Smith Meter® AccuLoad® IV

Operator Reference Manual

Bulletin MN06200 Issue/Rev. 0.4 (2/24)

Important

All information and technical specifications in this document have been carefully checked and compiled by the author; however, we cannot completely exclude the possibility of errors. TechnipFMC is always grateful to be informed of any errors; contact us at TechnipFMC.com.

Caution

The default or operating values used in this document and in the configuration parameters of the AccuLoad IV are for factory testing only and should not be construed as default or operating values for your metering system. Each metering system is unique and each configuration parameter must be reviewed and programmed for that specific metering system application.

Disclaimer

TechnipFMC hereby disclaims all responsibility for damages, including but not included to consequential damages arising out of or related to the inputting of incorrect or improper program or default values entered in connection with the AccuLoad IV.

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Literature Library
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Contents

1 Introduction

1.1 Product Description

The Smith Meter AccuLoad provides reliable and accurate control and measurement of liquid petroleum blending and transfer operations. While primarily intended for use in refined petroleum distribution terminals, it can be easily configured for a wide variety of liquid transfer applications.

Operators can select an amount of product to transfer and the AccuLoad monitors and controls the configured pumps, valves, and additive injectors to safely and efficiently transfer the precise recipe and amount. During the transfer, all processing parameters are monitored to provide operators with an accurate amount of each component of the recipe delivered.

In addition to real-time control of the loading process, the AccuLoad also calculates averages and live quantities of all products and additives delivered. This information is stored in a run-time database that can be monitored by a supervisory host system. Whenever a transaction is completed, the AccuLoad stores a detailed record in an internal transaction log for subsequent retrieval or printing.

1.2 AccuLoad IV Models and Modules

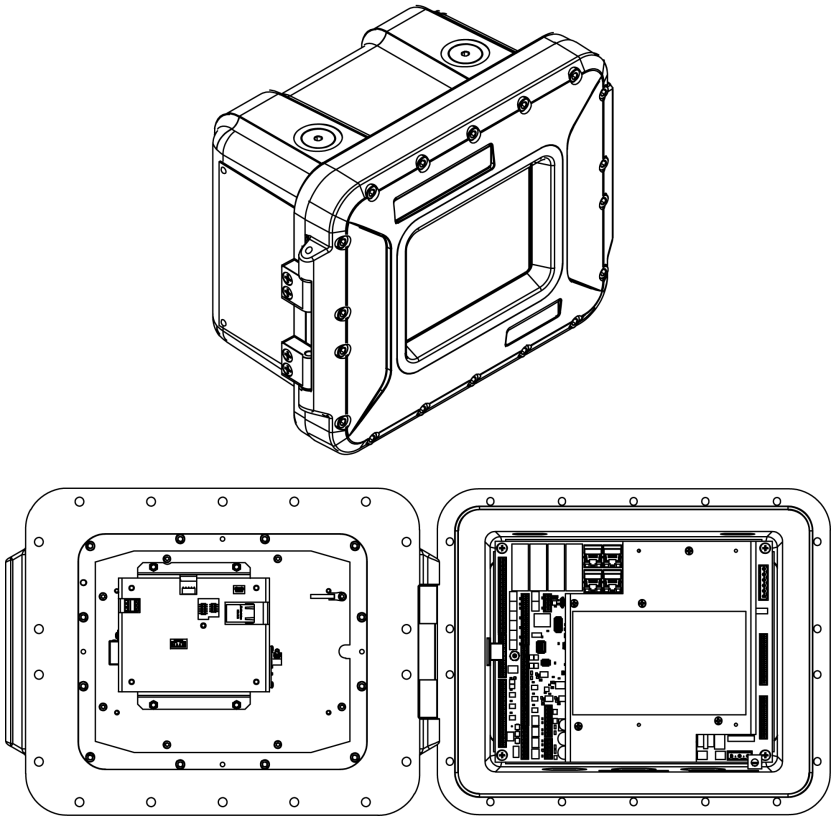
The AccuLoad IV is available in several hardware configurations and with multiple standard and optional modules.

1.2.1 AccuLoad IV ST Models

The Single Touch Screen (ST) model has the following specifications:

- Explosion-proof, Class I, Division 1, Zone 1-rated enclosure
- Up to two-arm operation
- Up to four single- or dual product meter inputs
- Up to four additive meter inputs or, with the optional A4I module, up to 24 additive meter inputs
- AccuLoad III to IV upgrade kit (UG3)

Figure 1: AccuLoad IV ST Model

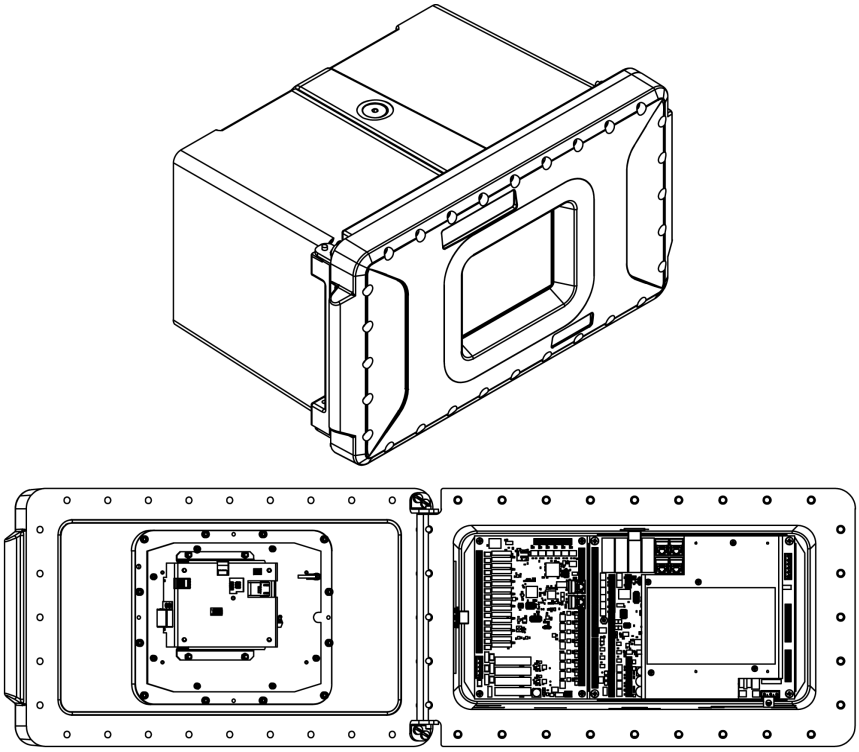


1.2.2 AccuLoad IV QT Model

The Quad Touch Screen (QT) model has the following specifications:

- Explosion-proof enclosure Class I, Division 1, Zone 1-rated enclosure
- Up to six-arm operation
- Up to six single- or dual-pulse product meter inputs
- Up to four additive meter inputs
- Up to 24 additive meter inputs with the optional A4I module
- AccuLoad III to IV upgrade kit (UG3)

Figure 2: AccuLoad IV QT Model

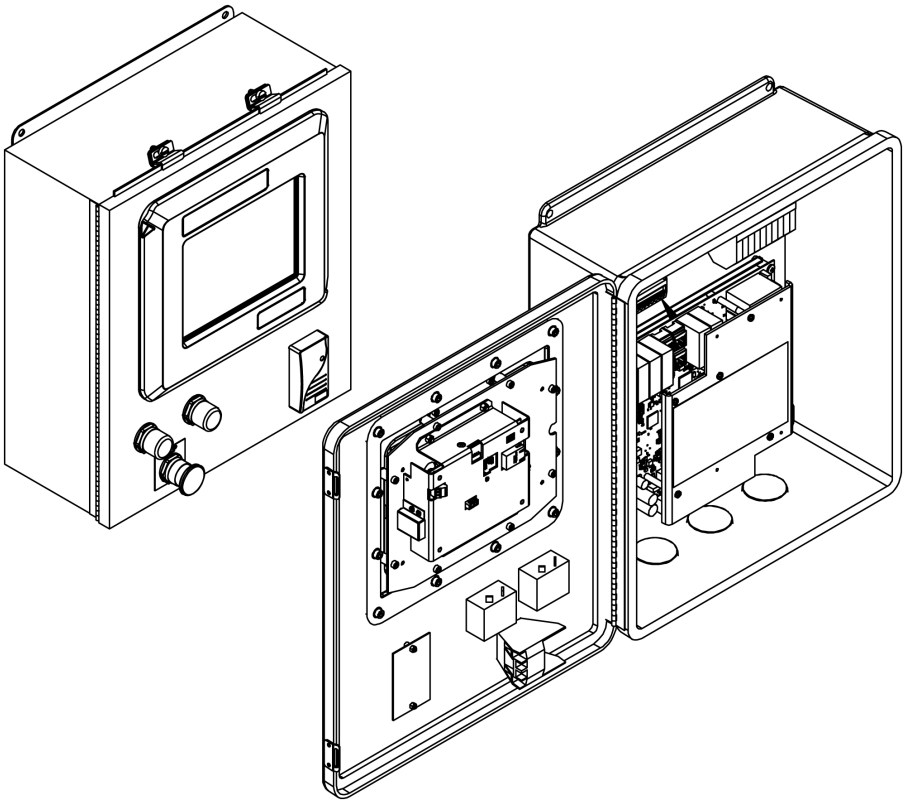


1.2.3 AccuLoad IV N4 Model

The NEMA 4 (N4) model has the following specifications:

- 304 stainless steel, NEMA 4X-rated, weather-tight Class I, Division 2-rated enclosure
- Up to two-arm operation
- Up to four single- or dual-pulse product meter inputs
- Up to four additive meter inputs with local input/output (I/O)
- Optional integrated card reader, indicator lights, and stop button

Figure 3: AccuLoad IV N4 Model



1.2.4 AccuLoad IV SA Model

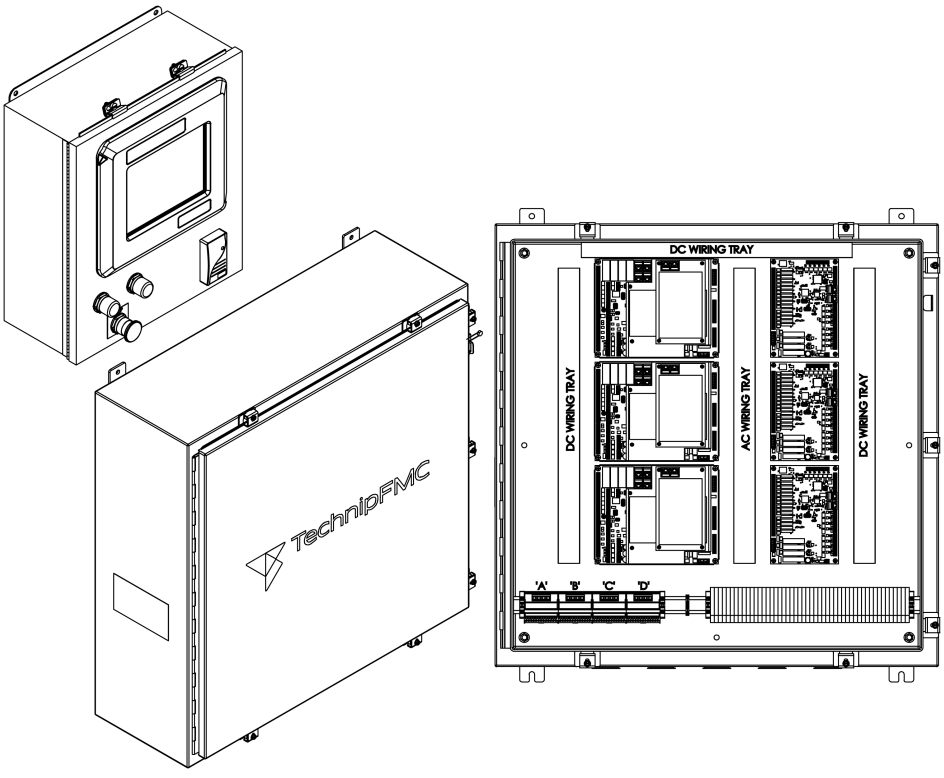
The Split Architecture (SA) model is comprised of one field control module (FCM) and one or two man-machine interfaces (MMI). The FCM contains the I/O control electronics that are connected to meters, valves, permissives, and other hardware; it can be located for convenient access by service personnel. The MMI components are the operator control panels and can be located for convenient access by drivers.

The SA model has the following specifications:

- 304 stainless steel, NEMA 4X-rated enclosure
- Up to 18-arm operation
- Up to 24 single- or dual-pulse product meter inputs
- Up to 56 additive meter inputs with the A4I I/O module
- Up to 96 additive meter inputs with the remote A4I module

The MMI has an optional integrated card reader, indicator lights, and stop button.

Figure 4: AccuLoad IV SA Model



1.3 Common Features of All Models

All AccuLoad IV models share the following features:

- Capable of transferring up to six different products on each arm
- Simultaneous operation of all arms
- Up to 24 additive injectors:
  - Metered
  - Piston
  - Smart
- Arms are individually configurable for a variety of operations including:
  - Straight (single product)
  - Sequential blending
  - Ratio blending
  - Side-stream blending
  - Hybrid (sequential/ratio) blending
  - Wild-stream blending
  - Unloading
- Single- or dual-channel meter pulse inputs representing volume or mass
- Modbus or Smith communications for monitoring and control via Ethernet or serial link
- Proximity card reader interface and driver identification (ID) database for access control
- Real-time diagnostic data displays
- Calculation of temperature, pressure, and density compensation factors according to API guidelines for a broad spectrum of petroleum products from LPG to asphalt as well as custom defined products
- Multilingual user interface
- User-configurable bill of lading (BOL)
- Event, transaction, and audit trail logs

- Five-point meter linearization
- Built-in driver prompting
- Five levels of passcode protection for parameter access
- Independently operated arms or grouped for bay operation
- Arms can be configured to swing to either side of a lane

There are a significant number of additional features available and these are described in detail in the remainder of this manual.

1.4 Configuring for Operation

Because the AccuLoad provides the flexibility to support many variations and features, it must be tailored to fit the specific application. The parameters which make up the configuration are stored in a database in the AccuLoad and once the initial setup is done, it remains permanently stored.

The parameter database can be modified by the following:

- Use of the front-panel touchscreen
- Use of AccuMate, a Windows compatible companion program
- Through a communications port

Regardless of the method used to access the configuration, the basic steps involved in configuring the AccuLoad for initial operation are as follows:

1. Set the number and type of load arms.
2. Select the I/O points (analog, pulse, digital) to be connected to the process equipment.
3. Select the units of measure.
4. Set the flow control parameters.
5. Define the products to be transferred.
6. Define any additive injectors.
7. Set up parameter security pass codes.

Once the configuration has been completed, the AccuLoad is ready for operation.

1.5 Load Arm Types

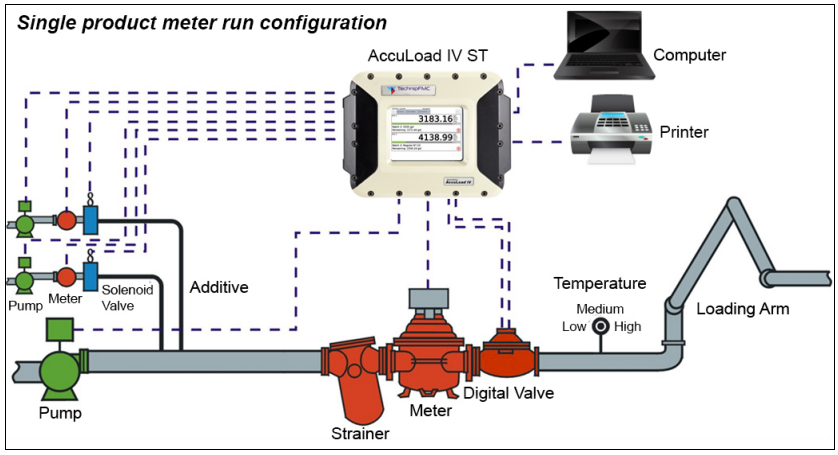
The following load arms are individually configurable for a variety of operations:

- Straight (single product)
- Sequential blending
- Ratio blending
- Side-stream blending
- Hybrid (sequential/ratio) blending
- Wild-stream blending
- Unloading

1.5.1 Straight

A straight arm is used to deliver a single product through a single meter.

Figure 5: Straight Arm



1.5.2 Sequential Blending

Sequential blending is done by loading multiple products, one at a time, into a vessel such as a tanker truck. This is most commonly done with products that mix very easily.

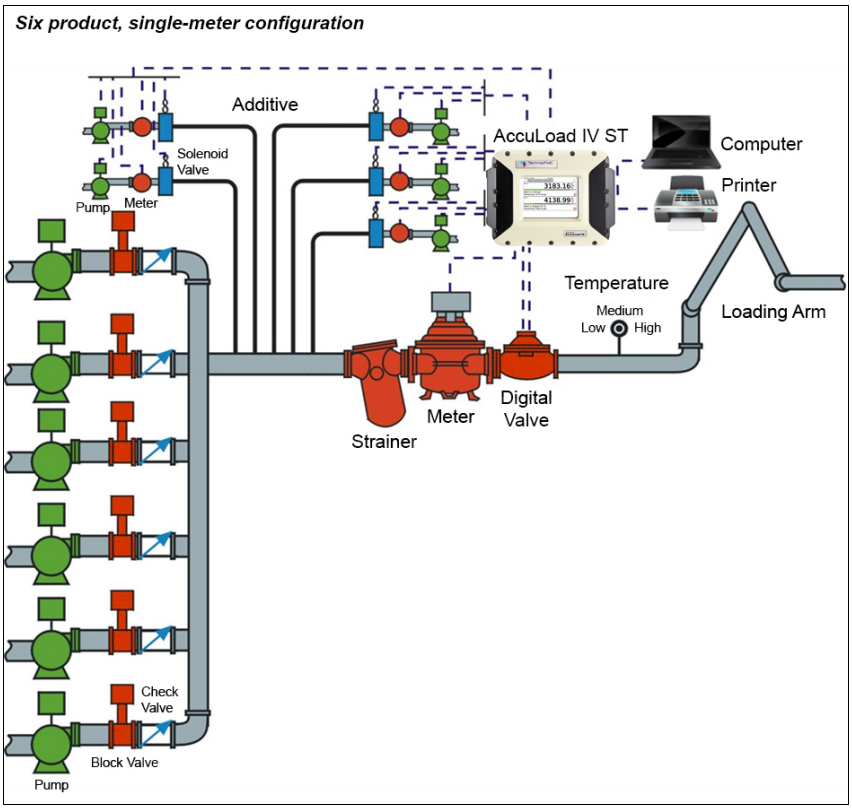
The prerequisites of sequential blending are as follows:

- The load arm must be designated as a sequential blending arm and all required I/O assignments, such as meter inputs, block valves, and flow control valves, etc.
- A recipe must be used to define the percentage of each product to be blended.

The AccuLoad accomplishes sequential blending of multiple products as follows:

- The ratio of varying products is designated in the recipe as a percentage of the total preset. These percentages must total 100%. When the operator enters the preset, the AccuLoad automatically calculates the actual volumes of each product to be delivered. Each of these is delivered as a type of “mini-batch,” complete with individual high flow rates, first trip volumes, etc. The order of product delivery is included in the recipe definition.
- If an incorrect product volume is delivered, the volumes of the remaining products are adjusted accordingly. If this adjustment creates a blend tolerance alarm, the operator will be prompted to stop or continue the batch. An exception to this rule is when another delivery of the same product is specified in the recipe. In this case, the volume of that product’s next delivery only is adjusted to maintain the correct blend ratio and preset amount.

Figure 6: Sequential Blending Arm



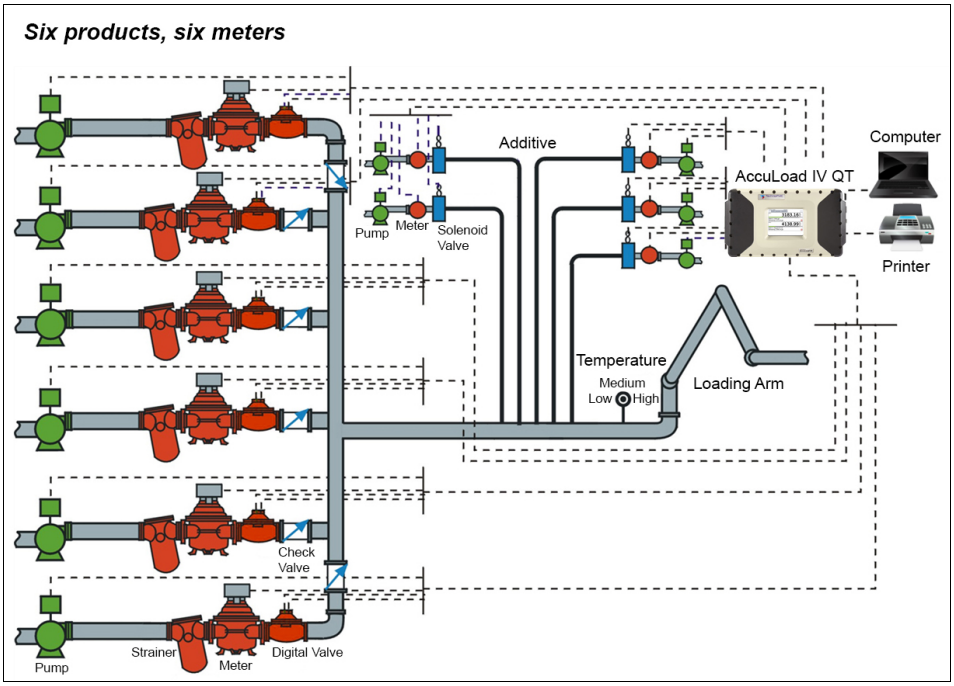
1.5.3 Ratio Blending

In ratio blending, multiple products flow simultaneously during delivery to a vessel such as a tanker truck. Ratio blending is used primarily when loading speed is an issue or when the component products do not easily mix.

The AccuLoad IV accomplishes ratio blending of multiple products as follows:

- All products required for the recipe are delivered simultaneously through their own meters and their own corresponding pumps and control valves. Two-stage valves are not used for ratio blending—only digital or analog valves are acceptable. The ratio of the component products is designated in the recipe as a percentage of the total preset. These percentages must total 100%.
- When the operator enters the preset, the AccuLoad IV automatically calculates the actual volumes of each product to be delivered. As previously stated, products are delivered simultaneously, each through its own meter. Flow rates are adjusted for optimal blend accuracy while conforming to the programmed system flow profile using Smith Meter's exclusive control algorithm. Should flow rate variations occur, the profile is dynamically adjusted to attain the best possible mix.

Figure 7: Ratio Blending Arm

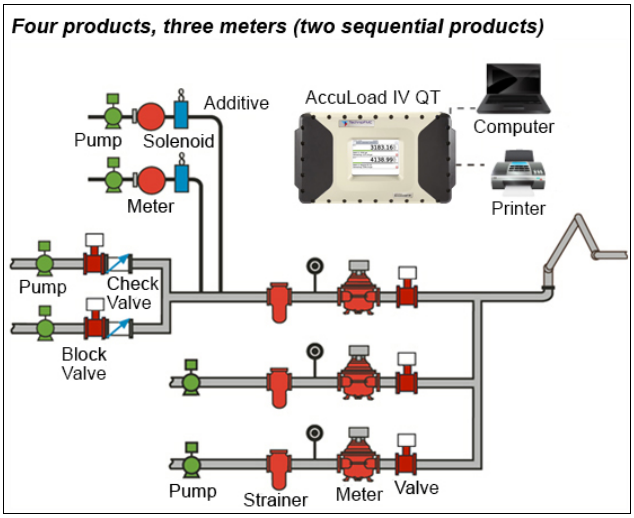


1.5.4 Hybrid Blending

The AccuLoad IV supports hybrid blending which is defined as a combination of sequential blending and ratio blending. A typical hybrid blending arm configuration, for example, could be three sequential products and one or two ratio products. The sequential products flow one at a time and in most cases, one of the ratio products would flow simultaneously with each of the sequential products. The ratio products can be plumbed either upstream or downstream of the sequential product meter. On a hybrid arm there must be at least one sequential product configured.

The hybrid blending arm type is also used to support in-line blending (also referred to as wild-stream blending). This feature is intended to be used in applications where it is desired to continuously blend two or more products where a preset volume is not normally used. In this configuration, the AccuLoad IV will monitor the flow through the main product line and adjust the amount of blend product based on the amount of main product flow. For more information on wild-stream blending, refer to the AccuLoad Wildstream Blending application bulletin (AB06072).

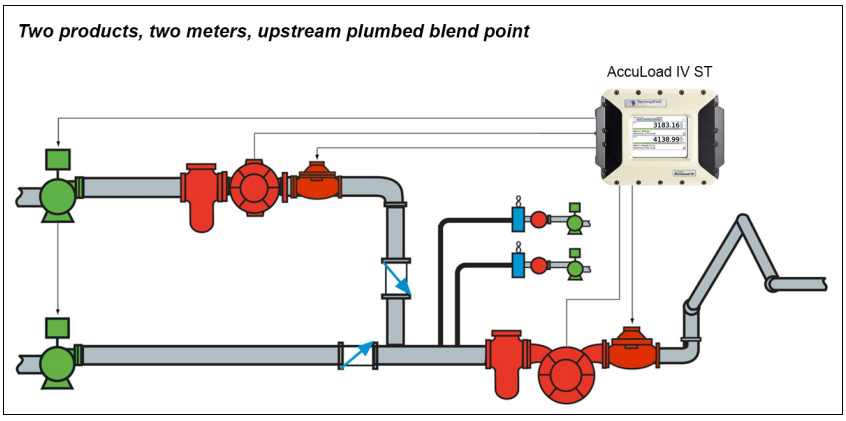
Figure 8: Hybrid Blending Arm



1.5.5 Side-Stream Blending

The AccuLoad supports side-stream blending, which is defined as two-product ratio blending where the minor of the two products is metered and is controlled by a valve, and the main product is free-flowing. Another meter and its corresponding control valve are located downstream of where the two products merge. The AccuLoad also supports side-stream blender arm proving. For more information on side-stream blending, refer to the AccuLoad Side-Stream Blending application bulletin (AB06054).

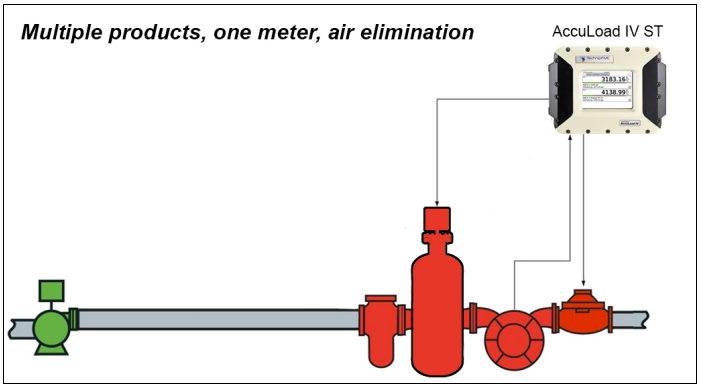
Figure 9: Side-Stream Blending Arm



1.5.6 Unloading

This arm type allows a truck compartment to be unloaded without entering a preset volume. Implementing this feature requires that a load arm be identified as “unloading”. For more information on unloading, refer to the AccuLoad Unloading application bulletin (AB06055).

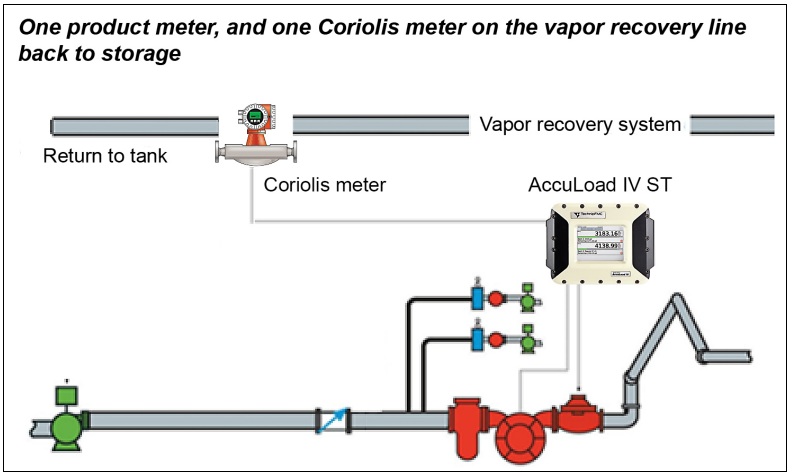
Figure 10: Unloading Arm



1.5.7 Straight Arm With Vapor Recovery System

This arm type supports delivering a single product while monitoring the amount of vapor recovered. This feature requires a load-arm type to be programmed as “Straight with VRS”. Two meters are required for this application to determine the amount of vapor recovered while loading light density products. The AccuLoad provides a vapor product total and a net mass total between the liquid product meter and the vapor product meter in the system. For additional information, refer to the AccuLoad Vapor Recovery application bulletin (AB06073).

Figure 11: Straight Arm with Vapor Recovery System (VRS)



1.6 I/O Assignments

The specific I/O points used to connect the AccuLoad to the field equipment are assigned by the user. The types of I/O supported by the AccuLoad are as follows:

- Meter pulse inputs (product or additive meters)
- Pulse outputs
- Analog I/O (4-20 millampere (mA), 1-5 direct current voltage (VDC))
- Discrete I/O (alternating current (AC) and direct current (DC))

The function associated with each I/O point is configured by the user. For example, if an AC output signal is needed for pump control, the AccuLoad allows the user to select any one of the AC outputs to be assigned that function. These selections are made in the section 1.1: Configuration Directories on page 1.

The analog I/O requires the correct type of module to be installed in the unit as well as the correct setting in the configuration database. There are six slots available on the A4M board for analog I/O modules.

The AccuLoad accepts meter pulse inputs which represent increments of mass or volume depending on the type of meter. The AccuLoad supports single-channel and dual-channel meter connection with optional transmitter integrity.

> **Note:** Using dual-pulse meter inputs and transmitter integrity reduces the total number of meter inputs available).

1.7 Units of Measure

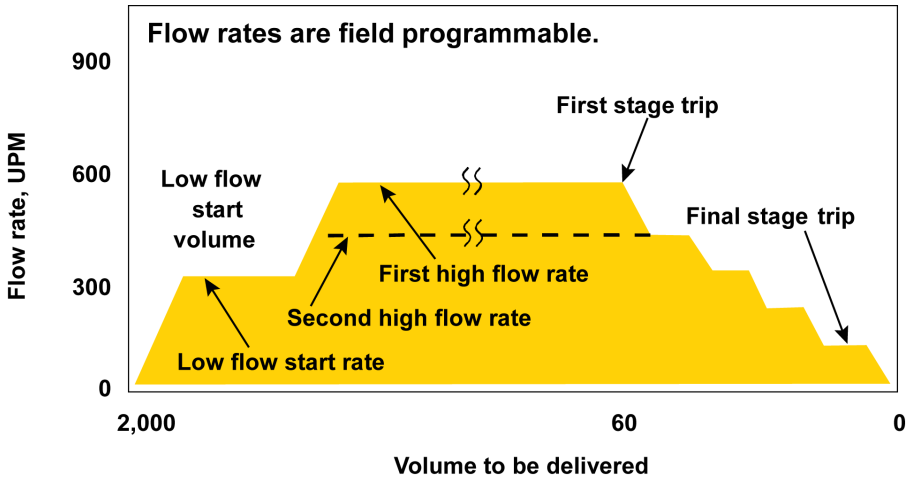
In the AccuLoad, the units of measure are set by the user. These include the volume, mass, temperature, pressure, and density. These parameters are set in the section 1.1: System Directories on page 1 and affect the operation of all arms configured in the AccuLoad.

1.8 Flow Control

The AccuLoad gives the user full control of the flow profile used during delivery. A typical profile consists of a period of lower flow rate delivery at the beginning of the transfer (low flow start). Next, the flow rate is increased for most of the delivery (high

flow rate). Finally, the flow rate is reduced in stages at the end of the transfer (ramp down).

Figure 12: Flow Rate Profile



There are parameters provided in the flow control sections of the configuration database which allow the flow rate during each of these phases of the transfer to be tailored to meet the safety, efficiency, and hydraulic requirements of the installation.

1.9 Product Definition

The AccuLoad supports configuring up to six base products to be transferred per arm. The Product section in the Arm Directories of the configuration database define the characteristics of each product, including:

- Meter factor curve
- Temperature compensation method
- Pressure compensation information
- Vapor pressure
- Others

A complete and detailed description of the fluid being measured helps the AccuLoad to calculate the transferred quantities more accurately.

1.10 Additive Injection

The AccuLoad supports up to 24 additive injectors which can be a mix of piston, metered, or smart types. There are parameters in the System-Additives Section of

section 1.1: System Directories on page 1 which allow the type and arrangement of the injectors to be selected. Once the available injectors are defined, the pacing of the additive injection is controlled by parameters in the section 8.7: Recipe Directories on page 239. The I/O required to connect the injectors is defined in section 1.1: Configuration Directories on page 1 of the database.

2 Operations

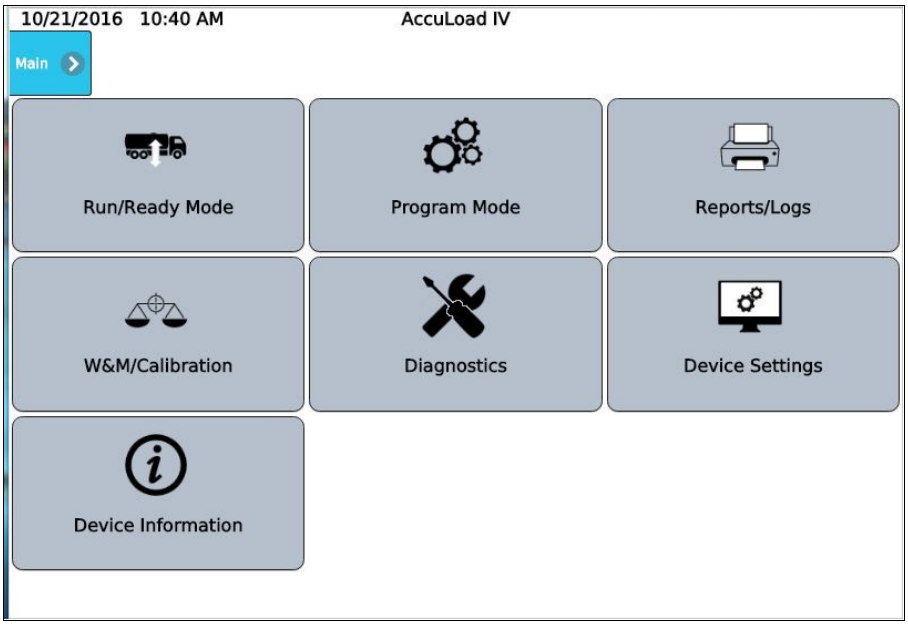
The AccuLoad has two primary modes of operation and are as follows:

- Run Mode
- Program Mode

In general, the run mode is used to perform transfers and the program mode is used to configure and maintain the AccuLoad.

This description assumes operation of the AccuLoad using the front-panel touchscreen. For information on AccuLoad remote control options, refer to the AccuLoad IV Smith Communications manual (MN06204L) or the AccuLoad Modbus Communications manual (MN06131L).

Figure 13: Main Screen Menu

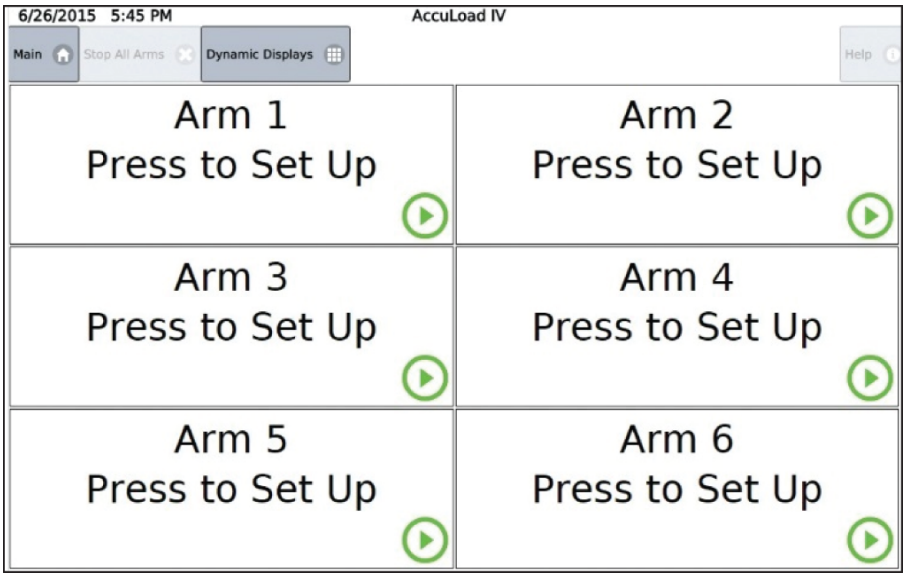


2.1 Run Mode Overview

The AccuLoad powers up in the run mode which is the normal operational mode used primarily to initiate loading or unloading transactions. The secondary function provided in run mode is dynamic data display.

At power-up, the AccuLoad is in the run mode and will display the ready screen. The ready screen is shown below with no transactions in progress with a six arm configuration and in daytime display mode.

Figure 14: Run Mode Ready Screen

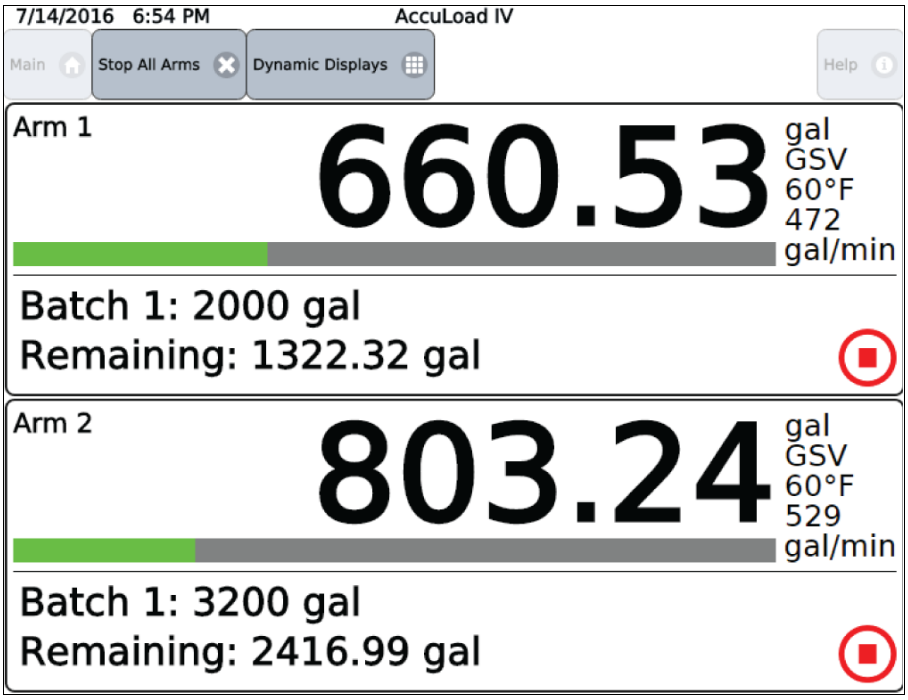


2.1.1 Run Mode Options

Run mode allows the operator to control and monitor transactions. During a typical transaction, the driver will perform the general sequence of steps as follows:

1. Enter the responses to any prompts.
2. Select the desired recipe to deliver.
3. Enter the amount to be delivered.
4. Start the transfer.
5. Confirm the end of the transfer.

Figure 15: Run Screen with Transactions in Progress (Two-Arm Configuration)



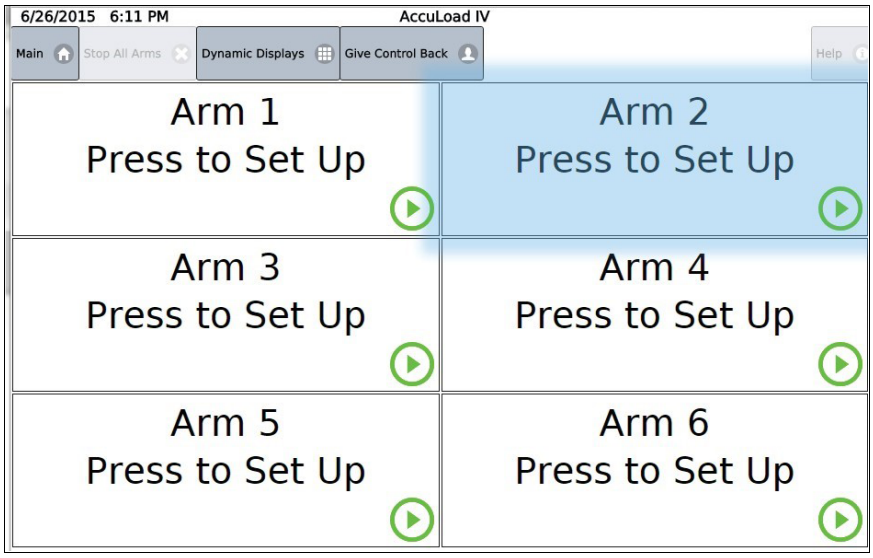
2.1.2 Typical Loading Sequence

There are many parameters in the configuration database which allow customization of the AccuLoad operation. For instance, the number and type of any prompt messages are selectable.

The following steps are one example of a typical loading sequence. Note that there are many other options available than what is shown in the following sequence:

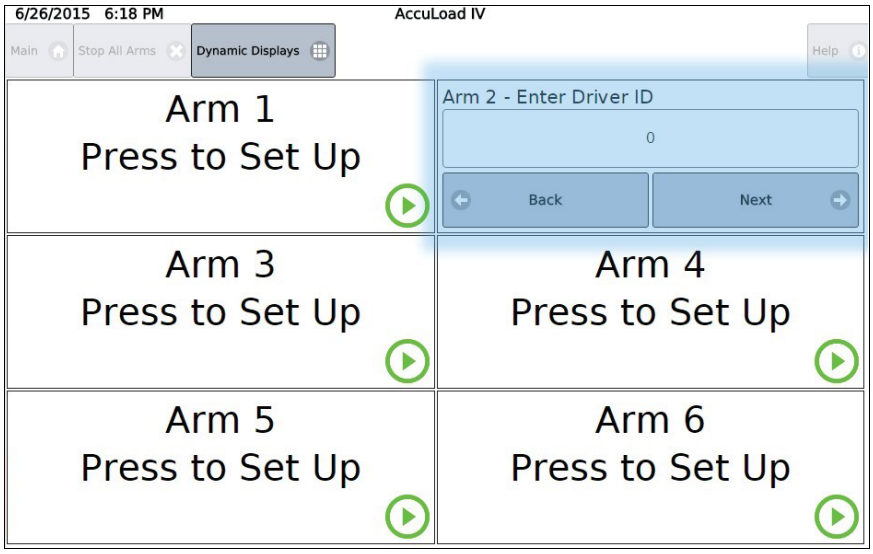
1. Select an arm for the transaction.

Figure 16: Typical Loading Sequence, Select Arm



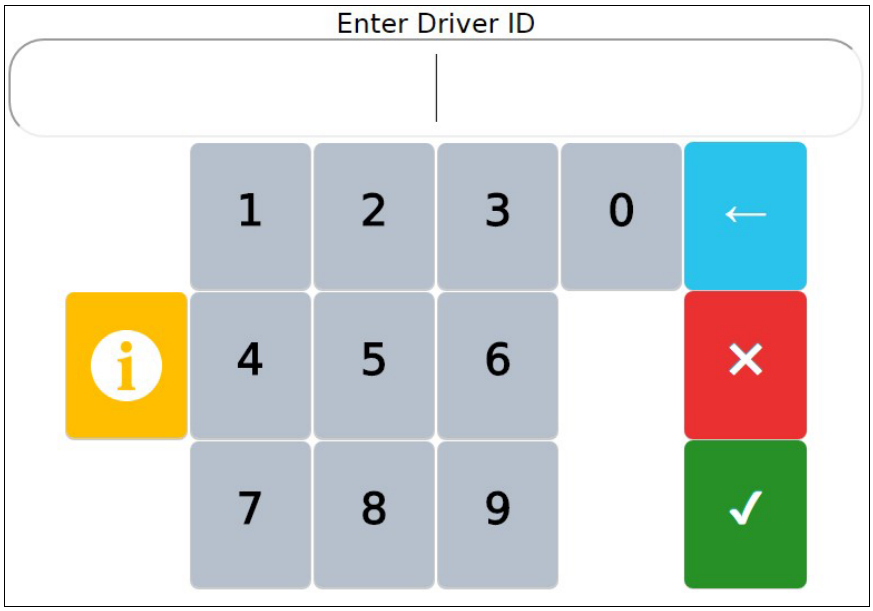
2. Select the input field for the driver ID entry.

Figure 17: Selecting the Input Field for the Driver ID Entry



3. Using the pop-up keypad, enter the driver ID and select the Accept button to confirm.

Figure 18: Entering the Driver ID Number

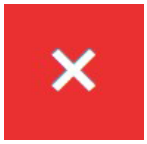


The buttons displayed on the screen are as follows:

Figure 19: Accept Button

The red X (cancel) button will cancel the entry and return to the previous screen.

Figure 20: Cancel Button



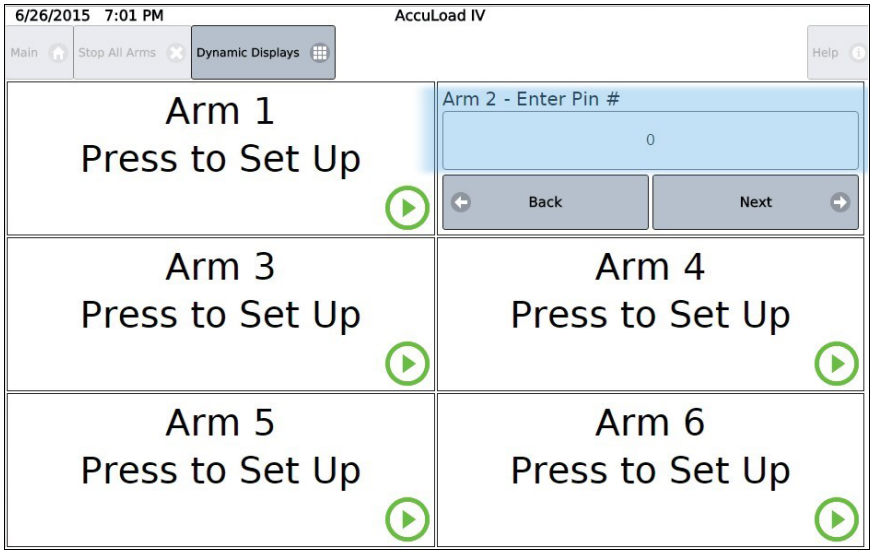
The blue left-pointing arrow (Backspace) button will delete characters entered in error.

Figure 21: Backspace Button

The yellow circled i (Information) button provides help with the entry.

Figure 22: Information Button

4. Select Next to continue.
5. Select the data-entry field to enter the personal identification number (PIN) number.



6. Enter the PIN number and select the Accept button to accept the entry. Press the Cancel button to return to the prompt.

Figure 23: Entering the PIN number

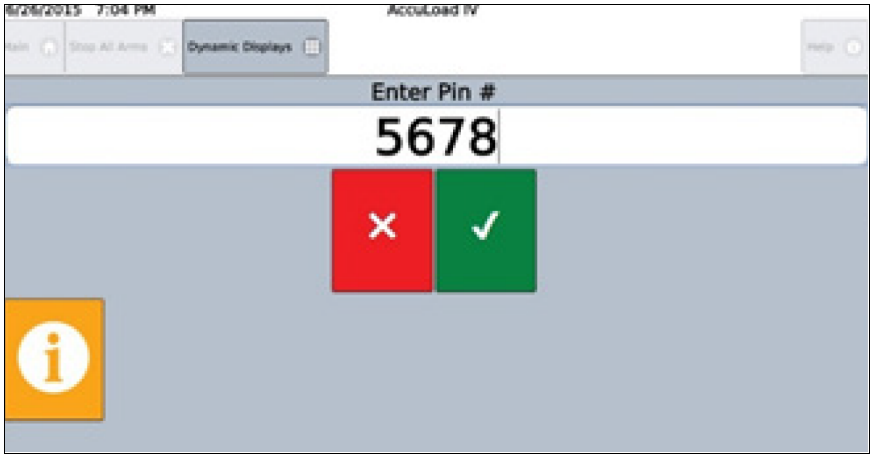
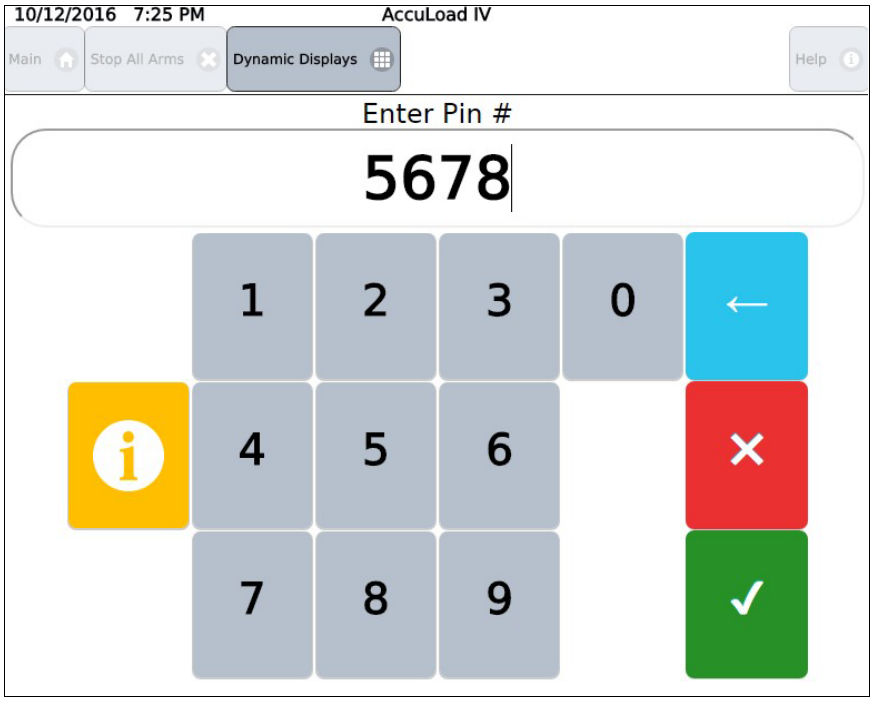
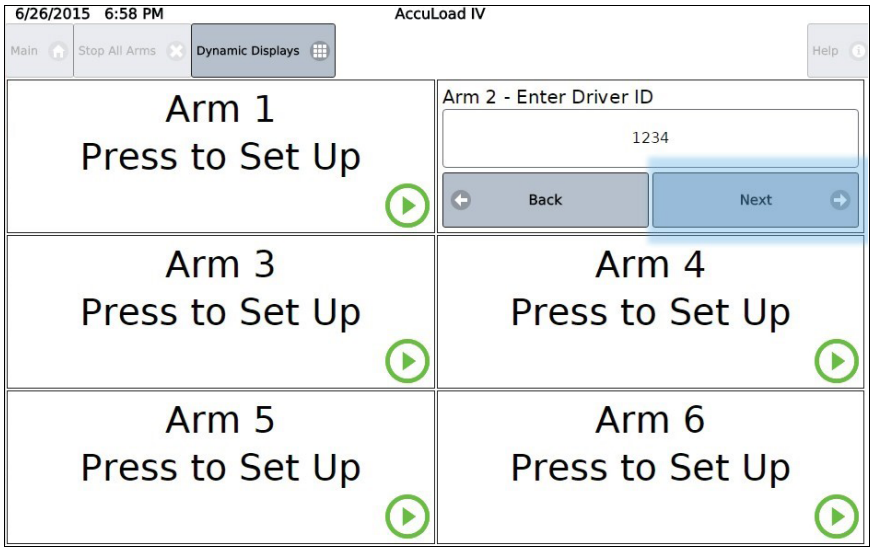


Figure 24: Typical Loading Sequence, Enter Pin Number, Step 3



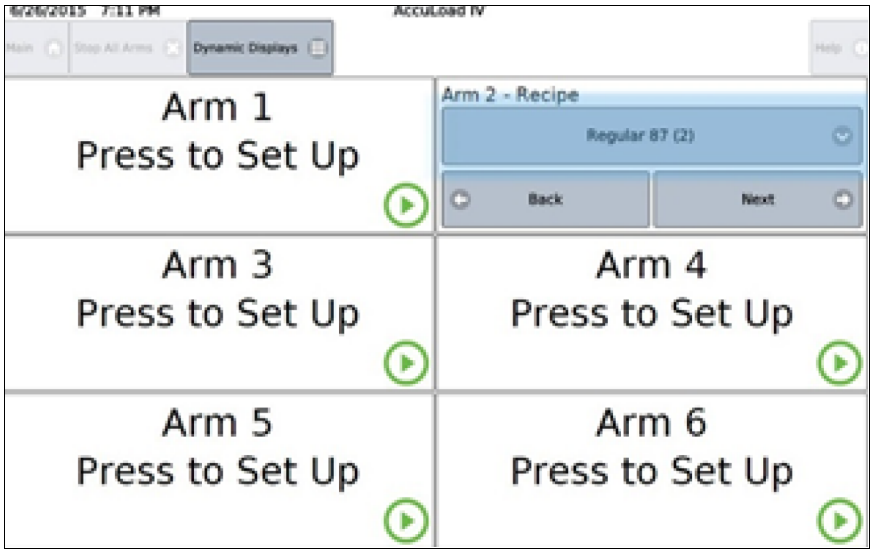
7. Select the Next button to continue.

Figure 25: Typical Loading Sequence, Enter Pin Number, Step 4



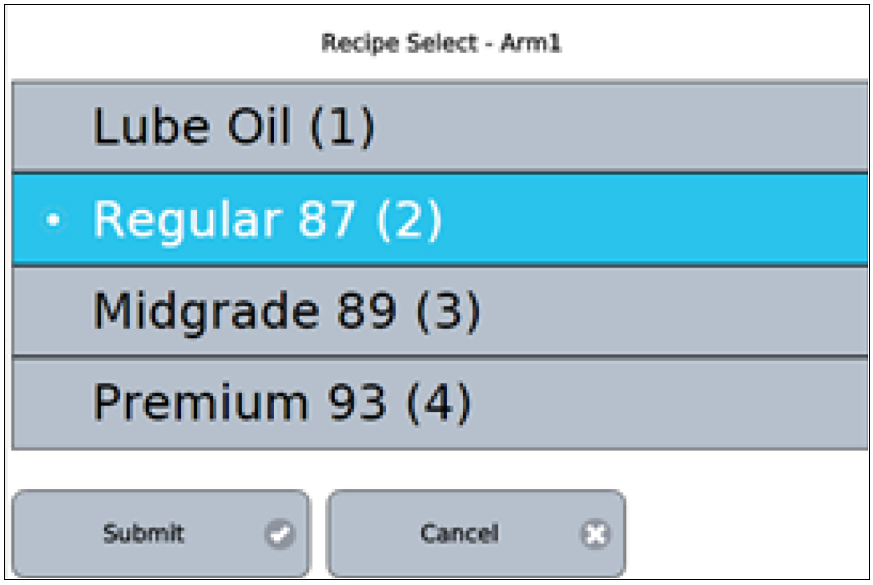
8. Selected the recipe button to change the recipe. The default recipe for this arm is displayed.

Figure 26: Displaying the Recipe Options



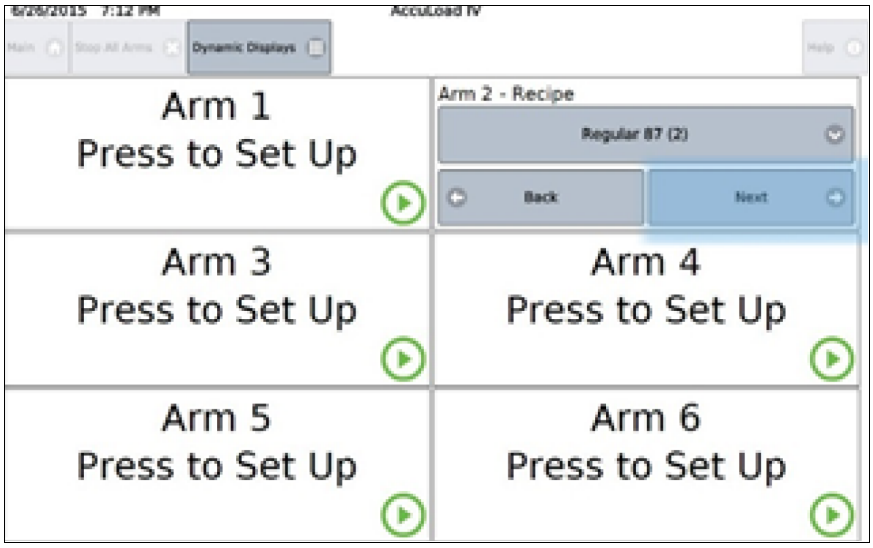
9. Selecti the recipe to be loaded from the drop-down list and then select the Submit button.

Figure 27: Selecting the Recipe



10. Once the correct recipe has been chosen, select the Next button.

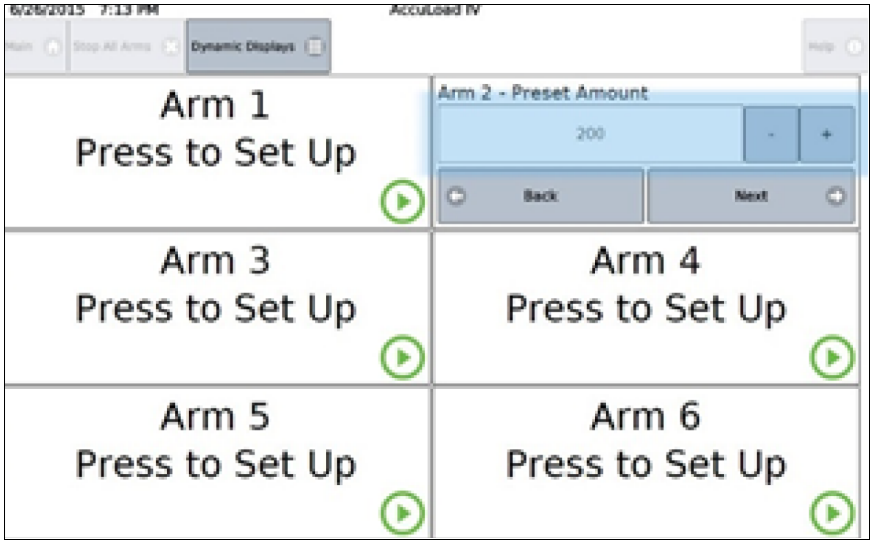
Figure 28: Typical Loading Sequence, Recipe Selection, Step 3



11. To display the numeric keypad to allow direction entry of a new preset amount, perform either of the following actions:

    - Select the preset amount field to display the numeric keypad to allow direct entry of a new preset amount.
    - Alternately select the plus and minus buttons to increment or decrement the preset amount by the programmed amount. Once the correct preset amount has been entered, select the Next button.

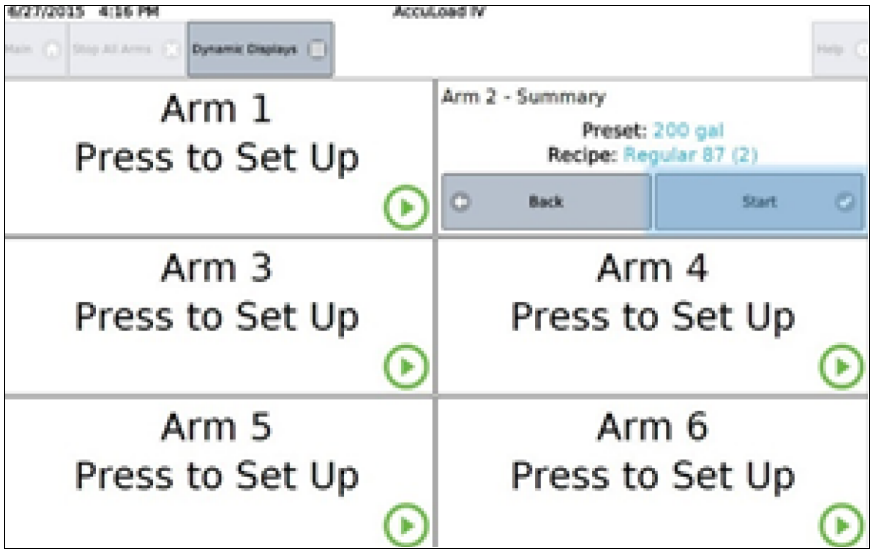
Figure 29: Entering the Correct Preset Amount



12. Once the correct preset amount has been entered, press the Next button.

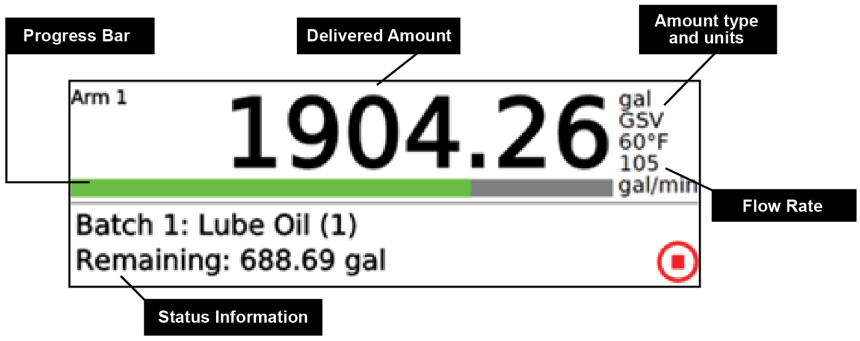
13. The AccuLoad displays the preset amount and the recipe for confirmation. If everything is correct, press the Start button to begin the flow of product.

Figure 30: Typical Loading Sequence, Recipe Selection, Step 5



14. Once the transaction is started, the AccuLoad will display the status of the transaction in the arm's status panel area, as shown in the following diagram:

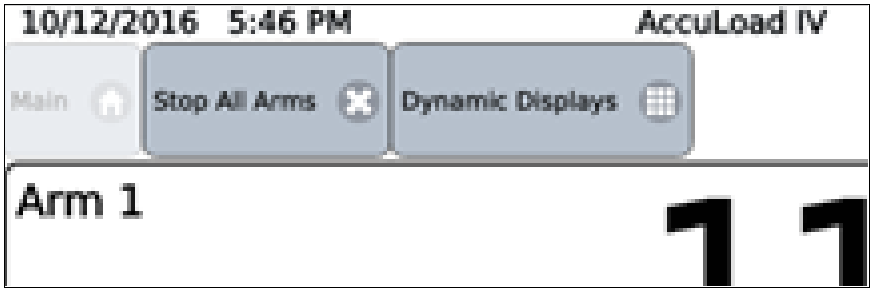
Figure 31: Transaction Status Diagram



15. To stop flow on the arm, press the Stop button on the delivery display for the arm.

16. To stop flow on all arms, press the Stop All Arms button.

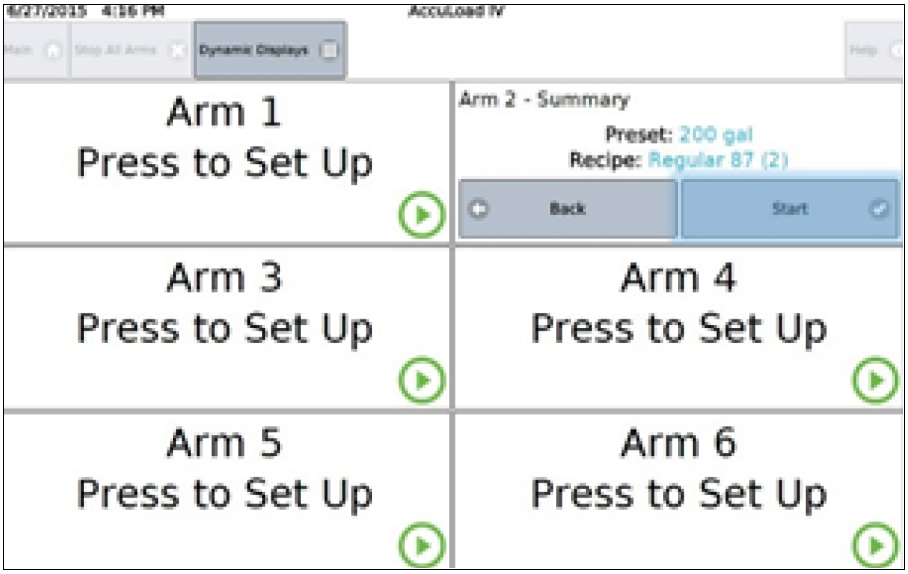
Figure 32: Typical Loading Sequence, Stop Flow on All Arms



17. When the batch has completed, another batch in this transaction can be started or the transaction can be ended.

If the transaction is ended, the AccuLoad returns to the ready screen and prints a transaction report if configured to do so.

Figure 33: Return to Ready Screen



2.1.3 System Status Display

The system status display feature is available in AccuLoad IV firmware versions 1.0 and higher. It provides an alternative view for run mode similar to the system status display available in the AccuLoad III.

Figure 34: System Status Display

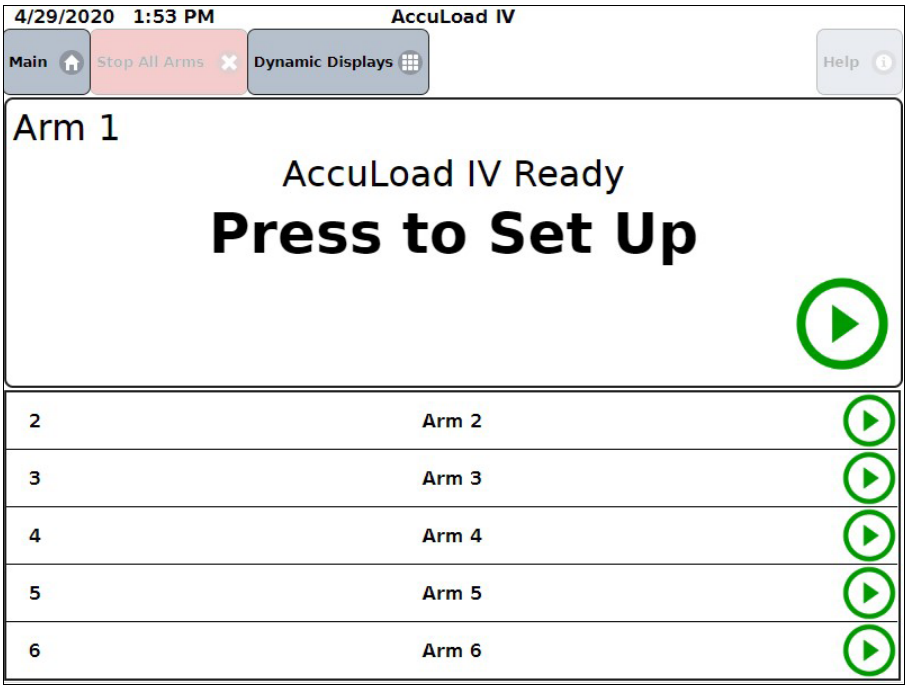
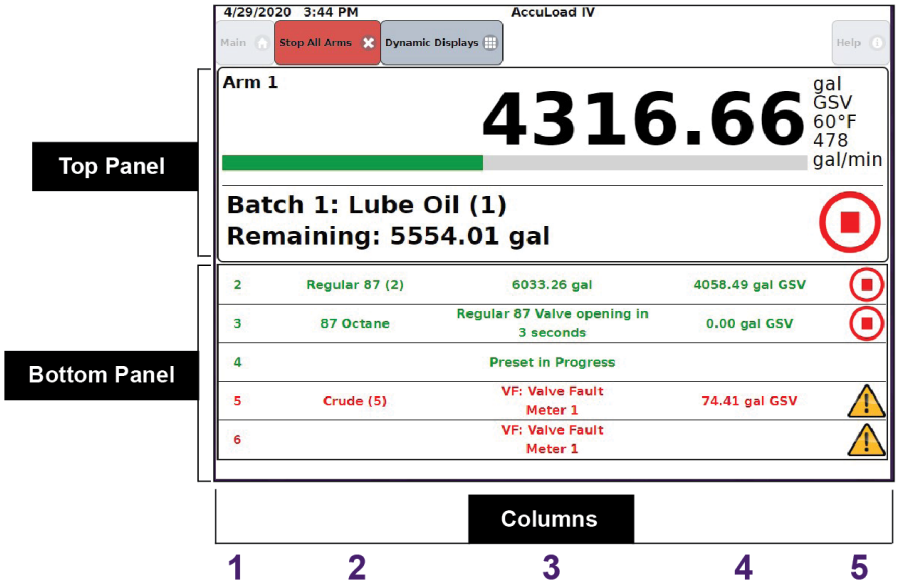


Figure 35: System Status Display Callouts



2.1.3.1 Top Panel—Arm In Focus

The top panel shows the arm that is currently in focus.

2.1.3.2 Bottom Panel—List View

The bottom panel shows the additional available arms.

2.1.3.3 Column 1—Arm Number/Arm Address

When Program Code Parameter 1003, Board Set Function, is set to no split arch or dual human machine interface (HMI), the arm number will be displayed.

When Program Code Parameter 1003, Board Set Function, is set to no HMI, HMI A, or HMI B—for example, split architecture is enabled—instead of the arm number, the programmed arm address, as configured in the program mode parameters below, will be displayed:

- 701—Arm 1 Address
- 702—Arm 2 Address
- 703—Arm 3 Address
- 704—Arm 4 Address
- 705—Arm 5 Address
- 706—Arm 6 Address

2.1.3.4 Column 2—Recipe Name

The recipe name is shown based on Recipe Program Code 002 which is the recipe name for the current or most recently selected recipe.

2.1.3.5 Column 3—Remaining Volume/Unit Status

Remaining Volume

The preset remaining amount is displayed with the appropriate units based on the parameters as shown below, when Program Code 331, Run Display Options, is set to “Default”:

- 332 Preset Amount Type, and either
- 303 Volume Descriptor, or
- 304 Mass Descriptor, when Preset Amount Type is Mass
- If Parameter 331, Run Display Options, is set to “No Down Count” the preset remaining amount is not displayed.
- When the preset remaining amount is displayed, the remaining amount is displayed in whole numbers.

Arm Status

- The unit arm status is shown in place of the remaining volume amount during the following conditions:

- Valve Opening—Message—Valve Opening
- Valve Closing—Message—Valve Closing
- Batch Done—Message—Batch Done
- Batch Paused—Message—Stopped
- Alarm—Message—<Alarm Name>
- Permissive—Message—Permissive not Met
- Presetting—Message—Preset in Progress

> **Note:** When in preset is in progress with an active alarm, the “Preset in Progress” message and the active alarm name alternate.

2.1.3.6 Column 4—Delivered Amount

The delivered amount is displayed with the appropriate units as programmed in Program Mode based on the following parameters:

- 333 Delivery Amount Type and either
- 303 Volume Descriptor or
- 304 Mass Descriptor, when delivery amount type is Mass.

The delivered amount resolution follows the 334 Display Resolution parameter.

The delivered amount displayed could be one of two options:

1. Batch delivered volume/mass
2. Transaction delivered volume/mass

If parameter 335 Delivered Amount Type is set to “Batch”, the batch delivered amount is shown.

If parameter 335 Delivered Amount Type is set to “Transaction”, the transaction delivered amount is shown.

2.1.3.7 Column 5—Icons

2.1.3.7.1 Start

Figure 36: Start Icon and Button

The green right-facing arrow head (Start) icon indicates that an arm is idle and ready to be setup for a transaction.

The start icon also functions as a start button.

- If an arm is idle and the start button is selected, the arm is brought into focus.
- If a transaction is in progress and paused, the transaction will be restarted and the arm is brought into focus.

2.1.3.7.2 Stop

Figure 37: Stop Icon and Button

The red square inside of a circle (Stop) icon is used to show an arm is flowing.

The stop icon also functions as a stop button to stop flow.

- If the icon is selected during flow, flow will be stopped, the valve is closed, and the arm will automatically be brought into focus.

2.1.3.7.3 Alarm

Figure 38: Alarm Icon

The exclamation mark inside of a yellow triangle (Alarm) icon is used to show when an alarm is present on an arm.

2.1.3.7.4 Permissive Lost

Figure 39: Premissive Lost Icon

The red, broken-ground connection (Permissive Lost) icon is used to show when a permissive is not met and the connection to ground has been lost.

2.1.3.8 Column 6—Scroll Buttons

Up and down pointing scroll buttons are shown on the right-hand side of the system status display when there are more than six arms configured to be displayed on the HMI.

The scroll buttons move one row up or one row down per click based on the button selected and cycle, in a circular manner, through the idle arms.

Arms that have a transaction in progress or preset in progress, with or without an active alarm, are not affected by the scroll buttons and will remain in view.

2.1.4 Idle Arms

When an arm is idle the arm name as programmed in parameter Arm 107, Load Arm ID, will be displayed across the row.

If an alarm occurs that affects an arm that is idle, the alarm name is displayed across the row in place of the arm name.

Program Code Arm 1610, Idle Arm Alarm, applies only to split architecture.

- If configured for Stop Arms and six arms are in an active transaction or in preset and an alarm occurs on an idle arm, the idle arm alarm message which is not a true alarm, is shown indicating there is a problem and flow is stopped on all active arms.
- If configured for Don’t Stop Arms and six arms are in an active transaction or in preset and an alarm occurs on an idle arm, the idle arm alarm message is not shown and flow will continue on all active arms.

2.1.5 Arm Focus

Arms shown in the bottom panel can be selected from the HMI to bring the arm into focus on the top panel by touching the desired arm in the list.

The arm that was previously in focus will move to the bottom panel and be displayed in the appropriate location based on the arm number/arm address and the state of the arm.

If an arm displayed in the bottom panel is started or stopped using a remote start or remote stop input switch, the arm will remain in the bottom panel. Note that it is not automatically brought into focus on the top pane.

Communications commands are also capable of changing the arm focus via the FS command or via Modbus extended services command.

Inhibit Auto Focus

- If Program Code System 734, Inhibit Auto Focus, is set to Yes, arms are prevented from automatically being given focus priority when the following Commands are used:
  - SB/SF
  - AP
  - WD
  - WX
  - WP
  - WQ

Example: If Arm 1 is in focus and one of the commands listed above is sent to Arm 5, Arm 1 will remain in focus in the top pane.

Note: The FS command will still cause the arm to change focus even if Inhibit Auto Focus is set to Yes.

- If Inhibit Auto Focus is set to No, the arm focus will automatically change when one of the commands listed above is sent to an arm.

Example: If Arm 1 is in focus and one of the commands listed above is sent to Arm 5, Arm 5 will be displayed in the top pane. Arm 1 will be moved to the bottom pane. If these commands are sent to multiple arms, the last arm receiving the command will have focus.

2.1.6 Arm Display Precedence

A limit of six arms per HMI can be in a transaction or in a presetting state at the same time.

Arms are always listed in ascending order based on the column 1 value, arm number or arm address, as described previously.

When configured for split architecture, active arms will always be displayed on the top of the list of available arms in the bottom pane. Otherwise, these arms are also ordered in ascending order based on the arm address.

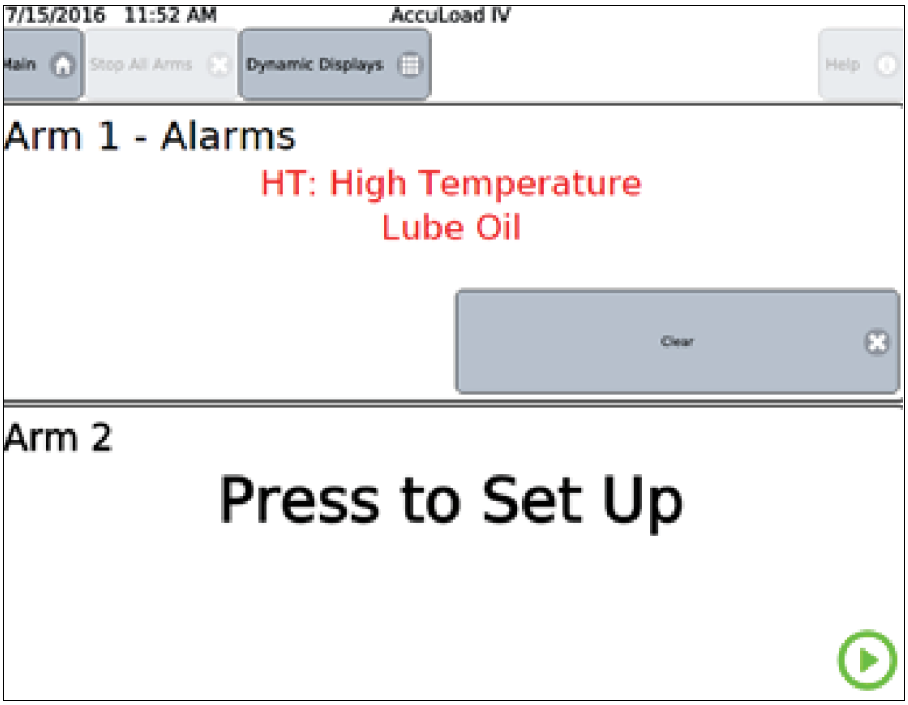
2.1.7 Alarm Reporting

The AccuLoad will post an alarm when an error condition is detected. For example, an alarm is generated if the flow rate exceeds the allowed range or if the valve malfunctions.

A complete listing of the alarms can be found in this manual in section 8: Program Mode Reference on page 129, and in the AccuLoad IV Smith Communications manual (MN06204L). The default actions taken by the AccuLoad when an alarm occurs are:

- Post a message on the display.
- Shut down flow on the associated arm.
- Record the occurrence in the alarm log.

Figure 40: Typical Ready Screen Alarm Message



There are configurable options which can be set for each default alarm type as follows:

- Allow run mode clearing
- Energize alarm relay output number one
- Energize alarm relay output number two
- Notify via e-mail
- Allow flow to continue

2.1.8 Allow Run/Ready Mode Clearing

This option controls whether the selected alarm can be cleared while in the run mode. If enabled, this will allow the driver to clear the alarm without entering program mode with no passcode required.

2.1.9 Energize Alarm Relay Output One/Two

This selection will determine if the alarm output will be energized when an alarm occurs. This option requires that the particular digital output has been configured as an alarm output.

2.1.10 Notify Via Email

Selecting this option results in the AccuLoad issuing an email message to the designated recipient upon the occurrence of this alarm. Multiple parameters in the communications section of the configuration database in System: Communications: Prompts: Prompt Timeout on page 1 must be set up for this option to function correctly.

2.1.11 Allow Flow to Continue

By default, the AccuLoad will stop flow for all alarms. This option will override the default and allow flow to continue.

2.1.12 Permissive Inputs

The AccuLoad can be configured to monitor the status of digital inputs for permissive control. Up to two inputs can be configured as system permissives and affect all arms. Up to three can be configured that are specific to a particular arm such as arm permissives. Typically, these would be used to monitor safety systems such as grounding, overfill etc., will stop flow, and display a message to the operator if a problem is detected.

> **Important:** The AccuLoad should never be relied on to act as the primary safety system control for the flow valve and pump controls. Emergency stop, overfill, ground protection, etc. must be used.
>
> These should always be handled by separate systems specifically designed for that application. For example, safety systems that specifically meet SIL requirements. Any power control circuits from these external systems shall be wired in series ahead of the AccuLoad to remove power to the ancillary devices. Reference the AccuLoad IV Installation and Maintenance manual (MN06201) for connection details.

For example, to enable a permissive input to monitor the status of the ground detection system, the following would be required:

- Configure a digital input as a system permissive or as an arm permissive input.
- Define a message to be displayed to the operator when the permissive signal is lost. For example, the message might be Connect Ground.
- Configure at what times the AccuLoad should monitor the permissive input state.

The available options are:

- Transaction Star: Permissive only checked immediately after authorization.
- Continuous: Permissive must be met continuously during the batch.
- Start Pressed: Permissive must be met whenever flow is started.
- Batch Start: Permissive must be met to start a batch.

- Once configured as previously described, if this permissive is lost during a batch, the flow will be stopped. There is another configuration parameter which controls the way the flow is resumed with options as follows:
  - Manual: Start must be pressed to restart flow.
  - Automatic: Flow will be started as soon as the permissive signal is restored.

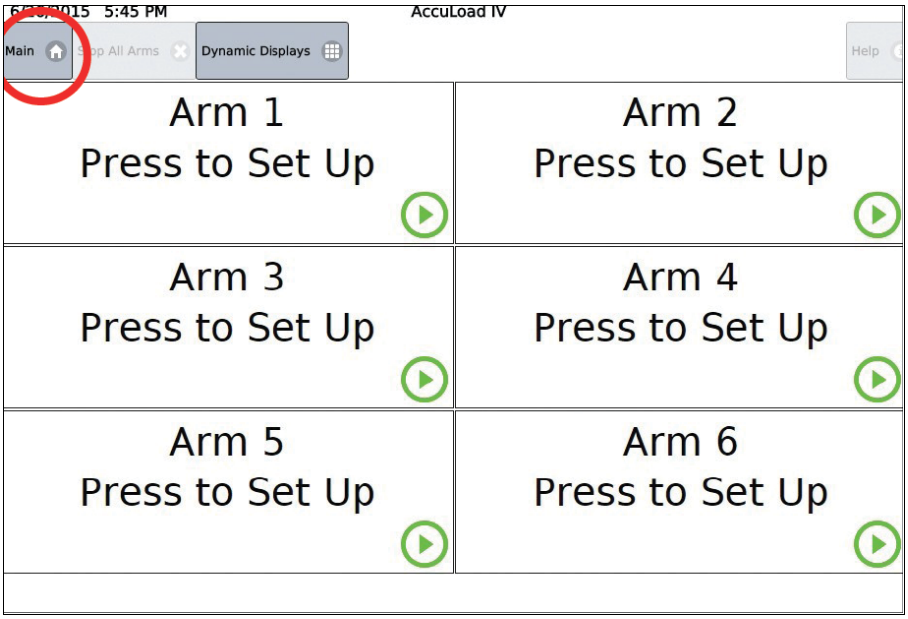
  For this example, ground fault detection, the continuous option would be used so that the AccuLoad will prohibit loading any time the ground is not connected. Either restart option could be used.

  With this configuration, the operator is able to enter the loading information without connecting the ground. However, the batch would not start and the message, “Connect Ground”, would be displayed if the operator tried to start the batch. Also, if the ground permissive signal is lost anytime during the batch, the AccuLoad would stop flow and display the “Connect Ground” message.

2.1.13 Main Menu Operation

The main menu is the starting point for all non-transaction related operation of the AccuLoad. To get to the main menu from the Ready screen, press the Main button in the top left corner of the screen as shown.

Figure 41: Return to Main Menu

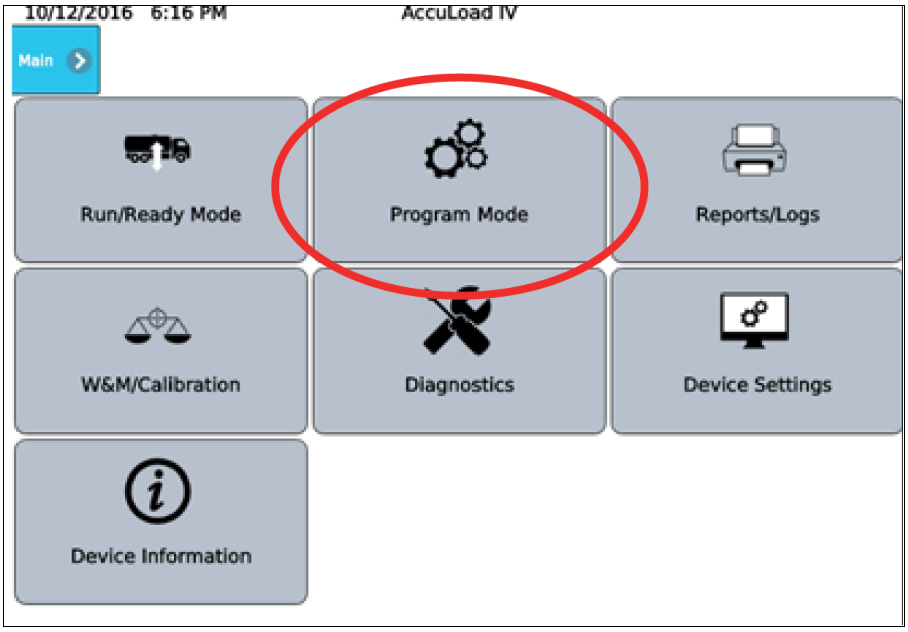


Note: If a transaction is in progress, the main menu is not available.

2.2 Program Mode Overview

To modify the AccuLoad configuration, enter Program Mode by pressing the program mode option from the main menu.

Figure 42: Program Mode



Program Mode provides a means to modify the AccuLoad configuration database. Modifying the configuration with program mode allows the end user to customize the behavior of the AccuLoad to meet the operational requirements of the installation.

The AccuLoad can be configured to require a passcode and an external enable contact input before granting access to make parameter changes. In general, program mode access should be controlled since the settings in the database can affect critical measurement and operational functions. Local weights and measures jurisdictions may require password protection of some or all of the operating parameters that are accessible through Program Mode.

A complete description of the security features provided by the AccuLoad can be found in section 1.1.9: Security Directory on page 1.

Detailed information regarding the individual parameters that can be configured in Program Mode is included this manual. See section 8: Program Mode Reference on page 129.

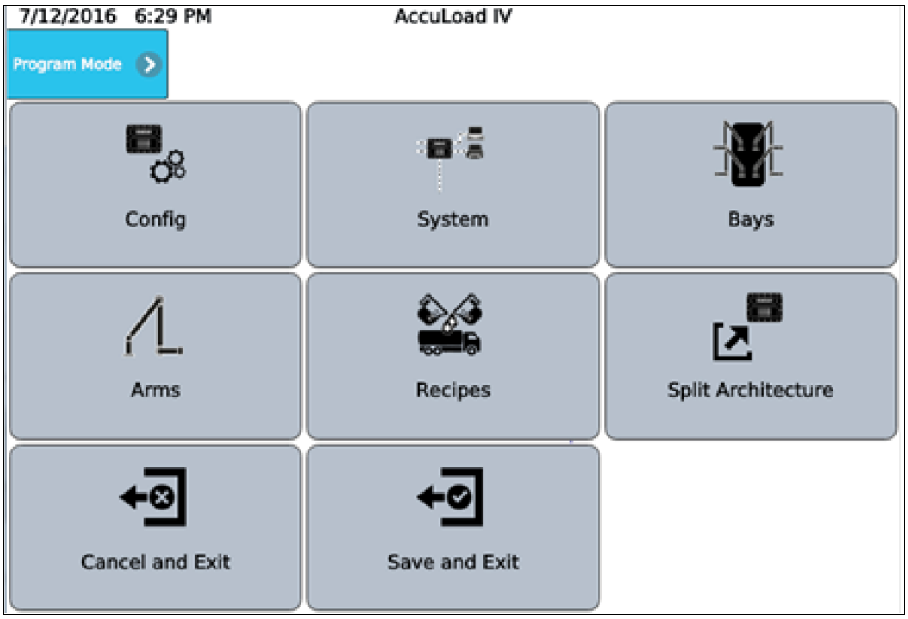
> **Note:** If security passcodes have been enabled, the AccuLoad will display a prompt to enter the passcode before granting access to the program mode.

2.2.1 Program Mode Menu

From the top level Program Mode menu, the directory selections are:

- Configuration
- System
- Bays
- Arms
- Recipes
- Split Architecture
- Cancel and Exit
- Save and Exit

Figure 43: Program Mode Directories



2.2.1.1 Configuration Directory Overview

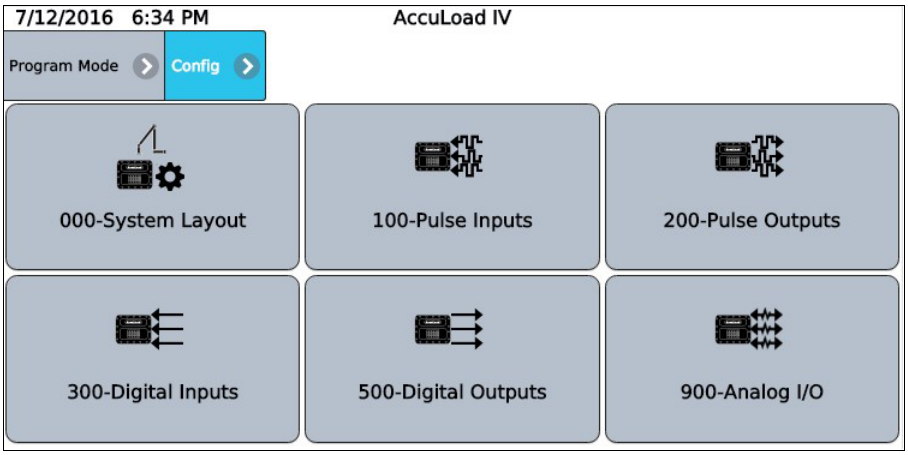
The configuration directory contains options defining the load arm layout and how I/O points are connected to meters, valves, pumps, injectors, etc.

The configuration database, often called Program Mode, is organized in the following sections:

Configuration Subdirectories:

- System Layout
- Pulse Inputs
- Pulse Outputs
- Digital Inputs
- Digital Outputs
- Analog I/O

Figure 44: Configuration Subdirectories



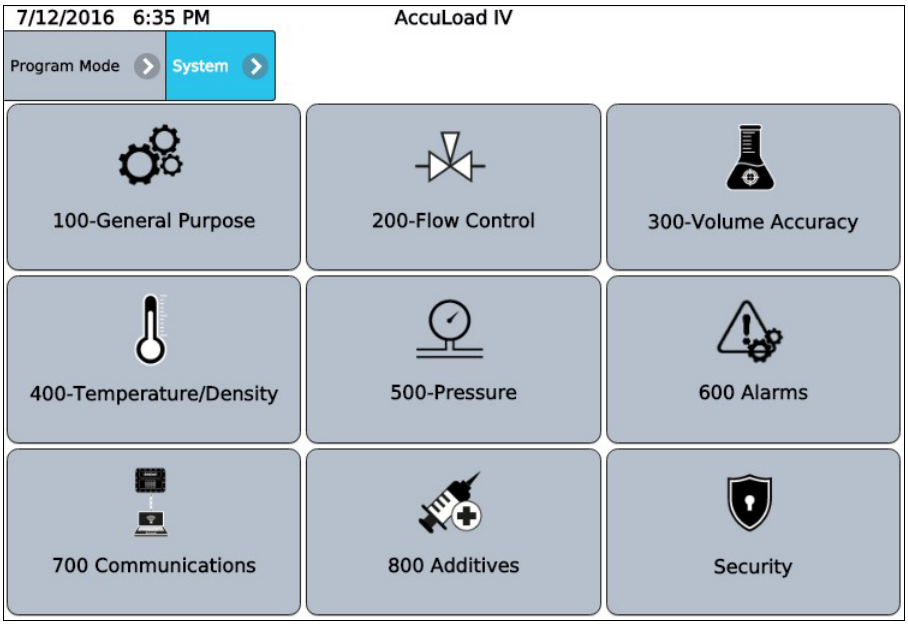
2.2.1.2 System Directory Overview

This section is used to set operating parameters which affect the operation of the entire AccuLoad.

System Subdirectories:

- General Purpose
- Flow Control
- Volume Accuracy
- Temperature/Density
- Pressure
- Alarms
- Communications
- Additives
- Security

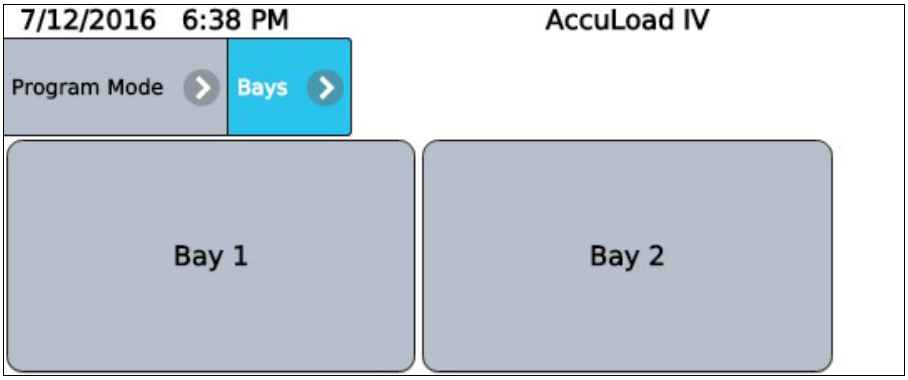
Figure 45: System Directories



2.2.1.3 Bays Directory Overview

This section is for configuration of items that are specific to dual bays controlled by one AccuLoad, for example, the swing arm applications.

Figure 46: Bays Directory Subdirectories



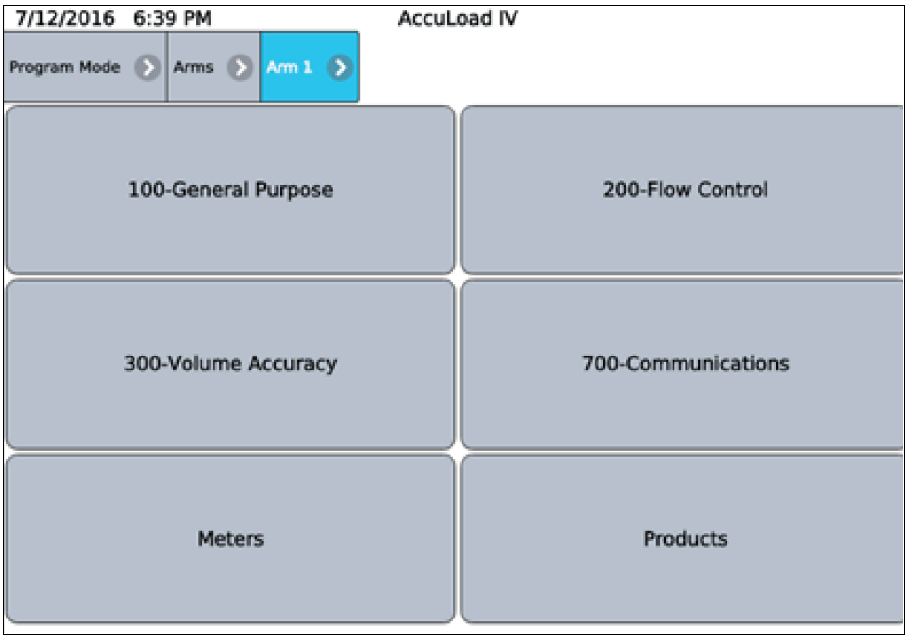
Bays Subdirectories:

- Bay 1
- Bay 2

2.2.1.4 Arms Directory Overview

This section is used to set parameters that affect the operation of a single arm which includes one section for each and up to six maximum arms.

Figure 47: Arms Directory Subdirectories



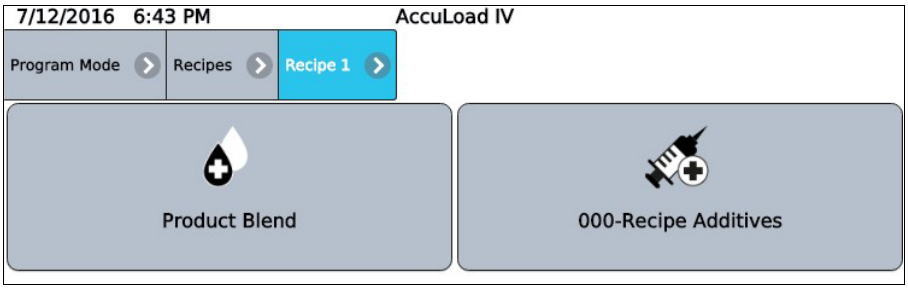
Subdirectories include:

- General Purpose
- Flow Control
- Volume Accuracy
- Communications
- Meters
- Products

2.2.1.5 Recipes Directory Overview

This section is used to pre-define specific combinations of products and additives that can be selected for delivery by the AccuLoad which includes one section for each of 50 recipes maximum.

Figure 48: Recipes Directory Subdirectories

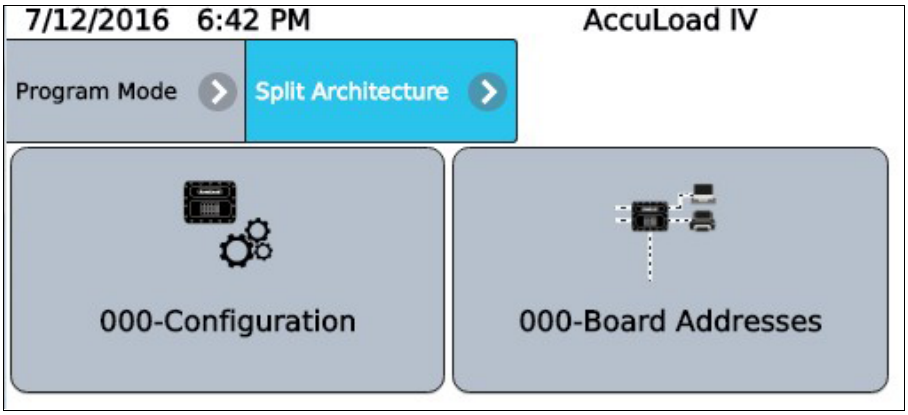


Subdirectories include:

- Product Blend
- Recipe Additives

2.2.1.6 Split Architecture Directory Overview

Figure 49: Split Architecture Directory Subdirectories



Subdirectories include:

- Configuration
- Board Addresses

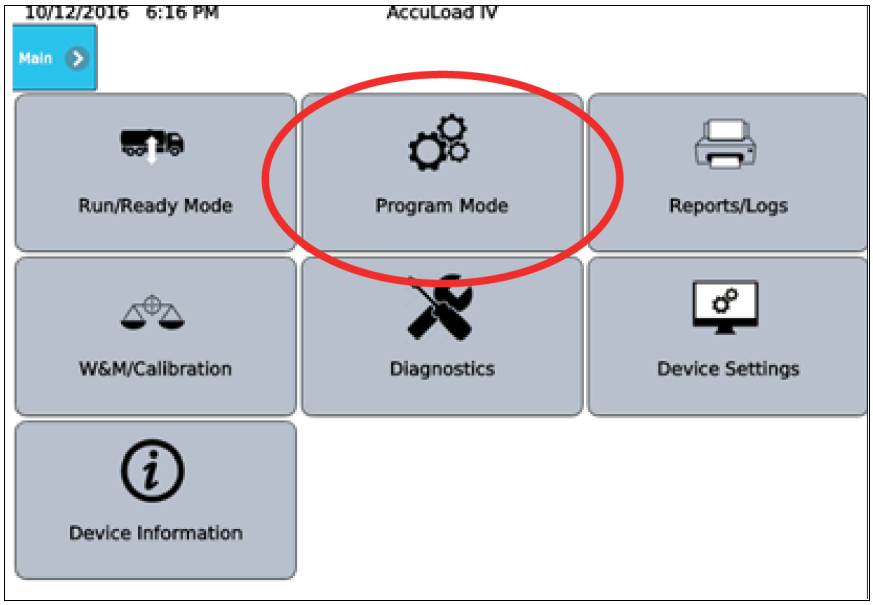
2.2.2 Database Modification Using Front Panel or Browser

The following sequence illustrates the process of modifying a parameter in the AccuLoad database using the built-in menu system. The parameters in the configuration database can also be changed through communications using the AccuMate program running on a PC or by using the Modbus protocol. For other methods, see the AccuLoad IV Smith Communications manual (MN06204L) and the AccuLoad Modbus Communications manual (MN06131L).

The following example is a sequence of screens that show an example of entering program mode, changing a parameter such as the AccuLoad ID, and then exiting.

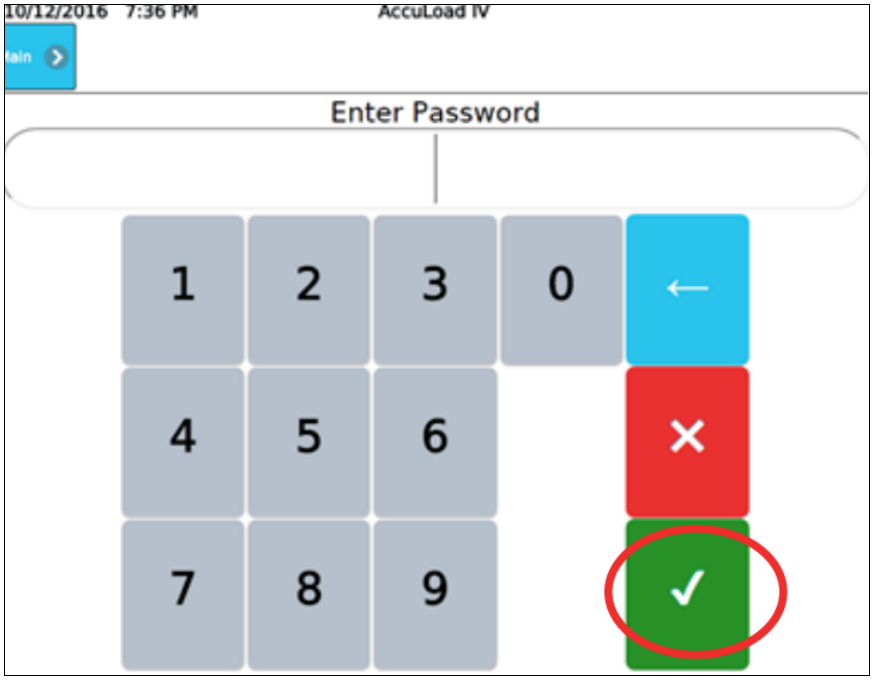
1. At the Main menu, press Program Mode. Note the AccuLoad Unit ID, AccuLoad IV, displayed in the middle of the top line of the display.

Figure 50: Program Mode Screen



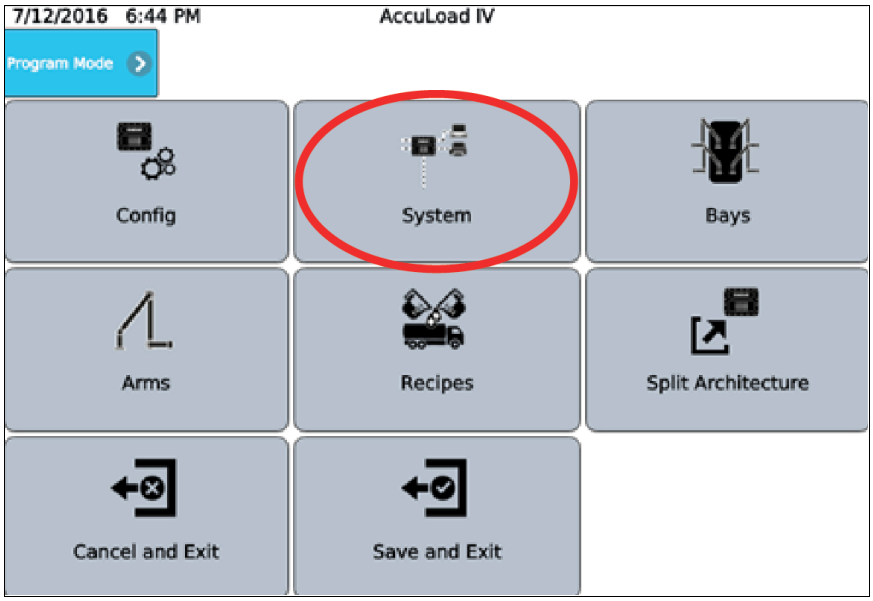
2. Enter the security passcode and select the Accept button. Note that this is optional depending on security configuration, see section 1.1.9: Security Directory on page 1.

Figure 51: Security Passcode Entry



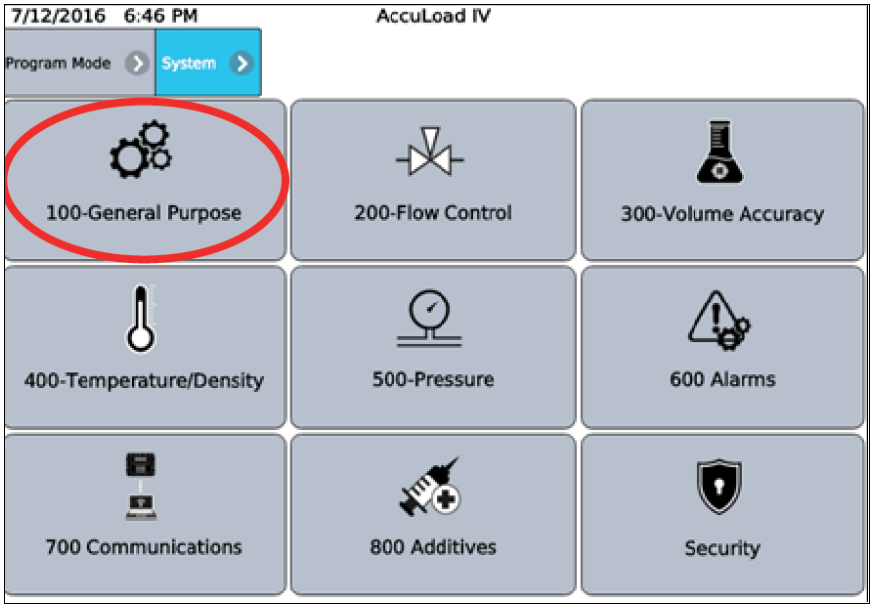
3. If the passcode is correct, the top-level program mode menu is displayed. From here, select the System menu.

Figure 52: System Menu



4. The System top level menu is displayed. From here, selected the General Purpose menu. Note the “bread crumb” bar across the top shows each menu level as it entered. Pressing any of the bread crumb menu levels will navigate directly back to that menu level.

Figure 53: System Menu, General Purpose



5. Select the Unit ID parameter which is currently set to AccuLoad IV. The current setting for the Unit ID parameter is displayed with a keyboard to enter a new value.

Figure 54: System, General Purpose, Unit ID

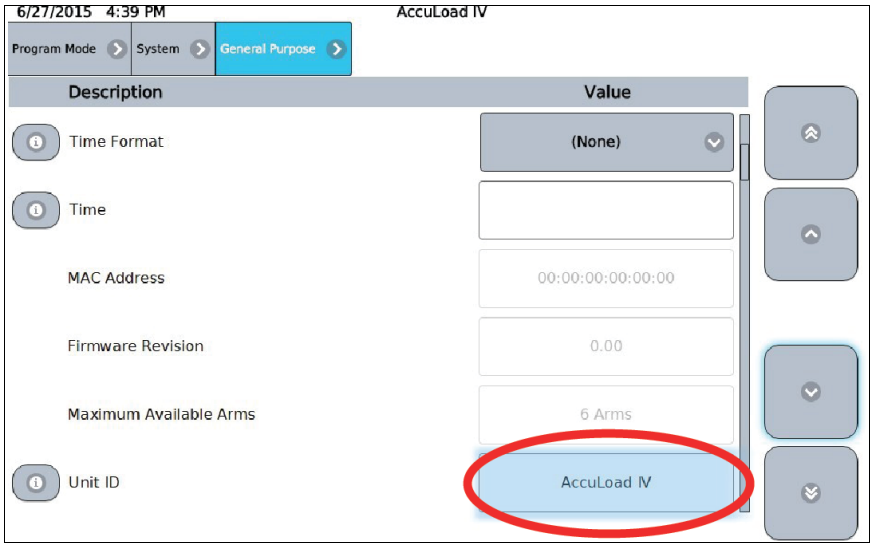
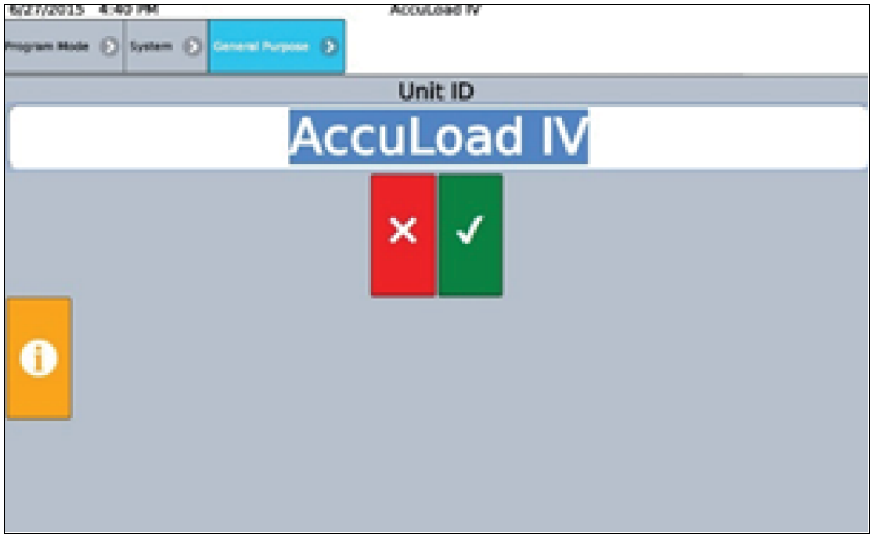


Figure 55: System, Unit ID



6. Select the Unit ID field and change the Unit ID from AccuLoad IV to AL IV Unit ID.

Figure 56: Changing Unit ID

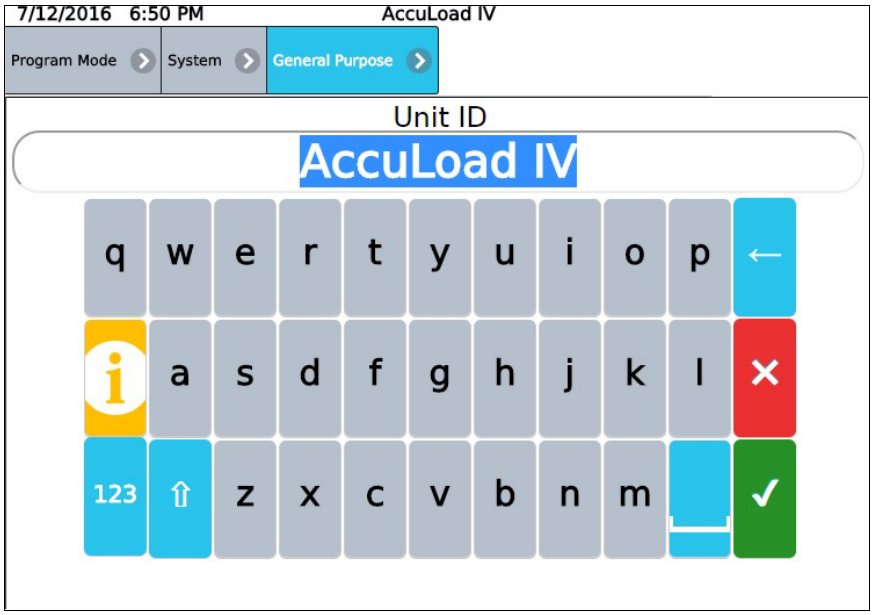
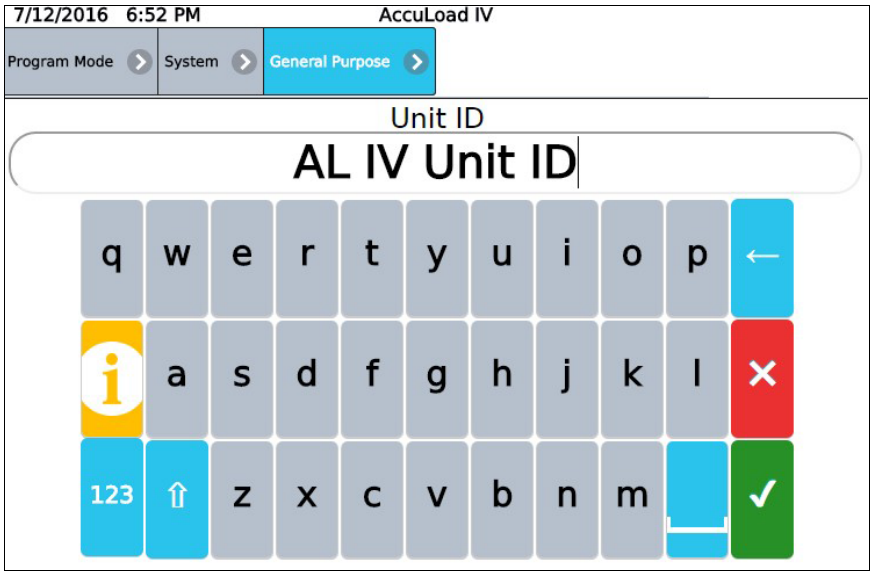
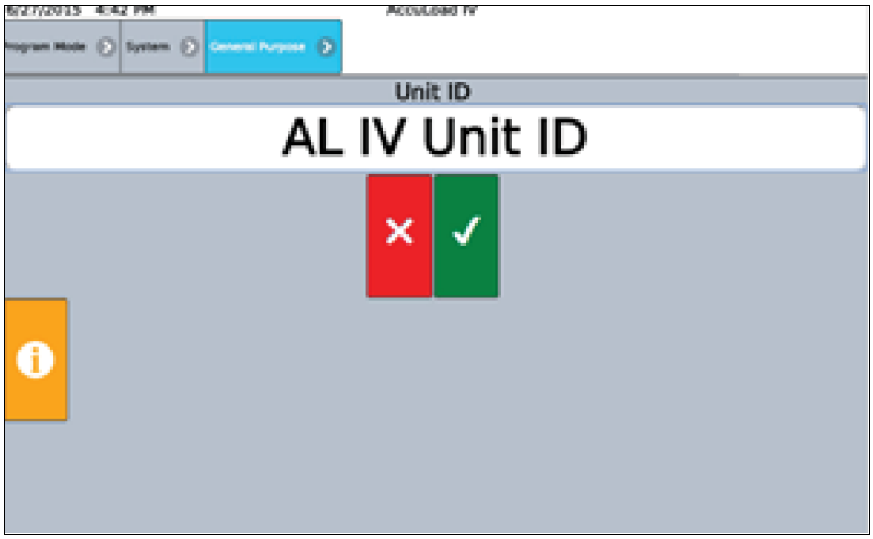


Figure 57: Entering New Unit ID



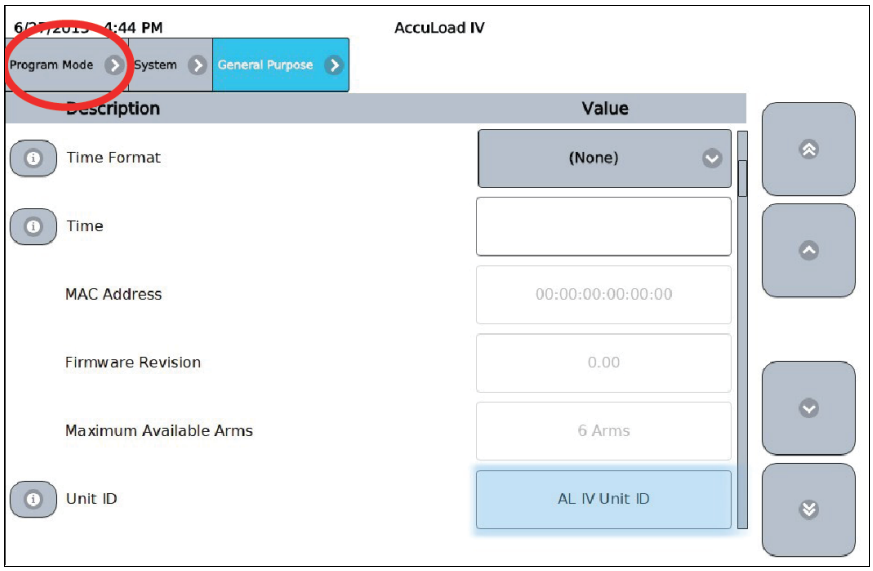
7. Select the Accept button to accept the changes.

Figure 58: Changing Unit ID



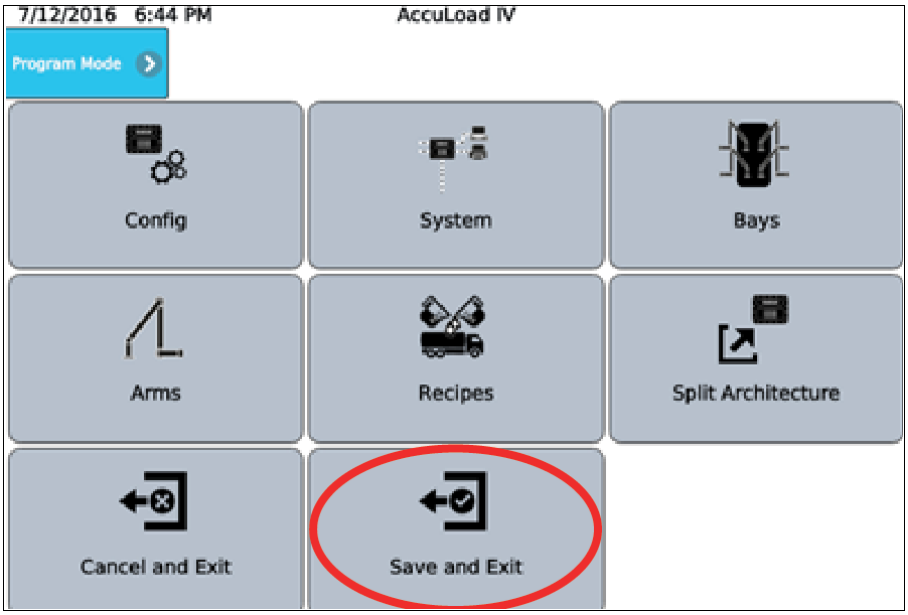
8. Selected the far-left bread crumb to return to the top level Program Mode menu. The Unit ID displayed at the top of the screen is still reads AccuLoad IV since the change has not been saved to the database.

Figure 59: Changing Unit ID



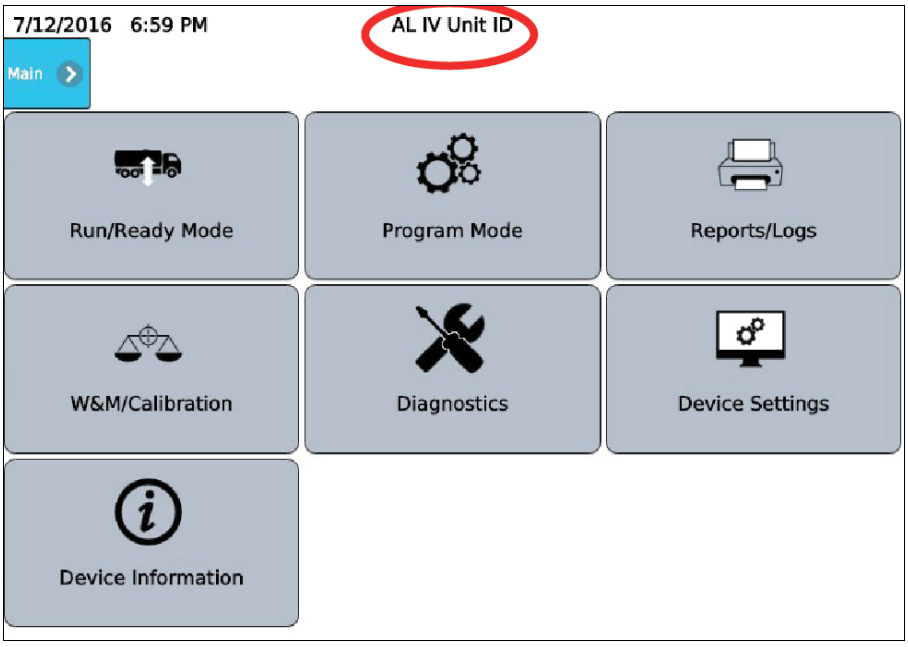
9. Select the Save and Exit option to permanently save the change in the AccuLoad database.

Figure 60: Selecting Save and Exit



After exiting Program Mode, the Unit ID displayed at the top of the screen is changed to AL IV Unit ID.

Figure 61: Verifying Unit ID Change



2.2.3 Program Mode Directory Map

This outline shows the top-level organization of directories and subdirectories for the AccuLoad's Program Mode database. Note that the configuration code range is used for making program code changes via communications. See the Modbus Communications manual (MN06131L).

2.2.3.1 Configuration Directories

Table 1: Program Mode Configuration Directories

Code	Description
000	Load Arm Configuration Directory
100	Pulse Input Directory
200	Pulse Output Directory
300	Digital Input Directory
500	Digital Output Directory
900	Analog Input and Output Directory

2.2.3.2 System Directories

Table 2: Program Mode System Directories

Code	Description
100	General Purpose Directory
200	Flow Control Directory
300	Volume Accuracy Directory
400	Temperature/Density Directory
500	Pressure Directory
600	Alarm Configuration Directory
700	Communications Directory
800	Additive Directory

2.2.3.3 Load Arm Directories

Table 3: Program Mode Load Arm Directories

Code	Description
100	General Purpose Directory
200	Flow Control Directory
300	Volume Accuracy Directory
700	Communications Directory

2.2.3.4 Meter Directories

Table 4: Program Mode Meter Directories

Code	Description
200	Flow Control Directory
300	Volume Accuracy Directory
400	Temperature/Density Directory
500	Pressure Directory

2.2.3.5 Product Directories

Table 5: Program Mode Product Directories

Code	Description
100	General Purpose Directory
200	Flow Control Directory
300	Volume Accuracy Directory
400	Temperature/Density Directory
500	Pressure Directory

2.2.3.6 Bay Directories

Code	Description
100	General Purpose Directory
700	Communications Directory

2.2.3.7 Recipe Directories

Recipes 01 through 50

2.2.3.8 Split Architecture Directories

2.2.4 Viewing the Help Messages

The AccuLoad includes unique help messages that allow the operator to have the ability to review what is required or what the options are for an individual program code.

Select the gray and white i (Program Code Information) icon next to a program code to see the help messagefor that parameter.

Figure 62: Program Code Information

2.2.5 Security

The AccuLoad provides a comprehensive set of features to control access to the parameters in the configuration database including:

- Security switch inputs
- Passcodes
- Communications
- Diagnostics

2.2.5.1 Security Levels

The AccuLoad can be configured to use up to five levels of security to control access to parameters. Security level one is the least privileged and level five is the most. For example, a technician could be allowed to change a small set of parameters by using the level one passcode to enter Program Mode and a weights and measures official could have complete access by using the level five passcode to enter program mode.

2.2.5.2 Security Level Activation

A security level is activated by assigning a passcode in the Security section of the System directory in the configuration database. It's not required that all security levels be activated but if one security level is activated then Level 5 security level must also be programmed to assure the proper functionality of the audit trail log. Each parameter in the database can be individually assigned any active security level.

The AccuLoad will not allow a parameter to be changed unless the user has entered program mode using the passcode of the assigned level or higher.

The factory-default security level for most parameters is level 1. Meter K factors, linearization factors, and a few other settings that typically need to be secured are set to level 5 by default.

2.2.5.3 Parameter Security Level Assignment

This controls who can access those parameters in Program Mode and also affects how change events are logged. Parameter changes are normally recorded in the Event Log. Parameters assigned to Level 4 or 5 are tracked in the Audit Trail Log.

The individual assignment of parameter security levels is handled using the companion AccuMate application. See the AccuMate Installation and Operation manual (MN06136) for operational details of the AccuMate program.

> **Note:** The operator must enter the password for the highest security level programmed in the unit to access any data on the security menu.

The Set Parameter Security option in the Security menu can be used from the display interface to globally set all non-metrological parameters to a certain security level (for example, level 3).

2.2.5.4 Security Switches

The AccuLoad may be configured to require one or two security contact inputs to be activated before database changes can be made. These are typically wired to key switches and provide additional protection options. If one of the two security switches are set for a certain security level, then that switch must be active to access that level of security (in addition to any passcode that may be configured for the level).

2.2.5.5 Communications Security

Parameter changes can be performed via communications and the AccuLoad allows the security level associated with requests received on a communications port to be assigned a security level. The parameter that sets the communications security level is called Comm Link Programming (Code 731 from AccuMate) and is found in the System>Communications>Host Interface directory. If no communication parameter change access is allowed by the authority having jurisdiction, then the parameter must be set to Alarm Clear Only, otherwise it will be set to a security level, usually level 4 or 5 to have the events recorded in the audit trail.

2.2.5.6 Diagnostics Security

The security level required to access the diagnostic functions is also programmable. The Diagnostic Security Level is set in the System>Security directory. If this parameter is set, the AccuLoad will prompt for a passcode before granting access to the diagnostic screens.

2.2.5.7 Security Configuration Example

The AccuLoad is shipped from the factory with no security configured, so initially there is no need for a passcode or user supplied (optional) key switch signal to enter Program Mode, and once in Program Mode all parameters (including security settings) are read/write accessible. Be aware that changes to security settings require entry to Program Mode at the highest currently configured level.

In this example, use the following access categories:

- Weights and measures officials/measurement/proving personnel—external contact input and passcode. This group should have read/write access to all settings including meter factors, K factors, and other metrologically significant parameters.

  This group should have read/write access to all settings including meter factors, K factors, and other metrologically significant parameters. This group should be the only group permitted to change security related settings. Both a passcode and activation of the security switch input are required to gain access at this level.

- Maintenance technicians—passcode only.

  This group should have read/write access to all non-metrologically significant parameters, functional diagnostics, etc.

- Operators—passcode only.

  This group has read/write access to non-metrological parameters only.

Since there are three groups with different access requirements, this requires configuring three different security levels in the AccuLoad. Assuming the AccuLoad is factory default and no security has been previously configured, the following steps are used to configure the AccuLoad for this example:

1. Enter Program Mode (no passcode needed).
2. Set a passcode for levels 5, 2, and 1.
3. Select Security 1 for the function of the digital input connected to the first security key switch (Configuration>Digital Inputs).
4. Set the security level associated with the first security switch input. In this case, use Level 5 to make it the Proving personnel key switch.
5. Use the Set Parameter Security function in the Security menu to set all parameters to Level 2.
6. Ensure that the security levels for the meter factors and K factors are at the highest level (Level 5) for changes to be audited and protected by the switch.
7. Set the security level for non-metrological product, recipe, flow control, and alarm program codes to Level 1.
8. Ensure the key switch input is wired.
9. Exit Program Mode.

The AccuLoad requires the correct passcode and an active key switch input before granting the read/write access to Program Mode at Level 5. For Level 1 and Level 2, only the correct passcode is required.

For complete control, the security level associated with communications should be set. For this example, setting the Comm Link Programming parameter in the communications section of the database to Level 2 is appropriate. This would allow full access to the configuration database via the AccuMate except for the meter factors and K factors.

> **Note:** Authorities Having Jurisdiction (AHJ) may require parameters other than those that are set by factory default to be set to either Level 4 or 5 to be logged in the audit trail. This is determined at commissioning (initial verification).

3 Dynamic Displays

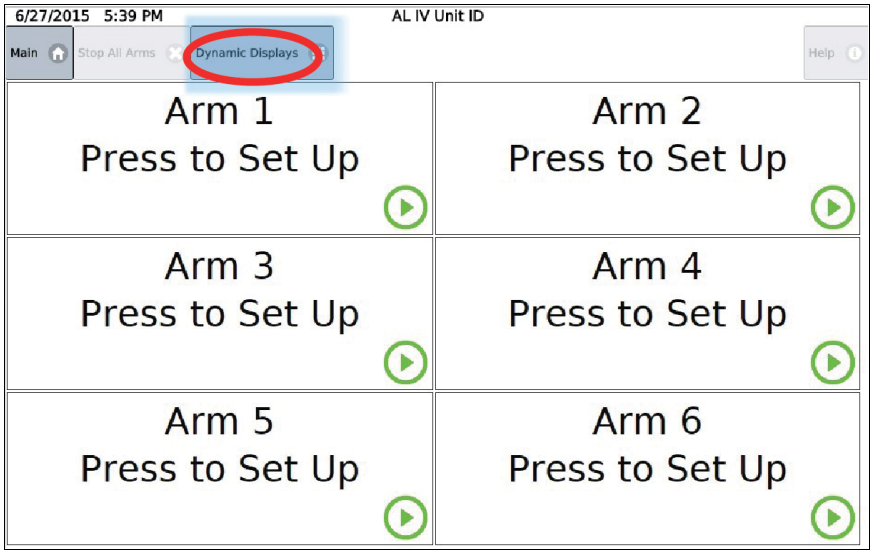
3.1 Dynamic Displays Overview

The Dynamic Display section describes informational displays that can be viewed while in the Run or Ready Mode. These displays are dynamic because the displayed values reflect current actual conditions and continuously update while being viewed.

The following steps describe how to navigate the menus to view the current flow rate of Product 2 on Arm 1.

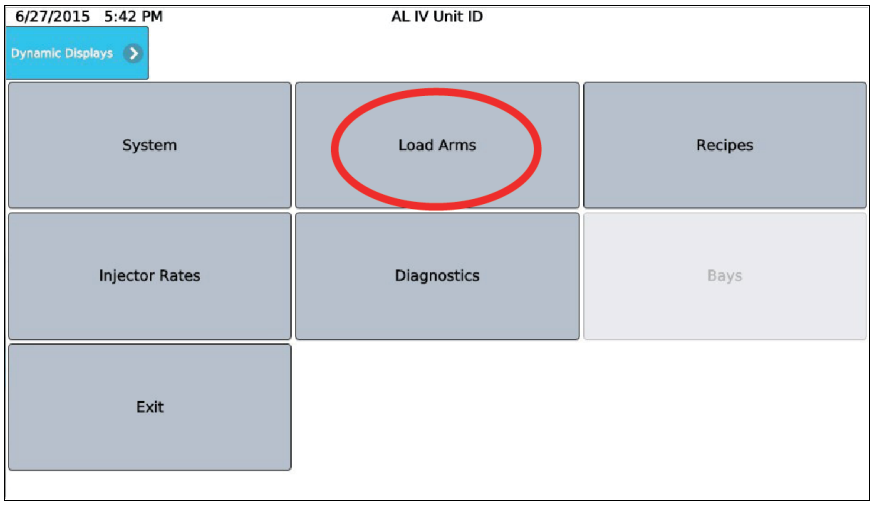
1. Select the Dynamic Displays option from the main menu.

Figure 63: Dynamic Displays Menu



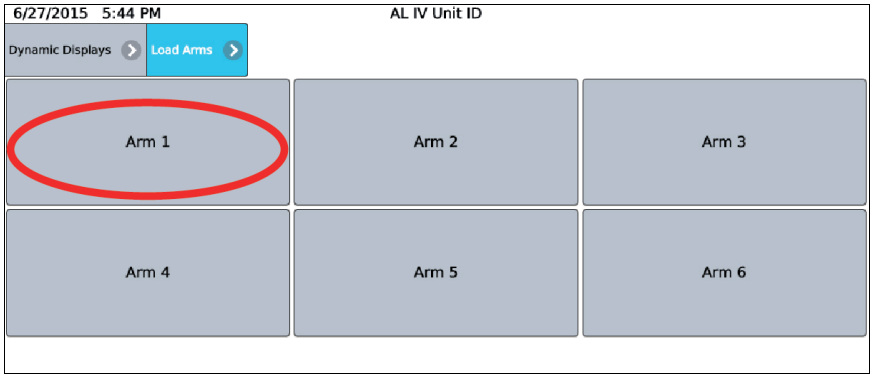
2. Select Load Arms to display the load arm selection menu.

Figure 64: Dynamic Displays Menu, Load Arms



3. Select Load Arm 1 to view product data.

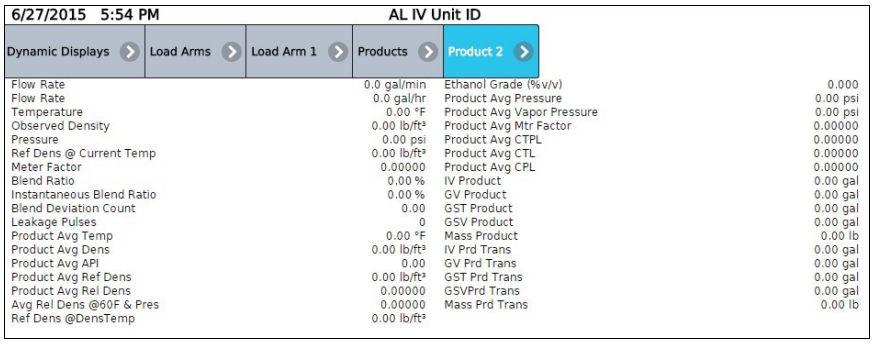
Figure 65: Dynamic Displays, Load Arm 1



4. Select Product to view data by product type.

5. Select Product 2 for data display on the product.

Figure 66: Dynamic Displays, Product 2



> **Note:** System Directory Parameter 313—Dynamic Display Timeout—can be used to automatically return to the Ready screen after a period of inactivity while viewing a Dynamic Display screen.

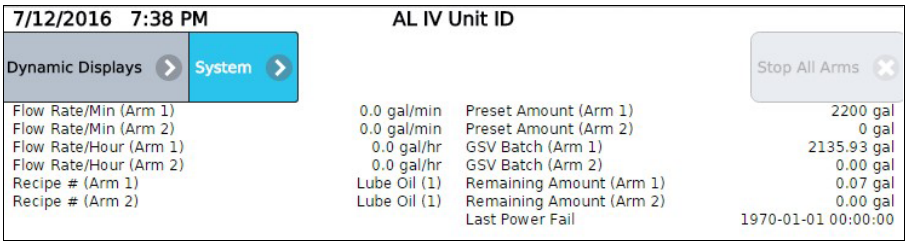
3.2 Dynamic Displays Categories

Dynamic display data is grouped into five categories as listed:

- System
- Load Arms
- Recipe
- Injector Rates
- Diagnostics

3.2.1 System Dynamic Displays

Figure 67: System Dynamic Displays



System dynamic displays show all data that is common to the entire AccuLoad. A listing of system dynamic displays, as well as the format in which the information appears, is displayed in the following table:

Table 6: System Dynamic Displays

Description	Display Format	
Current Flow Rate in Units/Min for Arm 1	Flow (Arm 1)	XXXXX.X Gal/Min
Current Flow Rate in Units/Min for Arm 2	Flow (Arm 2)	XXXXX.X Gal/Min
Current Flow Rate in Units/Min for Arm 3	Flow (Arm 3)	XXXXX.X Gal/Min
Current Flow Rate in Units/Min for Arm 4	Flow (Arm 4)	XXXXX.X Gal/Min
Current Flow Rate in Units/Min for Arm 5	Flow (Arm 5)	XXXXX.X Gal/Min
Current Flow Rate in Units/Min for Arm 6	Flow (Arm 6)	XXXXX.X Gal/Min
Current Flow Rate in Units/Hour for Arm 1	Flow (Arm 1)	XXXXXXX.X Gal/Hr
Current Flow Rate in Units/Hour for Arm 2	Flow (Arm 2)	XXXXXXX.X Gal/Hr

Description	Display Format	
Current Flow Rate in Units/Hour for Arm 3	Flow (Arm 3)	XXXXXXX.X Gal/Hr
Current Flow Rate in Units/Hour for Arm 4	Flow (Arm 4)	XXXXXXX.X Gal/Hr
Current Flow Rate in Units/Hour for Arm 5	Flow (Arm 5)	XXXXXXX.X Gal/Hr
Current Flow Rate in Units/Hour for Arm 6	Flow (Arm 6)	XXXXXXX.X Gal/Hr
Current Recipe for Arm 1	Recipe (Arm 1)	NNNNNNNNN
Current Recipe for Arm 2	Recipe (Arm 2)	NNNNNNNNN
Current Recipe for Arm 3	Recipe (Arm 3)	NNNNNNNNN
Current Recipe for Arm 4	Recipe (Arm 4)	NNNNNNNNN
Current Recipe for Arm 5	Recipe (Arm 5)	NNNNNNNNN
Current Recipe for Arm 6	Recipe (Arm 6)	NNNNNNNNN
Preset and delivered for Arm 1	Arm 1 Preset	XXXXXX Del XXXXXX
Preset and delivered for Arm 2	Arm 2 Preset	XXXXXX Del XXXXXX
Preset and delivered for Arm 3	Arm 3 Preset	XXXXXX Del XXXXXX
Preset and delivered for Arm 4	Arm 4 Preset	XXXXXX Del XXXXXX
Preset and delivered for Arm 5	Arm 5 Preset	XXXXXX Del XXXXXX
Preset and delivered for Arm 6	Arm 6 Preset	XXXXXX Del XXXXXX

3.2.2 Load Arms Dynamic Displays

Load Arms dynamic displays are divided into the following categories:

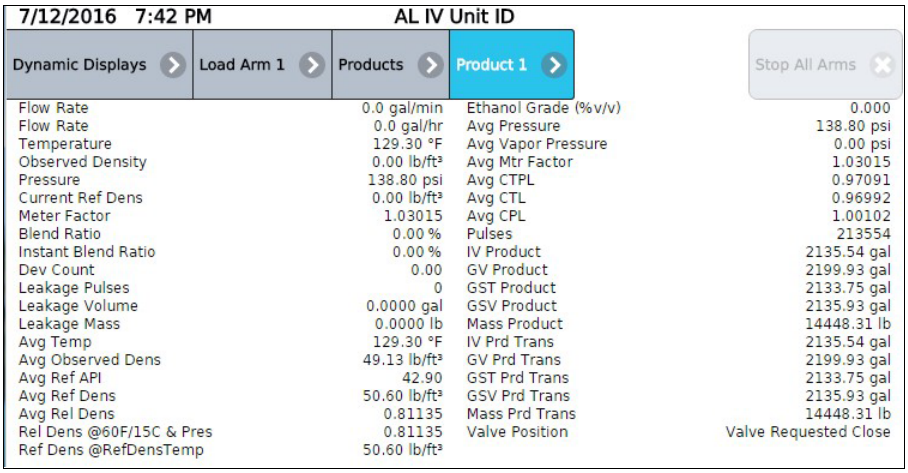
- Product
- Batch
- Transaction
- Blend
- Ratio Blend Data
- Recipes

- Injector Rates
- Flow Controlled Additives

3.2.2.1 Product Dynamic Displays

Product dynamic displays show all data associated with a specific product. If Product Dynamic Displays is selected, a menu appears listing all products associated with that load arm. (If only one product is available on the selected load arm, this screen is omitted.) Each load arm can accommodate up to six products.

Figure 68: Product Dynamic Displays



If user-defined names have been assigned to these products, they will appear on this menu. If no user-defined name has been configured, the products will be listed as Product 1, Product 2, etc.

A listing of product dynamic displays, as well as the format in which the information appears, is displayed in the following table:

Table 7: Product Dynamic Displays

Description	Display Format	
Current Flow Rate in Units/Min	Flow (Arm 1)	XXXXX.X gal/min
Current Flow Rate in Units/Hour	Flow	XXXXXXX.X gal/hr
Current and Average Temperature	Temperature Cur Avg	XXXX.XF XXXX.XF
Current and Average Density at Observed Temperature	Dens Cur Avg	XXXX.X XXXX.X kg/m^3
Average API at Reference Temperature	Avg Dens at ref temp	XXXX.X APJ
Average Reference Density at Reference Temperature	Avg Dens at ref temp	XXXX.X kg/m^3

Description	Display Format	
Average Relative Density at Reference Temperature	Avg Rel Dens at ref temp	X.XXXX
Relative Density at 60 °F and Current Pressure	Avg Rel Dens at 60°F and PRS	X.XXXX
Reference Density at Reference Density Temperature	Ref Dens at ref dens temp	XXXX.X kg/m^3
Current Reference Density at Reference Temperature	Cur Ref Dens at ref temp	XXXX.X kg/m^3
Batch Average Pressure	Batch Avg Press	XXXX.X psi
Batch Average Vapor Pressure	Avg Vapor Press	XXXX.X psi
Current and Average Meter Factor	Mfac Cur Avg	X.XXXXX X.XXXXX
Batch Average CTPL	Batch Avg CTPL	X.XXXXX
Batch Average CTL	Batch Avg CTL	X.XXXX
Batch Average CPL	Batch Avg CPL	X.XXXX
Actual Percentage of Batch	Actual Blend %	XXX%
Desired Percentage of Batch	Desired Blend %	XXX%
Instantaneous Blend Percentage	Instantaneous Blend %	XX.X
Deviation Count (Error Between Desired and Actual Volume)	Deviation Count	XXXX.XX
Indicated (Raw) Volume	IV Batch	XXXXXXX.XX gal
Gross Batch Volume	GV Batch	XXXXXXX.XX gal
Gross at Standard Temperature Batch	GST Batch	XXXXXXX.XX gal
Gross at Standard Temperature and Pressure Batch	GSV Batch	XXXXXXX.XX gal
Mass Amount Batch	Mass Batch	XXXXXXX.XX lbs
Raw Transaction Volume Transaction	IV Trans	XXXXXXX.XX gal
Gross Transaction Volume Transaction	GV Trans	XXXXXXX.XX gal
Gross at Standard Temperature Transaction	GST Trans	XXXXXXX.XX gal

Description	Display Format	
Gross at Standard Temperature and Pressure Transaction	GSV Trans	XXXXXXX.XX gal
Mass Transaction Amount Transaction	Mass Trans	XXXXXXX.XX lbs
Current Valve Requested Position	Valve Requested	Closed

3.2.2.2 Batch Dynamic Displays

Batch Dynamic Displays, from the Load Arm Dynamic Displays menu, shows all data associated with a specific batch.

A listing of batch dynamic displays, as well as the format in which the information appears, is displayed in the following table:

Table 8: Batch Dynamic Displays

Description	Display Format	
Recipe Name and Number	Recipe XX	NNNNNNNNN
Indicated (Raw) Batch Volume	IV Batch	XXXXXXX.X Gal
Gross Batch Volume	GV Batch	XXXXXXX.X Gal
Gross at Standard Temperature	GST Batch	XXXXXXX.X Gal
Gross at Standard Temperature and Pressure	GSV Batch	XXXXXXX.X Gal
Mass Batch Amount	Mass Batch	XXXXXXX.X Gal
Batch Average Temperature	Batch Avg Temp	XXXX.X °F
Batch Average Density	Batch Avg Dens	XXXX.X lb/F3
Batch Average Pressure	Batch Avg Press	XXXX.X psi
Batch Average Meter Factor	Batch Avg Mtr Factor	X.XXXXX
Batch Average CTL	Batch Avg CTL	X.XXXX
Batch Average CPL	Batch Avg CPL	X.XXXX
Additive 1 Batch Total	Add 1 Batch	XXXXXX.XXX Gal
Additive 2 Batch Total	Add 2 Batch	XXXXXX.XXX Gal
Additive 3 Batch Total	Add 3 Batch	XXXXXX.XXX Gal
Additive 4 Batch Total	Add 4 Batch	XXXXXX.XXX Gal
Additive 5 Batch Total	Add 5 Batch	XXXXXX.XXX Gal
Additive 6 Batch Total	Add 6 Batch	XXXXXX.XXX Gal
Additive 7 Batch Total	Add 7 Batch	XXXXXX.XXX Gal

Description	Display Format	
Additive 8 Batch Total	Add 8 Batch	XXXXXX.XXX Gal
Additive 9 Batch Total	Add 9 Batch	XXXXXX.XXX Gal
Additive 10 Batch Total	Add 10 Batch	XXXXXX.XXX Gal
Additive 11 Batch Total	Add 11 Batch	XXXXXX.XXX Gal
Additive 12 Batch Total	Add 12 Batch	XXXXXX.XXX Gal
Additive 13 Batch Total	Add 13 Batch	XXXXXX.XXX Gal
Additive 14 Batch Total	Add 14 Batch	XXXXXX.XXX Gal
Additive 15 Batch Total	Add 15 Batch	XXXXXX.XXX Gal
Additive 16 Batch Total	Add 16 Batch	XXXXXX.XXX Gal
Additive 17 Batch Total	Add 17 Batch	XXXXXX.XXX Gal
Additive 18 Batch Total	Add 18 Batch	XXXXXX.XXX Gal
Additive 19 Batch Total	Add 19 Batch	XXXXXX.XXX Gal
Additive 20 Batch Total	Add 20 Batch	XXXXXX.XXX Gal
Additive 21 Batch Total	Add 21 Batch	XXXXXX.XXX Gal
Additive 22 Batch Total	Add 22 Batch	XXXXXX.XXX Gal
Additive 23 Batch Total	Add 23 Batch	XXXXXX.XXX Gal
Additive 24 Batch Total	Add 24 Batch	XXXXXX.XXX Gal
Batch Mass Vapor Recovery Meter	Vapor Recovered	XXXXXXX.XX lb
Batch Mass Net Volume for VRS	Delivered Net	XXXXXXX.XX lb

3.2.2.3 Transaction Dynamic Displays

Transaction Dynamic Displays, from the Load Arm Dynamic Displays menu, shows all data associated with the overall transaction. Only those additive injectors configured for this load arm will be included in the transaction dynamic displays.

A listing of transactiondynamic displays, as well as the format that the information appears in, is displayed in the following table:

Table 9: Transaction Dynamic Displays

Description	Display Format	
Indicated (Raw) Transaction Volume	IV Trans	XXXXXXX.XX gal
Gross Transaction Volume	GV Trans	XXXXXXX.XX gal
Gross at Standard Temperature Volume	GST Trans	XXXXXXX.XX gal
Gross at Standard Temperature and Pressure	GSV Trans	XXXXXXX.XX

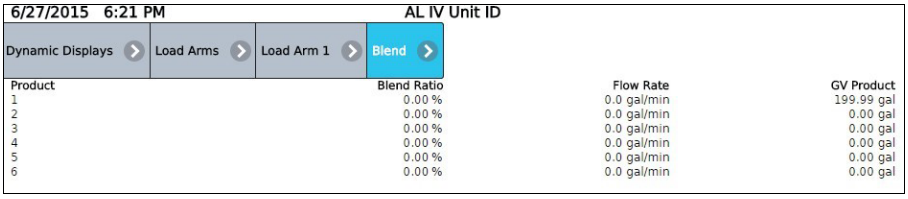
Description	Display Format	
		gal
Mass Transaction Volume	Mass Trans	XXXXXXX.XX lb
Transaction Average Temperature	Trans Avg Temp	XXXX.X °F
Transaction Average Density	Trans Avg Dens	XXX.X lb/F3
Transaction Average Pressure	Trans Avg Press	XXXX.X psi
Transaction Average Meter Factor	Trans Avg Mtr Factor	X.XXXXX
Transaction Average CTL	Trans Avg CTL	X.XXXX
Transaction Average CPL	Trans Avg CPL	X.XXXX
Injector 1 Transaction Total	Add 1 Trans	XXXXXX.XXX gal
Injector 2 Transaction Total	Add 2 Trans	XXXXXX.XXX gal
Injector 3 Transaction Total	Add 3 Trans	XXXXXX.XXX gal
Injector 4 Transaction Total	Add 4 Trans	XXXXXX.XXX gal
Injector 5 Transaction Total	Add 5 Trans	XXXXXX.XXX gal
Injector 6 Transaction Total	Add 6 Trans	XXXXXX.XXX gal
Injector 7 Transaction Total	Add 7 Trans	XXXXXX.XXX gal
Injector 8 Transaction Total	Add 8 Trans	XXXXXX.XXX gal
Injector 9 Transaction Total	Add 9 Trans	XXXXXX.XXX gal
Injector 10 Transaction Total	Add 10 Trans	XXXXXX.XXX gal
Injector 11 Transaction Total	Add 11 Trans	XXXXXX.XXX gal
Injector 12 Transaction Total	Add 12 Trans	XXXXXX.XXX gal
Injector 13 Transaction Total	Add 13 Trans	XXXXXX.XXX gal
Injector 14 Transaction Total	Add 14 Trans	XXXXXX.XXX gal

Description	Display Format	
Injector 15 Transaction Total	Add 15 Trans	XXXXXX.XXX gal
Injector 16 Transaction Total	Add 16 Trans	XXXXXX.XXX gal
Injector 17 Transaction Total	Add 17 Trans	XXXXXX.XXX gal
Injector 18 Transaction Total	Add 18 Trans	XXXXXX.XXX gal
Injector 19 Transaction Total	Add 19 Trans	XXXXXX.XXX gal
Injector 20 Transaction Total	Add 20 Trans	XXXXXX.XXX gal
Injector 21 Transaction Total	Add 21 Trans	XXXXXX.XXX gal
Injector 22 Transaction Total	Add 22 Trans	XXXXXX.XXX gal
Injector 23 Transaction Total	Add 23 Trans	XXXXXX.XXX gal
Injector 24 Transaction Total	Add 24 Trans	XXXXXX.XXX gal
Mass Transaction Volume Vapor Recovery Meter	Vapor Recovered	XXXXXXX.XX lb
Mass Transaction Net Volume for VRS	Delivered Net	XXXXXXX.XX lb

3.2.2.4 Blend Dynamic Displays

Blend Dynamic Displays show all data associated with a specific sequential blending transaction. Selecting Blend from the Dynamic Displays menu displays the following data:

Figure 69: Blend Dynamic Displays

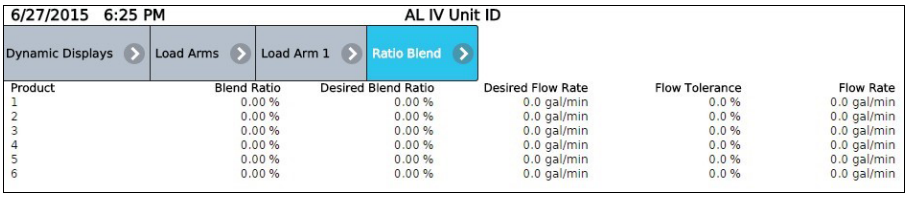


3.2.2.5 Ratio Blend Data Dynamic Displays

Ratio blend data dynamic displays show all data associated with a specific ratio blending transaction. Selecting Ratio Blend from the Dynamic Displays menu displays

the following information:

Figure 70: Ratio Blend Data Dynamic Displays

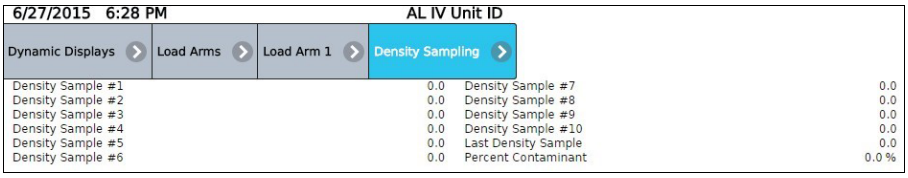


Product	Blend Ratio	Desired Blend Ratio	Desired Flow Rate	Flow Tolerance	Flow Rate
1	0.00 %	0.00 %	0.0 gal/min	0.0 %	0.0 gal/min
2	0.00 %	0.00 %	0.0 gal/min	0.0 %	0.0 gal/min
3	0.00 %	0.00 %	0.0 gal/min	0.0 %	0.0 gal/min
4	0.00 %	0.00 %	0.0 gal/min	0.0 %	0.0 gal/min
5	0.00 %	0.00 %	0.0 gal/min	0.0 %	0.0 gal/min
6	0.00 %	0.00 %	0.0 gal/min	0.0 %	0.0 gal/min

3.2.2.6 Density Sampling Dynamic Displays

Density sampling dynamic displays apply only to unloading arms. The screen displays up to ten density samples taken during the batch. Selecting Density Sampling from the Dynamic Displays menu displays the following information:

Figure 71: Density Sampling Dynamic Displays



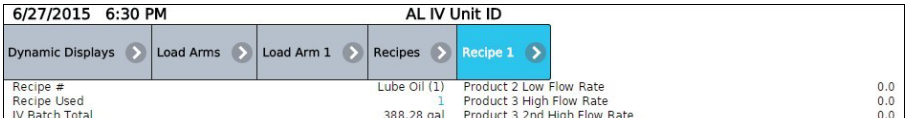
Density Sample #1	0.0	Density Sample #7	0.0
Density Sample #2	0.0	Density Sample #8	0.0
Density Sample #3	0.0	Density Sample #9	0.0
Density Sample #4	0.0	Density Sample #10	0.0
Density Sample #5	0.0	Last Density Sample	0.0
Density Sample #6	0.0	Percent Contaminant	0.0 %

Each of the samples is a flow-weighted average over the delta volume programmed in Product Parameter 415. The last complete density sample is considered the density of the pure uncontaminated product when the contaminant percentage is calculated.

3.2.2.7 Recipe Dynamic Displays

Recipe dynamic displays show all data associated with a programmed recipe. A listing of recipe dynamic displays, as well as the format in which the information appears, is displayed in the following graphic:

Figure 72: Recipe Dynamic Displays



Recipe #	Lube Oil (1)	Product 2 Low Flow Rate	0.0
Recipe Used	1	Product 3 High Flow Rate	0.0
IV Batch Total	388.28 gal	Product 3 2nd High Flow Rate	0.0
GV Batch Total	399.99 gal	Product 3 Low Flow Rate	0.0
GST Batch Total	387.96 gal	Product 4 High Flow Rate	0.0
GSV Batch Total	388.35 gal	Product 4 2nd High Flow Rate	0.0
Mass Batch Total	2626.96 lb	Product 4 Low Flow Rate	0.0
Minimum Recipe Preset	0	Product 5 High Flow Rate	0.0
Product 1 High Flow Rate	0.0	Product 5 2nd High Flow Rate	0.0
Product 1 2nd High Flow Rate	0.0	Product 5 Low Flow Rate	0.0
Product 1 Low Flow Rate	0.0	Product 6 High Flow Rate	0.0
Product 2 High Flow Rate	0.0	Product 6 2nd High Flow Rate	0.0
Product 2 2nd High Flow Rate	0.0	Product 6 Low Flow Rate	0.0

3.2.2.8 Injector Rates Dynamic Displays

Injector Rates Dynamic Displays show all data associated with specific injector rates. Twenty-four injectors are available for use but the AccuLoad will display only those that are configured.

If the Injector Dynamic Displays are accessed from the main Dynamic Display menu, then all additive injectors configured for the AccuLoad will be included in the displays. However, if the Injector Rates Dynamic Displays are accessed from the Load Arm Dynamic Displays, then only the additive injectors configured for the particular load arm will be displayed.

A listing of injector dynamic displays, as well as the format in which the information appears, is displayed in the following table:

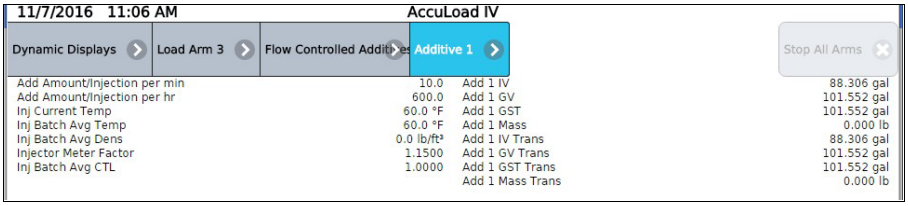
Figure 73: Injector Rates Dynamic Displays

Desription	Display Format	
Injector 1 Current Pulse Rate	Inj 1 Prg XXX	Cal XXXX.XX
Injector 2 Current Pulse Rate	Inj 2 Prg XXX	Cal XXXX.XX
Injector 3 Current Pulse Rate	Inj 3 Prg XXX	Cal XXXX.XX
Injector 4 Current Pulse Rate	Inj 4 Prg XXX	Cal XXXX.XX
Injector 5 Current Pulse Rate	Inj 5 Prg XXX	Cal XXXX.XX
Injector 6 Current Pulse Rate	Inj 6 Prg XXX	Cal XXXX.XX
Injector 7 Current Pulse Rate	Inj 7 Prg XXX	Cal XXXX.XX
Injector 8 Current Pulse Rate	Inj 8 Prg XXX	Cal XXXX.XX
Injector 9 Current Pulse Rate	Inj 9 Prg XXX	Cal XXXX.XX
Injector 10 Current Pulse Rate	Inj 10 Prg XXX	Cal XXXX.XX
Injector 11 Current Pulse Rate	Inj 11 Prg XXX	Cal XXXX.XX
Injector 12 Current Pulse Rate	Inj 12 Prg XXX	Cal XXXX.XX
Injector 13 Current Pulse Rate	Inj 13 Prg XXX	Cal XXXX.XX
Injector 14 Current Pulse Rate	Inj 14 Prg XXX	Cal XXXX.XX
Injector 15 Current Pulse Rate	Inj 15 Prg XXX	Cal XXXX.XX
Injector 16 Current Pulse Rate	Inj 16 Prg XXX	Cal XXXX.XX
Injector 17 Current Pulse Rate	Inj 17 Prg XXX	Cal XXXX.XX
Injector 18 Current Pulse Rate	Inj 18 Prg XXX	Cal XXXX.XX
Injector 19 Current Pulse Rate	Inj 19 Prg XXX	Cal XXXX.XX
Injector 20 Current Pulse Rate	Inj 20 Prg XXX	Cal XXXX.XX
Injector 21 Current Pulse Rate	Inj 21 Prg XXX	Cal XXXX.XX
Injector 22 Current Pulse Rate	Inj 22 Prg XXX	Cal XXXX.XX
Injector 23 Current Pulse Rate	Inj 23 Prg XXX	Cal XXXX.XX
Injector 24 Current Pulse Rate	Inj 24 Prg XXX	Cal XXXX.XX

3.2.2.9 Flow Controlled Additives Dynamic Displays

The following screen is an example of the information that is available on the display for all configured flow-controlled additives. If additives are not temperature compensated, Batch Average CTL, current and average temperature, GST values, GSV values, and mass values are not displayed.

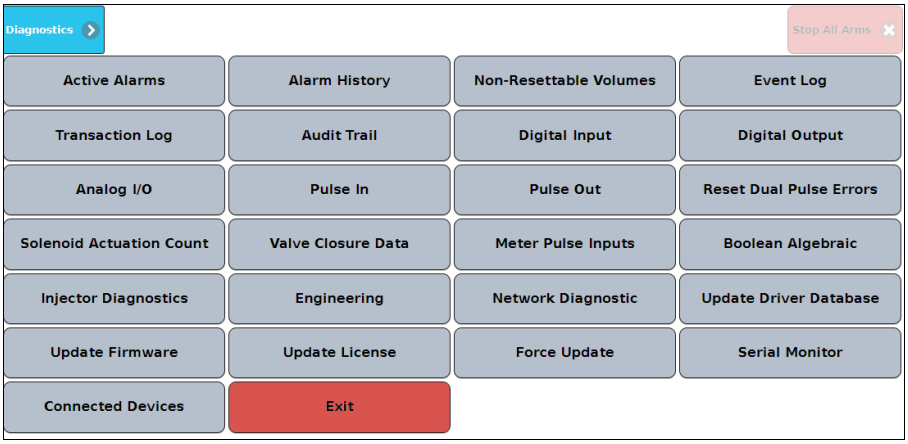
Figure 74: Flow-Controlled Additives Dynamic Displays



3.2.3 Diagnostics Dynamic Displays Menu

Diagnostics options from the Dynamic Displays menu allows the operator to view current conditions, identify causes of system errors, and analyze data collected by the AccuLoad. Diagnostic options available are listed below and are shown in the following graphic:

Figure 75: Diagnostic Dynamic Displays Options



> **Note:** The diagnostics available through the Dynamic Displays menu are run-time diagnostics only. Program mode diagnostics are accessed from the Main Menu.

The Diagnostics menu available through the Dynamic Display consists of the following options:

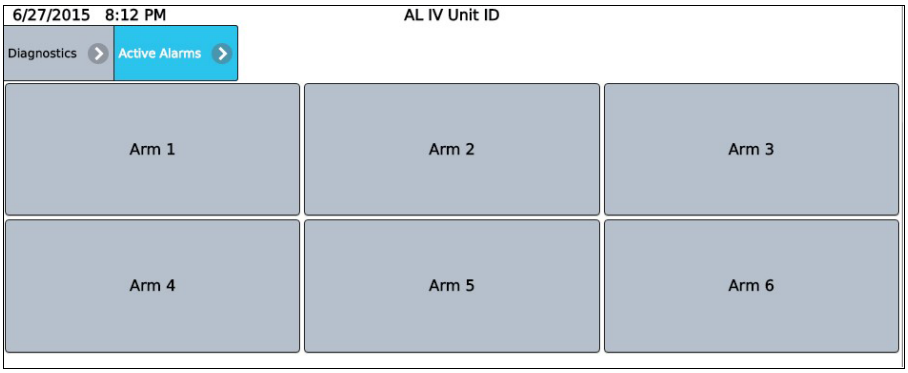
- Active Alarms
- Alarm History
- Non-Resettable Volumes

- Event Log
- Transaction Log
- Audit Trail
- Digital Input
- Digital Output
- Analog I/O
- Pulse Inputs
- Pulse Outputs
- Reset Dual Pulse Errors
- Solenoid Actuation Count
- Valve Closure Data
- Meter Pulse Inputs
- Boolean Algebraic
- Injector
- Engineering
- Network
- Update Driver Database
- Update Firmware
- Update License
- Force Update
- Serial Monitor
- Connected Devices
- Exit

3.2.3.1 Active Alarms Diagnostics

Displays all currently active alarms associated with any of the arms.

Figure 76: Active Alarms



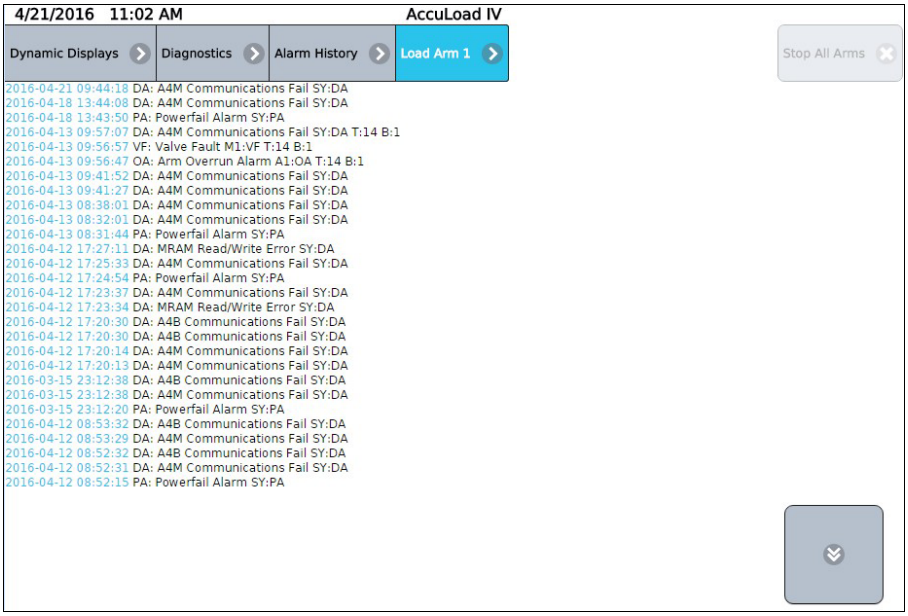
The active alarms can be cleared from this display by pressing the Clear button. The AccuLoad will then ask for the passcode. When the passcode is entered, the alarm will clear.

> **Note:** Individual alarms can be configured as driver clearable, and no password will be required to clear these alarms as long the maximum number of driver-clearable alarms is not exceeded.

3.2.3.2 Alarm History Diagnostics

The Diagnostics menu provides the selection of Alarm History where the most recent alarms can be viewed. Select the Alarm History button, then select a load arm and the historical alarms will be displayed. The alarms will be listed in order of occurrence.

Figure 77: Alarm History



This is an alarm history for the arm. The Event Log screen provides a more complete history of alarms for all arms.

Pressing the up and down arrow buttons will allow the operator to page through the Alarm History displays. If “More…” is not displayed, then there is only one screen of alarms in the alarm history.

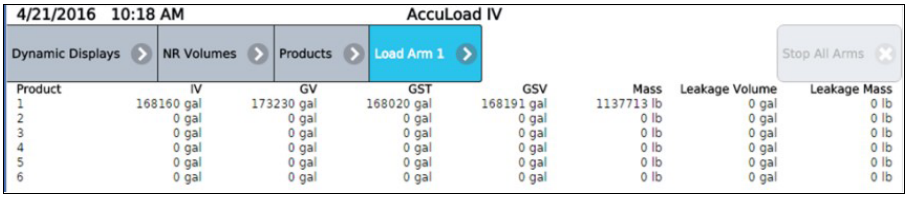
3.2.3.3 Non-Resettable Volumes Diagnostics

The Diagnostics menu provides the selection of non-resettable volumes where the product, additive injector, and recipe totalizer amounts can be viewed as shown on the following screen:

Figure 78: Non-Resettable Volumes

Product volumes are displayed per arm as shown on the following screen:

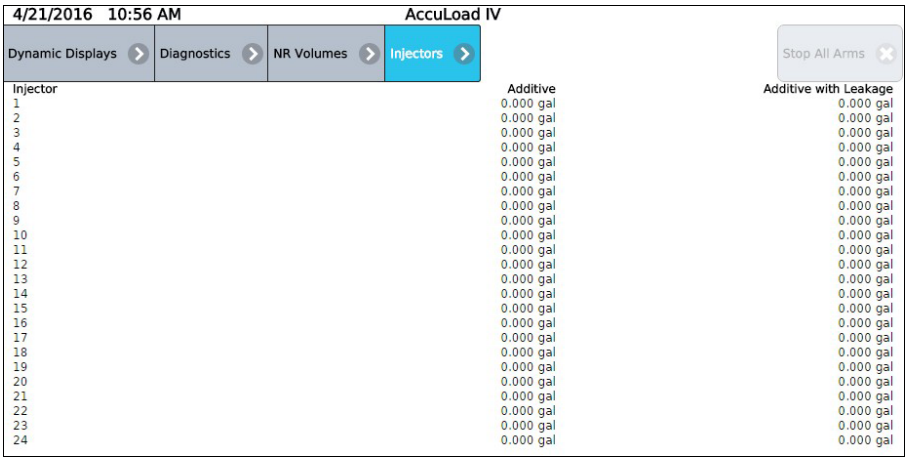
Figure 79: Product Volumes



Product	IV	GV	GST	GSV	Mass	Leakage Volume	Leakage Mass
1	168160 gal	173230 gal	168020 gal	168191 gal	1137713 lb	0 gal	0 lb
2	0 gal	0 gal	0 gal	0 gal	0 lb	0 gal	0 lb
3	0 gal	0 gal	0 gal	0 gal	0 lb	0 gal	0 lb
4	0 gal	0 gal	0 gal	0 gal	0 lb	0 gal	0 lb
5	0 gal	0 gal	0 gal	0 gal	0 lb	0 gal	0 lb
6	0 gal	0 gal	0 gal	0 gal	0 lb	0 gal	0 lb

Additive injector values are displayed as shown in the following screen:

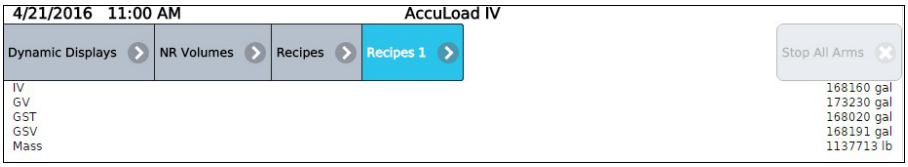
Figure 80: Additive Injector Values



Injector	Additive	Additive with Leakage
1	0.000 gal	0.000 gal
2	0.000 gal	0.000 gal
3	0.000 gal	0.000 gal
4	0.000 gal	0.000 gal
5	0.000 gal	0.000 gal
6	0.000 gal	0.000 gal
7	0.000 gal	0.000 gal
8	0.000 gal	0.000 gal
9	0.000 gal	0.000 gal
10	0.000 gal	0.000 gal
11	0.000 gal	0.000 gal
12	0.000 gal	0.000 gal
13	0.000 gal	0.000 gal
14	0.000 gal	0.000 gal
15	0.000 gal	0.000 gal
16	0.000 gal	0.000 gal
17	0.000 gal	0.000 gal
18	0.000 gal	0.000 gal
19	0.000 gal	0.000 gal
20	0.000 gal	0.000 gal
21	0.000 gal	0.000 gal
22	0.000 gal	0.000 gal
23	0.000 gal	0.000 gal
24	0.000 gal	0.000 gal

Select Recipes, then select a specific recipe to view that recipe's totalizers:

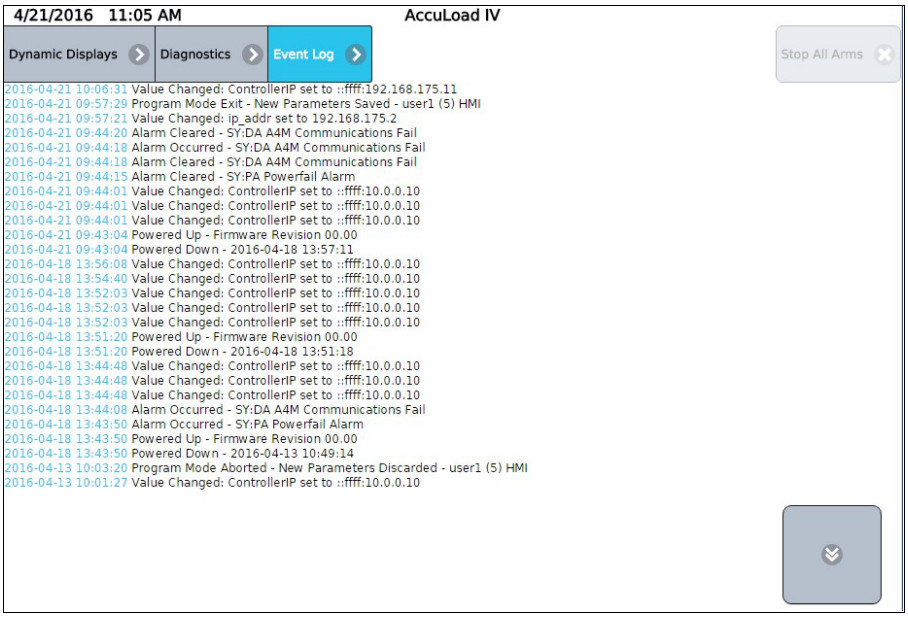
Figure 81: Recipes Selection



3.2.3.4 Event Log Diagnostics

The View Only Diagnostics menu option of Event Log is where past events can be viewed. The Event Log includes alarms, transaction start and transaction end events, and program mode parameter changes. Each entry includes the date/time of the event and the associated detailed event description.

Figure 82: Event Log



3.2.3.5 Transaction Log Diagnostics

The Transaction Log displays the details of a current or past transaction. Totals for the transaction and for each batch can be viewed as shown in the following screens:

Figure 83: Transaction Log

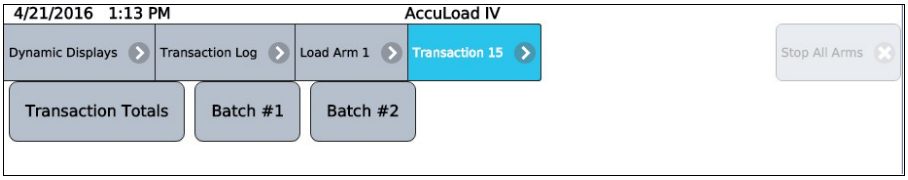


Figure 84: Transaction Totals

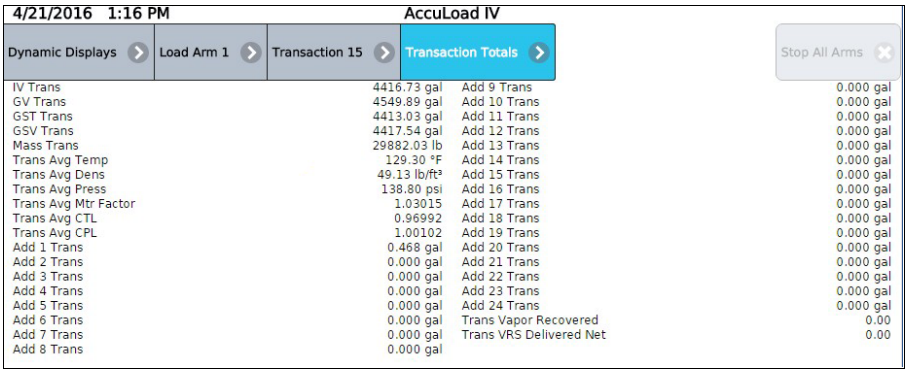
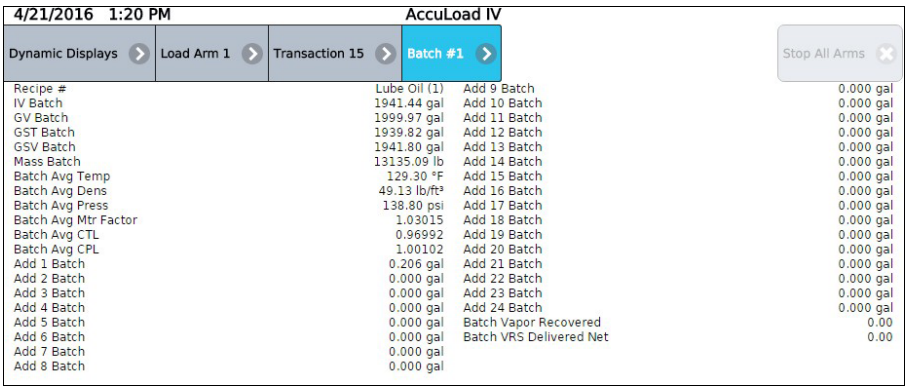


Figure 85: Transaction Batch

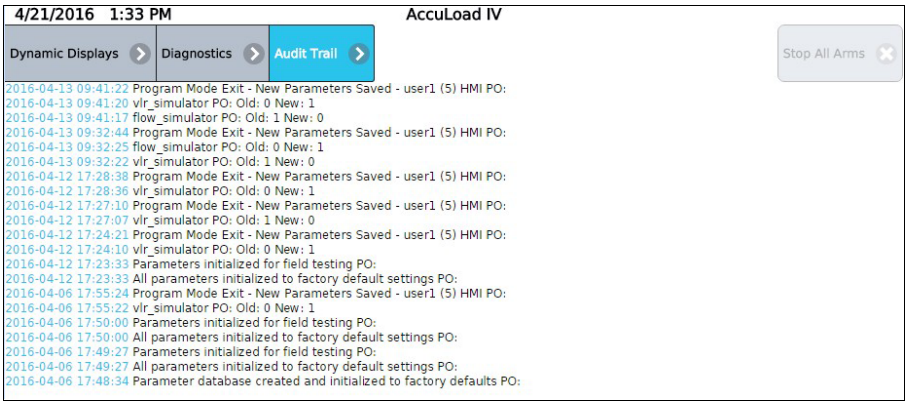


> **Note:** Additive totals will be displayed only for those injectors used in the transaction.

3.2.3.6 Audit Trail Diagnostics

The audit trail provides the date, time, and description of program mode changes that are relevant to weights and measures. Note that only changes to parameters secured at the two highest security levels programmed are logged in the audit trail. All metrologically significant program codes should be set to the highest two levels. Reference section 2.2.5.5: Communications Security on page 53 for further details.

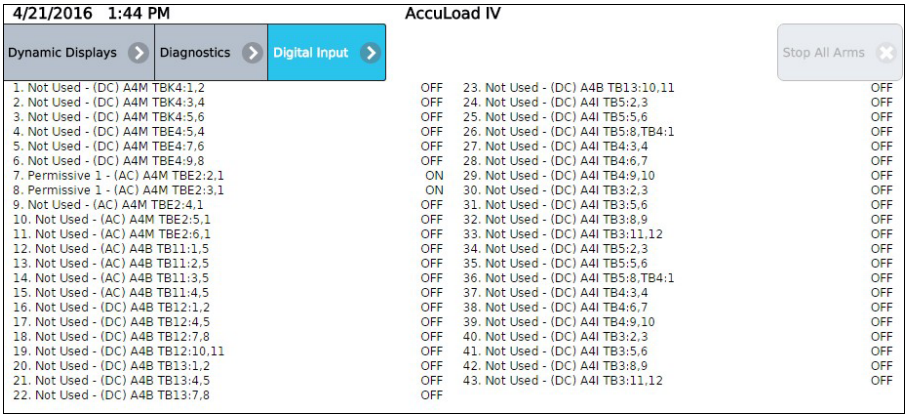
Figure 86: Audit Trail Diagnostics



3.2.3.7 Digital Inputs Diagnostics

This diagnostic provides information on digital input states.

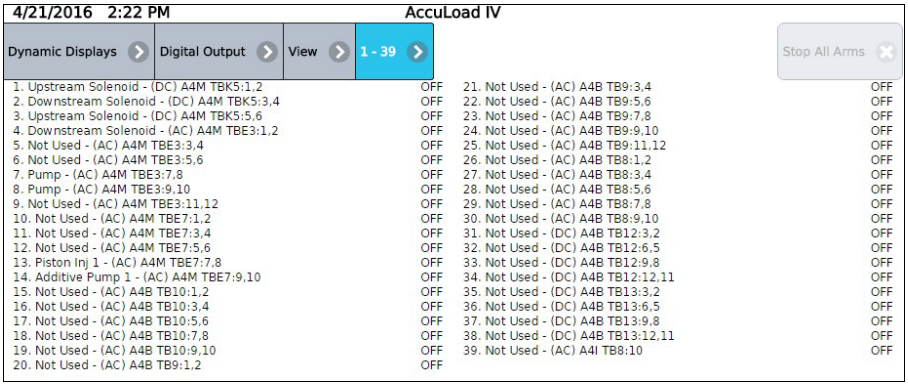
Figure 87: Digital Inputs



3.2.3.8 Digital Outputs Diagnostics

It is possible to monitor the state of the outputs on the AccuLoad via this diagnostic. With the proper access level, outputs from this diagnostic to assist in startup and troubleshooting can be toggled.

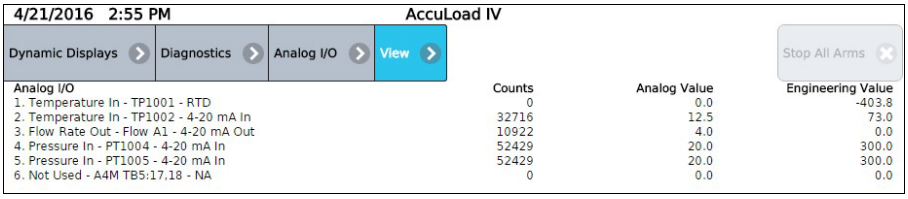
Figure 88: Digital Outputs



3.2.3.9 Analog Input/Output (I/O) Diagnostics

From the Analog I/O diagnostic, the data associated with the analog inputs and outputs can be viewed. In addition, given a sufficient level of access, it is possible to override the analog output engineering values manually from this diagnostic for startup and troubleshooting purposes.

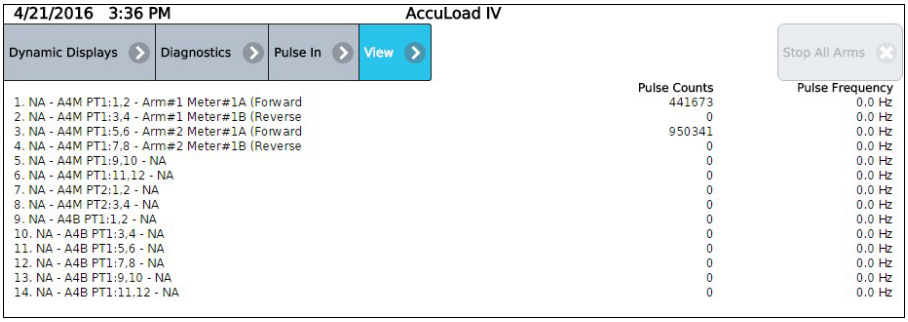
Figure 89: Analog I/O



3.2.3.10 Pulse Inputs Diagnostics

From the Pulse Input Diagnostic, the pulse counts associated with the meter pulse inputs can be viewed. In addition, given a sufficient level of access, it is possible to access a "test" mode that permits the resetting of the pulse counts manually for startup and troubleshooting purposes.

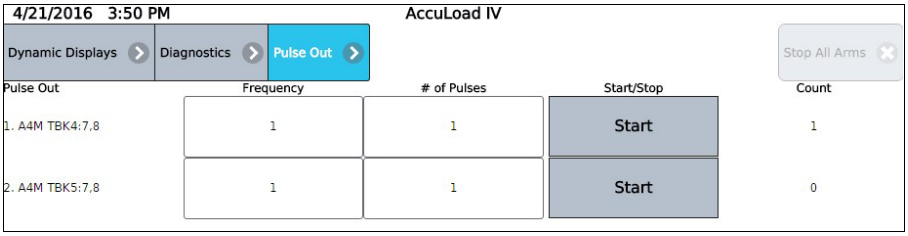
Figure 90: Pulse Inputs



3.2.3.11 Pulse Outputs Diagnostics

From the Pulse Outputs Diagnostic, it is possible to enter a frequency and a specific pulse count for testing and start/stop for each of the pulse output streams.

Figure 91: Pulse Outputs



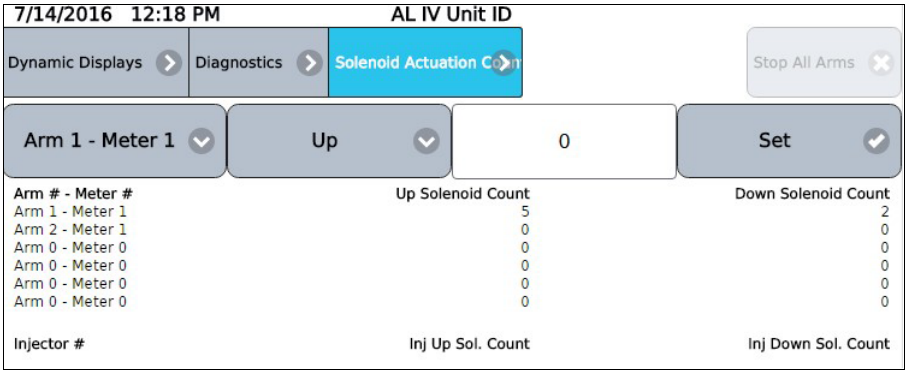
3.2.3.12 Reset Dual Pulse Errors Diagnostics

From the Reset Dual Pulse Errors diagnostic, it is possible to clear any built up error pulse counts that have accumulated for an arm.

3.2.3.13 Solenoid Actuation Count Diagnostics

The AccuLoad IV provides counters to track the upstream and downstream solenoid actuations. Separate counters are available for both the upstream and downstream solenoid of each meter. The counter is incremented each time the solenoid is energized. The counters can also be cleared or set to a specific value via this diagnostic, with sufficient security access.

Figure 92: Solenoid Actuation Count Diagnostics



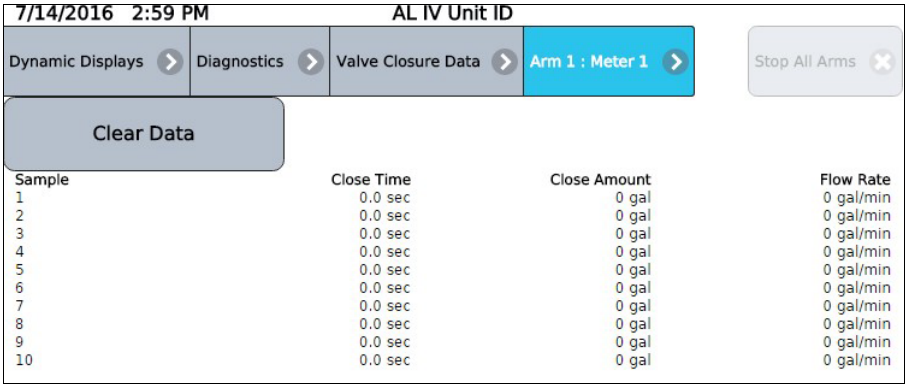
> **Note:** The counters will be cleared by a factory initialization of firmware upgrade. The registers may also be read and modified, set or cleared, via communications.

3.2.3.14 Valve Closure Database Diagnostics

This command retrieves the time it takes for the product flow control valve to completely close, retrieves the volume of product that has been delivered after the Stop button or remote stop has been pressed, and indicates the flow rate. This command also measures the volume and time if there is a loss of permissive resulting in valve closure or if a communication command is issued to stop the batch.

Select a meter to view the time, volume, and flow rate of the valve closure.

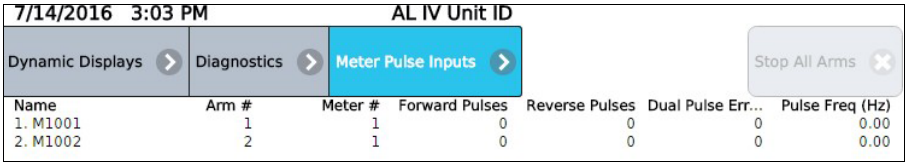
Figure 93: Valve Closure Database Diagnostics



3.2.3.15 Meter Pulse Inputs Diagnostics

Selecting this diagnostic results in a screen that indicates the number of pulses received by the respective pulse input. This diagnostic should not be used to verify the actual meter pulses received for any batch or transaction. It is intended as a method to verify pulse input wiring to the respective pulse input on the AccuLoad. Applying pulses to the respective input causes the respective counter to increment.

Figure 94: Meter Pulse Inputs



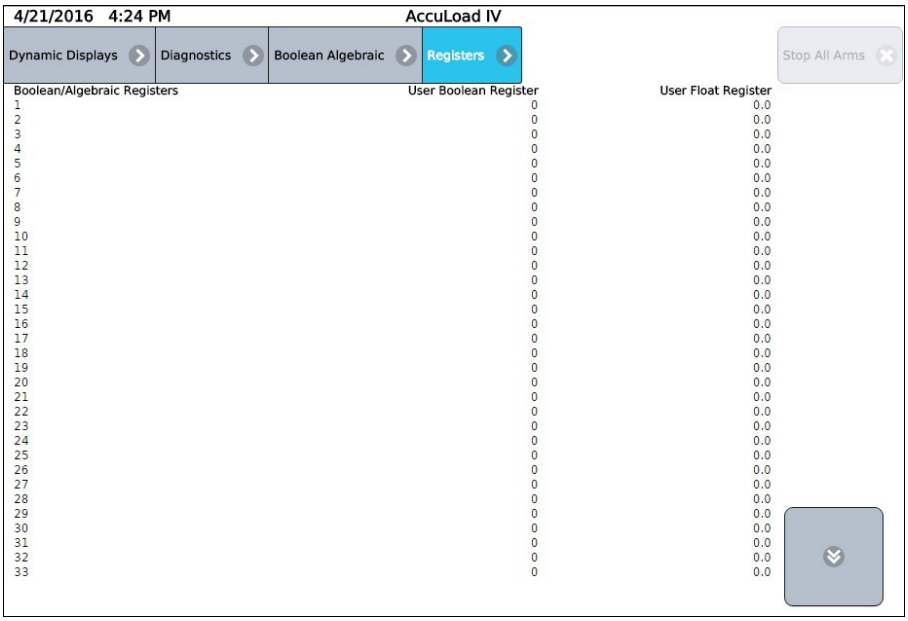
> **Note:** If Dual Pulse is enabled, “Reset Dual Pulse Errors” will appear as a menu option on the screen. See description under section 3.2.3.12: Reset Dual Pulse Errors Diagnostics on page 75.

3.2.3.16 Boolean/Algebraic Diagnostics

The Diagnostics menu provides the selection of Boolean Algebraic to view Boolean/ Algebraic registers and their results. General-purpose timers can also be viewed from this diagnostic.

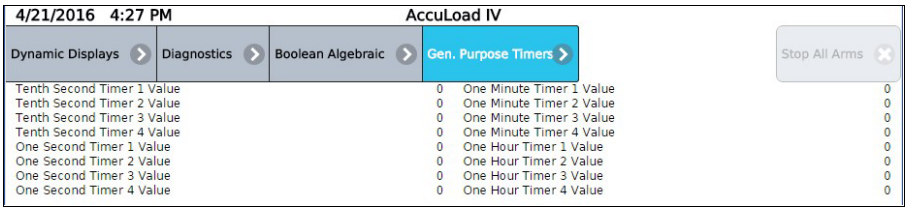
Boolean algebraic equation line status with user boolean and float values are as follows:

Figure 95: Boolean/Algebraic Diagnostics



See the AccuMate online help for further information. Visit the software download area here: http://info.smithmeter.com/literature/online_index.html.

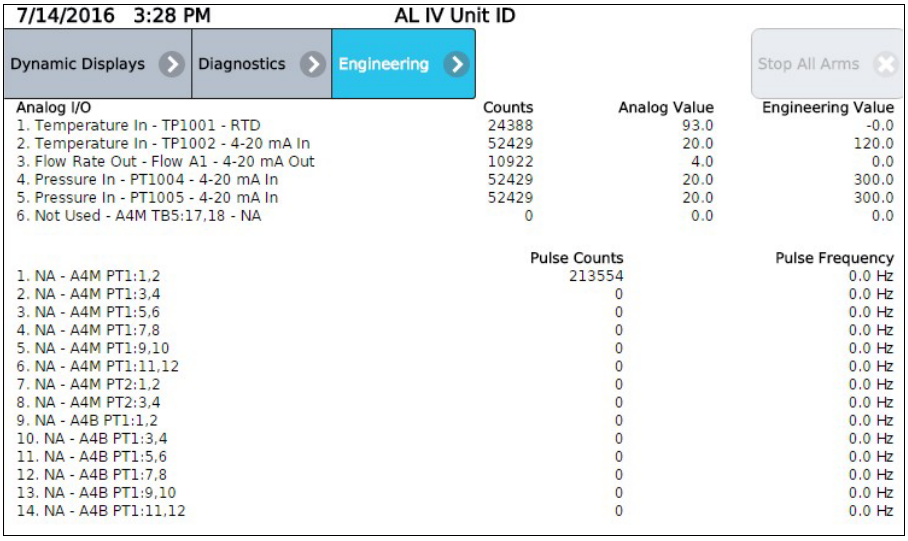
Figure 96: General Purpose Timers Diagnostics



3.2.3.17 Engineering Diagnostics

The diagnostic screen, shown in the following screen, is a combination of the analog and digital input low level status for factory testing.

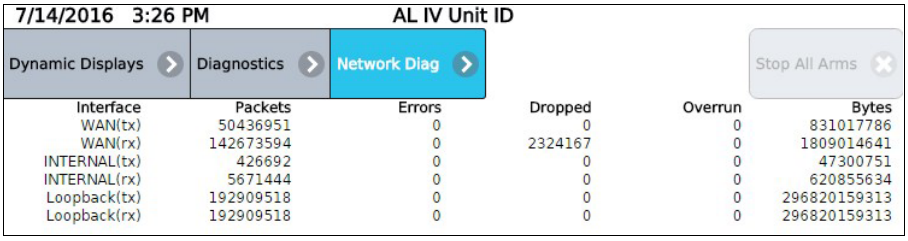
Figure 97: Engineering Diagnostics



3.2.3.18 Network Diagnostics

Displays network diagnostics for each of the network interfaces in the AccuLoad IV.

Figure 98: Network Diagnostics

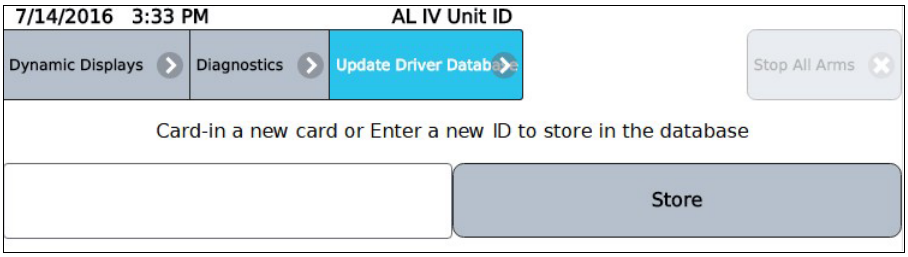


3.2.3.19 Update Driver Database Diagnostics

The Update Drive Database Diagnostic allows for direct addition of new driver information to the database new driver information can be added manually or by

presenting a previously unused card to the reader while in this diagnostic.

Figure 99: Update Driver Database Diagnostics



3.2.3.20 Update Firmware Diagnostics

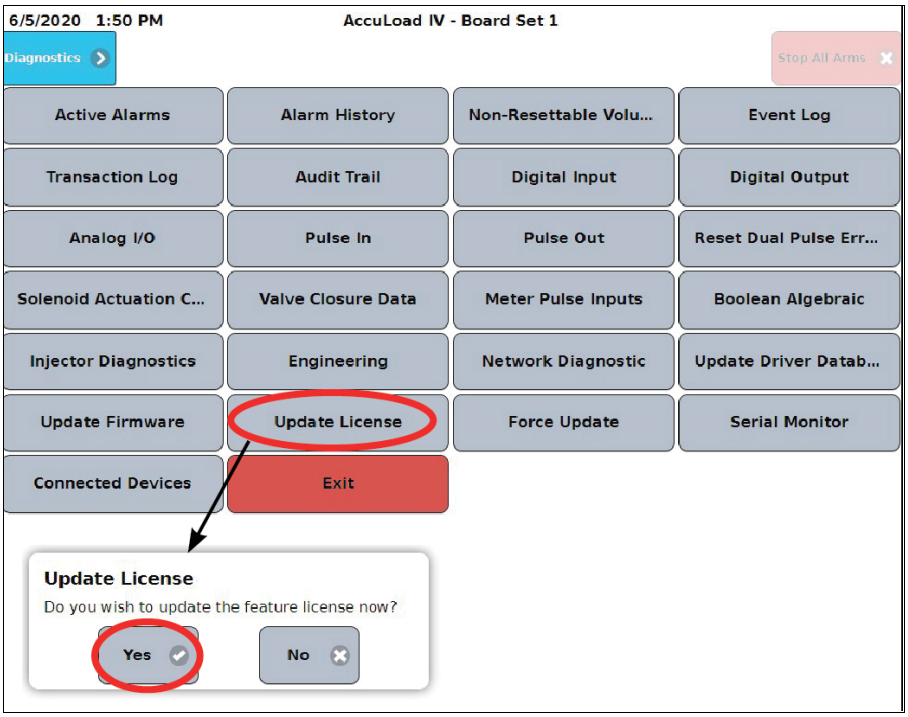
The update firmware diagnostic is intended to provide a mechanism to authenticate a firmware upgrade. Upgrades can be accomplished without using this diagnostic if the communications interface being used has sufficient privileges. In the case where the configuration does not permit updates from being initiated automatically, this diagnostic allows the confirmation of the desire to upgrade via the AccuLoad IV.

> **Note:** If the firmware lock function located in the section 5: Weights and Measures/Calibration on page 93 is enabled, firmware updates are inhibited until the firmware lock is disabled. This action will then be recorded in the audit trail.

3.2.3.21 Update License Diagnostics

If a new feature license was obtained from the factory to expand the maximum number of load arms or add additional features beyond the original licensed capacity, the new feature license can be uploaded to the AccuLoad IV via AccuMate. Afterward, this diagnostic must be used to instruct the AccuLoad to load and validate the new license information. Assuming a valid license is found and loaded, the new arms or features should then be available for use.

Figure 100: Update License Diagnostics



3.2.3.22 Force Update Diagnostics

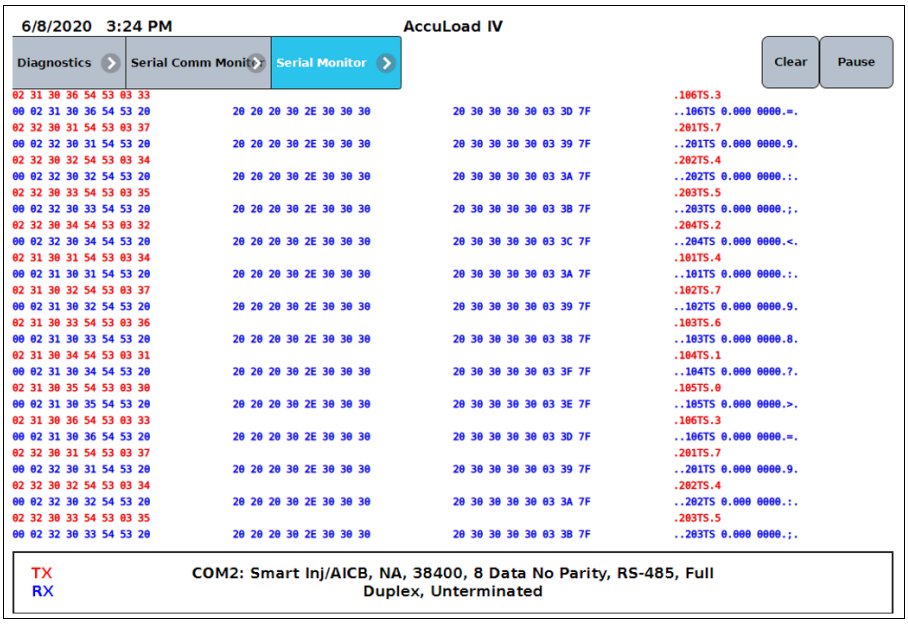
This diagnostic is intended to allow the AccuLoad to install or reinstall the most recently uploaded firmware onto one or more of the satellite boards, such as A4M, A4B, A4I, and THMI, in the unlikely event that the normal automated upgrade process does not complete successfully.

3.2.3.23 Serial Communications Monitor Diagnostics

The serial communications monitor is a monitoring feature of the serial traffic over RS-232 or RS-485 connections. Key features of the monitor are as follows:

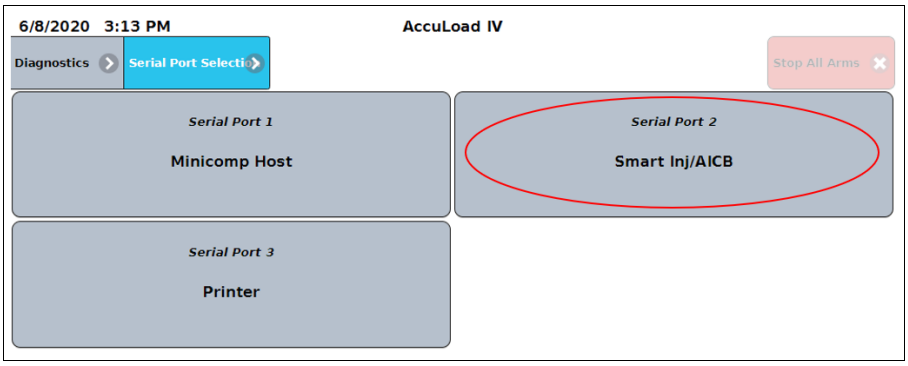
- Transmitted data is shown in the color red
- Received data is shown in the color blue
- The button labeled as Clear will clear the screen
- The button labeled as Pause will pause the data so it can be viewed
- Only live data is shown
- Past data not shown on the screen cannot be viewed

Figure 101: Serial Monitor



After navigating to the serial monitor from the diagnostics menu, any serial port that is configured can be selected to be monitored as shown in the following screen capture.

Figure 102: Selecting a Serial Port



3.2.3.24 Connected Devices

The Connected Devices Menu shows which I/O boards, such as A4Ms, A4Bs, and A4Is, are included and connected within the board set. Starting with AccuLoad IV version 1.0, the I/O boards must be connected or paired in order to use the I/O. There are three states that the I/O boards can be in on this screen:

- Not Allocated: The I/O board is recognized by the system but is not paired.
- Connected: The I/O board is recognized by the system, is paired, and communicating properly.
- Disconnected: The I/O board is paired to the system but is not communicating.

On the main Connected Devices screen, the system reset button will force a soft

restart of the system without requiring a full power cycle.

Each I/O board can be selected to view more information for that device. On the Connected Devices screen, the board can be added (paired), deleted (unpaired), replaced, or reset. Selecting reset will force a soft restart of that individual board with out needing to cycle power.

3.2.3.25 Connected Devices Diagnostics

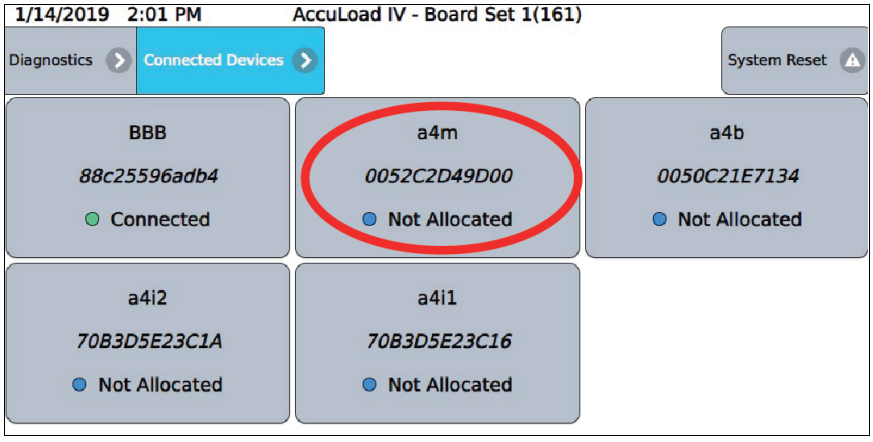
Starting with firmware version 1.0, the user has the ability to explicitly pair the auxiliary I/O boards—A4M, A4B, A4I1, and A4I2—with the main processor board, labeled as BBB. AccuLoads that are shipped from the factory with version 1.0 or higher will already have the I/O boards paired. However, AccuLoad IV units being upgraded from a pre-1.0 revision to revision 1.0 or higher will require the boards to be manually paired after the upgrade.

This same procedure will be required to replace an I/O board in the event one of the auxiliary I/O boards needs to be replaced.

3.2.3.25.1 Adding (Pairing) I/O Boards:

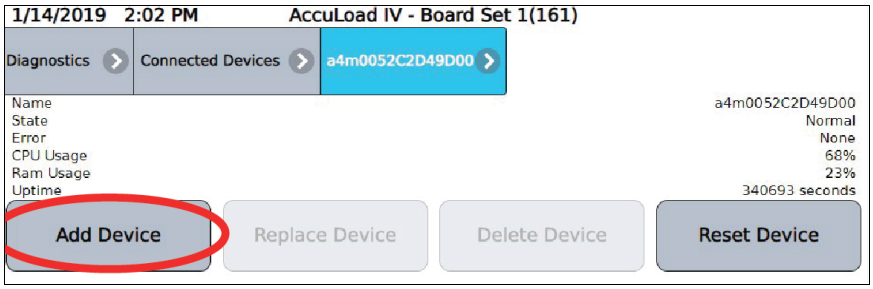
1. Navigate to Main>Diagnostics>Connected Devices
   - Devices that have not been paired will show as “Not Allocated”
   - BBB will always show as “Connected”
   - A4B, A4I1, and A4I2 will only show for systems using those boards
2. Select the board to be added.

Figure 103: Pairing I/O Boards and Selection



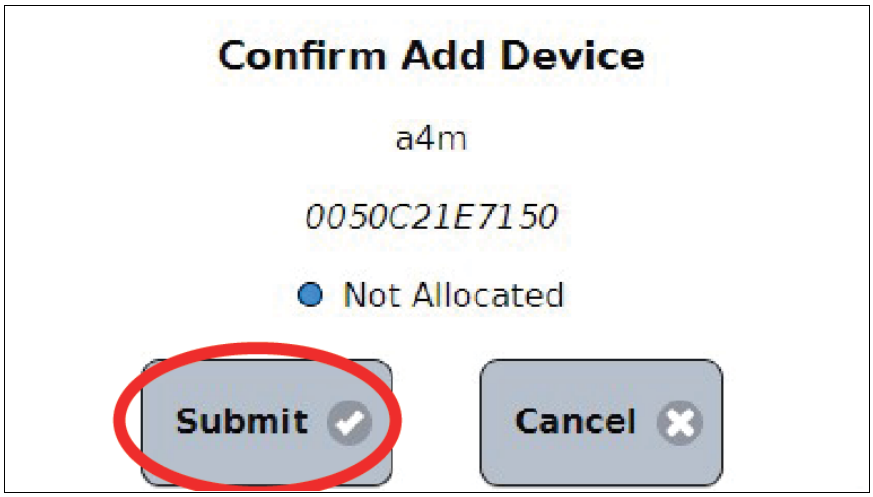
3. When the information for the board is shown, select the “Add Device” button.

Figure 104: Adding Device



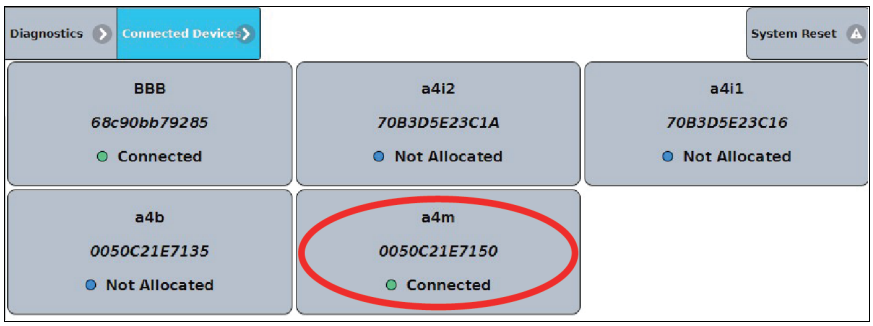
4. When the popup is shown to confirm the selection, select the “Submit” button.

Figure 105: Adding Device, Submit



5. The device will now show as “Connected”.

Figure 106: Device showing as connected



6. Repeat steps 2 through 5 for all I/O boards in the system.

3.2.3.25.2 Replacing I/O Boards

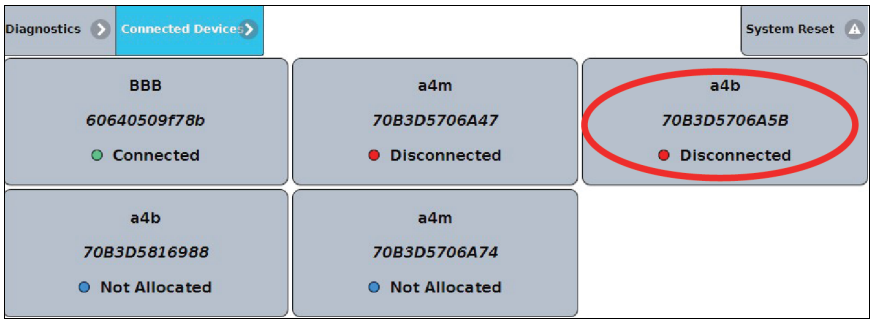
If an A4M is replaced, the other A4B or A4I boards in the system will need to be manually unpaired by setting S1-6 ON and resetting the board. After the board has

been reset, turn S1-6 OFF and pair the A4B and A4I boards to the newly connected A4M.

If an I/O board needs to be replaced in the event of a failure, follow the steps below:

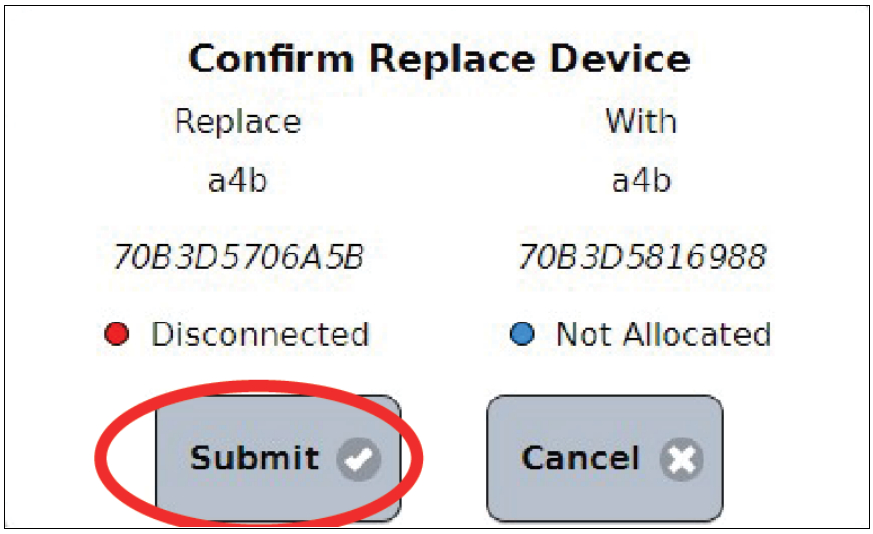
1. After the new board has been wired into the system and the AccuLoad has been powered on, navigate to Main>Diagnostics>Connected Devices
2. Select the board that is being replaced. It will be listed as “Disconnected”:

Figure 107: Replacing I/O Boards, Step 1



3. Select the board that is replacing the one removed from the system.
4. Add the desired selected device in the same manner as in “Adding a new board”, and confirm by selecting Submit.

Figure 108: Replacing I/O Boards, Step 2

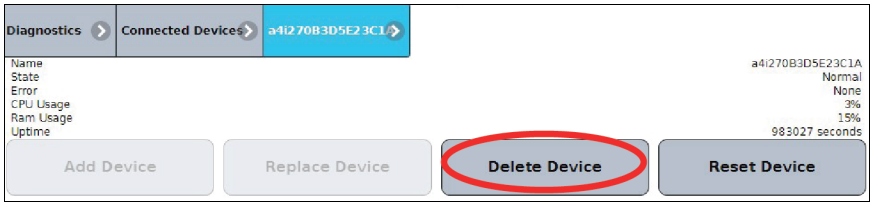


3.2.3.25.3 Deleting I/O Boards

If an I/O board is removed from the system and is no longer used, it should be unpaired or deleted.

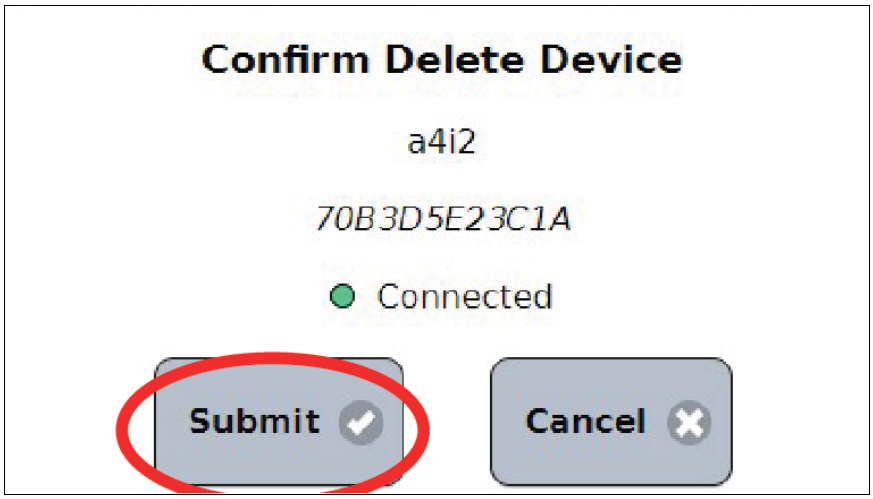
1. Navigate to Main>Diagnostics>Connected Devices.
2. Select the device to be unpaired. It may show as Disconnected.
3. When the information for the board is shown, select the “Delete Device” button.

Figure 109: Deleting I/O Boards



4. When the popup is shown to confirm the selection, select the Submit button.

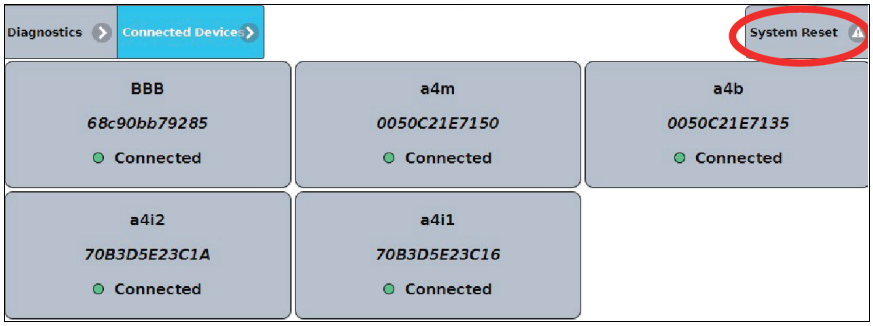
Figure 110: Deleting I/O Boards 2



3.2.3.25.4 Resetting the System (Soft Restart)

1. Navigate to Main>Diagnostics>Connected Devices.
2. Select the System Reset button.

Figure 111: Resetting the System 1



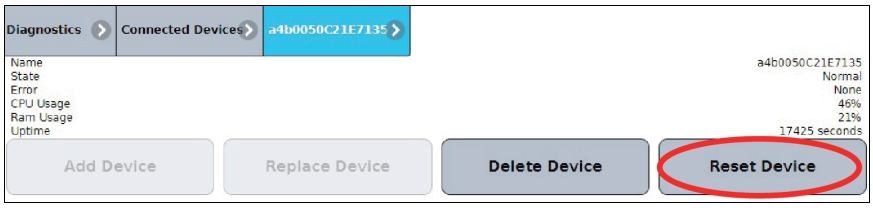
3. Confirm that the system should be restarted by selecting the Continue button when prompted.

Figure 112: Resetting the System 2

3.2.3.25.5 Resetting Individual I/O Boards (Soft Restart)

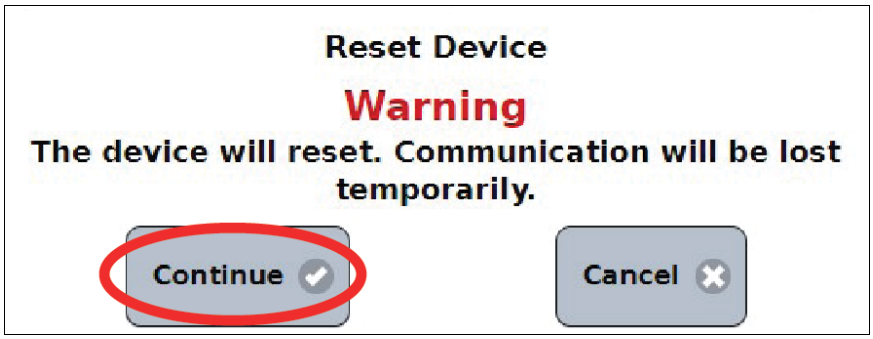
1. Navigate to Main>Diagnostics>Connected Devices.
2. Select the I/O board to be reset.
3. When the information for the board is shown, select the Reset Device button, as shown below:

Figure 113: Resetting Individual I/O Boards



4. Confirm that the board should be restarted by selecting the Continue button when prompted.

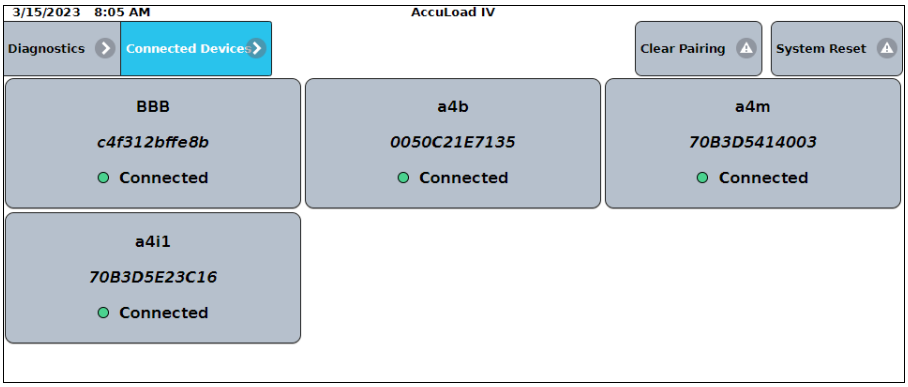
Figure 114: Resetting Individual I/O Boards 2



3.2.3.25.6 Clear Pairing

Starting in AccuLoad IV version 1.6, a new button called Clear Pairing has been added to the Connected Devices screen. This button resets the pairing information on the System on Module (SoM) and on the currently paired auxiliary I/O boards, if properly communicating. If the pairing information has been cleared, it is required to re-add (pair) the auxiliary I/O boards to reestablish communications and I/O functionality.

Figure 115: Clear Pairing

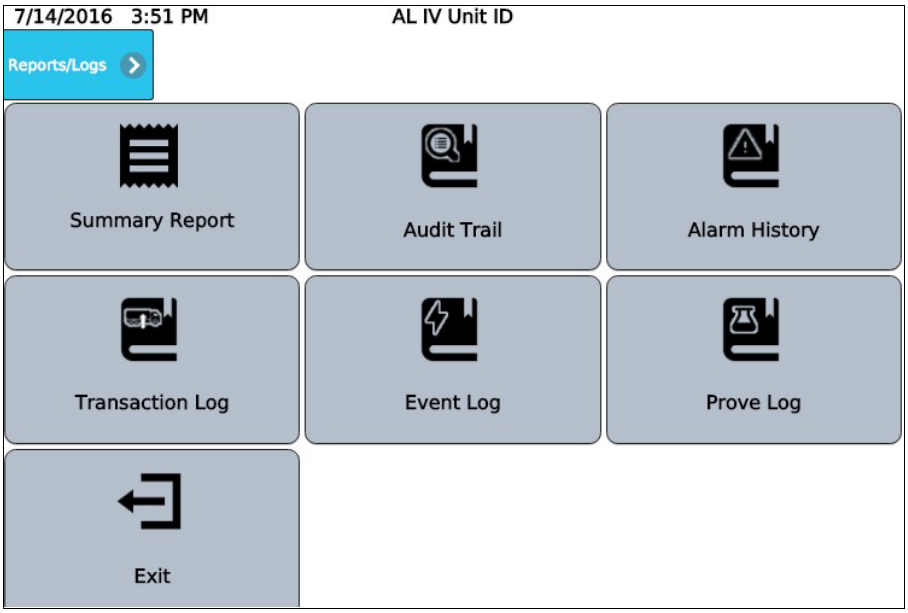


4 Reports/Logs

4.1 Report/Logs Main Menu

By selecting Reports/Logs from the Main Menu, printed reports can be generated and viewed in the AccuLoad's historical data logs.

Figure 116: Report Logs Main Menu



The Reports/Logs main menu consists of the following options:

- Summary Report
- Audit Trail
- Alarm History
- Transaction Log
- Event Log
- Prove Log
- Exit

4.1.1 Summary Report

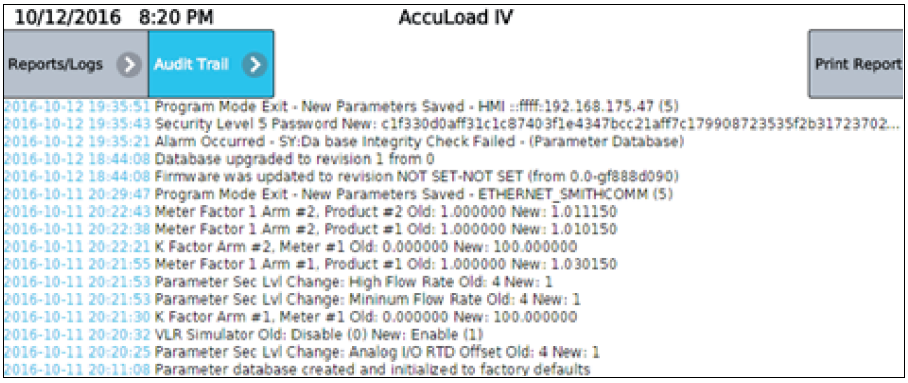
This selection allows for printing summary data of all throughput during a designated period. Specify an arm, start, and end time/date to define the period to use for the report, and select Print Report to generate the summary.

Figure 117: Summary Reports

4.1.2 Audit Trail

This selection provides a means to view the audit trail log and optionally print a subset of the entries in the log. All changes to parameters set to Access Level 4 or 5 are recorded in this log. See section 2.2.5.3: Parameter Security Level Assignment on page 52.

Figure 118: Audit Trail



4.1.3 Alarm History

Alarm History provides a means to view the alarms that have occurred.

Figure 119: Alarm History

4.1.4 Transaction Log

Transaction Log provides a means to view a list of the transactions that have been completed and optionally view the details or print entries in the log as shown in the following screens:

Figure 120: Transaction Log Options

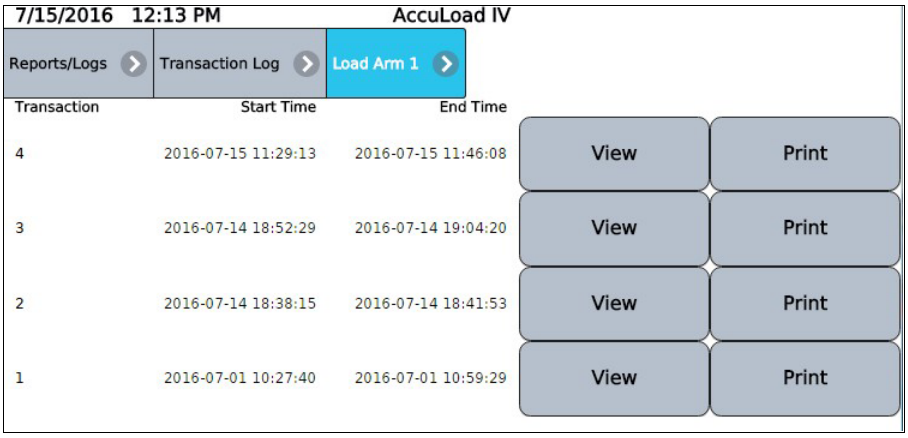
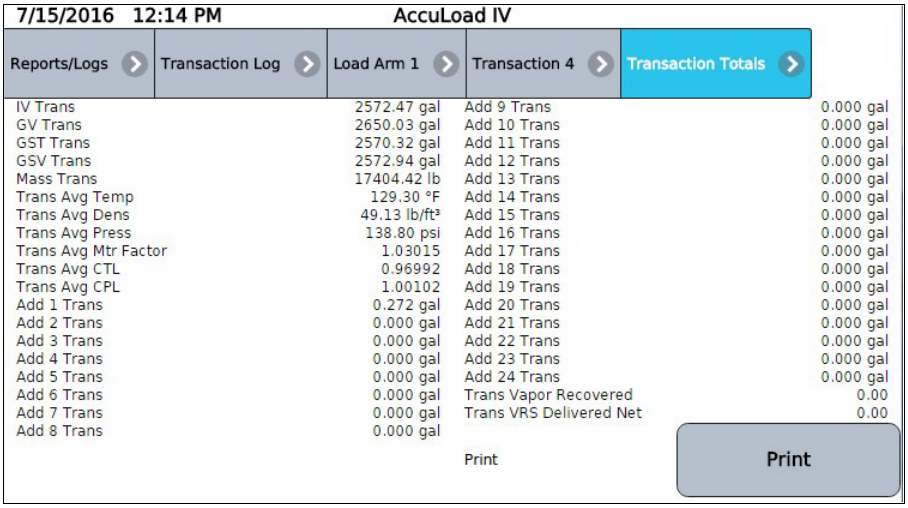


Figure 121: Viewing a Transaction Log



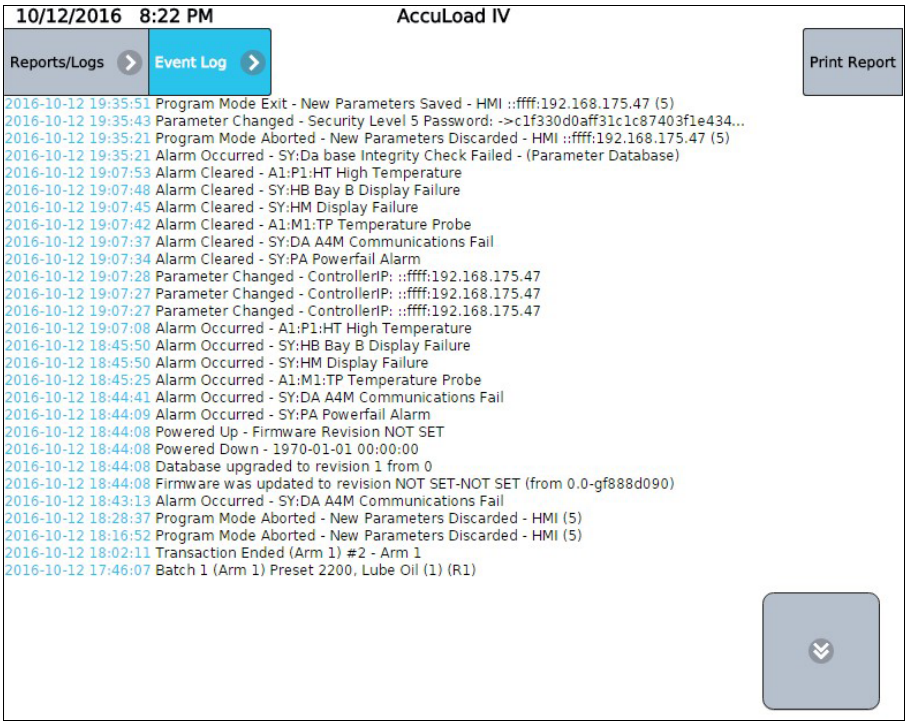
4.1.4.1 Total Number of Stored Batches

The AccuLoad IV can store a maximum of 6000 batch records spread across a variable number of transactions. Once this limit is reached, the oldest transaction is deleted so that the latest transaction can be stored for reference purposes.

4.1.5 Event Log

Event Log provides a means to view and optionally print the event log. All events, such as alarms, transaction start/end, and changes to parameters are recorded in this log. See section 2.2.5.3: Parameter Security Level Assignment on page 52.

Figure 122: Event Log



4.1.6 Prove Log

The Prove Log provides a means to view the historic prove data, if the AccuLoad's Auto-Proving mechanism is used to generate linearization curves for the meters.

Figure 123: Prove Log

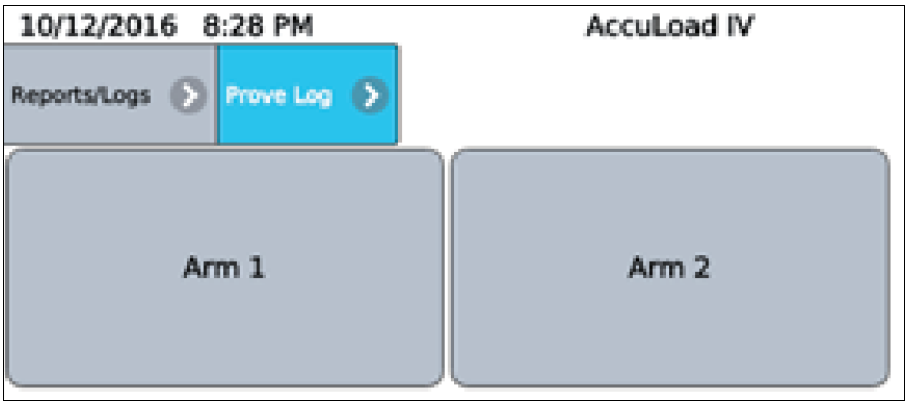


Figure 124: Prove Log Arm 1 Options

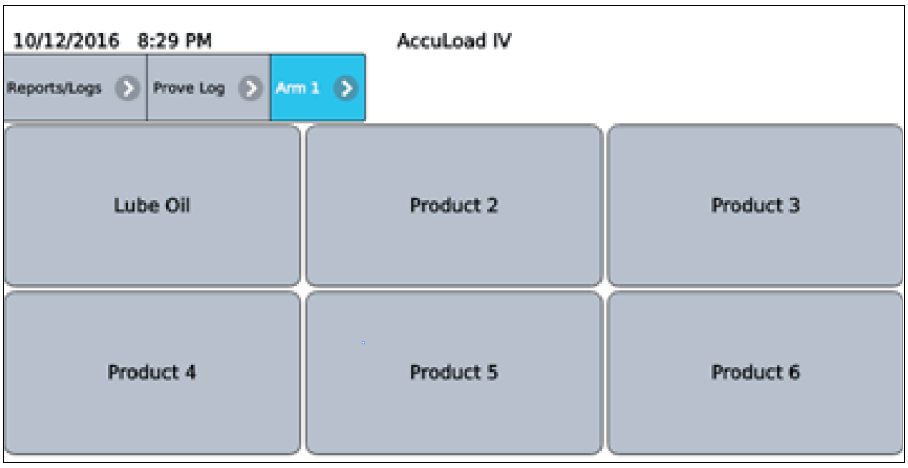
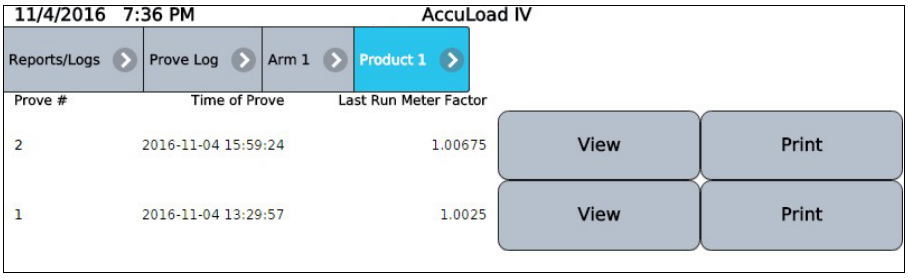
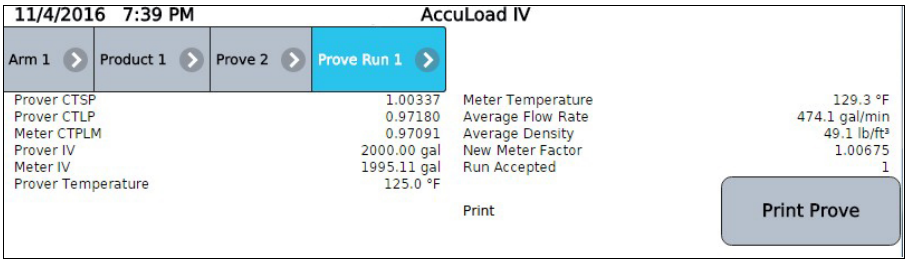


Figure 125: Prove Log, Arm 1, Product 1



A list of the prove data for the arm as shown in the following screen. Prove details can be viewed or printed from this diagnostic.

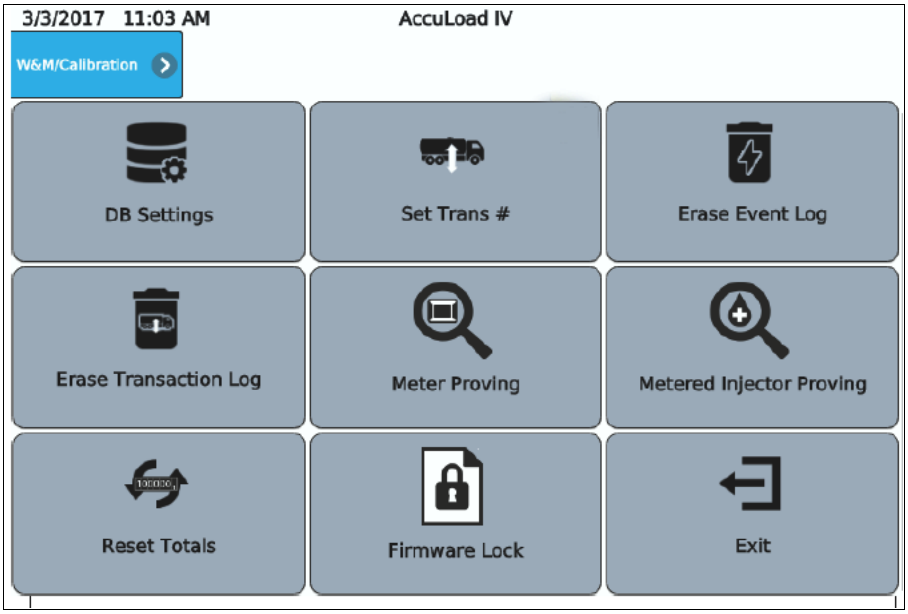
Figure 126: Prove Data



5 Weights and Measures/Calibration

The features available within this section of the user-interface menu affect the calibration information and metrologically significant data storage and are protected by the weights and measures security requirements. The Level 5 access code (if configured) will be required to perform these functions. Additionally, if the user has programmed an input for a weights and measures security switch, it must be active. See the Installation and Maintenance manual (MN06201) for connection details for this optional switch.

Figure 127: Weights and Measures/Calibration Main Menu



The weights and measures/calibration main menu consists of the following options:

- Database (DB) Settings
- Set Transaction (Trans) Number (#)
- Erase Event Log
- Erase Transaction Log
- Meter Proving
- Metered Injector Proving

- Reset Totals
- Firmware Lock
- Exit

5.1 DB Settings (Database Settings)

From the database initialization screen, it is possible to reconfigure the database to one of a list of possible desired starting points.

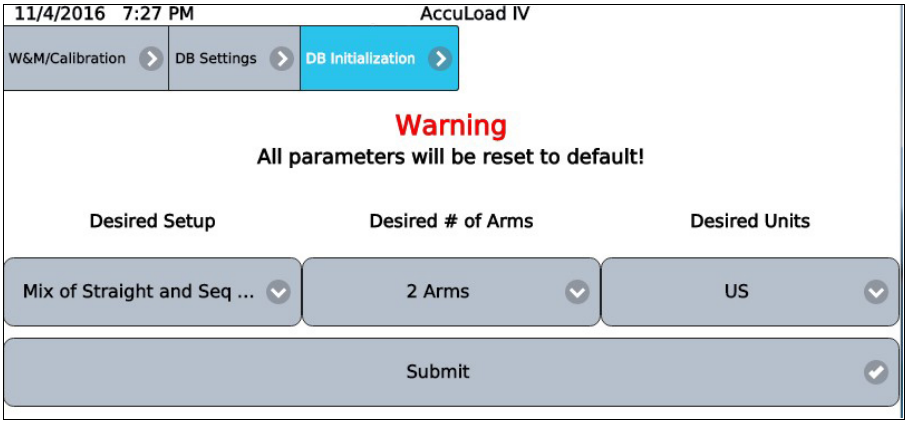
> Note that this option will reset all previous program code configuration values in the database and return the AccuLoad to one of a fixed set of initial states.

Options include:

- Mix of straight and sequential arms
- Ratio blending (1 or 2 arms)
- Factory default
- Hybrid blending (1-3 arms)

The number of arms (1-6) and the desired system of units (US or SI) can also be configured as part of the reconfiguration. Once these options are selected, select Submit to reconfigure the database.

Figure 128: Database Initialization



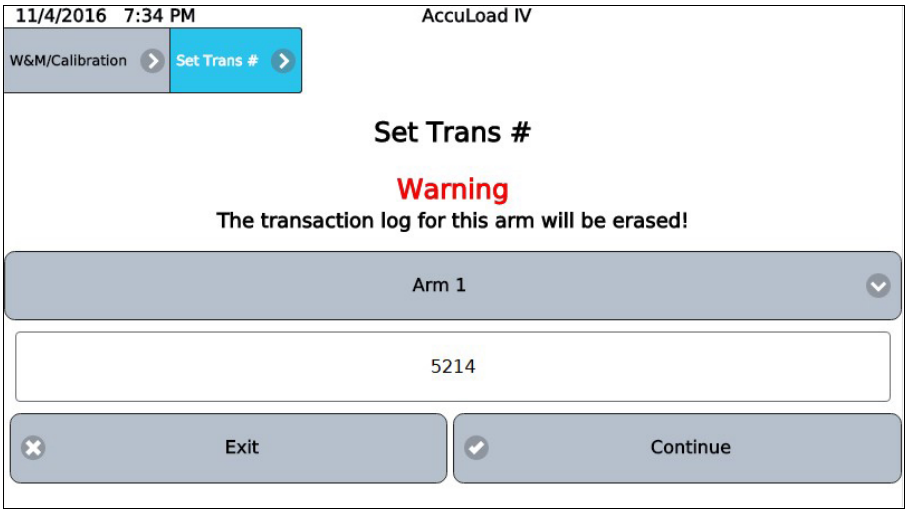
5.2 Set Trans # (Set Transaction Number)

The Set Trans # option allows the operator to specify what value the Transaction ID for the next transaction run will be. This is to allow the operation to have continuous transaction identifiers in the case of an upgrade or replacement of an existing preset.

> Note that all existing transactions in the AccuLoad for the arm will be erased since the prevention of duplicate transaction IDs cannot be guaranteed otherwise.

To change the starting transaction number, select the arm and enter the desired ID in the text field, then select Continue.

Figure 129: Set Transaction Number



Press Continue once more to complete the process, or Cancel to return to the screen and exit without changes.

5.3 Erase Event Log

This option erases all records in the Event Log.

Figure 130: Erasing the Event Log

A confirmation dialog will appear:

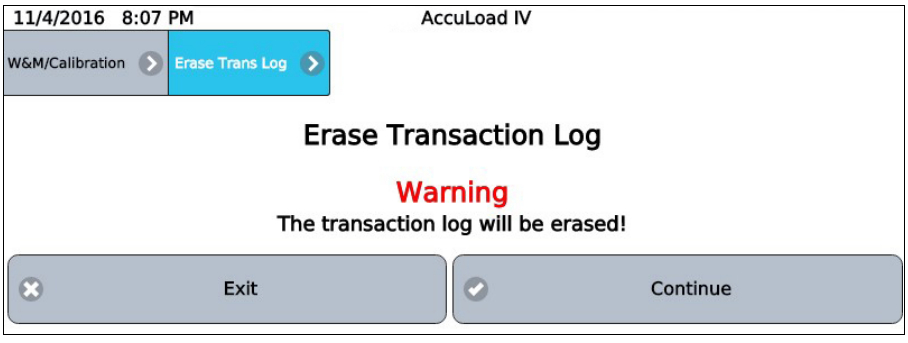
Figure 131: Erase Event Log Confirmation

If Continue is selected, all entries in the event log will be erased. In either case, after a selection is made the control returns to the Weights and Measures/Calibration menu. This activity will be logged in the Audit Trail.

5.4 Erase Transaction Log

This option erases all records in the Transaction Log:

Figure 132: Erase Transaction Log, Screen 1



A confirmation dialog will appear.

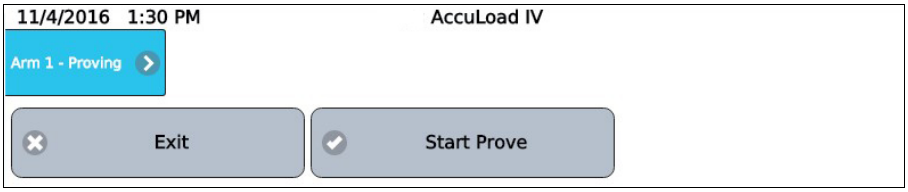
Figure 133: Erase Transaction Log, Screen 2

This activity will be logged in the Audit Trail.

5.5 Meter Proving

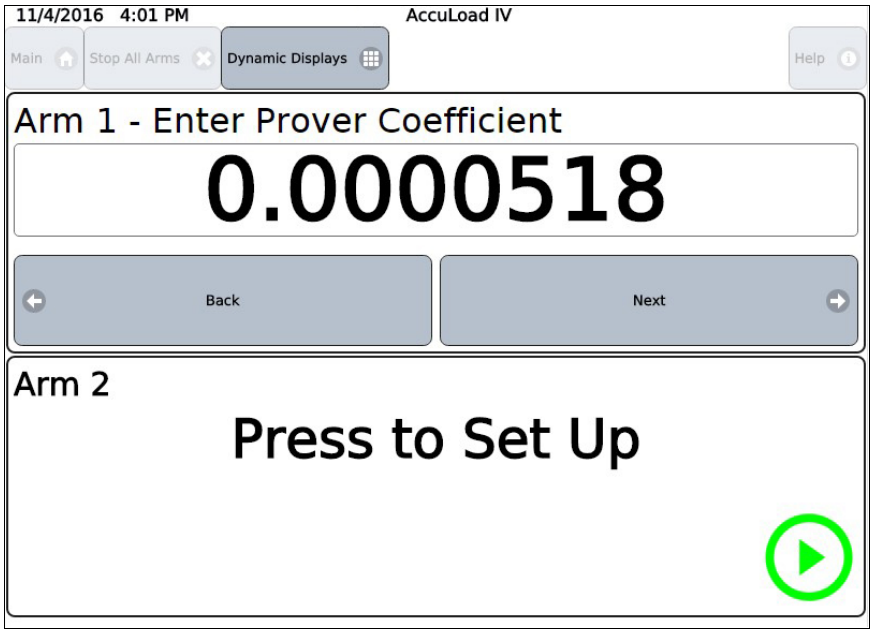
Follow the following steps to begin a proving operation from the Weights and Measure/Calibration menu:

Figure 134: Meter Proving, Step 1



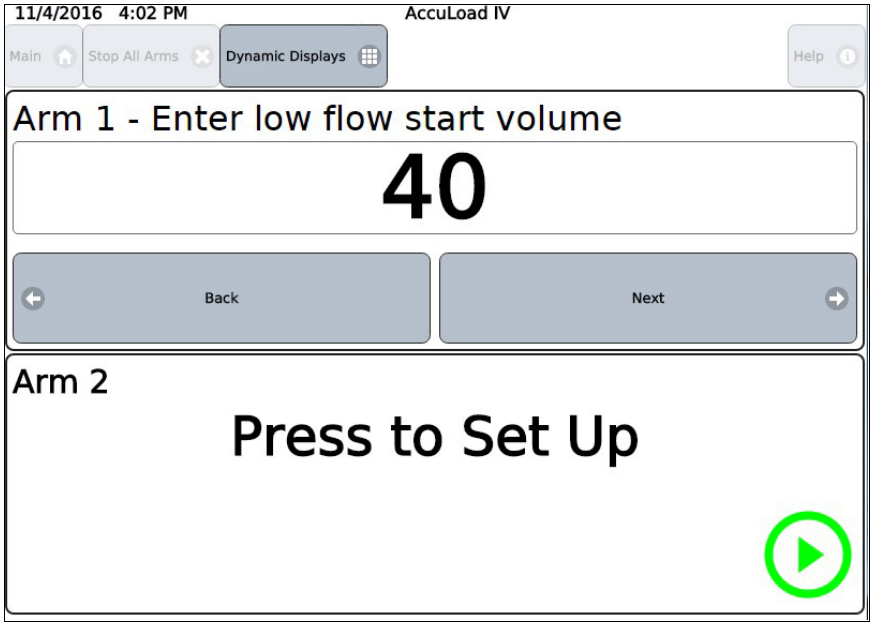
1. Select Start Prove.
2. Enter the volumetric coefficient of expansion for the steel which is typically found on the nameplate of the prover.

Figure 135: Entering the Volumetric Coefficient of Expansion for Steel



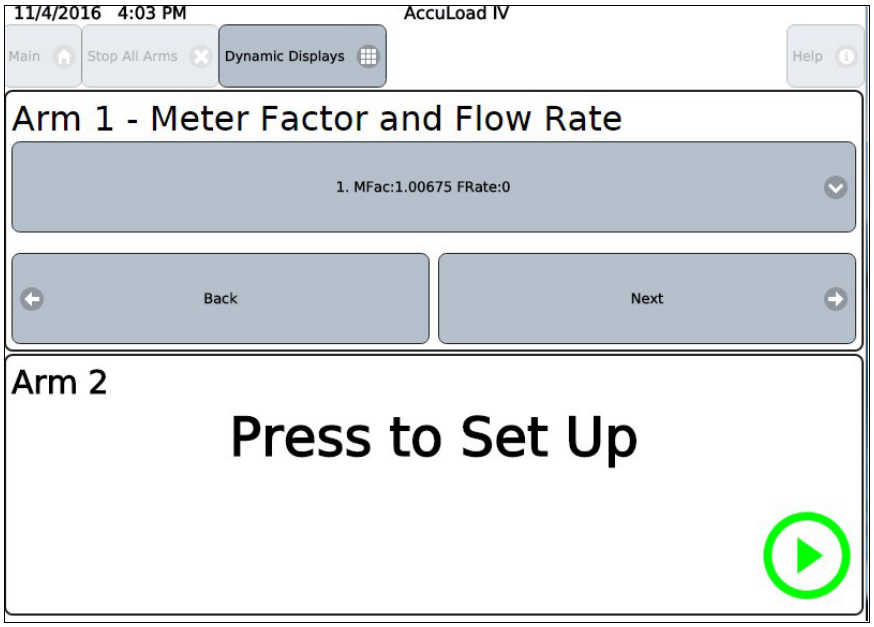
3. Enter low flow start volume.

Figure 136: Entering Low Flow Start Volume



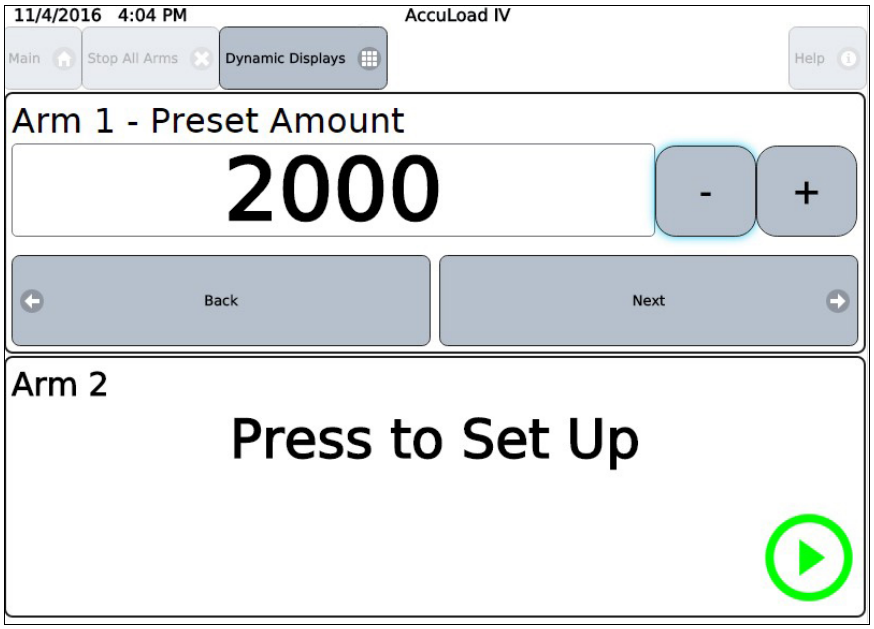
4. Enter the desired preset based on the can size and press Next.

Figure 137: Entering Preset



5. Start the prove run for a normal delivery.

Figure 138: Start the Prove Run

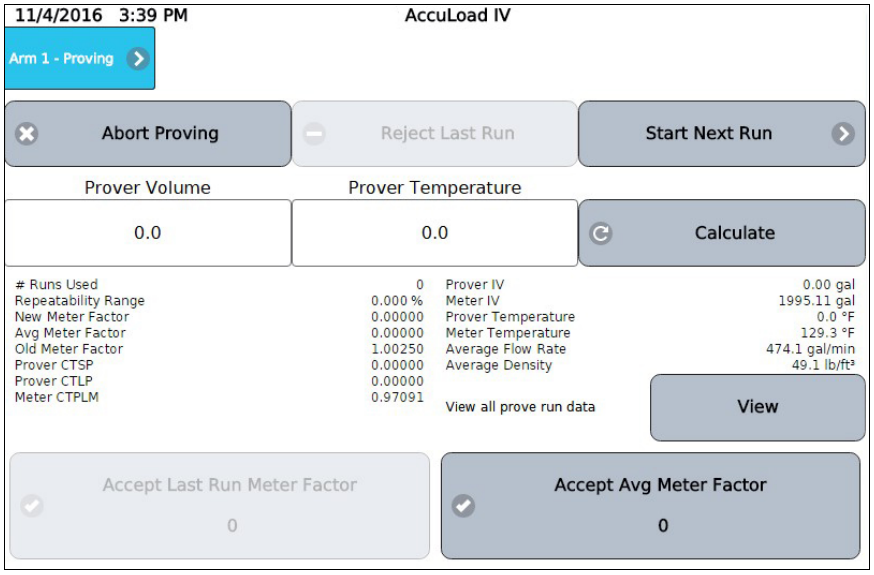


At the end of the run, the data is presented allowing for multiple actions, including:

- Calculating the meter factor based on the prover neck reading and temperature
- Aborting the run and discarding the data associated with the run

- Accepting the run
- Starting a new run

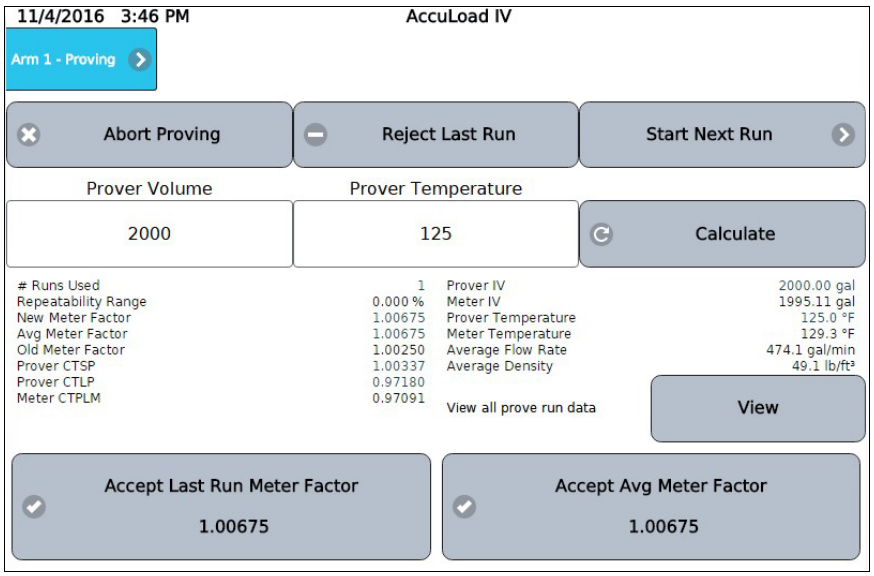
Figure 139: Meter Proving Data Presentation



6. Enter the volume in the prover can and the prover temperature reading, then select Calculate to generate the new factor based on the run.

> Note: This action may take some time.

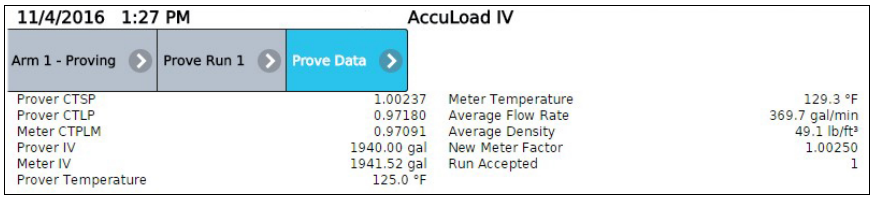
Figure 140: Entering the Volume in the Prover Can



7. To accept the new meter factor, press Accept Last Run Meter Factor. To employ additional runs, press Start Next Run. After multiple runs, the option to Accept Avg

Meter Factor can also be used. To see all the data associated with the prove run, press the View button:

Figure 141: Meter Proving, Weights and Measures Screen



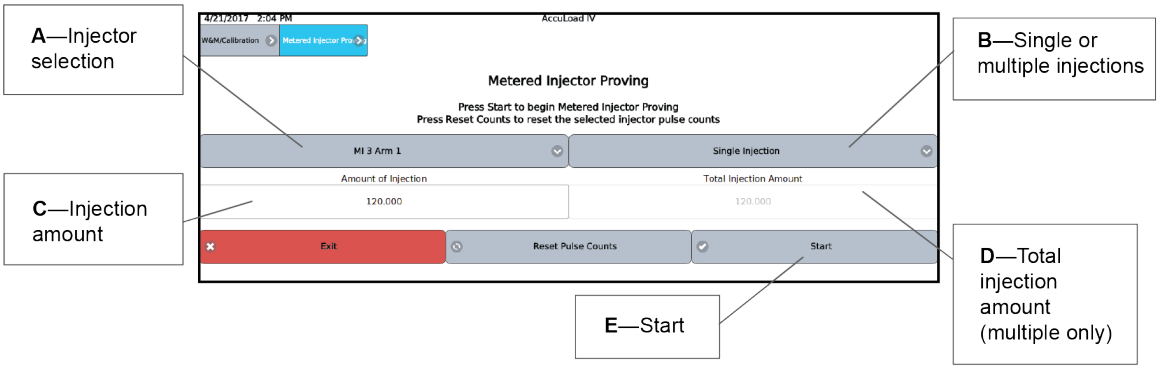
Once the prove operation is completed successfully and the appropriate meter factor has been accepted, the AccuLoad will return to the weights and measures menu.

5.6 Metered Injector Proving

Proving of additive meters is required to ensure accurate additive injection through metered injectors. To prove a metered injector, the flow out of the injector is collected in a calibrated container while the injector is activated to deliver additive to fill the container. Next, the amount delivered into the container is compared to the amount indicated by the number of pulses counted by the AccuLoad and then a meter factor is calculated.

The AccuLoad has built-in metered injector proving support which provides a simple and efficient way to ensure the accuracy of metered injectors.

Figure 142: Metered Injector Proving

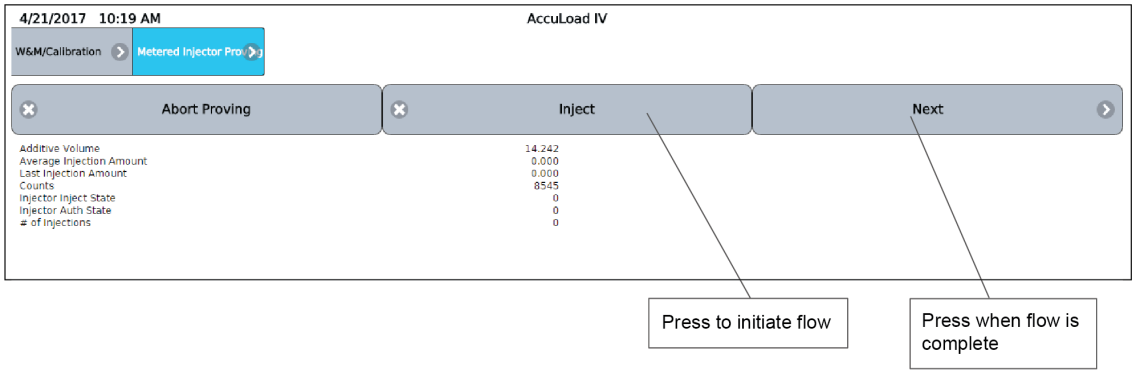


The process of proving an additive meter is as follows:

1. Arrange the plumbing out of the injector to flow into a graduated vessel.
2. Clear any active alarms.

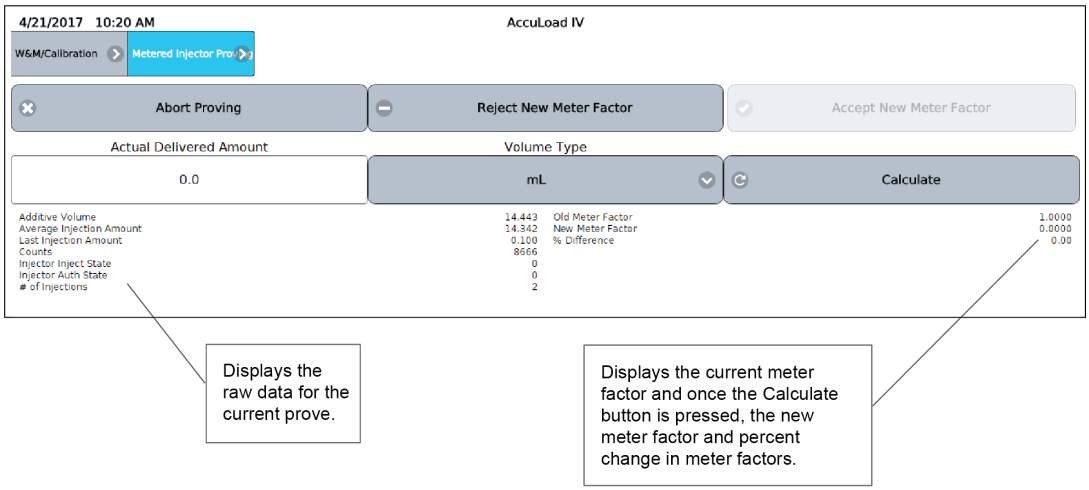
3. Access the metered injector proving screen, shown above, from the main menu (Weights and Measures/Calibration>Metered Injector Proving).
4. Select the injector to prove from the drop-down list. See A in Figure 142: Metered Injector Proving on the previous page.
5. Select the option for a single or multiple injections:
   - Single—The injections are manually controlled by the operator with one injection of the amount entered in the amount of injection field each time the operator presses the Inject button.
   - Multiple—The AccuLoad automatically performs enough individual injections of the amount entered in the amount of injection field to deliver the amount entered in the total injection amount field.
6. Enter the Amount of Injection, see Figure 142: Metered Injector Proving on the previous page.
7. Enter the Total Injection Amount if using the Multiple Injections method, see Figure 142: Metered Injector Proving on the previous page.
8. Press the Reset Pulse Counts to clear the proving data if starting a new prove.
9. Press Start to move to the next screen to where the additive flow is initiated. The next screen will display the count of additive meter pulses and the amount of flow represented by the pulses. For multiple injections, these totals will increment for each injection.
10. If using the Single Injection method, press the Inject button the required number of times required for the size of the proving vessel. If using the Multiple Injection method, the AccuLoad will perform the selected number of injections automatically.

Figure 143: Metered Injector Proving 2



11. Once the injections are complete, press Next to move to the next screen to enter the amount of additive indicated by the calibrated vessel.

Figure 144: Metered Injector Proving

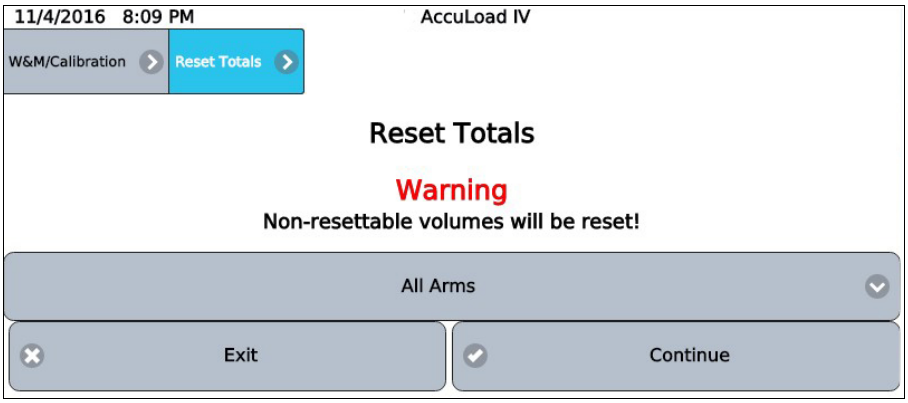


12. On the calculations screen, enter the Actual Delivered Amount as read from the proving vessel and select the correct units for this amount, then press the Calculate button. The AccuLoad will calculate the new meter factor and also display the percentage change between the old meter factor and the new meter factor.

5.7 Reset Totals

From this menu selection, the totalizers in the AccuLoad can be reset. It is possible to reset the totalizers for all arms at once, or for an individual load arm if desired.

Figure 145: Reset Totals

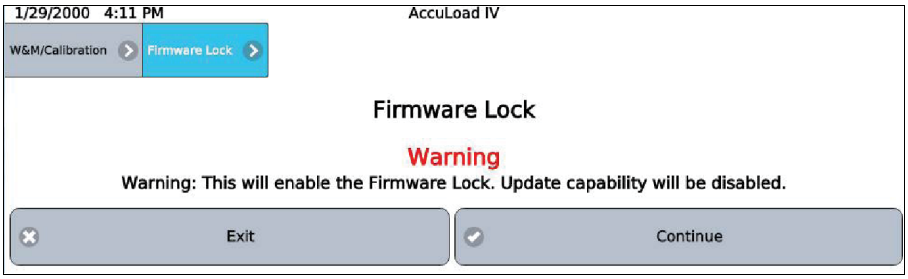


A confirmation dialog will appear. If continue is pressed, the totalizers for the selected arms will be cleared.

5.8 Firmware Lock

This option allows an installation to prevent certain features from being accessible unless it is unlocked via a Weights and Measures-only accessible re-enable selection. Disabled features include the ability to update the firmware, access to the factory service port, and the ability to upload or download configuration files from AccuMate such as equations, configurable reports, etc.).

Figure 146: Firmware Lock

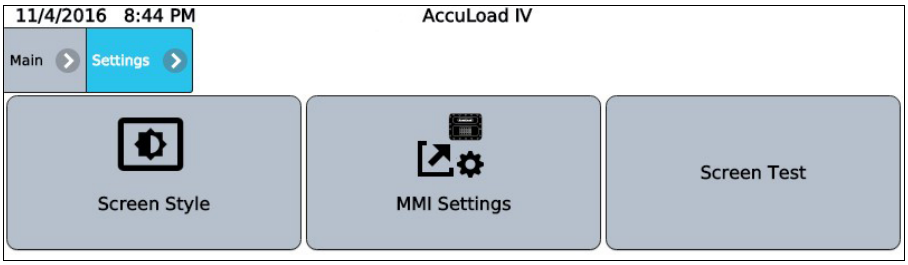


6 Device Settings

6.1 Device Settings Main Menu

This menu provides options for configuring how the device operates, primarily related to the user interface and display. Options are as shown and listed below:

Figure 147: Device Settings



- Screen Style
- NMI Settings
- Screen Test
- Screen Brightness

6.1.1 Screen Style

This selection allows the user to configure the display style with the following options:

- Day style
- Night style
- Auto

The day style uses dark text and icons on a white background and is easier to read in daylight. The night style uses a black background and is easier to view in darkness. In auto, the AccuLoad will transition from day to night style based on a preset time of 8:00 AM to 6:00 PM.

6.1.2 MMI Settings

This selection redirects the interface to the local database server to allow modification of the HMI/MMI settings. The following network settings are default values for the HMI/MMI allowing network connection to an A4M with default network settings:

Connections/Primary URL: http://10.0.0.1/?secret=HMI#

Network Settings/Static IP: 10.0.0.6

Network Settings/Netmask: 255.255.255.0

Network Settings/Gateway: 10.0.0.1

6.1.3 Screen Test

This diagnostic is designed to validate each pixel on the display. When pressed, the entire screen will cycle from all black, to all red, to all green, to all blue, to all white. This will repeat until the screen is pressed again to return to the menu.

6.2 Changing the Internal IP Address

The AccuLoad uses an internal virtual local area network (VLAN) for communication between the user interface (THMI) and the main program. By default, this internal VLAN uses the 10.0.0.x/8-bit network address range. Hence, if the AccuLoad is connected to an external Ethernet network that encompasses that range of addresses, it may be necessary to reconfigure the internal IP address range used by the AccuLoad IV to avoid address conflicts.

> **Note:** Prior to revision 1.4, the net mask for the internal VLAN was not limited to 8-bit host address. For example, the internal VLAN network address space encompassed 10.x.x.x/24. In revision 1.4, the netmask applied to the internal VLAN was changed to 255.255.255.0—from the previously used 255.0.0.0—to reduce the likelihood of conflict with existing network topologies, but it is still possible that conflicts may arise requiring the internal network address range to be changed manually in the AccuLoad and THMI configurations.

If it is determined that the AccuLoad will be connected to an external network with an address range that overlaps the range of the internal VLAN, the following procedure allows for changing the network address of the internal VLAN to avoid any conflict.

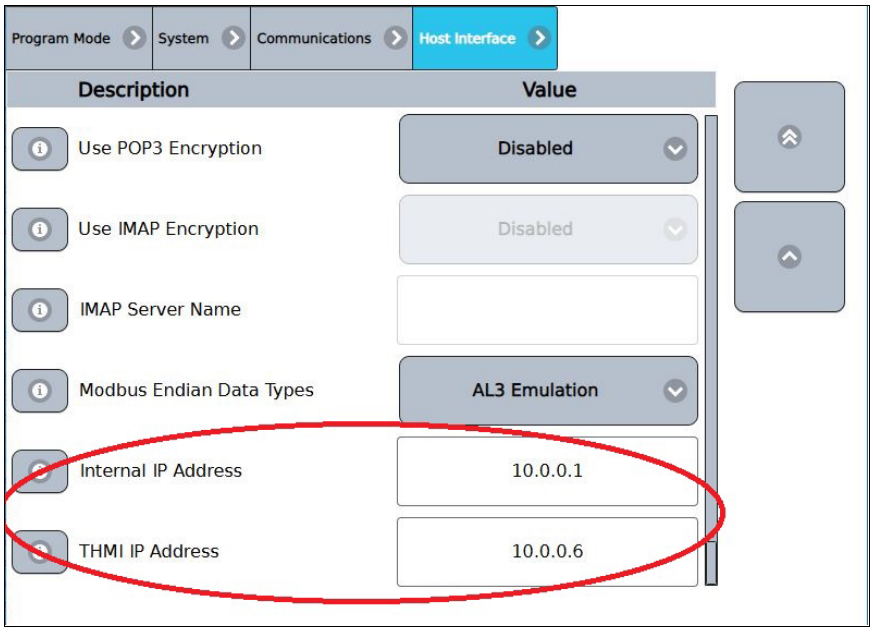
6.2.1 ST, QT, and N4 Models

Follow the steps below to change the internal IP address for models ST, QT, and N4:

1. From the AccuLoad IV ready screen, press Main at the top left corner.
2. Navigate to the Program Mode>System>Communications>Host Interface. Scroll to the bottom of the page where the parameters for Internal IP address and THMI

IP addresses are listed.

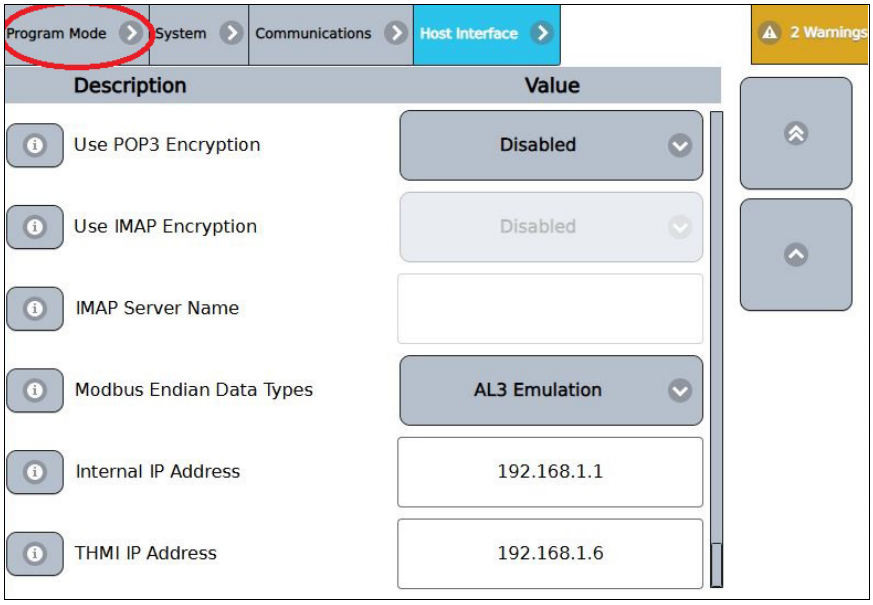
Figure 148: Changing the Internal IP Address (ST, QT, and N4 Models), Step 2



3. Change the parameters to the desired IP addresses and then select Program Mode at the top of the screen.

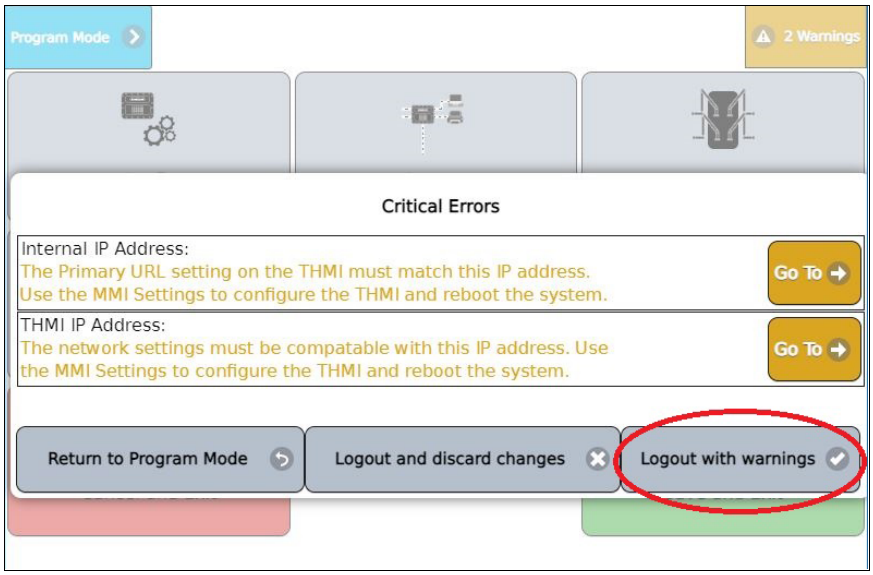
   Example: 192.168.1.1 and 192.168.1.6 respectively

Figure 149: Changing the Internal IP Address (ST, QT, and N4 Models), Step 3



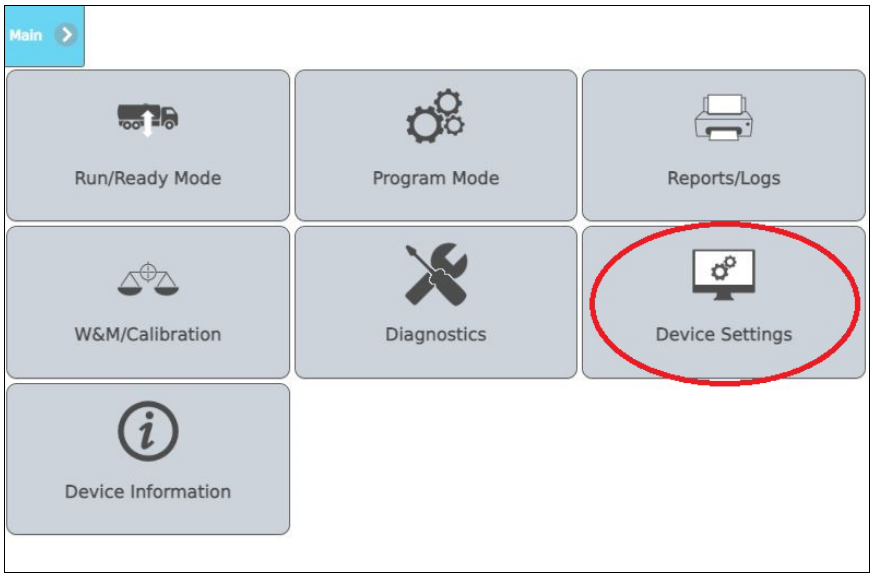
4. Once at the Program Mode menu, select save and exit. A Critical Errors screen will appear. Choose Logout with warnings.

Figure 150: Changing the Internal IP Address (ST, QT, and N4 Models), Step 4



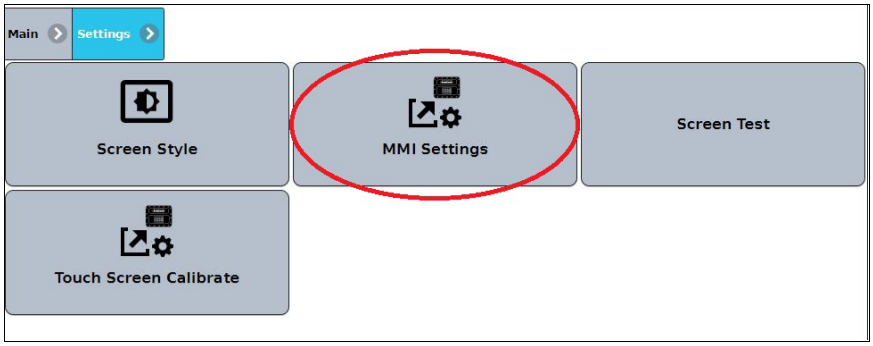
5. Once this has been completed, you will be brought back to the Main Menu. Select Device Settings.

Figure 151: Changing the Internal IP Address (ST, QT, and N4 Models), Step 5



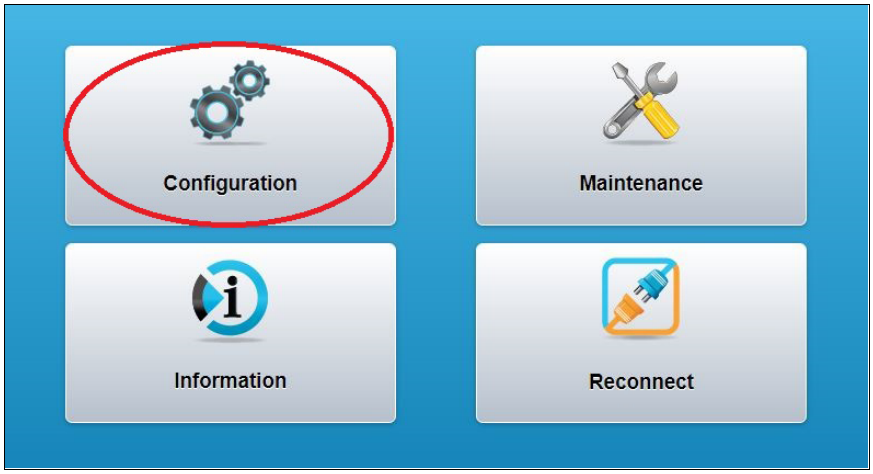
6. Choose MMI Settings. The screen will turn white for a moment.

Figure 152: Changing the Internal IP Address (ST, QT, and N4 Models), Step 6



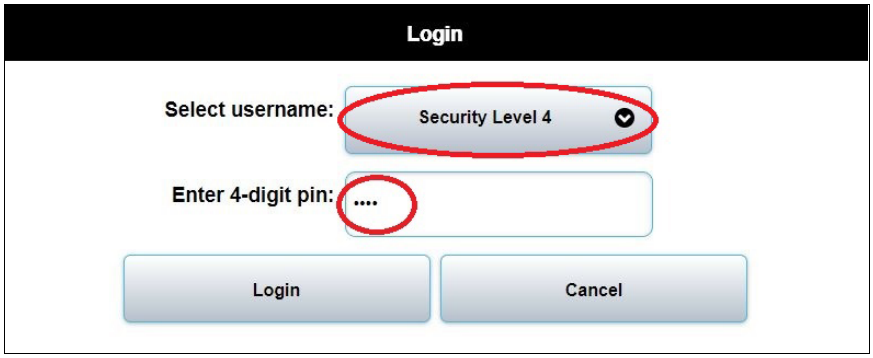
7. Choose Configuration.

Figure 153: Changing the Internal IP Address (ST, QT, and N4 Models), Step 7



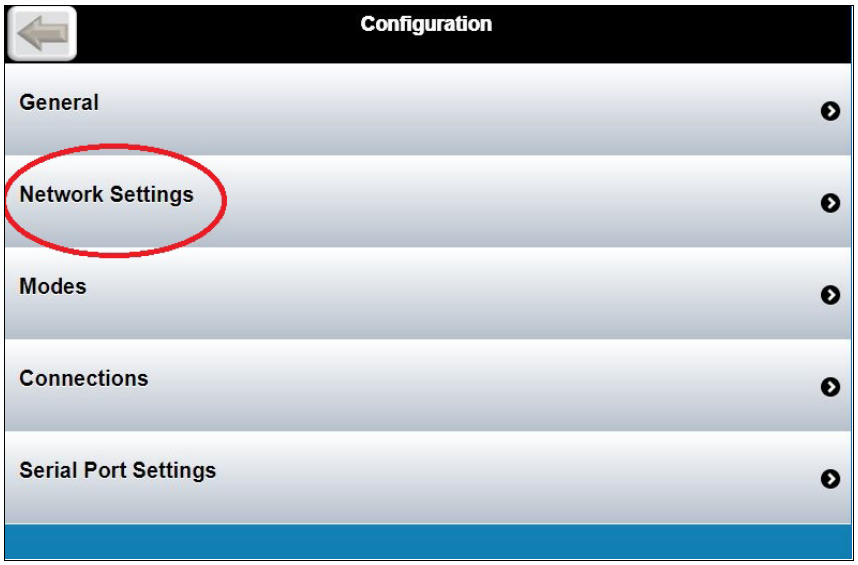
8. Enter the Level 4 pin. The default is 4444.

Figure 154: Changing the Internal IP Address (ST, QT, and N4 Models), Step 8



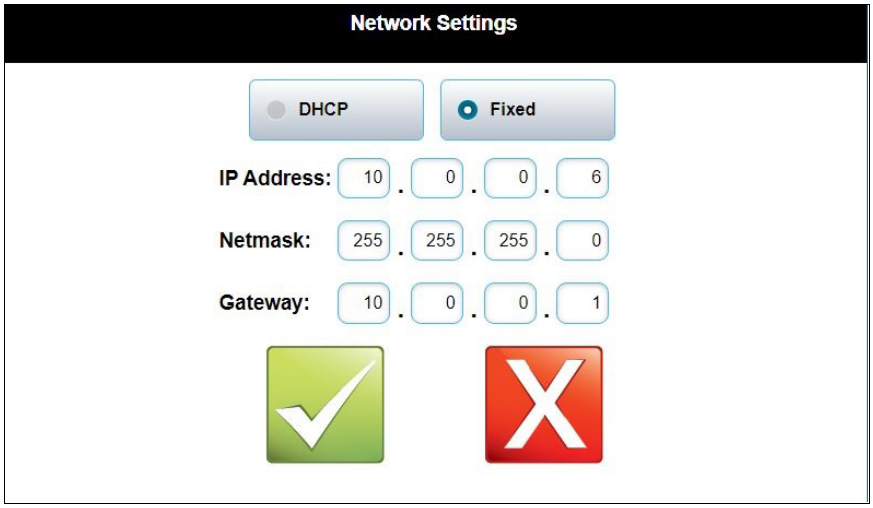
9. Select Network Settings.

Figure 155: Changing the Internal IP Address (ST, QT, and N4 Models), Step 9



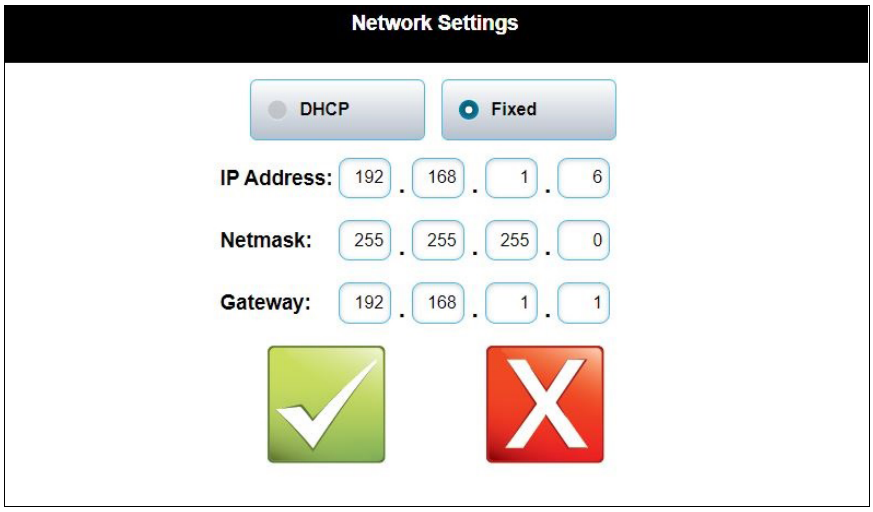
The current IP address of the THMI and programmed gateway is displayed.

Figure 156: Current IP Address of THMI and Programmed Gateway



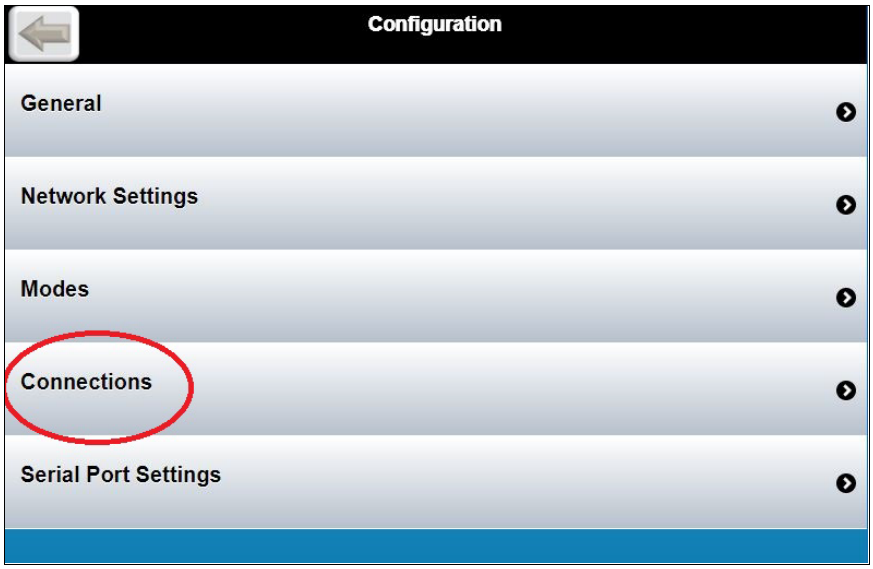
10. Change them to the desired new IP settings like the example below. Use the new AccuLoad IV IP address as the Gateway. Once completed, select Accept.

Figure 157: Changing IP Settings



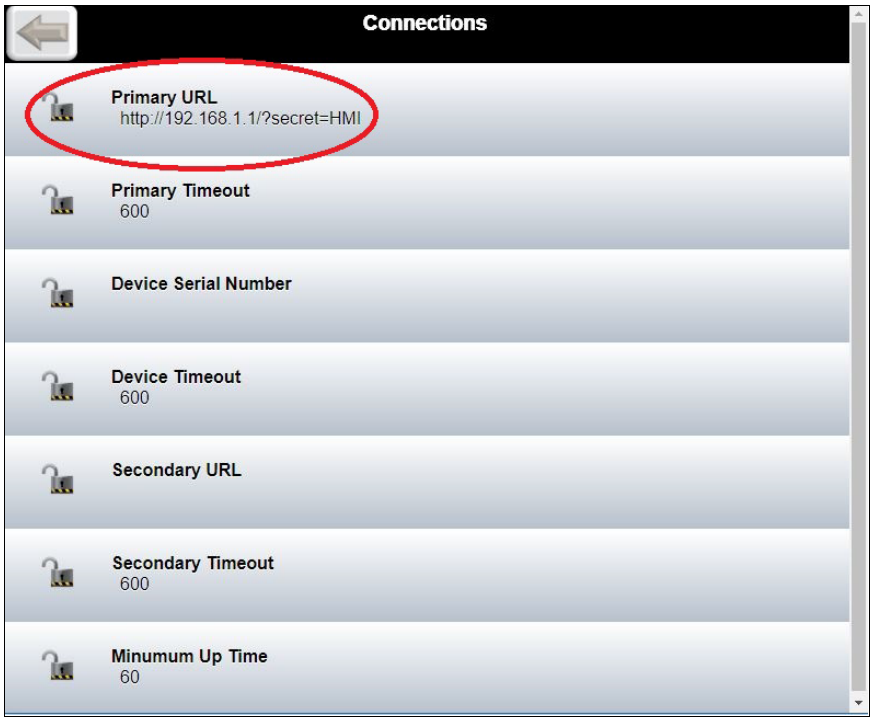
11. You will be returned to the Configuration screen. Select Connections.

Figure 158: Pressing Connections from the Configuration Screen



12. Select Primary URL.

Figure 159: Selecting Primary URL



13. Change the Primary URL to reflect the new AccuLoad IV IP address preserving all other content in the Primary URL.
14. Select the back arrow in the top right corner of the screen to ensure all settings have saved.
15. Once these steps are completed, power down the entire AccuLoad IV for one minute and re-apply power. The new IP settings should take effect.

6.2.2 SA Model

1. Determine all of the IP addresses to be used for the system.
   - A unique internal IP address will be needed for each board set in the system.
   - A unique THMI IP address will be needed for the board set connected to the MMI A.
   - A unique THMI B IP address will be needed for the board set connected to MMI B (if applicable).
   - The same class of IP address must be used for each parameter.

     Example: This example assumes a three board set system—SAA, SAB, and SAC—with two MMIs.

a. Board set SAA

- Internal address—192.168.0.2
- THMI IP address—192.168.0.6
- THMI B IP address—0.0.0.0 (the MMI is not connected to board set SAA)

b. Board set SAB

- Internal IP address—192.168.0.3
- THMI IP address—0.0.0.0 (the MMI is not connected to board set SAB)
- THMI B IP address—0.0.0.0 (the MMI is not connected to board set SAB)

c. Board set SAC

- Internal IP address—192.168.0.4
- THMI IP address—0.0.0.0 (the MMI is not connected to board set SAC)
- THMI B IP address—192.168.0.7

2. From the Run Ready Screen, select the Main button, then select the desired board set from the Board Selector popup.
3. Navigate to Program Mode>System>Communications>Host Interface and scroll to the bottom of the list.
4. Change the following parameters' IP addresses to the addresses listed below.

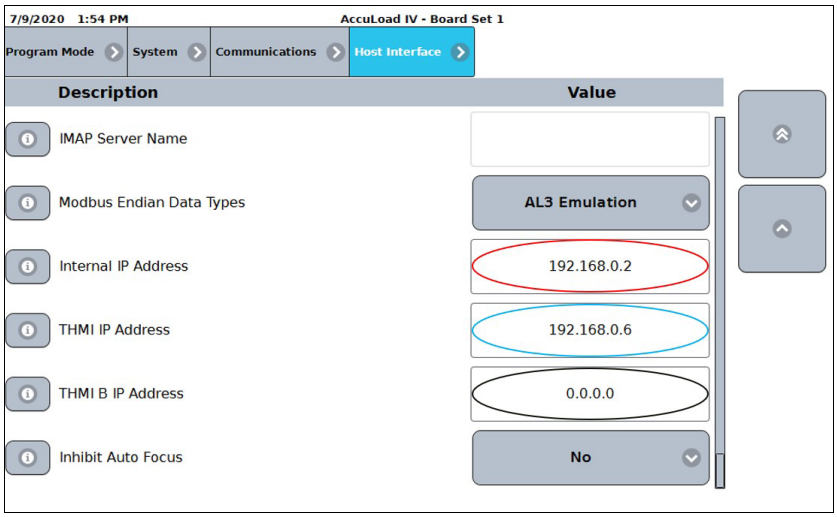
   - Parameters 1720 internal IP address
   - Parameter 1721 THMI IP address (if MMI A is connected to the board set)
   - Parameter 1722 THMI B IP address (if MMI B is connected to the board set) from the default values to the values determined in Step 1.

   See the following board set examples:

   a. Board set SAA as listed below and shown in Figure 160: Changing the IP Address, SA Model, Board Set SAA on the next page:

      - Internal IP Address—192.168.0.2
      - THMI IP Address—192.168.0.6
      - THMI B IP Address—0.0.0.0

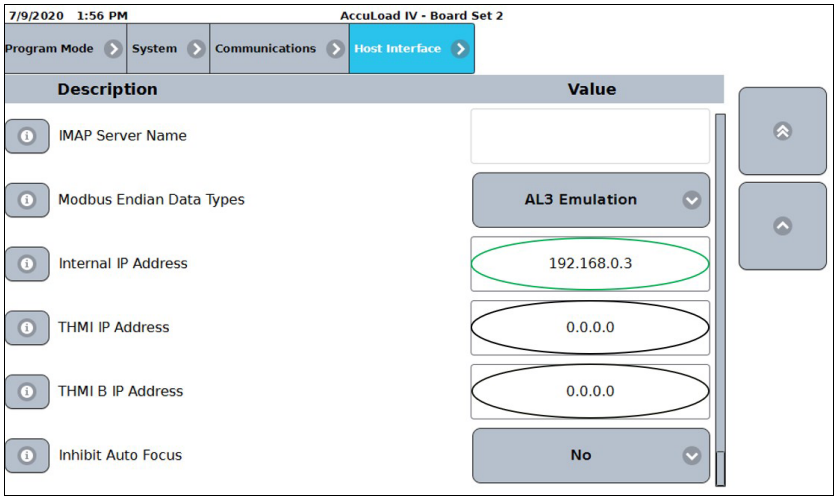
Figure 160: Changing the IP Address, SA Model, Board Set SAA



b. Board set SAB as listed below and shown in Figure 161: Changing the IP Address, SA Model, Board Set SAB below:

- Internal IP Address—192.168.0.3
- THMI IP Address—0.0.0.0
- THMI B IP Address—0.0.0.0

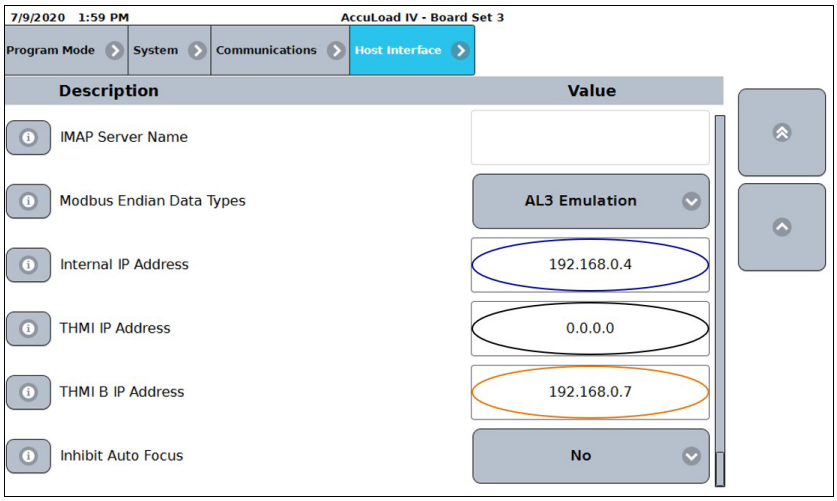
Figure 161: Changing the IP Address, SA Model, Board Set SAB



c. Board set SAC as listed below and shown in Figure 162: Changing the IP Address, SA Model, Board Set SAC on the next page:

- Internal IP Address—192.168.0.4
- THMI IP Address—0.0.0.0
- THMI B IP Address—192.168.0.7

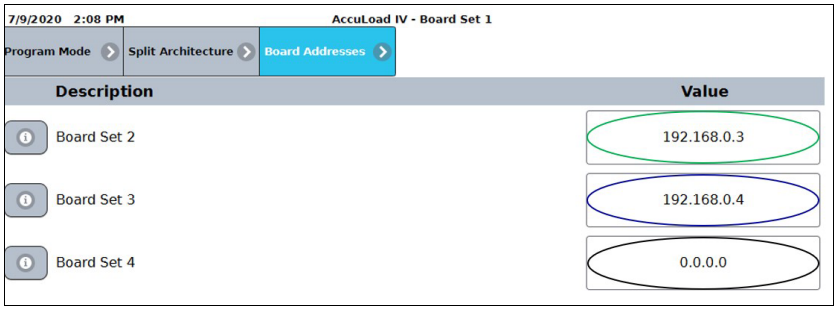
Figure 162: Changing the IP Address, SA Model, Board Set SAC



5. While still in Program Mode, navigate to Split Architecture>Board Addresses.
6. Update the following parameters with the internal IP addresses from the other board sets in the system:
   - Parameter 1611 Board Set 2
   - Parameter 1612 Board Set 3
   - Parameter 1613 Board Set 4

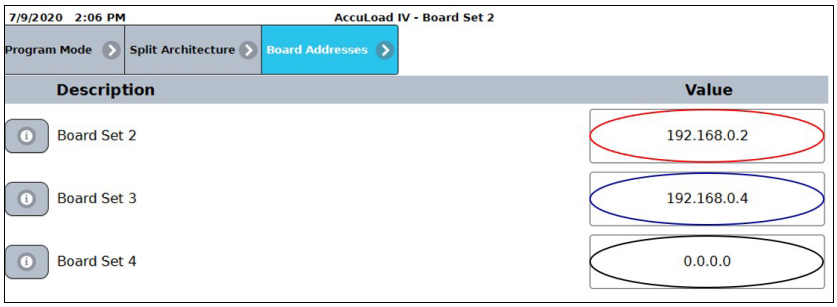
   See the following board set examples:
   - Board set SAA as listed below and shown in Figure 163: Board Set SAA IP Addresses below:
     - Board Set 2—192.168.0.3
     - Board Set 3—192.168.0.4
     - Board Set 4—0.0.0.0

Figure 163: Board Set SAA IP Addresses



- Board set SAB as listed below and shown in Figure 164: Board Set SAB IP Addresses below:
  - Board Set 2—192.168.0.2
  - Board Set 3—192.168.0.4
  - Board Set 4—0.0.0.0

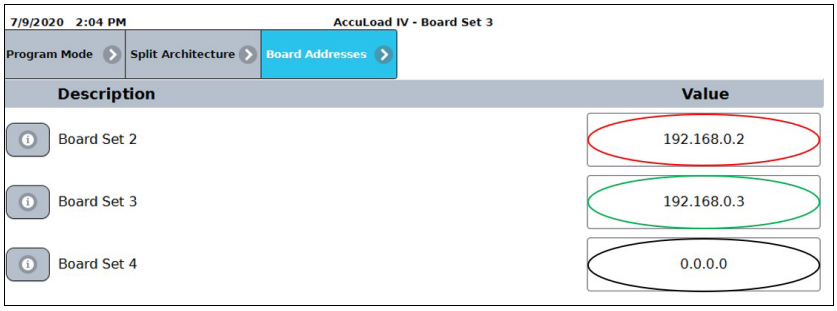
Figure 164: Board Set SAB IP Addresses



- Board set SAC as listed below and shown in Figure 165: Board Set SAC IP Addresses below:

1. Board Set 2—192.168.0.2 Board Set 3—192.168.0.3 Board Set 4—0.0.0.0

Figure 165: Board Set SAC IP Addresses

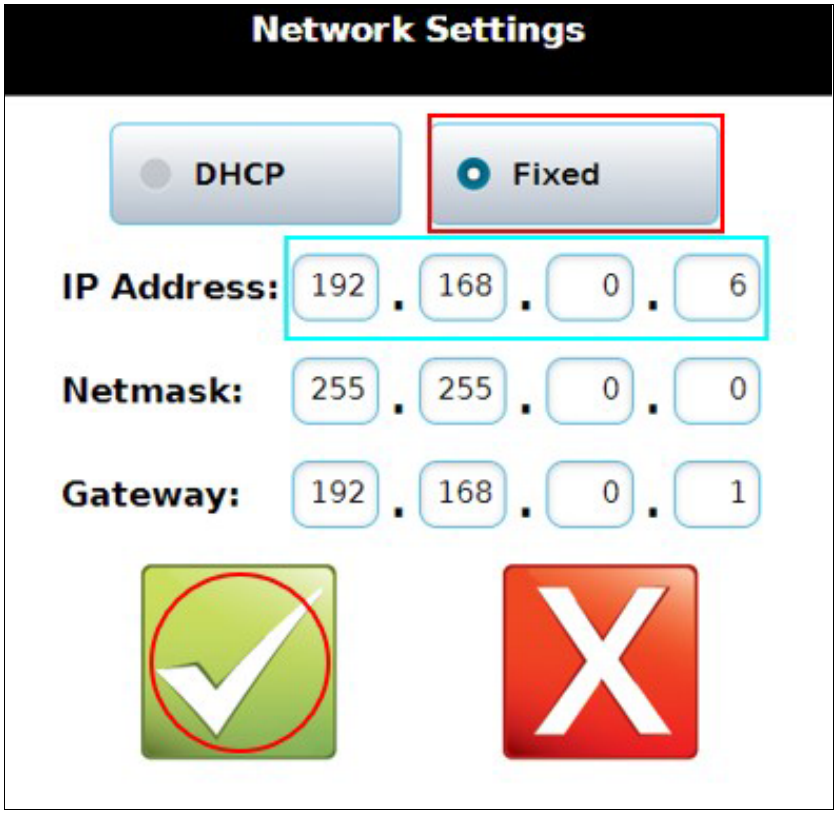


7. Exit Program Mode and save changes.
8. Using the MMIs, navigate to the Main Menu on the board set connected to the MMI. From there, navigate to Device Settings>MMI Settings.
9. Once the MMI menu is shown, select Configuration and Login.
   - Default pin: 4444
10. Navigate to Network Settings.
11. Update the IP Address to use the THMI IP address or the THMI B IP address entered on Board Sets that are connected to the MMIs. Save the changes.

See the following board set examples and update IP address, Netmask, and Gateway:

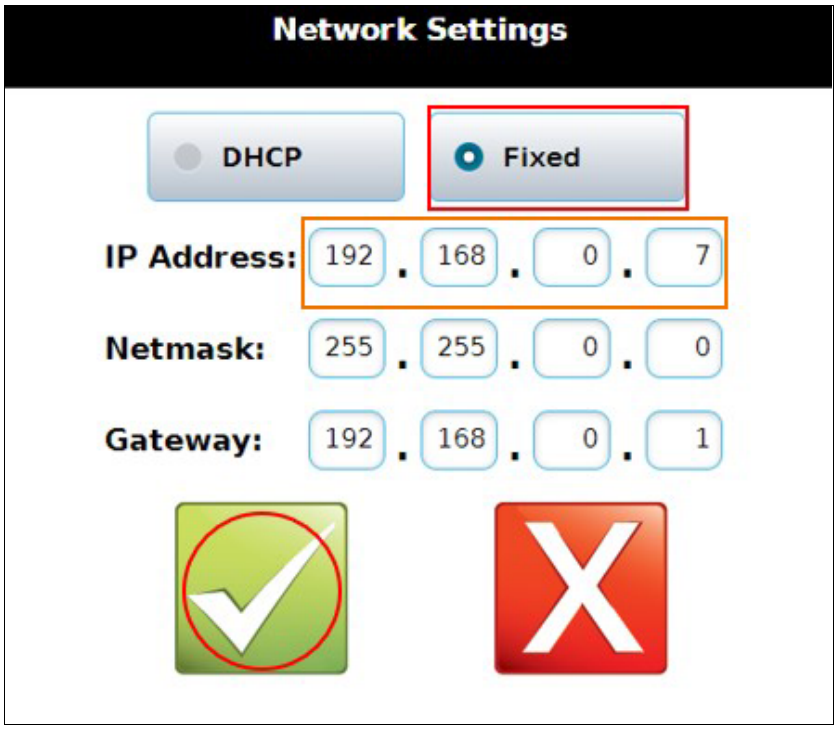
- MMI A
  - IP Address—192.168.0.6
  - Netmask—255.255.0.0
  - Gateway—192.0.0.1

Figure 166: Changing the Internal IP Address of the SA Model, Network Settings MMI A



- MMI B
  - IP Address—192.168.0.7
  - Netmask—255.255.0.0
  - Gateway—192.0.0.1

Figure 167: Changing the Internal IP Address of the SA Model, Network Settings MMI B

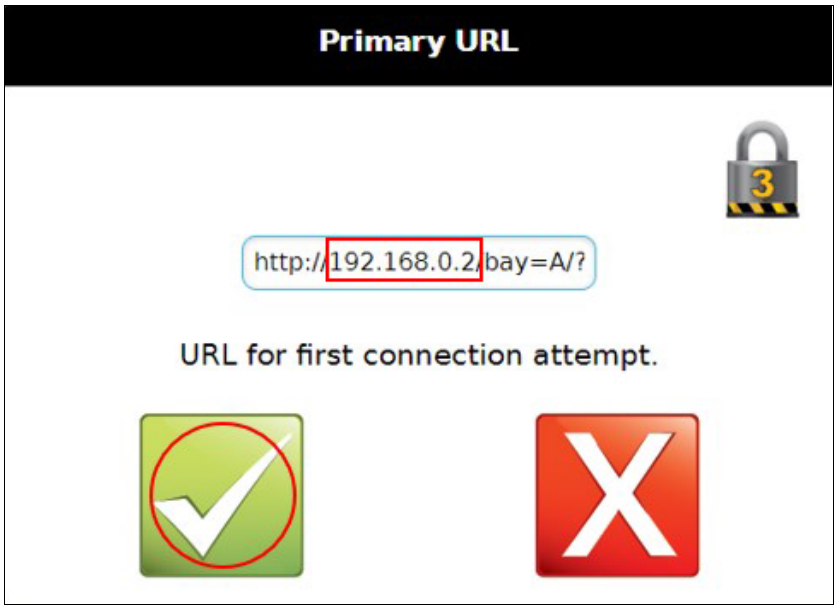


12. Navigate to the Connections settings.
13. Select Primary URL.
14. Update the URL to use the internal IP address to the Board Set connected to the MMI.

    Examples:

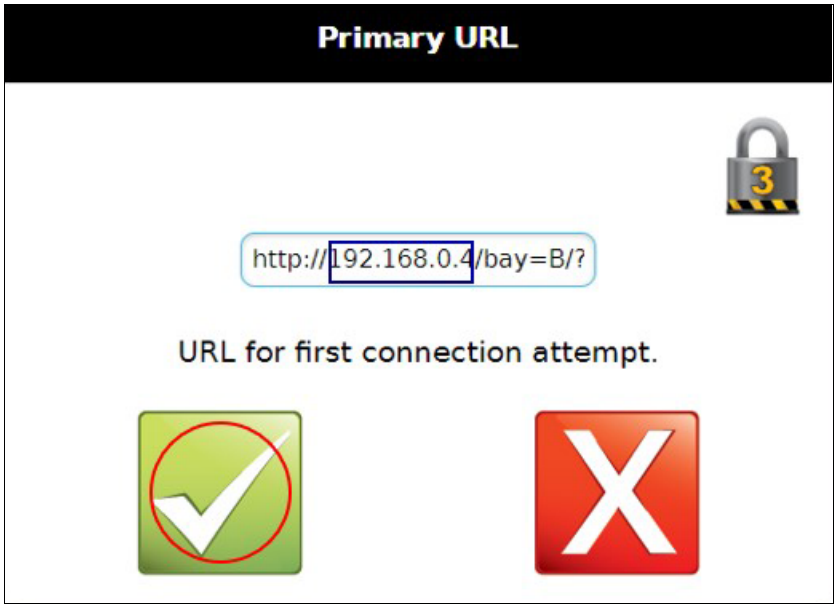
    - MMI A (either URL is valid):
      - http://192.168.0.2/?secret=HMI
      - http://192.168.0.2/bay=A/?secret=HMI

Figure 168: Changing the Internal IP Address of the SA Model, Primary URL 1



- MMI B:
  - http://192.168.0.4/bay=B/?secret=HMI

Figure 169: Changing the Internal IP Address of the SA Model, Primary URL 2



15. Return to the Main Menu for the MMI.
16. The AccuLoad must be restarted for all of the changes to be implemented.

6.3 Touch Screen Recalibration Procedures

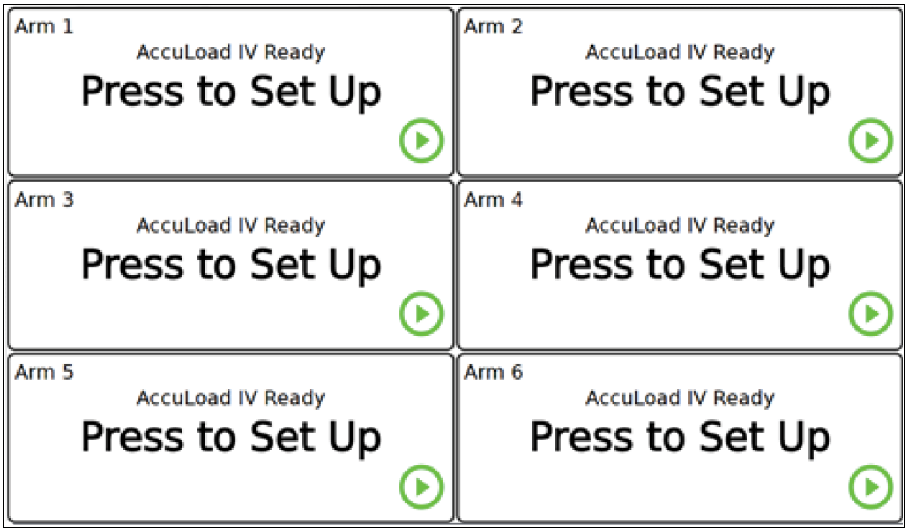
6.3.1 Equipment and Other Requirements

A nylon stylus MFG: FTDI PN: VA-FC-STYLUS1 or equivalent should be used on the screen.

> **Warning:** Do not use a pen, screwdriver, or any other sharp object as this may damage or destroy the screen.

6.3.2 Accessing the Display Module Menu Through the AccuLoad IV Menu

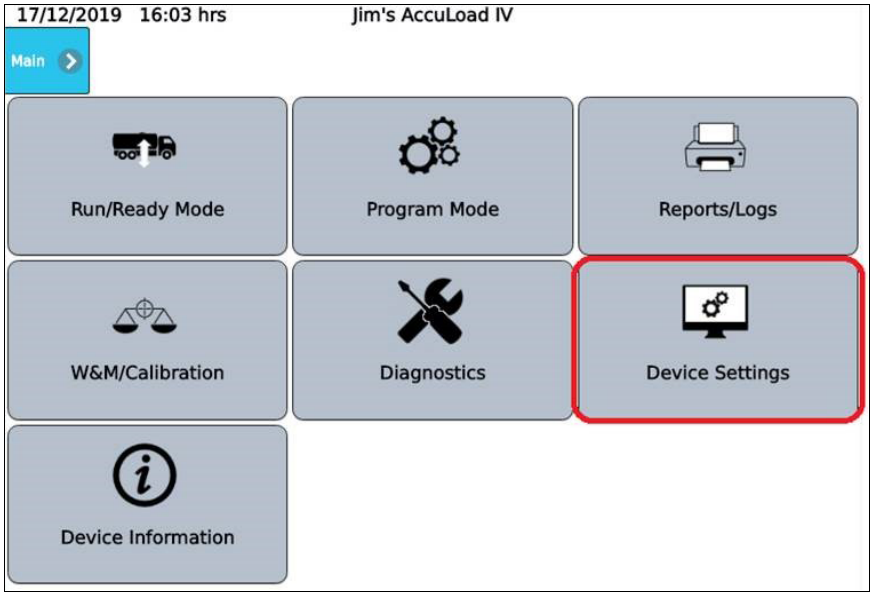
Figure 170: Display Module Menu



The following steps describe how to access the display module menu:

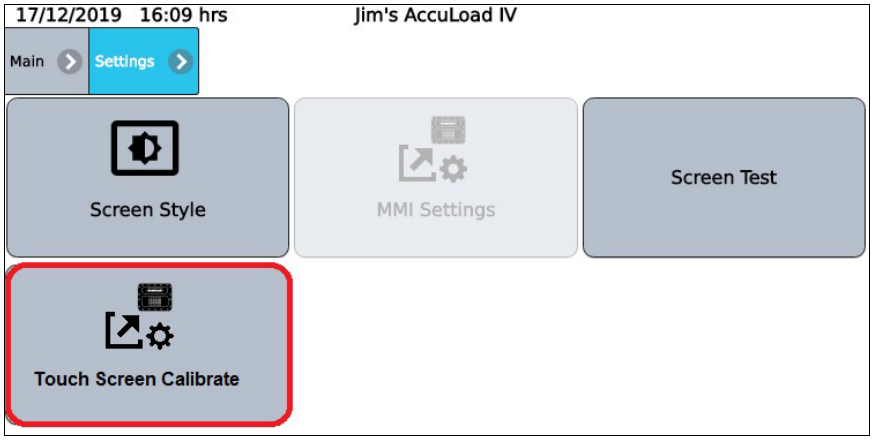
1. From the Run/Ready Mode screen, go to the Main menu.

Figure 171: Device Settings Main Menu



2. Select the Device Settings menu.
3. If firmware is revision 0.10 or higher, there will be a Touch Screen Calibration button on this menu. Select that button to begin the process.

Figure 172: Device Settings Main Menu Touch Screen Calibration



4. For firmware older than 0.10, select the MMI Settings button and wait for the Display Module menu to appear. If the menu does not appear after a short time, you may have to restart the Display Module as follows:

a. Power down the AccuLoad IV unit.

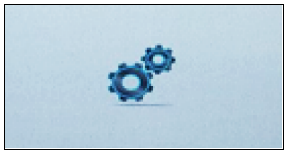
b. Remove the front cover bolts and open the unit.

c. Remove the Ethernet cable that connects the THMI to the A4M board.

d. Re-apply power to the unit. While the THMI is booting, a gear icon will display momentarily.

e. Press the gears button to access the Display Module Main menu.

Figure 173: Display Module Main Menu, Gears



f. Proceed to the Recalibration procedure below.

6.3.3 Display Module Touch Screen Recalibration Procedure

Follow these steps to recalibrate the display module touchscreen:

1. Select Touch Screen Calibration from the Maintenance menu.

Figure 174: Maintenance Menu

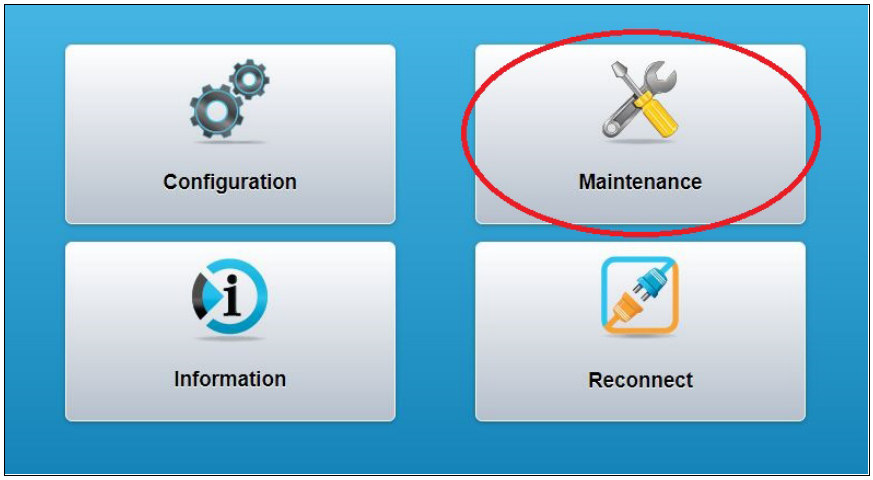
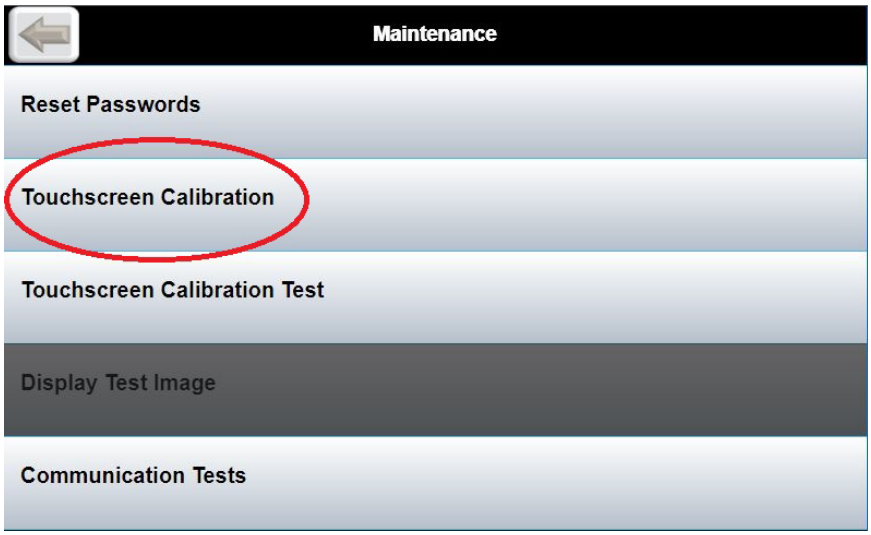


Figure 175: Touchscreen Calibration from Maintenance Menu



2. Log in at Security Level 4 using the 4-digit pin 4444. Upon successful login, the calibration utility will appear.

Figure 176: Login at Security Level 4

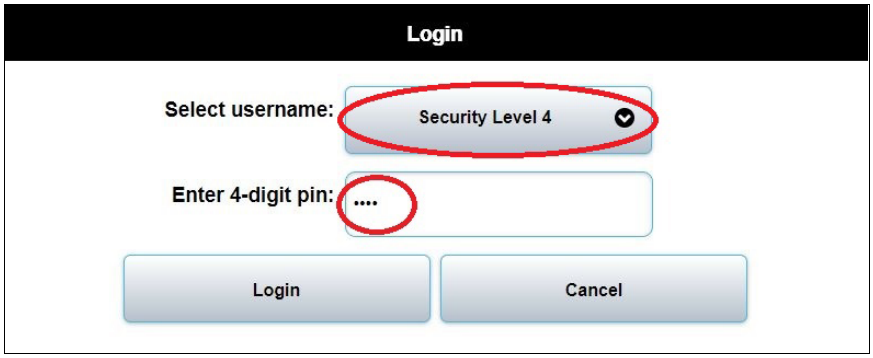
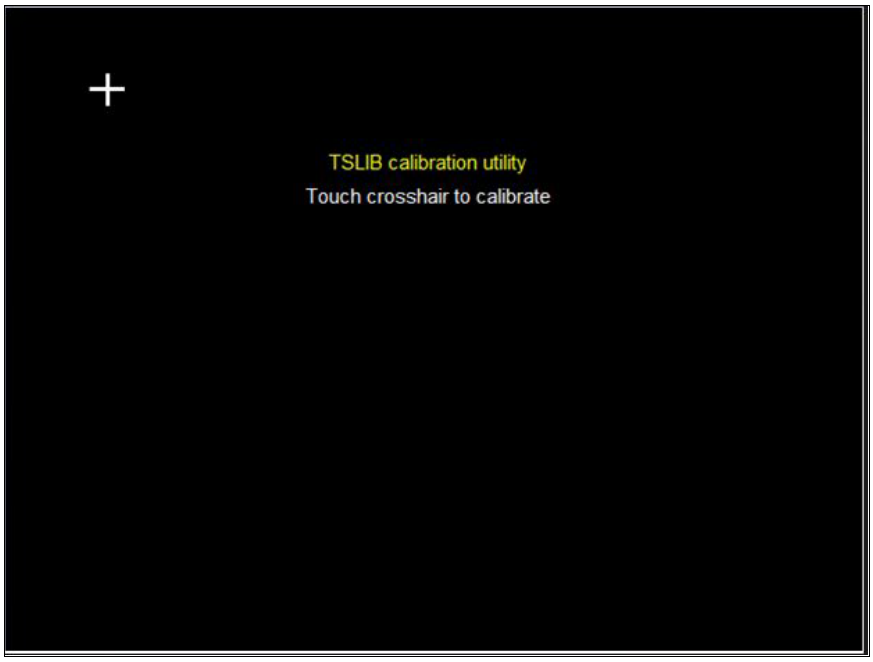
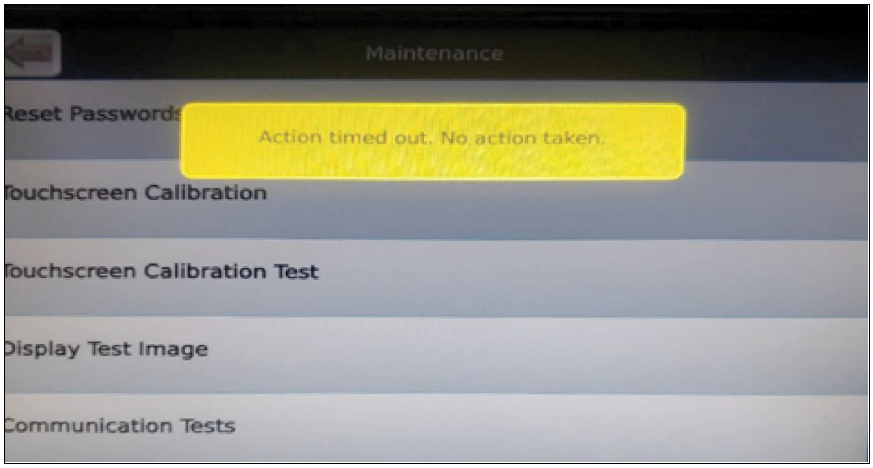


Figure 177: TSLIB Test Program



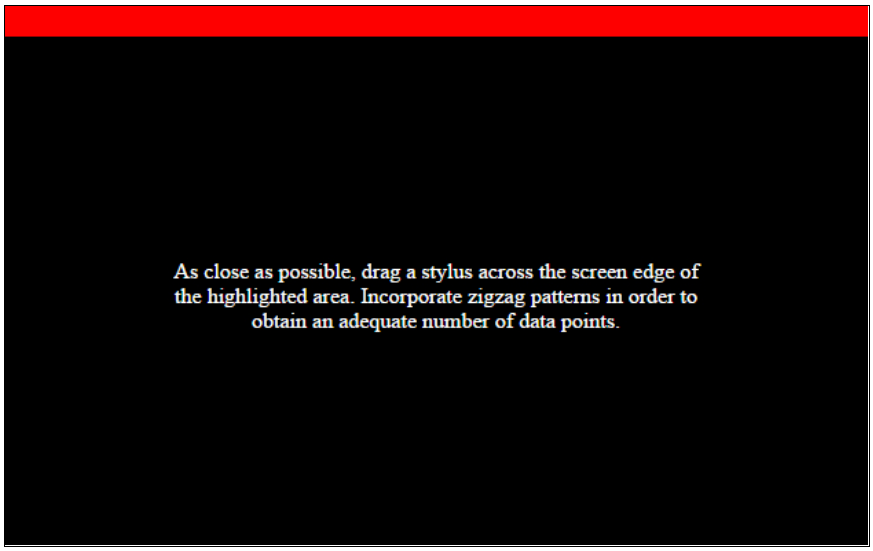
3. Calibrate by touching the cursor with the stylus in each of the five positions when prompted. If this fails, restart calibration utility then launch the low-level calibration by firmly pressing the same location on the TSLIB calibration utility screen five times.

Figure 178: Action Timed Out



A red bar will be displayed on the LCD.

Figure 179: Red Bar on LCD



4. Using an approved stylus (nylon stylus MFG: FTDI PN: VA-FC-STYLUS1 or equivalent) tap the screen moving across the red bar from one corner of the display to the other (try to keep as close to the edge of the LCD as possible).

   Once enough touch points are received, the red bar will be displayed on a new edge. Once all four sides have been calibrated, the process is complete.

6.3.4 Alternate Methods to Initiate a Calibration (If the touch screen is unresponsive)

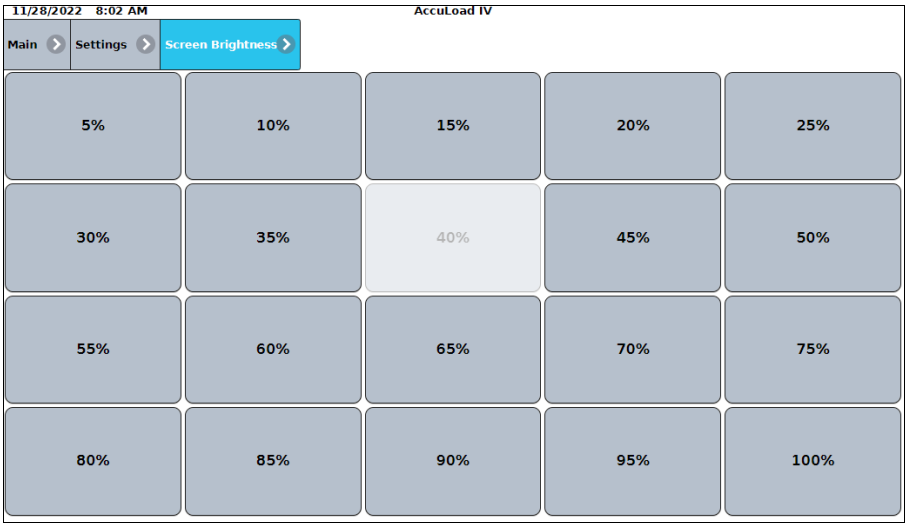
1. Try to initiate calibration using a remote browser.
2. Issue a TC_cal communications command via Smith host protocol.
3. Trigger calibration via internal DIP Switch.

6.4 Screen Brightness

In firmware revision AccuLoad IV 1.5 and higher, in AccuLoad IV units with the high contrast display (red vs. blue box for THMI display electronics), the user can select the screen brightness through this menu. The brightness level can be set between 5% and 100% in 5% increments. The default brightness is 40%.

> **Note:** Increasing the screen brightness will reduce the amount of power available to supply external DC devices.

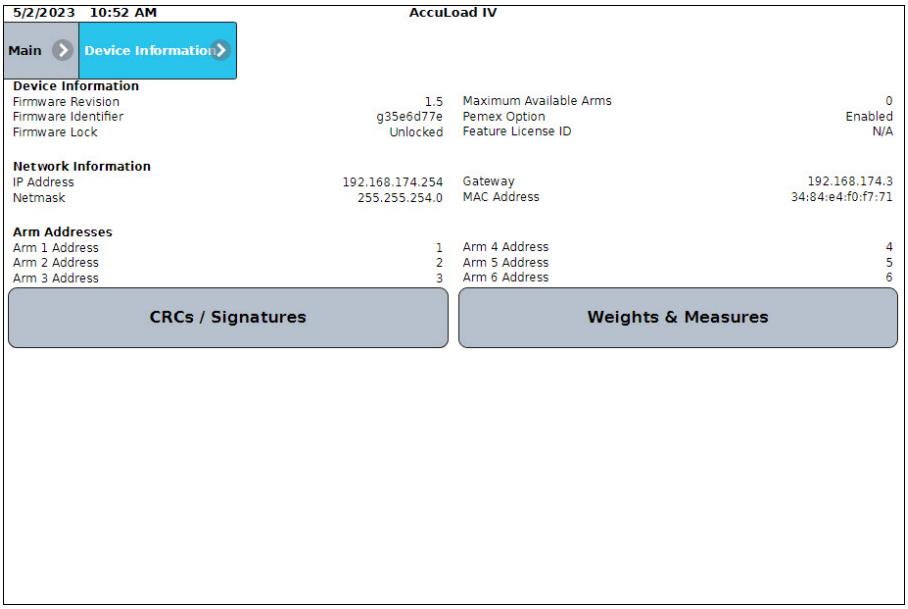
Figure 180: Screen Brightness

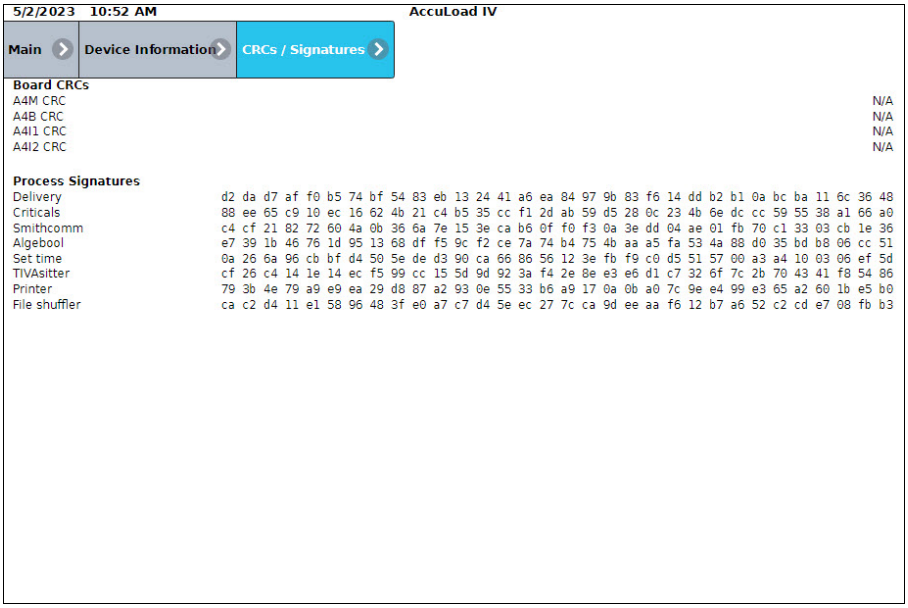


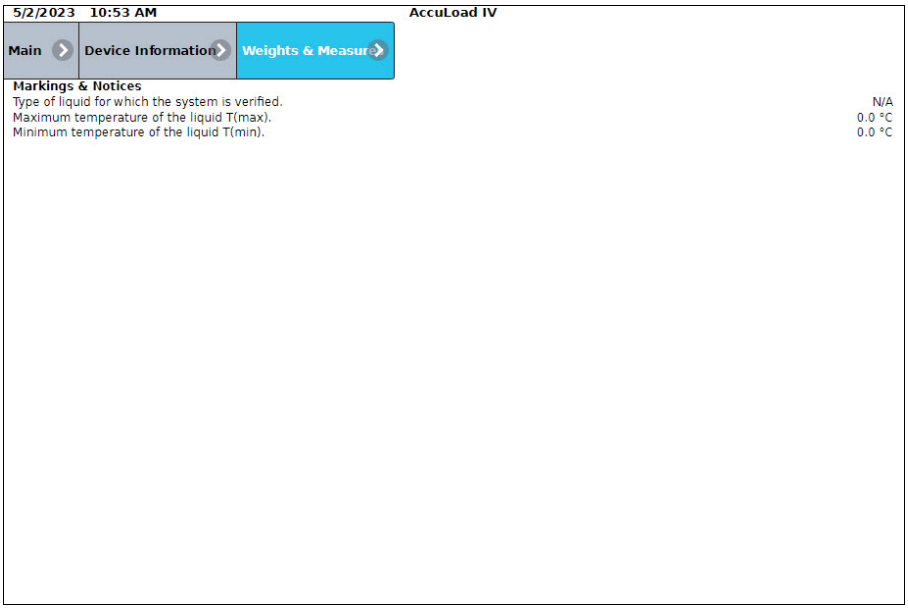
7 Device Information

Device Information provides details about the AccuLoad IV firmware and software as shown in the following screen:

Figure 181: Device Information Screen






5/2/2023 10:53 AM
AccuLoad IV
Main
Device Information
Weights & Measure
Markings & Notices
Type of liquid for which the system is verified.
N/A
Maximum temperature of the liquid T(max).
0.0 °C
Minimum temperature of the liquid T(min).
0.0 °C

8 Program Mode Reference

The program mode reference section describes the individual program codes within the directories. The directories and subdirectories are listed above each set of parameters. Please note that the numbers in parentheses are reference numbers for communications. In the database, pick list items have a reference number for communications, for example, (2). Through communications, a 2 would be sent to the AccuLoad to select that option for the parameter.

The program code explanations frequently list fatal or critical warnings, or indicate that in some circumstances, the code is no entry. A fatal warning is triggered by a selection that the AccuLoad cannot accept and will not allow to be entered. Possible causes include an entry that falls outside an allowable range or an entry that seriously conflicts with a previous entry. A critical warning signals that a selection is incompatible with a previously configured program code. The AccuLoad will accept the new entry, but the conflict will have to be resolved prior to operation.

The main system directories are as follows:

Configuration (Config) Directories

000—System Layout
100—Pulse Inputs
200—Pulse Outputs
300—Digital Inputs
500—Digital Outputs
900—Analog I/O

System Directories
100—General Purpose
200—Flow Control
300—Volume Accuracy
400—Temperature/Density
500—Pressure
600—Alarm Configuration
700—Communications
800—Additive
Security

Bay Directories
100—General Purpose

700—Communications

Arm Directories
100—General Purpose
200—Flow Control
300—Volume Accuracy
700—Communications

Meter Directories (Located in the Load Arm directory)
200—Flow Control
300—Volume Accuracy
400—Temperature/Density
500—Pressure

Product Directories (Located in the Load Arm directory)
100—General Purpose
200—Flow Control
300—Volume Accuracy
400—Temperature/Density
500—Pressure

Recipe Directories
Product Blend
Recipe Additives

Split Architecture Directories

> Shaded areas are new to the AccuLoad IV.

8.1 Configuration Directories

8.1.1 000—System Layout Directory

000—System Layout Directory includes:

- Number of Load Arms
- Arm 1 - 6 Configuration
- Arm 1 - 6 Number of Products
- Arm 1 - 6 Ratio Products
- A4B Available

- A4I Available
- Board Set Number
- Board Set Function

Configuration: System Layout: Number of Load Arms **Configuration—001**	Index: None	Range: • AccuLoad ST—1-2 • AccuLoad QT—1-6
Description: This parameter defines the number of load arms associated with this AccuLoad.		
Criticals: • Insufficient meter pulse inputs—A4B required. • Configuration requires more meters than are available.		
Fatal: Entry is out of specified range.		

Configuration: System Layout: Arm **Configuration—See Table 10: System Layout Configurations on the next page.**	Index: Arm	Range: 0 - 6 Default: (0) Straight Product Arm
Description: These parameters determine the functionality of each arm. Selection: • (0) Straight Product Arm • (1) Sequential Blending Arm • (2) Ratio Blending Arm • (3) Side-Stream Blender • (4) Unloading • (5) Hybrid Blending • (6) Straight with VRS		
Critical: Unloading requires inputs DE head high flow, low flow, and stop.		

Configuration: System Layout: Arm Number of Products **Configuration—See Table 10: System Layout Configurations on the next page.**	Index: Arm	Range: 1 - 6 Default: (1)
Description: This parameter defines the number of products assigned to the arm.		
Criticals: • Straight-product configuration requires single product. • Ratio-blending configuration requires more than one product. • Block valves required for all products (sequential blending configuration). • Configuration requires more meters than are available. • Number of products must be two when side-stream blending. • Ratio blending limited to two products. • Straight with VRS requires this parameter to be programmed to 2.		

Configuration:System Layout:Arm Number of Ratio Products **Configuration—See Table 10: System Layout Configurations on the next page.** **Hybrid-Type Blending Arms Only**	Index: Arm	Range: 1 - 6

Description: The parameter specifies the number of products on a hybrid load arm that do not share a meter. Product runs with separate metering, whether upstream or downstream of a shared meter, are considered ratio products. Each ratio product for the hybrid arm requires a digital or analog valve for flow control. Each sequential product requires a block valve unless there is only one sequential product. This parameter does not require an entry if the loading arm is not programmed as a hybrid loading arm.
Criticals: • Control valves required for all hybrid arm ratio products. • Block valves required for all hybrid arm sequential products (if more than one sequential product). • Entry for the ratio products must be less than arm number of products.

Table 10: System Layout Configurations

System Layout	Arm Configuration	Arm Number of Products	Arm Number of Ratio Products
Arm 1	002	003	014
Arm 2	004	005	015
Arm 3	006	007	016
Arm 4	008	009	017
Arm 5	010	011	018
Arm 6	012	013	019

Configuration: System Layout: A4B Available **Configuration—1000**	Index: None	Range: Yes/No
Description: This parameter should be set to No for the AccuLoad ST and N4 models which do not have an A4B module. It should be set to Yes for the AccuLoad QT and SA models which have the A4B module. Selections: • No—for the AccuLoad ST and N4 models which do not have an A4B module. • Yes—for the AccuLoad QT and SA models which have the A4B module.		
Help: Enter No for ST and N4 models, enter Yes for QT and SA models.		

Configuration: System Layout: A4I Available **Configuration—1001**	Index: None	Range: • None • One A4I board • Two A4I boards
Description: This parameter must be set to indicate the number of optional A4I modules installed in the unit. Selections: • No (None) • One board • Two boards		

Configuration: System Layout: Board Set Number **Split Architecture Only Configuration—1002**	Index: None	Range: 0 - 99
Description: This parameter must be set to the number of board sets in the system.		

Configuration: System Layout: Board Set Function **Configuration—1003**	Index: None	Range:

Description: Select if this AccuLoad board set is standalone or part of a split architecture configuration. Selections: • No Split Arch—Used for the ST, QT, and N4 models • No HMI—Used for a board set in split architecture that does not have an MMI connected to it • HMI A—Used for a board set in split architecture that has MMI A connected to it • HMI B—Used for a board set in split architecture that has MMI B connected to it • Dual HMI—Used for a single board set with two MMIs
Help: See section 8.8: Split Architecture Directories on page 243 for additional split architecture parameters.

8.1.2 100—Pulse Inputs Directory

100—Pulse Inputs Configuration Directory includes:

- Pulse Input Tag
- Pulse Input Function
- Pulse Input Arm
- Pulse Input Meter

The AccuLoad ST and N4 models have a total of eight pulse inputs available for use. The AccuLoad QT model supports up to 14 pulse inputs. The AccuLoad automatically assigns pulse inputs for the product meters. Only pulse inputs not required for the product meters are user configurable. Because the AccuLoad must have at least one product meter input, at a minimum pulse inputs 1 and 2 are reserved for connection to a product meter.

8.1.2.1 Pulse Inputs 3 - 14

The configurable Pulse Input parameters include Tag, Function, Pulse Input Arm, and Pulse Input Meter.

This section describes the parameters which are used to configure the pulse inputs.

Configuration: Pulse Inputs: Pulse Input Tag **Configuration—See Table 11: Pulse Inputs Configurations on the next page.**	Index: Pulse Input	Range: 20 characters maximum
Description: The tag will be used as the label for this pulse input. The default tag describes the connection terminals associated with this pulse input.		

Configuration: Pulse Inputs: Pulse Input Function **Configuration—See Table 11: Pulse Inputs Configurations on the next page.**	Index: Pulse Input	Range:
Description: This parameter defines the purpose of this pulse input. Selections: • (0) NA • (1) Frequency Densitometer • (2 - 5) Meter Inector 1 - 4 • (6 - 9) Flow Rate Controlled Injector 1 - 4		

Criticals: • Input assignments must be unique. • Injector I/O assignment does not match type. • No digital output assigned for this injector. • This input cannot be a frequency densitometer. • Pulse input already allocated for meter pulses. • Insufficient configurable pulse inputs (no A4B). • Only one densitometer allowed per arm/meter.

Configuration: Pulse Inputs: Pulse Input Arm **Configuration—See Table 11: Pulse Inputs Configurations below.**	Index: Pulse Input	Range: 0 - 5
Description: This parameter identifies which arm the pulse input is associated with. For example, if a pulse input is designated as a metered injector, this parameter will define which arm the metered injector is associated. Selections: • (0) Arm 1 • (1) Arm 2 • (2) Arm 3 • (3) Arm 4 • (4) Arm 5 • (5) Arm 6		
Criticals: • Load arm not configured. • Only one densitometer allowed per arm/meter.		

Configuration: Pulse Inputs: Pulse Input Meter **Configuration—See Table 11: Pulse Inputs Configurations below.**	Index: Pulse Input	Range: 0 - 5
Description: Pulse input 1 - 14 can be assigned to one of the following meters: Selection: • (0) Meter 1 • (1) Meter 2 • (2) Meter 3 • (3) Meter 4 • (4) Meter 5 • (5) Meter 6		
Criticals: • Meter not configured. • Only one densitometer allowed per arm/meter.		

Table 11: Pulse Inputs Configurations

Pulse Input	Pulse Input Tag	Pulse Input Function	Pulse Input Arm	Pulse Input Meter
1	1100	1101	1102	1103
2	1104	1105	1106	1107
3	1108	103	104	105
4	1109	107	108	109
5	1110	111	112	113

Pulse Input	Pulse Input Tag	Pulse Input Function	Pulse Input Arm	Pulse Input Meter
6	1111	115	116	117
7	1112	119	120	121
8	1113	123	124	125
9	1114	127	128	129
10	1115	131	132	133
11	1116	135	136	137
12	1117	139	140	141
13	1118	1119	1120	1121
14	1122	1123	1124	1125

Shaded areas are new to the AccuLoad IV

8.1.3 200—Pulse Outputs Directory

8.1.3.1 Pulse Outputs 1 - 5

200—Pulse Outputs Configuration Directory includes:

- Pulse Output Tag
- Pulse Output Arm
- Pulse Output Meter
- Pulse Output Pulses/Amount
- Pulse Output Units
- Pulse Output Maximum Frequency

Configuration: Pulse Outputs: Pulse Output Tag **Configuration—See Table 12: Pulse Outputs Configurations on page 137.**	Index:	Range: 20 characters maximum
Description: This parameter defines the tag associated with this pulse output used on diagnostic screens. The default tag is the terminal connections associated with this pulse output, for example, A4M TBK4:7,8.		

Configuration: Pulse Outputs: Pulse Output Arm **Configuration—See Table 12: Pulse Outputs Configurations on page 137.**	Index:	Range: 0 - 6

Description: This program code sets which arm this output represents. The output will be active when flow is active during a batch, and represents volume. The number of pulses is determined by Configuration 203 – Pulse/Volume, and volume type is determined by Configuration 204 – Pulse Out Units. Selections: • (0) Not used • (1) Arm 1 Pulses • (2) Arm 2 Pulses • (3) Arm 3 Pulses • (4) Arm 4 Pulses • (5) Arm 5 Pulses • (6) Arm 6 Pulses
Critical: Load arm not configured.

Configuration: Pulse Output: Pulse Output Meter **Configuration—See Table 12: Pulse Outputs Configurations on the next page.**	Index:	Range: 0 - 6
Description: This parameter defines the meter associated with this pulse output. Selections: • (0) Combined Meters (Ratio Blending Only) • (1) Meter 1 Pulses • (2) Meter 2 Pulses • (3) Meter 3 Pulses • (4) Meter 4 Pulses • (5) Meter 5 Pulses • (6) Meter 6 Pulses		

Configuration: Pulse Output: Pulse Output Pulse/Amount **Configuration—See Table 12: Pulse Outputs Configurations on the next page.**	Index:	Range: 0.00 - 999.99
Description: This five-digit parameter defines the pulse output resolution, the number of pulses per unit of volume to be generated. For example, 0.1 will output one pulse for every 10 units of volume.		

Configuration: Pulse Output: Pulse Output Units **Configuration—See Table 12: Pulse Outputs Configurations on the next page.**	Index: Pulse Output	Range: 0 - 4
Description: This parameter defines the volume type used to pace the pulse output. Selections: • (0) IV (Indicated Volume or Raw) • (1) GV (Gross) • (2) GST (Gross Standard Temperature) • (3) GSV (Gross at Standard Temperature and Pressure) • (4) Mass		
Critical: Selected units not available.		

Configuration: Pulse Output: Pulse Output Maximum Frequency **Configuration—See Table 12: Pulse Outputs Configurations below.**	Index: Pulse Output	Range: 0 - 3500 hertz
Description: This four-digit entry limits the pulse output frequency for Pulse Output #1 to a fixed range (0 to 3500 Hz) to avoid over-speeding the device attached to the pulse output. All of the intended pulses will eventually be transmitted; the total period will be increased if required to ensure the correct number of pulses is output. A (0) entry disables this feature.		
Fatal: Entry is out of specified range.		

Table 12: Pulse Outputs Configurations

Pulse Output	Pulse OP Tag	Pulse OP Arm	Pulse OP Meter	Pulse OP Pulse/Amount	Pulse OP Pulse Units	Pulse OP Maximum Frequency
OP 1	1200	201	202	203	204	205
OP 2	1201	206	207	208	209	210
OP 3	1202	211	212	213	214	215
OP 4	1203	216	217	218	219	220
OP 5	1204	221	222	223	224	225

Shaded area is new to the AccuLoad IV.

8.1.4 300—DC and AC Digital Input Function Directories

Refer to the AccuLoad IV Installation and Maintenance manual (MN06201) for terminal assignments.

8.1.4.1 Digital Inputs 1 - 43

300—Pulse Inputs Configuration Directory includes:

- Digital Input Tag
- Digital Input Function
- Digital Input Arm
- Digital Input Product

The availability of the digital inputs depends on the hardware being used in the AccuLoad. The inputs available are as follows:

Table 13: DC and AC Digital Inputs 1-43

Hardware	Inputs Available
ALIV-ST	Digital Input 1—Digital Input #11 (6-DC and 5-AC)
ALIV-QT	Digital Input 1— Digital Input #23 (14-DC and 9-AC) Digital Inputs #16-23 are bi-state I/O points located on the A4B. If a digital input function is selected for one of these I/O points and the corresponding digital output (ranging between numbers 31-38) has already been configured, the I/O point cannot be used as a digital input.
A4I (Optional)	Digital Input #24—Digital Input #33 (10-DC) Available as an option on both the ALIV-ST and ALIV-QT hardware.

Hardware	Inputs Available
A4I2 (Optional)	Digital Input #34—Digital Input #43 (10-DC) Available as an option on the ALIV-QT hardware.

The AccuLoad also allows unused channels on installed A4I boards to be used for general-purpose I/O. One input is available for each A4I channel not being used for Add-Pak injector control. The A4I set to address 100 is mapped to Digital Inputs #24-33 and a second A4I at address 200 would be mapped to Digital Inputs #34-43.

For example, if one A4I is installed and six Add-Pak injectors are programmed for use, four channels on the A4I are available for use as general purpose inputs. If additives 5,6,7,8,9, and 10 10 (corresponding to A4I channels 1-6) are programmed for Add-Pak injectors then channels 7-10 on the A4I (Digital Inputs #30-#33) could be used for other features.

These program codes define the function for a digital input. Except for general purpose inputs, duplicate assignments are not allowed. Inputs 1 through 6 are DC inputs and 7 through 15 are AC. Selections are as follows:

Configuration: Pulse Inputs: Digital Input Tag **Configuration—See Table 14: Digital Inputs Configurations on page 140.**	Index:	Range: 20 characters maximum
Description: This parameter defines the tag associated with this digital input used on diagnostic screens. The default tag is the terminal connections associated with this digital input, for example, A4M TBK4:1,2.		

Configurations: Digital Inputs: DC and AC Digital Input Function **Configuration—See Table 14: Digital Inputs Configurations on page 140.**	Index:	Range: 0 - 43

Description: Assign a function to one of the digital inputs. Inputs 7 - 15 are AC; all others are DC.

Selections:

- (0) Not used
- (1 - 2) Security 1 - 2
- (3 - 4)Permissive 1 - 2
- (5) First/Second High Flow
- (6) Remote Start
- (7) Remote Stop
- (8) Remote Stop Arm
- (9) Transaction Reset
- (10) General Purpose Input
- (11) Printer Tray Switch
- (12) Block Valve Feedback
- (13 - 36) Piston Injector 1 – 24 Feedback
- (37 - 39) System Permissive 1 - 3
- (40 - 41) Swing Arm – Side A and Side B
- (42) DE Head Stop Flow (not available if no unloading arms)
- (43) DE Head Low Flow [not available if no unloading arms]
- DE Head High Flow [not available if no unloading arms]
- Bay A Permissive 1 and 2 [not available if Bays not assigned]
- Bay B Permissive 1 and 2 [not available if Bays not assigned]
- Metered Injector Prove Remote
- Recipe Select 1 – 3

Criticals:

- Must be at highest level of security (to program or de-program security inputs)
- Input assignments must be unique [except general purpose inputs; block valve feedback (check arm and product); permissive #1 (check arm); permissive #2 (check arm)]
- Injector I/O assignment does not match type (injector feedbacks only)
- No digital output assigned for this injector (injector feedbacks only)
- Block valves used with sequential blending only
- A4B required for this digital I/O point.
- This I/O currently configured as an Add-Pak injector. (Inputs 24 – 43 only)

Notes: Additive injector selections available dependent on Configuration Code 020. (Only 12 are available with AccuLoad IV SThardware)

Configuration: Digital Inputs: Digital Input Arm **Configuration—See Table 14: Digital Inputs Configurations on the next page.**	Index: Digital Input	Range: 0 - 5

Description: Some digital input functions are specific to an arm which is selected by this parameter.

Selections: (0 - 5) Arm 1 – Arm 6

Critical:

- No DE head high flow, low flow, stop inputs on this arm.
- Load arm not configured.

Notes: Some digital input functions are system-based and the arm entry is not used, and will not appear on the AccuLoad Program Mode menus in these cases. These functions include security inputs, general purpose inputs, remote stop (master), and piston injector feedback inputs.

Configuration: Digital Inputs: Digital Input Product **Configuration—See Table 14: Digital Inputs Configurations below.**	Index: Digital Input	Range: 0 - 5
Description: Assign a product to one of the digital input function from the list above. Selections: (0 - 5) Product 1 - 6 These entries can only be configured for a Sequential Blending arm.		
Criticals: • Only one block valve feedback per product. • Product not configured.		

Table 14: Digital Inputs Configurations

Digital Inputs	Input Tag	Input Function	Input Arm	Input Product
1	1300	301	302	304
2	1301	305	306	308
3	1302	309	310	312
4	1303	313	314	316
5	1304	317	318	320
6	1305	321	322	324
7	1306	325	326	328
8	1307	329	330	332
9	1308	333	334	336
10	1309	337	338	340
11	1310	341	342	344
12	1311	345	346	348
13	1312	349	350	352
14	1313	353	354	356
15	1314	357	358	360
16	1315	361	362	364
17	1316	365	366	368
18	1317	369	370	372
19	1318	373	374	376
20	1319	377	378	380
21	1320	381	382	384
22	1321	385	386	388
23	1322	389	390	392
24	1323	393	394	396
25	1324	397	398	400
26	1325	401	402	404
27	1326	405	406	408
28	1327	409	410	412
29	1328	413	414	416
30	1329	417	418	420
31	1330	421	422	424
32	1331	425	426	428
33	1332	429	430	432
34	1333	433	434	436

Digital Inputs	Input Tag	Input Function	Input Arm	Input Product
35	1334	437	438	440
36	1335	441	442	444
37	1336	445	446	448
38	1337	449	450	452
39	1338	453	454	456
40	1339	457	458	460
41	1340	461	462	464
42	1341	465	466	468
43	1342	469	470	472

Shaded area isnew to the AccuLoad IV.

8.1.5 500—DC and AC Digital Output Function Directories

Refer to the AccuLoad IV Installation and Maintenance Manual (MN06201) for terminal assignments.

These program code define the functionality of the digital outputs. Except for General Purpose outputs, duplicate assignments are not allowed for the same arm (or meter or product). If a digital valve is being configured, both upstream and downstream solenoids must be assigned. Outputs 1-3 are DC (located on the A4M board). Outputs 4-30 are AC. The first 11 AC outputs are on the A4M. The remaining AC outputs (15-30) are on the Bi-State Expansion (A4B) hardware, as well as 8 additional DC channels, mapped to outputs 31-38.

The AccuLoad also allows unused channels on installed A4I (Add-Pak) boards to be used for general-purpose I/O. Two digital outputs are available for each A4I channel not being used for Add-Pak injector control. The A4I set to address 100 maps to Digital Output #39-58. If a second A4I is installed, the outputs map to Digital Output #59-78.

Example: If 1 A4I is installed and 6 Add-Pak injectors are programmed for use, 8 channels on the A4I are available for use as general purpose outputs. If additives 5,6,7,8,9 and 10 are programmed for Add-Pak injectors (corresponding to A4I channels 1-6) then A4I channels 7-10 are available for General Purpose I/O. Digital Outputs #51-58 (which map to those A4I channels) could then be assigned to the desired functions.

Note: If the A4I I/O is controlled via serial communications; it is recommended that it not be used for any time-sensitive function. Do not use these outputs for control valve or injector solenoids. Response should be satisfactory for pump outputs and block valve control.

The number of additive pumps, piston injectors, and metered injectors is dependent on Configuration Code 020 and shared additives and on the hardware. (AccuLoad hardware allows for 24.) The number of metered injectors depends on the number of load arms selected and choices for dual pulse and transmitter integrity. See Installation and Maintenance Manual (MN06201) for pulse input table.

> **Note:** Selection (97) Vapor Line Valve is only available for arm type "Straight with VRS". If configured, the AccuLoad will open the vapor line valve when the main product valve is open and close the vapor line valve when the main product valve is closed.

Configuration: Digital Outputs: Digital Output Tag **Configuration—See Table 15: Digital Outputs Configurations on the next page.**	Index:	Range: 20 characters maximum
Description: This parameter defines the tag associated with this digital input used on diagnostic screens. The default tag is the terminal connections associated with this digital input, for example, A4M TBK5:1,2.		

Configurations: Digital Outputs: DC and AC Digital Output Function **Configuration—See Table 15: Digital Outputs Configurations on the next page.**	Index:	Range: 1 - 97
Selections: • (0) Not used • (1) Pump • (2) Upstream Solenoid • (3) Downstream Solenoid • (4 - 5) Alarm Relay 1 - 2 • (6) General Purpose Output • (7) Block Valve [not selectable if no sequential blending] • (8) Stop Relay • (9 - 32) Additive Pump 1 - 24 • (33 - 56) Piston Injector 1 - 24 • (57 - 60) Metered Injector 1 - 4 • (61 - 84) Shared Additive 1 - 24 Solenoid • (85 - 88) Shared System Flush 1 - 4 • (89 - 92) Flow Controlled Injector 1 - 4 Upstream Solenoid • (93 - 96) Flow Controlled Injector 1 - 4 Downstream Solenoid • (97) Vapor Line Valve		

Criticals:

- Output assignments must be unique [except for general purpose function, block valve, up and downstream solenoids, and pump in multi-arm/multi-meter modes]
- Metered injector pulse input not configured
- Both upstream and downstream solenoids required
- Injector I/O assignment does not match type
- Too many additive pumps defined
- Too many additive injectors defined
- Block valves used with sequential blending only
- This I/O point is configured for Add-Pak Injector
- Smart Injector communications must be configured to use Add-Pak I/O
- Upstream/downstream solenoid function not supported on Add-Pak hardware
- Digital valve solenoids not supported on A4I hardware
- Smart inject comm port required for A4I I/O
- Upstream and downstream solenoids not available for vapor recovery line
- Pump not available for vapor recovery line

Configuration: Digital Outputs: DC and AC Digital Output Arm **Configuration—See Table 15: Digital Outputs Configurations below.**	Index: Digital Output	Range: 0 - 5 (depending on model)
Description: This entry defines the arm associated with the digital output function. Selections: (0 - 5) Arm 1 - 6		
Critical: Load Arm not configured.		

Configuration:Digital Outputs:DC and AC Digital Output Meter **Configuration—See Table 15: Digital Outputs Configurations below.**	Index: Digital Output	Range: DC 1 - 3, AC 4 - 78
Description: This entry defines the arm associated with the digital output function. Selection: (0 - 5) Meter 1 - 6 This entry is only valid for a Ratio Blending arm. (In other configurations, only Meter 1 exists for the arm; hence, the arm entry determines which meter is intended.)		
Critical: Meter not configured.		

Configuration: Digital Outputs: DC and AC Digital Output Product **Configuration—See Table 15: Digital Outputs Configurations below.**	Index: Digital Output	Range: DC 1 - 3, AC 4 - 78
Description: Assign a product to one of the digital output functions that are listed on page 142. Selections: (0 - 5) Product 1 - 6 These entries are used only if the entry for the related Digital Output Function is “Block Valve Feedback."		
Critical: Product not configured.		

Table 15: Digital Outputs Configurations

Digital Output	Output Tag	Output function	Output Arm	Output meter	Output product
1	1500	501	502	503	504

Digital Output	Output Tag	Output function	Output Arm	Output meter	Output product
2	1501	505	506	507	508
3	1502	509	510	511	512
4	1503	513	514	515	516
5	1504	517	518	519	520
6	1505	521	522	523	524
7	1506	525	526	527	528
8	1507	529	530	531	532
9	1508	533	534	535	536
10	1509	537	538	539	540
11	1510	541	542	543	544
12	1511	545	546	547	548
13	1512	549	550	551	552
14	1513	553	554	555	556
15	1514	557	558	559	560
16	1515	561	562	563	564
17	1516	565	566	567	568
18	1517	569	570	571	572
19	1518	573	574	575	576
20	1519	577	578	579	580
21	1520	581	582	583	584
22	1521	585	586	587	588
23	1522	589	590	591	592
24	1523	593	594	595	596
25	1524	597	598	599	600
26	1525	601	602	603	604
27	1526	605	606	607	608
28	1527	609	610	611	612
29	1528	613	614	615	616
30	1529	617	618	619	620
31	1530	621	622	623	624
32	1531	625	626	627	628
33	1532	629	630	631	632
34	1533	633	634	635	636
35	1534	637	638	639	640
36	1535	641	642	643	644
37	1536	645	646	647	648
38	1537	649	650	651	652
39	1538	653	654	655	656
40	1539	657	658	659	660
41	1540	661	662	663	664
42	1541	665	666	667	668
43	1542	669	670	671	672
44	1543	673	674	675	676
45	1544	677	678	679	680

Digital Output	Output Tag	Output function	Output Arm	Output meter	Output product
46	1545	681	682	683	684
47	1546	685	686	687	688
48	1547	689	690	691	692
49	1548	693	694	695	696
50	1549	697	698	699	700
51	1550	701	702	703	704
52	1551	705	706	707	708
53	1552	709	710	711	712
54	1553	713	714	715	716
55	1554	717	718	719	720
56	1555	721	722	723	724
57	1556	725	726	727	728
58	1557	729	730	731	732
59	1558	733	734	735	736
60	1559	737	738	739	740
61	1560	741	742	743	744
62	1561	745	746	747	748
63	1562	749	750	751	752
64	1563	753	754	755	756
65	1564	757	758	759	760
66	1565	761	762	763	764
67	1566	765	766	767	768
68	1567	769	770	771	772
69	1568	773	774	775	776
70	1569	777	778	779	780
71	1570	781	782	783	784
72	1571	785	786	787	788
73	1572	789	790	791	792
74	1573	793	794	795	796
75	1574	797	798	799	800
76	1575	801	802	803	804
77	1576	805	806	807	808
78	1577	809	810	811	812

Shaded area is new to the AccuLoad IV.

8.1.6 900—Analog I/O Directories

Note: The AccuLoad leaves the factory with default values programmed for Cal 1 and Cal 2 counts for the six analog I/O points, to achieve the highest possible accuracy, it is a user requirement to program the calibration numbers marked on the individual modules.

Configuration: Analog I/O: Analog I/O Tag **Configuration—See Table 16: Analog I/O Configurations on page 148.**	Index: Analog I/O	Range: 20 characters maximum
Description: This entry allows for a tag (text description) to be entered for this analog I/O point. It is used on dynamic display and diagnostic screens to provide an identifier for the value. The default entry is 'TP100*n*' for analog I/O pt *n*.		

Configuration: Analog I/O: Analog I/O Function **Configuration—See Table 16: Analog I/O Configurations on page 148.**	Index: Analog I/O	Range: 1 - 6
Description: These program codes define the function of the analog inputs. The configuration must be compatible with the type of module installed in the associated analog channel's slot. Selections: • (0) Not Used • (1) Temperature Input • (2) Density Input • (3) Pressure Input • (4) Analog Valve • (5) Flow Rate Output • (6) General Purpose Output • (7 - 10) Injector 1 – 4 Analog Valve • (11 - 14) Injector 1 – 4 Temperature Input • (15) General Purpose Input		
Criticals: • RTDs can only be temperature inputs • I/O assignments must be unique (per load arm or meter) • Function and type must both be input or output • Only one densitometer allowed per arm/ meter • This injector is not configured as a flow controlled injector • Duplicate assignments are not allowed		

Configuration: Analog I/O: Analog I/O Arm **Configuration—See Table 16: Analog I/O Configurations on page 148.**	Index: Analog I/O	Range: 0 - 5
Description: This entry defines the arm associated with the Analog I/O point. This entry is only valid for a Ratio Blending arm. In other configurations, only Meter 1 exists for the arm; hence, the arm entry determines which meter is intended. Selection: (0 - 5) Arm 1 - 6		
Critical: Load arm not configured.		

Configuration: Analog I/O: Analog I/O Meter **Configuration—See Table 16: Analog I/O Configurations on page 148.**	Index: Analog I/O	Range: 0 - 5
Description: This entry defines the meter associated with the Analog I/O point. Selection: (0 - 5) Meter 1 - 6		

Criticals:

- Meter not configured.
- Meter must be set to 1 when this input is assigned to a side-stream blending arm.
- Density cannot be configured for the vapor recovery meter.
- Analog valve not available for vapor recovery line.

Configuration: Analog I/O: Analog I/O Type **Configuration—See Table 16: Analog I/O Configurations on the next page.**	Index: Analog I/O	Selections: 0 - 5
Description: These program codes define the type of analog module used. Selections: • (0) Not used • (1) 4-20 mA Input • (2) 1-5 Vdc Input • (3) RTD • (4) 4-20 mA Output • (5) 1-5 Vdc Output		
Criticals: • RTDs can only be temperature inputs. • Function and type must both be input or output. • Analog type must be programmed.		

Configuration: Analog I/O: Analog I/O Calibration 1 Counts **Configuration—See Table 16: Analog I/O Configurations on the next page.**	Index: Analog I/O	Range: 0 - [12288] - 65535
Description: These five-digit program codes are used to calibrate the analog input module. Calibration factors can be found on the top label of the input modules. Calibration 1 counts must be less than Calibration 2 counts. When these values are assigned based on the values from the label on the Analog Input/Output Modules, maximum accuracy will be attained.		
Critical: Cal1 must be less than Cal 2		
Note: The AccuLoad leaves the factory with default values programmed for Cal 1 and Cal 2 counts for the six analog I/O points, to achieve the highest possible accuracy, it is a user requirement to program the calibration numbers marked on the individual modules.		

Configuration: Analog I/O: Analog I/O Calibration 2 Counts **Configuration—See Table 16: Analog I/O Configurations on the next page.**	Index: Analog I/O	Range: 0 - [53248] - 65535
Description: These five-digit program codes are used to calibrate the analog input module. Calibration factors can be found on the top label of the input modules. Calibration 2 counts must be greater than Calibration 1 counts. When these values are assigned based on the values from the label on the Analog Input/Output Modules, maximum accuracy will be attained.		
Critical: Cal1 must be less than Cal 2		
Note: The AccuLoad leaves the factory with default values programmed for Cal 1 and Cal 2 counts for the six analog I/O points, to achieve the highest possible accuracy, it is a user requirement to program the calibration numbers marked on the individual modules.		

Configuration: Analog I/O: Analog I/O Low Value **Configuration—See Table 16: Analog I/O Configurations below.**	Index: Analog I/O	Range: -999.99 - [0.00] - 9999.99
Description: These entries define the lower ranges of the analog input, expressed as engineering values corresponding to the defined function of the input. The Low entry represents the engineering value at 4mA (or 1v for a V-In module) and the High entry represents the engineering value at 20mA (or 5v). This varies with the assigned function. Low Value must be less than High Value.		
Critical: Low value must be less than high value (unless density input and units are API		
Fatal: Entry is out of specified range.		
Note: These entries are not valid if a RTD temperature probe is selected as the transducer type for that input.		

Configuration: Analog I/O: Analog I/O High Value **Configuration—See Table 16: Analog I/O Configurations below.**	Index: Analog I/O	Range: -999.99 - [600.00] - 9999.99
Description: These entries define the lower and upper ranges of the analog input, expressed as engineering values corre sponding to the defined function of the input. The Low entry represents the engineering value at 4mA (or 1v for a V-In module) and the High entry represents the engineering value at 20mA (or 5v). High Value must be greater than the Low Value.		
Critical: Low value must be less than high value (unless density input and units are API)		
Fatal: Entry is out of specified range.		
Notes: These entries are not valid if a RTD temperature probe is selected as the Transducer Type for that input.		

Configuration: Analog I/O: Analog RTD Offset **Configuration—See Table 16: Analog I/O Configurations below.**	Index: Analog I/O	Range: -9.9 - [0.00] - 9.9
Description: This parameter is used to correct the reading of the RTD input by a fixed amount.		
Note: This offset is applied to inputs configured as an RTD only. Note also that it is a single-point offset value.		

Table 16: Analog I/O Configurations

Analog I/O	Analog I/O Tag	Analog I/O Function	Analog I/O Arm	Analog I/O Meter	Analog I/O Type	Analog I/O Cal 1	Analog I/O Cal 2	Analog Low Value	Analog High Value	Analog RTD Offset
1	1900	901	902	903	905	906	907	908	909	910
2	1901	911	912	913	915	916	917	918	919	920
3	1902	921	922	923	925	926	927	928	929	930
4	1903	931	932	933	935	936	937	938	939	940
5	1904	941	942	943	945	946	947	948	949	950
6	1905	951	952	953	955	956	957	958	959	960

Shaded area is new to the AccuLoad IV.

8.2 System Directories

100—General Purpose Directories
200—Flow Control Directories
300—Volume Accuracy Directories
400—Temperature/Density Directories
500—Pressure Directories
600—Alarms Directories
700—Communications
800—Additives
Security

8.2.1 100—General Purpose Directory

General Purpose Directory includes:

- Date Format
- Date
- Time Format
- Time
- MAC Address
- Firmware Revision
- Maximum Available Arms
- Unit ID
- Flow Rate Time
- Flow Rate Descriptor
- Dynamic Display Timeout
- Auto Reset Timer
- Remote Browser
- Remote Browser Timeout
- Decimal/Comma Select
- Default/Translated Literals
- Start Button Disable
- Stop Button Disable
- Transaction ID
- Transaction ID Message
- Number of Batches/Transaction
- Bay Transactions
- Permissive 1 - 3 Sense

- Permissive 1 - 3 Message
- Permissive 1 - 3 Restart

System: General Purpose: Date Format **System 101**
Description: This entry allows the operator to select the format used to display/print dates on the AccuLoad. Selections: • Month/Day/Year • Day/Month/Year
Fatal: Invalid date

System: General Purpose: Date
Description: This entry allows the operator to select the date. Selections: Month/Day/Year

System: General Purpose: Time Format/Clock **System 102**
Description: This entry allows the operator to select the format used to display/print dates on the AccuLoad. • 12 Hour • 24 Hour
Fatal: • Entry out of range • Invalid time

Note: Date, time and date/time format program codes are read-only via communications; the SD command (smith protocol) or Extended Services (Modbus protocols) must be used to set the date and time via communications.

System: General Purpose: Time
Description: This entry allows the operator to select the time. Selections: Hour/Minute/AM or PM

System: General Purpose: Unit MAC Address **System 103**	Index: None	Range: READ ONLY
Description: This displays the MAC Address of the Ethernet interface. It is read-only.		

System: General Purpose: Firmware Revision **System 104**	Index: None	Range: READ ONLY
Description: This displays the revision level of the firmware running in the unit. It is read-only.		

System: General Purpose: Maximum Available Arms **System 105**	Index: None	Range: READ ONLY
Description: This displays the maximum number of arms this unit will support It is read-only.		

System: General Purpose: Unit ID **System 1103**	Index: None	Range: Text 28 characters maximum
Description: This sets the Unit ID which is displayed in the center of the top line of the display.		

System: General Purpose: Flow Rate Time **System 111**	Index: None	Range:
Description: This parameter is used to define the time units used to compute the flow rate. Selections: • (0) per minute • (1) per hour		

System: General Purpose: Flow Rate Descriptor **System 112**	Index: None	Range: Text - maximum 7 characters
Description: This parameter allows an alphanumeric message to serve as the flow rate units identifier, for example, GPM, LPM, BPH.		

System:General Purpose:Dynamic Display Timeout **System 121**	Index: System	Range: [0] - 99 seconds
Description: This program code defines the amount of time, in seconds, that dynamic displays will remain displayed before the AccuLoad automatically returns to the run or ready screen. A zero entry for this program code will cause the dynamic display to remain indefinitely, until the operator manually exits the dynamic display menu.		

System: General Purpose: Auto Reset Time **System 122**	Index: None	Range: [0] - 99 seconds
Description: This program code defines the amount of time, in minutes, before AccuLoad will return to the ready screen in the absence of input by the operator. The auto reset feature will remove the AccuLoad from the program mode or end transactions in progress when this parameter is set to a non-zero value. The clock starts after each button press (unless flowing). If another button press is not made in the time set in this code, the unit will revert to the Ready display. If the delivery has been completed and the transaction has not been ended, the AccuLoad will return to the Ready mode after the time has expired. An entry of 0 disables this feature.		

System: General Purpose: Remote Browser **System 1104**	Index: None	Range:
Description: This parameter is used to allow/disallow remote access to the AccuLoad over the network from a browser. Selections: • [Enable] • Disable		
Help: Select whether to enable/disable remote browsing.		

System: General Purpose: Remote Browser Timeout **System 1105**	Index: None	Range: [0] - 999
Help: Enter time in minutes for the remote browser idle timeout. Zero allows remote browsers to remain idle indefinitely.		

System: General Purpose: Decimal/Comma Select **System 131**	Index: None	Range:
Description: This parameter specifies whether a decimal or a comma is to be used to separate the whole and fractional parts of numeric data. The comma is typically used in European markets. The selected delimiter is used in the program mode and on run screens and dynamic displays local to AccuLoad, in host communications, and on delivery reports. Selections: • (0) Decimal • (1) Comma		

System:General Purpose:Start Key Disable **System 132**	Index: None	Range:
Description: Allows the enabling/disabling of the START button on the touch panel. When this parameter is set to disabled, the only methods for starting a batch will be through the communication remote start command or through a remote start input. Selections: • (0) No (Enabled) • (1) Yes (Disabled)		
Notes: • If the touch panel START is disabled at the AccuLoad and communications is in polling only or Poll/Program, the AccuLoad will not be able to start a transaction until the parameters are properly set. • The START Key Disable selection will not prohibit starting the batch via communications.		

System:General Purpose:Default/ Translated Literals System 133	Index: None	Range:
Description: This parameter selects the default (English) language or a custom translation to be displayed and printed. Selections: • (0) Default • (1) Translated		
Note: If a translation has been entered on AccuMate and downloaded to the AccuLoad, the new translation will not appear on the display until "translated literals" is selected here.		

System: General Purpose: Stop Button Disable **System 140**	Index: System	Range:
Description: This program code allows the STOP button on the AccuLoad front panel to be disabled for wild stream blending operations. It is only available when the AccuLoad has at least one arm configured with a wild stream meter. For example, the AccuLoad is not in control of one product stream. Arms that are not configured with any wild stream meter will always stop when the STOP button is pressed, regardless of this setting. Selections: • (0) No • (1) Yes		
Warning: Disabling the STOP button for wild stream arms prevents an operator from using the STOP button to shut down flow on product streams that ARE being controlled by the AccuLoad.		

Important: The AccuLoad STOP button should never be relied on for emergency stop functionality, all control power should be routed through systems specifically designed for this purpose ahead of the AccuLoad. See the AccuLoad IV Installation and Maintenance Manual (MN06201) for wiring details.
Note: Allowing the STOP button to function on a wild stream blending arm could result in an out-of-spec blend if STOP is pressed during the blending operation.

System: General Purpose: Transaction ID **System 134**	Index: None	Range: [0] - 1000000000
Description: This nine-digit security number provides an additional security level for operation of the AccuLoad. If this code is programmed with any number other than 000000000, the driver or operator is required to enter this security ID before a transaction can be started. A 0 entry disables this feature.		

System: General Purpose: Transaction ID Message **System 135**	Index: None	Range: Text - 28 characters maximum
Description: This code allows a 28-character alphanumeric entry to prompt during the preset operations to enter a security ID. This message should not be programmed as blanks.		

System: General Purpose: Batches per Transaction **System 136**	Index: None	Range: 1 - [5] - 10
Description: This program code provides the operator with the capability of setting the loading position up for the number of batches allowed per transaction.		
Fatal: Entry out of specified range.		
Note: Enter the number of batches per transaction.		

System: General Purpose: System Status Display **System 139**	Index: None	Range: 0 - 1
Description: This program code allows the operator to determine the mode of the display interface. The factory default is No. Selecting Yes dedicates the lower panel to system status display. The upper panel is always a full-screen view of the arm currently in focus. Selections: • (0) No • (1) Yes		
Help: Select whether the lower panel is dedicated to the System Status view. Note: It is required that this parameter be set to "Yes" when in a Split Architecture configuration. Note: Added in firmware revision 1.0.		

System: General Purpose: Bay Transactions **System 1106**	Index: None	Range:

Description: Enables/disables bay transaction handling. Selections: • (0) No • (1) Yes
Help: Select Yes to have a single transaction recorded for all arms assigned to a bay. See AccuLoad Bay Configuration Application Bulletin (AB06058) for more information. Warning: Changing this value deletes all stored transaction data. Do not use System Code 1106 to purge transactions; the Erase Transaction Log diagnostic has been provided for this purpose. For more information on Erase Transaction Log, refer to section 1: Weights and Measures/Calibration.

System: General Purpose: System Permissive 1, 2, 3 Sense **System 141, 144, 147**	Index: 1 - 3	Range:
Description: Enables and defines the conditions under which a system permissive is expected to be present in order for loading operations to be allowed. Selections: • (0) N/A—Permissive is disabled • (1) Transaction Start—Permissive input is only checked immediately after authorization • (2) Continuous—Permissive input must be asserted continuously during the batch • (3) Start Pressed—Permissive input must be asserted whenever flow is started • (4) Batch Start—Permissive input must be asserted to start a batch		
Important: Select permissive sense for loading.		

System: General Purpose: Permissive 1, 2, 3 Messages **System 142, 145, 148**	Index: 1 - 3	Range: Text - 28 characters max.
Description: These 28-character alphanumeric messages will be displayed if a permissive sense entry, corresponding with the message, is defined but not present when expected.		

System: General Purpose: Permissive 1, 2, 3 Restart **System 143, 146, 149**	Index: 1 - 3	Range:
Description: Select whether batch will restart automatically or START button will be required after permissive is restored. Selections: • (0) Manual • (1) Automatic		
Important: Select permissive sense for loading.		

8.2.2 200—Flow Control Directory

Flow Control Directory includes:

- Solenoid Alarm Count
- Solenoid Count Clear
- Leakage Alarm Limit
- Reverse Flow Limit
- Flow Simulator

System: Flow Control: Solenoid Alarm Count **System 201**	Index: System	Range: 0 - 1000000000 Disable Value: 0
Description: The AccuLoad provides counters to indicate the number of times the upstream and downstream solenoids have been energized. This parameter sets the solenoid actuation count which when exceeded will cause a SC: Solenoid Count alarm to occur (alarms 666). This alarm will only be set when the load arm is idle. Separate counters are available for both the upstream and downstream solenoid of each meter. The counter will be incremented each time the solenoid is energized. Clearing the alarm will not occur again until the count has been cleared and the threshold exceeded again. The range of this parameter is 0 to 999999999. The factory default setting is 0, which disables this feature. The counters are viewable from the AccuLoad's Diagnostic Menu. The registers may be manually or automatically cleared either through the front panel or through communications.		
Note: The counters will be cleared by a factory initialization or firmware upgrade.		

System: Flow Control: Solenoid Count Clear **System 204**	Index: System	Range:
Description: This program code determines whether the solenoid actuation counts maintained by the AccuLoad are reset when the Solenoid Counts alarm is cleared. Selections: • (0) Manual • (1) Automatic If Manual (the default) is selected, the counts are not cleared automatically when the alarm is cleared. If Automatic is selected, then when the Solenoid Counts alarm is cleared, the counts are reset to zero immediately. If Manual is selected, the counts can be reset manually using the diagnostic or alternately via communications using the SC command.		

System: Flow Control: Leakage Alarm Limit **System 202**	Index: System	Range: [0.0] - 999.9
Description: This parameter indicates the maximum leakage limit in delivery units between transactions. Leakage amounts greater than the value entered in this parameter will activate a leakage alarm. The range of this parameter is 0 to 999.9. The factory default setting is 0 which disables this feature.		

System: Flow Control: Reverse Flow Limit **System 203**	Index: System	Range: [0.0] - 999.9
Description: This parameter indicates the maximum reverse flow amount limit in delivery units. When sufficient reverse flow occurs during a batch to exceed this programmed limit, then a Reverse Flow Alarm is activated. The range of this parameter is 0 to 999.9. The factory default setting is 0 (which disables this feature).		

System: Flow Control: Flow Simulator **System 1200**	Index: System	Range:
Description: Enables/disables the built-in flow simulator which simulates flow based on the programmed flow profile. This feature is used for testing or training. The factory default setting is Disable. Selections: • Disable • Enable		
Note: This feature shall not be enabled during normal operation; changes to this option are logged in the audit trail.		

8.2.3 300—Volume Accuracy Directory

Volume Accuracy Directory includes:

- Pulse Transmitter Select
- Transmitter Integrity
- Reverse Volume - Batch
- Reverse Volume - Non-Resets
- Volume Units
- Mass Units
- Volume Descriptor
- Mass Descriptor
- Pulse Input Type
- Maximum Preset
- Minimum Preset
- Auto Preset
- Auto Preset Increment
- Transaction Termination
- Recipes per Transaction
- Transaction Start
- Prove Type
- Auto Prove
- Prover Output
- Run Display Options
- Preset Amount
- Preset Amount Type
- Delivery Amount Type

- Display Resolution
- Delivered Amount Display
- Update Leakage

System: Volume Accuracy: Pulse Transmitter Select **System 101**	Index: None	Range:
Description: Selects the transmitter pulse train type in use. Selections: • Single • [Dual]		
Help: Select a single or dual channel pulse xmitter, PT1 1(+),2(-) for single channel or A; 3(+),4(-) for channel B		

System: Volume Accuracy: Transmitter Integrity **System 102**	Index: None	Range:
Description: Selects whether transmitter integrity is in use (/A, /B). Selections: • [No] • Yes		
Help: If Yes, /A and /B inputs are required for each meter channel. Meter 1 requires PT1 5(+),6(-) for /A and 7(+),8(-) for /B		

System: Volume Accuracy: Reverse Volume - Batch **System 146**	Index: None	Range:
Description: Selects whether reverse flow is accounted for (subtracted from batch amount) when calculating batch amounts. Selections: • [Ignore] • Totalize		
Help: Select if reverse amounts should count toward batch totals. Note: Meters are typically not proved in the reverse direction and this amount may not be accurate. Reverse flow is typically considered an error and should not be part of normal operation.		

System: Volume Accuracy: Reverse Volume - Non-Resets **System 147**	Index: None	Range:
Description: Selects whether reverse flow is accounted for (subtracted) when updating non-resettable totalizers. Selections: • [Ignore] • Totalize		
Help: Select if reverse amounts should count toward non-resettable totals. Note: Meters are typically not proved in the reverse direction and this amount may not be accurate. Reverse flow is typically considered an error and should not be part of normal operation.		

System: Volume Accuracy: Volume Units **System 301**	Index: None	Range:
Description: This parameter selects the volume units used to measure product delivery. The factory default is Gallons. Selections: • (0) Gallons (gal) • (1) Barrels (bbl) • (2) Dekaliters (dal) • (3) Liters (L) • (4) Cubic Meters (m^3)		
Help: Select volume units. These are used to select proper conversion factors for calculations.		

System: Volume Accuracy: Mass Units **System 302**	Index:	Range:
Description: This parameter defines the mass units used for product measurement. The factory default is Pounds. Selections: • (0) Pounds (lb) • (1) Kilograms (kg) • (2) US Tons • (3) Metric Tons • (4) Long Tons		
Help: Select mass units. These are used to select proper conversion factors for calculations.		

System: Volume Accuracy: Volume Descriptor **System 303**	Index:	Range: Text - 4 characters maximum
Description: This code allows a four-character entry message to serve as the display unit identifier of the volumetric measurement units that will be displayed on the display and the reports.		

System: Volume Accuracy: Mass Descriptor **System 304**	Index:	Range: Text - 4 characters maximum
Description: This code allows a four-character entry message to serve as the display unit identifier of the volumetric measurement units that will be displayed on the display and the reports.		

System: Volume Accuracy: Pulse In Type **System 305**	Index:	Range:
Description: This parameter allows the selection of mass pulse input rather than the default of pulses representing volume from the meter. The AccuLoad then totalizes directly in mass. A density input is required to back-calculate volume when using a meter that produces pulses based on mass flow. Selections: • (0) Volume • (1) Mass		

System: Volume Accuracy: Maximum Preset **System 311**	Index:	Range: 0 - 999999
Description: This six-digit entry establishes the largest volume that can be preset. If a preset amount greater than this limit is entered, an error message will be displayed on any attempt to start a batch with more than the maximum preset value. The factory default is "0".		
Note: "0" disables the maximum preset volume check.		

System: Volume Accuracy: Minimum Preset **System 312**	Index:	Range: 0 - 999999
Description: This six-digit entry will allow for the setting of the minimum preset amount. An error message will be displayed on any attempt to start a batch with less than the minimum preset value. The factory default is "0".		
Note: "0" disables the minimum preset volume.		

System: Volume Accuracy: Auto Preset **System 313**	Index:	Range: 0 - [200] - 999999
Description: The value in this parameter will automatically be filled in as the preset amount. The preset amount can be changed by the operator during the preset setup process. This can be useful for an operation that usually delivers the same batch amount.		
Note: "0" disables the auto preset.		

System: Volume Accuracy: Auto Preset Increment **System 314**	Index:	Range: 0 - [10] - 99999
Description: This sets the amount by which the preset amount is increased or decreased by each press of the "+" or " -" buttons next to the preset input field.		

System: Volume Accuracy: Transaction Termination **System 315**	Index:	Range:

Description: This program code defines the primary method used to terminate a transaction. Communications can always be used to terminate a transaction if the AccuLoad is programmed for Poll & Authorize or Remote Control operations. The factory default is "End Transaction" button.

Selections:

- User Interface
- Communications Only
- Trans Reset Input
- Printer Tray
- Card Reader
- End Transaction - For transactions that may be remotely authorized and terminated via the user interface: The ticket printer tray switch is ignored. The "End Transaction" button is used to end the transaction. (The transaction may also be terminated via communications.)
- Communications control only – For transactions that will be authorized and terminated remotely, for example, through communications: The "End Transaction" button is disabled and the ticket printer tray switch is ignored.
- Transaction reset input – For transactions that will be authorized and terminated by a master reset input, the "End Transaction" button is disabled. The ticket printer tray input is used to authorize and end the transaction.
- Printer Tray Switch Input – For transactions that will be authorized and terminated by a switch input from a load printer: The "End Transaction" button is disabled. The switch input, when active, authorizes the AccuLoad to load. When the input de-activates, the transaction is ended. The AccuLoad will not allow loading to continue or restart until the input is re-activated (a ticket is put in the printer).
- Card Reader – For transactions that will be authorized and terminated by the insertion and removal of the card from the card reader. The transaction is ended when the card is pulled.

Criticals :

- No comm port selected for communications control.
- Transaction reset input required for each arm configured.
- Printer tray switch input required for each arm configured.
- Printer tray switch input is configured [if other method is selected].
- Option not allowed if bays are configured. [Printer tray switch input]

System: Volume Accuracy: Recipes per Transaction **System 316**	Index:	Range:

Description: Allows either single recipe transactions or multiple recipes per transaction. If programmed for a single recipe, the AccuLoad will only prompt the driver for a recipe at the beginning of the transaction. The driver can load multiple batches of the recipe but only that recipe for the transaction. If programmed for multiple recipes, the driver will be prompted for the recipe at the beginning of each batch. The factory default is Multiple.

Selections:

- (0) Single Recipe per Transaction
- (1) Multiple Recipes per Transaction

System: Volume Accuracy: Transaction Start **System 317**	Index:	Range:
Description: This parameter selects whether a transaction requires operator intervention to begin and end the transaction. In Manual Mode, a transaction is started by the operator interaction with the user interface (touch screen) and ended when the operator presses the "End Transaction" button. Using the Auto mode for this parameter, the Auto Preset and Auto Reset timer are used to continuously run batches that are initiated by a Remote Start input and can be stopped by a Remote Stop input without operator intervention. If a Remote Stop input is not used the batch would run until the Auto Preset value was reached. The Auto mode is intended to be used in an unattended operation. Selections: • (0) Manual Operation • (1) Automatic Operation		

System: Volume Accuracy: Prove Type **System 1300**	Index:	Range:
Description: Selects whether auto-proving will be done as "Net proving" or "Gross proving". If set to net, both the volume of the liquid will be compensated for temperature as well as the volume of the proving can. If set to gross, the effect of temperature on the liquid will be ignored. Selections: • (0) Net Proving • (1) Gross Proving		

System: Volume Accuracy: Auto Prove Select **System 321**	Index:	Range:
Description: This parameter is used to enable or disable the Automated Proving Mode. The default for this program code is "Disabled". Select one of the three security options to enable the automated prove and associated security. Once selected and the security activated, the beginning of the next transaction will launch the auto prove. Once the prove is completed and the meter factor calculated, the operator has the choice of downloading the calculated meter factor into the software or ignoring it. Selections: • (0) Disabled • (1) Security input not required • (2) Security input 1 required • (3) Security input 2 required		
Critical: Security input not configured		
Note: Auto proving is described in the AccuLoad Tank Proving Guide (MN06146).		

System: Volume Accuracy: Prover Out **System 323**	Index:	Range: 0 - 14
Selections: • (0) Auto Prove Meter • (1 - 14) Pulse Input 1 - 14		

Description: This parameter defines which pulse input is echoed to the high-speed prover pulse output terminals. The feature is designed to ease proving operations by redirecting the selected meter to a pair of terminals which can be field- wired for proving personnel access. Although with both the A4M and A4B boards present there could be two high-speed prover pulse outputs, only one output at a time will be activated. This will allow the outputs to be wired in parallel to provide a common connection point external to the AccuLoad for proving personnel access, independent of the meter currently being proved. Select 0 in this parameter to utilize this functionality. Alternately, any individual pulse input can be configured to be echoed to the high-speed prover output. Selections are as follows: • (0) - Echo meter selected via Auto Proving • (1 - 8) Echo pulse input #1 - 8 - A4M • (9 - 14) Echo pulse input #9 - 14 - A4B
Critical: Security input not configured.

Volume Accuracy: Run Display **System 331**	Index:	Range: 0 - 2
Description: This parameter defines which arrangement the AccuLoad IV will use for the delivery display. The default, Delivery Display, contains a transaction counter and a preset downcounter. A downcounter starts at the preset volume and counts down to zero, indicating the remaining volume throughout the batch. The US W&M display uses a smaller font for this down-counter, and prefixes it with a "Remain" prompt. The "Blank Downcounter" option prevents the downcounter from appearing. Selections are as follows: • (0) Default Display • (1) Blank Downcounter • (2) US Weights and Measures Display		
Note: This option will have no effect while the AccuLoad IV is in the proving mode.		

System: Volume Accuracy: Preset Amount Type **System 332**	Index:	Range: 0 - 4
Description: This program code selects the registration type used to enter the preset value. This registration type is also used for the downcounter display. Selections: • (0) IV - Indicated volume • (1) GV - Gross volume • (2) GST volume • (3) GSV volume • (4) Mass		
Critical: Selected units not available.		

System: Volume Accuracy: Delivery Amount Type **System 333**	Index:	Range: 0 - 4
Description: This code establishes how the delivery registration display (up-counter) will appear during operation. Five possible selections are available that are dependent on the needs of the operation. The factory default selection is IV - Indicated Volume. Selections: • (0) IV - Indicated Volume • (1) GV - Gross Volume • (2) GST Volume • (3) GSV Volume • (4) Mass		
Note: Selected units not available.		

System: Volume Accuracy: Display Resolution **System 334**	Index:	Range: 0 - 2
Description: This program codes selects the resolution that will be used by AccuLoad for the delivery up-counter and down-counter during normal operations. The factory default selection is Whole Units. Selections: • (0) Whole Units • (1) 10ths - Tenths • (2) 100ths - Hundredths]		

System: Volume Accuracy: Delivered Amount/Upcounter **System 335**	Index:	Range: 0 - 1
Description: This parameter selects whether the up-counter represents the batch delivered amount or the transaction delivered amount on the delivery screen. Selections: • (0) Transaction • (1) Batch		

System: Volume Accuracy: Update Leakage **System 336**	Index:	Range: 0 - 1
Description: Leakage (flow that occurs between transactions) may be added to the non-resettable totals either dynamically or at the start of the next transaction. The factory default is Transaction Start which indicates that the non-resettable totals will be updated with leakage at the start of the next transaction. To have the non-resettable totals updated as the leakage occurs, choose Dynamic. To ensure the true end of transaction non-resettable totals are retrieved, for example not including leakage which may have occurred after the transaction was ended, review the VT host command in the AccuLoad IV Smith Communications Manual (MN06204L). Selections: • (0) Transaction Start] • (1) Dynamic		

8.2.4 400—Temperature/Density Directory

Temperature/Density Directory includes:

- Temperature Units
- Reference Temperature
- Density Units
- Density Prompt

System: Temperature/Density: Temperature Units **System 401**	Index:	Range: Default: Not Used

Description: This program code selects the temperature scale used by AccuLoad. Selections: • (0) NA • (1) [°F] - Fahrenheit • (2) °C - Celsius
Critical: API table conflicts with selected units
Note: A zero entry, signifying No Temperature Selected, will disable all temperature-related calculations.

System: Temperature/Density: Reference Temperature **System 402**	Index:	Range: 0 - [60.0] - 999.9
Description: This parameter defines the reference temperature from which temperature corrections are made. Typical entry units are 60°F, and 15°C.		
Note: Temperature units are defined in a separate parameter.		

System: Temperature/Density: Density Units **System 411**	Index:	Range:
Description: This selection allows the operator to choose which density scale will be used if there is a densitometer installed. It is used to convert volume to mass. Selections: • (0) NA • (1) [°API] • (2) lb/ft^3 (Pounds/Cubic Feet) • (3) kg/m^3 (Kilograms/Cubic Meter) • Relative Density		
Note: When using temperature compensation, a value (API, lb/ft^3, or kg/m^3) must be entered in this parameter.		

System: Temperature/Density: Density Prompt **System 412**	Index:	Range:
Description: This parameter defines whether the operator will be prompted for a density entry prior to starting a batch. Selections: • (0) No • (1) Always • (2) In Standby		

8.2.5 500—Pressure Directory

Pressure Directory includes:

- Pressure Units
- Atmospheric Pressure

System: Pressure: Pressure Units **System 501**	Index:	Range:
Description: This parameter defines the pressure units used by AccuLoad. Selections: • (0) NA • (1) psi • (2) bar • (3) kg/cm^2 (Kilograms/square centimeter) • (4) kPa (kilopascals)		
Note: If "NA" is selected, signifying no pressure transducer installed, any associated parameters will be removed from the menus in Program Mode.		

System: Pressure: Atmospheric Pressure **System 502**	Index:	Range: [0.000] - 999.999
Description: Sets the local atmospheric pressure used in GPA TP-15 (gauge pressure) vapor pressure and NH3 volume calculations. This should be set to the average local atmospheric air pressure.		

8.2.6 600—Alarm Configuration Directory

Alarm Directory includes:

- Driver Alarm Clearing
- Powerfail Alarm
- Program Alarm Outputs
- Alarm Configuration for each alarm
- User Alarm Configuration
- User Alarm Messages for each user alarm

Alarm Responses:

- Additive Clean Line 630
- Additive Comm Failure 602
- Additive Comm Totals 662
- Additive Excess Pulses 616
- Additive Feedback Error 606
- Additive Frequency Alarm 622
- Additive High Temperature Alarm 655
- Additive Injector Error 628
- Additive Low Temperature Alarm 656
- Additive Pulse Security 659
- Additive Temperature Probe 657
- Additive Unauthorize Failed Alarm 626

- Additive Xmit Integrity 660
- Add-Pak 1 Diagnostic (x2) 645
- Add-Pak 2 Powerfail Alarm 1600
- Add-Pak Power Fail 1 (x2)
- Add-Pak 2 Power Fail Alarm 1601
- A4I1/AICB Auto Detect 646
- A4I2/AICB Auto Detect 1602
- A4I1/AICB Commfail 647
- A4I2/AICB Commfail 1603
- Arm Overrun Alarm 618
- Arm Zero Flow Alarm 627
- Back Pressure Alarm 603
- Bay A Excess Active Arms 649
- Bay B Excess Active Arms 1604
- Blend High Alarm 636
- Blend Low Alarm 637
- Block Valve Alarm 635
- Card Removed Alarm 658
- Clean Line Alarm 634
- Communications Alarm 604
- CTL Calculation Alarm 1605
- DE Head Alarm 651
- Density Transducer Alarm 605
- Email Error 1606
- Leakage Alarm 669
- F.A. Sening COP Alarm 665
- High Density Alarm 607
- High Flow Alarm 608
- High Pressure Alarm 609
- High Temperature Alarm 610
- Injector Auto Detect 643
- Injector Solenoid Counts 1607
- Injector Command Rejected 631
- Low Additive Alarm 611
- Low Density Alarm 612
- Low Flow Alarm 613
- Low Pressure Alarm 614
- Low Temperature Alarm 615

- Mass Meter Comm Fail 652
- Network Printer Alarm 664
- No Additive Pulses Alarm 617
- Overspeed Injector 629
- Predict Overrun Alarm 668
- Pressure Transducer Alarm 620
- Printer Alarm 641
- Product Overrun 638
- Product Solenoid Counts 666
- Product Stop Alarm 661
- Product Zero Flow 639
- Promass Meter Alarm 667
- Pulse Security Alarm 621
- Report Storage Full Alarm 681
- Reverse Flow 670
- Shared Printer Alarm 623
- Storage Full Alarm 650
- Temperature Probe Alarm 624
- Ticket Alarm 632
- Transmitter Integrity Alarm 619
- Valve Fault Alarm 625

User Alarm Configuration

- User Alarms 1 - 10, 671-680

User Alarm Messages

- User Alarms 1 - 10 Messages, 686-695

System: Default Alarms: Driver Alarm Clearing **System 601**	Index:	Range: 0 - [5] - 20
Description: This parameter defines the number of alarms that can be cleared in the Run and Ready modes without entering a passcode. In addition, the alarms to be cleared must be configured to be clearable in the Run/Ready mode. When this number of alarms has been cleared, subsequent alarms require a passcode entry to clear, even if they are programmed for Run/Ready mode clearing.		

System: Default Alarms: Powerfail Alarm **System 137**	Index: None	Range:

Description: This program code provides the operator with the capability of either enabling or disabling the powerfail alarm. The powerfail alarm is a diagnostic alarm that is not clearable through communications. Selections: • [Enable] • Disable

System: Default Alarms: Program Alarm Output **System 682**	Index:	Range:
Description: The AccuLoad provides two digital outputs which are energized when an alarm occurs. This parameter controls whether programming error alarms will activate these outputs. Selections: • [BOTH] - Both relays enabled • ALRM1 - Output Relay #1 Only • ALRM2 - Output Relay #2 Only • NONE - No Relays Enabled		

8.2.6.1 Alarm Actions

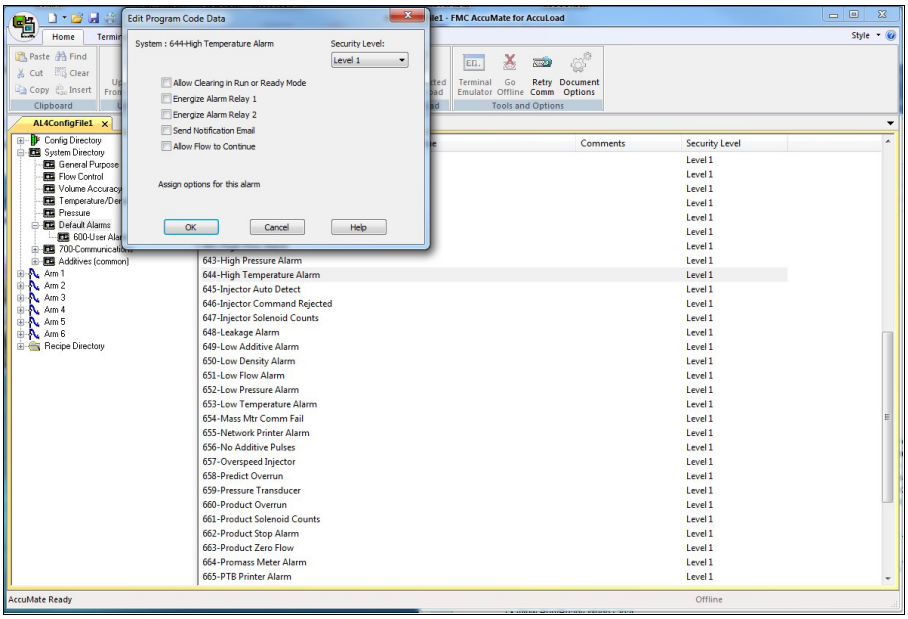
The actions taken when an alarm occurs and if a passcode is required to clear the alarm can be selected for each individual alarm type. The options are as follows:

- Allow run/ready clearing: No need for a passcode to clear the alarm.
- Energize alarm relay #1: If configured, alarm output #1 will be asserted.
- Energize alarm relay #2: If configured, alarm output #2 will be asserted.
- Send notification email: If configured, an email notification will be sent.

  > If this option is checked and a valid mail server and recipient is configured, an alarm notification email will be issued by the AccuLoad

- Allow flow to continue: Do not stop the flow when the alarm occurs.

Figure 182: Configuring Alarm Actions in AccuMate



The combination of these program codes and new options will provide the information required to transmit e-mail notifications on specified events, and check for replies to alarm events that signal the alarm should be cleared remotely. Replies will only be accepted from the programmed e-mail notification destination address. To clear the alarm remotely, “Reply” to the notification. The reply message sent must contain the alarm message in the body of the response message. Nothing else needs to be included. The AccuLoad will recognize the message sent to it by the alarm message previously sent and will clear the appropriate alarm, if it is clearable.

System: Alarms: Default Alarms: Alarm Actions	Index: per built-in Alarm	Range:
Description: These parameters allow the actions of each alarm to be configured. Multiple options selected from the following list may be configured for each alarm. Selections: • Allow Run/Ready Mode Clear • Energize Alarm Output 1 • Energize Alarm Output 2 • Send via Email • Allow Flow to Continue		
Notes: • Through communications, add binary bits to get combination of desired options, for example 7 would set up the first three options. • Allow flow to continue is available with unlimited preset arms only.		

System: Default Alarms: User Alarms: User Alarm Configuration and User Alarm Message **System - See Table 17: Default Alarms below.**	Index: per User Alarm	Range: 1 - 10; 18 characters maximum
Description: These program codes allow the operator to customize the AccuLoad by defining alarm conditions to a particular system. User alarms may be set through communications or Boolean/algebraic equations, or may be selected from the following: • Allow run/ready mode clear • Energize alarm output 1 • Energize alarm output 2 • Notify via email • Allow flow to continue		

Table 17: Default Alarms

Default Alarm/User Alarms	Configuration	Message
1	671	686
2	672	687
3	673	688
4	674	689
5	675	690
6	676	691
7	677	692
8	678	693
9	679	694
10	680	695

8.2.7 700—Communications Directory

Communications Directory includes:

- Arm Addresses
- Printer Control
- Host Interface
- Card/Nedap Reader
- Serial Port Config
- Prompts

8.2.7.1 Arm 1 - 6 Addresses

System: Communications: Arm Address **System 701 - 706**	Index: Arm	Range: 1 - 99
Description: This two-digit entry defines the communications address associated with this load arm. For multiple AccuLoads on a shared serial communications line, all addresses must be unique.		

Critical: • Address must not be zero. • Addresses must be unique.
Fatal: Entry out of specified range.
Note: Load Arm 3 – 6 Address - Not used on AccuLoad-ST hardware.

8.2.7.2 Printer Control

System: Communications: Printer Control: Printer Standby **System 727**	Index: None	
Description: This parameter defines how the AccuLoad reacts when a transaction report fails to print. If "Standby" is selected, the AccuLoad will silently enter printer standby mode (no alarm will be set or displayed) when a transaction report fails to print within the programmed communications port timeout. An event will be logged in the event log indicating that the transaction report is pending. A printer standby flag will be available via communications (see EE command) which will indicate when there are pending transaction reports. If "Standby & Alarm" is selected and Network Printing, XON/XOFF or PTB printing is being used, the AccuLoad will set the "NP: Network Printer" or "PP: Printer" alarm respectively and will enter printer standby mode. These alarms are configurable in the Alarms Directory and therefore do not necessarily need to stop flow. If choosing this option, be sure to configure the alarm appropriately. No alarm will be set if using serial printing with no flow control. If "Alarm + No Trans" is selected, the AccuLoad will set the associated printer alarm as above but will not enter standby mode. Although the alarm may be cleared, the AccuLoad will not allow a new transaction to start on that arm until the pending transaction has been successfully printed. Selections: • [NA] • Silent Standby • Standby and Alarm • Alarm and No Transaction		
Critical: Select if desired to protect transaction reports not printed and if alarm should be set when the report is not printed.		

System: Communications: Printer Control: Auto Reprint **System 728**	Index: None	
Description: The AccuLoad may be configured to automatically reprint pending transaction reports using this parameter. The AccuLoad will always attempt to print a transaction report when the transaction is ended. If a report is successfully print- ed and there are pending reports, then the pending reports will be printed as well. Selections: • [No] • Yes The AccuLoad will only reprint pending reports on idle arms. If a transaction is in progress on an arm, then the pending reports on that arm will not be printed until the arm becomes idle. If any report fails to print, the printing of any remaining reports will be aborted.		

System: Communications: Printer Control: Auto Tear Off **System 729**	Index: None	
Description: When enabled, the AccuLoad will function with a printer's auto tear off feature. The tear off feature is when a printer automatically advances the paper to the tear off position after a form feed is received (a form feed is at the end of the print job). Selections: • [No] • Yes		

8.2.7.3 Host Interface

System: Communications: Host Interface: Comm Link Programming **System 731**	Index: System
Description: Defines which parameters can be modified through communications by the access level assigned to those parameters. The factory default is "Level 5 Access." Selections: • (0) Alarm Clearing Only—This selection allows only the alarms to be reset (cleared) through communications. • (1) Level 1 Access Parameters • (2) Level 2 Access Parameters • (3) Level 3 Access Parameters • (4) Level 4 Access Parameters • (5) Level 5 Access Parameters - These selections limit the parameters that can be changed through communications to those assigned a security level at or below the option selected.	

System: Communications: Host Interface: Modbus Endian **System 732**	Index: None
Description: This program code defines the byte order for floating point values returned by Modbus communications. AccuLoad supports three variations of byte ordering when sending floating point values via Modbus protocols. The factory default and AccuLoad native byte order is Big Endian. Selections: • (0) Big Endian - bytes are ordered most significant first • (1) Little 8 Endian - bytes are ordered least significant first • (2) Little 16 Endian - 16-bit words are ordered least significant first; bytes within words remain big Endian.	

System: Communications: Host Interface: Timeout Action **System 733**	Index: None	
Description: This program mode selects the action taken when a Host communications timeout occurs, i.e., the automation or supervisory system has stopped communicating for longer than the timeout period in System 739 (for Ethernet hosts) or for serial hosts either System 711 (for Comm 1), 716 (for Comm 2), 721 (for Comm 3, or 726 (for Comm 4). Standby mode allows the AccuLoad to continue to allow transactions in the case where host control has been lost. Selections: • (0) Alarm • (1) Standby • (2) Alarm and Standby		

System: Communications: Host Interface: Inhibit Auto Focus **System 734**	Index: None	
Description: This program code, when selected, prevents the automation SB, SF, AP, WD, WP, WQ, and WX functions from changing the focus of the display. (The FS command will still result in a focus change.) Selections are as follows: • (0) No • (1) Yes		
Help: Select if it is not desired to automatically change the focus to an arm receiving communication prompt commands (SB, SF, AP, WD, WP, WQ, WX).		
Note: This parameter is only available when using Revision 1.0 and above firmware		

System: Communications: Host Interface: IP Discovery **System 1700**	Index: None	
Description: This setting selects whether the AccuLoad is configured with a fixed Ethernet IP address or it should obtain an address automatically from a DHCP server on the network. Selection: • [Manual] • DHCP		

System: Communications: Host Interface: THMI IP Address **System 1721**	Index: None	Range: 000.000.000.000
Description: Sets the network communications address associated with the AccuLoad's MMI. In a Split Architecture configuration, the THMI IP Address is associated with MMI A. If multiple MMIs are used the THMI IP Address must be unique. If parameter 1003 Board Set Function is set to No HMI or HMI B, the THMI IP Address should be set to 0.0.0.0.		
Note: See section 8.8: Split Architecture Directories on page 243 for additional Split Architecture parameters.		

System: Communications: Host Interface: THMI B IP Address **System 1722**	Index: None	Range: 000.000.000.000
Description: Sets the network communications address associated with the AccuLoad's MMI B when using a Split Architecture configuration. The THMI B IP Address must be unique. If parameter 1003 Board Set Function is set to No Split Arch, No HMI, or HMI A, the THMI B IP Address should be set to 0.0.0.0.		
Note: See section 8.8: Split Architecture Directories on page 243 for additional Split Architecture parameters		

System: Communications: Host Interface: Netmask **System 736**	Index: None	Range: 000.000.000.000
Description: The netmask (sometimes called a subnet mask) is a four octet address used to define a network. This address uses the same format as the IP address. A typical netmask is 255.255.255.0. This means that the first three octets describe a particular network and the last octet describes a specific device. If the AccuLoad is assigned IP address 192.168.0.1 and a printer has IP address 192.168.0.9, then the two devices are on the same network because the first three octets of each address are the same. In order to increase the number of devices on a particular network, simply adjust the netmask. In the previous examples, the netmask allowed 256 devices to be connected to the network. If more devices are needed on a network, then the netmask of 255.255.254.0 would allow 512 devices to be connected to the network. Similarly, a network of 255.255.253.0 would allow 1024 devices to be connected. • 4 octet numeric entry – 255.255.255.255		

System: Communications: Host Interface: Gateway **System 737**	Index: None	Range: 000.000.000.000
Description: The Gateway address is another four octet address that also uses the same format as the IP address. A Gateway provides an exit route for all addresses that are not part of the local network. The Gateway address typically belongs to a network device such as a router. The router can then connect to another local network or to the internet. The entry for 'System 737-Gateway' should be the IP address for the router that your AccuLoad IV.net uses to connect to any IP addresses not in your local subnet. If you don't have a router and are not connected to external networks, you can leave this entry 0.0.0.0. • 4 octet numeric entry – 255.255.255.255		

System: Communications: Host Interface: Ethernet Host Control **System 738**	Index: None	
Description: This program code determines what level of control is exhibited by a host interfaced to the AccuLoad via the Ethernet interface. Selections: • Polling Only • [Poll and Program] • Poll and Authorize • Remote Control The highest level of control programmed among this entry and the serial port entries is assumed to be the desired level of control for the AccuLoad.		

System: Communications: Host Interface: Ethernet Timeout **System 739**	Index: None	Range: 0 - 999
Description: This entry specifies the timeout value in seconds for the host communication protocols via Ethernet TCP/IP network (Smith I/P, Modbus TCP) before a communications alarm will be generated. A zero entry disables the time out action. • Three -digit numeric entry		

System: Communications: Host Interface: Host User Text Archived **System 777**	Index: None	
Help Message: When this option is selected, the eight 32-character user text fields available for writing/reading by the host, via BW/ BR commands, are stored along with the final transaction data when a transaction ends. This allows a host to not just place relevant text on the immediate bill of lading/receipt ticket but also allows the AccuLoad.net to recall the data and to reprint the ticket later with the same information. Selections: • Not Saved • Saved Enabling this option (selecting Stored) will reduce the total number of transactions that can be archived at the AccuLoad in the transaction log since it increases the size of each stored transaction.		

System: Communications: Host Interface: DNS Server IP **System 780**	Index: None	Range: 000.000.000.000
Sets the IP address of the primary DNS server on the Ethernet network. The DNS (Domain Name Service) provides a mechanism for Internet devices to obtain the IP address of another device on the network using a text-based name instead of a numeric address.		
This IP address will be used by the AccuLoad to resolve host names if host names are entered instead of IP addresses for the remote servers, specifically the SMTP and POP3 servers and network printers at this time.		

System: Communications: Host Interface: SMTP Server Name **System 781**	Index: None	Range: Text - 28 characters maximum
Enter the host name for the SMTP (Simple Mail Transfer Protocol) server that provides the email account set up for the AccuLoad. Examples: • If using DNS - smtp.yourmailserver.com • If using IP address - 192.168.0.98 To utilize the email features, an email account must be set up for each AccuLoad on a mail service provider that supports SMTP (and optionally POP3) access. Enter up to 28 characters of text. Enter the server name or IP address of the SMTP server.		

System: Communications: Host Interface: POP3 Server Name **System 782**	Index: None	Range: Text - 28 characters maximum
Description: Enter the host name or IP address of the POP3 (Post Office Protocol v3) server that provides the email account to which the AccuLoad should send email notifications of alarms conditions. Examples: • If using DNS - pop.yourmailserver.com • If not using DNS - 192.168.0.99		

System: Communications: Host Interface: Email Account User Name **System 783**	Index: None	Range: Text - 28 characters
Description: Enter the user name on the email account to use to send email notifications.		

System: Communications: Host Interface: Email Account Password **System 784**	Index: None	Range: Text - 28 characters
Description: Enter the password for the email account used to send email notifications.		

System: Communications: Host Interface: Email Notify Address **System 785**	Index: None	Range: Text - 28 characters
Description: Enter the email address where notification emails will be sent when an alarm configured for notification occurs. The AccuLoad.net must have access to an SMTP server that is capable of forwarding emails to the destination for this feature to operate.		

System: Communications: Host Interface: Email Address for Reply (FROM address) **System 786**	Index: None	Range: Text - 28 characters
Description: Enter the email address to be used in the <FROM> field of notification emails sent by this AccuLoad. For example, if the email server is at yourmailhere.com, and the Email account name is AL3NET_1, then the reply-to address would be AL3NET_1@yourmailhere.com		

System: Communications: Host Interface: Network Printer **System 787**	Index: None	Range: Text - 28 characters
Description: Enter the IP address (or printer name if DNS server is available and the printer has a name in the domain) of the network printer where the AccuLoad.net is to send print jobs. The network printer can be used in place of or in conjunction with serial printer options.		

System: Communications: Host Interface: BlueTooth Master Enable/Disable **System 788**	Index: None	
Description: This parameter is to select the Master AccuLoad when interfacing via the Smith Meter/Sening Cross Over prevention (COP) system via a Bluetooth interface. One and only one of the AccuLoads sharing a Bluetooth module should be configured as a master. Selections: • Disabled—AccuLoad is not designated as a master) • Enabled —Designate this AccuLoad as the Bluetooth master.		

8.2.7.4 Card/Nedap Reader

System: Communications: Card/ Nedap Reader: HMI Card Reader **System 1701**	Index: None	
Description: Used to specify whether card reader is connected directly to the AccuLoad or remotely (on the HMI). Selections: • [No] • Yes		

System: Communications: Card/ Nedap Reader: Card ID Validation **System 771**	Index: System	
Description: This parameter defines the type of operator validation required by the card reader prior to initiating a transaction. The factory default is ID Stamp Only. If Standalone/Standby is selected, the AccuLoad operates as if ID Stamp Only was selected while under host control. Selections: • (0) ID Stamp Only] • (1) ID Stamp and Card-In Required • (2) Standalone/Standby • (3) Validate Always		
Note: If an MMI port is configured and no card reader is being used, this parameter should be set to (0) ID Stamp Only; otherwise, card data will be expected.		

System: Communications: Card/ Nedap Reader: Card ID Timeout **System 772**	Index: System	Range: 0 - 99 minutes
Description: This entry indicates the period that new card data will remain valid when no transactions are in progress. On new card data, this timer is reset to 1 and begins to increment each minute until either a transaction is started or the timer reaches the value programmed and expires. On expiration, the card data is erased. If programmed for any validation selection other than ID stamp only, loading will be prevented until a valid card is again presented to the reader, or until the next message from the card reader containing successfully read data is received. Once a transaction is started within the card data valid timeout period, other transactions may be started on other arms. Only when all transactions on all arms in the unit have been ended, will the valid card status will be removed. A value of zero for this program entry indicates the timer should never expire. The card data will remain valid until a transaction is started and will remain valid until all transactions are ended.		
Critical: Card reader must be attached to MMI if using an MMI.		

System: Communications: Card/ Nedap Reader: Card Reader Configuration **System 773**	Index: System	
Description: This selects the operating mode of the card reader. Momentary is used when a card will be "swiped" to access the AccuLoad. The captive option requires the card to be continuously present in front of the card reader to remain valid. The factory default selection is Momentary. Selections: • (0) Momentary • (1) Captive Card mode		
Note: A new option has also been added to System 315 – Transaction Termination to allow selection of card removal as a means of ending a transaction. This is to ensure that in Captive Card mode the operator cannot leave his card behind, as the transaction cannot be ended until the card is removed.		

System: Communications: Card/Nedap Reader: Card Authorization **System 774**	Index: None	
Description: Select if it is desired for a valid card to allow multiple transactions to be started or only for the next transaction that is started. Factory default selection is All Arms. • All Arms • Single Transaction		
Note: Single Trans authorization is not available with "captive card" reader option (773).		

Sytem: Communications: Card/Nedap Reader: Vehicle ID Tag **System 775**	Index: None	
Description: Used to select which of the standard AccuLoad prompts should be used to prompt the driver for the vehicle ID tag when it is not electronically read from the trailer. Selections: • [N/A] • Prompt 1 • Prompt 2 • Prompt 3 • Prompt 4 • Prompt 5		

8.2.7.5 Serial Port Configuration 1 - 4

System: Communications: Serial Port Configuration: Function **System 707**	Index: Serial comm port	Range:
Description: This program code defines the function of the communications port. The factory default is Minicomp Host on comm port 1. Selections: • N/A—This communications port is not selected for use. • Term Host— This communications port communicates with a terminal type device using a simplified communications protocol • Minicomp Host—This communications port communicates with a minicomputer type device using a sophisticated and secure communications protocol • Modbus Host • Printer—Permits the AccuLoad through this communication port to automatically output an end of a transaction report to a printer connected to the AccuLoad • Shared Printer—Same as number (4) above except the output report will go to a shared printer connected to one or more AccuLoads. This requires special wiring. See the AccuLoad IV Installation and Maintenance Manual (MN06201) for further details. • Smart Inj/AICB/A4I—Permits the AccuLoad through this communication port to communicate with and control up to twenty-four smart additive injector systems • E+H Promass— Assigns a communication channel to an E+H Promass Coriolis Meter. • Smith Meter Card Reader—Assigns a communications channel to the Smith Meter Card Reader Interface board, allowing passage of card data to a host computer • Nedap Reader—For connection to a Nedap access control device • F.A. Sening COP—Enables the interface to the F.A. Sening cross over prevention. The communications port control must be correctly configured for the selected function.		
Fatal: Baud rates below 9600 are no longer supported. (They remain in the select list for backward compatibility).		
Critical: • Shared printing is only possible on port 1 • An address must not be zero. • A maximum of two ports may be configured for injector control. • A maximum of two ports may be configured for printer functions. • A maximum of two ports may be configured for host interface. • Modbus requires 8-bit data. • Function conflicts with port control.		
Note: it is possible to program multiple host control ports for redundancy purposes. Note that only one host control port should be issuing control commands at any one time. It is up to the automation system to prevent conflicts when using this feature.		

System: Communications: Serial Port Config: Baud Rate **System 708**	Index: Serial port	Range: 1200 - [57600] - 115200
Description: Sets the speed of the associated communications port. Selections: 9600, 19200, 38400, [57600], or 115200 baud.		

System: Communications: Serial Port Config: Data/Parity **System 709**	Index: Serial port	Range:
Description: This parameter defines the number of data bits and parity used by the associated communications port. Unless indicated otherwise, one stop bit is used. Factory default is selection 8 bits/No Parity. Selections: • (0) 7 bits No Parity • (1) 7 bits Odd Parity • (2) 7 bits Even Parity • (3) 8 bits No Parity • (4) 8 bits Odd Parity • (5) 8 bits Even Parity • (6) 8 bits No Parity, 2 Stop Bits		
Critical: Modbus requires 8-bit data.		

System: Communications: Serial Port Config: Control **System 710**	Index: Serial port	Range:
Description: This program code sets the level of control the associated communications port commands. Polling Only, Poll and Authorize, and Remote Control are valid with host communications options. XON/XOFF is valid with printer options. Only one port can have transaction control. The factory default is Poll & Program. Selections: • (0) N/A—No communications on this port. • (1) Polling Only—No transaction control, display control or programming allowed via this port. Able to read program code values and run data from the unit. • (2) Poll & Authorize—Full programming/prompting control. Transaction control requiring authorization from host. Allows use of AccuLoad communications commands such as AU Authorize Transaction and AP Authorize Transaction and Preset for host authorization. Designed for terminals where the driver enters desired preset volume after authorization. • (3) Remote Control—Full programming and prompting control. Transaction control (also requiring authorization from host) Allows use of SB—Set Batch to enter the preset remotely and EB to end the batch remotely. This is designed for pre-dispatch operations where the driver has limited input during the load process and the preset is host-controlled. • (4) XON/XOFF—For printer ports only. XON/XOFF flow control. • (5) Poll & Program—For use with AccuMate ports. Allows full program access but does not affect transaction control (acts like a standalone unit). • (6) PTB-FX—Security level designed to support PTB Weights and Measures agency-approved printer interface. • (7) PTB-LQ—Security level designed to support PTB Weights and Measures agency-approved printer interface.		
Criticals: • Comm port not configured for host communications. • Comm port not configured for printer. Note: Enter elapsed time in seconds of comm fail before signaling an alarm.		

System: Communications: Serial Port Config: Serial Interface **System 1702**	Index: Serial port	Range:
Description: Sets the serial port for RS-232 or RS-485 Selections: • [RS-232] • RS-485		

System: Communications: Serial Port Config: RS-485 Duplex **System 1706**	Index: Serial port	Range:
Description: Sets the mode of RS-485 serial communications. Selections: • [Full Duplex] - 4-wire • Half Duplex - 2-wire		

System: Communications: Serial Port Config: Termination Resistors **System 1710, 1711, 1712**	Index: Serial port	Range:
Description: Enables or disables the on-board termination resistors for RS-485 serial ports Selections: • [Disabled] • Enabled		

8.2.7.6 Prompts

System: Communications: Prompts: Prompt Mode **System 740**	Index: None	
Description: This program code selects when prompts will be displayed. Selections: • (0) [Transaction Start] • (1) Standby		

System: Communications: Prompts: Prompts Used **System 741**	Index: None	Range: 0 - [2] - 5 0 disables this feature
Description: Sets the number of built-in prompts to present to the operator at the start of the transaction setup screen sequence. The responses entered by the operator get stored as part of the transaction record by the AccuLoad and can be printed on the Transaction Report and/or retrieved through communications.		

System: Communications: Prompts: Prompt Timeout **System 742**	Index: None	Range: 0 [30] - 99 seconds
Description: This two-digit entry defines the amount of time, in seconds, that a local prompt will remain displayed at AccuLoad before the prompting sequence is aborted and AccuLoad returns to the ready screen. If set to zero the AccuLoad will wait indefinitely for data entry in response to a prompt. The factory default is 0.		

System: Communications: Prompts: Prompt Validation **System 758**	Index: None	Range: 0 - 3

Description: Selects how the AccuLoad validates (using the built-in driver database) the data entered by the operator in response to a prompt. Options 1 and 2 are used only if no card reader is installed on the system. If Option 3 is selected, a card reader must be in place because with that option, ID validation is performed by using the card data. Once the card data has been verified, the PIN is compared with the previously defined PIN for that card in the database. Selections: • (0) None • (1) ID • (2) ID & PIN • (3) PIN
Criticals: • Selection invalid when using card reader for options 1 and 2 above. • Prompt response type cannot be alphanumeric for PIN entry. • Card validation must be enabled in 761 for this option for option 3 above.

System: Communications: Prompts: Prompt Message **System - See Table 18: Communications/Prompts below**	Index: Per Prompt, 5 max.	Range: Text - 28 characters max.
Description: Defines the message displayed on the screen to prompt the operator for information.		

System: Communications: Prompts: Prompt Input Type **System - See Table 18: Communications/Prompts below**	Index: Per Prompt, 5 max.	Range: 0 - 2
Description: This parameter defines whether numeric or alphanumeric data entered in response to a local prompt will echo to the screen or display Xs in place of digits as a security feature. Selections: • (0) [Numeric] - shown on screen • (1) Hidden - numeric, X's shown on screen • (2) Alphanumeric		

System: Communications: Prompts: Prompt Length **System - See Table 18: Communications/Prompts below**	Index: Per Prompt, 5 max.	Range: 0 - [9] - 25 characters
Description: Sets the maximum length of a response to a prompt.		

Table 18: Communications/Prompts

Communications/Prompts	Prompt Message	Prompt Input Type	Prompt Length
Prompt 1	743	744	745
Prompt 2	746	747	748
Prompt 3	749	750	751
Prompt 4	752	753	754
Prompt 5	755	756	757

8.2.8 800—Additive Directory

Common Additives Menu

- Number of Injectors
- Additive Selection Method
- Additive Pacing Units
- Additive Stop Option
- Additive Stop Amount
- Additive Stop Disable
- Additive Stop Pump Action
- Additive Injection Units
- Additive Totals Units
- Inject to Totals Convert
- Clean Line Additive
- Piston Feedback Errors
- Piston Stop Action
- Alarm Pulse Count
- Alarm Pulse time
- FC Inj Additive Totals
- FC Inj Channel Select
- FC Inj Error Count
- FC Inj Error Reset
- FC Inj Error Amount
- Injection Window Percentage

Additive Configuration Menu (1 - 24)

- Injector Tag
- Injector Type
- Injector Arm
- Injector Plumbing
- Injector Address
- Injector K Factor
- Injector Meter Factor
- Injector High Tolerance
- Injector Low Tolerance
- Injector Maximum Tolerance Errors

8.2.8.1 Common Additives

System: Additives: Additives Common: Number of Injectors **System 020**	Index: None	Range: 0 - [24]
Description: The total number of injectors controlled by this AccuLoad.		

System: Additives: Additives Common: Additive Selection Method **System 801**	Index: System	Range: 0 - 4
Description: This parameter defines how additive injectors will be selected for delivery. Only those additives programmed for a recipe will be available. The selection of available additives may be further limited with a communications command from an automation system. The factory default selection is Automatic. Selections: • (0) Automatic—No selection is required or allowed when presetting. All the injectors that are programmed, less those disabled via automation communications, will automatically pulse when the unit is loading • (1) Transaction—Manual selection of the injectors at the start of the transaction. At the start of each transaction, the operator will be prompted to select the desired injectors prior to presetting • (2) Batch—Manual selection of the injectors at the start of each batch. At the start of each batch, the operator will be prompted to select the desired injectors prior to presetting • (3) Standby Transaction • (4) Standby Batch		

System: Additives:Additives Common: Additive Pacing Units **System 802**	Index: System	Range: 0 - 4 Default: [IV]
Description: This program code selects the volume type used to pace the additive injectors. Selections: • (0) Indicated volume (IV) • (1) Gross volume (GV) • (2) GST volume (GST) • (3) GSV volume (GSV) • (4) Mass		
Critical: Selected units not available.		

System: Additives: Additives Common: Additive Stop Option **System 803**	Index: None	Range: 0 - 2
Description: This parameter defines when the additive injection will stop for each batch. It also determines whether the rate will be recalculated so that the total amount of additive expected for the preset volume will be delivered before the down- counter reaches the volume in System 805 – Additive Stop Amount. The factory default selection is End of Batch. Selections: • (0) End of Batch—Stop volume is ignored. Additive is delivered until end of batch • (1) No recalculation—Additive is delivered as above but injection halts when only stop volume remains • (2) Recalculation—Proper additive volume for entire preset volume is "squeezed" so that the correct additive amount for preset is delivered when the stop volume is reached.		
Note: See System: Additives: Additives Common: Additive Totals Units on the next page. Additive Stop Volume Disable for those individual additives that deliver to the end of the batch.		

System: Additives: Additives Common: Additive Stop Amount **System 804**	Index: None	Range: [0] - 999
Description: This four-digit entry allows the operator to select the amount of product remaining to be delivered when the additive injectors will be shut down. This code is used only in conjunction with Injector Option 1 and 2 of parameter 803. The range of this code is 0 to 9999		

Note: System: Additives: Additives Common: Additive Totals Units below. Additive Stop Volume Disable for those individual additives that deliver to the end of the batch.

System: Additives: Additives Common: Additive Stop Disable **System 098**	Index: System	Range: 1 - 24
Description: This parameter allows the programming of the additive stop volume to be ignored for specified additives. Select the additives that will NOT be stopped at the additive stop volume by scrolling through the list on the AccuLoad display. Selections: • Additive 1 - 24 Additives that will ignore the stop volume will be highlighted and a 'check mark' icon will appear on that additive in the list.		

System: Additives: Additives Common: Additive Stop Pump Action **System 099**	Index: System	Range: 0 - 1
Description: This program code determines when the additive pump is de-energized while an additive stop amount is configured and active for the associated injector. Selections: • (0) End of Batch • (1) When Stop Amount reached (after last injection completes) If the Additive Stop Disable option is configured for the associated injector, this option has no effect and the pump will remain on until end of batch (default operation).		
Note: This option cannot be guaranteed to give the desired results when used with smart injectors that perform their own pump control.		

System: Additives: Additives Common: Additive Injection Units **System 805**	Index: None	Range: Text - 3 characters maximum
Description: This code allows entry of a three-character identifier for the injected additive units, such as cc or oz. These are the units associated with the programmed additive volume per injection in the recipe directory.		

System: Additives: Additives Common: Additive Totals Units **System 806**	Index: None	Range: Text - 3 characters maximum
Description: This program code is a three-character text entry used to define the units in which additive injector volumes are totaled. All additive injector totals are available in dynamic displays and via communications will be in these units.		

System: Additives: Additives Common: Injection/Totalization Conversion Factor **System 807**	Index: System	Range: 0 - 9999999000
Description: This ten-digit numeric entry is used to convert injection units to totals units. The AccuLoad uses this formula for the conversion: Volume in Injector units/Conversion factor = Volume in Total Units. Example: If injection units are in cc., and injector totals are to be displayed in liters, the value would be 1000. (1.00 e+03).		

System: Additives: Additives Common: Clean Line Additive **System 808**	Index: System	Range: 0 - 999 0 disables alarm
Description: Sets the tolerance for the additive stop volume. If the batch is ended before the programmed stop volume has been completely delivered, this entry determines if an alarm will occur. An alarm will occur at batch end if the volume delivered since the last injection is short of the stop volume by more than this entry. A 0 entry disables the alarm. Example: If injection units are in cc., and injector totals are to be displayed in liters, the value would be 1000. (1.00 e+03).		

System: Additives: Additives Common: Piston Injector Feedback Errors **System 809**	Index: System	Range: 0 - 9 0 disables the alarm
Description: This one-digit numeric entry is used with piston injectors with feedback only. It defines the number of missed feedback signals that can occur before an additive feedback alarm occurs. A 0 entry disables the alarm.		

System: Additives: Additives Common: Piston Injector Stop Action **System 026**	Index: System	Range: 0 - 1
Description: This parameter determines whether any active piston injector outputs are de-energized if the batch is stopped prematurely via the user interface, an alarm, or loss of permissive. This does not affect the state of the piston injector solenoid output at batch end or transaction end. Selections: • (0) [No Action] • (1) De-energize		

System: Additives: Additives Common: Alarm Pulse Count **System 087**	Index: System	Range: 0 - 999
Description: This parameter determines the threshold of leakage pulses allowed without an alarm. This parameter is for metered injectors. When set to 0, the count defaults to 10.		

System: Additives: Additives Common: Alarm Pulse Time **System 088**	Index: System	Range: 0 - 999 minutes
Description: This parameter defines the amount of time in minutes between automatic resets of the Injector Alarm Pulse Count. If set to 0, the count is not reset.		

System: Additives: Additives Common: Include Flow-Controlled Inj Additive Totals **System 093**	Index: System	Range: 0 - 999 sec
Description: Due to the large percentages and delivered amounts typically associated with flow-controlled additives, these meters are typically custody transfer so they can be segregated/reported independently from the combined (product + additive) total usually reported when additives are plumbed downstream. Select whether to treat this flow-control additive specially and not include the additive volume in the reported product total. Default is to include additive volumes in the totals reported for the product. Selections: • (0) [Include with product] • (1) D not include		

System: Additives: Additives Common: Flow Rate Controlled Inj Channel Select **System 142**	Index: None	Range: 0 - 1
Description: Selects single or dual channel pulse inputs for flow controlled additive meters. Selections: • (0) [Single Channel] • (1) Dual Channel		
Note: If the meter pulse input type in Configuration 101 - Transmitter Channel Selection is programmed for 0 – Single Channel, then this program code must also be 0 – Single Channel.		

System: Additives: Additives Common: Flow Rate Controlled Inj Error Count **System 143**	Index: None	Range: 0 - 999
Description: Sets the maximum number of dual pulse error counts allowed before a dual pulse error alarm occurs. The count is maintained for each flow-controlled additive separately and the alarm is generated only if the error count for any one injector pulse stream exceeds the error count programmed here. An entry of 0 disables the alarm.		

System: Additives: Additives Common: Flow Rate Controlled Inj Pulse Error Reset **System 144**	Index: None	Range: 0 - 3
Description: This program code defines the conditions under which the dual pulse error count will be reset for the flow-controlled additives. Selections: • (0) [No Reset] • (1) Transaction End • (2) Power-Up • (3) Transaction & Power-Up		

System: Additives: Additives Common: Flow Rate Controlled Inj Error Amount **System 145**	Index: None	Range: 0 -1
Description: This program code determines if error pulses accumulated after a Pulse Security alarm occurs are counted towards the flow-controlled additive amount delivered. Selections: • (0) [Count] • (1) Ignore Note: Select '0 – Count' to continue to totalize normally after this alarm occurs; Select 1 – Ignore to ignore all pulses after an alarm occurs. Selecting 1 – Ignore will cause any volume or mass that actually flows through the meter from point where this alarm occurs to when the valve is completely closed to be ignored. The AccuLoad will ignore any pulses from the meter until the alarm is cleared. Some measurement agencies require this behavior.		

8.2.8.2 Additives Configuration Menu - Injector 1 - 24

System: Additives:Additives Configuration: Injector Tag **System—See** **Table 19: Additives Configurations on page 190**	Index: Injector 1 - 24	Range: Text - 20 characters maximum
Description: Enter a name for this injector		

System: Additives: Additives Configuration: Injector Type **System—See** **Table 19: Additives Configurations on page 190**	Index: Injector 1 - 24	Range: 0 - 14
Description: These program codes define the type of additive injector installed at that injector position. AccuLoad supports a mixed implementation of additive injector types. Selections: • N/A • Piston • Piston Feedback • Titan • Blend-Pak • Mini-Pak • Smith Smart Injector • Metered Injector • Add-Pak-AICB • Shared Injector 1 • Shared Injector 2 • Shared Injector 3 • Shared Injector 4 • Flow Rate Controlled Injector • Add-Pak 2-Stroke injector		
Critical: • Metered injector pulse input not configured. • Injector I/O assignment does not match type. • No comm port configured for smart additive control. • No injector address assigned. • Only four metered injectors may be configured. • Add-Pak channel already assigned as auxiliary I/O point. • Additive 1 must be a metered injector type to configure Shared Injector 1. • Flow Rate Controlled Injectors limited to injectors 1-4. • Flow Rate Controlled Injector pulse input not configured.		

System: Additives: Additives Configuration: Injector Arm **System—See** **Table 19: Additives Configurations on page 190**	Index: Injector 1 - 24	Range: 1 - 6
Description: These entries specify the arm with which the associated additive injector is used. Selections: Arm 1 - Arm 6		

System: Additives: Additives Configuration: Injector Plumbing **System—See** **Table 19: Additives Configurations on page 190**	Index: Injector 1 - 24	Range:

Description: Selects which meters runs this injector is plumbed into. Selections: • Meter 1 - Meter 6 • Downstream (None)

System: Additives: Additives Configuration: Injector Address **System—See Table 19: Additives Configurations on the next page**	Index: Injector 1 - 24	Range: 0 - 999
Description: This three-digit numeric entry is used with any smart injector type. It defines the communications address for the associated injector. When more than one injector is installed at AccuLoad, injector addresses must be unique.		
Critical: • Injector address must be unique. • If A4I Board #1 is present [determined by seeing if Injectors 5 through 14 are Add-Pak], then no other injector may have address 100 through 110. • If A4I Board #2 is present [determined by seeing if Injectors 15 through 24 are Add-Pak], then no other injector may have address 200 through 210.		
Notes: • No entry if corresponding type is not a Smart Injector (Smith Meter, Titan, Gate City types). •		

System: Additives: Additives Configuration: Injector K Factor **System—See Table 19: Additives Configurations on the next page**	Index: Injector 1 - 24	Range: [0.000] - 9999.999
Description: This seven-digit value defines the nominal number of pulses from a meter for one unit of registration.		
Critical: • Entry must not be zero. • Metered injector pulse input not configured.		
Critical: Metered injector pulse input not configured.		

System: Additives: Additives Configuration: Injector Meter Factor **System—See Table 19: Additives Configurations on the next page**	Index: Injector 1 - 24	Range: [0.0000] - 9.9999
Description: The meter factor for the additive meters that are being controlled directly by the AccuLoad are programmed in these parameters. If the additives are being controlled through communications and ancillary equipment, no value should be programmed in these parameters. Meter factor equals the actual volume times the current meter factor times the K factor, all divided by the input pulses. The factory default is 0.0000.		
Critical: • Entry must not be zero. •		

System: Additives: Additives Configuration: Metered Injector High Tolerances **System—See Table 19: Additives Configurations on the next page**	Index: Injector 1 - 24	Range: [0] - 999.9
Description: These four-digit numeric entries define a percentage in three whole digits, followed by one decimal place, for the amount the actual injected volume can surpass the average volume required to meet the additive needs. The factory default is 0.		

System: Additives: Additives Configuration: Injector Low Tolerances **System—See Table 19: Additives Configurations below**	Index: Injector	Range: [0] - 999.9
Description: These four-digit numeric entries define a percentage in three whole digits, followed by one decimal place, for the amount the actual injected volume can be under the average volume required to meet the additive needs. The factory default is 0.		

System: Additives: Additives Configuration: Injector Maximum Tolerance Errors **System—See Table 19: Additives Configurations below**	Index: Injector	Range: [0] - 99
Description: These two-digit numeric entries allow the operator to set up how many times during the batch that the high and low tolerance percentages can be exceeded continuously before an alarm is set. The factory default is 0.		

Table 19: Additives Configurations

Additives: Injectors (INJ)	INJ Tag	INJ Type	INJ Arm	INJ Plumb.	INJ Add.	INJ KFactor	INJ Meter Factor	INJ High Tolerance	INJ Low Tolerance	INJ Max Tolerance Errors
1	1800	810	811	812	882	906	907	908	909	910
2	1801	813	814	815	883	911	912	913	914	915
3	1802	816	817	818	884	916	917	918	919	920
4	1803	819	820	821	885	921	922	923	924	925
5	1804	822	823	824	886	926	927	928	929	930
6	1805	825	826	827	887	931	932	933	934	935
7	1806	828	829	830	888	936	937	938	939	940
8	1807	831	832	833	889	941	942	943	944	945
9	1808	834	835	836	890	946	947	948	949	950
10	1809	837	838	839	891	951	952	953	954	955
11	1810	840	841	842	892	956	957	958	959	960
12	1811	843	844	845	893	961	962	963	964	965
13	1812	846	847	848	894	966	967	968	969	970
14	1813	849	850	851	895	971	972	973	974	975
15	1814	852	853	854	896	976	977	978	979	980
16	1815	855	856	857	897	981	982	983	984	985
17	1816	858	859	860	898	986	987	988	989	990
18	1817	861	862	863	899	991	992	993	994	995
19	1818	864	865	866	900	996	997	998	999	000
20	1819	867	868	869	901	001	002	003	004	005
21	1820	870	871	872	902	006	007	008	009	010
22	1821	873	874	875	903	011	012	013	014	015
23	1822	876	877	878	904	016	017	018	019	020
24	1823	879	880	881	905	021	022	023	024	025

8.2.8.3 Flow Controlled Injector 1 - 4

System: Additives: Flow Controlled Injector: Injector Minimum Flow **System—See Table 20: Flow Controlled Injector Configurations 1 - 4 on page 195**	Index: Injector 1 - 4	Range: 0 - 9999
Description: This four-digit numeric entry defines the lowest programmed flow rate for the additive. This will be the final stage flow rate for the additive when the valve is signaled to close at the completion of a preset. The range of this entry is 0 to 9999 units per time measurement.		

System: Additives: Flow Controlled Injector: Injector Maximum Flow **System—See Table 20: Flow Controlled Injector Configurations 1 - 4 on page 195**	Index: Injector 1 - 4	Range: 0 - 99999
Description: This four-digit numeric entry defines the maximum flow rate being controlled for this additive during loading. The range of this entry is front 0 to 99999 flow units.		
Note: Additive will not flow if additive maximum flow is zero.		

System: Additives: Flow Controlled Injector: Injector Flow Tolerance **System—See Table 20: Flow Controlled Injector Configurations 1 - 4 on page 195**	Index: Injector 1 - 4	Range: 0 - 9
Description: This single-digit entry designates the percentage of the currently requested flow rate that the flow rate of the additive may vary before the AccuLoad initiates a valve correction. The range of this one-digit numeric entry is from 0 to 9%. Example: Current Flow Rate: 130 GPM Flow Tolerance: ±5% Flow rate may vary ±6.5 GPM (130 GPM × 5% = 6.5 GPM without a valve correction)		

System: Additives: Flow Controlled Injector: Injector 2nd Trip **System—See Table 20: Flow Controlled Injector Configurations 1 - 4 on page 195**	Index: Injector 1 - 4	Range: 0 - 99.9
Description: This three-digit numeric entry defines the preset amount in tenths remaining for this additive at the final valve closure signal for the product. The range of this entry is from 0.0 to 99.9 units.		

System: Additives: Flow Controlled Injector: Injector Valve Type **System—See Table 20: Flow Controlled Injector Configurations 1 - 4 on page 195**	Index: Injector 1 - 4	Range:
Description: This entry defines the type of valve to be used with this additive. Selections: • Digital • Analog		

System: Additives: Flow Controlled Injector: Analog Valve Kp (PID, Proportional Gain Factor) **System—See Table 20: Flow Controlled Injector Configurations 1 - 4 on page 195**	Index: Injector 1 - 4	Range: 0 - 999.999
Description: This entry defines the PID proportional gain factor for analog valve control. The range of this entry is 0.000 to 999.999. This entry is used only with analog valves.		

System: Additives: Flow Controlled Injector: Analog Valve Ki (PID, Integral Gain Factor) **System—See Table 20: Flow Controlled Injector Configurations 1 - 4 on page 195**	Index: Injector 1 - 4	Range: 0 - 999.999
Description: This entry defines the PID integral gain factor for analog valve control. The range of this entry is 0.000 to 999.999. This entry is used only with analog valves.		

System: Additives: Flow Controlled Injector: Additive Kd (PID, Derivative Gain Factor) **System—See Table 20: Flow Controlled Injector Configurations 1 - 4 on page 195**	Index: Injector 1 - 4	Range: 0 - 999.999
Description: This entry defines the PID derivative gain factor for analog valve control. The range of this entry is 0.000 to 999.999. This entry is used only with analog valves.		

System: Additives: Flow Controlled Injector: Analog Valve PID Interval **System—See Table 20: Flow Controlled Injector Configurations 1 - 4 on page 195**	Index: Injector 1 - 4	Range: 0 - 9.9
Description: This entry defines the time interval, in seconds, between PID calculations. The range of this entry is 0.0 to 9.9.		

System: Additives: Flow Controlled Injector: Additive API Table **System—See Table 20: Flow Controlled Injector Configurations 1 - 4 on page 195**	Index: Injector 1 - 4	Range:
Description: This entry allows the operator to select the appropriate calculation to be used to temperature compensate the additive. This parameter applies only when the injector is configured as a flow rate controlled injector with temperature compensation. Selections: • None • API 2004 - crude oils • API 2004 - refined products • API 2004 - C tables special • API 2004 - Lube Oils • API E Tables - LPG, NGL • API 1952 (6,23,24,53,54) • PTB-1 - Ethanol/Bio Blend • PTB-3 - Ethanol/Bio Blend • EPA-RFS2 (E100) • EPA-RFS2 (B100) • Aromatics (ASTM D1555) • Brazil ABNT5992 (RefDen) • Brazil ABNT5992 (RefGrade) • Brazil ABNT5992 (LiveDen) • Brazil BR1A • Brazil BR1P • Brazil BR2P • NH3 - Ammonia		
Critical: This API table not available for flow controlled injectors. [Odd-numbered API tables, Brazil tables and 24E]		

System: Additives: Flow Controlled Injector: Additive Reference Density **System—See Table 20: Flow Controlled Injector Configurations 1 - 4 on page 195**	Index: Injector 1 - 4	Range: -9999.9 – +9999.9
Description: This code has a constant five-digit entry with a floating decimal point. The format is based on table and product selection. The program code format and data entry allows the programmable entry of the Reference Density when Table 54 is selected, Relative Density when Table 24 is selected, API when Table 6 is selected, and temperature coefficient when a C Table is selected. This entry represents the reference value used to calculate the volume correction factor. The range of this value will vary with the table selection chosen.		
Note: When Table 6 is selected, the leading digit will be used to show polarity, + = positive and a - = negative.		
Fatal: Entry is out of specified range.		

System: Additives: Flow Controlled Injector: Reference Density Units **System—See Table 20: Flow Controlled Injector Configurations 1 - 4 on page 195**	Index: Injector 1 - 4	Range: 0 - 4
Description: This entry allows the operator to indicate whether an additive is to share a temperature probe already assigned to another arm/meter or additive, and to select a specific probe to be shared. This eliminates having to configure multiple analog inputs for temperature. Selections: • NA • API • lb/ft^3 (pounds per cubic feet) • kg/m^3 (kilograms per cubic meter) • Relative Density		

System: Additives: Flow Controlled Injector: Additive Shared Temperature **System—See Table 20: Flow Controlled Injector Configurations 1 - 4 on page 195**	Index: Injector 1 - 4	Range: 0 - 40
Description: This entry allows the operator to indicate whether an additive is to share a temperature probe already assigned to another arm/meter or additive, and to select a specific probe to be shared. This eliminates having to configure multiple analog inputs for temperature. Selections: • Not Used • Arm 1 Meter 1 – 6 • Arm 2 Meter 1 – 6 • Arm 3 Meter 1 – 6 • Arm 4 Meter 1 – 6 • Arm 5 Meter 1 – 6 • Arm 6 Meter 1 – 6 • Flow Rate Injector 1 – 4		
Critical: Temperature probe already assigned to additive.		

System: Additives: Flow Controlled Injector: Additive Maintenance Temperature **System—See Table 20: Flow Controlled Injector Configurations 1 - 4 on the next page**	Index: Injector 1 - 4	Range: -999.9 – +999.9
Description: This code allows the entry of a maintenance temperature to be used when a temperature probe is not installed or working, but temperature related calculations are desired. The temperature units are dependent on the entry made in the Temperature Scale Select code. This four-digit entry has a range of –999.9 to 999.9 temperature units where –999.9 disables the maintenance temperature.		
Note: • An entry greater than -999.9 will override the temperature probe or transducer input if installed and will be used in all calculations where temperature is used. • This feature may be disallowed in certain weights and measures jurisdictions.		

System: Additives: Flow Controlled Injector: Additive High Temperature Alarm Limit **System—See Table 20: Flow Controlled Injector Configurations 1 - 4 on the next page**	Index: Injector Flow 1 - 4	Range: -999.9 – +999.9
Description: This code allows the entry of a temperature reading that will cause a high temperature alarm to be generated. The temperature units will be dependent on the entry made in the Temperature Scale Select code. This four-digit entry has a range of –999.9 to +999.9 degrees F or C.		
Note: An entry of "+999" will disable the alarm.		

System: Additives: Flow Controlled Injector: Additive Low Temperature Alarm Limit **System—See Table 20: Flow Controlled Injector Configurations 1 - 4 on the next page**	Index: Injector Flow 1 - 4	Range: -999.9 — +999.9
Description: This code allows the entry of a temperature reading that will cause a low temperature alarm to be generated. The temperature units will be dependent on the entry made in the Temperature Scale Select code. This four-digit entry has a range of -999.9 to +999.9 °F or °C.		
Note: “999” will disable the alarm.		

System: Additives: Flow Controlled Injector: Injector Flow Timeout **System—See Table 20: Flow Controlled Injector Configurations 1 - 4 on the next page**	Index: Injector Flow 1 - 4	Range: 0 - 9999
Description: This parameter determines the maximum amount of time in seconds allowed to reach the desired rate for a flow rate controlled additive before an alarm will be issued. If the desired flow is not reached before this timeout expires a low additive alarm will occur. A zero entry disables the feature.		
Help: Enter time in seconds to reach desired flow rate before an alarm occurs. Zero disables.		

System: Additives: Flow Controlled Injector: Rate Cutoff **System—See Table 20: Flow Controlled Injector Configurations 1 - 4 on the next page**	Index: Injector Flow 1 - 4	Range: 0 - 9999

Description: This parameter defines the additive flow rate below which dual pulse errors will not be counted. Entry is volume or mass based upon System 305 – Pulse In Type. The range of this entry is 0-9999. This parameter has no effect if flow controlled additive pulse inputs are not configured for dual channel transmitters in System 836 – Flow Controlled Additive Channel Select.

Table 20: Flow Controlled Injector Configurations 1 - 4

Injector Flow Control	Injector 1	Injector 2	Injector 3	Injector 4
Min Flow	027	031	035	039
Max Flow	028	032	036	040
Flow Tolerance	029	033	037	041
Inj. 2nd trip	030	034	038	042
Inj. Valve type	043	048	053	058
Analog Valve Kp	044	049	054	059
Analog Valve Ki	045	050	055	060
Analog Valve Kd	046	051	056	061
Analog Valve PID Interval	047	052	057	062
Additive API Table	063	069	075	081
Additive Ref. Density	064	070	076	082
Ref Density Units	1824	1825	1826	1827
Additive Share Temp	065	071	077	083
Additive Maint. Temp	066	072	078	084
Additive Hi Temp Alarm	067	073	079	085
Additive Low Temp Alarm	068	074	080	086
Flow timeout	089	090	091	092
Rate Cutoff	094	095	096	097

The shaded areas are new to the AccuLoad IV.

8.2.9 Security Directory

System: Security: Access Codes	Index: Security Level 1 - 5	Range: 1 - 12 digits
Description: These user-defined security access codes control entry into the AccuLoad's program or Weights and Measures program codes. Once the security is set up for the parameters in the unit the operator must enter the program mode at or above the level assigned to the parameter(s) that are to be changed. The access codes must be entered through the AccuLoad IV user interface after the Program Mode security contact has been closed (if the optional security switch input feature has been programmed and wired to a switch). If this contact has not been closed, the AccuLoad IV will not allow entry into the Program Mode.		
Critical: • Duplicate access codes are not permitted • Must be at highest level of security • A Level 5 access code must be entered at a minimum to utilize this feature.		
Note: • • The operator must enter Program Mode at the highest programmed security level to modify these access codes. • Access codes can only be configured at the user interface (no access via communications)		

System: Security: Security Input 1 **System 1900**	Index: None	Range: 0 - 43
Description: Select the digital input to use for the Security Input #1 function. Selections: • (0) No Security Input • (1 - 43) Digital Input 1 - 43		

System: Security: Security Input 2 **System 1901**	Index: None	Range: 0 - 43
Description: Select the digital input to use for the Security Input #2 function. Selections: • (0) No Security Input • (1 - 43) Digital Input 1 - 43		

System: Security: Security Input 1 Level **System 156**	Index: None	Range: 1 - 5
Description: This entry selects the security level associated with Security Input #1. Access up to this level will be available with the activation of this input (and passcode if configured). Selections: • No Security • Security Level 1 - 5		

System: Security: Security Input 2 Level **System 157**	Index: None	Range: 1 - 5
Description: This entry selects the security level associated with Security Input #2. Access up to this level will be available with the activation of this input (and passcode if configured). Selections: • No Security • Security Level 1 - 5		

System: Security: Diagnostics Security Level **System 158**	Index: None	Range: 1 - 5
Description: This entry selects the level of security required to enter the diagnostics menu. Selections: • (0) No Security • (1-5) Security Level 1 - 5		

System: Security: Set Parameter Security	Index: None	Range: 1 - 5
Description: Used to set the security of all configuration database parameters to the specified level		

8.2.9.1 Additives Configuration Menu - Injector 1 - 24

System: Additives:Additives Configuration: Injector Tag **System—See Table 21: Additives Configurations on page 199**	Index: Injector 1 - 24	Range: Text - 20 characters maximum
Description: Enter a name for this injector		

System: Additives: Additives Configuration: Injector Type **System—See Table 21: Additives Configurations on page 199**	Index: Injector 1 - 24	Range:
Description: These program codes define the type of additive injector installed at that injector position. AccuLoad supports a mixed implementation of additive injector types. Selections: • N/A • Piston • Piston Feedback • Titan • Blend-Pak • Mini-Pak • Smith Smart Injector • Metered Injector • Add-Pak-AICB • Shared Injector 1 • Shared Injector 2 • Shared Injector 3 • Shared Injector 4 • Flow Rate Controlled Injector • Add-Pak 2-Stroke injector		
Critical: • Metered injector pulse input not configured. • Injector I/O assignment does not match type. • No comm port configured for smart additive control. • No injector address assigned. • Only four metered injectors may be configured. • Add-Pak channel already assigned as auxiliary I/O point. • Additive 1 must be a metered injector type to configure Shared Injector 1. • Flow Rate Controlled Injectors limited to injectors 1-4. • Flow Rate Controlled Injector pulse input not configured.		

System: Additives: Additives Configuration: Injector Arm **System—See Table 21: Additives Configurations on page 199**	Index: Injector 1 - 24	Range: 1 - 6
Description: These entries specify the arm with which the associated additive injector is used. Selections: Arm 1 - Arm 6		

System: Additives: Additives Configuration: Injector Plumbing **System—See Table 21: Additives Configurations on the next page**	Index: Injector 1 - 24	Range:
Description: Selects which meters runs this injector is plumbed into. Selections: • Meter 1 - Meter 6 • Downstream (None)		

System: Additives: Additives Configuration: Injector Address **System—See Table 21: Additives Configurations on the next page**	Index: Injector 1 - 24	Range: 0 - 999
Description: This three-digit numeric entry is used with any smart injector type. It defines the communications address for the associated injector. When more than one injector is installed at AccuLoad, injector addresses must be unique.		
Critical: • Injector address must be unique. • If A4I Board #1 is present [determined by seeing if Injectors 5 through 14 are Add-Pak], then no injector may have address 100 through 110. • If A4I Board #2 is present [determined by seeing if Injectors 15 through 24 are Add-Pak], then no injector may have address 200 through 210.		
Notes: • No entry if corresponding type is not a Smart Injector (Smith Meter, Titan, Gate City types). • No entry if the injector is an Add-Pak type. If the injector is an Add-Pak type, this entry will be set automatically.		

System: Additives: Additives Configuration: Injector K Factor **System—See Table 21: Additives Configurations on the next page**	Index: Injector 1 - 24	Range: [0.000] - 9999.999
Description: This seven-digit value defines the nominal number of pulses from a meter for one unit of registration.		
Critical: • Entry must not be zero. • Metered injector pulse input not configured.		
Critical: Metered injector pulse input not configured.		

System: Additives: Additives Configuration: Injector Meter Factor **System—See Table 21: Additives Configurations on the next page**	Index: Injector 1 - 24	Range: [0.0000] - 9.9999
Description: The meter factor for the additive meters that are being controlled directly by the AccuLoad are programmed in these parameters. If the additives are being controlled through communications and ancillary equipment, no value should be programmed in these parameters. Meter factor equals the actual volume times the current meter factor times the K factor, all divided by the input pulses. The factory default is 0.0000.		
Critical: • Entry must not be zero. • Enter the meter factor for the metered injector.		

System: Additives: Additives Configuration: Metered Injector High Tolerances **System—See Table 21: Additives Configurations below**	Index: Injector 1 - 24	Range: [0] - 999.9
Description: These four-digit numeric entries define a percentage in three whole digits, followed by one decimal place, for the amount the actual injected volume can surpass the average volume required to meet the additive needs. The factory default is 0.		

System: Additives: Additives Configuration: Injector Low Tolerances **System—See Table 21: Additives Configurations below**	Index: Injector	Range: [0] - 999.9
Description: These four-digit numeric entries define a percentage in three whole digits, followed by one decimal place, for the amount the actual injected volume can be under the average volume required to meet the additive needs. The factory default is 0.		

System: Additives: Additives Configuration: Injector Maximum Tolerance Errors **System—See Table 21: Additives Configurations below**	Index: Injector	Range: [0] - 99
Description: These two-digit numeric entries allow the operator to set up how many times during the batch that the high and low tolerance percentages can be exceeded continuously before an alarm is set. The factory default is 0.		

Table 21: Additives Configurations

Additives: Injectors (INJ)	INJ Tag	INJ Type	INJ Arm	INJ Plumb.	INJ Add.	INJ KFactor	INJ Meter Factor	INJ High Tolerance	INJ Low Tolerance	INJ Max Tolerance Errors
1	1800	810	811	812	882	906	907	908	909	910
2	1801	813	814	815	883	911	912	913	914	915
3	1802	816	817	818	884	916	917	918	919	920
4	1803	819	820	821	885	921	922	923	924	925
5	1804	822	823	824	886	926	927	928	929	930
6	1805	825	826	827	887	931	932	933	934	935
7	1806	828	829	830	888	936	937	938	939	940
8	1807	831	832	833	889	941	942	943	944	945
9	1808	834	835	836	890	946	947	948	949	950
10	1809	837	838	839	891	951	952	953	954	955
11	1810	840	841	842	892	956	957	958	959	960
12	1811	843	844	845	893	961	962	963	964	965
13	1812	846	847	848	894	966	967	968	969	970
14	1813	849	850	851	895	971	972	973	974	975
15	1814	852	853	854	896	976	977	978	979	980
16	1815	855	856	857	897	981	982	983	984	985
17	1816	858	859	860	898	986	987	988	989	990
18	1817	861	862	863	899	991	992	993	994	995
19	1818	864	865	866	900	996	997	998	999	000

Additives: Injectors (INJ)	INJ Tag	INJ Type	INJ Arm	INJ Plumb.	INJ Add.	INJ KFactor	INJ Meter Factor	INJ High Tolerance	INJ Low Tolerance	INJ Max Tolerance Errors
20	1819	867	868	869	901	001	002	003	004	005
21	1820	870	871	872	902	006	007	008	009	010
22	1821	873	874	875	903	011	012	013	014	015
23	1822	876	877	878	904	016	017	018	019	020
24	1823	879	880	881	905	021	022	023	024	025

8.2.9.2 Flow Controlled Injector 1 - 4

System: Additives: Flow Controlled Injector: Injector Minimum Flow **System—See Table 22: Flow Controlled Injector Configurations 1 - 4 on page 204**	Index: Injector 1 - 4	Range: 0 - 9999
Description: This four-digit numeric entry defines the lowest programmed flow rate for the additive. This will be the final stage flow rate for the additive when the valve is signaled to close at the completion of a preset. The range of this entry is 0 to 9999 units per time measurement.		

System: Additives: Flow Controlled Injector: Injector Maximum Flow **System—See Table 22: Flow Controlled Injector Configurations 1 - 4 on page 204**	Index: Injector 1 - 4	Range: 0 - 99999
Description: This four-digit numeric entry defines the maximum flow rate being controlled for this additive during loading. The range of this entry is front 0 to 99999 flow units.		
Note: Additive will not flow if additive maximum flow is zero.		

System: Additives: Flow Controlled Injector: Injector Flow Tolerance **System—See Table 22: Flow Controlled Injector Configurations 1 - 4 on page 204**	Index: Injector 1 - 4	Range: 0 - 9
Description: This single-digit entry designates the percentage of the currently requested flow rate that the flow rate of the additive may vary before the AccuLoad initiates a valve correction. The range of this one-digit numeric entry is from 0 to 9%. Example: Current Flow Rate: 130 GPM Flow Tolerance: ±5% Flow rate may vary ±6.5 GPM (130 GPM × 5% = 6.5 GPM without a valve correction)		

System: Additives: Flow Controlled Injector: Injector 2nd Trip **System—See Table 22: Flow Controlled Injector Configurations 1 - 4 on page 204**	Index: Injector 1 - 4	Range: 0 - 99.9
Description: This three-digit numeric entry defines the preset amount in tenths remaining for this additive at the final valve closure signal for the product. The range of this entry is from 0.0 to 99.9 units.		

System: Additives: Flow Controlled Injector: Injector Valve Type **System—See Table 22: Flow Controlled Injector Configurations 1 - 4 on page 204**	Index: Injector 1 - 4	Range:
Description: This entry defines the type of valve to be used with this additive. Selections: • Digital • Analog		

System: Additives: Flow Controlled Injector: Analog Valve Kp (PID, Proportional Gain Factor) **System—See Table 22: Flow Controlled Injector Configurations 1 - 4 on page 204**	Index: Injector 1 - 4	Range: 0 - 999.999
Description: This entry defines the PID proportional gain factor for analog valve control. The range of this entry is 0.000 to 999.999. This entry is used only with analog valves.		

System: Additives: Flow Controlled Injector: Analog Valve Ki (PID, Integral Gain Factor) **System—See Table 22: Flow Controlled Injector Configurations 1 - 4 on page 204**	Index: Injector 1 - 4	Range: 0 - 999.999
Description: This entry defines the PID integral gain factor for analog valve control. The range of this entry is 0.000 to 999.999. This entry is used only with analog valves.		

System: Additives: Flow Controlled Injector: Additive Kd (PID, Derivative Gain Factor) **System—See Table 22: Flow Controlled Injector Configurations 1 - 4 on page 204**	Index: Injector 1 - 4	Range: 0 - 999.999
Description: This entry defines the PID derivative gain factor for analog valve control. The range of this entry is 0.000 to 999.999. This entry is used only with analog valves.		

System: Additives: Flow Controlled Injector: Analog Valve PID Interval **System—See Table 22: Flow Controlled Injector Configurations 1 - 4 on page 204**	Index: Injector 1 - 4	Range: 0 - 9.9
Description: This entry defines the time interval, in seconds, between PID calculations. The range of this entry is 0.0 to 9.9.		

System: Additives: Flow Controlled Injector: Additive API Table **System—See Table 22: Flow Controlled Injector Configurations 1 - 4 on page 204**	Index: Injector 1 - 4	Range:
Description: This entry allows the operator to select the appropriate calculation to be used to temperature compensate the additive. This parameter applies only when the injector is configured as a flow rate controlled injector with temperature compensation. Selections: • None • API 2004 - crude oils • API 2004 - refined products • API 2004 - C tables special • API 2004 - Lube Oils • API E Tables - LPG, NGL • API 1952 (6,23,24,53,54) • PTB-1 - Ethanol/Bio Blend • PTB-3 - Ethanol/Bio Blend • EPA-RFS2 (E100) • EPA-RFS2 (B100) • Aromatics (ASTM D1555) • Brazil ABNT5992 (RefDen) • Brazil ABNT5992 (RefGrade) • Brazil ABNT5992 (LiveDen) • Brazil BR1A • Brazil BR1P • Brazil BR2P • NH3 - Ammonia		
Critical: This API table not available for flow controlled injectors. [Odd-numbered API tables, Brazil tables and 24E]		

System: Additives: Flow Controlled Injector: Additive Reference Density **System—See Table 22: Flow Controlled Injector Configurations 1 - 4 on page 204**	Index: Injector 1 - 4	Range: -9999.9 – +9999.9
Description: This code has a constant five-digit entry with a floating decimal point. The format is based on table and product selection. The program code format and data entry allows the programmable entry of the Reference Density when Table 54 is selected, Relative Density when Table 24 is selected, API when Table 6 is selected, and temperature coefficient when a C Table is selected. This entry represents the reference value used to calculate the volume correction factor. The range of this value will vary with the table selection chosen.		
Note: When Table 6 is selected, the leading digit will be used to show polarity, + = positive and a - = negative.		
Fatal: Entry is out of specified range.		

System: Additives: Flow Controlled Injector: Reference Density Units **System—See Table 22: Flow Controlled Injector Configurations 1 - 4 on the next page**	Index: Injector 1 - 4	Range:
Description: This entry allows the operator to indicate whether an additive is to share a temperature probe already assigned to another arm/meter or additive, and to select a specific probe to be shared. This eliminates having to configure multiple analog inputs for temperature. Selections: • NA • API • lb/ft^3 (pounds per cubic feet) • kg/m^3 (kilograms per cubic meter) • Relative Density		

System: Additives: Flow Controlled Injector: Additive Shared Temperature **System—See Table 22: Flow Controlled Injector Configurations 1 - 4 on the next page**	Index: Injector 1 - 4	Range:
Description: This entry allows the operator to indicate whether an additive is to share a temperature probe already assigned to another arm/meter or additive, and to select a specific probe to be shared. This eliminates having to configure multiple analog inputs for temperature. Selections: • Not Used • Arm 1 Meter 1 – 6 • Arm 2 Meter 1 – 6 • Arm 3 Meter 1 – 6 • Arm 4 Meter 1 – 6 • Arm 5 Meter 1 – 6 • Arm 6 Meter 1 – 6 • Flow Rate Injector 1 – 4		
Critical: Temperature probe already assigned to additive.		

System: Additives: Flow Controlled Injector: Additive Maintenance Temperature **System—See Table 22: Flow Controlled Injector Configurations 1 - 4 on the next page**	Index: Injector 1 - 4	Range: -999.9 – +999.9
Description: This code allows the entry of a maintenance temperature to be used when a temperature probe is not installed or working, but temperature related calculations are desired. The temperature units are dependent on the entry made in the Temperature Scale Select code. This four-digit entry has a range of –999.9 to 999.9 temperature units where –999.9 disables the maintenance temperature.		
Note: • An entry greater than -999.9 will override the temperature probe or transducer input if installed and will be used in all calculations where temperature is used. • This feature may be disallowed in certain weights and measures jurisdictions.		

System: Additives: Flow Controlled Injector: Additive High Temperature Alarm Limit **System—See Table 22: Flow Controlled Injector Configurations 1 - 4 below**	Index: Injector Flow 1 - 4	Range: -999.9 – +999.9
Description: This code allows the entry of a temperature reading that will cause a high temperature alarm to be generated. The temperature units will be dependent on the entry made in the Temperature Scale Select code. This four-digit entry has a range of –999.9 to +999.9 degrees F or C.		
Note: An entry of "+999" will disable the alarm.		

System: Additives: Flow Controlled Injector: Additive Low Temperature Alarm Limit **System—See Table 22: Flow Controlled Injector Configurations 1 - 4 below**	Index: Injector Flow 1 - 4	Range: -999.9 — +999.9
Description: This code allows the entry of a temperature reading that will cause a low temperature alarm to be generated. The temperature units will be dependent on the entry made in the Temperature Scale Select code. This four-digit entry has a range of -999.9 to +999.9 °F or °C.		
Note: “999” will disable the alarm.		

System: Additives: Flow Controlled Injector: Injector Flow Timeout **System—See Table 22: Flow Controlled Injector Configurations 1 - 4 below**	Index: Injector Flow 1 - 4	Range: 0 - 9999
Description: This parameter determines the maximum amount of time in seconds allowed to reach the desired rate for a flow rate controlled additive before an alarm will be issued. If the desired flow is not reached before this timeout expires a low additive alarm will occur. A zero entry disables the feature.		
Help: Enter time in seconds to reach desired flow rate before an alarm occurs. Zero disables.		

System: Additives: Flow Controlled Injector: Rate Cutoff **System—See Table 22: Flow Controlled Injector Configurations 1 - 4 below**	Index: Injector Flow 1 - 4	Range: 0 - 9999
Description: This parameter defines the additive flow rate below which dual pulse errors will not be counted. Entry is volume or mass based upon System 305 – Pulse In Type. The range of this entry is 0-9999. This parameter has no effect if flow controlled additive pulse inputs are not configured for dual channel transmitters in System 836 – Flow Controlled Additive Channel Select.		

Table 22: Flow Controlled Injector Configurations 1 - 4

Injector Flow Control	Injector 1	Injector 2	Injector 3	Injector 4
Min Flow	027	031	035	039
Max Flow	028	032	036	040
Flow Tolerance	029	033	037	041
Inj. 2nd trip	030	034	038	042
Inj. Valve type	043	048	053	058
Analog Valve Kp	044	049	054	059

Injector Flow Control	Injector 1	Injector 2	Injector 3	Injector 4
Analog Valve Ki	045	050	055	060
Analog Valve Kd	046	051	056	061
Analog Valve PID Interval	047	052	057	062
Additive API Table	063	069	075	081
Additive Ref. Density	064	070	076	082
Ref Density Units	1824	1825	1826	1827
Additive Share Temp	065	071	077	083
Additive Maint. Temp	066	072	078	084
Additive Hi Temp Alarm	067	073	079	085
Additive Low Temp Alarm	068	074	080	086
Flow timeout	089	090	091	092
Rate Cutoff	094	095	096	097

The shaded areas are new to the AccuLoad IV.

8.3 Bay Directories

8.3.1 100—General Purpose Directory

Bay 1-2:

- Bay Permissive 1 Sense
- Bay Permissive 1 Message
- Bay Permissive 1 Restart
- Bay Permissive 2 Sense
- Bay Permissive 2 Message
- Bay Permissive 2 Restart
- Bay ID
- Report Select
- Summary Report Print Time
- Summary Report Interval
- Report Totals Resolution
- Report Pages
- Report HM Class

Bays: Bay Permissive 1 Sense **Bays: 101, 104**	Index: Bays 1 and 2	Range: 1 - 2

Description: Enables and defines the conditions under which a bay permissive is expected to be present in order for loading operations to be allowed. Bay permissives affect all arms currently assigned to (or in the case of swing arms, positioned on) that bay. Selections: • (0) [N/A]—Permissive is disabled • (1) Transaction Start—Permissive input is only checked immediately after authorization • (2) Continuous—Permissive input must be asserted continuously during the batch • (3) Start Pressed—Permissive input must be asserted whenever flow is started • (4) Batch Start—Permissive input must be asserted to start a batch

Bays: Bay Permissive Messages **Bays 102, 105**	Index: Bays 1 and 2	Range: 1 - 2 28 character maximum
Description: These 28 character alphanumeric messages will be displayed if a permissive sense entry, corresponding with the message is defined but not present when expected. The data entry allows 28 character maximum.		

Bays: Bay Permissive Restart **Bays 103, 106**	Index: Bays 1 and 2	Range: 1 - 2
Description: These parameters will determine how a restart is mediated after a permissive is lost and then restored. Selections: • (0) Manual—Start button must be pressed to restart flow. • (1) Automatic—Flow will be started automatically as soon as the permissive is restored.		

Bays: Bay ID **Bays 107**	Index: Bays 1 and 2	Range: Text - 28-character maximum
Description: This entry allows the operator to enter or edit a 28-character bay identification. The ID is used on default reports and is available for configurable reports.		

8.3.2 700—Communications Bay Directories

Bays: Report Select **Bays 701**	Index: Bays 1 and 2	Range:
Description: This program code defines which delivery report will be printed at the completion of a transaction on the bay if a printer function is assigned to one or more communications ports. The same report will be printed at each port if multiple ports are configured for printer options. Selections: • (0) Default • (1) User Configurable 1 • (2) User Configurable 2		

Bays: Summary Report Print Time **Bays 702**	Index: Bays 1 and 2	Range: Text - 6-character maximum
Description: This entry defines the initial time at which the AccuLoad will generate the summary report for the bay. This report summarizes all transaction data on the bay for the interval defined in the Summary Report Interval parameter.		

Bays: Summary Report Interval **Bays 703**	Index: Bays 1 and 2	Range: 0 - 999
Description: This entry defines the interval of time covered by the Summary Report. Used in conjunction with the Summary Report Print Time, a new report is generated at the interval specified in this program code. The range of this entry is 0 – 999 hours. If set to zero, the summary report is disabled.		

Bays: Report Totals Resolution **Bays 704**	Index: Bays 1 and 2	
Description: This entry selects the amount resolution to print on default reports. There are three available options. Selections: • (0) Whole • (1) 10ths • (2) 100ths		

Bays: Report Pages **Bays 705**	Index: Bays 1 and 2	
Description: This entry selects which pages will be printed on reports. There are four available options. Selections: • (0) Batch and Transaction • (1) Batch Only • (2) Transaction Only • (3) No Report		

Bays: Report HM Class **Bays 706**	Index: Bays 1 and 2	Range: 0 - 5
Description: This entry allows the operator to select which product's Hazardous Materials (HM) Classification will be printed on the summary page of the report. Selections: (0-5) Arm 1 - 6		

8.4 Arms Directories

Arm 1-6

- 100—General Purpose
- 200—Flow Control
- 300—Volume Accuracy
- 700—Communications
- Meter directories for this arm
- Product directories for this arm

8.4.1 100—General Purpose Directory

Arms: General Purpose: Permissive 1, 2 Sense **Arms 101, 104**	Index: Arm Permissive (1-2)	Range:
Description: Defines the states when permissive inputs are required to allow loading operations. Selections: • (0) N/A • (1) Transaction Start – Permissive only checked immediately after authorization • (2) Continuous – Permissive must be met continuously during the batch • (3) Start Pressed – Permissive must be met whenever flow is started • (4) Batch Start – Permissive must be met to start a batch		

Arms: General Purpose: Permissive 1, 2 Message **Arms 102, 105**	Index: Arm Permissive (1-2)	Range: Text - 28 Characters
Description: Messages displayed if the permissive input corresponding with the message, is defined but not present when expected.		

Arms: General Purpose: Permissive 1, 2 Restart **Arms 103, 106**	Index: Arm Permissive (1-2)	Range:
Description: Determines how a restart is initiated after a permissive is lost and then restored. Selections: • (0) Manual – Start must be pressed to restore flow. • (1) Automatic – Flow will be started automatically as soon as the permissive is restored.		

Arms: General Purpose: Load Arm ID **Arms 107**	Index: Arm	Range: Text - 28 Characters
Description: Used to identify the load position. It is included on the AccuLoad's display in Ready mode. The Load Arm ID can also be included on the delivery report.		

Arm: General Purpose: Ready Message **Arms 108**	Index: Arm	Range: Text - 28 Characters
Description: Enter the message to be displayed for the arm when it is idle (at the Ready screen).		

Arms: General Purpose: Bay Assignment **Arms 109**	Index: Arm	Range:
Description: Allows the operator to assign a load arm to a bay. Selections: • (0) Independent • (1) Bay A • (2) Bay B • (3) Swing Arm		

Arms: General Purpose: Unlimited Preset **Arms 111**	Index: Arm	Range:
Description: Enables an alternative method of product delivery for specialized applications where the goal is to continuously blend two or more products. This feature can optionally also be used in situations where a main product stream is not under the control of the AccuLoad but component products being blended into the main product ARE being controlled by the AccuLoad (wild stream blending). When configured for unlimited preset with a wild stream meter, the desired flow rates will not be based on a programmed high flow rate or low flow start rate. Instead the desired flow rate for the controlled products will be based on the flow rate of the wild stream. The AccuLoad will attempt to adjust the flow rates for the controlled products to produce the programmed blend ratio. If all products are controlled (no wild stream meter), the desired flow rates will be based on the programmed high flow rate or low flow rate. In this configuration, the high flow rate will not be exceeded. Selections: • No • Yes		

Arms: General Purpose: Transaction Reset Time **Arms 112**	Index: Arm	Range: 0 - 999 hours 0 to disable
Description: The time period between automatic resetting of the current transaction in Unlimited Preset mode. The current transaction will be terminated and a new transaction will be started when the period expires. Only affects and is only available with arms configured for Unlimited Preset.		

Arms: General Purpose: Transaction Reset Start Hour **Arms 113**	Index: Arm	Range: 0 - 23
Description: Specifies the hour of the day when the transaction reset period begins.		

8.4.2 200—Flow Control Directory

- Low Flow Start Rate
- Low Flow Start Amount
- Low Flow Start Percentage
- Low Flow Start Condition
- High Flow Rate
- 2nd High Flow Rate
- 1st/2nd High Flow
- 1st/2nd High Flow Preset
- Start/Stop Delay
- Overrun Alarm Limit
- Zero Flow Timer
- Valve Delay to Open
- Pump Delay to Off
- Valve Fault Timeout
- Clean Line Amount

- Clean Line Product
- Clean Line Alarm Limit

Arms: Flow Control: Low Flow Start Rate **Arms 201**	Index: Arm	Range: 0.0 - 9999.9
Description: Designates the flow rate used during low flow start. For example, for the volume of product defined by the low flow start volume or low flow start percentage parameters.		
Critical: Low flow start rate can't be less than the minimum flow rate (checks all products configured).		

Arms: Flow Control: Low Flow Start Amount **Arms 202**	Index: Arm	Range: 0.0 - 9999.9
Description: Defines the amount of product to be delivered at the low flow start rate. If both low flow start amount and low flow start percentage are defined, the larger of the two will be used for low flow start.		

Arms: Flow Control: Low Flow Start Percentage **Arms 203**	Index: Arm	Range: 0 - 99
Description: Defines the percentage of the preset volume to be delivered during low flow start. If both low flow start per- centage and low flow start volume are defined, the larger of the two will be used for low flow start.		

Arms: Flow Control: Low Flow Start Condition **Arms 204**	Index: Arm	Range:
Description: Selects if the low flow start should be performed only at the start of a delivery or every time flow starts. Selections: • (0) Always • (1) Start of batch		

Arms: Flow Control: High Flow Rate **Arms 205**	Index: Arm	Range: 1 - 99999
Description: For ratio blending arms, this rate will be divided among the products being delivered according to the percentages assigned in the recipe selected for loading. For other arm types, the high flow rate is set per product.		
Note: • 00000 will not allow the valve to open. • This parameter is only used for ratio blending.		

Arms: Flow Control: 2nd High Flow Rate **Arms 206**	Index: Arm	Range: 0 - 99999
Description: For ratio blending arms, sets a second high flow rate which is selectable by a digital input. This flow rate would be typically selected for smaller trucks.		
Note: This parameter is only used for ratio blending.		

Arms: Flow Control: 1st/2nd High Flow **Arms 232**	Index: Arm	Range:
Description: Selects when the 1st/2nd High Flow input is monitored as follows: If Batch Start is selected, the high flow rate used for the delivery will be based on the state of the input at the start of the batch and subsequent changes in the input will be ignored. If the Dynamic option is used, the AccuLoad will continuously adjust the high flow rate based on the state of this input during the high flow portion of the batch. If the batch has already reached 1st trip, the flow rate will only be reduced by a change in state of the frist/second high flow digital input. • (0) Batch Start • (1) Dynamic		

Arms: Flow Control: First/Second High Flow Preset **Arms 229**	Index: Arm	Range: [0] – 999999 Disable: 0
Description: Preset amounts above this value will deliver at the first or standard high flow rates programmed. Presets less than this amount will deliver at the second high flow rate (as if the second high flow switch input had been activated). Any batch with a preset amount less than or equal to this entry will use the rates programmed in Product 203 – Second High Flow Rate and Load Arm 206 – Second High Flow Rate in place of the rates programmed in Product 202 – High Flow Rate and Load Arm 205 – High Flow Rate. This program code does not require nor preclude the use of a first/second high flow switch. The second high flow rate will be used if either the second high flow switch is active or the preset amount is at or below the value in this entry. An entry of 0 disables the feature. The range of this entry is units.		
Note: The load arm high flow rate values only apply to ratio blending arms.		

Arms: Flow Control: Start Stop Delay **Arms 207**	Index: Arm	Range: 0 - 999 seconds
Description: Sets the number of seconds delay before allowing flow to be re-started after flow was stopped during a batch.		

Arm: Flow Control: Overrun Alarm Limit **Arms 208**	Index: Arm	Range: 0 - 99 units delivered
Description: Sets the alarm threshold for product delivered in excess of the preset amount.		

Arm: Flow Control: Zero Flow Timer **Arms 209**	Index: Arm	Range: 0 - 99.9 seconds Disable: 0
Description: Sets the alarm threshold for the amount of time the AccuLoad will wait for flow to begin after opening the flow control valve. Once this alarm occurs, the flow control valve will be commanded closed. The alarm must be cleared prior to attempting to restart flow.		

Arms: Flow Control: Valve Delay to Open **Arms 210**	Index: Arm	Range: 0 - 99 seconds
Description: Sets the amount of time between asserting the pump control signal and opening the flow control valve. This can be used to allow the pump to pressurize the line, providing for better valve response.		

Arms: Flow Control: Pump Delay to Off **Arms 211**	Index: Arm	Range: [0] - 99 seconds

Description: Sets a time delay between flow stop and de-asserting the pump control signal. Upon a normal or operator-requested stop, the pump output will remain active for this delay before turning off. Alarm shutdown will not be delayed; the pump output will be turned off immediately.

Arms: Flow Control: Valve Fault Timeout **Arms 212**	Index: Arm	Range: [0] - 99 Seconds Disable: 0
Description: Sets the alarm threshold for the amount of time that the AccuLoad will ignore flow after the valve has been commanded to close. If flow persists beyond this time, a "Valve Fault" alarm will occur.		

Arms: Flow Control: Valve Fault Amount **Arms 213**	Index: Arm	Range: [0] - 99 Delivery units Disable: 0
Description: Sets the alarm threshold for the amount of flow that the AccuLoad will ignore after the valve has been commanded to close. If flow exceeds this amount, a "Valve Fault" alarm will occur.		

Arms: Flow Control: Clean Line Amount **Arms 221**	Index: Arm	Range: [0] - 999 Delivery units
Description: Specifies the amount of clean line flush product to be delivered to fill the pipe/load arm at the end of every batch. This amount is determined by calculating the amount of product to fill the pipe/load arm from the control valves to the end of the loading arm.		

Arms: Flow Control: Clean Line Product **Arms 222**	Index: Arm	Range: 1 - 6 Default: Product 1
Description: Selects the product that will be used as the clean line product. The clean line product will be delivered at the end of every batch whether the designated clean line product is part of the recipe being delivered or not. The purpose is to have the line packed with the clean line product at the end of a delivery.		
Critical: Clean line product must be Product 1 when configured for side-stream blending.		

Arms: Flow Control: Clean Line Alarm Limit **Arms 223**	Index: Arm	Range: 0 - 99 Delivery units
Description: Sets the alarm threshold for the number of delivery units that the clean line amount can fall short of the pro grammed amount before causing an alarm. For example, if the clean line amount is set for 100 gallons and the maximum clean line alarm limit is programmed for 5 gallons, the clean line amount can range between 95 gallons and 100 gallons without causing an alarm.		

Arms: Flow Control: Clean Line Blend **Arms 230**	Index: Arm	Range:
Description: When a clean line product is used, it will be the first portion of the next delivery which can cause the blend to be out of tolerance initially. If this parameter is enabled, the control valve for the clean line product will not be opened at the start of the batch, to reduce the time to get the blend corrected. Selections: • (0) No • (1) Yes		
Note: Applies only to ratio blending arms.		

Arms: Flow Control: Ratio Factor Adjust **Arms 224**	Index: Arm	Range: 0.1 - 99.9 Default: 0.0
Description: Sets the ratio adjustment factor used to adjust the response of the blend valves to help maintain the programmed blend ratio during loading. This factor is used to magnify the difference between the programmed blend ratio and the current blend ratio so that the programmed blend ratio can be achieved more quickly.		

Arms: Flow Control: Ratio Factor Time **Arms 225**	Index: Arm	Range: 01 - [10] - 99 Seconds
Description: Sets the time in seconds between flow rate calculations based on programmed and current blend ratios. If this results in a desired flow rate outside the tolerance of the current flow rate, then the control valves will be adjusted. This value should be determined based on the hydraulic conditions that exist for the system.		

Arms: Flow Control: Block Valve Position **Arms 226**	Index: Arm	Range: [0] - 3 Default: 0
Description: For sequential blending arms this entry selects the position of the block valve at the end of a transaction and when the STOP button is pressed. The valve can either be left open (for relief of thermal expansion) or closed. This code applies only to electric motor-operated valves. Selections: • (0) Valve is closed when STOP is pressed and at the end of the transaction • (1) Valve is open when STOP is pressed and closed at the end of the transaction • (2) Valve is closed when STOP is pressed and open at the end of the transaction • (3) Valve is open when STOP is pressed and open at the end of the transaction.		
Note: Applies to sequential blending only.		

Arms: Flow Control: Valve Close Delay **Arms 228**	Index: Arm	Range: 0 - 999 Seconds
Description: For unloading arms. This parameter determines the amount of time in seconds the valve will remain open after the stop switch input is de-asserted. This prevents the valve from closing during the period when the gear pump may be engaged.		

Arms: Flow Control: Additive Stop Amount **Arms 227**	Index: Arm	Range: [0] - 9999
Description: This program code allows an arm-specific additive stop quantity (in delivery units) to be specified. If a nonzero value is programmed both here and in System 805 – Additive Stop Amount, this value supersedes the system value.		
Help: Enter load arm preset amount left to be delivered before injector shutdown (in preset type).		

Arm: Flow Control: Additive Low Flow Start **Arms 231**	Index: Arm	Range:

Description: This program code determines when additive pacing begins. Selections: • (0) Batch Start - Additive pacing begins immediately at the start of the batch • (1) After Low Flow - Additive pacing begins after Low Flow start volume has been delivered This option allows for a delay between additive pump startup and first injection to assure sufficient pressure has been established in the additive system.
Critical: Low flow start condition must be Batch Start.
Note: Feature is not available for flow-controlled additives.

8.4.3 300—Volume Accuracy Directory

Arms: Volume Accuracy: Blend Tolerance (Percentage) **Arms 301**	Index: Arm	Range: 0.0 % - 9.9 % [1.0]
Description: Sets the alarm threshold for blend error as a percentage of the total batch. If the delivered amount of each product is within plus or minus the blend percentage of the total delivery, no blend alarm will occur. For example, assume a blend tolerance of 2%, a preset of 1000 gallons, and a recipe consisting of four products with each making up 25% (250 gal)of the total. If 1000 gallons are delivered, the blend tolerance would be 20 gallons (2% of 1000 gal lons). If any product delivered less than 230 gallons (250 – 20) a blend low alarm will be set. If any product delivered more than 270 gallons (250 + 20), a blend high alarm will be set. (This is true only if all 1000 gallons are delivered.)		
Note: A blend tolerance entry of zero allows no tolerance, causing an alarm to occur unless all components are delivered exactly.		

Arms: Volume Accuracy: Blend Tolerance (Amount) **Arms 302**	Index: Arm	Range: 0.1 - 99.9 delivery units
Description: Sets the alarm threshold for blend error as a fixed volume. This volume represents the maximum delivered volume of each product in the blend over or under the target volume that will be allowed by AccuLoad without causing an alarm. The range of this entry is 00.1 to 99.9 units.		
Note: If both a blend tolerance volume and a blend tolerance percentage are entered, the AccuLoad will use the larger of the two for a specific batch. It is recommended that the volume tolerance be programmed here to override the percentage for very small batches to reduce nuisance alarms.		

Arms: Volume Accuracy: Blend Correction **Arms 303**	Index: Arm	Range: Default: No Blend Correction
Description: Sets the type of Blend Correction on a sequential load arm, that will be allowed in case of a product overrun. Three possible selections are available. Selections: • (0) [No Blend Correction]. If a product overrun occurs during the loading process, which would cause a blend alarm, no correction will be allowed and the transaction must be ended. • (1) Self-Corrected Blend. If a product overrun occurs during the loading process, the AccuLoad will automatically try to correct the blend if the product in error is being loaded as another component of the blend (i.e., error in component 2 – Regular, Regular also being loaded as component 5). If the component in error is not repeated as one of the components that has not been loaded, the transaction will have to be ended. • (2) Self-Corrected Blend/Complete Batch. If a product overrun occurs during the loading process, the AccuLoad IV will automatically try to correct the blend if the product in error is being loaded as another component of the blend. If the compo- nent in error is not repeated as one of the components that has not been loaded, the driver/operator will have the choice of ending the batch or completing the loading of the original preset amount.		

Arms: Volume Accuracy: Blend Alarm Timeout **Arms 304**	Index: Arm	Range: 0 - 999 Seconds
Description: For "Unlimited Preset" arms and arms using the timed blend algorithm this sets the alarm threshold for the amount of time an "out of tolerance" blend condition can exist. The blend tolerance is determined by the values in both Load Arm 301 - Blend Tolerance Percentage and in Load Arm 302 - Blend Tolerance Amount. Both tolerance limits must be exceeded before the AccuLoad begins the out-of-tolerance condition timer.		
Note: A zero value will result in an immediate alarm if the blend goes out of tolerance.		

Arms: Volume Accuracy: Blend Alarm Minimum Amount **Arms 305**	Index: Arm	Range: 0 - 9999 delivery units
Description: For unlimited preset arms and arms using the timed blend algorithm, this program code inhibits the blend tolerance alarm checking at batch start until this amount has been delivered. In unlimited preset arms, this volume or mass allows time for the blend stream to catch up with wild stream. For arms using the timed blend algorithm, this is used to suppress blend tolerance checking until after low flow start is completed if the blend makes impossible to maintain blend during low flow start.		

Arms: Volume Accuracy: Blend Correction Amount **Arms 306**	Index: Arm	Range: 0 - 999.99 delivery units
Description: Sets the deadband for the deviation from the target blend that is allowed before the AccuLoad attempts to adjust/correct the blend on an Unlimited Preset or timed blend algorithm arm (in order to prevent continuous valve adjustment). If this amount is exceeded, the AccuLoad will attempt to adjust the flow rate of the products such that the blend will be on spec within the time specified in Load Arm 307 - Blend Correction Time.		

Arms: Volume Accuracy: Blend Correction Time **Arms 307**	Index: Arm	Range: 1 - 999 seconds
Description: This program code determines how quickly the AccuLoad attempts to bring the blend percentage of an Unlimited Preset or timed blend algorithm arm back to ideal conditions once the deviation from the desired percentages exceeds the value in Load Arm 306 - Blend Correction Amount.		

Arms: Volume Accuracy: Blend Error Reset **Arms 308**	Index: Arm	Range:
Description: This program code determines at what points the accumulated blend errors are reset to 0 when an arm is configured for Unlimited Preset operation. Selections: • (0) Batch Start • (1) Blend Alarm Cleared • (2) Batch Start and Alarm • (3) No Reset		

Arms: Volume Accuracy: Blend Algorithm **Arms 309**	Index: Arm	Range:

Description: This program code determines which algorithm will be used for ratio blend applications. The “Ratio Adj Factor” is the traditional ratio blend method and uses the ratio adjust factor to control how quickly the blend is corrected. The “Timed” blend algorithm will attempt to correct the blend within a programmable amount of time. The “Timed” blend algorithm is independent of batch size and therefore works best when batch sizes can vary significantly. The “Timed” blend algorithm will also make blend corrections during low flow start. This parameter can also be used for an unlimited preset arm.

Arms: Volume Accuracy: Ratio Product Minimum Flow **Arms 310**	Index: Arm	Range:
Selections: • Maintain min rate • Allow valve to close		
Critical: Option available with Timed Blend Algorithm only.		
Factory Default: "Maintain min rate" (lowest flow rate allowed will be the programmed minimum flow rate – Product 201).		

Arms: Volume Accuracy: Minimum Valve Close Time **Arms 311**	Index: Arm	Range: 0 - 999 seconds
Note: If zero is entered, then the valve will be allowed to open and close as often as necessary to maintain blend.		

8.4.4 700—Communications Directory

Arms: Communications: Report Selection **Arms 701**	Index: Arm	Range:
Description: This program code defines which delivery report will be printed at the completion of a transaction. Selections: • (0) Default • (1) User Configured Report 1 • (2) User Configured Report 2		
Note: • Default Appendix 4: Default Straight Product Arm Report on page 6. • The user-configured reports are designed on the AccuMate and downloaded to the AccuLoad. • Even if a user-configured report has been downloaded from the AccuMate to the AccuLoad, it will not be printed unless it is selected here. If a user-configured report is selected but none has been downloaded, no report will print. • The same report will be printed at each port if multiple ports are configured for printer options.		

Arms: Communications: Summary Report Print Time **Arms 702**	Index: Arm	Range: 0 - 999
Description: Sets the initial print time of the summary report. Enter the hours, minutes, and time type (AM, PM, or military) the summary report is to be printed. The summary report includes a line per batch for all transactions run during the time interval specified.		
Fatal: Invalid time entry		

Arms: Communications: Summary Report Interval **Arms 703**	Index: Arm	Range: 0 - 999 hours Disable: 0

Description: Sets the number of hours between printings of the summary report. Once the time of the report has been set using the Summary Report Print Time parameter, the report will automatically print each interval starting from that time.

Arms: Communications: Report Totals Resolution **Arms 704**	Index: Arm	Range:
Description: This entry selects the volume resolution to print on default reports. Selections: • (0) Whole units • (1) Tenths • (2) Hundredths		

Arms: Communications: Report Pages **Arms 705**	Index: Arm	Range: Default: Batch and Transaction Pages
Description: Selects which pages will be printed on reports. The default report for a straight product load arm consists of a single page report with both batch and transaction data on that page. Selections: • (0) [Batch and transaction pages]—one page per batch plus a summary page for the transaction • (1) Batch page only—one page per batch only; no transaction summary • (2) Transaction page only—transaction summary only; no batch details • (3) No transaction report—printer only used for summary reports		

Arms: Communications: Report HM Classification **Arms 706**	Index: Arm	Range: 1 - 6
Description: Selects which products' HM Classification message will be printed on the transaction summary page of the default transaction report. Product 1 - 6		

Arms: Communications: Arm Tag ID **Arms 710**	Index: Arm	Range: Text 8 characters max.
Description: This parameter is used to enter a unique tag name for the load arm. Enter up to 8 characters of text.		

8.5 Meter Directories

- 200—Flow Control Directory
- 300—Volume Accuracy Directory
- 400—Temperature/Density Directory
- 500—Pressure Directory

8.5.1 200—Flow Directory Directory

Arms: Meter: Flow Control: Meter Tag **Meter 1000**	Index: Arm	Range: Text 20 characters maximum
Description: This parameter is used to enter a unique tag name for the meter.		

Arms: Meter: Flow Control: Valve Type **Meter 201**	Index: Meter	Range: Default: Digital
Description: This parameter selects the type of control valve used by AccuLoad IV. Selections: • (0) [Digital] • (1) Two-Stage • (2) Analog • (3) Wild Stream		
Critical: • Two-stage valve not allowed with ratio blending • No analog valve output configured • Upstream/downstream solenoids required		

Arms: Meter: Flow Control: Analog Valve (Kp) **Meter 202**	Index: Meter	Range: 0.000 - 999.999
Description: This three-digit entry is the PID proportional gain factor for analog valve control. The range of this entry is from (used only with analog valves).		
Note: This entry is used only with analog valves.		

Arms: Meter: Flow Control: Analog Valve Ki **Meter 203**	Index: Meter	Range: 0.000 - 999.999
Description: This three-digit entry is the PID integral gain factor for analog valve control.		
Note: This entry is used only with analog valves.		

Arms: Meter: Flow Control: Analog Valve Kd **Meter 204**	Index: Meter	Range: 0.000 - 999.999
Description: This three-digit entry is the PID derivative gain factor for analog valve control. (It is used only with analog valves.)		
Note: This entry is used only with analog valves.		

Arms: Meter: Flow Control: Analog Valve PID Interval **Meter 205**	Index: Meter	Range: 0.0 - 99
Description: Sets the time interval in seconds between PID calculations.		
Note: This entry is used only with analog valves.		

Arms: Meter: Flow Control: Zero Flow Alarm Timer **Meter 206**	Index: Meter	Range: [0] - 99 seconds Disable: 0
Description: For ratio blending arms, sets the alarm threshold for the maximum time the AccuLoad will allow between commanding the flow control valve open and the start of flow. An entry of zero causes AccuLoad IV to disable the zero flow alarm.		
Note: No entry if not a ratio blender. Use the arm zero flow timer for other arm types.		

Arms: Meter: Flow Control: Overrun Alarm Limit **Meter 207**	Index: Meter	Range: [0] - 99 delivery units Disable: 0
Description: For ratio blending arms, this sets the alarm threshold for the number of delivery units that may be delivered in excess of the target amount before an alarm occurs.		
Note: This parameter only applies to ratio blender arms, for other arm types use the arm overrun alarm limit parameter.		

Arms: Meter: Flow Control: Flow Adjust Tolerance **Meter 208**	Index: Meter	Range: 0 to 9.9%
Description: Set the dead band tolerance used on ratio blending arms when making flow rate adjustments. This is intended as a tighter flow tolerance than in Product 204. This tolerance is only applied when the flow rate has been adjusted (from low flow to high flow, to improve the blend). The purpose of the tighter tolerance is to closely match the desired flow rate. Note that this tight tolerance is only in effect for the time specified in the following parameter. For a desired flow rate Q, the tolerance band is defined as Q +/- (Q * t) where t is the percentage entered for this tolerance.		
Note: Applies only to ratio blender arms.		

Arms: Meter: Flow Control: Flow Adjust Timer **Meter 209**	Index: Meter	Range: 0.0 - 99.9 seconds
Description: Sets the time in seconds for the flow rate adjustment tolerance to be in effect.		
Note: Applies only to ratio blending arms.		

Arms: Meter: Flow Control: Meter Plumbing **Meter 210**	Index: Meter	Range:
Description: This entry defines the plumbing of a minor product meter for a hybrid blending arm. Selections: • (0) Ratio (downstream of the main product meter) • (1) Side Stream (upstream of the main product meter) If the ratio product is plumbed side stream it can share the same temperature probe and densitometer as the sequential product if desired. This entry is used for hybrid blending arms only; it is not used for any other arm types.		

Arms: Meter: Flow Control: Ramp Down Tolerance (Q1) **Meter 211**	Index: Meter	Range: [0] - 99% Disable: 0
Description: Sets the alarm threshold for flow rate error during the first stage of the end-of-batch ramp down and is used to predict a valve fault condition as the batch ends. If during the first stage of the end-of-batch ramp down, the flow rate is not decreasing within the percentage entered for this parameter, a "PO: Predict Overrun" alarm will occur which will stop the batch and turn the pump off. Note this tolerance should be greater than the programmed product flow tolerance % (Product 204) and needs to be large enough to allow for normal flow rate fluctuations during ramp down otherwise false alarms may occur.		

Arms: Meter: Flow Control: Ramp Down Tolerance (Q2) **Meter 212**	Index: Meter	Range: [0] - 99% Disable: 0

Description: Sets the alarm threshold for flow rate error during the second stage of the end-of-batch ramp down and is used to predict a valve fault condition as the batch ends. If during the second stage of the end-of-batch ramp down, the flow rate is not decreasing within the percentage entered for this parameter, a "PO: Predict Overrun" alarm will occur which will stop the batch and turn the pump off. Note this tolerance should be greater than the programmed product flow tolerance % (Product 204) and needs to be large enough to allow for normal flow rate fluctuations during ramp down otherwise false alarms may occur.

8.5.2 300—Volume Accuracy Directory

Arms: Meter: Volume Accuracy: K-Factor **Meter 301**	Index: Meter	Range: 0.001 to 99999.999
Description: Sets the nominal number of pulses representing one unit of volume registration.		
Critical: Security level for parameter must be at top 2 levels.		
Fatal: Entry must not be zero.		

Arms: Meter: Volume Accuracy: Dual Pulse Error Count **Meter 302**	Index: Meter	Range: [0] - 999
Description: Sets the alarm threshold for dual pulse errors before posting a pulse security alarm.		
Note: Requires dual channel pulse meter input.		

Arms: Meter: Volume Accuracy: Dual Pulse Error Reset **Meter 303**	Index: Meter	Range: Default: No Reset
Description: Sets the conditions which reset the dual pulse error count. Selections: • (0) No Reset • (1) Transaction End • (2) Power-Up • (3) Transaction and Power-Up		
Note: Clearing a pulse security alarm does not reset the error count.		

Arms: Meter: Volume Accuracy: Dual Pulse Flow Rate Cutoff **Meter 304**	Index: Meter	Range: [0] - 9999
Description: Sets the flow rate below which dual pulse errors are not counted.		
Note: Requires dual channel pulse meter input.		

Arms: Meter: Volume Accuracy: Pulse Security Alarm Amount **Meter 305**	Index: Meter	Range:
Description: This program code determines whether pulses received after a Pulse Security Alarm occurs are ignored (no volume or mass is registered). Select “no” to continue to totalize normally after this alarm occurs. Select “yes” to ignore all pulses after an alarm occurs. Selecting “yes” will cause any volume or mass that actually flows through the meter from the point where this alarm occurs to when the valve is completely closed to be ignored. The AccuLoad will ignore any pulses from the meter until the alarm is cleared. Some measurement agencies require this behavior, taking the position that after a pulse security alarm, the consumer cannot be responsible for any measured quantity because it may not be reliable.		

Arms: Meter: Volume Accuracy: Pulse Period Sample Count **Meter 306**	Index: Meter	Range: [0] - 20
Description: Sets the amount of time in 0.1 second increments over which the frequency of the meter pulses is averaged to provide flow rate smoothing. This parameter is intended for meters that produce a varying frequency pulse output when the flow is steady.		

8.5.3 400—Temperature/Density Directory

Arms: Meter: Temperature/Density: Freq Densitometer Type **Meter 401**	Index: Meter	Range: Default: N/A
Description: This parameter allows the operator to select the frequency densitometer used by the meter. The factory default is N/A. Selections: • (0) NA • (1) Linear • (2) Solartron • (3) Sarasota • (4) UGC • (5) Other		

Arms: Meter: Temperature/Density Share Temperature Input **Meter 402**	Index: Meter	Range: 1 - 6
Description: Selects a temperature input defined for another meter to be used with this meter. For example, a single temperature probe may be used to supply temperature for several arms without having to use multiple analog inputs. Selections: • (0) Not Used • (1-36) Arm 1 - 6, Meter 1 - 6 • (37-40) Flow Rate Injector 1 - 4		
Critical: Selected meter has no I/O point configured for temperature.		

Arms: Meter: Temperature/Density: Share Density Input **Meter 403**	Index: Meter	Range:
Description: Selects a density input defined for another meter to be used with this meter. For example, a single density probe may be used to supply density for several arms without having to use multiple analog inputs. Selections: • (0) Not Used • (1-36) Arm 1 - 6 Meter 1 - 6 • Flow Rate Injector 1 - 4		
Critical: Selected meter has no I/O point configured for density.		

Arms: Meter: Temperature/Density: Mass Meter Type **Meter 425**	Index: Meter	Range:

Description: This parameter allows the operator to select the type of mass meter used. Selections: • NA • Promass

Arms: Meter: Temperature/Density: Mass Meter Address **Meter 426**	Index: Meter	Range: 0 - 99999
Description: Sets the address used for serial communications with this mass meter.		

Arms: Meter: Temperature/Density: Linear Densitometer A **Meter 1400**	Index: Meter	Range: -1e+37 - 1e+38
Description: Sets the value for the A coefficient used to in the equation to calculate the density. - Density = A*freq + B		
Note: Scientific notation is used for this value.		

Arms: Meter: Temperature/Density: Linear Densitometer B **Meter 1401**	Index: Meter	Range: -1e+37 - 1e+38
Description: Sets the value for the B coefficient used to in the equation to calculate the density. - Density = A*freq + B		
Note: Scientific notation is used for this value.		

Arms: Meter: Temperature/Density: Linear Densitometer DCF **Meter 1402**	Index: Meter	Range: -9.9999 - 9.9999
Description: The Density Correction Factor is used to correct the density reading from a densitometer. The density received by the AccuLoad is multiplied by the DCF before it is used for volume calculations.		

8.5.3.1 Solatron Densitometer

Arms: Meter: Temperature/Density: Solartron Calibration Cert Units **Meter 411**	Index: Meter	Range:
Description: This entry allows the user to select the calibration units used for the Solartron Densitometer. Selections: • (0) English (Fahrenheit, PSI, lb/ft3) • (1) Metric (Celsius, Bar, kg/m3)		

Arms: Meter: Temperature/Density: Solartron DCF **Meter 412**	Index: Meter	Range: -9.9999 - 9.9999
Description: This entry allows the operator to enter the density correction factor for computing the calculated density from the actual density. Selections: • English (Fahrenheit, PSI, lb/ft^3) • Metric (Celsius, Bar, kg/m^3)		

Arms: Meter: Temperature/Density: Solartron K0, K1, K2 **Meter 413, 414, 415**	Index: Meter	Range: -1e+37 and 1e+38
Description: This entry allows the operator to enter the Constant K0, K1, K2 from the Solartron densitometer. Enter the base number (six digits) and two digits for the exponent. This exponential numeric entry has a range of –1e37 to 1e38.		

Arms: Meter: Temperature/Density: Solartron K18, K19, K20a, K20b, K21a, K21b **Meter 416, 417, 418, 419, 420, 421**	Index: Meter	Range: -1e+37 and 1e+38
Description: This entry allows the operator to enter the Constant K18, K19, K20a, K20b, K21a, K21b from the Solartron densitometer. Enter the base number (six digits) and two digits for the exponent. This exponential numeric entry has a range of –1e37 to 1e38.		

Arms: Meter: Temperature/Density: Solartron Tcal **Meter 422**	Index: Meter	Range: -9999.999 - 9999.999
Description: This entry allows the operator to enter the temperature that the densitometer was calibrated at the factory. The range of this entry is –9999.999 to 9999.999 (limit of three decimal points).		

Arms: Meter: Temperature/Density: Solartron Pcal **Meter 423**	Index: Meter	Range: -9999.999 - 9999.999
Description: This entry allows the operator to enter the pressure that the densitometer was calibrated at the factory. The range of this entry is –9999.999 to 9999.999 (limit of three decimal places).		

8.5.3.2 Sarasota Densitometer

Arms: Meter: Temperature/Density: Sarasota Calibration Cert Units **Meter 441**	Index: Meter	Range: Default: English
Description: This entry allows the user to select the calibration units used for the Sarasota Densitometer. The factory default is English. Selections: • (0) English (Fahrenheit, PSI, lb/ft^3) • (1) Metric (Celsius, Bar, kg/m^3)		

Arms: Meter: Temperature/Density: Sarasota DCF **Meter 442**	Index: Meter	Range: -9.9999 - 9.9999
Description: This entry allows the operator to enter the density correction factor for computing the calculated density from the actual density. The range of six-digit numeric entry is -9.9999 to 9.9999.		

Arms: Meter: Temperature/Density: Sarasota K **Meter 443**	Index: Meter	Range: -9.999999 - 9.999999
Description: This entry allows the operator to enter the calibration constant for the spool on the Sarasota densitometer. The range of this exponential numeric entry is from -9.999999 to 9.999999.		

Arms: Meter: Temperature/Density: Sarasota T0 **Meter 445**	Index: Meter	Range:
Description: This entry allows the operator to enter the T0 constant from the Sarasota densitometer. This constant is in microseconds. The range of this eight-digit numeric entry is -9999.999 to 9999.999.		

Arms: Meter: Temperature/Density: Sarasota Tcoef **Meter 446**	Index: Meter	Range: -9.999999 - 9.999999
Description: This entry is used for entering the temperature coefficient constant from the Sarasota densitometer in microseconds/degrees F. The range of this exponential numeric entry is –9.999999 to 9.999999.		

Arms: Meter: Temperature/Density: Sarasota Tcal **Meter 447**	Index: Meter	Range: -9999.999 - 9999.999
Description: This entry allows the operator to enter the temperature that the densitometer was calibrated at the factory. The range of this eight-digit numeric entry is –9999.999 to 9999.999.		

Arms: Meter: Temperature/Density: Sarasota Pcoef **Meter 448**	Index: Meter	Range: -9.999999 - 9.999999
Description: This entry is used for entering the pressure coefficient constant from the Sarasota densitometer in microseconds/PSIG. The range of this exponential numeric entry is –9.999999 to 9.999999.		

8.5.3.3 UGC Densitometer

Arms: Meter: Temperature/Density: UGC Calibration Cert Units **Meter 461**	Index: Meter	Range: Default: English
Description: This entry allows the user to select the calibration units used for the UGC Densitometer. Selections: • (0) [English] (Fahrenheit, PSI, gr/cc) • (1) Metric (Celsius, Bar, gr/cc)		

Arms: Meter: Temperature/Density: UGC DCF **Meter 462**	Index: Meter	Range: -9.9999 - 9.9999
Description: This entry allows the operator to enter the density correction factor for computing the calculated density from the actual density.		

Arms: Meter: Temperature/Density: UGC K0, K1, K2. Kt1, Kt2, kt3 **Meter 463, 464, 465, 467, 468, 469**	Index: Meter	Range: -1e+37 and 1e+38
Description: This entry allows the operator to enter the Constant K0, K1, K2, Kt1, Kt2, Kt3 from the UGC densitometer. Enter the base number (six digits) and then two digits for the exponent. The range of this exponential entry is –1e37 to 1e38.		

Arms: Meter: Temperature/Density: UGC Tc **Meter 466**	Index: Meter	Range: -999.9999 - 999.9999
Description: This entry allows the operator to enter the temperature that the densitometer was calibrated at the factory. The range of this eight-digit numeric entry is –999.9999 to 999.9999.		

Arms: Meter: Temperature/Density: UGC Pc **Meter 470**	Index: Meter	Range: -999.9999 - 999.9999
Description: This entry allows the operator to enter the temperature that the densitometer was calibrated at the factory. The range of this eight-digit numeric entry is –999.9999 to 999.9999.		

Arms: Meter: Temperature/Density: UGC Kp1 **Meter 471**	Index: Meter	Range: -1e+37 and 1e+38
Description: This entry allows the operator to enter the Pressure Constant Kp1 from the UGC densitometer. Enter the base number (six digits) and then two digits for the exponent. The range of this exponential numeric entry is –1e37 to 1e38.		

Arms: Meter: Temperature/Density: UGC Kp2, Kp3 **Meter 472, 473**	Index: Meter	Range: -1e+37 and 1e+38
Description: This entry allows the operator to enter the Constant Kp2, Kp3 from the UGC densitometer. Enter the base number (six digits) and then two digits for the exponent. The range of this exponential numeric entry is –1e37 to 1e38.		

8.5.3.4 Other Densitometer

Arms: Meter: Temperature/Density: Other Densitometer Calibration Units **Meter 491**	Index: Meter	Range: Default: English
Description: This entry allows the user to select the calibration units used for the Solartron Densitometer. The factory default is English. Selections: • (0) [English] (Fahrenheit, PSI, lb/ft^3) • (1) Metric (Celsius, Bar, kg/m^3)		

Arms: Meter: Temperature/Density: Other DCF **Meter 476**	Index: Meter	Range: -9.9999 - 9.9999
Description: This entry allows the operator to enter the density correction factor for computing the calculated density from the actual density. The range of this six-digit numeric entry is –9.9999 to 9.9999.		

Arms: Meter: Temperature/Density: Other A, B or C Coefficient **Meter 493, 494, 495**	Index: Meter	Range: –1e37 to 1e38

Description: This code allows the operator to enter the constant “a” or "b" by which the density will be calculated according to the following formula: Density = aT2 + bT + c Where: T is the period of the incoming signal and a, b, and c are the programmed constants. Nine digits must be entered for constant a. The first seven digits represent the base number and the last two numbers represent the exponent. The +/- button may be used to set the sign of the base and the exponent field. The range of this exponential numeric entry is.

8.5.4 500—Pressure Directory

Arm: Meter: Pressure: Share Pressure Input **Meter 501**	Index: Meter	Range: 1 - 6
Description: Selects a pressure input defined for another meter to be used with this meter. For example, a single pressure probe may be used to supply pressure for several arms without having to use multiple analog inputs. Selections: • (0) Not Used • (1-36) Arm 1 - 6, Meter 1 - 6		
Critical: Selected meter has no I/O point configured for pressure.		

8.6 Product Directories

- 200—General Purpose Directory
- 200—Flow Control Directory
- 300—Volume Accuracy Directory
- 400—Temperature/Density Directory
- 500—Pressure Directory

8.6.1 100—Arm: Products: General Purpose Directory

Arms: Product: General Purpose: Product ID **Product 101**	Index: Product	Range: Text 20 characters maximum
Description: Enter a name for this product.		

Arms: Product: General Purpose: HM Classification Part 1 and Part 2 **Product 102, 103**	Index: Product	Range: Text - 30 characters each
Description: Enter the Hazardous Materials (HM) Classification text printed on the BOL.		

8.6.2 200—Arm: Products: Flow Control Directory

Arms: Products: FlowControl: Minimum Flow Rate **Product 201**	Index: Product	Range: [0] - 9999
Description: Sets the lowest (final stage) flow rate for the product. This will be the flow rate when the valve is signaled to close at the completion of a preset.		

Arms: Products: Flow Control: High Flow Rate **Product 202**	Index: Product	Range: [0] - 99999
Description: Sets the maximum flow rate for this product during loading.		

Arms: Products: Flow Control: Second High Flow Rate **Product 203**	Index: Product	Range: [0] - 99999 Disable: 0
Description: Sets a second high flow rate that is selectable by a digital input. This flow rate would normally be used in situations where the size of the deliveries varies and a lower high flow rate is needed for the smaller batches.		
Note: Not used with a two-stage flow control valve.		

Arms: Products: Flow Control: Flow Tolerance Percentage **Product 204**	Index: Product	Range: 0 - 9%
Description: Sets the threshold for making a valve adjustment as a percentage of the requested flow rate. Example: Current Flow Rate 600 GPM Flow Tolerance 9% Flow rate can vary by + or - 54 GPM (600 GPM x 9% = 54 GPM) without a valve correction signal from the AccuLoad. The AccuLoad will calculate the current flow deviation as a percentage of the target flow rate. This will be compared with the programmed flow tolerance rate (below), with the larger of the two tolerances determining when to adjust the valve.		

Arms: Products: Flow Control: Flow Tolerance Rate **Product 205**	Index: Product	Range: 0 - 999 flow rate units
Description: Sets the threshold for making a valve adjustment as a number of flow rate units. For example, if this parameter is set to 20, the AccuLoad will adjust the flow control valve anytime the actual flow rate varies more than 20 flow rate units from the target flow rate. The AccuLoad will calculate the current flow tolerance using the percentage entered in Product 204 and the current flow rate. This will be compared with the programmed flow tolerance rate entered here. The larger of the two tolerances will determine when to adjust the valve.		

Arms: Products: Flow Control: First Trip Amount **Product 206**	Index: Product	Range: [0] - 9999 delivery units
Description: Sets remaining amount of delivery when the flow rate ramp-down should begin.		

Arms: Products: Flow Control: Second Trip Amount **Product 207**	Index: Product	Range: [0.0] - 99.9 delivery units
Description: Sets the remaining amount (in tenths) of delivery when the flow rate ramp-down ends and the valve is completely closed. 0.0 to 99.9 units.		

Arms: Products: Flow Control: Second Trip Auto Adjust **Product 208**	Index: Product	Range: 1 - 9
Description: This one-digit numeric entry defines the number of batches to be included in the average used to calculate the second trip point adjustment. For a preset, this is the number of batches run. This parameter provides the operator an automatic method of adjusting the final trip point of the valve. The use of this parameter is ideal when starting up the system or when system hydraulics are changed during maintenance. The AccuLoad will automatically set up the second trip amount (Product 207) when this parameter is used. If for some reason the system parameters change and the second trip amount needs adjusted, the operator must get into the Program Mode and reset the auto adjust to again automatically adjust the final stage trip point.		
Note: The batch volumes must be sufficient to allow the AccuLoad to reach high flow before the first trip point is encountered.		

Arms: Products: Flow Control: Excess High Flow Alarm **Product 209**	Index: Product	Range: [0] - 99%
Description: Sets the alarm threshold for the maximum percentage by which the flow rate can exceed the product's high flow rate. This entry must be greater than the Flow Tolerance entry, except when a value of zero is entered to disable excess high flow alarm checking. The excess rate is entered as a percentage of the product high flow rate.		

Arms: Products: Flow Control: Low Flow Rate Alarm Limit **Product 210**	Index: Product	Range: [0] - 999
Description: Sets the alarm threshold for the low flow rate alarm which will be posted whenever a flow rate is equal to or lower than the limit set and is maintained for eight seconds. The low flow alarm is not triggered in cases where there is no flow.		

Arms: Products: Flow Control: Block Valve Delay to Open **Product 211**	Index: Product	Range: 0 - 99 seconds
Description: Sets a time delay (in seconds) for the opening of the product block valve prior to delivery of the product. If an input is programmed for block valve feedback and the feedback does not indicate the valve is open within the programmed delay, a block valve alarm will be triggered. The range of this two-digit numeric entry is 01 to 99 seconds. For example, if the Block Valve Delay to Open entry is set to 05 seconds, the AccuLoad would allow 5 seconds for the block valve to open or else an alarm would be triggered if the valve had not been opened. If no block valve feedback input has been configured, the AccuLoad assumes that the valve has opened after the programmed delay.		
Critical: Zero not allowed without block valve feedback.		
Note: Applies only to sequential blender arms.		

Arms: Products: Flow Control: Block Valve Delay to Close **Product 212**	Index: Product	Range: 0 - 99 seconds

Description: Sets a time delay (in seconds) for the closing of the product block valve after the product has been delivered. If an input is configured for block valve feedback and the feedback does not indicate that the valve has closed within the programmed delay, a block valve alarm will be triggered. The range of this two-digit numeric entry is 01 to 99 seconds. For example, if the block valve delay entry were set to 05 seconds once the delivery was completed, the AccuLoad would allow 5 seconds for the block valve to close, and then an alarm would be triggered. If no input is configured for block valve feedback, the AccuLoad assumes that the valve has closed after the programmed delay.
Critical: Zero not allowed without block valve feedback.
Note: Applies only to sequential blender arms.

Arms: Products: Flow Control: Product Stop Amount **Product 213**	Index: Product	Range: 0-999 delivery units
Description: Sets the shut down point of the ratio product. When the remaining batch amount (preset type) is equal to or less than this programmed value the ratio product valve will shut down. The flow rates for the ratio product with an early shutdown will be set up such that its requirement towards the batch will be satisfied before the stop volume is met. This feature can be used in lieu of specifying a clean line product and clean line volume in the arm directory. Operation of this parameter is identical to the additive stop amount, except that the stop amount pertains to a product and not an additive.		
Note: • Using this feature will likely result in a period during the batch where the component percentages do not remain at the desired blend ratio. Assuming the batch completes normally, the blend percentages will be accurate. • If the clean line volume as specified in the arm flow control directory (Code 221) is greater than the value programmed here then the ratio product will complete its delivery prior to the beginning of the clean line delivery. The clean line amount in the arm control directory (Code 221) will take precedence over this parameter if its value is greater than the value programmed here. • Applies only to ratio products on hybrid arms.		

Arms: Products: Flow Control: Product Stop Alarm **Product 214**	Index: Product	Range: [0] - 999.9 Disable: 0
Description: Sets the amount of under-run allowed for the product stop programmed in Product 213 - Product Stop Amount before an alarm occurs.		
Note: • Due to the conflicting goals of maintaining the correct product percentage ratios throughout the batch while accommodating a product stop amount, it may be desirable to program this amount to a larger value to avoid spurious alarms. The AccuLoad will favor an accurate final blend percentage and preset over a precise stop amount. • Applies only to ratio products on hybrid arms.		

8.6.3 300—Accuracy Directory

Arms: Products: Volume Accuracy: Minimum Batch Amount **Product 301**	Index: Product	Range: 1 to 99999 delivery units
Description: Sets a minimum batch size for this product. This value is used to calculate the minimum preset for the recipe. An error message, "The minimum preset for this recipe is *." will be displayed. Any attempt to start a batch with a product volume less than the minimum batch size for that product will not be allowed.		
Note: • * indicates the summation of all the minimum batches of the components of the recipe according to the percentages programmed for that recipe. • Not applicable to straight arms.		

Arms: Products: Volume Accuracy: Meter Factor 1 through 5 **Product 302, 304, 306, 308, 315**	Index: Product	Range: 0 - 9.99999
Description: The meter factors (1 - 5) and the associated flow rates below allow the entry of the meter factor curve. The AccuLoad will perform linearization to calculate meter factors between the entered flow rates. GV = Meter factor * IV Note: If only a single meter factor is used, it must be put into program code 302. The flow rate selected in program code 303, 305, 307, 309, 316 must be set to "0". Under these conditions any other meter factors programmed will be ignored. The range of these six-digit numeric entries is 0 to 9.99999.		
Note: A zero entry in meter factor 1 will be considered an invalid entry. Zero entries in the remaining factors will result in that factor and subsequent factors not being used. (e.g., if a zero entry is made for factor 2, factors 3 and 4 will not be used.)		
Fatal: Entry must not be zero [302 only]		
Critical: • Factor varies more than the Linearized Factor Deviation. • Meter factors must be within 2% of the master meter factor. • Security level for parameter must be at top 2 levels.		

Arms: Products: Volume Accuracy: Flow Rate 1 through 5 **Product 303, 305, 307, 309, 316**	Index: Product	Range: 0 - 99999 flow rate units
Description: These five-digit entries are the flow rates at which the meter factors (codes 302, 304, 306, 308, 315) are defined beginning with the highest flow rate in program code 303 and descending to the lowest flow rate in program code 316. If only one meter factor is used, these program codes must be set at "0". The range of these entries is 0 to 99999 flow units.		
Critical: • Flow rates must be entered in descending order. • Corresponding meter factor not programmed. • Security level for parameter must be at top 2 levels.		

Arms: Products: Volume Accuracy: Master Meter Factor **Product 310**	Index: Product	Range: [0] - 9.99999 Disable: 0
Description: This program code allows the operator to set a master meter factor which restricts meter factors one through f ive (codes 302, 304, 306, 308 and 315), to plus or minus 2% of the master factor (i.e., the value entered here). This range restriction applies only to meter factors which are programmed for use (i.e., meter factor one always and, if linearizing, all the factors used). Any attempt to enter a meter factor outside the 2% range, if installed, will cause a Critical Warning. In addition, a master factor entry that causes the current meter factors installed to be out of range will cause those meter factors which are out of range to prompt a Critical Message. This critical condition must be corrected so that all used meter factors are within the 2% range of the master factor before normal Run Mode operations can occur.		
Critical: • Meter factor must be within 2% of the master meter factor. • Security level for parameter must be at top 2 levels.		

Arms: Products: Volume Accuracy: Linearized Factor Deviation **Product 311**	Index: Product	Range: [0] - 9.99% Disable: 0

Description: Sets a maximum allowable deviation between adjacent meter factors. Any attempt to enter a meter factor outside this range will cause a Critical Warning. A linearized factor deviation entry that results in the current meter factors installed to be out of range will set a program code alarm. The meter factors that are out of range will be indicated by a DA alarm. The meter factors at fault must be corrected so they are within range of the deviation entry before normal Run Mode operations can occur.
Critical: • Meter factor varies more than the Linearized Factor Deviation. • Security level for parameter must be at top 2 levels.

Arms: Products: Volume Accuracy: Meter Factor Variation Select **Product 312**	Index: Product	Range:
Description: Enables or disables meter factor variation based on the temperature of the product. The factory default is "Disabled." Selections: • (0) [Disabled] • (1) Enabled		
Note: The magnitude of the variation is determined by the meter factor percent change per degree temperature parameter below.		
Critical: Security level for parameter must be at top 2 levels.		

Arms: Products: Volume Accuracy: Meter Factor Percent Change Per Degree Temperature **Product 313**	Index: Product	Range: 0.0001 to 0.9999%
Description: The amount in percentage that the meter factor varies for each degree change in temperature.		
Note: Has no effect if Program Code 312 is disabled or temperature units are not assigned.		
Critical: Security level for parameter must be at top 2 levels.		

Arms: Products: Volume Accuracy: Meter Factor Variation Reference Temperature **Product 314**	Index: Product	Range: -999.9 - 999.9 degrees
Description: Sets the meter factor variation reference temperature. This entry represents the temperature, in tenths, at which the present meter factor was determined.		
Note: Not applicable if Program Code 312 is disabled or temperature units are not assigned.		
Critical: Security level for parameter must be at top 2 levels.		

8.6.4 400—Temperature/Density Directory

Arms: Products: Temperature/Density: High Temperature Alarm Limit **Product 402**	Index: Product	Range: -999.99 - +999.99 degrees Disable: 999.99
Description: Sets the alarm threshold for a high temperature alarm to be posted.		
Note: An entry of "+999" will disable the alarm.		

Arms:Products:Temperature/Density:Low Temperature Alarm Limit **Product 403**	Index: Product	Range: -999.99 - +999.99 degrees Disable: -999.99
Description: Sets the alarm threshold for a low temperature alarm to be posted.		

Arms: Products: Temperature/Density: Maintenance Temperature **Product 401**	Index: Product	Range: -999.9 to 999.9 degrees Disable: -999.9
Description: Maintenance temperature is used when a temperature probe is not installed or working, but temperature related calculations are desired.		
Notes: • An entry greater than -999.9 will override the temperature probe or transducer input if installed and will be used in all calculations where temperature is used. Note that this may not be allowed in all weights & measures jurisdictions. • Not applicable if Temperature Units = Not Used		

Arms:Products:Temperature/Density:API Table **Product 411**	Index: Product	Range:

Description: This program code selects the temperature correction method used for the product being delivered.

Selections:

- None
- API 2004 crude oils
- API 2004 refined products
- API 2004 C Tables Special
- API 2004 Lube Oils
- API E Tables - LPG, NGL
- API 1952 (6,23,24,53,54)
- PTB-1 ethanol/bio blend
- PTB-3 ethanol/bio blend
- EPA-RFS2 (E100) - ethanol
- EPA-RFS2 (B100) - biodiesel
- Aromatics (ASTM D1555)
- Brazil ABNT5992 (Refden)
- Brazil ABNT5992 (RefGrade)
- Brazil ABNT5992 (LiveDen)
- Brazil BR1A
- Brazil BR1P
- Brazil BR2P
- NH3 - Ammonia
- API Ethanol (11.3.4)

The old tables (API 1952) allow for non-60F/15C reference temperatures. In addition, the reference density may be at a different temperature from the reference temperature. For example, the reference temperature may be 30C and the reference density's temperature may be 15C. Product parameter #414 may be used to enter the reference density's temperature. The API 1952 tables may be used for Asphalt temperature compensation. Old Tables 6, 24 and 54 may be used in place of ASTM D4311 (Asphalt temperature compensation). ASTM D4311 uses a reference density of 1028.1 kg/m3 or 920.9 kg/m3. API Ethanol (11.3.4) is applied to the ethanol product when configured for gasoline-ethanol blending applications.

Critical: • API table conflicts with temperature units • No density input configured [odd tables only] • Live density is not available with PTB Ethanol blend calculation.
(PTB) available with 11.06 and higher. Table Aromatic available with 11.08 and higher.
Note: Eth and B100 (EPA-RFS2) equations for “Standardization of Volumes for renewable fuels per EPA 40 CFR Part 80 regulation of Fuels and Fuel additives”. A Reference Density entry is not required when using these equations; EPA-RFS2 uses a C of E of 0.000630 for ethanol and 0.000458 for B100 in these equations that can be entered for Reference Density entry if volume to mass conversion is required.

Arms: Products: Temperature/Density: Reference Density **Product 412**	Index: Product	Range: -9999.9 - 9999.9
Description: This entry specifies the reference density of the product (density at standard temperature/pressure) when not using a densitometer.		
Entry range based on table selection. Table 6 999.9 to +999.9 API Table 24 0 to 9.9999 Relative Density Table 54, 60 0 to 9999.9 Reference Density Eth/Gas (PTB) 0 to 9999.9 kg/m^3		
Note: • If the API table selection is changed, the previous five-digit entry for reference will not be converted. This value must be re-entered. • The valid range for the E tables is 0.3500 to 0.6880 relative density @ 60 °F or 351.7 to 687.8 kg/m^3 at 15 °C or 331.7 to 683.6 kg/m3 @ 20° C per GPA TP-27 and API 11.2.4.		
The following are examples of the display when Tables 24, 54 or 6C and 54C are selected: • Table 6B selected: +43.2 API • Table 24 selected: 0.8175 Rel Density • Table 54 selected: 1150.2 kg/m^3		
Critical: Reference density is required for ethanol blends.		
Note: For Eth/Gas (PTB) tables enter density at 15 °C in units of kg/m^3, regardless of what the reference temperature (System 402) is programmed for.		
Fatal: Entry is out of specified range.		

Arms: Products: Temperature/ Density: Reference Density Units **Product 1400**	Index: Product	Range:
Description: This entry allows the user to specify the units associated with the value entered in Product 413 – Reference Density Selections: • NA • °API • lb/ft^3 • kg/m^3 • Relative Density		

Arms: Products: Temperature/Density: Reference Density Temperature **Product 418**	Index: Product	Range: 0 - 999.9
Description: In some applications, the temperature used to obtain the reference density may not always be the same as the base temperature used for volume correction. The AccuLoad will allow entering a separate reference temperature for the reference density. Volumes will continue to be corrected to the programmed reference temperature in System Directory 402. This feature will only be available with the API 2004 tables (for example. 6A\B\D, 24A\B\D, 54A\B\D, 60A\B\D), old tables and aromatics. For example, this parameter will allow entering a reference density measured at 15 °C and correcting volumes to 30 °C or enter a reference density measured at 60 °F and correct volumes to 86 °F.		
Critical: Reference density must be 15 °C or 59 °F for PTB ethanol blends.		

Arms: Products: Temperature/Density: Coefficient of Expansion **Product 1401**	Index: Product	Range: 0 - 999.9
Description: This entry, in units of percent per degree of temperature, specifies the amount of expansion as a percentage for the product when using a C type table. For example, a Coefficient of Expansion with a value of 0.0010720 would be entered as a percentage value of 0.107200.		

Arms: Products: Temperature/Density: Densitometer Type **Product 1402**	Index: Product	Range:
Description: This entry specifies whether a live densitometer is used and if so, whether it is providing a density corrected to reference temperature or is providing the observed density at line conditions. Selections: • No Densitometer • Observed Density • Corrected Density		

Arms: Products: Temperature/Density: Calculate Current Reference Density **Product 417**	Index: Product	Range:
Description: This entry enables calculation of a real-time reference density from current temperature and live (observed) density. An average reference density calculation for the delivery is always included, but if the reference density needs to be monitored during the delivery, enable this option. Selections: • No • Yes		

Arms: Products: Temperature/Density: High Density Alarm Limit **Product 413**	Index: Product	Range: -999.9 - +999.9 API for other density units 0 - 9999.0
Description: Sets the alarm threshold for the high density alarm.		
Note: Not applicable if Density Units = Not Used.		

Arms: Products: Temperature/Density: Low Density Alarm Limit **Product 414**	Index: Product	Range: -999.9 - +999.9 API for other density units 0 - 9999.0
Description: Sets the alarm threshold for the low density alarm.		

Arms:Products:Temperature/Density:Maintenance Density **Product 1403**	Index: Product	Range: -999.9 - +999.9 API for other density units 0 - 9999.0
Description: This program code allows for the entry of a maintenance density in situations where the densitometer fails, etc. and the density value must be entered via the user interface or communications.		

Arms: Products: Temperature/Density: Delta Amount **Product 415**	Index: Product	Range: 0 - 99999 delivery units
Description: This parameter applies to unloading arms only, and specifies the batch quantity between density samples –999.9 to +999.9 API used to calculate the percentage of contaminant during unloading. A maximum of ten samples are taken over the course of a batch. Each of the samples is a flow-weighted average over the amount defined by this entry. The density sample for the 10th delta amount delivered (or the last complete sample if less than 10) will be considered the density of the pure uncontaminated product when the contaminant percentage is calculated.		

Arms: Products: Temperature/Density: Contaminant Density **Product 416**	Index: Product	Range: 0 - 9999.9 density units
Description: This parameter applies to unloading arms only, and specifies the density value assumed for the contaminant (such as water) that may be present in an unloading operation. It is used in the calculation to determine the percentage of contaminant present during the unloading operation.		

Arms: Products: Temperature/Density: PTB kOE Method 1 **Product 425**	Index: Product	Range: -1e+37 and 1e+38
Description: This entry is the coefficient required to implement the PTB k0E method 1 algorithm for ethanol/biodiesel blends.		

Arms: Products: Temperature/Density: PTB A1 Method 3 A1, A2, A3 Coefficients **AProduct 420, 421, 422**	Index: Product	Range: -1e+37 and 1e+38
Description: These parameters provide temperature compensation of ethanol and gasoline blends using the PTB equation. The AccuLoad will allow entering the coefficients used in the equation to allow for other blends as new data is available from PTB. - > -1.12345e-09		
Critical: A1, A2 and A3 constants are required for ethanol blends.		

Arms: Products: Temperature/Density: Ethanol Grade (%M/M) **Product 426**	Index: Product	Range: 0 - 100
Description: This program code is used to set the numerical value of alcoholic grade, expressed in percentage by mass (kg of ethanol/100 kg of alcohol). Temperature compensation will be performed according to the ABNT NBR 5992:2008 standard. This entry is only applicable if API table (product parameter #411) is programmed for "ABNT5992(RefGrade)" and temperature units (system parameter #401) are programmed to °C.		

Arms: Products: Temperature/Density: Aromatic Hydrocarbon Product **Product 423**	Index: Product	Range: -1e+37 to +1e+38
Description: This program code specifies the industrial aromatic hydrocarbon or cyclohexane product being delivered. Temperature compensation will be performed according to the ASTM D 1555 standard. This entry is only applicable if API table (product parameter #411) is programmed for Aromatic and temperature units (system parameter #401 are programmed. For impure products, product parameter #424 may be used to enter the density of the mixture. Otherwise the density of the pure product will be used in the calculations. • (0) Benzene • (1) Cumene • (2) Cyclohexane • (3) Ethylbenzene • (4) Styrene • (5) Toluene • (6) m-Xylene • (7) 0-Xylene • (8) p-Xylene • (9) 300-350F Aromatic • (10) 350-400F Aromatic		

Arms: Products: Temperature/Density: Aromatic Hydrocarbon Reference Density **Product 424**	Index: Product	Range: 0 -9999.99
Description: This parameter is used to enter the reference density of an aromatic hydrocarbon product that is considered impure. If 0 is entered, the density of the pure product will be used in the calculations. Reference density should be entered in density units of kg/m^3 and should be based at the programmed reference temperature (system parameter #402) or the reference density's temperature (product parameter #414)		
Note: If 300-350 °F Aromatic or 350-400 °F Aromatic product is selected, the reference density for the product must be entered. Otherwise the conversion of volume and mass will not be available (for example, if volume pulse input, mass will not be available. If mass pulse input, volume will not be available.		

Arms: Products: Temperature/% Water in NH3 **Product 1404**	Index: Product	Range: 0.000 - 10.000
Description: Enter the % weight of water used to correct density of ammonia (NH3).		

8.6.5 500—Pressure Directory

Arm:Product:Pressure:High Pressure Alarm Limit **Product 503**	Index: Product	Range: [0] - 9999 pressure units
Description: Sets the alarm threshold for the High Pressure Alarm to be generated.		

Arm: Product:Pressure: Low Pressure Alarm Limit **Product 504**	Index: Product	Range: [0] - 9999 pressure units
Description: Sets the alarm threshold for the Low Pressure Alarm to be generated.		

Arms: Products: Pressure: Maintenance Pressure **Product 501**	Index: Product	Range: 0.0 - 9999.9 pressure units Disable: 0.0
Description: Sets a pressure to be used when a pressure transmitter is not installed or is not working, but pressure-related calculations are desired.		

Arms: Products: Pressure: Pressure Coefficient **Product 502**	Index: Product	Range: 0 - 99999
Description: This code will allow for the entry of a Compressibility Factor that will be used by the system to calculate the CPL. This entry should be zero except when API 2004 C Tables is selected for the API table and pressure compensation is required as the AccuLoad has no density with which to calculate the compressibility factor. The factor is used as the following: XXXXX equals the factor entered and it is applied as 0.0000XXXXX.		
Note: This value will represent the F variable in the CPL equation.		

Arms: Products: Pressure: Differential Pressure **Product 511**	Index: Product	Range: [0] - 9999 pressure units Disable: 0
Description: Sets the additional pressure to be maintained above the vapor or back pressure. In this situation, the low pressure alarm must be set high enough to ensure that the pressure does not fall below the product's vapor pressure.		
Note: A non-zero entry here will override any other programmed type of back pressure flow control.		

Arms: Products: Pressure:Minimum Back Pressure Flow Rate **Product 512**	Index: Product	Range: [0] - 9999 flow rate units
Description: Sets the minimum flow rate allowed when reducing the flow rate to maintain the minimum back pressure. The AccuLoad will post an alarm if the flow rate would need to be reduced below this level to maintain the target back pressure.		

Arms: Products: Pressure: Minimum Back Pressure Flow Rate Timer **Product 513**	Index: Product	Range: 0 - 99 seconds Disable: 0
Description: Sets the minimum time, in seconds, allowed for the unit to achieve a desired flow rate. If the flow rate is not reached in this time, the flow rate will be lowered by a percentage because of insufficient back pressure. If the flow rate falls below the back pressure minimum flow, an alarm will be issued and the valve will be closed. If a differential pressure is entered in Product 511, this pressure must be attained within this time period after a flow rate change. If not, the flow rate will be lowered due to insufficient back pressure.		
Note: This entry is used for Automatic Flow Optimization (AFO).		

Arms: Products: Pressure: Back Pressure Percent Reduction **Product 514**	Index: Product	Range: 50 - 90%
Description: This two-digit entry will allow the operator to select the percentage of flow rate to be used during insufficient back pressure conditions or insufficient flow conditions. (For example, an entry of 90% will cause the flow rate to be reduced to 90% of the current rate during insufficient back pressure conditions.)		
Note: This entry is used for Automatic Flow Optimization (AFO).		

Arms: Products: Pressure: Back Pressure Flow Recovery Pressure **Product 515**	Index: Product	Range: [0] - 9999
Description: Sets the amount of pressure above the vapor pressure of the product that will trigger the AccuLoad to attempt flow recovery to the programmed high flow.		
Note: This function requires a pressure input and this pressure must be sufficiently higher than the differential pressure entered in Product 511 to prevent flow rate oscillation.		

Arms:Products:Pressure:Back Pressure Flow Recovery Timer **Product 516**	Index: Product	Range: [0] - 99 minutes Disable: 0
Description: Sets the time the AccuLoad will wait to attempt flow rate recovery if a pressure reading is not available. This parameter provides a method of flow recovery that does not require the use of a pressure transmitter input.		

Arms: Products: Pressure: Vapor Pressure Calculation Method **Product 521**	Index: Product	Range:
Description: This parameter defines the method that the AccuLoad will use to calculate the vapor pressure of a product. Selections: • (0) Straight Line Approximation (Requires points of the curve to be entered in codes 522 through 527). • GPA TP-15 (absolute) • GPA TP-15 (gauge): As outlined in GPA TP-15 (Gas Processors Association Technical Publication 15). (Uses the reference density of the product in the calculations).		
Critical: GPA-TP15 requires corrected density [temperature used, API table selected]		

Arms: Products: Pressure: Vapor Pressures 1 - 3 **Arms 522, 524, 526**	Index: Product	Range: [0.0] - 9999.9
Description: These three parameters are used to define the vapor pressure portion of the vapor pressure versus temperature curve used to calculate the current vapor pressure. The pressure(s) are defined lowest to highest. The vapor pressure calculation, determined from the entries made here, will be used both for differential back pressure control and in the CPL equation as the Pe entry. Therefore, careful consideration should be given in determining these points and their accuracy.		
Critical: Vapor pressures must be entered in ascending order.		

Arms: Products: Pressure: Vapor Pressure Temperatures 1 - 3 **Product 523, 525, 527**	Index: Product	Range: -999 - +999 degrees
Description: These three parameters are used to define the temperature portion of the vapor pressure versus temperature curve used to calculate the current vapor pressure. These temperatures correspond with the vapor pressures. The vapor pressure calculation, determined from the entries made here, will be used both for differential back pressure control and in the CPL equation as the Pe entry. Therefore, careful consideration should be given in determining these points and their accuracy.		
Critical: Corresponding vapor pressure not programmed.		
Note: Not used for Vapor Pressure Calculation Method = GPA-TP15		

8.7 Recipe Directories

- Product Blend
- Recipe Additives

8.7.1 Product Blend

Recipes: Product Blend: Recipe Used **Recipes 001**	Index: Recipe	Range: 1 - 6
Description: This program code indicates whether a recipe is configured for use. Selections: • (0) Not Used • (1-6) Load Arm 1 - 6		
Critical: Load Arm not configured.		
Note: Load Arms 3 through 6 are not available on the AccuLoad-ST hardware.		

Recipes: Product Blend: Recipe Name **Recipes 002**	Index: Recipe	Range: Text - 20 characters maximum
Description: Assigns a name for this recipe.		

Recipes: Product Blend: HM Classification **Recipes 003**	Index: Recipe	Range: 0 - 5
Description: Selects a product Hazardous Materials (HM) Classification for this recipe. This HM Classification will print on the load ticket for this recipe. HM Classifications are defined in the individual product directories. Selections: (0-5) Product 1 - 6		
Critical: Product not configured.		

Recipes: Product Blend: Product Delivery Order 1 - 6 **Recipes 004, 006, 008, 010, 012, 014**	Index: Recipe	Range: 0 - 6
Description: Sequential Blending: These parameters define the order of delivery of the sequentially blended products in this recipe. This applies to sequential blending arms and the sequentially delivered products on a hybrid arm. Selections: • (0) Not Used • (1-6) Product 1 - 6		
Critical: • First component must be programmed [-04 only] • Not used for ratio products (unless configured for successive delivery in Recipe 090)		
Note: • Applies to sequential blending arms, hybrid arms, and ratio arms configured to deliver product successively only. • For hybrid arms, the ratio products are counted first.		

Recipes: Product Blend: Product Percentage 1 - 6 **Recipes 005, 007,009, 011, 013, 015**	Index: Recipe	Range: 0.0 - 100.0%
Description: These parameters set the percentage of each product in a recipe as a percentage of the total batch that is to be contributed by this product. The percentages of the six products (ratio blending) or six components (sequential blending) must add up to one hundred percent; otherwise, a critical warning will be issued. For example, 0 would mean that this product is not to be included in the recipe, and 100.0 would mean that the recipe was to consist entirely of this product. Hybrid Blending: Program product percentages for the ratio products first. The remaining parameters can be used to specify the percentages for the sequential products.		
Critical: • Component percentages must sum to 100%. • Component percentage not used with straight product.		

Recipes: Product Blend: Clean Line Deduct **Recipes 016**	Index: Recipe	Range: 1 - 6
Description: Selects the product from which the clean line volume is to be deducted. In the Ready Mode, when a recipe is selected and a preset amount is entered, the preset is divided among the products according to the percentages programmed in the recipe. The clean line volume is deducted from the preset volume of the product selected here. If the product selected is not part of this recipe, a critical warning will be issued. The range of this entry is one through six. For example, assume a recipe with 50% of products 1 and 2. The clean line is 50 gallons of product 4. A preset of 1000 gallons is entered. This preset is divided among products 1 and 2: 500 gallons each. If product 1 is selected here as the product from which to deduct clean line, then the product 1 preset would be 500 – 50 = 450 gallons. When START is pressed, products 1 and 2 would deliver 450 gallons and 500 gallons, respectively. When products 1 and 2 have been delivered, 50 gallons of the clean line product (product 4) will be delivered. Selections: Product 1 - 6		
Critical: • Product not used in recipe. • Clean Line Deduct must be Product 1 when recipe is assigned to a side-stream blending arm.		

Recipes: Product Blend: Clean Line Product **Recipes 089**	Index: Recipe	Range: 1 - 6
Description: This parameter specifies the product used to pack the load arm and meter run at the end of the batch. This allows the operator to set a clean line product on a per-recipe basis. If Load Arm parameter 221 Clean Line Amount is greater than zero and if Recipe 32 - Clean Line Prd is not set to NA, the product as programmed in here in Recipe 32 - Clean Line Prd will be the clean line product. In other words, the clean line product programmed in the recipe directory will take precedence over the clean line product programmed in the arm directory provided that the recipe clean line product is not NA. If the recipe clean line product is programmed as NA then the clean line product will be that as programmed in the arm directory (222 Clean Line Product). Selections: • Not Used • Product 1 - 6		
Critical: • Product cannot be a side stream product (ratio product plumbed upstream of the sequential product meter) on a hybrid arm. • Product greater than the number of products available for this arm.		

Recipe: Product Blend: Ratio Delivery Mode **Recipes 090**	Index: Recipe	Range:
Description: This program code allows for a ratio plumbed arm configuration to deliver products one after the other instead of concurrently. Recipes where ratio percentages are difficult to achieve concurrently due to system hydraulics, or where endothermic reactions could significantly affect results may be configured to deliver each product successively with this program code. Selections: • (0) Concurrent – Products are set up to flow simultaneously (traditional ratio blending) mixing in the arm as they are flowing into the vessel. • (1) Successive – Products are set up to flow one after the other (sequentially) and mixing once they are in the vessel. If this option is set to '1 – Successive' then the product order of delivery must also be specified (as for a sequential blending arm).		

8.7.2 Recipe Additives

Recipes: Recipe Additives: Additive Amount/Cycle **Recipes - See Table 23: Recipe Additives on the next page**	Index: Recipe	Range: 0.000 - 9999.999
Description: Defines the volume of additive product that will be injected for each cycle of additive injector (e.g., an entry of 000.100 shows that one-tenth of a unit of additive will be injected each cycle of the injector). For piston or metered injectors, the units for this additive volume are as programmed in system code 881. For smart injectors, this is the number downloaded to the smart injector. The units may be fixed or programmed on the smart injector. When using a Smart Additive Injector System, the additive injector volume is downloaded to the additive injector at the start of each batch. Some additive injectors do not support the full range that the AccuLoad will allow. Titan injectors accept only whole numbers for the volume. Smith and Gate City injectors (Blend-Pak, Mini-Pak, and AccuTroller) accept injector volume in tenths. The AccuLoad will truncate the entry to the format required for the smart injector.		

Recipes: Recipe Additives: Additive Rate **Recipes - See Table 23: Recipe Additives on the next page**	Index: Recipe	Range: 0 - 999 delivery units or 0 - 20%
Description: Defines the rate at which additive is injected into the product stream during delivery. This is the volume of the main product per additive injection, typically 40 gallons or 100 liters. If the injector is a flow controlled injector, the value represents a percentage of the preset amount that this additive will comprise. For example, with a preset of 1000 units and this parameter programmed to 10.0, the result will be 900 units of the component products in the recipe plus 100 units of this additive. The range is 0 to 20.0 percent.		

Recipes: Recipe Additives: Product Using Additive **Recipes - See Table 23: Recipe Additives on the next page**	Index: Recipe	Range: 1 - 24

Description: This entry is used to select whether this injector is to be used with this recipe and with which products it will be used. Each of the 24 possible injectors may be used with the products being loaded in this recipe.

Product 1 - 24

This program code allows the operator to select which products use a respective injector in a blender. Products using an injector are marked with an asterisk. The number of products shown on the display is dependent on the number of products configured for the respective load arm.

Table 23: Recipe Additives

Additives	Additive Amount/Cycle	Additive Rate	Product Using Additive
Injector 1	017	018	019
Injector 2	020	021	022
Injector 3	023	024	025
Injector 4	026	027	028
Injector 5	029	030	031
Injector 6	032	033	034
Injector 7	035	036	037
Injector 8	038	039	040
Injector 9	041	042	043
Injector 10	044	045	046
Injector 11	047	048	049
Injector 12	050	051	052
Injector 13	053	054	055
Injector 14	056	057	058
Injector 15	059	060	061
Injector 16	062	063	064
Injector 17	065	066	067
Injector 18	068	069	070
Injector 19	071	072	073
Injector 20	074	075	076
Injector 21	077	078	079
Injector 22	080	081	082
Injector 23	083	084	085
Injector 24	086	087	088

8.8 Split Architecture Directories

Split Architecture: Configuration: Board Set ID **Split Architecture 1608**	Index: None	Range: Text - 28 characters maximum
Description: A unique and descriptive identifier for this split architecture configuration board set.		

Split Architecture: Configuration: Stop Key **Split Architecture 1609**	Index: None	Range:
Description: Select if pressing the Stop All button should stop all arms on both HMIs or stop arms on this HMI only. Selections: • Arms on Both HMIs • Arms on HMI only		

Split Architecture: Configuration: Idle Arm Alarm **Split Architecture 1610**	Index: None	Range:
Description: Select if all arms should be stopped when an alarm occurs on an idle arm that can't be displayed. Selections: • Stop Arms • Don't Stop Arms		

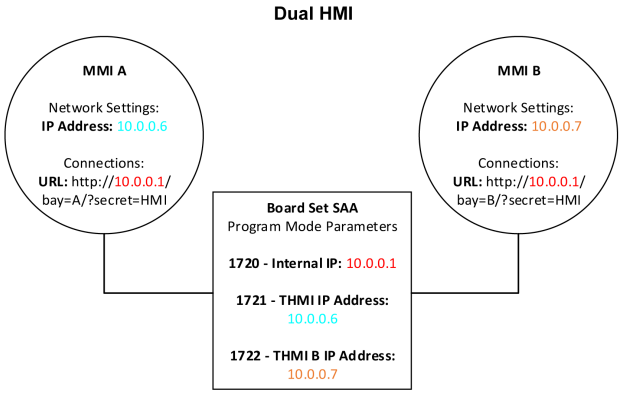
Split Architecture: Board Addresses: Board Set 2 **Split Architecture 1611**	Index: None	Range: 000.000.000.000
Description: Enter the Internal IP Address of other board sets in the Split Arch configuration. Help: See Figure 183: Board Set 1 on the next page for additional information.		

Split Architecture: Board Addresses: Board Set 3 **Split Architecture 1612**	Index: None	Range: 000.000.000.000
Description: Enter the Internal IP Address of other board sets in the Split Arch configuration. Help: See Figure 184: Board Set 2 on the next page for additional information.		

Split Architecture: Board Addresses: Board Set 4 **Split Architecture 1613**	Index: None	Range: 000.000.000.000
Description: Enter the Internal IP Address of other board sets in the Split Arch configuration. Help: See Figure 185: Board Set 3 on page 245 for additional information.		

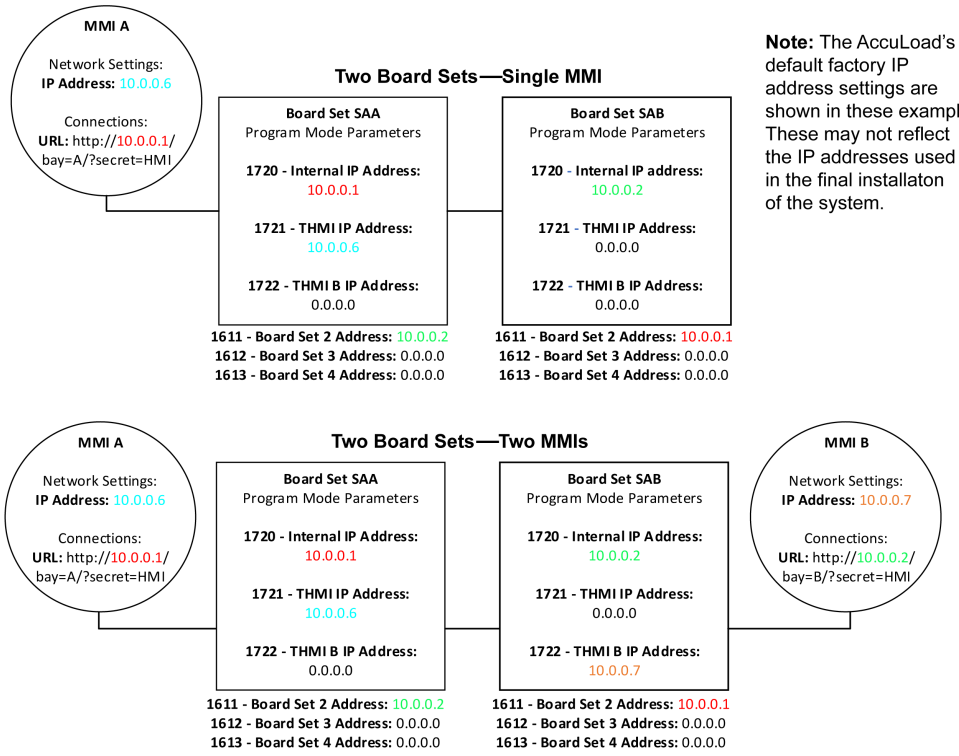
8.8.1 Split Architecture Board Sets

Figure 183: Board Set 1



Note: The AccuLoad's default factory IP address settings are shown in these examples. These may not reflect the IP addresses used in the final installaton of the system.

Figure 184: Board Set 2



Note: The AccuLoad's default factory IP address settings are shown in these examples. These may not reflect the IP addresses used in the final installaton of the system.

Figure 185: Board Set 3

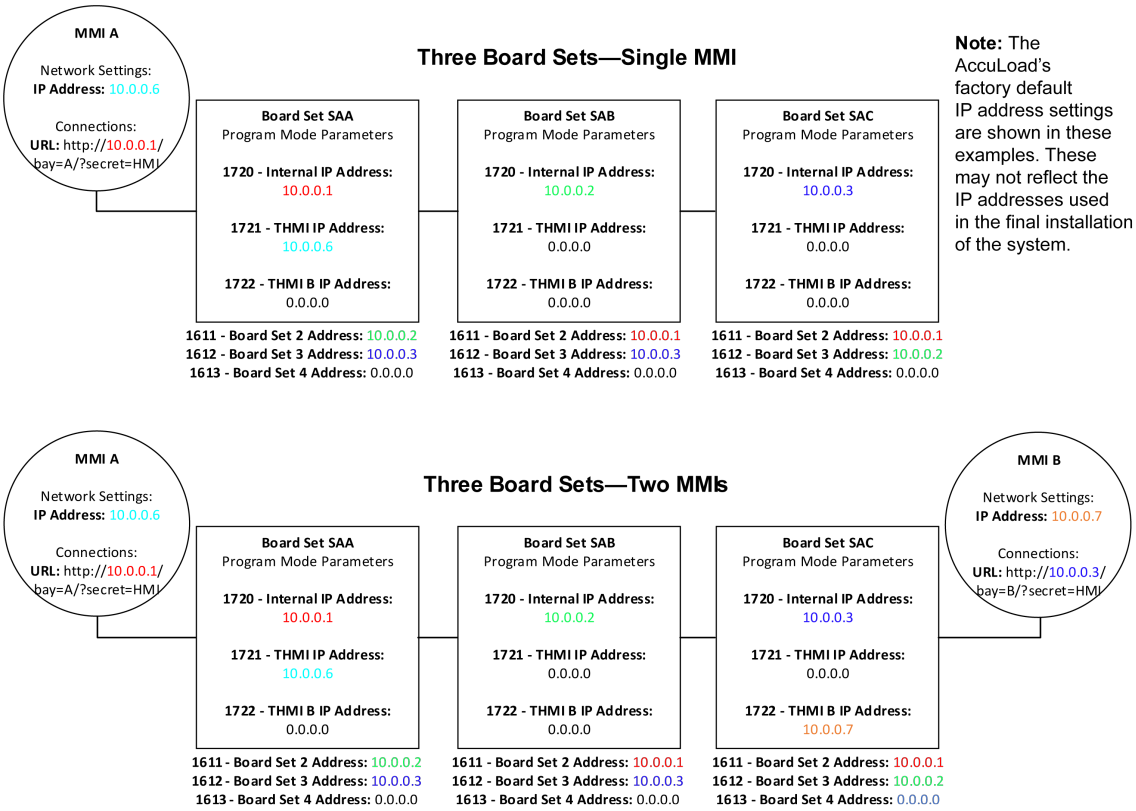
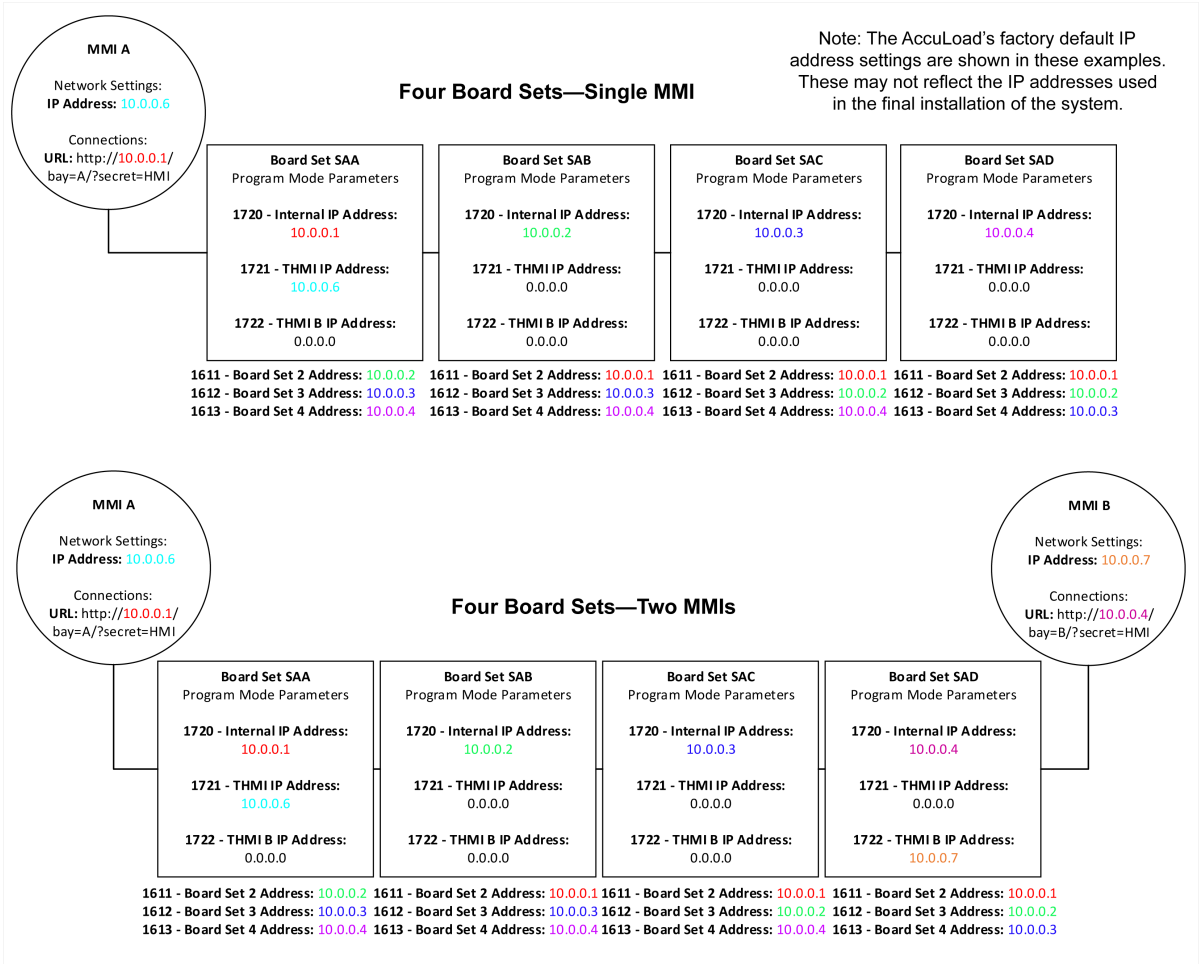


Figure 186: Board Set 4



Appendix 1: Alarms

Table 24: Smart Additive Inject Alarm Cross Reference

Smart Additive Inject Alarm Cross Reference	
Blend-Pak Injector (From the Blend-Pak's point of view)	**AccuLoad III AccuLoad IV Equivalent Error Code**
Excess Additive	RA: Additive Frequency Alarm
No Additive Flow	NA: No Additive Pulses Alarm
No Fuel Flow	GA: Additive Injector Error
Low Additive	KA: Low Additive Volume
Leaking Solenoid	MA: Excess Additive Pulses
No Act. Time-Out	GA: Additive Injector Error
Fuel Flow Switch	GA: Additive Injector Error
Low Flow Switch Failure	GA: Additive Injector Error
Flash Vol Alarm	GA: Additive Injector Error
Communication Error to Additive Injector	CT: Additive Communication Totals
Mini-Pak Injector (From the Mini-Pak's point of view)	**AccuLoad IV Equivalent Error Code**
Additive Cycle Volume Alarm	GA: Additive Injector Error
No Additive Alarm	NA: No Additive Pulses Alarm
Leaking Solenoid	MA: Excess Additive Pulses
Firmware Failure	GA: Additive Injector Error
EEPROM Failure	GA: Additive Injector Error
Communication Error to Additive Injector	CT: Additive Communication Totals
Titan Injector (From the Titan's point of view)	**AccuLoad IV Equivalent Error Code**
Alarm Low 1	RA: Additive Frequency Alarm
Alarm Low 2	KA: Low Additive Volume
Pulse Detection	NA: No Additive Pulses Alarm
Alarm High	MA: Excess Additive Pulses
Product Pulse Failure	GA: Additive Injector Error
Unclean Product	GA: Additive Injector Error

Table 25: Table of Equivalent Error Codes

Table of Equivalent Error Codes	
Add-Pak (A4I or AICB)	**AccuLoad IV Equivalent Error Code**
Injections occurring too fast	OR: Overspeed Injector CR: Inj Command Rejected
No additive pulses occurring	NA: No Add Pulses
Out of tolerance high	RA: Additive Frequency Alarm
Out of tolerance low	KA: Low Additive Volume
Excess additive pulses	MA: Excess Additive Pulse
Additive total at least 10 times greater than expected injection volume per injection	CT: Additive Communication Totals
Faulty ROM or RAM	D1: Add-Pak Diagnostic Alarm
Metered Injector – If this happens...	**AccuLoad IV – This alarm occurs...**
Injections are occurring too fast (before the previous one is complete)	OR: Overspeed Metered Injector
No additive pulses are registering (no pulses have been registered from previous injection)	NA: No Additive Pulses Alarm
Out of tolerance high (meter constantly out of tolerance on high side)	RA: Additive Frequency Alarm
Out of tolerance low (meter constantly out of tolerance on low side)	KA: Low Additive Volume
Excess Additive Pulses	MA: Excess Additive Pulses

Table 26: AccuLoad IV DA Alarms

AccuLoad IV DA Alarms	
Arm Program Error	This alarm indicates a conflict or inconsistency in arm configuration.
Arm Recipe Program Error	This alarm indicates a conflict or inconsistency in arm recipe selection.
A4B Comm Fail	This alarm indicates a failure on the A4B.
Display Failure	This alarm indicates a failure in data transmission to the display.
Flash Corrupt on Power Up	This alarm indicates that flash memory failed to successfully complete the power up testing sequence.
Flash Memory Error	This alarm indicates a flash memory failure.
Meter Program Error	This alarm indicates a conflict or inconsistency in meter configuration.
Passcode Reset	This alarm indicates that the passcode has been reset.
Product Program Error	This alarm indicates a conflict or inconsistency in product configuration.
RAM Bad	When displayed, this alarm indicates a RAM failure.
RAM Corrupt on Power Up	This alarm indicates that RAM failed to successfully complete the power up testing sequence.
Recipe Program Error	The alarm indicates a conflict or inconsistency in recipe configuration.
ROM Bad	When displayed, this alarm indicates a ROM failure.
System Program Error	This alarm indicates a conflict or inconsistency in system configuration.
Watchdog Alarm	Indicates an internal check feature has detected a possible operational problem in the microprocessor that may have affected information stored in memory. A complete review of all program codes stored in memory must be made to confirm their correctness.

Appendix 2: Metered Injector Map on the AccuLoad IV

Injector Number (AccuLoad)	Communications Address	Board	S1-2 Address Jumper on A4I Board	Input Point (A4I)	Output Points (A4I)	Input Point (AccuLoad)	Output Points (AccuLoad)
1	NA	A4M-A4B	NA	NA	NA	NA	NA
2	NA	A4M-A4B	NA	NA	NA	NA	NA
3	NA	A4M-A4B	NA	NA	NA	NA	NA
4	NA	A4M-A4B	NA	NA	NA	NA	NA
5	101	A4I #1	Out	1	Pump = 1 Solenoid = 2	A4I 1 = 24	A4I 1 = 39 A4I 2 = 40
6	102	A4I #1	Out	2	Pump = 3 Solenoid = 4	A4I 2 = 25	A4I 3 = 41 A4I 4 = 42
7	103	A4I #1	Out	3	Pump = 5 Solenoid = 6	A4I 3 = 26	A4I 5 = 43 A4I 6 = 44
8	104	A4I #1	Out	4	Pump = 7 Solenoid = 8	A4I 4 = 27	A4I 7 = 45 A4I 8 = 46
9	105	A4I #1	Out	5	Pump = 9 Solenoid = 10	A4I 5 = 28	A4I 9 = 47 A4I 10 = 48
10	106	A4I #1	Out	6	Pump = 11 Solenoid = 12	A4I 6 = 29	A4I 11 = 49 A4I 12 = 50
11	107	A4I #1	Out	7	Pump = 13 Solenoid = 14	A4I 7 = 30	A4I 13 = 51 A4I 14 = 52
12	108	A4I #1	Out	8	Pump = 15 Solenoid = 16	A4I 8 = 31	A4I 15 = 53 A4I 16 = 54
13	109	A4I #1	Out	9	Pump = 17 Solenoid = 18	A4I 9 = 32	A4I 17 = 55 A4I 18 = 56
14	110	A4I #1	Out	10	Pump = 19 Solenoid = 20	A4I 10 = 33	A4I 19 = 57 A4I 20 = 58
15	201	A4I #2	In	1	Pump = 1 Solenoid = 2	A4I 1 = 34	A4I 1 = 59 A4I 2 = 60
16	202	A4I #2	In	2	Pump = 3 Solenoid = 4	A4I 2 = 35	A4I 3 = 61 A4I 4 = 62
17	203	A4I #2	In	3	Pump = 5 Solenoid = 6	A4I 3 = 36	A4I 5 = 63 A4I 6 = 64
18	204	A4I #2	In	4	Pump = 7 Solenoid = 8	A4I 4 = 37	A4I 7 = 65 A4I 8 = 66
19	205	A4I #2	In	5	Pump = 9 Solenoid = 10	A4I 5 = 38	A4I 9 = 67 A4I 10 = 68
20	206	A4I #2	In	6	Pump = 11 Solenoid = 12	A4I 6 = 39	A4I 11 = 69 A4I 12 = 70
21	207	A4I #2	In	7	Pump = 13 Solenoid = 14	A4I 7 = 40	A4I 13 = 71 A4I 14 = 72
22	208	A4I #2	In	8	Pump = 15 Solenoid = 16	A4I 8 = 41	A4I 15 = 73 A4I 16 = 74

Injector Number (AccuLoad)	Communications Address	Board	S1-2 Address Jumper on A4I Board	Input Point (A4I)	Output Points (A4I)	Input Point (AccuLoad)	Output Points (AccuLoad)
23	209	A4I #2	In	9	Pump = 17 Solenoid = 18	A4I 9 = 42	A4I 17 = 75 A4I 18 = 76
24	210	A4I #2	In	10	Pump = 19 Solenoid = 20	A4I 10 = 43	A4I 19 = 77 A4I 20 = 78

Note: Add-Pak parameters and mappings are fixed and set automatically.

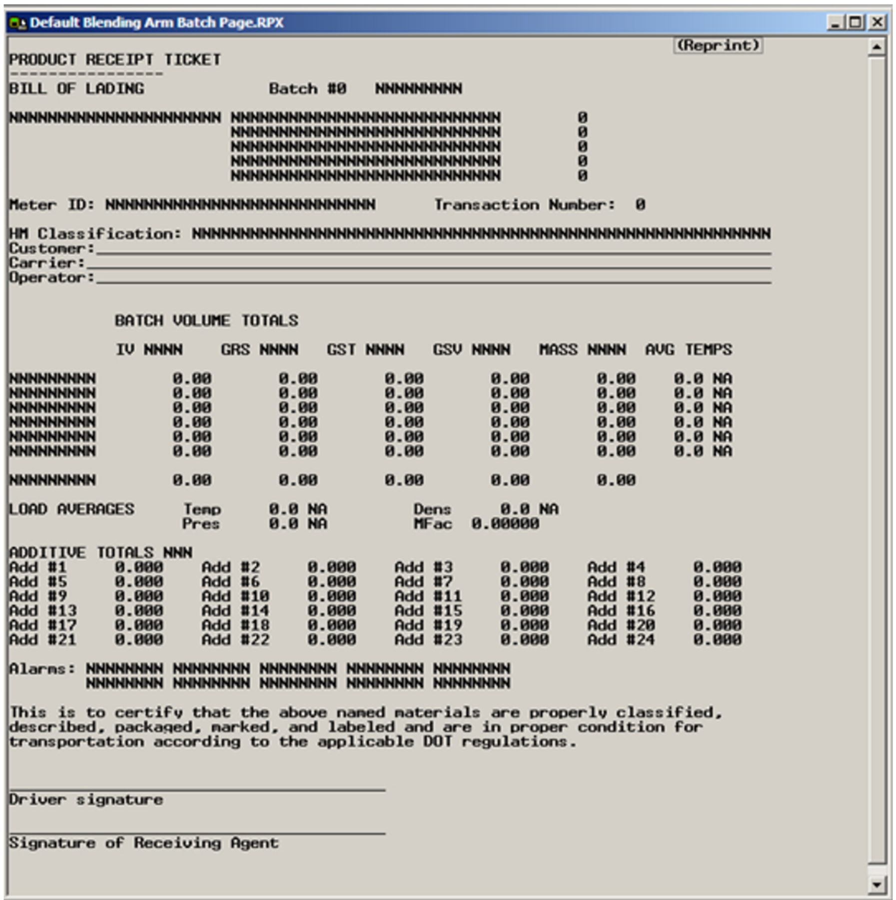
Note: If one Add-Pak injector is programmed to operate, then all addresses are reserved and are unable to be used for any other injector for the entire system in an address bank. Banks are 100 through 110 and 200 through 210. Note that the addresses 100 and 200 are system addresses for the entire A4I board.

Note: Special attention should be paid to the Configuration 020 parameter (Number of Injectors). This number provides the number of injectors that will be used staring at Injector #1 and running sequentially to #24. If an injector number is not programmed up, its position is still counted.

Example: Only two injectors are needed and these are Add-Paks. Injector positions numbers 5 and 6 are configured as Add-Pak injectors. The parameter CF 020 must be set to at least 6, since the accounting starts at injector #1 and continues sequentially to #6. Injectors #1 through #4 count against this number, even though they are not currently configured.

Appendix 3: Default Blending Arm Batch Page Report

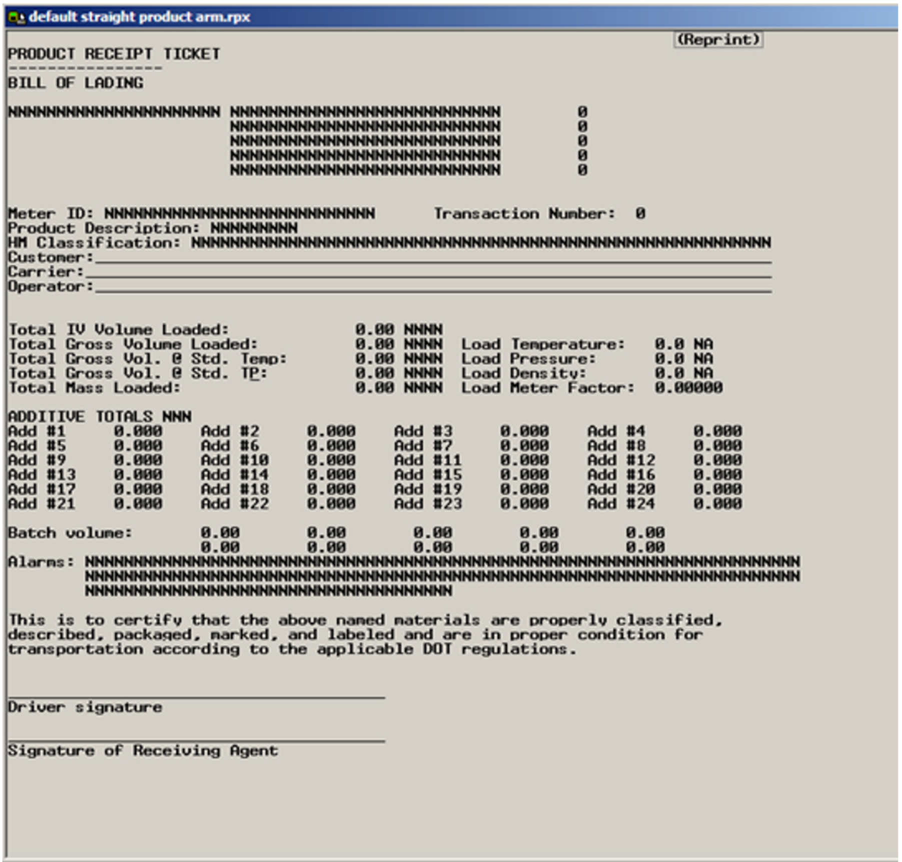
Figure 187: Blending Arm Batch Page Report



```
Default Blending Arm Batch Page.RPX
                                                                              (Reprint)
PRODUCT RECEIPT TICKET
----------------
BILL OF LADING              Batch #0    NNNNNNNNN

NNNNNNNNNNNNNNNNNNNNNN NNNNNNNNNNNNNNNNNNNNNNNNNNNN        0
                       NNNNNNNNNNNNNNNNNNNNNNNNNNNN        0
                       NNNNNNNNNNNNNNNNNNNNNNNNNNNN        0
                       NNNNNNNNNNNNNNNNNNNNNNNNNNNN        0
                       NNNNNNNNNNNNNNNNNNNNNNNNNNNN        0

Meter ID: NNNNNNNNNNNNNNNNNNNNNNNNNNNN      Transaction Number:  0

HM Classification: NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
Customer:_______________________________________________________________________
Carrier:________________________________________________________________________
Operator:_______________________________________________________________________

           BATCH VOLUME TOTALS

           IV NNNN    GRS NNNN   GST NNNN   GSV NNNN   MASS NNNN  AVG TEMPS

NNNNNNNNN        0.00       0.00       0.00       0.00       0.00    0.0 NA
NNNNNNNNN        0.00       0.00       0.00       0.00       0.00    0.0 NA
NNNNNNNNN        0.00       0.00       0.00       0.00       0.00    0.0 NA
NNNNNNNNN        0.00       0.00       0.00       0.00       0.00    0.0 NA
NNNNNNNNN        0.00       0.00       0.00       0.00       0.00    0.0 NA
NNNNNNNNN        0.00       0.00       0.00       0.00       0.00    0.0 NA

NNNNNNNNN        0.00       0.00       0.00       0.00       0.00

LOAD AVERAGES       Temp     0.0 NA         Dens      0.0 NA
                    Pres     0.0 NA         MFac   0.00000

ADDITIVE TOTALS NNN
Add #1     0.000     Add #2     0.000     Add #3     0.000     Add #4     0.000
Add #5     0.000     Add #6     0.000     Add #7     0.000     Add #8     0.000
Add #9     0.000     Add #10    0.000     Add #11    0.000     Add #12    0.000
Add #13    0.000     Add #14    0.000     Add #15    0.000     Add #16    0.000
Add #17    0.000     Add #18    0.000     Add #19    0.000     Add #20    0.000
Add #21    0.000     Add #22    0.000     Add #23    0.000     Add #24    0.000

Alarms: NNNNNNNN NNNNNNNN NNNNNNNN NNNNNNNN NNNNNNNN
        NNNNNNNN NNNNNNNN NNNNNNNN NNNNNNNN NNNNNNNN

This is to certify that the above named materials are properly classified,
described, packaged, marked, and labeled and are in proper condition for
transportation according to the applicable DOT regulations.


_______________________________________
Driver signature

_______________________________________
Signature of Receiving Agent
```

Appendix 4: Default Straight Product Arm Report

Figure 188: Default Straight Product Arm Report



```
default straight product arm.rpx
                                                                  (Reprint)
PRODUCT RECEIPT TICKET
----------------
BILL OF LADING

NNNNNNNNNNNNNNNNNNNNNN NNNNNNNNNNNNNNNNNNNNNNNNNNNN       0
                       NNNNNNNNNNNNNNNNNNNNNNNNNNNN       0
                       NNNNNNNNNNNNNNNNNNNNNNNNNNNN       0
                       NNNNNNNNNNNNNNNNNNNNNNNNNNNN       0
                       NNNNNNNNNNNNNNNNNNNNNNNNNNNN       0

Meter ID: NNNNNNNNNNNNNNNNNNNNNNNNNNNN      Transaction Number:  0
Product Description: NNNNNNNNN
HM Classification: NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
Customer:_______________________________________________________________________
Carrier:________________________________________________________________________
Operator:_______________________________________________________________________

Total IV Volume Loaded:            0.00 NNNN
Total Gross Volume Loaded:         0.00 NNNN  Load Temperature:   0.0 NA
Total Gross Vol. @ Std. Temp:      0.00 NNNN  Load Pressure:      0.0 NA
Total Gross Vol. @ Std. TP:        0.00 NNNN  Load Density:       0.0 NA
Total Mass Loaded:                 0.00 NNNN  Load Meter Factor:  0.00000

ADDITIVE TOTALS NNN
Add #1     0.000    Add #2     0.000    Add #3     0.000    Add #4     0.000
Add #5     0.000    Add #6     0.000    Add #7     0.000    Add #8     0.000
Add #9     0.000    Add #10    0.000    Add #11    0.000    Add #12    0.000
Add #13    0.000    Add #14    0.000    Add #15    0.000    Add #16    0.000
Add #17    0.000    Add #18    0.000    Add #19    0.000    Add #20    0.000
Add #21    0.000    Add #22    0.000    Add #23    0.000    Add #24    0.000

Batch volume:       0.00       0.00       0.00       0.00       0.00
                    0.00       0.00       0.00       0.00       0.00
Alarms: NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
        NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
        NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN

This is to certify that the above named materials are properly classified,
described, packaged, marked, and labeled and are in proper condition for
transportation according to the applicable DOT regulations.


_______________________________________
Driver signature

_______________________________________
Signature of Receiving Agent
```

This document takes precedence over and supersedes in their entirety all previous versions or revisions.

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