

# Leak Detection System

3A6976C

EN

*For detecting leaks in your pump diaphragm system. For professional use only.*

Not approved for use in explosive atmospheres or hazardous locations unless otherwise specified.

**Part No. 17Z666 Leak Sensor Kit**

**Part No. 17Z667 Leak Sensor Kit**

includes ATEX-certified leak sensor

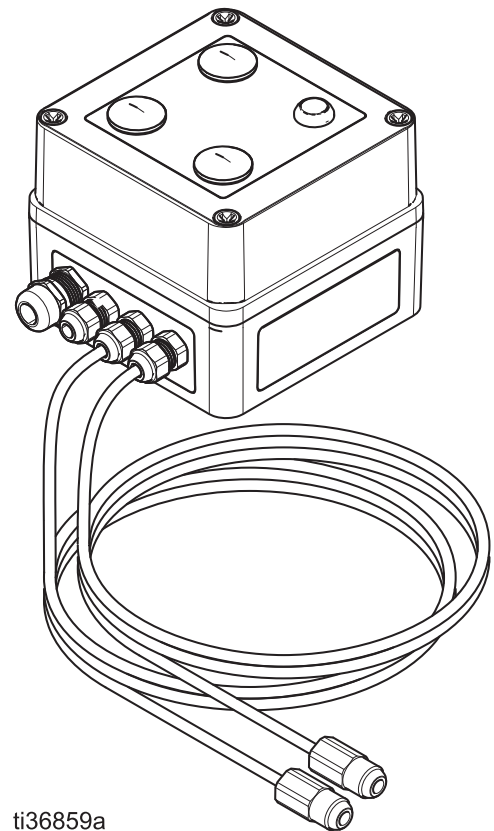
**Part No. 25P303 Control Box Kit**

**Part No. 25P305 Control Box Mounting Kit**



## Important Safety Instructions

Read all warnings and instructions in this manual before using the equipment.  
Save these instructions.







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# 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>ELECTRIC SHOCK HAZARD</b></p> <p>Improper setup or usage of the system can cause electric shock.</p> <ul style="list-style-type: none"> <li>• Turn off and disconnect power cord before servicing equipment.</li> <li>• Do not expose to rain. Store indoors.</li> </ul>
	<p><b>FIRE AND EXPLOSION HAZARD</b></p> <p>Flammable fumes, such as solvent and paint fumes, in <b>work area</b> can ignite or explode. Paint or solvent flowing through the equipment can cause static sparking. To help prevent fire and explosion:</p> <ul style="list-style-type: none"> <li>• Use equipment only in well-ventilated area.</li> <li>• Eliminate all ignition sources; such as pilot lights, cigarettes, portable electric lamps, and plastic drop cloths (potential static sparking).</li> <li>• Ground all equipment in the work area. See <b>Grounding</b> instructions.</li> <li>• Keep work area free of debris, including solvent, rags and gasoline.</li> <li>• Do not plug or unplug power cords, or turn power or light switches on or off when flammable fumes are present.</li> <li>• Use only grounded hoses.</li> <li>• <b>Stop operation immediately</b> if static sparking occurs or you feel a shock. Do not use equipment until you identify and correct the problem.</li> <li>• Keep a working fire extinguisher in the work area.</li> <li>• Route exhaust away from all ignition sources. If diaphragm ruptures, fluid may be exhausted with air.</li> </ul>
	<p><b>FIRE AND EXPLOSION HAZARD</b></p> <p>Static charge may build up on plastic parts during cleaning and could discharge and ignite flammable vapors. To help prevent fire and explosion:</p> <ul style="list-style-type: none"> <li>• Clean plastic parts only in well-ventilated area.</li> <li>• Do not clean with a dry cloth.</li> <li>• Do not operate electrostatic guns in equipment work area.</li> </ul>

# **WARNING**

 	<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 Technical Specifications in all equipment manuals.</li> <li>Use fluids and solvents that are compatible with equipment wetted parts. See Technical Specifications in all equipment manuals. Read fluid and solvent manufacturer's warnings. For complete information about your material, request Safety Data Sheets (SDSs) from distributor or retailer.</li> <li>Do not leave the work area while equipment is energized or under pressure.</li> <li>Turn off all equipment and follow the Pressure Relief Procedure when equipment is not in use.</li> <li>Check equipment daily. 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>Do not kink or over bend hoses or use hoses to pull equipment.</li> <li>Keep children and animals away from work area.</li> <li>Comply with all applicable safety regulations.</li> </ul>
	<p><b>PERSONAL PROTECTIVE EQUIPMENT</b></p> <p>Wear appropriate protective equipment when in the work area to help prevent serious injury, including eye injury, hearing loss, inhalation of toxic fumes, and burns. Protective equipment includes but is not limited to:</p> <ul style="list-style-type: none"> <li>Protective eyewear, and hearing protection.</li> <li>Respirators, protective clothing, and gloves as recommended by the fluid and solvent manufacturer.</li> </ul>

## Approvals

			
<p><b>FIRE AND EXPLOSION HAZARD</b></p> <p>Do not use ATEX kit 17Z667 (17Z051 sensors) with control box kit 25P303. The control box is not approved for explosive atmospheres or hazardous locations and could result in injury.</p>			

Part No.	Description	Approvals
25P303	Control box kit	
17Z664	Sensor (included in kit 17Z666)	
17Z051	ATEX-certified sensor (included in kit 17Z667)	 

# Overview

## Usage

The leak detection system monitors air operated double diaphragm pumps for diaphragm rupture or other leaks that may contaminate the fluid being pumped. The system is made up of a main control box and two liquid detection sensors. The sensors are screwed into the air side of each diaphragm on the pump. Each sensor corresponds to a green LED indicator on the control box.

When a sensor detects liquid, the corresponding green LED indicator will extinguish and the red FAULT LED indicator will light, indicating a diaphragm rupture or other leak has occurred. The control box also has the ability to control an external device such as an alarm, light, or air solenoid via an onboard relay.

During normal operation, the green LED indicators on the control box will remain lit. The red FAULT LED indicator will remain extinguished, indicating proper operation.

## Component Identification and Description

Before you install the system, you should be familiar with the parts discussed in the following paragraphs.

### Sensors

The sensors are mounted on the pump to detect liquid on the air side of each diaphragm. See FIG. 1 and FIG. 5.

**NOTE:** Leak sensor kit 17Z667 is ATEX certified and should not be used with control box kit 25P303. Control box kit 25P303 is not rated for use in hazardous locations.

### Control Box

The control box powers and continuously monitors the sensors. It will display a fault condition by lighting the red FAULT LED indicator when a diaphragm rupture or other leak is detected. The FAULT LED indicator will remain lit until the reset button is pressed.

### Relay

The relay has two sets of contacts that can be used to indicate an error by activating an output signal, such as

turning off a valve, lighting a light, etc. The contacts are located on the CR3 terminal strip. See FIG. 6.

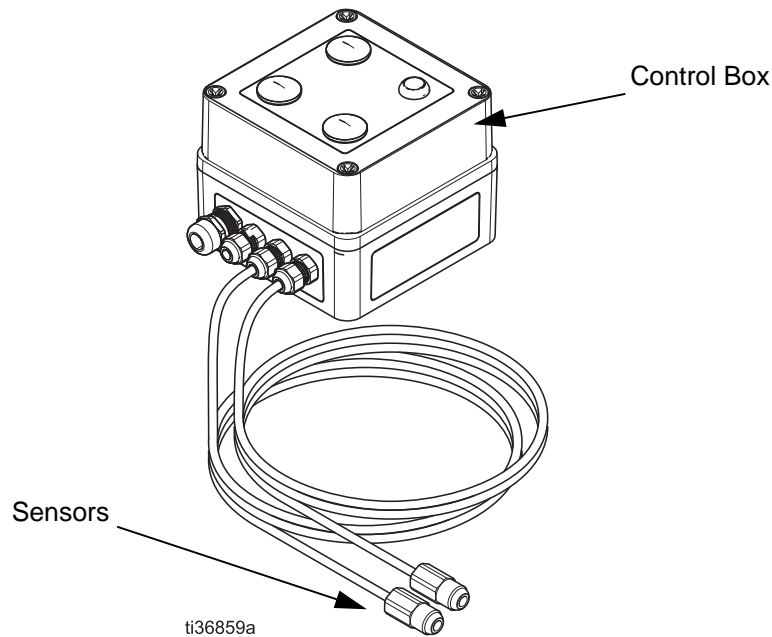
## Grounding



Follow the instructions in your pump manual to ground the diaphragm pump system and check its electrical grounding continuity.

The control box does not require electrical grounding.

# Installation



**FIG. 1. Typical Leak Detection System**

## ATEX-Certified Leak Sensor Kit 17Z667

For use with a customer-supplied, ATEX-certified monitoring device.



### Electric Shock

To avoid potential injury from electric shock, shut off power to your monitoring device before installing the sensors or servicing the leak detector system.

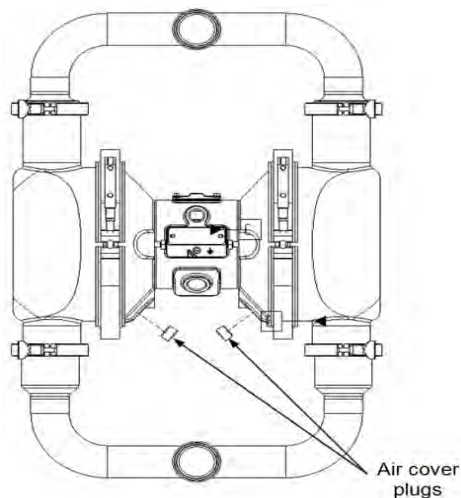
### Pressure Relief

Your diaphragm pump stays pressurized until pressure is relieved manually. To help prevent serious injury from pressurized fluid, such as splashing in the eyes or on skin, follow the Pressure Relief Procedure when you stop pumping and before you install the leak detector sensors. Refer to your pump manual for the correct Pressure Relief Procedure.

### Fire and Explosion Hazard

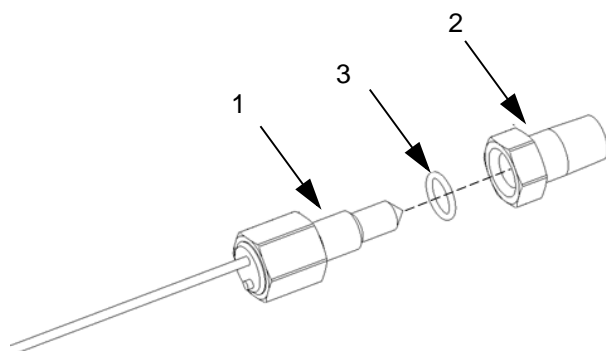
Do not use ATEX kit 17Z667 (17Z051 sensors) with control box kit 25P303. The control box is not approved for explosive atmospheres or hazardous locations and could result in injury.

1. To install the sensors, first disconnect power to your monitoring device.
2. Relieve pump pressure. Follow the Pressure Relief Procedure in your pump manual.
3. Remove plugs from the pump air covers, if plugs are present. See FIG. 2.



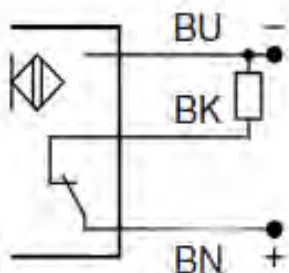
**FIG. 2. Air Cover Plugs on Typical Pump**

4. Assemble the sensor.
  - a. Slip the o-ring (3) onto the sensor (1). See FIG. 3.
  - b. Screw the sensor bushing (2) onto the sensor (1). See FIG. 3.



**FIG. 3. ATEX-Certified Sensor Assembly**

5. Screw the sensor assembly into the pump. Use thread sealant as needed.
6. Connect the sensors to your monitoring device according to your device's instructions. See FIG. 4 for sensor wiring connections. See **Technical Data** for electrical specifications.

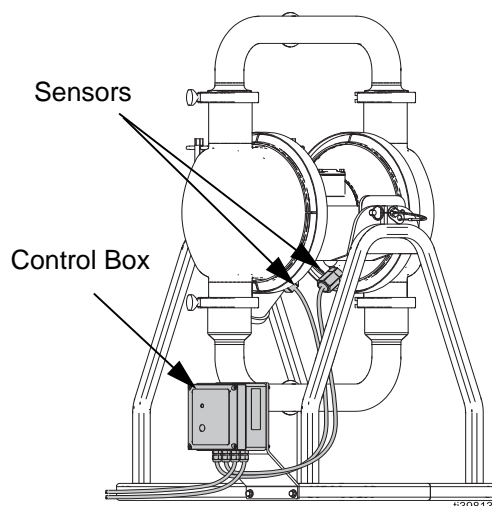


**FIG. 4. Sensor Wiring Connections**

## Leak Sensor Kit 17Z666

<p><b>Electric Shock</b> To avoid potential injury from electric shock, shut off power to the control box before installing the sensors or servicing the leak detector system.</p> <p><b>Pressure Relief</b> Your diaphragm pump stays pressurized until pressure is relieved manually. To help prevent serious injury from pressurized fluid, such as splashing in the eyes or on skin, follow the Pressure Relief Procedure when you stop pumping and before you install the leak detector sensors. Refer to your pump manual for the correct Pressure Relief Procedure.</p>			

1. To install the sensors, first disconnect power to the control box.
2. Relieve pump pressure. Follow the Pressure Relief Procedure in your pump manual.
3. Mount the leak detector control box in a convenient location.
4. Remove plugs from the pump air covers, if plugs are present. See FIG. 2.
5. Screw the sensors into the pump. Use thread sealant, as needed. See FIG. 5.



**FIG. 5. Typical Control Box and Sensor Installation**

Installation

6. On the control box, unscrew four screws (C) and remove the cover (D). See FIG. 6.
  7. Route the sensor wires into the control box through the fittings (F) at the bottom of the box.
  8. Connect Sensor 1 to the control box by attaching the lead wires from the sensor to the control box as follows:
    - a. Attach the supply wire (brown) to either of the terminals marked PWR.
    - b. Attach the ground wire (blue) to one of the terminals marked COM.
    - c. Attach the output wire (black) to the terminal marked A1 on terminal strip CR1.
  9. Connect Sensor 2 to the control box by attaching the lead wires from the sensor to the sensor terminals as follows:
    - a. Attach the supply wire (brown) to either of the terminals marked PWR.
    - b. Attach the ground wire (blue) to one of the terminals marked COM.
    - c. Attach the output wire (black) to the terminal marked A1 on terminal strip CR2.
  10. Tighten the fittings (F) after attaching the sensor lead wires.
- NOTE:** If the power connections will be made next, skip the next step.
11. Reinstall the cover (D) using the four screws (C).

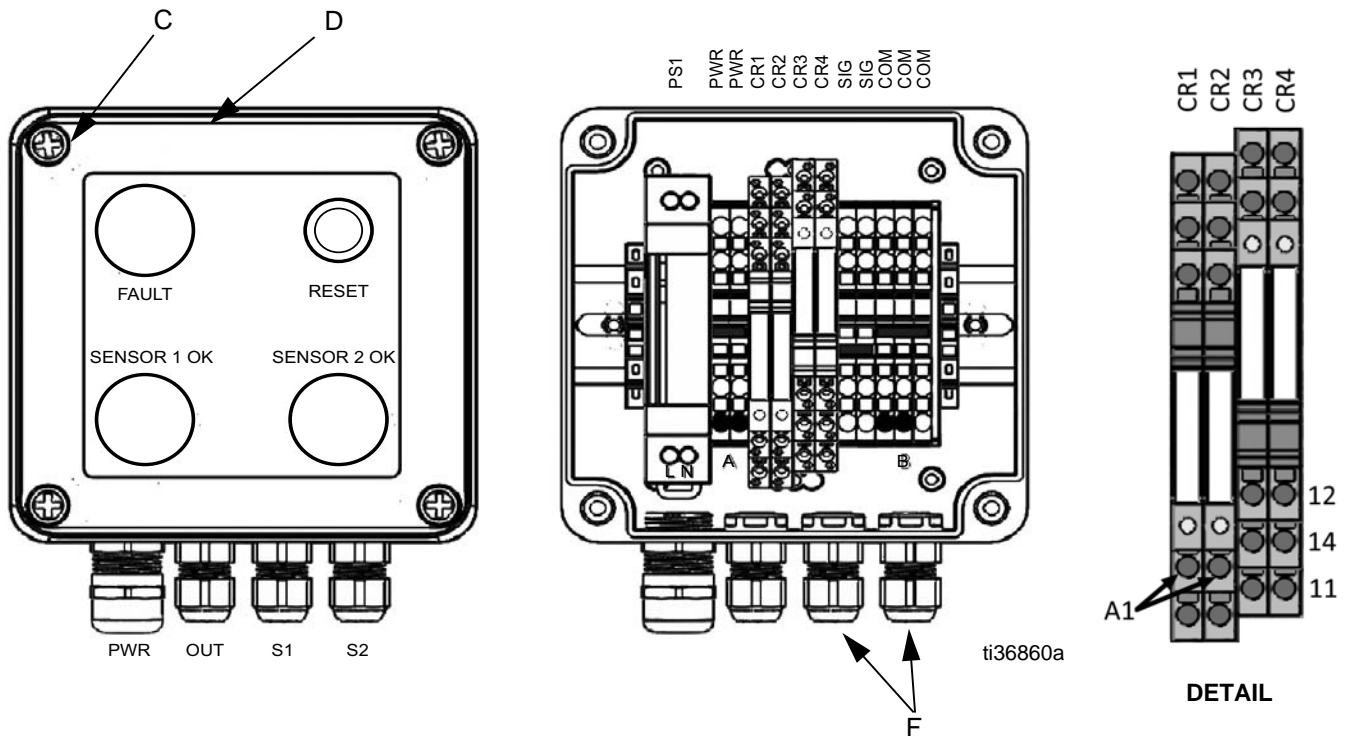
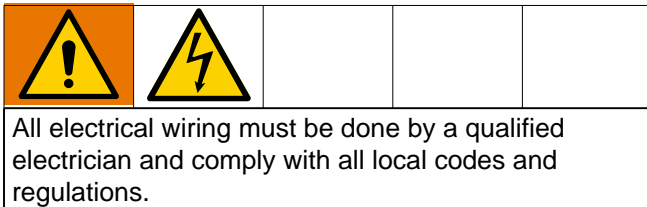


FIG. 6. Sensor Wire Connections in Control Box



## Connect Power to Control Box



The control box can be powered by 110 VAC or 240 VAC. AC power is connected to power supply PS1. See FIG. 6.

1. If the cover has not already been removed for sensor installation, unscrew four screws (C) and remove the cover (D) from the control box. See FIG. 6.
2. Connect the line wire from your power source to terminal L and the neutral wire to terminal N, labeled on the power supply PS1. See FIG. 6.

**NOTE:** The power cord from your power source may include a ground wire. The ground wire from your power cord is not needed and should remain unused. Clip off the unused ground wire.

3. Connect an external alarm, air valve, etc. to the internal relay, if desired. The leak sensors can be wired normally open (NO) or normally closed (NC). See **Technical Data** for electrical specifications.

To wire the leak sensors NO, connect the output signal wires to pins 11 and 14 on the CR3 terminal strip. See FIG. 6.

To wire the leak sensors NC, connect the output signal wires to pins 11 and 12 on the CR3 terminal strip. See FIG. 6.

4. Reinstall the cover using the four screws.

## Operation

During normal operation, the two green LED indicators on the control box will be lit.

If an error or a diaphragm rupture or other leak occurs, the green LED indicator corresponding to the sensor that identified the leak will extinguish. The red FAULT LED indicator will light. The relay will trip and change state.

To clear the faulted state, press the reset button. See FIG. 6. The relay will remain in faulted state until the reset button is pressed. The green LED indicators will relight if the corresponding sensors no longer detect liquid.

## Maintenance

### Clean Sensors

Clean the sensors whenever the pump is disassembled for cleaning or inspection.

**NOTE:** Always disconnect the power supply from the control box or monitoring device prior to cleaning the pump.

### Test to ensure proper operation

1. Verify non-fault condition. With power to the control box, verify that:
  - the green LED indicators are lit
  - the red FAULT LED indicator is extinguished
2. Verify operation of each sensor. Submerge each sensor separately in the fluid being pumped. Verify that:
  - the green LED indicators are extinguished
  - the red FAULT LED indicator is lit
3. Verify loss-of-power condition. Disconnect the power supply from the control box. Verify that:
  - the relay is set and performs the intended operation (i.e. shuts down the pump)
  - all LED indicators are extinguished

## Parts

### Leak Sensor Kit 17Z666

Ref. No	Part. No	Description	Qty.
1	114475	BUSHING, pipe	2
2	17Z664	SENSOR, 3A	2

### ATEX Leak Sensor 17Z667

Ref. No	Part. No	Description	Qty.
1†	17Z051	SENSOR	2
2	17Z052	BUSHING	2
3	107186	PACKING, O-RING	2

†This model is certified:



### Control Box Kit 25P303

Ref. No	Part. No	Description	Qty.
1	18A529	LEAK DETECTOR BOX	1
2*	15G303	LABEL, warning	1

\* Replacement warning labels, signs, tags, and cards are available at no cost.

### Control Box Mounting Kit 25P305

Ref. No	Part. No	Description	Qty.
1	109478	HEX NUT, stainless steel	2
2	111833	WASHER, flat	2
3	122664	WASHER, back-up	4
4	15H972	GASKET, 3A	1
5	18A791	BRACKET	1
6	18A874	NUT, 6-32, nylon lock	4
7	18A875	SCREW, 6-32, pan head	4
8	15H966	SCREW, hex head	2

# Technical Data

## Control Box Kit 25P303

Input voltage range	100–240 VAC (50/60 Hz)
Full-load amperes	0.3 A
Maximum output relay voltage	60 V
Maximum output relay current	0.3 A
Output relay wire gage (stranded copper wire)	24–16 AWG (0.14–1.5 mm <sup>2</sup> )

## Leak Sensor Kit 17Z666

Maximum sensor pressure	100 psi (0.69 MPa, 6.9 bar)
Maximum sensor operating temperature	257°F (125°C)
Rated operational voltage	4.5–15.4 VDC

## Leak Sensor Kit 17Z667

Maximum sensor pressure	125 psi (0.86 MPa, 8.6 bar)
Maximum sensor operating temperature	104°F (40°C)
Rated operational voltage	10–16.8 VDC
Rated operational current	< 50 mA
No-load supply current	< 12 mA

*Type of liquids that can be detected by leak sensor kits 17Z666 and 17Z667: water, oil, or any liquid compatible with polysulphone.*

# California Proposition 65

## CALIFORNIA RESIDENTS

 **WARNING:** Cancer and reproductive harm – [www.P65warnings.ca.gov](http://www.P65warnings.ca.gov).

# 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.

## **FOR GRACO CANADA CUSTOMERS**

The Parties acknowledge that they have required that the present document, as well as all documents, notices and legal proceedings entered into, given or instituted pursuant hereto or relating directly or indirectly hereto, be drawn up in English. Les parties reconnaissent avoir convenu que la rédaction du présente document sera en Anglais, ainsi que tous documents, avis et procédures judiciaires exécutés, donnés ou intentés, à la suite de ou en rapport, directement ou indirectement, avec les procédures concernées.

# Graco Information

**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:** 612-378-350

*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.*

Original instructions. This manual contains English. MM 3A6976

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