Instructions - Parts List

IM35, IM60, IM35P, and IM60P Meters

3A9515B

EN

For dispensing petroleum-based oils, diesel, antifreeze, gear lube, automatic transmission fluid (ATF), and diesel exhaust fluid (DEF). For professional use only.

Not approved for use in explosive atmospheres or hazardous (classified) locations.

1500 psi (10.3 MPa, 103 bar) Maximum Working Pressure

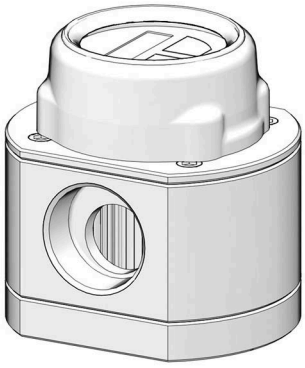
Meter measures in gallons, quarts, pints, and liters. The meter is factory set to gallons.

See page 3 for model information.

Important Safety Instructions

Read all warnings and instructions in this manual before using the equipment. Be familiar with the proper control and usage of the equipment. Save these instructions.

IM35 / IM60



IM35P / IM60P

ti01221a

PROVEN QUALITY. LEADING TECHNOLOGY.

Contents

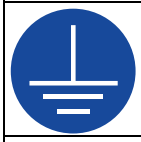
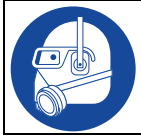
Models

Part No.	Model	Description	Inlet	Outlet	Thread	Fluid
2004290	IM35P	Pulse Meter, Aluminum Alloy	1	1	NPT	Petroleum-based oil, diesel, antifreeze, gear lube, ATF
2004291	IM60P	Pulse Meter, Aluminum Alloy	1 1/2	1 1/2	NPT	Petroleum-based oil, diesel, antifreeze, gear lube, ATF
2004292	IM35	Display Meter, Aluminum Alloy	1	1	NPT	Petroleum-based oil, diesel, antifreeze, gear lube, ATF
2004293	IM60	Display Meter, Aluminum Alloy	1 1/2	1 1/2	NPT	Petroleum-based oil, diesel, antifreeze, gear lube, ATF
2007587	IM35	Display Meter, Stainless Steel	3/4	3/4	BSPP	Diesel exhaust fluid (DEF)
2007588	IM35P	Pulse Meter, Stainless Steel	3/4	3/4	BSPP	Diesel exhaust fluid (DEF)

Safety Symbols

The following safety symbols appear throughout this manual and on warning labels. Read the table below to understand what each symbol means.

Symbol	Meaning
	Equipment Misuse Hazard
	Fire and Explosion Hazard
	Skin Injection Hazard
	Skin Injection Hazard
	Splash Hazard
	Do Not Place Hands or Other Body Parts Near Fluid Outlet

Symbol	Meaning
	Do Not Stop Leaks with Hand, Body, Glove or Rag
	Follow Pressure Relief Procedure
	Ground Equipment
	Read Manual
	Wear Personal Protective Equipment

Safety Alert Symbol
This symbol indicates: Attention! Become Alert! Look for this symbol throughout the manual to indicate important safety messages.

General Warnings

The following warnings apply throughout this manual. Read, understand, and follow the warnings before using this equipment. Failure to follow these warnings can result in serious injury.

⚠WARNING





SKIN INJECTION HAZARD

High-pressure fluid from dispensing device, hose leaks, or ruptured components will pierce skin. This may look like just a cut, but it is a serious injury that can result in amputation. **Get immediate surgical treatment.**

- Engage trigger lock when not dispensing.
- Do not point dispensing device at anyone or at any part of the body.
- Do not put your hand over the fluid outlet.
- Do not stop or deflect leaks with your hand, body, glove, or rag.
- Follow the **Pressure Relief Procedure** when you stop dispensing and before cleaning, checking, or servicing equipment.
- Tighten all fluid connections before operating the equipment.
- Check hoses and couplings daily. Replace worn or damaged parts immediately.


FIRE AND EXPLOSION HAZARD

When flammable fluids are present in the work area, such as gasoline and windshield wiper fluid, be aware that flammable fumes can ignite or explode. To help prevent fire and explosion:

- Use equipment only in well-ventilated area.
- Eliminate all ignition sources, such as cigarettes and portable electric lamps.
- Ground all equipment in the work area.
- Keep work area free of debris, including rags and spilled or open containers of solvent and gasoline.
- Do not plug or unplug power cords or turn lights on or off when flammable fumes are present.
- Use only grounded hoses.
- **Stop operation immediately** if static sparking occurs or you feel a shock**.** Do not use equipment until you identify and correct the problem.
- Keep a working fire extinguisher in the work area.

⚠WARNING

EQUIPMENT MISUSE HAZARD

Misuse can cause death or serious injury.

- Do not operate the unit when fatigued or under the influence of drugs or alcohol.
- Do not exceed the maximum working pressure or temperature rating of the lowest rated system component. See **Technical Specifications** in all equipment manuals.
- 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.
- Turn off all equipment and follow the **Pressure Relief Procedure** when equipment is not in use.
- Check equipment daily. Repair or replace worn or damaged parts immediately with genuine manufacturer's replacement parts only.
- Do not alter or modify equipment. Alterations or modifications may void agency approvals and create safety hazards.
- Make sure all equipment is rated and approved for the environment in which you are using it.
- Use equipment only for its intended purpose. Call your distributor for information.
- Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces.
- Do not kink or over bend hoses or use hoses to pull equipment.
- Keep children and animals away from work area.
- Comply with all applicable safety regulations.

PERSONAL PROTECTIVE EQUIPMENT

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:

- Protective eyewear, and hearing protection.
- Respirators, protective clothing, and gloves as recommended by the fluid and solvent manufacturer.

Typical Installation

The installation shown in FIG. 1 is only a guide for selecting and installing system components and accessories. The components shown are typical; however, it is not a complete system design. Contact your Graco distributor for assistance in designing a system. Additionally, these dispense valves can be installed on a console.

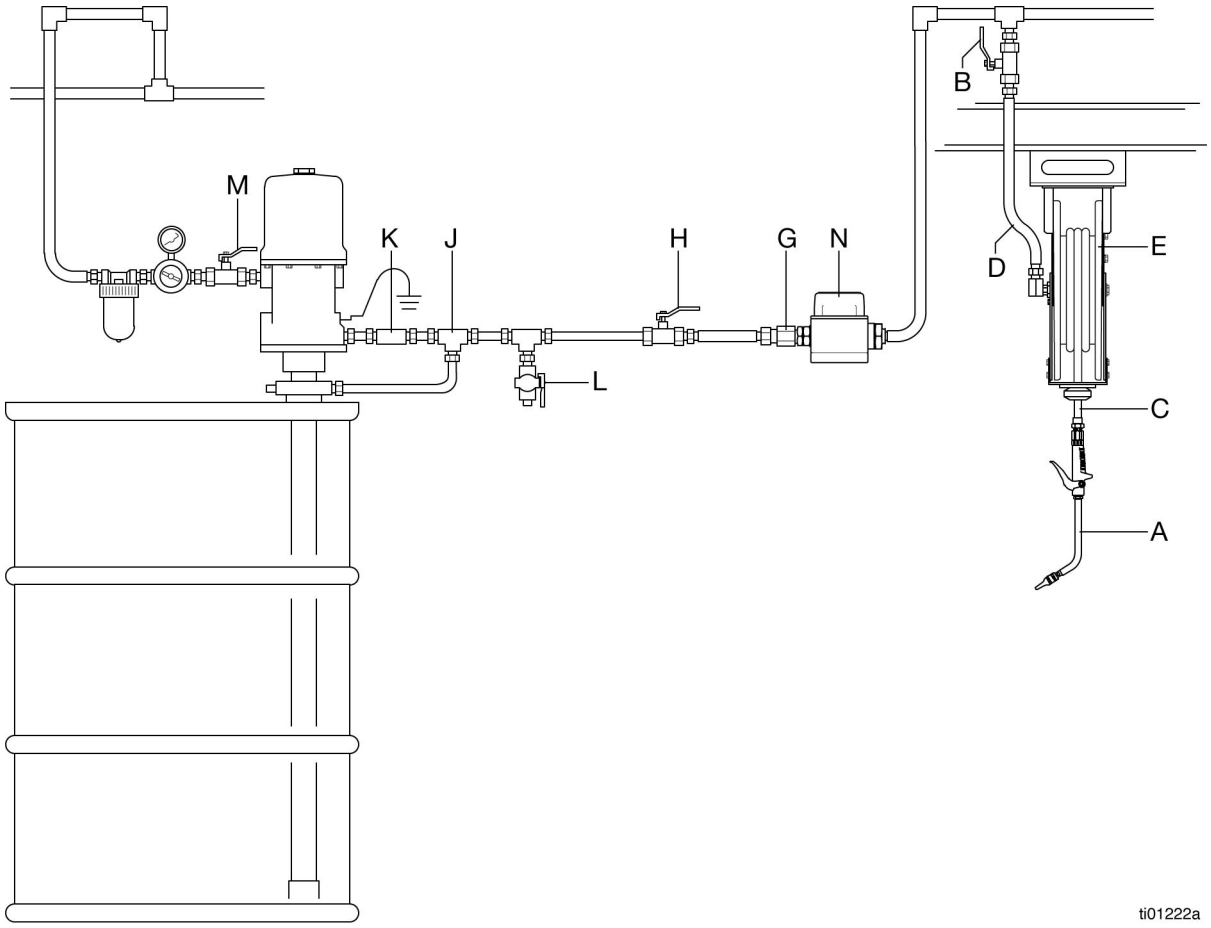


FIG. 1: Typical Installation

Key:

A Dispense Valve
B Fluid Shut-off Valve - Hose Reel
C Hose
D Fluid Inlet Hose
E Hose Reel
G In-line strainer
H Fluid Shut-off Valve
J Pressure relief Valve
K Check Valve
L Bleed-off Valve (drain valve)
M Bleed-type Master Air Valve
N Inline Meter

NOTICE

- Do not over-tighten fittings. Excessive torque will crack the casting. Only tighten fittings 2.5± 0.5 turns past finger tight. Do not exceed 80 ft.-lbs (9.04 N•m).
- Flush lines before installing equipment in the system to prevent contamination which can cause equipment damage or malfunction. See **Flush Lines**, page 8.

Installation

Grounding

The equipment must be grounded to reduce the risk of static sparking. Static sparking can cause fumes to ignite or explode. Grounding provides an escape wire for the electric current.

Pump: Follow recommendations of the manufacturer.

Air and fluid hoses: Use only grounded hoses.

Air compressor: Follow manufacturer's recommendations.

Fluid supply container: Follow local codes and regulations.

In-line meters: Use thread sealant when connecting the meter to the hose. Do not use PTFE tape on the pipe joints, it may cause loss of ground across the pipe joint.

Waste container while flushing: Use a grounded metal container. Hold metal part of meter firmly to the side of the waste container while flushing.

Pre-Installation Procedure

The reference letters used in this section refer to **Typical Installation**, page 7.

1. Follow **Pressure Relief Procedure**, page 11.
2. Close the hose reel fluid shut-off valve (B).
3. Ground the hose and reel, or console. See **Grounding**, page 8. Do not use PTFE tape on the inlet and outlet port threads, it may cause a loss of ground across the threaded connections.

Flush Lines

For a new installation or if the fluid in the lines is contaminated, flush the lines before installation of the dispense valve. To avoid contamination of the fluid with oil, flush the equipment with a compatible solvent before using the equipment.

NOTE: The dispense valve should not be installed on the hose when flushing the equipment.

1. Follow **Pressure Relief Procedure**, page 11.
2. Close the hose reel fluid shut-off valve (B) at each of the dispense positions.
3. For an existing installation, remove the dispense valve (A) from the hose.
4. Place the hose end into a container for waste fluid. Secure the hose in the container so it will not move during the flush.

NOTE: For multiple dispense positions, flush the dispense position farthest from the pump, then work toward the pump.

5. Slowly open the hose reel fluid shut-off valve (B) at the dispense position. Flush out a sufficient amount of fluid to ensure the entire system is clean, then close the hose reel fluid shut-off valve (B).
6. Repeat Step 5 at all of the dispense positions.

Installation of Meter

To install a new meter in an existing installation, start with Step 1 and Step 2.

To install a new meter in a new installation, start with Step 3.

1. Follow **Pressure Relief Procedure**, page 11.
2. Loosen and disconnect the hose from the meter to be replaced.

For Steps 3 - 7, refer to FIG. 2. The reference letters used in this section refer to **Typical Installation**, page 7.

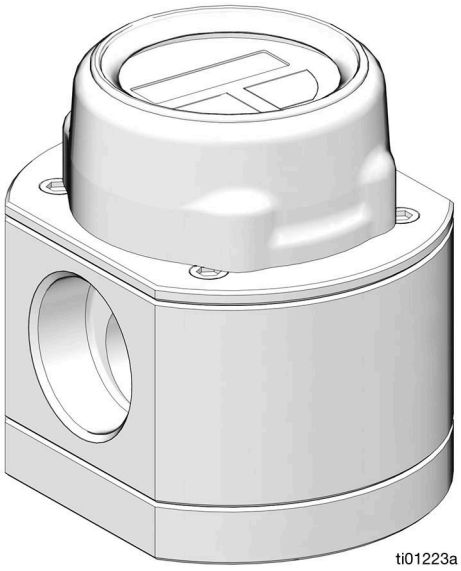


FIG. 2

3. Apply thread sealant to the male thread of the hose fitting.
4. Thread the inline meter (N) onto the hose fitting and tighten firmly.
5. Open all of the dispense position fluid shut-off valves (H).
6. Start the pump to pressurize the system. See **Operation**, page 11, for instructions.
7. Purge all of the air from the fluid lines and dispense valves before use to ensure dispense accuracy.

Installation of Batteries

The numbers used in these instructions refer to FIG. 3.

NOTE: This process is only for IM35 / IM60 models.

1. Follow **Pressure Relief Procedure**, page 11.
2. Remove the four screws (2) from the meter housing (3).
3. Separate the meter bezel assembly (1), reed switch and plugs (5) together from the meter housing (3).
4. Remove the battery retainer (6).

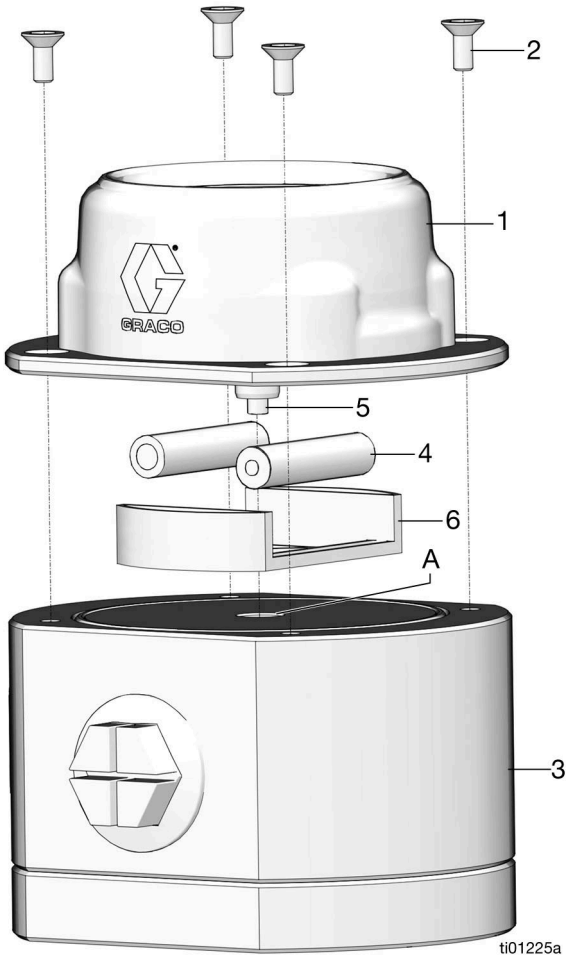


FIG. 3

5. Pull the battery retention ribbon, located under the batteries, up to unseat the batteries (FIG. 4).

NOTE: Dispose of the batteries according to local regulations.

6. Insert new batteries, follow the indicated positions on the battery holder, and press down firmly on the batteries.

NOTE: FIG. 4 identifies the negative and positive sides of the batteries. Be sure that the battery retention ribbon is in place beneath the batteries to assist with future battery removal.

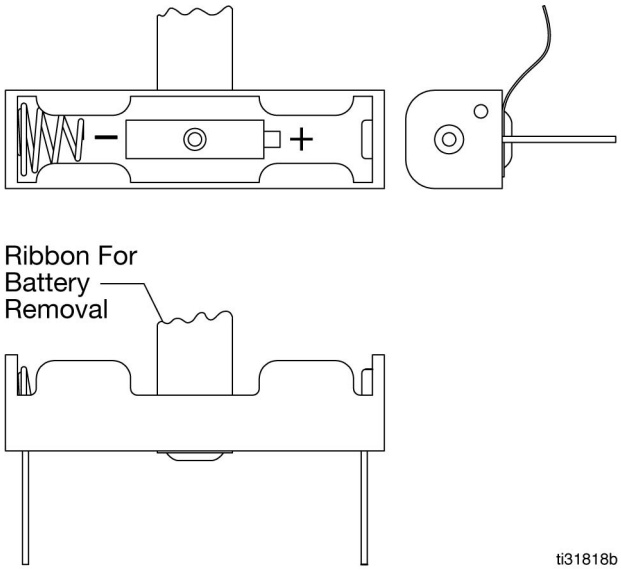


FIG. 4

7. Reinstall the battery retainer (6).

8. Place the plug and reed switch (5) at the center hole (A) of the meter housing (3).

9. Reinstall screws (2), and tighten the screws in a diagonal pattern then torque to 35 - 45 in-lb (4.0 - 5.1 N•m).

Operation

Pressure Relief Procedure

Follow the Pressure Relief Procedure whenever you see this symbol.

This equipment stays pressurized until pressure is manually relieved. To help prevent serious injury from pressurized fluid, such as skin injection, and splashing fluid, follow the Pressure Relief Procedure when you stop dispensing and before cleaning, checking, or servicing the equipment.

1. Turn off the power supply to the pump.
2. Trigger the dispense valve into a grounded waste container to relieve pressure.
3. Open any bleed-type master air valves and fluid drain valves in the system.
4. Leave the drain valves open until ready to pressurize the system.
5. If it is suspected that the valve, extension, or nozzle is clogged, or that pressure has not been fully relieved:
   a. Very slowly loosen the fitting nut on the fluid line to relieve pressure gradually.
   b. Loosen the fitting nut completely.
   c. Clear any obstruction in the hose or tip.

IM35 and IM60

Activate the Digital Display

Press TOTAL or RESET to activate the digital display. The quantity of the last dispense cycle is shown on the screen, if the quantity was not cleared manually.

The digital display also activates when fluid is run through the meter. The quantity increases from the last dispense cycle, if the quantity was not cleared manually (FIG. 5).

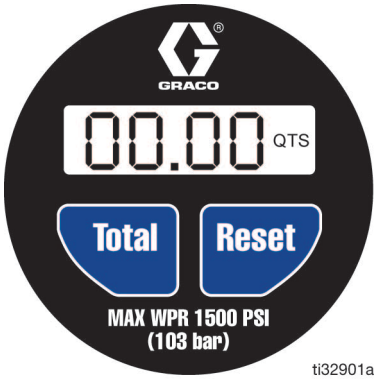


FIG. 5

NOTE: The digital display on the meter turns off after approximately one minute of non-use.

Function of TOTAL

Press and hold TOTAL to view the accumulated total of fluid dispensed through the meter. The meter can accumulate a running total of up to 19,999 units dispensed before it returns to zero (0) (FIG. 6).

FIG. 6

Function of RESET

Press RESET to clear the quantity of the last dispense cycle and return the digital display to zeros (FIG. 5).

Setup

1. Press TOTAL and RESET together and hold for one second (FIG. 8).

- All segments of the digital display illuminate for approximately six seconds.
- The software revision displays for approximately two seconds.
- The meter goes blank and the volume unit blinks.

2. The meter is now in SETUP.
3. Release TOTAL and RESET.

Volume Unit

1. The factory default Unit of Measure (UOM) is gallons.

   Press TOTAL to change the displayed unit of measure. Press TOTAL repeatedly until the required UOM is displayed.

   Examples of each Unit of Measure (UOM) screen are shown in FIG. 7.

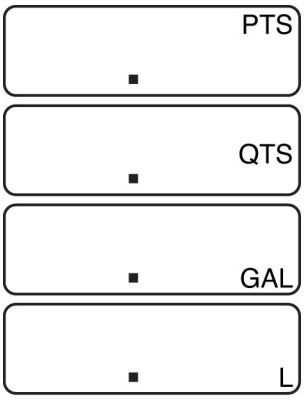


FIG. 7

2. When the desired UOM is displayed, press RESET (FIG. 5) to save the selection.
3. CAL appears on the display.to indicate that the meter is ready for Calibration (FIG. 8).

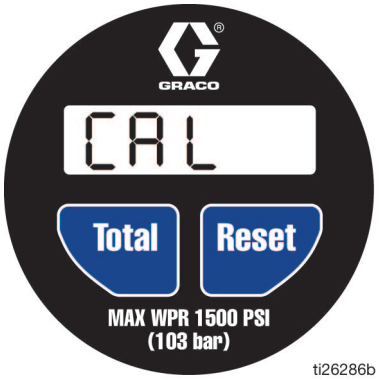


FIG. 8

4. To save the current calibration factor, press RESET and the unit saves and exits Setup.

Meter Recalibration

1. Dispense eight quarts (or eight liters) of fluid into a clean, calibrated container.
2. When the volume of fluid in the calibrated container reaches eight quarts (or eight liters), stop the dispense.

   NOTE: The numbers on the display and the UOM flash on the screen while the fluid dispenses.

3. Press and hold TOTAL until 8.00 QTS (or 8.00 L) displays on the screen, as shown in FIG. 9.

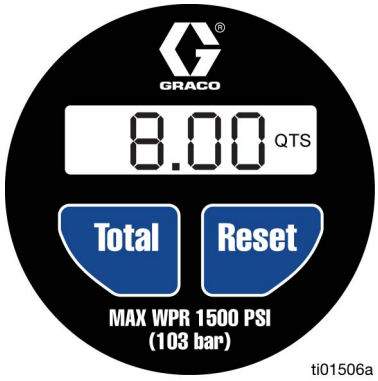


FIG. 9

4. If the dispense was accurate, press RESET to save the new calibration factor and exit Setup.

5. If the dispense was not accurate and needs to be performed again, repeat Steps 1 - Step 4.

NOTE:

To interrupt or restart the calibration dispense at any time, push TOTAL. This resets the display back to 00.00.

If RESET is pressed before the calibration factor is calibrated, the meter disregards the new calibration information and exits Setup.

Restore the Default Calibration Factor

From the CAL screen:

1. Start a dispense to register a count.
2. Quickly press and release TOTAL to reset the calibration dispense to 00.00.

NOTE: The UOM (either QTS or L) flashes on the display.

3. Press and hold TOTAL until 8.00 displays on the screen and UOM no longer flashes (FIG. 10).
4. Press RESET to save the default calibration factor and exit Setup.

FIG. 10

IM35P and IM60P

The meter requires a Logic Control Device to operate. The Logic Control Device interprets pulse signals from the meter and converts them into a fluid quantity.

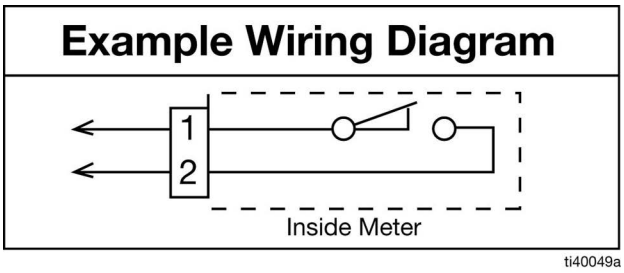


FIG. 11

The number of pulses per volumetric unit varies based on the fluid viscosity.

For Models 2004290 and 2004291, the default calibration factor is 31.4127 pulses per quart, based on the fluid viscosity of 10W30 motor oil.

For Model 2007588, the default calibration factor is 30.5729 pulses per quart, based on the fluid viscosity of 32.5% diesel exhaust fluid (DEF).

The meter sensor design allows for both PNP and NPN Logic Controller Devices (FIG. 12).

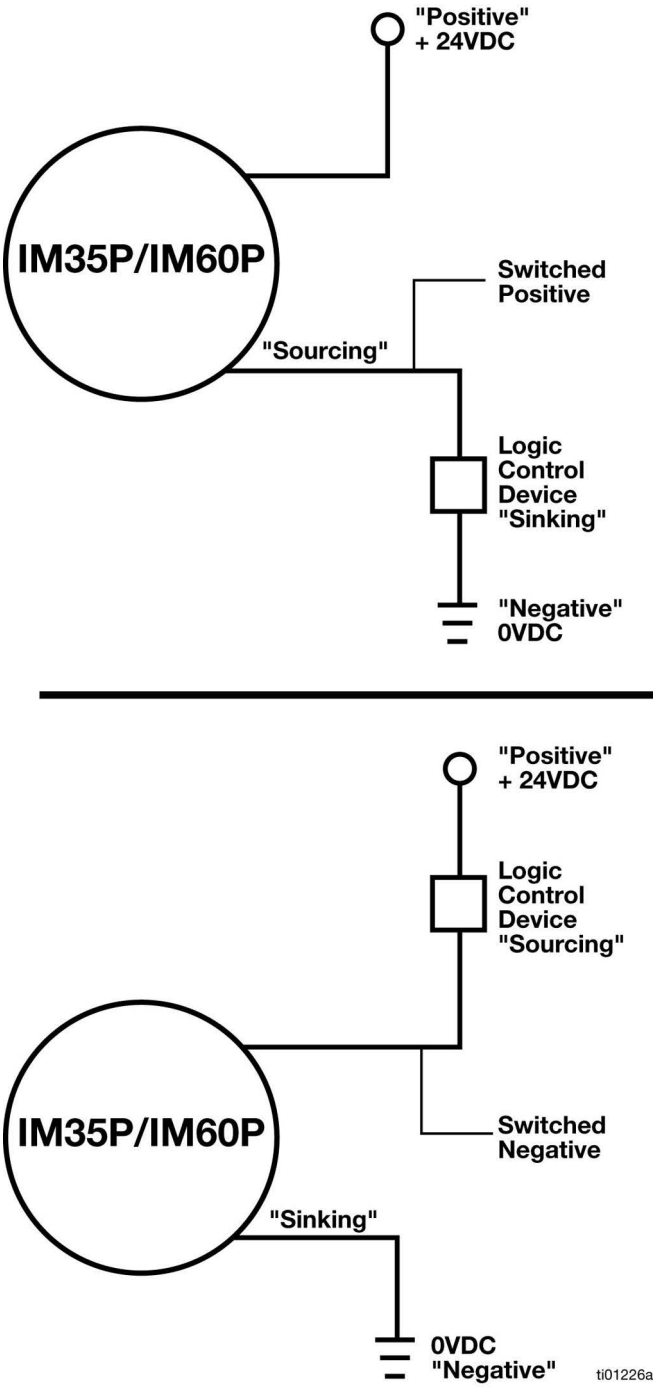


FIG. 12

Verify Accuracy

1. Set the pump air pressure to the lowest possible setting to dispense fluid.
2. Place the top of the nozzle at the bottom of a clean, calibrated container.

NOTE: If using a single container, clean the container after each dispense.

NOTE: If the tip of the dispense valve does not reach the bottom of the calibrated container, use a length of plastic tubing over the tip of the nozzle to make sure that the fluid enters the container from the bottom

3. Trigger the dispense valve slowly and dispense the fluid until the calibrated container is full.
4. Allow the fluid to settle for 20 min.
5. Compare the actual, physical measurement in the calibrated container to the measurement displayed on the meter.

NOTE: This determines if the meter is accurately dispensing the fluid and minimizes testing errors. Some variance may occur depending on the viscosity of the fluid. If it is determined that the meter is not accurate, recalibrate the meter following the **Meter Recalibration**, page 12.

Maximum Dispense Accuracy

For gallon, quart, and pint dispenses only.

Set the meter to dispense in quarts or pints when dispensing one gallon or less.

Always press RESET to clear the meter before a new dispense cycle.

Recycling and Disposal

End of Product Life

At the end of the product's useful life, dismantle and recycle it in a responsible manner.

- Perform the **Pressure Relief Procedure**, page 11.
- Drain and dispose of fluids according to applicable regulations. Refer to the material manufacturer's Safety Data Sheet.
- Remove motors, batteries, circuit boards, LCDs (liquid crystal displays), and other electronic components. Recycle according to applicable regulations.
- Do not dispose of batteries or electronic components with household or commercial waste.

- Deliver remaining product to a recycling facility.

Troubleshooting

Follow **Pressure Relief Procedure**, page 11, before checking or repairing the equipment.

NOTE: Check all possible problems and causes before disassembling the equipment.

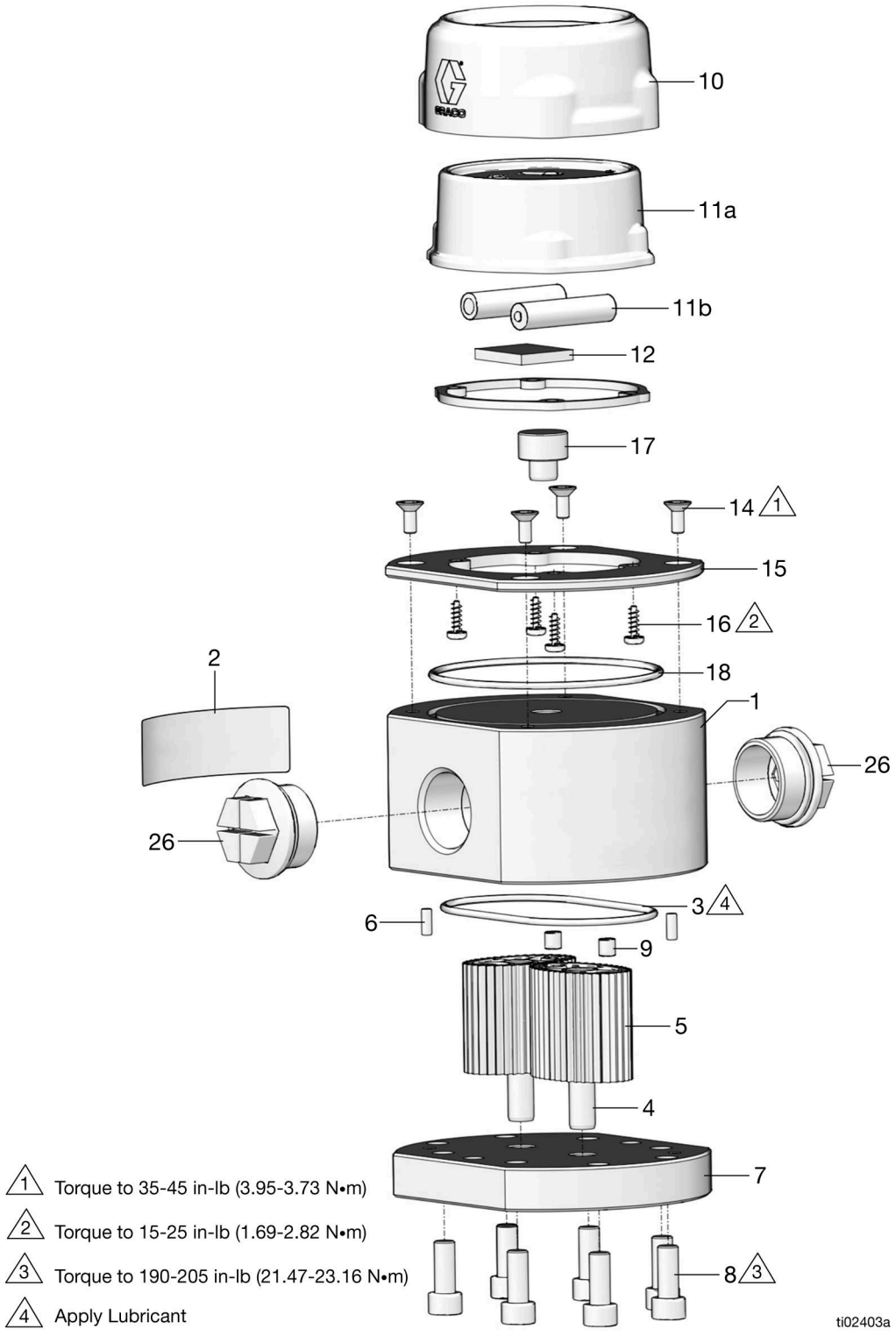
Problem	Cause	Solution
Display does not activate or is showing unintelligible characters	Electronic control is malfunctioning	Replace the electronic control. Order Electronics Kit 2007275 or 2008355. The kit includes electronic control, seal, and mounting screws.
	Batteries in the electronic control are depleted	Replace the battery. Order Battery Repair Kit 2007279. The kit includes a seal, batteries, and screws.
Display segments do not illuminate	Loose board mounting screws cause the electronic control to malfunction	Tighten the 3 board mounting screws on the inside of the electronic control. If this does not correct the problem, replace the electronic control. Order Electronics Kit 2007275 or 2008355.
Slow or no fluid	Pump pressure is low	Increase the pump pressure.
	Shut off valve is not fully open	Fully open the shut off valve.
	The meter element is jammed	Contact your local Graco distributor for repair or replacement.
Fluid leaks from cover (7)	Damaged or worn o-ring (3)	Replace the o-ring (3) and torque the cover to 15.8 - 17 ft-lb (21.4.0 - 23 N•m).

Notes

Parts

IM35 / IM60 Models

Part No. 2004292, 2004293, and 2007587



Part No. 2004292, 2004293, and 2007587

Ref.	Part	Description	Qty
1	2004295	Housing, meter, 1 NPT (Model 2004292)	1
	2004294	Housing, meter, 1 1/2 NPT (Model 2004293)	1
	2007585	Housing, SST meter, 3/4 BSPP (Model 2007587)	1
2	29A703	Identification, serial label	1
3◆	2004313	Packing, o-ring	1
4	2004299	Pin, dowel	2
5		Gear, oval	2
6	2004307	Pin, location	2
7		Cover, oval gear	1
8	2004315	Screw, M8 x 1.25, hex socket head	8
9		Magnet	2
10	2004321	Guard, impact	1
11a	†	Control, electronic (Models 2004292 and 2004293)	1
	❖	Control, electronic, SST meter (Model 2007587)	1
11b†★❖		Battery, AAA	2
12†★◆❖	17V719	Foam, cushion	1
13†★◆❖	129949	Seal, bezel	1
14†★❖	2004316	Screw, M5 x .08	4
15		Adapter	1
16†❖	2004314	Screw, self-tapping	4
17		Plug, reed switch	1
18◆	2004312	Packing, o-ring	1
26	2006879	Plug, 1 NPT (Model 2004292)	2
	2006880	Plug, 1 1/2 NPT (Model 2004293)	2
	404182	Plug, 3/4 BSPP (Model 2007587)	2

† *Parts included in Bezel Kit 2007275 (purchase separately).*

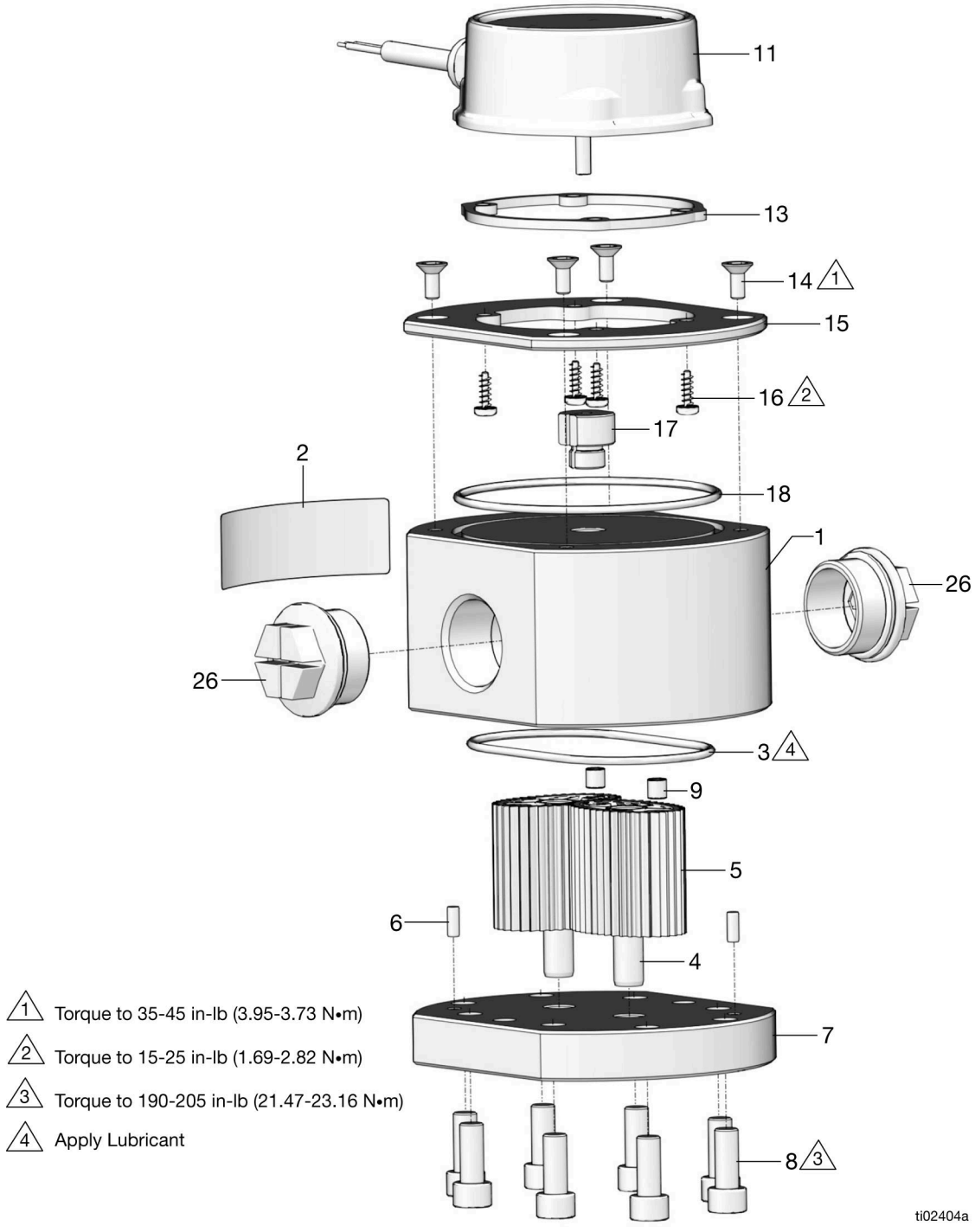
★ *Parts included in Battery Kit 2007279 (purchase separately).*

◆ *Parts included in Seal Kit 2007278 (purchase separately).*

❖ *Parts included in Bezel Kit 2008355 (purchase separately).*

IM35P / IM60P Models

Part No. 2004290, 2004291, and 2007588



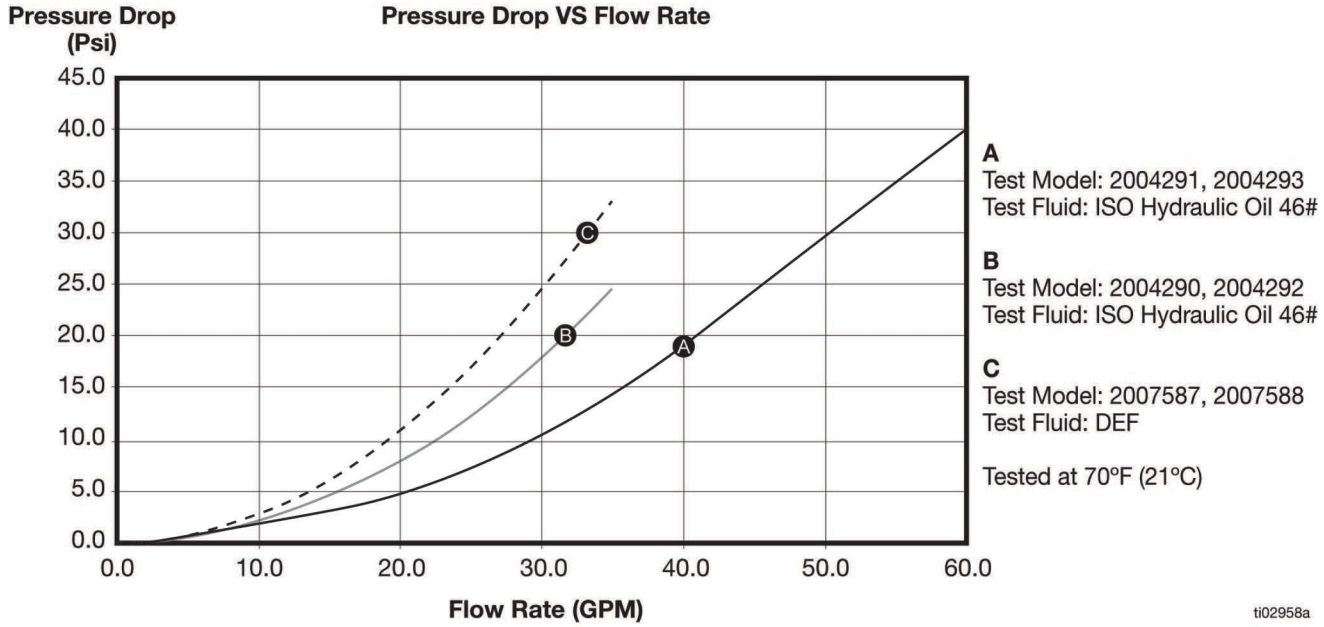
Part No. 2004290, 2004291, and 2007588

Ref.	Part	Description	Qty
1	2004295	Housing, meter, 1 NPT (Model 2004290)	1
	2004294	Housing, meter, 1 1/2 NPT (Model 2004291)	1
	2007585	Housing, SST meter, 3/4 BSPP (Model 2007588)	1
2	29A703	Identification, serial label	1
3◆	2004313	Packing, o-ring	1
4	2004299	Pin, dowel	2
5		Gear, oval	2
6	2004307	Pin, location	2
7		Cover, oval gear	1
8	2004315	Screw, M8 x 1.25, hex socket head	8
9		Magnet	2
11	⁜	Control, electronic	1
13⁜◆	129949	Seal, bezel	1
14⁜	2004316	Screw, M5 x .08	4
15		Adapter	1
16⁜	2004314	Screw, self-tapping	4
17		Plug, reed switch	1
18◆	2004312	Packing, o-ring	1
26	2006879	Plug, 1 NPT (Model 2004290)	2
	2006880	Plug, 1 1/2 NPT (Model 2004291)	2
	404182	Plug, 3/4 BSPP (Model 2007588)	2

⁜ *Parts included in Bezel Kit 2007277 (purchase*

◆ *Parts included in Seal Kit 2007278 (purchase separately).*

Pressure Drop Chart



Technical Specifications

IM35, IM60, IM35P, and IM60P		
	US	**Metric**
Maximum Operating Pressure		
All Models	1500 psi	10 MPa, 102 bar
Maximum Flow Rate		
IM30 and IM35P	35 gpm	132.5 lpm
IM60 and IM60P	60 gpm	227.1 lpm
Minimum Flow Rate		
IM30 and IM35P	1.5 gpm	5.678 lpm
IM60 and IM60P	1.5 gpm	5.678 lpm
Meter Pressure Loss: See **Pressure Drop Chart**, page 22. Flow rate varies with fluid pressure, temperature, viscosity, and inlet fitting size.		
Temperature		
Operating Temperature Range	-22 to 180°F	-30 to 82°C
Accuracy		
Models 2004290, 2004291, 2004292, and 2004293	+ / - 0.5%	
Models 2007587 and 2007588	+ / - 1%	
Ingress Protection		
All Models	IP69K per DIN 40050-0	
Inlet/Outlet Sizes		
Models 2004290 and 2004292 inlet/outlet size	1 NPT	
Models 2004291 and 2004293 inlet/outlet size	1-1/2 NPT	
Models 2007587 and 2007588 inlet/outlet size	3/4 BSPP	
Operating Voltage		
IM35P and IM60P	12 - 24 VDC	
Notes:		
All trademarks or registered trademarks are the property of their respective owners.		

California Proposition 65

CALIFORNIA RESIDENTS

⚠ **WARNING:** Cancer and reproductive harm – 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.

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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.

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For the latest information about Graco products, visit www.graco.com.
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TO PLACE AN ORDER, contact your Graco distributor or call to identify the nearest distributor.

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Original instructions. This manual contains English. MM 3A9515
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