

CARDINAL CLiC HC-198
STANDALONE CONTROLLER
INSTALLATION MANUAL



PRECAUTIONS

IMPORTANT SAFETY INSTRUCTIONS

Read Instructions: Read all safety and operating instructions before using the device.

Retain Instructions: Keep safety and operating instructions for future reference.

Heed Warnings: Adhere to all warnings on the device and in the operating instructions.

Follow Instructions: Follow operating instructions and installation instructions. Failure to follow these instructions may damage the product or void the product warranty.

Power Sources: Connect only to a standard 120V outlet.

Power Cord Protection: Route power supply cords so that they are not likely to be stepped on or pinched by items placed on or against them. Paying particular attention to the cords at plugs, receptacles, and at the point at which they connect to the device.

Heat: Keep the device away from heat sources such as radiators, heat registers, stoves, etc.

Water and Moisture: Do not use the device in an environment where water may be present; for example, near a sink, in a wet basement, near a swimming pool, near an open window, in a damp mechanical room, etc.

Object and Liquid Entry: Do not allow objects to fall or liquids to be spilled into the enclosure through openings.

Indoor Use Only: The device is intended to be installed and used indoors in a climate-controlled environment only. Do not use the device outdoors.

Servicing: There are no user serviceable parts inside of the device. Do not attempt to open the enclosure or perform any service beyond that described in the operating instructions. Refer all other service needs to qualified service personnel.

WARNING – RISK OF ELECTRIC SHOCK – CONNECT THIS FURNISHING TO A PROPERLY GROUNDED BUILDING SUPPLY ONLY, OR THE EQUIVALENT. FAILURE TO DO SO MAY RESULT IN ELECTRIC SHOCK OR OTHER HAZARDS.

Damage: Discontinue use of the device if any of these have occurred:

- Objects have fallen or liquid has been spilled into the device.
- The power supply cord or the plug has been damaged.
- The device does not appear to operate normally or exhibits a marked change in performance.
- The device has been dropped or the enclosure has been damaged.

WARNING!

TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THE HC-198 STANDALONE CONTROLLER TO RAIN OR MOISTURE. ALL PROTECTIVE FILMS MUST BE REMOVED FROM THE CLiC GLASS PANEL WITH CLiC WIRING DISCONNECTED FROM THE DEVICE!



DISCLAIMER

FCC INFORMATION TO USERS

FCC Information to Users

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 Subpart B of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in commercial, industrial, and residential installations. This equipment generates, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Warning: Changes or modifications not expressly approved by Cardinal IG Company could void the user's authority to operate the equipment.



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CHAPTER 1 - INTRODUCTION

OVERVIEW

This guide pertains to the Cardinal CLiC HC-198 Standalone Controller. This device and the associated CLiC Glass panel(s) have been designed as a NEC Class-3 electrical system. The purpose of this document is to provide guidance on how to set up and install the device in a commercial, industrial, or residential environment. This document includes installation site requirements, wiring requirements, system connection instructions, and basic troubleshooting.

IMPORTANT NOTES

Please read these important notes about the HC-198 Standalone Controller:

- The device must be installed within a dry, ventilated area that maintains a normal room temperature between 50°F (10°C) to 104°F (40°C).
- Avoid installing the device in a location where it will have exposure to prolonged direct sunlight.
- Do not let the device get wet. It should not be handled with wet hands or placed in an area where it could get wet.
- All wiring and installation shall be in accordance with the National Electrical Code (NEC).
- Do not disassemble the device. Only authorized personnel should perform service.
- Completely disconnect glass wiring from device before removing protective films from glass panels.

COMPATIBILITY

The HC-198 Standalone Controller is specifically designed for use only with CLiC Glass panels. Use this device only for its intended use as described in these instructions. Do not use attachments not recommended by the manufacturer. Connecting this device to load types other than CLiC Glass panels may damage the device or the unauthorized loads. Cardinal IG Company will not be responsible for any damage caused by inappropriate usage of this device.

WHAT'S IN THE BOX?

The following items are included with the HC-198 Standalone Controller:

- Quick Start Guide
- Cardinal Screwdriver
- 6' Power Cord
- 4x 10-32 Rack Mount Screws

The following items are pre-attached to the HC-198 Standalone Controller:

- 8x 4-Position Trigger Connectors
- 8x 2-Position Glass Connectors
- 125V 6A 5mm x 20mm Bussmann Fuse
- Rack Ears



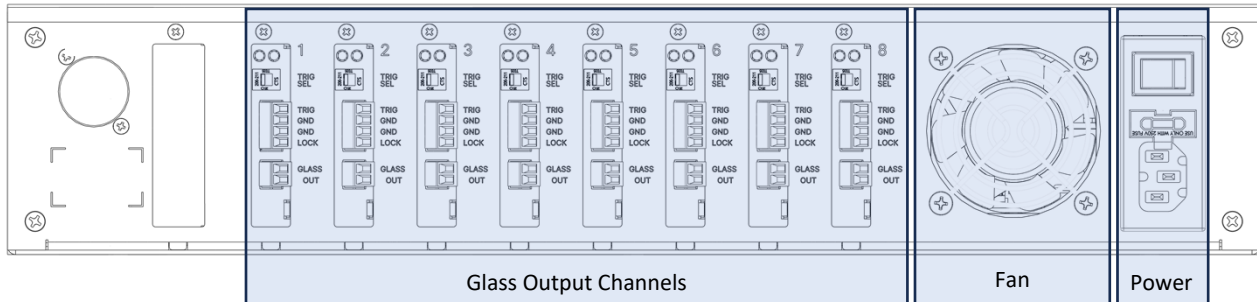
UNPACKING AND INSPECTION

After opening the HC-198 Standalone Controller package, save all the packaging material in case you ever need to ship the unit. Thoroughly inspect and make sure the device is in good condition and there is no visible damage. If you have any doubt about the product's integrity, please contact your reseller or an authorized support center immediately.



CHAPTER 2 - FEATURES

HC-198 STANDALONE CONTROLLER LAYOUT



GLASS OUTPUT CHANNELS

Note: Each Glass Out operates independently.

1. Channel Output Status LEDs

Red LED	Green LED	Description
On	On	Glass State is Clear, as determined by Local Lockout or Trigger
Off	On	Glass State is Private, as determined by Lock Lockout or Trigger
Flashing	Flashing	Error condition. See troubleshooting section on page 13.

2. TRIG SEL (Trigger Mode Select) – see Trigger Input for details – Only change with HC-198 Standalone Controller powered off.

Left (On) – Dry Contact Trigger

Right (Off) – Voltage Trigger

3. Trigger Input and Local Lockout Input

These inputs control the Glass Output

a. TRIG

Trigger input that is used to allow external devices to control the state of the CLiC Glass panel. See Trigger Input below.

b. GND

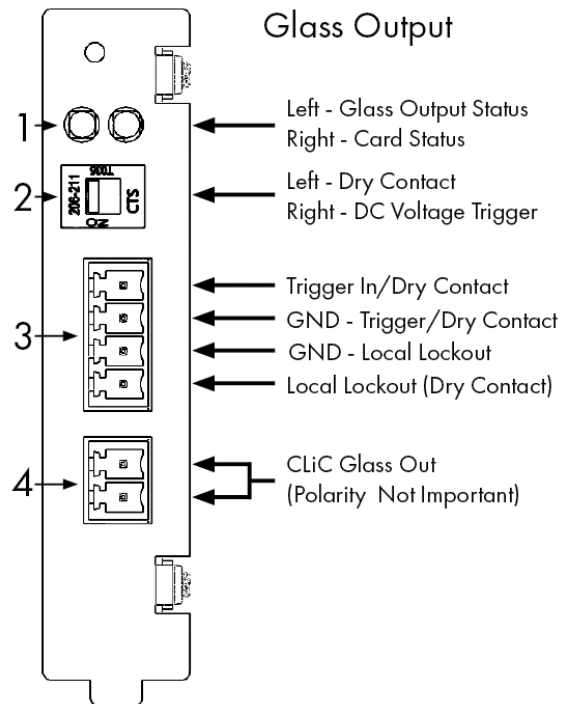
Common ground connection. Use this ground reference for Trigger ground connections.

c. GND

Common ground connection. Use this ground reference for Lockout ground connections.

d. LOCK

Lockout input disables switching the glass to the clear state with the trigger input. This input accepts only a dry contact.



4. CLiC GLASS OUT

This is the Class 3 output used to directly connect the CLiC Glass panel. Both connections on the glass out must be connected to the CLiC Glass panel. There is no polarity in these connections. Do not *short the outputs or add/remove CLiC glass while powered on. Removing the protective film on the glass with these outputs connected may damage the HC-198 Standalone Controller and must be avoided.*

5. Power Switch

Ensure this is off during wire termination and connection.

6. Power Inlet

Power input connection for an IEC Cord (IEC-60320 C13) to a 120V receptacle. Contains a Busman GMA-6A fuse.

TRIGGER INPUT

The HC-198 Standalone Controller has been designed to accommodate many installation configurations and scenarios by utilizing a custom engineered Trigger Input Circuit. This circuit allows a wide variety of switch devices, relays, contact closures, or other automation controllers to provide end user control of the CLiC Glass panel. There is a separate input for each Glass Out for a total of 8 trigger inputs. The triggering device shall use either a dry contact or a direct current voltage trigger.

The trigger circuit supports wiring the trigger input of multiple channels together in a parallel circuit to allow a single switch device to control multiple glass outputs. **Note: Only daisy chain channels that are set to the same trigger mode.**

The CLiC Glass panel will go to the clear state when the dry contact is either shorted to ground, or when the voltage trigger is above +2.8VDC. The CLiC Glass panel will go to the private state when the dry contact is open, or the voltage trigger is below +2.4VDC. The maximum input voltage shall not exceed +25VDC when set to voltage trigger. Do not apply voltage to the trigger input when the Trigger Select is set to dry contact mode.

Control devices can include, but are not limited to:

- Standard light switches **NOTE: USED FOR LOW-VOLTAGE CONTACT CLOSURE ONLY AND NOT CONNECTED TO AC POWER**
- Occupancy Sensors
- Relays, Switch outputs, or voltage triggers from automation controllers or remote-control systems
- Doorjamb Plunger Switches
- Magnetic Security Style Door Switches



CHAPTER 3 – INSTALLATION

SITE WIRING AND PREPARATION

Wiring from the HC-198 Standalone Controller to the CLiC Glass panel(s) should be run prior to the CLiC Glass panel installation. All wiring must be performed in accordance with the applicable building codes and electrical wiring requirements as denoted for Class 3 systems of the National Electric Code (NEC). All wiring should be completed by a qualified and experienced technician. Protective film must be removed from CLiC Glass panels prior to connecting glass panel wiring to the HC-198 Standalone Controller.

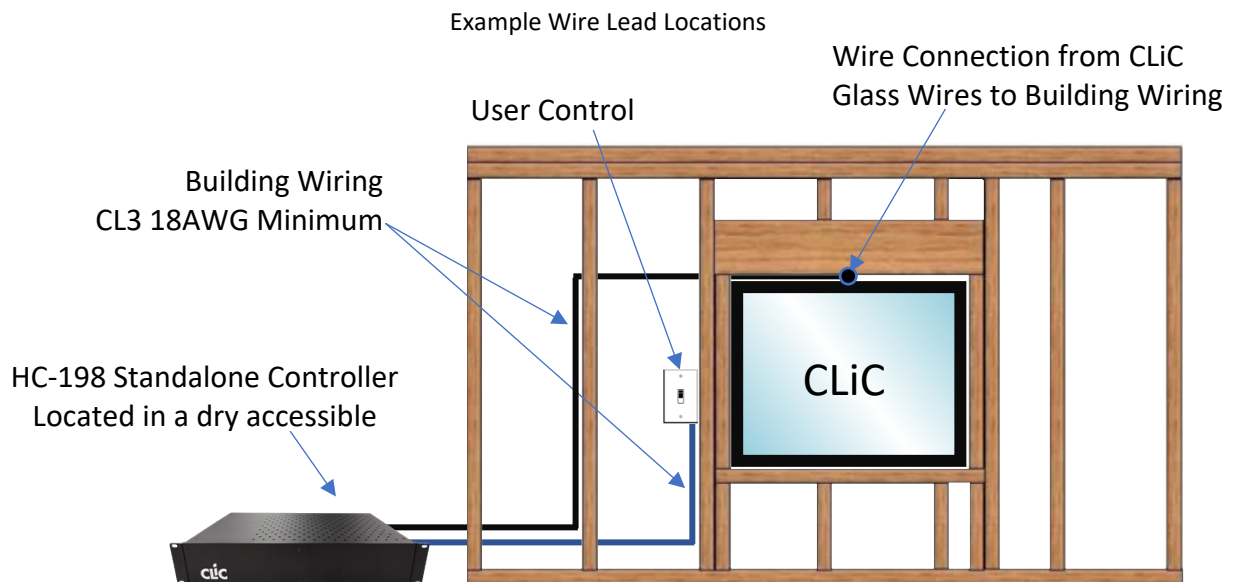
Placement

The HC-198 Standalone Controller has integrated rack ears that can be used to mount it within a standard 19-inch audio/video rack. The device does not need to be mounted near the CLiC Glass panel. The CLiC Glass outputs and the trigger inputs can be extended up to 328 feet (100 meters). Use a standard IEC power cord (IEC-60320 C13) to connect the device to a standard 120V receptacle.

Wire Size and Maximum Length

The wire utilized for glass connections on the HC-198 Standalone Controller shall be a minimum of 18 AWG CL3 wiring. It is important that the correct gauge wire is used to ensure the correct voltage and signal reaches the CLiC Glass panel. The maximum wire distance between the device and the CLiC Glass panel is 328 feet (100 meters). Wiring with CL3P wire may be required if it passes through a plenum airspace. Consult your local building codes for details.

NOTE: CLiC glass can arrive in a Window or Door frame, or as a standalone panel. There will be 2 wires to connect to the building wiring going to the Glass Output of the HC-198 Standalone Controller.



IMPORTANT: REMOVAL OF PROTECTIVE FILMS CAN PRODUCE ELECTRIC SHOCKS AND SPARKS WHICH COULD CAUSE DAMAGE TO CONNECTED ELECTRONICS. ALL PROTECTIVE FILMS MUST BE REMOVED WITH WIRING DISCONNECTED FROM THE GLASS CONTROLLER!

DO NOT APPLY POWER PRIOR TO COMPLETING ALL WIRING CONNECTIONS AND TERMINATIONS!

GLASS OUTPUT LOAD LIMITS

The HC-198 Standalone Controller provides the ability to combine up to four (4) CLiC Glass panels to a single glass output channel. The restrictions for this are a maximum of four (4) CLiC Glass panels shall be connected to the channel's glass output and the total square footage of all panels combined shall be 40 square feet or less. **DO NOT exceed either of these restrictions. Exceeding these restrictions can cause damage and will void the warranty.**

CLiC Glass panels must be wired in parallel when wiring more than one CLiC Glass panel to the same channel. It is recommended to run separate wires from the glass panels to the HC-198 Standalone Controller and then combine them in parallel at the glass output. This allows for much more flexibility if when troubleshooting the installation if an issue occurs. Do not wire the panels in series. Wiring multiple CLiC Glass panels in series can cause damage and will void the warranty.

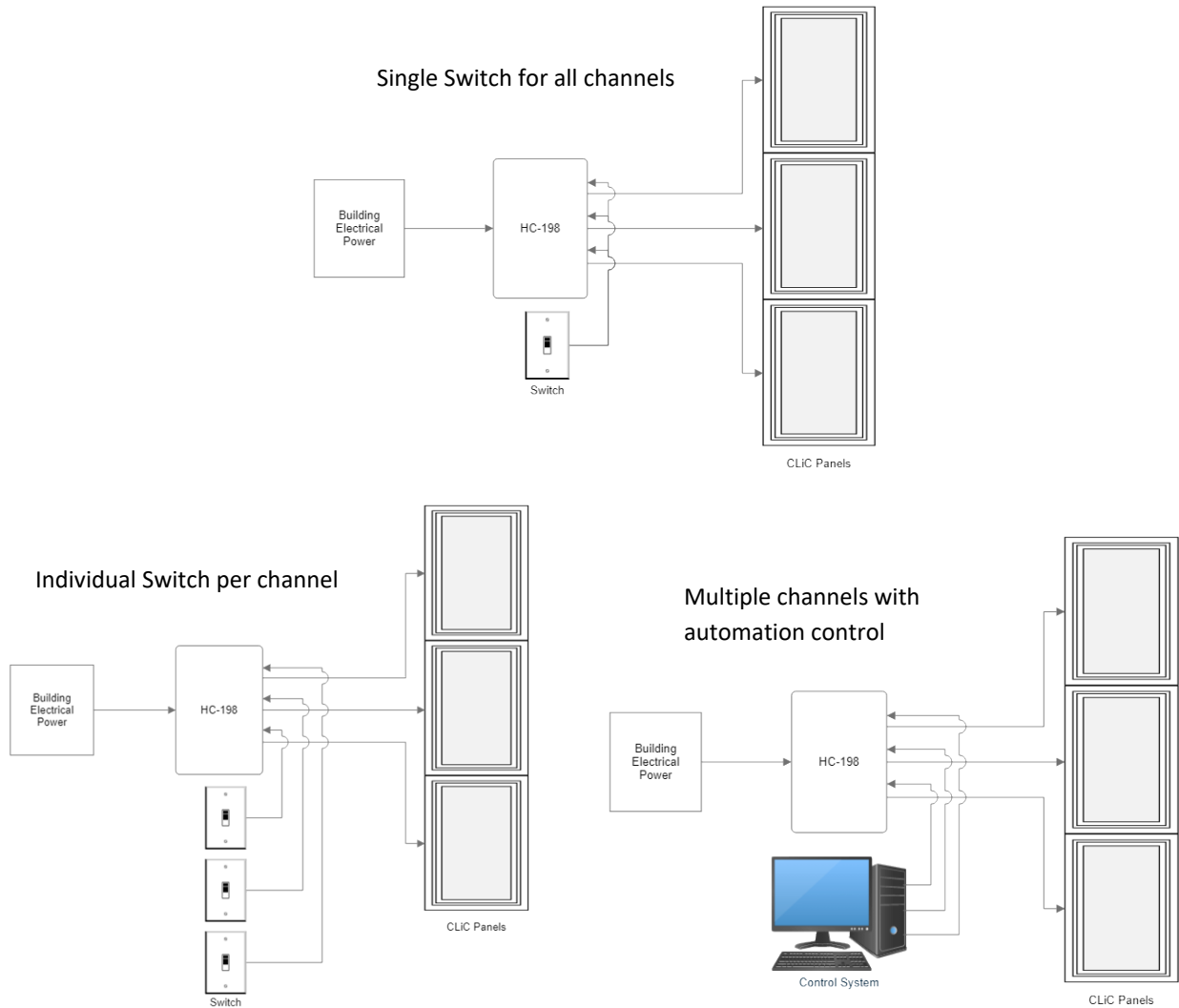
When multiple CLiC Glass panels are connected on a single output they will only be controllable as a group. This means every panel connected to that output will be in the same state (clear or private). You will not be able to control any of the panels individually from the group.



SYSTEM LAYOUT EXAMPLES

Please review the following diagrams for example wiring scenarios:

Note: The following diagrams demonstrate the usage of three (3) channels being used to connect three (3) separate CLiC Glass panels, but the same principles apply to all channels on the HC-198 Standalone Controller



SPECIFICATIONS

CLiC Glass Output	75VAC Max, 1.1 Amps, Capacitive Load, Class 3 AC Voltage	
Wiring Connector Ratings	Solid Core Stranded Wire	0.08 – 1.5 mm ² / AWG 28 – 16 0.08 – 1.5 mm ² / AWG 22 – 16
Power Output Circuit	Note that the outputs of this device are considered a power limited Class 3 circuit, in accordance with Article 725 of the National Electrical Code NFPA 70.	
Input Trigger Type	Open Collector; Shunt to Ground or DC Voltage	
HC-198 Standalone Controller Dimensions with Mounting Ears (without)	19.0" x 3.4" x 11.6" (17.0" x 3.4" x 11.6")	
Weight	12.2 LBs	
Operating Temperatures	50°F to 104°F (10°C to 40°C)	
Storage and Transportation	-40°F to +140°F (-40°C to +60°C)	
Certifications	NEC Class 3, FCC Part 15 Subpart B Class B, UL 60730	
Purpose of Control	Operating Control, Electronic Window Controller	
Construction of Control	Independently Mounted	
Pollution Degree	2	
Rated Impulse Voltage	1500V	
Overvoltage Category	II	
Protection Against Electric Shock	Class I	



TROUBLESHOOTING

COMMON SYMPTOMS AND SOLUTIONS

If you are experiencing problems with your HC-198 Standalone Controller or CLiC glass panel(s), please read the information below before contacting technical support. If you continue to experience problems, see the next chapter for more information on contacting Cardinal IG Company technical support.

Symptom	Troubleshooting Steps
Glass stuck in Clear State (It will not change state)	<ol style="list-style-type: none"> 1. Verify the switch and the CLiC glass panel are wired to the correct channel. 2. Verify wiring from the switching device to the HC-198 Standalone Controller. 3. Verify the position of the trigger select switch. 4. Verify switching device is functioning properly and opening the circuit. 5. Verify absence of voltage if using a voltage trigger.
Glass stuck in Private State (It will not change state)	<ol style="list-style-type: none"> 1. Verify proper function of LEDs on the corresponding output channel. 2. Verify the switch and the CLiC Glass panel are wired to the correct channel. 3. Verify the local lockout is not being triggered. 4. Verify the position of the trigger mode select switch. 5. Verify wiring from HC-198 Standalone Controller to the CLiC Glass panel. 6. Verify wiring from the switching device to the HC-198 Standalone Controller. 7. Verify the switching device is functioning properly and is activating the circuit. 8. Reboot the device. 9. <i>See HC-198 Standalone Controller does not power on Below.</i>
HC-198 Standalone Controller does not power on	<ol style="list-style-type: none"> 1. Verify the HC-198 Standalone Controller is plugged into a working wall outlet. 2. Verify the power switch is turned on. 3. Verify the Device Status light is on. 4. Verify the Fuse in the power inlet is functional. 5. Contact technical support.
Clear state unstable	<ol style="list-style-type: none"> 1. Verify wiring and connections from the HC-198 Standalone Controller to the CLiC glass panel. 2. Contact technical support.
Glass triggered to the clear state when not locally triggered	<ol style="list-style-type: none"> 1. Verify trigger select is set correctly on all daisy chained trigger inputs. 2. Contact technical support.
Channel LEDs flashing fast (0.5s)	<ol style="list-style-type: none"> 1. Verify glass out is connected to the CLiC glass panel and terminated correctly. 2. Contact technical support.
Channel LEDs flashing slow (2s)	<ol style="list-style-type: none"> 1. The HC-198 Standalone Controller has detected an internal fault on the channel and has disabled the channel. 2. Power cycle the device to reverify the fault. 3. If fault persists, contact technical support.
Channel LEDs off	<ol style="list-style-type: none"> 1. Verify the HC-198 Standalone Controller is powered on. (<i>See HC-198 Standalone Controller does not power on</i>) 2. Contact technical support.



SERVICE AND SUPPORT

CONTACTING US

Visit our Website for the Latest Information

You can find the latest revision of this manual, as well as, a list of frequently asked questions, and an easy way to contact us at www.clicglass.com

Contacting Technical Support

At Cardinal IG Company, customer service and satisfaction are two of our core missions. If you have any questions, concerns, or issues related to the window or framing systems please contact the window manufacturer directly.

For any problems or questions regarding your CLiC products, please contact our technical support department by email at: CLiCsupport@cardinalcorp.com

Please include the following information within your email:

- Your Name
- Company Name
- Window or Door Manufacturer
- Telephone Number
- Email address
- Product models and serial numbers
- Detailed description of your question or the problems you are experiencing

We greatly appreciate your purchase of Cardinal CLiC products, and we strive to provide a long-lasting and trouble-free experience. Our goal is to respond to your email promptly and to expediently resolve any issues you are experiencing.

Contacting Cardinal IG Company

For general information, you can contact Cardinal IG Company at:

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7201 W Lake St
Minneapolis, MN 55426
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