VGC
Installation And Setup Manual

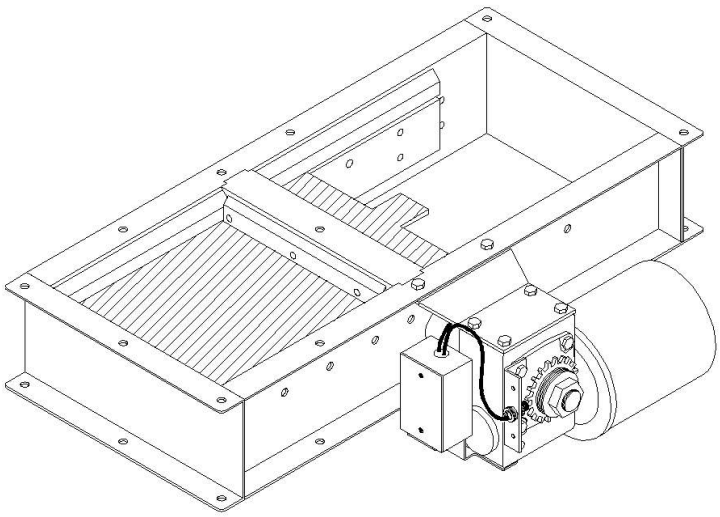
Pat. Pend.

Other manuals available for the VGC are:

Operating And Customizing The VGC

Operating The VGC From A PLC.

Installing VGC Sensors On An Electric Gate



These instructions apply to an electric gate with the VGC sensors properly mounted. See the separate manual ***Installing VGC Sensors On An Electric Gate*** if the sensor installation is incomplete.

The VGC includes all of the necessary electrical control components to operate the gate. A 120 VAC supply is required for power. The standard 3 Phase C-Face motor is powered by the VGC inverter and the gate position is read by two inductive sensors. These two sensors are connected to a barrier relay allowing intrinsically safe wiring practice. Much of the high reliability of the VGC system is the result of the elimination of mechanical switches.

The location of the components is site specific but generally the gate, electric drive package and VGC Panel are usually in different areas. Keep in mind that convenient access to the drive components is valuable when troubleshooting a problem. When more than one drive is being installed, using a single enclosure for all drives may be the most convenient method for mounting the drives. We can supply NEMA 12 enclosures for multiple drives or mounting panel for grouping the VGC Panels on request.

This manual covers the following subjects:

- How it works
- Connecting the electrical components
- Testing the connections
- Running the gate manually
- Running the Learn Mode routine
- VGC Specifications

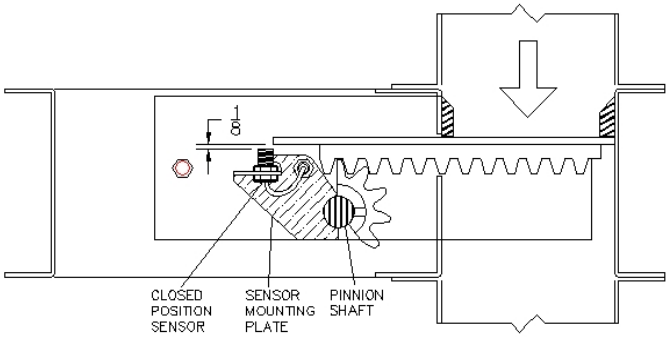
⚠ WARNING

Failure to comply with the wiring instructions in this document could lead to improper operation, equipment damage or serious injury or death.

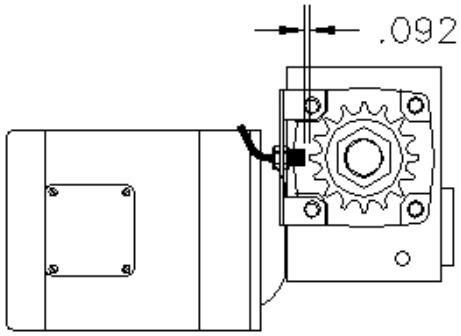
The VGC control should only be installed and wired by an experienced electrician. Make sure the wiring meets all applicable regulations and codes including local and national standards and codes.

High voltage can kill or seriously injure personnel. All maintenance personnel must be trained and follow the proper Lockout/Tagout procedures established by the facility management.

How It Works



Closed position (CP) sensor location.



Target Wheel (TW) sensor location.

Two inductive sensors collect all of the necessary gate position data. The illustrations above show their location within the gate. These sensors are Intrinsically Safe when wired in accordance with the governing code authority.

The CP sensor cable is mounted inside the gate and activates when the slide is fully closed. The CP cable is routed to the outside of the gate through the nipple, then into the junction box. The TW sensor is mounted to the reducer output shaft and monitors the shaft rotation. Its cable goes directly to the junction box. A field supplied 4-wire cable runs from the junction box to the barrier relay allowing Intrinsically Safe wiring practice. The barrier relay provides the power for the IS sensor circuit.

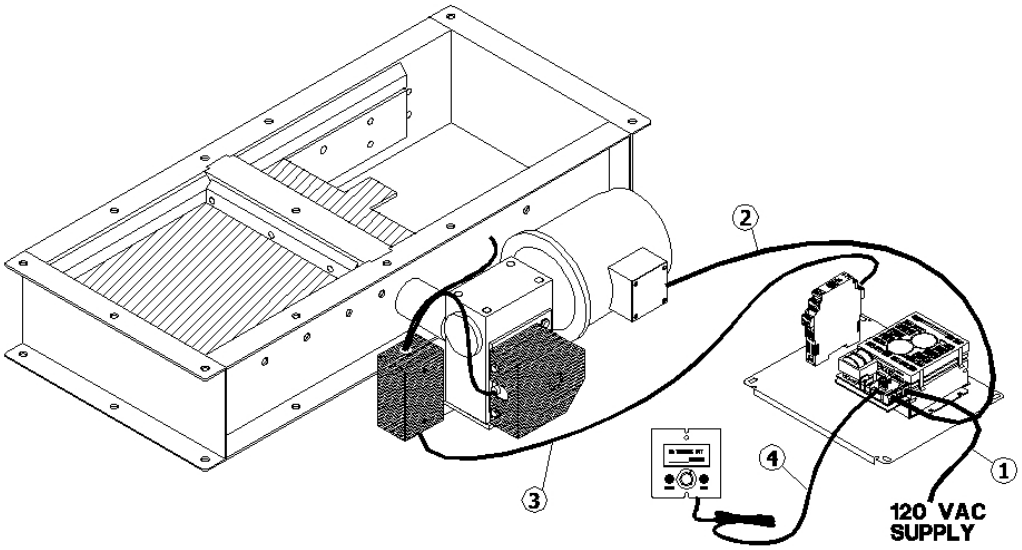
The motor is a 1/2 Hp 3 phase motor wired for 220 Volts. The motor may be ordered as TENV or explosion proof. An inverter that uses a 110 Volt supply powers the motor.

A 3" x 3" microprocessor-based VGC Panel includes a gate position display as well as the pushbuttons and positioning potentiometer. The VGC Panel is usually mounted in a control room. This control reads the sensors and has full control of the inverter. It is connected to the inverter using a 10-wire ribbon cable. The control is fully enabled to communicate with up to 20 other VGC gates and EDI distributors through our UIO Interface. The UIO communicates via Ethernet or serial with the PLC to allow full control or just monitoring of all of these devices.

The inverter and barrier relay are shipped mounted on a backplane suitable for installing in a 10 x 12 NEMA 12 enclosure. A backplane holding the inverters and barrier relays for 2 VGC drives can be mounted in a 10 x 16 NEMA 12 enclosure. Enclosures are available from our stock.

We can supply precut VGC Panel mounting matrixes in just about any combination. Please call us for this or any technical information you may need.

VGC Electrical Connections



There are 4 electrical connections to make for each VGC control. A more detailed discussion of each connection will follow these descriptions

Item	Description
1	120-volt supply to the inverter.
2	230-volt 3 phase connection from the inverter to the gate motor.
3	A 4-wire cable from the barrier relay to the gate junction box. 4000' maximum length. This is an Intrinsically Safe circuit.
4	A 10-wire flat or round ribbon cable from the inverter to the VGC Panel. 400' Max.

Refer to the pictorials on the previous page for a complete layout of the electrical connections.

Item 1. The power input is a 120-volt 10 Amp supply. This is usually supplied by individual breakers in a breaker sub-panel.

Item 2. The inverter output to the motor is 230-volt 2.4 Amp 3 Phase. Attention to motor direction is not required. Since this connection carries variable frequency from the inverter it is generally advisable to keep its length less than 200'. If it must be greater than 200' please contact us for recommendations.

Item 3. This 4-wire cable is used to connect the barrier relay to the sensors and may be up to 4000' in length. Any type of 4 wire cable is suitable – e.g. thermostat wire – and can be confined in a conduit with other IS wiring. This circuit is classified as Intrinsically Safe (IS). It can be run as open wiring in Cls II, Grps E,F,G hazardous locations. It cannot be allowed to run in raceways with power wiring or be close in proximity with non-IS wiring. Follow the jurisdictional codes for IS wiring.

Item 4. A 5' long flat cable with suitable connectors on each end is supplied with each VGC. We have satisfactorily tested operation with cables over 400' long. A round ribbon cable approximately .275" dia. can also be provided in any length. It uses the same field applied connectors as the flat cable. Although this cable carries only low voltage, low current power, it is NOT Intrinsically Safe.

Sensor to Barrier Relay Connections

There are 2 sensors at the gate: The closed position (CP) sensor and the target wheel sensor (TW). Each sensor has 2 wires: brown and brown/blue. It is important that these 4 wires are connected properly to the barrier relay (BR) terminals.

The CP sensor brown wire to BR-1
The CP sensor brown/blue wire to BR-4
The TW sensor brown wire to BR-2
The TW sensor brown/blue wire to BR-5

The barrier relay has 8 switches on its top face. All switches should be right EXCEPT the first or top switch should be left.

Power Check

You may want to remove the Control from its permanent location and temporarily connect it to the drive using the supplied 5' ribbon cable for testing and setup.

CAUTION! Be sure that moving the gate will not cause personal injury to someone near the gate. Also make sure that opening the gate will not allow bulk product to mistakenly flow thru the gate.

Remove the ribbon cable to the VGC Panel from the connector on the inverter. This will prevent the gate from moving when power is applied.

Apply power to the 120-volt circuit. The green Pwr LED on the BR should be lit.

There should be no red LEDs showing.
BR-Led-1 and BR-Led-2 may be yellow or off (but it must not be red).

If any of the above conditions are wrong, the sensors are improperly wired to the barrier relay or the switches are improperly set. Correct the connections and re-do this power check.

Testing Gate Motion

The following instructions will allow you to electrically operate the gate with the push buttons on the VGC Panel. No position readout is available until the control has been configured in Learn Mode but gate movement and sensor operation can be visually observed using the LED on the front of the control. In Manual Mode you can make small positioning adjustments to check sensor operation or just position the gate manually until a full configuration can be made at a later date.

CAUTION! Be sure that moving the gate will not cause personal injury to someone near the gate. Also make sure that opening the gate will not allow bulk product to mistakenly flow thru the gate.

The multi-colored LED at the top of the VGC Panel is used in Manual Mode to check the gate and sensor operation. The colors and blink pattern have special meaning.

State 1: A steady Green state indicates the gate is fully closed.
State 2: A steady Yellow, Red, or off, indicates the gate is not closed.
State 3: A blinking pattern with State 2 colors means the gate is moving.

Remove the power to the VGC drive.

Note*: If you don't know if the* VGC Panel ***you are working with has been previously programmed, hold the*** **CLOSE** ***button during the first power-up to ensure the control is in Manual Mode. Once in Manual Mode, it will always power-up to Manual Mode until the installer performs the escape sequence. This sequence will be explained near the end of these installation instructions.***

Re-attach the VGC Panel to the inverter using the ribbon cable. Apply power to the drive.

The Control will display '<- MANUAL MODE ->' on the second line. You now have electrical control of the gate movement using the VGC Panel pushbuttons.

Pressing the **OPEN** and **CLOSE** pushbuttons will move the gate in opposite directions. At this time the control is not aware of the actual motor-rotation/gate-direction so **OPEN** and **CLOSE** have no literal meaning. You can just 'bump' the gate a bit with the push buttons until you can establish if the direction of the gate matches the push button name. The motor direction will be automatically compensated for during the Learn Mode. If you will be using the gate in Manual Mode for sometime, you may want to electrically change the motor rotation to match the push button description.

Fully close the gate. The LED should be in State1. If not, the closed position sensor is miswired, has the wrong barrier relay switch settings or is improperly adjusted.

Slightly open the gate about 1/4". The LED should be in State 2. Again, check the close sensor if this is not correct.

Depress and hold the **OPEN** button so the gate opens fully. During this time the LED should be in State 3. The blinking pattern is reflecting the target wheel sensor state.

When the gate finishes its opening travel limit, the LED will return to State 2.

As a final check, the following two rules apply to the LED indicators on the barrier relay:

1. **Lamp 1 must be yellow ONLY when the gate is fully closed. Lamp 1 must be off whenever the gate is NOT fully closed.**
2. **Lamp 2 must blink yellow to off when the gate is moving.**

If any of these conditions are not met, correct them before continuing.

Learn Mode

The Learn Mode exercises the gate to find, and record in its memory, the motor rotation and length of gate travel. For this reason, the VGC Panel that will be assigned to this gate must be used during the setup. For convenient access you may remove the Control from its permanent location and connect it to the drive using the supplied 5' ribbon cable.

CAUTION! Be sure that moving the gate will not cause personal injury to someone near the gate. Also make sure that opening the gate will not allow bulk product to mistakenly flow thru the gate.

You will now escape the Manual Mode so that the control may be used to begin the Learn Mode routine. Press and hold both **OPEN** and **CLOSE** buttons at the same time, Release these buttons when prompted to do so.

If you are using an un-programmed control, the screen will display "LEARN MODE" on the first line and "PRESS OPEN" on the second line.

- or -

if the control was previously programmed, press and hold the **OPEN** button during reset or power-up to enter Learn Mode.

Momentarily press the **OPEN** button when you want the Learn Mode routine to start.

The gate will move back and forth, testing the sprocket sensor adjustment, motor rotation, travel limits and the closed position limit switch. Upon successful completion, a percent value and count value will be shown on line 2 of the display. Make a note of the percent number. It should be between 60% and 0%, the closer to 0% the better the adjustment is. If it is greater than 60%, the sprocket sensor will need adjustment. If the routine fails, return to page 5 to test the gate setup..

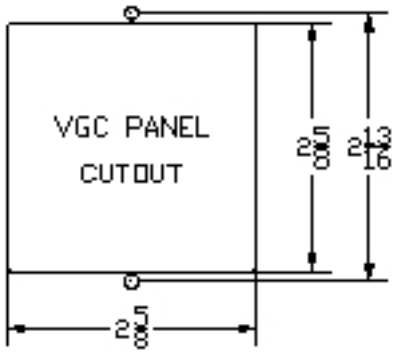
If there were no errors during Learn Mode, the information gathered from this routine will be stored in permanent memory in the VGC Panel. The VGC Panel may be returned to its permanent location.

Refer to the ***Operating And Customizing The VGC*** manual to operate the gate and customize the VGC Panel.

VGC Specifications

VGC Drive Components	
Motor	.5 HP, 1750 RPM, 220 Volt 3 Phase 56 C-Face
Gear Reducer	100:1 Worm gear, 1” dia. adjustable clutch driven output shaft
Inverter input	120 Volt, single phase. Full load current draw 3.6 Amp
Gate Force & Speed - Direct Shaft Drive, 11 Tooth Pinion*	
Gate travel speed	2.4 In/Sec
Gate force	Adjustable 0 to 1800 Lbs. (See Note.)
Travel	1in. to over 100 ft.
VGC Panel	
Size	3” x 3” x 1” deep
Power	Supplied by the inverter within 10 wire ribbon control cable
Display	12 character, 2 line LCD, Multicolored LED
Operators	**OPEN** and **CLOSE** pushbuttons, Positioning potentiometer
Communication	Onboard EDINet (RS-485) for UIO network messaging is standard.

*Note: Roller chain reductions may be used to increase force at the cost of speed.



*Drill 5/32 dia. for #6 screw clearance.
*Drill 7/64 dia. for #6 self threading screw.

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