Demonstration unit only. Do not install meter or connect to pressure!

Model No.: 24F318

Important Safety Instructions
Read all warnings and instructions in this manual. Save these instructions.

US Patent No: D594,490S
India Patent No: 219652
Korea Patent No: 30-555779
Taiwan Patent No.: D130836
China Patent No.: ZL200830250995.2
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 symbol refers to procedure-specific risk. Refer back to these warnings. Additional, product-specific warnings may be found throughout the body of this manual where applicable.

![WARNING]

**BATTERY SAFETY**
The battery may leak, explode, cause burns, or cause an explosion if mishandled:
- You must use the battery type specified for use with the equipment.
- Sparking can occur when changing batteries. Only replace the battery in a non-hazardous location, away from flammable fluids or fumes.
- Handle and dispose of battery properly - do not short circuit, charge, force over discharge, disassemble, crush, penetrate, incinerate, or heat the battery to a temperature exceeding 185°F (85°C).

Meter Overview

Navigation and Modes

5-Way Menu Navigation Keypad (Fig. 1)
- Includes 4 direction ARROWS (UP, DOWN, LEFT, RIGHT) and a center, ENTER button.
- Pressing the direction ARROWS allows user to easily scroll through menus. To select/store your selection, you must press the center, ENTER button on meter’s keypad.
- Pressing and holding the direction ARROW down allows user to scroll through menus quickly.

Fig. 1
Registering the Meter

Graco recommends registering the meter prior to installation.

NOTE: Before registering the meter, use the Matrix PC software to enter setup information pertaining to the:

- Transceiver,
- Tank Level Monitor (TLM),
- Tank Set Up,
- and (optional)
  - Pump Air Control (PAC).

If this has not been done first, the software will display an error when attempting to set up meter.

Main Utility Setup Screens (Fig. 4)

The Main Utility Screen displays a list of available Setup Screens. This list also includes a link (QUIT) back to the Operation Screens.

- REGISTER
- RF TEST
- UPGRADE
- EMERGENCY
- QUIT

Displaying Register Utility Screen

1. If you are on a Dispense Screen, to display the Main Utility Screen, first hold down the RIGHT ARROW (a) only, for a few seconds (Fig. 3).

Meter Display

Adjusting Screen Contrast using ARROWS

On the Main Utility Setup Screen (page 3), use the LEFT and RIGHT ARROWS to adjust the screen contrast.

- **Darken the Screen:** Press the RIGHT ARROW multiple times.
- **Brighten the Screen:** Press the LEFT ARROW multiple times.

Asleep / Awake Mode

- **Asleep:** Battery-saving mode. In dispense mode, the display goes blank after 5 minutes of inactivity.
- **Awake:** Display comes awake from sleep mode when you press any ARROW or the center ENTER button on the meter's keypad or when you squeeze the trigger to dispense fluid.

Locking and Unlocking Trigger

The locking trigger feature allows the user to lock the trigger in the dispense position as shown in Fig. 2. To release the lock, firmly squeeze the trigger to the handle.

Fig. 2

Fig. 3

The locking trigger feature allows the user to lock the trigger in the dispense position as shown in Fig. 2. To release the lock, firmly squeeze the trigger to the handle.

1. If you are on a Dispense Screen, to display the Main Utility Screen, first hold down the RIGHT ARROW (a) only, for a few seconds (Fig. 3).
2. Then at the same time, also hold down the center, ENTER button (b) (Fig. 3). Hold both buttons down until the Main Utility Screen shown in Fig. 4 displays.

3. Use the UP or DOWN arrow to move the cursor up and down the list until it is over the REGISTER option on the list.

4. Press the center ENTER button on meter’s keypad to select the REGISTER option. The Register Screen shown in Fig. 5 displays.

**REGISTER Screen**

A. NETWORK ID: The unique Radio Frequency (RF) assigned to components of the same operating system in a specific facility. The unique NETWORK ID assigned to the facility, prevents RF interference from other Matrix Systems operating in the vicinity, at other locations. There are 8 NETWORK ID’s available.

To setup a meter to receive the correct NETWORK ID RF signal, use the UP or DOWN ARROWS to scroll, one number at a time, through the NETWORK ID numbers (1-8). When the correct NETWORK ID number assigned to your facility is displayed in the field/box, press center ENTER button on meter’s keypad to lock in the choice.

B. TRANS ID: The unique RF frequency assigned to a specific transceiver in the operating system. Each transceiver in the system has its own TRANS(ceiver) ID number assigned to it. An operating system can have more than one transceiver. There are 8 TRANS ID’s available.

To set up a meter to receive the correct TRANS ID RF Signal, use the UP or DOWN ARROWS to scroll, one number at a time, through the TRANS ID numbers (1-8). When the number assigned to the transceiver you are using displays in the field/box, press center ENTER button on meter’s keypad to lock in the choice.

C. REGISTER /field: Sends message to Matrix PC Software to register the meter with the operating system.

Use the LEFT or RIGHT ARROWS to move the cursor over the REGISTER field/box on the display. Then press center, ENTER button on meter’s keypad, to confirm the selection.

D. WRENCH Icon: Returns user to Main Utility Screen.

Use the LEFT or RIGHT ARROWS to move the cursor over the WRENCH Icon on the display. Then press center, ENTER button on meter’s keypad, to confirm the selection.

E. SERIAL Number: Unique meter ID.

**Registering Meter with Matrix PC Software**

1. The screen displays the NETWORK ID (A) and TRANS(ceiver) ID (B) (Fig. 5) currently assigned to the meter.
2. If the ID’s in both fields are correct and you do not need to make any changes, use LEFT or RIGHT ARROWS to move cursor over REGISTER (C). Press center ENTER button on meter’s keypad. The meter resets to its initial screen.

OR . . .

If the NETWORK ID or TRANS ID information shown on the display is NOT correct:

a. Use LEFT or RIGHT ARROWS to move cursor to NETWORK ID field and/or TRANS ID field.

b. When field you want to modify is selected, use UP or DOWN ARROWS to scroll forward or backward through the available NETWORK ID or TRANS ID numbers.

c. When correct ID number displays, press center ENTER button on meter’s keypad to confirm your choice. If necessary, use LEFT or RIGHT ARROWS to move cursor to the next field and repeat this procedure.

d. When both the NETWORK ID and TRANS ID fields display the correct information, use LEFT or RIGHT ARROWS to move cursor over REGISTER. Press center ENTER button on the meter’s keypad to complete meter registration.

e. The meter resets and returns to its initial screen.

NOTE: If the meter is not able to communicate with the PC during registration, the message NO SIGNAL or NO PC SIGNAL appears on the meter display.

NO SIGNAL message means:

- There is no RF signal between the PC and Meter.
- The meter is out of the RF Signal range.
- The Transceiver does not have power.
- Either the NETWORK ID and/or TRANSCEIVER ID information is not correct in the meter and the correct information must be provided.

NO PC SIGNAL message means:

- The Matrix Client isn’t running.
- The cable is not connected between the PC and Transceiver.

f. After the information is programmed into the electronic meter, the meter can be connected to the dispensing hose.

NOTE: If the programmed parameters need to be changed, the meter must be reprogrammed.

RF Test

An RF Test is performed before a Matrix System and meters are installed at a site to evaluate the strength of the RF signal and determine the number of Transceivers that will be needed and where they should be installed in the facility.

In order to perform this test, a test computer with the Matrix PC software installed and a Transceiver are located in the area of the shop that the installed Transceiver will be located. The tester then uses a meter to evaluate the strength of the RF Signal between the Transceiver and meter at each potential meter location throughout the shop.

1. On the Main Utility Screen, use the UP or DOWN ARROWS to select the RF TEST option on the list. Then press the center ENTER button on meter’s keypad to confirm the selection.

To perform the RF TEST:

2. Holding the meter, walk around the shop to a potential meter installation work area.
3. Verify that the Network ID and Trans ID assigned to the meter are correct. If they are not correct, you must first register the meter. (See Registering the Meter, page 3).

4. Use RIGHT ARROW to move cursor over START (Fig. 7).

5. Use center ENTER button to confirm the selection. The meter sends an RF signal to the Transceiver.

If the signal is good on the following message displays on the meter screen (Fig. 8):

```
TEST RF
NETWORK ID [8] TRANS ID 6
RETRIES = 0 (or 1-5)
GOOD SIGNAL
```

Fig. 7

If the signal is weak or there is not a signal at all, one of the following message appears on the meter screen (Fig. 9).

```
TEST RF
NETWORK ID [8] TRANS ID 6
RETRIES = 5
BAD SIGNAL
```

Fig. 8

```
TEST RF
NETWORK ID [8] TRANS ID 6
RETRIES = 0
NO PC SIGNAL
```

Fig. 9

NOTE: The meter is programmed to try sending a signal to the Transceiver 5 times before displaying the BAD SIGNAL message.

6. After the final area has been tested, use the LEFT ARROW to move the cursor to the Wrench Icon. Press the center ENTER button on meter's keypad to confirm the selection and return to the Main Utility Screen.
Upgrade

This feature is used to modify the firmware software used by the meter when a new and upgraded version of the software is released or a new feature is added. When this is required, your Graco distributor will contact you to arrange the upgrade.

Emergency

If the communication link between the meter and PC is lost due to power loss or the computer crashing, the meter will continue to function if it is placed in Emergency Mode.

1. On the Main Utility Screen, use the UP or DOWN ARROWS to select the EMERGENCY option on the list. Then press the center ENTER button to confirm the selection.

2. The Emergency Screen appears. The cursor is already in position for entering the first number of the Emergency Code. Use the UP or DOWN ARROWS to scroll through the numbers 0-9 until the first number of the unique Emergency Code assigned to that meter appears in the field.

3. Use the center ENTER to confirm the selection. The cursor moves to the next field.

4. Repeat steps 2-3 until all 4 numbers have been entered. After the 4th number of the Emergency Code is entered the cursor automatically moves to the ENTER on the display.

5. Press the center ENTER button to confirm the selection.

6. The Dispense Screen displays on the meter.

NOTE: When the meter is put in Emergency Mode:

- All pending work orders will be deleted from the work order queue in the meter. They will have to be entered again by the System Administrator on the PC.
- New work orders cannot be added at the meter.
Setup

Battery Indicator

A battery icon appears on the upper right corner of most Setup and Dispense screens. When the batteries are fully charged, the battery will be completely filled in. As the battery discharges, the amount of battery that is filled in will decline. For example, the battery in Fig. 13 is at about 50%.

NOTE: The meter's operating parameters are controlled by the Matrix PC Software and setup by the System Administrator. See the Matrix 3 Software instruction manual for these instructions.

Meter Calibration

Meter calibration is performed using the Matrix PC software. Refer to the Matrix 3 Software instruction manual for this procedure.

Security Modes

When the meter was originally programmed by the system administrator, one of the following security choices was entered:

- PIN Code
- Parts Room Authorization
- System Monitoring

Prior to dispensing, it may be necessary to complete one of the following security procedures, depending on the security mode set by the system administrator.

PIN Code (Fig. 14)

PIN Code (Personal Identification Number) means that a four digit number must be entered at the meter before every new dispense to obtain dispense authorization. To use a meter with PIN Code security:

1. Use the UP or DOWN ARROWS to select the first PIN Code number field.
2. Press the UP or DOWN ARROWS to scroll through the numbers 0-9. When the correct numeral appears in the field, press center ENTER button on meter's keypad to select the number. After a number is entered, the cursor automatically moves to the right, to the next number field.
3. Continue this process until the complete, 4-digit PIN Code has been entered.
4. After the last number is entered, the cursor moves over ENTER. Press center ENTER button on the meter's keypad to send the PIN Code entry to the PC.
5. The PC recognizes the PIN Code entered, and authorizes the meter to begin the dispense.
Parts Room Authorization (Fig. 15)

This mode provides highest level of security and requires a Parts Room Administrator to authorize each dispense. Before each dispense the meter displays the message: AUTHORIZATION REQUIRED. To send an authorization request to the Parts Room Administrator:

1. Move cursor to select the REQUEST on the display and push the center ENTER button on meter’s keypad to send the authorization request to the Parts Room.

2. After sending the request, the message PLEASE WAIT appears at the top of the screen as shown in Fig. 16.

3. You will not receive a message at the meter saying the Parts Room Administrator has authorized the meter to begin the dispense.

There are two ways to determine when the meter is ready:

- Press the center ENTER button to select REQUEST again. If the meter has received authorization from the Parts Room Administrator, the meter display will change to either the Dispense Screen or, if the meter was programmed to process work orders, the Work Order Enter/Select screen will appear (see Work Orders and Job Numbers, page 10).

OR

- Wait for the meter to fall asleep. When you press any button to wake it up, if the meter has been authorized for the dispense, the Dispense Screen will display.

NOTE: The Parts Room Administrator can choose to reject the dispense request. If a request is rejected, the PLEASE WAIT message on the display will be replaced with REJECTED and the meter will not be allowed to dispense.

System Monitoring

When system monitoring is selected, no security authorization is required prior to making a dispense. Any amount of fluid dispensed is automatically sent by the meter to the PC where it is recorded for future reference.
Work Orders and Job Codes

Refer to the Matrix 3 Software manual for instructions on creating and sending Work Orders and Job Codes using the PC and/or Global Work Orders.

The System Administrator can program the meter to process work orders using one of the following methods:

- Work Order/Job Code at the PC only
- Work Order/Job Code at the PC and Meter

Work Orders can have a maximum of (8) characters. The Job Code can have a maximum of (3) characters. The Work Order number is separated from the Job Code with a dash (-) (Fig. 17).

On the meter, use the UP or DOWN ARROWS to scroll through the list of entered work orders.

On meters configured to enter Work Orders and Job Codes at the PC and meter, the screen shown in Fig. 19 displays before the Dispense Screen.

Work orders entered at the meter appear at the beginning of the Work Order list on the meter and are placed ahead of Work Orders previously entered on the PC.

On meters configured to enter Work Orders and Job Codes at the PC only, the screen shown in Fig. 18 displays before the Dispense Screen.

The meter can receive any number of work orders. New work orders added at the PC will appear at the end of the work order list.

Fig. 17

The numbers, 0 - 9; alphabet characters, A - Z; and period (.), forward slash (/) and dash (-) or space characters can be used when assigning a Work Order or Job Number. One Work Order can require more than one service.

NOTE: One naming convention that can be implemented for identifying different services on a Work Order is adding an extension to the end of the order number (i.e., 123456.oil, 123456.atf).

On meters configured to enter Work Orders and Job Codes at the PC only, the screen shown in Fig. 18 displays before the Dispense Screen.

The meter can receive any number of work orders. New work orders added at the PC will appear at the end of the work order list.
To Display PC Created Work Order on the Meter:

The screen shown in Fig. 20 (a) (meters set to receive Work Orders and Job Numbers from the PC only) or (b) (meter set to receive Work Orders and Job Numbers from the PC or created at the meter), displays before a dispense can be made by the meter.

To view the Work Orders in the Work Order Queue:

1. Use the UP or DOWN ARROWS to display the work orders.
2. When the work order that applies to the vehicle you are servicing appears on the display, press the ENTER button to start a dispense.

Creating Work Order at the Meter (Fig. 21)

Using the UP ARROW displays the numbers, 0 - 9 and then alphabet letters, A - Z. By using the DOWN ARROW when the blank field is displays will also provide the period (.) ; forward slash (/); dash (-) characters; or space can be used.

To enter a new work order at the meter:

1. Use the LEFT ARROW to position the cursor over ENTER NEW.
2. Press center ENTER button on the meter’s keypad to select the ENTER NEW option.
3. The cursor automatically is positioned on the first field of the Enter Work Order screen. Use the UP or DOWN ARROWS to scroll through the list of numbers, letters and characters or a field can be left blank.

4. When the number, letter or character you want to use displays, press the center ENTER button on meter’s keypad to confirm the selection. The cursor automatically advances to the next field.
5. Repeat this procedure for all Work Order and Job Number fields on the display.

After the last field has been completed, the cursor will automatically move to the CANCEL.

6. To Cancel the new Work Order and Job Number you just created on the meter, press the center ENTER button on meter’s keypad to select the Cancel option.

To Select the new Work Order and Job Number you just created on the meter, use the LEFT ARROW to move the cursor to ENTER on the display. Press the center ENTER button on the meter’s keypad. This
new work order now appears as the first item in the Work Order Queue.

7. The work order selection screen displays. You can either select the work order you just created or use the UP or DOWN ARROWS to scroll through the list of all work orders in the queue until you find the work order that applies to the vehicle you are servicing.

8. Use the LEFT or RIGHT ARROWS to move cursor to SELECT. Press the center ENTER button on the meter’s keypad to confirm the work order selection.

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**Dispense**

The meter dispense options are determined by the System Administrator at the time the meter is programmed. Meter dispense options include:

- Manual Dispense Mode
- Preset Dispense Mode
- Restricted Preset Dispense Mode

NOTE: To change the meter from one mode to another, you must edit the meter’s profile.

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**Manual Dispense Mode**

To dispense fluid in this mode:

1. If necessary, enter the PIN Code or Parts Room Authorization request (8 and 17) and, if the meter is set to use Work Orders and Job Codes, select or add a Work Order (page 10).

2. The Manual Dispense Screen (Fig. 23) displays. Press the center ENTER button on the meter’s keypad to select ACTIVATE. You will hear a loud click at the meter indicating it is now ready to begin dispensing fluid.

3. Pull the trigger to begin the dispense. The meter counts up until you release the trigger.
4. When you have finished the dispense, press the center ENTER button on the meter’s keypad to select END (Fig. 24).

The meter sends the dispense report to the PC.

**Preset Dispense**

To dispense fluid in this mode:

1. If necessary enter the PIN Code or Parts Room Authorization request (pages 8 and 17) and, if the meter is set to use Work Orders and Job Codes, select or add a Work Order (page 10).

2. The Preset Dispense Screen displays. Press the center ENTER button on the meter’s keypad to select the ACTIVATE. You will hear a loud click at the meter indicating it is now ready to begin dispensing fluid.

3. The display changes to show the Preset Amount. The UP or DOWN ARROWS can be used to increase or decrease this amount. If you change the amount you must press the center ENTER button on the meter’s keypad to confirm the new amount before you begin dispensing fluid.

4. Pull the trigger to begin the dispense. The meter counts up from 0. The progression bar also provides a visual display of the dispense.

**NOTE:** If at any time before reaching the preset dispense amount, you want to stop the dispense, STOP on the bottom of the screen can be selected.

**NOTE:** The screen shown in Fig. 28 displays. Use the LEFT or RIGHT ARROW and center ENTERs to select one of three options:

a. **TOP OFF** - the dispense can be continued in TOP OFF mode (see description of TOP OFF, on this page).

b. **PRESET** - returns meter to PRESET mode and continues the current preset dispense where it was stopped.
Dispense

5. When the preset amount has been dispensed the meter will click loudly and release the trigger, stopping the dispense.

6. You now have the option to choose either:
   - TOP OFF if you need to add additional fluid. The amount of top off allowed can be limited during meter programming.
   - END to finish the dispense and send the dispense report to the PC.

**TOP OFF**

1. To TOP OFF, press the center ENTER button on the meter’s keypad to select TOP OFF on the display (the cursor will automatically be positioned over this option when the meter clicks off).

2. Squeeze trigger to dispense additional fluid.

   The amount dispensed on the display will continue to count up. Unless there is a preset limit on the amount you are allowed to top off and you have reached the limit, you can squeeze the trigger again to dispense more fluid.

   To end the TOP OFF release trigger. The cursor will be over the END option on the display.

3. Use the center ENTER button on the meter’s keypad to select END on the display.

   The meter sends the dispense report to the PC.

**Restricted Preset Dispense**

When meters are programmed in restricted preset mode, the specified dispense value cannot be increased, only decreased. The functionality of this feature is identical to Preset Dispense Mode except that the preset value can only be decreased with the DOWN ARROW.

**Simulated Dispense**

To simulate a dispense on the Matrix Sim Meter, manually turn the exposed gears. This actuation simulates fluid traveling through the meter.
Service

Replacing the Battery

- Only use the size and type of batteries specified in this manual.
  Batteries required to meet life expectancy:
  - Energizer E91

- Be sure to follow the correct polarity when installing batteries in the battery compartment (Fig. 31). Reversed batteries may damage this meter.

- Do not mix different types of batteries together or old batteries with fresh ones. Always replace all 4 batteries with 4, fresh, new batteries.

To change the battery:

1. Press firmly on battery compartment cover. Using a flat screwdriver turn latch screw counter-clockwise 1/2 turn.

2. Remove the battery compartment cover and batteries.

3. Install new batteries. See Fig. 31 for battery orientation.

4. Replace cover. The cover is designed to only fit on battery compartment one way. The notch (a) on cover fits into slot (b) on compartment. (Fig. 32).

5. Press down firmly on cover. Using a flat screwdriver turn latch screw clockwise 1/4 turn.

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**Fig. 31**

**Battery Orientation**

**Fig. 32**
Torque to 25-35 IN. LBS

Torque to 20-30 FT. LBS
Technical Data

NOTE: Technical Data is provided for reference and only applies to non-demo units.

Flow range* 0.1 to 14 gpm (0.4 to 53 lpm)
Maximum Working Pressure 1500 psi (103.4 bar)
Units of Measure pints, quarts, gallons, liters (factory set to quarts)
Weight 5 pounds (2.26 kg)
Dimensions (without extension)
  Length 13 inches (33 cm)
  Width 3.75 inches (9.5 cm)
  Height 5.75 inches (14.6 cm)
Units of measure factory set in quarts
maximum totalizer amount = 999,999 gallons or liters
maximum recorded dispensed volume = 999.99 units
maximum preset volume = 999.9 units
Inlet 1/2-14 npt or 3/4-14 npt
Outlet 3/4-16 straight thread o-ring boss
Operating temperature range 4 °F to 158°F (-4°C to 70°C)
Storage temperature range -40°F to 150°F (-40°C to 70°C)
Battery** 4AA alkaline or lithium batteries
  6 months
Expected battery life in typical shop environment
Wetted parts aluminum, stainless steel, PBT/PC, zinc,
nitrile rubber, CS
Fluid compatibility antifreeze, gear oil, crankcase oil, ATF
  80 psi @ 10 gpm
Meter pressure loss +/- 0.5 percent

*Tested in 10W motor oil. Flow rates vary with fluid pressure, temperature and viscosity.

**Battery required to meet life expectancy: Energizer® Alkaline E91.

† At 2.5 gpm (9.5 lpm), at 70°F (21°C), with 10-weight oil and 1 gallon dispensed. May require calibration; out-of-box accuracy is +/- 1.25 percent.