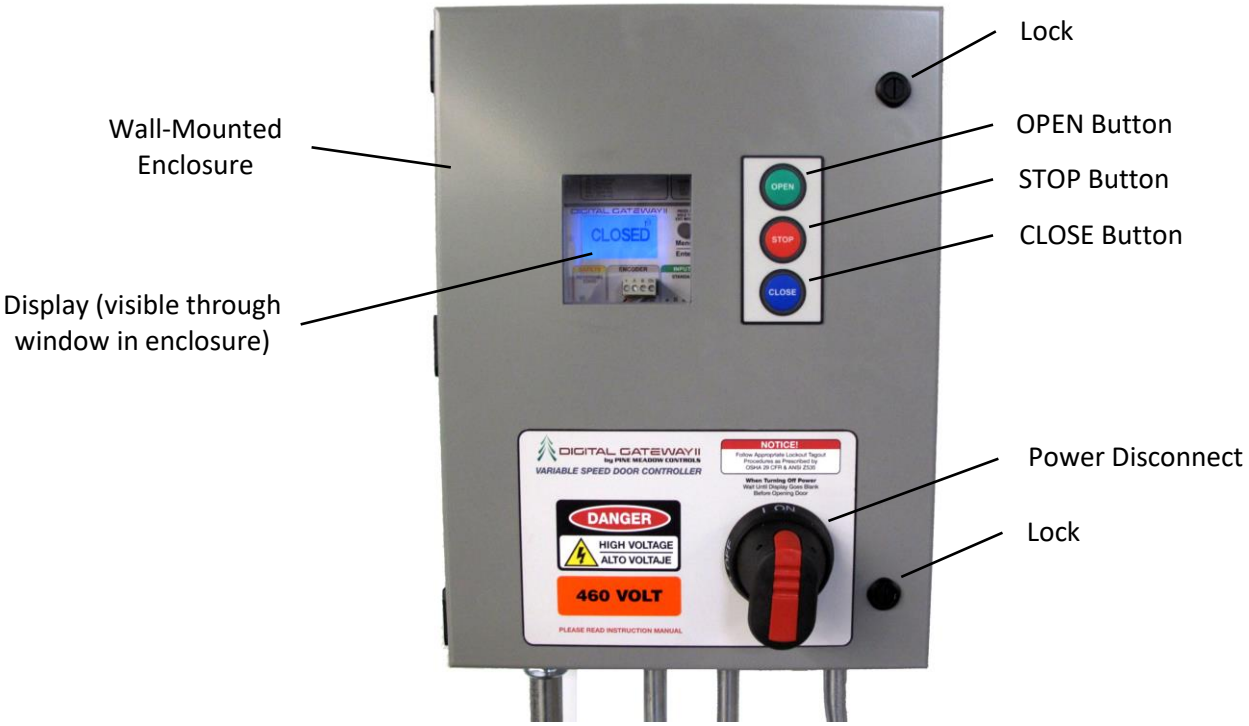
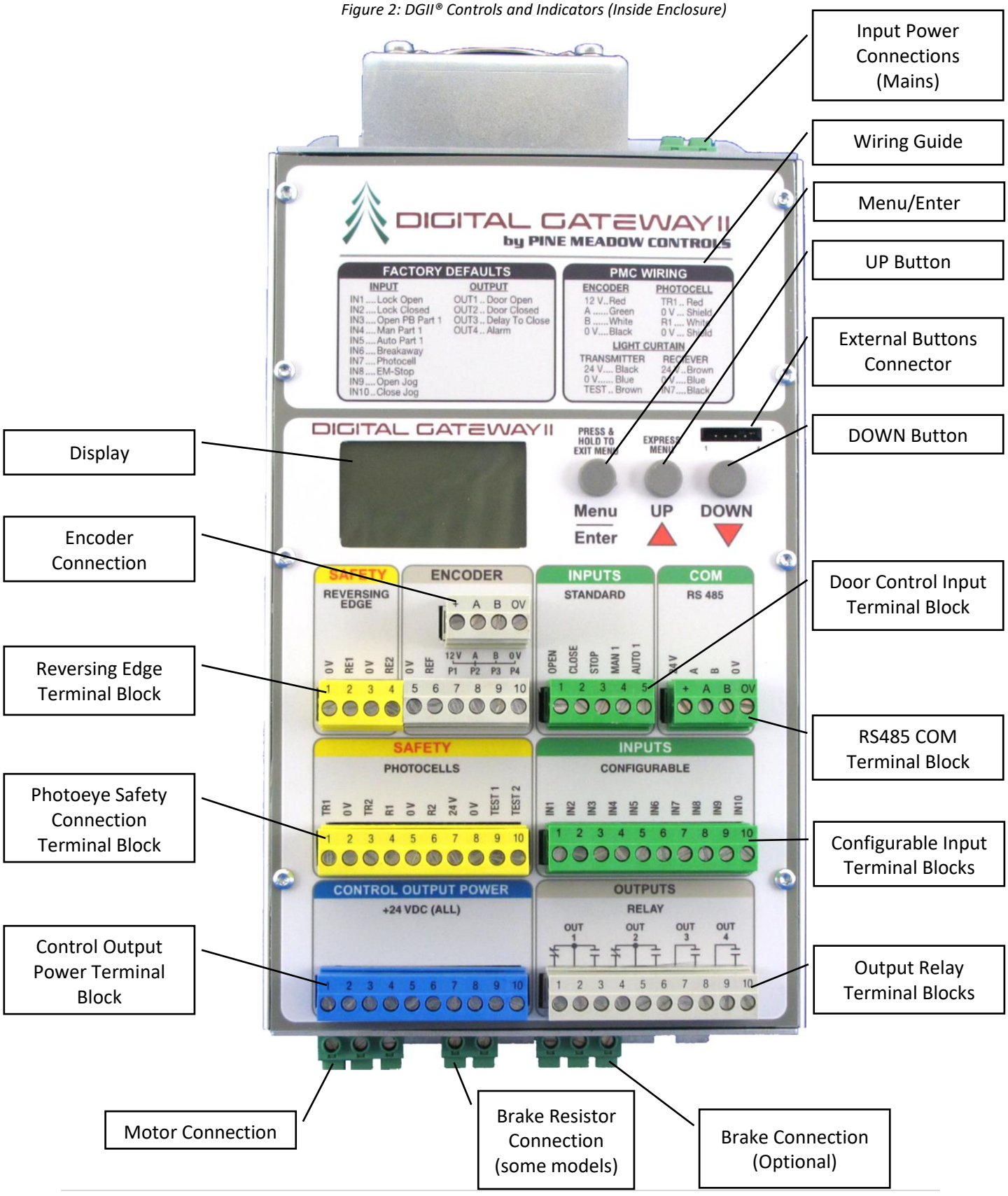


Figure 1: Enclosure Features

Item	Description
OPEN Button	Opens door when pressed.
STOP Button	Stops moving door when pressed.
CLOSE Button	Closes door when pressed.
Power Disconnect	Applies/removes AC input power when rotated 90°. **Vertical position (shown):** Power connected **Horizontal position:** Power disconnected
Lock	Two locks help prevent unauthorized access to the DGII® controller.
Display	LED display provides the primary user interface. The controllers display is visible through the enclosure door. It provides the controllers and doors status during normal operation. Additional programming, setup menus and error feedback is provided as well.

Table 1: Enclosure Feature Description.

Figure 2: DGII® Controls and Indicators (Inside Enclosure)



Item	Description
Menu/Enter Button	Press once to enter a menu or confirm a selection during programming. Press and hold to exit the current menu or cancel a programming selection.
UP Button	During programming and setup, press to navigate through menus or to jog the door in the open direction in certain menus. While on an IDLE screen, press to enter EXPRESS menu.
External Buttons Connector	Connects the ribbon cable from the **OPEN/STOP/CLOSE** switches on the enclosure door to the DGII®.
DOWN Button	During programming and setup, press to navigate through menus or to jog the door in the closed direction in certain menus.
Motor Connections	Terminal blocks for connecting the motor are located on the bottom of the controller.
Brake Connection	If a motor brake is used, the terminal blocks for connection are located on the bottom of the controller. The internal relay is rated for 250V only. If the motor brake requires a higher voltage, than a properly rated motor contactor operated by the relay must be added.
Brake Resistor Connection	Some models come equipped with a braking resistor (required for large or heavy doors). The braking resistor is supplied in the enclosure, prewired to the DGII®. Consult with BTR Controls, Inc. for the correct rating.
USB Port Adapter (not shown; for service use ONLY)	Connects to the COM terminal block and allows programmed settings to be copied to a USB drive for transfer to another DGII® controller.

Table 2: DGII® Feature Description

5. Technical Assistance

For additional technical assistance, contact:
BTR Controls, Inc.
1570 Todd Farm Drive
Elgin, IL 60123
(847) 608-9500

Chapter 2 Specifications

1. Overview

This chapter provides specifications for all models of the DGII® Controller and provides information on the sensors and motors compatible with the DGII®.

2. Model Information

Digital Gateway II® models and options are listed in Table 3. All models are suitable for use on a circuit capable of delivering not more than 100,000A RMS symmetrical Amperes, 480 voltage AC maximum.

Model Number	Input Current (Amps)	Output		Recommended Fuse
		HP (kW)	Current (Amps)	
100-120 VAC (±10%) 50/60Hz, 1-Phase Input, 0-230 VAC 3-Phase Output, 0-250Hz				
DG2-12111-10	16	1.0 (0.75)	4	20A CCMR
200-240 VAC (±10%) 50/60Hz, 1-Phase Input, 0-230 VAC 3-Phase Output, 0-250Hz				
DG2-23111-10	8	1.0 (0.75)	4	15 A CCMR
DG2-23211-10	14	2.0 (1.5)	7	20 A CCMR
200-240 VAC (±10%) 50/60Hz, 3-Phase Input, 0-230 VAC 3-Phase Output, 0-250Hz				
DG2-23131-10	5	1.0 (0.75)	4	10 A CCMR
DG2-23231-10	8	2.0 (2.2)	7	15 A CCMR
400-480 VAC (±10%) 50/60Hz, 3-Phase Input, 0-460VAC 3-Phase Output, 0-250Hz				
DG2-46231-10	7	2.0 (1.5)	4	10 A CCMR
DG2-46531-10	9	5.0 (4.0)	7.6	15 A CCMR

Table 3: Models and Options

3. Specifications

Item	Specification
Dimensions	Controller Only = 10.1875" X 5.1875" X 4.875" (25.8763 cm x 13.1763 cm x 12.3825 cm) Inside of Enclosure = 16" X 12" X 5.5" (40.64 cm x 30.48 cm x 13.97 cm)
Weight	Controller only = 5.5lb (2.5 kg) Controller inside of enclosure = 23lb (10.5 kg)
Cooling	Air-cooled. No special cooling required
Altitude	Consult with factory for installations in high altitude locations
Humidity	<90% (non-condensing)
Ambient Operating Temperature	-10° C to 40° C
Firmware Updates	Consult factory for firmware upgrades
Internal Power Supply	+24 VDC Maximum power rating 500 mA
Brake Resistor Sizes	230 VAC: 100 Ohm 100W min 460 VAC: 200 Ohm 100W min
Auxiliary Relay Contacts	Power relays: 240V AC 5A Max (resistive), 120V AC 0.5A (General Purpose)
	Control Relays: 30V AC/DC 0.5A (General Purpose)
	NPN Transistor: Open Collector 30V DC, 50mA Non-Inductive

Table 4: General Specifications

	Max Wire Size	Min Wire Size	Torque
Power	12 AWG	28 AWG	0.5 - 0.6 Nm (4.4 - 5.3lb in)
Control	12 AWG	28 AWG	0.5 - 0.6 Nm (4.4 - 5.3lb in)

Table 5: Terminal Block Specifications

Item	Specification
Power	Unshielded 600V, 75C or 90C THHN/THWN or equivalent
	Shielded 600V, 75C or 90C RHH/RHW-2
Control	Unshielded 600V, 75C or 90C THHN/THWN or equivalent
Communication	18AWG (0.8mm^2) twisted pair, 100% shield with drain

Table 6: Wiring Specifications

4. Product Labeling

The labeling for all models is shown in Figure 3: DGII® Labeling.

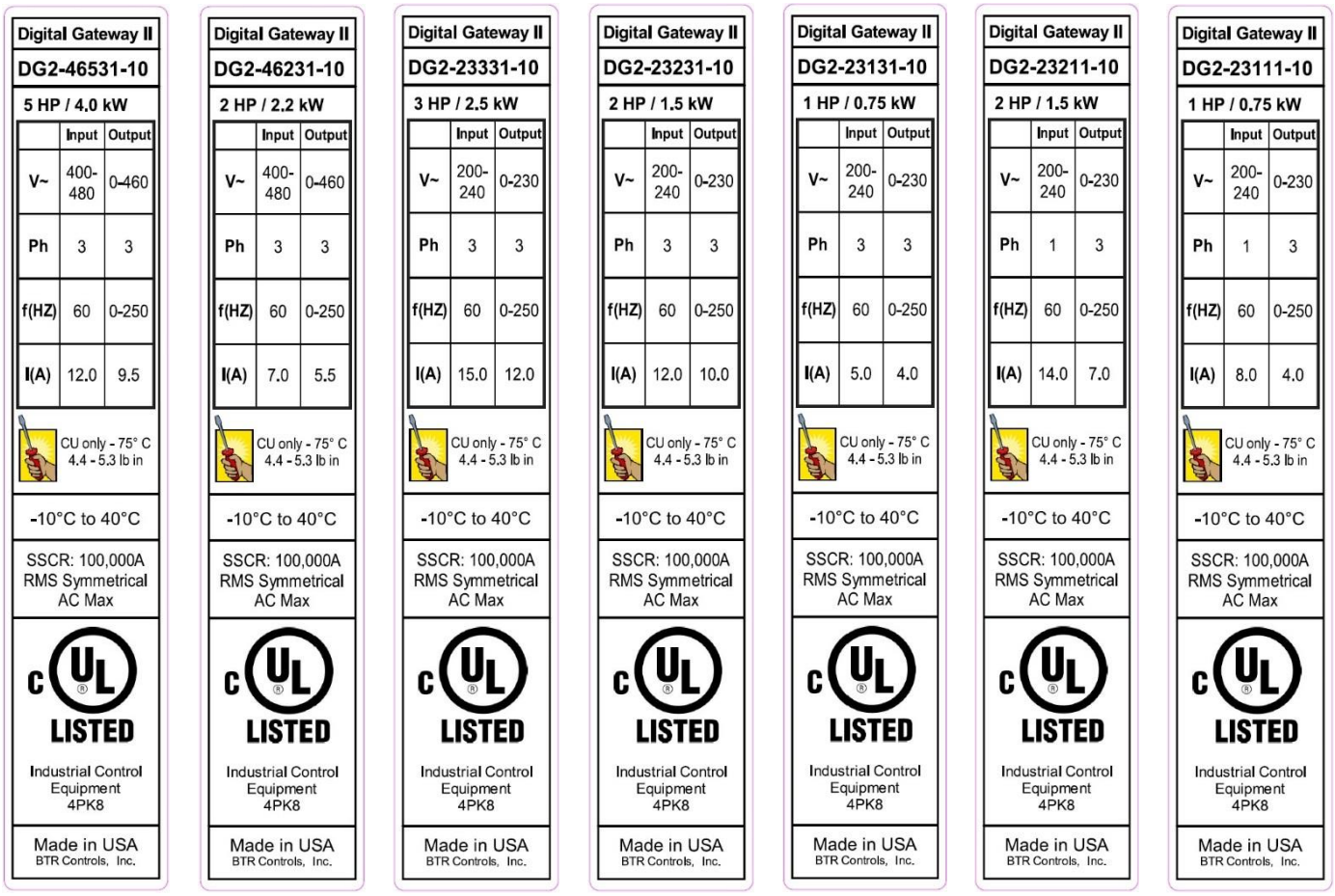


Figure 3: DGII® Labeling

Chapter 3 Installation

1. Overview

This chapter provides the following installation information:

2. Hardware Installation

WARNING

THE MOUNTING LOCATION FOR THE DGII® CONTROLLER MUST PROVIDE SUFFICIENT USER ACCESS AND COMPLY WITH NFPA® 70, THE NATIONAL ELECTRICAL CODE.

WARNING

HAZARDOUS VOLTAGE PRESENT! BEFORE INSTALLING OR SERVICING THIS EQUIPMENT, ALWAYS DISCONNECT MAIN POWER AND USE PROPER LOCK-OUT, TAG-OUT PROCEDURES. LOCK THE DISCONNECT IN THE OPEN POSITION.

WARNING

THE METAL PORTION OF ANY TERMINAL BLOCK MAY HAVE HIGH VOLTAGE PRESENT EVEN AFTER POWER HAS BEEN REMOVED FROM THE DGII® CONTROLLER. WAIT AT LEAST 5 MINUTES AFTER REMOVING POWER TO TOUCH ANY TERMINAL WITHIN THE DGII® ENCLOSURE.

WARNING

TO HELP ENSURE PERSONNEL SAFETY, FOLLOW ALL APPLICABLE LOCAL BUILDING CODES AND ELECTRICAL CODES WHEN INSTALLING OR SERVICING THIS EQUIPMENT.

WARNING

TO HELP PREVENT OVERHEATING, DO NOT MOUNT THE CONTROLLER IN DIRECT SUNLIGHT.

The DGII® can be mounted within a UL-listed enclosure suitable for wall-mounting. The controller enclosure should be mounted as closely as possible to the door motor. Ensure that there is adequate space for the electrical conduit runs required for the DGII® to operate and that there is room for the runs from the controller to the door motor and motor encoder as well as safety sensors that may need to be connected.

Enclosure Installation

1. Choose a mounting location for the enclosure on the wall near the door the DGII® will control.

2. After planning the conduit runs needed, punch out the knockouts in the bottom of the enclosure only as needed for the conduit runs.

3. Drill mounting holes for the enclosure according to dimensions shown in Figure 4.

4. Mount the enclosure to the wall in a location near the door to which the DGII® will be connected, at a height convenient for the user (approximately 4 ft. above the floor). Observe all local building and electrical codes when wall-mounting the enclosure.

WARNING

THE MOTOR, CONTROL AND ENCODER CABLES MUST BE RUN IN SEPARATE CONDUIT. FAILURE TO DO SO WILL VOID THE PRODUCTS WARRANTY.

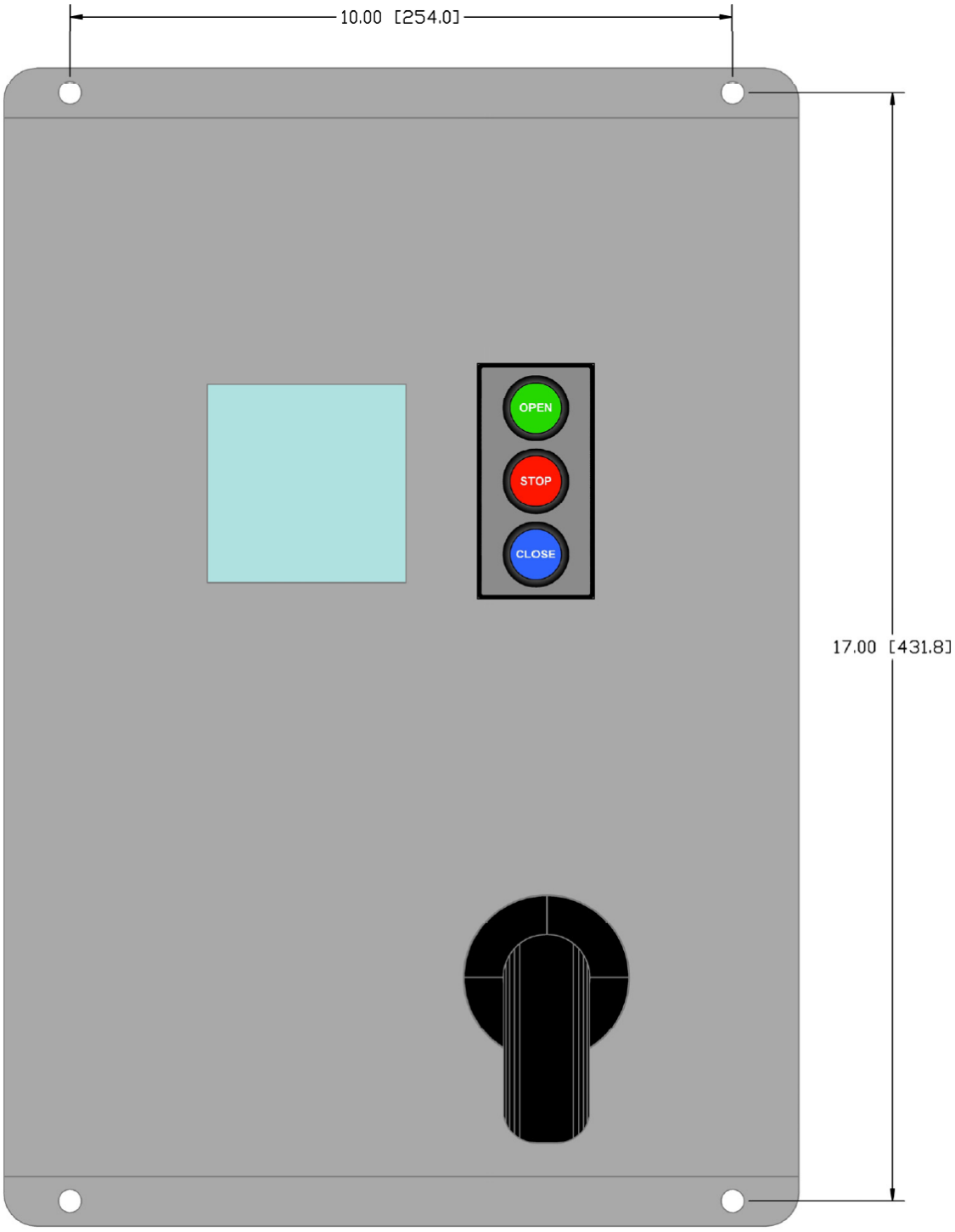


Figure 4: Enclosure Mounting Hole Dimensions

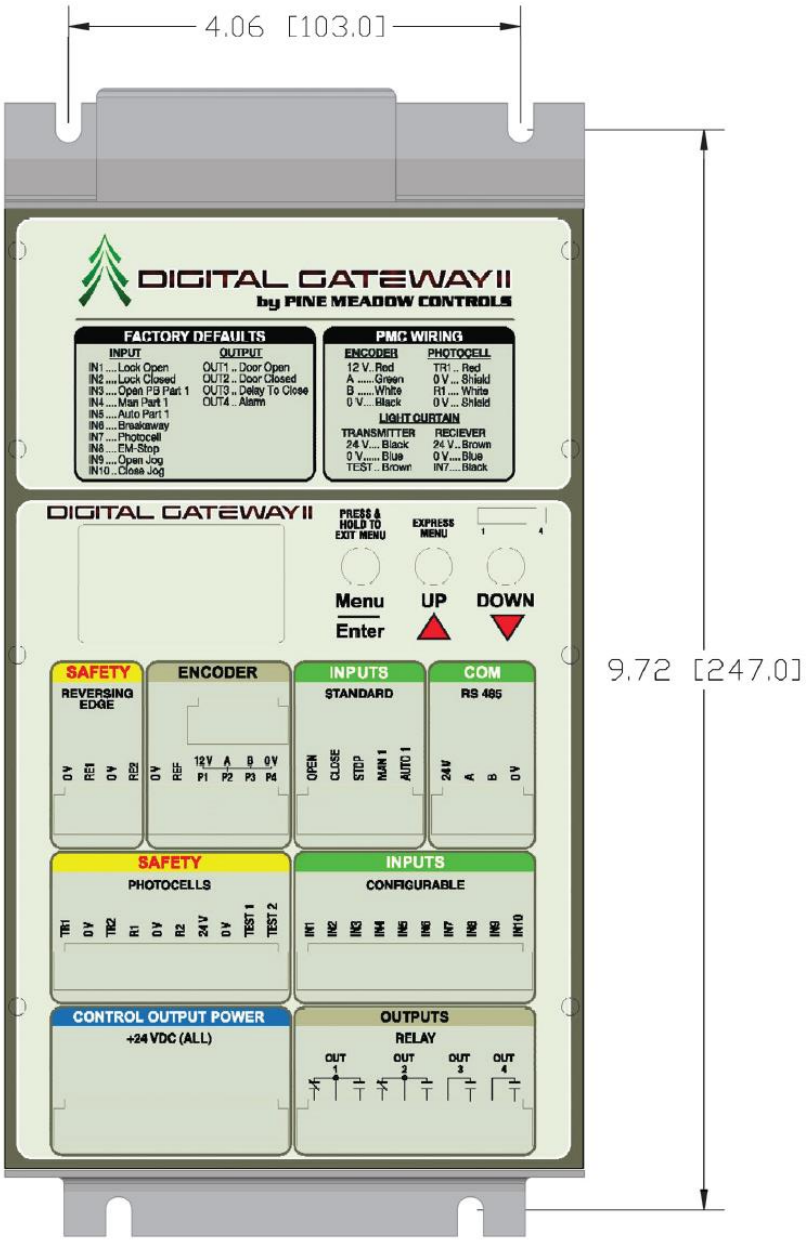


Figure 5: DGII® Controller Mounting Hole Dimensions

3. Wiring

Power Wiring

WARNING

POWER WIRING USED FOR THE DGII® CONTROLLER AND ASSOCIATED DOOR SHALL COMPLY WITH NFPA 70®, ALSO REFERRED TO AS THE NATIONAL ELECTRICAL CODE.

Refer to Figure 2 for the location of the following terminal blocks:

- Incoming power: on the top of the controller for single phase and 3-phase.
- Motor: located on the bottom of the controller. A shielded cable must be used. The cable shield must be connected to positive earth ground on both the controller and motor end.
- If a motor brake is used, the terminal blocks for connection are located on the bottom of the controller. The internal relay is rated for 250V only. If the motor brake requires a higher voltage, a properly rated motor contactor operated by the relay must be added.
- A braking resistor is supplied with DGII® models used for large or heavy doors. The braking resistor is pre-wired to the controller on the models equipped with braking resistors.
- Connect the mains voltage to the terminal block at the top right of the DGII® as indicated in Figure 6.
  - **230V single-phase AC power:** Connect Neutral to the leftmost terminal and line voltage to the other terminal.
  - **460V 3-phase AC power:** Connect L1 to the leftmost terminal, L2 to the center terminal, and L3 to the rightmost terminal.

120VAC Models: **L N** 230VAC Models (3-phase): **L3 L2 L1**
230VAC Models: **L1 L2** 460VAC Models (3-phase): **L3 L2 L1**

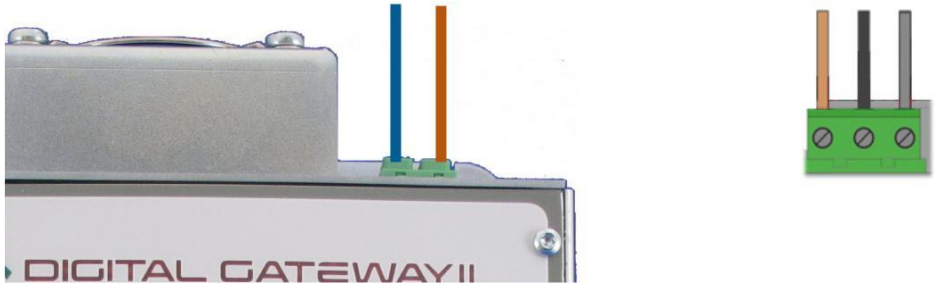


Figure 6: Mains Voltage Connection

Motor Wiring

CAUTION

A SHIELDED CABLE MUST BE USED BETWEEN THE MOTOR AND THE DGII® CONTROLLER. THE CABLE MUST BE CONNECTED AS SHOWN IN THIS MANUAL.

1. Connect motor wiring according to the AC power requirements described below.
   - If using a single winding motor, connect the leads to the motor.
   - If using a dual-winding motor, do one of the following as appropriate:
     - For 3-phase, 230 VAC installations, connect the motor wiring to the motor terminal block on the DGII® using a delta configuration.
     - For 3-phase, 460 VAC installations, connect the motor wiring to the motor terminal block on the DGII® using a star configuration.

2. Ground both the controller and motor end of the cable shield to positive earth ground.

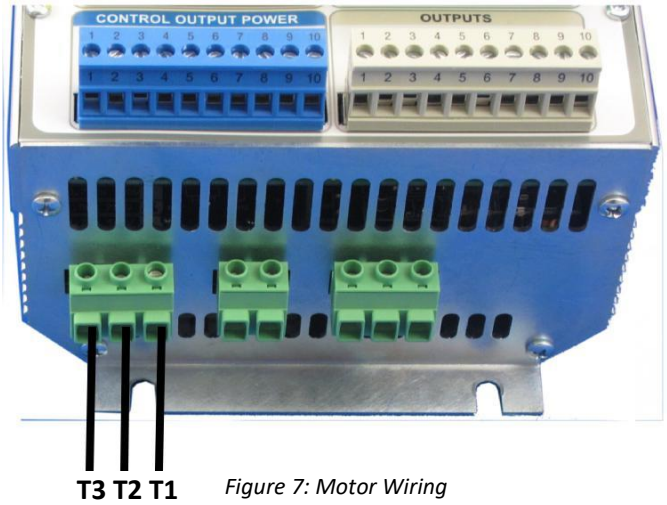


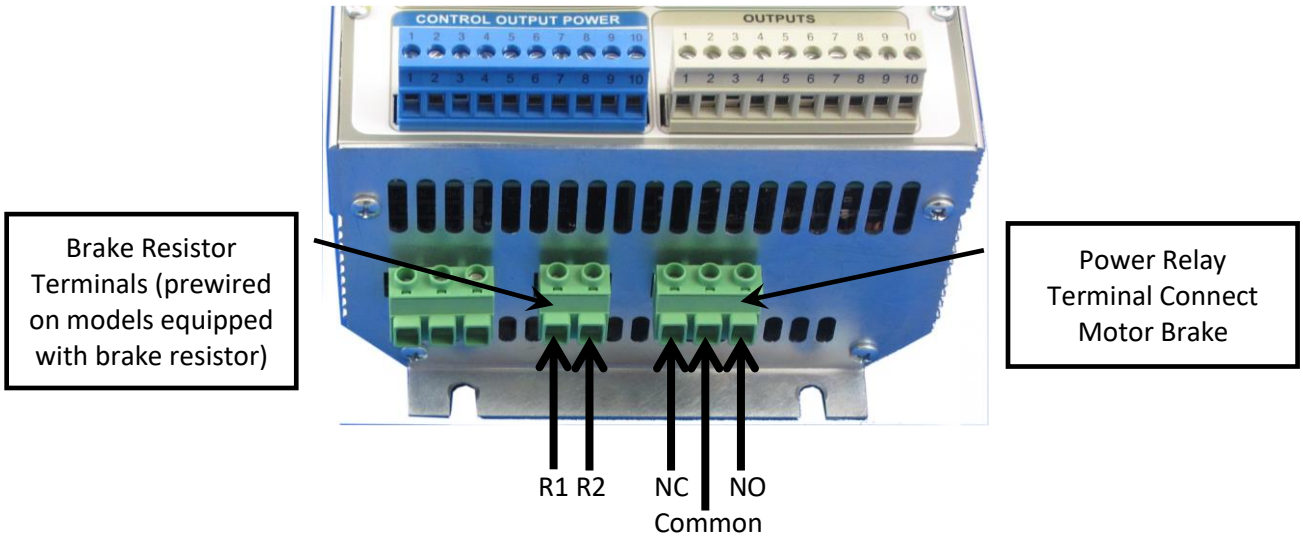
Figure 7: Motor Wiring

Motor Brake and Resistor Wiring

Connect motor brake wiring to the Power Relay.

Certain models are supplied with a pre-installed brake resistor wired to the center two-terminal block on the bottom of the DGII® as shown in Figure 8. No additional brake resistor wiring is needed.

Figure 8: Motor Brake Connections



Control Wiring

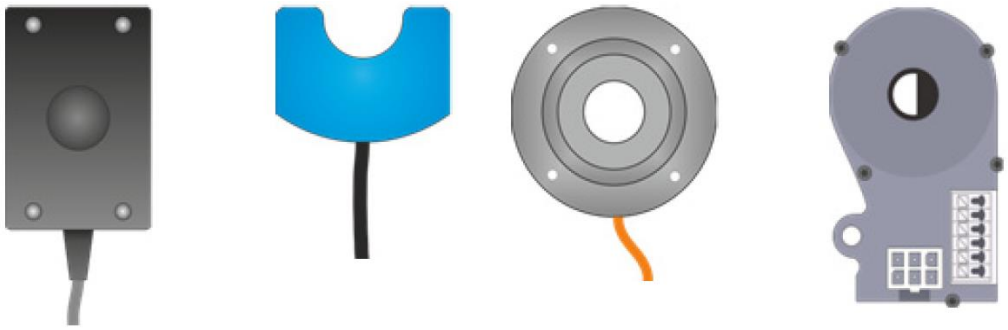
All activator (or control wiring) is 24 VDC provided by a power supply internal to the DGII® Controller. The connectors on the front of the DGII® are color-coded as described below.

- **Yellow:** Safety/Reversing Edge and Photoeye
- **Green:** Inputs/Standard Preset and Programmable
- **Beige/Gray:** Outputs/Relay Programmable
- **Blue:** 24VDC Power Supply (500mA maximum)
- **Green:** Shielded Connections/Encoder and RS485

Encoder Wiring

The encoders shown in Figure 9 are compatible with the DGII®. Wiring details are provided in Figure 10 and Table 7.

Figure 9: Encoders compatible with the DGII® Controller.



BTR Controls, Inc. SC MIG Kostal/GFA/MFZ

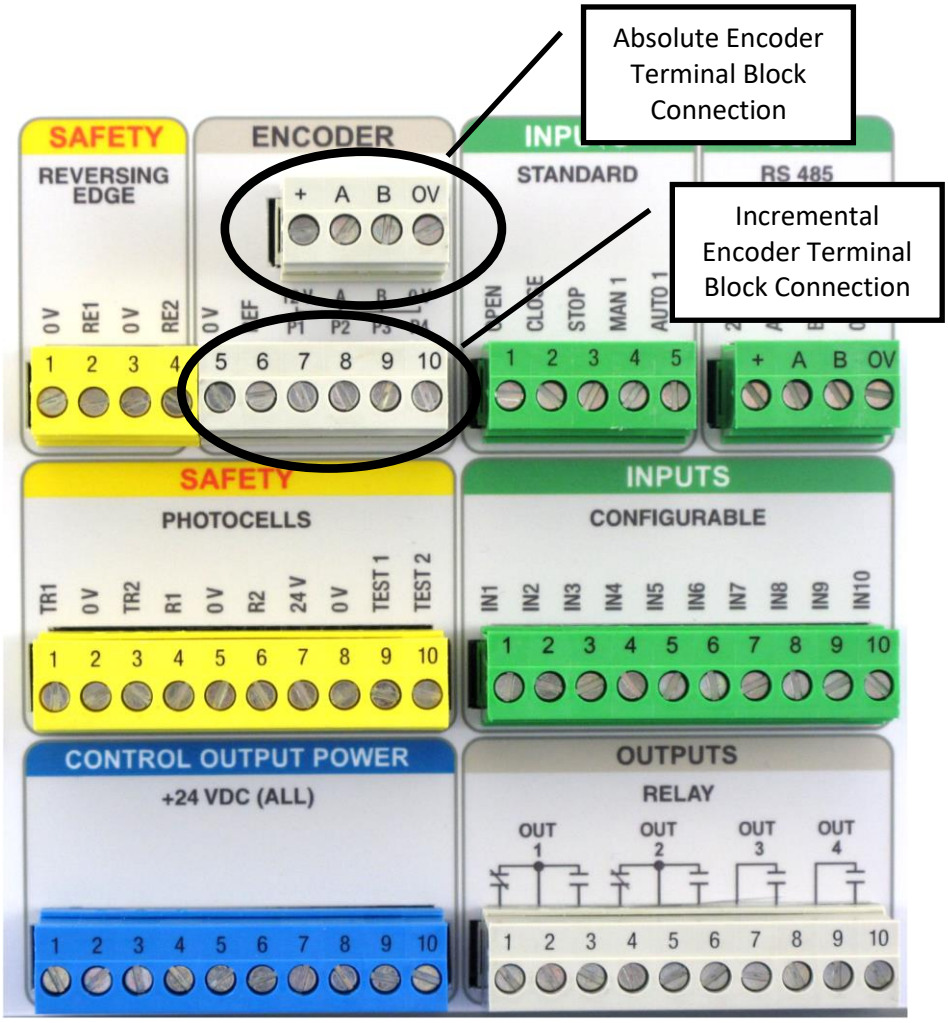


Figure 10: DGI Encoder Wiring

Brand	Type	Encoder Terminal							
		P1	P2	P3	P4	12V	A	B	0V
BTR Controls	Absolute		Black			Brown	Gray	Blue	Blue
SC	Incremental	Brown	Yellow	Green	White				
MIG	Incremental	Brown	Yellow	Green	White				
Kostal	Absolute					Red	Green	White	Black

Table 7: Encoder Wiring

NOTE: A reference limit switch is required for incremental encoders (see Reference Limit Switch Wiring (Incremental Encoders Only) below). A reference run must be performed when programming the DGII® for use with incremental encoders. See Reference on page 48 for instructions.

Reference Limit Switch Wiring (Incremental Encoders Only)

A reference switch/point is required when the DGII® is used with incremental encoders. The DGII® Controller does not know where the door is positioned when power is applied; it starts looking after its reference position (Position value 0). This is done in slow speed until the door activates the switch.

NOTE: The correct reference function must be selected in the Reference menu during programming and setup.

The reference switch must change states once during the complete travel of the door. If the switch is mounted in the doors open position, it must be a normally open switch. If it is mounted in the closed position, it must be a normally closed switch.

Connect the switch wires to the **0V** and the **REF** terminals on the **ENCODER** terminal block.

Safety Wiring/Photoeye/Reversing Edge Wiring

The DGII® tests connected door safety devices for normal operation each time the door is ready to close and displays an error if it detects that the safety devices are not functional or properly connected. Instructions are provided below for a variety of safety edges.

WARNING

ALL SAFETY DEVICES MUST BE WIRED ACCORDING TO THE MANUFACTURER'S SPECIFIC INSTRUCTIONS. FAILURE TO COMPLY MAY RENDER THE DGII® CONTROLLER INOPERABLE AND/OR CAUSE EQUIPMENT DAMAGE OR PERSONNEL INJURY.

WARNING

TO COMPLY WITH UL325, ANY CONNECTED SAFETY DEVICE MUST BE LISTED TO OPERATE WITH THE DGII®. CONTACT BTR CONTROLS, INC. FOR A LIST OF APPROVED SAFETY DEVICES.

WARNING

ALWAYS DISCONNECT THE MAINS SUPPLY BEFORE WORKING WITH THE DOOR OR THE CONTROLLER. SAFETY EDGES MUST BE USED IN CONJUNCTION WITH THE DGII® CONTROLLER. THE SAFETY EDGE MUST COMPLY WITH BSEN 12978. USE ONLY THE DEDICATED SAFETY EDGE INPUTS ON THE SAFETY REVERSING EDGE TERMINAL BLOCK.

Conductive Edge with Resistor

NOTE: If the DGII® detects that the safety edge is not properly connected, the door can be operated in deadman mode only.

Connect the safety edge to the DGII® as follows:

1. Connect the front edge to 0V and RE1 of the REVERSING EDGE terminal block.
2. Connect rear edge (if used) to 0V and RE2 of the REVERSING EDGE terminal block.
3. Connect an 8k ohm terminating resistor across the safety edge as shown in Figure 11.

NOTE: Take note of the terminating resistor value for use when programming the DGII®.

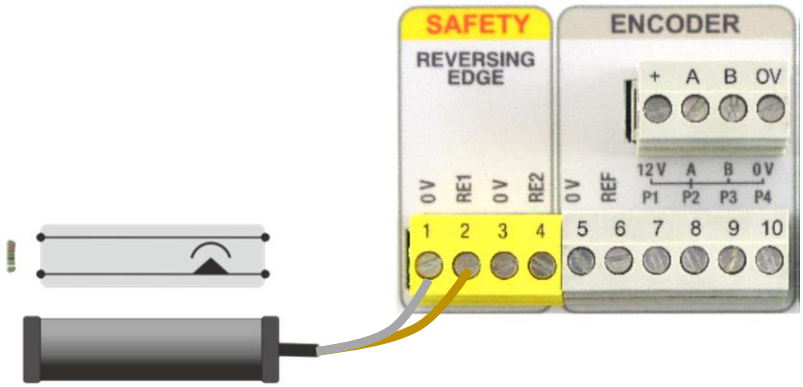


Figure 11: Reversing Safety Edge Wiring: Conductive

FRABA/Opto type

Connect the receiver and transmitter wires with the same color to the same terminal on the DGII® (in parallel), see Figure 12. When programming the DGII®, set the type of safety edge in the Safety Edge menu.

1. Connect front edge white wires to Safety Reversing Edge terminal 1 (0 V).
2. Connect front edge green wire to Safety Reversing Edge terminal 2 (RE1).
3. If using a rear edge, connect its white wire to Safety Reversing Edge terminal 3 (0 V).
4. If using a rear edge, connect its green wire to Safety Reversing Edge terminal 4 (RE2).
5. Connect the brown wire to Encoder terminal 7 (P1).

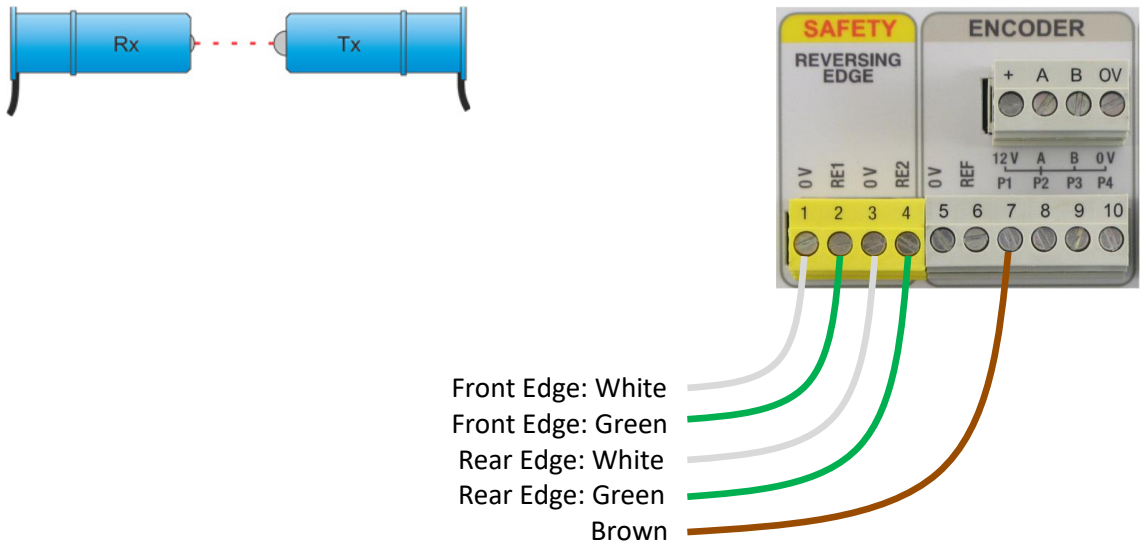


Figure 12: Reversing Safety Edge Wiring: FRABA/Opto Type

BTR CONTROLS, INC. Photoeye Wiring

1. For the best noise immunity, mount the receiver (white wire) on the side of the door closest to the control panel.

2. Mount the transmitter at approximately the same height on the opposite side of the door. The exact position can be adjusted for the best alignment during programming.

3. Connect the transmitter and receiver wiring to the **SAFETY PHOTOEYES** terminal block on the DGII® as shown in Figure 13.

4. After connecting the photoeyes and powering the controller, use the System Status menu, Photoeyes option to configure the photoeyes. Try to activate the photoeyes while the door is closing.

NOTE: Photoeyes can be disabled during travel at a selected position using the Photoeye disable position. See Safety Edges on page 48.

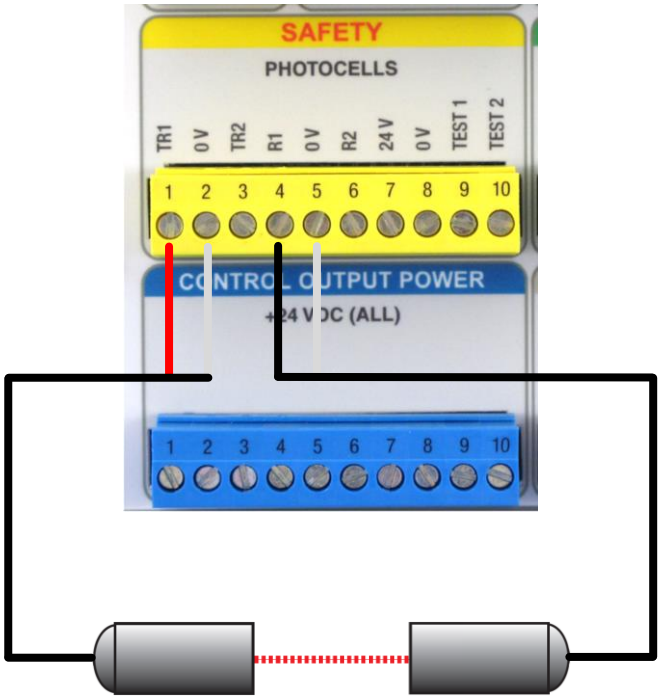


Figure 13: BTR Controls Photoeye Wiring

Other Photoeye/Light Curtain Connections

The following table shows the wiring connections to the DGII® when using door sensors/ light curtains with TEST signal capability. The TEST1 and TEST2 outputs on the DGII® SAFETY terminal block are NPN type with a maximum current of 500mA.

From Sensor	To DGII® Terminals
Transmitter +	SAFETY 24V
Transmitter -	SAFETY 0V
Test Input	SAFETY TEST1
Receiver +	SAFETY 24V
Receiver -	SAFETY 0V
Receiver Common	SAFETY 24V
Receiver Signal	INPUTS IN7

Figure 14: Wiring for Photoeyes/Light Curtain with Test Capabilities

Input Control Wiring

The function and level of each control signal input used are programmed using the **Input** menu. All control signal inputs are 12-24 VDC. Function and Level (Normally Open/ Normally Closed) are programmable. Table 8 lists input signals available for programming. After wiring, program the inputs using the System Configuration menu as described in Chapter 4 Programming the DGII®.

Input Signals	Activation Description
Manual	Momentary activation opens the door unless the door is already at an open position. In this case, the door will close. If the Manual timer is set to a value greater than zero, the controller delays closing of the door until the timer expires.
Open	Opens the door to the fully open position limit.
Auto	Maintained activation opens the door to the fully open position limit. Upon deactivation the controller delays the door for the duration of the Auto timer. If reactivated during this time delay, the timer will be reset and will begin to decrement when the input is again deactivated. Upon expiration of the timer, the controller closes the door to the fully closed position.
Stop	Stops the motion of the door. This input uses the Stop Deceleration Ramp set under the System Config menu. This input is also used to clear certain error conditions.
Close	Closes the door to the fully closed position limit.
Emergency Stop	Immediately halts door motion. This input uses the Emergency Deceleration Ramp set under the System Config menu.
Safety Edge	Activation during a closing cycle stops the door and then reverses door motion back to the fully open position limit. An **E10 Safety Edge Activated** error occurs.
Photoeye	Activation during a closing cycle stops the door and then reverses door motion back to the fully open position limit.

Lock Open	Activation causes the Controller to hold the door at the fully open position limit. The input must be continuously activated to maintain the locked open state. Deactivating this input unlocks the door and allows normal operation.
Lock Closed	Activation causes the Controller to hold the door at the fully closed position limit. The input must be continuously activated to maintain the locked closed state. Deactivating this input unlocks the door and allows normal operation.
Jog Open	Activation of this input moves the door in the direction of the fully open limit at jog speed. Deactivating this input stops door motion.
Jog Close	Activation of this input moves the door in the direction of the fully closed limit at jog speed. Deactivating this input stops door motion.
Breakaway	Activation halts door motion and causes an error.
Open Part 1	Activation opens the door to the partial open 1 position limit.
Open Part 2	Activation opens the door to the partial open 2 position limit.
Open Part 1 Auto	Activation opens the door to the partial open 1 position limit. The controller then delays the door for the duration of the Auto timer. Upon timer expiration, the door closes fully.
Open Part 2 Auto	Activation opens the door to the partial open 2 position limit. The controller then delays the door for the duration of the Auto timer. Upon timer expiration, the door closes fully.
Man Part 1	Activation opens the door to the partial open 1 position limit if not already at this position. If the door is already at this position, the door closes. If the Man timer is greater than zero, the controller delays the door for the duration of the Man timer before closing. Upon timer expiration, the door closes fully.
Man Part 2	Activation opens the door to the partial open 2 position limit if it is not already at this position. If the door is already at this position, the door closes. If the Man timer is greater than zero, the controller delays the door for the duration of the Man timer before closing. Upon timer expiration, the door closes fully.

Table 8: Input Signal Descriptions

Connect standard door control signals to the **INPUTS STANDARD** terminal block on the DGII® as shown in the example provided in Figure 15.

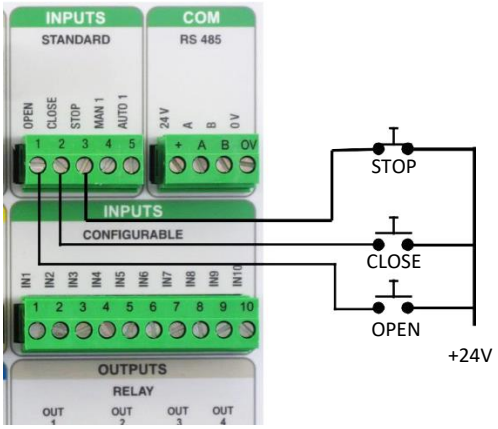


Figure 15: Control Input Signal Wiring Example

Output Control Wiring

Table 9 lists output signals available for programming. After wiring, program the outputs using the System Configuration menu as described in Chapter 4 Programming the DGII®.

Output Signal	Activation Description
Door Moving	Output is active anytime the door is in motion.
Door Not Moving	Output is active anytime the door is not in motion.
Door Open	Output is active whenever the door is at the fully open position.
Door Open State (For Signaling)	Output is active whenever the door is in the door open state. This function should be used when door state signaling is required.
Door Closed	Output is active whenever the door is at the fully closed position.
Door Closed State (For Signaling)	Output is active whenever the door is in the door closed state. This function should be used when door state signaling is required.
Door Not Closed	Output is active whenever the door is above the fully closed position.
Door Open Partial	Output is active whenever the door is at the open part 1 position.
Door Opening	Output is active whenever the door is moving in the open direction.
Door Closing	Output is active whenever the door is moving in the close direction.
Delay To Close	Output is activated when the Delay To Close timer is greater than zero and the door is commanded to close. The output remains active for the duration of the Delay To Close timer, and then remain on until the door is fully closed.
Delay To Open	Output is activated when the Delay To Open timer is greater than zero and the door is commanded to open. The input must remain activated until the Delay To Close timer has expired, the output will be active during this time. Upon expiration of the timer, the door opens and the output is deactivated.
Auto Close Active	Output is active for the duration of the Auto or Man timer during an auto close sequence.
System Alarm	The output is active if the DGII® is in any error condition.

Table 9: Output Signal Description

Enclosure Door Switch Cable

Plug the ribbon cable connector from the buttons mounted on the enclosure door into the membrane connector on the front of the DGII® as shown in Figure 16.

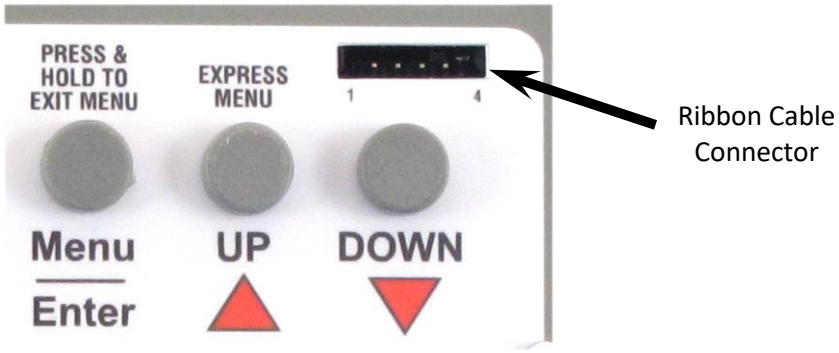


Figure 16: Enclosure Door Ribbon Cable Connection

Check all connections, then close the enclosure door.

4. Controller Power Up

After all connections are made, apply power to the DGII® by setting the power disconnect on the enclosure door to the ON position (rotate handle 90° clockwise so that handle is in the vertical position).

The DGII® powers up when AC power is applied. Confirm that the following start-up screens are displayed when the DGII® Controller is powered up. Screens are shown for 3 seconds each. Button presses or other inputs are ignored during start-up screen display.

This screen sequence takes place whenever the DGII® is powered on.

- Controller Size screen indicates the output capacity of the controller.
- Serial Number screen displays the device's unique serial number.
- Software Version screen displays the installed software version.
- Wireless State screen indicates if on-board wireless initialized successfully.
- Controller Registration screen indicates if the controller has been registered.
- Current Profile screen displays the currently-selected door profile.
- Company Logo screen

When the power-on sequence is complete, the idle screen is displayed. If there is a problem with a connection or with the DGII®, an error code may be displayed.

Proceed to Chapter 4 Programming the DGII® to program the DGII® Controller. If an error code appears, refer to Chapter 5 Troubleshooting. If the DGII® does not power up, recheck the wiring.

CAUTION

IF ANY POWER RELATED ERROR CODES ARE GIVEN AT POWER-UP, IMMEDIATELY DISCONNECT POWER FROM THE CONTROLLER AND CHECK WIRING FOR FAULTS.

Chapter 4 Programming the DGII®

1. Overview

This chapter provides the following information on programming the DGII®:

A PC-based controller programming application is also available from BTR Controls, Inc. Using the application allows the controller firmware to be saved to an SD card or transferred directly through a USB connection to multiple controllers. Contact BTR Controls, Inc. for additional information.

2. Using the Menus

Navigation

- To enter any menu or selected submenu, briefly press the **Menu/Enter** button.
- Use the ▲ and ▼ buttons to scroll through menu options. The current selection is highlighted in black with light text.
- To exit any menu, press and hold the **Menu/Enter** button.

The buttons on the front of the DGII® are used for programming and may also be used for door operation. The buttons on the outside of the enclosure operate the door only and are not for use in programming the DGII®. During programming the buttons on the DGII® are used as described in Table 10.

Button	Short Press	Long Press (> 2 sec)
Menu/Enter	Enter selected menu	Exist current menu Repeat exit after 2 sec
▲	Navigate up one menu item	Scroll up

▼	Navigate down one menu item	Scroll down

Table 10: Programming Buttons

When the device has completed its power-on sequence, press the **Menu/Enter** button to enter the programming menus.

Within a menu, press the ▼ button to scroll downward through the menu options. The scrollbar on the right side of the screen indicates the approximate position in the menu.

Use the ▲ or ▼ button to highlight the desired menu selection.

Press the ▲ button to scroll upward through a menu.

Press the **Menu/Enter** button to enter the selected menu function.

To return to a previous menu item after selecting an option, press and hold the **Menu/Enter** button to exit the programming mode and return to the Idle screen.

Entering a Passcode

Some menus may require a 3-digit passcode to gain access. This helps prevent unauthorized personnel from changing the controller settings. The code is provided by the manufacturer at the time of purchase.

The code request screen shown above appears when a menu is protected by an access code. Use the ▲ and ▼ buttons to enter the code, then press the **Menu/Enter** button to accept the code.

Menu Structure

Figure 17 is a diagram showing the DGII® Controller menu structure. Each option is described in further detail in this chapter. The keypresses to navigate through the main menus are also shown (**Menu/Enter**, ▲, and ▼).

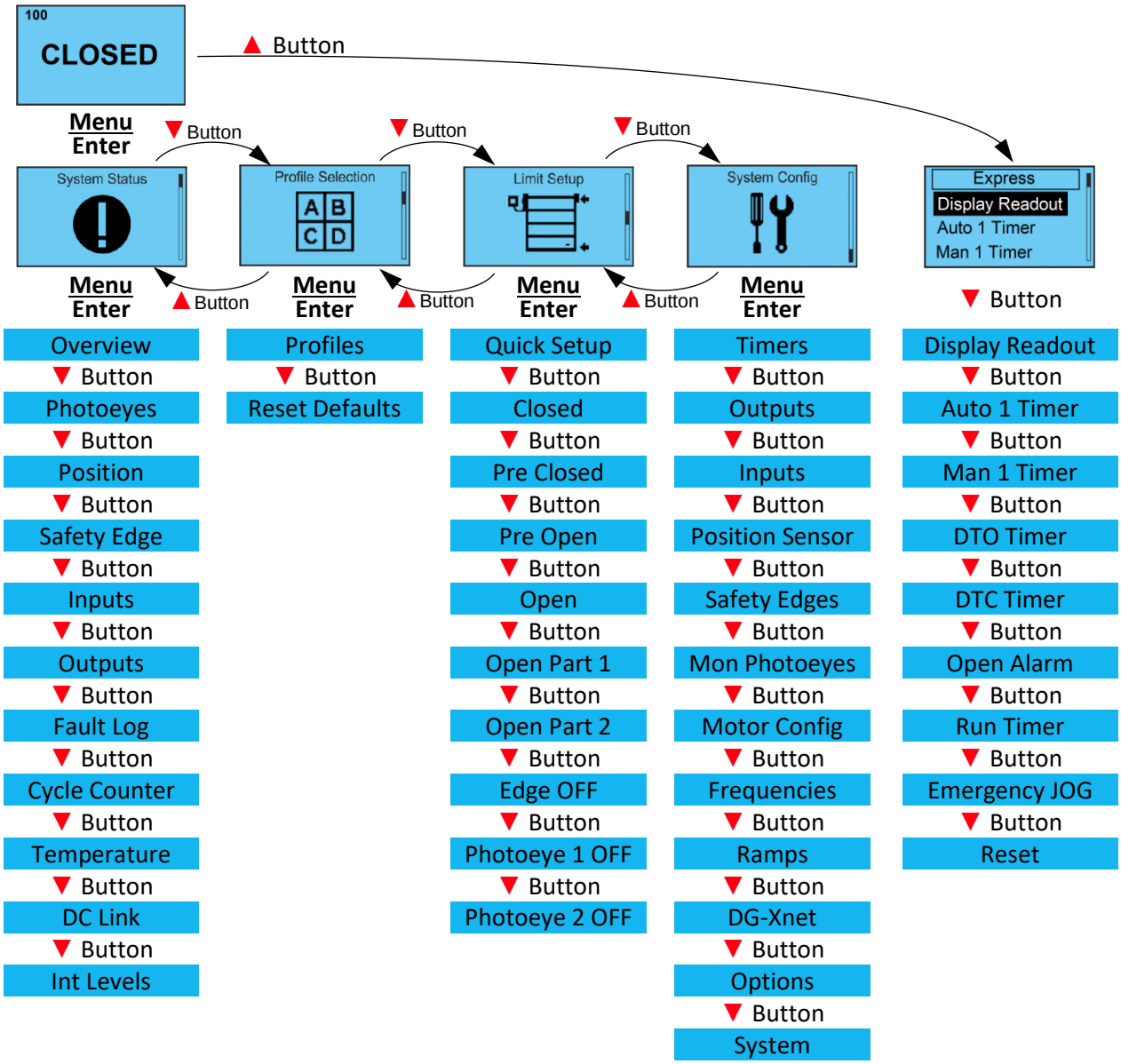


Figure 17: DGII® Menu Structure

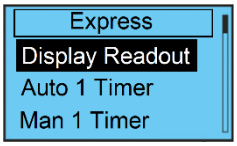
3. Idle Screen Description

The Idle screen is displayed during normal operation and is divided into 3 sections:
Top: Non-critical information about background controller operations, such as door cycle counter.

Middle: Information messages about the current state of the controller/door. The following messages may be displayed: **OPEN, OPENING, CLOSED, CLOSING, AUTO, LOCKED, IDLE, MANUAL, OPEN P1, OPEN P2.**

Bottom: Status messages about current controller events, displayed for the duration of each event. The most recent event is shown.

4. Express Menu



The **Express** menu, allowing rapid programming, is available from the Idle screen by pressing the ▲ button. The **Express** menu provides options to the user to quickly access certain door parameters and view of internal controller parameters for troubleshooting. Press the ▼ button to scroll down through the **Express** menu. Press and hold the **Menu/Enter** button to exit the **Express** menu when finished.

Display Readout

The following options are available for the DGII® display. The options other than **Normal** are intended for use as troubleshooting aids only. The display should always be set to **Normal** when the door is in use.

Use the ▼ button to highlight an option, then press the **Menu/Enter** button to select it.

Normal: Select to return the display to the normal idle screen display after troubleshooting is complete.

Motor Current: Displays the motor current when selected. This is useful for performing troubleshooting and is not intended for use as the normal operational display.

DC Link: Displays the internal DC voltage when selected. This is useful for performing troubleshooting and is not intended for use as the normal operational display.

Position: Displays the door's current position.

Measured Frequency: Displays the measured frequency from the motor in Hz. This value correlates to the speed of the motor.

Output Frequency: Displays the current frequency being applied to the motor. This value correlates to the speed of the motor.

Auto Close Timer

The time period after which the door will close automatically after an Auto input has been activated and released, in seconds and tenths of seconds. To edit the time interval, use the ▲ and ▼ buttons to select the desired value, then press the **Menu/Enter** button to store it. The message **STORED** is briefly displayed, then the screen returns to the **Express** menu.

Setting the value to zero disables the Auto Close Timer.

Manual Close Timer

The time period, in seconds and tenths of seconds, after which the door will close automatically, after a manual input has been activated and released. To edit the time interval, use the ▲ and ▼ buttons to select the desired value, then press the **Menu/Enter** button to store it. The message **STORED** is briefly displayed, then the screen returns to the **Express** menu.

Setting the value to zero disables the Manual Close Timer.

DTO Timer

Delay-To-Open time period, in seconds and tenths of seconds. After an open input is activated, the controller will delay the opening of the door by the set amount. To edit the time interval, use the ▲ and ▼ buttons to select the desired time, then press **Menu/Enter** button to store it. The message **STORED** is briefly displayed, then the screen returns to the **Express** menu.

DTC Timer

Delay-To-Close time period, in seconds and tenths of seconds. After a close input is activated, the controller will delay the closing of the door by the set amount. To edit the time interval, use the ▲ and ▼ buttons to select the desired time, then press the **Menu/Enter** button to store the value. The message **STORED** is briefly displayed, then the screen returns to the **Express** menu.

Open Alarm

Use this timer, along with an output whose function has been set to Open Alarm, to signal if a door has been left open for too long.

Open Alarm timer, in seconds and tenths of seconds. To edit the time interval, use the ▲ and ▼ buttons to select the desired value, then press the **Menu/Enter** button to store it. The message **STORED** is briefly displayed, then the screen returns to the **Express** menu.

Setting this value to zero disables the Open Alarm.

Run Timer

Run Timer value, in seconds. The Run Timer is a safety feature that stops door movement if the DGII® detects that the door is still in motion after the Run Timer period elapses. Set the Run Timer to a value of 1 to 4 seconds longer than the time required to open or close the door, whichever is greater. The Run

Timer starts every time the door moves. If the door does not stop moving before the Run Timer expires, the DGII® stops the door.

To edit the time interval, use the ▲ and ▼ buttons to select the desired value, then press the **Menu/Enter** button to store it. The message **STORED** is briefly displayed, then the screen returns to the **Express** menu.

Emergency JOG

Provides the ability to jog the door using the ▲ and ▼ buttons. Any connected safety inputs are ignored to allow unrestricted door movement.

CAUTION

ANY CONNECTED SAFETY DEVICES ARE IGNORED TO ALLOW UNRESTRICTED DOOR MOVEMENT.

Reset

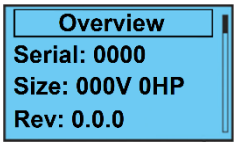
Resets (reboots) the Controller when selected. Parameter settings are not affected.

5. System Status Menu

The **System Status** menu is read-only and provides parameter status displays for use in setup and troubleshooting. The options of the System Status menu are shown and described below. The DGII® is fully operational within this menu, allowing real-time parameter updates. To use the System Status menu:

1. Press the **Menu/Enter** button to enter the System Status menu
2. Press ▼ to scroll down and highlight a menu option.
3. Press the **Menu/Enter** button to view the highlighted option.
4. Press and hold the **Menu/Enter** button when finished to return to the System Status menu.
5. Repeat steps 1 through 4 to view other parameters if desired.

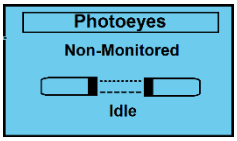
Overview



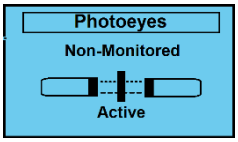
Displays the serial number of the controller, size (voltage and horse power) and the firmware version installed in the controller.

Press and hold the **Menu/Enter** button to return to the System Status menu.

BTR Controls, Inc. Photoeyes

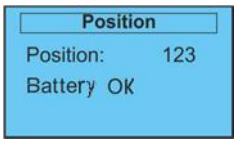


Displays a diagram status of photoeyes 1 & 2. Press the ▲ button to display a diagram for Photoeye 2. Use this function when aligning photoeyes.



If photoeye communication fails or the photoeyes are blocked, the screen shows a vertical line separating the receiver from the transmitter.

Position

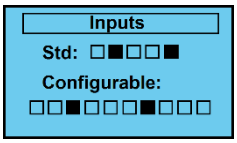


Shows the internal door position count. The example shown is for a door using a BTR Controls, Inc. encoder. If using an incremental encoder, information about the reference status is also shown. If using a BTR Controls, Inc. encoder, the battery level and status are shown in place of the reference status. If an absolute encoder is used, the screen displays position only.

Safety Edge

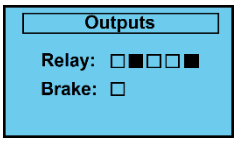
Shows the status of the safety edges (SE).

Inputs



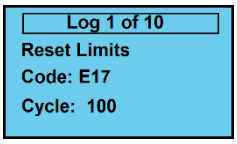
Provides an overview of the controllers' inputs. Both Standard and Programmable inputs are shown. A filled box indicates an input is active, an unfilled box indicates an input that is not active.

Outputs



Provides an overview of the controller outputs. Both Relay and Brake outputs are shown. A filled box indicates an input is active, an unfilled box indicates an input that is not active.

Fault Log

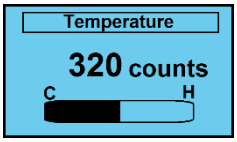


Displays the last 10 error codes and door operation cycle faults. This screen contains 3 lines of information; the first line shows a description of the fault. The second line shows the code associated with the fault. The final line displays the door cycle count at which the fault occurred. Use ▲ or ▼ buttons to navigate through the fault log. Press and hold the **Menu/Enter** button to exit the fault log and return to the System Status menu.

Cycle Counter

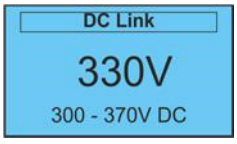
Shows the number of operating cycles the door has completed (open/close = 1 cycle).

Temperature



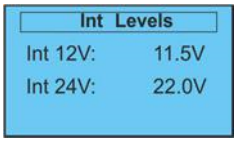
Shows the internal temperature of the DGII® Controller. This is a raw analog value and does not represent degrees Centigrade or Fahrenheit.

DC Link



Shows the controllers internal DC voltage along with the acceptable range.

Int Levels



Shows the controllers actual internal supply 12V and 24V voltages.

6. Profile Selection Menu

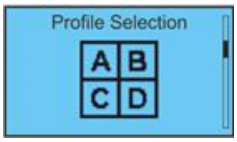
The DGII® Controller has many customizable settings. Different settings are required for different door types. To simplify installation and setup, several preconfigured door profiles are provided. The installer selects the profile matching the door type and all options are set automatically for the selected door. The installer can then customize the Input, Output and Safety functions if necessary.

NOTE: All current door settings are lost when the profile is changed.

Selecting a Preconfigured Door Profile

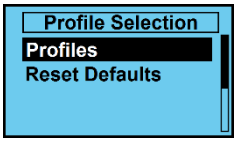
To select one of the preconfigured door profiles, do the following:

1. From the Idle screen, press the **Menu/Enter** button to access the Main Menu. The **System Status** screen is displayed.



2. Press the ▼ button to view the **Profile Selection** screen, then press the **Menu/Enter** button to enter the **Profile Selection** menu.

NOTE: You may be asked to enter a passcode, see section **Entering a Passcode** on page 35 for additional information.



3. Press the ▼ button to highlight the **Profiles** menu option if not already highlighted, then press **Menu/Enter** button to enter the menu.

4. Use the ▲ and ▼ buttons to highlight the appropriate door type.

5. Press the **Menu/Enter** button to select the profile.

6. Press and hold the ▲ button until **Loading Profile** message is displayed on the screen. The DGII® controller will load the profile and automatically reboot with the new door profile in effect.

NOTE: You may have to set the door limits again when changing profiles, see the Limit Setup Menu on page 43 on how to setup limits.

Reset Defaults

1. Select the **Reset Defaults** from the **Profile Selection** menu.

2. Press the **Menu/Enter** button to enter the menu.

3. Press and hold the ▲ button until **Resetting Please Wait** message is displayed on the screen. The DGII® controller will load the current profile defaults and automatically reboot with the profile defaults in effect.

7. Limit Setup Menu

The Limit Setup menu contains all the door limit settings. While in the Limit Setup menu, the door control is inactive and the door can only be jogged when needed.

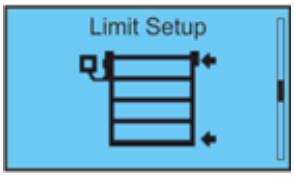
Quick Setup of Door Limits

The procedure below provides quick setup steps for setting up the motor encoder. The setup procedure differs with the type of encoder used. When Quick Setup is used, only the door closed and open limits are actually set by the user. The DGII® then calculates the other limits from these points.

NOTE: When using Quick Setup, only the Open and Close limits must be set. The following three settings are calculated automatically. If these settings must be changed, press and hold the **Menu/Enter** button to return to the previous menu and select the item to be changed.

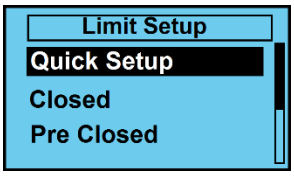
- **Photo:** Closed
- **Partial 1:** 50%
- **Partial 2:** 75%

1. From the Idle screen, press the **Menu/Enter** button. The **System Status** screen is displayed.



2. Press the ▼ button to view **Limit Setup** from the Main Menu, then press the **Menu/Enter** button to enter the menu.

NOTE: You may be asked to enter a passcode, see section **Entering a Passcode** on page 35 for additional information.



3. The **Quick Setup** menu should already be highlighted. If not, then use the ▲ or ▼ buttons to highlight the **Quick Setup** menu. Press the **Menu/Enter** button to start the quick setup.

SEE Quick Setup ON PAGE 58 FOR QUICK SETUP INSTRUCTIONS.

8. Adjusting Door Positions

The controller uses the position counts generated by the motor encoder to position the door. Depending on the encoder type, it may be necessary to install a reference switch/point so the controller knows where the door is located after power up. Figure 18 shows the location of the door positions.

NOTE: A Quick setup must be performed before positions can be manually adjusted.

To adjust the individual door positions instead of using Quick Setup, select each individual position listed below from the **Limit Setup** menu. Then move the door to the desired position using the ▲ or ▼ buttons. Store the position by pressing the **Menu/Enter** button when finished. The display shows **Stored** and returns to the previous menu.

- **Closed**: Door fully closed.
- **Pre Closed**: Position where door changes to pre-closing speed during close.
- **Pre Open**: Position where door changes to pre-open speed during open.
- **Open**: Door fully open.
- **Open Part 1**: Partially open position 1. Door opens to this position when a part 1 open input is active.
- **Open Part 2**: Partially open position 2. Door opens to this position when a part 2 open input is active.
- **Edge OFF**: Sets door position where safety edge check is turned off: the limit where the reversing safety edge should be ignored.
- **Photoeye 1 OFF**: Sets door position where photoeye should be ignored.
- **Photoeye 2 OFF**: Sets door position where photoeye should be ignored.

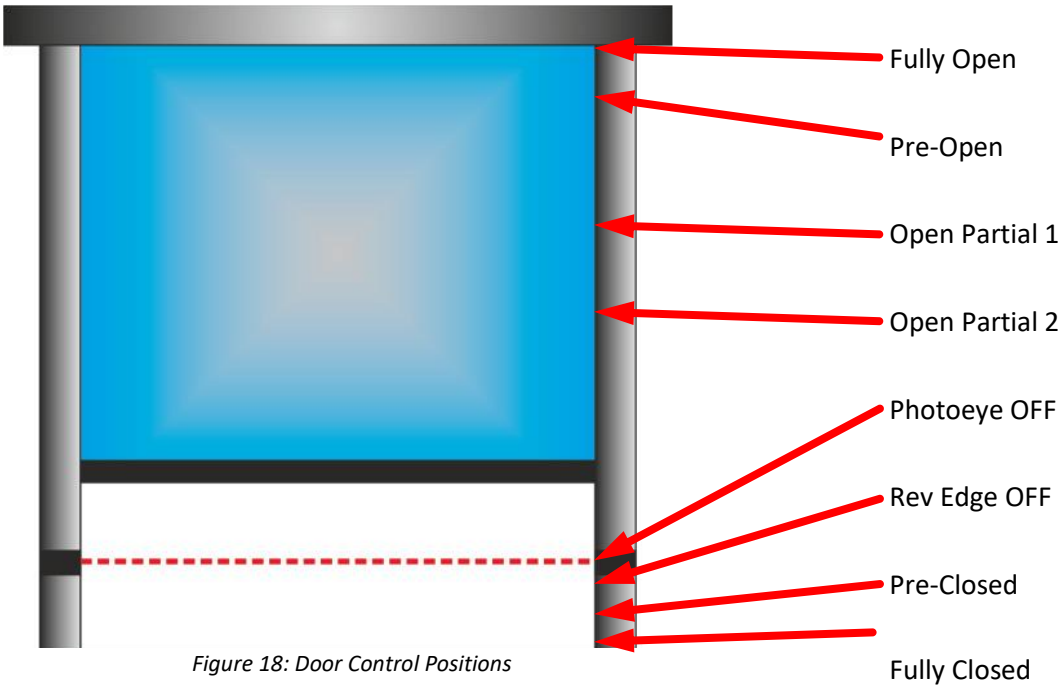


Figure 18: Door Control Positions

9. System Configuration Menu

The System Configuration Menu contains all editable parameters for the DGII®. This menu has nested submenus that group relevant parameters together. Parameters can be entered numerically or can be selected from a list.

NOTE: While in the System Configuration menu, the door will not respond to any Open/Close button requests.

Timers

NOTE: Setting a timer to 0 disables the timer.

The **Timers** option in the **System Config** menu allows setting of the following timers:

- **Auto Close:** The time period after which the door will close automatically after an Auto input has been activated and released, in seconds and tenths of seconds.
- **Manual Close:** The time period, in seconds and tenths of seconds, after which the door will close automatically, after a manual input has been activated and released.
- **Delay To Open:** Amount of time the door is delayed before opening, in seconds and tenths of seconds.
- **Delay To Close:** The amount of time the door is delayed before closing, in seconds and tenths of seconds.
- **Open Alarm:** Setting this timer to a value greater than zero enables the Open Alarm. Use this timer, along with an output whose function has been set to Open Alarm, to signal if a door has been left open for too long.
- **Run Timer:** A safety feature that stops door movement if the DGII® detects that the door is still in motion after the Run Timer period elapsed. Set the Run Timer to a value of 1 to 4 seconds longer than the time required to open or close the door, whichever is longer. The Run Timer starts every time the door moves. If the door does not stop moving before the Run Timer expires, the DGII® stops the door.
- **Input Stuck:** The length of time before the controller displays a message that the recently activated input has not been released.

To set a timer, perform the following:

1. Select **System Config** from the **Main Menu**.
2. Use the ▲ and ▼ buttons to select the **Timers** menu.
3. Press the **Menu/Enter** button.

4. A submenu listing all timers is displayed. Use the ▲ and ▼ button to select the timer to be programmed.
5. Press the **Menu/Enter** button.
6. The screen lists the current setting for the selected timer. Use the ▲ and ▼ button to select the timer value.
7. Press the **Menu/Enter** button. A **STORED** message will display briefly at the bottom of the display and will return to the **Timers** menu.
8. Press and hold the **Enter/Menu** button to return to the previous screen.

Outputs

See Table 9 for a description of available outputs. Ensure that the outputs are properly wired to the **OUTPUTS** terminal block on the front of the DGII®, then use the **Outputs** option to configure the relays by performing the following:

1. Use the ▲ and ▼ button to select **System Configuration** from the **Main Menu**.
2. Use the ▲ and ▼ button to select **Outputs** from the menu.
3. Press the **Menu/Enter** button.
4. Use the ▲ and ▼ buttons to select the output to be programmed (Relay 1 - 4, Power Relay, NPN 1 and NPN 2), then press the **Menu/Enter** button.
5. The screen lists functions for that output (No Function is the default). Select a function using the ▲ and ▼ buttons to specify how the output should operate.
6. Press the **Menu/Enter** button.
7. If a timer is associated with the desired function, a screen for setting the time is displayed. Use ▲ and ▼ to select the desired time (in seconds).
8. Press the **Menu/Enter** button to save the settings and return to the previous screen.
9. Press and hold the **Menu/Enter** button to return to the previous screen.

Inputs

See Table 8 for a description of available inputs. Ensure that the inputs are properly wired to the **INPUTS** terminal blocks on the front of the DGII®, then use the **Inputs** submenu option to configure the inputs by performing the following:

1. Select **System Configuration** from the Main Menu.
2. Use the ▲ and ▼ buttons to select **Inputs**, then press the **Menu/Enter** button. The screen displays a list of the physical inputs available on the front of the Controller.
3. Use the ▲ and ▼ buttons to select the desired input to be programmed, then press the **Menu/Enter** button. The screen lists 3 programmable items for that input:
   - **Function**
   - **Name**
   - **Logic**

4. Start by selecting **Function** to identify how the input should operate. A list of functions appears (see Table 8 for a list of possible functions).
5. Use the ▲ and ▼ buttons to scroll to the desired selection, then press the **Menu/Enter** button.

NOTE: Certain automatic functions have a specific timer assigned when selected (see the Timers section on page 45 for a list of possible timers).

6. Press and hold the **Menu/Enter** button to return to the programmable items screen.
7. Using the ▲ and ▼ buttons highlight **Name** to assign a specific activator name to that input.
8. Press the **Menu/Enter** button to go into the submenu.
9. Using the ▲ and ▼ buttons highlight the name you want to use for that input then press the **Menu/Enter** button to select that name (filled box indicates option has been chosen).
10. Press and hold the **Menu/Enter** button to return to the programmable items screen.

NOTE: This name will be displayed whenever the input is triggered.

11. Using the ▲ and ▼ buttons highlight **Logic** to assign the outputs normal operation state.
12. Press the **Menu/Enter** button to enter the submenu. The following list is displayed:
    - **NO** (normally open)
    - **NC** (normally closed)

13. Use the ▲ and ▼ buttons to highlight the desired state and press the **Menu/Enter** button.
14. Press and hold the **Menu/Enter** button to return to the programmable items screen.

Position Sensor

NOTE: Entering this menu causes an E17 Reset Limits error and requires a new limit setup.

The following must be configured for the position sensor:

- **Type**: select the type of encoder connected to the system.
- **Pulse Count**: set the number of pulses given by the connected encoder.
- **Pulse Output:** required for BTR Controls, Inc. encoders ONLY.
- **Scale**: sets the encoder scale.

To configure the position sensor, perform the following:

1. Select **System Configuration** from the Main Menu.
2. Use the ▲ and ▼ buttons to select **Position Sensor**, then press the **Menu/Enter** button.
3. Use the ▲ and ▼ buttons to select **Type,** then press the **Menu/Enter** button.
4. Use the ▲ and ▼ buttons to highlight the desired encoder type, then press the **Menu/Enter** button.
5. Press and hold the **Menu/Enter** button to return to the **Position Sensor** menu.
6. Use the ▲ and ▼ buttons to select **Pulse Count**, then press the **Menu/Enter** button.
7. Use the ▲ and ▼ buttons to enter the pulse count for the selected encoder, then press the **Menu/ Enter** button to store the setting.
8. If using a BTR Controls, Inc. encoder, use the ▲ and ▼ buttons to select **Pulse Output**, then press the **Menu/Enter** button to store the setting.
9. Use the ▲ and ▼ buttons to select **Scale**, then press the **Menu/Enter** button.
10. Use the ▲ and ▼ buttons to enter the scale for the selected encoder, then press **Menu/Enter** to store the setting.

11. Press and hold the **Menu/Enter** button to exit the **Position Sensor** menu.

Reference

Contact BTR Controls, Inc. for more information on setting up a reference switch.

Safety Edges

1. Select **System Configuration** from the Main Menu.
2. Use the ▲ and ▼ buttons to select **Safety Edges**, then press the **Menu/Enter** button.
3. Use the ▲ and ▼ buttons to select **Safety Edge 1** or **Safety Edge 2**, then press the **Menu/Enter** button.
4. A list of reversing edges is displayed. Use the ▲ and ▼ buttons to select the installed edge from the following types:
   - **OFF** (no reversing safety edge being used)
   - **NC with 8K2**
   - **NO with 8K2**
   - **NC with 1K2**
   - **NO with 1K2**
   - **FRABA System**
   - **Radioband**
   - **SeyWave EXT**
   - **Lightcurtain**
   - **Opto 1**
   - **Opto 2**
   - **Diode/Cap**

5. Press the **Menu/Enter** button to store the setting.
6. Use the ▲ and ▼ buttons to select the **Retry Count** (the amount of tries the controller will try to close the door before stopping and showing an error), press the **Menu/Enter** button.
7. A list of the retries is displayed. Use the ▲ and ▼ buttons to select the retry count from the following types:
   - **No Retry**
   - **1 Retry**
   - **2 Retry**
   - **3 Retry**
   - **4 Retry**
   - **5 Retry**
   - **Unlimited Retry**

8. Press the **Menu/Enter** button to store the setting.
9. Use the ▲ and ▼ buttons to select the **Operation Mode**, then press the **Menu/Enter** button.
10. A list of the safety edge operation modes is displayed. Use the ▲ and ▼ buttons to select mode from the following types:
    - **Normal**: If an obstruction is detected by the safety edge, the door will open then re-try to close at normal speed.

- **Slow Retry** – If an obstruction is detected by the safety edge, the door will open and then re-try to close at a slow speed. Once the door passes the position of where the obstruction occurred the door will close at normal speed.

11. Press the **Menu/Enter** button to store the setting.
12. Press and hold the **Menu/Enter** button to return to the System Configuration menu.

Monitoring Photoeyes

NOTE: The monitored photoeyes feature is not currently supported.

Motor Configuration

1. Select **System Configuration** from the Main Menu
2. Use the ▲ and ▼ buttons to select **Motor Config**, then press the **Menu/Enter** button.
3. Use the ▲ and ▼ buttons to scroll through the menu, press the **Menu/Enter** button to configure the option.
   - **NP Speed:** The connected motor's nameplate speed rating.
   - **Gear Ratio:** The motors gear size ratio between the motors shaft gear and the output shaft gear.
   - **Direction:** Select Normal, Motor Reverse, or Encoder Reverse as appropriate.
   - **V/F Open:** Base frequency (Hz) at which full voltage will be delivered to the motor during an Open cycle.
   - **V/F Close:** Base frequency (Hz) at which full voltage will be delivered to the motor during a Close cycle.
   - **Boost Open:** Required torque boost during a door open cycle as a percentage.
   - **Boost Closed:** Required torque boost during a close cycle as a percentage.
   - **Switch Freq:** Transistor switching frequency in kHz.
   - **Position Tol(erance):** Allowed deviation from actual position limits.
   - **Relay Tol(erance):** Allowed deviation from actual signal output limits.
   - **DC Brake Cur(rent):** DC current injected into the motor during door braking, as a percentage.
   - **DC Brake Time:** Length of time DC current is injected into the motor during braking.

4. Press **Menu/Enter** to store each setting and return to the **Motor Config** menu.
5. Press and hold the **Menu/Enter** button to return to the **System Configuration** menu.

Frequencies

1. Select **System Configuration** from the Main Menu.
2. Use the ▲ and ▼ buttons to select **Frequencies**, then press the **Menu/Enter** button.
3. Use the ▲ and ▼ buttons to navigate through the **Frequencies** menu, press the **Menu/Enter** button to configure each of the following options:
   - **Open:** Maximum frequency limit during an open cycle.
   - **Pre Open:** Maximum frequency used when the door is inside of the Pre Open position limits.

- **Close:** Maximum frequency limit during a close cycle.
- **Pre Close:** Maximum frequency used when the door is inside of the Pre Close position limits.
- **Deadman:** Deadman frequency used while jogging the motor.
- **Minimum:** Minimum frequency limit.

4. Press the **Menu/Enter** button to store each setting and return to the **Frequencies** menu.
5. Press and hold the **Menu/Enter** button to return to the **System Configuration** menu.

Ramps

1. Select **System Configuration** from the Main Menu.
2. Use the ▲ and ▼ buttons to select **Ramps**, then press the **Menu/Enter** button.
3. Use the ▲ and ▼ buttons to navigate through the **Ramps** menu, press the **Menu/Enter** button to configure the following settings:
   - **Acc Open:** acceleration ramp during opening, in Hz per second.
   - **Acc Close:** acceleration ramp during closing, in Hz per second.
   - **Dec Open:** deceleration ramp during opening, in Hz per second.
   - **Dec Close:** deceleration ramp during closing, in Hz per second.
   - **Dec Stop Open:** deceleration ramp during an open cycle when Stop is activated, in Hz per second.
   - **Dec Stop Close:** deceleration ramp during a close cycle when Stop is activated, in Hz per second.
   - **Dec Emergency:** deceleration ramp when an Emergency Stop is activated, in Hz per second.
4. Press the **Menu/Enter** button to store each setting and return to the **Ramps** menu.
5. Press and hold the **Menu/Enter** button to return to the **System Configuration** menu.

DG-XNet

1. Select **System Configuration** from the Main Menu
2. Use the ▲ and ▼ buttons to select **Wireless**, then press the **Menu/Enter** button.
3. Use the ▲ and ▼ buttons to navigate through the **Wireless** menu and press the **Menu/Enter** button to configure the following settings:
   - **Enable Wireless:** Enable or disable on-board wireless.

   NOTE: Wireless must be enabled in order to configure the following settings.

   - **Discovery:** Select this option to discover other wireless nodes nearby. A message is displayed if wireless is not enabled for the Controller.
   - **Connect:** Select to enable/disable communication with discovered wireless nodes listed on the screen.
   - **X-Lock:** Enables/disables airlock between nodes.
   - **Clear All:** Press Menu/Enter to clear all wireless nodes from the controller.
   - **Settings:** contains the following configurable settings:
     a. **Channel:** Sets the communication channel for the DG-XNet.
     b. **Network ID:** Sets the Network ID for the DG-XNet.

NOTE: The Channel and Network ID must match between all other DG-XNet devices being networked together for proper communication.

4. Press the **Menu/Enter** button to store each setting and return to the **Wireless** menu.
5. Press and hold the **Menu/Enter** button to return to the **System Configuration** menu.

Options

1. Select **System Configuration** from the Main Menu
2. Use the ▲ and ▼ buttons to select **Options**, then press the **Menu/Enter** button.
3. Use the ▲ and ▼ buttons to navigate through the **Options** menu and press the **Menu/Enter** button to configure the following settings:
   - **SeyWave Host:** Enable or Disable the host unit; select Information to view the number of connected Remote Units.
   - **Illumadoor:** Enable or Disable light controller; set up light controller outputs when enabled. Contains the following configurable settings:
     a. **Output 1**
     b. **Output 2**
     c. **Output 3**
     d. **Output 4**
     e. **Output 5**
     f. **Output 6**
     g. **Flash Rate:** If the flash setting is enabled, this sets the flash rate of the outputs.

     There are two submenus for each output: FUNCTION and FLASH.
     - FUNCTION: submenu includes the same functions as described in Table 9 on page 31.
     - FLASH: submenu enables or disables flashing for that particular output when it is active.

4. Press the **Menu/Enter** button to store each setting and return to the **Options** menu.
5. Press and hold the **Menu/Enter** button to return to the **System Configuration** menu.

System

1. Select **System Configuration** from the Main Menu.
2. Use the ▲ and ▼ buttons to select **System**, then press the **Menu/Enter** button.
3. Use the ▲ and ▼ buttons to navigate through the **System** menu, press the **Menu/Enter** button to configure each of the following options:
   - **Clear Fault Log:** clears all fault logs.
   - **Clear Service:** clears the operation counter, this is separate from the system cycle counter.
   - **Clear Cycle Cnt:** resets the cycle counter back to 0. **FACTORY USE ONLY**
   - **Sound:** enable/disable the onboard horn
   - **Backlight:** This option is not supported.
   - **Contrast:** Adjusts the display contrast.
   - **SW Update:** Resets DGII® into BOOT mode, from which the DGII® software can be changed.
   - **System Info:** View system information about the DGII® (HP and Voltage).
   - **SW Info:** View the installed software version.
   - **Factory: FACTORY USE ONLY**

- **Language:** Changes the controllers operating language to English, French, German, Spanish. This option can be changed only at the factory.
- **Diagnostics: FACTORY USE ONLY**

4. Press the **Menu/Enter** button to store each setting and return to the **System** menu.
5. Press and hold the **Menu/Enter** button to return to the **System Configuration** menu.

Chapter 5 Troubleshooting

1. Overview

This chapter provides information on error codes that may occur on the DGII® along with troubleshooting information and corrective actions. High-priority codes preempt the display of lower-priority error codes.

2. Error Messages

If an error occurs, it is displayed in a window occupying the entire display similar to the example shown in Figure 19. Find the error code in the tables included in this chapter to determine the cause and corrective action.

Error messages originate in one of three categories:

- Inverter (power faults): see Table 11 on page 53.
- Door control codes related to the motor and encoder: see Table 12 on page 54.
- Option codes related to optional equipment used with the DGII®: see Table 13 on page 56.

Table 14 on page 56 defines the priorities and reset conditions for error messages.

Figure 19 shows error code E17, which is found in Table 13. The cause is that the door position limits cannot be verified. Depending on the type of error, user interaction may be required to clear the error. The error window closes when the error has been cleared/corrected.

Figure 19: Error Message Example

Table 11: Inverter Error Codes

Code	Description	Cause	Corrective Action
UU	DC Link low Top Priority	The incoming mains voltage is too low.	View **System Status - DC Link** to check that the voltage is within the range shown.
OU	DC Link high Medium Priority	Either the incoming mains voltage is too high or the deceleration rate is too short	View **System Status - DC Link** to check that the voltage is within the range shown. Decrease the deceleration ramps.
OC1	Overcurrent 210% Medium Priority	The motor current exceeds the inverter rating by 210%	View the Motor Current display to check the current delivered to the motor. Check the

			motor nameplate data to confirm that the correct controller model is being used. Check for mechanical obstruction or damage.
OC2	Overcurrent 150%/30 sec Medium Priority	The motor current exceeds the inverter rating by 150% for more than 3 seconds	View the Motor Current display to see the current delivered to the motor. Check the motor nameplate data to confirm that the correct controller is being used. Check for mechanical obstruction or damage.
OC3	Overcurrent during acceleration	Over current while accelerating	View the Motor Current display to see the current delivered to the motor. Decrease the acceleration ramps
OC4	Overcurrent DC/Brake Medium Priority	Over current while DC braking	View the Motor Current display to see the current delivered to the motor. Decrease the DC Brake level.
OC5	Peak overcurrent High Priority	Severe overload	Check for: ▪ a short in the motor cable ▪ stalled motor ▪ mechanically or electrically damaged motor. ▪ If equipped with a parking brake, ensure that it is being released. Decrease the Boost parameters.
OH	Controller overheat High Priority	The inverter is overheated	View **System Status - Temperature** to check that the reported temperature is within range. (**Note:** Temperature display shows raw analog counts and not actual temperature) Check ventilation and ensure fan, (if equipped), is operating. Reset the controller and confirm that the fan operates for 1 second during the power-up routine. Reduce the switching frequency and the DC brake level.
HE	Low internal 12V Top Priority	The internal 12VDC power supply voltage is too low	View the **System Status - Int Levels** to check that the voltage is within range. Check I/O wiring for shorts.
HE	Low internal 24V Top Priority	The internal 24VDC power supply voltage is too low	View the **System Status - Int Levels** to check that the voltage is within range. Check I/O wiring for shorts.

Table 12: Door Control Error Codes

Code	Description	Cause	Corrective Action
E01	Slip error Low Priority	Mechanical overload (Slip Monitoring) or missing signal from encoder.	Check door for obstruction. Ensure the pulse output from the encoder is connected to terminal P2 on the controller. Verify that the encoder pulse output is set correctly.

E02	Direction Error – occurs during setup only Low Priority	The direction of the motor is incorrect. The encoder count must increment positively while the door is moving in the open direction.	Use the Motor Direction parameter to set the correct direction for the motor and encoder. If the motor moves in the incorrect direction and the encoder is decrementing, set the Motor Direction parameter to **Motor REV**. If the motor moves in the correct direction but the encoder is decrementing, set the Motor Direction parameter to **Encoder REV**. If the motor is moving in the incorrect direction and the encoder is incrementing, then set the Motor Direction parameter to **Both REV**.
E03	No Signal From Pulse Generator – occurs during setup only. Low Priority	No pulse input detected from the encoder.	Check door for obstruction. Ensure the pulse output from the encoder is connected to terminal P2 on the Controller. Verify that the encoder pulse output is set correctly.
E04	N/A		
E05	Reference Switch Connection Medium Priority	The reference switch is shorted or broken	Check the reference switch for damage and bad connections. Ensure the correct setting for the Reference parameter. Perform a Quick Setup to reset the position limits.
E06	Reference Switch False Activation Medium Priority	The reference switch was activated in the wrong position	Check the reference switch for damage and bad connections. Ensure the correct setting for the Reference parameter. Perform a Quick Setup to reset the position limits.
E07	Run Timer Exceeded Low Priority	The Run Timer has expired.	Check the **Run Timer** parameter to ensure a correct value.
E08	Safety Edge Test Fail Medium Priority	The Reversing Edge test has failed	Check the connections from the reversing edge to the controller. If using the SeyWave wireless system, check operation of connected host and remote door sensor.
E09	Safety Edge Connection Medium Priority	The Reversing Edge connection cannot be verified.	Check the connections from the reversing edge to the controller. If using the SeyWave wireless system, check operation of connected host and remote door sensor.
E10	Safety Edge 1 Activated Low Priority	The Reversing Edge has been activated	Check for obstruction in door's path.
E11	Safety Edge 2 Activated Low Priority	The Reversing Edge has been activated	Check for obstruction in door's path.
E12	Lifting Force Exceeded Low Priority	The torque limit has been exceeded	If the torque limiting feature is being used, adjust the **Torque Limit** parameter to suit the application.

E13	N/A		
E14	Absolute Encoder Comm Loss Top Priority	Communication with the absolute encoder has been lost.	Check the connections between the encoder and the controller.
E15	Installation Fault Low Priority	An error occurred during Quick Setup	Re-perform Quick Setup
E16	N/A		

Table 13: Option Error Codes

Code	Description	Cause	Corrective Action
E17	Reset Limits High Priority	The position limits cannot be verified	Perform a Quick Setup
E18	Wireless Airlock Failed to Authorize Opening Low Priority	The controller failed to receive an Airlock request acknowledgement	Check opposite controller to ensure that it is operational. Check that both controllers have been wirelessly connected together and that each controller has **Wireless** and **Airlock** enabled. Disconnect controllers and run a discovery to reconnect controllers.
E19	Wireless No Response	There was no response from the onboard wireless	Ensure that the **Wireless** is Enabled then power cycle the controller.
E20	N/A		
E21	Option - SeyWave OCS Remote Timeout	A paired SeyWave wireless O/C/S remote has timed out	Check the remote for operation. Refer to supplied SeyWave Wireless manual for troubleshooting.
E22	Option - SeyWave DS Remote Timeout	A paired SeyWave wireless Door Sensor remote has timed out	Option - SeyWave DS Connection Fault
E23	Option - SeyWave DS Connection Fault	A paired SeyWave wireless Door Sensor remote has reported a connection fault	Check the connection and remote for operation. Refer to supplied SeyWave Wireless manual for troubleshooting.

Table 14: Error Code Priority Levels

Code	Description	Cause
Low	Activation input	Can also be reset by higher priority reset Conditions
Medium	Stop, E-Stop or Menu/Enter button pressed	Can also be reset by higher priority reset conditions
High	Menu/Enter button pressed	
Priority Reset Limits	Successful Quick Setup	

Priority Encoder Connection	Communication restored between encoder and controller	Auto-clears when fault no longer exists
Priority UU	Incoming main voltage is within range	Auto-clears when fault no longer exists
Priority 12V	Internal 12V DC level is within range	Auto-clears when fault no longer exists
Priority 24V	Internal 24V DC level is within range	Auto-clears when fault no longer exists

Appendix A

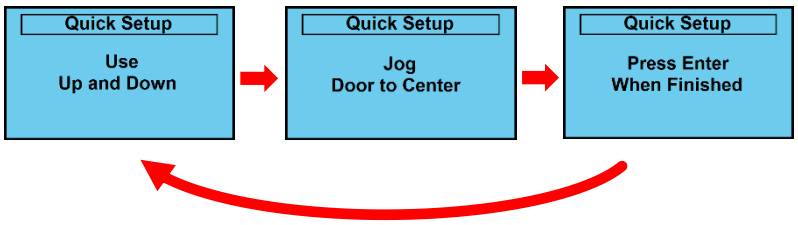
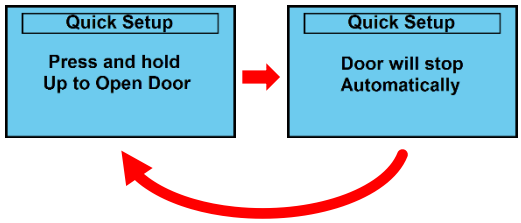
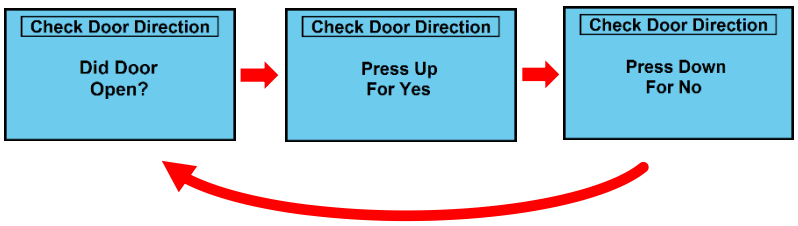
1. Quick Setup

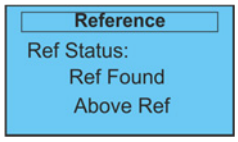
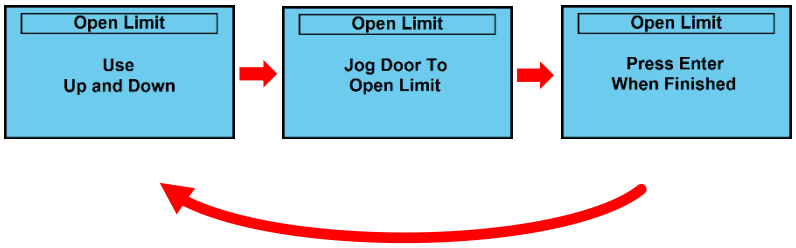
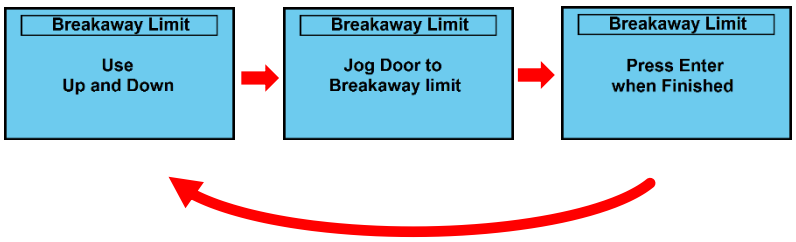
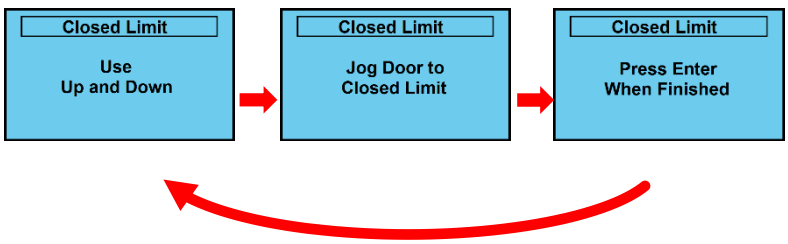
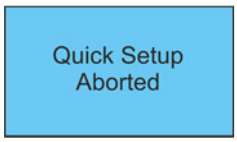
The Quick Setup procedure is a required step during the installation of the DGII®. A Quick Setup must be performed after all connections and programming, including profile selection, have been completed.
The Quick Setup is used to set door positions and also validate the installation. If the Quick Setup encounters a problem it will abort and provide a corresponding error message.

NOTE: Performing a quick setup is the only way to clear an E17 "Reset Limits" error.

NOTE: If the door is not ready to be moved due to an error or a stop input signal, the screen will display a **Not Ready** message and a short description below that. The error must be fixed before quick setup can be performed.

Follow the steps shown below and the on-screen instructions to perform a Quick Setup.

Step	Screen (display will cycle between each screen during each step)	Action
1		- Press the ▲ or ▼ button to jog the door approximately to the center. **NOTE**: the door may travel in the opposite direction then the button pressed. This is normal and will be corrected in later steps. - Press the **Menu/Enter** button when the door is at the center.
2		- Press and hold the ▲ button, the door will start to move, take note of the direction the door is moving. Wait until the door stops automatically and release the ▲ button.
3		- If the door was moving up, press the ▲ button, if the door was moving down, press the ▼ button.

4		- If using an incremental encoder, a reference run is required to calculate the position values, otherwise the controller will skip this step. Start the reference run using the ▲ or ▼ buttons.
5		- Press the ▲ button to jog the door to its normal open position. - Press the **Menu/Enter** button.
6		**NOTE:** This step applies only to certain doors, if this option does not apply then the controller will skip to the next step. See the DGII® controllers screen for more information. - Press the ▲ or ▼ button to jog the door to the breakaway position. This position is typically right before the bottom edge of the door is ready to touch the roller. - Press the **Menu/Enter** button.
7		- Press the ▼ button to jog the door to its normal closed position. - Press the **Menu/Enter** button.
8	 	"Quick Setup Done" will display on the screen if the quick setup was completed successfully. The calculated positions are stored in the controllers' memory. The operation mode is automatically set to **Auto.** If an error occurred during quick setup, the message **Quick Setup Aborted** is displayed and an error code **E17 – Reset Limits** is displayed. Retry the procedure beginning with step 1.