Control Drawing - 233607



ProBatch[™] System 309300 rev.J

Used for accurate dispense of multiple-color, plural component paints and lacquers.

125 psi (0.9 MPa, 9 bar) Maximum Incoming Air Pressure 250 psi (1.7 MPa, 17 bar) Maximum Working Fluid Pressure



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

Model 244440 ProBatch System with three dispense valves

Model 244441 ProBatch System with six dispense valves



CAN/CSA 22.2 No. 157-92 & No. 1010.1-92 Intrinsically safe for hazardous locations. Class I, Division 1, Group D T3







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About this Manual

Conventions

The following conventions are used in this manual to help guide you through the information.



Warning Symbol

The warning symbol alerts you to the possibility of serious injury or death if you do not follow the instructions.



Safety symbols, such as the icons for a fire, explosion, or electric shock hazard (shown at left), alert you to the specific hazard you are avoiding by following the accompanying instructions. The safety symbol is also a signal to read the main Warnings on pages 6-7 for detailed information about the hazard indicated.



Caution Symbol

The caution symbol alerts you to the possibility of equipment or property damage or to operation errors if you do not follow the instructions.

Amount 20 qts

Recipe#



- *Italicized text* in a screen diagram indicates the text may vary according to how the system parameters have been configured. For example, the units of measure shown in the manual may be *qts* (quarts). The units you see on the screen may be pounds, kilograms, quarts, gallons, or liters.
 - A shaded box is used to indicate a value/field that can be edited on a ProBatch screen.
- A circled number $\stackrel{(1)}{\longrightarrow}$ in a screen diagram relates a field on the screen to a step in a procedure.
- **NOTE:** is used to call your attention to additional helpful information.
- Numbers and letters in parentheses in the text, such as (A) or (7), refer to reference numbers and letters in the figures.

Documentation

The following manuals are included with the ProBatch system. Follow the instructions in this manual and refer to the component manuals for additional warning, operation, service, and parts information.

- 309300 ProBatch System Manual (this manual)
- 308167 Air Regulator Manual
- 308169 Air Filter Manual
- 306715 Dispense Valve Manual
- 307212 Fluid Regulator Manual
- 309313 Network Interface Kit and Printer Barrier Kit Manual

FIRE, EXPLOSION, AND ELECTRIC SHOCK HAZARD Improper grounding, poor ventilation, open flames or sparks can cause a hazardous condition and result in fire, explosion or electric shock.
 The ProBatch controller must only be installed and serviced by a qualified electrician. Ground the equipment and dispense only into grounded, conductive containers. See Ground the System on page 19. The ProBatch system may be installed in a Class 1, Division 1, Group D environment. The ProBatch controller is intrinsically safe when no external electrical components are connected to it. If a printer, computer, or other electrical component is connected to the ProBatch system, it must be used in conjunction with a barrier interface box. If there is any static sparking while using the equipment, stop dispensing immediately. Identify and correct the problem. Provide fresh air ventilation to avoid the buildup of flammable fumes. Do not plug or unplug electrical cords or turn lights on and off while flammable fumes are present. Eliminate all ignition sources, such as pilot lights and cigarettes. Avoid spilling fluids onto electrical components. Turn off the ProBatch system and disconnect the electrical power supply before servicing the equipment.
 TOXIC FLUID HAZARD Hazardous fluid or toxic fumes can cause serious injury or death if splashed in the eyes or on the skin, inhaled, or swallowed. Always wear protective eyewear, gloves, clothing and respirator as recommended by the fluid and solvent manufacturer. Know the specific hazards of the fluid you are using. Store hazardous fluid in an approved container. Dispose of hazardous fluid according to all local, state and national guidelines.
 EQUIPMENT MISUSE HAZARD Equipment misuse can cause the equipment to rupture or malfunction and result in serious injury. This equipment is for professional use only. Read all instruction manuals, tags, and labels before operating the equipment. Use the equipment only for its intended purpose. If you are not sure, call your Graco distributor. Do not alter or modify this equipment. Check equipment daily. Repair or replace worn or damaged parts immediately. Do not exceed the maximum working pressure stated on the equipment or in the Technical Data for your equipment. Use fluids and solvents which are compatible with the equipment wetted parts. Refer to the Technical Data for grace hoses away from traffic areas, sharp edges, moving parts, and hot surfaces. Do not expose Graco hoses to temperatures above 180°F (82°C) or below -40°F (-40°C).



PRESSURIZED EQUIPMENT HAZARD

Fluid coming from the dispense valves, leaks or ruptured components can splash in the eyes or on the skin and cause serious injury.

- Wear protective eyewear.
- Do not put your hand or fingers over the valve nozzle.
- Do not stop or deflect leaks with your hand, body, glove or rag.
- Follow the **Pressure Relief Procedure** on page 24 before cleaning, checking, or servicing the equipment or installing or cleaning the dispense valve tip.
- Tighten all fluid connections before operating the equipment.
- Check the hoses, tubes, and couplings daily. Replace worn, damaged, or loose parts immediately.

Notes

Overview

How the ProBatch System Works

Usage

The ProBatch system controls the dispense of up to six fluids in a batch recipe. Fluids can be automatically dispensed or manually added as prompted by the system. The controller can store the parameters for 99 fluids and 250 recipes.

Fluid Supply

The ProBatch system can dispense fluids supplied from pressure tanks or feed pumps. The fluids can be transferred from their original containers or from central paint recirculating lines. Each fluid is supplied separately to the ProBatch system.

Batch Dispense

The ProBatch system is designed to accurately dispense 4 oz. (0.118 liters) to 5 gallon (19 liters) batches of 2K paints and coatings. The typical flow rate is 0.125 to 2 GPM (0.473 to 3.8 LPM), depending on the properties of the fluid being dispensed. Smaller dispenses are achievable for some materials with proper feed system and flow rate control. Please consult your Graco representative for more information.

A dispense tolerance must be entered for each fluid. The controller monitors the Target and Actual dispense values and reports an error if the tolerance is not maintained.



Fig. 1 ProBatch Main Components



Power Switch (A)

On = I Off = O.

Operation Mode Switch (B) and Key (C)

The position of the switch (B) determines which mode of operation you are in: Dispense Mode $\widehat{\blacksquare}$ or Setup Mode $\widehat{\blacksquare}$. A key (C) supplied with the ProBatch system is inserted into the switch and turned to change operation modes. The key cannot be removed while the system is in Setup Mode.

Dispense Mode is used to dispense a recipe, check last batch totals and overall dispensed fluid totals, and to view the alarms log.

Setup Mode $\widehat{}$: is used to configure the fluid, density, recipe and system parameters and to calibrate the scale.



Scale (D)

The scale communicates the weight of the fluid dispensed to the controller. The controller uses the scale information to determine when to turn a dispense valve on and off, based on the setup information and the amount entered on the Run screen.

NOTE: To prevent overloading the scale, the software limits the maximum target weight and corresponding volumetric dispense entry to 50 lbs (22.7 kg). If the batch weight exceeds 50 lbs (22.7 kg), the system displays a Batch Amount Alarm with the selected recipe number indicated.

NOTE: The maximum container weight is 20 lbs (9.1 kg). Do not exceed 70 lbs (31.8 kg) total scale load.



The scale (D) tray can be pulled out to make it easier to do a manual dispense into the container or to remove the container from the scale. Pulling the scale out during an automatic dispense will shut off the air to the dispense valve and stop the dispense. Pushing the scale completely back in engages the air interlock and restarts the dispense where it left off, unless an alarm or other input has been received by the controller.

The top of the scale can be lifted off for cleaning or to check the scale cable connection (E). The other end of the cable connects to the back of the ProBatch (F).





Solenoid Valve Banks

One of the two banks of solenoid valves is pressure regulated and the other is not.

Regulated Solenoid Valves (G)

The solenoid bank on the left side of the ProBatch system has four pressure regulated solenoid valves (G). The solenoid valves are labeled 1 to 4 and are set to supply different air pressures to the ProBatch fluid regulators, enabling the system to regulate the flow rate to four different levels.

The default solenoid valve settings are:

Solenoid Valve 1 — 10 psi (69 kPa, 0.7 bar) Solenoid Valve 2 — 20 psi (138 kPa, 1.4 bar) Solenoid Valve 3 — 40 psi (276 kPa, 2.8 bar) Solenoid Valve 4 — 80 psi (552 kPa, 5.5 bar

NOTE: The adjustment range for each level is 5-100 psi (0.3-6.9 bar).

Each fluid you configure in setup will have a minimum and maximum air valve pressure. The **minimum setting** is used to start and finish each dispense. The default minimum setting is 1 [10 psi (69 kPa, 0.7 bar)]. The **maximum setting** is for the maximum flow rate during the dispense. The default maximum setting is 4 [80 psi (552 kPa, 5.5 bar)].

The solenoids "step up" and "step down" to the two pressure settings to reduce splashing and overshooting the dispense. **For example**, if the minimum setting for a fluid is 1 and the maximum setting is 3, the valve will start the dispense at 10 psi (solenoid 1), increase to 20 psi (solenoid 2), and then increase to 40 psi (solenoid 3). As the dispense nears the target, the valve air pressure will drop from 40 psi (solenoid 3) to 20 psi (solenoid 2) and end the dispense at 10 psi (solenoid 1).

To change the solenoid valve settings, see page 47.

Non-regulated Solenoid Valves (H)

Dispense Valve Manifold (J)

The solenoid bank on the right of the ProBatch system has six non-regulated solenoid valves (H). These solenoid valves open and close the automatic dispense valves to start and stop a dispense.

NOTE: On Model 244440, only three of the six solenoid valves are used. The other three solenoids are available for use if dispense valve kits are added.

The dispense valve manifold (J) has three dispense valves (Model 244440) or six dispense valves (Model 244441). The dispense valve manifold can be pulled out to check or service the



valves.

The number labels on the valves correlate with the numbers on the fluid line connectors (K) on the backpanel.



Latch Handle (L)

The latch handle (L) allows you to adjust the height of the dispense point to correspond to the size of your dispense container (page 44). The dispense point height adjustment latch must be fully engaged before operating the system.

NOTE: Always adjust the dispense height and container position to prevent splashing and to ensure the material is dispensed directly into the container.



Display and Keypad (M)

The EasyKey[™] keypad provides the operator interface for the ProBatch system. The graphic LCD screen displays system status, setup information, and operation options that can be selected using the keypad.

The EasyKey keypad is used to set up and operate the ProBatch system. The keypad consists of number keys, scrolling (arrow) keys, and operation (start, stop, clear, and print) keys.



Installation



- Do not install or service this equipment unless you are trained and qualified.
- Figure 2 is not an actual system design. Contact your Graco distributor for assistance in designing your system.
- See detailed installation instructions, beginning on page 16.
- Be sure all accessories are adequately sized and pressure rated to meet the system requirements.

Key for Figures 2 and 3

Components

- Air Supply Line filtered to 20 micron 1
- 2 Bleed-type Air Shutoff Valve
- 3 ProBatch System
- Power Supply, 15 V, intrinsically safe AC Power Cord 4*
- 5
- 6* Printer (optional)
- 7 Printer Cable (supplied with optional printer)
- Printer Barrier Interface Box (required if printer is installed in a hazardous area) 8*
- PC Barrier Kit (optional) 9



Do not install components 4, 6, or 8 in a Hazardous Area. If a printer, computer, or other electrical component is connected to the ProBatch system, it must be used in conjunction with a barrier interface box.

Connections

- Air supply line to ProBatch, 1/4 npt air inlet Α
- В Power Supply cable to ProBatch power inlet
- С Printer cable to ProBatch printer connector
- D RS-485 Terminal Connector (see AMR 2.0 manual 309218 for connection information)
- Е Fluid Connectors, 3/8 npsm(f)
- Ground Wire to true earth ground F
- G Scale Connector



Fig. 2 ProBatch System Installation Drawing

Select the ProBatch System Location

For the best operating results, follow the ProBatch system location and anchoring requirements below.

- Install the ProBatch system on a flat surface: the floor or a sturdy workbench. If you are
 using a workbench surface, the bench must not rock or vibrate and must be able to support the weight of the ProBatch system plus the fluids being dispensed [approximately 200
 lbs. (91 kg)].
- Locate the ProBatch system in a vibration free area away from punch presses, large motors, heavy fork lift traffic, rail lines and other devices that produce significant, low frequency, mechanical vibrations. These vibrations could cause performance problems.
- Shield the ProBatch scale platform from direct air streams that are perpendicular to the scale surface. Changes in direct air flow against the scale platform could result in scale instability.
- Locate the ProBatch system to minimize material handling. If there will be multiple users, a central location that meets the above requirements is ideal.
- Bolt the frame in all four corners with 3/8 in. (9 mm) diameter bolts. If the system is installed on the floor, anchor the ProBatch frame to a poured concrete surface.



Fig. 3 ProBatch System Hazardous Area Installation

Install the Viewing Angle Adapter (Optional)

The Viewing Angle Adapter makes it easier to view the ProBatch screen when it is floor mounted. If you are using this adapter, install it as follows:



- 1. Turn off the ProBatch power switch.
- 2. Loosen the four thumb screws (A1), disconnect the two cables (A2, A3) and remove the control box cover.
- 3. Remove the three bolts from the back and one bolt (B) from the bottom and remove the control box.
- 4. Disconnect the three cables and ground wire (C1, C2, C3).
- 5. Set the viewing angle adapter (D) on top of the ProBatch fluid housing and secure it with the four bolts.
- 6. Connect the three cables and ground wire.
- 7. Reinstall the control box.
- 8. Replace the control box cover with cables and four thumb screws.







Level the Scale

Once the ProBatch system is anchored in its final position, lift off the scale cover. View the level and adjust the feet on the bottom of the scale platform as needed. Make sure that the platform is stable.







Install the Fluid Supplies

The ProBatch system can be supplied by pressure tanks, pail or drum pumps, or central paint recirculating lines.

The fluid supply must be free of pressure spikes, commonly caused by a pump stroke changeover. If necessary, install pressure regulators or a surge tank on the fluid supply outlets. Note that this will also reduce the fluid supply pressure.

Connect the Air and Fluid Lines



For maintenance and safety, you must install:

- a fluid shutoff valve between each fluid supply line and the ProBatch system.
- a bleed-type air shutoff valve on the air supply line.



Connect the air supply line to the ProBatch 1/4 in. npt air line connector. The air supply to the ProBatch must be filtered to 10 micron and regulated to 85-120 psi (5.86-8.27 bar) to ensure optimum solenoid valve life.



Fluid Line Connectors

If you have Model 244440 with three dispense valves, dispense valve 1 has a 1/8 in. fluid nozzle and valves 2 and 3 have a 1/4 in. fluid nozzle.

If you have Model 244441 with six dispense valves, valves 1 and 6 have a 1/8 in. fluid nozzle and valves 2, 3, 4, and 5 have a 1/4 in. fluid nozzle.

Connect the fluid supply lines to the ProBatch 3/8 in. npsm(f) fluid line connectors. Connect light viscosity fluid lines to the connectors for the 1/8 in. dispense valves, and heavier viscosity materials to the 1/4 in. dispense valves. It may be necessary to change the valve nozzle size to accurately dispense small amounts of material.

Ground the System



The system must be properly grounded. Follow the instructions here and on.



ProBatch System: Connect a ground wire (G) to the ProBatch base grounding lug (H). Connect the other end of the ground wire to a true earth ground.

NOTE: Check your local code for true earth ground requirements.

Power Supply: Ground the power supply as instructed in "Check the Resistance".

Barrier Interface Boxes: Ground any barrier interface boxes by connecting a ground wire to the grounding lug on the box. Connect the other end of the ground wire to a true earth ground.

Feed Pumps or Pressure Pots: See your separate pump or pressure pot manual.

Air and Fluid Hoses: Use only grounded hose.

Fluid Supply Container: Ground the container according to your local code.

Dispense Containers: Use only metal containers, which are conductive, placed on the metal scale. Do not place non-conductive materials, such as paper or cardboard, between the container and the scale.



Check the Resistance

1. Have a qualified electrician check the resistance between each ProBatch component and the true earth ground. The resistance must be less than 1 ohm. If the resistance is 1 ohm or greater, a different ground site may be required. Do not operate the system until the problem has been corrected.



NOTE: To reduce the risk of fire, explosion, or electric shock, the resistance between the ProBatch components and true earth ground must be less than 1 ohm.

Connect the Power Supply



NOTE: The power supply does not contain any user-serviceable parts. Contact an authorized Graco distributor for service. Substitution of components may impair intrinsic safety.

- 1. Locate the power supply in a non-hazardous area.
- 2. Connect the 12 ga (1.5 mm²) ground wire (E) to the power supply. Connect the other end to a true earth ground.
- 3. Connect the 12 ga (1.5 mm²) ground wire to the ProBatch system. Connect the other end to a true earth ground.
- 4. Connect the intrinsically safe power supply cable (C) between the power supply and the ProBatch system (D).



NOTE: Do not connect or disconnect the intrinsically safe power supply cable (D) while **power** is energized (the power supply is energized if the power cord is plugged into an electrical outlet.

NOTE: Two power cords are supplied: a 120 volt, 13 amp power cord (U.S.A.) and a 250 volt, 10 amp power cord (Europe). Each cord is 10 ft. (3.05 M) long. Be sure to use the correct power cord.

5. Connect the appropriate power cord (A) to the power supply Power Input socket (B). Plug the other end of the power cord into a grounded electrical outlet.



Intrinsically Safe Power Supply Description

The intrinsically safe power supply (244425) supplies intrinsically safe power suitable for hazardous locations as listed on the label located on the unit.

The intrinsically safe power supply contains a universal input (125/250 VAC) to 15 VDC voltage regulator, a diode safety barrier, and other components that provide an intrinsically safe supply circuit. The power supply has two outputs. Output 1 is defined as pin 3. Output 2 is defined as pin 5 on the POWER OUTPUT connector.

The power supply's power entry module contains two time-lag fuses rated at 1A, 250V. The power supply's intrinsic safety does not depend on the fuses in the power entry module and may be replaced by a qualified electrician.

The components inside the power supply enclosure are not user-serviceable. Substitution of components may impair the intrinsic safety of the power supply.

The intrinsic safety of the ProBatch system depends on proper installation and grounding of the power supply and the ProBatch unit, and use of the intrinsically safe power supply cord provided by Graco.

Connect a Printer (optional)



The printer must be located in a non-hazardous area. A barrier interface box must be connected between the printer and the ProBatch system when the ProBatch is installed in a hazardous area.



1. Connect the printer cable between the printer and the barrier interface box. See Figure 2, page 15.

2. Connect a cable between the barrier interface box and the ProBatch printer port (K).

NOTE: The maximum printer cable length is 50 feet (15.24 m).

Connect to a RS-485 Network (optional)

The ProBatch system can be connected to a RS-485 network for use with the PrecisionView AMR 2.0 software. See AMR Installation Guide 309219 for more information.

NOTE: A Barrier Interface box must be connected between the PC and the ProBatch when the ProBatch is installed in a hazardous area. See AMR Installation Guide 309219 for details.

Check the Resistance

Have a qualified electrician check the resistance between the ProBatch stand and a true earth ground. The resistance must be less than 1 ohm. If the resistance is greater than 1 ohm, a different ground cable or length of cable may be required. Do not operate the system until the problem is corrected.

Before Beginning Operation

- Check all fluid and air connections for correctness and tightness.
- Follow the Startup procedure on page 23.

Operation

Startup

Follow this procedure to start the ProBatch system for the first time (initial startup) or after the system has been shut down.

1. Turn on the power. The ProBatch system startup screen will display while the system is starting, then the Run screen (page 32) or System Setup screen (page 30) will appear, depending on the mode of operation the system is in. For an explanation of operation modes, see page 10.



- 2. Initial Startup: Change to Setup Mode (page 25) and complete the setup procedures.
- 3. Change to the Dispense Mode Run screen if you are not there already (page 31).
- 4. Place a metal container on the center of the scale.



Center the container on the scale to avoid having the dispense valves miss the container.

- 5. Adjust the height of the dispense valve manifold so it is two inches above the top of the container (page 44).
- 6. Adjust the dispense height and flow rate (page 44).
- 7. Load the fluids (page 46).
- 8. Dispense a batch (page 32) and adjust the flow rate as needed (page 46).

NOTE: Pulling the scale out during an automatic dispense will shut off air to the dispense valve and stop the dispense. Pushing the scale completely back in engages the air interlock and restarts the dispense where it left off, unless an alarm or other input has been received by the controller.

Pressure Relief Procedure



Follow this procedure before cleaning, checking, or servicing the equipment or installing or cleaning the dispense valve tip.

		Recip	e:		1
	2 <u>qts</u>				
		ID#:			
Ru	n	Last Tot	als All	Totals	Alarms
Start	Stop	8	4		

1. Shut off the fluid supply to the ProBatch system. Follow the Pressure Relief Procedure for your fluid supply system.

 Enter the load/purge recipe number (see page 28) for the fluid line pressure you are relieving.

- 3. Enter a dispense quantity.
- Press Start (
 to begin dispensing.
- 5. Press Stop \bigtriangledown when the pressure is relieved.
- 6. Repeat the process for each dispense valve.

Shutdown

Follow this procedure before servicing the equipment and to avoid having fluid dry in the equipment and fluid lines when the equipment is not being operated.

1. Purge the system until it is clean (page 45).



- 2. Relieve the pressure as instructed above.
- 3. Turn off the ProBatch power switch.

Setup Mode



Setup Mode

Screen Navigation

To enter Setup Mode:

You must have the key supplied with the system. Insert the key into the switch and turn it to Setup Mode $\widehat{}$. The Fluids Setup screen appears.



Do not turn the key to Setup Mode while the ProBatch is dispensing or the system will abort the dispense.



The name of the currently displayed screen is highlighted.



Press the left or right arrow keys on the keypad to move through the screens.

NOTE: With the exception of the station number, which must be set using the local user interface, ProBatch system setup and configuration can be done through the ProBatch setup screens or through the RS485 network connection and AMR. See AMR User Guide 309218 for detailed information.

To exit Setup Mode:

Turn the key to Dispense Mode. The Run screen appears. Refer to page 32.

Fluids

Fluids Setup Screen

In fluids setup, you designate the parameters for each fluid you will use in a recipe. Fluid parameters must be set before the fluid can be used in a recipe.

	FI	uid#:	1	
Specific Gra	avity:		(2)	
Dispense To	olerance:		% 3	
Fluids 1-6 o	nly (Min. Pre	ss.=1, Max.=	4)	
Min. Valve F	Pressure:		(5)	
Max. Valve	Pressure:			
Fluids	Density	Recipes	Scale	System

To set up the fluids:

- 1. Type the fluid number* (1-99).
- 2. Type the specific gravity, which is used to convert weight to volume (.1-9.99).

NOTE: A value greater than zero must be entered for the fluid to be used in a recipe.

3. Type the dispense tolerance (1-99).



5. If the fluid number is from 1 to 6, enter the minimum and maximum valve pressures (1-4).



A maximum setting that is too high may cause fluid to splash and cause inconsistent scale readings with light viscosity fluids. See page 47 for more information on minimum and maximum values. See chart below for setup guidelines.

- 6. Repeat steps 1 to 4 for all the fluids you will dispense.
- 7. Press the right arrow key 🕑 to go to the Density Setup screen.

*Fluid Numbers

Fluid numbers 1 to 6 correspond to the fluid valves and are used for automatically dispensed fluids (with a 3-valve ProBatch system, fluid numbers 4, 5, and 6 are not used).

Fluid numbers 7 to 99 correspond to manually added fluids.

NOTE: If you enter a number greater than 6, the ProBatch control prohibits entering minimum and maximum valve pressures from the screen.

				Maximum Setting		
Viscosity cps	Example Material	Minimum Setting	Small Target Amount	Large Target Amount		
1-20	Solvent	1	1	1-2		
20-50	Catalyst	1	2	3		
50-200	Resin	1	3	4		
200-2000	Resin	2	4	4		

Typical minimum and maximum settings

Density

Density Setup Screen

In density setup, you measure the specific gravity of the fluid you will dispense.

Ν	leasure	Spe	ecific Gravit	y	
Fluid #:		Spe	cific Gravity	Volume (m	ıl)
	Current		0.00	0	
M	easured		0.00	0	
1. Place empty container on scale and press START					
2. Manually add about 300 ml of material					
3. Enter the actual material volume added					
4. Press Stop to accept measured specific gravity					
Fluids	Dens	itv	Recipes	Scale	System

To measure specific gravity:

NOTE: Always recheck specific gravity when you refill your material supply container, even if you are only changing to a new supply of the same material.

- 1. Press Enter 😝 to accept the fluid number displayed or enter the fluid number you wish to set up and then press Enter 📢.
- 2. Place an empty graduated beaker on scale
- 3. Press Start (to tare the scale.
- 4. Manually add approximately 300 ml of fluid to the beaker.

NOTE: You may remove the beaker from the scale to complete step 4 and return it to the scale to begin step 5.

- 5. Enter the exact fluid volume added in the Measured Volume field.
- 6. Press down arrow key 🚺 to move cursor to the measured volume field.
- Press Enter
 The system calculates the specific gravity and displays it in the Measured Specific Gravity field.
- 8. Press Stop v to accept the measured value as the specific gravity for that fluid. The measured value is now the current specific gravity value.
- 9. Press the right arrow key b to go to the Recipes Setup screen.

Operation

Recipes

Recipes Setup Screen

In recipes setup, you designate the parameters for each recipe you will dispense.

		ſ	Becine#:		
		1	iecipe#.	\cup	
Step	Flui	id# Pa	r ts (by weight)	(2)	
1	e	a) (0	
2				Specific g	gravity must
3				be entere	ed before
4				fluid can	be used.
5					
6					
	If Flu	uid# = 0 or 1	00, Parts = pau	se in minutes	
	(Use	e Fluid# 100	for automatic p	ause.)	
Fluid	s	Density	Recipes	Scale	System

To setup the recipes:

- 1. Type the recipe number (1-250).
- 2. For each step of the recipe:
 - a. Type the fluid number (0-100).
 1-6 = automatic valves
 0 = pause
 7-99 = manual fluid add
 100 = automatic pause

NOTE: The controller will not accept an invalid fluid number. Make sure all of the fluid parameters were defined in Fluid Setup.

b. Type the parts (proportion) of the fluid required in relationship to the other fluids in the recipe. If the Fluid# is 0 (pause) type the number of minutes to pause (0-250). At the end of that pause, the operator will need to press Start to resume.

If the Fluid# is 100 (automatic pause) type the number of minutes to pause (0-250). At the end of that pause, the recipe will automatically resume.

NOTE: The fluid is set to proportion by either weight or volume in the System setup screen (page 30).

3. Press the right arrow key b to go to the Scale Setup screen.

Recipes to Load and Purge Fluid

You must configure a recipe for each of your dispense valves to use to load and purge the fluid line.

To setup load/purge recipes:

- 1. In Setup mode, select a group of recipe numbers that you are not planning to use. In this example, the load/purge recipes will start with Recipe 51. The fluids should already be set up as instructed on page 26.
- 2. Configure Recipe 51 to consist of Fluid #1 and an amount of 1 part.
- 3. Configure Recipe 52 to consist of Fluid #2 and an amount of 1 part.
- 4. Continue to configure a Recipe for each of the fluid valves.

Scale Setup Screen

In scale setup, you calibrate the scale.

The analog signal that the scale sends to the processor varies due to scale bounce caused by air flow across the scale, floor vibration, fluid movement in the container, and movement from users pressing keys on the key pad or leaning against the unit. The scale stability value allows the user to define the range of fluctuation permissible within a valid scale reading. The factors that affect scale stability are time and signal fluctuation range. The software treats time as a constant, only the signal range can be selected. The selectable range is from 1 to 20. The value selected indicates the allowable +/- gram fluctuation of the scale signal in one second. If the scale is recognized as stable, a reading is taken. If the signal is not recognized as stable, it is monitored for up to 10 seconds before a Scale Unstable error alarm occurs. A typical installation functions well with a scale stability factor of 1 or 2, however, some windy or unstable environments may require a factor of 5 to 8 to minimize the number of alarms generated.

Setup Scale						
Stability Value: grams (1-20) 1						
Calibration: Place calibrated weight on scale and enter new value.						
New Value (5) Gross weight (3)						
Fluids	Density	Recipes	Scale	System		

To set up the scale:

1. Type a stability value number (1-20) 🛃.

NOTE: The default setting is 2.

- 2. Set the scale reading to zero.
 - a. Make sure there is nothing on the scale.
 - b. Type in 0 (zero) for new value
- 3. Place the 10 Kg (22 lb) calibrated weight provided with the system on the scale.
 - a. Press down arrow key to move cursor to the field to enter a new value.
 - b. The scale can be calibrated using any weight of a known true weight value in grams. The weight on the scale should be within a tolerance of ± 1 gram of the known true weight. Additional calibrated weights are available from Graco, Inc. (see Accessories on page) or from a local supplier.
 - c. The amount of weight used for calibration should be greater than the typical batch weight.
- 4. The scale reading appears as the gross weight.
- 5. If the gross weight reading equals the calibrated weight on the scale, the scale does not need calibration. Go to step 9.
- 6. If the readings are not equal, enter the weight of the calibrated weight in the New Value field (1-99999)
 The ProBatch control will calibrate the scale.
- 7. Press the right arrow key sto go to the System Setup screen.

Scale

System

System Setup Screen

In system setup, you configure the date, time, units of measurement, the station number, language, and whether recipe proportions are weight- or volume-based.

Setup System							
Day/Month/Year: Hour/Minute: Units: (3)	Static Lang	Station Number: Language: 1=English 3=German 5=Japanese					
1=kg 2=lbs 3=qts 4=liter 5=gal	Recipe Parts: 1=by weight		6) 2=by volume				
Fluids Density	Recipes	Scale	System				

To setup the system:

- 1. Type the current date: day (1-31) month (1-12) , year (2000-2099)
- Type the current time: hour (0-23) minute (0-59)

NOTE: The ProBatch clock is a 24 hour clock. The date and time are used for date/time stamps on alarms and reports.

NOTE: The ProBatch system does not support automatic clock adjustment for daylight savings time, as PCs do. Since AMR software runs on a PC, the PC and ProBatch clocks are likely to go out of synch when daylight savings time begins and ends. This will cause the alarms/events and the last batch time stamps to not match. You can manually synchronize the two clocks by clicking on the appropriate "Synchronize Clocks" button in AMR.

- 3. Type the desired units number (1-5).
- 4. Type the station number (0-99).

NOTE: This number is used for communications if you are using AMR 2.0 software. Each station must have a unique station number.

5. Type the desired language number (1-5).

NOTE: You must return the system to Run mode and cycle power before the language change will take affect.

6. Type the number for the desired method for proportioning fluid in a recipe (1-2).

The ProBatch system will accept recipe part values by weight or by volume. Select the option (1 for weight, 2 for volume) that best fits the material information available.

Dispense Mode



Mode

Screen Navigation

Dispense Mode $\widehat{\mathbf{a}}$ is used to dispense a recipe, check batch totals and overall dispensed fluid totals, and to view the alarms log.

	Recipe:			
	Amount:		<u>qts</u>	
	ID#:			
Run	Last Totals	All Totals	Alarms	4 screen selections

current screen

The name of the screen that is currently displayed is highlighted.



Press the left or right arrow keys on the keypad to move through the screens.

Run

Run Screen

The Run Screen is displayed when the ProBatch system has completed the power-up, whenever the system is idle and in Dispense Mode, and when you use the left or right arrow keys to navigate to it. The Run screen is used to dispense a recipe.



To dispense a recipe:

1. Place a metal container on the center of the scale.

NOTE: Container must weigh at least 20 grams (.7 oz) or Batch Amount Alarm will occur.

- 2. Type the recipe number (1-250).
- 3. Type the amount to dispense (.01-99.99).

NOTE: The system limits the target weight and the corresponding volumetric dispense to 50 lbs (22.7 kg).

The units (quarts in this example) are set during setup.

- 4. Enter an ID number if desired (up to four digits).
- 5. Press Start (to begin the dispense.

NOTE: To repeat the amount and recipe that was

most recently dispensed, press Start (



Automatic Dispense

The screen at left displays during the automatic dispense steps in the recipe. The information on the screen updates as the recipe steps progress. The graphic shows which valve is dispensing. The status field notes whether the ProBatch system is *Dispensing*.

If an alarm occurs, an alarm screen will appear. Refer to page 41.

NOTE: The ProBatch control logic includes self-timing functions for value offset and second dispense time values. After a setup change or material change it may take up to six dispenses from each valve for the system to fully retune and consistently hit the target value.



Status Field



Status Field

Recipe: 12	ipe: 12 Dispense Complete Batch Target: 17.00 Batch Actual: 17.00			ID#: 1111		
Step: Fluid#: Target: Actual: %Diff:	1 3 1.00 1.00 0	2 42 3.00 3.00 0	3 27 6.00 5.90 -2	4 0 3.00 3.00 0	5 2 3.00 3.03 1	6 6 4.00 4.00 0
Remove container to dispense again.						<u>qts.</u>

Manual Dispense

The screen at left displays during the manual dispense steps in the recipe. The information on the screen updates as the container is filled.

NOTE: Any fluid number higher than 6 is a manual dispense.

Manual Add appears in the status field until the Step Target is reached, then *Target reached...* appears.

If an alarm occurs, an alarm screen will appear. Refer to page 41.

Press Start (to continue operation.

Pause (sweat or mix time)

The screen at left displays during pauses that were setup in the recipe for sweat or mixing time.

NOTE: Fluid number 0 is always a pause for a set amount of time.

Timing down appears in the status field until the Total Time is reached, then *Pause complete...* appears.

Press Start (to end pause and continue operation.

Recipe Complete

The screen at left displays when the recipe is complete. It summarizes the dispenses during the steps of the recipe.

You cannot exit the screen until the container is removed from the scale. When you remove the container, the Pro-Batch display returns to the Run screen and the system is ready to start the next dispense. Alarm

Alarm Screens

NOTE: The alarm history screen shows the last five alarms (page 41).

There are eleven alarm screens that display if an alarm condition occurs while you are dispensing: Invalid recipe, Scale uncalibrated, Batch amount, Flow rate error, Out of tolerance, Weight loss error, Scale unstable, Memory failure, Scale communication, Scale disconnected, and Scale fault.

Three of the eleven alarms, Invalid recipe, Scale uncalibrated, and Batch Amount will not allow you to continue operation until you correct the problem.

Invalid Recipe Alarm

An Invalid Recipe Alarm occurs if you select a recipe that does not exist in setup or all the required setup information for that recipe was not entered.



Press Clear (S) to return to the Run screen. Verify that you entered the correct recipe number and reenter the number if it is not correct. If the recipe number is correct, change to Setup Mode. Verify the recipe information was entered (page 28) and all the fluids are valid (page 26).

Change to Dispense Mode and run the recipe after the problem is corrected.

Clear

Scale Uncalibrated Alarm

A Scale Uncalibrated Alarm occurs if you press Start to run a recipe and the scale was not calibrated after replacing the scale or a scale board.



Press Clear 🚫 to return to the Run screen. Change to Setup Mode and go to the Scale screen. Calibrate the scale.

Change to Dispense Mode and run the recipe after the problem is corrected.

Batch Amount Alarm

A Batch Amount Alarm occurs under two conditions. Condition 1: the batch amount is greater than 50 pounds (the maximum scale capacity). The alarm screen will show the recipe number. Condition 2: the container weight is less than 20 grams. The alarm screen will show a recipe number "0".



The following alarms alert you to a problem condition but do not prevent restart of operation.

Flow Rate Error Alarm

A Flow Rate Error Alarm occurs when the current scale weight is within 2 grams of the previous scale reading for 10 consecutive seconds.



to cancel

Out of Tolerance Alarm

An Out Tolerance Alarm occurs when the current actual dispense is either less than the (target - tolerance) or greater than the (target + tolerance).



Press Start to ignore the alarm and return to a screen to continue operation. Press Stop to cancel the batch and exit the Alarm screen.

Refer to Troubleshooting, page 76, to determine the cause of the alarm and correct the problem.

Weight Loss Error Alarm

A Weight Loss Error Alarm occurs when the at the start of step 2 to 6 or during an automatic dispense if the current scale weight is 20 grams less than the initial (empty container) weight.



Refer to Troubleshooting, page 76, to determine the cause of the alarm and correct the problem.
Scale Unstable Alarm

A Scale Unstable Alarm occurs when the current weight reading fluctuates more than the programmed stability value for 10 consecutive seconds.



Press Start (to ignore the alarm and return to a screen to continue operation. Press Stop (to cancel the batch and exit the Alarm screen.

Refer to Troubleshooting, page 76, to determine the cause of the alarm and correct the problem.

Memory Failure Alarm

A Memory Failure Alarm occurs when the memory has been replaced but not programmed or when the memory has become corrupt.



Press Start to ignore the alarm and return to a screen to continue operation. Press Stop to cancel the batch and exit the Alarm screen.

Refer to Troubleshooting, page 76, to determine the cause of the alarm and correct the problem.

Scale Comm Error Alarm

A Scale Comm Error Alarm occurs when there is no response/communication between the scale board and the main circuit board.



Press Start (to ignore the alarm and return to a screen to continue operation. Press Stop voto cancel the batch and exit the Alarm screen.

Refer to Troubleshooting, page 76, to determine the cause of the alarm and correct the problem.

Scale Disconnected Alarm

A Scale Disconnected Alarm occurs when the load cell is damaged or disconnected.



Press Start to ignore the alarm and return to a screen to continue operation. Press Stop voto cancel the batch and exit the Alarm screen.

Refer to Troubleshooting, page 76, to determine the cause of the alarm and correct the problem.

Scale Fault Alarm

A Scale Fault Alarm occurs when the scale is disconnected.



Press Start to ignore the alarm and return to a screen to continue operation. Press Stop to cancel the batch and exit the Alarm screen.

Refer to Troubleshooting, page 76, to determine the cause of the alarm and correct the problem.

Last Totals _

Last Totals Screen

Press the left or right arrow key to select Last Totals. This screen summarizes the last batch dispensed, including the fluid number; actual amount dispensed; and the deviation for each of the recipe steps.

Last BatchRecipe: 12Batch Target:ID#: 1111						: 1111	Press Print e Last Batch Report
Step: <u>1</u> Fluid#: <u>3</u> Target: <u>1</u> . Actual: <u>1</u> . % Diff: <u>0</u> Date: 01/22/01	2 42 .00 3.0 .0 3.0 0 7 Time:	3 2 27 00 6. 0 5. -1 14:39	4 7 1 00 3. 90 3. 0	00 3 00 3	5 2 3.00 3.03 1 L	6 6 4.00 4.00 0 	- – - Over Target
Run	Last To	otals	All Tota	als	Ala	arms	- – - Under Target

All Totals

All Totals Screen

Press the left or right arrow key to select All Totals. This screen shows how much of each of the fluids has been dispensed overall. Two totals are shown. **Grand Totals** are tracked from the time the system is first started up and they are not resettable. **Resettable Totals** show the total amount of each fluid dispensed since the last reset.

			Fluid	Totals		
Fluid# 1 2 3 4 5 6 Use Arro Press Er	Resett XXXX XXXX XXXX XXXX XXXX XXXX XXXX	table XX.X XX.X XX.X XX.X XX.X XX.X to view Clear	Grand XXXXX XXXXX XXXXX XXXXX XXXXX XXXXX Y up to 99 flu to reset tota	X X X X X Juids. Ils	La [st Reset: Date: <i>01/01/2001</i> Fime: <i>7:00</i> <u>Liter</u>
Rı	ın	Las	t Totals	All Totals		Alarms
			\bigotimes	👍 Pri	nt	

Press the up or down arrow keys to scroll through up to 99 fluids.

Press Clear and Enter simultaneously to reset all resettable totals. \bigcirc +

All fluid totals are reset when Clear and Enter are pressed. Fluid totals cannot be reset individually.

Alarm History Screen

Press the left or right arrow key to select Alarms. This screen summarizes the last five alarms that have occurred.

		Ala	arms		
Date	Time	Description		Rec	ipe Fluid
7/14	9:21	Dispense Tole	rance	2	3
7/12	19:05	Dispense Tole	rance	2	3
7/12	18:24	Flow Rate Err	or	6	3
7/10	11:37	Scale Commu	inication		
7/9	15:05	Error		2	2
		Dispense Tole	rance		
			-		
R	un	Last Totals	All Tota	ıls	Alarms
			<u>ه</u> F	Print	

Alarms

Press Print an Alarms Report.

Operation



Accuracy chart explanation

- 1. The accuracy chart applies to all material viscosities. Low viscosity materials require very low pressures to achieve the desired flow rate. Solvents may start to spray or fan at pressures higher than 4 or 5 psi (.27 to.34 bar). Higher viscosity materials require higher pressures to achieve the flow rate. The higher viscosity helps maintain a stream pattern at higher flow and pressures.
- 2. Attainable accuracy relies on constant fluid pressures and flow rates.
- 3. Maximum viscosity for the standard configuration ProBatch dispense machine is 2000 cps. Higher viscosity requires use of the high viscous kit and higher pressure ratio supply pumps. See Accessories on page 60.
- 4. Example: a 100 gram dispense would take approximately 20 seconds at 1% accuracy or approximately 5 seconds at 5% accuracy.

Supply system recommendations for various material viscosities:

- 0-60 cps Pressure pots: for solvent materials and small dispense targets, a pressure setting of 5 psi (.34 bar) or less may be common to prevent splashing and fanning of the material. Diaphragm pumps may be required if circulation is needed.
- 40-200 cps Diaphragm pumps and 1:1 piston pumps: the smaller diaphragm pumps may not have enough pressure at 80-100 psi (5.5-6.9 bar).
- 200-1,000 cps 2:1 or higher pumps: a pump with a high ratio will have more severe pressure fluctuations from changeover than a lower ratio pump.
- 1,000-5,000 cps 3:1 pump or higher:
- 5,000-20,000 cps 5:1 ratio pump or higher: a high viscosity kit must be used for these viscosities.
- Application Note: Acid catalysts (lacquers for wood finishes) must use the corrosion resistant valve or needle/nozzle kit and may require a pressure pot supply set at low pressure to prevent material splashing and fanning from the valve during dispense.

Operation Procedures



Wear eye protection whenever you are dispensing fluid.

NOTE: You must have the load/purge recipes setup (page 28) to complete some of the following procedures.

To raise or lower the dispense manifold



Allow 2 in. (50.8 mm) of space between the top of the container and the dispense manifold tray (B); do not let them touch each other. You should be able to see the valves dispensing.



1. Pull out the latch handle (A) and raise or lower the controller and manifold assembly as needed.

NOTE: Bumpers prevent the assembly from lowering or raising past a certain point.

2. Release the handle so the latch sets in one of the height adjustment holes (C). Make sure the latch is fully set in the holes so the controller and manifold assembly cannot unintentionally move.



To adjust the dispense valves

- 1. Slide out the dispense valve manifold tray and set the peg into the side tray notch to hold the tray in place.
- 2. Turn all the dispense valve knobs (E) in fully, then turn the knobs out about four full turns. This is a general starting point to start dispensing your fluids. The actual adjustment necessary will depend on the valve size, container size, fluid viscosity and dispense amount.
- 3. Push the manifold tray (D) fully in.
- Load the valves with fluid and adjust the valves as needed to avoid splashing or "spraying" fluid.

Typical Setting Examples

	Min	Max	Valve Size	Turns from full closed
Solvent	1	2	1/8 in.	3-4
Paint Resin	2	4	1/4 in.	4-5
Catalyst	2	4	1/4 in.	3-4

To pull out and return scale and tray to autodispense position

- 1. Pull out scale as necessary to position container. Scale may be pulled out to about 2/3 of full before the latch/lock engages.
- 2. If scale does not slide back in, pull all the way out to stops.
- 3. Press the scale latch release tabs.
- 4. Push scale in about 2 in., release latch tabs.
- 5. Push scale back to closed position.

To purge the system

Purge the ProBatch system before using the equipment for the first time or when changing fluids.

	ł	Recipe:		1
	2) <u>qts</u>			
		ID#:		
Run		Last Totals	All Totals	Alarms
Start	Stop		5	

- 1. Enter the load/purge recipe number for the fluid line you are purging.
- 2. Enter a dispense quantity that will be sufficient to clean the fluid line.
- 3. Press Start (to begin dispensing.

NOTE: Because of the air in the fluid line, flow rate alarms will occur. Press Start to ignore the alarms and continue dispensing.

- 4. Press Stop \bigcirc when the fluid line is clean.
- 5. Repeat the process for each fluid line you need to purge.

To load fluid

Follow this procedure to load the fluid lines and purge the air.



- 1. Enter the load/purge recipe number for the fluid you are loading.
- Enter a dispense quantity that will be sufficient to purge all the air out of the fluid line and load the line with fluid.
- 3. Press Start (to begin dispensing.

NOTE: Because of the air in the line, flow rate alarms will occur while loading fluid. Press Start **(1**) to ignore the alarms and continue dispensing.

- 4. When the flow of fluid is consistent, press Stop
- 5. Repeat this process for each of the fluids.

To adjust the flow rate

Because of the numerous factors involved in adjusting the flow rate, this is only a general guideline to the three main ways to make adjustments to flow rate on the ProBatch system. You should already have fluid loaded into the system (page 46). You can Start the recipe as needed to make adjustments.

		Recipe:		1
	2 <u>qts</u>			
		ID#:		
Ru	n	Last Totals	All Totals	Alarms
Start	Stop		5	

1. Enter a recipe.

- 2. Enter a dispense quantity. 두
- 3. Press Start (to begin dispensing.
- Adjust the dispense valves as needed (page 44) while dispensing at the maximum (solenoid pressure) setting. Observe the flow at the minimum setting.
- If the flow rate is too low at the minimum setting, increase the minimum setting by one in Fluid Setup (page 26). Observe the dispense at the new setting.
- If you cannot obtain the desired flow by adjusting the dispense valves or minimum/maximum setting, change the solenoid valve pressure settings as instructed below.

To change solenoid valve pressures

The ProBatch module 244440 comes with three fluid valves. Valve 1 is 1/8 in. ported. Valves 2 and 3 are 1/4 in. ported. The 1/8 in. valve should be used for low flow rate and light viscosity materials such as solvents. The 1/4 in. valves are for higher flow rate and heavier viscosity materials. A typical setup for a 3K material is resin 1/4 in., catalyst 1/4 in., and reducer 1/8 in. For optimal system accuracy and control, convert a valve to 1/8 in. or 1/4 in. Each valve should be individually adjusted based on the material viscosity, the desired flow rate, and the pressure settings of the regulators.

Regulator Pressure Setup

The air pressure regulators are factory set at 10, 20, 40, and 80 psi. These pressure settings will work well for medium viscosity materials. Adjustment range for each regulator is 5-100 psi (0.3-6.9 bar).



Regulator #1

When solvents and low viscosity reducers are dispensed, 10 psi may be excessive pressure that could cause high velocity or spray of the material through the valve. In that situation you must reduce the pressure on air regulator #1 to a setting that produces a uniform stream of material when dispensing. When this new pressure is set, it may be too low to create flow of heavier viscosity materials. The minimum pressure/valve setting for heavier materials should then be 2. On very light viscosity materials, you may have to ignore the regulator setting and set the pressure pot supply at 4-5 psi (.28-.34 bar) to have pressures low enough to prevent splashing or spray. When overriding the fluid regulator, apply a minimum of 10 psi pilot pressure to the fluid regulator to ensure it opens fully.

• Regulator #2

Air regulator #2 should have the lowest setting for heavier viscosity materials. The pressure should be set and locked at a setting that produces a uniform, controlled stream.

• Regulator #3

Typically, air regulator #3 does not need to be adjusted. You can adjust to an optional upper pressure for use with light viscosity materials that do not spray from the valve at 20 or 30 psi.

• Regulator #4

Air regulator #4 is set for the highest fluid pressure needed to achieve maximum flow rates desired for higher viscosity materials.

To adjust a valve:

- 1. Determine the required maximum flow rate.
- 2. Start a dispense
- 3. Allow the system to increment to the highest valve setting
- 4. Loosen the set screw in the center of the knob with an allen wrench.
- 5. Turn the solenoid valve knob (F) until the desired pressure is shown on its gauge.
- 6. Tighten the set screw to lock the setting.

Notes

Parts

User Interface Cover Assembly 244452



	" I alt "	Becchpach	α
	244452	Assembly, cover, electrical:	
2	197281	SWITCH, membrane	1
3	116371	SPACER, round, .151 ID	4
4	197427	DISPLAY, graphic, assembly	1
5	116374	SPACER, round, 140 ID	4
6	244407	BOARD, circuit, assembly (display)	1
6A	244840	KIT, repair, chip	1
7	103181	WASHER, lock ext	4
8	100072	NUT, hex mscr	4
9	197902	PAINT SHIELD, membrane switch	1 pk. of 10

Main Control Box Assembly



Ref.	# Part #	Description	Qty.
		ASSEMBLY, control box, main:	
3	197386	LABEL, power, set-up	1
4	116368	SWITCH, key, rotary, 2-position (includes 4A)	1
4A	116370	KEY, rotary switch, 2 pack	1
5	116320	SWITCH, rocker, power	1
8	112446	BLOCK, clamp end	4
9	244408	BOARD, circuit, assembly (Main control)	1
9A	244839	KIT, repair, chip	1
10	244721	MODULE, assembly PCB, scale	1
11	197577	HARNESS, wire	1
12	197579	HARNESS, wire	1
13	197580	HARNESS, wire	1
14	197581	HARNESS, wire	1
15	197827	HARNESS, wire	1
16	197835	KIT, repair	1



Notes



Latch Assembly Parts

Ref.	. # Part #	Description	Qty.
18	111801	SCREW, cap, hex head	6
39	197447	BRACKET, trigger	1
40	513505	WASHER, plain #10 SST	2
41	100166	NUT, full hex	2
42	116415	BUSHING, clip	3
43	197355	TRIGGER, adjustment, height	1
44	116324	HANDLE, plastic	1
51	100050	WASHER, lock	2
67	116526	SPRING, compression	2
68	116413	COLLAR, screw, set	3



Fluid Section Enclosure Assembly



Ref. # Part # Description

244440 244441 Qty. Qty.

2345678911123456789011222224256791233456789011234567890112222345679123345678	197387 197501 104641 197385 244437 244436 110996 197565 113034 114158 100030 116404 116329 513308 244375 115942 116326 197348 197366 244382 244383 113419 510223 597350 590332 598095 116415 070566 197529 197530 197467 514228 C38163 100166 244425	LABEL, identification, fluid LABEL, identification FITTING, bulkhead FASTENER, hex, standoff MANIFOLD, solenoid, assembly MANIFOLD, solenoid, assembly NUT, hex, flanged HARNESS, wire FITTING, tube FITTING, tube FITTING, tube, Y-elbow, triple TERMINAL, block, panel, feed-through FITTING, connector REGULATOR, pressure, fluid (see 307212) NUT, hex, flange head SCREW, shoulder, socket head (not shown) BUSHING, wheel (not shown) PAN, drip, with dispense mtg VALVE, dispense, .125 diameter (see 306715) VALVE, dispense, .250 diameter (see 306715) NUT, sealing, 3/8 in 18 npt FITTING, elbow, male TUBE, PTFE, bulk TUBE, poly-flo5/32id x 1/4 in. outside diameter TUBE, 5/32 in. outside diameter BUSHING, clip GROMMET, edging HARNESS, wire, solenoid HARNESS, wire, solenoid LABEL, identification, valve FITTING, reducer WASHER, lock, star; see page 50 NUT, full hex; see page 50 NUT, full hex; see page 50	111411811111433644112337.1.1.11112111	1 1 1 4 1 1 8 1 1 1 1 4 6 6 12 4 4 1 2 4 6 6 4.4 1.7.5 1 4 1 1 2 1 1 1 2 1 1 1 1 2 4 6 6 12 4 4 1 2 4 6 6 12 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
35 36 27	514228 C38163	FITTING, reducer WASHER, lock, star; see page 50	2 1	2 1
38	244425	POWER SUPPLY 16VDC IS	1	1
39		CABLE power IS 50 ft	1	1
40	241998	CABLE, power supply 10 ft USA	1	1
41	115984	CABLE, power supply 10 ft Euro	1	1

Regulator and Solenoid Valve Bank Assembly (for fluid regulator operation)



Ref.	# Part #	Description	Qty.
2	114109	FITTING, elbow, male, swivel	1
3	100721	PLUG, pipe	1
4	517449	MUFFLER, sintered, 1/4 NPT	1
5	116381	SOLENOID, valve, 3-way	4
6	116382	REGULATOR, air, solenoid valve	4
7	113630	ELBOW, street 45 degree 1/8 NPT	4
8	116383	GAUGE, air pressure, micro	4

Solenoid Valve Assembly (for fluid valve operation)



Ref. # Part #		Description	
2	101954	PLUG, pipe	2
3	114263	FITTING, connector, male	6
4	114153	FITTING, elbow, male, swivel	1
5	C07097	MUFFLER, sintered	1
7	116380	SOLENOIĎ, valve, 3-way	6



ProBatch Base and Scale Assembly

Ref. # Part #		Description	Qty.
1	197430	BASE, dispense	1
2	197382	BRACKET, slide, left	1
3	197356	BRACKET, slide, right	1
6	197360	SUPPORT, C-channel, right	1
7	179358	SUPPORT, C-channel, left	1
8	114122	SLIDE	1
13	197555	VALVE, actuator, button, push	1
17	116348	BUMPER, rubber	4
19	197359	SHELF, scale, base, dispense	1
20	197383	BRACKET, lift, center	1
23	197380	COVER, base, dispense	1
24	197375	COVER, side, base, dispense	2
29	116349	SPRING, gas	1
31	116313	SCALE, 50 pounds, 12x12	1
31A	198329	CABLE, scale, 48 inches	1
32	116523	BOLT, eye	1
33	197374	COVER, center, base	1

Accessories

Part Number 244385 244387	Description Valves Needles and nozzles 1/8 in. 1/4 in. corrosion resistant
244382 244384	Valve assemblies 1/8 in. 1/4 in. corrosion resistant
244792	Regulator kit for adding valves*
239873	Printer kit - ProMix
514037	Printer paper roll
244510	Printer barrier kit with 45 ft. cable
244534	Network barrier kit
244778	Network kit RS232/432 converter
243377 243378 243379	AMR 1 station 5 station 31 station
116542	Weight, 10 Kg
114124 114228	Air filter, 5 micron Air filter replacement element
244983	High viscosity material kit
197902	Paint Shield (10 pack)

* Regulator kit for adding valves (244792) includes regulator, fluid tubing, air tubing, and fittings to add an additional valve to a ProBatch system. Order valve assembly separately.

High Viscosity Fluid Dispense Valve Access Kit Assembly 244983



The high viscosity kit can be used in any one of the six valve positions, but is recommended to be used with a 1/4 in. valve.

- 1. Follow the instructions on pages 63 and 64 to remove the fluid regulator and valve from the ProBatch.
- 2. Remove fluid inlet tube fitting from the dispense valve.
- 3. Add fluid inlet pipe fittings (90 degree) (3 and 4) from the kit to the dispense valve as shown.
- 4. Disconnect pneumatic tubing from the solenoid bank manifold (B).
- 5. Feed new tubing (5) through hole (1) used for scale switch tubing on the back of the fluid panel and connect to the solenoid/regulator bank manifold (B).
- 6. Mount air regulator (7) to air supply on pump (regulator is 3/8 NPT(f) ported) and connect pilot pressure tubing (5) to the air regulator.
- 7. Reinstall the fluid valve (A).
- 8. Assemble bulkhead into large opening and connect hose (2) to valve (8) and bulkhead.

Notes

Service

Replacing a Dispense Valve

1. Purge the ProBatch system (page 45).



- 2. Relieve the pressure (page 24) and turn off the ProBatch power switch.
- 3. Loosen the four thumb screws and remove the front manifold cover.
- 4. Slide out the dispense valve tray (A). Tip down and hook notch on pin to hold the tray in place.
- 5. Disconnect the air (B) and fluid lines (C) from the dispense valve.
- 6. Remove the dispense valve retaining nut (D) from the bottom of the tray with a 7/8 in. sixpoint socket wrench.
- 7. Remove the dispense valve by lifting it up and out of the mounting hole.
- 8. Install the new dispense valve in reverse order of disassembly. Be sure to put a loop in the fluid tube, as shown in Figure 9, to avoid crimping the tube.
- **NOTE:** Be sure that the PTFE-coated side of the valve retaining nut is toward the valve.



Fig. 9 Replacing a Dispense Valve

Replacing a Fluid Regulator

1. Purge the ProBatch system (page 45).



- 2. Relieve the pressure (page 24) and turn off the ProBatch power switch.
- 3. Loosen the four screws and remove the front manifold cover.
- 4. If either of the top two regulators is being replaced, remove the control box as instructed on page 68.
- 5. Disconnect the air (A) and fluid lines (B) from the fluid regulator.
- 6. Disconnect the corresponding fluid line (C) from the connector on the back side of the Pro-Batch housing.
- 7. Remove the two nuts (D) holding the regulator from the back side of the housing.
- 8. Remove the fluid regulator. The lower four are removed through the fluid panel, the upper two are removed through the top service cutout behind the control box.
- 9. Install the new fluid regulator in reverse order of disassembly. Be sure to put a loop in the fluid tube as shown in Figure 9 on page 63 to avoid crimping the tube.



Replacing a solenoid bank for valve triggers



1. Turn off the ProBatch power switch.

- 2. Remove the top access panel.
- 3. Remove the two bolts holding the solenoid bank from the back of the ProBatch housing and position them for the next stop.
- 4. Disconnect the input (A) and output air lines (B) from the solenoids.
- 5. Disconnect the din connectors (C) from the solenoids.
- 6. Remove the solenoid bank (D).
- 7. Install the new solenoid bank in the reverse order of disassembly.



Replacing a solenoid bank for pressure regulation

- 1. Turn off the ProBatch power switch.
 - 2. Remove the top access panel.
 - 3. Remove the two bolts holding the solenoid bank from the back of the ProBatch housing
 - 4. Disconnect the input and output air lines from the solenoids.
 - 5. Disconnect the din connectors from the solenoids.
 - 6. Remove the solenoid bank.
- 7. Install the new solenoid bank in the reverse order of disassembly.



Replacing the Scale



1. Turn off the ProBatch power switch.

- 2. Pull out the scale tray and remove the top (A).
- 3. Disconnect the scale cable (B) and ground wire (C).
- 4. Remove the scale.
- 5. Install the new scale in reverse order of disassembly.

NOTE: Level scale (page 18) and recalibrate (page 29) before use.



Removing and Reinstalling the Control Box



Wear a grounding strap when replacing any of the controller boards to avoid shorting them out.

NOTE: Check with your Graco distributor periodically to see if circuit board or software updates are available.

To remove the control box:



1. Turn off the ProBatch power switch.

- 2. Remove the cover assembly:
 - a. Loosen the four screws and slowly remove the cover (B) from control box.
 - b. Disconnect cable connectors from the display board (C).
- 3. Remove the control box assembly:
 - a. Remove the four bolts and remove the control box (D).

b. Disconnect the three cables and ground wire. (See page 51 for view of connectors.) To reinstall the control box:

- 3. Connect the three cables and ground wire.
- 4. Place the control box on top of the dispense manifold housing and secure it with the four bolts.
- 5. Plug in the two connectors and install the control box cover and tighten the four screws.



Notes

Replacing the Display Board



- 1. Turn off the ProBatch power switch.
- 2. Remove the control box cover assembly (A) as instructed on page 68.
- 3. Unplug the ribbon cable (B) from the board by sliding it out of the connector. Note position of the cable in connector. Arrow indicates pin #1, reconnect with pin #1 engaged.
- 4. Remove the four nuts (C) from the board.
- 5. Disconnect the ground wire.
- 6. Unplug the three fiber optic connectors (E) from the diodes, then remove the display board (D).
- 7. Install the parts in reverse order of disassembly.

NOTE: Use a chip puller to remove the software chip from the display board when replacing

NOTE: Spacers must be used in correct positions to protect the display and board.

Replacing the Display

- 1. Follow steps 1 through 6 in the procedure for replacing the display board.
- 2. Remove the display (F).
- 3. Install the parts in reverse order of disassembly.

NOTE: Spacers must be used in correct positions to protect the display and board.

Replacing the Membrane

- 1. Follow steps 1 through 6 in the procedure for replacing the display board.
- 2. Remove the display (F).
- 3. Peel the membrane (G) off the control box cover.
- 4. Remove the adhesive liner from the back of the new membrane. Align the membrane with the recessed area on the panel and press it into place.
- 5. Install the parts in reverse order of disassembly.

NOTE: Spacers must be used in correct positions to protect the display and board.



NOTE: The membrane key pad (G) adheres to the cover and must be peeled off to replace.

Replacing the Main Board



- 1. Turn off the ProBatch power switch (A).
- 2. Remove the control box cover (B) as instructed on page 68.
- 3. Unplug all wire connectors (D) from the main board.
- 4. To remove the main board, squeeze the release clips and pull away from the din rail.
- 5. Install the parts in reverse order of disassembly.

Replacing the Scale Board and Junction Box



- 1. Turn off the ProBatch power switch (A).
- 2. Remove the control box cover (B) as instructed on page 68.
- 3. Unplug all wire connectors (C) from the scale junction box.
- 4. Remove the ground wire (E).
- 5. Pull the orange tab down with a screw driver and remove the scale junction box from the din rail.
- 6. Install the parts in reverse order of disassembly.

Replacing Software Chip in Main Board and Display Board

- 1. Locate chip (see page 73 for photos of the main board and the display board).
- 2. Use a chip puller to remove the software chip (F).
- 3. Lay replacement chip on socket and snap chip firmly into place. Top of chip will be flush with top of socket when properly installed.

NOTE: When removing the chip, note that there are three sharp corners and one chamfered corner. When inserting the replacement chip, ensure that the chamfered corner of the chip is oriented toward the chamfered corner of the socket.Incorrect installation can result in damage to the chip or the board.


Main Board

Display Board



Replacing the Gas Spring



The gas spring raises and lowers the controller and manifold assembly. Bumpers prevent the assembly from lowering or raising past a certain point. When you remove the gas spring, there is nothing to keep the assembly in position. To avoid having the assembly pinch or crush your hand, have another person hold the controller and manifold assembly in place while you replace the gas spring.

- 1. Remove the lift ring (A) and top sheet metal cap (B).
- 2. Remove aluminum cross member (C) and upper two rubber stoppers (D).
- 3. Disengage trigger and secure in the unlocked position with a plastic zip tie (see page 12).
- 4. Raise the ProBatch fluid section to the maximum height the spring will allow.
- 5. Support the fluid section at this height to ensure it will not drop.
- 6. Unsnap the ball/socket assembly (E) on the top part of the gas spring (G) and then unscrew the gas spring from the base (F).
- 7. Reassemble in reverse order paying close attention to the aluminum extrusion to ensure they remain parallel when the cross member is tightened.





Problem	Cause	Solution
Invalid Recipe Alarm	A recipe is selected that does not exist or all the required setup information for that recipe is not entered.	See page 34.
Scale Uncalibrated Alarm	Scale was not calibrated after replacing scale or scale board.	Calibrate the scale (page 34).
Flow Rate Alarm	Scale reading did not occur within 10	Check the following:
	······································	 Scale platform is pushed all the way in.
		Scale communication (see below)
		Scale calibration.
		• Air supply is on.
		Fluid supply is not empty or faulty.
		Fluid line is not clogged.
		 Solenoids are receiving air and are operat- ing.
		Air regulators are operating.
		Dispense valves operating.
		Service parts as needed. Calibrate the scale.
Out of Tolerance Alarm	Dispense is under or over tolerance limit set for the fluid. Check the devia- tion column in the last batch totals screen. Refer to page 34.	Adjust the fluid valve and/or the air pressure on the minimum valve pressure.
Weight Loss Error Alarm	During a dispense, the scale reading	• Place the container back on the scale.
	drops more than 20 grams from the reading at the beginning of the	Replace the container if it leaks.
	dispense. This can be caused by lifting the container off the scale during the dispense or a leak in the container.	To avoid an inaccurate batch, cancel the batch and restart it.
Scale Unstable Alarm	The current scale weight fluctuates	Make sure that the scale platform is level
	value for more than 10 seconds.	Recalibrate the scale
		 Increase the stability value
Memory Failure Alarm	 In a new unit, the unit may need to be programmed 	Program setup values
		Replace flash eprom
	corrupt memory.	

Troubleshooting

Problem	Cause	Solution
Scale Communication Alarm	 Scale cable is faulty or not con- nected properly between scale and main board. 	 Replace or reconnect cables (page 11).
	Faulty scale board.	Replace scale board (page 72).
Scale Disconnected Alarm	 Load cell damaged or discon- nected 	Replace or reconnect load cell.
Batch Amount Alarm	 The total batch amount requested exceeded 50 lbs. (22.7 Kg). Alarm will include the recipe number of the dispense that triggered the alarm. 	 Request a smaller batch. Split larger batch into two smaller ones.
	• If the recipe number is "0", the alarm was generated because there was less than 20 gm (.7 oz) container weight on the scale at the start of the dispense.	 Ensure there is a container on the scale before starting dispense.
Scale Fault Alarm	 Analog/digital scale board was requested to start a conversion but timed out. 	
	Command sent from main circuit board not recognized.	
	 Scale board reset command failed. 	
	Scale board power cycled unex- pectedly.	
Cannot communicate with	Faulty communication cable	Replace cable.
the ProBatch system through the RS485 port	 Communication cable wired incorrectly, possibly wired back- wards. 	• Verify connection, swap A and B if neces- sary. See AMR Installation Guide 306219 for additional detail.
	• Station number not configured.	 Assign station number on system setup screen.
Fluid sprays from dispense valve.	 Too much restriction through valve. 	Open valve adjustment.
	Fluid pressure too high.	Reduce pressure setting selection.
		 Reduce air pressure regulator setting of solenoid #1.
		 Reduce supply pressure from pressure pot to a setting lower than the air pressure regulator setting.

Problem	Cause	Solution
Fluid dispense is too slow.	Fluid valve is too small.	• Use 1/4 in. valve.
		Open valve travel adjustment.
	• Fluid pressure is too low.	Increase maximum valve pressure.
		Increase supply pressure.
No display.	No power.	Ensure power supply is plugged in.
		• Ensure power switch is turned on.
		 Ensure connection is secure on back of display.
No fluid flow.	Supply pump not on.	Turn on supply pump.
		Open supply valve.
	• No air pressure to ProBatch.	Open air supply valve.
	Minimum fluid pressure setting too low.	Increase minimum fluid pressure setting.
	• Valve adjustment not open.	Open valve adjustment.
	Plumbing plugged.	Clean out regulator hoses and valves.

Control Box Wiring Chart					
Harness	Connection (Connector-Pin)		Color	Function	
	J8-1	J3-8	Black	SPI_Cs2	
	J8-3	J3-6	White	Ground	
197577	J8-4	J3-5	Red	VCC	
(Scale Module to	J8-5	J3-3	Green	SPI_MOSI	
Main Board)	J8-6	J3-4	Brown	SPI_MISO	
	J8-7	J3-2	Blue	SPI_CLK	
	J8-8	J3-1	Orange	+15V	
	J5-1	P4-1	Black	Ground	
	J5-2	P4-2	Brown	DIG_OUT_6	
107570	J5-3	P4-3	Red	Ground	
(Main Board to	J5-4	P4-4	Orange	DIG_OUT_7	
8-Pin Solenoid Bulkhead)	J5-5	P4-5	Yellow	Ground	
	J5-6	P4-6	Green	DIG_OUT_8	
	J5-7	P4-7	Blue	Ground	
	J5-8	P4-8	Purple	DIG_OUT_9	
	J6-1	P5-1	Black	Ground	
	J6-2	P5-2	Brown	DIG_OUT_0	
	J6-3	P5-3	Red	Ground	
	J6-4	P5-4	Orange	DIG_OUT_1	
197580	J6-5	P5-5	Yellow	Ground	
(Main Board to	J6-6	P5-6	Green	DIG_OUT_2	
Bulkhead)	J6-7	P5-7	Blue	Ground	
	J6-8	P5-8	Purple	DIG_OUT_3	
	J6-9	P5-9	Gray	Ground	
	J6-10	P5-10	White	DIG_OUT_4	
	J6-11	P5-11	Tan	Ground	
	J6-12	P5-12	Pink	DIG_OUT_5	

Control Box Wiring Chart					
Harness	Connection (Connector-Pin)		Color	Function	
	P6-1	J1-4	Red	Scale Module	
	P6-2	J1-5	White	Scale Module	
	P6-3	F1 (J3-8)	White	MODBUSB	
	P6-4	F2 (J3-9)	Red	MODBUSA	
	P6-5	F3 (J2-6)	Black	Ground	
	P6-6	J2-7	Brown	Printer	
	P6-8	F3 (J2-6)	Purple	Ground	
	P6-11	2	White/Black	Power (Board & Input)	
197581 (Main Control	P6-13	1	Red/Black	Power (Output Only)	
Harness)	P6-14	J1-6	Green	Scale Module	
	P6-15	J1-7	Black	Scale Module	
	P6-16	J1-1	Blue	Scale Module	
	P6-17	J1-2	Orange	Scale Module	
	P6-18	J1-3	Drain	Scale Module	
	P6-19	Ring Term	Inner Shield	Ground	
	P6-23	J7-2	White/Black	Ground (Board & Input)	
	P6-25	J7-3	Red/Black	Ground (Output Only)	
	1B	J7-4	Red/Black	Power (Output Only	
	2B	J7-1	White/Black	Power (Board & Input)	
197827	J3-1	J4-1	Brown	RS485_B	
(Main Board to Front Panel)	J3-2	J4-2	White	RS485_A	
,	J3-3	J4-5	Black	Ground	
	J3-5	J4-3	Green	DSRI	
	J3-10	J4-4	Red	VCC	
197835	J1-1	SW1	Black	Key Switch	
(Front Panel to Key Switch)	J1-2	SW2	Red	Key Switch	

Fluid Section Wiring Chart					
Harness	Connection (Connector-Pin)		Color	Function	
	P2-1	P3 - (-)	Black	Solenoid 1	
	P2-2	P3 - (+)	Red	Solenoid 1	
	P2-3	P4 - (-)	Black	Solenoid 2	
	P2-4	P4 - (+)	Red	Solenoid 2	
	P2-5	P5 - (-)	Black	Solenoid 3	
197529 (18-Pin to	P2-6	P5 - (+)	Red	Solenoid 3	
Solenoids)	P2-7	P6 - (-)	Black	Solenoid 4	
	P2-8	P6 - (+)	Red	Solenoid 4	
	P2-9	P7 - (-)	Black	Solenoid 5	
	P2-10	P7 - (+)	Red	Solenoid 5	
	P2-11	P8 - (-)	Black	Solenoid 6	
	P2-12	P8 - (+)	Red	Solenoid 6	
	P1-1	P9 - (-)	Black	Solenoid 1	
	P1-2	P9 - (+)	Red	Solenoid 1	
	P1-3	P10 - (-)	Black	Solenoid 2	
197530 (8-Pin to Solenoids)	P1-4	P10 - (+)	Red	Solenoid 2	
	P1-5	P11 - (-)	Black	Solenoid 3	
	P1-6	P11 - (+)	Red	Solenoid 3	
	P1-7	P12 - (-)	Red	Solenoid 4	
	P1-8	P12 - (+)	White	Solenoid 4	

Fluid Section Wiring Chart					
Harness	Cor (Conn	nection ector-Pin)	Color	Function	
	P3-1	SCL-4	Red	Scale	
I	P3-2	SCL-5	White	Scale	
I	P3-3	MODBUS-A	Clear	MODBUS A	
I	P3-4	MODBUS-B	Red	MODBUS B	
	P3-5	MODBUS-GND	Black	Ground	
	P3-6	PTR-2	Clear	Printer	
	P3-8	PTR-1	Black	Printer	
	P3-11	PWR-5	Blue	Power	
197565 (Bulkhead to Bulkhead)	P3-13	PWR-3	Black	Power	
	P3-14	SCL-6	Green	Scale	
	P3-15	SCL-7	Black	Scale	
	P3-16	SCL-1	Blue	Scale	
	P3-17	SCL-2	Orange	Scale	
	P3-18	SCL-3	Drain Shield	Scale	
	P3-23	PWR-4	White	Power	
	P3-25	PWR-2	Red	Power	
	Ring Term	PWR-1	Shield	Ground	
	Ring Term	PTR-3	Green	Ground	
	Ring Term	MODBUS-SHD	Green	Ground	

Scale/Power Supply Wiring Chart				
Harness	Conne (Connec	ection ctor-Pin)	Color	Function
	1	1	Blue	VREF +
	2	2	Brown	VREF -
198329	3	3	Yellow	Guard/A)
(Bulkhead to Scale)	4	4	Red	AINI +
	5	5	White	AINI -
	6	6	Green	+5V Analog
	7	7	Black	Ground Analog
	1	1	Bare	Shield Drain
197347 (Bulkhead to Power Supply)	2	2	Red	+ Voltage
	3	3	Black	- Voltage
	4	4	White	CAN_H
	5	5	Blue	CAN_L

Technical Data

Power Requirements

Electrical	85-250 VAC, 0.25 amp maximum, 50 or 60 Hz
Pneumatic	85-120 psi (0.59-0.9 MPa, 5.9-9 bar) at 1/4 cfm max- imum (filtered to 10 micron)
Material Requirements	
Number of fluids	
Automatic dispense	6 maximum
Manual dispense	93 maximum
Specific gravity	0.5-2.0
Viscosity	0.5-2000 cps
Dispense Ranges	
Amount	
minimum	.1 qt., 0.1 lb, 0.1 liter, 0.1 Kg
maximum	5 gal, 50 lb, 20 liters, 22.5 Kg
Tolerance	up to +/- 1% (see chart on page 42)
Flow rates	0.060-2 GPM (.250-8 liters per minute)
Scale	
Resolution	+/-1 gram
Capacity	50 lbs. (22.5 Kg)
Size	12 in. x 12 in. (30.5 cm x 30.5 cm)
Container Sizes	
Height maximum	15.2 in. (38.6 cm)
Diameter maximum	12 in. (30.5 cm)
Diameter minimum	2.5 in. (6.35 cm) for multi-valve dispenses
Weight maximum	20 lb (9 Kg)
Recipes	
Quantity	250 maximum
Proportions	1-250 parts
Pause times	1-250 minutes
System	
Weight	125 lb. (57 Kg)
Height (fully extended)	44.5 in. (113 cm)
Width	22.2 in.(56 cm)
Depth	26.1 in. (66 cm)
Maximum Fluid Working Pressure	250 psi (17.2 bar)
Porting	
Fluid	3/8 npsm(f)
Pneumatic	1/4 npt
Fluid valves	
3 valve system	(#1) 1/8 in., (#2, #3) 1/4 in.

Technical Data

6 valve system	(#1, #6) 1/8 in., (#2, #3, #4, #5) 1/4 in.
Sound	Less than 70 dBA
Fluid Wetted Parts	
Fluid Regulator	Tungsten carbide, Acetal resins, PTFE, 304 & 316 sst
Hose	PTFE
Fluid Valves	
Standard valve (1/8 in.)	316 and 400 sst, chrome, nylon, UHMWPE
Corrosion resistant valve (1/4 in.)	17.4 ph sst, 316 sst, nylon, UHMWPE



Control Drawing - 233607

Notes

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Graco Standard Warranty

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

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

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

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

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

Graco makes no warranty, and disclaims all implied warranties of merchantability and fitness for a particular purpose in connection with accessories, equipment, materials or components sold but not manufactured by Graco. These items sold, but not manufactured by Graco (such as electric motors, switches, hose, etc.), are subject to the warranty, if any, of their manufacturer. Graco will provide purchaser with reasonable assistance in making any claim for breach of these warranties.

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

FOR GRACO CANADA CUSTOMERS

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Graco Phone Number

TO PLACE AN ORDER, contact your Graco distributor, or call this number to identify the distributor closest to you:

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

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

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Graco Headquarters: Minneapolis International Offices: Belgium, China, Japan, Korea

GRACO INC. P.O. BOX 1441 MINNEAPOLIS, MN 55440-1441 www.graco.com 06/2001, Revised 9/2006