

Electronic Preset Delivery System

Smith Meter® AccuLoad® IV

Operator Reference Manual

Bulletin MN06200 Issue/Rev 0.0 (4/17)



Important

All information and technical specifications in this documentation 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 on the website.

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Caution

The default or operating values used in this manual and in the program 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 program parameter must be reviewed and programmed for that specific metering system application. In addition, the default security level for most parameters is level 1 (open access); select parameters default to level 4 or level 5 (Audit Trail logging). It is a user requirement to evaluate all parameter security level settings to ensure compliance with local weights and measures jurisdictions, see section 2.9 (Security) for details.

Disclaimer

TechnipFMC hereby disclaims any and all responsibility for damages, including but not limited 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:

http://info.smithmeter.com/literature/online_index.html

Table of Contents

1 – Introduction.....	5	3 – Dynamic Displays.....	37
1.1. – Product Description	5	3.1. – Dynamic Display Categories	38
1.2. – Load Arm Types.....	7	3.1.1. – System Dynamic Displays	39
1.2.1. – Straight	7	3.1.2. – Load Arm Dynamic Displays.....	39
1.2.2. – Sequential Blending.....	7	3.1.3. – Product Dynamic Displays.....	40
1.2.3. – Ratio Blending	8	3.1.4. – Batch Dynamic Displays.....	41
1.2.4. – Hybrid Blending	9	3.1.5. – Transaction Dynamic Displays	42
1.2.5. – Side Stream Blending.....	10	3.1.6. – Blend Dynamic Displays.....	43
1.2.6. – Unloading	11	3.1.7. – Ratio Blend Data Dynamic Displays.....	43
1.2.7. – Straight Arm With Vapor Recovery System (Straight with 'VRS').....	11	3.1.8. – Density Sampling Dynamic Displays.....	43
1.3. – I/O Assignments	12	3.1.9. – Recipe Dynamic Displays.....	44
1.4. – Units of Measure	12	3.1.10. – Injector Dynamic Displays	44
1.5. – Flow Control	12	3.1.11. – Flow Controlled Additives Dynamic Displays.....	45
1.6. – Product Definition	13	3.2. – Dynamic Displays Diagnostics Menu	45
1.7. – Additive Injection.....	13	3.2.1. – Active Alarms.....	46
2 – Operations.....	15	3.2.2. – Alarm History	47
2.1. – Run Mode Overview	15	3.2.3. – Non-Resettable Volumes.....	47
2.2. – Alarm Reporting.....	22	3.2.4. – Event Log	48
2.2.1. – Allow Run/Ready Mode Clearing.....	23	3.2.5. – Transaction Log.....	49
2.2.2. – Energize Alarm Relay Output One/Two.....	23	3.2.6. – Audit Trail.....	49
2.2.3. – Notify via Email.....	23	3.2.7. – Digital Inputs.....	50
2.2.4. – Allow Flow to Continue	23	3.2.8. – Digital Outputs.....	50
2.3. – Permissive Inputs	23	3.2.9. – Analog I/O.....	51
2.4. – Main Menu Operation.....	24	3.2.10. – Pulse Inputs.....	51
2.5. – Program Mode Overview.....	24	3.2.11. – Pulse Outputs	51
2.5.1. – Program Mode Top Level Menu	25	3.2.12. – Reset Dual Pulse Errors.....	52
2.6. – Configuration Overview	26	3.2.13. – Solenoid Actuation Diagnostic Counters	52
2.6.1. – Example – Database Modification Using Front Panel or Browser.....	28	3.2.14. – Valve Closure Diagnostics.....	52
2.7. – Directory Map	33	3.2.15. – Meter Pulse Inputs.....	53
2.8. – Viewing the Help Messages	34	3.2.16. – Boolean/Algebraic	53
2.9. – Security.....	34	3.2.17. – Engineering Diags	54
2.9.1. – Security Levels	34	3.2.18. – Network Diags	54
2.9.2. – Security Level Activation.....	34	3.2.19. – Update Driver Database.....	54
2.9.3. – Parameter Security Level Assignment.....	34	3.2.20. – Update Firmware	55
2.9.4. – Security Switches	34	4 – Reports / Logs	57
2.9.5. – Communications Security.....	35	4.1. – Summary Reports.....	57
2.9.6. – Diagnostics Security.....	35	4.2. – Audit Trail.....	57
2.9.7. – Example: Security Configuration	35	4.3. – Alarm History	58
		4.4. – Transaction Log	58
		4.5. – Event Log`	59
		4.6. – Prove Log	59

5 – Reports / Logs	61	8.2.8.3. – Flow Controlled Injector 1 - 4.....	131
5.1. – Summary Reports.....	61	8.2.8.4. – Security Directory	136
5.2. – Set Trans # (Set Transaction Number).....	62	8.3. – Bay Directories	138
5.3. – Erase Event Log.....	62	8.3.1. – Bay 1-2	138
5.4. – Erase Transaction Log.....	63	8.3.2. – Communications.....	139
5.5. – Proving	63	8.4. – Arms Directories	140
5.6. – Metered Injector Proving	66	8.4.1. – 100 - General Purpose Directory.....	140
5.7. – Reset Totals.....	68	8.4.2. – 200 - Arm Flow Control Directory	142
5.8. – Firmware Lock.....	68	8.4.3. – 300 - Volume Accuracy Directory	147
6 – Device Settings.....	69	8.4.4. – 700 - Communications Directory	149
6.1. – Screen Style	69	8.5. – Meter Directories	151
6.2. – MMI Settings.....	69	8.5.1. – 200 - Flow Control Directory.....	151
6.3. – Screen Test.....	69	8.5.2. – 300 - Volume Accuracy Directory	154
7 – Device Information	71	8.5.3. – 400 - Temperature/Density Directory.....	155
8 – Program Mode Reference	73	8.5.4. – 400 - Solatron Densitometer.....	157
8.1. – Configuration Directories	74	8.5.5. – 400 - Sarasota Densitometer.....	158
8.1.1. – 100 – Pulse Inputs Directory	77	8.5.6. – 400 - UGC Densitometer	159
8.1.2. – 200 – Pulse Outputs Directory.....	79	8.5.7. – 400 - Other Densitometer	160
8.1.3. – 300 – DC & AC Digital Input Function Directories..	81	8.5.8. – 500 - Pressure Directory.....	161
8.1.4. – 500 – DC & AC Digital Output Function Directories .	84	8.6. – Product Directories	162
8.1.5. – 900 – Analog I/O Directories.....	87	8.6.1. – 100 - Arm: Products: General Purpose Directory ..	162
8.2. – System Directories	90	8.6.2. – 200 - Arm:Products:Flow Control Directory	162
8.2.1. – 100 - General Purpose Directory.....	90	8.6.3. – 300 - Accuracy Directory	165
8.2.2. – 200 - Flow Control Directory.....	96	8.6.4. – 400 - Temperature/Density Directory.....	168
8.2.3. – 300 - Volume Accuracy Directory	98	8.6.5. – 500 - Pressure Directory.....	173
8.2.4. – 400 - Temperature / Density Directory.....	105	8.7. – Recipe Directories	176
8.2.5. – 500 - Pressure Directory.....	106	8.7.1. – Product Blend	176
8.2.6. – 600 - Alarms Directory	107	8.7.2. – Recipe Additives	178
8.2.7. – 700 - Communications Directory	110	8.8. – Split Architecture Directories	179
8.2.7.1. – Arm 1 - 6 Addresses	110	9 – Appendix I – Alarms.....	182
8.2.7.2. – Printer Control	111	10 – Appendix II – Metered Injector Map on the	
8.2.7.3. – Host Interface	112	AccuLoad® IV	184
8.2.7.4. – Card / Nedap Reader	116	11 – Appendix III – Default Blending Arm Batch Page Report	185
8.2.7.5. – Serial Port Configuration 1 - 4	119	12 – Appendix IV – Default Straight Product Arm Report.....	186
8.2.7.6. – Prompts	121		
8.2.8. – 800 - Additive Directory	123	13 – Related Publications	191
8.2.8.1. – Additives (common).....	124		
8.2.8.2. – Additives Configuration Menu - Injector 1 - 24....	129		

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's easily configured for a wide variety of liquid transfer applications.

Using the AccuLoad, an operator can select the desired amount of any one of up to 50 recipes and the AccuLoad will control and monitor the pumps, valves, and additive injectors to efficiently and safely transfer the precise amount. During the transfer, all process parameters are monitored to provide an accurate total of the amount of each component of the recipe delivered.

In addition to the real-time control of the loading process, the AccuLoad calculates averages and live quantities of all products and additives delivered. These values are kept in the runtime database which can be monitored by a supervisory host system. When a transaction is complete, the AccuLoad stores a detailed record in its internal transaction log for subsequent printing or retrieval.

The AccuLoad IV is available in multiple hardware configurations as shown below:



AccuLoad IV-ST – 1 or 2 load arms, up to six products, Ex-Proof Class I Div 1 / Zone 1 rated.



AccuLoad IV-QT – Up to 6 load arms, up to six products, Ex-Proof Class I Div 1 / Zone 1 rated.



AccuLoad IV NEMA4 - 1 or 2 load arms, Weather tight Class I Div 2 rated.

Features common to all of the above packages:

- 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:
 - 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/control via Ethernet or serial link
- Proximity card reader interface and driver 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
- Multi-lingual user interface
- User configurable BOL
- Event, transaction and audit trail logs
- Five-point meter linearization
- Built-in driver prompting
- Five levels of passcode protection for parameter access
- Arms can be operated independently or grouped for “Bay” operation
- Arms can be configured to swing to either side of a lane

Because the AccuLoad provides the flexibility to support all of these 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 using the front panel touchscreen, by using AccuMate (a Windows compatible companion program) or through a communications port using a web browser.

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

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

There are a significant number of additional features available which are described in detail in the remainder of this document. Once the configuration has been completed, the AccuLoad is ready for operation.

1.2. Load Arm Types

1.2.1. Straight

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

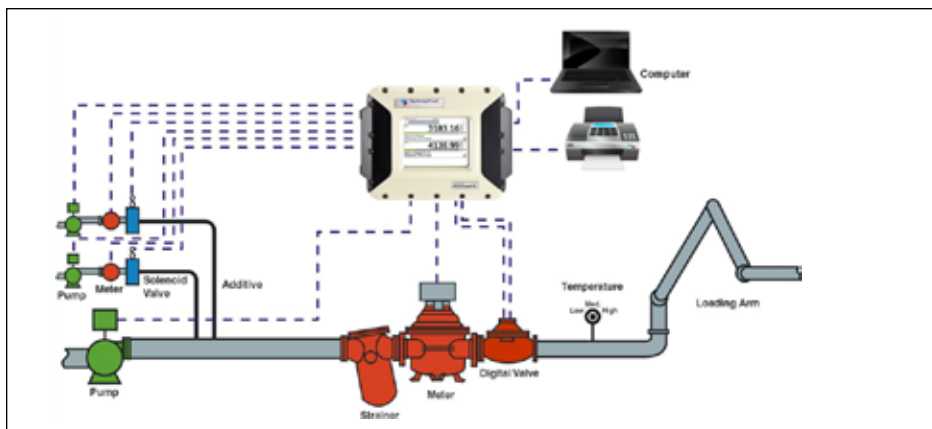


Figure 1.2.1: Typical straight arm - single product meter run configuration

1.2.2. Sequential Blending

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

Prerequisites:

- 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 valve etc.).
- A recipe which defines the percentage of each product to be blended

Operation:

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, and so on. 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.

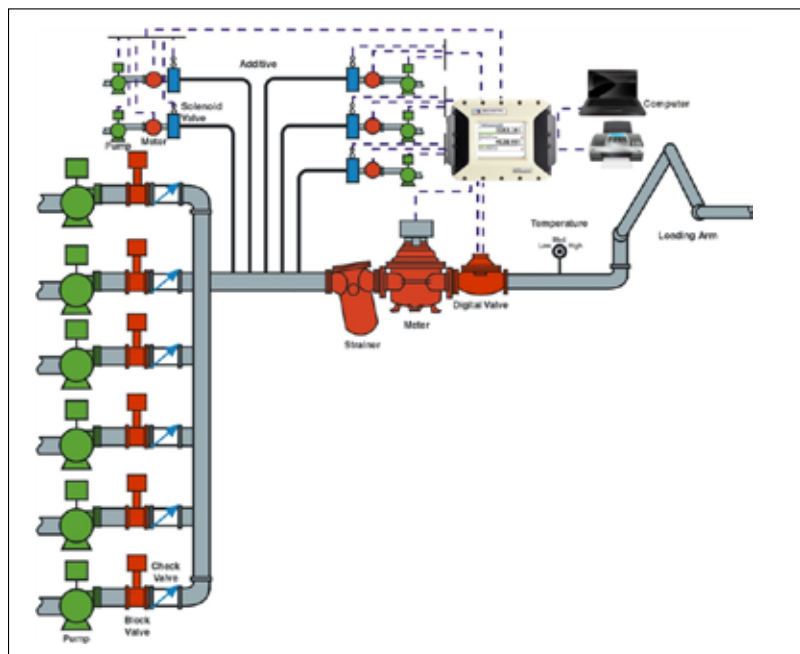


Figure 1.2.2: Sequential blending arm - six product, single meter configuration

1.2.3. Ratio Blending

In ratio blending multiple products flow simultaneously during delivery to a vessel (e.g., 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 in the following manner. 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 stated above, 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.

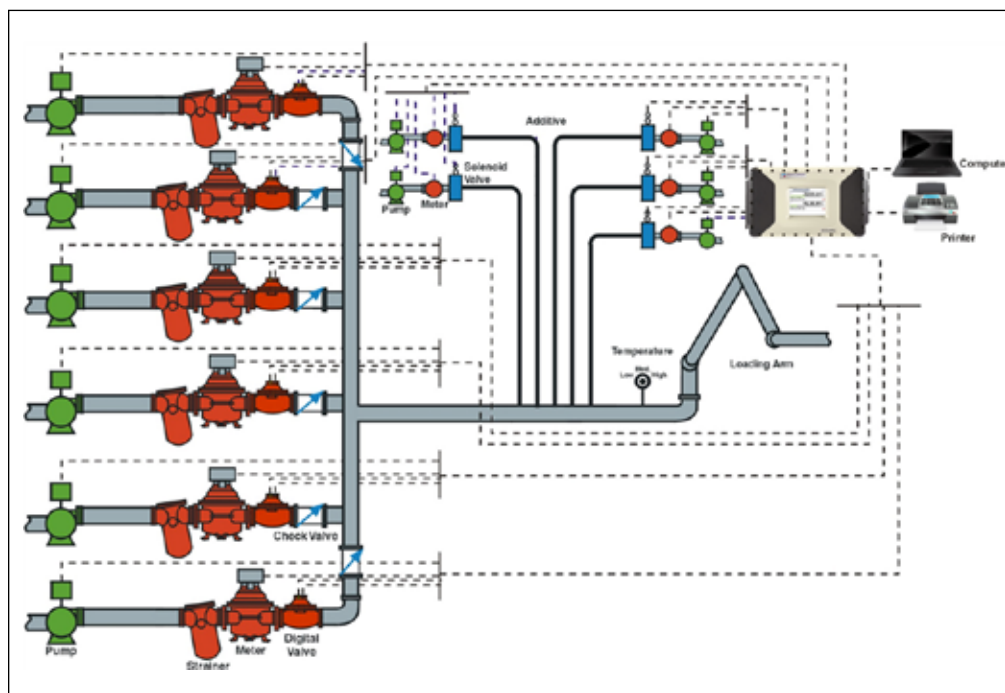


Figure 1.2.3: Ratio blending arm - six products and six meters

1.2.4. 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 may 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 product(s) 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 application bulletin [AB06072](#).

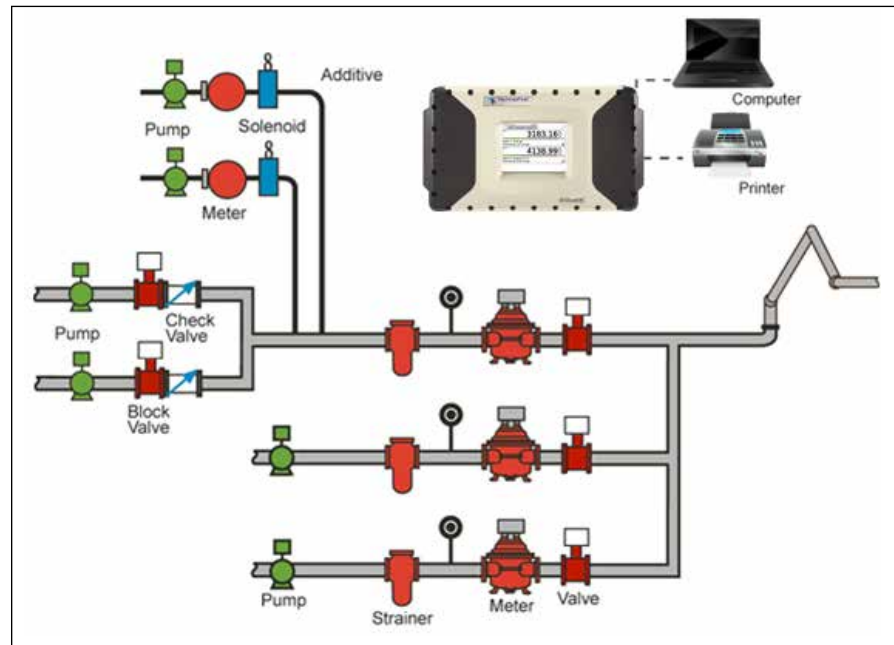


Figure 1.2.4: Hybrid blending arm - four products, three meters (two sequential products)

1.2.5. 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 Application Bulletin [AB06054](#).

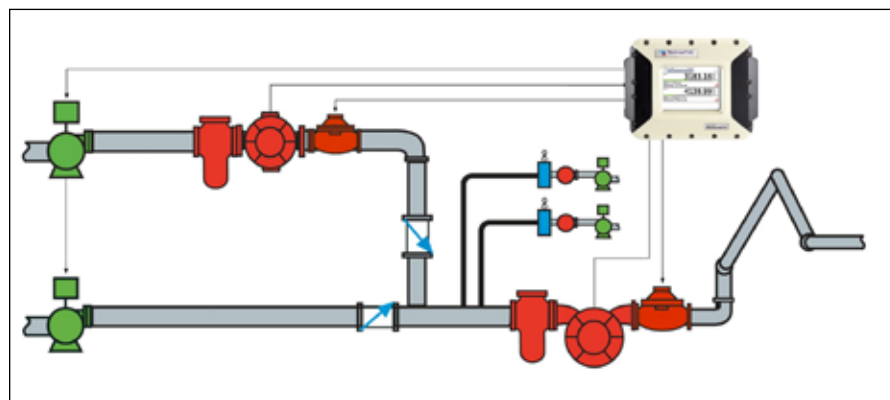


Figure 1.2.5: Side-stream blending arm – two products, two meters, upstream plumbed blend point

1.2.6. 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 Application Bulletin [AB06055](#).

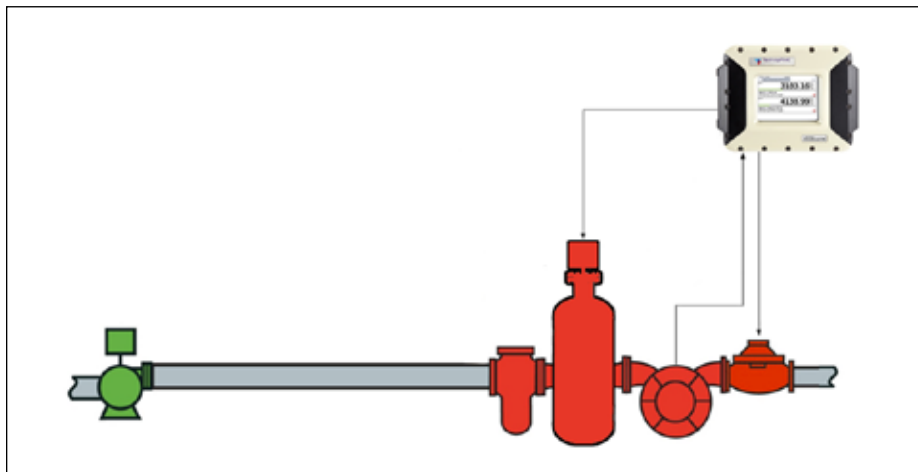


Figure 1.2.6: Unloading arm – multiple products, one meter, air elimination

1.2.7. "Straight Arm With Vapor Recovery System (Straight with 'VRS')"

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 [AB06073](#).

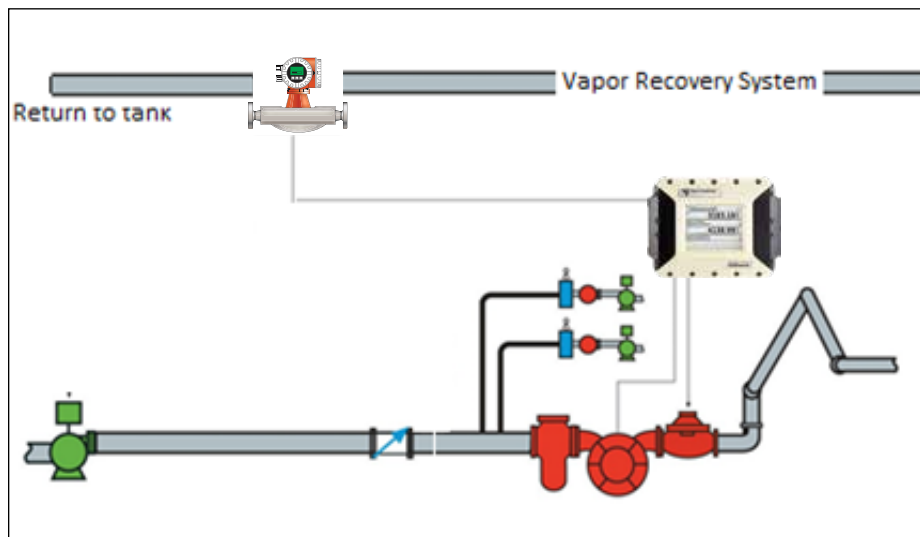


Figure 1.2.7: Straight arm with vapor recovery system – one product meter, plus one Coriolis meter on the vapor recovery line back to storage

1.3. 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:

- Meter pulse inputs (product or additive meters)
- Pulse outputs
- Analog I/O (4-20 mA, 1-5 VDC)
- Discrete I/O (AC and 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 "Configuration" section of the parameter database.

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.

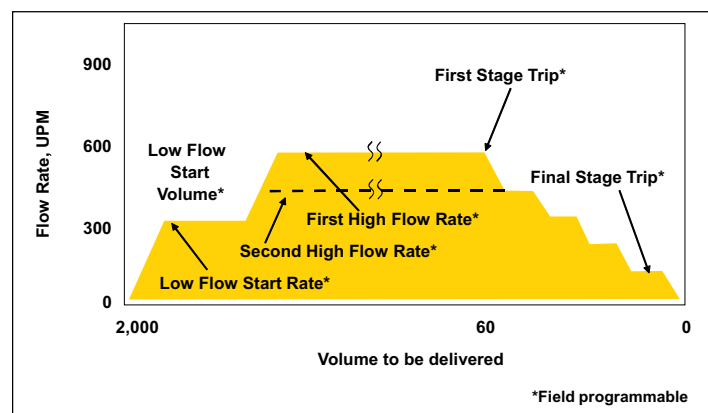
The AccuLoad accepts meter pulse inputs which represent increments of mass or volume depending on the type of meter. The AccuLoad supports single channel and dual channel meter connection with optional transmitter integrity. (Note using dual-pulse meter inputs and transmitter integrity reduces the total number of meter inputs available).

1.4. 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 System section of the configuration database and affect the operation of all arms configured in the AccuLoad.

1.5. 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) and then the flow rate is increased for most of the delivery (high flow rate) and then finally the flow rate is reduced in stages at the end of the transfer (ramp down).



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.

1.6. Product Definition

The AccuLoad supports up to 6 base products to be transferred. The Arm ->Meter ->Product sections of the configuration database define the characteristics of each product. This includes the meter factor curve, temperature and pressure compensation information, vapor pressure, etc. A complete and detailed description of the fluid being measured helps the AccuLoad to calculate the transferred quantities more accurately.

1.7. Additive Injection

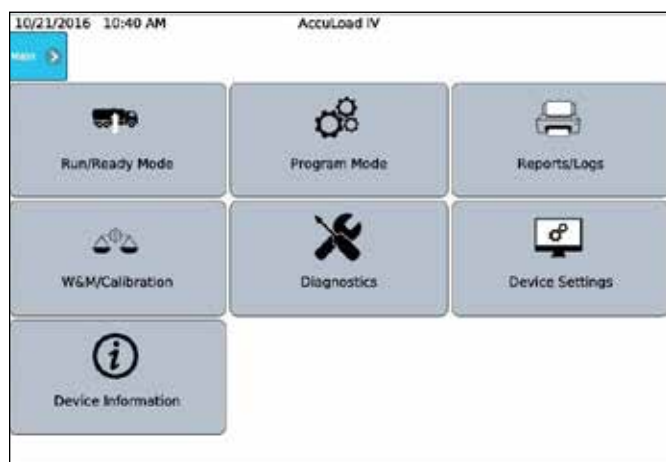
The AccuLoad supports up to 24 additive injectors which can be a mix of piston, metered or smart. There are parameters in the System->Additives section of the configuration database which allow the type and arrangement of the injectors to be selected. Once the available injectors are defined, the pacing of the additive injection is controlled by parameters in the Recipe section of the configuration database. The I/O required to connect the injectors is defined in the configuration and/or the communications sections of the database.

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2 – Operations

The AccuLoad has two primary modes of operation “Run” mode and “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 touch screen, for information on AccuLoad remote control options refer to the AccuLoad IV Smith Communications Manual [MN06204L](#) or the AccuLoad IV Modbus Communications Manual [MN06202](#).

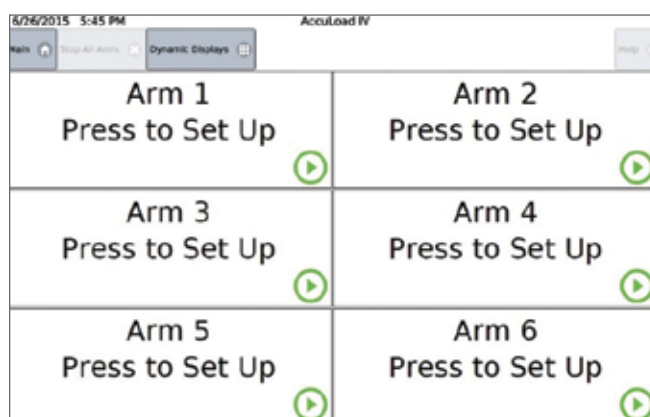


Main Menu Screen

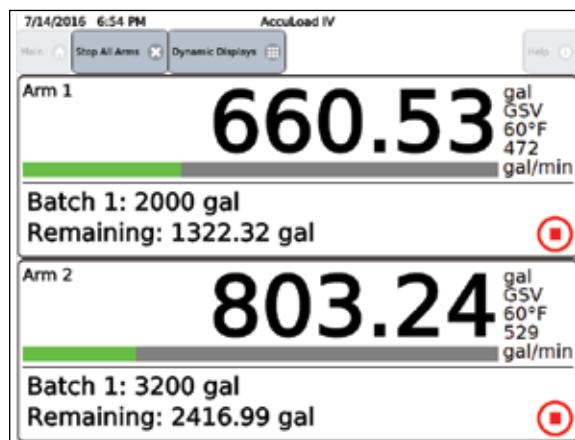
2.1. Run Mode Overview

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 as shown below:



Ready Screen with no transactions in progress (six arm configuration, daytime display).



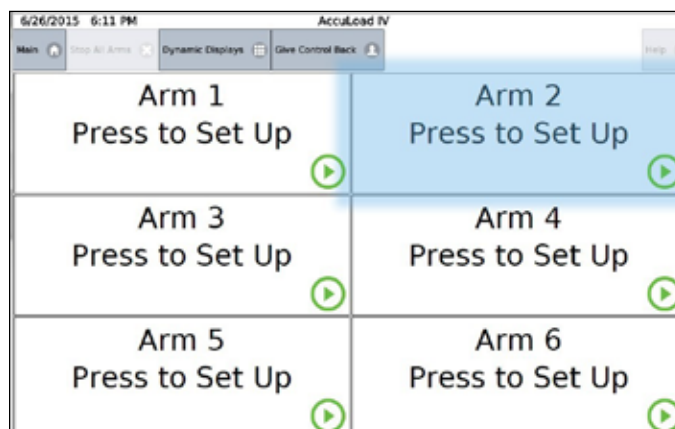
Run Screen with transactions in progress (two arm configuration).

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

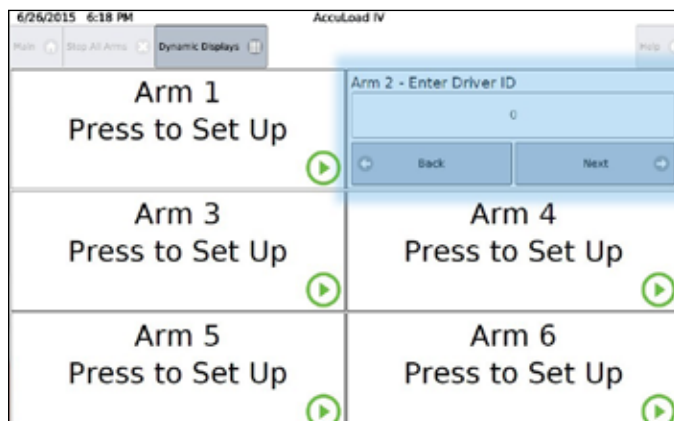
- Enter the response(s) to any prompt(s)
- Select the desired recipe to deliver
- Enter the amount to be delivered
- Start the transfer
- Confirm the end of the transfer

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 description is just one example of a typical loading sequence and does not attempt to explain the many options available.

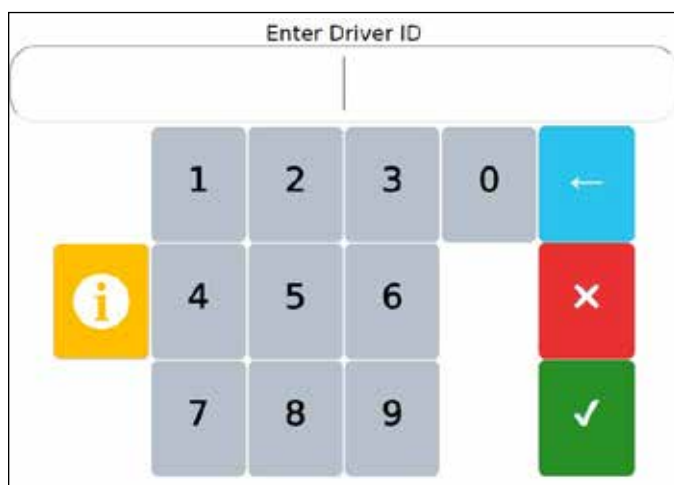
The following shows the sequence of starting a typical loading transaction on Arm 2.







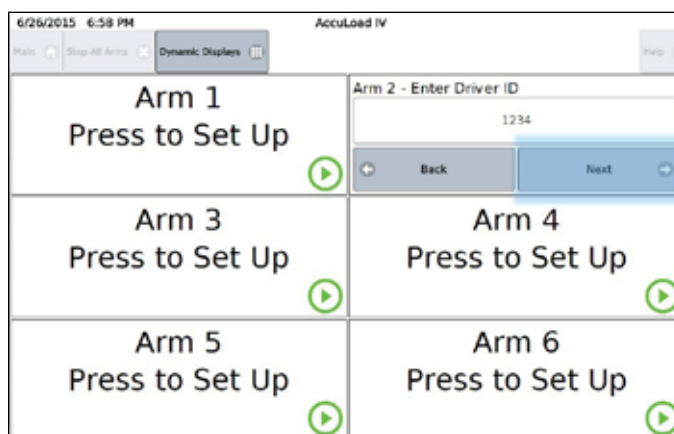
Press the highlighted area to select the arm for the transaction.



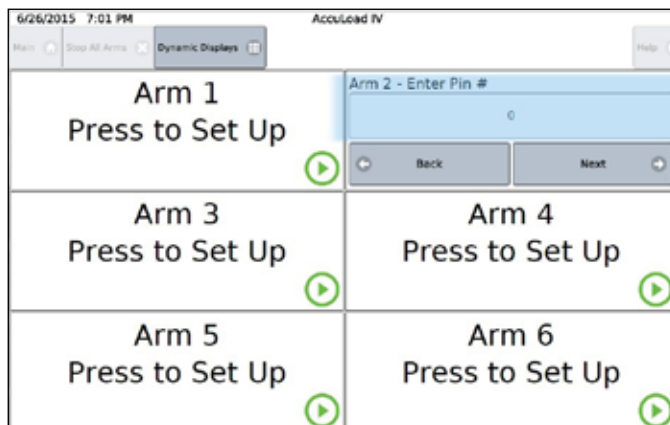
Press the input field for the Driver ID entry.



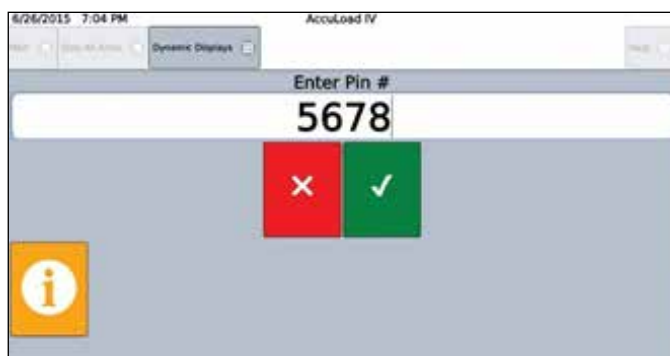
Using the pop-up keypad, enter the driver ID and press the  (OK) button to confirm. Pressing the  (Cancel) button will cancel the entry and return to the previous screen. Press the  (backspace) button to delete characters entered in error. Press the  (information) button for help with the entry.





Press Next to continue.



Press the data entry field to enter the PIN number.



Enter the PIN number and press  (OK) to accept the entry. Press  (Cancel) to return to the prompt.

6/26/2015 7:08 PM AccuLoad IV

Arm 1 Press to Set Up

Arm 2 - Enter Pin #

5678

Back Next

Arm 3 Press to Set Up

Arm 4 Press to Set Up

Arm 5 Press to Set Up

Arm 6 Press to Set Up

Press next to continue.

6/26/2015 7:11 PM AccuLoad IV

Arm 1 Press to Set Up

Arm 2 - Recipe

Regular 87 (2)

Back Next

Arm 3 Press to Set Up

Arm 4 Press to Set Up

Arm 5 Press to Set Up

Arm 6 Press to Set Up

The default recipe for this arm is displayed. To change the recipe, press the Recipe button.

Recipe Select - Arm1

Lube Oil (1)

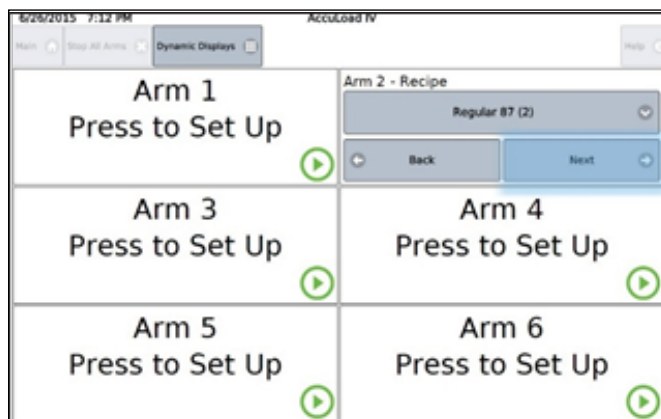
• Regular 87 (2)

Midgrade 89 (3)

Premium 93 (4)

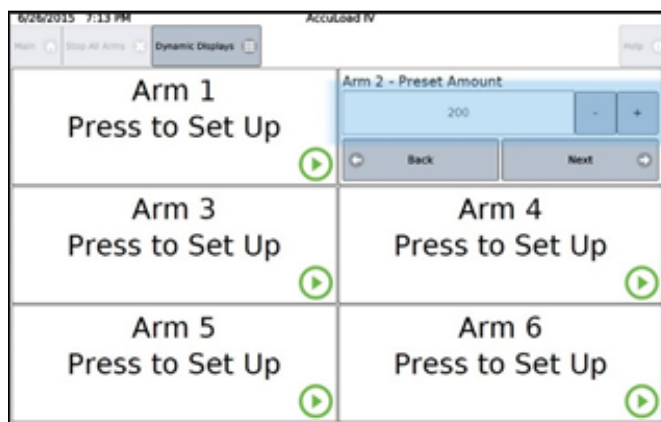
Submit Cancel

Press the recipe to be loaded from the drop-down list and press Submit.



Once the correct recipe has been selected, press Next.

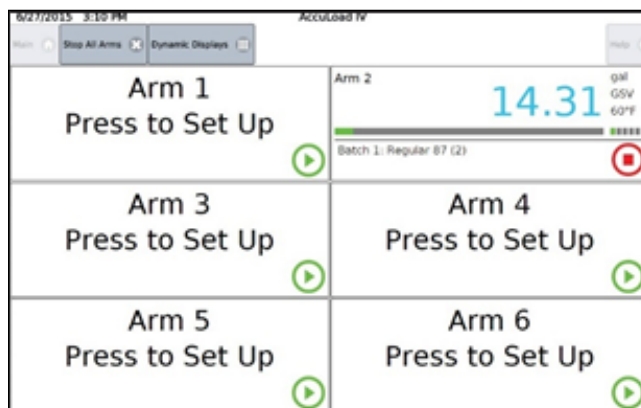
Either press the preset amount field to display the numeric keypad to allow direct entry of a new preset amount, or alternately press the plus/minus buttons to increment or decrement the preset amount by the programmed amount.



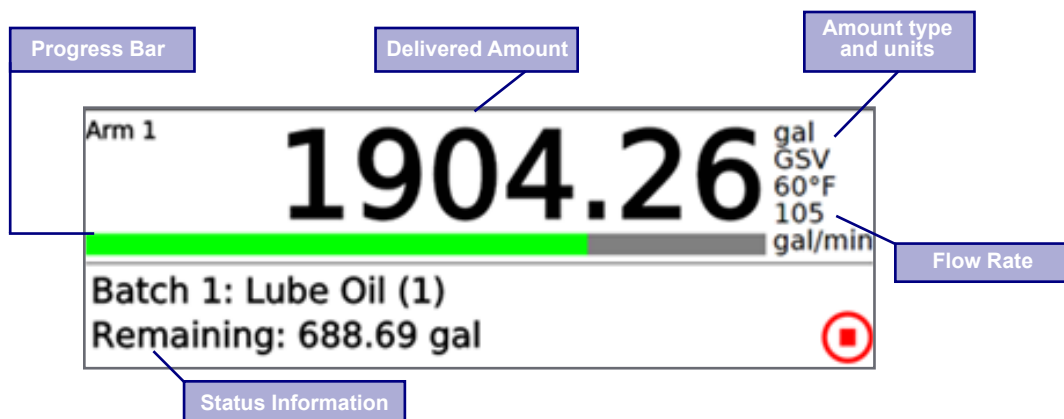
Once the correct preset amount has been entered, press the 'Next' button.



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

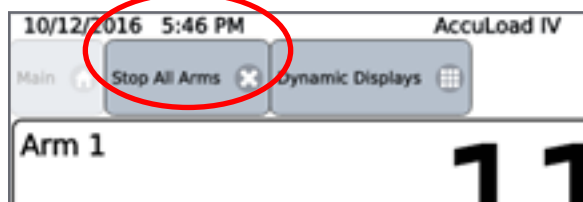


Once the transaction is started, the AccuLoad will display the status of the transaction in the arm's status panel area, as shown in the following:

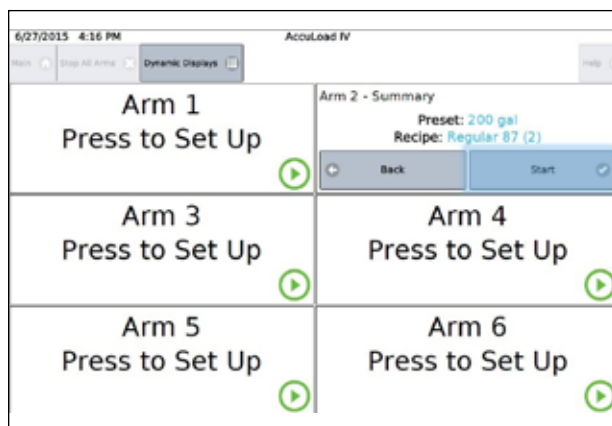


To stop flow on the arm, press the Stop icon (red square in circle) on the delivery display for the arm.

Note: Press the button at the top of the screen to stop flow on all arms:



When the batch has completed, another batch in this transaction can be started (total accumulates) or the transaction can be ended.



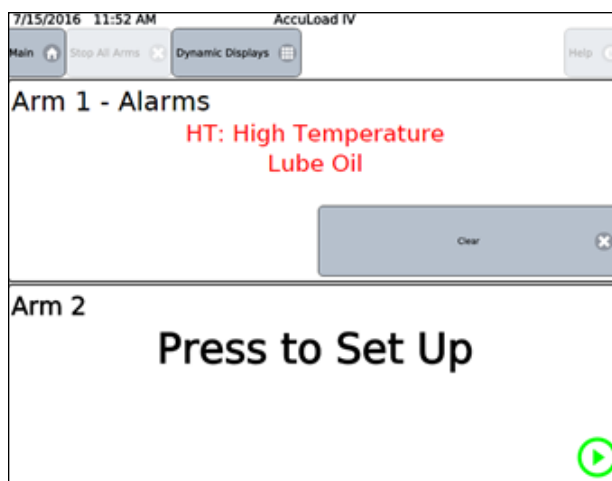
If the transaction is ended, the AccuLoad returns to the Ready screen and prints a transaction report (if configured to do so).

2.2. 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 Code Reference and in the 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



Typical alarm message on Ready screen.

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 email
- Allow flow to continue

2.2.1. 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 (no passcode required).

2.2.2. 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.

2.2.3. 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 (System Communications directory, parameters 742-747) must be set up for this option to function correctly.

2.2.4. 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.

2.3. 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 (Arm Permissives). Typically, these would be used to monitor safety systems (grounding, overfill etc.) and stop flow and display a message to the operator if a problem is detected.

Important: The AccuLoad should never be relied upon to act as the primary safety system control for the flow valve and pump controls, i.e. emergency stop, overfill, ground protection, etc.

These should always be handled by separate systems specifically designed for that application. For example Safety systems specifically to 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. See [MN06201](#) for connection details.

For example, to enable a permissive input to monitor the status of the ground detection system for example, 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 time(s) the AccuLoad should monitor the permissive input state. Available options are:

Transaction Start – 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 above, 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

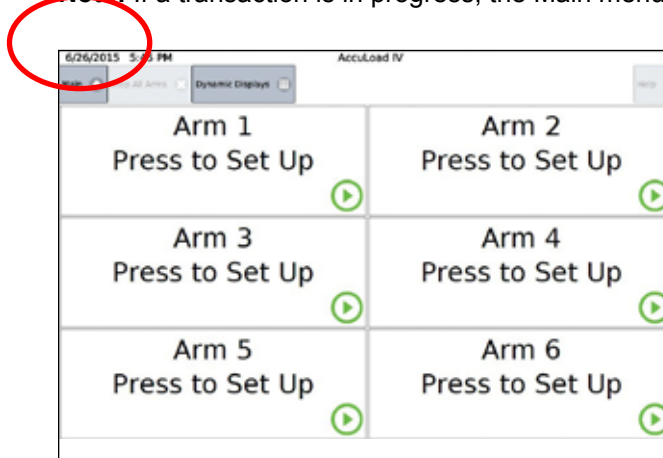
For this example (ground fault detection) the Continuous option would be used so that the AccuLoad will prohibit loading any time the ground is not connected. Either restart option could be used.

With this configuration, the operator would be 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.

2.4. 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.

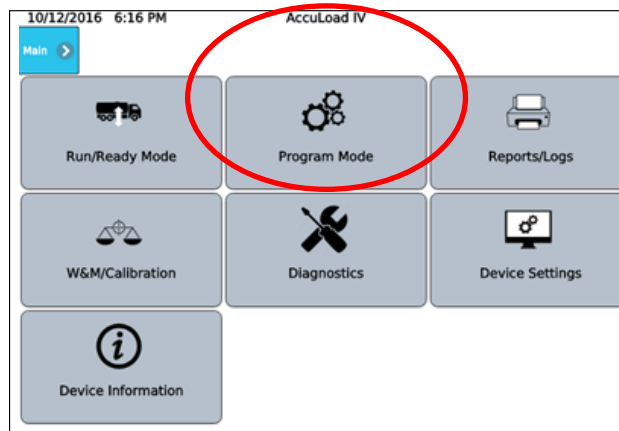
Note: If a transaction is in progress, the Main menu is not available.



From the ready screen, press the Main button in the top left of the screen.

2.5. Program Mode Overview

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



Program mode provides a means to modify the AccuLoad configuration database. Modifying the configuration via 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/or 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 & Measures jurisdictions may require password protection of some or all of the operating parameters that are accessible via Program Mode.

A complete description of the security features provided by the AccuLoad can be found in section 2.9.

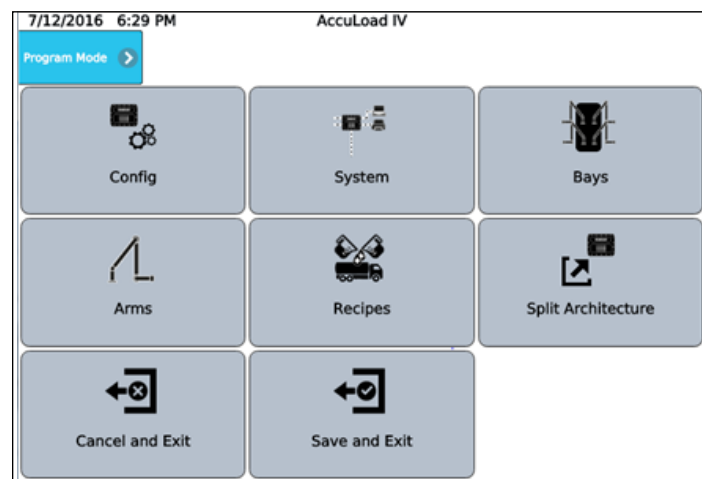
Detailed information regarding the individual parameters that can be configured in Program Mode is included this manual; see Section 8 – Program Code Reference.

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

2.5.1. Program Mode Top Level Menu

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

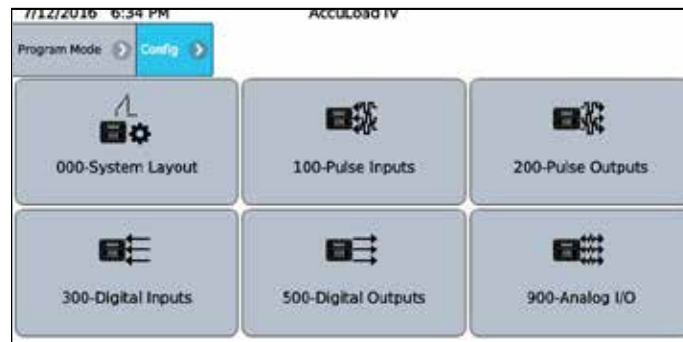
- Config
- System
- Bays
- Arms
- Recipes
- Split Architecture
- Cancel and Exit
- Save and Exit



2.6. Configuration Overview

The Configuration (often called 'Program Mode') database is organized in sections as follows:

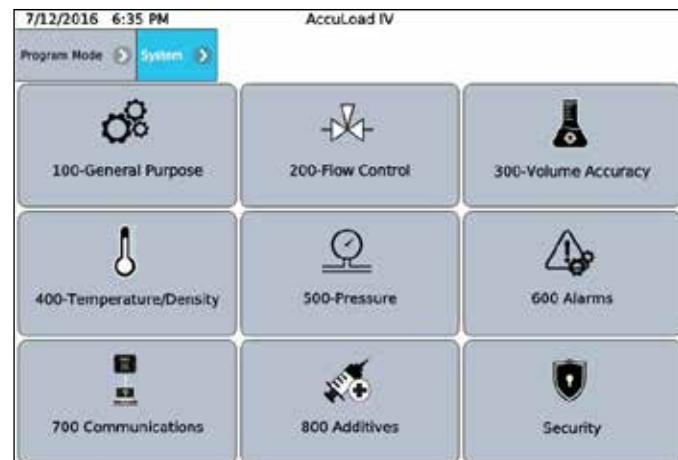
- **Config** – The Config directory contains options defining the load arm layout and how I/O points are connected to meters, valves, pumps, injectors, etc.



Subdirectories in the Config directory:

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

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



Subdirectories include:

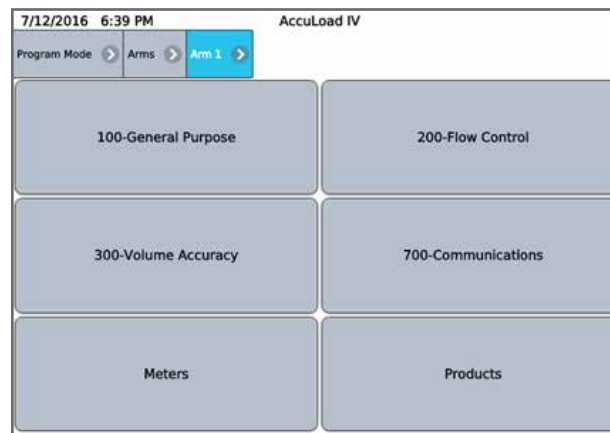
- General Purpose
- Flow Control
- Volume Accuracy
- Temperature/Density
- Pressure
- Alarms
- Communications
- Additives

- Security
- **Bays** – This section is for configuration of items that is specific to dual bays controlled by one AccuLoad i.e. swing arm applications



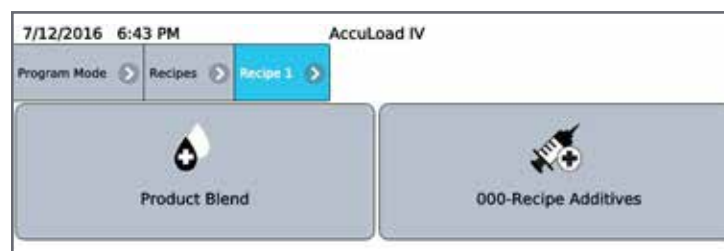
Subdirectories include:

- Bay 1
- Bay 2
- **Arms** – (one section for each up to 6 maximum) This section is used to set parameters which affect the operation of a single arm.



Subdirectories include:

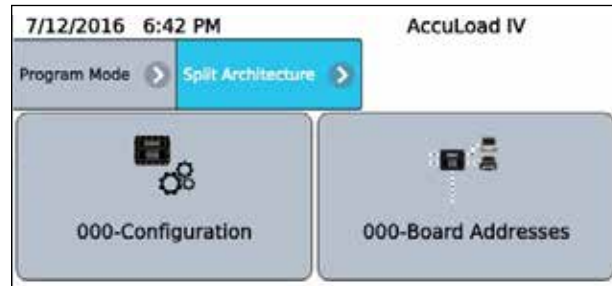
- General Purpose
- Flow Control
- Volume Accuracy
- Communications
- Meters
- Products
- **Recipes** – (one section for each of 50 recipes maximum.) This section is used to pre-define specific combinations of products and additives that can be selected for delivery by the AccuLoad.



Subdirectories include:

- Product Blend
- Recipe Additives

- **Split Architecture**

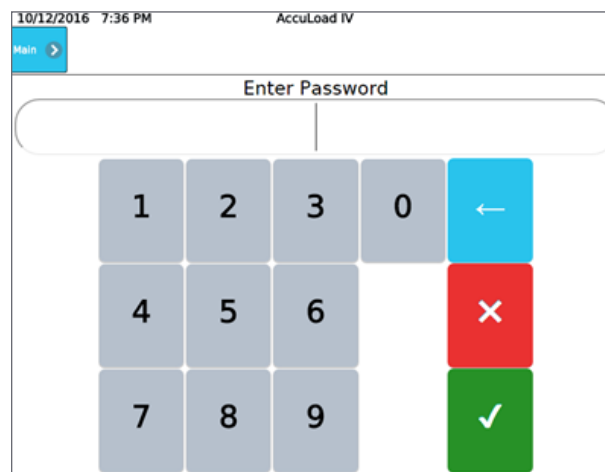
**Subdirectories include:**

- Configuration
- Board Addresses

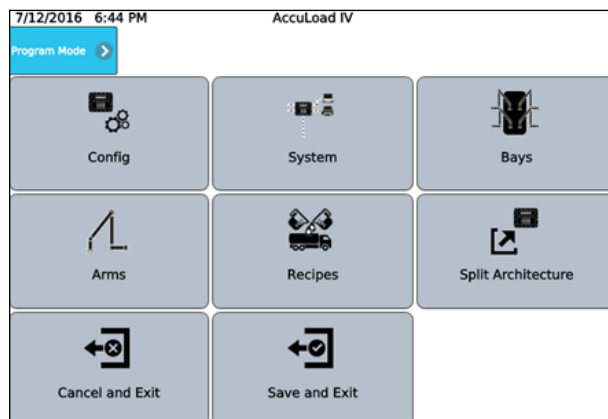
2.6.1. Example – Database Modification Using Front Panel or Browser

The following sequence of screens shows an example of entering program mode, changing a parameter (the “AccuLoad ID”) and then exiting.

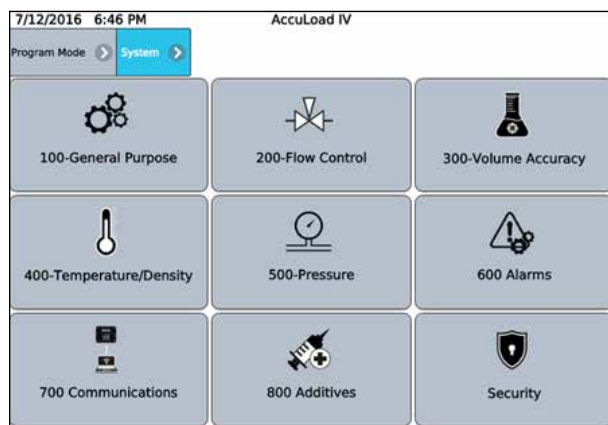
At the Main menu, press Program Mode. Note the AccuLoad Unit ID “AccuLoad IV” displayed in the middle of the top line of the display.



Enter the security passcode (optional depending on security configuration, see Section 2.)



If the passcode is correct, the top-level Program Mode menu is displayed. From here press the System menu.



The System top level menu is displayed. From here press 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.

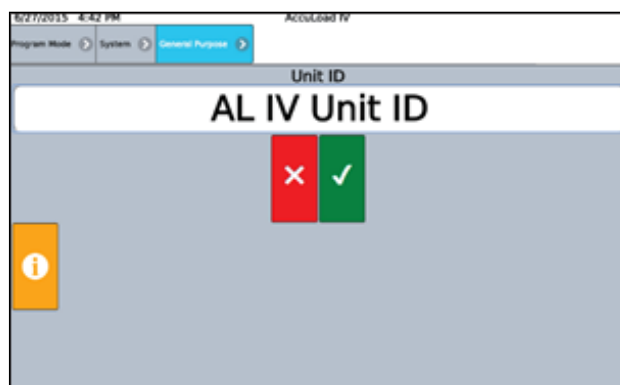
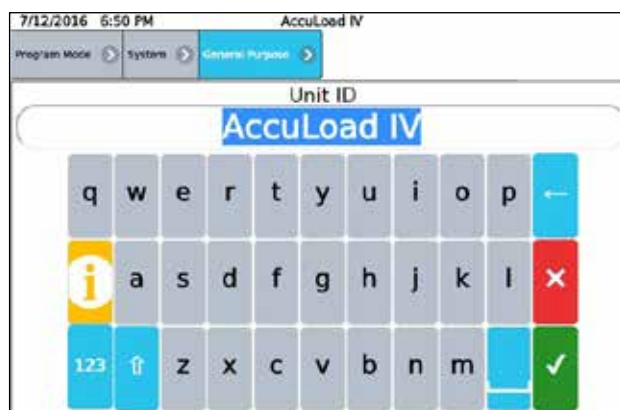


Select the Unit ID parameter which is currently set to read “AccuLoad IV”.

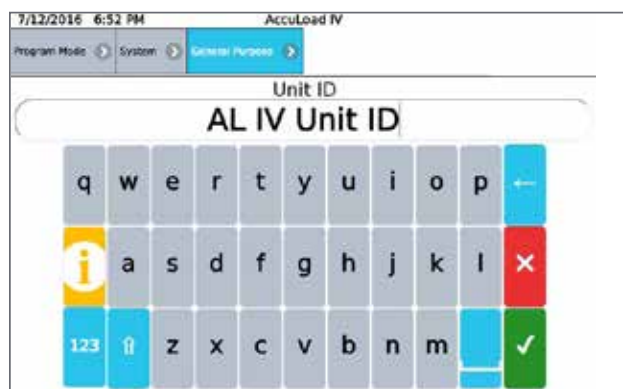
The current setting for the Unit ID parameter is displayed with a keyboard to enter a new value.



The current setting for the Unit ID parameter is displayed with a keyboard to enter a new value.



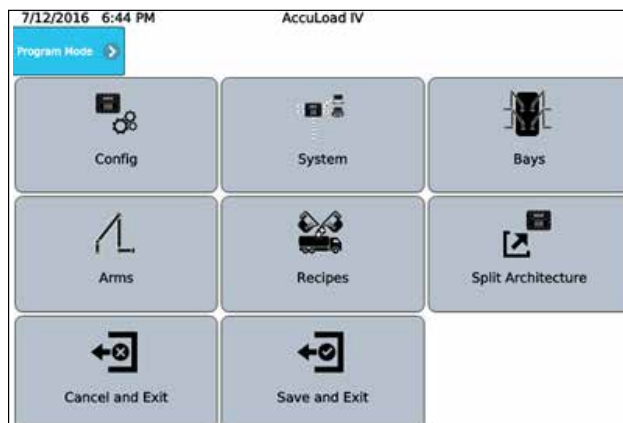
Change the Unit ID to “AL IV Unit ID”
Press the “check mark button” to accept the changes



The Unit ID has been edited.

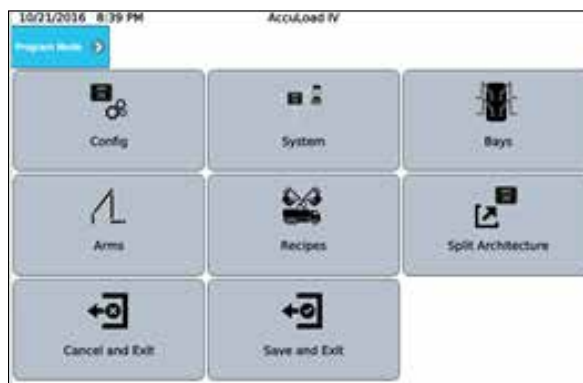


Press the far left bread crumb to return to the top level program mode menu.

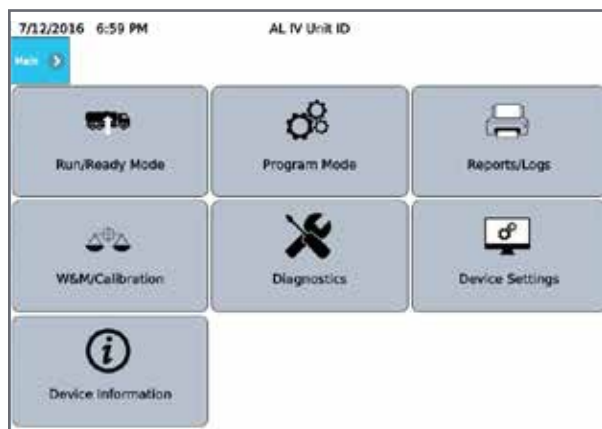


The Unit ID displayed at the top of the screen is still “AccuLoad IV” since the change has not been saved to the database.

Press Save and Exit to permanently save the change in the AccuLoad database.



Press Save and Exit to permanently save the change in the AccuLoad database.



After exiting Program Mode, the Unit ID displayed at the top of the screen is changed to “AL IV Unit ID”. This 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. These other methods are described in the AccuLoad IV Smith Communications manual [MN06204](#), and the AccuLoad IV Modbus Communications manual [MN06202](#).

2.7. 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 [MN06202](#).

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

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

Load Arm Directories

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

Meter Directories

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

Product Directories

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


Bay Directories

Code	Description
100	General Purpose Directory
700	Communications

Recipe Directories

Recipes 01 through 50

2.8. Viewing the Help Messages

The AccuLoad features unique “Help” messages that allow the operator to have at his fingertips the ability to review what is required or what the options are for an individual program code. Click on the icon next to a  program code to see the help message for that parameter.

2.9. 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

2.9.1. 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 & Measures official could have complete access by using the level five passcode to enter program mode.

2.9.2. 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.

2.9.3. 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 [MN06205](#) 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.

2.9.4. 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).

2.9.5. 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 which 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.

2.9.6. 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.

2.9.7. Example: Security Configuration

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 & Measures officials/Measurement/Proving personnel – external contact input and passcode. This group should have read/write access to all settings including meter factors and 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 will require configuring three different security levels in the AccuLoad. Assuming the AccuLoad is factory default and no security has been previously configured, the follow steps are used to configure the AccuLoad for this example.

- Enter program mode (no passcode needed).
- Set a passcode for levels 5, 2 and 1.
- Select Security 1 for the function of the digital input connected to the first security key switch (Configuration -> Digital Inputs).
- 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.
- Use the "Set Parameter Security" function in the Security menu to set all parameters to "Level 2."
- Assure that the security levels for the meter factors and K factors are at the highest level (Level 5) so changed are audited and protected by the switch.
- Set the security level for non-metrological product, recipe, flow control and alarm program codes to "Level 1."
- Ensure the key switch input is wired.
- Exit program mode.

Now the AccuLoad will require 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.

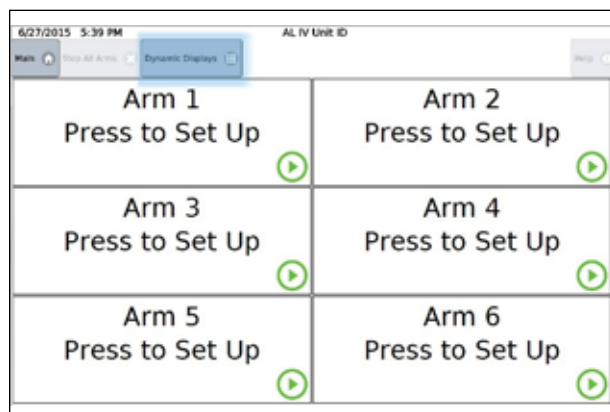
Note: Authorities Having Jurisdiction (AHJ) may require parameters other than those that are set by factory default to be set to either level 4 or 5 to be logged in the audit trail.

This will be determined at commissioning (Initial verification).

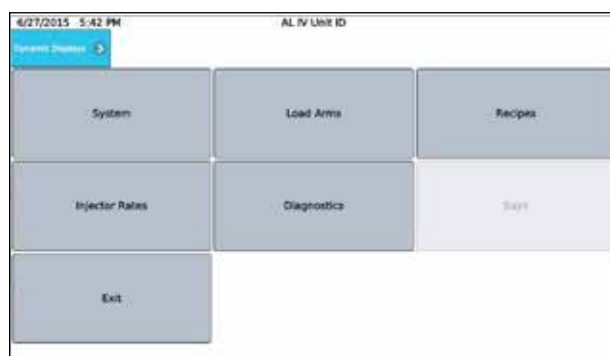
For information on changing parameter security level assignment see the AccuMate Manual [MN06205](#).

3 – Dynamic Displays

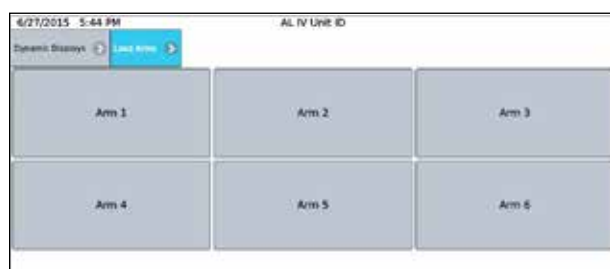
This section describes informational displays that can be viewed while in the Run or Ready Mode. These displays are “dynamic” in the sense that the displayed values reflect current actual conditions and continuously update while being viewed. The following shows how to navigate the menus to view the current flow rate of Product 2 on Arm 2.



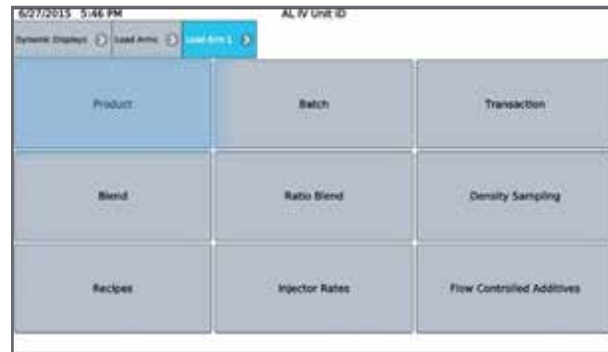
Press the Dynamic Displays button.



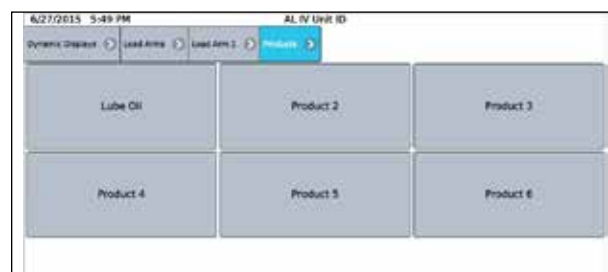
Dynamic Display Selection Menu – Pressing the Load Arm Dynamic Displays from the selection menu displays the arm selection menu.



Pressing arm button results in the presentation of the following options.



Load Arm 1 - Dynamic Display selection menu – Press Product to view data by product.



Arm->Load Arm 1->Products Dynamic Display menu

[illegible]

Dynamic Displays->Load Arms->Load Arm 1->Products->Product 2 data display.

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.

3.1. Dynamic Display Categories

Dynamic display data is grouped into five categories: **System**, **Load Arm**, **Recipe**, **Injector**, and **Diagnostics**. Displays may be accessed by selecting Dynamic Displays from the Ready screen. The load arm dynamic displays are further divided into eight sub-categories: product, batch, transaction, blend, density sampling, recipes, injector rates, and flow controlled additives.

3.1.1. System Dynamic Displays

7/12/2016 7:38 PM		AL IV Unit ID	
Dynamic Displays >		System >	
		Stop All Arms ✕	
Flow Rate/Min (Arm 1)	0.0 gal/min	Preset Amount (Arm 1)	2200 gal
Flow Rate/Min (Arm 2)	0.0 gal/min	Preset Amount (Arm 2)	0 gal
Flow Rate/Hour (Arm 1)	0.0 gal/hr	GSV Batch (Arm 1)	2135.93 gal
Flow Rate/Hour (Arm 2)	0.0 gal/hr	GSV Batch (Arm 2)	0.00 gal
Recipe # (Arm 1)	Lube Oil (1)	Remaining Amount (Arm 1)	0.07 gal
Recipe # (Arm 2)	Lube Oil (1)	Remaining Amount (Arm 2)	0.00 gal
		Last Power Fail	1970-01-01 00:00:00

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 set forth in the table below:

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

3.1.2. Load Arm Dynamic Displays

Load Arm dynamic displays are divided into the following categories: Product, Batch, Transaction, Blend, Ratio Blend Data, Recipes, Injector Rates, and Flow Controlled Additives. Product dynamic displays show all data associated with a specific product.

3.1.3. Product Dynamic Displays

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.

7/12/2016 7:42 PM		AL IV Unit ID	
Dynamic Displays >	Load Arm 1 >	Products >	Product 1 >
Flow Rate	0.0 gal/min	Ethanol Grade (Nv/v)	0.000
Flow Rate	0.0 gal/hr	Avg Pressure	138.80 psi
Temperature	129.30 °F	Avg Vapor Pressure	0.00 psi
Observed Density	0.00 lb/ft³	Avg Mtr Factor	1.00015
Pressure	138.80 psi	Avg CTPL	0.97091
Current Ref Dens	0.00 lb/ft³	Avg CTL	0.96992
Meter Factor	1.00015	Avg CPL	1.00102
Blend Ratio	0.00%	Pulses	213554
Instant Blend Ratio	0.00%	IV Product	2135.54 gal
Dev Count	0.00	GV Product	2199.93 gal
Leakage Pulses	0	GST Product	2133.75 gal
Leakage Volume	0.0000 gal	GSV Product	2135.93 gal
Leakage Mass	0.0000 lb	Mass Product	14448.31 lb
Avg Temp	129.30 °F	IV Prd Trans	2135.54 gal
Avg Observed Dens	49.13 lb/ft³	GV Prd Trans	2199.93 gal
Avg Ref API	42.90	GST Prd Trans	2133.75 gal
Avg Ref Dens	50.60 lb/ft³	GSV Prd Trans	2135.93 gal
Avg Rel Dens	0.81135	Mass Prd Trans	14448.31 lb
Rel Dens @60°F/15C & Pres	0.81135	Valve Position	Valve Requested Close
Ref Dens @RefDensTemp	50.60 lb/ft³		

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 set forth in the table below:

Description	Display Format
Current Flow Rate in Units/Min	Flow (Arm 1) XXXXX.X Gal/Min
Current Flow Rate in Units/Hour	Flow XXXXXXXX.X Gal/Hr
Current and Average Temperature	Temperature Cur Avg XXXX.XF XXXX.XF
Current and Average Density @ Observed Temperature	Dens Cur Avg XXXX.X XXXX.X KgM3
Average API @ Reference Temperature	Avg Dens @ ref temp XXXX.X APJ
Average Reference Density @ Reference Temperature	Avg Dens @ ref temp XXXX.X kg/m3
Average Relative Density @ Reference Temperature	Avg Rel Dens @ ref temp X.XXXX
Relative Density @ 60°F and Current Pressure	Avg Rel Dens @ 60°F and PRS X.XXXX
Reference Density @ Reference Density Temperature	Ref Dens @ ref dens temp XXXX.X kg/m3
Current Reference Density @ Reference Temperature	Cur Ref Dens @ ref temp XXXX.X kg/m3
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.XXXXXX X.XXXXXX
Batch Average CTPL	Batch Avg CTPL X.XXXXXX
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 XXXXXXXX.XX Gal
Gross Batch Volume	GV Batch XXXXXXXX.XX Gal
Gross at Standard Temperature Batch	GST Batch XXXXXXXX.XX Gal
Gross at Standard Temperature and Pressure Batch	GSV Batch XXXXXXXX.XX Gal

Mass Amount Batch	Mass Batch XXXXXXXX.XX Lbs
Raw Transaction Volume Transaction	IV Trans XXXXXXXX.XX Gal
Gross Transaction Volume Transaction	GV Trans XXXXXXXX.XX Gal
Gross at Standard Temperature Transaction	GST Trans XXXXXXXX.XX Gal
Gross at Standard Temperature and Pressure Transaction	GSV Trans XXXXXXXX.XX Gal
Mass Transaction Amount Transaction	Mass Trans XXXXXXXX.XX Lbs
Current Valve Requested Position	Valve Requested Closed

3.1.4. 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 set forth in the following table:

Description	Display Format
Recipe Name and Number	Recipe XX NNNNNNNNNN
Indicated (Raw) Batch Volume	IV Batch XXXXXXXX.X Gal
Gross Batch Volume	GV Batch XXXXXXXX.X Gal
Gross at Standard Temperature	GST Batch XXXXXXXX.X Gal
Gross at Standard Temperature and Pressure	GSV Batch XXXXXXXX.X Gal
Mass Batch Amount	Mass Batch XXXXXXXX.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
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	XXXXXXXX.XX lbs
Batch Mass Net Volume for VRS	Delivered Net	XXXXXXXX.XX lbs

3.1.5. Transaction Dynamic Displays

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

A listing of batch dynamic displays, as well as the format in which the information appears, is set forth in the table below:

Description	Display Format	
Indicated (Raw) Transaction Volume	IV Trans	XXXXXXXX.XX Gal
Gross Transaction Volume	GV Trans	XXXXXXXX.XX Gal
Gross at Standard Temperature Volume	GST Trans	XXXXXXXX.XX Gal
Gross at Standard Temperature and Pressure	GSV Trans	XXXXXXXX.XX Gal
Mass Transaction Volume	Mass Trans	XXXXXXXX.XX Lbs
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
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	XXXXXXXX.XX lbs
Mass Transaction Net Volume for VRS	Delivered Net	XXXXXXXX.XX lbs

3.1.6. Blend Dynamic Displays

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

6/27/2015 6:21 PM		AL IV Unit ID	
Dynamic Displays >	Load Arms >	Load Arm 1 >	Blend >
Product	Blend Ratio	Flow Rate	GV Product
1	0.00 %	0.0 gal/min	199.99 gal
2	0.00 %	0.0 gal/min	0.00 gal
3	0.00 %	0.0 gal/min	0.00 gal
4	0.00 %	0.0 gal/min	0.00 gal
5	0.00 %	0.0 gal/min	0.00 gal
6	0.00 %	0.0 gal/min	0.00 gal

3.1.7. 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 gives the following display:

6/27/2015 6:25 PM		AL IV Unit ID					
Dynamic Displays >		Load Arms >		Load Arm 1 >		Ratio Blend >	
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		

3.1.8. 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 results in a screen like that shown.

6/27/2015 6:28 PM		AL IV Unit ID	
Dynamic Displays >	Load Arms >	Load Arm 1 >	Density Sampling >
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.

3.1.9. 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 set forth in the table below:

6/27/2015 6:30 PM		AL IV Unit ID	
Dynamic Displays	Load Arms	Load Arm 1	Recipes
			Recipe 1
Recipe #		Lube Oil (1)	Product 2 Low Flow Rate
Recipe Used		1	Product 2 High Flow Rate
IV Batch Total		388.28 gal	Product 3 2nd High Flow Rate
GV Batch Total		399.99 gal	Product 3 Low Flow Rate
GST Batch Total		387.96 gal	Product 4 High Flow Rate
GSV Batch Total		388.35 gal	Product 4 2nd High Flow Rate
Mass Batch Total		2626.96 lb	Product 4 Low Flow Rate
Minimum Recipe Preset		0	Product 5 High Flow Rate
Product 1 High Flow Rate		0.0	Product 5 2nd High Flow Rate
Product 1 2nd High Flow Rate		0.0	Product 5 Low Flow Rate
Product 1 Low Flow Rate		0.0	Product 6 High Flow Rate
Product 2 High Flow Rate		0.0	Product 6 2nd High Flow Rate
Product 2 2nd High Flow Rate		0.0	Product 6 Low Flow Rate

3.1.10. Injector Dynamic Displays

Injector dynamic displays show all data associated with specific injectors. 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.

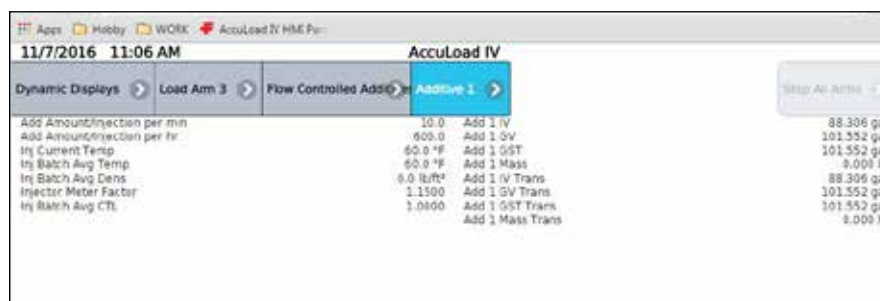
A listing of injector dynamic displays, as well as the format in which the information appears, is set forth in the table below:

Description	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 Transaction Total	Inj 11 Prg XXX	Cal XXXX.XX
Injector 12 Transaction Total	Inj 12 Prg XXX	Cal XXXX.XX
Injector 13 Transaction Total	Inj 13 Prg XXX	Cal XXXX.XX
Injector 14 Transaction Total	Inj 14 Prg XXX	Cal XXXX.XX
Injector 15 Transaction Total	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

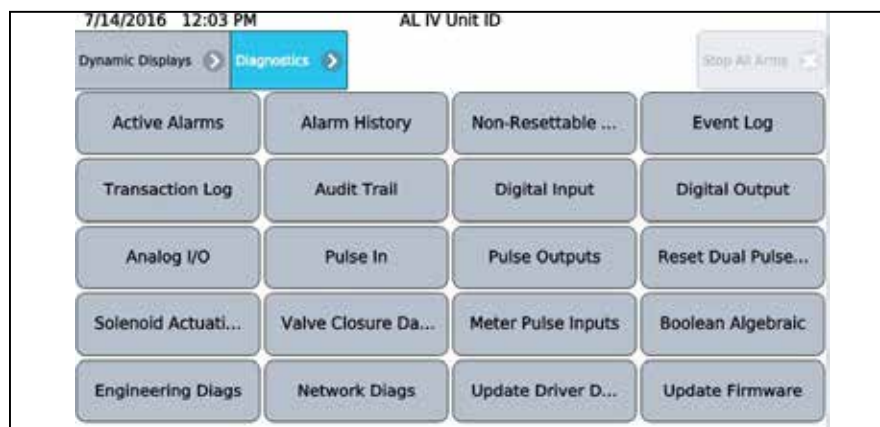
3.1.11. Flow Controlled Additives Dynamic Displays

The screens below and to the right are examples 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.



3.2. Dynamic Displays Diagnostics 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:



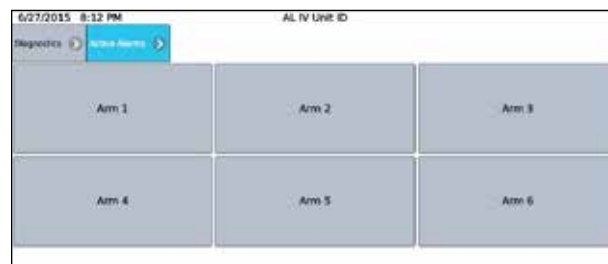
Note: The diagnostics available through the Dynamic Displays menu are run-time diagnostics only. Program mode diagnostics are accessed from the Main Menu.

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

- 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
- Add-Pak Diagnostics
- Engineering
- Network Diagnostic
- Update Driver Data
- Update Firmware
- Update License
- Force Update
- Exit

3.2.1. Active Alarms

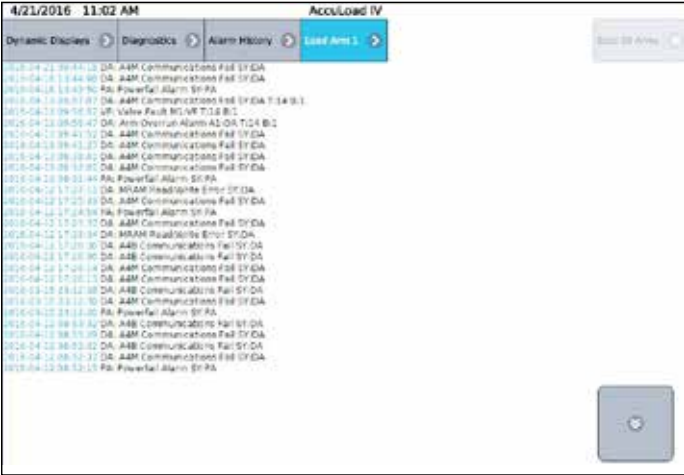
Displays all currently active alarms associated with any of the arms.



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.

3.2.2. Alarm History

The Diagnostics menu provides the selection “Alarm History” where the most recent alarms can be viewed. Press 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.



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. Non-Resettable Volumes

The Diagnostics menu provides the selection “Non-Resettable Volumes” where the product, additive injector and recipe totalizer amounts can be viewed:



Product volumes are displayed per arm as follows:

4/21/2016 10:18 AM AccuLoad IV									
Dynamic Displays		NR Volumes		Products	Load Arm 1				
Product	IV	GV	GST	GSV	Mass	Leakage Volume	Leakage Mass		
1	188160 gal	173220 gal	188020 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 follows:

4/21/2016 10:56 AM		AccuLead IV	
Dynamic Displays >	Diagnostics >	MR Volumes >	Injectors >
Injector		Additive	
1	0.000 gal	Additive with Leakage	
2	0.000 gal	0.000 gal	0.000 gal
3	0.000 gal	0.000 gal	0.000 gal
4	0.000 gal	0.000 gal	0.000 gal
5	0.000 gal	0.000 gal	0.000 gal
6	0.000 gal	0.000 gal	0.000 gal
7	0.000 gal	0.000 gal	0.000 gal
8	0.000 gal	0.000 gal	0.000 gal
9	0.000 gal	0.000 gal	0.000 gal
10	0.000 gal	0.000 gal	0.000 gal
11	0.000 gal	0.000 gal	0.000 gal
12	0.000 gal	0.000 gal	0.000 gal
13	0.000 gal	0.000 gal	0.000 gal
14	0.000 gal	0.000 gal	0.000 gal
15	0.000 gal	0.000 gal	0.000 gal
16	0.000 gal	0.000 gal	0.000 gal
17	0.000 gal	0.000 gal	0.000 gal
18	0.000 gal	0.000 gal	0.000 gal
19	0.000 gal	0.000 gal	0.000 gal
20	0.000 gal	0.000 gal	0.000 gal
21	0.000 gal	0.000 gal	0.000 gal
22	0.000 gal	0.000 gal	0.000 gal
23	0.000 gal	0.000 gal	0.000 gal
24	0.000 gal	0.000 gal	0.000 gal

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

4/21/2016 11:00 AM AccuLoad IV

Dynamic Displays NR Volumes Recipes Recipes 1 Stop All Arms

IV	168160 gal
GV	173230 gal
GST	168020 gal
GSV	168191 gal
Mass	1137713 lb

3.2.4. Event Log

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

4/21/2016 11:05 AM **AccuLoad IV**

Dynamic Displays Diagnostics **Trend Log**

2016-04-21 10:59:11	Value Changed: ControllerIP set to :###192.168.1.75.1.1
2016-04-21 10:59:13	Program Mode Ext - New Parameters Discarded - user1 (\$) HM:
2016-04-21 10:57:01	Value Changed: g_poor set to 252.356.175.2
2016-04-21 10:44:29	Alarm Cleared - SF DA A&M Communications Fail
2016-04-21 10:44:41	Alarm Occurred - SF DA A&M Communications Fail
2016-04-21 10:44:42	Alarm Cleared - SF DA A&M Communications Fail
2016-04-21 10:44:58	Alarm Cleared - SF PA PowerFail Alarm
2016-04-21 10:44:01	Value Changed: ControllerIP set to :###10.0.0.10
2016-04-21 10:44:01	Value Changed: ControllerIP set to :###10.0.0.10
2016-04-21 10:44:01	Value Changed: ControllerIP set to :###10.0.0.10
2016-04-22 10:43:04	Powered Up - Firmware Revision 00.00
2016-04-22 10:43:04	Powered Down - 2016-04-18 13:57:13
2016-04-22 10:56:01	Value Changed: ControllerIP set to :###10.0.0.10
2016-04-22 10:56:01	Value Changed: ControllerIP set to :###10.0.0.10
2016-04-22 10:56:01	Value Changed: ControllerIP set to :###10.0.0.10
2016-04-22 10:56:01	Value Changed: ControllerIP set to :###10.0.0.10
2016-04-22 10:56:01	Value Changed: ControllerIP set to :###10.0.0.10
2016-04-22 10:56:01	Value Changed: ControllerIP set to :###10.0.0.10
2016-04-22 10:56:01	Powered Up - Firmware Revision 00.00
2016-04-22 10:56:01	Powered Down - 2016-04-18 13:51:38
2016-04-22 10:49:43	Value Changed: ControllerIP set to :###10.0.0.10
2016-04-22 10:49:43	Value Changed: ControllerIP set to :###10.0.0.10
2016-04-22 10:49:43	Value Changed: ControllerIP set to :###10.0.0.10
2016-04-22 10:49:43	Value Changed: ControllerIP set to :###10.0.0.10
2016-04-22 10:49:43	Alarm Occurred - SF DA A&M Communications Fail
2016-04-22 10:49:59	Alarm Cleared - SF PA PowerFail Alarm
2016-04-22 10:49:59	Powered Up - Firmware Revision 00.00
2016-04-22 10:49:59	Powered Down - 2016-04-18 13:49:58
2016-04-21 10:56:12	Program Mode Aborted - New Parameters Discarded - user1 (\$) HM:
2016-04-21 10:56:17	Value Changed: ControllerIP set to :###10.0.0.10

3.2.5. Transaction Log

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

4/21/2016 1:13 PM AccuLoad IV

Dynamic Displays > Transaction Log > Load Arm 1 > Transaction 15 >

Transaction Totals Batch #1 Batch #2

Stop All Arms

4/21/2016 1:16 PM AccuLoad IV

Dynamic Displays > Load Arm 1 > Transaction 15 > Transaction Totals >

Stop All Arms

IV Trans	4416.73 gal	Add 9 Trans	0.000 gal
GV Trans	4549.09 gal	Add 10 Trans	0.000 gal
GST Trans	4413.03 gal	Add 11 Trans	0.000 gal
GSV Trans	4417.54 gal	Add 12 Trans	0.000 gal
Mass Trans	29882.03 lb	Add 13 Trans	0.000 gal
Trans Avg Temp	129.30 °F	Add 14 Trans	0.000 gal
Trans Avg Dens	49.13 lb/ft³	Add 15 Trans	0.000 gal
Trans Avg Press	138.80 psi	Add 16 Trans	0.000 gal
Trans Avg Mtr Factor	1.03015	Add 17 Trans	0.000 gal
Trans Avg CTL	0.96992	Add 18 Trans	0.000 gal
Trans Avg CPL	1.00102	Add 19 Trans	0.000 gal
Add 1 Trans	0.468 gal	Add 20 Trans	0.000 gal
Add 2 Trans	0.000 gal	Add 21 Trans	0.000 gal
Add 3 Trans	0.000 gal	Add 22 Trans	0.000 gal
Add 4 Trans	0.000 gal	Add 23 Trans	0.000 gal
Add 5 Trans	0.000 gal	Add 24 Trans	0.000 gal
Add 6 Trans	0.000 gal	Trans Vapor Recovered	0.00
Add 7 Trans	0.000 gal	Trans VRS Delivered Net	0.00
Add 8 Trans	0.000 gal		

4/21/2016 1:20 PM AccuLoad IV

Dynamic Displays > Load Arm 1 > Transaction 15 > Batch #1 >

Stop All Arms

Recipe #	Lube Oil (1)	Add 9 Batch	0.000 gal
IV Batch	1941.44 gal	Add 10 Batch	0.000 gal
GV Batch	1999.97 gal	Add 11 Batch	0.000 gal
GST Batch	1938.82 gal	Add 12 Batch	0.000 gal
GSV Batch	1941.80 gal	Add 13 Batch	0.000 gal
Mass Batch	13135.09 lb	Add 14 Batch	0.000 gal
Batch Avg Temp	129.30 °F	Add 15 Batch	0.000 gal
Batch Avg Dens	49.13 lb/ft³	Add 16 Batch	0.000 gal
Batch Avg Press	138.80 psi	Add 17 Batch	0.000 gal
Batch Avg Mtr Factor	1.03015	Add 18 Batch	0.000 gal
Batch Avg CTL	0.96992	Add 19 Batch	0.000 gal
Batch Avg CPL	1.00102	Add 20 Batch	0.000 gal
Add 1 Batch	0.206 gal	Add 21 Batch	0.000 gal
Add 2 Batch	0.000 gal	Add 22 Batch	0.000 gal
Add 3 Batch	0.000 gal	Add 23 Batch	0.000 gal
Add 4 Batch	0.000 gal	Add 24 Batch	0.000 gal
Add 5 Batch	0.000 gal	Batch Vapor Recovered	0.00
Add 6 Batch	0.000 gal	Batch VRS Delivered Net	0.00
Add 7 Batch	0.000 gal		
Add 8 Batch	0.000 gal		

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

3.2.6. Audit Trail

The audit trail provides the date, time, and description of Program Mode changes that are relevant to Weights & Measures. Note that only changes to parameters secured at the two highest security levels programmed are logged in the audit trail, so all metrologically significant program codes should be set to the highest two levels. Reference Security Section 2.9 for further details.

4/21/2016 1:33 PM		AccuLoad IV	
Dynamic Displays	Diagnostics	Audit Trail	Stop All Arms
2016-04-21 09:41:22 Program Mode Exit - New Parameters Saved - user1 (5) HM: PO: 2016-04-21 09:41:20 vlr_simulator PO: Old: 0 New: 1 2016-04-21 09:41:17 flow_simulator PO: Old: 1 New: 0 2016-04-21 09:32:44 Program Mode Exit - New Parameters Saved - user1 (5) HM: PO: 2016-04-21 09:32:25 flow_simulator PO: Old: 0 New: 1 2016-04-21 09:32:22 vlr_simulator PO: Old: 1 New: 0 2016-04-21 17:28:38 Program Mode Exit - New Parameters Saved - user1 (5) HM: PO: 2016-04-21 17:28:36 vlr_simulator PO: Old: 0 New: 1 2016-04-21 17:27:10 Program Mode Exit - New Parameters Saved - user1 (5) HM: PO: 2016-04-21 17:27:07 vlr_simulator PO: Old: 1 New: 0 2016-04-21 17:24:21 Program Mode Exit - New Parameters Saved - user1 (5) HM: PO: 2016-04-21 17:24:10 vlr_simulator PO: Old: 0 New: 1 2016-04-21 17:23:33 Parameters initialized for field testing PO: 2016-04-21 17:23:33 All parameters initialized to factory default settings PO: 2016-04-06 17:55:24 Program Mode Exit - New Parameters Saved - user1 (5) HM: PO: 2016-04-06 17:55:22 vlr_simulator PO: Old: 0 New: 1 2016-04-06 17:50:00 Parameters initialized for field testing PO: 2016-04-06 17:50:00 All parameters initialized to factory default settings PO: 2016-04-06 17:48:27 Parameters initialized for field testing PO: 2016-04-06 17:48:27 All parameters initialized to factory default settings PO: 2016-04-06 17:48:34 Parameter database created and initialized to factory defaults PO:			

3.2.7. Digital Inputs

This diagnostic provides information on digital input states.

4/21/2016 1:44 PM		AccuLoad IV	
Dynamic Displays	Diagnostics	Digital Input	Stop All Arms
1. Not Used - (DC) A4M TBK4:1,2 OFF 2. Not Used - (DC) A4M TBK4:3,4 OFF 3. Not Used - (DC) A4M TBK4:5,6 OFF 4. Not Used - (DC) A4M TBE4:5,4 OFF 5. Not Used - (DC) A4M TEE4:7,6 OFF 6. Not Used - (DC) A4M TBE4:9,8 OFF 7. Permissive 1 - (AC) A4M TBE2:2,1 ON 8. Permissive 1 - (AC) A4M TBE2:3,1 ON 9. Not Used - (AC) A4M TBE2:4,1 OFF 10. Not Used - (AC) A4M TBE2:5,1 OFF 11. Not Used - (AC) A4M TBE2:6,1 OFF 12. Not Used - (AC) A4B TB11:1,5 OFF 13. Not Used - (AC) A4B TB11:2,5 OFF 14. Not Used - (AC) A4B TB11:3,5 OFF 15. Not Used - (AC) A4B TB11:4,5 OFF 16. Not Used - (DC) A4B TB12:1,2 OFF 17. Not Used - (DC) A4B TB12:4,5 OFF 18. Not Used - (DC) A4B TB12:7,8 OFF 19. Not Used - (DC) A4B TB12:10,11 OFF 20. Not Used - (DC) A4B TB13:1,2 OFF 21. Not Used - (DC) A4B TB13:4,5 OFF 22. Not Used - (DC) A4B TB13:7,8 OFF 23. Not Used - (DC) A4B TB13:10,11 OFF 24. Not Used - (DC) A4B TB5:2,3 OFF 25. Not Used - (DC) A4B TB5:5,6 OFF 26. Not Used - (DC) A4B TB5:8,9 OFF 27. Not Used - (DC) A4B TB4:3,4 OFF 28. Not Used - (DC) A4B TB4:6,7 OFF 29. Not Used - (DC) A4B TB4:9,10 OFF 30. Not Used - (DC) A4B TB3:2,3 OFF 31. Not Used - (DC) A4B TB3:5,6 OFF 32. Not Used - (DC) A4B TB3:8,9 OFF 33. Not Used - (DC) A4B TB3:11,12 OFF 34. Not Used - (DC) A4B TB5:2,3 OFF 35. Not Used - (DC) A4B TB5:5,6 OFF 36. Not Used - (DC) A4B TB5:8,9 OFF 37. Not Used - (DC) A4B TB4:3,4 OFF 38. Not Used - (DC) A4B TB4:6,7 OFF 39. Not Used - (DC) A4B TB4:9,10 OFF 40. Not Used - (DC) A4B TB3:2,3 OFF 41. Not Used - (DC) A4B TB3:5,6 OFF 42. Not Used - (DC) A4B TB3:8,9 OFF 43. Not Used - (DC) A4B TB3:11,12 OFF			

3.2.8. Digital Outputs

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.

4/21/2016 2:22 PM		AccuLoad IV	
Dynamic Displays	Digital Output	View	Stop All Arms
1. Upstream Solenoid - (DC) A4M TBK5:1,2 OFF 2. Downstream Solenoid - (DC) A4M TBK5:3,4 OFF 3. Upstream Solenoid - (DC) A4M TBK5:5,6 OFF 4. Downstream Solenoid - (AC) A4M TEE3:1,2 OFF 5. Not Used - (AC) A4M TBE3:3,4 OFF 6. Not Used - (AC) A4M TBE3:5,6 OFF 7. Pump - (AC) A4M TBE3:7,8 OFF 8. Pump - (AC) A4M TBE3:9,10 OFF 9. Not Used - (AC) A4M TBE3:11,12 OFF 10. Not Used - (AC) A4M TBE7:1,2 OFF 11. Not Used - (AC) A4M TBE7:3,4 OFF 12. Not Used - (AC) A4M TBE7:5,6 OFF 13. Piston Inj 1 - (AC) A4M TBE7:7,8 OFF 14. Additive Pump 1 - (AC) A4M TBE7:9,10 OFF 15. Not Used - (AC) A4B TB10:1,2 OFF 16. Not Used - (AC) A4B TB10:3,4 OFF 17. Not Used - (AC) A4B TB10:5,6 OFF 18. Not Used - (AC) A4B TB10:7,8 OFF 19. Not Used - (AC) A4B TB10:9,10 OFF 20. Not Used - (AC) A4B TB9:1,2 OFF 21. Not Used - (AC) A4B TB9:3,4 OFF 22. Not Used - (AC) A4B TB9:5,6 OFF 23. Not Used - (AC) A4B TB9:7,8 OFF 24. Not Used - (AC) A4B TB9:9,10 OFF 25. Not Used - (AC) A4B TB9:11,12 OFF 26. Not Used - (AC) A4B TB8:1,2 OFF 27. Not Used - (AC) A4B TB8:3,4 OFF 28. Not Used - (AC) A4B TB8:5,6 OFF 29. Not Used - (AC) A4B TB8:7,8 OFF 30. Not Used - (AC) A4B TB8:9,10 OFF 31. Not Used - (DC) A4B TB12:3,2 OFF 32. Not Used - (DC) A4B TB12:4,5 OFF 33. Not Used - (DC) A4B TB12:9,8 OFF 34. Not Used - (DC) A4B TB12:12,11 OFF 35. Not Used - (DC) A4B TB13:3,2 OFF 36. Not Used - (DC) A4B TB13:6,5 OFF 37. Not Used - (DC) A4B TB13:9,8 OFF 38. Not Used - (DC) A4B TB13:12,11 OFF 39. Not Used - (AC) A4B TB9:10 OFF			

3.2.9. Analog I/O

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.

4/21/2016 2:55 PM		AccuLoad IV		
Dynamic Displays	Diagnostics	Analog I/O	View	Stop All Arms
Analog I/O		Counts	Analog Value	Engineering Value
1. Temperature In - TP1001 - RTD		0	0.0	-403.8
2. Temperature In - TP1002 - 4-20 mA In		32716	12.5	73.0
3. Flow Rate Out - Flow A1 - 4-20 mA Out		10922	4.0	0.0
4. Pressure In - PT1004 - 4-20 mA In		52429	20.0	300.0
5. Pressure In - PT1005 - 4-20 mA In		52429	20.0	300.0
6. Not Used - A4M TB5:17,18 - NA		0	0.0	0.0

3.2.10. Pulse Inputs

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.

4/21/2016 3:36 PM		AccuLoad IV	
Dynamic Displays	Diagnostics	Pulse In	View
		Pulse Counts	Pulse Frequency
1. NA - A4M PT1:1.2 - Arma#1 Meter#1A (Forward)		441673	0.0 Hz
2. NA - A4M PT1:3.4 - Arma#1 Meter#1B (Reverse)		0	0.0 Hz
3. NA - A4M PT1:5.6 - Arma#2 Meter#1A (Forward)		950341	0.0 Hz
4. NA - A4M PT1:7.8 - Arma#2 Meter#1B (Reverse)		0	0.0 Hz
5. NA - A4M PT1:9.10 - NA		0	0.0 Hz
6. NA - A4M PT1:11.12 - NA		0	0.0 Hz
7. NA - A4M PT2:1.2 - NA		0	0.0 Hz
8. NA - A4M PT2:3.4 - NA		0	0.0 Hz
9. NA - A4B PT1:1.2 - NA		0	0.0 Hz
10. NA - A4B PT1:3.4 - NA		0	0.0 Hz
11. NA - A4B PT1:5.6 - NA		0	0.0 Hz
12. NA - A4B PT1:7.8 - NA		0	0.0 Hz
13. NA - A4B PT1:9.10 - NA		0	0.0 Hz
14. NA - A4B PT1:11.12 - NA		0	0.0 Hz

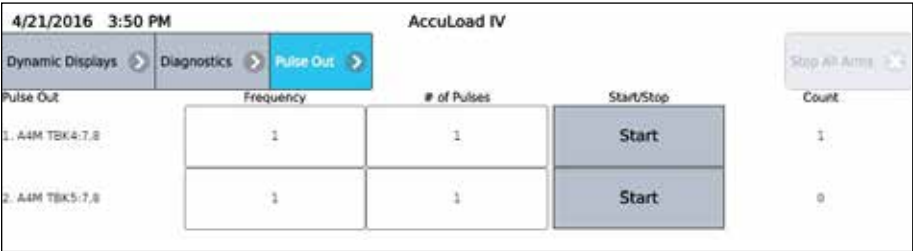
3.2.11. Pulse Outputs

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

4/21/2016 3:50 PM		AccuLoad IV	
Dynamic Displays	Diagnostics	Pulse Out	View
Pulse Out	Frequency	# of Pulses	Start/Stop
1. A4M TBK4-7.8	1	1	Start
2. A4M TBK5-7.8	1	1	Start

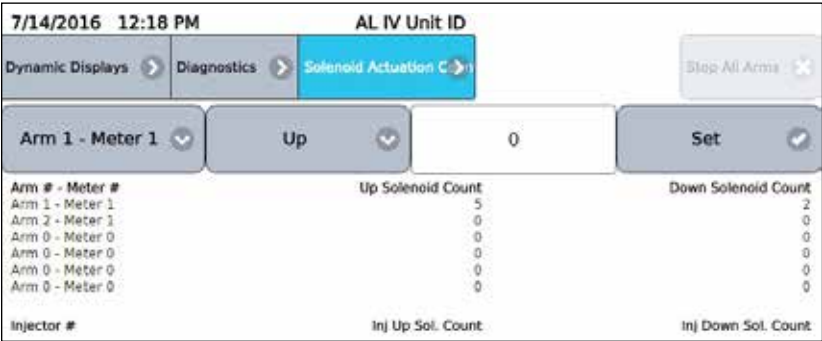
3.2.12. Reset Dual Pulse Errors

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



3.2.13. Solenoid Actuation Diagnostic Counters

The AccuLoad IV provides counters to track the upstream and downstream solenoid actuations. Separate counters will be available for both the upstream and downstream solenoid of each meter. The counter will be 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).



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.

3.2.14. Valve Closure 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 will also measure 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.

7/14/2016 2:59 PM		AL IV Unit ID	
Dynamic Displays >	Diagnostics >	Valve Closure Data >	Arm 1 : Meter 1 >
Stop All Arms X			
Clear Data			
Sample	Close Time	Close Amount	Flow Rate
1	0.0 sec	0 gal	0 gal/min
2	0.0 sec	0 gal	0 gal/min
3	0.0 sec	0 gal	0 gal/min
4	0.0 sec	0 gal	0 gal/min
5	0.0 sec	0 gal	0 gal/min
6	0.0 sec	0 gal	0 gal/min
7	0.0 sec	0 gal	0 gal/min
8	0.0 sec	0 gal	0 gal/min
9	0.0 sec	0 gal	0 gal/min
10	0.0 sec	0 gal	0 gal/min

3.2.15. Meter Pulse Inputs

Selecting this diagnostic will result 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 of verifying pulse input wiring to the respective pulse input on the AccuLoad. Applying pulses to the respective input will cause the respective counter to increment.

7/14/2016 3:03 PM		AL IV Unit ID	
Dynamic Displays >	Diagnostics >	Meter Pulse Inputs >	Stop All Arms X
Name	Arm #	Meter #	Forward Pulses
1. M1001	1	1	0
2. M1002	2	1	0
			Reverse Pulses
			0
			Dual Pulse Err...
			0
			Pulse Freq (Hz)
			0.00

Note: If Dual Pulse is enabled, “Reset Dual Pulse Errors” will appear as a menu option on the screen. See description “Reset Dual Pulse Errors”.

3.2.16. Boolean/Algebraic

The Diagnostics menu provides the selection “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:

4/21/2016 4:24 PM		AccuLoad IV	
Dynamic Displays >	Diagnostics >	Boolean Algebraic >	Registers >
Stop All Arms X			
Boolean Algebraic Registers		User Boolean Register	User Float Register
1		0	0.0
2		0	0.0
3		0	0.0
4		0	0.0
5		0	0.0
6		0	0.0
7		0	0.0
8		0	0.0
9		0	0.0
10		0	0.0
11		0	0.0
12		0	0.0
13		0	0.0
14		0	0.0
15		0	0.0
16		0	0.0
17		0	0.0
18		0	0.0
19		0	0.0
20		0	0.0
21		0	0.0
22		0	0.0
23		0	0.0
24		0	0.0
25		0	0.0
26		0	0.0
27		0	0.0
28		0	0.0
29		0	0.0
30		0	0.0

See the AccuMate online help.

4/21/2016 4:27 PM		AccuLoad IV	
Dynamic Displays >	Diagnostics >	Boolean Algebraic >	Gen. Purpose Timers >
		Stop All Timers >	
Tenth Second Timer 1 Value	0	One Minute Timer 1 Value	0
Tenth Second Timer 2 Value	0	One Minute Timer 2 Value	0
Tenth Second Timer 3 Value	0	One Minute Timer 3 Value	0
Tenth Second Timer 4 Value	0	One Minute Timer 4 Value	0
One Second Timer 1 Value	0	One Hour Timer 1 Value	0
One Second Timer 2 Value	0	One Hour Timer 2 Value	0
One Second Timer 3 Value	0	One Hour Timer 3 Value	0
One Second Timer 4 Value	0	One Hour Timer 4 Value	0

3.2.17. Engineering Diags

This diagnostic screen is a combination of the analog and digital input low level status for factory testing.

7/14/2016 3:28 PM AL IV Unit ID		
Dynamic Displays >	Diagnostics >	Engineering >
Stop All Arms		
Analog I/O		
1. Temperature In - TP1001 - RTD	Counts	Analog Value
2. Temperature In - TP1002 - 4-20 mA In	24388	93.0
3. Flow Rate Out - Flow A1 - 4-20 mA Out	52429	20.0
4. Pressure In - PT1004 - 4-20 mA In	10922	4.0
5. Pressure In - PT1005 - 4-20 mA In	52429	20.0
6. Not Used - A4M TB5:17,18 - NA	52429	20.0
	0	0.0
Pulse Counts		
1. NA - A4M PT1:1,2	213554	Pulse Frequency
2. NA - A4M PT1:3,4	0	0.0 Hz
3. NA - A4M PT1:5,6	0	0.0 Hz
4. NA - A4M PT1:7,8	0	0.0 Hz
5. NA - A4M PT1:9,10	0	0.0 Hz
6. NA - A4M PT1:11,12	0	0.0 Hz
7. NA - A4M PT2:1,2	0	0.0 Hz
8. NA - A4M PT2:3,4	0	0.0 Hz
9. NA - A4B PT1:1,2	0	0.0 Hz
10. NA - A4B PT1:3,4	0	0.0 Hz
11. NA - A4B PT1:5,6	0	0.0 Hz
12. NA - A4B PT1:7,8	0	0.0 Hz
13. NA - A4B PT1:9,10	0	0.0 Hz
14. NA - A4B PT1:11,12	0	0.0 Hz

3.2.18. Network Diags

Displays Network Diagnostics for each of the network interfaces in the AccuLoad IV.

7/14/2016 3:26 PM AL IV Unit ID		
Dynamic Displays >	Diagnostics >	Network Diag >
Stop All Arms		
Interface	Packets	Errors
WAN(tx)	50436951	0
WAN(rx)	142673594	0
INTERNAL(tx)	426692	0
INTERNAL(rx)	5671444	0
Loopback(tx)	192909518	0
Loopback(rx)	192909518	0
		Dropped
		Overrun
		Bytes
		031017786
		1809014641
		47300751
		620855634
		296820159313
		296820159313

3.2.19. Update Driver Database

This 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.

7/14/2016 3:33 PM

AL IV Unit ID

Dynamic Displays >

Diagnostics >

Update Driver Datab >

Stop All Arms

Card-in a new card or Enter a new ID to store in the database

Store

3.2.20. Update Firmware

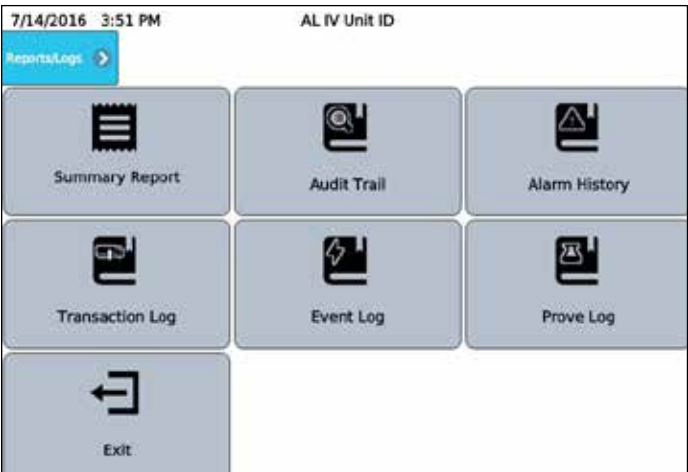
This diagnostic is intended to provide a mechanism to authenticate a firmware upgrade. Upgrades can be accomplished without using this diagnostic if the communications interface being used has sufficient privileges. In the case where the configuration does not permit updates from being initiated automatically,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

Note: If the Firmware Lock function located under the W&M Calibration menu (see section 5) is enabled, firmware updates are inhibited until the Firmware Lock is disabled. This action will then be recorded in the Audit trail.

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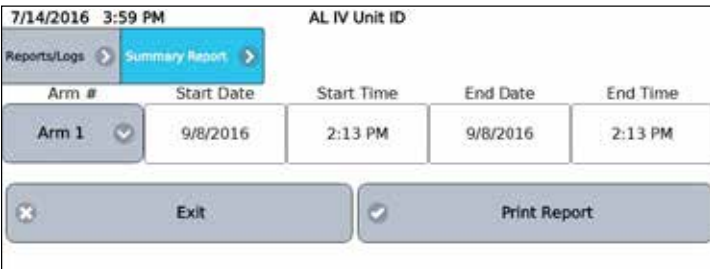
4 – Reports / Logs

By pressing Reports/Logs from the Main Menu, it is possible to generate printed reports and view the AccuLoad’s historical data logs.



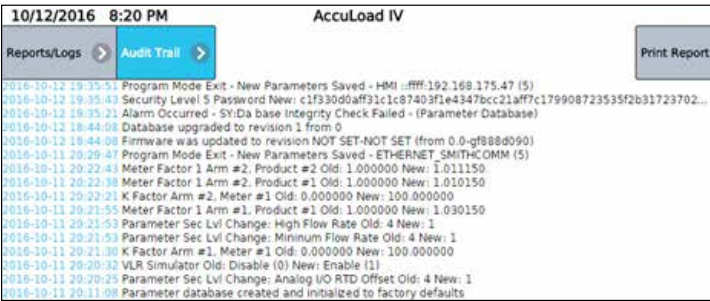
4.1. Summary Reports

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 press 'Print Report' to generate the summary.



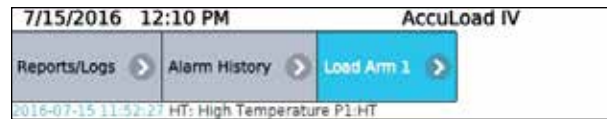
4.2. Audit Trail

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 (see section 2.9) are recorded in this log.



4.3. Alarm History

This selection provides a means to view the alarm history.



4.4. Transaction Log

This selection 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:

The screenshot shows the top navigation bar with the date and time '7/15/2016 12:13 PM' and the title 'AccuLoad IV'. Below the navigation bar, there are three buttons: 'Reports/Logs', 'Transaction Log', and 'Load Arm 1'. The 'Transaction Log' button is highlighted in blue. Below the buttons, a table displays the transaction log. The table has three columns: 'Transaction', 'Start Time', and 'End Time'. To the right of the table, there are two columns of buttons: 'View' and 'Print'.

Transaction	Start Time	End Time	View	Print
4	2016-07-15 11:29:13	2016-07-15 11:46:08	View	Print
3	2016-07-14 18:52:29	2016-07-14 19:04:20	View	Print
2	2016-07-14 18:38:15	2016-07-14 18:41:53	View	Print
1	2016-07-01 10:27:40	2016-07-01 10:59:29	View	Print

The screenshot shows the top navigation bar with the date and time '7/15/2016 12:14 PM' and the title 'AccuLoad IV'. Below the navigation bar, there are five buttons: 'Reports/Logs', 'Transaction Log', 'Load Arm 1', 'Transaction 4', and 'Transaction Totals'. The 'Transaction Totals' button is highlighted in blue. Below the buttons, a table displays the transaction totals. The table has two columns: 'Transaction' and 'Value'. To the right of the table, there is a 'Print' button.

Transaction	Value
IV Trans	2572.47 gal
GV Trans	2650.03 gal
GST Trans	2570.32 gal
GSV Trans	2572.94 gal
Mass Trans	17404.42 lb
Trans Avg Temp	129.30 °F
Trans Avg Dens	49.13 lb/ft³
Trans Avg Press	138.80 psi
Trans Avg Mtr Factor	1.03015
Trans Avg CTL	0.96992
Trans Avg CPL	1.00102
Add 1 Trans	0.272 gal
Add 2 Trans	0.000 gal
Add 3 Trans	0.000 gal
Add 4 Trans	0.000 gal
Add 5 Trans	0.000 gal
Add 6 Trans	0.000 gal
Add 7 Trans	0.000 gal
Add 8 Trans	0.000 gal
Add 9 Trans	0.000 gal
Add 10 Trans	0.000 gal
Add 11 Trans	0.000 gal
Add 12 Trans	0.000 gal
Add 13 Trans	0.000 gal
Add 14 Trans	0.000 gal
Add 15 Trans	0.000 gal
Add 16 Trans	0.000 gal
Add 17 Trans	0.000 gal
Add 18 Trans	0.000 gal
Add 19 Trans	0.000 gal
Add 20 Trans	0.000 gal
Add 21 Trans	0.000 gal
Add 22 Trans	0.000 gal
Add 23 Trans	0.000 gal
Add 24 Trans	0.000 gal
Trans Vapor Recovered	0.00
Trans VRS Delivered Net	0.00

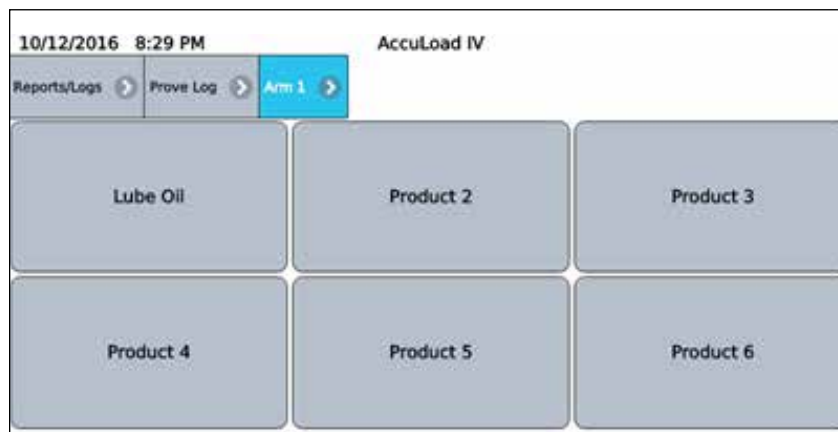
4.5. Event Log

This selection provides a means to view and optionally print the event log. All events, such as alarms, transaction start/end, and changes to parameters set to Access level 3 or below (see section 2.9) are recorded in this log.



4.6. Prove Log

This selection 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.



11/4/2016 7:36 PM			AccuLoad IV	
Reports/Logs >	Prove Log >	Arm 1 >	Product 1 >	
Prove #	Time of Prove	Last Run Meter Factor		
2	2016-11-04 15:59:24	1.00675	View	Print
1	2016-11-04 13:29:57	1.0025	View	Print

A list of the prove data for the arm is presented. It is then possible to view or print the prove details from this diagnostic.

11/4/2016 7:39 PM			AccuLoad IV	
Arm 1 >	Product 1 >	Prove 2 >	Prove Run 1 >	
Prover CTSP	1.00337	Meter Temperature	129.3 °F	
Prover CTLP	0.97180	Average Flow Rate	474.1 gal/min	
Meter CTPLM	0.97091	Average Density	49.1 lb/ft³	
Prover IV	2000.00 gal	New Meter Factor	1.00675	
Meter IV	1995.11 gal	Run Accepted	1	
Prover Temperature	125.0 °F			
			Print	Print Prove

5 – Weights & Measures / Calibration Menu

The features available within this section of the user interface menu affect the calibration information and metrologically significant data storage and hence are protected by the Weights & 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 W&M security switch, it must be active. See manual [MN06201](#) for connection details for this optional switch.

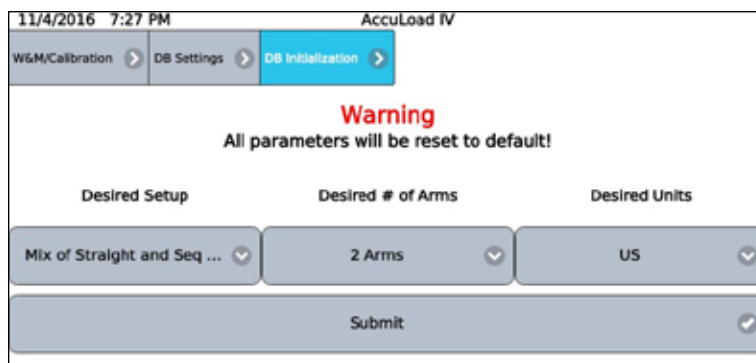


5.1. DB Settings (Database Settings)

DB Initialization – From this 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 Seq 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.



5.2. Set Trans # (Set Transaction Number)

This 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: 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.

11/4/2016 7:34 PM AccuLoad IV

W&M/Calibration > Set Trans # >

Set Trans #

Warning
The transaction log for this arm will be erased!

Arm 1

5214

Exit Continue

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:

11/4/2016 7:54 PM AccuLoad IV

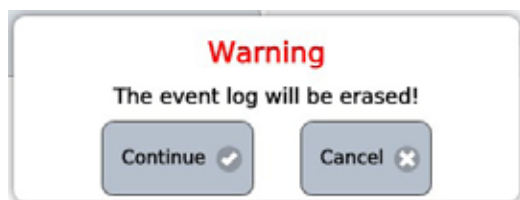
W&M/Calibration > Erase Event Log >

Erase Event Log

Warning
The event log will be erased!

Exit Continue

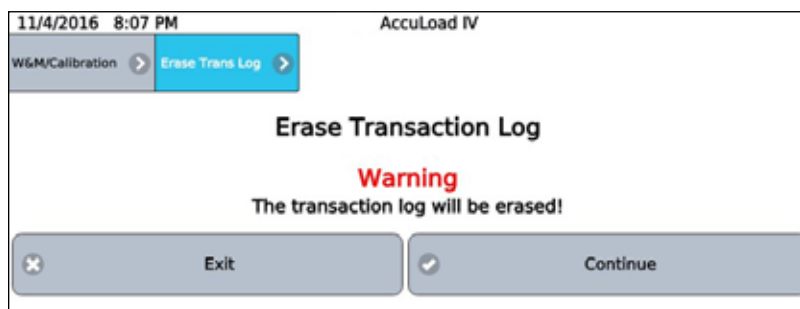
A confirmation dialog will appear:



If Continue is pressed, all entries in the Event Log will be erased. In either case after a selection is made control returns to the W&M/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:



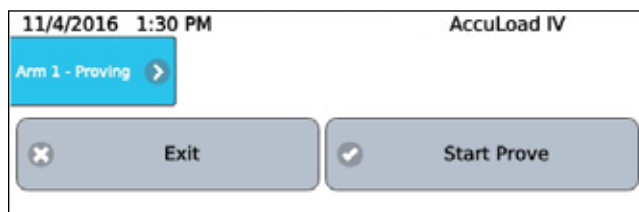
A confirmation dialog will appear.



This activity will be logged in the Audit Trail.

5.5. Proving

Press Proving from the W&M/Calibration menu to begin a proving operation.



Enter the volumetric coefficient of expansion for the steel (typically can be found on the nameplate of the prover).

11/4/2016 4:01 PM AccuLoad IV

Main Stop All Arms Dynamic Displays Help

Arm 1 - Enter Prover Coefficient

0.0000518

Back Next

Arm 2

Press to Set Up

▶

11/4/2016 4:02 PM AccuLoad IV

Main Stop All Arms Dynamic Displays Help

Arm 1 - Enter low flow start volume

40

Back Next

Arm 2

Press to Set Up

▶

11/4/2016 4:03 PM AccuLoad IV

Main Stop All Arms Dynamic Displays Help

Arm 1 - Meter Factor and Flow Rate

1. MPac:1.00675 PRate:0

Back Next

Arm 2

Press to Set Up

▶

Enter the desired preset based on the can size and press Next. Start the prove run as for a normal delivery.

11/4/2016 4:04 PM AccuLoad IV

Main Stop All Arms Dynamic Displays Help

Arm 1 - Preset Amount

2000 - +

BACK Next

Arm 2

Press to Set Up

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, and starting a new run.

11/4/2016 3:39 PM AccuLoad IV

Arm 1 - Proving

Abort Proving Reject Last Run Start Next Run

Prover Volume: 0.0 Prover Temperature: 0.0 Calculate

# Runs Used	0	Prover IV	0.50 gal
Repeatability Range	0.000 %	Meter IV	1995.11 gal
New Meter Factor	0.00000	Prover Temperature	0.0 °F
Avg Meter Factor	0.00000	Meter Temperature	129.3 °F
Old Meter Factor	1.00150	Average Flow Rate	474.1 gal/min
Prover CTSP	0.00000	Average Density	49.1 lb/ft³
Prover CTLP	0.00000		
Meter CTPLM	0.97091		

View all prove run data View

Accept Last Run Meter Factor: 0 Accept Avg Meter Factor: 0

Enter the volume in the prover can and the prover temperature reading, then select **Calculate** to generate the new factor based on the run (this can take some time):

11/4/2016 3:46 PM AccuLoad IV

Arm 1 - Proving

Abort Proving Reject Last Run Start Next Run

Prover Volume: 2000 Prover Temperature: 125 Calculate

# Runs Used	1	Prover IV	2000.00 gal
Repeatability Range	0.000 %	Meter IV	1995.11 gal
New Meter Factor	1.00675	Prover Temperature	125.3 °F
Avg Meter Factor	1.00675	Meter Temperature	129.3 °F
Old Meter Factor	1.00250	Average Flow Rate	474.1 gal/min
Prover CTSP	1.00337	Average Density	49.1 lb/ft³
Prover CTLP	0.97180		
Meter CTPLM	0.97091		

View all prove run data View

Accept Last Run Meter Factor: 1.00675 Accept Avg Meter Factor: 1.00675

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:

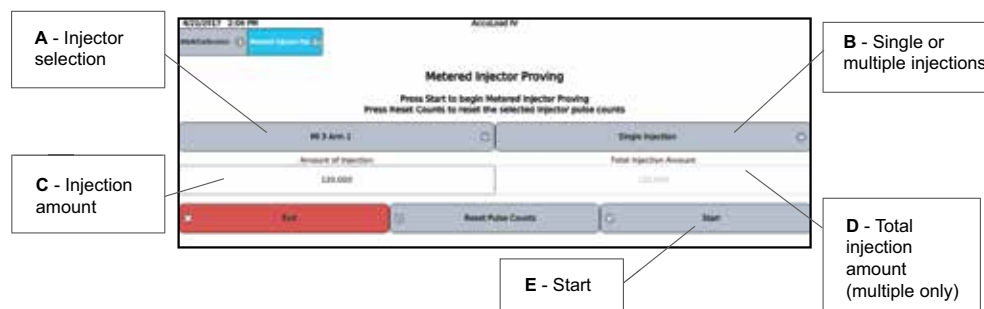
11/4/2016 1:27 PM		AccuLoad IV	
Arm 1 - Proving	Prove Run 1	Prove Data	
Prover CTSP	1.00237	Meter Temperature	129.3 °F
Prover CTLP	0.57180	Average Flow Rate	359.7 gal/min
Meter CTPLM	0.57091	Average Density	49.1 lb/m³
Prover IV	1940.00 gal	New Meter Factor	1.00250
Meter IV	1941.52 gal	Run Accepted	1
Prover Temperature	123.0 °F		

Once the prove operation is completed successfully and the appropriate meter factor has been accepted, the AccuLoad will return to the Weights & 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. Then the amount delivered into the container is compared to the amount indicated by the number of pulses counted by the AccuLoad and a meter factor is calculated.

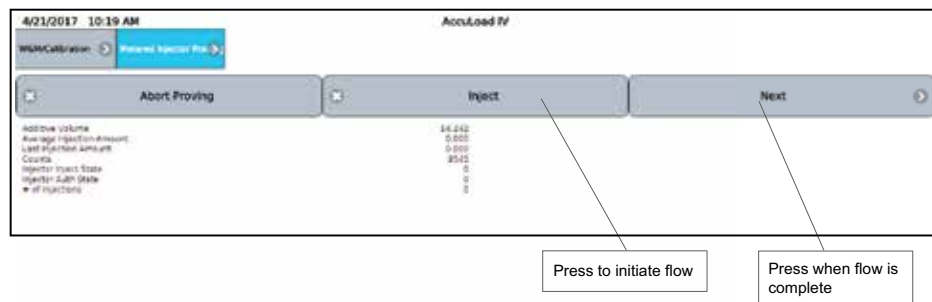
The AccuLoad has built-in Metered Injector Proving support which provides a simple and efficient way to ensure the accuracy of metered injectors.



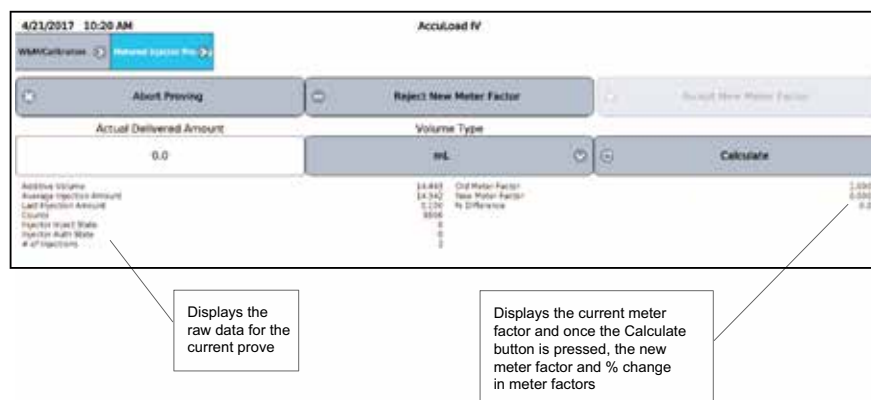
Process of proving an additive meter:

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 (W&M/Calibration->Metered Injector Proving)
4. Select the injector to prove from the drop-down list (A in the figure above)
5. Select the option for a single or multiple injections
 - a. Single – The injections are manually controlled by the operator with one injection of the amount entered in “Amount of Injection” each time the operator presses the Inject button
 - b. Multiple – The AccuLoad automatically performs enough individual injections of the amount entered in “Amount of Injection” to deliver the amount entered in “Total Injection Amount”

6. Enter the Amount of Injection (see above)
7. Enter the Total Injection Amount if using the Multiple Injections method (see above)
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.



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



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 in individual load arm if desired.



As with the other functions a confirmation dialog will appear. If continue is pressed, the totalizers for the selected arm(s) will be cleared.

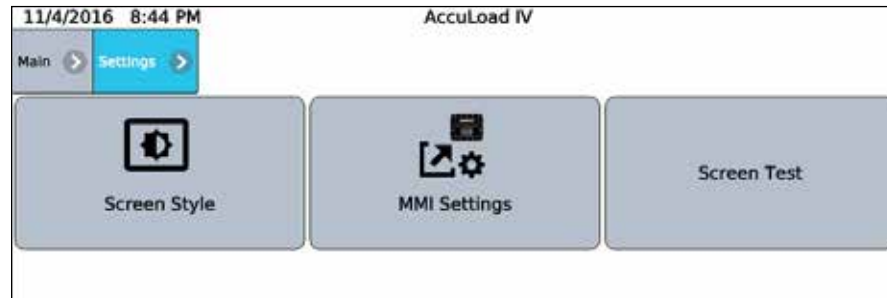
5.8. Firmware Lock

This option allows an installation to prevent certain features from being accessible unless 'unlocked' via a Weights & 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 (equations, configurable reports, etc.).



6 – Device Settings

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



6.1. Screen Style

This selection allows the user to configure the display style – Day, Night, or Auto. Day Style utilizes dark text and icons on a white background, easier to read in daylight. Night style utilizes a black background, 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.

6.2. MMI Settings

This selection is only valid in a Split Architecture configuration. It redirects the interface to the local database server to allow modification of the MMI settings. See the Split Architecture application bulletin for more information regarding MMI configuration.

6.3. 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.

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7 – Device Information

This selection provides details about the AccuLoad IV firmware and software:

11/4/2016 9:03 PM		AccuLoad IV	
Main	Device Information		
Device Information			
Firmware Revision		0.1	
Firmware Identifier		g87e74e7e	
Maximum Available Arms		6 Arms	
Software Seal		Unsealed	
Network Information			
IP Address		192.168.175.2	
Netmask		255.255.254.0	
Gateway		192.168.174.1	
Board CRCs			
A4M CRC		0	
A4B CRC		0	
A4I1 CRC		0	
A4I2 CRC		0	
Process Signatures			
Delivery		10 93 47 f0 3c bd 46 08 86 da e9 56 78 be 53 09 23 b5 04 4a 94 e3 a7 f9 da 98 bf 88 bb 7c 85 05	
Criticals		9e 28 dd 9a 64 d2 b5 8d 95 f4 5d 72 85 59 c7 64 dd 92 5d 03 f0 92 7f fc 25 cf 2d 0f a1 e9 bd 96	
Modbus		11 16 77 4e a6 7a 1c d2 b7 b4 8a d6 34 6c 3e 47 3b b2 6e 07 1a 55 84 4e fd 18 99 fb fc fa fb 9e	
Smithcomm		fe 4d da 96 c5 b2 9e f4 88 31 7e d8 06 9c 13 64 85 d4 f7 1b c2 4c 48 da d3 ec b8 99 91 bb b2 de	
Cardreader		7c 68 e3 2f a8 b7 d3 1b e7 ca df f9 78 95 f6 20 f4 c9 56 6d a7 cf 50 47 49 92 81 6a 94 62 05 69	
Algebool		17 24 20 6d 9a fe b6 12 90 1a 7f c9 0f 54 e2 2a e4 3d 7b fd 5f eb 3c 91 a6 ca 4b b7 a7 41 60 d0	
JSON write		d2 0d 29 9b f7 64 d6 7b 3f 7d 51 39 c8 a2 4e e5 60 d9 38 64 ad 7d 97 a5 a9 71 f9 f8 8d ce 7f 49	
Promass		a6 a8 e5 be d9 61 44 cf bd 9b 08 58 d6 f0 06 1d d8 3c 28 e4 ba 41 2f c9 9b 56 13 b8 6a ab 91 d7	
Set time		35 71 49 2b d4 c3 a5 2d a1 49 24 5d b8 de c9 f9 2f 1b f6 b6 c4 23 64 9c 73 d0 ff 21 e2 6c dc 07	
TIVAsitter		d4 cc 63 62 e7 0b ba b9 cd c8 55 fa e8 5f f8 7a 11 6b 18 a1 9f a4 5d b7 b7 e9 e4 c9 8e e7 72 b4	
Printer		4b ab 15 b0 9d c3 e5 5e a2 7d 67 ea 3b 79 f7 0d 78 50 03 a3 ab a0 5c 97 46 2b e9 07 91 13 28 d0	
File shuffler		e0 24 a3 50 a7 a3 09 78 04 e7 3c a6 1f e4 65 f6 39 4c 52 03 2f e5 0e 05 ab 64 2d c2 11 44 15 15	

Page intentionally left blank.

8 – Program Mode Reference

This 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 (e.g., (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. “No entry” indicates that a program code is unavailable and will not appear on the menu, because previous selections make it irrelevant. For example, ratio blending program codes will not appear when sequential blending has been chosen.

The main system directories are as follows:

Config (Configuration) 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

Arms 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

8.1. Configuration Directories

System Layout Directory

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	Index: None	Range: 1 - 6 • AccuLoad S - 1 or 2 • AccuLoad Q - 6 maximum
Configuration - 001		
Description: This parameter defines the number of load arms associated with this AccuLoad.		
Critical(s): Insufficient meter pulse inputs, A4B required. Configuration requires more meters than are available.		
Fatal: Entry is out of specified range.		

Configuration: System Layout: Arm	Index: Arm	Range: None Default: Straight Product
Configuration - 002, 005, 008, 011, 014, 017		
Description: These parameters determine the functionality of Arms 1 - 6 respectively.		
Selection: <ul style="list-style-type: none"> • [(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(s): Unloading requires inputs DE Head High Flow, Low Flow and Stop.		

Configuration: System Layout: Arm Number of Products Configuration - 003, 006, 009, 012, 015, 018	Index: Arm	Range: 1 - 6 Default: 1
Description: This parameter defines the number of products assigned to the arm. Valid entries are 1 - 6.		
Critical(s): <ul style="list-style-type: none"> • 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 - 004, 007, 010, 013, 016, 019 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.		
Critical(s): <ul style="list-style-type: none"> • 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". 		

Configuration: System Layout: A4B Available Configuration 051	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 Q and SA models which have the A4B module.		
Selections: <ul style="list-style-type: none"> • 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 052	Index: None	Range: <ul style="list-style-type: none"> • [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: <ul style="list-style-type: none"> • No (None) • One board • Two boards 		

Configuration: System Layout: Board Set Number Split Architecture Only Configuration 053	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	Index: None	Range:
Description: Selections: <ul style="list-style-type: none"> • No Split Arch • No HMI • HMI A • HMI B 		

8.1.1. 100 – Pulse Inputs Directory

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 8 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.

Pulse Inputs 3 - 14

Configurable Pulse Input parameters include Tag, Function, Pulse Input Arm, Pulse Input Meter.

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

Configuration:Pulse Inputs:Pulse Input Tag	Index: Pulse Input	Range: 10 characters max.
Configuration 101		
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	Index: Pulse Input	Range:
Configuration 102		
Description: This parameter defines the purpose of this pulse input.		
Selections: <ul style="list-style-type: none"> • NA • Freq Densitometer • Meter Inj 1 - 4 • Flow Cntrl Inj 1 - 4 		
Critical(s): <ul style="list-style-type: none"> • 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 103	Index: Pulse Input	Range: 1 - 6
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.		
Critical(s): <ul style="list-style-type: none">• Load arm not configured.• Only one densitometer allowed per arm/meter.		

Configuration:Pulse Inputs:Pulse Input Meter Configuration 104	Index: Pulse Input	Range: 1 - 6
Description: Pulse input 1 - 14 can be assigned to one of the following meters. Selection: <ul style="list-style-type: none">• Meter 1• Meter 2• Meter 3• Meter 4• Meter 5• Meter 6		
Critical(s): <ul style="list-style-type: none">• Meter not configured.• Only one densitometer allowed per arm/meter.		

8.1.2. 200 – Pulse Outputs Directory

Pulse Outputs 1 - 5

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	Index:	Range: 10 character
Configuration 201		
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 (ie A4M TBK4:7,8)		

Configuration:Pulse Outputs:Pulse Output Arm	Index:	Range: 1 - 6
Configuration 202		
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: <ul style="list-style-type: none"> • Not used • Arm 1 Pulses • Arm 2 Pulses • Arm 3 Pulses • Arm 4 Pulses • Arm 5 Pulses • Arm 6 Pulses 		
Critical(s): <ul style="list-style-type: none"> • Load arm not configured. 		

Configuration:Pulse Output:Pulse Output Meter	Index:	Range: 0 - 6
Configuration 203		
Description: This parameter defines the meter associated with this pulse output.		
Selections: <ul style="list-style-type: none"> • Combined Meters (Ratio Blending Only) • Meter 1 Pulses • Meter 2 Pulses • Meter 3 Pulses • Meter 4 Pulses • Meter 5 Pulses • Meter 6 Pulses 		

Configuration:Pulse Output:Pulse Output Pulse/Amount	Index:	Range: 0.00 - 999.99
Configuration 204		
Description: This five-digit parameter defines the pulse output resolution, the number of pulses per unit of volume to be generated (e.g., 0.1 will output 1 pulse for every 10 units of volume).		

Configuration:Pulse Output:Pulse Output Pulse Units	Index: Pulse Output	Range: 1 - 5
Configuration 205		
Description: This parameter defines the volume type used to pace the pulse output.		
Selections: <ul style="list-style-type: none"> • IV [Indicated Volume or Raw] • GV [Gross] • GST [Gross Standard Temperature] • GSV [Gross at Standard Temperature and Pressure] • Mass 		
Critical: <ul style="list-style-type: none"> • Selected units not available. 		

Configuration:Pulse Output:Pulse Output Maximum Frequency	Index: Pulse Output	Range: 0 - 3500 Hz.
Configuration 206		
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: <ul style="list-style-type: none"> • Entry is out of specified range. 		

8.1.3. 300 – DC & AC Digital Input Function Directories

Refer to the Installation Manual MN06201 for Terminal Assignments.

Digital Inputs 1 - 43

Digital 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:

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) <i>Digital input #16 – 23 can be configured as inputs or outputs, if configured as outputs not available in these parameters.</i>
A4I (Opt.)	Digital Input #24 – Digital Input #33 (10-DC) <i>Available as an option on both the ALIV-ST and ALIV-QT hardware.</i>
A4I2 (Opt.)	Digital Input #34 – Digital Input #43 (10-DC) <i>Available as an option on the ALIV-QT hardware.</i>

The AccuLoad also allows unused channels on installed A4I board(s) 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 2nd A4I at address 200 would be mapped to Digital Inputs #34-43.

Example – If 1 A4I is installed and 6 Add-Pak injectors are programmed for use, 4 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	Index:	Range: 10 character
Configuration 301		
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 (ie A4M TBK4:1,2)		

Configurations: Digital Inputs: DC & AC Digital Input Function	Index:	Range: 1 - 43
Configuration 302		
<p>Description: Assign a function to one of the digital inputs. Inputs 7 - 15 are AC; all others are DC.</p> <p>Selections:</p> <ul style="list-style-type: none"> • Not used • Security 1 - 2 • Permissive 1 - 2 • First/Second High Flow • Remote Start • Remote Stop • Remote Stop Arm • Transaction Reset • General Purpose Input • Printer Tray Switch • Block Valve Feedback • Piston Injector 1 – 24 Feedback • System Permissive 1 - 3 • Swing Arm – Side A and Side B • DE Head Stop Flow [not available if no unloading arms] • 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 <p>Criticals:</p> <ul style="list-style-type: none"> • 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] <p>Notes:</p> <ul style="list-style-type: none"> • Additive injector selections available dependent on Configuration Code 020. (Only 12 are available with AccuLoad IV-S hardware.) 		

Configuration: Digital Inputs: Digital Input Arm	Index: Digital Input	Range: 1 - 6
Configuration 303		
<p>Description: Some digital input functions are specific to an arm which is selected by this parameter.</p> <p>Selections:</p> <ul style="list-style-type: none"> • Arm 1 – Arm 6 <p>Critical(s):</p> <ul style="list-style-type: none"> • No DE Head High Flow, Low Flow, Stop Inputs on this arm. • Load arm not configured. <p>Notes:</p> <ul style="list-style-type: none"> • 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 305	Index: Digital Input	Range: 1 - 6
Description: Assign a product to one of the digital input functions from the list above.		
Selections: <ul style="list-style-type: none">• Product 1 – Product 6 These entries can only be configured for a Sequential Blending arm.		
Critical(s): <ul style="list-style-type: none">• Only one block valve feedback per product.• Product not configured.		

8.1.4. 500 – DC & AC Digital Output Function Directories

Refer to the Installation 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 Bi-State Expansion (A4B) hardware, provides 8 additional DC channels mapped to output(s) 31-38.

The AccuLoad also allows unused channels on installed A4I (Add-Pak) board(s) 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.

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. You could then assign Digital Outputs #51-58 (which map to those A4I channels) to the desired functions. If a second A4I is installed, the outputs map to Digital Output #59-78.

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 Manual [MN06201](#) for pulse input table, manual.)

Note: For selection (97) Vapor Line Valve, this is available for Straight with VRS arm type. 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	Index:	Range: 10 character
Configuration 501		
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 (ie A4M TBK5:1,2)		

Configurations:Digital Outputs:DC & AC Digital Output Function	Index:	Range: 1 - 78
Configuration 502		
Selections: <ul style="list-style-type: none"> • Not used • Pump • Upstream Solenoid • Downstream Solenoid • Alarm Relay 1 – 2 • General Purpose Output • Block Valve [not selectable if no sequential blending] • Stop Relay • Additive Pump 1 – 24 • Piston Injector 1 – 24 • Metered Injector 1 – 4 • Shared Additive 1 – 24 Solenoid • Shared System Flush 1 – 4 • Flow Controlled Injector 1 – 4 Upstream Solenoid • Flow Controlled Injector 1 – 4 Downstream Solenoid • Vapor Line Valve 		
Criticals: <ul style="list-style-type: none"> • 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 & AC Digital Output Arm	Index: Digital Output	Range: 1 - 6 (depending on model)
Configuration 503		
Description: This entry defines the arm associated with the digital output function.		
Selections: <ul style="list-style-type: none"> • Arm 1 – Arm 6 		
Critical: Load Arm not configured.		

Configuration: Digital Outputs: DC & AC Digital Output Meter	Index: Digital Output	Range: DC 1 - 3, AC 4 - 78
Configuration 504		
Description: This entry defines the arm associated with the digital output function. Selections: <ul style="list-style-type: none"> • Meter 1 – Meter 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(s): Meter not configured.		

Configuration: Digital Outputs: DC & AC Digital Output Product	Index: Digital Output	Range: DC 1 - 3, AC 4 - 78
Configuration 505		
Description: Assign a product to one of the digital output functions from the list above. Selections: <ul style="list-style-type: none"> • Product 1 – Product 6 These entries are used only if the entry for the related Digital Output Function is "Block Valve Feed-back."		
Critical: Product not configured.		

8.1.5. 900 – Analog I/O Directories

Configuration:Analog I/O:Analog I/O Tag	Index: Analog I/O	Range: 10 character
Configuration 901		
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.) ie TP1001		

Configuration:Analog I/O:Analog I/O Function	Index: Analog I/O	Range: 1 - 6
Configuration 902		
Description: These program codes define the function of the analog inputs.		
Selections: <ul style="list-style-type: none"> • Not Used • Temperature Input • Density Input • Pressure Input • Analog Valve • Flow Rate Output • General Purpose Output • Injector 1 – 4 Analog Valve • Injector 1 – 4 Temperature Input • General Purpose Input 		
Critical(s): <ul style="list-style-type: none"> • 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	Index: Analog I/O	Range: 1 - 6
Configuration 903		
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.)		
Selections: <ul style="list-style-type: none"> • Arm 1 - 6 		
Critical: Load arm not configured.		

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 Meter	Index: Analog I/O	Range: 1 - 6
Configuration 904		
Description: This entry defines the meter associated with the Analog I/O point.		
Selections: <ul style="list-style-type: none"> • Meter 1 - 6 		
Criticals: <ul style="list-style-type: none"> • 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	Index: Analog I/O	Selections: <ul style="list-style-type: none"> • Analog I/O #1: A4M TB5:1(RTD+), 2(SIG+), 3(SIG-), 4(RTD-) • Analog I/O #2: A4M TB5:5(RTD+), 6(SIG+), 7(SIG-), 8(RTD-) • Analog I/O #3: A4M TB5:9(RTD+), 10(SIG+), 11(SIG-), 12(RTD-)
Configuration 906		
Description: These program codes define the type of analog module used.		
Selections: <ul style="list-style-type: none"> • Not Used • 4-20 mA Input • 1-5 Vdc Input • RTD • 4-20 mA Output • 1-5 Vdc Output 		
Criticals: <ul style="list-style-type: none"> • 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	Index: Analog I/O	Range: 0 - [12288] - 65535
Configuration 907		
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 Cal2		

Configuration: Analog I/O:Analog I/O Calibration 2 Counts	Index: Analog I/O	Range: 0 - [53248] - 65535
Configuration 908		
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 Cal2		

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	Index: Analog I/O	Range: -999.99 - [0.00] - 9999.99
Configuration 909		
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.		
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 I/O High Value	Index: Analog I/O	Range: -999.99 - [600.00] - 9999.99
Configuration 910		
Description: These entries define the lower and upper 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). 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	Index: Analog I/O	Range: -9.9 - [0.00] - 9.9
Configuration 911		
Description: This parameter is used to correct the reading of the RTD input by a fixed amount.		
Notes: • This offset is applied to inputs configured as an RTD only. Note also that it is a single-point offset value.		

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 formats are read-only via communications; the SD command (smith protocol) or Extended Services (Modbus protocols) must be used to set the date & 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	Index: None	Range: READ ONLY
System 103		
Description: This displays the MAC Address of the Ethernet interface. It is read-only.		

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

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

System:General Purpose:Unit ID	Index: None	Range: Text 28 characters max.
System 111		
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	Index: None	Range:
System 112		
Description: This parameter is used to define the time units used to compute the flow rate.		
Selections: <ul style="list-style-type: none"> • [per minute] • per hour 		

System:General Purpose:Flow Rate Descriptor	Index: None	Range: Text - maximum 7 characters
System 113		
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	Index: System	Range: [0] - 99 seconds
System 121		
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	Index: None	Range: [0] - 99 seconds
System 122		
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	Index: None	Range:
System 123		
Description: This parameter is used to allow/disallow remote access to the AccuLoad over the network from a browser.		
Selections: <ul style="list-style-type: none"> • [Enable] • Disable 		
Help: Select whether to enable/disable remote browsing.		

System:General Purpose:Remote Browser Timeout	Index: None	Range: [0] - 999
System 124		
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	Index: None	Range:
System 131		
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: <ul style="list-style-type: none"> • [Decimal] • Comma 		

System:General Purpose:Default/Translated Literals	Index: None	Range:
System 132		
Description: This parameter selects the default (English) language or a custom translation to be displayed and printed.		
Selections: <ul style="list-style-type: none"> • [Default] • Translated 		
Note: <ul style="list-style-type: none"> • 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:Start Key Disable	Index: None	Range:
System 133		
Description: Allows the enabling/disabling of the "START" button on the touch panel and remote start input. When this parameter is set to disabled, the only method for starting a batch will be through the communication remote start command.		
Selections: <ul style="list-style-type: none"> • [No] (Enabled) • Yes (Disabled) 		
Note(s): <ul style="list-style-type: none"> • If the touch panel "START" is disabled at the AccuLoad and communications is in polling only, the AccuLoad will not be able to start a transaction until the parameters are properly set. • The "START" Button Enabled selection will not prohibit starting the batch via communications. 		

System:General Purpose:Stop Button Disable	Index: System	Range:
System 134		
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. (i.e. 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: <ul style="list-style-type: none"> • [No] • 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 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	Index: None	Range: [0] - 1000000000
System 135		
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	Index: None	Range: Text - 28 characters maximum
System 136		
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:Number of Batches / Transaction	Index: None	Range: 1 - [5] - 10
System 137		
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.		
Warning: Changing this value deletes all stored transaction data. Re-entering the same number will not clear local storage because the size of the transaction hasn't changed. Do not use System Code 136 to purge transactions; the Erase Transaction Log has been provided for this purpose. For more information on Erase Transaction Log, refer to Section V in this manual.		

System:General Purpose:Bay Transactions	Index: None	Range:
System 138		
Description: Enables/disables Bay Transaction handling.		
<ul style="list-style-type: none"> • [No] • Yes 		
Help: Select Yes to have a single transaction recorded for all arms assigned to a bay. See application bulletin for more information.		

System:General Purpose:System Permissive 1, 2, 3 Sense	Index: 1 - 3	Range:
System 161, 164, 167		
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: <ul style="list-style-type: none"> • [N/A] - Permissive is disabled • Transaction Start - Permissive input is only checked immediately after authorization • Continuous - Permissive input must be asserted continuously during the batch • Start Pressed - Permissive input must be asserted whenever flow is started • 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	Index: 1 - 3	Range: Text - 28 characters max.
System 162, 165, 168		
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	Index: 1 - 3	Range:
System 163, 166, 169		
Description: Select whether batch will restart automatically or START button will be required after permissive is restored.		
Selections: <ul style="list-style-type: none"> • [Manual] • Auto 		
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
- Revers Flow Limit
- Flow Simulator
- VLR Simulator

System:Flow Control:Solenoid Alarm Count	Index: System	Range: 0 - 1000000000
System 201		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	Index: System	Range:
System 202		
Description: This program code determines whether the solenoid actuation counts maintained by the AccuLoad are reset when the Solenoid Counts alarm is cleared.		
Selections: <ul style="list-style-type: none"> • [Manual] • 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	Index: System	Range: [0.0] - 999.9
System 203		
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	Index: System	Range: [0.0] - 999.9
System 204		
Description: This parameter indicates the maximum reverse flow limit. 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	Index: System	Range:
System 205		
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.		
Selections:		
<ul style="list-style-type: none"> • [Disable] • Enable 		
Note: This feature shall not be enabled during normal operation; changes to this option are logged in the audit trail.		

System:Flow Control:VLR Simulator	Index: System	Range:
System 206		
Description: Enables/disables the built-in virtual load rack simulation feature.		
Selections:		
<ul style="list-style-type: none"> • [Disable] • Enable 		
IMPORTANT: The VLR software shall be disabled on operational units; 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	Index: None	Range:
System 301		
Description: Selects the transmitter pulse train type in use. Selections: <ul style="list-style-type: none"> • Single • [Dual] Help: Select a single or dual pulse xmitter, PT1 1(+),2(-) for single channel or A; 3(+),4(-) for channel B		

System:Volume Accuracy:Transmitter Integrity	Index: None	Range:
System 302		
Description: Selects whether transmitter integrity is in use (/A, /B). Selections: <ul style="list-style-type: none"> • [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	Index: None	Range:
System 303		
Description: Selects whether reverse flow is accounted for (subtracted from batch amount) when calculating batch amounts. Selections: <ul style="list-style-type: none"> • [Ignore] • Totalize Help: Select if reverse amounts should count toward batch totals		

System:Volume Accuracy:Reverse Volume - Non-Resets	Index: None	Range:
System 304		
Description: Selects whether reverse flow is accounted for (subtracted) when updating non-resettable totalizers. Selections: <ul style="list-style-type: none"> • [Ignore] • Totalize Help: Select if reverse amounts should count toward non-resettable totals		

System:Volume Accuracy:Volume Units	Index: None	Range:
System 311		
Description: This parameter selects the volume units used to measure product delivery. The factory default is "Gallons." Selections: <ul style="list-style-type: none"> • [gal] - Gallons • bbl - Barrels • Dekaliters • Liters • m³ - Cubic Meters Help: Select volume units. These are used to select proper conversion factors for calculations.		

System:Volume Accuracy:Mass Units	Index:	Range:
System 312		
Description: This parameter defines the mass units used for product measurement. The factory default is "Pounds." Selections: <ul style="list-style-type: none"> • [lb] - Pounds • kg - Kilograms • US Tons • Metric Tons • Long Tons Help: Select mass units. These are used to select proper conversion factors for calculations.		

System:Volume Accuracy:Volume Descriptor	Index:	Range: Text - 4 characters max
System 313		
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	Index:	Range: Text - 4 characters max
System 314		
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	Index:	Range:
System 315		
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: <ul style="list-style-type: none"> • [Volume] • Mass 		

System:Volume Accuracy:Maximum Preset	Index:	Range: 0 - 999999
System 321		
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	Index:	Range: 0 - 999999
System 322		
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	Index:	Range: 0 - [200] - 999999
System 323		
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	Index:	Range: 0 - [10] - 99999
System 324		
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. See figure on page 18.		

System:Volume Accuracy:Transaction Termination	Index:	Range:
System 325		
<p>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.</p> <p>Selections:</p> <ul style="list-style-type: none"> • User Interface • Communications Only • Trans Reset Input • Printer Tray • Card Reader <p>• 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.)</p> <p>• Communications control only – For transactions that will be authorized and terminated remotely (i.e., through communications): The "End Transaction" button is disabled and the ticket printer tray switch is ignored.</p> <p>• 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.</p> <p>• 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).</p> <p>• 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.</p> <p>Critical (s):</p> <ul style="list-style-type: none"> • 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	Index:	Range:
System 326		
<p>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.</p> <p>Selections:</p> <ul style="list-style-type: none"> • Single Recipe per Transaction • [Multiple] Recipes per Transaction 		

System:Volume Accuracy:Transaction Start	Index:	Range:
System 327		
<p>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.</p> <p>Selections:</p> <ul style="list-style-type: none"> • [Manual] Operation • Automatic Operation 		

System:Volume Accuracy:Prove Type	Index:	Range:
System 331		
<p>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.</p> <p>Selections:</p> <ul style="list-style-type: none"> • [Net Proving] • Gross Proving 		

System:Volume Accuracy:Auto Prove Select	Index:	Range:
System 332		
<p>Description: This parameter is used to enable or disable the Automated Proving Mode. The default for this program code will be 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.</p> <p>Selections:</p> <ul style="list-style-type: none"> • [Disabled] • Security input not required • Security input 1 required • Security input 2 required 		
Critical: Security input not configured		
Note: Auto proving is described in MN06146 .		

System:Volume Accuracy:Prover Output	Index:	Range: 1 - 14
System 333		
<p>Description:</p> <p>Selections:</p> <ul style="list-style-type: none"> • [Auto Prove Meter] • Pulse Input 1 - 14 		

Volume Accuracy: High Speed Prover Pulse Output	Index:	Range:
<p>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 PIB III boards installed, 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:</p> <ul style="list-style-type: none"> • Echo meter selected via Auto Proving • Echo pulse input #1 - 6 - EAAI • Echo pulse input #7 - 12 - BSE 		
<p>Critical: Security input not configured</p>		

Volume Accuracy: Run Display	Index:	Range:
<p>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 downcounter, and prefixes it with a "Remain" prompt. The "Blank Downcounter" option prevents the downcounter from appearing. Selections are as follows:</p> <ul style="list-style-type: none"> • Default Display • Blank Downcounter • US Weights and Measures Display 		
<p>Note: This option will have no effect while the AccuLoad IV is in the proving mode.</p>		

System:Volume Accuracy:Preset Amount Type	Index:	Range:
System 341		
<p>Description: This program code selects the registration type used to enter the preset value. This registration type is also used for the downcounter display.</p> <p>Selections:</p> <ul style="list-style-type: none"> • IV - Indicated volume • [GV - Gross volume] • GST volume • GSV volume • Mass 		
<p>Note: Selected units not available.</p>		

Batch Reverse Flow Accumulation	Index: Pulse Input	Selection: Ignore or Count
Nonresettable Reverse Flow Accumulation	Index: Pulse Input	Selection: Ignore or Count
<p>Description: This program code allows for the detection and accumulation of reverse flow when using a dual-pulse transmitter (quadrature detection).</p> <ul style="list-style-type: none"> • Ignore (do not include reverse flow in totals) • Count (include reverse flow in batch totals) <p>If this option is enabled (by selecting '1') then measured flow in the reverse direction is accumulated and the amount is deducted from the batch amount.</p> <p>This feature requires Dual Pulse meter inputs. This feature is not available when Transmitter Integrity is selected. Meter pulse input wiring is as for dual pulse meters with integrity, however / A is not required to be wired to the Pulse Input Board to use this feature.</p>		
<p>Critical(s):</p> <ul style="list-style-type: none"> • Cannot totalize reverse flow with transmitter integrity (hardware limitation). 		
<p>Note(s):</p> <ul style="list-style-type: none"> • 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:Delivery Amount Type	Index:	Range:
System 342		
<p>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.</p> <p>Selections:</p> <ul style="list-style-type: none"> • IV - Indicated volume • GV - Gross volume • GST volume • [GSV volume] • Mass <p>Note: Selected units not available.</p>		

System:Volume Accuracy:Display Resolution	Index:	Range:
System 343		
<p>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 is "Whole."</p> <p>Selections:</p> <ul style="list-style-type: none"> • Whole units • 10ths - Tenths • [100ths - Hundredths] 		

System:Volume Accuracy:Delivered Amount/Upcounter	Index:	Range:
System 344		
<p>Description: This parameter selects whether the up-counter represents the batch delivered amount or the transaction delivered amount on the delivery screen.</p> <p>Selections:</p> <ul style="list-style-type: none"> • [Transaction] • Batch 		

System:Volume Accuracy:Update Leakage	Index:	Range:
System 345		
<p>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 "Trans 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 insure the true end of transaction non-resettable totals are retrieved (i.e. not including leakage which may have occurred after the transaction was ended), review the VT host command in the Smith communications manual (MN06204).</p> <p>Selections:</p> <ul style="list-style-type: none"> • [Transaction Start] • 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	Index:	Range: Default: Not Used
System 401		
Description: This program code selects the temperature scale used by AccuLoad.		
Selections:		
<ul style="list-style-type: none"> • [NA] • [°F] - Fahrenheit • °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	Index:	Range: 0 - [60.0] - 999.9
System 402		
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.		
Critical: API table conflicts with selected units		

System:Temperature/Density:Density Units	Index:	Range:
System 411		
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:		
<ul style="list-style-type: none"> • NA • [°API] • Lb/Ft³ (Pounds/Cubic Feet) • Kg/M³ (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	Index:	Range:
Description: This parameter defines whether the operator will be prompted for a density entry prior to starting a batch.		
Selections:		
<ul style="list-style-type: none"> • [No] • Always • In Standby 		

8.2.5. 500 - Pressure Directory

Pressure Directory includes:

- Pressure Units
- Atmospheric Pressure

System:Pressure:Pressure Units	Index:	Range:
System 501		
Description: This parameter defines the pressure units used by AccuLoad.		
Selections: <ul style="list-style-type: none"> • NA • [psi] • bar • kg/cm² (Kilograms/square centimeter) • 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	Index:	Range: [0.000] - 999.999
System 502		
Description: Sets the local atmospheric pressure used in GPA TP-15 (gauge pressure) vapor pressure calculations. This should be set to the average local atmospheric air pressure.		

8.2.6. 600 - Alarms Directory

Alarm Directory includes:

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

Alarm Responses

- Additive Clean Line
- Additive Comm Failure
- Additive Comm Totals
- Additive Excess Pulses
- Additive Feedback Error
- Additive Frequency Alarm
- Additive High Temperature Alarm
- Additive Injector Error
- Additive Low Temperature Alarm
- Additive Pulse Security
- Additive Temperature Probe
- Additive Unauthorize Failed Alarm
- Additive Xmit Integrity
- Add-Pak Diagnostic (x2)
- Add-Pak Power Fail (x2)
- A4I/AICB Auto Detect (x2)
- A4I/AICB Comm Failed (x2)
- Arm Overrun Alarm
- Arm Zero Flow Alarm
- Back Pressure Alarm
- Bay A Excess Active Arms
- Bay B Excess Active Arms
- Blend High Alarm
- Blend Low Alarm
- Block Valve Alarm
- Card Removed Alarm
- Clean Line Alarm
- Communications Alarm
- CTL Calculation Alarm
- DE Head Alarm
- Density Transducer Alarm
- Email Error
- F.A. Sensing COP Alarm
- High Density Alarm
- High Flow Alarm
- High Pressure Alarm

- High Temperature Alarm
- Injector Auto Detect
- Injector Solenoid Counts
- Injector Command Rejected
- Low Additive Alarm
- Low Density Alarm
- Low Flow Alarm
- Low Pressure Alarm
- Low Temperature Alarm
- Mass Meter Comm Fail
- Network Printer Alarm
- No Additive Pulses Alarm
- Overspeed Injector
- Predict Overrun Alarm
- Pressure Transducer Alarm
- Product Overrun
- Product Solenoid Counts
- Product Stop Alarm
- Product Zero Flow
- Promass Meter Alarm
- PTB Printer Alarm
- Pulse Security Alarm
- Report Storage Full Alarm
- Reverse Flow
- Shared Printer Alarm
- Storage Full Alarm
- Temperature Probe Alarm
- Ticket Alarm
- Transmitter Integrity Alarm
- Valve Fault Alarm

User Alarm Configuration

- User Alarms 1 - 10
- Report Storage Full Alarm

User Alarm Messages

- User Alarms 1 - 10 Messages
- Report Storage Full Alarm

System:Default Alarms:Driver Alarm Clearing	Index:	Range: 0 - [5] - 20
System 601		
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	Index: None	Range:
System 602		
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: <ul style="list-style-type: none"> • [Enable] • Disable 		

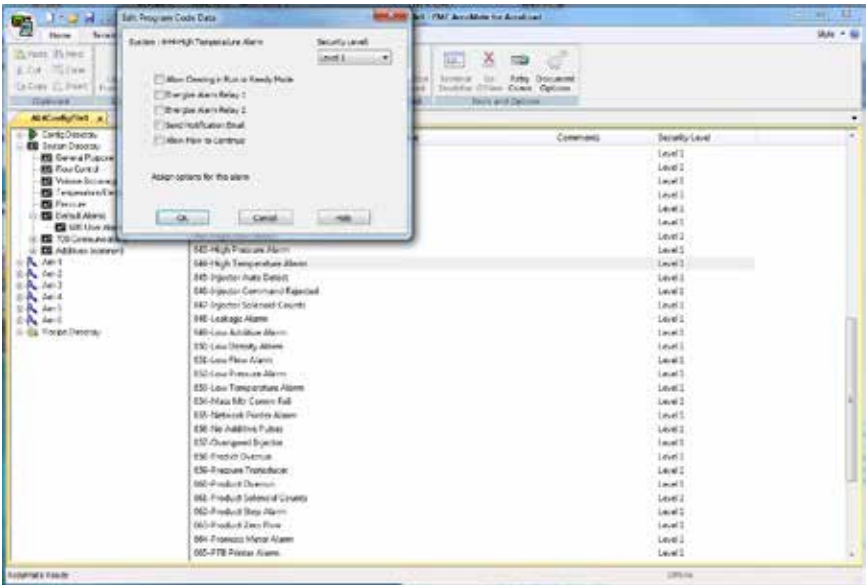
System:Default Alarms:Program Alarm Output	Index:	Range:
System 603		
Description: The AccuLoad provides two digital outputs which are energized when an alarm occurs. This parameter controls whether programming error alarms will activate these outputs.		
Selections: <ul style="list-style-type: none"> • [BOTH] - Both relays enabled • ALRM1 - Output Relay #1 Only • ALRM2 - Output Relay #2 Only • NONE - No Relays Enabled 		

Alarm Actions

The action(s) 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*
- Allow Flow to Continue - do not stop the flow when the alarm occurs

*If this option is checked and a valid server and user is configured, an email will be issued by the AccuLoad to the address specified in the email Notification Destination.



The combination of these program codes and new options will provide the information required to transmit email 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 email 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 send 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: <ul style="list-style-type: none">• Allow Run/Ready Mode Clear• Energize Alarm Output 1• Energize Alarm Output 2• Send via Email• Allow Flow to Continue		
Note: Through Communications, add binary bits to get combination of desired options (e.g., 7 would set up the first three options.)		
Note: Allow Flow to Continue is available with Unlimited Preset arms only.		

System:Default Alarms>User Alarms>User Alarm Configuration and User Alarm Message	Index: per User Alarm	Range: 1 - 10; 18 characters maximum
System 695 and 696		
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: <ul style="list-style-type: none"> • Allow Run/Ready Mode Clear • Energize Alarm Output 1 • Energize Alarm Output 2 • Notify via email • Allow Flow to Continue 		

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	Index: Arm	Range: 1 - 99
System 701 - 706		
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.		
Critical: 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	Index: None	
System 721		
<p>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.</p> <p>If "Standby & Alarm" is selected and Network Printing or PTB printing is being used, the AccuLoad will set the "NP: Network Printer" or "PP: PTB 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 XON/XOFF or no flow control.</p> <p>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.</p> <p>Selections:</p> <ul style="list-style-type: none"> • [NA] • Silent Standby • Standby and Alarm • Alarm and No Transaction <p>Critical: Select if desired to protect transaction reports not printed and if alarm should be set when the report is not printed.</p>		

System:Communications:Printer Control:Auto Reprint	Index: None	
System 722		
<p>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 printed and there are pending reports, then the pending reports will be printed as well.</p> <p>Selections:</p> <ul style="list-style-type: none"> • [No] • Yes <p>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.</p>		

System:Communications:Printer Control:Auto Tear Off	Index: None	
System 723		
<p>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).</p> <p>Selections:</p> <ul style="list-style-type: none"> • [No] • Yes 		

8.2.7.3. Host Interface

System:Communications:Host Interface:Comm Link Programming System 731	Index: System	
<p>Description: Defines which parameters can be modified through communications by the access level assigned to those parameters. The factory default is "Level 1 Access."</p> <p>Selections:</p> <ul style="list-style-type: none"> • [Alarm Clearing Only] - This selection allows only the alarms to be reset (cleared) through communications. • Level 1 Access Parameters • Level 2 Access Parameters • Level 3 Access Parameters • Level 4 Access Parameters • 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	
<p>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."</p> <p>Selections:</p> <ul style="list-style-type: none"> • [Big] endian - bytes are ordered most significant first • Little 8 endian - bytes are ordered least significant first 		
System:Communications:Host Interface:Timeout Action System 733	Index: None	
<p>Description: Standby mode allows the AccuLoad to continue to allow transactions in the case where host control has been lost.</p> <p>Selections:</p> <ul style="list-style-type: none"> • [Alarm] • Standby • Alarm and Standby 		

System:Communications:Host Interface:IP Discovery	Index: None	
System 734		
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: <ul style="list-style-type: none"> • [Manual] • DHCP 		

System:Communications:Host Interface:IP Address	Index: None	Range: 000.000.000.000
System 735		
Description: Sets the network communications address associated with the AccuLoad. For multiple AccuLoads on a shared communications line, all addresses must be unique. The decimal range of each octet in this entry is 000 - 255.		
• 4 octet numeric entry – 255.255.255.255		

System:Communications:Host Interface:Netmask	Index: None	Range: 000.000.000.000
System 736		
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 and so on.		
• 4 octet numeric entry – 255.255.255.255		

System:Communications:Host Interface:Gateway	Index: None	Range: 000.000.000.000
System 737		
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: <ul style="list-style-type: none"> • Polling Only • [Poll & Program] • Poll & Authorize • Remote Control <p>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.</p>		
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/TC-IP network (Smith I/P, Modbus TCP) before a communications alarm will be generated. A zero entry disables the time out action. Range is 0-999 • 3 digit numeric entry		
System:Communications:Host Interface:Host User Text Archived System 740	Index: None	
Help Message: When this option is selected, the 8 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: <ul style="list-style-type: none"> • Not Saved • Saved <p>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.</p>		
System:Communications:Host Interface:DNS Server IP System 741	Index: None	Range: 000.000.000.000
<p>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.</p> <p>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 & POP3 servers and network printers at this time).</p>		

System:Communications:Host Interface:SMTP Server Name	Index: None	Range: Text - 28 characters max.
System 742		
<p>Enter the host name for the SMTP (Simple Mail Transfer Protocol) server that provides the email account set up for the AccuLoad.</p> <p>Examples: if using DNS - smtp.yourmailserver.com If using IP address - 192.168.0.98</p> <p>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.</p> <p>Enter up to 28 characters of text</p> <p>Enter the server name or IP address of the SMTP server</p>		

System:Communications:Host Interface:POP3 Server Name	Index: None	Range: Text - 28 characters max.
System 743		
<p>Description: Enter the host name or IP address of the POP3 (Post Office Protocol - 3) server that provides the email account to which the AccuLoad should send email notifications of alarms conditions.</p> <p>Examples: If using DNS - pop.yourmailserver.com If not using DNS - 192.168.0.99</p>		

System:Communications:Host Interface:Email Account User Name	Index: None	Range: Text - 28 characters
System 744		
Description: Enter the user name on the email account to use to send email notifications.		

System:Communications:Host Interface: Email Account Password	Index: None	Range: Text - 28 characters
System 745		
Description: Enter the password for the email account used to send email notifications.		

System:Communications:Host Interface:Email Notify Address	Index: None	Range: Text - 28 characters
System 746		
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 747	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 748	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 749	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: <ul style="list-style-type: none"> • [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 792	Index: None	
Description: Used to specify whether card reader is connected directly to the AccuLoad or remotely (on the HMI). Selections: <ul style="list-style-type: none"> • [No] • Yes 		

System:Communications:Card/Nedap Reader:Card ID Validation System 761	Index: System	
<p>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.</p> <p>Selections:</p> <ul style="list-style-type: none"> • [ID Stamp Only] • ID Stamp and Card-In Required • Standalone/Standby • Validate Always <p>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.</p>		
System:Communications:Card/Nedap Reader:Card ID Timeout System 762	Index: System	Range: 0 - 99 minutes
<p>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.</p> <p>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.</p> <p>Critical: Card reader must be attached to MMI if using an MMI.</p>		
System:Communications:Card/Nedap Reader:Card Reader Configuration System 763	Index: System	
<p>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.</p> <p>Selections:</p> <ul style="list-style-type: none"> • [Momentary] • Captive Card mode <p>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.</p>		

System:Communications:Card/Nedap Reader:Card Authorization System 764	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. <ul style="list-style-type: none">• [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 765	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: <ul style="list-style-type: none">• [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	Index: Serial comm port	Range:
System 711		
<p>Description: This program code defines the function of the communications port. The factory default is "Minicomp Host" on comm port 1. Selections are as follows:</p> <ul style="list-style-type: none"> • 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 Installation manual 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. <p>The communications port control must be correctly configured for the selected function.</p>		
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		
Critical: An address must not be zero.		
Critical: A maximum of two ports may be configured for injector control.		
Critical: A maximum of two ports may be configured for printer functions.		
Critical: A maximum of two ports may be configured for host interface.		
Critical: Modbus requires 8-bit data.		
Critical: 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	Index: Serial port	Range: 1200 - [57600] - 115200
System 712		
<p>Description: Sets the speed of the associated communications port.</p> <p>Selections:</p> <ul style="list-style-type: none"> • 9600, 19200, 38400, [57600], or 115200 baud. 		

System:Communications:Serial Port Config:Data/Parity	Index: Serial port	Range:
System 713		
<p>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.</p> <p>Selections:</p> <ul style="list-style-type: none"> • 7 bits No Parity • 7 bits Odd Parity • 7 bits Even Parity • [8 bits No Parity] • 8 bits Odd Parity • 8 bits Even Parity • 8 bits No Parity, 2 Stop bits <p>Critical: Modbus requires 8-bit data.</p>		

System:Communications:Serial Port Config:Control	Index: Serial port	Range:
System 714		
<p>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 are as follows:</p> <ul style="list-style-type: none"> • N/A – No communications on this port. • 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. • 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. • 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. • XON/XOFF – For printer ports only. XON/XOFF flow control. • [Poll & Program] – For use with AccuMate ports. Allows full program access but does not affect transaction control (acts like a standalone unit). • PTB-FX – Security level designed to support PTB Weights and Measures Agency-approved printer interface. • PTB-LQ – Security level designed to support PTB Weights and Measures Agency-approved printer interface. <p>Critical: Comm port not configured for host communications.</p> <p>Critical: Comm port not configured for printer.</p>		

System:Communications:Serial Port Config:Timeout	Index: None	Range: [0] - 999 seconds
System 715		
<p>Description: These three-digit codes allow the operator to specify the amount of time, in seconds, before aborting a communications transfer that has halted. The communications alarm will then be set. This entry is also used to abort a printout if waiting for a shared printer on an XON from a printer. If the timer expires while waiting for a shared printer, the shared printer alarm will be set.</p> <p>If the port is configured for host communication, zero disables the communications timeout and the accompanying alarm. If the port is configured for a printer, the timeout cannot be disabled.</p> <p>Critical: No entry if corresponding function = Not Used.</p> <p>Critical: Comm port not configured for printer.</p> <p>Note: Enter elapsed time in seconds of comm fail before signaling an alarm.</p>		

System:Communications:Serial Port Config:Serial Interface	Index: Serial port	Range:
Description: Sets the serial port for RS-232 or RS-485 Selections: <ul style="list-style-type: none"> • [RS-232] • RS-485 		

System:Communications:Serial Port Config:RS-485 Duplex	Index: Serial port	Range:
Description: Sets the mode of RS-485 serial communications. Selections: <ul style="list-style-type: none"> • [Full Duplex] - 4-wire • Half Duplex - 2-wire 		

System:Communications:Serial Port Config:Termination Resistors	Index: Serial port	Range:
Description: Enables or disables the on-board termination resistors for RS-485 serial ports Selections: <ul style="list-style-type: none"> • [Disabled] • Enabled 		

8.2.7.6. Prompts

System:Communications:Prompts: Prompt Mode	Index: None	
System 771		
Description: This program code selects when prompts will be displayed. Selections: <ul style="list-style-type: none"> • [Transaction Start] • Standby 		

System:Communications:Prompts: Prompts Used	Index: None	Range: 0 - [2] - 5 0 disables this feature
System 772		
Description: Sets the number of built-in prompts to present to the operator at the start of the transaction setup screen sequence. The response(s) 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	Index: None	Range: 0 [30] - 99 seconds
System 773		
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	Index: None	
System 774		
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: <ul style="list-style-type: none"> • [None] • ID • ID & PIN • PIN 		
Critical: Selection invalid when using Card Reader (for Options 1 and 2 above).		
Critical: Prompt Response Type cannot be alphanumeric for PIN entry.		
Critical: Card Validation must be enabled in 761 for this option (for Option 3 above).		

System:Communications:Prompts: Prompt Message	Index: Per Prompt, 5 max.	Range: Text - 28 characters max.
System 775, 778, 781, 784, 787		
Description: Defines the message displayed on the screen to prompt the operator for information.		

System:Communications:Prompts: Prompt Input Type	Index: Per Prompt, 5 max.	Range:
System 776, 779, 782, 785, 788		
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: <ul style="list-style-type: none"> • [Numeric] - shown on screen • Hidden - numeric, X's shown on screen • Alphanumeric 		

System:Communications:Prompts: Prompt Length	Index: Per Prompt, 5 max.	Range: 0 - [9] - 25 characters
System 777, 780, 783, 786, 789		
Description: Sets the maximum length of a response to a prompt.		

8.2.8. 800 - Additive Directory

Additives (common) 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 Config 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

Flow Controlled Injectors (1-4)

- Injector Minimum Flow
- Injector Maximum Flow
- Injector Flow Tolerance
- Injector Second Trip Amount
- Injector Valve Type
- Analog Valve Kp
- Analog Valve Ki
- Analog Valve Kd
- Analog Valve PID Interval
- Additive API Table
- Additive Reference Density
- Reference Density Units
- Additive Shared Temperature Input
- Additive Maintenance Temperature
- Additive High Temperature Alarm
- Additive Low Temperature Alarm
- Injector Flow Timeout
- Injector Flow Rate Cutoff (Dual Pulse)

8.2.8.1. Additives (common)

System:Additives:Additives Common:Number of Injectors System 801	Index: None	Range: 0 - [24]
Description: The total number of injectors controlled by this AccuLoad		
System:Additives:Additives Common:Additive Selection Method System 802	Index: System	
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. Selections: <ul style="list-style-type: none"> • [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 • 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 • 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 • Standby Transaction • Standby Batch 		
System:Additives:Additives Common:Additive Pacing Units System 803	Index: System	Range: Default: [IV]
Description: This program code selects the volume type used to pace the additive injectors. Selections: <ul style="list-style-type: none"> • [Indicated volume (IV)] • Gross volume (GV) • GST volume (GST) • GSV volume (GSV) • Mass 		
Critical: Selected units not available.		
System:Additives:Additives Common:Additive Stop Option System 804	Index: None	
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. Selections: <ul style="list-style-type: none"> • [End of Batch] – Stop volume is ignored. Additive is delivered until end of batch • No recalculation – Additive is delivered as above but injection halts when only stop volume remains • 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 806: Additive Stop Volume Disable for those individual additives that deliver to the end of the batch.		

System:Additives:Additives Common:Additive Stop Amount	Index: None	Range: [0] - 999
System 805		
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: See System 806: Additive Stop Volume Disable for those individual additives that deliver to the end of the batch.		

System:Additives:Additives Common:Additive Stop Disable	Index: System	Range: 1 - 24
System 806		
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	Index: System	Range:
System 807		
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: • [End of Batch] • 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	Index: None	Range: Text - 3 characters max.
System 811		
Description: This code allows entry of a three-character identifier for the injected additive volume 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	Index: None	Range: Text - 3 characters max.
System 812		
Description: This code allows entry of a three-character identifier for the injected additive volume 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:Injection/Totalization Conversion Factor System 813	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 814	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 815	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 816	Index: System	Range:
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: <ul style="list-style-type: none"> • [No Action] • De-energize 		
System:Additives:Additives Common:Alarm Pulse Count System 817	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 818	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 835	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: <ul style="list-style-type: none"> • [Include in Product] • Not Included 		
System:Additives:Additives Common:Flow Rate Controlled Inj Channel Select System 836	Index: None	Range:
Description: Selects single or dual channel pulse inputs for flow controlled additive meters. Selections: <ul style="list-style-type: none"> • [Single Channel] • 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 837	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 838	Index: None	Range:
Description: This program code defines the conditions under which the dual pulse error count will be reset for the flow-controlled additives. Selections: <ul style="list-style-type: none">• [No Reset]• Transaction End• Power-Up• Transaction & Power-Up		
System:Additives:Additives Common:Flow Rate Controlled Inj Error Amount System 840	Index: None	Range:
Description: This program code determines if error pulses accumulated after a Pulse Security alarm occurs are counted towards the flow-controlled additive amount delivered. 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	Index: Injector 1 - 24	Range: Text - 10 characters maximum
System 845		
Description: Enter a name for this injector		

System:Additives:Additives Configuration: Injector Type	Index: Injector 1 - 24	Range:
System 846		
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: <ul style="list-style-type: none"> • 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.		
Critical: Injector I/O assignment does not match type		
Critical: No comm port configured for smart additive control		
Critical: No injector address assigned		
Critical: Only four metered injectors may be configured		
Critical: Add-Pak channel already assigned as auxiliary I/O point		
Critical: Additive 1 must be a metered injector type to configure Shared Injector 1		
Critical: Flow Rate Controlled Injectors limited to injectors 1-4		
Critical: Flow Rate Controlled Injector pulse input not configured		

System:Additives:Additives Configuration:Additive Arm	Index: Injector 1 - 24	Range: 1 - 6
System 847		
Description: These entries specify the arm with which the associated additive injector is used.		
Selections: <ul style="list-style-type: none"> • Arm 1 - Arm 6 		

System:Additives:Additives Configuration:Additive Plumbing	Index: Injector 1 - 24	Range:
System 848		
Description: Selects which meters run(s) this injector is plumbed into. Selections: <ul style="list-style-type: none"> • Meter 1 - Meter 6 • Downstream (None) 		

System:Additives:Additives Configuration:Additive Injector Address	Index: Injector 1 - 24	Range: 0 - 999
System 849		
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.		
Critical: 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.		
Critical: 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.		
Note: No entry if corresponding type is not a Smart Injector (Smith Meter, Titan, Gate City types).		
Note: 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:Metered Injector K Factor	Index: Injector 1 - 24	Range: [0.000] - 9999.999
System 850		
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.		
Critical: Metered injector pulse input not configured.		

System:Additives:Additives Configuration:Metered Injector Meter Factor	Index: Injector 1 - 24	Range: [0.0000] - 9.9999
System 851		
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.		
Critical: Enter the meter factor for the metered injector.		

System:Additives:Additives Configuration:Metered Injector Tolerances (High)	Index: Injector 1 - 24	Range: [0] - 999.9
System 852		
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:Metered Injector Tolerances (Low)	Index: Injector	Range: [0] - 999.9
System 853		
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:Metered Injector Maximum Tolerance Errors	Index: Injector	Range: [0] - 99
System 854		
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".		

8.2.8.3. Flow Controlled Injector 1 - 4

System:Additives:Flow Controlled Injector:Injector Minimum Flow	Index: Injector 1 - 4	Range: 0 - 9999
System 881		
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:Maximum Flow Rate	Index: Injector 1 - 4	Range: 0 - 99999
System 882		
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 9999 flow units. Example: Current Flow Rate: 130 GPM Flow Tolerance: $\pm 5\%$ Flow rate may vary ± 6.5 GPM ($130 \text{ GPM} \times 5\% = 6.5 \text{ GPM}$ without a valve correction)		
Note: Additive will not flow if additive maximum flow is zero.		

System:Additives:Flow Controlled Injector:Flow Tolerance Percentage System 883	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%.		
System:Additives:Flow Controlled Injector:Injector Second Trip Amount System 884	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 Additive Valve Type System 885	Index: Injector 1 - 4	Range:
Description: This entry defines the type of valve to be used with this additive. Selections: <ul style="list-style-type: none"> • Digital • Analog 		
System:Additives:Flow Controlled Injector:Analog Valve Kp (PID, Proportional Gain Factor) System 886	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 887	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 888	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	Index: Injector 1 - 4	Range: 0 - 9.9
System 889		
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	Index: Injector 1 - 4	Range:
System 890		
<p>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.</p> <p>Selections:</p> <ul style="list-style-type: none"> • 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	Index: Injector 1 - 4	Range: -9999.9 – +9999.9
System 891		
<p>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.</p>		
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 892	Index: Injector 1 - 4	Range:
<p>Description: This entry allows the operator to indicate whether an additive is to share a temperature probe already as- signed 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.</p> <p>Selections:</p> <ul style="list-style-type: none"> • NA • API • Lb/Ft³ (Pounds/Cubic Feet) • Kg/M³ (Kilograms/Cubic Meter) • Relative Density 		
System:Additives:Flow Controlled Injector:Additive Shared Tempera- ture Input System 893	Index: Injector 1 - 4	Range:
<p>Description: This entry allows the operator to indicate whether an additive is to share a temperature probe already as- signed 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.</p> <p>Selections:</p> <ul style="list-style-type: none"> • 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 		
<p>Critical: Temperature probe already assigned to additive.</p>		
System:Additives:Flow Controlled Injector:Additive Maintenance Tem- perature System 894	Index: Injector 1 - 4	Range: -999.9 – +999.9
<p>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.</p>		
<p>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. Note: This feature may be disallowed in certain weights and measures jurisdictions.</p>		

System:Additives:Flow Controlled Injector:Additive High Temperature Alarm Limit System 895	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 896	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 degrees F or C.		
Note: "-999" will disable the alarm.		

System:Additives:Flow Controlled Injector:Injector Flow Timeout System 897	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 898	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.		

8.2.8.4. Security Directory

System:Security:Access Codes	Index: Security Level 1 - 5	Range: 0000 - 9999
Description: These four-digit numbers permit entry into the AccuLoad's program or Weights and Measures program codes. 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. Once the security is set up for the parameters in the unit the operator must enter the program mode at the level assigned to the parameter(s) that are to be changed. The range of these entries is from 0 to 9999.		
Critical (s): <ul style="list-style-type: none"> • 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 (s): <ul style="list-style-type: none"> • A Level 5 access code must be entered at a minimum to utilize this feature. • The operator must enter Program Mode at the highest programmed security level to obtain access to these access codes. 		

System:Security:Security Level 1 Password	Index: System Security	Range: 0 (none) - 43
System 190		
Description: Enter the desired access code for this security level.		

System:Security:Security Level 2 Password	Index: System Security	Range: 0 (none) - 43
System 191		
Description: Enter the desired access code for this security level.		

System:Security:Security Level 3 Password	Index: System Security	Range: 0 (none) - 43
System 192		
Description: Enter the desired access code for this security level.		

System:Security:Security Level 4 Password	Index: System Security	Range: 0 (none) - 43
System 193		
Description: Enter the desired access code for this security level.		

System:Security:Security Level 5 Password	Index: System Security	Range: 0 (none) - 43
System 194		
Description: Enter the desired access code for this security level.		

System:Security:Security Input 1	Index: None	Range: 1 - 43
System 195		
Description: Select the digital input to use for the Security Input #1 function. Selections: <ul style="list-style-type: none"> • No Security Input • Digital Input 1 - 43 		

System:Security:Security Input 2	Index: None	Range: 1 - 43
System 196		
Description: Select the digital input to use for the Security Input #2 function. Selections: <ul style="list-style-type: none"> • No Security Input • Digital Input 1 - 43 		

System:Security:Security Input 1 Level	Index: None	Range: 1 - 5
System 197		
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: <ul style="list-style-type: none"> • No Security • Security Level 1 - 5 		

System:Security:Security Input 2 Level	Index: None	Range: 1 - 5
System 198		
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: <ul style="list-style-type: none"> • No Security • Security Level 1 - 5 		

System:Security:Diagnostics Security Level	Index: None	Range: 1 - 5
System 199		
Description: This entry selects the level of security required to enter the diagnostics menu. Selections: <ul style="list-style-type: none"> • No Security • 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		

8.3. Bay Directories

8.3.1. 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	Index: Bays 1 and 2	Range: 1 - 2
Bays: 101, 104		
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: <ul style="list-style-type: none"> • [N/A] - Permissive is disabled • Transaction Start - Permissive input is only checked immediately after authorization • Continuous - Permissive input must be asserted continuously during the batch • Start Pressed - Permissive input must be asserted whenever flow is started • Batch Start - Permissive input must be asserted to start a batch 		

Bays:Bay Permissive Messages	Index: Bays 1 and 2	Range: 1 - 2 28 character maximum
Bays 102, 105		
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	Index: Bays 1 and 2	Range: 1 - 2
Bays 103, 106		
Description: These parameters will determine how a restart is mediated after a permissive is lost and then restored. Selections: <ul style="list-style-type: none"> • Manual – Start button must be pressed to restore • Automatic – Flow will be started automatically as soon as the permissive is restored. 		

Bays:Bay ID	Index: Bays 1 and 2	Range: Text - 28-character max.
Bays 111		
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. Communications

Bays:Report Select Bays 701	Index: Bays 1 and 2	Range:
<p>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.</p> <p>Selections:</p> <ul style="list-style-type: none"> • Default • User Config 1 • User Config 2 		
Bays:Summary Report Print Time Bays 702	Index: Bays 1 and 2	Range: Text - 6-character max.
<p>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.</p>		
Bays:Summary Report Interval Bays 703	Index: Bays 1 and 2	Range: 0 - 999
<p>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.</p>		
Bays:Report Totals Resolution Bays 704	Index: Bays 1 and 2	
<p>Description: This entry selects the amount resolution to print on default reports. There are three available options.</p> <p>Selections:</p> <ul style="list-style-type: none"> • Whole • 10ths • 100ths 		
Bays:Report Pages Bays 705	Index: Bays 1 and 2	
<p>Description: This entry selects which pages will be printed on reports. There are four available options.</p> <p>Selections:</p> <ul style="list-style-type: none"> • Batch and Transaction • Batch Only • Transaction Only • No Report 		

Bays:Report HM Class Bays 706	Index: Bays 1 and 2	Range: 1 - 6
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: <ul style="list-style-type: none"> • 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 Sense Arms 101, 104	Index: Arm Permissive (1-2)	Range:
Description: Defines the states when permissive inputs are required to allow loading operations. Selections: <ul style="list-style-type: none"> • N/A • Transaction Start – 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 		

Arms:General Purpose:Permissive 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 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: <ul style="list-style-type: none"> • Manual – Start must be pressed to restore flow • Automatic – Flow will be started automatically as soon as the permissive is restored 		
Arms:General Purpose:Load Arm ID Arms 111	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: Load Arm Ready Message Arms 112	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 113	Index: Arm	Range:
Description: Allows the operator to assign a load arm to a bay. Selections: <ul style="list-style-type: none"> • Independent • Bay A • Bay B • Swing Arm 		
Arms:General Purpose:Unlimited Preset Arms 116	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: <ul style="list-style-type: none"> • No • Yes 		

Arms:General Purpose:Transaction Reset Time	Index: Arm	Range: 0 - 999 hours 0 to disable
Arms 117		
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	Index: Arm	Range: 0 - 23
Arms 118		
Description: Specifies the hour of the day when the transaction reset period begins.		

8.4.2. 200 - Arm 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
- Clean Line Blend
- Ratio Factor Adjust
- Ratio Factor Time
- Block Valve Position
- Valve Close Delay
- Additive Stop Amount
- Additive (During) Low Flow Start

Arms:Flow Control:Low Flow Start Rate	Index: Arm	Range: 0.0 - 9999.9
Arms 201		
Description: Designates the flow rate used during low flow start, i.e., 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	Index: Arm	Range: 0.0 - 9999.9
Arms 202		
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	Index: Arm	Range: 0 - 99
Arms 203		
Description: Defines the percentage of the preset volume to be delivered during low flow start. If both low flow start percentage 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	Index: Arm	Range:
Arms 204		
Description: Selects if the low flow start should be performed only at the start of a delivery or every time flow starts.		
Selections:		
<ul style="list-style-type: none"> • Always • Start of batch 		

Arms:Flow Control:High Flow Rate	Index: Arm	Range: 1 - 99999
Arms 205		
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.		
Note: This parameter is only used for ratio blending.		

Arms:Flow Control:2nd High Flow Rate	Index: Arm	Range: 0 - 99999
Arms 206		
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	Index: Arm	Range:
Arms 207		
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 1st/2nd high flow digital input.		
<ul style="list-style-type: none"> • Batch Start • Dynamic 		

Arms:Flow Control:First/Second High Flow Preset	Index: Arm	Range: [0] – 999999 Disable: 0
Arms 208		

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	Index: Arm	Range: 0 - 999 seconds
Arms 211		
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	Index: Arm	Range: 0 - 99 units delivered
Arms 212		
Description: Sets the alarm threshold for product delivered in excess of the preset amount.		

Arm:Flow Control:Zero Flow Timer	Index: Arm	Range: 0 - 99.9 seconds Disable: 0
Arms 213		
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	Index: Arm	Range: 0 - 99 seconds
Arms 214		
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	Index: Arm	Range: [0] - 99 seconds
Arms 215		
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	Index: Arm	Range: [0] - 99 Seconds Disable: 0
Arms 216		
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 217	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 valve(s) to the end of the loading arm.		
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.		
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 programmed 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 Adjust Arms 224	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: <ul style="list-style-type: none"> • No • Yes 		
Note: Applies only to ratio blending arms.		
Arms:Flow Control:Ratio Factor Adjust Arms 231	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	Index: Arm	Range: 01 - [10] - 99 Seconds
Arms 232		
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	Index: Arm	Range: [0] - 3 Default: 0
Arms 233		
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:		
<ul style="list-style-type: none"> • 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	Index: Arm	Range: 0 - 999 Seconds
Arms 234		
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	Index: Arm	Range: [0] - 9999
Arms 241		
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	Index: Arm	Range:
Arms 242		

Description: This program code determines when additive pacing begins.

Selections:

- Batch Start - Additive pacing begins immediately at the start of the batch
- 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)	Index: Arm	Range: 0.0 % - 9.9 % [1.0]
Arms 301		
<p>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 gallons). 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.)</p> <p>Note: A blend tolerance entry of zero allows no tolerance, causing an alarm to occur unless all components are delivered exactly.</p>		
Arms:Volume Accuracy:Blend Tolerance (Amount)	Index: Arm	Range: 0.1 - 99.9 delivery units
Arms 302		
<p>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.</p> <p>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.</p>		
Arms:Volume Accuracy:Blend Correction	Index: Arm	Range: Default: No Blend Correction
Arms 303		

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:

- **[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.
- **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.
- **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 component 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	Index: Arm	Range: 0 - 999 Seconds
Arms 304		
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	Index: Arm	Range: 0 - 9999 delivery units
Arms 305		
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	Index: Arm	Range: 0 - 999.99 delivery units
Arms 306		
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	Index: Arm	Range: 1 - 999 seconds
Arms 307		
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	Index: Arm	Range:
Arms 308		
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: <ul style="list-style-type: none"> • Batch Start • Blend Alarm Cleared • Batch Start and Alarm • No Reset 		

Arms:Volume Accuracy:Blend Algorithm	Index: Arm	Range:
Arms 309		
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	Index: Arm	Range:
Arms 321		
Description:		
Selections: <ul style="list-style-type: none"> • 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	Index: Arm	Range: 0 - 999 seconds
Arms 322		
Critical: Option available only with "allow valve to close" option selected in Arm 321 - Ratio Product Minimum Flow.		
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	Index: Arm	Range:
Arms 701		

Description: This program code defines which delivery report will be printed at the completion of a transaction.
Selections: <ul style="list-style-type: none"> • Default • User Configured Report 1 and 2
Note: Default Report – see appendix IV
Note: The user-configured reports are designed on the AccuMate and downloaded to the AccuLoad.
Note: 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.
Note: The same report will be printed at each port if multiple ports are configured for printer options.

Arms:Communications:Summary Report Print Time	Index: Arm	Range: 0 - 999
Arms 702		
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	Index: Arm	Range: 0 - 999 hours Disable: 0
Arms 703		
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	Index: Arm	Range:
Arms 704		
Description: This entry selects the volume resolution to print on default reports.		
Selections: <ul style="list-style-type: none"> • Whole units • Tenths • Hundredths 		

Arms:Communications:Report Pages	Index: Arm	Range: Default: Batch and Transaction Pages
Arms 705		
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: <ul style="list-style-type: none"> • [Batch and transaction pages] – one page per batch plus a summary page for the transaction • Batch page only – one page per batch only; no transaction summary • Transaction page only – transaction summary only; no batch details • 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 711	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 Control Directory

Arms:Meter:Flow Control:Meter Tag Meter 201	Index: Arm	Range: Text 20 characters max.
Description: This parameter is used to enter a unique tag name for the meter.		

Arms:Meter:Flow Control:Valve Type Meter 202	Index: Meter	Range: Default: Digital
Description: This parameter selects the type of control valve used by AccuLoad IV. Selections: <ul style="list-style-type: none"> • [Digital] • Two-Stage • Analog • Wild Stream 		
Critical: Two-stage valve not allowed with ratio blending		
Critical: No analog valve output configured		
Critical: Upstream/downstream solenoids required		

Arms:Meter:Flow Control:Analog Valve (Kp)	Index: Meter	Range: 0.000 - 999.999
Meter 203		
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	Index: Meter	Range: 0.000 - 999.999
Meter 204		
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	Index: Meter	Range: 0.000 - 999.999
Meter 205		
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	Index: Meter	Range: 0.0 - 99
Meter 206		
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	Index: Meter	Range: [0] - 99 seconds Disable: 0
Meter 211		
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	Index: Meter	Range: [0] - 99 delivery units Disable: 0
Meter 212		
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	Index: Meter	Range: 0 to 9.9%
Meter 213		
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 $Q \pm (Q * t)$ where t is the percentage entered for this tolerance.		
Note: Applies only to ratio blender arms.		

Arms:Meter:Flow Control:Flow Adjust Timer	Index: Meter	Range: 0.0 - 99.9 seconds
Meter 214		
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	Index: Meter	Range:
Meter 215		
Description: This entry defines the plumbing of a minor product meter for a hybrid blending arm.		
Selections: <ul style="list-style-type: none"> • Ratio (downstream of the main product meter) • 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)	Index: Meter	Range: [0] - 99% Disable: 0
Meter 216		
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)	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: <ul style="list-style-type: none"> • No Reset • Transaction End • Power-Up • 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	Index: Meter	Range: [0] - 20
Meter 306		
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	Index: Meter	Range: Default: N/A
Meter 402		
Description: This parameter allows the operator to select the frequency densitometer used by the meter. The factory default is "N/A."		
Selections: <ul style="list-style-type: none"> • NA • Linear • Solartron • Sarasota • UGC • Other 		

Arms:Meter:Temperature/Density: Share Temperature Input	Index: Meter	Range: 1 - 6
Meter 403		
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: <ul style="list-style-type: none"> • Not Used • Arm 1 - 6, Meter 1 - 6 • Flow Rate Injector 1 - 4 		
Critical: Selected meter has no I/O point configured for temperature.		

Arms:Meter:Temperature/Density: Share Density Input	Index: Meter	Range:
Meter 404		
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: <ul style="list-style-type: none"> • Not Used • 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 405	Index: Meter	Range:
Description: This parameter allows the operator to select the type of mass meter used. Selections: <ul style="list-style-type: none"> • NA • Promass 		
Arms:Meter:Temperature/Density: Mass Meter Address Meter 406	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 425	Index: Meter	Range: -1e+37 - 1e+38
Description: Sets the value for the A coefficient used to in the equation to calculate the density. - $\text{Density} = A * \text{freq} + B$		
Note: Scientific notation is used for this value.		
Arms:Meter:Temperature/Density: Linear Densitometer B Meter 426	Index: Meter	Range: -1e+37 - 1e+38
Description: Sets the value for the B coefficient used to in the equation to calculate the density. - $\text{Density} = A * \text{freq} + B$		
Note: Scientific notation is used for this value.		
Arms:Meter:Temperature/Density: Linear Densitometer DCF Meter 427	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.		

8.5.4. 400 - Solatron Densitometer

Arms:Meter:Temperature/Density: Solartron Calibration Cert Units Meter 431	Index: Meter	Range:
Description: This entry allows the user to select the calibration units used for the Solartron Densitometer. Selections: <ul style="list-style-type: none"> • English (Fahrenheit, PSI, Lb/Ft3) • Metric (Celsius, Bar, Kg/m3) 		
Arms:Meter:Temperature/Density: Solartron DCF Meter 432	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: <ul style="list-style-type: none"> • English (Fahrenheit, PSI, Lb/Ft3) • Metric (Celsius, Bar, Kg/m3) 		
Arms:Meter:Temperature/Density: Solartron K0, K1, K2 Meter 433, 434, 435	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 436, 437, 438, 439, 440	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 442	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	Index: Meter	Range: -9999.999 - 9999.999
Meter 443		
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).		

8.5.5. 400 - Sarasota Densitometer

Arms:Meter:Temperature/Density: Sarasota Calibration Units	Index: Meter	Range: Default: English
Meter 447		
Description: This entry allows the user to select the calibration units used for the Sarasota Densitometer. The factory default is "English."		
Selections:		
<ul style="list-style-type: none"> • English (Fahrenheit, PSI, Lb/Ft3) • Metric (Celsius, Bar, Kg/m3) 		

Arms:Meter:Temperature/Density: Sarasota DCF	Index: Meter	Range: -9.9999 - 9.9999
Meter 448		
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	Index: Meter	Range: -9.999999 - 9.999999
Meter 449		
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 D0	Index: Meter	Range: -9999.999 - 9999.99
Meter 450		
Description: This entry allows the operator to enter the constant D0 from the Sarasota densitometer. The range of this eight- digit numeric entry is -9999.999 to 9999.999.		

Arms:Meter:Temperature/Density: Sarasota T0	Index: Meter	Range:
Meter 451		
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	Index: Meter	Range: -9.999999 - 9.999999
Meter 452		
Description: This entry is used for entering the temperature coefficient constant from the Sarasota densitometer in microseconds/degree F. The range of this exponential numeric entry is -9.999999 to 9.999999.		

Arms:Meter:Temperature/Density: Sarasota Tcal	Index: Meter	Range: -9999.999 - 9999.999
Meter 453		
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	Index: Meter	Range: -9.999999 - 9.999999
Meter 454		
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.		

Arms:Meter:Temperature/Density: Sarasota Pcal	Index: Meter	Range: -9999.999 - 9999.999
Meter 455		
Description: This entry allows the operator to enter the pressure that the densitometer was calibrated at the factory. The range of this eight-digit numeric entry is -9.999999 to 9.999999.		

8.5.6. 400 - UGC Densitometer

Arms:Meter:Temperature/Density: UGC Calibration Cert Units	Index: Meter	Range: Default: English
Meter 459		
Description: This entry allows the user to select the calibration units used for the UGC Densitometer.		
Selections:		
<ul style="list-style-type: none"> • [English] (Fahrenheit, PSI, gr/cc) • Metric (Celsius, Bar, gr/cc) 		

Arms:Meter:Temperature/Density: UGC DCF	Index: Meter	Range: -9.9999 - 9.9999
Meter 460		
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	Index: Meter	Range: -1e+37 and 1e+38
Meter 461, 462, 463, 465, 466		
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	Index: Meter	Range: -999.9999 - 999.9999
Meter 464		
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	Index: Meter	Range: -999.9999 - 999.9999
Meter 468		
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	Index: Meter	Range: -1e+37 and 1e+38
Meter 469		
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	Index: Meter	Range: -1e+37 and 1e+38
Meter 470, 471		
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.		

8.5.7. 400 - Other Densitometer

Arms:Meter:Temperature/Density: Other Densitometer Calibration Units	Index: Meter	Range: Default: English
Meter 475		
Description: This entry allows the user to select the calibration units used for the Solartron Densitometer. The factory default is "English."		
Selections: <ul style="list-style-type: none"> • [English] (Fahrenheit, PSI, Lb/Ft3) • Metric (Celsius, Bar, Kg/m3) 		

Arms:Meter:Temperature/Density: Other DCF	Index: Meter	Range: -9.9999 - 9.9999
Meter 476		
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	Index: Meter	Range: -1e37 to 1e38
Meter 477, 478, 479		
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 = $aT^2 + bT + c$ 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 .		

8.5.8. 500 - Pressure Directory

Arm:Meter:Pressure: Share Pressure Input	Index: Meter	Range: 1 - 6
Meter 501		
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: • Not Used • Arm 1 - 6, Meter 1 - 6		
Critical: Selected meter has no I/O point configured for pressure.		

8.6. Product Directories

General Purpose Directory
 Flow Control Directory
 Volume Accuracy Directory
 Temperature / Density Directory
 Pressure Directory

8.6.1. 100 - Arm: Products: General Purpose Directory

Arms:Product:General Purpose: Product ID	Index: Product	Range: Text 20 characters max.
Product 101		
Description: Enter a name for this product.		

Arms:Product:General Purpose: HM Classification Part 1 and Part 2	Index: Product	Range: Text - 30 characters each
Product 102, 103		
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	Index: Product	Range: [0] - 9999
Product 201		
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	Index: Product	Range: [0] - 99999
Product 202		
Description: Sets the maximum flow rate for this product during loading.		

Arms:Products:Flow Control:Second High Flow Rate	Index: Product	Range: [0] - 99999 Disable: 0
Product 203		
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%
<p>Description: Sets the threshold for making a valve adjustment as a percentage of the requested flow rate.</p> <p>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.</p> <p>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.</p>		
Arms:Products:Flow Control:Flow Tolerance Rate Product 205	Index: Product	Range: 0 - 999 flow rate units
<p>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.</p> <p>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.</p>		
Arms:Products:Flow Control:First Trip Amount Product 206	Index: Product	Range: [0] - 9999 delivery units
<p>Description: Sets remaining amount of delivery when the flow rate ramp-down should begin.</p>		
Arms:Products:Flow Control:Second Trip Amount Product 207	Index: Product	Range: [0.0] - 99.9 delivery units
<p>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.</p>		
Arms:Products:Flow Control:Second Trip Auto Adjust Product 208	Index: Product	Range: 1 - 9
<p>Description: This one-digit numeric entry defines the number of batches to be included in the average used to calculate the second adjustment. For a preset, this is the number of batches run.</p> <p>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.</p> <p>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</p> <p>Note: The batch volumes must be sufficient to allow the AccuLoad to reach high flow before the first trip point is encountered.</p>		

Arms:Products:Flow Control:Excess High Flow Alarm	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	Index: Product	Range: [0] - 999
Product 210		
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	Index: Product	Range: 0 - 99 seconds
Product 211		
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	Index: Product	Range: 0 - 99 seconds
Product 212		
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	Index: Product	Range: 0-999 delivery units
Product 213		
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.		
Note: 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.		
Note: Applies only to ratio products on hybrid arms.		

Arms:Products:Flow Control:Product Stop Alarm	Index: Product	Range: [0] - 999.9 Disable: 0
Product 214		
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.		
Note: Applies only to ratio products on hybrid arms.		

8.6.3. 300 - Accuracy Directory

Arms:Products:Volume Accuracy: Minimum Batch Amount	Index: Product	Range: 1 to 99999 delivery units
Product 301		
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.		
Note: Not applicable to straight arms.		

Arms:Products:Volume Accuracy: Meter Factor 1 through 5	Index: Product	Range: 0 - 9.99999
Product 311, 313, 315, 317, 319		
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 311. The flow rate selected in program code 312 or 314 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 [311 only] Critical: Factor varies more than the Linearized Factor Deviation. Critical: Meter factors must be within 2% of the master meter factor. Critical: Security level for parameter must be at top 2 levels.		

Arms:Products:Volume Accuracy: Flow Rate 1 through 5	Index: Product	Range: 0 - 99999 flow rate units
Product 312, 314, 316, 318, 320		
Description: These five-digit entries are the flow rates at which the meter factors (codes 311, 313, 315, 317, 319) 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, program code 311 or 313 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. Critical: Corresponding meter factor not programmed. Critical: Security level for parameter must be at top 2 levels.		

Arms:Products:Volume Accuracy: Master Meter Factor	Index: Product	Range: [0] - 9.99999 Disable: 0
Product 331		
Description: This program code allows the operator to set a master meter factor which restricts meter factors one through four (codes 302, 304, 306 and 308), 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. Critical: Security level for parameter must be at top 2 levels.		

Arms:Products:Volume Accuracy: Linearized Factor Deviation	Index: Product	Range: [0] - 9.99% Disable: 0
Product 332		
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.		
Critical: Security level for parameter must be at top 2 levels.		

Arms:Products:Volume Accuracy: Meter Factor Variation Select	Index: Product	Range:
Product 333		
Description: Enables or disables meter factor variation based on the temperature of the product. The factory default is "Disabled."		
Selections: <ul style="list-style-type: none"> • [Disabled] • 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	Index: Product	Range: 0.0001 to 0.9999%
Product 334		
Description: The amount in percentage that the meter factor varies for each degree change in temperature.		
Note: Has no effect if Program Code 333 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	Index: Product	Range: -999.9 - 999.9 degrees
Product 335		
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 333 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 401	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 402	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 403	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.		
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. Note that this may not be allowed in all weights & measures jurisdictions..		
Note: Not applicable if Temperature Units = Not Used		

Arms:Products:Temperature/ Density:API Table	Index: Product	Range:
Product 411		
<p>Description: This program code selects the temperature correction method used for the product being delivered.</p> <p>Selections:</p> <ul style="list-style-type: none"> • 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 <p>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.</p>		
Critical: API table conflicts with temperature units		
Critical: No density input configured [odd tables only]		
Critical: 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.		
<p>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.</p>		

Arms:Products:Temperature/Density: Reference Density	Index: Product	Range: -9999.9 - 9999.9
Product 412		
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.		
Note: 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 @ 15° C or 331.7 to 683.6 kg/m ³ @ 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/M3		
Critical: Reference density is required for ethanol blends.		
Note: For Eth/Gas (PTB) tables enter density @15C in units of kg/ m3, 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	Index: Product	Range:
Product 413		
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	Index: Product	Range: 0 - 999.9
Product 414		
<p>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 (i.e. 6A\B\D, 24A\B\D, 54A\B\D, 60A\B\D), old tables and aromatics.</p> <p>For example, this parameter will allow entering a reference density measured at 15C and correcting volumes to 30C or enter a reference density measured at 60F and correct volumes to 86F.</p>		
Critical: Reference density must be 15°C or 59°F for PTB ethanol blends.		

Arms:Products:Temperature/ Density:Coefficient of Expansion	Index: Product	Range: 0 - 999.9
Product 415		
<p>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.</p>		

Arms:Products:Temperature/ Density:Densitometer Type	Index: Product	Range:
Product 416		
<p>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.</p> <p>Selections:</p> <ul style="list-style-type: none"> • No Densitometer • Observed Density • Corrected Density 		

Arms:Products:Temperature/ Density:Calculate Current Reference Density	Index: Product	Range:
Product 421		
<p>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.</p> <p>Selections:</p> <ul style="list-style-type: none"> • No • Yes 		

Arms:Products:Temperature/ Density:High Density Alarm Limit	Index: Product	Range: -999.9 - +999.9 API for other density units 0 - 9999.0
Product 422		
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	Index: Product	Range: -999.9 - +999.9 API for other density units 0 - 9999.0
Product 423		
Description: Sets the alarm threshold for the low density alarm		

Arms:Products:Temperature/ Density:Maintenance Density	Index: Product	Range: -999.9 - +999.9 API for other density units 0 - 9999.0
Product 424		
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	Index: Product	Range: 0 - 99999 delivery units
Product 431		
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	Index: Product	Range: 0 - 9999.9 density units
Product 432		
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	Index: Product	Range: -1e+37 and 1e+38
Product 441		
Description: This entry is the coefficient required to implement the PTB kOE method 1 algorithm for ethanol/biodiesel blends.		

Arms:Products:Temperature/ Density:PTB A1 Method 3 A1, A2, A3 Coefficients	Index: Product	Range: -1e+37 and 1e+38
AProduct 442, 443, 444		
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:Aromatic Hydrocarbon Product	Index: Product	Range: -1e+37 to +1e+38
Arms 461		
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.		
<ul style="list-style-type: none"> • Benzene • Cumene • Cyclohexane • Ethylbenzene • Styrene • Toluene • m-Xylene • O-Xylene • p-Xylene • 300-350F Aromatic • 350-400F Aromatic 		

Arms:Products:Temperature/ Density:Aromatic Hydrocarbon Reference Density	Index: Product	Range: 0 -9999.99
Arms 46-2		
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/m3 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 (i.e. if volume pulse input, mass will not be available. If mass pulse input, volume will not be available.		

8.6.5. 500 - Pressure Directory

Arm:Product:Pressure:High Pressure Alarm Limit	Index: Product	Range: [0] - 9999 pressure units
Product 501		
Description: Sets the alarm threshold for the High Pressure Alarm to be generated.		

Arm:Product:Pressure:Low Pressure Alarm Limit Product 502	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 503	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 504	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	Index: Product	Range: 50 - 90%
Product 514		
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	Index: Product	Range: [0] - 9999
Product 515		
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	Index: Product	Range: [0] - 99 minutes Disable: 0
Product 516		
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	Index: Product	Range:
Product 521		
Description: This parameter defines the method that the AccuLoad will use to calculate the vapor pressure of a product.		
Selections: <ul style="list-style-type: none"> • 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	Index: Product	Range: [0.0] - 9999.9
Arms 522, 524, 526		
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	Index: Product	Range: -999 - +999 degrees
Product 523, 525, 527		
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	Index: Recipe	Range: 1 - 6
Recipes 01		
Description: This program code indicates whether a recipe is configured for use.		
Selections: • Not Used • 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	Index: Recipe	Range: Text - 20 characters max.
Recipes 02		
Description: Assigns a name for this recipe		

Recipes:Product Blend:HM Classification	Index: Recipe	Range: 1 - 6
Recipes 03		
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: • Product 1 - 6		
Critical: Product not configured.		

Recipes:Product Blend:Product Delivery Order 1 - 6	Index: Recipe	Range: 1 - 6
Recipes 11, 13, 15, 17, 19, 21		
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: <ul style="list-style-type: none"> • Not Used • Product 1 - 6 		
Critical: First component must be programmed [--04 only]		
Note: Applies to sequential blending arms and hybrid arms only		
Note: For hybrid arms, the ratio products are counted first.		

Recipes:Product Blend:Product Percentage 1 - 6	Index: Recipe	Range: 0.0 - 100.0%
Recipes 12, 14, 16, 18, 20, 22		
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 per- cent; 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%.		
Critical: Component percentage not used with straight product.		
Critical: Component percentage not used with ratio blending [13, 15; others depend on number of product selection for ratio blend for this load arm]		

Recipes:Product Blend:Clean Line Deduct	Index: Recipe	Range: 1 - 6
Recipes 31		
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: <ul style="list-style-type: none"> • Product 1 - 6 		
Critical: Product not used in recipe.		
Critical: Clean Line Deduct must be Product 1 when recipe is assigned to a side-stream blending arm.		

Recipes:Product Blend: Clean Line Product	Index: Recipe	Range: 1 - 6
Recipes 32		
<p>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.</p> <p>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").</p> <p>Selections:</p> <ul style="list-style-type: none"> • Not Used • Product 1 - 6 <p>Critical: Product cannot be a side stream product (ratio product plumbed upstream of the sequential product meter) on a hybrid arm.</p> <p>Critical: Product greater than the number of products available for this arm.</p>		

Recipe:Product Blend:Ratio Delivery Mode	Index: Recipe	Range:
Recipes 33		
<p>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.</p> <p>Selections:</p> <p>Concurrent – Products are set up to flow simultaneously (traditional ratio blending) mixing in the arm as they are flowing into the vessel.</p> <p>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).</p>		

8.7.2. Recipe Additives

Recipes:Recipe Additives: Additive Amount/Cycle	Index: Recipe	Range: 0.000 - 9999.999
Recipes 51		
<p>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).</p> <p>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.</p> <p>Some additive injectors do not support the full range that we have offered here. 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.</p>		

Recipes:Recipe Additives:Additive Rate	Index: Recipe	Range: 0 - 999 delivery units or 0 - 20%
Recipes 52		
<p>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.</p> <p>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.</p>		

Recipes:Recipe Additives:Product Using Additive	Index: Recipe	Range: 1 - 24
Recipes 53		
<p>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.</p> <ul style="list-style-type: none"> • Product 1 - 24 <p>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.</p>		

8.8. Split Architecture Directories

Split Architecture:Configuration: Board Set ID	Index: Recipe	Range: Text - 28 characters max.
Split Architecture 101		
Description:		

Split Architecture:Configuration: Stop Button action	Index: Recipe	Range: Text - 28 characters max.
Split Architecture 102		
<p>Description:</p> <p>Selections:</p> <ul style="list-style-type: none"> • Arms on Both HMIs • Arms on HMI only 		

Split Architecture:Configuration: Idle Arm Alarm Split Architecture 103	Index: Recipe	Range: Text - 28 characters max.
Description: Selections: <ul style="list-style-type: none"> • Stop Arms • Don't Stop Arms 		
Split Architecture:Configuration: Idle Arm Alarm Split Architecture 104	Index: Recipe	Range: Text - 28 characters max.
Description: Selections: <ul style="list-style-type: none"> • Disabled • Enabled 		
Split Architecture:Board Addresses:Board Set ID Split Architecture 121	Index: Recipe	Range: -1 - 99
Description:		
Split Architecture:Board Addresses:Board Set ID Split Architecture 122	Index: Recipe	Range: -1 - 99
Description:		
Split Architecture:Board Addresses:Board Set ID Split Architecture 123	Index: Recipe	Range: -1 - 99
Description:		
Split Architecture:Card Reader:Mode Split Architecture 721	Index: Recipe	Range: -1 - 99
Description: Selections: <ul style="list-style-type: none"> • Momentary • Captive 		

Split Architecture:Card Reader:Baud Rate	Index: Recipe	Range:
Split Architecture 722		
Description:		
Selections: <ul style="list-style-type: none">• 9600• 19200• 38400• 57600• 115200		

Split Architecture:Card Reader:Data/Parity	Index: Recipe	Range:
Split Architecture 723		
Description:		
Selections: <ul style="list-style-type: none">• 7 Data No Parity• 7 Data Odd Parity• 7 Data End Parity• 8 Data No Parity• 8 Data Odd Parity• 8 Data Even Parity• 8 Data No Parity 2 Stop		

Split Architecture:Card Reader:Timeout	Index: Recipe	Range: 0 - 99
Split Architecture 724		
Description:		

9 – Appendix I – Alarms

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/AccuTroller – From the Mini-Pak/ AccuTroller'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 of Equivalent Error Codes	
Add-Pak (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

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.

10 – Appendix II – Metered Injector Map on the AccuLoad® IV

Injector # (AccuLoad)	Commu- nications 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
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 starting 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.

11 – Appendix III – Default Blending Arm Batch Page Report

[illegible]

12 – Appendix IV – Default Straight Product Arm Report

[illegible]

- A4B – 74, 75, 77, 82, 84, 103, 183
- A4I – 74, 76, 81, 84, 85, 107, 119, 184
- A4M – 12, 79, 81, 84, 85, 88, 103
- AC – 4, 12, 81, 82, 84, 85, 86
- AccuLoad ID – 28
- AccuMate – 7, 32, 34, 35, 36, 53, 68, 93, 120, 150
- Active Alarms – 3, 46
- Additive – 4, 13, 33, 41, 42, 48, 49, 73, 82, 85, 107, 123, 124, 125, 126, 127, 129, 130, 131, 132, 133, 134, 135, 142, 147, 178, 179, 182
- Additive Directory – 4, 33, 123
- Additive Injector – 48, 82
- Additive Injector Error – 107, 182
- Additive Pump – 85
- Additives – 3, 4, 13, 26, 28, 39, 45, 73, 90, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 178, 179
- Add-Pak – 81, 82, 84, 85, 107, 129, 130, 182, 184
- AFO – See Automatic Flow Optimization
- AHJ – 36 – See also Authorities Having Jurisdiction
- AICB – 107, 119, 129, 130, 182, 184
- Alarm History – 3, 46, 47, 58
- Alarm Pulse Count – 123, 126, 127
- Alarm Relay – 3, 23, 85
- Alarms – 3, 4, 26, 46, 90, 107, 108, 109, 110, 111, 182, 183
- Ammonia – 133, 169
- Analog I/O – 3, 4, 12, 26, 46, 51, 73, 87, 88, 89
- API – 6, 40, 89, 105, 123, 133, 134, 169, 170, 171, 172, 173, 174, 175
- Arm Addresses – 110
- Arms – 4, 6, 25, 27, 38, 61, 73, 74, 75, 90, 91, 94, 107, 118, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 179, 180
- Aromatic – 169, 173
- Aromatics – 133, 169
- asphalt – 6
- Atmospheric Pressure – 106
- Audit Trail – 2, 3, 34, 46, 49, 57
- Authorities Having Jurisdiction – 36 – See AHJ
- Automatic Flow Optimization – 174, 175 – See also AFO
- Auto Preset – 98
- Auto Prove – 98, 102
- Auto-Proving – 59
- Batch Start – 23, 95, 138, 140, 144, 147, 149
- Bay Directories – 4, 33, 73, 138
- Bay Permissive – 138
- Bays – 25, 27, 82, 138, 139, 140
- Bay Transactions – 90, 95
- bio blend – 169
- biodiesel – 169, 172
- Block Valve – 82, 85, 86, 107, 142, 146, 164, 165
- Bluetooth – 116
- Board Addresses – 28, 180
- Board Set Function – 74, 76
- Board Set Number – 74, 76
- Boolean Algebraic – 46, 53
- Brazil – 133, 169
- bread crumb – 29, 31
- Calculate – 65, 171
- Calibration – 4, 55, 61, 62, 63, 64, 65, 66, 67, 68, 88, 157, 158, 160, 161
- Calibration Menu – 4, 61
- captive card – 118
- Card Reader – 101, 116, 117, 119, 122, 180, 181
- Clean Line – 107, 123, 126, 142, 145, 146, 177, 178
- Communications – 3, 4, 15, 22, 26, 27, 32, 33, 34, 35, 73, 90, 101, 107, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 140, 150, 151, 184, 191
- Config – 25, 26, 73, 110, 119, 120, 121, 123, 139
- Configuration – 3, 4, 12, 26, 28, 33, 35, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 107, 110, 117, 119, 127, 129, 130, 131, 179, 180, 184
- Configuration Directories – 4, 33, 74
- Continuous – 23, 24, 95, 138, 140
- Cross Over Prevention – 116 – See also COP
- Date Format – 90
- date/time – 48, 91
- daytime display – 15
- DB Initialization – 61
- DB Settings – See Database Settings
- DC – 4, 12, 81, 82, 84, 85, 86
- Decimal/Comma Select – 90, 93
- DE Head – 74, 82, 107
- Delivery Amount Type – 98, 104
- Density Prompt – 105
- Density Sampling – 3, 43
- Density Units – 105, 123, 134, 170, 172
- Device Information – 4, 71
- Device Settings – 4, 69
- DHCP – 113
- Diagnostics – 3, 34, 35, 38, 45, 46, 47, 48, 52, 53, 54, 137
- Digital Input – 4, 33, 46, 81, 82, 83, 137

- Digital Inputs – 3, 26, 35, 50, 73, 81, 82, 83
- Digital Output – 4, 33, 46, 84, 85, 86
- Digital Outputs – 3, 26, 35, 50, 73, 85, 86
- DNS Server IP – 114
- Downstream Solenoid – 85
- Driver ID – 17
- Dual Pulse – 3, 46, 52, 53, 103, 123, 154, 155
- Dynamic Display – 37, 38, 44, 46, 90, 92
- Dynamic Displays – 3, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55
- E+H – 119
- Email Address – 116
- Engineering Diag – 46
- EPA – 133, 169
- Erase Event Log – 62
- Erase Transaction Log – 4, 63, 95
- ethanol – 169, 170, 171, 172, 173
- Ethernet Host Control – 114
- Ethernet Timeout – 114
- Event Log – 3, 4, 34, 46, 47, 48, 59, 62, 63
- Exit – 25, 32, 35, 46
- Factory Default – 61, 149
- Firmware – 3, 46, 55, 68, 90, 91, 182
- Flash – 182, 183
- Flash Memory Error – 183
- Flow Control – 3, 4, 12, 26, 27, 33, 73, 90, 96, 97, 140, 142, 143, 144, 145, 146, 147, 151, 152, 153, 154, 162, 163, 164, 165
- Flow Controlled Additives – 39
- Flow Rate – 21, 39, 40, 87, 90, 92, 123, 127, 128, 129, 131, 134, 142, 143, 144, 155, 156, 162, 163, 164, 166, 174
- Flow Rate Time – 90, 92
- Flow Tolerance – 123, 131, 132, 163, 164
- Gateway – 113
- General Purpose – 4, 26, 27, 29, 33, 73, 82, 84, 85, 87, 90, 91, 92, 93, 94, 95, 96, 140, 141, 142, 162
- Gross Proving – 102
- High Flow – 74, 82, 107, 142, 143, 144, 163, 164
- HMI – 76, 116, 179
- Host Interface – 4, 35, 110, 112, 113, 114, 115, 116
- Hybrid Blending – 3, 9, 61, 74, 177
- Injector Rates – 39, 44
- I/O Assignments – 12
- IP Address – 113
- Leakage Alarm Limit – 96, 97
- Load Arm – 3, 7, 33, 37, 38, 39, 41, 42, 44, 73, 85, 110, 141, 144, 148, 149, 176, 178
- Load Arm Directories – 33
- Low Flow – 74, 82, 107, 142, 143, 147, 164, 182
- LPG – 6, 133, 169
- Lube Oils – 133, 169
- MAC Address – 90, 91
- Main Menu – 3, 15, 24, 45, 57
- Maintenance Technicians – 35
- Mass Descriptor – 98
- Mass Units – 98, 99
- Maximum Available Arms – 90
- Maximum Preset – 98, 100
- Meter – 2, 3, 4, 5, 8, 12, 13, 33, 34, 40, 41, 42, 43, 46, 53, 66, 73, 77, 78, 79, 86, 87, 88, 98, 102, 103, 105, 107, 116, 119, 123, 130, 134, 140, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 166, 167, 168, 183, 192
- Meter Directories – 4, 33, 73, 151
- Metered Injector – 4, 82, 85, 123, 129, 130, 131, 182, 184
- Meter Factor – 40, 41, 42, 66, 123, 130, 166, 167, 168
- Meter Pulse Inputs – 3, 46, 53
- Meters – 27, 79, 99, 103
- Minicomp Host – 119
- Minimum Preset – 98, 100
- MMI Settings – 4, 69
- Modbus – 6, 15, 32, 91, 112, 114, 119, 120, 191
- Nedap Reader – 4, 110, 116, 117, 118, 119
- NEMA4 – 6
- Netmask – 113
- Net Proving – 102
- Network Diags – 3, 46, 54
- NGL – 133, 169
- Non-Resettable Volumes – 3, 46, 47
- Overrun Alarm – 107, 142, 144, 153
- Passcodes – 34
- Permissive – 3, 23, 82, 90, 95, 96, 138, 140, 141
- PID – 123, 132, 133, 152
- PIN – 18, 122
- Piston Injector – 82, 85, 126
- Piston Stop Action – 123
- Pressure – 4, 26, 33, 40, 41, 42, 73, 80, 87, 90, 106, 107, 151, 160, 162, 173, 174, 175, 176
- Pressure Directory – 4, 33, 106, 151, 162, 173
- Printer Control – 4, 110, 111
- Printer Tray – 82, 101
- Print Report – 57
- Product Blend – 4, 28, 73, 176, 177, 178

- Product Directories – 4, 33, 73, 162
- Products – 4, 27, 38, 74, 75, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 178, 179
- Program Mode – 3, 4, 24, 25, 26, 28, 29, 32, 33, 34, 49, 73, 74, 75, 76, 82, 106, 136, 164
- Promass – 107, 119, 156
- Prompts – 4, 110, 121, 122
- Prove Log – 4, 59
- Proving – 4, 35, 59, 63, 66, 102, 103
- Proximity card reader – 6
- PTB Printer Alarm – 107
- Pulse Inputs – 3, 4, 26, 46, 51, 53, 73, 77, 78, 81
- Pulse Input Type – 98
- Pulse Outputs – 3, 4, 26, 46, 51, 73, 79
- QT – 5, 75, 77, 81, 191
- RAM – 182, 183
- Ratio Blend – 3, 39, 43
- Ratio Blend Data – 3, 39, 43
- Ratio Blending – 3, 6, 8, 9, 61, 74, 75, 79, 86, 87
- Ready Screen – 15
- Recipe – 3, 4, 13, 19, 28, 33, 38, 39, 41, 44, 73, 82, 101, 176, 177, 178, 179, 180, 181, 183
- Recipe Additives – 4, 28, 73, 176, 178, 179
- Reference Density – 40, 123, 133, 134, 169, 170, 171, 173
- Reference Temperature – 40, 105, 168
- Relative Density – 40, 105, 133, 134, 170
- Remote Browser – 90, 93
- Report HM Class – 138, 140
- Reports / Logs – 3, 57, 58, 59, 60
- Reset Dual Pulse Errors – 3, 46, 52, 53
- Reset Totals – 4, 68
- Reverse Flow – 97, 103, 107
- Reverse Volume – 98, 99
- ROM – 182, 183
- Run Display Options – 98
- Run mode – 15, 23
- Run/Ready Mode – 23, 109, 110
- Run Screen – 16
- Sarasota – 4, 155, 158, 159
- Screen Style – 4, 69
- Screen Test – 4, 69
- Security – 2, 3, 4, 26, 34, 35, 49, 73, 82, 90, 102, 103, 107, 120, 128, 136, 137, 154, 155, 166, 167, 168
- Sening – 107, 116, 119
- Sequential Blending – 3, 6, 7, 74, 83, 177
- Serial Port – 4, 110, 119, 120, 121
- Set Transaction Number – 4, 62
- Shared Printer – 107, 119
- Side Stream Blending – 3, 10
- Smart – 6, 85, 119, 129, 130, 178, 182
- Smith Meter – 2, 5, 8, 116, 119, 130, 192
- SMTP – 114, 115
- Solartron – 155, 157, 158, 161
- Solenoid – 3, 46, 52, 85, 96, 107, 182, 184
- Solenoid Acuation Co – 46
- Split Architecture – 4, 25, 28, 69, 73, 76, 179, 180, 181
- ST – 5, 75, 77, 81, 110, 176, 191
- Start Button Disable – 0
- Start Next Run – 66
- Start Pressed – 23, 95, 138, 140
- Stop Button Disable – 90, 94
- Storage Full Alarm – 107
- Straight – 3, 4, 6, 7, 11, 61, 74, 75, 84, 175, 186
- Subdirectories – 26, 27, 28
- Summary Reports – 3, 57
- System Directories – 4, 33, 73, 90
- System Layout – 26, 73, 74, 75, 76
- Temperature/Density – 4, 26, 33, 73, 90, 105, 155, 156, 157, 158, 159, 160, 161, 168, 169, 170, 171, 172, 173
- Temperature Units – 105, 168
- Ticket Alarm – 107
- Time Format – 90
- Transaction• 3, 4, 23, 39, 41, 42, 43, 44, 46, 49, 58, 62, 63, 82, 90, 94, 95, 98, 101, 102, 104, 111, 117, 118, 120, 121, 124, 128, 138, 139, 140, 142, 151, 154
- Transaction Log – 3, 4, 46, 49, 58, 63, 95
- Transaction Start – 23, 95, 98, 102, 104, 121, 138, 140
- Transmitter Integrity – 98, 103, 107
- UGC DCF – 160
- UGC Densitometer – 4, 160
- Unit ID – 28, 29, 30, 31, 32, 90, 92
- Units of Measure – 12
- Unloading – 6, 11, 74
- Update Driver Data – 46
- Update Firmware – 3, 46, 55
- Update Leakage – 98
- Update License – 46
- Upstream Solenoid – 85
- Valve – 3, 41, 46, 52, 82, 84, 85, 86, 87, 107, 123, 132, 133, 142, 144, 145, 146, 149, 152, 164, 165
- Valve Closure Data – 46

Vapor Line Valve – 84, 85

Vapor Recovery Line – 85

Volume Accuracy – 4, 26, 27, 33, 73, 90, 98, 99, 100,
101, 102, 103, 104, 140, 147, 148, 149, 151, 154,
155, 162, 166, 167, 168

Volume Descriptor – 98, 100

Volumetric Coefficient of Expansion – 64

VRS – 3, 11, 42, 43, 74, 75, 84

Watchdog Alarm – 183

Weights & Measures – 4, 25, 34, 35, 49, 61, 62, 63,
64, 65, 66, 67, 68

W&M – 55, 61, 63, 103

13 – Related Publications

The following literature can be obtained from TechnipFMC Measurement Solutions Literature Fulfillment at measurement.fulfillment@TechnipFMC.com or online at http://info.smithmeter.com/literature/online_index.html.

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Specifications	Bulletin SS06200
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24/7 Technical Support/Schedule

a Technician: 1-844-798-3819

System Installation Supervision,
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