Instructions - Parts

HFR Flow Meter Kits

3A1657H

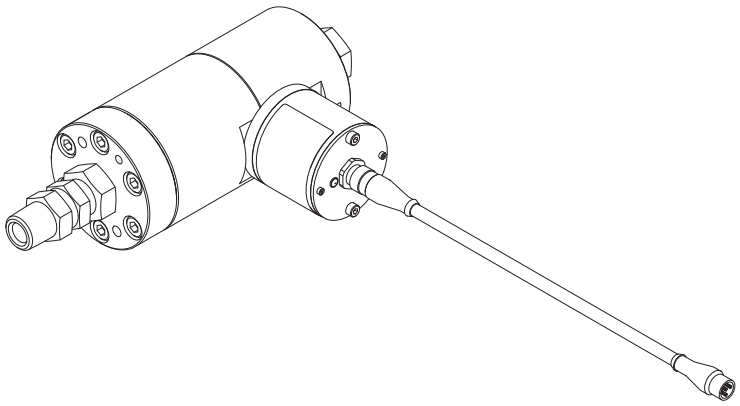
EN

For installation and calibration of flow meters on the HFR dispensing system. For professional use only.

HFR: *3000 psi (21 MPa, 207 bar) Maximum Working Pressure*
HFR For NVH: *2000 psi (14 MPa, 138 bar) Maximum Working Pressure*

Important Safety Instructions

Read all warnings and instructions in the HFR, Setup-Operation and NVH, Setup-Operation manuals.
Save all instructions.



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Kits

Flow Meter Electronics (Necessary)

Part No.	Description
24J318	Flow Meter Electronics Kit

HFR: “A” and “B” Side Flow Meter (One for each side)

Part No.	Description
24J319	S3000 Flow Meter Kit
24J320	G3000 Flow Meter Kit
24J321	G3000HR Flow Meter Kit
24J322	HG6000 Flow Meter Kit
24J323	HG6000HR Flow Meter Kit

HFR for NVH: Flow Meter Kits

Part No.	Description
24T182	24:1 and 16:1 NVH Cart Flow Meter Kit
24T183	1:1 NVH Cart Flow Meter Kit
24T200	24:1 and 16:1 NVH Modular Flow Meter Kit
24T201	1:1 NVH Modular Flow Meter Kit

HFR: Flow Meter Calibration Kit (Per Applicator)

Part No.	Description
24J324	L-Head Flow Meter Calibration Kit
24J325	S-Head Flow Meter Calibration Kit
24J326	P2 Flow Meter Calibration Kit
24J357	GX-16 Flow Meter Calibration Kit
24F227	EP/Fusion Flow Meter Calibration Kit
255247	MD2 1:1 Flow Meter Calibration Kit
255245	MD2 10:1 Flow Meter Calibration Kit

Related Manuals

Component manuals in English. Manuals are available at www.graco.com.

Manual No.	Description
Systems	
313997	HFR Operation
313998	HFR Repair-Parts
3A2797	HFR for NVH Foam - Cart, Setup-Operation
3A1961	HFR for NVH Foam - Modular, Setup-Operation
Flow Meters	
308778	3000 Series Flow Meters
309834	6000 Series Flow Meters
Dispense Valves	
312753	L-Head Operation-Maintenance
312752	S-Head Operation-Maintenance
313536	GX-16 Operation
313872	EP Gun, Instructions-Parts
313213	Probler P2, Instructions-Parts
309550	Fusion Gun Instructions-Parts
312185	MD2 Valve Instructions-Parts
313380	GX-7 DI Auto-Robotic Spray Gun, Operation-Maintenance
Accessories	
3A0395	HFR and VRM Tank Feed Systems Instructions-Parts
3A0861	Ratio Check Assembly for Fusion/EP Guns

Overview

On HFR systems, the flow meters are used only as a method of monitoring system performance, which will help with system maintenance. The ratio displayed on the ADM is a running average of the data collected.

NOTE: The flow meters will not correct any ratio errors caused by system performance.

When the ratio monitoring system is active, the ratio will be displayed on the screen below in the form of *ratio:1* (e.g. 24.03:1). The display will show “--:--” when the ratio monitoring system is not active. The recommended min imum value for an alarm is 3%.

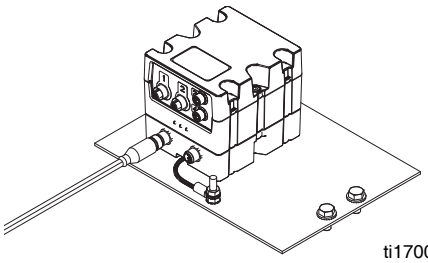
NOTE: For circulation or NVH systems, the ratio moni toring system only becomes active when the machine is in high pressure circulation.

Installation

Flow Meter Electronics Kit 24J318

1. Perform **Shutdown** procedure. See HFR or NVH operation manual for detailed instructions.
2. Use two 111800 hex head screws (supplied) to mount electronics assembly 24J318 to the bottom of the electrical enclosure. If there are transformers installed, remove two of the hex head screws from the transformers and use those two holes to mount the electronics assembly and discard the supplied hex head screws.

NOTE: For NVH machines, mount electronics assembly to the bottom of the “B” side electrical enclosure.



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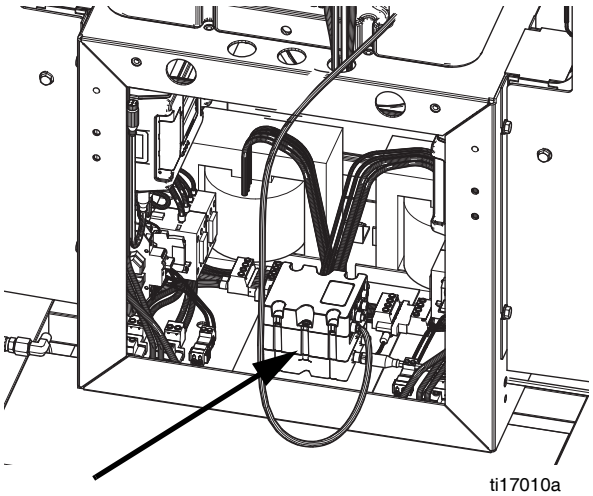

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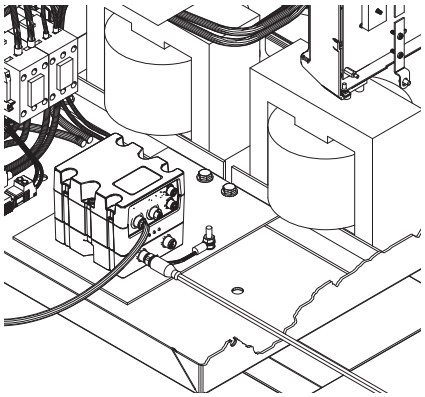
3. Connect CAN cable to CAN connection labeled “1” on the fluid control module.



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4. Connect opposite end of the CAN cable (111) to any free CAN port on any other fluid control module or temperature control module in the system. If none are available, use CAN cables (111 and 113) to connect to CAN splitter inside the power distribution box. See references on page 20.

HFR: 3000 Series Flow Meter

1. Perform HFR **Pressure Relief Procedure**. See HFR operation manual for detailed instructions.
2. Perform dispense valve **Pressure Relief Proce dure**. See dispense valve manual, page 3, for detailed instructions.
3. Verify all air, hydraulic, and material pressures have been relieved before continuing.
4. Perform HFR **Shutdown** procedure. See HFR oper ation manual for detailed instructions.
5. *If the flow meter is for the A (Red) side,* connect inlet fitting (2) and outlet fitting (4) to the flow meter. See FIG. 1.
   If the flow meter is for the B (Blue) side, connect inlet fitting (3) and outlet fitting (5) to the flow meter. See FIG. 1.

NOTE: The connections for each side of the machine are different sizes to prevent attaching the incorrect hoses. The A (Red) side has the smaller connections.

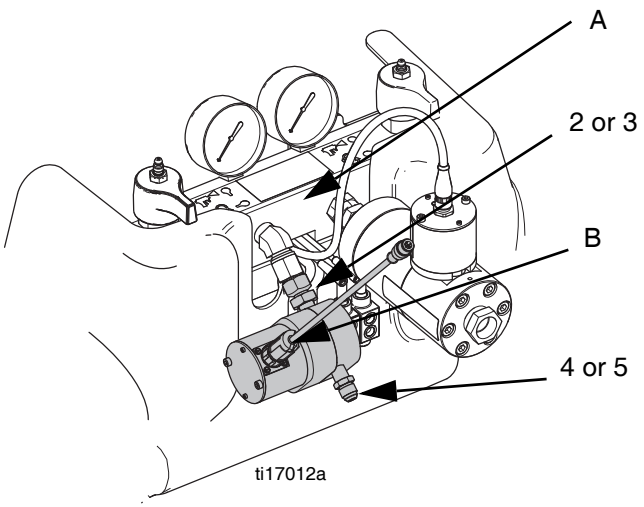


FIG. 1: Flow Meter Installed on Fluid Manifold -- A (Red) side shown

6. Connect the flow meter assembly to the fluid manifold (A) on the HFR system as shown in FIG. 1.
7. Connect the 3-pin connector (B) on the flow meter data cable to the flow meter. See FIG. 1.
8. Route the flow meter data cable as shown in FIG. 2.

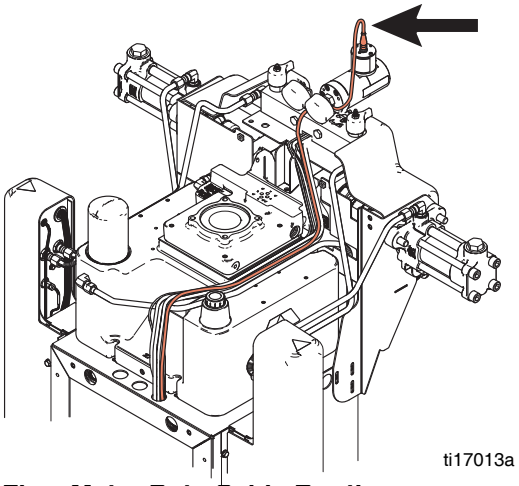


FIG. 2: Flow Meter Data Cable Routing

9. Connect the other end of the flow meter data cable to the fluid control module installed in the electrical enclosure.
   If the data cable is for the A (Red) side flow meter, connect to port 1 on the FCM. See FIG. 2.
   If the data cable is for the B (Blue) side flow meter, connect to port 2 on the FCM. See FIG. 2.

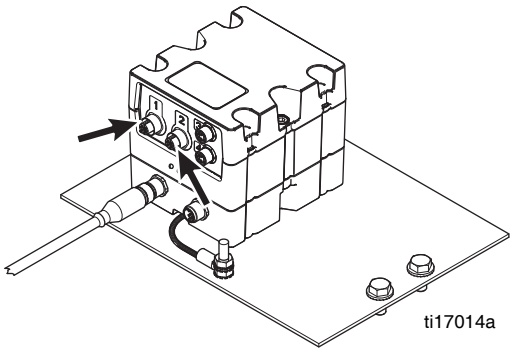


FIG. 3: Flow Meter Data Cable Connections

HFR: 6000 Series Flow Meter

1. Perform HFR **Pressure Relief Procedure**. See HFR operation manual for detailed instructions.
2. Perform dispense valve **Pressure Relief Proce dure**. See dispense valve manual, page 3, for detailed instructions.
3. Verify all air, hydraulic, and material pressures have been relieved before continuing.
4. Perform HFR **Shutdown** procedure. See HFR oper ation manual for detailed instructions.
5. Remove all fittings from the outlet ports on the front of the fluid manifold. See FIG. 4. Note which side each fitting is from to make sure they are installed on the correct side later.

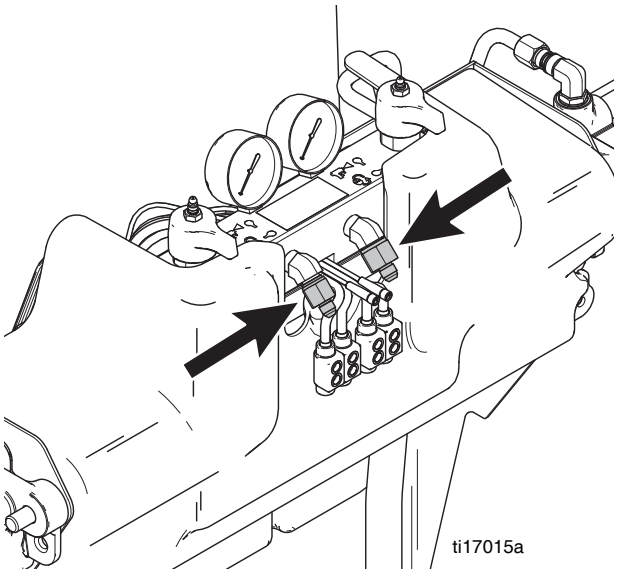


FIG. 4: Remove Fluid Manifold Fittings

6. Connect swivel fitting (302) to fluid manifold. See FIG. 5.
7. Connect fittings (303 and 304) to flow meter (301). See FIG. 5.
8. Connect flow meter and fittings to swivel fitting already connected to fluid manifold. See FIG. 5.

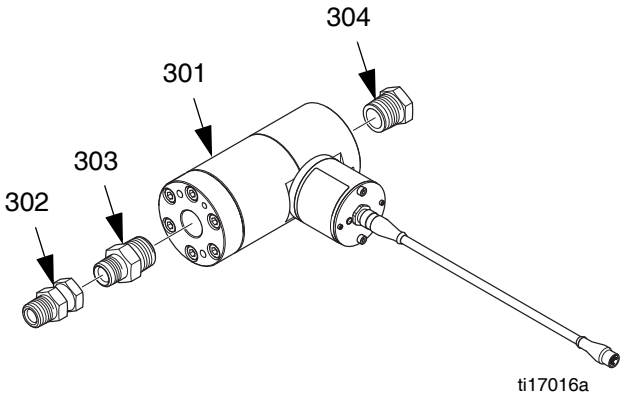


FIG. 5: Connect Fittings to Flow Meter

9. Connect the flow meter assembly to the fluid mani fold as shown. See FIG. 6.
10. Re-install the fittings that were previously removed. See FIG. 6.

NOTICE

Make sure to install the fittings in the correct mate rial lines. Failure to do so will result in material cross-contamination of the fittings and material hoses.

11. Connect the 4-pin connector of the flow meter data cable to the flow meter. See FIG. 6.

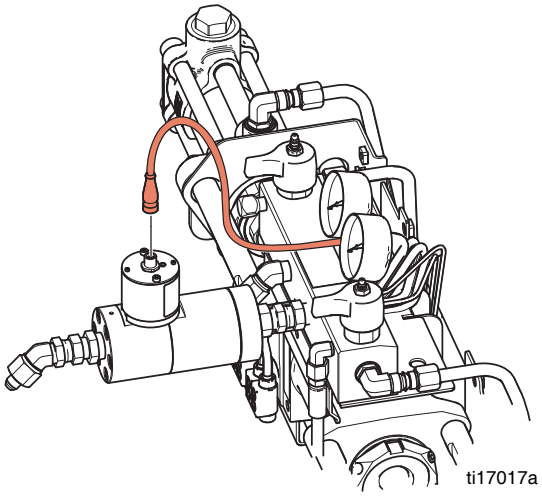


FIG. 6: Flow Meter Installation

12. Route the flow meter data cable as shown in FIG. 7.

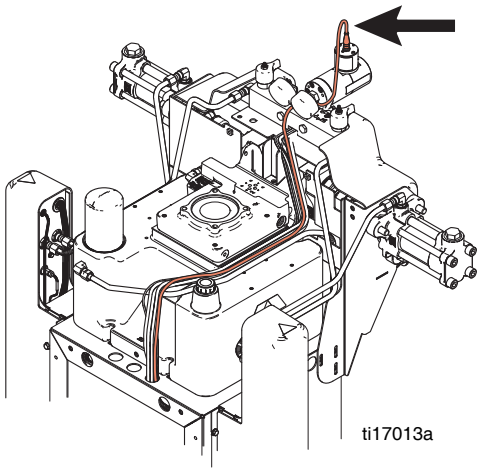


FIG. 7: Flow Meter Data Cable Routing

13. Connect the other end to the fluid control module installed in the electrical enclosure.
    If the data cable is for the A (Red) side flow meter, connect to port 1 on the FCM. See FIG. 2.
    If the data cable is for the B (Blue) side flow meter, connect to port 2 on the FCM. See FIG. 8.

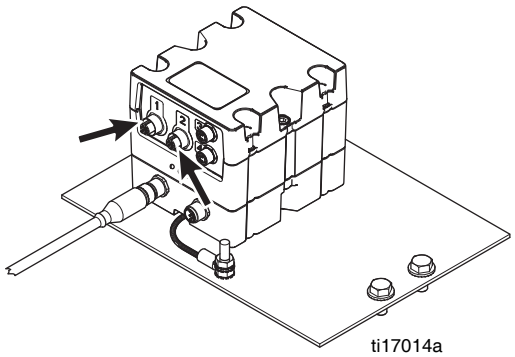


FIG. 8: Flow Meter Data Cable Connections

NVH Flow Meters

1. Perform HFR for NVH **Pressure Relief Procedure**. See HFR for NVH operation manual for detailed instructions.
2. Perform dispense valve **Pressure Relief Proce dure**. See dispense valve manual, page 3, for detailed instructions.
3. Verify all air, hydraulic, and material pressures have been relieved before continuing.
4. Perform HFR for NVH **Shutdown** procedure. See HFR operation manual for detailed instructions.
5. Remove all fittings from the inlet and outlet ports on the front of the fluid manifold. See FIG. 9.

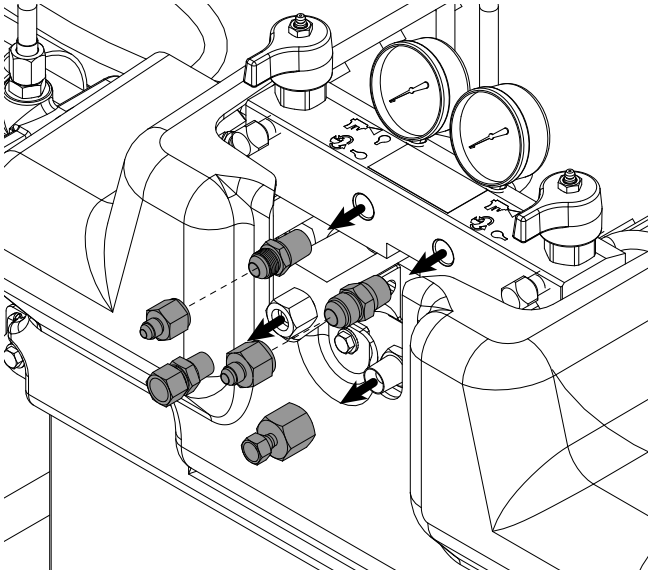


FIG. 9: Remove Fluid Manifold Fittings

6. If applicable, connect the A (Red) and B (Blue) return fittings. See FIG. 10.

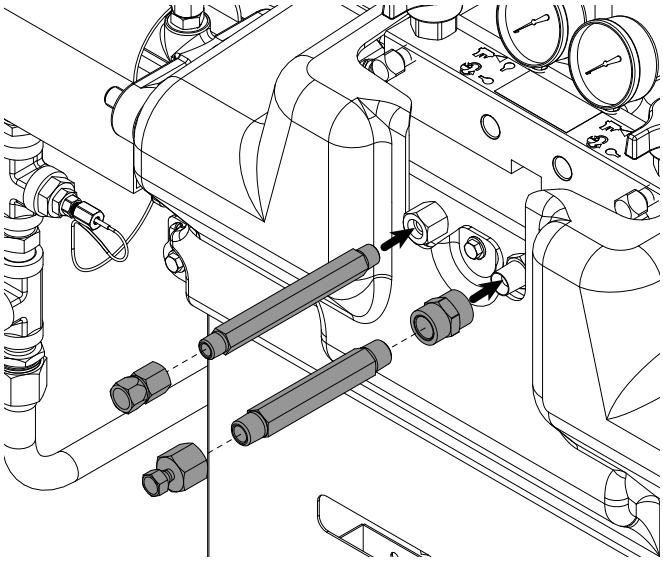


FIG. 10: Connect Return Fittings

7. Connect A (Red) flow meter and fittings to fluid manifold. See FIG. 11.

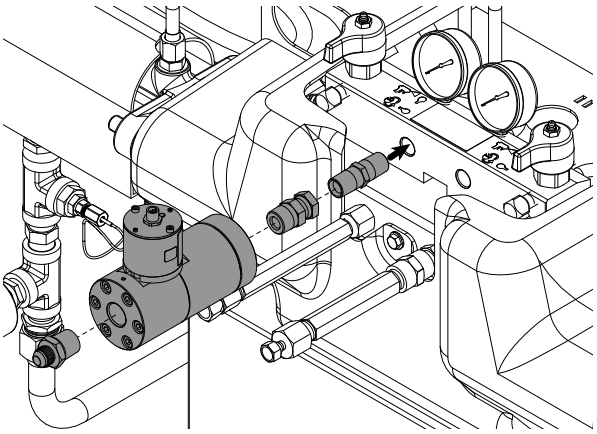
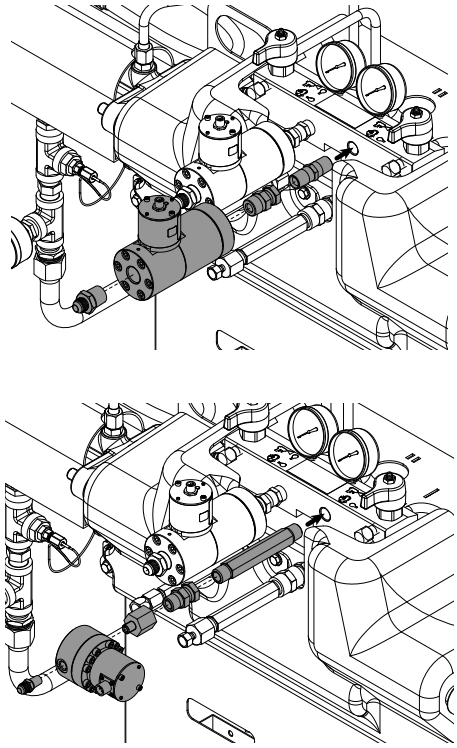


FIG. 11: A (Red) Flow Meter Installation

8. Connect B (Blue) flow meter and fittings to fluid manifold. See FIG. 12.



1:1 Ratio

24:1 or 16:1 Ratio

FIG. 12: B (Blue) Flow Meter Installation

9. Connect the supply and return hoses from the appli cator to the corresponding fittings.

10. Connect the 4-pin connector of the flow meter data cable to the flow meter.

11. Route the flow meter data cable as shown in FIG. 13.

NOTE: For NVH - Modular systems, route the flow meter data cable as shown in FIG. 7, page 7.

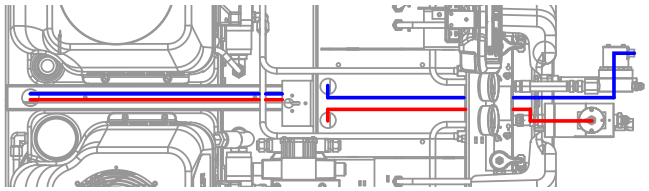


FIG. 13: Flow Meter Data Cable Routing

12. Connect the other end to the fluid control module installed in the electrical enclosure.
If the data cable is for the A (Red) side flow meter, connect to port 1 on the FCM. See FIG. 14.
If the data cable is for the B (Blue) side flow meter, connect to port 2 on the FCM. See FIG. 14.

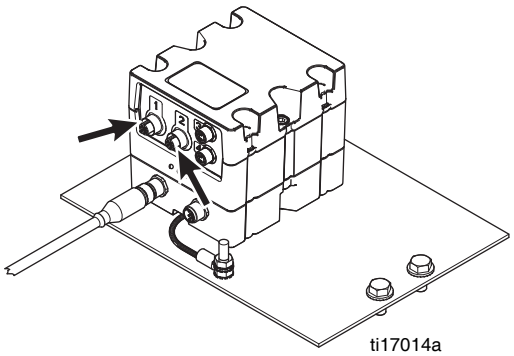


FIG. 14: Flow Meter Data Cable Connections

13. Install token into the FCM and turn the system power on. Once the software installation is com plete, remove the token.

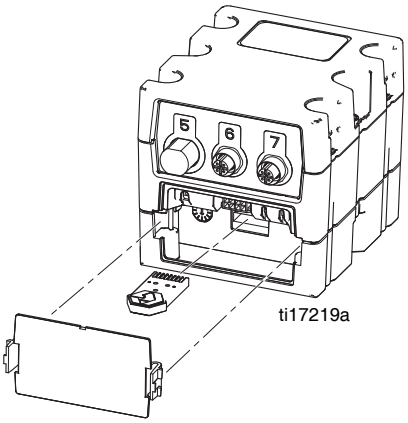


FIG. 15: Token Installation

HFR: Calibration Kit

In order to perform the calibration procedure the HFR system must have circulation lines going from the sys tem fluid manifold back to the tanks. If the system does not have circulation lines, a calibration kit must be pur chased and installed. See **HFR: Flow Meter Calibra tion Kits for Hydraulic Dispense Valves** on page 25 for the correct calibration kit number to order for your dispense valve.

This procedure applies to the L-Head, S-Head and GX-16 calibration kits only. See page 25 for part refer ence numbers.

1. Perform HFR **Pressure Relief Procedure**. See HFR operation manual for detailed instructions.
2. Perform dispense valve **Pressure Relief Proce dure**. See dispense valve manual, page 3, for detailed instructions.
3. Verify all air, hydraulic, and material pressures have been relieved before continuing.
4. Perform HFR **Shutdown** procedure. See HFR oper ation manual for detailed instructions.
5. If material hoses from the dispense valve are con nected to the HFR system, disconnect them from the system fluid manifold to enable removing the blue pumpline shield.
6. Remove blue plastic shield that covers the center of the pumpline.
7. Remove A (Red) and B (Blue) circulation fittings from the fluid manifold. See FIG. 16. Clean the fit tings then set them aside. They will not be needed.

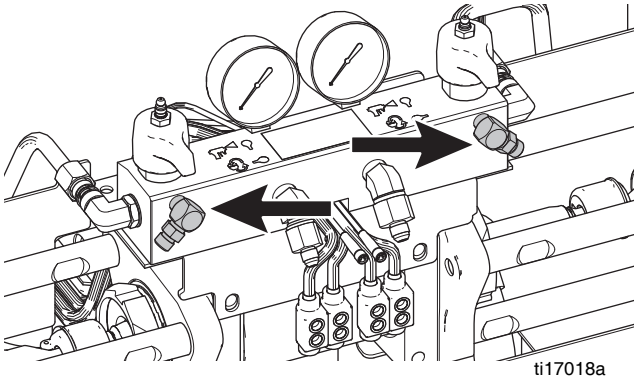


FIG. 16: Remove Circulation Fittings

8. Install fittings (ref. 3) from this kit in place of the cir culation fittings. See FIG. 18.
9. De-pressurize and empty the material tank.
10. Remove material return line from tank.
11. Assemble fittings and hose then connect assembled kit to the return port of the tank as shown in FIG. 17.

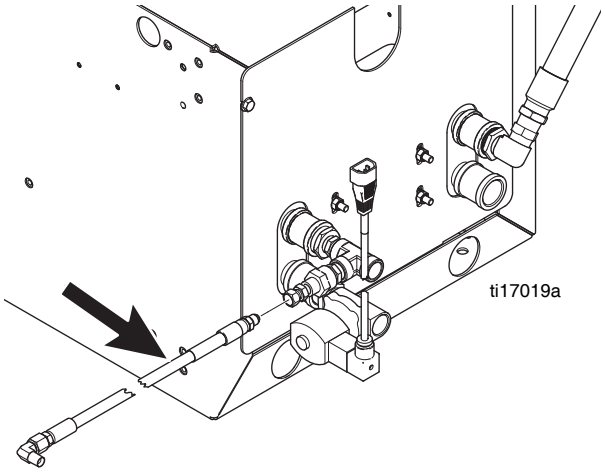


FIG. 17: Install Fittings and Hose

12. Connect the other end of the hose to the fluid mani fold as shown in FIG. 18.

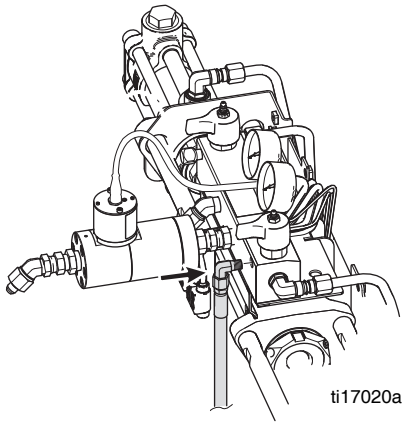


FIG. 18: Connect Hose to Fluid Manifold

13. Connect material return line to the open port of the tee fitting at the tank. See FIG. 17.

14. Repeat steps 9-12 for the other material side.

15. Re-install blue plastic shield that covers the center of the pumpline.

16. Re-connect material hoses to the HFR system.

NOTE: Keep blank orifices and o-rings (items 7, 8, 9 in this kit) for flow meter calibration.

Calibration

The following procedure describes how to adjust the mass flow rate calculated by the machine. To calculate the mass flow rate, the machine uses the chemical spe cific gravities entered in the Setup screens, the volumet ric flow measured by the flow meters, and the K-Factor inputs for each chemical.

The flow meters do not require regular calibration. How ever, if harmful materials such as solvents or abrasive materials pass through the flow meters re-calibration will be necessary.

NOTICE

Do not allow solvents or abrasive material to pass through the flow meters. Failure to do so will result in damage to the flow meters and reduced accuracy.

While this procedure adjusts the K-Factor, its purpose is to fine-tune the calculated specific gravity of each chem ical used. Because of this, it is important to have accu rate chemical specific gravities entered in ADM.

To accurately measure flow from each chemical side, some dispense valves require dispensing one chemical at a time, while other can split the stream into two sepa rate containers. To dispense one chemical at a time, a blocked orifice must be installed in one side of the dis pense valve to prevent fluid flow. To dispense both chemicals simultaneously but into separate containers, a special assembly must be installed to separate the fluid streams.

Using a Blocked Orifice

The L-Head, S-Head, and GX-16 dispense valves require installing a blocked orifice to calibrate fluid flow. The blocked orifice prevents leaking fluid and cross-con tamination of the fluid line not being calibrated.

NOTICE

The fluid line not being calibrated must have a blocked orifice installed. Failure to do so will result in fluid being pushed into the opposite fluid line during the calibration shot. This will result in significant labor to clear the mixed and cured material from the fluid lines.

Parts and Tools Required

GX-7DI Only

- 5/16 Nut Driver
- Adjustable Wrench
- Scale
- Two large containers with lids (a hole will need to be cut into the lid slightly larger than the spray nozzle. Using a 5 gallon pail and removing the pull out spout from the bung is recommended).
- Solvent and cleaning utensils to clean GX-7 mix module and inlets.

L-Head, S-Head, GX-16

- Blocked orifice -- see dispense valve manual for part numbers, see **Related Manuals** on page 3
- Scale
- Container to catch dispensed material
- ***L-Head Only --***
  - 4 mm and 6 mm hex keys
- ***S-Head Only --***
  - 5/32 hex key
  - 1 in. hex wrench
  - 3/8 in. hex wrench
- ***GX-16 Only --***
  - 7/16 in. hex wrench
  - Blocked orifice -- see dispense valve manual for part numbers, see **Related Manuals** on page 3

Fusion, EP, Probler P2

- Scale
- Two containers to catch dispensed material
- Adjustable wrench
- ***Fusion Gun and EP Gun Only --***
  - Ratio checking assembly 24F227
- ***Probler P2 Only --***
  - Calibration kit 24J326

MD2 Valve

- *Ratio Check Adapter:*
  Part No. 255247 for 1:1 MD2 Valves
  Part No. 255245 for 10:1 MD2 Valves
- Adjustable Wrench
- Scale
- Two small containers, must have a small enough rim to separately catch each material dispensed from the ratio check adapter

Calibrate Material Weight Measurement

For more detailed instructions regarding steps in this procedure, see **Related Manuals** listed on page 3.

1. If not already completed, install the flow meters. See **Installation** starting on page 12.
2. If the HFR system does not have circulation lines going from the system fluid manifold to the tanks, order and install the appropriate calibration kit. See **HFR: Calibration Kit** on page 10.
3. Perform HFR **Pressure Relief Procedure**. See HFR operation manual listed on page 3 for detailed instructions.
4. Perform dispense valve **Pressure Relief Procedure**. See dispense valve manual listed on page 3 for detailed instructions.
5. Verify all air, hydraulic, and material pressures have been relieved before continuing.
6. Perform HFR **Shutdown** procedure. See HFR operation manual for detailed instructions.
7. Place a bucket under the dispense valve to catch spilled material.
8. Prepare dispense valve for calibration dispense:

For GX7-DI Dispense Valves --

a. Disable air assist to the spray head air cap.

b. Close off material flow to the dispense head for the chemical NOT being calibrated. Turn the valve on the coupling block manifold fully clockwise until tight.

c. Open material flow to the dispense head for the chemical being calibrated. Turn the valve on the coupling block manifold fully counter-clockwise until tight.

d. Remove the Air Cap Nut, Pressure Cap Disc (PCD) retainer nut, and the PCD.

For S-Head and L-Head Dispense Valves Only --

a. Remove the four hex bolts on the chemical side **not** being calibrated.

b. Remove the existing orifice and nozzle assembly and replace with the blocked orifice and nozzle assembly.

c. With the blocked orifice and nozzle assembly installed, install the four hex bolts previously removed and tighten.

For GX-16 Dispense Valve Only --

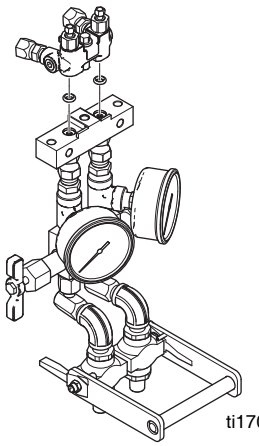
a. Use the 7/16 in. hex wrench to remove the orifice on the chemical stream **not** being calibrated.

b. Lubricate o-rings then install the blank restrictor orifice.

For Fusion and EP Gun Only --

a. Remove the gun fluid manifold from the gun. See gun manual listed on page 3.

b. Connect gun fluid manifold to ratio check assembly 24F227.



For Probler P2 Gun Only --

a. Disconnect both material lines at the gun. See gun manual listed on page 3.

b. Attach material lines to fluid manifold (1) included in calibration kit 24J326. See FIG. 19.

c. Place o-rings (2) in correct location then attach fluid manifold to the base (3) of the calibration kit.

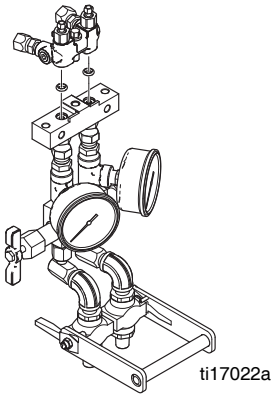


FIG. 19: Kit 24J326

For MD2 Valve Only --

a. Use an adjustable wrench to remove the static mixer.

b. Install the ratio check adapter onto the dispense valve.

For L-Head, S-Head, GX-7 DI, and GX-16 Dispense Valves Only --

- *If calibrating the A (Red) side,* close the B (Blue) valve on the fluid manifold. Make sure the A (Red) valve is open.

- *If calibrating the B (Blue) side,* close the A (Red) valve on the fluid manifold. Make sure the B (Blue) valve is open.

NOTE: The valves on the fluid manifold are closed when pointing to the side, as shown in FIG. 20. They are open when pointing forwards.

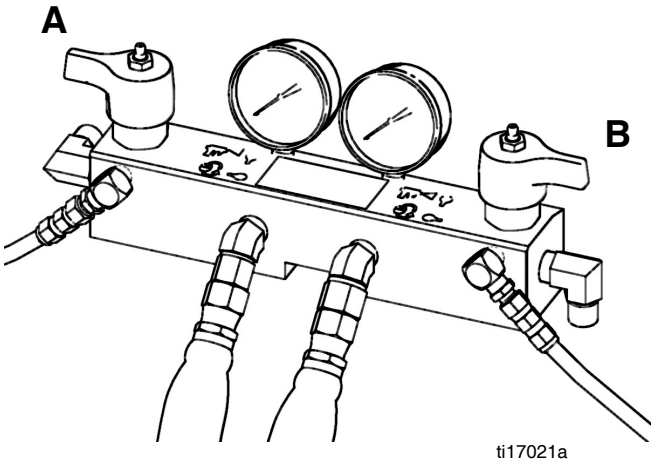


FIG. 20: Fluid Manifold Valves - shown closed

All Assemblies --

9. Turn the main power switch on the HFR to the ON position.

10. Press the ADM Power On/Off button (CA) to enable the system.

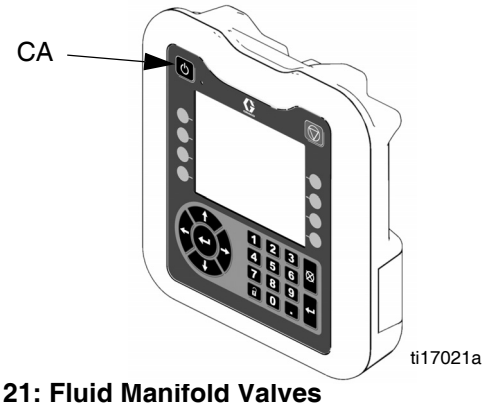
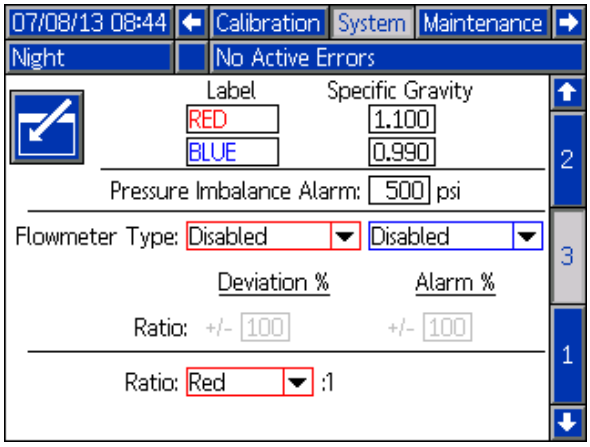
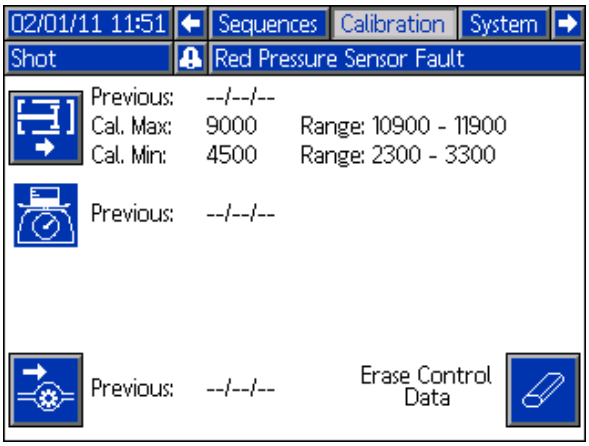


FIG. 21: Fluid Manifold Valves

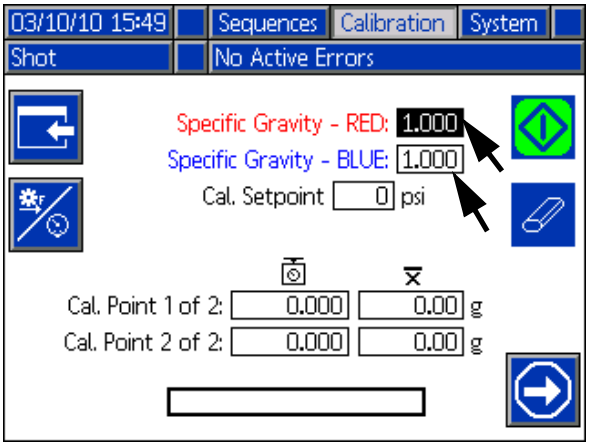
11. Press  to dispense a shot to prime the material lines.
12. Remove container from below the dispense valve.
13. Press  repeatedly to select Standby mode.
14. Press  to access the Setup screens.
15. Use the arrow keys to navigate to System screen #3.



16. Press  then use the arrow keys to navigate to the A (Red) and B (Blue) flow meter dropdown menus.
17. Enter material specific gravity in the A (Red) and B (Blue) Specific gravity input boxes. This information may be entered on the System 3 screen, or the Cal ibration screen depending on the specific machine model. See step 23.
18. Use the dropdown menus to select the type of flow meters installed.
19. Enter 0 in the Alarm % fields. This will prevent alarms during the calibration dispense that could prevent dispensing.
20. Select either “RED:1” or “BLUE:1” for the ratio dis play.
21. Press  to exit the System screen then use the arrow keys to navigate to the Calibration screen.

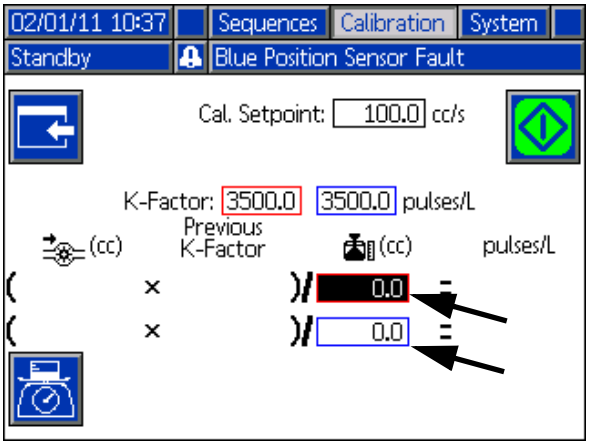


22. Press  to access the weight calibration and material specific gravity screen.
23. Enter the material specific gravity in the A (Red) and B (Blue) specific gravity input boxes.



24. Press  to go to the main Calibration screen.

25. Press  to go to the flow meter calibration screen.



26. Enter a value in the Cal. Setpoint input box that is close to what is used during normal dispensing. Ver ify the  softkey option is active.

27. Prepare containers for calibration dispense:

For L-Head, S-Head, and GX-16 Dispense Valves Only --

a. Weigh a container and record the weight.

b. Place container below dispense valve.

For Fusion, EP, Probler P2, and MD2 Dispense Valves Only --

a. Mark two containers as A and B.

b. Weigh each container and record the weights.

c. Place containers below the dispense valve to catch the each fluid separately.

All Assemblies --

28. Press  to begin dispensing then press again to stop.

NOTE: For better results, it is recommended to dis pense for a minimum of 10 seconds.

29. Weigh the container(s) and record the weight(s). Subtract the weight of each bucket measured before the shot to obtain the weight of each material dispensed.

30. Use the arrow keys to navigate to the applicable A (Red) or B (Blue) weight box below the (g) icon and enter the weight of the dispensed mate rial(s).

31. Record the K-factor(s) shown on the screen after the material weight(s) are entered.

32. Repeat steps 27 to 31 at least four times to dis pense many calibration shots. Record the weights and K-factors shown on the screen for each shot.

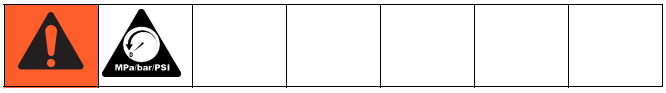
NOTE: The K-factor should be within 0.5% of the aver age value for all runs.

33. If any K-factors are not within 0.5% of the average K-factor value for all shots then:

a. Check all electrical connections.

b. Check material connections.

c. Check to make sure there is no air in the mate rial lines.



34. Perform HFR **Pressure Relief Procedure**. See HFR operation manual for detailed instructions.

35. Perform dispense valve **Pressure Relief Proce dure**. See dispense valve manual, page 3, for detailed instructions.

36. Verify all air, hydraulic, and material pressures have been relieved before continuing.

37. Perform HFR **Shutdown** procedure. See HFR oper ation manual for detailed instructions.

38. Prepare dispense valve:

For GX7-DI Dispense Valves --

a. Close off material flow to the dispense head for BOTH chemicals. Turn the valve on the cou pling block manifold fully clockwise until tight.

b. Remove and clean the mixing module retainer.

c. Remove and clean the mix module. The dis pense valve can be manually cycled open and closed by pressing the dispense valve button on the Maintenance screen. Cycle open and closed once to pull the module partially off of the valve rod.

d. Remove the inlet screen and check valve assembly for the chemical side that was NOT being calibrated and inspect for cross contami nation of chemical.

e. Remove manifold and completely clean if cross over is found. Clean parts with solvent or replace as necessary.

f. Return to step 8 and repeat calibration steps for the other chemical side.

For L-Head, S-Head, and GX-16 Dispense Valves Only --

a. Remove blocked orifice and replace with origi nal orifice.

b. Clean the used blocked orifice for future use.

c. Go to step 27 to repeat procedure to calibrate the other material line.

For Fusion and EP Guns Only --

a. Remove the ratio check assembly and clean for future use.

b. Attach fluid manifold to gun.

For Probler P2 Gun Only --

a. Remove material lines from calibration kit.

b. Remove calibration kit and clean for future use.

c. Attach material lines to gun.

For MD2 Valve Only --

a. Remove ratio check nozzle and clean for future use.

b. Install static mixer.

All Assemblies --

39. Navigate to the System 3 screen then update the Alarm % value to the desired percent.

Flow Meter Connector Pinout

The system utilizes a 5-pin CAN connection for commu nication with the flow meter. If a non-Graco flow meter is used the flow meter signal must be converted to the fol lowing 5-pin connection.

NOTE: The connection shown is the FCM connector, not the CAN cable pins.

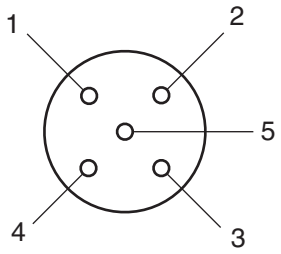


FIG. 22: FCM 5-pin Connector Input

1 *+10-30 VDC Supply*

2 *Signal out*

3 *Ground*

4 *Not Used*

5 *Not Used*

Maintenance

Install Upgrade Token

NOTE: The Motor Control Module, Fluid Control Mod ule, and Temperature Control Module connection to the system is temporarily disabled during the installation of upgrade tokens.

To install software upgrades:

1. Use correct software token stated in the table. See Graco Control Architecture™ Module Programming manual for instructions.

NOTE: Upgrade all modules in the system to the software version on the token, even if you are replacing only one or two modules. Different soft ware versions may not be compatible.

All data in the module (System Settings, USB Logs, Recipes, Maintenance Counters) may be reset to factory default settings. Download all settings and user preferences to a USB before the upgrade, for ease of restoring them following the upgrade.

See manuals for locations of specific GCA compo nents.

The software version history for each system can be viewed in the technical support section at www.graco.com.

Token	Application
16G407	**Ratio Monitoring (Flow Meters)**: - Fluid Control Module

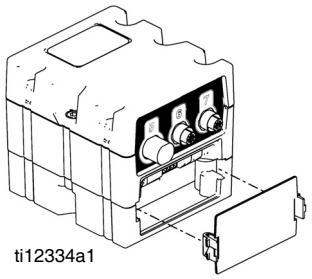
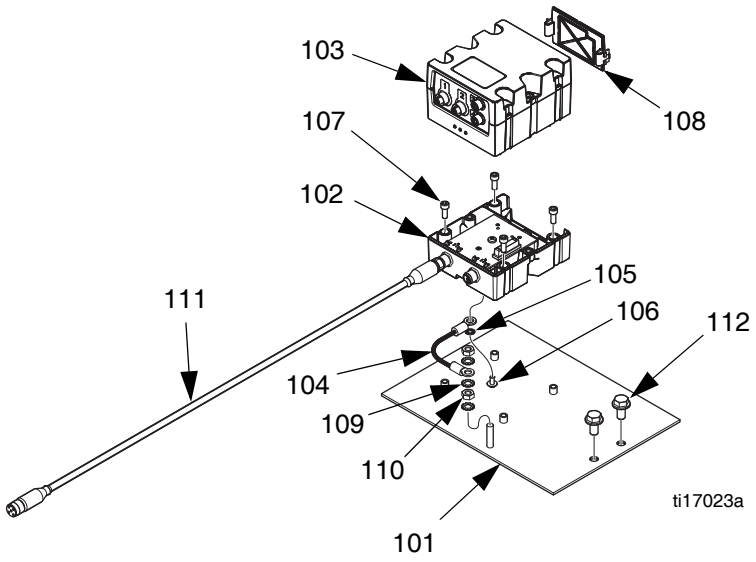


FIG. 23

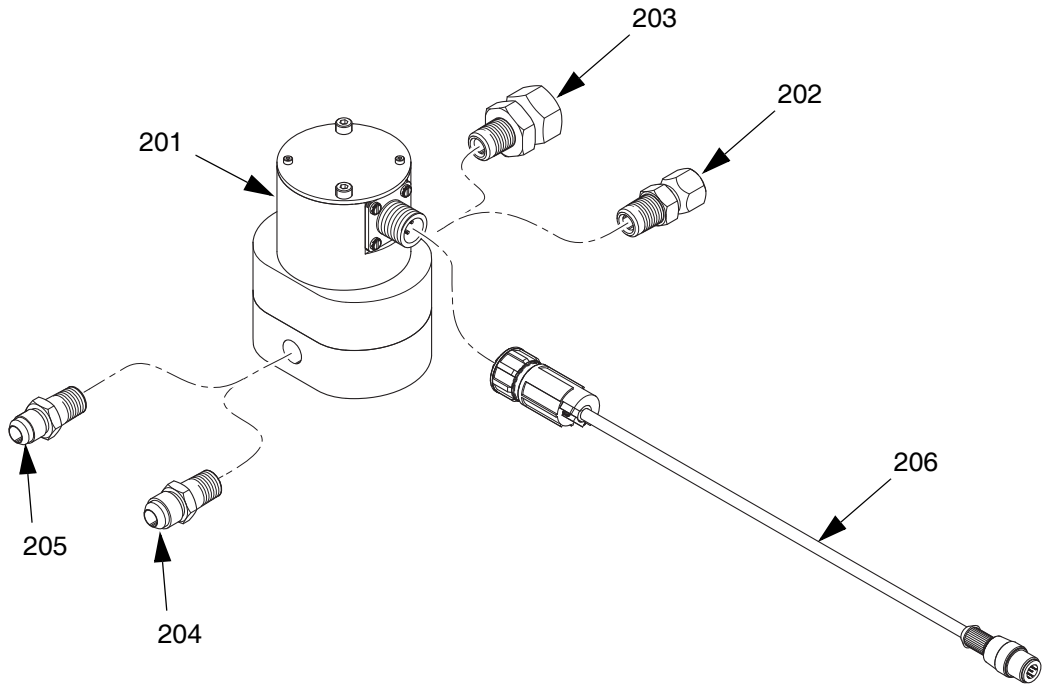
Parts

HFR and NVH: Flow Meter Electronics Kit, 24J318



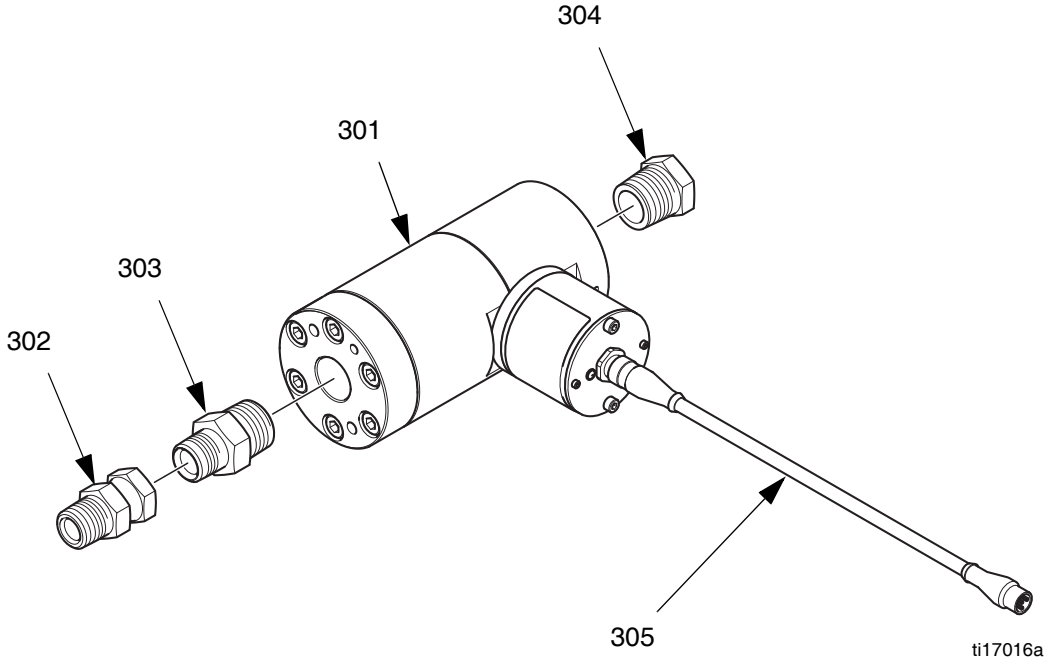
Ref	Part	Description	Qty
101	24J328	PLATE, mounting, electronics	1
102	289697	MODULE, base	1
103	289696	MODULE, FCM	1
104	24H240	HARNESS, wire, ground, term, 9 in.	1
105	102063	WASHER, lock, ext	1
106	114993	SCREW, machine, pan wash head	1
107	102598	SCREW, cap, socket head	4
108	277674	ENCLOSURE, cube door	1
109	100985	WASHER, lock ext	3
110	100015	NUT, hex mscr	2
111	121002	CABLE, CAN, female / female, 1.5 m	1
112	111800	SCREW, cap, hex head	2
113	123680	CABLE, CAN, male/male, 0.5 m (not shown)	1

HFR: 3000 Series Flow Meter Kits



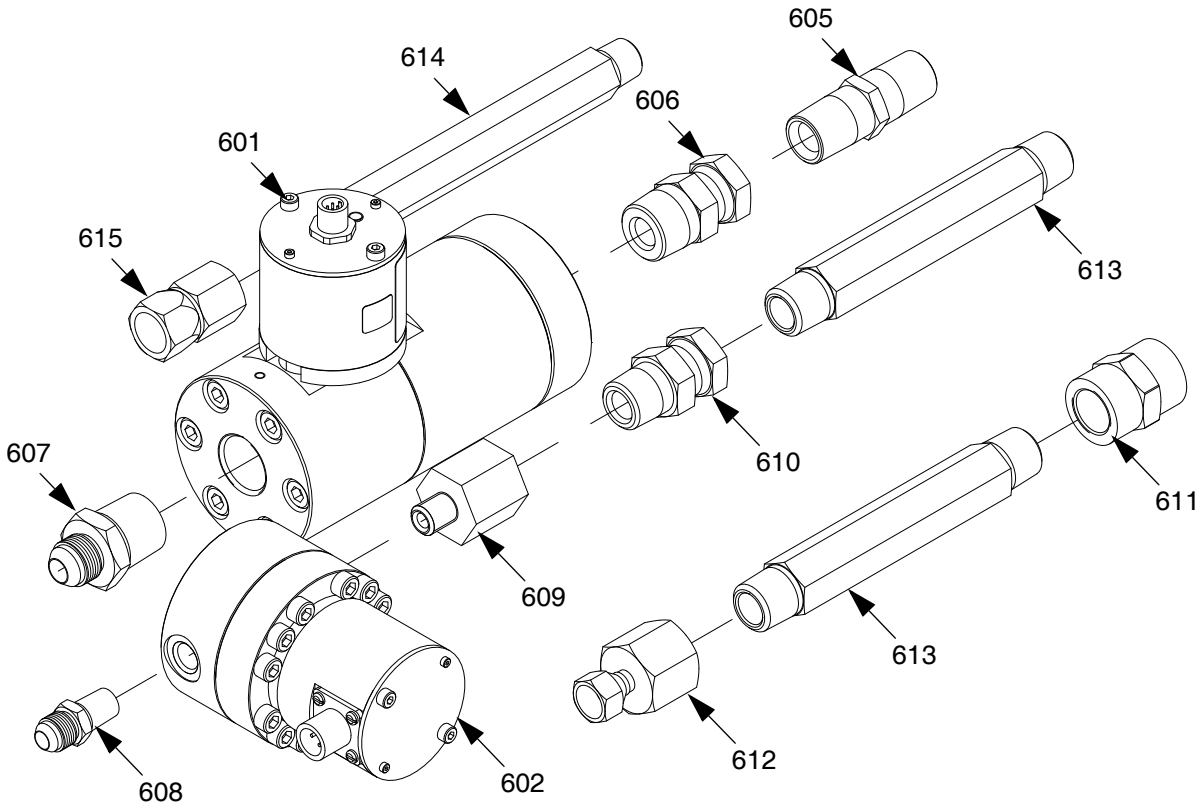
Ref	Part	Description	Quantity		
			24J319, S3000	24J320, G3000	24J321, G3000HR
201	258718	METER, gear, S3000	1		
	239716	METER, gear, G3000		1	
	244292	METER, gear, G3000HR			1
202	262205	FITTING, swivel, npt x JIC	1	1	1
203	262206	FITTING, swivel, 1/4 npt x 6 JIC	1	1	1
204	123596	ADAPTER, 5/16 JIC x 1/4 npt	1	1	1
205	123597	ADAPTER, 3/8 JIC x 1/4 npt	1	1	1
206	17E305	HARNESS, M12 x cir, 5-pin x 3-pin, male x female	1	1	1

HFR: 6000 Series Flow Meter Kits



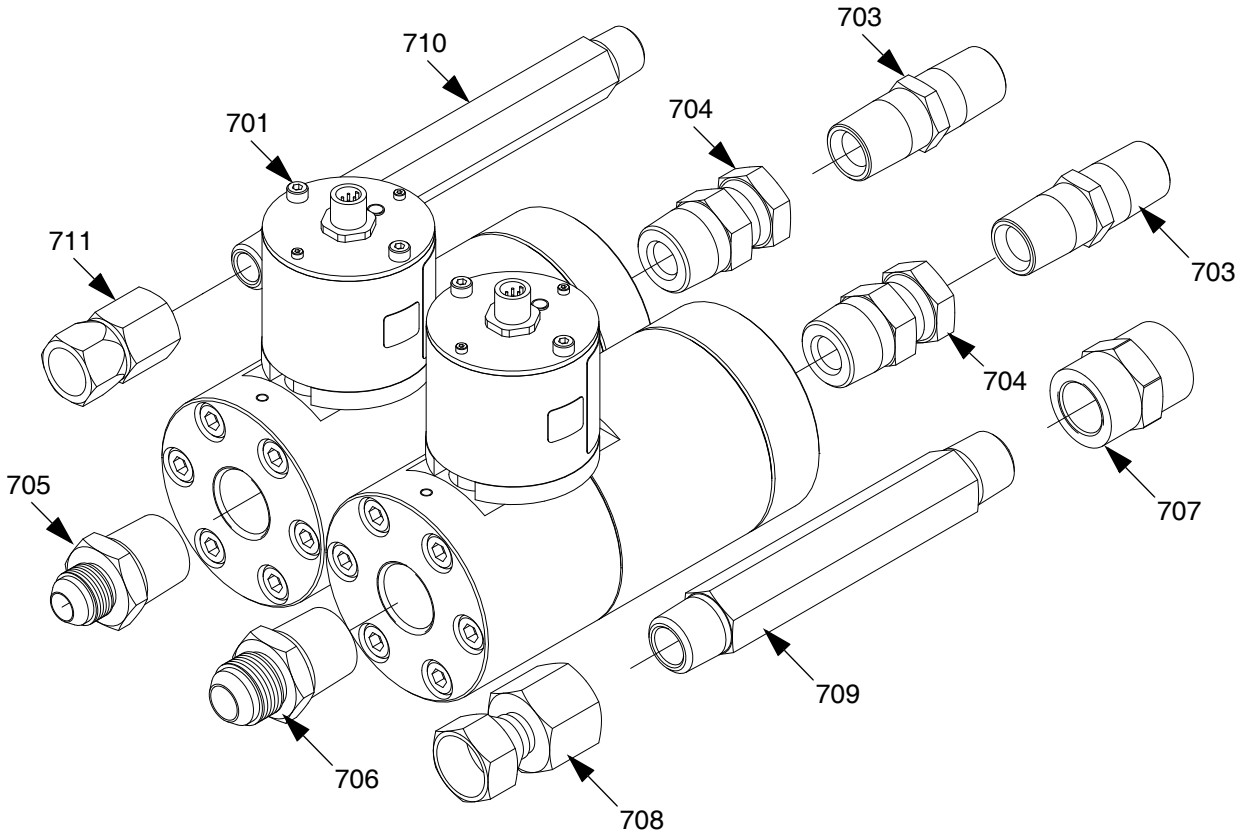
Ref	Part	Description	Quantity	
			24J322, HG6000	24J323, HG6000HR
301	246190	METER, helical gear, HG6000	1	
	246652	METER, helical gear, HG6000HR		1
302	114190	SWIVEL, stainless steel, 1/2 npt	1	1
303	114496	FITTING, nipple	1	1
304	502033	FITTING, bushing, pipe	1	1
305	123657	CABLE, 5-pin, male / female, 3.5 m	1	1

NVH: 24:1 and 16:1 Flow Meter Kits



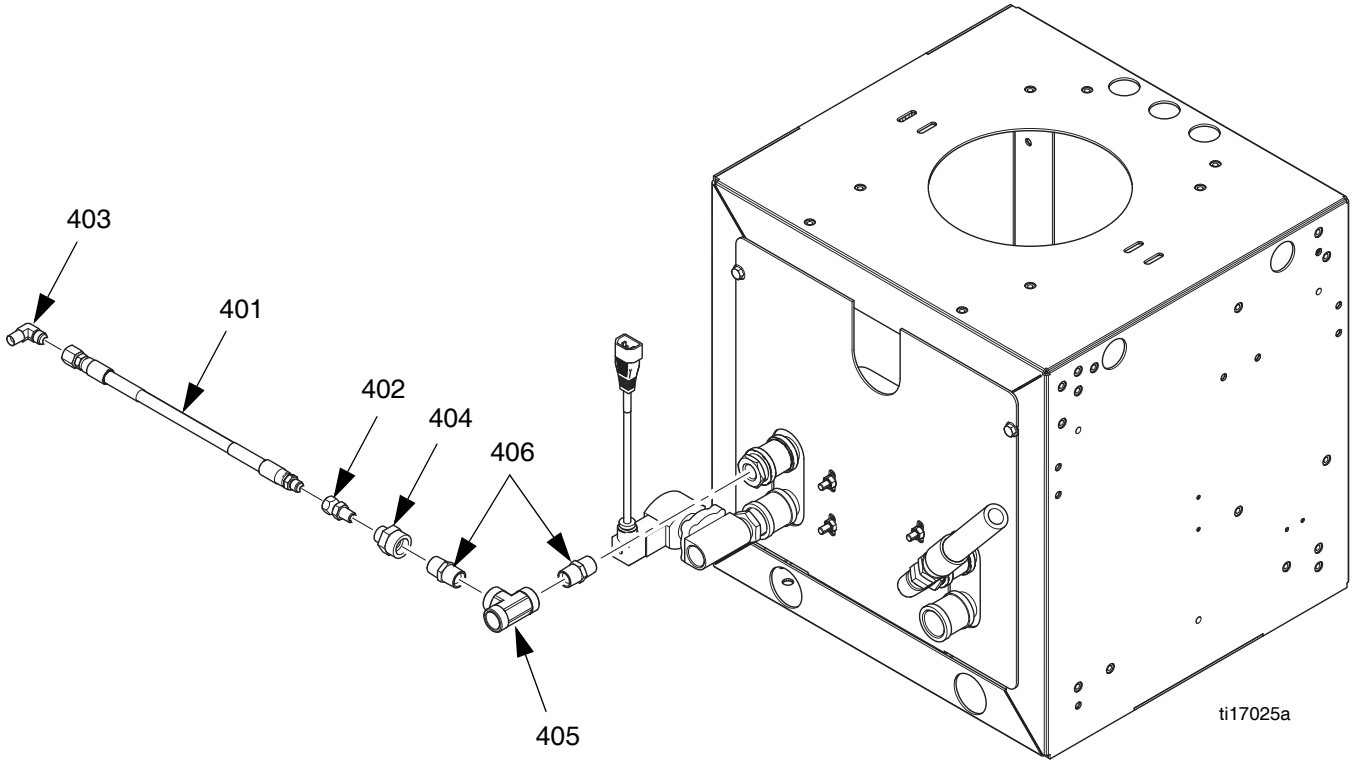
Ref	Part	Description	Quantity	
			24T182, 24:1 or 16:1 Flow Meter Kit - Cart	24T200, 24:1 or 16:1 Flow Meter Kit - Modular
601	246652	METER, heli gear, high resolution	1	1
602	289814	METER, gear, assembly, G3000HR	1	1
603	123657	CABLE, 5pin, male/female, 3.5 meter	1	1
604	17E305	HARNESS, M12xcir, 5pinx3pin, male x female	1	1
605	156877	FITTING, nipple, long	1	1
606	123980	FITTING, swivel, 3/4x1/2, male x female, sst, 3.5	1	1
607	124286	FITTING, adapter, 3/4NPTM x 8 JICM	1	1
608	123597	ADAPTER, 3/8 JIC x 1/4 NPT	1	1
609	124814	FITTING, reducer, 1/2NPTx1/4NPT, female x male, ss	1	1
610	114190	SWIVEL, sst, 1/2 NPT	1	1
611	124586	COUPLING, hex, 1/2NPT, ss, 3k, 316	1	
612	124152	FITTING, elbow, JIC06 x 1/2 NPT, ss	1	
613	16W140	FITTING, nipple, 1/2NPTx6.0 long, ss	2	
614	16W141	FITTING, nipple, 3/8NPTx7.0 long, ss	1	
615	112569	FITTING, union, swivel	1	
616	257700	RESTRICTOR, orifice assembly, blank	2	2
617	16G407	TOKEN, GCA, upgrade, ratio monitor	1	1

NVH: 1:1 Flow Meter Kits



Ref	Part	Description	Quantity	
			24T183, 1:1 Flow Meter Kit - Cart	24T201, 1:1 Flow Meter Kit - Modular
701	246652	METER, heli gear, high resolution	2	2
702	123657	CABLE, 5pin, male/female, 3.5meter	2	2
703	156877	FITTING, nipple, long	2	2
704	123980	FITTING, swivel, 3/4x1/2, male x female, sst, 3.5	2	2
705	124286	FITTING, adapter, 3/4NPTM x 8 JICM	1	1
706	15Y934	FITTING, 5/8 JIC/3/4 NPT	1	1
707	124586	COUPLING, hex, 1/2NPT, ss, 3k, 316	1	
708	126979	FITTING, adapter, 1/2NPTF x 10JICF, ss	1	
709	16W140	FITTING, nipple, 1/2NPTx6.0 long, ss	1	
710	16W141	FITTING, nipple, 3/8NPTx7.0 long, ss	1	
711	112569	FITTING, union, swivel	1	
712	257700	RESTRICTOR, orifice assembly, blank	2	2
713	16G407	TOKEN, GCA, upgrade, ratio monitor	1	1

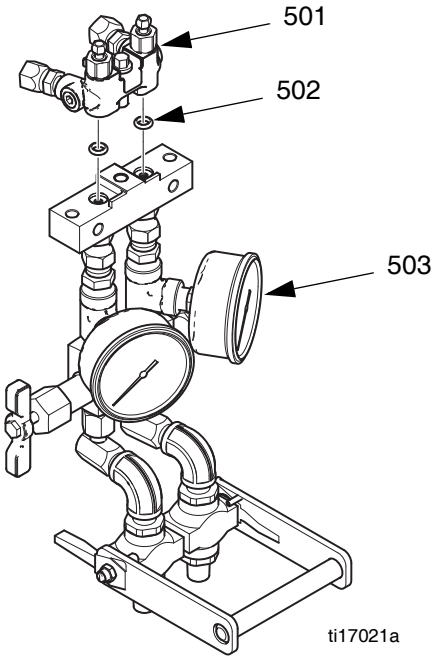
HFR: Flow Meter Calibration Kits for Hydraulic Dispense Valves



Ref	Part	Description	Quantity		
			24J324, L-Head Kit	24J325, S-Head Kit	24J357, GX-16 Kit
401	262184	HOSE, b, 10 ft., 3/8 in., moisture-lok, mild steel	2	2	2
402	117506	FITTING, swivel, 1/4 npt x #6 JIC	2	2	2
403	122311	FITTING, 9/16-18 JIC x 1/4 npt	2	2	2
404	124281	FITTING, coupling, 1/2 npt x 1/4 npt, female / female, mild steel	2	2	2
405	103475	FITTING, tee, pipe	2	2	2
406	158491	FITTING, nipple	4	4	2
407*	M0934A-4	KIT, L-Head injection nozzle, blank	2		
	24A036	KIT, S-Head injection nozzle, with needle, blank		2	
	257700	RESTRICTOR, orifice, blank			2
408*	285967	O-RING, #006 epr			2
409*	122679	O-RING, epr, #902			2

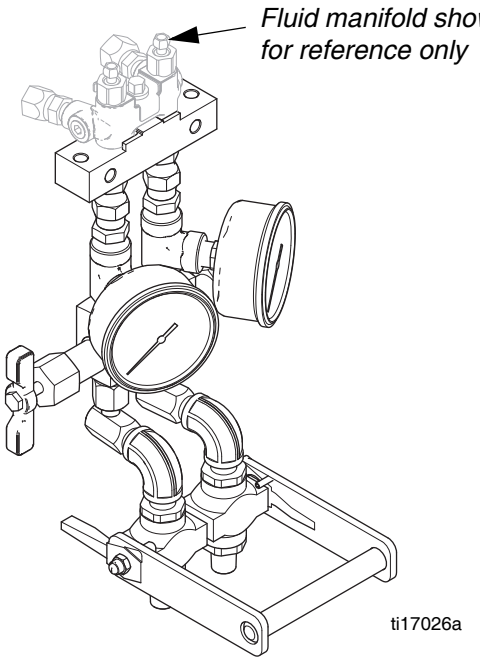
* *Parts 407, 408, 409 not shown.*

Flow Meter Calibration Kit for Probler P2 Gun, 24J326



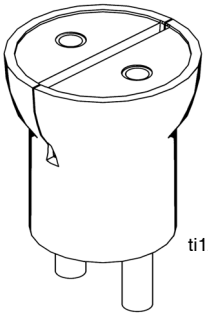
Ref	Part	Description	Qty
501	246012	MANIFOLD, fluid	1
502	117520	O-RING	2
503	24F227	KIT, ratio check	1

Ratio Check Kit for Fusion Gun, 24F227



See instruction manual 3A0861 for parts information.

Ratio Check Adapters for MD2 Valve



255247 shown

Use ratio check adapter 255247 for 1:1 MD2 valves. Use 255245 for 10:1 MD2 valves.

Technical Data

See Technical Data in the HFR or HFR for NVH system manuals for more information.

Wetted Parts	303 stainless steel, tungsten carbide, PTFE

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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.

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Original instructions. This manual contains English. MM 3A1657

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