

Instructions



# Harrier<sup>®</sup> Chemical Injection Controller

334993B  
EN

For controlling and monitoring an automated injection system.

Not approved for outdoor use or use in explosive atmospheres or hazardous locations.

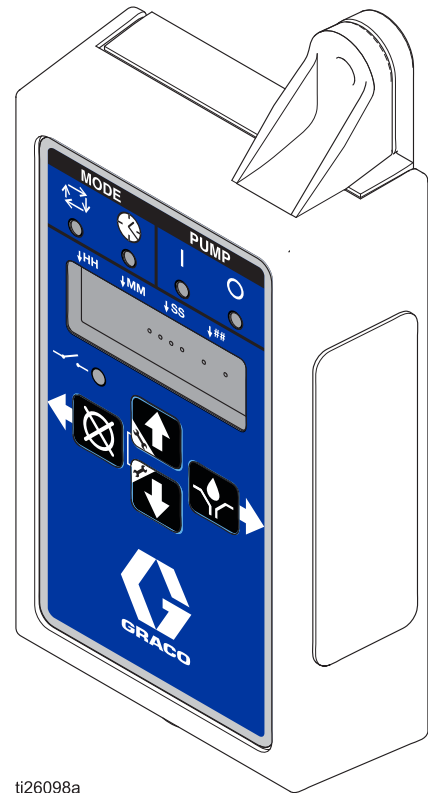
**B32001**

See page 2 for approvals.



### Important Safety Instructions

Read all warnings and instructions in this manual.  
Save these instructions.



ti26098a



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## Approvals





**Intertek**  
 3151640  
 Certified to CAN/CSA C22.2 No. 14  
 Conforms to  
 UL 508

## Related Manuals

Manual No.	Description
3A3099	Wolverine Advanced Chemical Injection System
334513	Wolverine Chemical Injection Pump

# Warnings

The following warnings are for the setup, use, grounding, maintenance, and repair of this equipment. The exclamation point symbol alerts you to a general warning and the hazard symbols refer to Procedure-specific risks. When these symbols appear in the body of this manual or on warning labels, refer back to these Warnings. Product-specific hazard symbols and warnings not covered in this section may appear throughout the body of this manual where applicable.

 <h1 style="margin: 0;">WARNING</h1>	
	<p><b>EQUIPMENT MISUSE HAZARD</b></p> <p>Misuse can cause death or serious injury.</p> <ul style="list-style-type: none"> <li>• Do not operate the unit when fatigued or under the influence of drugs or alcohol.</li> <li>• Do not exceed the maximum working pressure or temperature rating of the lowest rated system component. See <b>Technical Data</b> in all equipment manuals.</li> <li>• Use fluids and solvents that are compatible with equipment wetted parts. See <b>Technical Data</b> in all equipment manuals. Read fluid and solvent manufacturer's warnings. For complete information about your material, request Safety Data Sheet (SDS) from distributor or retailer.</li> <li>• Turn off all equipment when not in use and follow the <b>Pressure Relief Procedure</b> when equipment is not in use.</li> <li>• Check equipment regularly. Repair or replace worn or damaged parts immediately with genuine manufacturer's replacement parts only.</li> <li>• Do not alter or modify equipment. Alterations or modifications may void agency approvals and create safety hazards.</li> <li>• Make sure all equipment is rated and approved for the environment in which you are using it.</li> <li>• Use equipment only for its intended purpose. Call your distributor for information.</li> <li>• Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces.</li> <li>• Keep children and animals away from work area.</li> <li>• Comply with all applicable safety regulations.</li> </ul>

# Component Identification

## Keypad, Display, and Icons

**NOTICE**  
To prevent damage to soft key buttons, do not press the buttons with sharp objects such as pens, plastic cards, or fingernails.

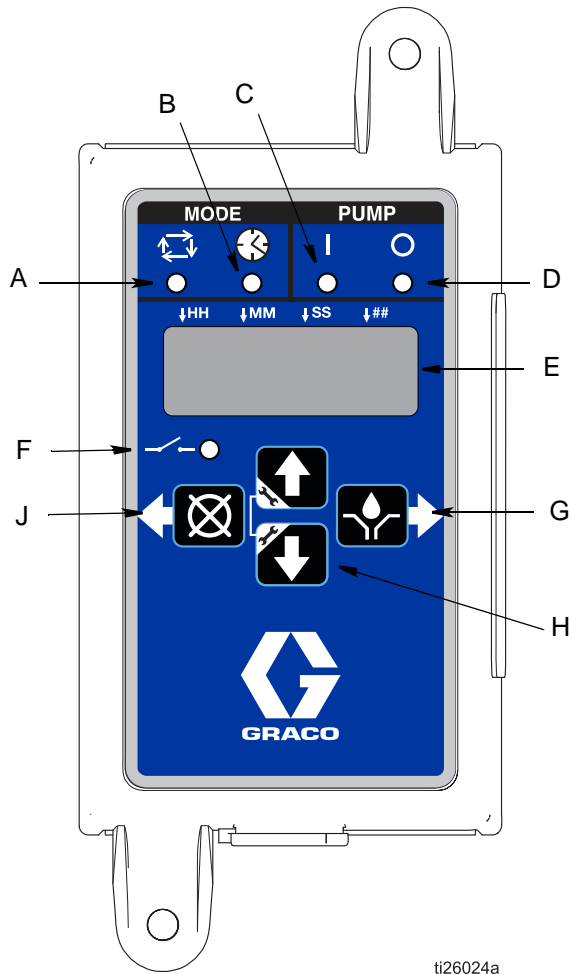


FIG. 1

### Mode LEDs (A & B)

- A Cycle Mode LED: Indicates when the controller is operating in Cycle Mode.
- B Time Mode LED: Indicates when the controller is operating in Time Mode.

### Pump LEDs (C & D)

- C On LED: In Run Mode, this LED illuminates when in the On portion of the Run cycle.
- D Off LED: In Run Mode this LED illuminates when in the Off or Reset portion of the Run cycle.

### Display (E)

- A blinking field or text on the display indicates the controller is in Setup Mode.
- In Run Mode numbers on the display will not blink.

### Auxiliary Switch LED (F)

Illuminates when the Auxiliary Switch is closed.

### Right Direction Arrow / Manual Run / Enter (G)

- In Setup Mode, saves entry, moves cursor in display one field to the right or to the next setup step.
- In Run Mode activates the pump for one complete On cycle if actuated during the Off portion of the Run cycle.

### Up and Down Direction Arrows (H)

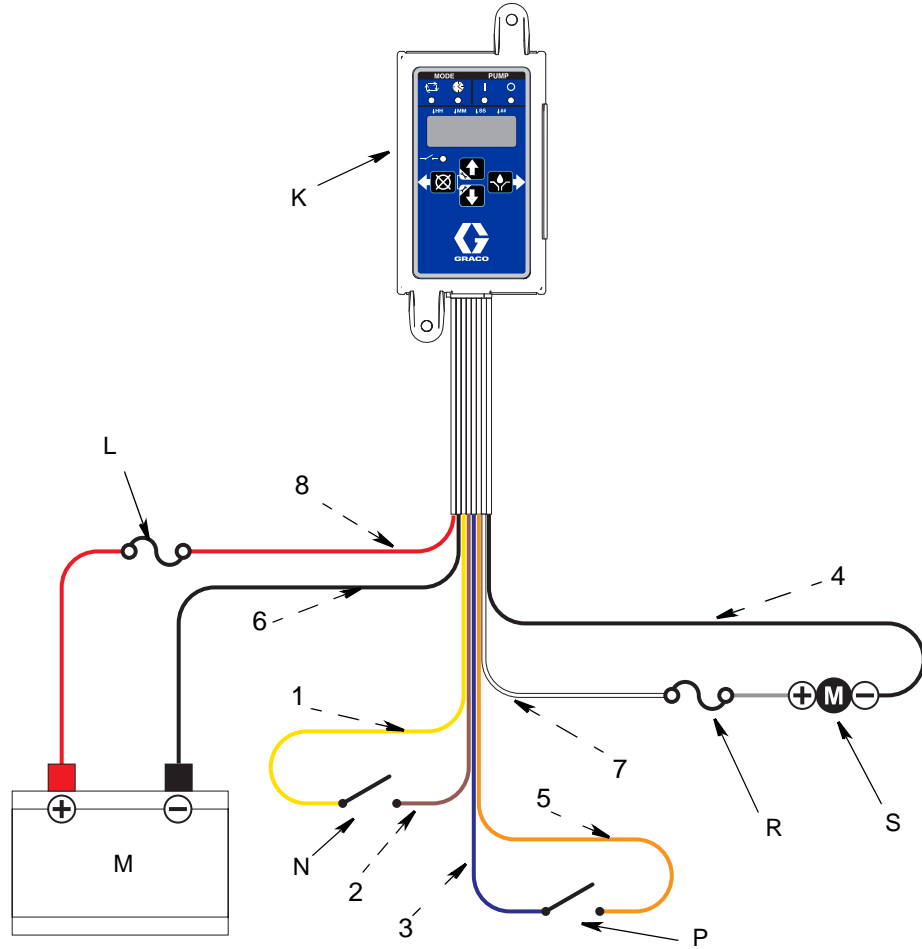
- Press and hold both the Up and Down Arrow keys together for 3 seconds to enter Setup Mode.
- In Setup Mode increase or decrease number values associated with the various Run Modes.

### Left Direction Arrow / Reset (J)

- In Setup Mode moves cursor in display one field to the left.
- In Run Mode, Pressing Reset starts a Pump Off cycle.
- In Alarm Mode, press and hold for 3 seconds to clear warning and switch controller to Run starting in the Off Cycle.

# Installation

## Typical Installation and Wiring Diagram



**FIG. 2 Typical Installation and Wiring**

FIG. 2 is an example of a Harrier chemical injection controller installation. Your installation may differ from what is shown here. The controller (K), with wiring, is supplied by Graco. All other components are supplied by the customer. Contact your Graco distributor for assistance in planning a system to suit your needs.





**Key:**

- K Controller
- L In-line Fuse (battery) - UL 248 approved, 15A or 20A max (per motor size)
- M Battery (12 V)
- N Auxiliary Switch (optional)
- P Cycle Switch for system control (optional)
- R In-line Fuse (pump) - UL 248 approved, 15A or 20A max (per motor size)
- S Pump

**Wiring Key:**

- 1 Auxiliary Switch (+), yellow
- 2 Auxiliary Switch (-), brown
- 3 Cycle Switch (-), blue
- 4 Pump (-), black w/gray stripe
- 5 Cycle Switch (+), orange
- 6 Ground (-), black
- 7 Pump (+), white
- 8 Voltage Input (+), red

## Installing the Injection Controller

				
<b>AUTOMATIC SYSTEM ACTIVATION HAZARD</b>				
Unexpected activation of the system could result in serious injury, including skin injection and amputation.				
This device has an automatic timer that activates the pump injection system when power is connected or when exiting the programming function. Before you install or remove the Injection Controller from the system, disconnect and isolate all power supplies.				

1. Select a flat surface to install the Injection Controller. Drill mounting holes. Refer to **Dimensions** on page 13.
2. Align junction box with predrilled holes. Use two screws (not provided) to secure junction box to mounting surface.

# Programming

<p><b>AUTOMATIC SYSTEM ACTIVATION HAZARD</b></p> <p>Unexpected activation of the system could result in serious injury, including skin injection and amputation.</p> <p>This device has an automatic timer that activates the pump injection system when power is connected or when exiting the programming function. Before you install or remove the Injection Controller from the system, disconnect and isolate all power supplies.</p>				

## Entering Setup Mode

Press both the Up and Down Arrow buttons together for three seconds.



**NOTES:**

- The controller stays in Setup Mode until exited by user.
- Setting changes are not stored unless programming is completed and setup mode is exited normally by pressing the Enter button.
- A blinking dot at the top of the display below HH, MM, SS, or ## indicates the field currently being programmed in the display.



## Programming On Duration

- **on:CY** or **on:ti** appears on the display identifying the mode you are programming (see below).

on:CY      on:ti

- The illuminated LED below the related symbol on the controller label also indicates the mode.

**NOTE:** Selection **on:CY** or **on:ti** designates the way the pump run time is controlled:

- **on:CY** = Cycle Mode, completing a specific number of cycles of an external cycle switch



on:CY

- **on:ti** = Time Mode, a specific duration of time elapses



on:ti

## Cycle Mode (on:CY) On Setup

The LED for Cycle Mode will be lit, indicating that you are programming Cycle Mode settings. The On LED will be lit, indicating that you are programming the number of cycles the controller will run the pump.

1. Use the Up or Down Arrow until **on:CY** displays.

on:CY



2. Press the Enter button.



The following indicates the device is ready to program the number of cycles:

- The first number displayed after the **on:CY** is entered blinks.
- A dot appears under ##.

**NOTE:** The cycle entry is a 2-digit number. A leading zero (0) must be entered in the first field if the number of cycles is fewer than 10.

3. Program the cycles by pressing the Up or Down Arrow to move up or down through the numbers 0-9.

- When the correct first digit is displayed, press the Enter button.

**NOTE:** The cursor automatically moves to the second number field and flashes.

- Use the Up or Down Arrow to scroll until the desired number appears in the second cycle number field.
- Press the Enter button. After you press the Enter button, the controller saves the Cycle Control information and moves to setting Off Time, page 10.

**NOTE:** The program cycles must be completed within five minutes. If the cycles are not completed within five minutes, an alarm is triggered and the controller stops in the Pump Off state.

### Time Mode (on:ti) On Setup

The LED for Time Mode will be lit, indicating that you are programming Time Mode settings. The On LED will be lit, indicating that you are programming the On Time the controller will run the pump.

**NOTES:**

- The HH, MM, and SS fields are 2-digit numbers.
- A leading zero (0) must be entered in the first field if the value is less than 10.
- The highest number that can be set for the HH field value is 99.
- The highest number that can be set for the MM and SS fields is 59.
- The HH, MM, and SS LEDs indicate which value is currently being set.

- Use the Up or Down Arrow to cycle through the settings until **on:ti** displays.



- Press the Enter button.

The following indicates the device is ready to program the On Time:

- The first number displayed after the **on:ti** is entered blinks.

- A dot appears under HH.
  - The On LED is lit.
- To set the On Time use the Up or Down Arrow to scroll until the desired number appears in the first Hours (HH) field.
  - Press the Enter button.

The next HH number field to the right flashes, indicating it is ready for programming.

- Use the Up or Down Arrow to scroll until the desired number appears in the second HH number field.
- Press the Enter button.

The next number field to the right flashes indicating it is ready to program the Minutes (MM) fields.

- Repeat steps 3 - 6 to set the MM fields.

The next number field to the right flashes indicating it is ready to program the Seconds (SS) fields.

- Repeat steps 3 - 6 to set the SS fields.
- Press the Enter button. After you press the Enter button the controller automatically switches to the Off Time Setup Mode.

Setting On Time to zero (0) will keep the controller in Off Mode.



## Programming Off TIME Duration

After setting the parameters for either Cycle (CY) or Time (Ti) On Modes, the Off Time must be set up.

The Off LED will be lit, indicating that you are programming the Off Time the controller will stop the pump.

Setting Off Time to zero (0) will keep the controller in On Mode.

To set the Off Time:

1. Use the Up or Down Arrow to scroll until the desired number appears in the first Hours (HH) field.



2. Press Enter.



The next HH number field to the right flashes, indicating it is ready for programming.

3. Use the Up or Down Arrow to scroll until the desired number appears in the second HH field.
4. Press the Enter button.

The next number field to the right flashes indicating it is ready to program the Minutes (MM) fields.

5. Repeat steps 1 - 4 to set the MM fields.
6. Press the Enter button to lock in the last MM field.

The next number field to the right flashes indicating it is ready to program the Seconds (SS) fields.

7. Repeat steps 1 - 4 to set the SS fields.
8. Press the Enter button to lock in the last SS field.

The controller automatically switches to the Auxiliary Switch Setup next.

## Programming the Auxiliary Switch Setting

The program is designed to work with a dry contact switch that is normally open. The program will Run starting in the Off state when the contact is closed.

AS:no



1. To have the program ignore the auxiliary switch input, use the Up and Down arrows to toggle until **AS:no** is displayed.

2. To have the program utilize the auxiliary switch input, use the Up or Down arrows to toggle until **AS:YS** is displayed.

AS:YS





3. Press the Enter button to save all settings and exit setup mode.



**NOTES:** When the user exits Setup Mode:

- All LEDs illuminate, indicating the new program settings are saved.
- The display shows the software version.
- The controller goes to the beginning of a Pump Off Cycle.

# Operation

				
<p><b>AUTOMATIC SYSTEM ACTIVATION HAZARD</b></p> <p>Unexpected activation of the system could result in serious injury, including skin injection and amputation.</p> <p>This device has an automatic timer that activates the pump injection system when power is connected or when exiting the programming function. Before you install or remove the Injection Controller from the system, disconnect and isolate all power supplies.</p>				

## Run Mode

The controller is in Run Mode providing the following circumstances are present:

- The controller is not in Setup Mode.
- An Alarm is not active.

### Cycle Mode: Pump On

The display alternates between the number of cycles remaining and the amount of time remaining on the Cycle Timeout. Both values count down from their setting (see **Cycle Mode (on:CY) On Setup**, page 7).

**NOTE:** The program cycles must be completed within five minutes. If the cycles are not completed within five minutes, an alarm is triggered and the controller stops in the Pump Off state.

- The Cycle On LED illuminates and the pump output is enabled as long as the system is in the Pump On state.
- Cycle Timeout is shown in MM:SS (minutes:seconds).

### Cycle Mode: Pump Off

The display indicates the amount of time remaining in the Pump Off cycle, counting down the Pump Off time value (see Programming Off Time Duration, page 9).

- The pump output does not run during the Pump Off time.

- The Time Off LED illuminates as long as the system is in the Pump Off state.
- Pump Off time is shown in HH:MM (hours:minutes) or MM:SS if the time remaining is less than an hour.

### Time Mode: Pump On

The display indicates the amount of time remaining in the pump cycle, counting down the Pump On time value (see Time Control (on:ti) On Setup, page 8).

- The Pump output is enabled.
- Pump On time is shown in HH:MM (hours:minutes) or MM:SS if the time remaining is less than an hour.

### Time Mode: Pump Off

The display indicates the amount of time remaining in the Pump Off cycle, counting down the Pump Off time value (see Programming Off Time Duration, page 9).

- The Time Off LED illuminates and the pump does not run during the Pump Off time.
- Pump Off time is shown in HH:MM (hours:minutes) or MM:SS if the time remaining is less than an hour.

## Priming the Lines

The Continuous Time Mode is good for priming long lines.

To operate in Continuous Time Mode, set the controller up in Time Mode and set the Off time to zero. This will make it so the controller will always have the pump on. The timer will still count down; however, when it hits zero, it will reset to the On time and continue the On state.

You can also press the Enter button to restart the On sequence. This is useful when priming.



## Alarm Operation

When an alarm situation occurs:

- pump operation is disabled,
- an error code displays.

Press and hold for 3 seconds to clear alarm and switch controller to Off Mode.



See **Alarm Types and Messages** for additional information related to alarms and alarm messages.

## Alarm Types and Messages

**NOTE:** Alarms are visual only.

Alarm Type	Error Code	Description	Things to Check/Do
Cycle	Er:04	Backup time expired prior to receiving programmed number of cycle counts	<p>Inspect injection system for broken or plugged lines.</p> <p>Confirm pump is operating correctly.</p> <p>Inspect wiring and switch.</p> <p>Verify programming.</p>
System Fault	Er:54	Internal system error occurred.	<p>Cycle power.</p> <p>If the system error persists contact Graco Customer Support.</p>

# Troubleshooting

Description	Problem	Solution
Unit does not power on or display is dim/unresponsive	Incorrect or loose wiring	Refer to <b>Installation</b> instructions starting on page 5.
	Input voltage is out of range	Confirm power source is between 9 and 26 VDC.
	Tripped external fuse	Confirm that none of the devices or wiring connected to the controller are causing a short circuit connection. Replace fuse. If fuse trips again, contact Graco Customer Support.

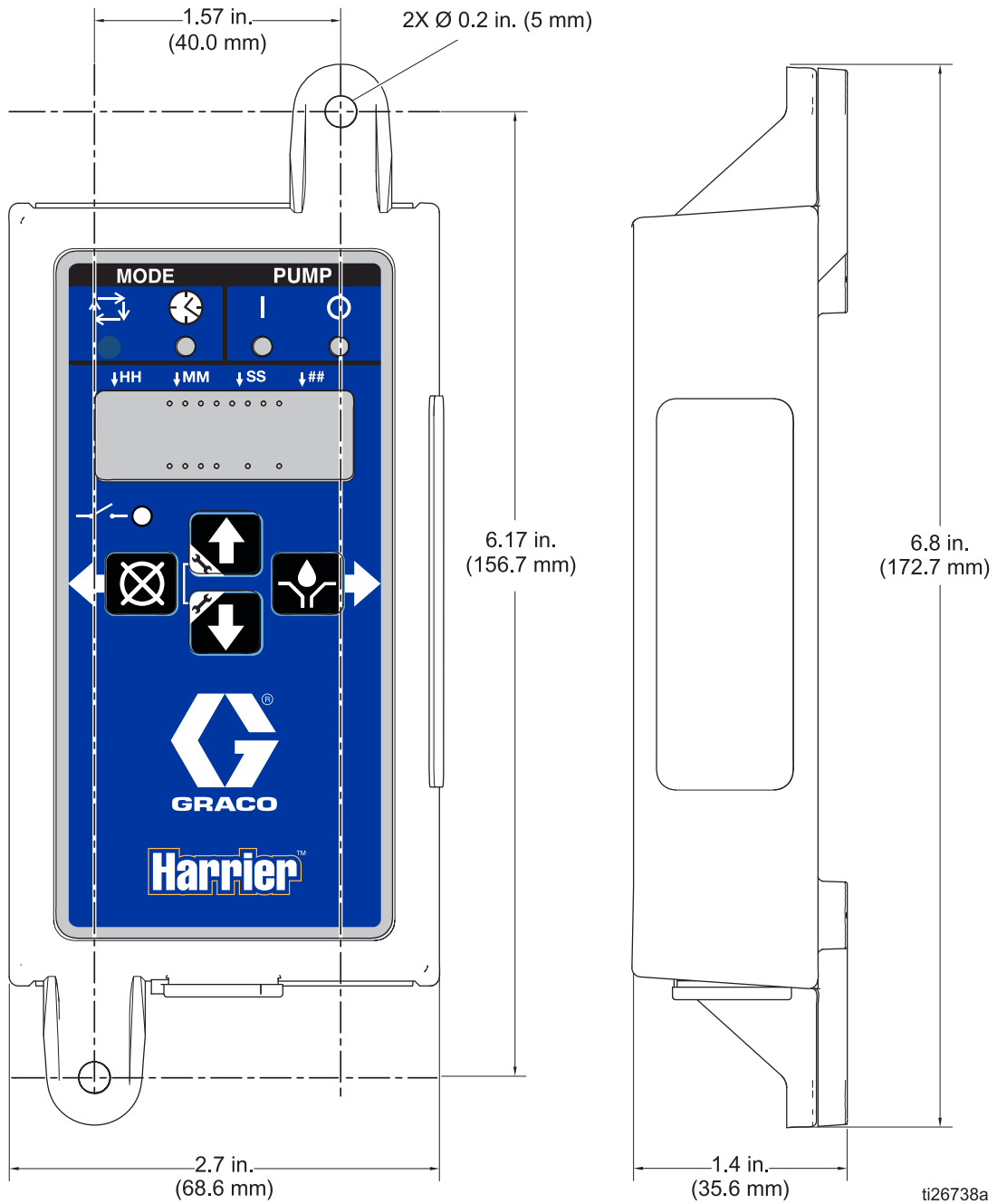
## Accessories

### Related Kits

Kit No.	Description
<b>B32107</b>	Cycle Counter (All motors)
<b>B32106</b>	Temperature Switch
<b>B32070</b>	15A Fuses (10)
<b>B32071</b>	25A Fuses (10)

# Dimensions

**NOTE:** The following image is not to scale.



**FIG. 3 Harrier Controller Dimensions**



# Technical Data

Input Contact	
Power Source DC	9 - 26 VDC
Power Consumption	1 Watt
Cycle/Pressure Control Input (optional)	9 - 26 VDC, Normally open or cycle switch
Auxiliary Input (optional)	Normally open switch
Outputs	
Pump control	Pump Control Voltage = Power Source
Voltage	Pump Control Voltage = Power Source
Max Switching Voltage	26 VDC
Max Switching Current	16A (DC)
Min Switching Current	100 mA (DC)
Protection grade	IP54 for indoors
Enclosure Material	Polycarbonate + PET
Membrane Material	Polyester
Maximum Humidity	90% Relative Humidity (non-condensing)
Operating temperature range	- 40°F to 131°F (- 40°C to 55°C)
Storage Temperature	- 40°F to 176°F (- 40°C to 80°C)

# Graco Standard Warranty

Graco warrants all equipment referenced in this document which is manufactured by Graco and bearing its name to be free from defects in material and workmanship on the date of sale to the original purchaser for use. With the exception of any special, extended, or limited warranty published by Graco, Graco will, for a period of twelve months from the date of sale, repair or replace any part of the equipment determined by Graco to be defective. This warranty applies only when the equipment is installed, operated and maintained in accordance with Graco's written recommendations.

This warranty does not cover, and Graco shall not be liable for general wear and tear, or any malfunction, damage or wear caused by faulty installation, misapplication, abrasion, corrosion, inadequate or improper maintenance, negligence, accident, tampering, or substitution of non-Graco component parts. Nor shall Graco be liable for malfunction, damage or wear caused by the incompatibility of Graco equipment with structures, accessories, equipment or materials not supplied by Graco, or the improper design, manufacture, installation, operation or maintenance of structures, accessories, equipment or materials not supplied by Graco.

This warranty is conditioned upon the prepaid return of the equipment claimed to be defective to an authorized Graco distributor for verification of the claimed defect. If the claimed defect is verified, Graco will repair or replace free of charge any defective parts. The equipment will be returned to the original purchaser transportation prepaid. If inspection of the equipment does not disclose any defect in material or workmanship, repairs will be made at a reasonable charge, which charges may include the costs of parts, labor, and transportation.

**THIS WARRANTY IS EXCLUSIVE, AND IS IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.**

Graco's sole obligation and buyer's sole remedy for any breach of warranty shall be as set forth above. The buyer agrees that no other remedy (including, but not limited to, incidental or consequential damages for lost profits, lost sales, injury to person or property, or any other incidental or consequential loss) shall be available. Any action for breach of warranty must be brought within two (2) years of the date of sale.

**GRACO MAKES NO WARRANTY, AND DISCLAIMS ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, IN CONNECTION WITH ACCESSORIES, EQUIPMENT, MATERIALS OR COMPONENTS SOLD BUT NOT MANUFACTURED BY GRACO.** These items sold, but not manufactured by Graco (such as electric motors, switches, hose, etc.), are subject to the warranty, if any, of their manufacturer. Graco will provide purchaser with reasonable assistance in making any claim for breach of these warranties.

In no event will Graco be liable for indirect, incidental, special or consequential damages resulting from Graco supplying equipment hereunder, or the furnishing, performance, or use of any products or other goods sold hereto, whether due to a breach of contract, breach of warranty, the negligence of Graco, or otherwise.

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## Graco Information

For the latest information about Graco products, visit [www.graco.com](http://www.graco.com).

For patent information, see [www.graco.com/patents](http://www.graco.com/patents).

**TO PLACE AN ORDER**, contact your Graco distributor or call to identify the nearest distributor.

**Phone:** 612-623-6921 **or Toll Free:** 1-800-328-0211 **Fax:** 612-378-3505

*All written and visual data contained in this document reflects the latest product information available at the time of publication. Graco reserves the right to make changes at any time without notice.*

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