Parts

INSTRUCTIONS-PARTS LIST

309279

Rev. A

INSTRUCTIONS

This manual contains important warnings and information.
READ AND KEEP FOR REFERENCE.

GRACO

First choice when quality counts.™

Batch Dispense System

Proportioning Controller

Model No. BDS, Series E

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

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Graco Inc. is registered to I.S. EN ISO 9001

Table of Contents

Conventions

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

- When you are instructed to “Press” something, this usually refers to pressing your finger on the Batch Dispense System’s touch screen to select an item or initiate an action.

- **Bold text** in a sentence indicates a button or text on the screen that you can press to make a selection or carry out an action. For example, “Press **Run Recipe** on the Main Operating Screen.” Bold text may also be used for emphasis.

- *Italicized text* shown on a screen diagram or in the text 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 *gallons*. The units you see on the screen- may be liters, quarts, or cubic centimeters.

- **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. Numbers in parentheses may also indicate metric conversions of units of measure.

Symbols

Warning Symbol

⚠ WARNING

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

Caution Symbol

⚠ CAUTION

This symbol alerts you to the possibility of damage to or destruction of equipment if you do not follow the instructions.

⚠ WARNING

FIRE EXPLOSION, AND ELECTRIC SHOCK HAZARD

Improper grounding, poor air ventilation, open flames or sparks can cause a hazardous condition and result in fire or explosion and serious injury.

- The Batch Dispense System Controller must only be installed and serviced by a qualified electrician.
- The controller is designed for use in a non-hazardous location as defined in the National Electrical Code (USA). To install the Batch Dispense equipment in a Class 1, Division 1, Group C and D environment, the X-purge option must be properly installed. Follow the instructions on pages 60–66.
- Ground the equipment and dispense only into grounded, conductive containers. See Ground the System on page 9.
- 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 from solvent or material.
- Do not smoke in the dispense area.
- Extinguish all open flames or pilot lights in the dispense area.
- Keep the dispense area free of debris, including solvent, rags and gasoline.
- Do not operate a gasoline engine in the dispense area.
- Keep liquids away from the electrical components.
- Disconnect electrical power at the main switch before servicing the equipment.
- The battery inside the Batch Dispense System Controller may explode if mishandled, which could cause serious injury and property damage. Do not recharge or disassemble the battery. Do not expose the battery to fire or heat. The battery is intended for use at normal temperatures, where high temperature cycles are not expected to exceed 212° F (100° C).

TOXIC FLUID HAZARD

Hazardous fluids or toxic fumes can cause a serious injury or death if splashed in the eyes or on the skin, swallowed, or inhaled.

- Know the specific hazards of the fluid you are using. Read the fluid manufacturer’s warnings.
- Store hazardous fluid in an approved container. Dispose of the hazardous fluid according to all local, state, and national guidelines.
- Wear appropriate protective clothing, gloves, eyewear, and respirator.

⚠ WARNING

PRESSURIZED EQUIPMENT HAZARD

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

- Do not stop or deflect fluid leaks with your hand, body, glove, or rag.
- Follow the **Pressure Relief Procedure** on page 16 whenever you: are instructed to relieve the pressure; stop dispensing; clean, check, or service the equipment; and install or clean the valve tip.
- Tighten all the fluid connections before operating the equipment.
- Check the hoses, tubes, and couplings daily. Replace worn, damaged, or loose parts immediately. Permanently coupled hoses cannot be repaired; replace the entire hose.

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 of the lowest rated system component. See the instruction manuals of the individual Batch Dispense System components for their maximum working pressures.
- Route the hoses away from the traffic areas, sharp edges, moving parts, and hot surfaces. Do not expose hoses to temperatures above 180°F (82°C) or below –40°F (–40°C).
- Do not use the hoses to pull the equipment.
- Do not move pressurized equipment.
- Use fluids or solvents that are compatible with the equipment wetted parts. See the Technical Data section of all the equipment manuals. Read the fluid and solvent manufacturer's warnings.
- Comply with all applicable local, state, and national fire, electrical and safety regulations.

Operator Controls And Indicators

See figure 1 on page 7.

Operator Controls

All the Batch Dispense System's (BDS) operator controls are on the door of the main cabinet. The power switch (47) turns all power to the cabinet on or off.

Pressing in the emergency stop (E-stop) button (7) turns off all electrical and pneumatic outputs. During normal operation, the E-stop button is pulled to the "out" position.

Scale Platform

The scale platform (B) is typically located at the base of the BDS. The platform surfaces are stainless steel for easy cleaning. There are no operator controls on the scale itself.

Display

The display (A) provides the operator interface for the the Batch Dispense System. The display is a 10.4" (264 mm) VGA 640 x 480 TFT Screen with Analog Resistive touch input. The touch screen allows the operator to access all necessary screens to run, edit and add a recipe, edit valve parameters, perform scale calibration, edit machine setup parameters, and manage reports by pressing selections displayed on the screen.

Main Operating Screen

The Main Operating Screen has buttons that can be pressed to access the following functions:

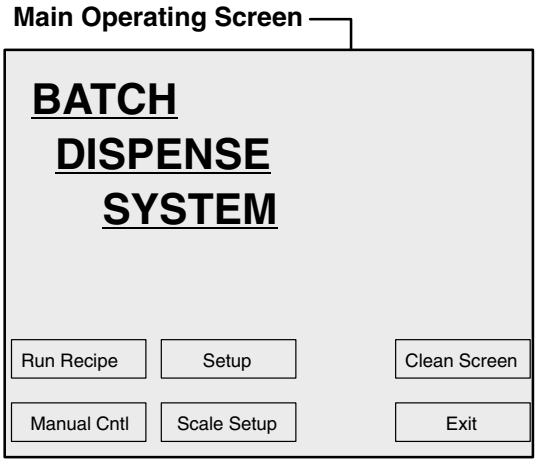
Run Recipe—to dispense a recipe in automatic mode.

Manual Cntrl—to dispense material manually.

Setup—to configure the system setup (including passwords, units of measure, and user screens), add and configure recipes and valves, and view and print reports.

Scale Setup—to select and calibrate the scale.

Clean Screen—to inactivate the touch screen to clean it.

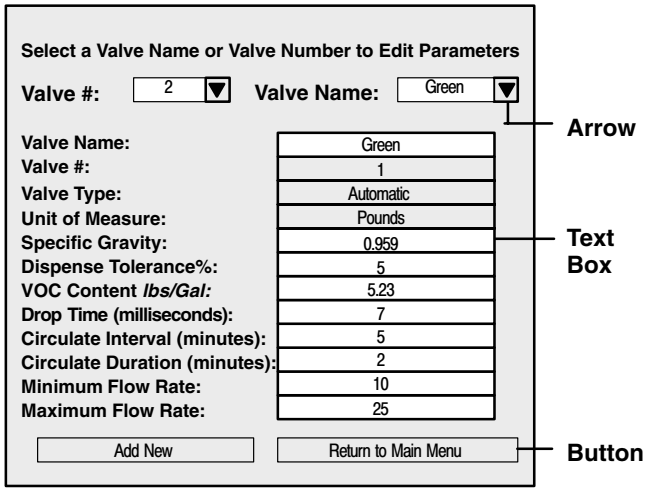


Screen Navigation

The BDS screens have one or more of the following elements to use to access or enter information:

- **Button:** press to access another screen.
- **Arrow:** press to view a list of options.
- **Text Box:** press to activate the box and place the cursor in it so you can type information.

NOTE: You can press the **Tab** key on your keyboard to move the cursor to the next field on the screen.



Introduction

How The Batch Dispense Systems Works

Usage

The standard BDS can proportion most two, three or more component epoxy or polyurethane paints, solvents, inks and a variety of other materials. Depending on the model selected, up to 20 different fluids (components) can be dispensed automatically, and any number of other materials (liquids, powders, etc.) can be added manually. The BDS is not for use with “quick–setting” paints (those with a pot life of less than 15 minutes).

Fluid Supply

The system can be set up to dispense components supplied from pressure tanks or feed pumps. The materials can be transferred from their original containers or from central paint recirculating lines. Each component material is supplied separately to the BDS unit. The standard BDS is designed to accurately dispense batches of 0.6 quarts (0.57 liters) to 55 gallons (208 liters), at average maximum flow rates of 1 GPM (3.8 LPM).

Controller Start Up Sequence

To turn on the BDS, turn the power switch (47) to ON and make sure the E-stop button (7) is not depressed. See figure 1. The controller (29) start up sequence may take up to 5 minutes. The projects and all self diagnostics are performed during this time. Please wait for the Main Operating Screen to appear on the Industrial PC (A) before doing anything else with the controller. Any selections made on the screen during start up may interfere with the process and cause inaccurate dispenses.

NOTE: If a password is requested during the initial startup and system configuration, the system is shipped with “P” as the password.

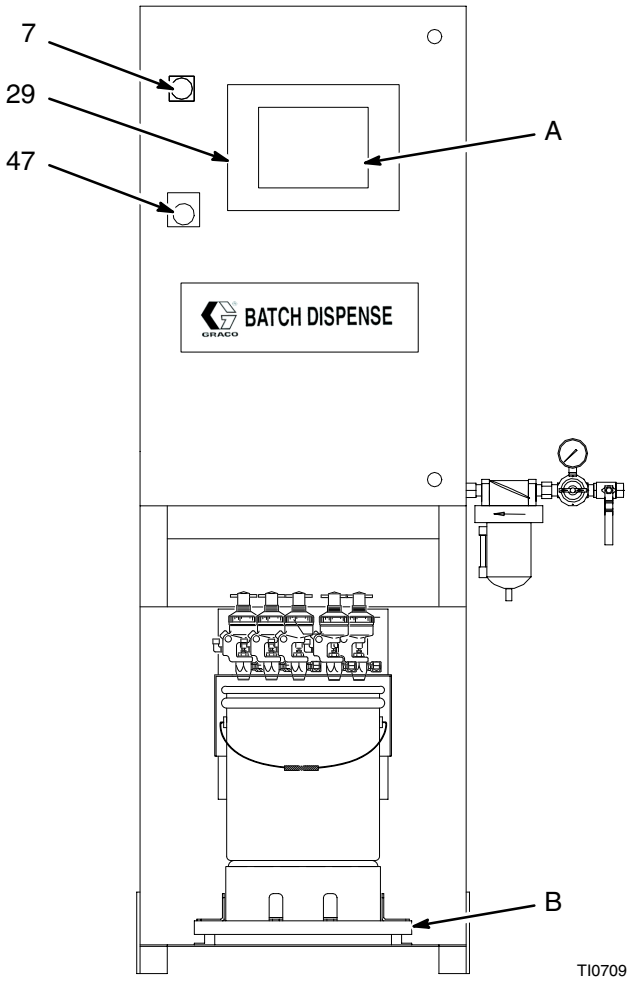


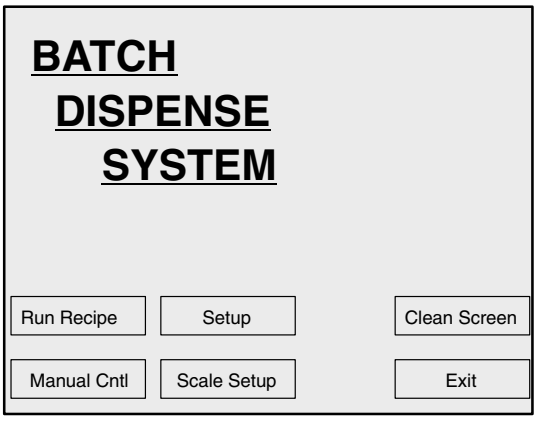
Figure 1 – Batch Dispense System (BDS)

Introduction

Operating Cycle

NOTE: See page 19 for full sequence of Run screens.

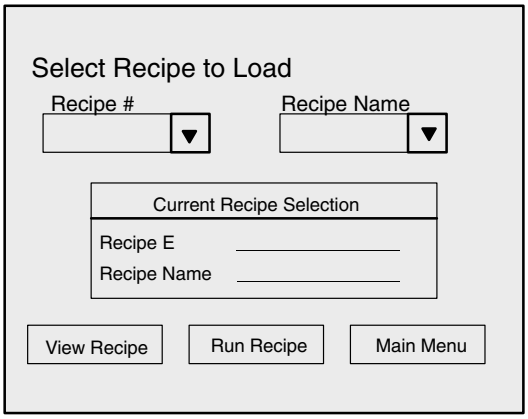
1. To begin operation, the operator presses **Run Recipe** on the Main Operating Screen.



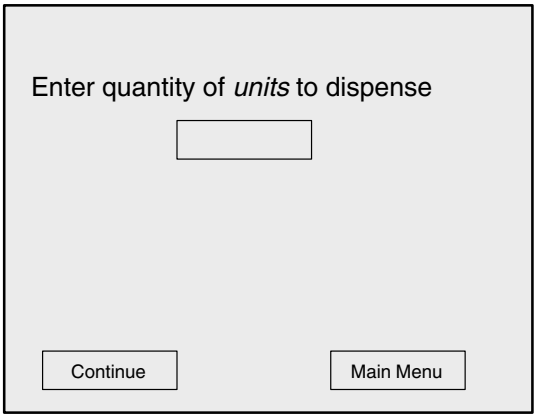
2. If a password is required, it would be entered next.

3. Two more optional screens may appear which require the operator to select tracking information from drop down lists.

4. The operator selects the desired recipe to run. The selection can be made using the recipe number or the recipe name. The recipe can be viewed to verify it is the correct recipe or the operator can select to run the recipe.

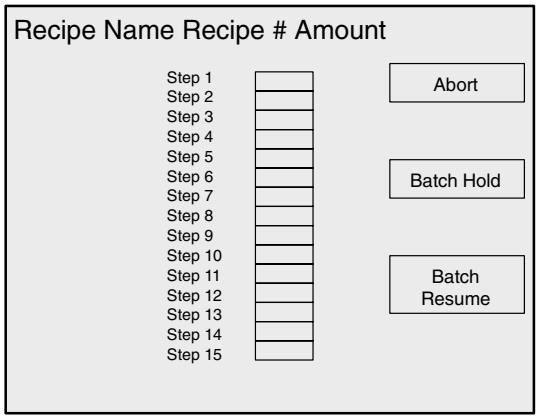


5. The operator enters the dispense quantity. The number entered will be in the units of measure that were selected during setup.

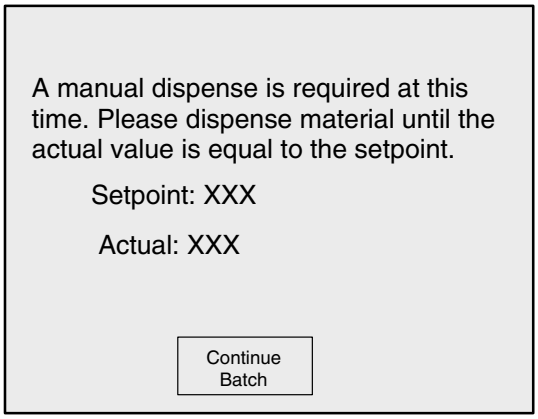


6. By selecting to continue on the next two screens, the operator is verifying that the scale was cleared and cleaned off and that a container of the correct size has been placed on the scale.

7. The Recipe Status Screen shows the operator which step of the recipe is currently running.

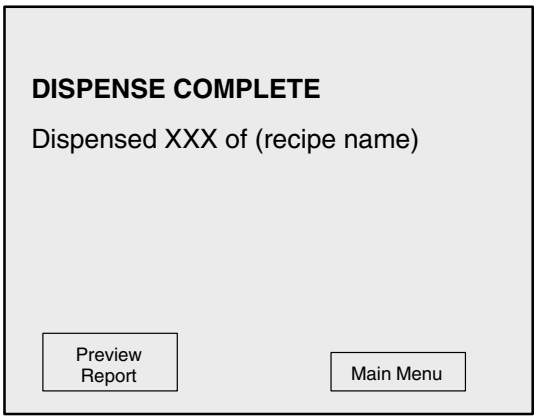


8. If a manual dispense is required, the operator is prompted for the correct amount to dispense. When the manual dispense is complete, the operator presses **Continue Batch**. The BDS verifies that the correct amount was dispensed and then continues with the next step in the recipe.



9. **Abort** can be pressed on the Recipe Status Screen at any time to stop a dispense at the step currently running in the recipe.

10. When a dispense is complete or aborted, the Dispense Complete Screen appears showing the amount of material dispensed.



11. The operator can view the batch report by pressing **Preview Report** and print the report if desired. The dispense data is also stored electronically for later retrieval.

12. Pressing **Main Menu** will return the BDS to the Main Operating Screen.

13. Once the batch is complete, the operator typically removes the container from the platform and agitates the material either manually or with a power mixer.

System Fine Tuning

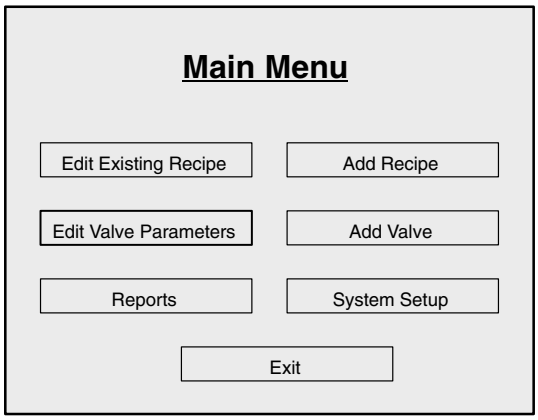
The actual volume of fluid dispensed in each batch can vary slightly from the calculated targets. However, the controller monitors this variance and reports an error if the desired tolerance is not maintained.

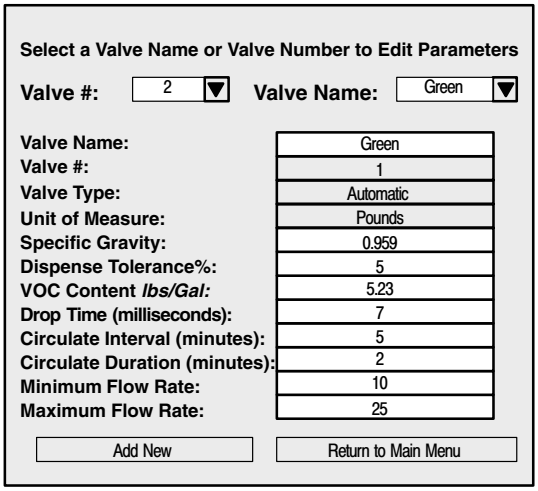
In order to minimize this variance, the controllers minimum flow, maximum flow and drop time parameters must be set for automatic valves and adjusted for each particular fluid and its delivery system. The automatic valve parameters are edited in Setup mode.

Minimum Flow Setting: adjusts the slow flow rate for material during a dispense. The lower the number, the slower the flow of fluid when it gets near the setpoint.

Maximum Flow Setting: adjusts the fast flow rate for material during a dispense. This is the rate at which the fast pour is done. The higher the number, the faster the flow of fluid when it gets near the setpoint.

Drop Time Setpoint: adjusts the amount of time the valve is open when the dispense amount is very close to the setpoint, but a little more material is needed. The higher the number, the longer the valve will stay open.





Installation

Before beginning...

⚠ WARNING

FIRE, EXPLOSION, AND ELECTRIC SHOCK HAZARD

Installing and servicing the equipment requires access to parts which could cause a serious injury if the work is not performed properly.

- Do not install or service this equipment or perform any of the following installation and adjustment procedures unless you are trained and qualified.
- Comply with all applicable local, state, and national fire, electrical, and other safety regulations.

⚠ WARNING

FLAMMABLE OR TOXIC VAPOR HAZARD

Provide fresh air ventilation to avoid the buildup of flammable or toxic vapors. Do not operate the dispense station unless ventilation fans are operating. Follow all national, state, and local codes regarding air exhaust velocity requirements.

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

  309297 — Batch Dispense System Manual (this manual)

  308167 — Air Regulator Manual

  308169 — Air Filter Manual

  306715 — Dispense Valve Manual
- Be sure all accessories are adequately sized and pressure rated to meet the system requirements.

NOTE: If a password is requested during the initial startup and system configuration, the system is shipped with “P” as the password.

- The Typical Installation shown in figure 1 is only a guideline for selecting and installing system components and accessories and is not an actual system design. Contact your Graco distributor for assistance in designing your system.

Select the System Location

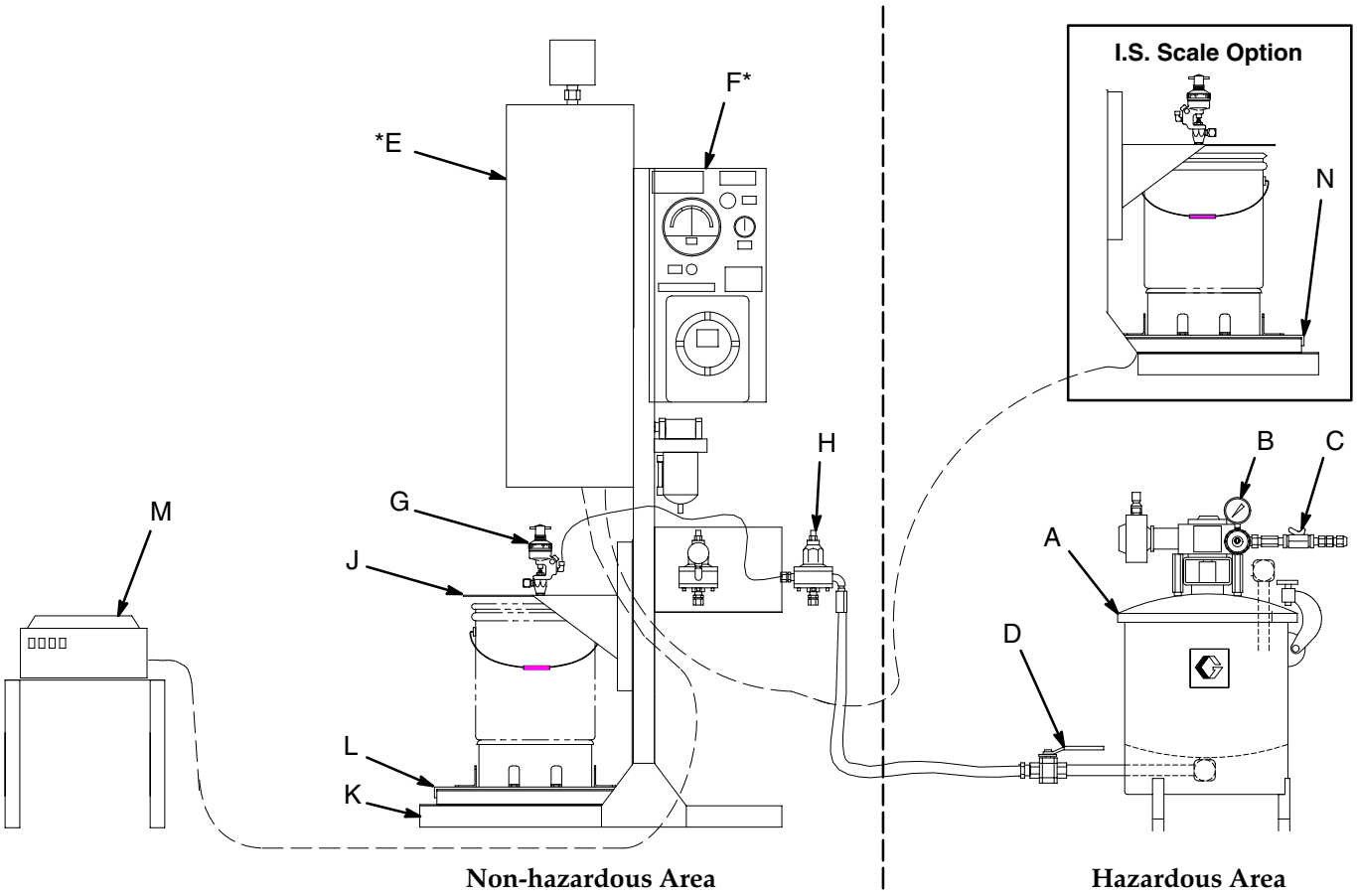
⚠ WARNING

FIRE AND EXPLOSION HAZARD

The controller is designed for use in a non-hazardous location as defined in the National Electrical Code (USA). To install the Batch Dispense equipment in a Class 1, Division 1, Group C and D environment, the X-purge option must be properly installed. Follow the instructions on pages 60–66. Contact your Graco distributor for more information.

It is important to follow the BDS location requirements below to ensure optimum operating results.

- Locate the BDS in a vibration free area: away from punch presses, heavy fork lift traffic, rail lines and other devices which produce significant, low frequency, mechanical vibrations. The vibrations from these items could cause performance problems.
- Shield the BDS 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 weight discrepancies.
- Locate the BDS to minimize material handling. If there will be multiple users, a central location that meets the above requirements is ideal.
- Anchor the BDS to a poured concrete surface. Bolt the BDS frame in all four corners, with a minimum of 3/8 inch diameter bolts.
- Once the Batch Dispense System is anchored in it’s final position, level the scale platform by adjusting the four feet on the base of the platform. Make sure that the platform is stable and does not “rock”.



KEY

A	Pressure Tank	F	X-Purge Assembly*	J	Valve Support	M	Printer
B	Air Regulator	G	Dispense Valve	K	Stand and Frame	N	I.S. Scale Option
C	Air Shutoff Valve	H	Fluid Regulator and Gauge	L	Scale		
D	Fluid Shutoff Valve						
E	Controller Assembly*						

* The controller (E) is designed for use in a non-hazardous location as defined in the National Electrical Code (USA). To install the Batch Dispense equipment in a Class 1, Division 1, Group C and D environment, the X-purge option (F) must be properly installed. Follow the instructions on pages 60–66.

Figure 2 – Typical Installation

Install the Fluid Supply

Connect the fluid and air supply lines as shown in the system and controller drawings starting on page 54.

The installation and operation instructions in this manual generally presume a standard system, using pressure tanks (A) to supply the paint components and solvent. The optional fluid supplies listed below are possible variations and their effect on the instructions.

Optional Fluid Supplies

Instead of pressure tanks (A), the BDS can be supplied by pail or drum pumps or central paint recirculating lines if they are available. An air piloted, fluid pressure regulator is required on each supply line at the input to the BDS.

Other than references to the pressure tanks, operation using other fluid supplies is the same as described in this manual. For maintenance and safety, you must install a fluid shutoff valve between each supply line and the BDS.

The fluid supply must be free of pressure spikes, which are 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.

Installation

Connect the Electrical Supply

⚠ WARNING

FIRE, EXPLOSION, AND ELECTRIC SHOCK HAZARD
To reduce the risk of fire, explosion, or electric shock:

- The Batch Dispense System must be electrically connected using approved explosion proof conduit and fittings.
- A qualified electrician must complete all wiring connections.
- Refer to local code for the explosion proof power supply requirements in your area.
- Also read and follow the warnings on page 4.

Connect the BDS to a 110 VAC grounded electrical supply, with an approved disconnect conduit, and fittings, as required by local electrical codes. Use the system and controller drawings starting on page 54 to make the electrical connections.

Ground the System

⚠ WARNING

FIRE, EXPLOSION, AND ELECTRIC SHOCK HAZARD
To reduce the risk of fire, explosion, or electric shock:

- The Batch Dispense System must be electrically connected to a true earth ground; in the electrical system is not sufficient.
- All wires used for grounding must be 10 gauge minimum.
- A qualified electrician must complete all grounding and wiring connections and check the resistance as instructed
- Refer to you local code for the requirements for a “true earth ground” in your area.
- Also read and follow the warnings on page 4.

Ground the BDS as instructed here and in the individual component manuals. Refer to figure 3 and the system and controller drawings starting on page 54.

Controller

Connect the controller’s green-yellow ground terminal block to the NEMA enclosure’s grounding lug. Connect a ground wire (A) from the enclosure (C) to a true earth ground (B).

Batch Dispense Valve Manifold

Electrically connect the mounting surface for the BDS valve manifold to a true earth ground point to dissipate static electricity generated as fluid is dispensed.

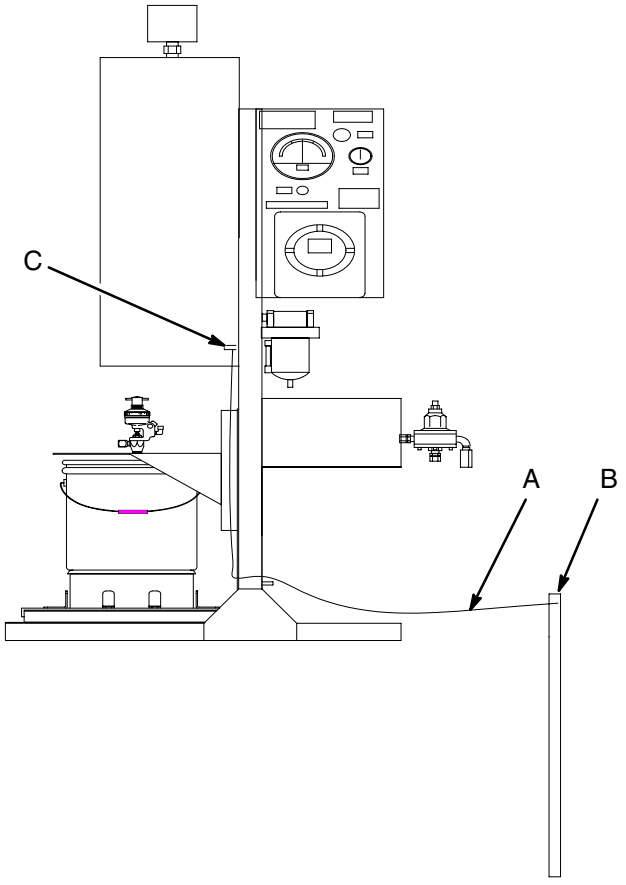


Figure 3 – Grounding the System

Feed Pumps or Pressure Pots

Use a ground wire and clamp to electrically connect each of the supply pumps or pots to a true earth ground. See your separate pump or pressure pot manual.

Air and Fluid Hoses

Use only grounded hoses for supply lines.

Fluid Supply Container

Ground the container according to your local code.

All Containers Filled when Dispensing

Use only metal pails or containers, which are conductive, placed on the grounded scale surface. Do not place the pail on a non-conductive surface, such as paper or cardboard, which interrupts the grounding continuity.

Check the Resistance

⚠ WARNING

FIRE, EXPLOSION, AND ELECTRIC SHOCK HAZARD
To reduce the risk of fire, explosion, or electric shock the resistance between the BDS components and true earth ground must be less than 25 ohms.

Have a qualified electrician check the resistance between each BDS component and the true earth ground. The resistance must be less than 25 ohms. If the resistance is greater than 25 ohms, a different ground site may be required. Do not operate the system until the problem is corrected.

Connect Other Wiring

Refer to the system and controller drawings starting on page 54.

⚠ WARNING

FIRE, EXPLOSION, AND ELECTRIC SHOCK HAZARD
To reduce the risk of fire, explosion, or electric shock:

- The Batch Dispense System must be electrically connected using approved explosion proof conduit and fittings
- A qualified electrician must complete all wiring connections.
- Refer to your local code for the explosion proof wiring requirements in your area.

Industrial PC

The Industrial PC is pre-connected at the factory. Do not change the cable length. If the Industrial PC, Industrial PC cable, or the barrier blocks fail, identify and correct the source of the problem first. Then replace the failed components with identical, approved components only. Service must only be performed by a qualified electrician.

Scale Platform

The scale platform is pre-connected at the factory. Do not change the cable length. The platform is connected to the controller through approved, intrinsically safe barrier blocks. If the platform, platform cable, or the barrier blocks fail, identify and correct the source of the problem first. Then replace the failed components with identical, approved components only. Service must only be performed by a qualified electrician.

Installation

Connect the Industrial PC Interface Cable

The Industrial PC interface cable is terminated on the controller (inside the cabinet) with an eight pin ethernet cable. Any connections to the controller cabinet must be made through approved fittings and connectors only. Connections must only be installed by a qualified electrician. Maximum cable length is 50 feet (15.2 m).

Printer Cable (optional)

The optional printer cable is terminated inside the controller cabinet with a 25 pin “D” connector on the parallel port of the controller. This port is not used if the printer option is not purchased. Communication is standard parallel. Any connections to the controller cabinet must be made through approved fittings and connectors only. Connections must only be installed by a qualified electrician. Maximum cable length for parallel communication is 25 feet (7.6 m).

Before Beginning Operation

- Check all fluid and air connections for correctness and tightness.
- Follow the **Initial Startup Sequence** on page 17.
- Shipping will affect scale calibration. Be sure to calibrate the scale after setting up the software.

Operation

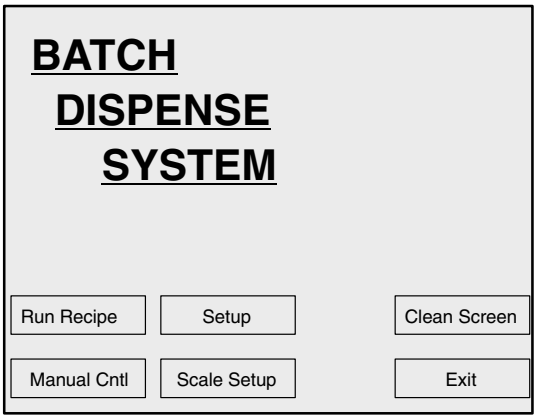
Pressure Relief Procedure

⚠ WARNING

PRESSURIZED EQUIPMENT HAZARD
The system pressure must be manually relieved to prevent the system from starting or dispensing accidentally. To reduce the risk of an injury from accidental spray from the valves, splashing fluid, or moving parts, follow the **Pressure Relief Procedure** whenever you:

- are instructed to relieve the pressure,
- stop dispensing,
- check or service any of the system equipment,
- or install or clean the spray tips.

1. Return to the Main Operating Screen.



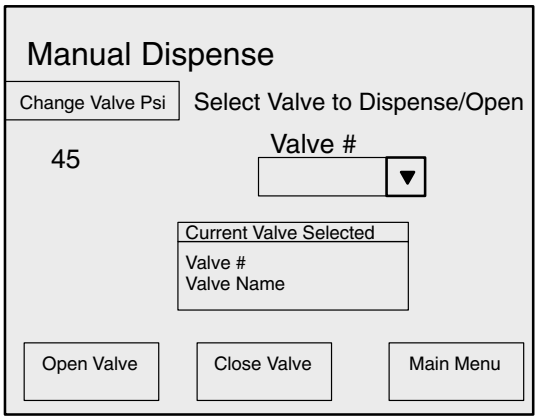
2. Relieve fluid and air pressure at the component and solvent feed pumps or pressure pots, as explained in their separate instruction manuals.

3. Turn off all of the fluid supply ball valves.

4. Place a container under the selected valve to catch the material.

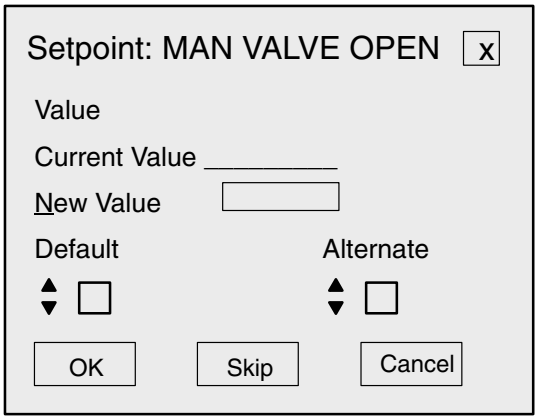
5. Press **Manual Cntrl**.

6. Press the **Valve #** arrow and press the number that corresponds to the valve or material line that you would like to open. Then press **Open Valve**.



NOTE: To open the valve, you must increase the valve air pressure as instructed in the following step.

7. Press **Change Valve Psi**. Type a new value in the text box or use the up arrow to increase the value. Then press **OK**.



8. The new value displays under **Change Valve Psi** on the Manual Dispense Screen. Do not press **Close Valve** until the material stops flowing from the valve to ensure the pressure was fully relieved.

NOTE: The valve will remain open until **Close Valve** is pressed or will close automatically after 30 seconds.

9. Repeat opening and closing all valves that need to have pressure relieved to finish the Pressure Relief Procedure.

10. Press **Main Menu** to return to the Main Operating Screen.

Operation

System Pressure

⚠ WARNING

COMPONENT RUPTURE HAZARD
Do not exceed the maximum working pressure of the lowest rated system component. See the instruction manuals of the individual system components for their maximum working pressures.

Initial Startup Sequence

⚠ WARNING

PRESSURIZED EQUIPMENT HAZARD
To reduce the risk of serious injury, follow the **Pressure Relief Procedure** on page 16 whenever you are instructed to relieve the pressure. stop dispensing, before checking or servicing equipment, or installing or cleaning fluid tips.

See figure 4.

1. The BDS is typically tested with lightweight oil. To prevent contamination of your fluids, thoroughly purge the system with solvent as instructed in **System Purge**, page 18. Leave the solvent in the system.

2. Make sure all cabinet doors are closed and locked.

3. Turn on the air pressure to the BDS and set the supply air regulator (63) to 80 psi (552 kPa, 5.5 bar) minimum.

4. Turn on the electrical power to the BDS through the main disconnect.

5. Turn the Main Power Switch (7) to ON. Make sure the E-stop button (47) is in the “out” position.

NOTE: Pressing the E-stop button in disables all electrical and pneumatic outputs.

6. The Industrial PC (29) will go through its load and boot up procedures and then display the Main Operating Screen (A). This procedure may take up to five minutes and is necessary to load all the correct data for recipe and valve operation, as well as other necessary project information. Do not make any selections until this procedure is complete and the Main Operating Screen is displayed.

7. If this is the first time your are starting up the system, setup information is required before you dispense material. See the Setup section, starting on page 26, to enter the necessary setup values, such as recipes, scale factors, valve and system parameters.

8. Position the container (C) you are filling in the center of the scale platform (B). Centering rings and other accessories are available to simplify this action.

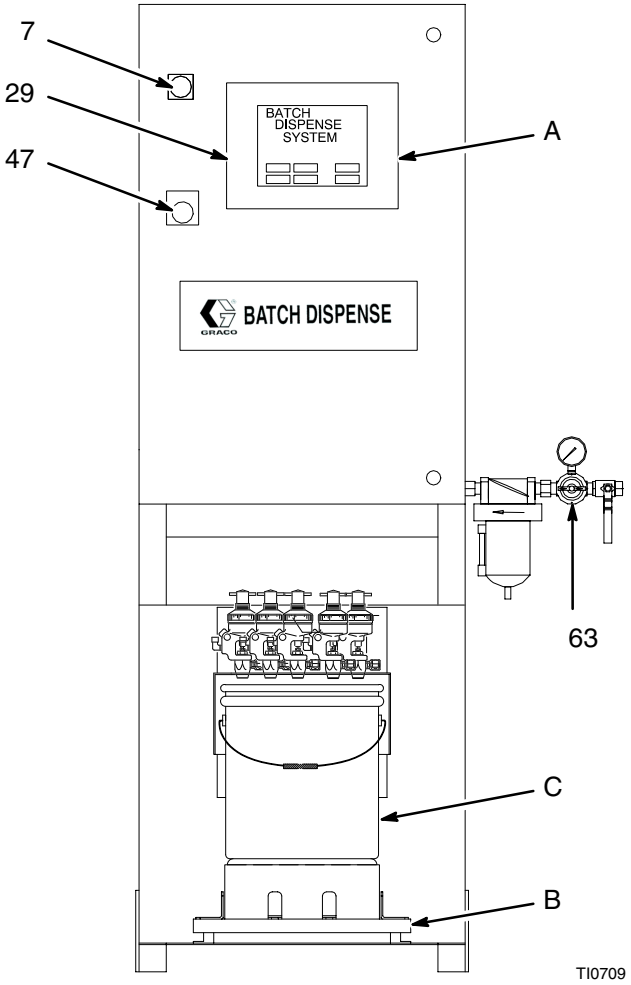


Figure 4 – Batch Dispense System (BDS)

Operation

Purging

To purge the valves or the entire system, follow the instructions below.

Purging the Valves

You may need to purge the valves for a number of reasons, such as changing materials, performing maintenance on a fluid component, or before extended shut down of the system. To purge the valves, follow the instructions below:

1. Identify the valve name and supply pump for the valve you want to purge.

2. Place a container under the selected valve to catch the material.

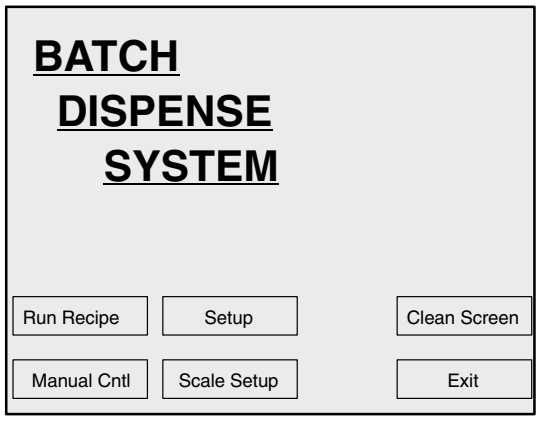
3. Remove excess material from the supply pump.

4. Safely shut down the supply pump, following the instructions provided with the pump.

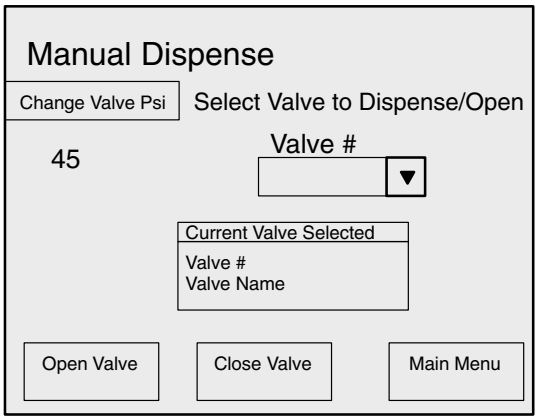
5. Place an adequate supply of flush solvent into the pump feed container.

6. Safely restore pressure to the supply pump.

7. Press **Manual Cntrl** on the Main Operating Screen.

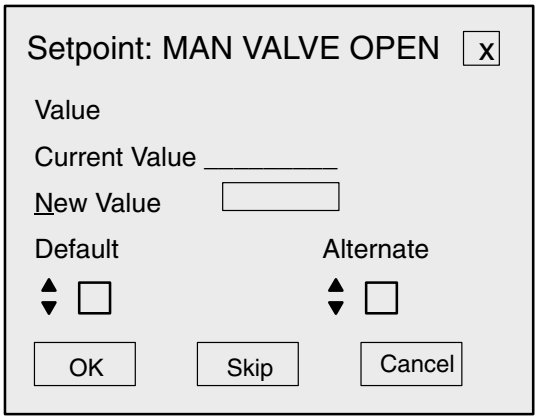


8. Press the **Valve #** arrow and press the number that corresponds to the valve or material line that you are purging. Then press **Open Valve**.



NOTE: To open the valve, you must increase the valve air pressure as instructed in the following step.

9. Press **Change Valve Psi**. Type a new value in the text box or use the up arrow to increase the value. Then press **OK**.



10. The new value displays under **Change Valve Psi** on the Manual Dispense Screen. Do not press **Close Valve** until only clean solvent flows from the valve.

NOTE: The valve will remain open until **Close Valve** is pressed or will close automatically after 30 seconds.

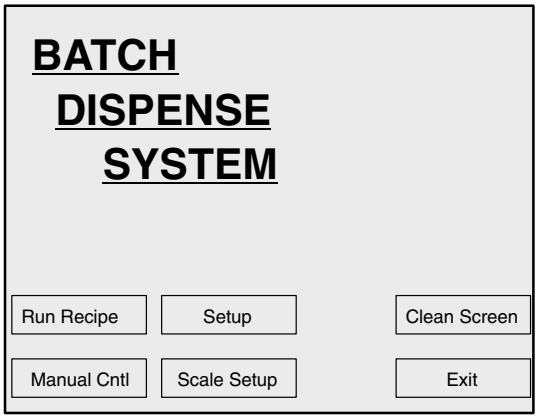
11. If the valve closes automatically before the line is completely purged, press **Open Valve** and repeat the process as needed.

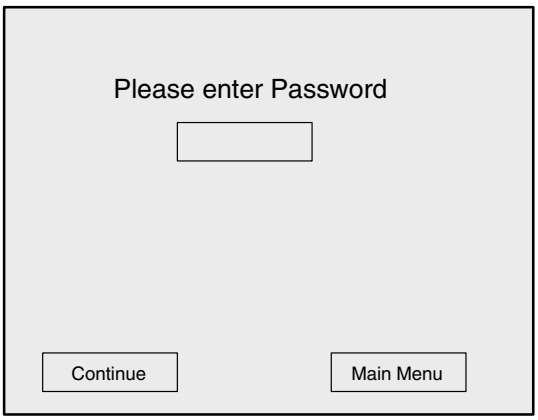
Purging the System

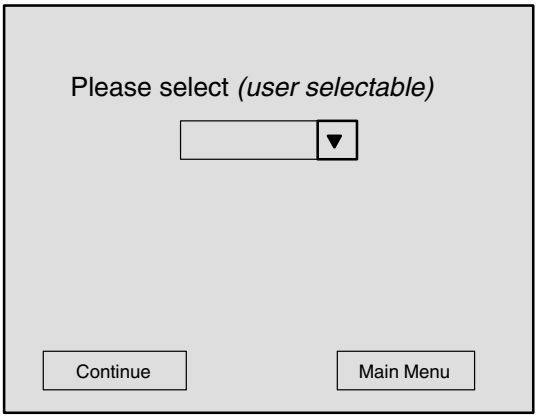
To purge the system, repeat the valve purging procedure above for each of the material valves.

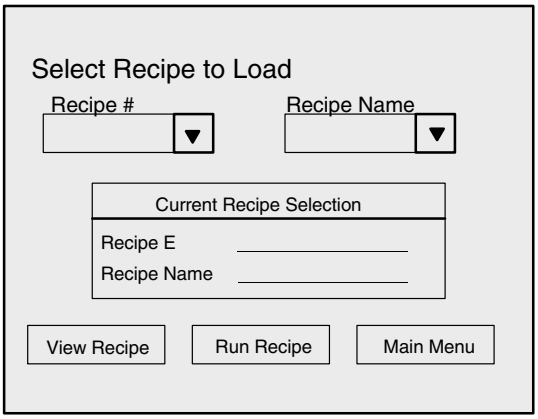
Run Recipe

Screen









How to Use

Run Recipe

Use Run Recipe to dispense a recipe in automatic mode.

Main Operating Screen

⇒ Press **Run Recipe**.

Password Screen *(optional)*

If a password is requested,

⇒ Press the password entry box to place the cursor in the box.

⇒ Type the password.

⇒ Press **OK** in the confirmation popup to accept and enter the password.

⇒ Press **Continue**.

User Selectable Screen *(optional)*

⇒ Press the arrow to see a list of options.

⇒ Press the desired option.

⇒ Press **Continue**.

Recipe Selection Screen

⇒ Press **Recipe #** or **Recipe Name** arrow to see a list of options.

⇒ Press the desired recipe.

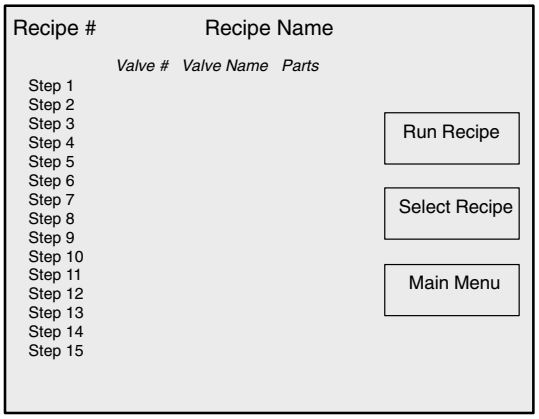
You can either press **View Recipe** to verify your selection or press **Run Recipe** to start the recipe.

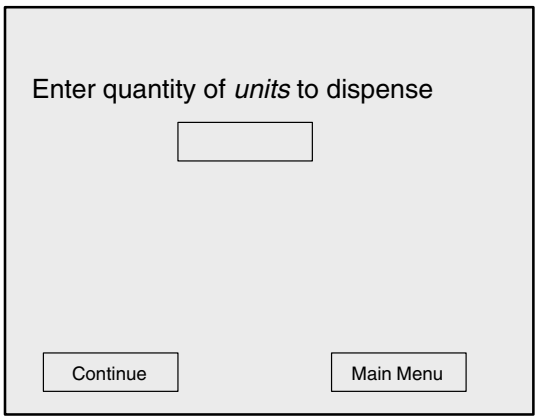
⇒ Press **View Recipe** to look at the Recipe Screen.

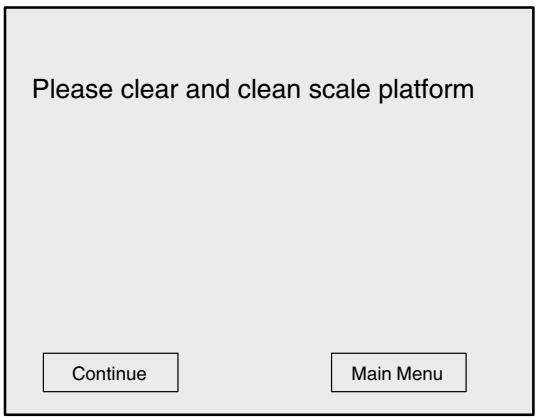
NOTE: Recipe 0 is pre-programmed to be a one valve, auto-dispense recipe.

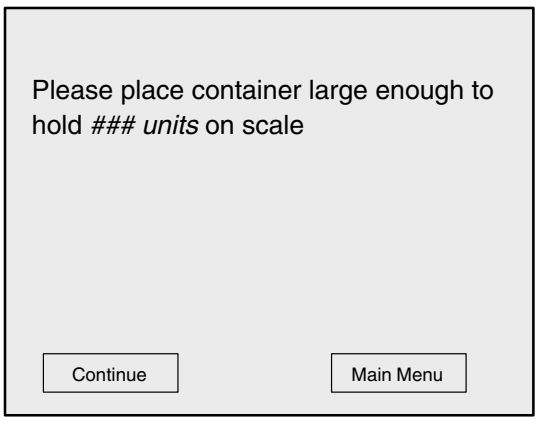
Run Recipe

Screen









How to Use

View Recipe Screen

You can either press **Select Recipe** to select a different recipe or press **Run Recipe** to start the recipe on the screen.

⇒ Press **Run Recipe** to start the recipe.

Quantity Screen

NOTE: *Units* of measure is selected during setup.

⇒ Press the quantity box to place the cursor inside it and type the amount to dispense.

⇒ Press the Enter key.

⇒ On the confirmation screen, press **OK**.

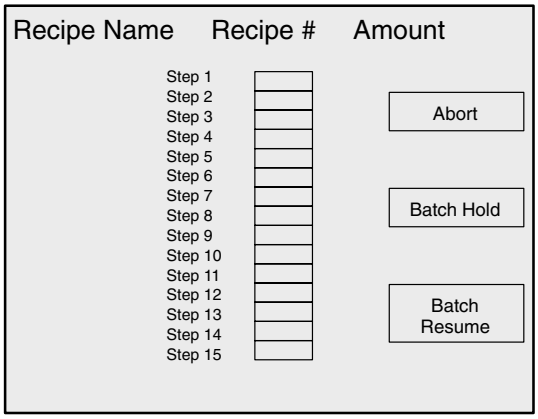
⇒ Press **Continue**.

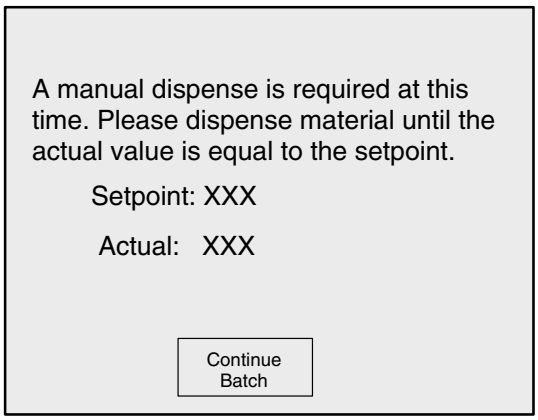
⇒ Press **Continue**

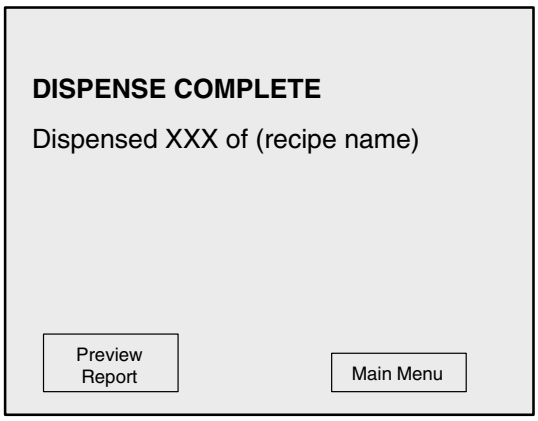
⇒ Press **Continue**.

Run Recipe

Screen







How to Use

Recipe Status Screen

This screen will show the status of the recipe. When a recipe step is active, the step box is green.

⇒ Press **Batch Hold** to stop the dispense at the end of the currently active step. The recipe will remain on hold until **Batch Resume** is pressed.

⇒ Press **Abort** to stop the batch immediately. The Dispense Complete Screen appears to display dispense information.

Manual Dispense Screen

This screen will appear only if a step is programmed as a manual dispense.

⇒ Dispense the material until the Actual quantity equals the Setpoint shown on the screen.

⇒ Press **Continue Batch**.

Dispense Complete Screen

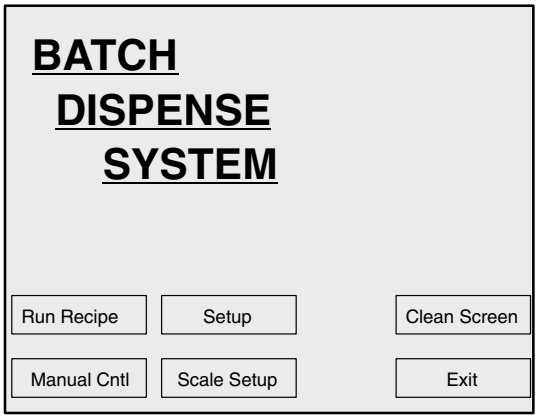
This screen will appear at the end of a batch or if a batch is aborted. The actual amount dispensed for the recipe is shown.

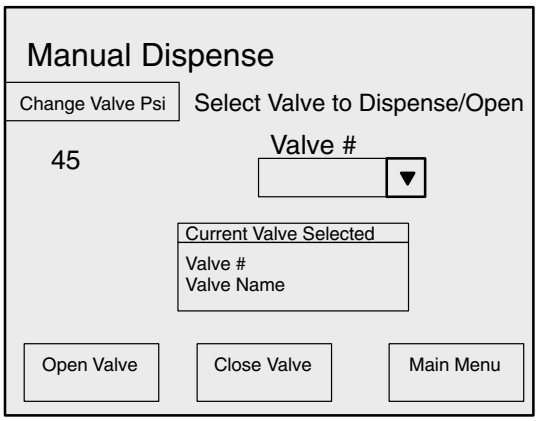
⇒ Press **Preview Report** to view and then print the report if desired.

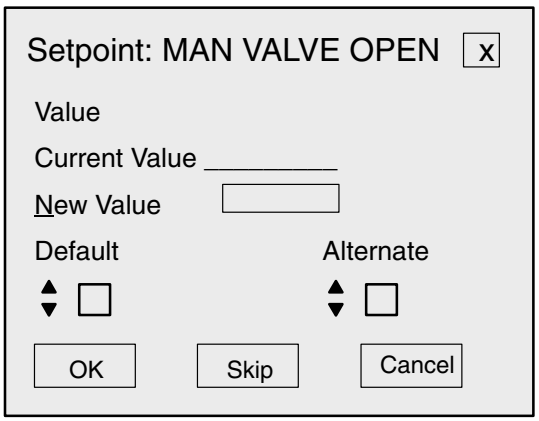
⇒ Press **Main Menu** to return to the Main Operating Screen to begin a new recipe.

Manual Control

Screen







How to Use

Manual Control

Use Manual Control to dispense material manually (used to obtain a sample, purge the valve, or relieve pressure).

Main Operating Screen

⇒ Press **Manual Control**.

Manual Control Screen

⇒ Press the **Valve #** arrow and press the number that corresponds to the valve or material line that you want to open.

⇒ Place a container under the valve.

⇒ Press **Change Valve Psi** to set the flow rate of the valve.

⇒ Type a new value in the text box or use the up arrow key to increase the value. Then press **OK**.

Valve Air Pressure Screen

⇒ Type a new value in the text box or use the up arrow to increase the value. Then press **OK**.

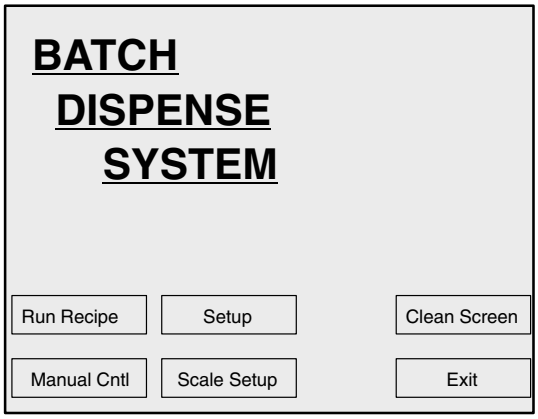
⇒ The new value displays under **Change Valve Psi** on the Manual Control Screen. Press **Open Valve** to start dispensing.

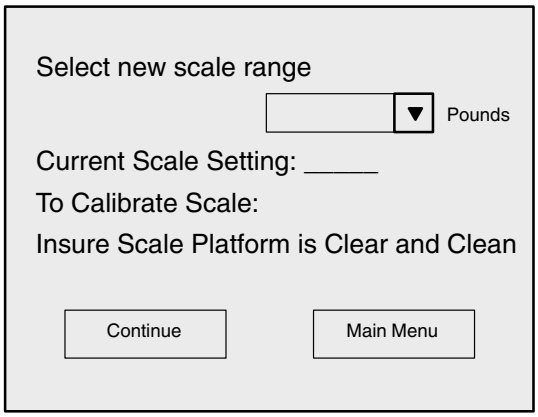
⇒ Press **Close Valve** to stop dispensing.

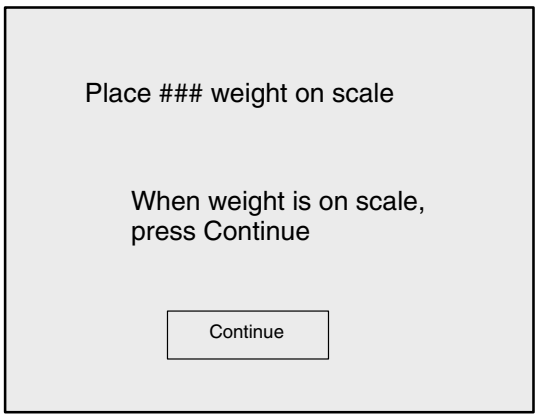
NOTE: The valve will remain open until **Close Valve** is pressed or will close automatically after 30 seconds.

Scale Setup

Screen







How to Use

Scale Setup

Use Scale Setup to calibrate your scale.

Main Operating Screen

⇒ Press **Scale Setup**.

IMPORTANT

If you are changing scales, note the following:

- You must insure the excitation and signal voltages match the voltages of the scale platform that is supplied with the Batch Dispense System.
- Different size load cells produce different increments of signal outputs and accuracy. Any change in full scale size, load cell size, or manufacture could result in inaccurate dispenses.

The screen displays the current scale selection.

⇒ Press the down arrow to select a new scale range if a different scale has been connected.

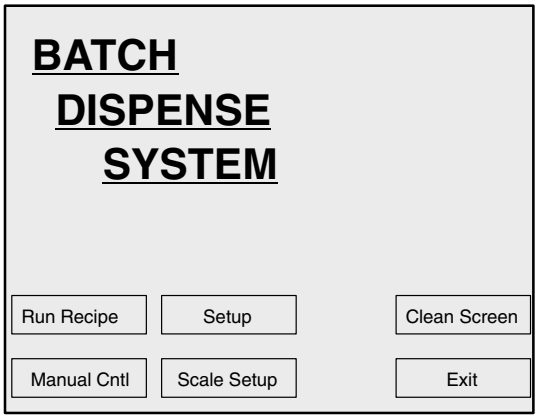
⇒ To calibrate the scale: clean the scale, then press **Continue**.

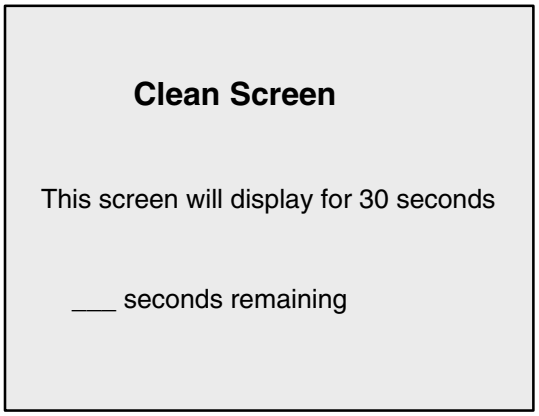
⇒ To finish the calibration, place the proper calibrated weight on the scale.

⇒ Press **Continue**.

Clean Screen

Screen





How to Use

Clean Screen

Use to inactivate the touch screen so you can wipe it clean.

⚠ CAUTION

To avoid damaging the screen, do not use solvents or chemicals to clean the screen. Do not wipe the screen with anything abrasive or rough. Wipe the screen carefully with a soft cloth or a screen wipe, designed for that purpose.

Main Operating Screen

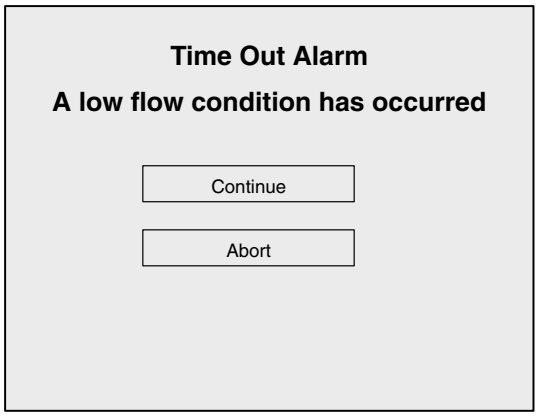
⇒ Press **Clean Screen**.

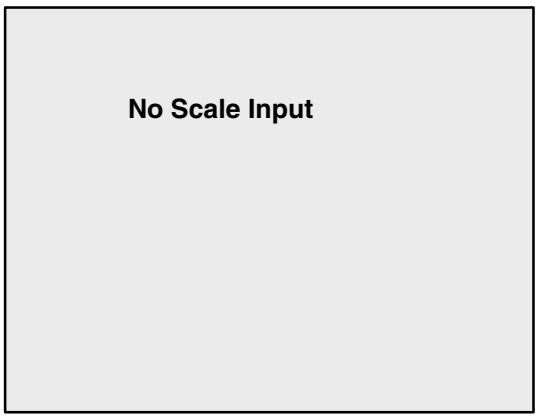
You can wipe the screen while *Clean Screen* is displayed without making any undesired screen selections.

Clean Screen displays for 30 seconds, then the screen returns to the Main Operating Menu.

Alarms

Screen





How to Use

Over Dispense Alarm

This alarm occurs when too much material was dispensed for the current batch.

⇒ Press **Continue** to accept this amount and continue with the batch,

–or–

Press **Abort** to stop the batch.

Under Dispense Alarm

This alarm occurs when not enough material was dispensed on a manual dispense only.

⇒ Press **Continue** to accept this amount and continue with the batch,

–or–

Press **Abort** to stop the batch,

–or–

Select **Add Material** to return to the Manual Add Screen to dispense more material.

Time Out Alarm

This alarm occurs when too much time has passed while the processor was looking for material to be added to the scale.

⇒ Determine the cause of the “low flow condition”.

⇒ Press **Continue** to finish the dispense,

–or–

Press **Abort** to stop the batch.

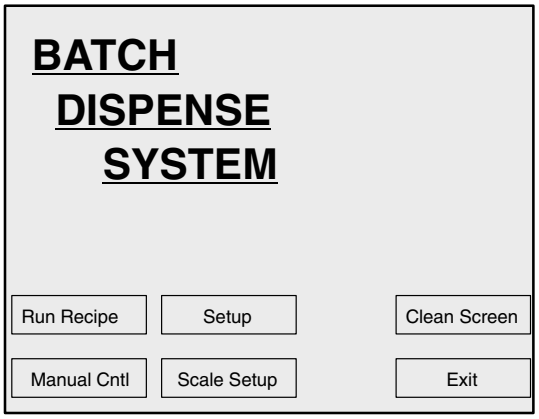
No Scale Input Alarm

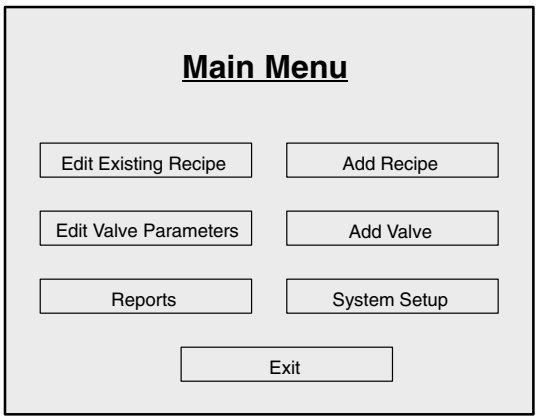
When there is no scale input, this screen appears and will remain visible until the problem is resolved.

⇒ Refer to the system and controller drawings, starting on page 54, to check the wiring connections. Make sure the 10 volt power supply is operating.

Setup

Screen





Initial Setup

To initially setup the BDS system, you usually go though the setup options in the following order:

1. System Setup
2. Edit Valve Parameters
3. Add Valve (if material needs to be added manually)
4. Add Recipe

Other setup options are accessed and used as needed.

How to Use

Setup

Press **Setup** to display the Main Setup Menu Screen.

Main Setup Menu Screen

Provides access to the following setup options:

Edit Existing Recipe (page 42) **—** Recipes provide the sequencing order for dispensing multiple materials into a common tank. You can assign up to 1000 recipes in the database.

Edit Valve Parameters (page 36) **—** Set the system valve variables. The batch dispense system comes preconfigured for either 4, 12, or 20 automatic valves. The valve variables are set with default values at the factory.

Reports (page 44) **—** Sort and view various database reports.

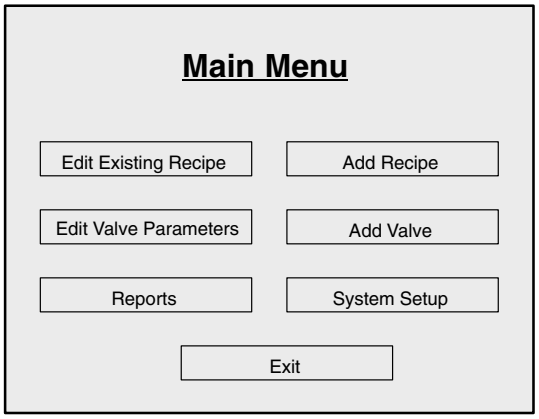
Add Recipe (page 40) **—** Setup recipes. See **Edit Existing Recipe**, above, for more information.

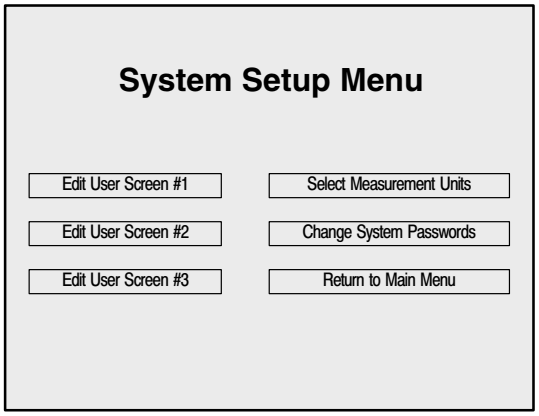
Add Valve (page 38) **—** Establish setpoints for manual valves. A manual valve defines the manual addition of specific materials into a recipe at a prescribed amount. You can assign up to 1000 manual valves in the database. Manual valve numbers are automatically assigned.

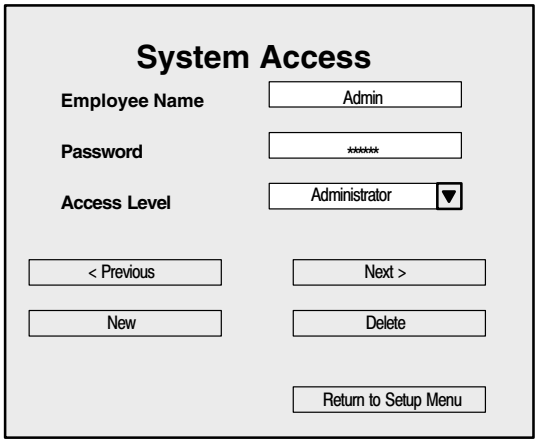
System Setup (page 27) **—** Set system wide variables such as units of measurement and passwords.

Setup

Screen







How to Use

System Setup

Use to set system wide variables.

Main Setup Menu

⇒ Press **System Setup.**

Password Screen

⇒ Type your Administrator password.

⇒ Press **Accept Password/Continue**.

To add new employees or edit existing employee entries:

System Setup Menu Screen

⇒ Press **Change System Passwords**.

NOTE: The system is shipped with "P" as the password. Be sure to change this password.

System Access Screen

⇒ Press **New** to add a new employee.

–or–

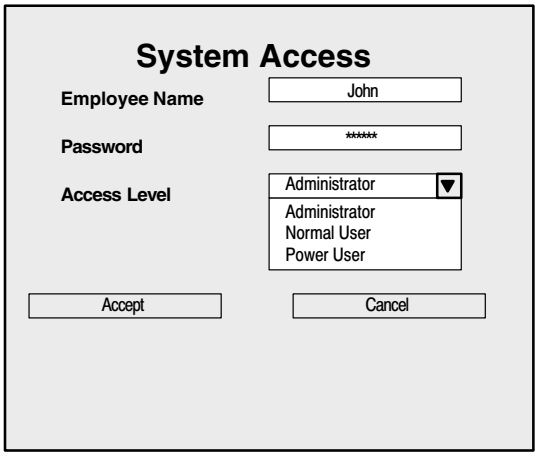
Press **Next>** or **<Previous** to view and edit existing employees.

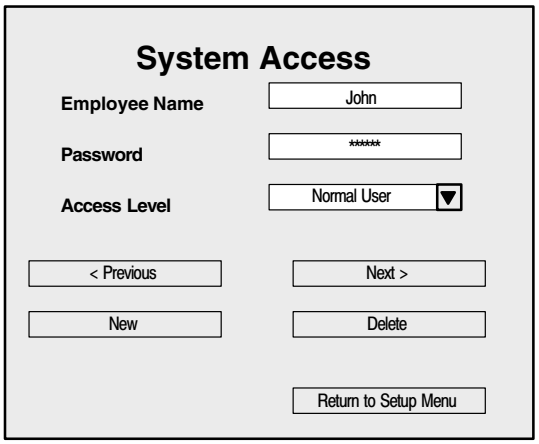
–or–

Press **Delete** to remove access privileges for an existing employee.

Setup

Screen





How to Use

⇒ Type the Employee Name and Password.

⇒ Press the down arrow and select the appropriate access level:

a. **Administrator –** Allows full access to all BDS screens.

b. **Normal User –** Allows access to run time screens. Prevents access to all setup and editing functions.

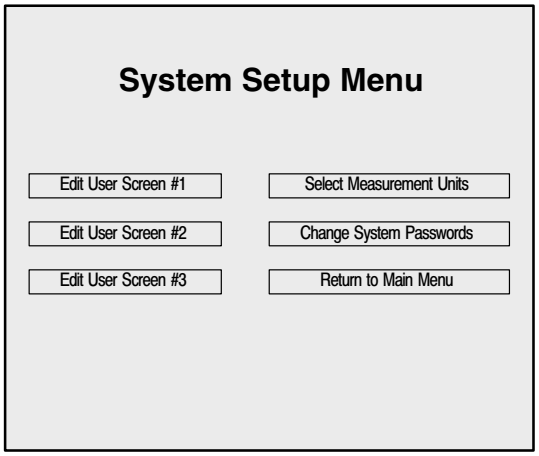
c. **Power User –** Allows access to run time screens and recipe and valve edit screens.

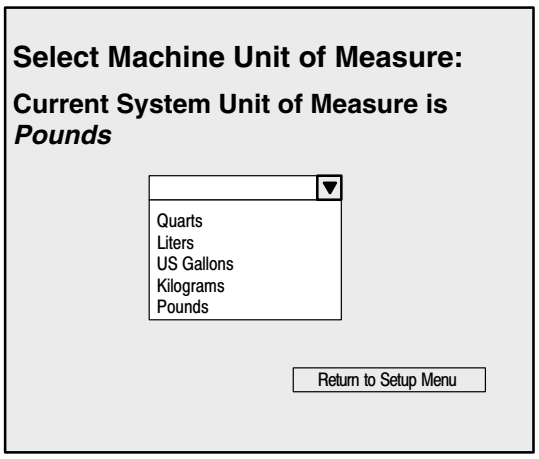
⇒ Press **Accept**.

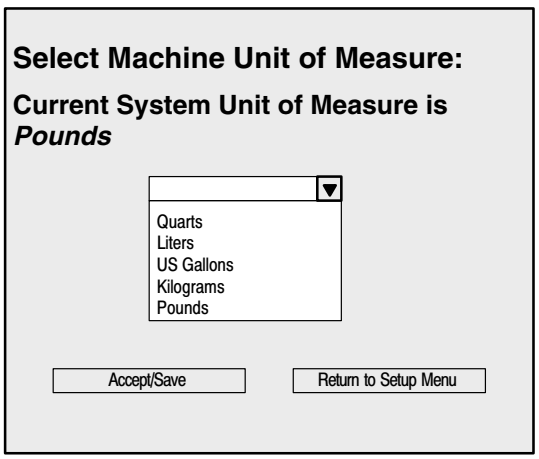
⇒ Press **Return to Setup Menu**.

Setup

Screen







How to Use

To set measurement units:

System Setup Menu Screen

⇒ Press **Select Measurement Units**.

Unit of Measure Screen

⇒ Press the down arrow and select the desired units of measure.

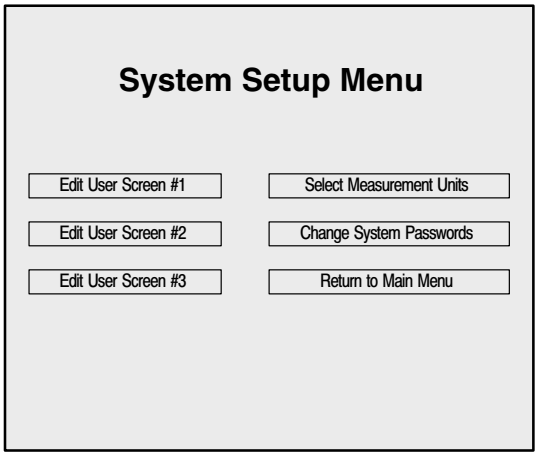
⇒ Press **Return to Setup Menu**.

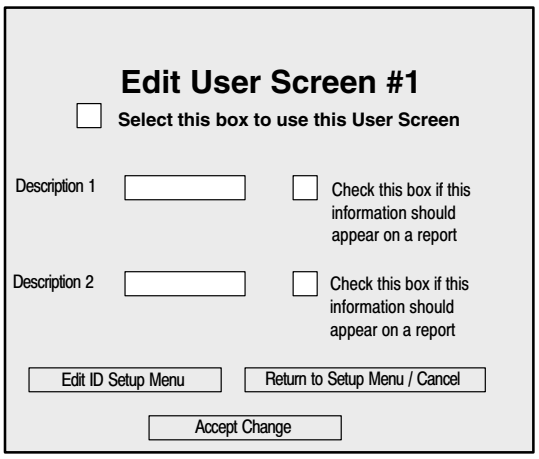
⇒ Press **Accept/Save**.

⇒ Press **Return to Setup Menu**.

Setup

Screen





How to Use

To edit User Screen #1:

System Setup Menu Screen

⇒ Press **Edit User Screen #1**.

Edit User Screen #1 Screen

⇒ Press the check box located next to *"Select this box to use this User Screen"* if you want USER SCREEN #1 to appear when running recipes.

⇒ To change **Description 1**, type in the box. The new description will appear on the Edit *Description* User Screen #1 Setup Menu and run time screens.

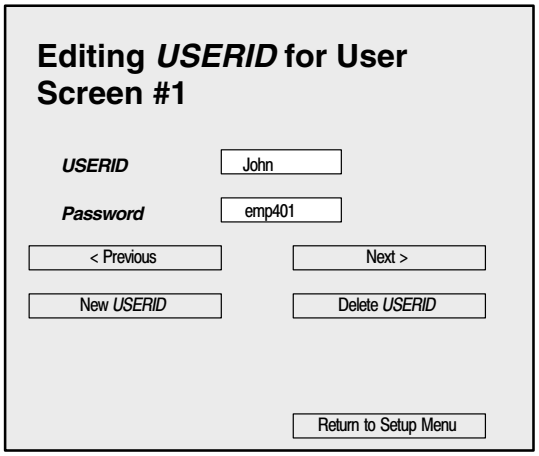
⇒ To change **Description 2**, type in the box. The new description will appear on the Edit *Description* User Screen #1 Setup Menu and run time screens.

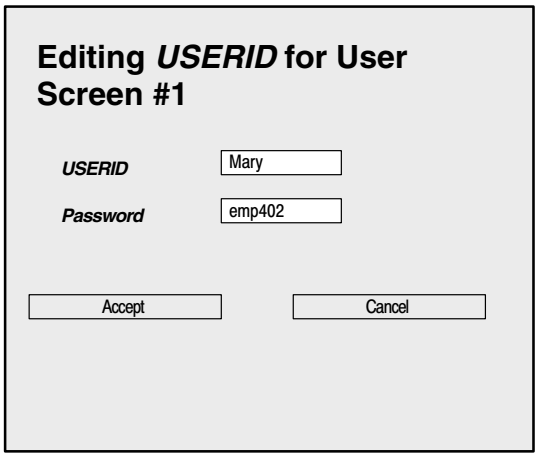
⇒ Press the Description 1 and/or Description 2 check box(es) if you want the information to appear on a report.

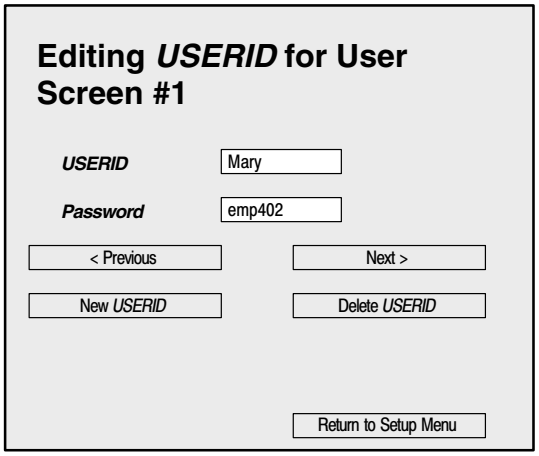
⇒ Press **Accept Change**.

⇒ Press **Edit ID Setup Menu** to add/edit information for User Screen #1.

Screen







How to Use

To add or edit description for User Screen #1:

NOTE: For this example the description for User Screen #1 is USERID. A user ID (description 1) and password (description 2) are requested.

⇒ Press **New** to add a new *USERID*.

–or–

Press **Next>** or **<Previous** to view and edit an existing *USERID*.

–or–

Press **Delete** to remove access privileges to an existing *USERID*.

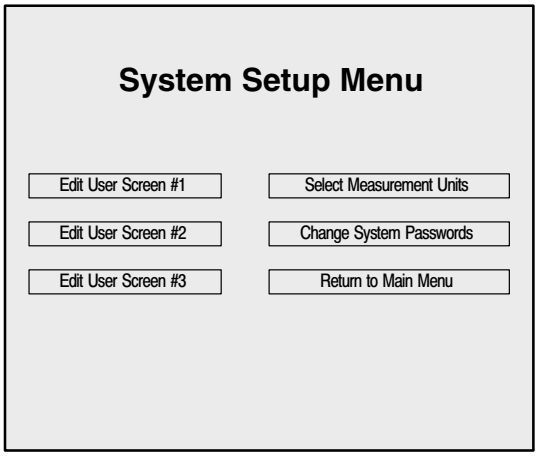
⇒ Type the necessary information in the text boxes.

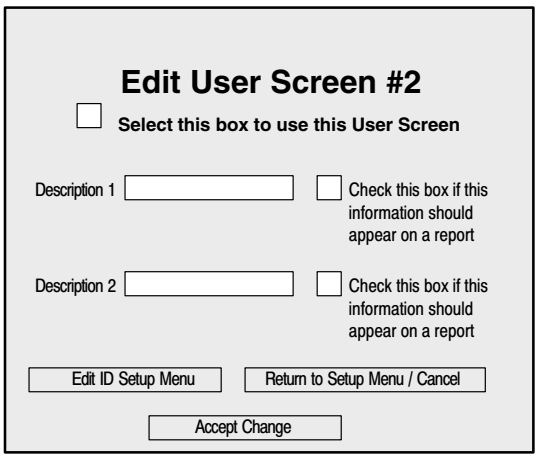
⇒ Press **Accept**.

⇒ Press **Return to Setup Menu**.

Setup

Screen





How to Use

To edit User Screen #2:

System Setup Menu Screen

⇒ Press **Edit User Screen #2**.

Edit User Screen #2 Screen

⇒ Press the check box located next to *"Select this box to use this User Screen"* if you want USER SCREEN #2 to appear when running recipes.

⇒ To change **Description 1**, type in the box. The new description will appear on the Edit *Description* User Screen #2 Setup Menu and run time screens.

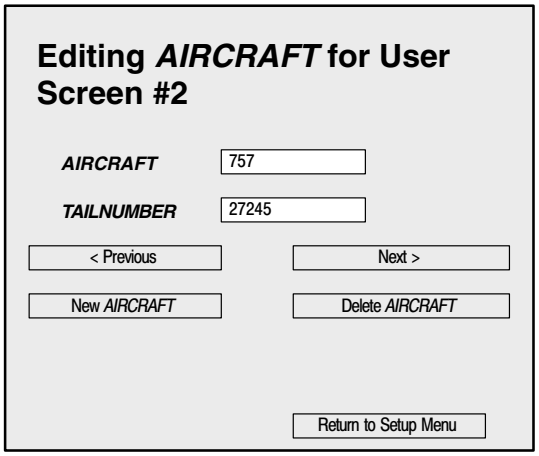
⇒ To change **Description 2**, type in the box. The new description will appear on the Edit *Description* User Screen #2 Setup Menu and run time screens.

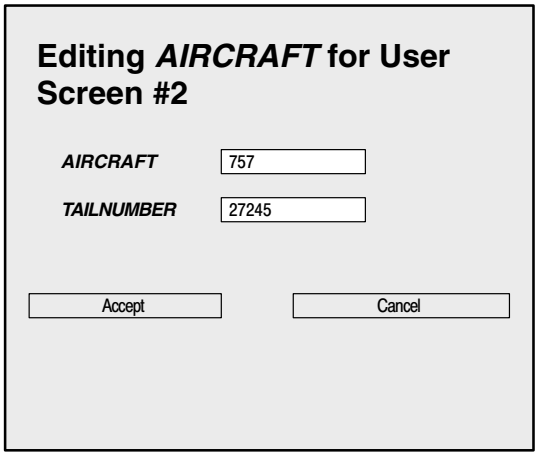
⇒ Press the Description 1 and/or Description 2 check box(es) if you want the information to appear on a report.

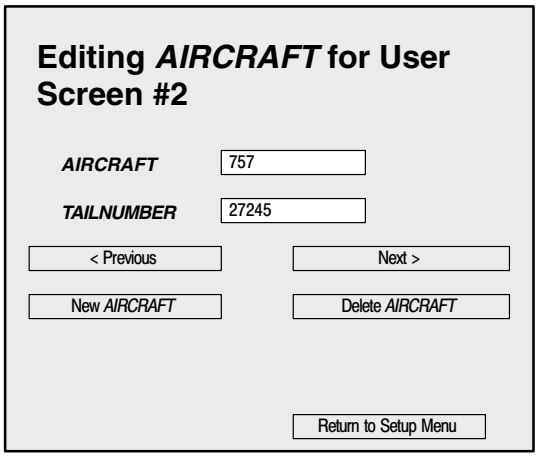
⇒ Press **Accept Change**.

⇒ Press **Edit ID Setup Menu** to add/edit information for User Screen #2.

Screen







How to Use

To add or edit description for User Screen #2:

NOTE: For this example the description for User Screen #2 is AIRCRAFT. An aircraft identification (description 1) and tail number (description 2) are requested.

⇒ Press **New** to add a new *AIRCRAFT*.

–or–

Press **Next>** or **<Previous** to view and edit an existing *AIRCRAFT*.

–or–

Press **Delete** to remove an existing *AIRCRAFT*.

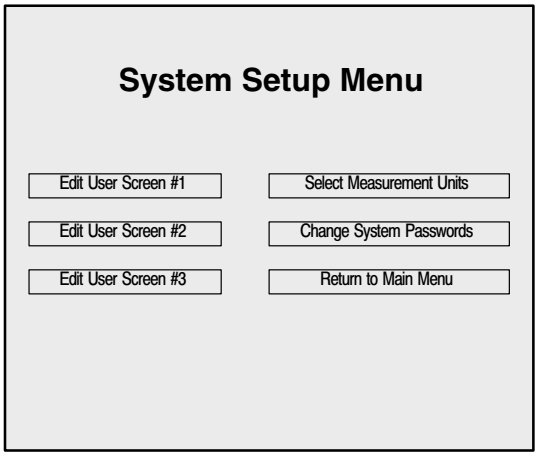
⇒ Type the necessary information in the text boxes.

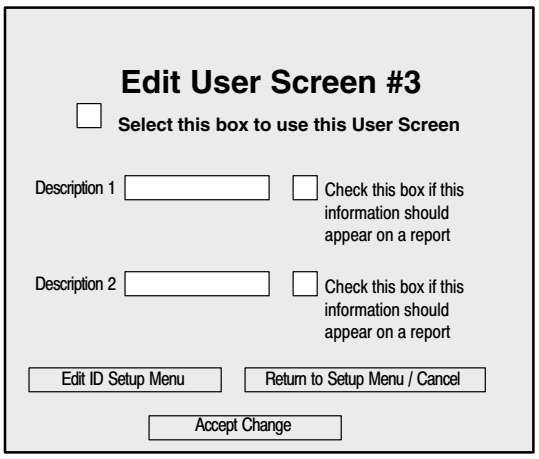
⇒ Press **Accept**.

⇒ Press **Return to Setup Menu**.

Setup

Screen





How to Use

To edit User Screen #3:

System Setup Menu Screen

⇒ Press **Edit User Screen #3**.

Edit User Screen #3 Screen

⇒ Press the check box located next to *"Select this box to use this User Screen"* if you want USER SCREEN #3 to appear when running recipes.

⇒ To change **Description 1**, type in the box. The new description will appear on the Edit *Description* User Screen #3 Setup Menu and run time screens.

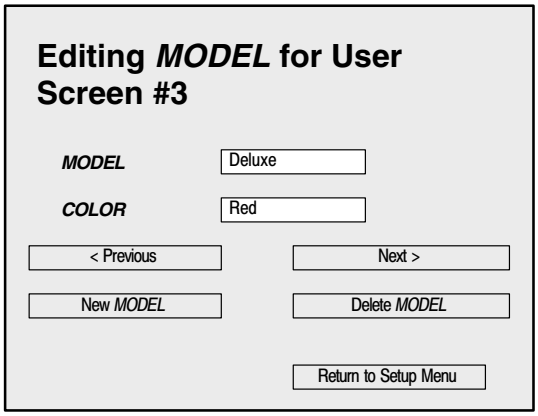
⇒ To change **Description 2**, type in the box. The new description will appear on the Edit *Description* User Screen #3 Setup Menu and run time screens.

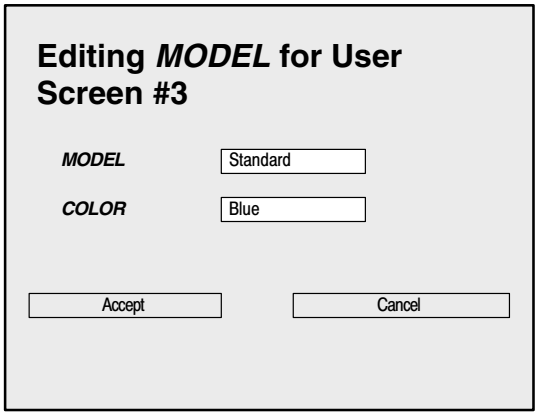
⇒ Press the Description 1 and/or Description 2 check box(es) if you want the information to appear on a report.

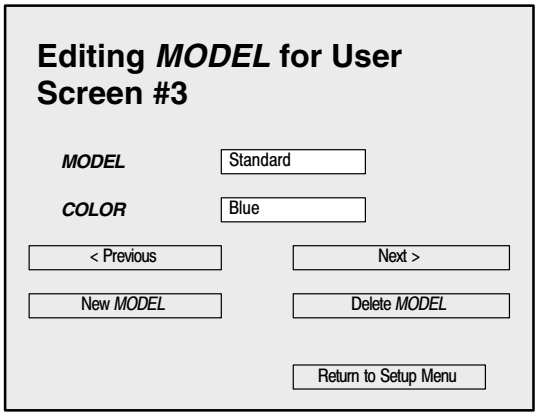
⇒ Press **Accept Change**.

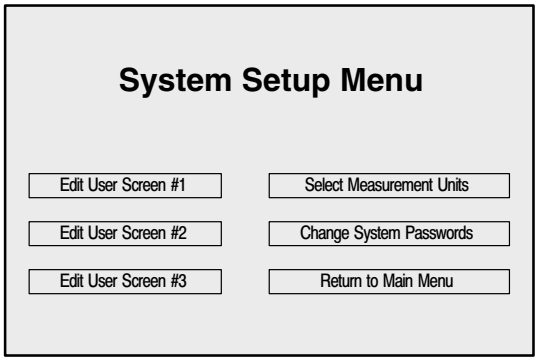
⇒ Press **Edit ID Setup Menu** to add/edit information for User Screen #3.

Screen









How to Use

To add or edit description for User Screen #3:

NOTE: For this example the description for User Screen #3 is MODEL. The model (description 1) and color (description 2) are requested.

⇒ Press **New** to add a new *MODEL*.

–or–

Press **Next>** or **<Previous** to view and edit an existing *MODEL*.

–or–

Press **Delete** to remove an existing *MODEL*.

⇒ Type the necessary information in the text boxes.

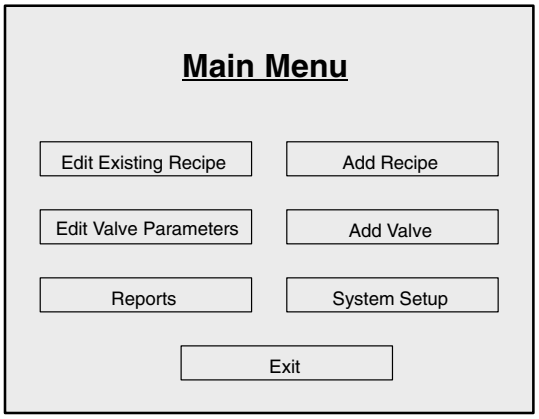
⇒ Press **Accept**.

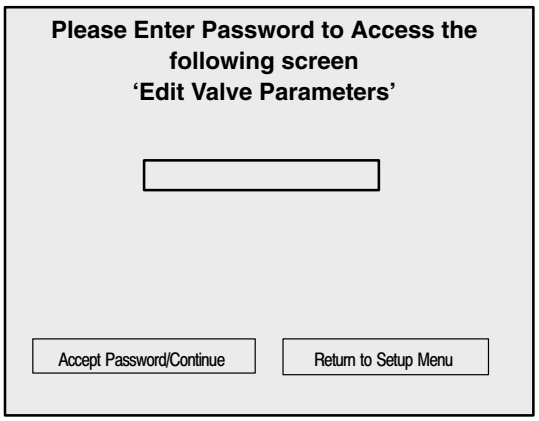
⇒ Press **Return to Setup Menu**.

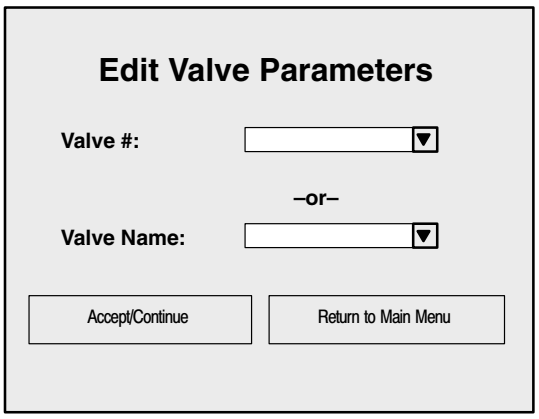
⇒ Press **Return to Main Menu**.

Setup

Screen







How to Use

Edit Valve Parameters

Use to set the system valve variables. The batch dispense system comes preconfigured for either 4, 12, or 20 automatic valves. The valve variables are set with default values at the factory.

NOTE: Contact your Graco distributor if your system requires additional automatic valves.

Main Setup Menu

⇒ Press **Edit Valve Parameters**.

Password Screen

⇒ Type your password.

⇒ Press **Accept Password/Continue**.

Edit Valve Parameters Selection Screen

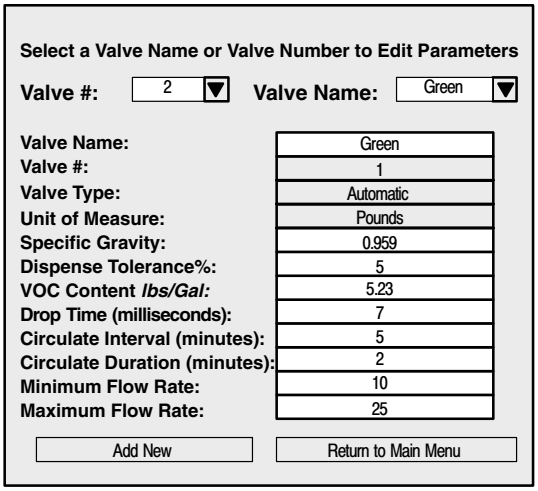
⇒ Press the **Valve #** or **Valve Name** down arrow and select the desired valve.

⇒ Press **Accept/Continue**.

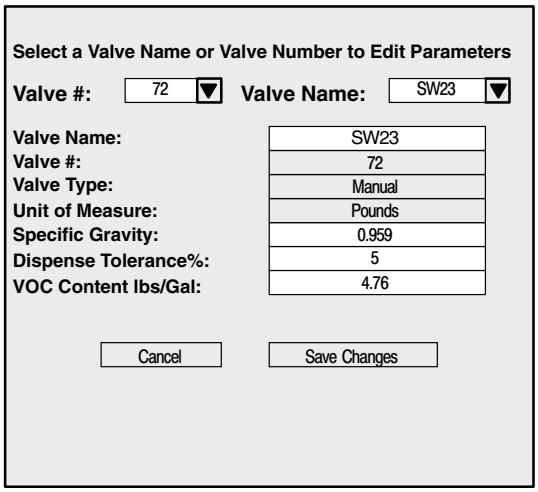
Setup

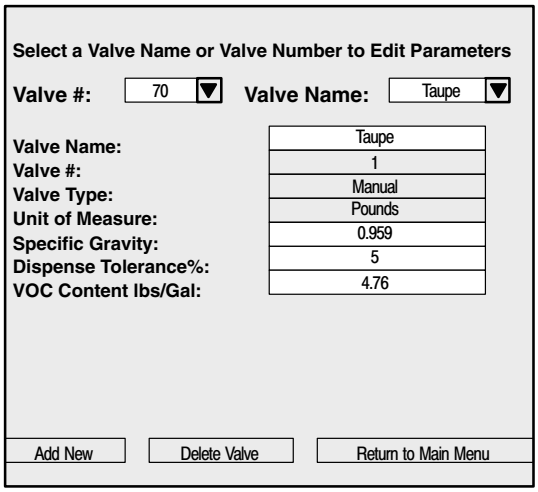
Screen

Screen for Automatic Valves



Screens for Manual Valves





How to Use

Edit Valve Parameters Screen

⇒ Press the **Valve #** or **Valve Name** down arrow to select a different valve to edit.

⇒ To make changes to the parameters, press the text box next to the parameter you want to change. Type the new value in the box.

NOTE:

- Manual valve numbers are automatically assigned when using the **Add Valve** option. (Note that if a valve is deleted, the valve number cannot be reassigned.) The setpoints that you can edit are:
  - **Valve Name**
  - **Specific Gravity**
  - **Dispense Tolerance** (whole numbers only)
  - **VOC Content**
- The **VOC Content** unit of measure is set during System Setup (page 29).
- The **Drop Time** setpoint determines how long the dispense valve actuates during the drop dispense portion of a recipe step.
- The **Circulate Interval** setpoint determines the length of time between valve recirculation cycles.
- The **Circulate Duration** setpoint determines the length of time the valve recirculates.
- The **Minimum Flow Rate** setpoint determines the minimum flow rate at which the dispense valve will operate. It is also the rate at which the step drop dispense occurs.
- The **Maximum Flow Rate** setpoint determines the maximum flow rate at which the dispense valve will operate.

⇒ When you are done editing the valve parameters, press **Save Changes**.

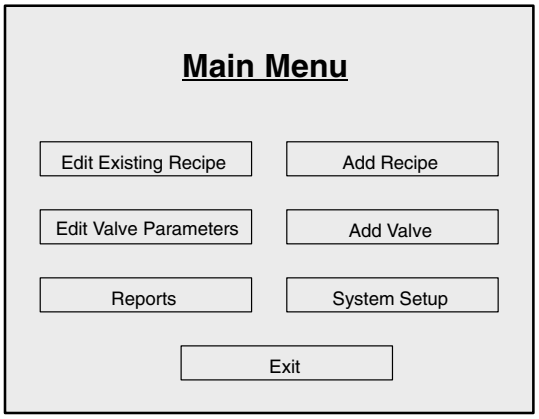
⇒ Press **Valve #** or **Valve Name** down arrow to select and edit another valve.

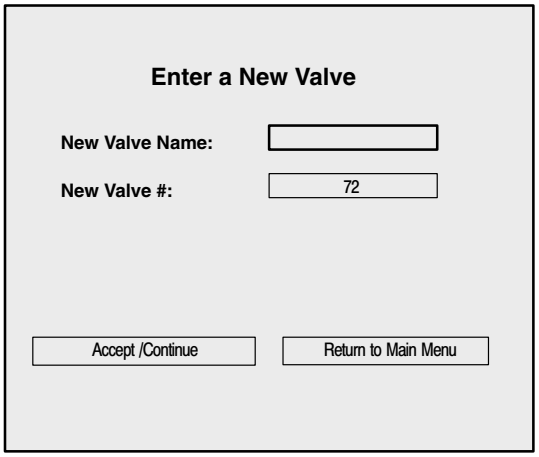
–or–

Press **Return to Main Menu** to exit the editing screen.

Setup

Screen





How to Use

Add Valve

Use to establish setpoints for manual valves. A manual valve defines the manual addition of specific materials into a recipe at a prescribed amount. You can assign up to 1000 manual valves in the database. Manual valve numbers are automatically assigned.

Main Setup Menu

⇒ Press **Add Valve**.

⇒ Type your password.

⇒ Press **Accept Password/Continue**.

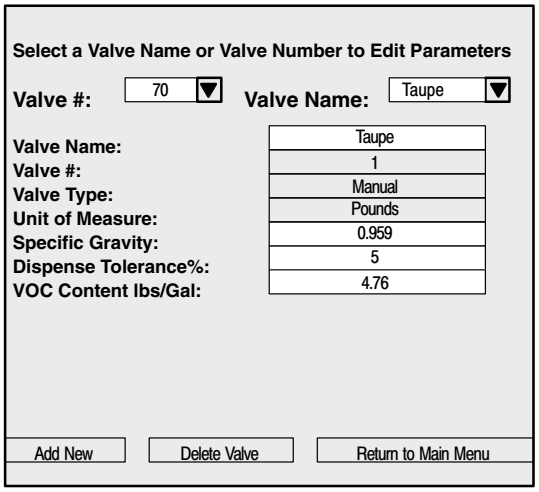
New Valve Screen

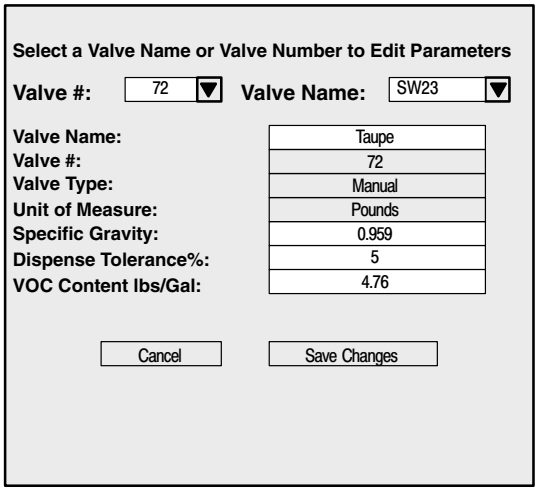
⇒ Type the New Valve Name or New Valve # in the designated text box.

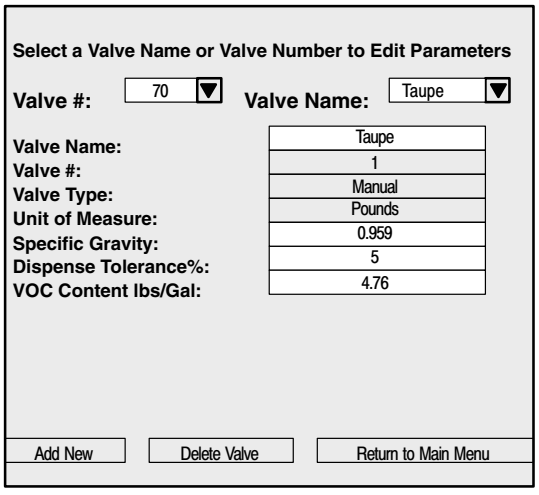
⇒ Press **Accept/Continue**.

Setup

Screen







How to Use

New Valve Parameters Screen

⇒ To make changes to the parameters, press the text box next to the parameter you want to change. Type the new value in the box.

NOTE: The Valve #, Valve Type, and Unit of Measure are not editable. The unit of measure is set during System Setup (page 27).

⇒ When you are done editing the valve parameters, press **Save Changes**.

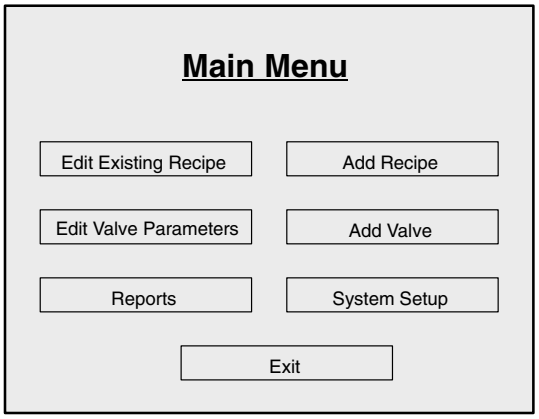
⇒ Press **Valve #** or **Valve Name** down arrow to select and edit another valve.

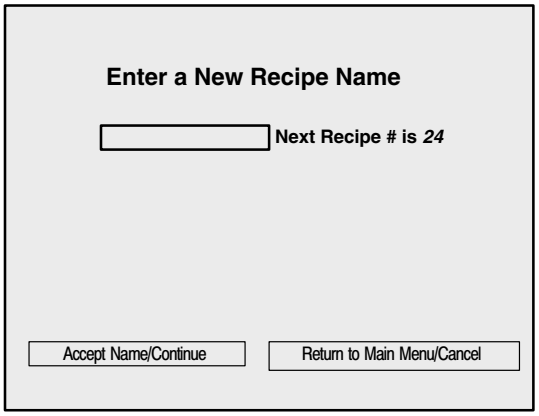
–or–

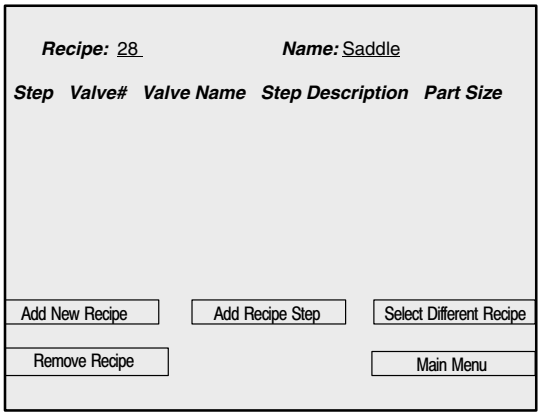
Press **Return to Main Menu** to exit the editing screen.

Setup

Screen







How to Use

Add Recipe

Use to setup recipes. Recipes provide the sequencing order for dispensing multiple materials into a common tank. You can assign up to 1000 recipes in the database.

Main Setup Menu

⇒ Press **Add Recipe**.

Password Screen

⇒ Type your password.

⇒ Press **Accept Password/ Continue**.

New Recipe Screen

⇒ Type the New Recipe Name. The recipe number is assigned automatically.

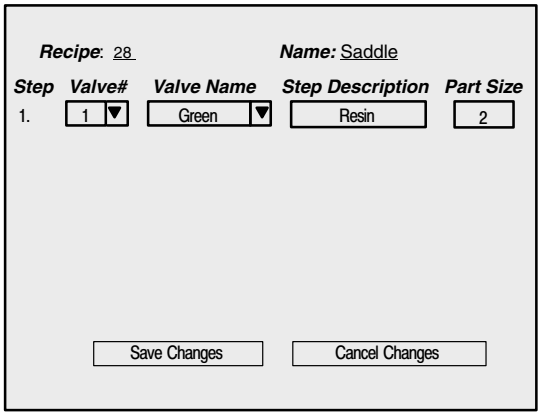
NOTE: Once a recipe is named, the name cannot be changed.

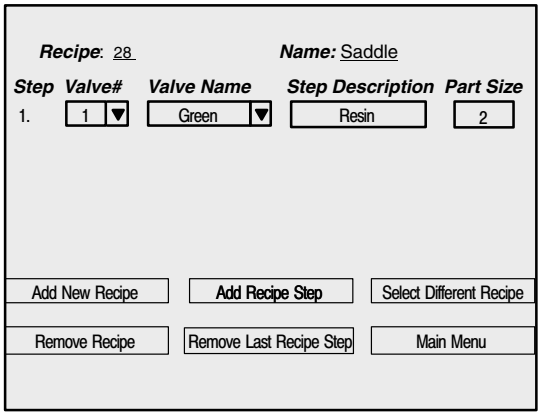
⇒ Press **Accept Name/Continue**.

⇒ Press **Add Recipe Step**.

Setup

Screen





How to Use

Recipe Setup Screen

⇒ Press the **Valve #** or **Valve Name** down arrow key and select the desired valve.

–or–

Type the **Valve #** or **Valve Name** in the respective text box.

Four different valve types are available:

- **Automatic Valves** (valve #1–20) The valve number depends on the quantity of valves purchased.
- **Sweat Timer** (valve #51) — A step delay that can be entered multiple times in the recipe. The recipe will automatically index to the next step after the timer preset has elapsed. The length of the delay is entered after valve 51 is selected in the recipe.
- **Hold Timer** (valve #52) — Is the same as the Sweat Timer except the recipe will *ONLY* index to the next step after the operator presses **Resume** on the run screen.
- **Manual Valves** — Are numbered 70 and above for manual entry of low volume materials.

NOTE: The same valve can be in a recipe multiple times. All dispenses of that valve must be equal.

⇒ Press the **Step Description** text box and type the description.

⇒ Press the **Part Size** text box and type the size.

Part Size is a unitless dimension. It references the number of parts of one step in relation to all other steps. For example, 2:1:1 = 2 parts of step #1 plus 1 part of step #2 plus 1 part of step #3.

NOTE: You cannot use fractional quantities. If the material data sheet uses fractional values, convert the fractions by multiplying them by a factor that will make all the parts whole numbers. For example, you would use a factor of 10 to change 1.5:2.1:1 to 15:21:10 .

⇒ Press **Save Changes**.

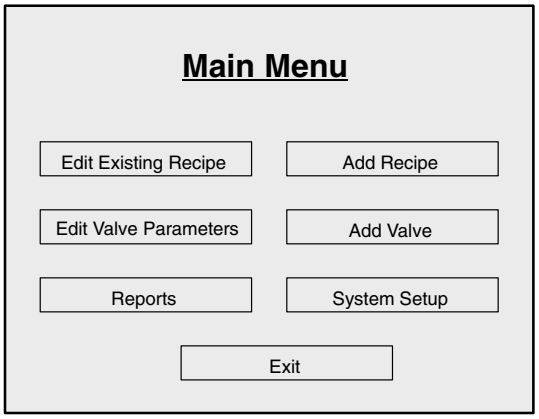
⇒ Press the button for the next desired action.

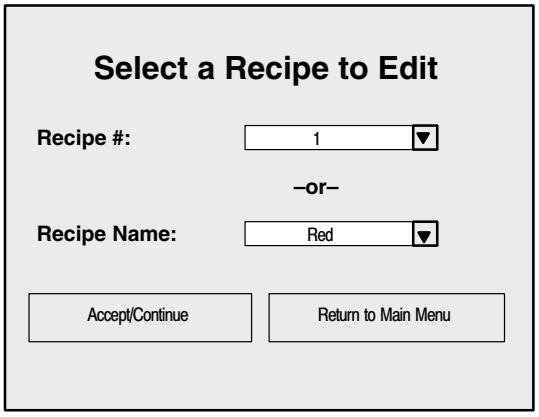
–or–

Press **Main Menu** to exit the recipe screen.

Setup

Screen





How to Use

Edit Existing Recipe

Use to establish the sequencing order for dispensing multiple materials into a common tank. Assign up to 1000 recipes in the database.

Main Setup Menu

⇒ Press **Edit Recipe**.

Password Screen

⇒ Type your password.

⇒ Press **Accept Password/Continue**.

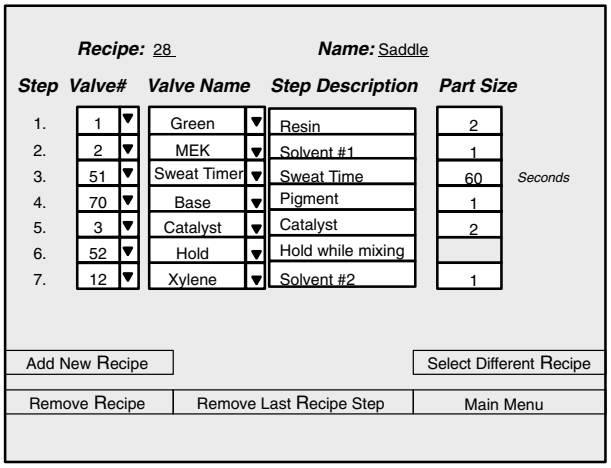
Recipe Selection Screen

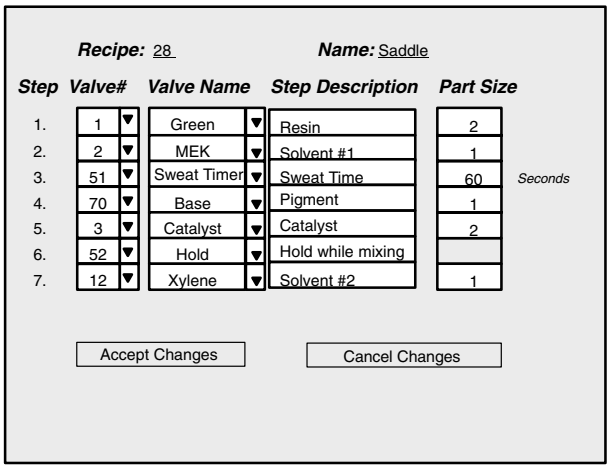
⇒ Press the **Recipe #** or **Recipe Name** down arrow and select the desired recipe.

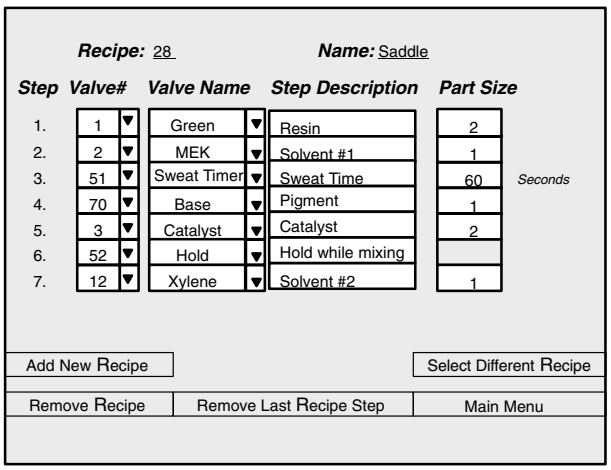
⇒ Press **Accept/Continue**.

Setup

Screen







How to Use

Edit Recipe Screen

⇒ Press the desired text box and type in the new value.

Valve # and **Valve Name** have a list of options to choose from. Press the down arrow to make a selection.

⇒ Press **Accept Changes**.

⇒ Press the button for the next desired action.

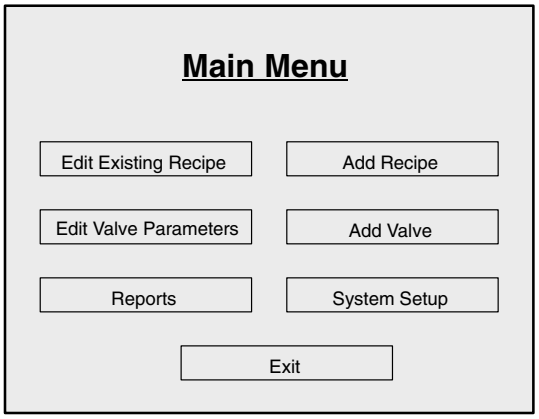
–or–

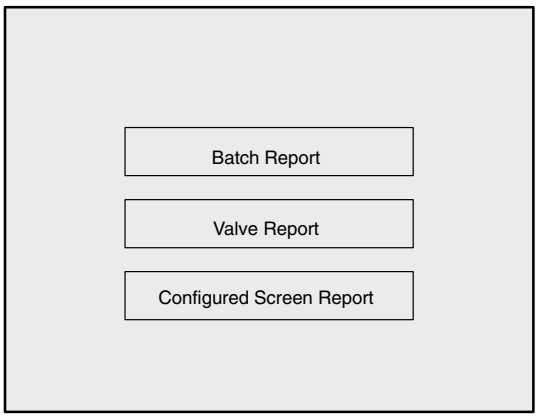
Press **Main Menu** to exit the recipe screen.

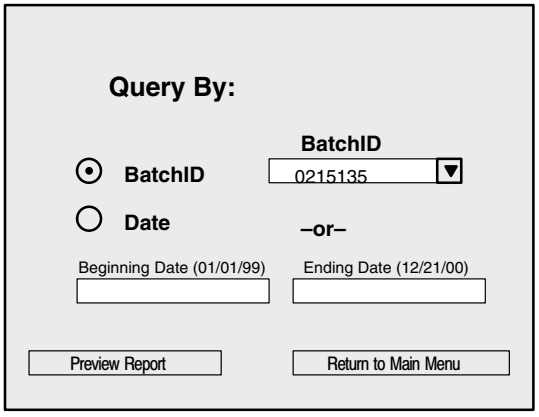
NOTE: Pressing **Remove Recipe** will delete the selected recipe. The number for a deleted recipe cannot be reused.

Setup

Screen







How to Use

Reports

Use to sort and view various database reports.

Main Setup Menu

⇒ Press **Reports**.

To generate a Batch Report:

Report Selection Screen

⇒ Press **Batch Report**.

A Batch Report is generated for every recipe batch that is processed.

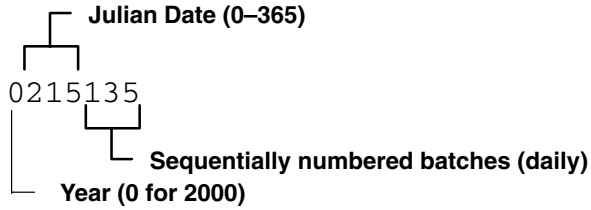
Batch Query Screen

The Batch ID number is seven digits in length and is automatically generated by the BDS. Batch Reports can be queried either by Batch ID or by date. To query by Batch ID:

⇒ Press the **BatchID** radio button to view individual batches.

⇒ Press the **BatchID** down arrow and press the desired Batch ID in the list.

NOTE: Batch reports are stored sequentially in a “last in, first out” order.

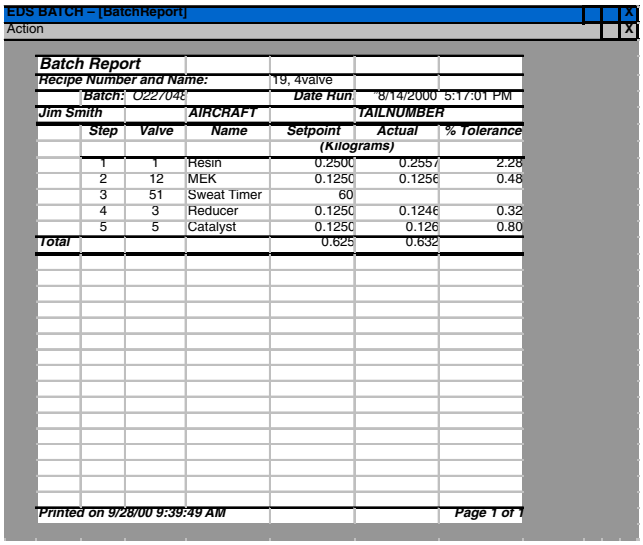


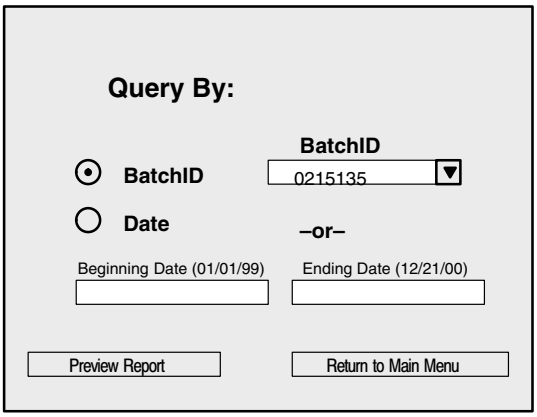
BatchID 0215135 represents batch 135 ran on day 215 in the year 2000.

⇒ Press **Preview Report**.

Setups

Screen





How to Use

Batch Report Screen

⇒ Press **Action**, located in the upper left corner of the screen, to send the report to a printer.

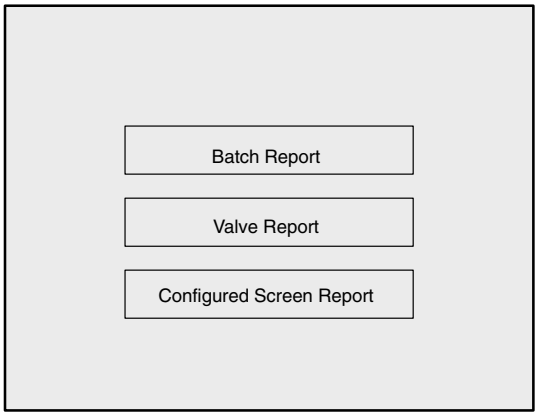
⇒ Press the **X** box, located in the upper right corner of the screen, to return to the **Batch Query** screen.

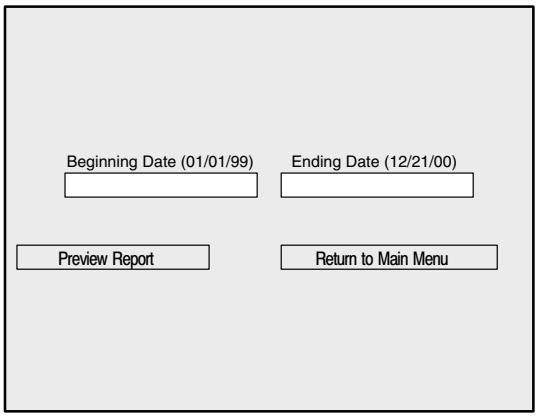
Batch Query Screen

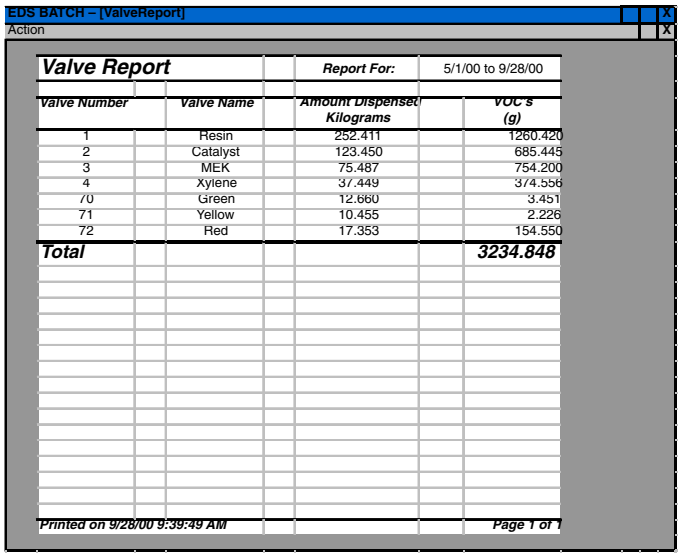
⇒ Press **Return to Main Menu**.

Setup

Screen







How to Use

To generate a Valve Report:

⇒ At the Main Setup Menu, press **Reports**.

Report Selection Screen

⇒ Press **Valve Report**.

The Valve Report provides a summary dispense record for all automatic and manual valves.

Report Date Range Screen

⇒ Type the desired date range in the text boxes.

⇒ Press **Preview Report**.

Valve Report Screen

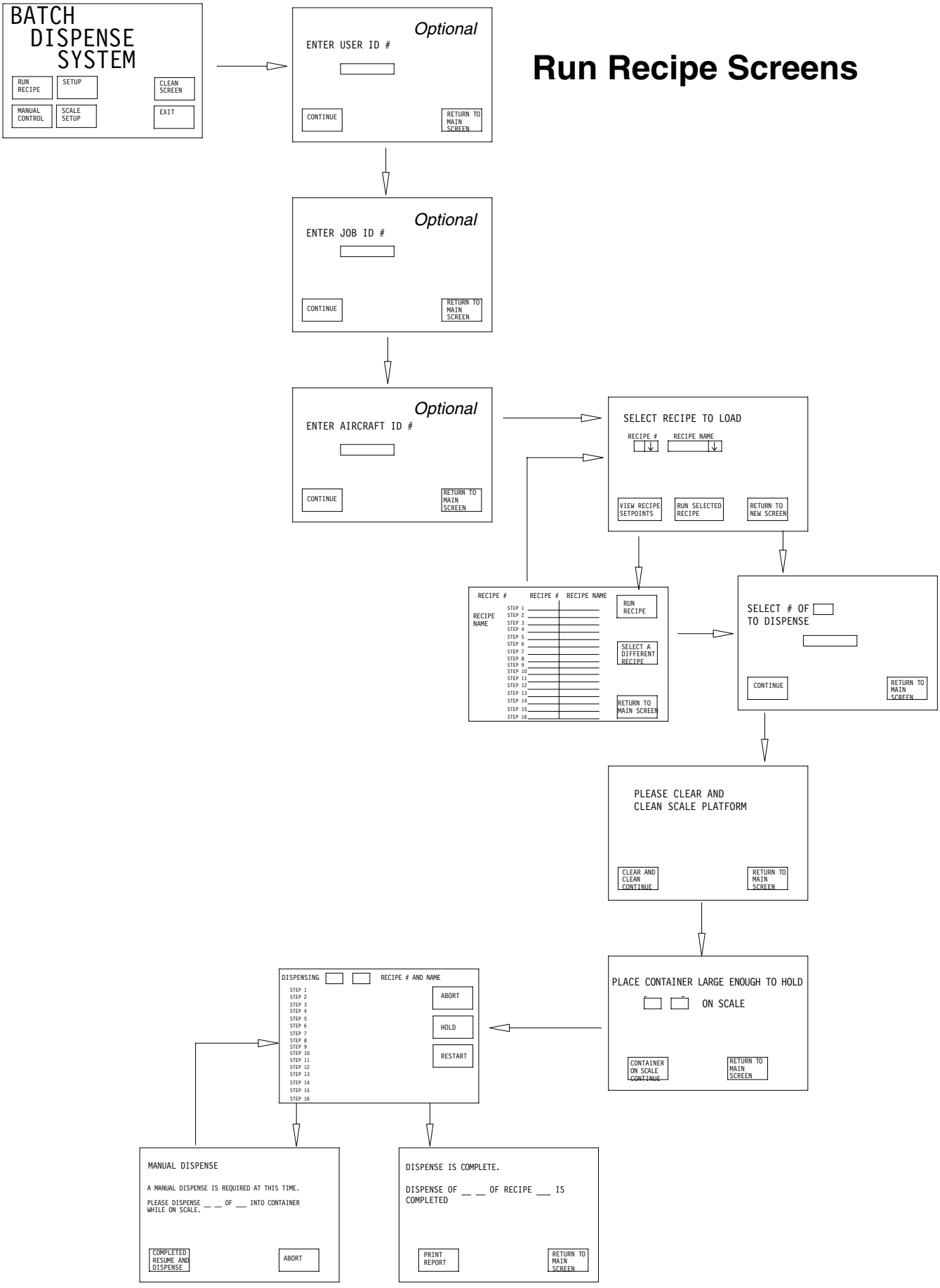
⇒ Press **Action**, located in the upper left corner of the screen, to send the report to a printer.

⇒ Press the **X** box, located in the upper right corner of the screen, to return to the previous (Report Date Range) screen.

⇒ Press **Return to Main Menu** in the Report Date Range Screen.

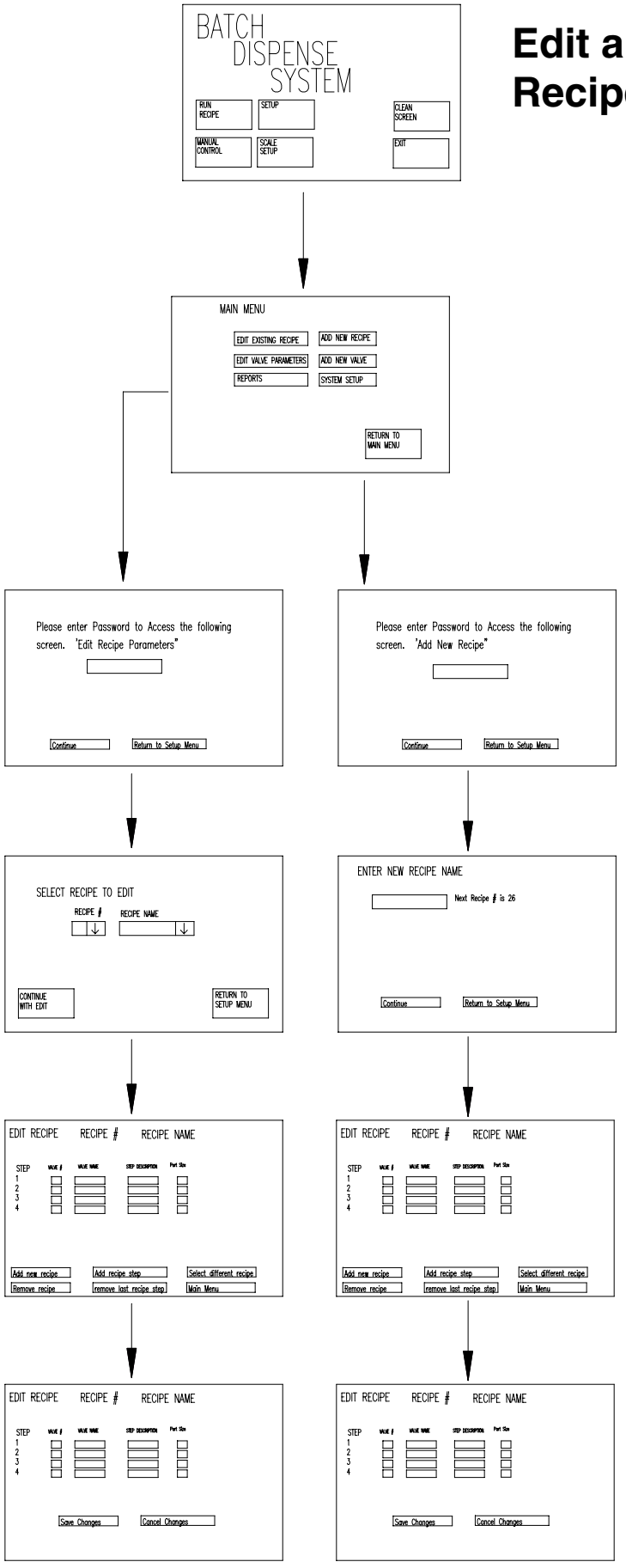
Screen Maps

Run Recipe Screens



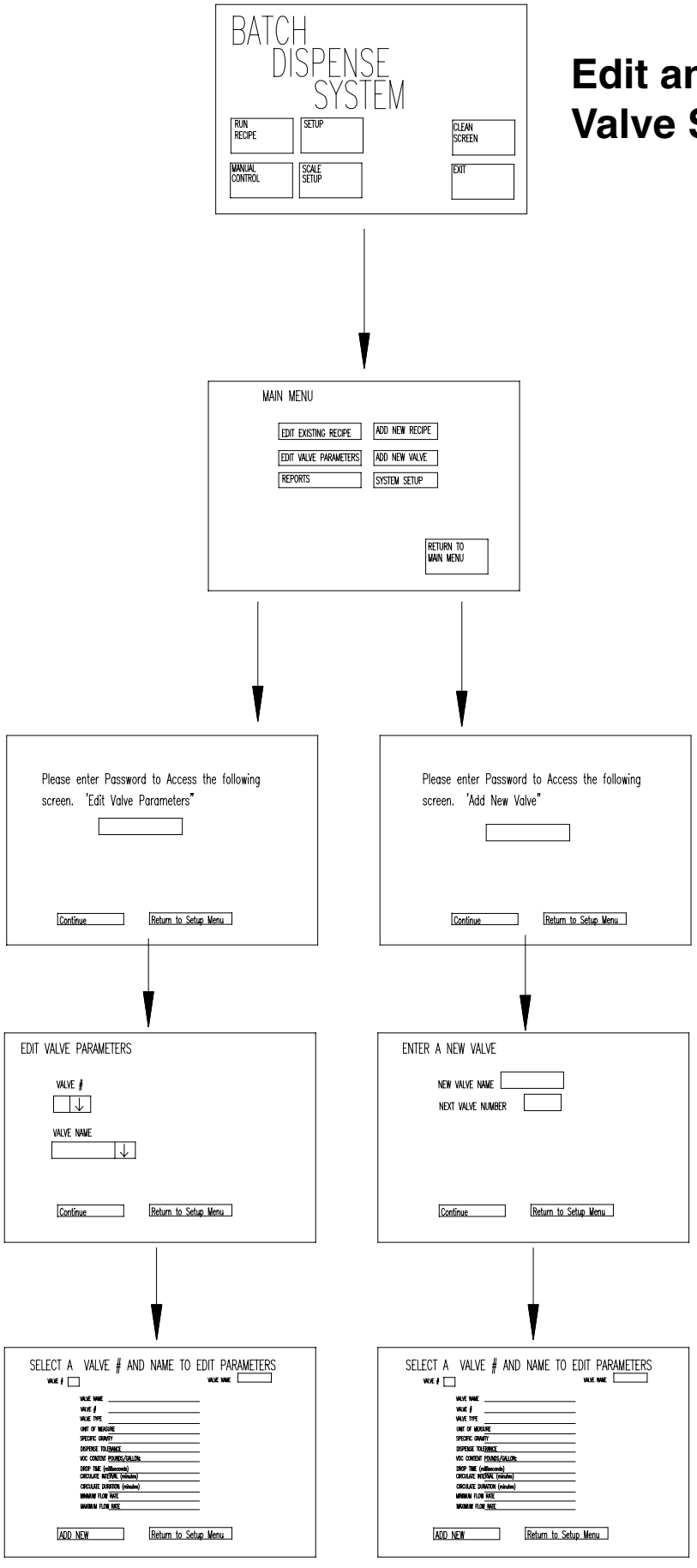
Screen Maps

Edit and Add Recipe Screens



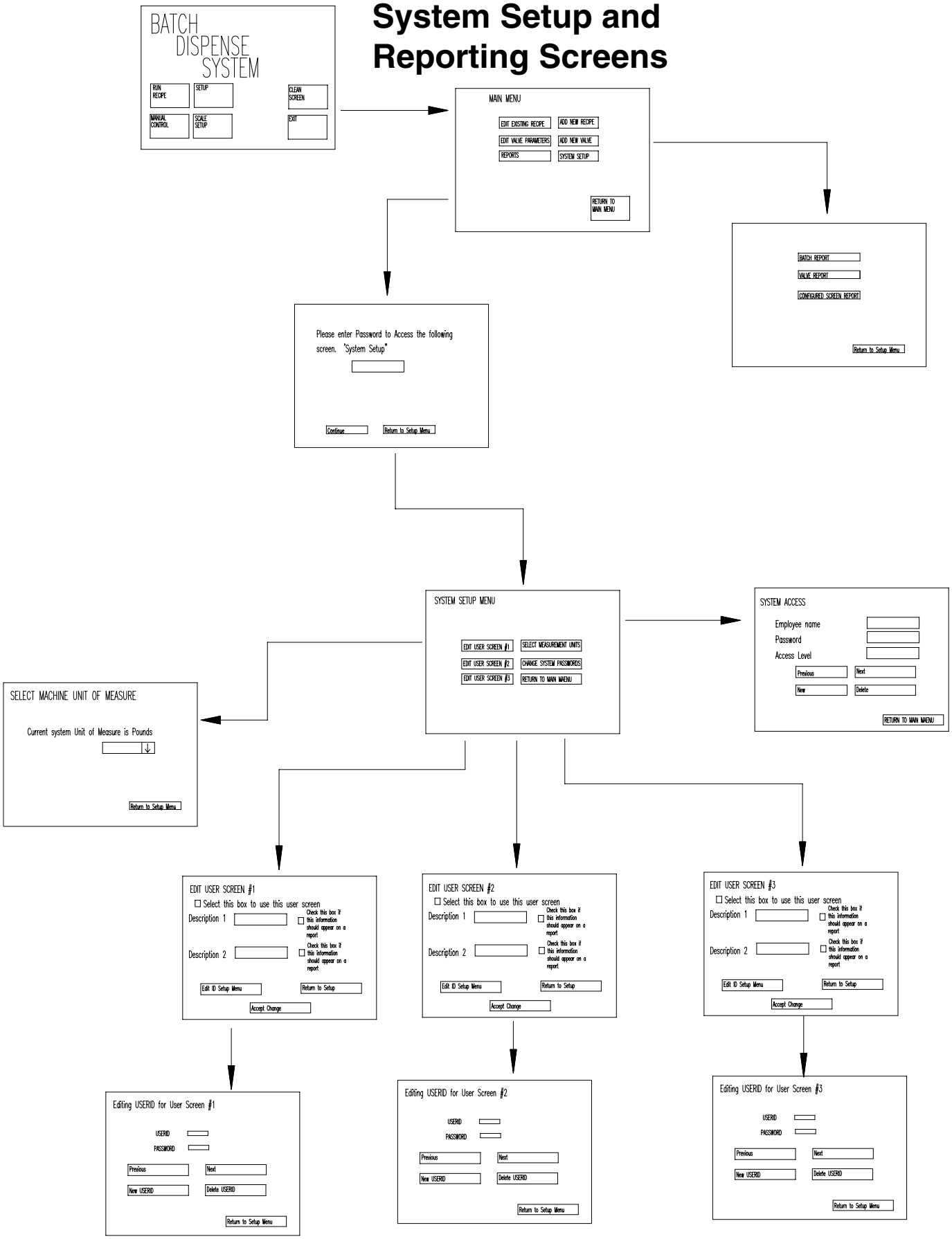
Screen Maps

Edit and Add Valve Screens



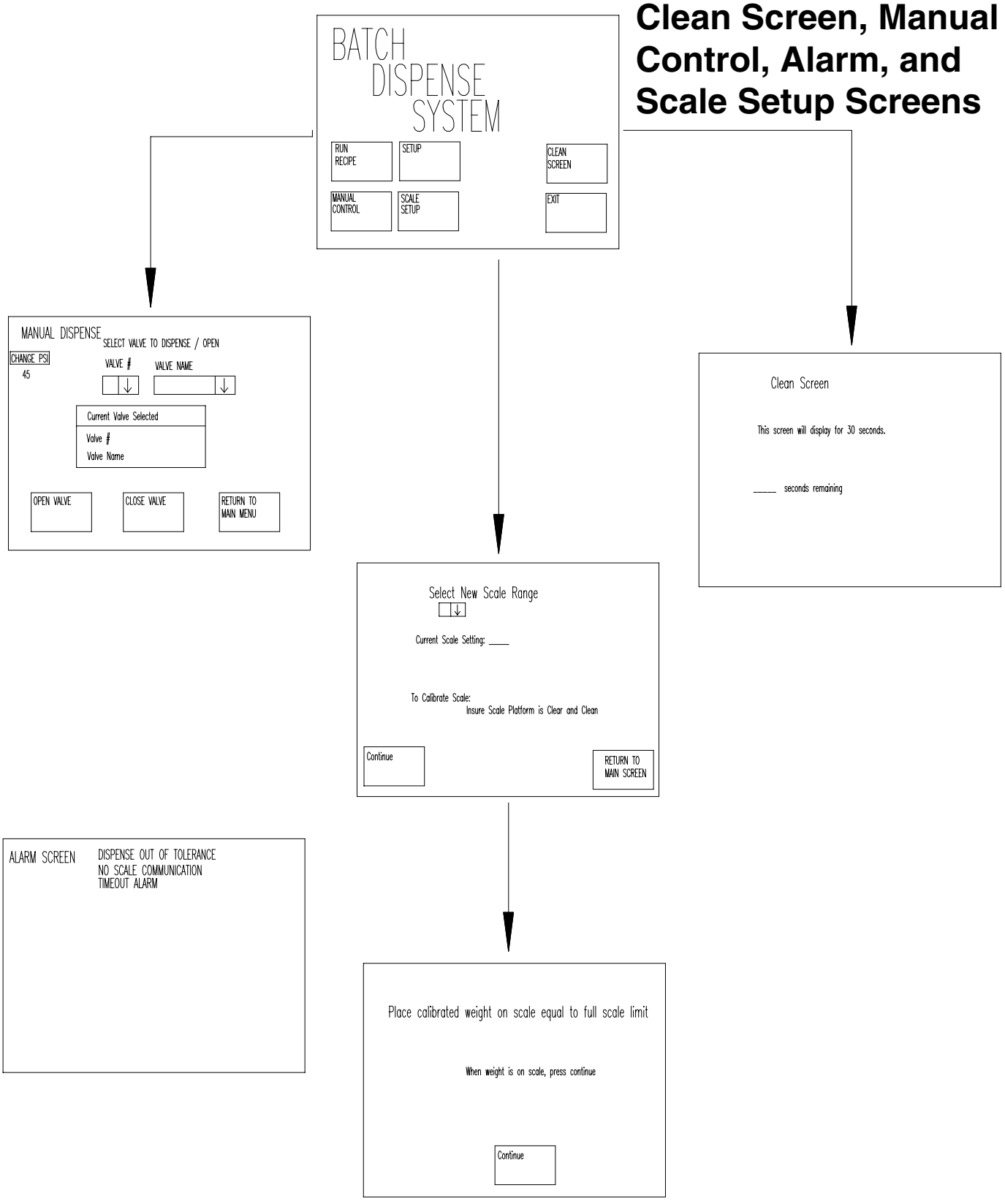
Screen Maps

System Setup and Reporting Screens



Screen Maps

Clean Screen, Manual Control, Alarm, and Scale Setup Screens



Troubleshooting

Problem	Possible Cause	Solution
No display	No electricity supplied	Ensure the BDS is plugged in
		Check the main fuse and replace it if needed
		If you have the x-purge option, ensure the cabinet is sealed and the x-purge is operating
	Problem with display	Check the fuse inside the display and replace it if needed
		Ensure 110 VAC is applied to the terminals on the display
		Ensure the display has not separated from the touch screen
Touch screen	Touch screen is too sensitive for large hands	Make screen selections with the eraser end of a pencil instead of your finger
No dispense	No air supply	Ensure air is supplied to the BDS
	Not enough air pressure to the fluid regulator	Increase the minimum fluid pressure setting in fluid setup
	Loss of 24 VDC	Check 24 VDC
		Check the 24 VDC fuse and replace it if needed
	Valve is plugged	Clean the valve
	Valve is not adjusted correctly	Lengthen the valve needle travel
	Regulator is plugged	Clean the regulator
Dispense flow is too slow	Not enough fluid supply pressure	Increase minimum fluid pressure setting in fluid setup
		Increase fluid supply pressure to BDS from supply module
	Minimum fluid pressure set too low	Increase minimum fluid pressure setting
	Maximum fluid pressure setting too low	Increase maximum fluid pressure setting
	Valve needle travel set too short	Lengthen needle travel by adjusting the valve
	Valve needle/nozzle size too small	Install needle/nozzle kit with larger orifice
	Material viscosity is too high	Cannot increase the flow rate if the material viscosity is too high

Troubleshooting

Problem	Possible Cause	Solution
Dispense flow is too fast	Maximum fluid pressure setting too high	Decrease maximum fluid pressure setting
	Minimum fluid pressure setting too high	Decrease minimum fluid pressure setting
	Valve needle travel set too long	Shorten needle travel to more restricted setting
	Valve needle/nozzle size too large	Install needle/nozzle kit with a smaller orifice
Scale fluctuating	Environmental factors affecting scale stability	Check scale area for vibration
		Check scale area for air flow interference
		Set scale stability parameters wider
		Level scale deck
		Replace scale or parts if damaged
Weights not correct	Scale out of calibration	Calibrate scale
		Level scale deck
	Scale damaged	Replace scale or parts if damaged
No scale input	Wiring	Ensure all connections are correct
		Check 10 VDC power supply
		Ensure barriers are connected properly
		Ensure 24 VDC to PLC
		Ensure connector is snug on thermocouple module
		Ensure cable has not been damaged
		Ensure scale platform has not been damaged
		Replace thermocouple/scale module

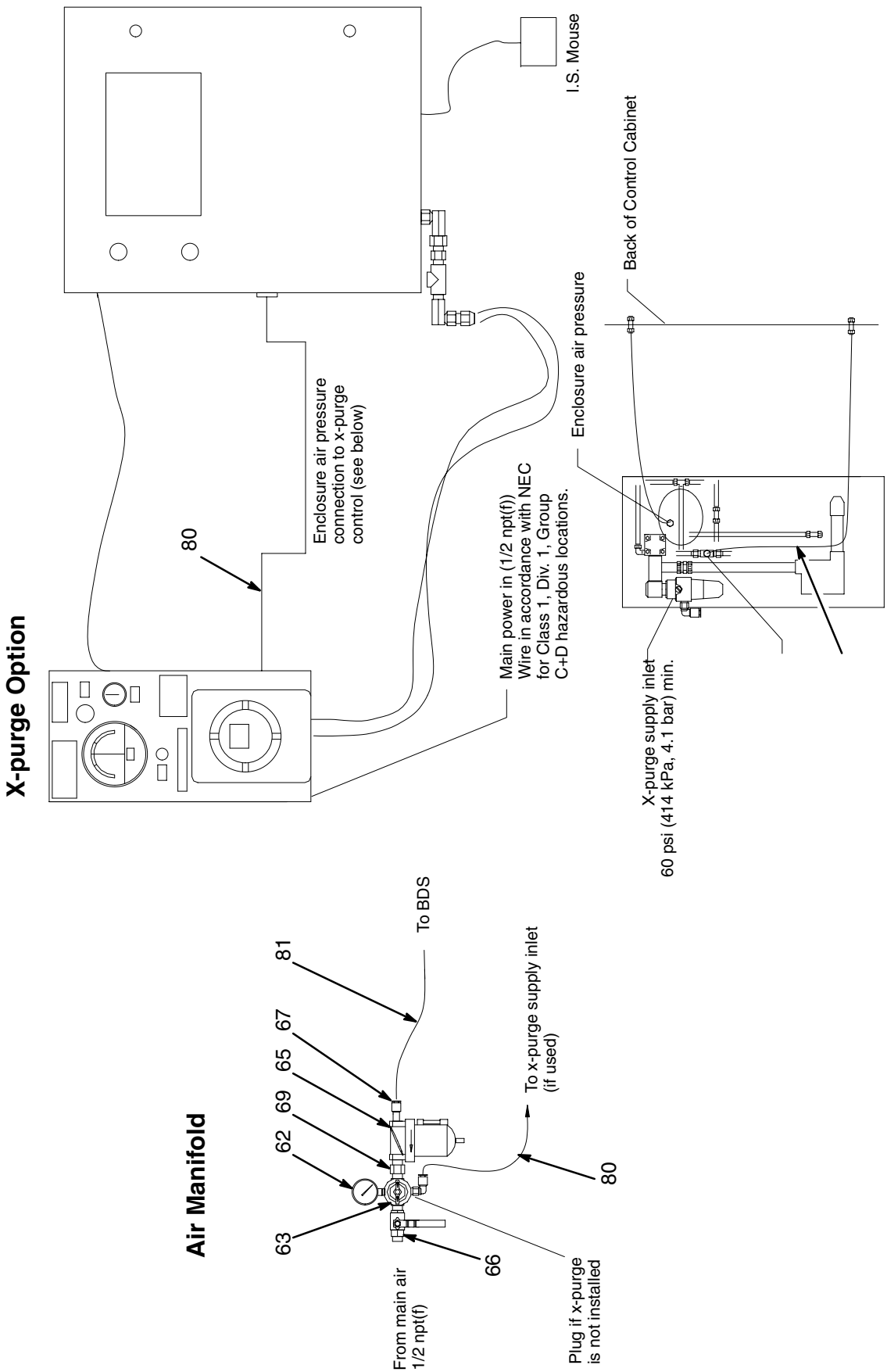


Figure 5 – Batch Dispense System (20 valve)

TI0859A

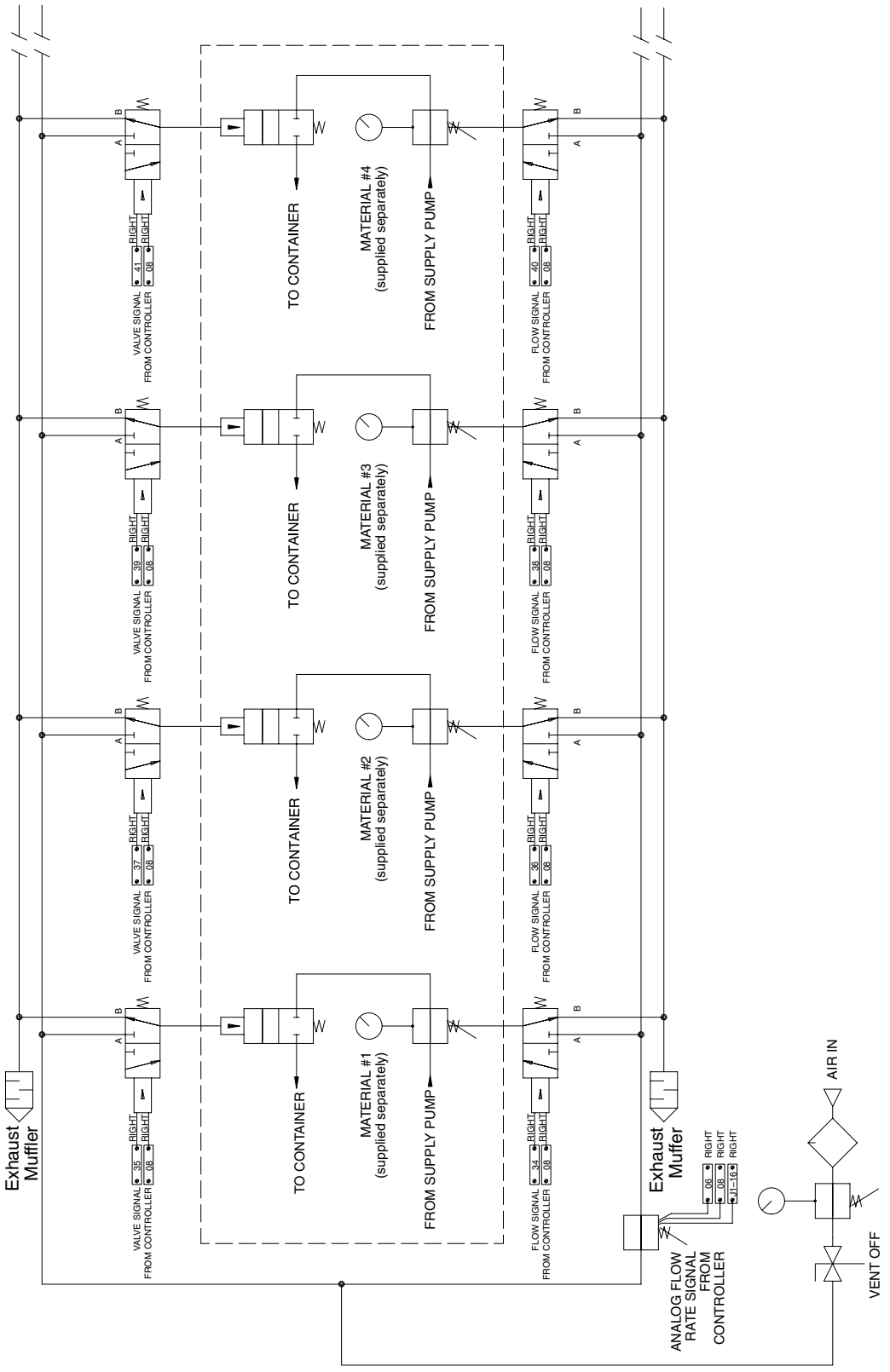
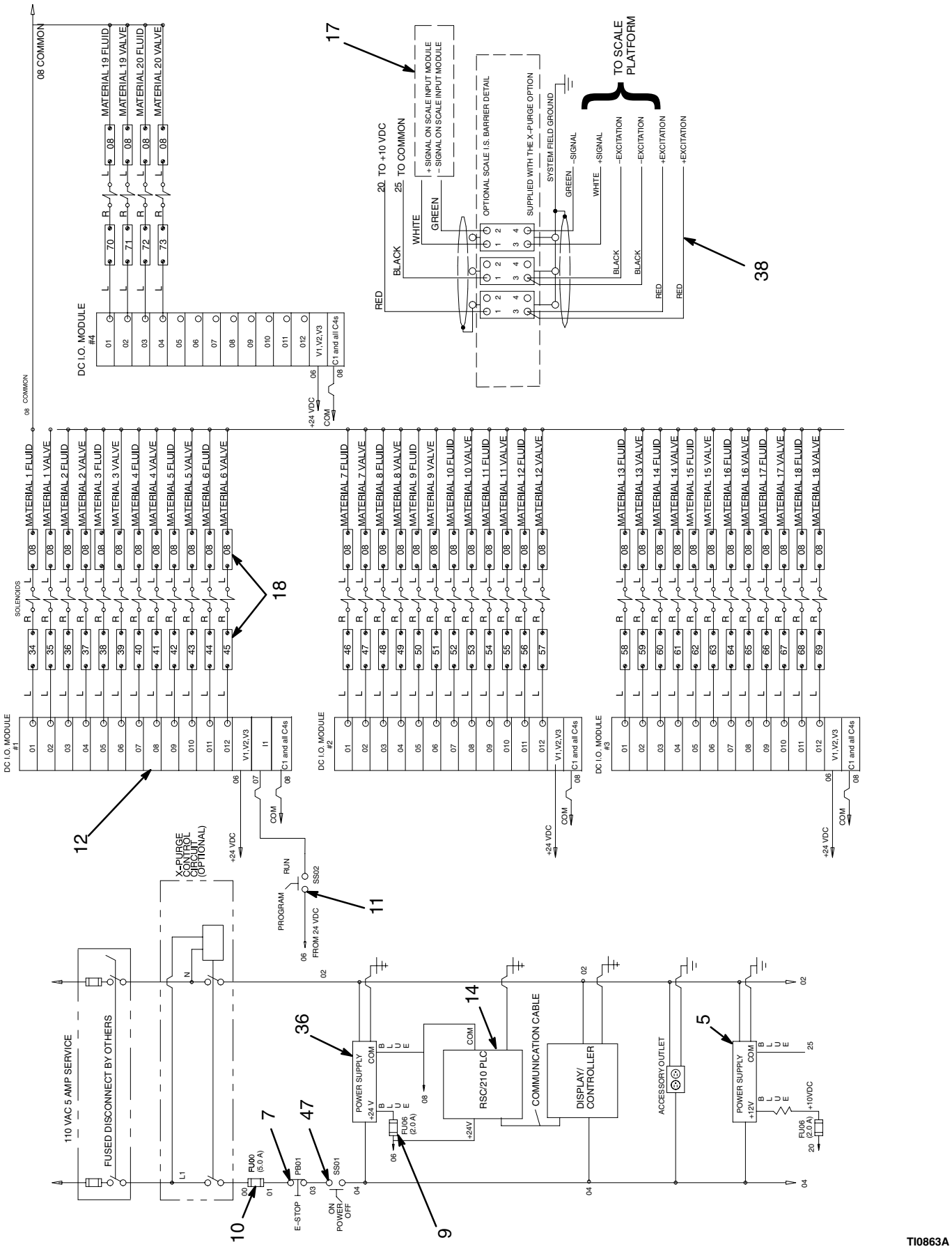


Figure 6 – Typical Pneumatic Schematic



TI0863A

Figure 7 – Electrical Schematic

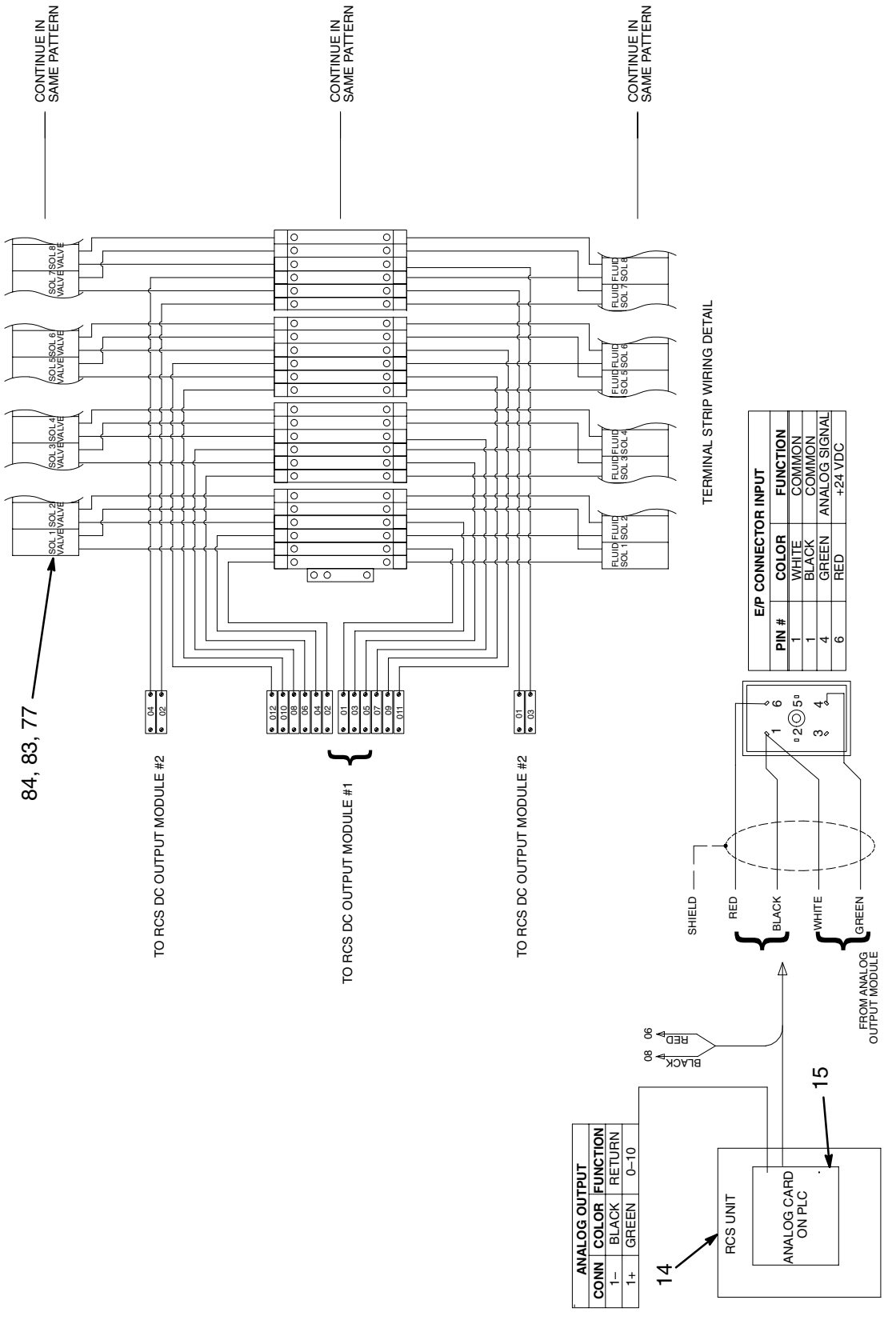


Figure 8 – Electrical Schematic

TI0862A

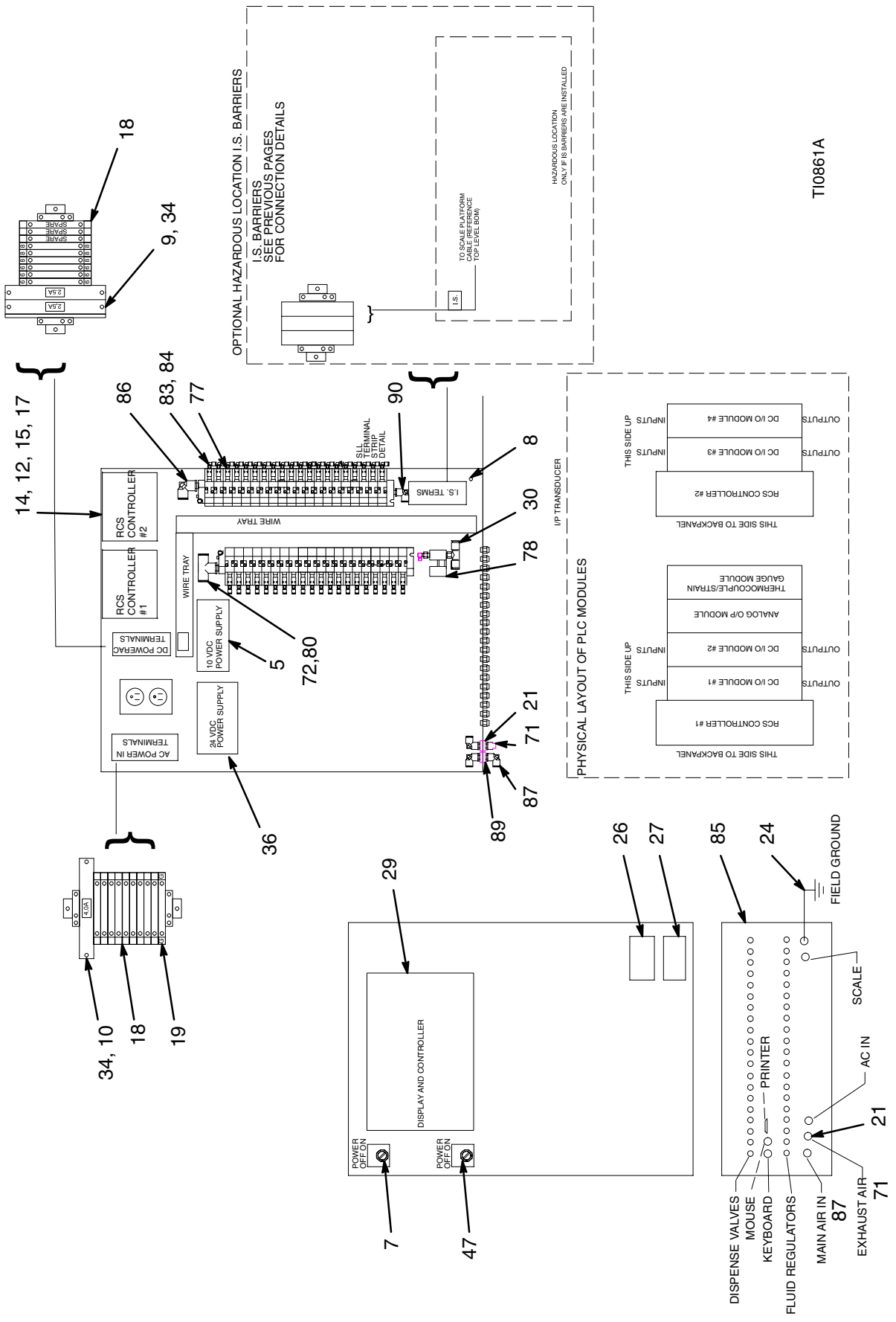


Figure 9 – Electrical Schematic

Parts

Ref. No.	Part No.	Description	Qty.
5	116355	POWER SUPPLY, 10 volt	1
7	116356	BUTTON, emergency stop (E-stop)	1
8	104029	CLAMP, ground	1
9	116357	FUSE, 1 amp, 250 volt, fast acting	2
10	116358	FUSE, 2 amp, 250 volt, fast acting	1
12	116359	MODULE, control, DC, 16 input, 12 output	4
14	116360	CONTROL, PLC	2
15	116361	MODULE, analog output	1
17	116362	MODULE, scale input	1
18	112442	TERMINAL, electric	18
19	112443	TERMINAL, ground	2
24	222011	CLAMP, ground	1
26▲	513312	LABEL, danger	1
27▲	513313	LABEL, warning, shock	1
29	116363	DISPLAY, controller, touch screen	1
34	514556	FUSE HOLDER	2
36	116364	POWER SUPPLY, DC, 24 volt, 1 amp	1
47	116365	SWITCH, on/off	1
62	101180	GAUGE, air pressure	1
63	104267	REGULATOR, air, see manual 308167 for parts	1
65	106149	FILTER, air, see manual 308169 for parts	1
66	107142	VALVE, ball, bleed-type	1
67	502958	FITTING, 1/2” tube x 1/2 npt	1
69	156877	NIPPLE, 1/2–14 npt	1
71	113037	MUFFLER, 1/4 npt	1
72	596832	TEE, 1/4 tube x 1/8 npt	1
77	116366	VALVE, solenoid, 24 VDC	40
78	116367	TRANSDUCER, electric to air	1
80	590332	TUBING, poly-flo, 1/4” OD	2
81	590570	TUBING, polyurethane, 1/2” OD	3
83	598095	TUBING, nylon, 5/32” OD	450
84	598140	ELBOW, 5/32” tube x 1/8 npt(m)	40
85	598251	BULKHEAD, 5/32” tube	40
86	114153	ELBOW, swivel, 1/4” tube x 3/8 npt(m)	1

▲ *Replacement Danger and Warning labels are available at no cost.*

Additional Parts Information

X-Purge Option

Contact the manufacturer (Bebco Industries, Inc.) for parts information.

Dispense Valve

The following dispense valves are available. See manual 306715 for further parts information.

Part No. 965745: 1/8” long neck

Part No. 244382: 1/8” standard

Part No. 244383: 1/4” standard

Part No. 244834: 1/4” standard, 316 SST

Fluid Regulator, Part No. 214980

See manual 307212 for further parts information. Order **gauge part no. 187874**.

Scale

Contact the manufacturer for parts information.

I.S. Scale Option

Contact the manufacturer for parts information.

Printer

Contact the manufacturer for parts information.

X-Purge Option

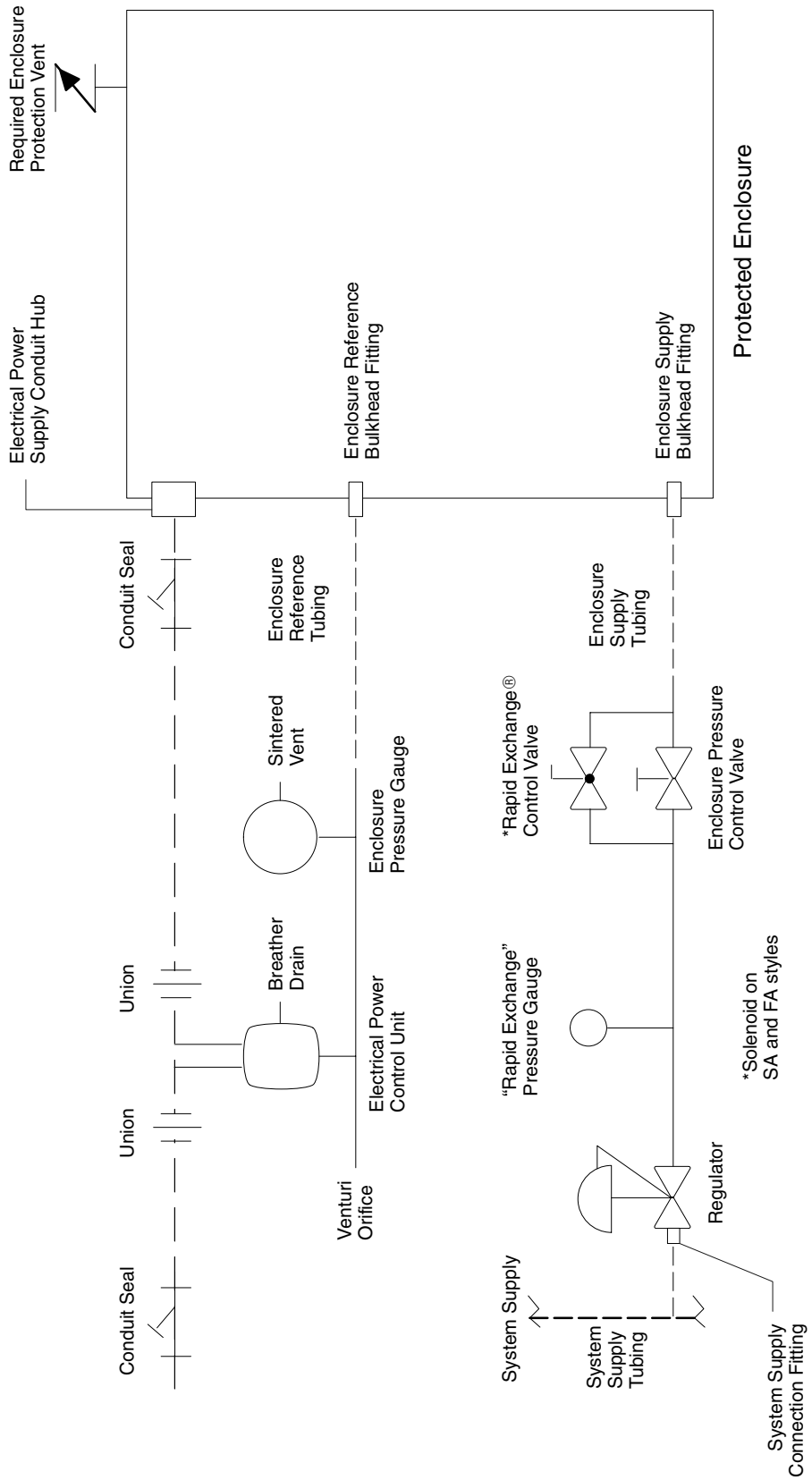


Figure 10 – Electrical and Pneumatic Schematic for X-Purge Option

X-Purge Option

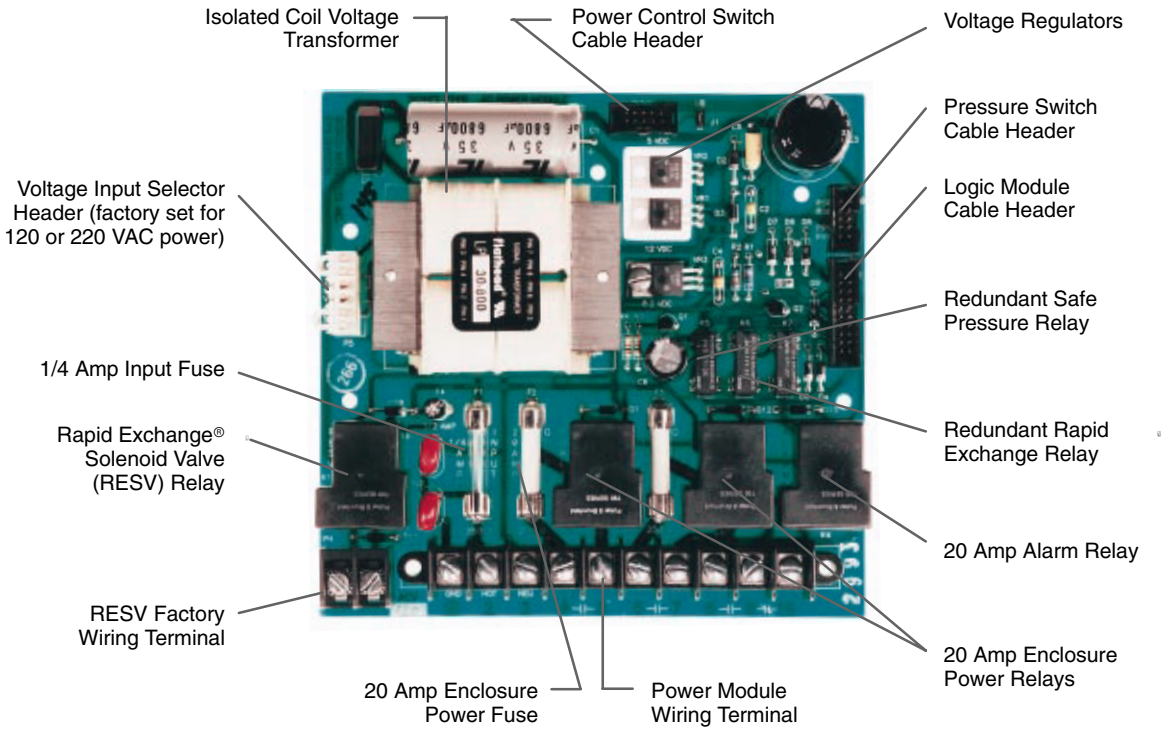


Figure 11 – 120/220 VAC Electrical Power Control Unit Power Module

⚠ WARNING

FIRE AND EXPLOSION HAZARD
The controller is designed for use in a non-hazardous location as defined in the National Electrical Code (USA). To install the Batch Dispense equipment in a Class 1, Division 1, Group C and D environment, the X-purge option must be properly installed.

LED Display Indicators

Power Off: Enclosure Power Relays De-energized

Power On: Enclosure Power Relays Energized

Safe Pressure: Enclosure Pressure > 0.15” or 0.50” w.c.

Rapid Exchange: Enclosure Pressure > 2.0” w.c.

Timer Running: Rapid Exchange® Timer Activity

Alarm Activity: Enclosure Pressure < 0.15” w.c.

Bypass Engaged: Control Bypass Active – Conditional Bypass and Unconditional Bypass Modes

Latch Engaged: Power Relay Latch Active – Power Latching Mode

X-Purge Option

Rapid Exchange® Timer Functions

The Rapid Exchange Timer provides a time delay after Rapid Exchange pressure is detected to allow four volume exchanges prior to energizing the enclosure power relays. If Rapid Exchange pressure is lost or interrupted during the time delay cycle, the Electrical Power Control Unit is reset.

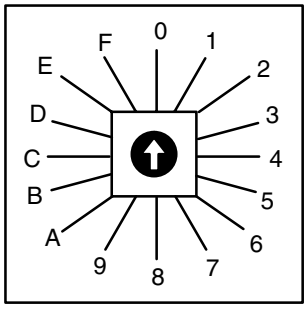


Figure 12 – RET Timer

Rapid Exchange® Timer Settings

Position	Time in Minutes
0	5
1	10
2	15
3	20
4	25
5	30
6	35
7	40
8	45
9	50
A	55
B	60
C	65
D	70
E	75
F	80

X-Purge Option

Setup Procedure

Important Notes:

Regardless of the conditions, the X-Purge option is designed to automatically withhold power to the protected enclosure while inducing Rapid Exchange®, for at least five minutes. Normal exchange times should be doubled if large obstructions block inert gas flow.

To test the vent's operation, gently prod the vent flapper open with a soft pointed object, such as the eraser end of a pencil, to ensure that the vent valve works freely. On vertically configured vents, this can be accomplished from within the protected enclosure. Side mounted –90 configured vents can be tested by removing the pipe plug at the bottom of the mounting tee. Multiple operations require only one test per day if the enclosure is not opened or left unattended.

The volume exchange rate is based on a four enclosure volume exchange.

The Startup Instruction Nameplate Exchange Time Slot will feature the standard factor for this system "ONE MINUTE PER CUBIC FOOT", but the unit may feature a set of direct factor nameplates with self adhesive backing such as "TEN MINUTES", for application to the start-up instructions, dependent on how the system was specified and purchased. Field modification of this nameplate, to show a direct factor, is acceptable as noted above if the method used to mark the nameplate does not deface the instructions listed. Materials used for the marking must be indelible and withstand prevailing environmental conditions.

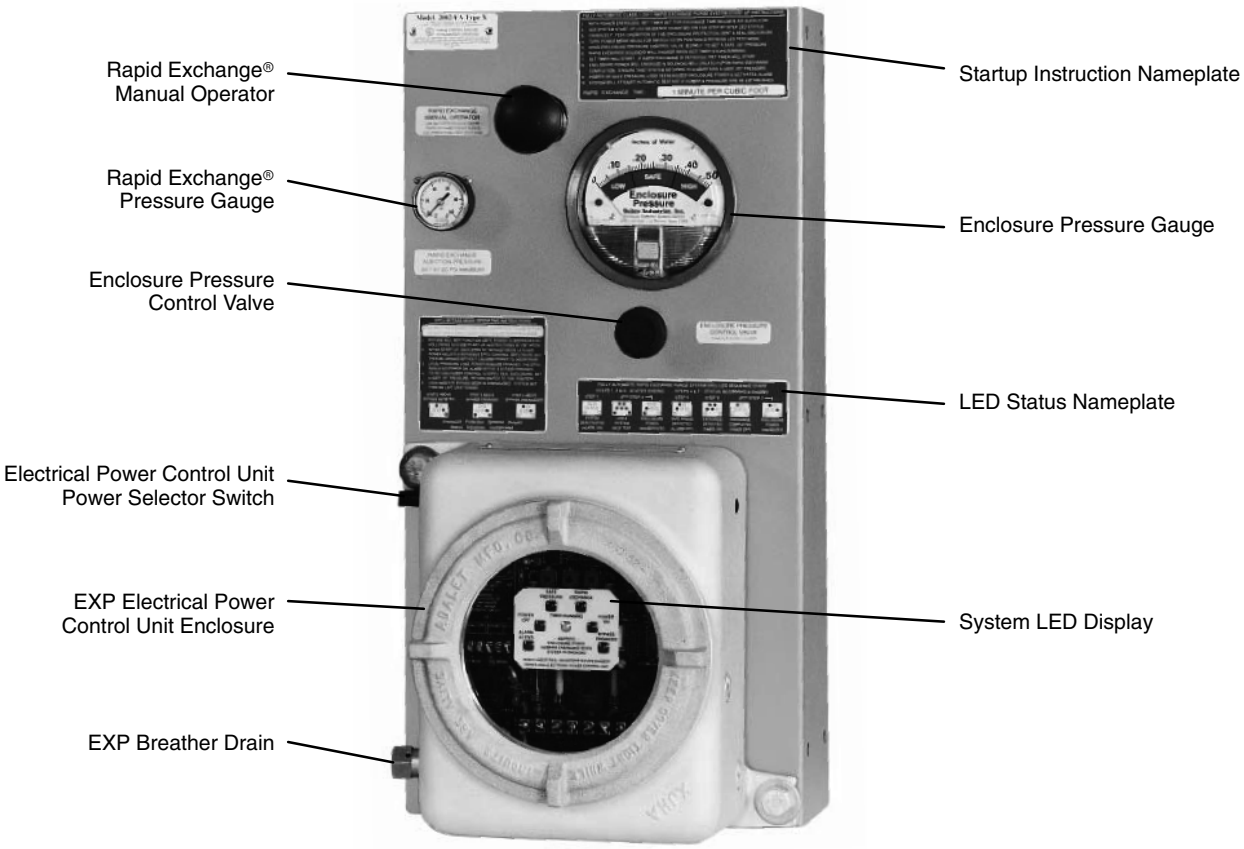


Figure 13 – Front View of X-Purge Option

X-Purge Option

Rapid Exchange® Purging Setup

1. Fully close the Enclosure Pressure Control Valve by turning the valve clockwise.

2. Connect the inert gas supply to the system supply inlet and set the Rapid Exchange Pressure Gauge to 60 psi.

3. Temporarily connect a 0–5 inch water column pressure gauge or manometer to the protected enclosure.

4. Check operation of the Enclosure Protection Vent as detailed in **Important Notes**, page 63.

5. Seal enclosure(s) and adjust the Enclosure Pressure Control Valve by turning the valve slowly counterclockwise to set a safe pressure on the Enclosure Pressure Gauge.

NOTE: If the pressure setting is difficult to stabilize or set, see Troubleshooting on page 66.

6. With the aid of an assistant with two 1/2 inch combination wrenches, place your left hand on the system mounting plate and pull the Rapid Exchange Manual Operator firmly with the right hand and quickly ensure the Enclosure Protection Vent opens. If the Enclosure Protection Vent operates properly, have the other person carefully place the open end of both wrenches behind the handle to hold the Manual Operator in the out position temporarily.

NOTE: The Enclosure Pressure Gaug*e* should move quickly off scale to the right, this is normal for all Rapid Exchange purging systems.

7. Readjust the regulator to 60 psi minimum, while inducing Rapid Exchange, the test gauge should then read approximately 2 inches of pressure and should not fluctuate. Insufficient enclosure pressure will cause the Enclosure Protection Vent to “shuttle”. **Do not** exceed 5 inches of pressure within the protected enclosure.

8. Close the Enclosure Pressure Control Valve or remove the two 1/2 inch combination wrenches from behind the handle.

NOTE: The Rapid Exchange Pressure Gauge may now indicate a higher set pressure than was originally set, this is normal for all Rapid Exchange purging systems.

9. Set the Rapid Exchange Timer for the required exchange time, based on the system exchange rate of one minute per cubic foot, five minutes minimum. Refer to the timer settings on page 62.

10. Install and tighten the cover of the Electrical Power Control Unit. Ensure that the conduit is sealed with approved compounds.

11. Depress the On-Off Push Button in normal running mode or power latching mode or turn the Power Selector Switch to the On position in conditional bypass mode or unconditional bypass mode. Each LED should illuminate fully for two seconds (self test), then all LEDs should turn off except the Power Off (solid red) and Alarm Active (flashing red) LEDs.

12. Turn the Enclosure Pressure Control Valve slowly clockwise to set the Enclosure Pressure Indicator to 0.25 inch pressure. The Safe Pressure LED should be on, the Alarm Active LED should turn off. Check for a 0.10 to 0.15 inch trip point by slowly stroking the indicator from 0.10 to 0.25 inch readings. The Safe Pressure and Alarm Active LEDs should turn on and off when the indicator reads between 0.10 and 0.15 inches.

13. Place your left hand on the system mounting plate and pull the Rapid Exchange Manual Operator until the solenoid latches (to hold the valve open automatically) then quickly ensure the Enclosure Protection Vent opens. The Rapid Exchange and Timer Active LEDs should be on. Check for the trip point by turning the Electrical Power Control Unit Power Switch off and on (to reset unit). The Rapid Exchange and Timer Running LEDs should not turn on until the valve is more than half open. Allow the system to run through the Rapid Exchange timer cycle and watch for the solenoid to disengage. The valve should be able to shut off without disturbing the status of the Safe Pressure LED.

14. After ensuring that the Safe Pressure and Timer Running LEDs are functioning properly, you are done testing. Remove the test equipment.

15. Follow the Purging Operation procedure on page 65 to complete a full startup cycle and ensure that the system functions normally during all phases of operation.

X-Purge Option

Rapid Exchange® Purging Operation

⚠ WARNING

FIRE AND EXPLOSION HAZARD
Do not exceed a “safe” pressure with the Enclosure Pressure Control Valve. Operators must follow step-by-step the sequence on the Startup Instructions Nameplate on the X-Purge system. Do not use the bypass modes without first securing a “Hot Work” permit. Never leave the system unattended in bypass modes.

With the inert gas supply on, the Rapid Exchange Timer set properly, and the Electrical Power Control Unit power and alarm system energized (if used), follow the steps below to complete a startup cycle.

1. Carefully read the Startup Instruction Nameplate on the system.

2. Check the operation of the Enclosure Protection Vent, opening it manually several times. See **Important Notes**, page 63.

3. Seal the protected enclosure(s).

4. Depress the On-Off Push Button (normal running and power latching modes) or turn the Selector Switch to the On position (conditional bypass and unconditional bypass modes). Each LED should illuminate fully for two seconds as a self test, then all LEDs should turn off except Power Off (solid red) and Alarm Active (flashing red) LEDs.

5. Turn the Enclosure Pressure Control Valve slowly counterclockwise to set the Enclosure Pressure Indicator to a “safe” 0.25 inch pressure. The Safe Pressure LED should be on, the Alarm Active LED should turn off.

6. Place your left hand on the system mounting plate and pull the Rapid Exchange Manual Operator firmly with your right hand, until the solenoid latches (to hold the valve open automatically) then quickly ensure the Enclosure Protection Vent opens. The Rapid Exchange and Timer Active LEDs should turn on.

NOTE: If the Safe Pressure or Timer Running LEDs blink on and off or “flicker” during this cycle, the Electrical Power Control Unit will reset the Rapid Exchange Timer.

7. Standby until the Electrical Power Control Unit Rapid Exchange Timer completes the timing cycle and energizes enclosure power. The Safe Pressure LED should stay on, Timer Running LED should turn off and the Power On LED should turn on.

8. After completion of the Rapid Exchange Timer timing cycle, the Timer Running LED should turn off and the Power On LED should turn on. At the same time, the Rapid Exchange Solenoid Valve should de-energize and the Rapid Exchange LED should turn off.

9. Ensure the Protection System Enclosure Pressure Indicator maintains a “safe” 0.25 inch pressure for one minute. Readjust the Enclosure Pressure Control Valve if required.

10. If “Safe” 0.25 inch pressure is lost, the Electrical Power Control Unit will de-energize the enclosure power and activate the alarm system (if used).

X-Purge Option

Troubleshooting

The most common X-Purge system problems are covered below. For additional assistance, call Bebco Industries, Inc. – Customer Service Department at (409) 935–5743. Please have the system project number (located on green quality control tag attached to back of system mounting plate) available.

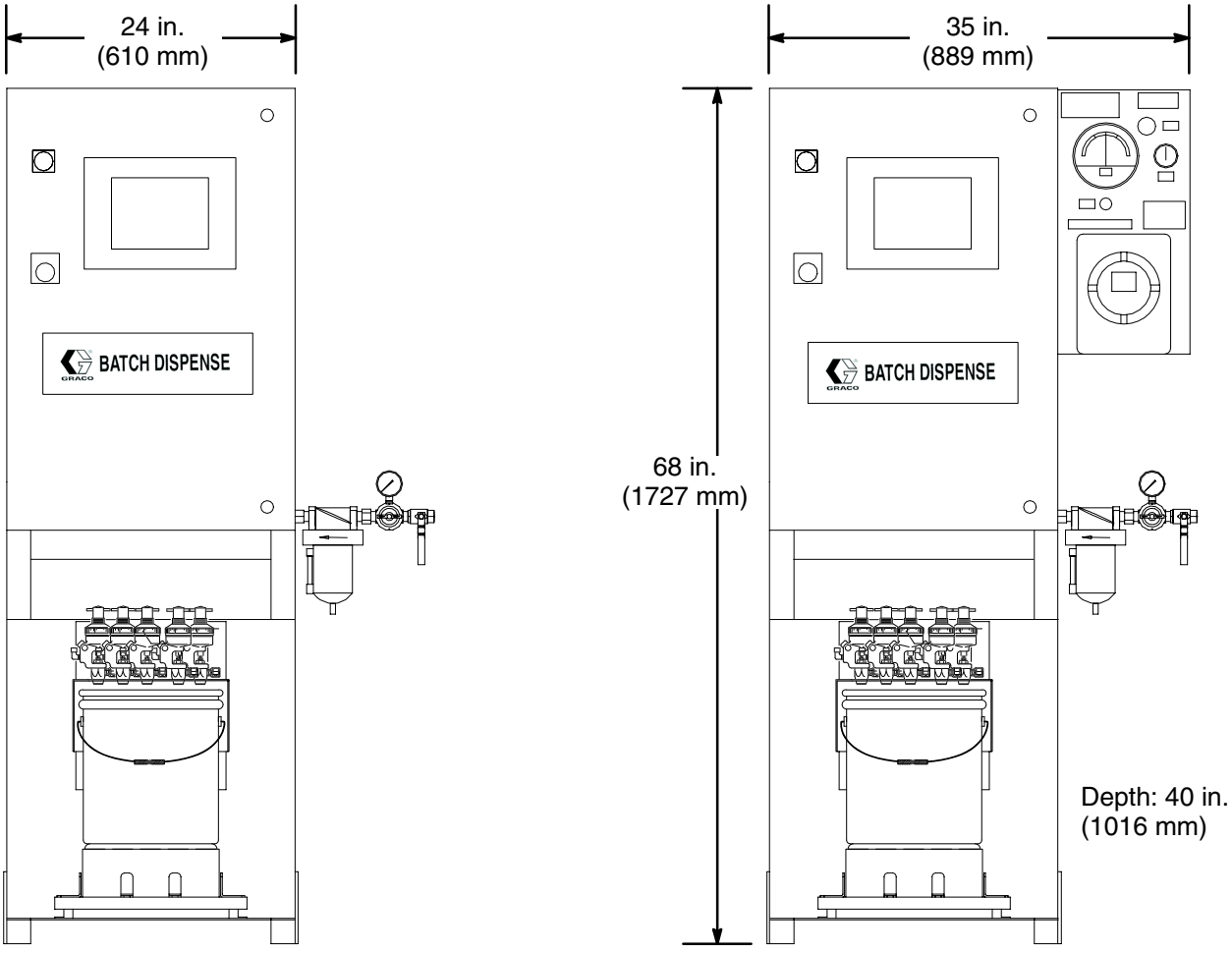
Problem or Fault	Possible Cause	Solution
Enclosure pressure control valve will not hold a “safe” 0.25 inch pressure.	Leakage around gasketing, cover, seams, piping and tubing connections, conduit connections and electrical conduit seals of the enclosure.	Tighten enclosure latches: where tightening is not feasible and gasketing materials are not practical, holes or gaps can be closed with silicone sealant applied from inside the protected enclosure.
Enclosure pressure indicator reading is difficult to stabilize.	Insufficient enclosure leakage or opening of the venturi orifice is crimped too small.	Remove the orifice cut off the crimped end and ream the tube, then recrimp and reinstall the tube to note effect. As tube is shortened, reamed, and recrimped, sensitivity decreases, allowing easier adjustment of setpoint on the enclosure.
Enclosure Protection Vent “shuttles” or “flutters”	Excessive leakage from protected enclosure.	Check all points above and verify a minimum 60 psi injection pressure reading on the Rapid Exchange Pressure Indicator during Rapid Exchange.
	Insufficient protective gas supply header pressure.	With a 0.0–5 inch water column test gauge installed properly (see page 64) slowly increase the Rapid Exchange Injection pressure with the Rapid Exchange valve engaged until this effect is eliminated. Do not exceed 3 inches of pressure within the protected enclosure.
Enclosure Pressure Indicator reads a “safe” pressure but the Safe Pressure LED is not illuminated.	Conduit seal between Electrical Power Control Unit (EPCU) and protected enclosure is not poured or is leaking pressure back into the EPCU. EPCU breather drain is clogged.	With the area positively known to be non-hazardous, remove the screw cover of the EPCU and attempt a complete startup procedure. If the system works properly, check enclosure power conduit seal for leakage and the EPCU breather drain for blockage. If the system does not operate properly, calibrate the Safe Pressure Switch.
	Safe Pressure Switch is out of calibration.	**NOTE:** Do not attempt to calibrate the switch until all efforts to make the switch respond properly have failed. Calibrate switch by slowly adjusting counterclockwise to decrease the setpoint and clockwise to raise the setpoint.
Problems persist or the system does not appear to be operating properly.	Persisting problems	One year warranty on X-Purge system. Contact Bebco Industries, Inc., Enclosure Protection Systems Division at (409) 953–5743.

Technical Data

- Power requirement – 110 VAC, 5 amp
- Dispenses 1 to 20 materials
- Stores up to 1000 individual recipes
- Each recipe can include up to 15 steps
- RS–232 and PC link port with software for MS Windows
- Selectable units of measure – gallons, quarts, liters, kilograms, or pounds.
- Container capacity – 1 quart (0.95 liter) cup up to 24 gallon (90.82 liter) tank
- Dispense volumes – 1/10 quart (0.09 liter) to 24 gallons (90.82 liters)
- Flow rate – from 0.1 to 2 gallon/min. (0.38 to 7.57 liter/min.)
- Viscosity range – 1 to 1000 cps

Rapid Exchange® is a registered trademark of Bebco Industries, Inc.

Dimensions



Batch Dispense System for Non-hazardous Location

Batch Dispense System for Hazardous Location

Figure 14 – Batch Dispense System Dimensions

TI0709

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 by an authorized Graco distributor 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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