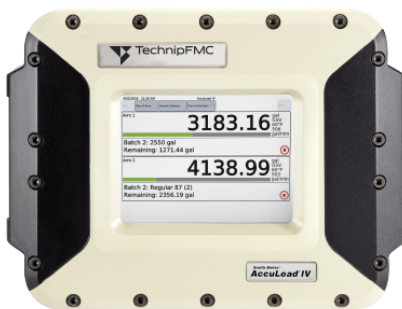# Smith Meter® AccuLoad® IV
Smith Communications Manual

Bulletin MN06204L Issue/Rev. 0.4 (10/24)

Important

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

Caution

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

Disclaimer

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

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Contents

1 Introduction

This manual describes how the Smith Meter AccuLoad IV Electronic Preset communicates with other computing devices—from a simple terminal to a high-end SCADA system computer running a terminal automation system—when using the Smith protocol.

Incorporated within the AccuLoad IV is the ability to communicate directly (without a modem or multiplexer) with a host or other device via Ethernet (Smith SMIP protocol, TCP/IP port 7734) or serially via an EIA-232C- or EIA-485-compatible remote serial terminal or minicomputer. Depending on the communication type, certain key information from multiple AccuLoad IVs can be requested (polled). The AccuLoad can optionally be configured to require remote authorization before releasing the interface for operator use. Using this interface, the host computer also can authorize specific additives, set a batch volume, reset alarms, and remotely program certain AccuLoad IV program codes.

To configure the AccuLoad for host communications, the following program codes must be specified.

1.1 System Communications Directory Options

Table 1: System Program Codes for Ethernet Communications Port Configuration

System Program Codes for Ethernet Communications Port Configuration	
734	IP Discovery
735	IP Address
736	Netmask
737	Gateway
738	Ethernet Host Control
739	Ethernet Timeout

Table 2: System Program Codes for Serial Communications Port Configuration

System Program Codes for Serial Communications Port Configuration				
Port 1	**Port 2**	**Port 3**	**Port 4**	
707	712	717	722	Function
708	713	718	723	Baud
709	714	719	724	Data/Parity
710	715	720	725	Control
711	716	721	726	Timeout

Table 3: System Program Codes for Arm Addresses and Other Communication Options (Both Serial and Ethernet)

System Program Codes for Arm Addresses and Other Communication Options (Both Serial and Ethernet)	
701	Load Arm #1 Address (1—99)
702	Load Arm #2 Address (1—99)
703	Load Arm #3 Address (1—99)
704	Load Arm #4 Address (1—99)
705	Load Arm #5 Address (1—99)
706	Load Arm #6 Address (1—99)
731	Comm Link Programming (Level of Access)
732	Modbus Endian Selection

Refer to the AccuLoad IV Operator Reference Manual (MN06200) for detailed information on the configuration of these communications parameters.

1.2 Using the Smith Meter Protocol Over TCP/IP

The AccuLoad IV has a reserved port that supports Smith Meter protocol communications. This protocol is currently fixed at port 7734. The AccuLoad IV expects a single complete command to be contained in each packet received. The AccuLoad IV ignores fragmented commands and any additional commands after the first in a packet. Due to the relatively small size of the Smith command frame, this does not usually pose a problem for the communicating client; however, most Telnet-type programs attempt to send data as soon as it is entered, so the resulting packets received by the AccuLoad IV do not have complete commands and are ignored. The AccuMate has a built-in tool—the Terminal Emulator—that sends an entire command in one packet. Custom software written to communicate with the AccuLoad can duplicate this functionality by submitting a completely formed communication command along with any required arguments to the TCP transport layer simultaneously.

Both Terminal and Minicomputer mode protocol framing will work via the TCP/IP connection. Note that with Minicomputer mode, the longitudinal redundancy check (LRC) is redundant to the inherent security provided by TCP and is not checked (and can be left off entirely).

2 Communication Protocols

2.1 Communication Types

The type of communicating device used in System Communications with an AccuLoad IV is configurable and can be defined in the System Communications directory of the AccuLoad IV. The available options are as follows:

- Terminal (Term Host)—Enables the AccuLoad IV communications ports to communicate with a terminal-type device using a simplified communications protocol.

- Minicomputer (Minicomp Host)—Enables the AccuLoad IV communications ports to communicate with a minicomputer-type device using a secure communications protocol.

- Modbus Host—Indicates the AccuLoad IV communication ports support Modbus communications.

- Card Reader—Permits the AccuLoad.net to communicate with the Smith Meter Card Reader.

- Printer—Indicates one AccuLoad IV communicates with one printer and that a report is printed at the end of each transaction.

- Shared Printer—Indicates multiple AccuLoad IVs communicate with a single printer and that a report is printed at the end of each transaction.

- Smart Injector—Permits the AccuLoad IV to communicate with smart additive injector systems (such as Gate City Blend-Pak and Mini-Pak, Titan Pak3, and Smith Meter AccuTroller).

- Nedap vehicle tag reader—Indicates the AccuLoad IV can be configured to capture data from a Nedap vehicle tag reader and autofill prompt response information with the tag data.

- Mass Meter—Indicates the AccuLoad IV can communicate with the Endress+Hauser Promass 100 or 300/500 transmitters.

2.2 Communications for Terminal Mode of Operation

The AccuLoad IV System Program Code Communications Port Function must be set to Terminal Host. This character-oriented protocol uses the American Standard Code for Information Interchange (ASCII) value for the asterisk character (*) to define the start of a message and carriage return and line feed (CR and LF) characters to end the message. No error checking other than parity on each character is performed.

The message format for terminal mode of operation for an instruction to AccuLoad IV is:

* A1 A2 <text> CR LF

The message format for terminal mode of operation for a response from AccuLoad IV is:

* A1 A2 <text> CR LF

where

- * (asterisk) = hexadecimal 2A

- Text = Character string containing instructional or response information

- CR = Carriage return (hexadecimal 0D)

- LF = Line feed (hexadecimal 0A)

- A1 A2 = AccuLoad IV address (01 to 99)

An example of the command and response is:

*01RS<CR><LF>

*01TD BD<CR><LF>

Data is formatted using ASCII characters and each character frame consists of 1 start bit, 7 or 8 data bits, none, even or odd parity, and 1 or 2 stop bits. A maximum communication rate of 38,400 baud is supported. There is no echo back of received characters by the AccuLoad IV in the Terminal Mode of operation.

2.3 Communications for Minicomputer Mode of Operation

This character-oriented protocol uses the transmission control character STX to define the start of a message, and ETX to terminate the message. A Longitudinal Redundancy Check (LRC) character follows the ETX character for additional message error detection beyond the traditional parity check done on each transmitted character.

The message format for minicomputer mode of operation for an instruction to AccuLoad IV is:

STX A1 A2 <message text> ETX LRC

where

- NL = Null character hexidecimal 00

- STX = Start of text hexidecimal 02

- Text = Character string containing instructional or response information

- ETX = End of text hexidecimal 03

- LRC = Longitudinal redundancy check

- PAD = Pad character hexidecimal 7F

- A1 A2 = AccuLoad IV address (01 to 99)

An example of the command and response is:

Command: <02>01EQ<03><LRC><7F>

Response: <00><02>0600018000000000<03><LRC><7F>

The LRC is an ASCII character computed as the exclusive OR (XOR) sum of all characters following the STX and including the ETX transmission control characters.

The universal or global address "00" is an invalid address and must not be assigned to any AccuLoad. The address, A1 A2, always consists of two ASCII characters.

Data is formatted using ASCII characters and each character frame consists of one start bit, seven or eight data bits, none, even or odd parity, and one or two stop bits. There is no echo back of received characters by the AccuLoad IV in the Minicomputer Mode of communications.

2.4 Text Format

Command and response text is shown enclosed in single quotes. Embedded spaces are represented by an underscore character (_). Any other character representation is described where used.

"OK" is used in response to any action type command that has been successfully carried out. For request-only commands, a good response reports the data requested in the format shown for that command.

"NOXX" (where XX represents a two-character code) is used to show that the command was rejected. The two-character code represents the condition causing the rejection. For an expanded description of these codes, see Alphanumeric Character Set Used By the AccuLoad IV.

A time out or no response received from the AccuLoad IV occurs when the command string was entered incorrectly. The communicating program should set an upper limit on the amount of time it waits for a response from any AccuLoad and register a time-out when that time has elapsed to prevent a bad command from locking up the communications. Commands must be formatted exactly as stated. Invalid addresses, incomplete data, and excess data are all causes for this to occur. A more detailed explanation follows:

- Invalid Address—AccuLoad IV ignores a commands with an address does not match its own. The communication address is programmed into the AccuLoad IV System program code 701 and following.

- Incomplete Data—The code format for each communication command is stated in the Command Reference Guide. If any portion of the command is left out, a time-out occurs.

- Excess Data—Commands must be formatted exactly as stated. No excess data may be inserted or added.

2.5 Communication Control Selections

The amount of control that the communicating device has over the AccuLoad IV is programmable for various degrees of control, as follows:

- Polling Only—Only permits the EIA-232 or EIA-485 communication device to request information.

- Poll and Authorize—Permits the EIA-232 or EIA-485 communication device to request information and to authorize operation.

- Remote Control—Permits the EIA-232 or EIA-485 communication device to have complete control over all operations.

- XON/XOFF—Printer security protocol designed to keep the printer buffer from overflowing. The printer sends an XOFF (13 hex) when the print buffer is nearly full. The AccuLoad stops sending data until the printer sends an XON (11 hex), signifying it is ready for more data.

- Poll and Program—Identical to Polling Only, but adds programming privilege and excludes authorizing privilege.

- PTB-FX pProtocol—A security level designed to support the PTB weights and measures agency-approved printer interface. This interface is currently supported by and applies to the Epson FX-850 printer.
  This interface uses a data-block structure with handshaking. The AccuLoad initially sends an ENQ (enquire) to the printer. The printer then responds with an acknowledgement (ACK) and is then ready to receive a block of data from the AccuLoad. A block of data is defined as one line to be printed. The data is wrapped between a STX (start of text) and an ETX (end of text) and is followed by the longitudinal redundancy checksum for the data block. After the AccuLoad sends the data block, the printer responds with an ACK (if the data was received correctly) or a NAK (negative acknowledgement, if not received correctly. If the printer responds with a NAK, the data block is re-transmitted.

- PTB-LQ protocol—A security level designed to support a PTB weights and measures agency-approved printer interface. This interface is currently supported by and applies to the Epson LQ-570 printer.

  This interface uses a data block structure with handshaking. The AccuLoad initially sends an ENQ (enquire) to the printer. The printer then responds with an ACK and is then ready to receive a block of data from the AccuLoad. A block of data is defined as one line to be printed. The data is wrapped between a STX (start of text) and an ETX (end of text) and is followed by the longitudinal redundancy checksum for the data block. After the AccuLoad sends the data block, the printer responds with an ACK (if the data was received correctly) or a NAK (if not received correctly). If the printer responds with a NAK, the data block is re-transmitted.

Each command listed in the Command Reference Guide of this manual indicates the supporting communication modes.

3 Communications with Smart Injectors

The AccuLoad IV communicates with the Titan, Gate City Smart Additive, and Smith Meter Smart Additive Systems. After three tries, if a response is not received from the additive injector system, an alarm is set and the AccuLoad IV responds to the alarm as instructed to do in the configuration.

The AccuLoad IV controls smart additive subsystems and additive pacing through communications. For example, the additive system receives communication commands at the same interval that piston injectors would receive a signal to inject. With smart injectors, incoming pulses are not required by the additive injector. Certain parameters must be established in the additive subsystem prior to each batch and injector commands are issued during the batch and at the end of the batch. In all cases, the parameters and commands are only issued to those additive injector systems authorized for use for the current batch.

3.1 Pass-By Communications Mode

The pass-by communications mode is designed to allow supervisory computers to communicate with smart additive injectors under the control of the AccuLoad IV.

Commands from the supervisory computer are received from the AccuLoad IV on one communications line and forwarded to the additive injection subsystem on another communications line. Queries and control commands are only permitted while the AccuLoad IV is in ready mode. Queries and commands are not accepted by the AccuLoad while it is in run mode or programming mode.

Communications from a supervisory computer to a smart additive injector is a three-step process. First, the supervisory computer issues a pass-by command to the AccuLoad IV. The AccuLoad IV acknowledges receipt of the command to the supervisory computer. Next, the AccuLoad adds framing characters, as required, and issues the command to the smart additive injector. The additive injector returns an appropriate response to the AccuLoad. The final step occurs when the supervisory computer requests the additive's response from the AccuLoad IV.

The communications scheme was developed to maintain a response time consistent with other commands sent by the supervisory computer.

4 Command Reference Guide

4.1 Command Code AB: Allocate Blend Recipes

This command allocates the blend recipes allowable for selection. This allocation is a subset of those enabled in the program mode.

Command

AB_C1 through C13:

where C1 through C13 is the three- to 13-character bitmap described in the following pages.

Responses

This code has two expected responses:

- Good response is OK = recipes were allocated

- Error response is NOXX = recipes were not allocated

Remarks

Note the following details about this command:

- The number one allocates the corresponding recipe number for selection. Allocation is canceled on transaction done status being set.

- Allocation is also canceled during remote control mode when a power-fail restart occurs between batches.

- This command does not require all characters. A minimum of three characters is accepted. For any characters omitted, the corresponding recipes are not allocated.

- This command automatically exits from program mode when initiated.

Constraints

Recipe allocation remains in effect only for the current transaction.

Special Case

None

Command Modes

- Polling only

- Poll and authorize

- Remote control

Table 4: Command Code AB—Command to Allocate Recipes, Character 1

Command to Allocate Recipes, Character 1					
Character		Recipe Request			
Char	Hex	Recipe #4	Recipe #3	Recipe #2	Recipe #1
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
A	41	X		X	
B	42	X		X	X
C	43	X	X		
D	44	X	X		X
E	45	X	X	X	
F	46	X	X	X	X

Table 5: Command Code AB—Command to Allocate Recipes, Character 2

Command to Allocate Recipes, Character 2					
Character		Recipe Request			
Char	Hex	Recipe #8	Recipe #7	Recipe #6	Recipe #5
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
A	41	X		X	
B	42	X		X	X
C	43	X	X		
D	44	X	X		X
E	45	X	X	X	
F	46	X	X	X	X

Table 6: Command Code AB—Command to Allocate Recipes, Character 3

Command to Allocate Recipes, Character 3					
Character		Recipe Request			
Char	Hex	Recipe #12	Recipe #11	Recipe #10	Recipe #9
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
A	41	X		X	
B	42	X		X	X
C	43	X	X		
D	44	X	X		X
E	45	X	X	X	
F	46	X	X	X	X

Table 7: Command Code AB—Command to Allocate Recipes, Character 4

Command to Allocate Recipes, Character 4					
Character		**Recipe Request**			
Char	Hex	Recipe #16	Recipe #15	Recipe #14	Recipe #13
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
A	41	X		X	
B	42	X		X	X
C	43	X	X		
D	44	X	X		X
E	45	X	X	X	
F	46	X	X	X	X

Table 8: Command Code AB—Command to Allocate Recipes, Character 5

Command to Allocate Recipes, Character 5					
Character		**Recipe Request**			
Char	Hex	Recipe #20	Recipe #19	Recipe #18	Recipe #17
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
A	41	X		X	
B	42	X		X	X
C	43	X	X		
D	44	X	X		X
E	45	X	X	X	
F	46	X	X	X	X

Table 9: Command Code AB—Command to Allocate Recipes, Character 6

Command to Allocate Recipes, Character 6					
Character		**Recipe Request**			
Char	**Hex**	**Recipe #24**	**Recipe #23**	**Recipe #22**	**Recipe #21**
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
A	41	X		X	
B	42	X		X	X
C	43	X	X		
D	44	X	X		X
E	45	X	X	X	
F	46	X	X	X	X

Table 10: Command Code AB—Command to Allocate Recipes, Character 7

Command to Allocate Recipes, Character 7					
Character		**Recipe Request**			
Char	**Hex**	**Recipe #28**	**Recipe #27**	**Recipe #26**	**Recipe #25**
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
A	41	X		X	
B	42	X		X	X
C	43	X	X		
D	44	X	X		X
E	45	X	X	X	
F	46	X	X	X	X

Table 11: Command Code AB—Command to Allocate Recipes, Character 8

Command to Allocate Recipes, Character 8					
Character		**Recipe Request**			
Char	**Hex**	**Recipe #32**	**Recipe #31**	**Recipe #30**	**Recipe #29**
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
A	41	X		X	
B	42	X		X	X
C	43	X	X		
D	44	X	X		X
E	45	X	X	X	
F	46	X	X	X	X

Table 12: Command Code AB—Command to Allocate Recipes, Character 9

Command to Allocate Recipes, Character 9					
Character		**Recipe Request**			
Char	**Hex**	**Recipe #36**	**Recipe #35**	**Recipe #34**	**Recipe #33**
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
A	41	X		X	
B	42	X		X	X
C	43	X	X		
D	44	X	X		X
E	45	X	X	X	
F	46	X	X	X	X

Table 13: Command Code AB—Command to Allocate Recipes, Character 10

Character		Recipe Request			
Char	Hex	Recipe #40	Recipe #39	Recipe #38	Recipe #37
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
A	41	X		X	
B	42	X		X	X
C	43	X	X		
D	44	X	X		X
E	45	X	X	X	
F	46	X	X	X	X

Table 14: Command Code AB—Command to Allocate Recipes, Character 11

Character		Recipe Request			
Char	Hex	Recipe #44	Recipe #43	Recipe #42	Recipe #41
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
A	41	X		X	
B	42	X		X	X
C	43	X	X		
D	44	X	X		X
E	45	X	X	X	
F	46	X	X	X	X

Table 15: Command Code AB—Command to Allocate Recipes, Character 12

Command to Allocate Recipes, Character 12					
Character		Recipe Request			
Char	Hex	Recipe #48	Recipe #47	Recipe #46	Recipe #45
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
A	41	X		X	
B	42	X		X	X
C	43	X	X		
D	44	X	X		X
E	45	X	X	X	
F	46	X	X	X	X

Table 16: Command Code AB—Command to Allocate Recipes, Character 13

Command to Allocate Recipes, Character 13					
Character		Recipe Request			
Char	Hex	Reserved	Reserved	Recipe #50	Recipe #49
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
A	41	X		X	
B	42	X		X	X
C	43	X	X		
D	44	X	X		X
E	45	X	X	X	
F	46	X	X	X	X

4.2 Command Code AN: Read Analog Engineering Value

This command returns the current analog engineering value for the specified analog input/output (I/O) point.

Command

AN X: read analog engineering value

where X = the analog I/O point desired (1-6).

Responses

AN VVVVVV.V:

where X = the analog I/O point desired (1-6 VVVV.V is the current value in the programmed engineering scale units)

Remarks, Constraints, and Special Case

None

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.3 Command Code AO: Set General Purpose Analog Output Engineering Value

This command sets a new engineering value associated with the general-purpose analog output, effectively changing the current/voltage out to a new value. The engineering value is scaled to the appropriate output voltage/current based on the programmed four mA or IV minimum (min.) and 20 mA or five V maximum (max.) engineering values for the specified I/O point.

Command

AO_X_VVVV.VV:

where:

- X = analog I/O point

- VVVV.VV = the new engineering value to set

Responses

Good response is OK = AccuLoad IV has set the new value.

Error responses are:

- NOXX = the new value was not set

- NOO1 = the requested operation cannot be performed while the AccuLoad IV is in program mode

Remarks and Special Case

None

Constraints

Output must be configured as general-purpose analog output.

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.4 Command Code AP: Authorize Transaction to Preset

This command authorizes a transaction and displays the PRESET prompt.

Command

AP: authorize transaction to preset

AP_A1A2A3A4A5A6: authorize AccuLoad to preset with selected additives 1 - 24

AP_A1A2A3A4A5A6A7A8A9A10A11; authorize AccuLoad to preset with selected additives 1 - 44 *(new in revision 1.9)*

where A1A2A3… is the optional additive selection code.

If the six-character form is used for the additive selection field and any additives in the range of 25-44 are configured, they will not be enabled. This format remains available for backward compatibility with existing systems.

Responses

Good response is OK = AccuLoad IV has been authorized for transaction.

Error responses are:

- NOXX = the transaction failed to release

- NO30 = will be returned if the additive specified is not currently allocated to the arm to which the command was directed

- NO36 = will be returned if the AccuLoad is being used with a card reader and the card data is invalid or has expired

Remarks

- If the additive qualifier (A1A2A3…) is not used, the additive selection will operate as currently programmed in the AccuLoad IV. For authorization with additives, only one recipe may be allocated. Additives selected in the qualifier must be programmed for use.

- If more than one recipe is enabled, the Select Recipe prompt will be displayed.

Constraints

The AP will reset the transaction done, batch done, and keypad pending flags.

Special Case

None

Command Mode

- Poll and authorize

Table 17: Additive Selection Codes for AP and AU, Character A1

Additive Selection Codes for AP and AU, Character A1					
Character Sent (A1)		Add 4	Add 3	Add 2	Add 1
Char	Hex				
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
A	41	X		X	
B	42	X		X	X
C	43	X	X		
D	44	X	X		X
E	45	X	X	X	
F	46	X	X	X	X

Table 18: Additive Selection Codes for AP and AU, Character A2

Additive Selection Codes for AP and AU, Character A2					
Character Sent (A2)		**Add 8**	**Add 7**	**Add 6**	**Add 5**
Char	**Hex**				
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
A	41	X		X	
B	42	X		X	X
C	43	X	X		
D	44	X	X		X
E	45	X	X	X	
F	46	X	X	X	X

Table 19: Additive Selection Codes for AP and AU, Character A3

Additive Selection Codes for AP and AU, Character A3					
Character Sent (A3)		**Add 12**	**Add 11**	**Add 10**	**Add 9**
Char	**Hex**				
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
A	41	X		X	
B	42	X		X	X
C	43	X	X		
D	44	X	X		X
E	45	X	X	X	
F	46	X	X	X	X

Table 20: Additive Selection Codes for AP and AU, Character A4

Additive Selection Codes for AP and AU, Character A4					
Character Sent (A4)		Add 16	Add 15	Add 14	Add 13
Char	Hex				
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
A	41	X		X	
B	42	X		X	X
C	43	X	X		
D	44	X	X		X
E	45	X	X	X	
F	46	X	X	X	X

Table 21: Additive Selection Codes for AP and AU, Character A5

Additive Selection Codes for AP and AU, Character A5					
Character Sent (A5)		Add 20	Add 19	Add 18	Add 17
Char	Hex				
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
A	41	X		X	
B	42	X		X	X
C	43	X	X		
D	44	X	X		X
E	45	X	X	X	
F	46	X	X	X	X

Table 22: Additive Selection Codes for AP and AU, Character A6

Additive Selection Codes for AP and AU, Character A6					
Character Sent (A6)		Add 24	Add 23	Add 22	Add 21
Char	Hex				
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
A	41	X		X	
B	42	X		X	X
C	43	X	X		
D	44	X	X		X
E	45	X	X	X	
F	46	X	X	X	X

Table 23: Additive Selection Codes for AP and AU, Character A6

Additive Selection Codes for AP and AU, Character A7					
Character Sent (A6)		Add 28	Add 27	Add 26	Add 25
Char	Hex				
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
A	41	X		X	
B	42	X		X	X
C	43	X	X		
D	44	X	X		X
E	45	X	X	X	
F	46	X	X	X	X

Table 24: Additive Selection Codes for AP and AU, Character A6

Additive Selection Codes for AP and AU, Character A8					
Character Sent (A6)		Add 32	Add 31	Add 30	Add 29
Char	Hex				
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
A	41	X		X	
B	42	X		X	X
C	43	X	X		
D	44	X	X		X
E	45	X	X	X	
F	46	X	X	X	X

Table 25: Additive Selection Codes for AP and AU, Character A6

Additive Selection Codes for AP and AU, Character A9					
Character Sent (A6)		Add 36	Add 35	Add 34	Add 33
Char	Hex				
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
A	41	X		X	
B	42	X		X	X
C	43	X	X		
D	44	X	X		X
E	45	X	X	X	
F	46	X	X	X	X

Table 26: Additive Selection Codes for AP and AU, Character A6

Additive Selection Codes for AP and AU, Character A10					
Character Sent (A6)		**Add 40**	**Add 39**	**Add 38**	**Add 37**
Char	**Hex**				
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
A	41	X		X	
B	42	X		X	X
C	43	X	X		
D	44	X	X		X
E	45	X	X	X	
F	46	X	X	X	X

Table 27: Additive Selection Codes for AP and AU, Character A6

Additive Selection Codes for AP and AU, Character A11					
Character Sent (A6)		**Add 44**	**Add 43**	**Add 42**	**Add 41**
Char	**Hex**				
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
A	41	X		X	
B	42	X		X	X
C	43	X	X		
D	44	X	X		X
E	45	X	X	X	
F	46	X	X	X	X

4.5 Command Code AR: Alarm Reset

This command resets one of the alarms currently registered at the AccuLoad IV.

Command

AR: reset all alarms in all tables

AR_XX_DD: reset specific alarm for a specified directory

AR_XX_DD_YY: reset specific alarm for a specific injector (only when DD=IN)

where:

- XX = Two-character alarm code

  - DD = Directory, where

    - SY = System

    - P1 = Product 1

    - P2 = Product 2

    - P3 = Product 3

    - P4 = Product 4

    - P5 = Product 5

    - P6 = Product 6

    - AR = Arm

    - M1 = Meter 1

    - M2 = Meter 2 (ratio, hybrid blending configuration only)

    - M3 = Meter 3 (ratio, hybrid blending configuration only)

    - M4 = Meter 4 (ratio, hybrid blending configuration only)

    - M5 = Meter 5 (ratio, hybrid blending configuration only)

    - M6 = Meter 6 (ratio, hybrid blending configuration only)

    - RR = Recipe Number (01-50)

    - IN = Injector

where YY = Injector number (01-44)

(01-50)

Responses

Good response is OK.

Error response is NOXX = the alarm was not reset.

Remarks

The two-character alarm code must be one of those alarms that can be reset through communications. All alarms except DA can be cleared through communications.

Constraints

The alarm code must be able to be reset through communications. If it is allowed, it must be pending or a NO will be returned.

Special Case

A special code, AA, can be used to reset all resettable alarms that are pending in the directory specified.

Command Modes

- Poll and authorize

- Remote control

4.5.1 Alarm Status Codes That Can Be Reset Through Communications: System

Table 28: Resettable Alarms: System

Code	Condition
CM	Communications Alarm—Communications failure on one of the communications channels.
CP	FA Sening Alarm
EM	Email Error
HB	HMI B Failure
ME	Excess Arms Active—Indicates that more than six arms are active when using the AcculLoad IV-SA. No more than six arms can be active at once.
NP	Network Printer Alarm
PA	Power-fail Alarm—The unit either had a power failure or a hardware reset occurred.
PP	Printer Failure—The printer failure alarm is set when the AcculLoad IV fails to get a good response from a printer after sending data to be printed. The AcculLoad IV will continue to resend the data to the printer until the communication port timeout setting expires, at which time the printer alarm is set. This alarm can also become active when an XON/XOFF timeout occurs when not using PTB protocol.
SP	Shared Printer—An output was attempted to the shared printer but was unsuccessful because the shared printer remained busy longer than the programmed communications timeout.
A1	Add-Pak Power-fail—Indicates that a power failure has occurred on Add-Pak #1.
A2	Add-Pak Power-fail—Indicates that a power failure has occurred on Add-Pak #2.
C1	Add-Pak Communications Alarm—Communications failure on Add-Pak #1.
C2	Add-Pak Communications Alarm—Communications failure on Add-Pak #2.
D1	Add-Pak Diagnostic Alarm—Indicates a failure on Add-Pak #1.
D2	Add-Pak Diagnostic Alarm—Indicates a failure on Add-Pak #2.
P1	Add-Pak #1 Auto-Detect Failed—Indicates that the AcculLoad has failed to detect Add-Pak Board #1.
P2	Add-Pak #2 Auto-Detect Failed—Indicates that the AcculLoad has failed to detect Add-Pak Board #2.
U1	User Alarm #1
U2	User Alarm #2
U3	User Alarm #3
U4	User Alarm #4
U5	User Alarm #5
U6	User Alarm #6
U7	User Alarm #7
U8	User Alarm #8
U9	User Alarm #9
U0	User Alarm #10

4.5.2 Alarm Status Codes That Can Be Reset Through Communications: Injector

Table 29: Resettable Alarms: Injector

Code	Condition
AD	Auto-detect failed—Indicates that a specific smart injector was unable to be located on any comm port.
FA	Additive feedback error—Indicates that the additive feedback has exceeded the programmed number of errors.
AC	Additive communications error—Indicates a failure on the primary/standby communications line between the AccuLoad IV and the additive injector subsystem.
KA	Low additive error—Indicates that not enough additive was injected during one cycle or an average of several cycles.
MA	Excessive additive pulses error—Indicates that too many additive flow meter pulses were detected.
NA	No additive pulses error—Indicates that the additive flow meter's pulses were not detected.
RA	Additive frequency error—Indicates that the additive volume is too high for the rate selected; a second dose of additive is being requested before delivery of the first dose completes.
UA	"Unauthorize" error—Indicates that the unauthorize command failed at the end of the batch for an additive. Authorization may have to be removed manually (by power cycling the additive system) to prevent unwanted additive in subsequent batches/transactions.
GA	General additive error—Indicates that there is an additive injector error.
OR	Overspeed injector—Indicates that the meter on the metered injector has exceeded its specified maximum frequency.
CR	Command refused error—Indicates that the command from the AccuLoad to the injector was rejected.
AH	Additive high temperature alarm—Used only for flow controlled additive types. Temperature probe or transducer is out of range with high alarm setting.
AL	Additive low temperature alarm—Used only for flow controlled additive types. Temperature probe or transducer is out of range with low alarm setting.
AT	Additive temperature probe—Used only for flow controlled additive types. Short or open condition in temperature probe.
PS	Pulse security—Used only with the security option. Indicated that an excessive number of out-of-sequence errors in the A-B pulse stream have been detected on one of the flow controlled additive meters.
XA	Indicates a collision in the incoming pulse stream. (The signals on A and A-bar or B and B-bar are the same).
CT	Indicates that the additive total received from the smart additive system may be erroneous.

4.5.3 Alarm Status Codes That Can Be Reset Through Communications: Arm

Table 30: Resettable Alarms—Arm

Code	Condition
CA	Additive clean line—The additive clean line volume delivered has under-run the additive clean line volume programmed.
CL	Clean line—The clean line volume delivered has under-run the clean line volume programmed by at least the amount of clean line alarm limit.
DE	DE head alarm (unloading only)—Indicates an illegal combination of inputs. If the low flow switch is covered, the stop float must be covered. If the high flow switch is covered, both the stop float and the low flow switches must also be covered.
HF	High flow—Flow rate has exceeded limit set by excess high flow program parameter for more than four seconds.
OA	Overrun—Volume delivered has exceeded the preset amount by at least the number of units set in the overrun limit program code.
SF	Storage full—Indicates that the archived transaction area is full. The operator must clear stored standby transactions in order to continue.
TK	Ticket—Ticket was cranked from ticket printer while the batch loading was in progress.
ZF	Zero flow—The AccuLoad did not see flow through the system before the zero flow timer expired.
CD	Card removed—The card was removed from the card reader prior to the end of the transaction.
RP	Report storage full

4.5.4 Alarm Status Codes That Can Be Reset Through Communications: Meter

Table 31: Resettable Alarms—Meter

Code	Condition
DR	Density transducer—Density transducer failure or out-of-range condition.
FR	Indicates that reverse flow occurring during a batch has exceeded the programmed "reverse flow limit" (system 203).
LA	Leakage alarm—Indicates that leakage between transactions has exceeded the programmed "leakage alarm limit" (system 202).
PM	The Promass meter has a system problem status alarm. This alarm indicates that the meter should be checked for programming errors.
PO	Predict overrun—Indicates that the AccuLoad has stopped the batch because it suspects a valve fault condition will result in an overrun occurring.
PR	Pressure transducer—Pressure transducer failure or out-of-range condition
PS	Pulse security—Used only with the security pulse option. Indicates that an excessive number of out-of-sequence errors in the A-B pulse stream have been detected.
SC	Solenoid count—Indicates that the solenoid count has exceeded the "solenoid alarm count" (system 201). This alarm will only be set when the load arm is idle.
TP	Temperature probe—Short or open condition in the temperature probe circuit.
VF	Valve fault—Indicates that the meter was still registering flow when the valve fault timer expired after the AccuLoad commanded the valve to close.
XA	Indicates a collision in the incoming pulse stream. (The signals on A and A-bar or B and B-bar are the same.)
MF	Mass meter comm failure
PM	Promass alarm

4.5.5 Alarm Status Codes That Can Be Reset Through Communications: Product

Table 32: Resettable Alarms: Product

Code	Condition
BH	Blend high alarm—An overflow on this product has caused a blend tolerance to be exceeded.
BL	Blend low alarm—An underflow on this product has caused the blend tolerance to be exceeded.
BP	Back pressure—Back pressure per the entries set cannot be maintained during flow enough to maintain entry set in product program code.
BV	Block valve alarm—The valve did not close within 10 seconds after receiving the signal to close.
HD	High density—Density transducer is out of range of the high alarm setting.
HF	High flow alarm—Flow rate has exceeded limit set by excess high flow program code for more than 4 seconds.
HP	High pressure—Pressure transducer is out of range of the high alarm setting.
HT	High temperature—Temperature probe or transducer is out of range of the high alarm setting.
LD	Low density—Density transducer is out of range of the low alarm setting.
LF	Low flow alarm—Flow rate was at or below the minimum flow rate established by Low Flow Limit program code for longer than 8 seconds.
LP	Low pressure—Pressure transducer is out of range of the low alarm setting.
LT	Low temperature—Temperature probe or transducer is out of range of the low alarm setting.
OA	Overrun alarm—Volume delivered has exceeded the preset amount by at least the number of units set in the overrun limit program code.
PA	Product stop alarm—Hybrid blending arms only—This alarm indicates that there was an under-run of product after the ratio product was shut down. Therefore, the line may not be clear of the ratio product.
UF	Unauthorized flow—The AccuLoad has detected unauthorized flow.
ZF	Zero flow—The AccuLoad did not see flow through the system before the zero flow timer expired.

4.6 Command Code AT: Request Additive Volumes by Transaction

This command retrieves additive transaction volumes from AccuLoad IV.

Command

Current transaction:

- AT_XX: cumulative transaction additive volume

- AT_XX_Z: total additive, by volume type, of transaction in progress if that type is available

Local storage transaction:

- AT_XX_NNN: total additive in an historic transaction

- AT_XX_Z_NNN: total additive, by volume type, in an historic transaction for flow-controlled additives

where:

- XX = 1 through 44 (additive number)

- Z = R (raw total); G (GV total); N (GST total); M (mass total)

- NNN = number of transactions back into local storage to retrieve the data

Response

Good responses are:

- Current transaction

  - AT_XX_YY_VVVVV.VVV for AT_XX

- AT_XX_YY_Z_VVVVV.VVV for AT_XX_Z

- Local storage transaction

  - AT_XX_YY_VVVVV.VVV_NNN for AT_XX_YY_NN

  - AT_XX_YY_Z_VVVVV.VVV_NNN for AT_XX_YY_Z_NNN

where:

- XX = 01 through 44 (additive number)

- YY = total number of batches completed

- VVVVV.VVV = total additive transaction

- Z =

  - R for raw or indicated (IV) total

  - G for gross (GV) total

  - N for gross at standard temperature (GST) total

  - M for mass total

  - NNN = number of transactions back into local storage to retrieve the data

Error response is NOXX = additive volume cannot be reported

Remarks

None

Constraints

Volume units are assumed as the type programmed into AccuLoad IV. Additive must be assigned to the arm that is addressed. Volume types are available for flow control additives only.

Special Case

If bays are configured, the returned value is the bay transaction total

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.7 Command Code AU: Authorize Transaction

This command authorizes a transaction at the AccuLoad IV. The AccuLoad will continue to display ready until the set key is pressed, then the preset or recipe selection prompt will be displayed.

Command

- AU: authorize AccuLoad

- AU_A1A2A3A4A5A6: authorize AccuLoad with selected additives 1-24

- AU_A1A2A3A4A5A6A7A8A9A10A11: authorize AccuLoad with selected additives 1-44 *(new in revision 1.9)*

where A1A2A3... = the optional additive selection code.

If the 6-character format is used for the additive selection field and any additives from 25-44 are configured, they will not be enabled. This format remains available for backward compatibility with existing systems.

See section 4.4: Command Code AP: Authorize Transaction to Preset on page 19

Responses

- Good response is OK: the AccuLoad IV has been authorized for the transaction.

- Error response is NOXX: the transaction was not authorized.

> **Note:** NO30 will be returned if the additive specified is not currently allocated to the arm to which the command was directed.

Remarks

- If the additive qualifier (A1A2…) is not used, the additive selection will operate as currently programmed in the AccuLoad IV. For authorization with additives, only one recipe may be allotted. Additives selected in the qualifier must be programmed for use.

- If more than one recipe is enabled, the Select Recipe prompt will be displayed.

Constraints

The AU will reset the transaction done, batch done and keypad pending flags. Additive must be assigned to the arm that is being authorized.

Special Case

None

Command Modes

Poll and authorize

4.8 Command Code AV: Request Additive Volumes by Batch

This command retrieves additive batch volumes from AccuLoad IV.

Command

Current transaction:

- AV_XX: total additive of batch in progress (delivery type for flow-controlled additive)

- AV_XX_Z: total additive, by volume type, of batch in progress if that type is available

- AV_XX_YY: total additive of a specified batch

- AV_XX_YY_Z: total additive of specified batch, specified volume type if volume was stored

Local storage transaction:

- AV_XX_YY_NNN: total additive of a specified batch in an historic transaction

- AV_XX_YY_Z_NNN: total additive, volume type, of specified batch in a historic transaction for flow-controlled additives

where:

- XX = 01 through 44 (additive number)

- YY = batch number requested

- Z =

  - G (GV total)

  - N (GST total)

  - M (mass total)

  - NNN = number of transactions back into local storage to retrieve the data

  - R (raw total)

Responses

Good responses:

- AV_XX_YY_VVVVV.VVV for AV_XX; AV_XX_YY

- AV_XX_Z_VVVVV.VVV for AV_XX_Z

- AV_XX_YY_Z_VVVVV.VVV; For AV_XX_YY_Z

Local storage transaction:

- AV_XX_YY_VVVVV.VVV_NNN for AV_XX_YY_NN

- AV_XX_YY_Z_VVVVV.VVV_NNN for AV_XX_YY_Z_NNN

where:

- XX = one through 44 (additive number)

- YY = batch number requested

- R = raw or indicated (IV) total

- G = gross (GV) total

- N = gross at standard temperature (GST) total

- M = mass total

- VVVVV.VVV = total additive batch volume

- NNN= number of transactions back into local storage to retrieve the data

Error response is NOXX

Remarks

If bays are configured, the AV for the current batch returns the current batch on the arm addressed (or NO39 if no batch is in progress for the arm). For an AV command for a completed batch, the batch argument specified in the batch is the bay-based transaction and may return a batch completed on an arm that is not the arm being addressed.

Constraints

Volume units are assumed as the type programmed into AccuLoad IV. Volume types are available for flow-controlled additives only.

Special Case

None

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.9 Command Code BA: Bay Assignment

This command retrieves the position of each arm in the bay.

Command

BA: bay assignment

Responses

Good response is BA_A1A2A3A4A5A6, where A*n* is one of the following characters representing the position of arm *n* :

- A = bay A

- B = bay B

- ? = in transit

Error response is NOXX

Remarks, Constraints, and Special Case

None

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.10 Command Code BR: Boolean/Algebraic Variable Read

This command retrieves the Boolean/algebraic data from AccuLoad IV.

Command

BR_X_YYY: reads the Boolean/algebraic variable, where:

- X =
    - F = algebraic variable (single precision, floating point)
    - B = Boolean variable
    - T = timer variable
    - S = string
- YYY = variable number

Responses

Good response is BR_X_YYY_D…D, where:

- X =
    - F = algebraic variable (single precision, floating point)
    - B = Boolean variable
    - T = timer variable
    - S = string
- YYY = variable number
- D...D = the data is zero to 255 for Boolean variables and numeric string for algebraic and timer variables

Error response is NOXX

Remarks

String variables can be up to 32 characters in length.

Constraints and Special Case

None

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.11 Command Code BW: Boolean/Algebraic Variable Write

This command writes to the Boolean/algebraic registers in AccuLoad IV.

Command

BW_X_YYY_D…D : writes to the Boolean/algebraic registers, where:

- X:

    - F = algebraic variable (single precision, floating point)

    - B = Boolean variable

    - T = timer variable

    - A = set user alarm (Leave off _D…D)

    - S = string

- YYY = variable number

- D…D = the data is up to 255 for Boolean variables and numeric floating point string for algebraic and timer variables (no radix point allowed for timer variables).

Responses

Good response is OK.

Error response is NOXX.

Remarks

String variables can be up to 32 characters in length.

Constraints and Special Case

None

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.12 Command Code CD: Card Reader Data

This command returns card reader data to the host.

Command

- CD

- CD_C1C2

- CD_NNN

- CD_V

where:

- C1C2 (optional) is a two-character bitmap

- NNN (optional) is the number of transactions back in storage

Responses

Good responses:

- CD_S1_HHHHHHHHH for CD (and CD_C1C2 when no card read error)

- CD_VVVVVV_K

- CD_VVVVVV_K for CD_V

- CD_S1 for CD_C1C2 (when card read error)

- CD_HHH_N…_NNN for CD_NNN

where:

- S1 is a one-character status indication—0 = data good

- S1 = 1—timed out (after three seconds from the time the card was swiped)

- HHHHHHHHH is the data encoded on the card

- NNN is the number of transactions back

- Both 26-bit and 37-bit card data formats are supported

- VVVVVV is the tag ID returned for the vehicle or the entered response to the prompt for vehicle ID

- K is a terminating character; R - if data comes from a Nedap reader; E - if entered as a prompt response

- For the 26-bit data format, the nine characters of card data are returned as follows: 002NNXXXX, where:

  - 002 is fixed and is added to the data read from the card

  - NN is the facility code in hexadecimal (decimal range is 0 to 255)

  - XXXX is the card ID in hexadecimal (decimal range is 0 to 65535)

  - For the 37-bit data format, the nine characters of card data can consist of any digits 0 through 9 and letters A through F

Remarks and Special Case

None

Constraints

- Override bit must be set to control I/O on the card reader

- Override bit cleared returns control of the I/O to the card reader; red and green LED bits both on results in an amber LED on reader

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

Table 33: CD Command, Optional Character C1

Character		Hex Value			
Char	Hex	0x08 Override I/O Control	0x04 Override I/O Control	0x02 Override I/O Control	0x01 Override I/O Control
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
:	3A	X		X	
;	3B	X		X	X
<	3C	X	X		
=	3D	X	X		X
>	3E	X	X	X	
?	3F	X	X	X	X

Note: Override bit must be set to control I/O on card reader. Override bit cleared returns control of these I/O to the card reader.

Table 34: CD Command, Optional Character C2

Character		Hex Value			
Char	Hex	0x08 Contact Closed	0x04 Beep	0x02 Red LED On	0x01 Green LED On
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
:	3A	X		X	
;	3B	X		X	X
<	3C	X	X		
=	3D	X	X		X
>	3E	X	X	X	
?	3F	X	X	X	X

Note: Red and green LED both on; amber LED on reader.

Table 35: Response to CD Command, Character S1

Character		Hex Value			
Char	Hex	0x08 Reserved for Future Use	0x04 Reserved for Future Use	0x02 Card Validated	0x01 Card Read Error
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
:	3A	X		X	
;	3B	X		X	X
<	3C	X	X		
=	3D	X	X		X
>	3E	X	X	X	
?	3F	X	X	X	X

4.13 Command Code CF: AccuLoad Configuration

This command provides the hardware configuration of the requested AccuLoad. The first character is "1" if an A4B is installed in the unit and communicating. The second character is always "1".

Command

CF

Responses

Good response is CF_XY, where:

- X = A4B status

- Y = always "1"

Error response is NOXX.

Remarks

These parameters may take one of two values. An ASCII zero indicates the feature is not present, while an ASCII 1 indicates that the feature is present.

> **Note:** A host should allow for future expansion of the argument field in this response as additional optional features may be added in later revisions.

Example: An AccuLoad IV-QT is configured as a six-product ratio blender. The response should be CF 11.

Constraints and Special Case

None

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.14 Command Code CP: Request Contaminant Percentage

This command requests the percentage of contaminant from the AccuLoad IV.

Command

Current transaction:

- CP: current percentage of contaminant for the current batch

- CP_YY: percentage of contaminant for a specified batch

Local storage:

- CP_YY_NNN: returns the requested percentage of contaminant for a previously completed batch, where:

- YY = batch number (01 to 10)

- NNN = number of transactions back into local storage to retrieve data

Responses

Good response is CP_YY_XXX.X.

Local storage is CP_YY_XXX.X_NNN, where:

- YY = batch number (01 to 10)

- XXX.X = percentage of contaminant

- NNN = number of transactions back into local storage to retrieve data

Error response is NOXX: the percentage of contaminant was not read, where:

XX =

- 03: value rejected

- 05: no transaction ever done

- 19: option not installed

Remarks and Special Case
None

Constraints

Applies to arms configured as unloading arms only. Other arm configurations will result in NO19 being returned.

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.15 Command Code DA: Release Keypad and Display

This command returns the control of the keypad and display to the AccuLoad IV.

Command

DA

Responses

Good response is OK = keypad and display have been released to the AccuLoad IV and the keypad data pending flag is reset.

Error response is NOXX = the keypad and display were not released.

Remarks and Special Case

None

Constraints

A NO01 response will be returned if another arm is in the program mode locally or via communications.

Command Modes

- Poll and authorize

- Remote control

4.16 Command Code DD: Delete Driver Data

This command removes a driver and/or card from the list in the AccuLoad IV. It modifies the current run database but does not update the table in non-volatile memory. After any combination of DI and DD commands are sent, the DU command should be used to make the changes permanent by writing the data to non-volatile (flash) memory.

Command

DD_HHHH...H:

where HHHH...H = the ID number of the record to delete.

Responses

Good response is OK.

Error response is NOXX.

Remarks, Constraints, and Special Case

None

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.17 Command Code DI: Insert Driver Data

The DI command inserts (adds) a driver record to the driver database in the AccuLoad IV. It modifies the current run database but does not update the table in non-volatile memory. After any combination of DI and DD commands are sent, the DU command should be used to make the changes permanent by writing the data to non-volatile (flash) memory.

Command

DI_HHHH...H:

where HHHH...H = the driver and/or card data value for the new record.

Responses

Good response is OK.

Error response is NOXX.

Remarks, Constraints, and Special Case

None

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.18 Command Code DQ: Query Driver Data

The DQ command returns the driver and/or card data for the specified record index. This command is included to allow a host to retrieve the list of valid records from the AccuLoad IV. Note that the index for any one entry may change when records have been inserted or deleted, as they are maintained in sorted order internally.

Command

DQ_NNN:

where NNN = the index of the database record that is being requested.

Responses

Good response is DQ_HHHH…H.

where HHHH...H = the data for the requested record.

Error response is NOXX.

Remarks, Constraints, and Special Case

None.

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.19 Command Code DS: Display Density Sample

This command retrieves one of ten density samples from the AccuLoad IV for the current batch.

Command

DS_X: for the current batch, returns the density sample requested, where:

X = specific density sample (0-9).

Responses

Good response is DS_X_VVVV.V, where:

- X = 0-9, number of density sample

- VVVV.V = density of sample in programmed density units

Error response is NOXX, where:

- XX:

    - 00 = invalid command

    - 03 = value out of range

    - 37 = data not available

Remarks, Constraints, and Special Case
None

Command Modes
- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.20 Command Code DU: Update Driver Database

The DU command rebuilds the driver card data table in non-volatile memory, after freeing any memory used by deleted records and re-sorting the table by card number. This command is to be used by the host after the host has issued any combination of DI or DD commands to modify the driver card database at the AccuLoad IV. Failure to issue this command after modifying the database via DI or DD will cause those changes to be lost if the AccuLoad is powered down.

Command

DU

Responses

Good response is OK.

Error response is NOXX.

Remarks, Constraints, and Special Case

None

Command Modes

- Polling only
- Poll and authorize
- Remote control
- Poll and program

4.21 Command Code DY: Request Dynamic Display Values

This command retrieves a current dynamic display value from the AccuLoad IV.

Command

DY_ddxx, where:

- dd = dynamic display type

- SY = system

- IN = injector

- P1 = product #1

- P2 = product #2

- P3 = product #3

- P4 = product #4

- P5 = product #5

- P6 = product #6

- CP = current product (straight and sequential blending only)

- RR = recipe number (01-50 for a specific recipe)

- Bz = batch, where z is 1…9 for batches 1-9, and A for batch 10

- CB = current batch

- CR = current recipe

- TR = transaction

- FA = flow controlled additives

- xx = variable number to access

Responses

Good response is DY_V..V_D..D, where:

- V..V = the value of the variable

- D..D = description of the variable (may contain spaces)

Error response is NOXX = requested display not returned.

Remarks

No response exceeds 31 characters.

For bay configurations, the following information applies:

1. All additives on the bay can be accessed via any valid arm address located on the bay.

2. Batch values are for the bay-based batch.

3. Not all transaction DY values are available when bays are configured. For example: average temperature, pressure, meter factor, etc.

Constraints

- NO06 will be returned if the requested batch has not been delivered (Bz qualifier).

- NO05 will be returned if there is no transaction in progress and no transaction has ever been done (TR qualifier).

- NO30 will be returned if a product or recipe is requested which is not currently allocated to the arm to which the command was directed.

- NO31 will be returned if the command format does not match the current configuration for the arm.

Special Case

None

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

Table 36: System DY_SYxx Dynamic Display Values

Index (xx)	Description		Response
00	Current Flow Rate Units/Min, Arm 1	DY Flow (Arm 1)	XXXXX.X Gal/Min
01	Current Flow Rate Units/Min, Arm 2	DY Flow (Arm 2)	XXXXX.X Gal/Min
02	Current Flow Rate Units/Min, Arm 3	DY Flow (Arm 3)	XXXXX.X Gal/Min
03	Current Flow Rate Units/Min, Arm 4	DY Flow (Arm 4)	XXXXX.X Gal/Min
04	Current Flow Rate Units/Min, Arm 5	DY Flow (Arm 5)	XXXXX.X Gal/Min
05	Current Flow Rate Units/Min, Arm 6	DY Flow (Arm 6)	XXXXX.X Gal/Min
06	Current Flow Rate Units/Hr, Arm 1	DY Flow (Arm 1)	XXXXXXX.X Gal/Hr
07	Current Flow Rate Units/Hr, Arm 2	DY Flow (Arm 2)	XXXXXXX.X Gal/Hr
08	Current Flow Rate Units/Hr, Arm 3	DY Flow (Arm 3)	XXXXXXX.X Gal/Hr
09	Current Flow Rate Units/Hr, Arm 4	DY Flow (Arm 4)	XXXXXXX.X Gal/Hr
10	Current Flow Rate Units/Hr, Arm 5	DY Flow (Arm 5)	XXXXXXX.X Gal/Hr
11	Current Flow Rate Units/Hr, Arm 6	DY Flow (Arm 6)	XXXXXXX.X Gal/Hr
12	Current Recipe Name, Arm 1	DY Recipe (Arm 1)	XXXXXXXXX
13	Current Recipe Name, Arm 2	DY Recipe (Arm 2)	XXXXXXXXX
14	Current Recipe Name, Arm 3	DY Recipe (Arm 3)	XXXXXXXXX
15	Current Recipe Name, Arm 4	DY Recipe (Arm 4)	XXXXXXXXX
16	Current Recipe Name, Arm 5	DY Recipe (Arm 5)	XXXXXXXXX
17	Current Recipe Name, Arm 6	DY Recipe (Arm 6)	XXXXXXXXX
18	Current Preset, Arm 1	DY Preset (Arm 1)	XXXXXX Gal
19	Current Preset, Arm 2	DY Preset (Arm 2)	XXXXXX Gal
20	Current Preset, Arm 3	DY Preset (Arm 3)	XXXXXX Gal
21	Current Preset, Arm 4	DY Preset (Arm 4)	XXXXXX Gal
22	Current Preset, Arm 5	DY Preset (Arm 5)	XXXXXX Gal
23	Current Preset, Arm 6	DY Preset (Arm 6)	XXXXXX Gal
24	Current Delivered Volume, Arm 1	DY Arm 1 Delivered	XXXXXX.XX Gal
25	Current Delivered Volume, Arm 2	DY Arm 2 Delivered	XXXXXX.XX Gal
26	Current Delivered Volume, Arm 3	DY Arm 3 Delivered	XXXXXX.XX Gal
27	Current Delivered Volume, Arm 4	DY Arm 4 Delivered	XXXXXX.XX Gal
28	Current Delivered Volume, Arm 5	DY Arm 5 Delivered	XXXXXX.XX Gal
29	Current Delivered Volume, Arm 6	DY Arm 6 Delivered	XXXXXX.XX Gal
30	Current Remaining Volume, Arm 1	DY Arm 1 Remaining	XXXXXX.XX Gal
31	Current Remaining Volume, Arm 2	DY Arm 2 Remaining	XXXXXX.XX Gal
32	Current Remaining Volume, Arm 3	DY Arm 3 Remaining	XXXXXX.XX Gal
33	Current Remaining Volume, Arm 4	DY Arm 4 Remaining	XXXXXX.XX Gal
34	Current Remaining Volume, Arm 5	DY Arm 5 Remaining	XXXXXX.XX Gal
35	Current Remaining Volume, Arm 6	DY Arm 6 Remaining	XXXXXX.XX Gal
36	Time of Last Power Fail	DY Pwr Fail	MM-DD-YY HH:MM:SS

Table 37: Injector DY_INxx Dynamic Displays

> **Note:** If injectors 1 through 4 are flow control type, responses to DY_INXX appear in the table immediately following the table below.

Index (xx)	Description	Response	
00	Injector 1 Current Pulse Rate	DY Inj 1 Cal	XXXX.XX
01	Injector 2 Current Pulse Rate	DY Inj 2 Cal	XXXX.XX
02	Injector 3 Current Pulse Rate	DY Inj 3 Cal	XXXX.XX
03	Injector 4 Current Pulse Rate	DY Inj 4 Cal	XXXX.XX
04	Injector 5 Current Pulse Rate	DY Inj 5 Cal	XXXX.XX
05	Injector 6 Current Pulse Rate	DY Inj 6 Cal	XXXX.XX
06	Injector 7 Current Pulse Rate	DY Inj 7 Cal	XXXX.XX
07	Injector 8 Current Pulse Rate	DY Inj 8 Cal	XXXX.XX
08	Injector 9 Current Pulse Rate	DY Inj 9 Cal	XXXX.XX
09	Injector 10 Current Pulse Rate	DY Inj 10 Cal	XXXX.XX
10	Injector 11 Current Pulse Rate	DY Inj 11 Cal	XXXX.XX
11	Injector 12 Current Pulse Rate	DY Inj 12 Cal	XXXX.XX
12	Injector 13 Current Pulse Rate	DY Inj 13 Cal	XXXX.XX
13	Injector 14 Current Pulse Rate	DY Inj 14 Cal	XXXX.XX
14	Injector 15 Current Pulse Rate	DY Inj 15 Cal	XXXX.XX
15	Injector 16 Current Pulse Rate	DY Inj 16 Cal	XXXX.XX
16	Injector 17 Current Pulse Rate	DY Inj 17 Cal	XXXX.XX
17	Injector 18 Current Pulse Rate	DY Inj 18 Cal	XXXX.XX
18	Injector 19 Current Pulse Rate	DY Inj 19 Cal	XXXX.XX
19	Injector 20 Current Pulse Rate	DY Inj 20 Cal	XXXX.XX
20	Injector 21 Current Pulse Rate	DY Inj 21 Cal	XXXX.XX
21	Injector 22 Current Pulse Rate	DY Inj 22 Cal	XXXX.XX
22	Injector 23 Current Pulse Rate	DY Inj 23 Cal	XXXX.XX
23	Injector 24 Current Pulse Rate	DY Inj 24 Cal	XXXX.XX
24	Injector 1 Programmed Pulse Rate	DY Inj 1 Prg	XXXX.XX
25	Injector 2 Programmed Pulse Rate	DY Inj 2 Prg	XXXX.XX
26	Injector 3 Programmed Pulse Rate	DY Inj 3 Prg	XXXX.XX
27	Injector 4 Programmed Pulse Rate	DY Inj 4 Prg	XXXX.XX
28	Injector 5 Programmed Pulse Rate	DY Inj 5 Prg	XXXX.XX
29	Injector 6 Programmed Pulse Rate	DY Inj 6 Prg	XXXX.XX
30	Injector 7 Programmed Pulse Rate	DY Inj 7 Prg	XXXX.XX
31	Injector 8 Programmed Pulse Rate	DY Inj 8 Prg	XXXX.XX
32	Injector 9 Programmed Pulse Rate	DY Inj 9 Prg	XXXX.XX
33	Injector 10 Programmed Pulse Rate	DY Inj 10 Prg	XXXX.XX
34	Injector 11 Programmed Pulse Rate	DY Inj 11 Prg	XXXX.XX
35	Injector 12 Programmed Pulse Rate	DY Inj 12 Prg	XXXX.XX
36	Injector 13 Programmed Pulse Rate	DY Inj 13 Prg	XXXX.XX
37	Injector 14 Programmed Pulse Rate	DY Inj 14 Prg	XXXX.XX
38	Injector 15 Programmed Pulse Rate	DY Inj 15 Prg	XXXX.XX

Index (xx)	Description	Response	
39	Injector 16 Programmed Pulse Rate	DY Inj 16 Prg	XXXX.XX
40	Injector 17 Programmed Pulse Rate	DY Inj 17 Prg	XXXX.XX
41	Injector 18 Programmed Pulse Rate	DY Inj 18 Prg	XXXX.XX
42	Injector 19 Programmed Pulse Rate	DY Inj 19 Prg	XXXX.XX
43	Injector 20 Programmed Pulse Rate	DY Inj 20 Prg	XXXX.XX
44	Injector 21 Programmed Pulse Rate	DY Inj 21 Prg	XXXX.XX
45	Injector 22 Programmed Pulse Rate	DY Inj 22 Prg	XXXX.XX
46	Injector 23 Programmed Pulse Rate	DY Inj 23 Prg	XXXX.XX
47	Injector 24 Programmed Pulse Rate	DY Inj 24 Prg	XXXX.XX
48	Injector 25 Current Pulse Rate	DY Inj 25 Cal	XXXX.XX
49	Injector 26 Current Pulse Rate	DY Inj 26 Cal	XXXX.XX
50	Injector 27 Current Pulse Rate	DY Inj 27 Cal	XXXX.XX
51	Injector 28 Current Pulse Rate	DY Inj 28 Cal	XXXX.XX
52	Injector 29 Current Pulse Rate	DY Inj 29 Cal	XXXX.XX
53	Injector 30 Current Pulse Rate	DY Inj 30 Cal	XXXX.XX
54	Injector 31 Current Pulse Rate	DY Inj 31 Cal	XXXX.XX
55	Injector 32 Current Pulse Rate	DY Inj 32 Cal	XXXX.XX
56	Injector 33 Current Pulse Rate	DY Inj 33 Cal	XXXX.XX
57	Injector 34 Current Pulse Rate	DY Inj 34 Cal	XXXX.XX
58	Injector 35 Current Pulse Rate	DY Inj 35 Cal	XXXX.XX
59	Injector 36 Current Pulse Rate	DY Inj 36 Cal	XXXX.XX
60	Injector 37 Current Pulse Rate	DY Inj 37 Cal	XXXX.XX
61	Injector 38 Current Pulse Rate	DY Inj 38 Cal	XXXX.XX
62	Injector 39 Current Pulse Rate	DY Inj 39 Cal	XXXX.XX
63	Injector 40 Current Pulse Rate	DY Inj 40 Cal	XXXX.XX
64	Injector 41 Current Pulse Rate	DY Inj 41 Cal	XXXX.XX
65	Injector 42 Current Pulse Rate	DY Inj 42 Cal	XXXX.XX
66	Injector 43 Current Pulse Rate	DY Inj 43 Cal	XXXX.XX
67	Injector 44 Current Pulse Rate	DY Inj 44 Cal	XXXX.XX
68	Injector 25 Programmed Pulse Rate	DY Inj 25 Prg	XXXX.XX
69	Injector 26 Programmed Pulse Rate	DY Inj 26 Prg	XXXX.XX
70	Injector 27 Programmed Pulse Rate	DY Inj 27 Prg	XXXX.XX
71	Injector 28 Programmed Pulse Rate	DY Inj 28 Prg	XXXX.XX
72	Injector 29 Programmed Pulse Rate	DY Inj 29 Prg	XXXX.XX
73	Injector 30 Programmed Pulse Rate	DY Inj 30 Prg	XXXX.XX
74	Injector 31 Programmed Pulse Rate	DY Inj 31 Prg	XXXX.XX
75	Injector 32 Programmed Pulse Rate	DY Inj 32 Prg	XXXX.XX
76	Injector 33 Programmed Pulse Rate	DY Inj 33 Prg	XXXX.XX
77	Injector 34 Programmed Pulse Rate	DY Inj 34 Prg	XXXX.XX
78	Injector 35 Programmed Pulse Rate	DY Inj 35 Prg	XXXX.XX
79	Injector 36 Programmed Pulse Rate	DY Inj 36 Prg	XXXX.XX
80	Injector 37 Programmed Pulse Rate	DY Inj 37 Prg	XXXX.XX
81	Injector 38 Programmed Pulse Rate	DY Inj 38 Prg	XXXX.XX

Index (xx)	Description	Response	
82	Injector 39 Programmed Pulse Rate	DY Inj 39 Prg	XXXX.XX
83	Injector 40 Programmed Pulse Rate	DY Inj 40 Prg	XXXX.XX
84	Injector 41 Programmed Pulse Rate	DY Inj 41 Prg	XXXX.XX
85	Injector 42 Programmed Pulse Rate	DY Inj 42 Prg	XXXX.XX
86	Injector 43 Programmed Pulse Rate	DY Inj 43 Prg	XXXX.XX
87	Injector 44 Programmed Pulse Rate	DY Inj 44 Prg	XXXX.XX

Table 38: Injector DY_INxx Responses for Flow Controlled Injector Type

Index (xx)	Description	Response	
00	Injector 1 Current Pulse Rate	DY Meter Inj 1	XXXX.X Gal/per min
01	Injector 2 Current Pulse Rate	DY Meter Inj 2	XXXX.X Gal/per min
02	Injector 3 Current Pulse Rate	DY Meter Inj 3	XXXX.X Gal/per min
03	Injector 4 Current Pulse Rate	DY Meter Inj 4	XXXX.X Gal/per min

Table 39: Product DY_PNxx Dynamic Display Values

Index (xx)	Description	Response	
00	Current Flow Rate, Units/Minute	DY Flow	XXXXX.X Gal/Min
01	Current Flow Rate, Units/Hour	DY Flow	XXXXXXX.X Gal/Hr
02	Batch Average Temperature	DY Batch Avg Temp	SXXXX.X F
03	Batch Average Density	DY Batch Avg Dens	XXXX.X Kg/M^3
04	Batch Average API	DY Batch Avg API	SXXX.X
05	Batch Average Reference Density	DY Avg Ref Dens	XXXX.X Lb/F^3
06	Batch Average Relative Density	DY Avg Rel Dens	X.XXXX
07	Batch Average Pressure	DY Batch Avg Press	XXXX.XX PSI
08	Batch Average Vapor Pressure	DY Avg Vapor Press	XXXX.XX PSI
09	Batch Average Meter Factor	DY Batch Avg Mtr Factor	X.XXXXX
10	Batch Average CTL	DY Batch Avg CTL	X.XXXXX
11	Batch Average CPL	DY Batch Avg CPL	X.XXXXX
12	Current Temperature	DY Temperature	SXXXX.X F
13	Current Density	DY Density	SXXXX.X Kg/M^3
14	Current Meter Factor	DY Cur Mtr Factor	X.XXXXX
15	Current Valve Requested Position	DY	Valve Requested Close
16	Current Percentage of Batch	DY Actual Blend	XXX %
17	Desired Percentage of Batch	DY Desired Blend	XXX %
18	Current Batch Raw Volume	DY IV Batch	XXXXXXX.XX Gal
19	Current Batch Gross Volume	DY GV Batch	XXXXXXX.XX Gal

Index (xx)	Description	Response	
20	Current Batch GST Volume	DY GST Batch	XXXXXXX.XX Gal
21	Current Batch GSV Volume	DY GSV Batch	XXXXXXX.XX Gal
22	Current Batch Mass Total	DY Mass Batch	XXXXXXX.XX Lbs
23	Transaction Raw Volume	DY IV Trans	XXXXXXX.XX Gal
24	Transaction Gross Volume	DY GV Trans	XXXXXXX.XX Gal
25	Transaction GST Volume	DY GST Trans	XXXXXXX.XX Gal
26	Transaction GSV Volume	DY GSV Trans	XXXXXXX.XX Gal
27	Transaction Mass Total	DY Mass Trans	XXXXXXX.XX Lbs
28	Current Reference Density (Calculated)	DY Cur Ref Dens	XXXX.X Lb/F^3
29	Batch Average CTPL	DY Batch Avg CTPL	X.XXXXX
30	Instantaneous Blend Percentage	DY Inst Blend	XXX.XX%
31	Deviation Count	DY Deviation Cnt	XXXXXXX.X
32	Ref Dens @ Ref Dens Temp	DY Ref Dens@DensTe	XXXX.XX Lb/Ft^3
33	Avg Rel Dens@60F & Prs E tables only (relative density @ 60 °F and current pressure) used in CPL calculation.	DY Avg Rel Dens@60F & Prs	X.XXXXX
34	Ethanol Grade (%v/v)	DY Ethanol Grade (%v/v)	X.XXX

Table 40: Recipe DY_DDxx Dynamic Display Values

Index (xx)	Description	Response	
00	Recipe Name and Number	DY Recipe	XXXXXXXXX
01	Transaction Indicated Volume	DY IV Recipe	XXXX.XX Gal
02	Transaction Gross Volume	DY GV Recipe	XXXX.XX Gal
03	Transaction GST Volume	DY GST Recipe	XXXX.XX Gal
04	Transaction GSV Volume	DY GSV Recipe	XXXX.XX Gal
05	Transaction Mass Total	DY Mass Recipe	XXXXX.XX lb

Table 41: Batch DY_BNxx Dynamic Display Values

Index (xx)	Description	Response	
00	Recipe Name and Number	DY Recipe	XXXXXXXX
01	Indicated (Raw) Batch Volume	DY IV Batch	XXXXXXX.XX Gal
02	Gross Batch Volume	DY GV Batch	XXXXXXX.XX Gal
03	GST Batch Volume	DY GST Batch	XXXXXXX.XX Gal
04	GSV Batch Volume	DY GSV Batch	XXXXXXX.XX Gal
05	Mass Batch Total	DY Mass Batch	XXXXXXXX.XX lb
06	Batch Average Temperature	DY Batch Avg Temp	SXXXX.XX F
07	Batch Average Density	DY Batch Avg Dens	XXX.XX Lb/F^3
08	Batch Average Pressure	DY Batch Avg Pres	XXXX.XX PSI
09	Batch Average Meter Factor	DY Batch Avg Mtr Factor	X.XXXXX
10	Batch Average CTL	DY Batch Avg CTL	X.XXXXX
11	Batch Average CPL	DY Batch Abv CPL	X.XXXXX
12	Additive #1 Batch Volume	DY Add 1 Batch	XXXXXXXX.XXX
13	Additive #2 Batch Volume	DY Add 2 Batch	XXXXXXXX.XXX
14	Additive #3 Batch Volume	DY Add 3 Batch	XXXXXXXX.XXX
15	Additive #4 Batch Volume	DY Add 4 Batch	XXXXXXXX.XXX
16	Additive #5 Batch Volume	DY Add 5 Batch	XXXXXXXX.XXX
17	Additive #6 Batch Volume	DY Add 6 Batch	XXXXXXXX.XXX
18	Additive #7 Batch Volume	DY Add 7 Batch	XXXXXXXX.XXX
19	Additive #8 Batch Volume	DY Add 8 Batch	XXXXXXXX.XXX
20	Additive #9 Batch Volume	DY Add 9 Batch	XXXXXXXX.XXX
21	Additive #10 Batch Volume	DY Add 10 Batch	XXXXXXXX.XXX
22	Additive #11 Batch Volume	DY Add 11 Batch	XXXXXXXX.XXX
23	Additive #12 Batch Volume	DY Add 12 Batch	XXXXXXXX.XXX
24	Additive #13 Batch Volume	DY Add 13 Batch	XXXXXXXX.XXX
25	Additive #14 Batch Volume	DY Add 14 Batch	XXXXXXXX.XXX
26	Additive #15 Batch Volume	DY Add 15 Batch	XXXXXXXX.XXX
27	Additive #16 Batch Volume	DY Add 16 Batch	XXXXXXXX.XXX
28	Additive #17 Batch Volume	DY Add 17 Batch	XXXXXXXX.XXX
29	Additive #18 Batch Volume	DY Add 18 Batch	XXXXXXXX.XXX
30	Additive #19 Batch Volume	DY Add 19 Batch	XXXXXXXX.XXX
31	Additive #20 Batch Volume	DY Add 20 Batch	XXXXXXXX.XXX
32	Additive #21 Batch Volume	DY Add 21 Batch	XXXXXXXX.XXX
33	Additive #22 Batch Volume	DY Add 22 Batch	XXXXXXXX.XXX
34	Additive #23 Batch Volume	DY Add 23 Batch	XXXXXXXX.XXX
35	Additive #24 Batch Volume	DY Add 24 Batch	XXXXXXXX.XXX
36	Additive #25 Batch Volume	DY Add 25 Batch	XXXXXXXX.XXX
37	Additive #26 Batch Volume	DY Add 26 Batch	XXXXXXXX.XXX
38	Additive #27 Batch Volume	DY Add 27 Batch	XXXXXXXX.XXX
39	Additive #28 Batch Volume	DY Add 28 Batch	XXXXXXXX.XXX
40	Additive #29 Batch Volume	DY Add 29 Batch	XXXXXXXX.XXX
41	Additive #30 Batch Volume	DY Add 30 Batch	XXXXXXXX.XXX

Index (xx)	Description	Response	
42	Additive #31 Batch Volume	DY Add 31 Batch	XXXXXXXX.XXX
43	Additive #32 Batch Volume	DY Add 32 Batch	XXXXXXXX.XXX
44	Additive #33 Batch Volume	DY Add 33 Batch	XXXXXXXX.XXX
45	Additive #34 Batch Volume	DY Add 34 Batch	XXXXXXXX.XXX
46	Additive #35 Batch Volume	DY Add 35 Batch	XXXXXXXX.XXX
47	Additive #36 Batch Volume	DY Add 36 Batch	XXXXXXXX.XXX
48	Additive #37 Batch Volume	DY Add 37 Batch	XXXXXXXX.XXX
49	Additive #38 Batch Volume	DY Add 38 Batch	XXXXXXXX.XXX
50	Additive #39 Batch Volume	DY Add 39 Batch	XXXXXXXX.XXX
51	Additive #40 Batch Volume	DY Add 40 Batch	XXXXXXXX.XXX
52	Additive #41 Batch Volume	DY Add 41 Batch	XXXXXXXX.XXX
53	Additive #42 Batch Volume	DY Add 42 Batch	XXXXXXXX.XXX
54	Additive #43 Batch Volume	DY Add 43 Batch	XXXXXXXX.XXX
55	Additive #44 Batch Volume	DY Add 44 Batch	XXXXXXXX.XXX

Table 42: Transaction "DY_TRxx" Dynamic Display Values

Index (xx)	Description	Response	
00	Recipe Name and Number	DY Multiple Recipes	
01	Indicated (Raw) Transaction Volume	DY IV Trans	XXXXXXX.XX Gal
02	Gross Transaction Volume	DY GV Trans	XXXXXXX.XX Gal
03	GST Transaction Volume	DY GST Trans	XXXXXXX.XX Gal
04	GSV Transaction Volume	DY GSV Trans	XXXXXXX.XX Gal
05	Mass Transaction Totals	DY Mass Trans	XXXXXXX.XX Gal
06	Transaction Average Temperature	DY Trans Avg Temp	SXXXX.X F
07	Transaction Average Density	DY Trans Avg Dens	XXXX.X Lb/F^3
08	Transaction Average Pressure	DY Trans Avg Pres	XXXX.X PSI
09	Transaction Average Meter Factor	DY Trans Avg Mtr Factor	X.XXXXX
10	Transaction Average CTL	DY Trans Avg CTL	X.XXXXX
11	Transaction Average CPL	DY Trans Avg CPL	X.XXXXX
12	Additive #1 Transaction Volume	DY Add 1 Trans	XXXXXXXX.XXX
13	Additive #2 Transaction Volume	DY Add 2 Trans	XXXXXXXX.XXX
14	Additive #3 Transaction Volume	DY Add 3 Trans	XXXXXXXX.XXX
15	Additive #4 Transaction Volume	DY Add 4 Trans	XXXXXXXX.XXX
16	Additive #5 Transaction Volume	DY Add 5 Trans	XXXXXXXX.XXX
17	Additive #6 Transaction Volume	DY Add 6 Trans	XXXXXXXX.XXX
18	Additive #7 Transaction Volume	DY Add 7 Trans	XXXXXXXX.XXX
19	Additive #8 Transaction Volume	DY Add 8 Trans	XXXXXXXX.XXX
20	Additive #9 Transaction Volume	DY Add 9 Trans	XXXXXXXX.XXX
21	Additive #10 Transaction Volume	DY Add 10 Trans	XXXXXXXX.XXX
22	Additive #11 Transaction Volume	DY Add 11 Trans	XXXXXXXX.XXX
23	Additive #12 Transaction Volume	DY Add 12 Trans	XXXXXXXX.XXX
24	Additive #13 Transaction Volume	DY Add 13 Trans	XXXXXXXX.XXX
25	Additive #14 Transaction Volume	DY Add 14 Trans	XXXXXXXX.XXX
26	Additive #15 Transaction Volume	DY Add 15 Trans	XXXXXXXX.XXX

Index (xx)	Description	Response	
27	Additive #16 Transaction Volume	DY Add 16 Trans	XXXXXXXX.XXX
28	Additive #17 Transaction Volume	DY Add 17 Trans	XXXXXXXX.XXX
29	Additive #18 Transaction Volume	DY Add 18 Trans	XXXXXXXX.XXX
30	Additive #19 Transaction Volume	DY Add 19 Trans	XXXXXXXX.XXX
31	Additive #20 Transaction Volume	DY Add 20 Trans	XXXXXXXX.XXX
32	Additive #21 Transaction Volume	DY Add 21 Trans	XXXXXXXX.XXX
33	Additive #22 Transaction Volume	DY Add 22 Trans	XXXXXXXX.XXX
34	Additive #23 Transaction Volume	DY Add 23 Trans	XXXXXXXX.XXX
35	Additive #24 Transaction Volume	DY Add 24 Trans	XXXXXXXX.XXX
36	Additive #25 Transaction Volume	DY Add 25 Trans	XXXXXXXX.XXX
37	Additive #26 Transaction Volume	DY Add 26 Trans	XXXXXXXX.XXX
38	Additive #27 Transaction Volume	DY Add 27 Trans	XXXXXXXX.XXX
39	Additive #28 Transaction Volume	DY Add 28 Trans	XXXXXXXX.XXX
40	Additive #29 Transaction Volume	DY Add 29 Trans	XXXXXXXX.XXX
41	Additive #30 Transaction Volume	DY Add 30 Trans	XXXXXXXX.XXX
42	Additive #31 Transaction Volume	DY Add 31 Trans	XXXXXXXX.XXX
43	Additive #32 Transaction Volume	DY Add 32 Trans	XXXXXXXX.XXX
44	Additive #33 Transaction Volume	DY Add 33 Trans	XXXXXXXX.XXX
45	Additive #34 Transaction Volume	DY Add 34 Trans	XXXXXXXX.XXX
46	Additive #35 Transaction Volume	DY Add 35 Trans	XXXXXXXX.XXX
47	Additive #36 Transaction Volume	DY Add 36 Trans	XXXXXXXX.XXX
48	Additive #37 Transaction Volume	DY Add 37 Trans	XXXXXXXX.XXX
49	Additive #38 Transaction Volume	DY Add 38 Trans	XXXXXXXX.XXX
50	Additive #39 Transaction Volume	DY Add 39 Trans	XXXXXXXX.XXX
51	Additive #40 Transaction Volume	DY Add 40 Trans	XXXXXXXX.XXX
52	Additive #41 Transaction Volume	DY Add 41 Trans	XXXXXXXX.XXX
53	Additive #42 Transaction Volume	DY Add 42 Trans	XXXXXXXX.XXX
54	Additive #43 Transaction Volume	DY Add 43 Trans	XXXXXXXX.XXX
55	Additive #44 Transaction Volume	DY Add 44 Trans	XXXXXXXX.XXX

Table 43: Flow Controlled Additives DY_FAxx Dynamic Display Values

Index (xx)	Description	Response	
00	Additive 1 Current Batch IV (Raw)	DY A1 IV Batch	XXXXX.XXX Gal
01	Additive 1 Current Batch GV (Gross)	DY A1 GV Batch	XXXXX.XXX Gal
02	Additive 1 Current Batch GST Volume	DY A1 GST Batch	XXXXX.XXX Gal
03	Additive 1 Current Batch Mass Total	DY A1 Mass Batch	XXXXXX.XXX lb
04	Additive 1 Current Batch Temperature	DY A1 Current Temp	XXX.X F
05	Additive 1 Batch Average Temperature	DY A1 Batch Avg Temp	XXX.X F
06	Additive 1 Batch Average Density	DY A1 Batch Avg Den	XXX.X Lb/ft^3
07	Additive 1 Batch Average CTL	DY A1 Batch Avg CTL	X.XXXX
08	Additive 1 IV (Raw) Transaction Total	DY A1 IV Trans	XXXXXX.XXX Gal
09	Additive 1 GV (Gross) Trans Total	DY A1 GV Trans	XXXXXX.XXX Gal
10	Additive 1 GST Transaction Total	DY A1 GST Trans	XXXXXX.XXX Gal
11	Additive 1 Mass Transaction Total	DY A1 Mass Trans	XXXXXX.XXX lb

Index (xx)	Description	Response	
12	Additive 2 Current Batch IV (Raw)	DY A2 IV Batch	XXXXX.XXX Gal
13	Additive 2 Current Batch GV (Gross)	DY A2 GV Batch	XXXXX.XXX Gal
14	Additive 2 Current Batch GST Volume	DY A2 GST Batch	XXXXX.XXX Gal
15	Additive 2 Current Batch Mass Total	DY A2 Mass Batch	XXXXXX.XXX lb
16	Additive 2 Current Batch Temperature	DY A2 Current Temp	XXX.X F
17	Additive 2 Batch Average Temperature	DY A2 Batch Avg Temp	XXX.X F
18	Additive 2 Batch Average Density	DY A2 Batch Avg Den	XXX.X Lb/ft^3
19	Additive 2 Batch Average CTL	DY A2 Batch Avg CTL	X.XXXX
20	Additive 2 IV (Raw) Transaction Total	DY A2 IV Trans	XXXXXX.XXX Gal
21	Additive 2 GV (Gross) Trans Total	DY A2 GV Trans	XXXXXX.XXX Gal
22	Additive 2 GST Transaction Total	DY A2 GST Trans	XXXXXX.XXX Gal
23	Additive 2 Mass Transaction Total	DY A2 Mass Trans	XXXXXX.XXX lb
24	Additive 3 Current Batch IV (Raw)	DY A3 IV Batch	XXXXX.XXX Gal
25	Additive 3 Current Batch GV (Gross)	DY A3 GV Batch	XXXXX.XXX Gal
26	Additive 3 Current Batch GST Volume	DY A3 GST Batch	XXXXX.XXX Gal
27	Additive 3 Current Batch Mass Total	DY A3 Mass Batch	XXXXXX.XXX lb
28	Additive 3 Current Batch Temperature	DY A3 Current Temp	XXX.X F
29	Additive 3 Batch Average Temperature	DY A3 Batch Avg Temp	XXX.X F
30	Additive 3 Batch Average Density	DY A3 Batch Avg Den	XXX.X Lb/ft^3
31	Additive 3 Batch Average CTL	DY A3 Batch Avg CTL	X.XXXX
32	Additive 3 IV (Raw) Transaction Total	DY A3 IV Trans	XXXXXX.XXX Gal
33	Additive 3 GV (Gross) Trans Total	DY A3 GV Trans	XXXXXX.XXX Gal
34	Additive 3 GST Transaction Total	DY A3 GST Trans	XXXXXX.XXX Gal
35	Additive 3 Mass Transaction Total	DY A3 Mass Trans	XXXXXX.XXX lb
36	Additive 4 Current Batch IV (Raw)	DY A4 IV Batch	XXXXX.XXX Gal
37	Additive 4 Current Batch GV (Gross)	DY A4 GV Batch	XXXXX.XXX Gal
38	Additive 4 Current Batch GST Volume	DY A4 GST Batch	XXXXX.XXX Gal
39	Additive 4 Current Batch Mass Total	DY A4 Mass Batch	XXXXXX.XXX lb
40	Additive 4 Current Batch Temperature	DY A4 Current Temp	XXX.X F
41	Additive 4 Batch Average Temperature	DY A4 Batch Avg Temp	XXX.X F
42	Additive 4 Batch Average Density	DY A4 Batch Avg Den	XXX.X Lb/ft^3
43	Additive 4 Batch Average CTL	DY A4 Batch Avg CTL	X.XXXX
44	Additive 4 IV (Raw) Transaction Total	DY A4 IV Trans	XXXXXX.XXX Gal
45	Additive 4 GV (Gross) Trans Total	DY A4 GV Trans	XXXXXX.XXX Gal
46	Additive 4 GST Transaction Total	DY A4 GST Trans	XXXXXX.XXX Gal
47	Additive 4 Mass Transaction Total	DY A4 Mass Trans	XXXXXX.XXX lb

4.22 Command Code EA: Enquire Alarms

This command requests the alarm status from the AccuLoad IV (short form).

Command

EA_DD: request alarm status of directory, where:

- DD = directory specification
- SY = system
- SE = system (extended) (added in revision 1.9)
- P1 = product 1
- P2 = product 2
- P3 = product 3
- P4 = product 4
- P5 = product 5
- P6 = product 6
- AR = arm
- IN = injector 1-24
- I2 = injector 25-44 (added in revision 1.9)
- M1 = meter 1
- M2 = meter 2 (ratio, hybrid blending configuration only)
- M3 = meter 3 (ratio, hybrid blending configuration only)
- M4 = meter 4 (ratio, hybrid blending configuration only)
- M5 = meter 5 (ratio, hybrid blending configuration only)
- M6 = meter 6 (ratio, hybrid blending configuration only)
- RR = recipe

Responses

Good responses:

- EA_SY_A1A2A3A4A5A6A8A9A10A11 = 11 characters for system

- "EA_SE_A1A2A3A4A5A6A8A9A10A11A12A13A14A15" = 15 characters for system extended (characters A1-A11 are the same as in the EA_SY response)

- EA_Px_A1A2A3A4 = four characters for products

- EA_AR_A1A2A3 = three characters for arm

- EA_IN_A1A2A3 … A83 = 83 characters for additive injectors 1 - 24

- EA_I2_A1A2A3 … A83 = 83 characters for additive injectors 25 - 44

- EA_Mx_A1A2A3 = three characters for meter

- EA_RR_A1 = one character for recipe

Error response is NOXX = alarm status cannot be reported.

Remarks

Allow for additional characters to be added to the end when alarms are added in the future.

Constraints

- NO30 will be returned if the meter, product, or additive specified is not currently configured to the arm which the request was sent.

- NO31 will be returned if the command format does not match the current configuration for the arm.

Special Case

None

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

Enquire Alarms Responses

Each of the characters (A1, A2, A3, etc.) in the response indicates the state of four separate alarms. Each character can be one of 16 values representing every possible combination of the four alarms. If none of the four alarms is active, a zero character will be returned and if all four alarms are active, a "?" character will be returned. See

for additional detail and the following table for each possible return character and value.

Table 44: Enquire Alarms Response: Decoding

Character	Alarm States (X=On, Blank=Off)			
Character (Hex Value)	Alarm #4	Alarm #3	Alarm #2	Alarm #1
0 (0x30)	Reserved	Reserved	Reserved	Reserved
1 (0x31)	Reserved	Reserved	Reserved	X
2 (0x32)	Reserved	Reserved	X	Reserved
3 (0x33)	Reserved	Reserved	X	X
4 (0x34)	Reserved	X	Reserved	Reserved
5 (0x35)	Reserved	X	Reserved	X
6 (0x36)	Reserved	X	X	Reserved
7 (0x37)	Reserved	X	X	X
8 (0x38)	X	Reserved	Reserved	Reserved
9 (0x39)	X	Reserved	Reserved	X
: (0x3A)	X	Reserved	X	Reserved
; (0x3B)	X	Reserved	X	X
< (0x3C)	X	X	Reserved	Reserved
= (0x3D)	X	X	Reserved	X
> (0x3E)	X	X	X	Reserved
? (0x3F)	X	X	X	X

Table 45: Enquire Alarms Response: System (first 11 characters) or System Extended (all 15 characters)

Character	Alarm #4	Alarm #3	Alarm #2	Alarm #1
A1				Firmware Error
A2	A4M Comm Failure	System Prog Error	Watchdog	Internal Error
A3	Communication Error	Power Fail	Passcode Reset	A4B Comm Failure
A4	User Alarm 1	Printer Fault	Shared Printer Error	Reserved
A5	User Alarm 5	User Alarm 4	User Alarm 3	User Alarm 2
A6	User Alarm 9	User Alarm 8	User Alarm 7	User Alarm 6
A7	Add-Pak #1 Diagnostic	Add-Pak #2 Power Fail	Add-Pak #1 Power Fail	User Alarm 10
A8	A4I #1 Comm Fault	A4I #2 Autodetect Fault	A4I #1 Autodetect Fault	Add-Pak #2 Diagnostic
A9	Excess Bay Arms	HMI B Fault	HMI A/Node Fault	A4I #2 Comm Fault
A10	Sening Comm Fault	Network Printer Fault	Reserved	Data Retention Fault
A11	Reserved	Reserved	Email Fault	Factory Diag Fault
A12	Add-Pak 4 Power Fail (A4)	Add-Pak 3 Power Fail (A3)	Add-Pak 4 Diagnostic (D4)	Add-Pak 3 Diagnostic (D3)
A13	A4I 4 Auto Detect (P4)	A4I 3 Auto Detect (P3)	A4I 4 Comm Fail (C4)	A4I 3 Comm Fail (C3)
A14	Reserved	Reserved	Reserved	Reserved
A15	Reserved	Reserved	Reserved	Reserved

Table 46: Enquire Alarms Response: Product

Character	Alarm #4	Alarm #3	Alarm #2	Alarm #1
A1	High Flow	High Density	Back Pressure	Product Program Error
A2	Low Flow	Low Density Alarm	High Temperature	High Pressure
A3	Overrun Alarm	Zero Flow	Low Temperature	Low Pressure
A4	Product Stop	Blend Low	Blend High	Block Valve

Table 47: Enquire Alarms Response: Arm

Character	Alarm #4	Alarm #3	Alarm #2	Alarm #1
A1	Arm Ticket Alarm	Arm Over-run	Arm Zero Flow Fault	Arm Programming Error
A2	Storage Full Alarm	Reserved	Additive Clean Line Alarm	Product Clean Line Alarm
A3	Max Arms Alarm	Report Storage Full	Card Removed Alarm	A4B Comm Failure

Table 48: Enquire Alarms Response: Injector

Character	Alarm #4	Alarm #3	Alarm #2	Alarm #1
A1	Injector 4 Feedback	Injector 3 Feedback	Injector 2 Feedback	Injector 1 Feedback
A2	Injector 8 Feedback	Injector 7 Feedback	Injector 6 Feedback	Injector 5 Feedback
A3	Injector 12 Feedback	Injector 11 Feedback	Injector 10 Feedback	Injector 9 Feedback
A4	Injector 16 Feedback	Injector 15 Feedback	Injector 14 Feedback	Injector 13 Feedback
A5	Injector 20 Feedback	Injector 19 Feedback	Injector 18 Feedback	Injector 17 Feedback
A6	Injector 24 Feedback	Injector 23 Feedback	Injector 22 Feedback	Injector 21 Feedback
A7	Injector 4 Comm Error	Injector 3 Comm Error	Injector 2 Comm Error	Injector 1 Comm
A8	Injector 8 Comm Error	Injector 7 Comm Error	Injector 6 Comm Error	Injector 5 Comm Error
A9	Injector 12 Comm Error	Injector 11 Comm Error	Injector 10 Comm Error	Injector 9 Comm Error
A10	Injector 16 Comm Error	Injector 15 Comm Error	Injector 14 Comm Error	Injector 13 Comm Error
A11	Injector 20 Comm Error	Injector 19 Comm Error	Injector 18 Comm Error	Injector 17 Comm Error
A12	Injector 24 Comm Error	Injector 23 Comm Error	Injector 22 Comm Error	Injector 21 Comm Error
A13	Injector 4 Low Additive Error	Injector 3 Low Additive Error	Injector 2 Low Additive Error	Injector 1 Low Additive Error
A14	Injector 8 Low Additive Error	Injector 7 Low Additive Error	Injector 6 Low Additive Error	Injector 5 Low Additive Error
A15	Injector 12 Low Additive Error	Injector 11 Low Additive Error	Injector 10 Low Additive Error	Injector 9 Low Additive Error
A16	Injector 16 Low Additive Error	Injector 15 Low Additive Error	Injector 14 Low Additive Error	Injector 13 Low Additive Error
A17	Injector 20 Low Additive Error	Injector 19 Low Additive Error	Injector 18 Low Additive Error	Injector 17 Low Additive Error
A18	Injector 24 Low Additive Error	Injector 23 Low Additive Error	Injector 22 Low Additive Error	Injector 21 Low Additive Error

Character	Alarm #4	Alarm #3	Alarm #2	Alarm #1
A19	Injector 4 Excess Pulses	Injector 3 Excess Pulses	Injector 2 Excess Pulses	Injector 1 Excess Pulses
A20	Injector 8 Excess Pulses	Injector 7 Excess Pulses	Injector 6 Excess Pulses	Injector 5 Excess Pulses
A21	Injector 12 Excess Pulses	Injector 11 Excess Pulses	Injector 10 Excess Pulses	Injector 9 Excess Pulses
A22	Injector 16 Excess Pulses	Injector 15 Excess Pulses	Injector 14 Excess Pulses	Injector 13 Excess Pulses
A23	Injector 20 Excess Pulses	Injector 19 Excess Pulses	Injector 18 Excess Pulses	Injector 17 Excess Pulses
A24	Injector 24 Excess Pulses	Injector 23 Excess Pulses	Injector 22 Excess Pulses	Injector 21 Excess Pulses
A25	Injector 4 No Pulses	Injector 3 No Pulses	Injector 2 No Pulses	Injector 1 No Pulses
A26	Injector 8 No Pulses	Injector 7 No Pulses	Injector 6 No Pulses	Injector 5 No Pulses
A27	Injector 12 No Pulses	Injector 11 No Pulses	Injector 10 No Pulses	Injector 9 No Pulses
A28	Injector 16 No Pulses	Injector 15 No Pulses	Injector 14 No Pulses	Injector 13 No Pulses
A29	Injector 20 No Pulses	Injector 19 No Pulses	Injector 18 No Pulses	Injector 17 No Pulses
A30	Injector 24 No Pulses	Injector 23 No Pulses	Injector 22 No Pulses	Injector 21 No Pulses
A31	Injector 4 Frequency	Injector 3 Frequency	Injector 2 Frequency	Injector 1 Frequency
A32	Injector 8 Frequency	Injector 7 Frequency	Injector 6 Frequency	Injector 5 Frequency
A33	Injector 12 Frequency	Injector 11 Frequency	Injector 10 Frequency	Injector 9 Frequency
A34	Injector 16 Frequency	Injector 15 Frequency	Injector 14 Frequency	Injector 13 Frequency
A35	Injector 20 Frequency	Injector 19 Frequency	Injector 18 Frequency	Injector 17 Frequency
A36	Injector 24 Frequency	Injector 23 Frequency	Injector 22 Frequency	Injector 21 Frequency
A37	Injector 4 Unauthorize Fail	Injector 3 Unauthorize Fail	Injector 2 Unauthorize Fail	Injector 1 Unauthorize Fail
A38	Injector 8 Unauthorize Fail	Injector 7 Unauthorize Fail	Injector 6 Unauthorize Fail	Injector 5 Unauthorize Fail
A39	Injector 12 Unauthorize Fail	Injector 11 Unauthorize Fail	Injector 10 Unauthorize Fail	Injector 9 Unauthorize Fail
A40	Injector 16 Unauthorize Fail	Injector 15 Unauthorize Fail	Injector 14 Unauthorize Fail	Injector 13 Unauthorize Fail
A41	Injector 20 Unauthorize Fail	Injector 19 Unauthorize Fail	Injector 18 Unauthorize Fail	Injector 17 Unauthorize Fail
A42	Injector 24 Unauthorize Fail	Injector 23 Unauthorize Fail	Injector 22 Unauthorize Fail	Injector 21 Unauthorize Fail
A43	Injector 4 General Error	Injector 3 General Error	Injector 2 General Error	Injector 1 General Error
A44	Injector 8 General Error	Injector 7 General Error	Injector 6 General Error	Injector 5 General Error
A45	Injector 12 General Error	Injector 11 General Error	Injector 10 General Error	Injector 9 General Error
A46	Injector 16 General Error	Injector 15 General Error	Injector 14 General Error	Injector 13 General Error

Character	Alarm #4	Alarm #3	Alarm #2	Alarm #1
A47	Injector 20 General Error	Injector 19 General Error	Injector 18 General Error	Injector 17 General Error
A48	Injector 24 General Error	Injector 23 General Error	Injector 22 General Error	Injector 21 General Error
A49	Injector 4 Over-speed	Injector 3 Over-speed	Injector 2 Over-speed	Injector 1 Over-speed
A50	Injector 8 Over-speed	Injector 7 Over-speed	Injector 6 Over-speed	Injector 5 Over-speed
A51	Injector 12 Over-speed	Injector 11 Over-speed	Injector 10 Over-speed	Injector 9 Over-speed
A52	Injector 16 Over-speed	Injector 15 Over-speed	Injector 14 Over-speed	Injector 13 Over-speed
A53	Injector 20 Over-speed	Injector 19 Over-speed	Injector 18 Over-speed	Injector 17 Over-speed
A54	Injector 24 Over-speed	Injector 23 Over-speed	Injector 22 Over-speed	Injector 21 Over-speed
A55	Injector 4 Command Refused	Injector 3 Command Refused	Injector 2 Command Refused	Injector 1 Command Refused
A56	Injector 8 Command Refused	Injector 7 Command Refused	Injector 6 Command Refused	Injector 5 Command Refused
A57	Injector 12 Command Refused	Injector 11 Command Refused	Injector 10 Command Refused	Injector 9 Command Refused
A58	Injector 16 Command Refused	Injector 15 Command Refused	Injector 14 Command Refused	Injector 13 Command Refused
A59	Injector 20 Command Refused	Injector 19 Command Refused	Injector 18 Command Refused	Injector 17 Command Refused
A60	Injector 24 Command Refused	Injector 23 Command Refused	Injector 22 Command Refused	Injector 21 Command Refused
A61	Injector 4 Auto-detect Fault	Injector 3 Auto-detect Fault	Injector 2 Auto-detect Fault	Injector 1 Auto-detect Fault
A62	Injector 8 Auto-detect Fault	Injector 7 Auto-detect Fault	Injector 6 Auto-detect Fault	Injector 5 Auto-detect Fault
A63	Injector 12 Auto-detect Fault	Injector 11 Auto-detect Fault	Injector 10 Auto-detect Fault	Injector 9 Auto-detect Fault
A64	Injector 16 Auto-detect Fault	Injector 15 Auto-detect Fault	Injector 14 Auto-detect Fault	Injector 13 Auto-detect Fault
A65	Injector 20 Auto-detect Fault	Injector 19 Auto-detect Fault	Injector 18 Auto-detect Fault	Injector 17 Auto-detect Fault
A66	Injector 24 Auto-detect Fault	Injector 23 Auto-detect Fault	Injector 22 Auto-detect Fault	Injector 21 Auto-detect Fault
A67	Injector 4 High Temp	Injector 3 High Temp	Injector 2 High Temp	Injector 1 High Temp
A68	Injector 4 Low Temp	Injector 3 Low Temp	Injector 2 Low Temp	Injector 1 Low Temp
A69	Injector 4 Temperature Probe	Injector 3 Temperature Probe	Injector 2 Temperature Probe	Injector 1 Temperature Probe
A70	Injector 4 Pulse Security	Injector 3 Pulse Security	Injector 2 Pulse Security	Injector 1 Pulse Security

Character	Alarm #4	Alarm #3	Alarm #2	Alarm #1
A71	Injector 4 Transmitter Integrity	Injector 3 Transmitter Integrity	Injector 2 Transmitter Integrity	Injector 1 Transmitter Integrity
A72	Injector 4 Additive Comm Totals	Injector 3 Additive Comm Totals	Injector 2 Additive Comm Totals	Injector 1 Additive Comm Totals
A73	Injector 8 Additive Comm Totals	Injector 7 Additive Comm Totals	Injector 6 Additive Comm Totals	Injector 5 Additive Comm Totals
A74	Injector 12 Additive Comm Totals	Injector 11 Additive Comm Totals	Injector 10 Additive Comm Totals	Injector 9 Additive Comm Totals
A75	Injector 16 Additive Comm Totals	Injector 15 Additive Comm Totals	Injector 14 Additive Comm Totals	Injector 13 Additive Comm Totals
A76	Injector 20 Additive Comm Totals	Injector 19 Additive Comm Totals	Injector 18 Additive Comm Totals	Injector 17 Additive Comm Totals
A77	Injector 24 Additive Comm Totals	Injector 23 Additive Comm Totals	Injector 22 Additive Comm Totals	Injector 21 Additive Comm Totals
A78	Injector 4 Digital Solenoid Counts	Injector 3 Digital Solenoid Counts	Injector 2 Digital Solenoid Counts	Injector 1 Digital Solenoid Counts
A79	Reserved	Reserved	Reserved	Reserved
A80	Reserved	Reserved	Reserved	Reserved
A81	Reserved	Reserved	Reserved	Reserved
A82	Reserved	Reserved	Reserved	Reserved
A83	Reserved	Reserved	Reserved	Reserved

Table 49: Enquire Alarms Response: Injector 2 (I2)

Character	Alarm #4	Alarm #3	Alarm #2	Alarm #1
A1	Injector 28 Feedback	Injector 27 Feedback	Injector 26 Feedback	Injector 25 Feedback
A2	Injector 32 Feedback	Injector 31 Feedback	Injector 30 Feedback	Injector 29 Feedback
A3	Injector 36 Feedback	Injector 35 Feedback	Injector 34 Feedback	Injector 33 Feedback
A4	Injector 40 Feedback	Injector 39 Feedback	Injector 38 Feedback	Injector 37 Feedback
A5	Injector 44 Feedback	Injector 43 Feedback	Injector 42 Feedback	Injector 41 Feedback
A6	Reserved	Reserved	Reserved	Reserved
A7	Injector 28 Comm Error	Injector 27 Comm Error	Injector 26 Comm Error	Injector 25 Comm Error
A8	Injector 32 Comm Error	Injector 31 Comm Error	Injector 30 Comm Error	Injector 29 Comm Error
A9	Injector 36 Comm Error	Injector 35 Comm Error	Injector 34 Comm Error	Injector 33 Comm Error
A10	Injector 40 Comm Error	Injector 39 Comm Error	Injector 38 Comm Error	Injector 37 Comm Error
A11	Injector 44 Comm Error	Injector 43 Comm Error	Injector 42 Comm Error	Injector 41 Comm Error
A12	Reserved	Reserved	Reserved	Reserved
A13	Injector 28 Low Additive Error	Injector 27 Low Additive Error	Injector 26 Low Additive Error	Injector 25 Low Additive Error
A14	Injector 32 Low Additive Error	Injector 31 Low Additive Error	Injector 30 Low Additive Error	Injector 29 Low Additive Error

Character	Alarm #4	Alarm #3	Alarm #2	Alarm #1
A15	Injector 36 Low Additive Error	Injector 35 Low Additive Error	Injector 34 Low Additive Error	Injector 33 Low Additive Error
A16	Injector 40 Low Additive Error	Injector 39 Low Additive Error	Injector 38 Low Additive Error	Injector 37 Low Additive Error
A17	Injector 44 Low Additive Error	Injector 43 Low Additive Error	Injector 42 Low Additive Error	Injector 41 Low Additive Error
A18	Reserved	Reserved	Reserved	Reserved
A19	Injector 28 Excess Pulses	Injector 27 Excess Pulses	Injector 26 Excess Pulses	Injector 25 Excess Pulses
A20	Injector 32 Excess Pulses	Injector 31 Excess Pulses	Injector 30 Excess Pulses	Injector 29 Excess Pulses
A21	Injector 36 Excess Pulses	Injector 35 Excess Pulses	Injector 34 Excess Pulses	Injector 33 Excess Pulses
A22	Injector 40 Excess Pulses	Injector 39 Excess Pulses	Injector 38 Excess Pulses	Injector 37 Excess Pulses
A23	Injector 44 Excess Pulses	Injector 43 Excess Pulses	Injector 42 Excess Pulses	Injector 41 Excess Pulses
A24	Reserved	Reserved	Reserved	Reserved
A25	Injector 28 No Pulses	Injector 27 No Pulses	Injector 26 No Pulses	Injector 25 No Pulses
A26	Injector 32 No Pulses	Injector 31 No Pulses	Injector 30 No Pulses	Injector 29 No Pulses
A27	Injector 36 No Pulses	Injector 35 No Pulses	Injector 34 No Pulses	Injector 33 No Pulses
A28	Injector 40 No Pulses	Injector 39 No Pulses	Injector 38 No Pulses	Injector 37 No Pulses
A29	Injector 44 No Pulses	Injector 43 No Pulses	Injector 42 No Pulses	Injector 41 No Pulses
A30	Reserved	Reserved	Reserved	Reserved
A31	Injector 28 Frequency	Injector 27 Frequency	Injector 26 Frequency	Injector 25 Frequency
A32	Injector 32 Frequency	Injector 31 Frequency	Injector 30 Frequency	Injector 29 Frequency
A33	Injector 36 Frequency	Injector 35 Frequency	Injector 34 Frequency	Injector 33 Frequency
A34	Injector 40 Frequency	Injector 39 Frequency	Injector 38 Frequency	Injector 37 Frequency
A35	Injector 44 Frequency	Injector 43 Frequency	Injector 42 Frequency	Injector 41 Frequency
A36	Reserved	Reserved	Reserved	Reserved
A37	Injector 28 Unauthorize Fail	Injector 27 Unauthorize Fail	Injector 26 Unauthorize Fail	Injector 25 Unauthorize Fail
A38	Injector 32 Unauthorize Fail	Injector 31 Unauthorize Fail	Injector 30 Unauthorize Fail	Injector 29 Unauthorize Fail
A39	Injector 36 Unauthorize Fail	Injector 35 Unauthorize Fail	Injector 34 Unauthorize Fail	Injector 33 Unauthorize Fail
A40	Injector 40 Unauthorize Fail	Injector 39 Unauthorize Fail	Injector 38 Unauthorize Fail	Injector 37 Unauthorize Fail
A41	Injector 44 Unauthorize Fail	Injector 43 Unauthorize Fail	Injector 42 Unauthorize Fail	Injector 41 Unauthorize Fail
A42	Reserved	Reserved	Reserved	Reserved

Character	Alarm #4	Alarm #3	Alarm #2	Alarm #1
A43	Injector 28 General Error	Injector 27 General Error	Injector 26 General Error	Injector 25 General Error
A44	Injector 32 General Error	Injector 31 General Error	Injector 30 General Error	Injector 29 General Error
A45	Injector 36 General Error	Injector 35 General Error	Injector 34 General Error	Injector 33 General Error
A46	Injector 40 General Error	Injector 39 General Error	Injector 38 General Error	Injector 37 General Error
A47	Injector 44 General Error	Injector 43 General Error	Injector 42 General Error	Injector 41 General Error
A48	Reserved	Reserved	Reserved	Reserved
A49	Injector 28 Over-speed	Injector 27 Over-speed	Injector 26 Over-speed	Injector 25 Over-speed
A50	Injector 32 Over-speed	Injector 31 Over-speed	Injector 30 Over-speed	Injector 29 Over-speed
A51	Injector 36 Over-speed	Injector 35 Over-speed	Injector 34 Over-speed	Injector 33 Over-speed
A52	Injector 40 Over-speed	Injector 39 Over-speed	Injector 38 Over-speed	Injector 3 7 Over-speed
A53	Injector 44 Over-speed	Injector 43 Over-speed	Injector 42 Over-speed	Injector 41 Over-speed
A54	Reserved	Reserved	Reserved	Reserved
A55	Injector 28 Command Refused	Injector 27 Command Refused	Injector 26 Command Refused	Injector 25 Command Refused
A56	Injector 32 Command Refused	Injector 31 Command Refused	Injector 30 Command Refused	Injector 29 Command Refused
A57	Injector 36 Command Refused	Injector 35 Command Refused	Injector 34 Command Refused	Injector 33 Command Refused
A58	Injector 40 Command Refused	Injector 39 Command Refused	Injector 38 Command Refused	Injector 37 Command Refused
A59	Injector 44 Command Refused	Injector 43 Command Refused	Injector 42 Command Refused	Injector 41 Command Refused
A60	Reserved	Reserved	Reserved	Reserved
A61	Injector 28 Auto-detect Fault	Injector 27 Auto-detect Fault	Injector 26 Auto-detect Fault	Injector 25 Auto-detect Fault
A62	Injector 32 Auto-detect Fault	Injector 31 Auto-detect Fault	Injector 30 Auto-detect Fault	Injector 29 Auto-detect Fault
A63	Injector 36 Auto-detect Fault	Injector 35 Auto-detect Fault	Injector 34 Auto-detect Fault	Injector 33 Auto-detect Fault
A64	Injector 40 Auto-detect Fault	Injector 39 Auto-detect Fault	Injector 38 Auto-detect Fault	Injector 37 Auto-detect Fault
A65	Injector 44 Auto-detect Fault	Injector 43 Auto-detect Fault	Injector43 Auto-detect Fault	Injector 41 Auto-detect Fault
A66	Reserved	Reserved	Reserved	Reserved
A67	Reserved	Reserved	Reserved	Reserved
A68	Reserved	Reserved	Reserved	Reserved
A69	Reserved	Reserved	Reserved	Reserved
A70	Reserved	Reserved	Reserved	Reserved

Character	Alarm #4	Alarm #3	Alarm #2	Alarm #1
A71	Reserved	Reserved	Reserved	Reserved
A72	Injector 28 Additive Comm Totals	Injector 27 Additive Comm Totals	Injector 26 Additive Comm Totals	Injector 25 Additive Comm Totals
A73	Injector 32 Additive Comm Totals	Injector 31 Additive Comm Totals	Injector 30 Additive Comm Totals	Injector 29 Additive Comm Totals
A74	Injector 36 Additive Comm Totals	Injector 35 Additive Comm Totals	Injector 34 Additive Comm Totals	Injector 33 Additive Comm Totals
A75	Injector 40 Additive Comm Totals	Injector 39 Additive Comm Totals	Injector 38 Additive Comm Totals	Injector 37 Additive Comm Totals
A76	Injector 44 Additive Comm Totals	Injector 43 Additive Comm Totals	Injector 42 Additive Comm Totals	Injector 41 Additive Comm Totals
A77	Reserved	Reserved	Reserved	Reserved
A78	Reserved	Reserved	Reserved	Reserved
A79	Reserved	Reserved	Reserved	Reserved
A80	Reserved	Reserved	Reserved	Reserved
A81	Reserved	Reserved	Reserved	Reserved
A82	Reserved	Reserved	Reserved	Reserved
A83	Reserved	Reserved	Reserved	Reserved

Table 50: Enquire Alarms Response: Meter

Character	Alarm #4	Alarm #3	Alarm #2	Alarm #4
A1	Valve Fault	Meter Pulse Security Alarm	Meter Transmitter Integrity Fault	Meter Program Error
A2	Reserved	Density Transducer Fault	Pressure Transducer Fault	Temperature Transducer Fault
A3	Solenoid Actuation Count Alarm	Reserved	Reserved	Mass Meter Comm Fail
A4	Reverse Flow	Leakage	Overrun Prediction Alarm	Promass Fault

4.23 Command Code EB: End Batch

This command cancels the remaining batch volume.

Command

EB

Responses

Good response is OK = batch flagged as complete if batch is in progress. Batch authorization is removed.

Error response is NOXX = the batch volume has not been canceled.

Remarks

None

Constraints

NO01 = will be returned if the other side is in the program mode locally or via communications.

Special Case

Valve will be commanded to close if it has not already been commanded to do so.

Command Modes

Remote control

4.24 Command Code EE: Enquire Status Extended

This command retrieves the operational status of AccuLoad IV and is simply an extended version of the EQ command. Data is returned in a bit-mapped format.

Command

EE

Responses

Good response:

'AAAAAAAAAAAAAAAAAAAA' = 20 characters.

where each "A" is a "quasi hex" value, such as "0 1 2 3 4 5 6 7 8 9 : ; < = > ?".

Error response is NOXX = data not retrieved.

> **Note:** A1—A16 are in the same format as the EQ command; A19-A20 not used.

Remarks

- For bay configurations, SA, SF, TD, and TP refer to the bay; other flags continue to be specific to the arm.

- If the AccuLoad is unable to start a transaction because it would require over-writing a protected or pending transaction report, the AccuLoad will respond to SB, AU, and AP commands with a NO10 (storage full).

Constraints

None

Special Case

4.24: Command Code EE: Enquire Status Extended

4.24: Command Code EE: Enquire Status Extended

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

Table 51: Response to EE Enquire, Character A17

Character		Condition			
Char	Hex	Pending Report	Pending Report Storage Full	Printer Standby	New Valve Diagnostic Data
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
:	3A	X		X	
;	3B	X		X	X
<	3C	X	X		
=	3D	X	X		X
>	3E	X	X	X	
?	3F	X	X	X	X

Table 52: Response to EE Enquire, Character A18

Character		Condition			
Char	Hex	Reserved	Reserved	Nedap Comm Fail	New Vehicle Tag Data
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
:	3A	X		X	
;	3B	X		X	X
<	3C	X	X		
=	3D	X	X		X
>	3E	X	X	X	
?	3F	X	X	X	X

4.25 Command Code EQ: Enquire Status

This command retrieves the operational status of AccuLoad IV. Data is returned in a bit-mapped format.

Command

EQ: Request status

Responses

Good response:

AAAAAAAAAAAAAAAA = 16 characters.

For descriptions of each of the characters, see the following information where each "A" is a "quasi hex" value; "0 1 2 3 4 5 6 7 8 9 : ; < > ? " .

Remarks

- Allow for additional characters to be added on the end for future status indicators.

- For bay configurations, in Standby Mode, Storage Full, Transaction Done, and Transaction in Progress, refer to the bay. Other flags continue to be specific to the load arm.

Constraints

None

Special Case

See notes under tables in this section.

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

In the EQ Enquire response tables, "X" shows an asserted condition.

Table 53: Response to EQ Enguire, Character A1

Character		Condition			
Char	Hex	Program Mode	Released	Flowing	Authorized
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
:	3A	X		X	
;	3B	X		X	X
<	3C	X	X		
=	3D	X	X		X
>	3E	X	X	X	
?	3F	X	X	X	X

Note: The AccuLoad IV is considered released whenever the valve is commanded opened and has not been commanded to close.

Table 54: Response to EQ Enquire, Character A2

Character		Condition			
Char	Hex	Transaction in Progress	Transaction Done	Batch Done	Keypad Data Pending
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
:	3A	X		X	
;	3B	X		X	X
<	3C	X	X		
=	3D	X	X		X
>	3E	X	X	X	
?	3F	X	X	X	X

Table 55: Response to EQ Enquire, Character A3

Character		Condition			
Char	Hex	Alarm On	Standby Transactions Exist	Storage Full	In Standby Mode
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
:	3A	X		X	
;	SB	X		X	X
<	3C	X	X		
=	3D	X	X		X
>	3E	X	X	X	
?	3F	X	X	X	X

Note: Some alarm conditions cannot reset through the communication channel. See Command Code AR: Alarm Reset 26.

Table 56: Response to EQ Enquire, Character A4

Character		Condition			
Char	Hex	Program Value Changed	Delayed Prompt in Effect	Display Message Time-out	Power-fail Occurred
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
:	3A	X		X	
;	3B	X		X	X
<	3C	X	X		
=	3D	X	X		X
>	3E	X	X	X	
?	3F	X	X	X	X

Table 57: Response to EQ Enquire, Character A5

Character		Condition			
Char	Hex	Checking Entries	Input #1	Input #2	Input #3
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
:	3A	X		X	
;	3B	X		X	X
<	3C	X	X		
=	3D	X	X		X
>	3E	X	X	X	
?	3F	X	X	X	X

Table 58: Response to EQ Enquire, Character A6

Character		Condition			
Char	Hex	Input #4	Input #5	Input #6	Input #7
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
:	3A	X		X	
;	3B	X			
<	3C	X	X		
=	3D	X	X		
>	3E	X	X	X	
?	3F	X	X	X	X

Table 59: Response to "EQ" Enquire, Character A7

Character		Condition			
Char	Hex	Input #8	Input #9	Input #10	Input #11
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
:	3A	X		X	
;	3B	X		X	X
<	3C	X	X		
=	3D	X	X		X
>	3E	X	X	X	
?	3F	X	X	X	X

Table 60: Response to "EQ" Enquire, Character A8

Character		Condition			
Char	Hex	Input #12	Input #13	Input #14	Input #15
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
:	3A	X		X	
;	3B	X		X	X
<	3C	X	X		
=	3D	X	X		X
>	3E	X	X	X	
?	3F	X	X	X	X

Table 61: Response to EQ Enquire, Character A9

Character		Condition			
Char	Hex	Input #16 (BIO #1)	Input #17 (BIO #2)	Input #18 (BIO #3)	Input #19 (BIO #4)
		If configured as an input.			
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
:	3A	X		X	
;	3B	X		X	X
<	3C	X	X		
=	3D	X	X		X
>	3E	X	X	X	
?	3F	X	X	X	X

Table 62: Response to EQ Enquire, Character A10

Character		Condition			
Char	Hex	Input #20 (BIO #5)	Input #21 (BIO #6)	Input #22 (BIO #7)	Input #23 (BIO #8)
		If configured as an input.			
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
:	3A	X		X	
;	3B	X		X	X
<	3C	X	X		
=	3D	X	X		X
>	3E	X	X	X	
?	3F	X	X	X	X

Table 63: Response to EQ Enquire, Character A11

Character		Condition			
Char	Hex	Input #24 (A4I #1)	Input #25 (A4I #1)	Input #26 (A4I #1)	Input #27 (A4I #1)
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
:	3A	X		X	
;	3B	X		X	X
<	3C	X	X		
=	3D	X	X		X
>	3E	X	X	X	
?	3F	X	X	X	X

Table 64: Response to EQ Enquire, Character A12

Character		Condition			
Char	Hex	Input #28 (A4I #1)	Input #29 (A4I #1)	Input #30 (A4I #1)	Input #31 (A4I #1)
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
:	3A	X		X	
;	3B	X		X	X
<	3C	X	X		
=	3D	X	X		X
>	3E	X	X	X	
?	3F	X	X	X	X

Table 65: Response to EQ Enquire, Character A13

Character		Condition			
Char	Hex	Input #32 (A4I #1)	Input #33 (A4I #1)	Input #34 (A4I #2)	Input #35 (A4I #2)
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
:	3A	X		X	
;	3B	X		X	X
<	3C	X	X		
=	3D	X	X		X
>	3E	X	X	X	
?	3F	X	X	X	X

Table 66: Response to EQ Enquire, Character A14

Character		Condition			
Char	Hex	Input #36 (A4I #2)	Input #37 (A4I #2)	Input #38 (A4I #2)	Input #39 (A4I #2)
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
:	3A	X		X	
;	3B	X		X	X
<	3C	X	X		
=	3D	X	X		X
>	3E	X	X	X	
?	3F	X	X	X	X

Table 67: Response to EQ Enquire, Character A15

Character		Condition			
Char	Hex	Input #40 (A4I #2)	Input #41 (A4I #2)	Input #42 (A4I #2)	Input #43 (A4I #2)
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
:	3A	X		X	
;	3B	X		X	X
<	3C	X	X		
=	3D	X	X		X
>	3E	X	X	X	
?	3F	X	X	X	X

Table 68: Response to EQ Enquire, Character A16

Character		Condition			
Char	Hex	Printing In Progress	Permissive Delay	Card Data Present	Preset In Progress
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
:	3A	X		X	
;	3B	X		X	X
<	3C	X	X		
=	3D	X	X		X
>	3E	X	X	X	
?	3F	X	X	X	X

4.26 Command Code ER: Event Recall

This command retrieves historical data using the sequence number of the data.

Command

ER_S...S where S…S = the sequence number.

Responses

Good response is ER_SSSSSSSSS_DDDDDDDD_HHNN_X_EEEEE_A…A.

where:

- SSSSSSSSS = sequence number

- DDDDDDDD = standard time MMDDYYYY or military time DDMMYYYY

- MM = month, DD = day, YYYY = year

- HH = hours

- NN = minutes

- X = A (standard time—AM), P (standard time—PM), M (military time)

- EEEEE = type number (returned, but not currently used)

- A….A = data variable length string (may contain "tab" characters)

Error response is NOXX = data not retrieved.

Remarks, Constraints, and Special Case

None

Command Modes

- Poll and authorize

- Poll and program

- Remote control

4.27 Command Code ES: Last Event Recall

This command requests the sequence number for a specified event stored by the AccuLoad IV.

Command

ES (deprecated form—use ES_N)

ES_X

ES_X_DDDDDDDD_HHMM_T (for X - 'D')

where X =

- N for newest (most recent) event

- O for oldest event D for most recent event on or before date/time specified

for ES_D, the date argument above must be in the format specified, where:

- DDDDDDDD = date (MMDDYYYY standard convention or DDMMYYYY military convention)

- HHMM = time

- T = time type (A for AM, P for PM, M for military)

Responses

Good responses:

- ES_SSSSSSSSSS (for deprecated form)

- ES_X_SSSSSSSSSS (for all others)

where SSSSSSSSSS = sequence number.

Error response is NOXX = data not available.

Remarks, Constraints, and Special Case

None

Command Modes

- Poll and authorize

- Poll and program

- Remote control

4.28 Command Code ET: End Transaction

This command removes authorization and flags the transaction as complete.

Command

ET

Responses

Good response is OK.

Transaction is flagged as complete if a transaction had been in progress. Authorization is removed.

Error response is NOXX.

Transaction was not ended.

Remarks

If bays are configured, this command will end the transaction for the entire bay.

If flow is active, the transaction cannot be ended. Leakage may induce sufficient flow to result in a NO04 response.

Constraints and Special Case

None

Command Modes

- Poll and authorize
- Poll and program
- Remote control

4.29 Command Code FL: Read Flow Count

This command retrieves raw pulse and volume counts from the AccuLoad IV.

Command

FL: read flow count for the arm (straight, sequential, ratio, hybrid sequential meter)

FL_Px: read raw pulse counts for specified product (ratio blending only). Read raw pulse counts for specified ratio products (only) on a hybrid arm.

FL_R: read raw volume or mass for the arm (straight, sequential, ratio, hybrid sequential meter).

FL_Px_R: read raw volume or mass for specified product (ratio blending only and products only on a hybrid arm.)

where:

- x = product number 1, 2, 3, 4, 5, or 6 for ratio blending

- X = product number 1, 2, 3, 4, 5 for hybrid arm (only if ratio product)

Responses

Good responses:

- FL_VVVVVVVVV = flow count for arm (straight product or ratio blending)

- FL_VVVVVVVVV_Px = flow count for specified product (ratio, sequential, or hybrid)

- FL_VVVVVVVVV _VV = raw volume or mass amount for the arm

- FL_VVVVVVVVV _VV_Px = raw volume or mass amount for specified product

where VVVVVVVVV = raw pulse count.

Error response is NOXX = did not receive the raw counts from the AccuLoad.

Remarks

For straight product applications the response will not include the Px parameter. The count is reset to zero at the start and end of each transaction.

Constraints

- VVVVVVVVV is an unfactored raw pulse count. This value is reset to zero at start and end of each transaction.

- Sequential blending applications and hybrid arm sequential products: The Px parameter will indicate the component currently flowing. In this case, the flow count may not reflect the pulses for the component indicated. For example, if the first component delivered 1,000 pulses and the second component delivered 750 pulses, the response will show FL 1000 P1 after component one has completed its delivery and FL 1750 P2 after component two completes its delivery.

- Ratio blending applications and hybrid arm sequential products: FL without the Px parameter will return the current pulse count through the arm; for example, the sum of the two component products' flow count. The Px parameter will not be returned.

- NO31 will be returned if the command FL_Px is directed to an arm currently configured for straight product or sequential blending. NO31 will be returned if the product regulated is a sequential product on a hybrid arm.

Special Case

Px reflects the product currently being loaded or the last product that was loaded, if loading is not currently active. Stray pulses from the meter may accumulate and register in the FL command between loads. In the event of unauthorized flow such as this, the Px product designation does not necessarily indicate which product is leaking.

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.30 Command Code FS: Full Screen

This command will cause the AccuLoad to bring the requested arm into focus on the top panel of the Run/Ready Mode screen when parameter 139—System Status Display is set to Yes. If the arm is currently in focus, there will be no action. If parameter 139—System Status Display is set to No, there will be no action.

Command

FS

Responses

Good response is OK.

Error response is NOXX.

where X=

- 00: if there are trailing characters after the command

- 01: if the unit is in Program Mode

- 07: if the port is not in Remote Control or Poll and Authorize Mode

Remarks

If transaction is in progress and the user interface is navigating within the dynamic display menu, the dynamic displays will be exited and the delivery screen will be displayed. If the AccuLoad is displaying the main menu or any of its submenus, that menu will be exited and the ready screen will be displayed.

Constraints

If the host prompt keypad is active on an arm when the FS command is issued, the arm will not change focus until the host prompt keypad is no longer displayed.

Command Modes

- Poll and authorize

- Remote control

4.31 Command Code GD: Get Date and Time

This command retrieves the current date and time from the AccuLoad IV.

Command

GD

Responses

Good response is GD_DDDDDDDD_HHNN_X,

where DDDDDDDD =

- MMDDYYYY (standard time)

- DDMMYYYY (military time)

- HH = hours

- NN = minutes

- MM = month

- DD = day

- YYYY = year

and X =

- A (standard time - A.M.)

- P (standard time - P.M.)

- M (military time)

Error response is NOXX: the date and time were not read from the AccuLoad IV.

Remarks, Constraints, and Special Case

None

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.32 Command Code GK: Get Key

This command retrieves the last key that was pressed at the AccuLoad IV prompt entry virtual keypad.

Command

GK

Responses

Good responses:

- GK_XX: last key pressed.

- GK*XX: last key pressed, this arm has current focus.

where XX =

- _0 through _9 for numeric keys

- E1 for the ENTER key

- P1 for the PRINT key

- A1 for the START key

- B1 for the SET key

- C1 for the CLEAR key

- S1 for the STOP key

- F1 for the F1 key

- F2 for the F2 key

- - + for the +/- key

- _. for the . key

Remarks and Special Case

None

Constraints

NO32 will be returned if no key has ever been pressed.

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.33 Command Code GP: Get Program Identifier

This command requests information about the installed application software in AccuLoad IV. There are options to request either the revision or the software identification (MD5 checksums).

Command

GP: retrieve firmware identifier

GP_R: retrieve firmware revision

Responses

Good responses:

- GP_SSSSSSSS: firmware identifier.

- GP_XX.XX: firmware revision.

where:

- SSSSSSSS = eight hexadecimal digit identifier.

- XX.XX = firmware revision.

Error response is NOXX = did not read the firmware signatures.

Constraints and Special Case

None

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.34 Command Code IC: Injector Command

This command is used to specify the command to be sent to a smart additive injector.

Command

IC_c..c

where:

- IC = injector command literal

- c..c = command text (as shown below)

- c..c = AAAY…Y, where

    - AAA = injector comm address (ASCII)

    - Y...Y = injector command (ASCII)

(Gate City Protocol I and Titan PAC-3 Protocol)

> **Note:** The AccuLoad installs an STX before c..c, an ETX and calculated LRC after c..c, and then sends this out the injector comm port.

Responses

Good response is OK.

Error response is NOXX.

where X =

- 01 = in the programming mode

- 02 = AccuLoad IV released

- 06 = operation not allowed

- 19 = option not installed

When the AccuLoad IV receives an IC command, a NO06 response will be moved into the appropriate response buffer. This NO06 response will indicate that no response has yet been received from the Additive Injector Subsystem. This will prevent the supervisory computer from issuing an immediate IR command and reading an old

response from a previous command that may have been issued to a different additive subsystem.

If communications with an additive subsystem has not been selected in the programming mode, this command will return a NO response.

If the specified command is valid for the AccuLoad's current mode of operation, the query or command is copied into the additive command buffer. If the address is invalid, for example, there is no additive injector with that address connected to the AccuLoad, no response will ever be received. If the command is improperly constructed or not valid for the type of additive injector selected, the additive injector will respond appropriately and the supervisory computer can decode the response given.

STX and ETX characters are added to the command. The LRC is calculated and added onto the end of the command.

Constraints and Special Case

None

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.35 Command Code IR: Injector Response

This command is used to retrieve the response from a pass-by command to an Additive Injection Subsystem.

Command

IR

Responses

Good response is IR_r..r, where:

- IR = injector response command

- r..r = response text

  - r..r in form of AAAY..Y

    - AAA = injector comm address (ASCII)

    - Y..Y = injector response (ASCII)

(Gate City Protocol I and Titan PAC-3 Protocol)

> **Note:** The AccuLoad receives the response from the injector, then strips off the STX, ETX, and LRC, and what remains is r..r above.

Error response is NOXX.

Constraints and Special Case

None

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.36 Command Code LC: Request Load Reference Density

This command requests the load reference density corrected to reference from the AccuLoad IV.

Command

Current transaction

- LC_R = current batch reference density

- LC_P = current product batch reference density

- LC_Px = current batch reference density of the specified product

- LC_YY = batch reference density for the specified batch

- LC_YY_Px = batch reference density for the specified batch and the specified product

Local storage

- LC_YY_NNN = batch reference density of a stored transaction

- LC_YY_Px_NNN = batch reference density for a specified product of a stored transaction

where:

- R = indicated current batch

- P = constant (current product)

- Px = product 1, 2, 3, 4, 5, or 6

- NNN = number of transactions back into local storage to retrieve data

- YY = batch number requested (01-10)

Responses

Good response:

Current transaction

- LC_YY_RR_SVVVV.V for commands LC_R, LC_YY

- LC_YY_Px_VVVV.V for commands LC_P, LC_Px, LC_YY_PX

Local storage

- LC_YY_RR_SVVVV.V_NNN for commands LC_YY_NNN

- LC_YY_Px_VVVV.V_NNNfor commands LC_Px_NNN

where:

- VVVV.V = reference density value (where most significant digit can be - minus sign)

- NNN = number of transactions back into Local Storage to retrieve data

- YY = batch number (01-10)

- RR = recipe Number (01-50)

- Px = product 1, 2, 3, 4, 5, or 6

- S = sign (+/-)

Error response is NOXX = the load reference density was not read.

Remarks

Response field padded with leading spaces. If value is negative, minus sign will immediately precede most significant digit.

Constraints

- Density units are as programmed in the AccuLoad IV.

- NO06 = will be returned for a product request if the product requested was not delivered in the transaction.

- NO30 = will be returned if the product specified is not currently configured to the arm to which the command was directed.

- NO31 = will be returned if product load averages are requested for an arm currently configured for straight product delivery.

- NO39 = (no current batch on this arm) will be returned if transaction is in progress on bay but there is no active batch on the addressed arm. YY specifies the bay-based batch number.

Special Case

None

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.37 Command Code LD: Request Load Average Density

This command requests load average density from the AccuLoad IV.

Command

Current transaction

- LD_R = current batch average density

- LD_P = current product batch average density

- LC_Px = current batch average density of the specified product

- LD_YY = batch average density for the specified batch

- LD_YY_Px = batch average density for the specified batch and the specified product

Local storage

- LD_YY_NNN = batch average density of a stored transaction

- LD_YY_Px_NNN = batch average density for a specified product of a stored transaction

where:

- R = indicated current batch

- P = constant (current product)

- Px = product 1, 2, 3, 4, 5, or 6

- NNN = number of transactions back into local storage to retrieve data

- YY = batch number requested (01-10)

Responses

Good responses:

Current transaction:

- LD_YY_RR_SVVVV.V for commands LD_R, LD_YY

- LD_YY_Px_VVVV.V for commands LD_P, LD_Px, LD_YY_PX

Local storage:

- LD_YY_RR_SVVVV.V_NNN for commands LD_YY_NNN

- LD_YY_Px_VVVV.V_NNN for commands LD_Px_NNN

where:

- VVVV.V = average value (where most significant digit can be - minus sign)

- NNN = number of transactions back into local storage to retrieve data

- YY = batch number (01-10)

- RR = recipe number (01-50)

- Px = product 1, 2, 3, 4, 5, or 6

- S = sign (+/-)

Error response is NOXX = the load average density was not read.

Remarks

Response field padded with leading spaces. If value is negative, minus sign will immediately precede most significant digit.

Constraints

- Density units are as programmed in the AccuLoad IV.

- NO06 = will be returned for a product request if the product requested was not delivered in the transaction.

- NO30 = will be returned if the product specified is not currently configured to the arm to which the command was directed.

- NO31 = will be returned if product load averages are requested for an arm currently configured for straight product delivery.

- NO39 = (no current batch on this arm) will be returned if transaction is in progress on bay but there is no active batch on the addressed arm. YY specifies the bay-based batch number.

Special Case

None

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.38 Command Code LO: Request Log Out of Program Mode

This command forces an immediate log out of program mode and all changes made by the PC command to be saved.

Command

LO

Responses

Good response is OK.

Error response is NOXX.

Remarks

Ten seconds after last being issued a PC command, the AccuLoad begins the log out process. The LO command starts it immediately. All changes made by the PC command are not available (made active) until the log out process is complete.

Special Case

None

Command Modes

- Poll and authorize

- Remote control

- Poll and program

4.39 Command Code LP: Request Load Average Pressure

This command requests the value of the load average pressure from the AccuLoad IV.

Command

Current transaction

- LP_R = current load average pressure for the current recipe
- LP_YY = load average pressure for previous batch of the current transaction
- LP_P = current load average pressure for the current product
- LP_Px = current load average pressure of specified product (ratio, sequential)
- LP_YY_Px = batch average pressure for a specified product (sequential, ratio)

Local storage

- LP_YY_NNN = load average pressure for the batch indicated in local storage.
- LP_YY_Px_NNN = batch average pressure for a specified product stored in local storage (sequential ratio).

where:

- R = current batch
- P = current product
- Px = product 1, 2, 3, 4, 5, or 6
- YY = batch number requested (01-10)
- NNN = number of transactions back into local storage to retrieve data

Responses

Good responses:

Current transaction

- LP_YY_RR_VVVV.V for LP_YY_Px_NNN
- LP_YY_Px_VVVV.V for command LP_P, LP_Px, LP_YY_Px

Local storage

- LP_YY_Px_VVVV.V_NNN for LP_YY_Px_NNN

- LP_YY_RR_VVVV.V_NNN for LP_YY_NNN

where:

- YY = batch number (01-10)

- RR = recipe Number (01-50)

- Px = product 1, 2, 3, 4, 5, or 6

- VVVV.V = average value

- NNN = number of transactions back into Local Storage to retrieve data

Error response is NOXX = the load average density was not read.

Remarks and Special Case

None

Constraints

- Pressure units are as programmed for the AccuLoad IV.

- NO06 = will be returned for a product request if the product requested was not delivered in the transaction.

- NO30 = will be returned if the product specified is not currently configured to the arm to which the command was directed

- NO31 = will be returned if product load averages are requested for an arm currently configured for straight product delivery.

- NO39 = (no current batch on this arm) will be returned if transaction is in progress on bay but there is no active batch on the addressed arm. YY specifies the bay-based batch number.

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.40 Command Code LS: Request Last Density Sample

This command requests the last density sample taken during an unloading batch.

Command

Current transaction:

- LS = last density sample from the current batch.

- LS_YY = last density sample for a specified batch.

Local storage:

- LS_YY_NNN = returns the density sample for a previously completed batch.

where:

- YY = batch number (01-10)

- NNN = number of transactions back into local storage to retrieve

Responses

Good responses:

Current transaction:

- LS_YY_XXXX.X

Local storage:

- LS_YY_XXXX.X_NNN

where:

- YY = batch number (01—10)

- XXXX.X = Last density sample in programmed density units

- NNN = number of transactions back into local storage to retrieve data

Error response is NOXX = the last density sample was not read.

where XX =

- 03: value rejected

- 05: no transaction ever done

- 19: option not installed

Remarks

If bays are configured, LS will return the sample for the current batch on the arm addressed, and CP YY will return the percentage for the bay batch number specified by YY (which may be a batch from another arm on the bay).

Constraints

- Density units are as programmed in the AccuLoad IV.

- Applies to arms configured as unloading arms only. Other arm configurations will result in NO19 being returned.

Special Case

None

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.41 Command Code LT: Request Load Average Temperature

This command requests the value of the load average temperature from the AccuLoad IV.

Command

Current transaction:

- LT_R = current batch average

- LT_YY = batch average

- LT_YY_NNN = batch average for local storage transaction

- LT_P = current average of the current product (sequential, hybrid sequential product)

- LT_Px = current average of specified product (ratio, sequential, hybrid)

- LT_YY_Px = batch average for specified product (ratio, sequential, hybrid)

- LT_YY_Px_NNN = batch average for specified product for local storage transaction (sequential, ratio, hybrid)

where:

- R = current batch

- P = current product

- Px = product 1, 2, 3, 4, 5, or 6

- YY = batch number requested

- NNN = number of transactions back into local storage to retrieve data

Responses

Good responses:

Current transaction:

- LT_YY_RR_SVVVV.V for commands LT_R, LT_XX

- LT_YY_RR_SVVVV.V_NNN for commands LT_XX_NNN

- LT_YY_Px_SVVVV.V for commands LT_P, LT_Px, LT_XX_Px

- LT_YY_Px_SVVVV.V_NNN for commands LT_XX_Px_NNN

where:

- YY = batch number requested

- RR = recipe (01-50)

- S = sign (+ or -)

- Px = product 1, 2, 3, 4, 5, or 6

- VVVV.V = average value

- NNN = number of transactions back into local storage to retrieve data

Error response is NOXX = the load average density was not read.

Remarks and Special Case

None

Constraints

- Temperature units are as programmed for the AccuLoad IV. Negative temperature is possible.

- NO06 will be returned for a product request if the product requested was not delivered in the transaction.

- NO30 will be returned if the product specified is not currently configured to the arm to which the command was directed.

- NO31 will be returned if product load averages are requested for an arm currently configured for straight product delivery.

- NO39 (no current batch on this arm) will be returned if transaction is in progress on bay but there is no active batch on the addressed arm. YY specifies the bay-based batch number.

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.42 Command Code MP: Minimum Preset

This command requests the minimum preset allowed for the recipe specified.

Command

MP_RR

where RR = recipe number (01-50).

Responses

Good response is MP_RR_VVVVVV

where:

- RR = recipe number (01-50)

- VVVVVV = minimum preset

Error response is NOXX = minimum preset not returned.

Remarks and Special Case

None

Constraints

NO30 will be returned if the recipe specified is not currently configured to the arm (or bay, if bays are configured) to which the command was directed.

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.43 Command Code MS: Override HMI Swing Arm Position

This command allows the host to override the current state of the swing arm detect switch, and force an arm to be displayed on a particular HMI regardless of the swing arm's current position. This is useful when a driver needs to be notified to swing the arm to the other loading position.

Command

MS_X

where:

- X = A to move arm's display to side A (HMI_A)

- X = B to move arm's display to side B (HMI_B)

Responses

Good response is OK.

Error response is NOXX

where XX =

- 01: in the program mode

- 03: value rejected

- 07: wrong control mode

- 13: AccuLoad authorized

- 19: option not installed

Remarks

- Once the host has sent a command to override the detect switch, the AccuLoad will continue to ignore the detect switch setting until either the swing arm is moved into the requested position or the host sends another MS command to move the arm to the correct HMI.

- If an automation command is sent to a KDC to authorize a transaction (for example, AU, AP, or SB) and the swing arm is not in the correct position, the

AccuLoad will respond with the following error code: NO35 = swing arm not in correct position.

Constraints

None

Special Case

A NO19 response occurs when there are no detect switches configured.

Command Modes

- Poll and authorize

- Remote control

4.44 Command Code NR: New Recipe

This command is valid only for unlimited preset arms. It allows for on-the-fly recipe changes during delivery. This command will also authorize an unlimited preset arm as if an AU/AP, or SB command was sent.

Command

NR_RR

where RR = recipe number (01-50)

Responses

Good response is OK.

Error response is NOXX.

Remarks

- To specify an additive mask via communications you should continue to use the AB command to select the recipe, followed by the AU/AP, or SB to specify the additive mask.

- If the NR is received during a batch, the recipe will be changed immediately. The portion of the batch already delivered will not be affected (except any existing deviation from the desired ratio will still be taken into account if possible). The remainder of the batch will be delivered using the blend percentages specified by the new recipe.

- If recipe select inputs are defined, the NR command will override the recipe selected via the digital inputs.

Constraints

Unlimited preset mode only.

Special Case

None

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.45 Command Code OA: Other Arm Addresses

This command requests the address of the other arms configured in this AccuLoad IV.

Command

OA

Responses

Good response is OA_WW_XX_YY_ZZ_AA_BB

where:

- WW = address of Arm 1 (00—99)

- XX = address of Arm 2 (00—99)

- YY = address of Arm 3 (00—99)

- ZZ = address of Arm 4 (00—99)

- AA = address of Arm 5 (00—99)

- BB = address of Arm 6 (00—99)

Error response is NOXX = the address was not returned.

Remarks

A value of zero indicates the arm cannot be addressed via communications.

Constraints

None

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.46 Command Code OR: Output Relay

This command will activate or deactivate a general-purpose relay output.

Command

OR_XX_Y

where:

- XX = the output number (01—78)

- Y = desired state (1 = on, 0 = off)

Responses

Good response is OK = the command was accepted and the desired state was output to the selected contact.

Error response is NOXX = the command was rejected. The AccuLoad did not request a state change at the selected output.

Remarks

NO03 will be returned if XX or Y is out of range. NO06 will be returned if the output is not assigned as a general-purpose output.

Constraints

This command will not be allowed if the corresponding relay is not configured as a general-purpose relay.

Special Case

None

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.47 Command Code PC: Change Program Code Values

This command instructs the AccuLoad IV to change the value of one of the programmable entries (001 through 9999) in the directory specified.

Command

PC_DD_XXX_V...V or

PC_DD_XXXX_V...V or

PC_DD_XXX+VVV.V for alternate floating point parameters or

PC_DD_XXXX+VVV.V for alternate floating point parameters.

> **Note:** The + argument appended to the PC command string affects the number of significant digits returned for floating point numbers. For the + version of the command, additional decimal digits may be included in the response beyond the specified format for the program code if they are non-zero (up to a maximum of six total digits to the right of the decimal point).

where:

- DD = major directory
- CF = configuration
- SY = system
- AR = arm
- Mx = meter 1, 2, 3, 4, 5, or 6
- Px = product 1, 2, 3, 4, 5, or 6
- BA = bay A
- BB = bay B
- 01-50 = recipe number
- X...X = program parameter number
- V...V = new value, content depends on parameter

Responses

Good responses are (see : Examples below):

- PV_DD_XXX_V...V for three-digit codes

- PV_DD_XXXX_V...V for four-digit codes

where:

- DD = major directory

- CF = configuration

- SY = system

- AR = arm

- Mx = meter 1, 2, 3, 4, 5, or 6

- Px = product 1, 2, 3, 4, 5, or 6

- BA = bay A

- BB = bay B

- 01-50 = recipe number

- X...X = program parameter number

- V...V = new value; content depends on parameter

Error response is NOXX = the program value was not changed.

Remarks

Due to the varying lengths of programmable text fields, the number of digits or alpha characters entered for a program code can number up to a maximum of 30. However, the number of digits or alpha characters stored will depend on the maximum length of the parameter being changed.

Constraints

- Refer to the reference section in the operator reference manual (MN06200) for a complete list of parameters in each directory.

- NO01 will be returned if another load arm is in the program mode locally or via communications.

Special Case

None

Command Modes

- Poll and authorize

- Remote control

- Poll and program

Examples

- 01PV 01 005 — PV 01 005 000.0 1st Percentage

- 01PC 01 005 23.36 — PC 01 005 023.4 1st Percentage

- 01PV 01 005 — PV 01 005 023.4 1st Percentage

- 01PV 01 005+ — PV 01 005 023.36 1st Percentage

- 01PC 01 005+23.64 — PC 01 005 023.64 1st Percentage

- 01PV 01 005 — PV 01 005 023.6 1st Percentage

- 01PV 01 005+ — PV 01 005 023.64 1st Percentage

4.48 Command Code PF: Request Time of Power-Fail

This command requests the time and date the last power-fail occurred.

Command

PF

Responses

Good response is PF_DDDDDDDD_AAAA_X

where DDDDDDDD =

- Power-fail date

- (MMDDYYYY for standard time)

- (DDMMYYYY for military time)

- AAAA = power-fail time (HHMM)

where X =

- A (standard time — A.M.)

- P (standard time — P.M.)

- M (military time)

Remarks, Constraints, and Special Case

None

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.49 Command Code PN: Batch Net Mass for Vapor Recovery System

This command retrieves the net mass for a batch. The net mass is the mass measured from the delivery meter (example: Meter #1) less the mass measured by the vapor recovery meter (example: Meter #2).

Command

- PN for the current batch net mass.

- PP YY for the completed batch net mass.

Responses

Good responses:

- PN_MMMMMMM.MM = current batch net mass

- PN_YY_MMMMMMM.MM = completed batch net mass

where:

- YY = batch number (1-10)

- MMMMMMM.MM = batch net mass

Error response is NOXX.

Remarks, Contraints, Special Case
None

Command Modes
- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.50 Command Code PP: Print Report to Printer

This command initiates a reprint of the requested transaction at the printer for the arm.

> Note: This command code is available only when using revision 10 and above firmware.

Command

- PP for the most recently completed transaction
- PP NNN for NNN transactions back in local storage
- PP ST for standby transactions that have failed to print

Responses

Good response is OK.

Error response is NOXX

where XX is 41= no pending reports to print.

Remarks and Special Case

None

Constraints

A printer port must be configured.

Command Modes

- Polling only
- Poll and authorize
- Remote control
- Poll and program

4.51 Command Code PR: Program Change Recall

This command retrieves program mode changes from the AccuLoad audit trail log using the sequence number of the log entry.

Command

PR_S...S

where S...S is the sequence number.

Responses

Good response is PR_SSSSSSSSSS_DDDDDD_HHNN_X_EEEEE_A…A

where:

- SSSSSSSSSS = sequence number
- DDDDDDDD = standard time MMDDYYYY or military time DDMMYYYY
- MM = month
- DD = day
- YYYY = year
- HH = hours
- NN = minutes
- X = A (standard time—A.M.), P (standard time—P.M.), M (military time)
- EEEEE = type number—returned, but not currently used
- A…A = 0_WW_ZZZ <Tab> old data <Tab> new data
- WW = directory designation
- 00 = system
- Px = product number (01—06)
- 00 = recipe number (01—50)
- ZZZ = program code number

Error response is NOXX = data not retrieved.

Remarks, Constraints, and Special Case

None

Command Modes

- Poll and authorize

- Remote control

- Poll and program

4.52 Command Code PS: Last Program Code Change Sequence Number

This command retrieves the last changed program codes sequence number for a program mode change stored by AccuLoad IV in the program change (audit) log.

Command

PS (deprecated form, use PS_N)

PS_X

PS_X_DDDDDDDD_HHNN_Y (for X = D)

where:

- X =

  - N newest (most recent) entry

  - O = oldest entry still available

  - D = most recent entry on or before a specified date/time

for PS_D the date argument above must be in the format specified

where:

- DDDDDDDD is the date (MM DD YYYY for standard convention and DD MM YYYY for military convention) HHH is the time

- Y is the time type (A for A.M., P for P.M., M for Military)

Responses

Good responses:

- PS_SSSSSSSSSS (deprecated form, most recent entry)

- PS_X_SSSSSSSSSS (all others)

where SSSSSSSSSS = requested sequence number

Error response is NOXX = sequence number not retrieved.

Remarks, Constraints, and Special Case

None

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.53 Command Code PT: Print Transaction to Host

This command allows a transaction report to be generated directly to the host over the existing communications line. The AccuLoad first responds with an OK response (framed normally per the current host protocol) followed by the report text. No additional framing characters appear before, during, or after the report text.

Command

PT for the most recently completed transaction.

PT NNN for NNN transactions back in local storage.

Responses

Good Response: OK (followed by the report text)

Error Response: NOXX

Remarks

None

Constraints

A printer port must be configured.

Special Case

This case is not supported via TCP/IP (Ethernet or SLIP).

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.54 Command Code PV: Request Program Code Values

This command requests program values from the AccuLoad IV.

Command

- PV_DD_XXX

- PV_DD_XXXX

- PV_DD_XXX+ for alternate floating point response

- PV_DD_XXXX+ for alternate floating point response

> **Note:** The "+" argument appended to the PV command string affects the number of significant digits returned for floating point numbers. For the "+" version of the command, additional decimal digits may be included in the response beyond the specified format for the program code if they are non-zero (up to a maximum of six total digits to the right of the decimal point).

where:

- DD = major directory

- CF = configuration

- SY = system

- AR = arm

- Mx = meter 1, 2, 3, 4, 5, or 6

- Px = product 1, 2, 3, 4, 5, or 6

- 01-50 = recipe number

- BA = bay A

- BB = bay B

- X...X = program code number

- + = see note on next page

Responses

Good responses:

- PV_DD_XXX_V...V for three-digit codes

- PV_DD_XXXX_V...V for four-digit codes

where:

- DD = directory

- CF = configuration

- SY = system

- AR = arm

- Mx = meter 1-6

- Px = product 1-6

- 01-50 = recipe number

- BA = bay A

- BB = bay B

- X...X = program code number

- V...V = value of the parameter

Error response is NOXX program value not read.

Remarks, Constraints, and Special Case

None

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

Examples

- 01PV 01 005 — PV 01 005 000.0 1st Percentage

- 01PC 01 005 23.36 — PC 01 005 023.4 1st Percentage

- 01PV 01 005 — PV 01 005 023.4 1st Percentage

- 01PV 01 005+ — PV 01 005 023.36 1st Percentage

- 01PC 01 005+23.64 — PC 01 005 023.64 1st Percentage

- 01PV 01 005 — PV 01 005 023.6 1st Percentage

- 01PV 01 005+ — PV 01 005 023.64 1st Percentage

4.55 Command Code PX: Transaction Net Mass for Vapor Recovery System

This command retrieves the net mass for a transaction. The net mass is the mass measured from the delivery meter (for example: Meter #1) less the mass measured by the vapor recovery meter (for example: Meter #2).

Command

- PX for the current transaction net mass

- PX_NNN for the historic transaction request

Good responses:

- PX_MMMMMMM.MM = current transaction net mass

- PX_NNN_MMMMMMM.MM = historical transaction net mass

Responses

Good responses:

- PN_MMMMMMM.MM = current transaction net mass

- PN_YY_MMMMMMM.MM = historical transaction net mass

  where:

  - NNN = number of transactions back into local storage to retrieve data

  - MMMMMMM.MM = transaction net mass

Error response is NOXX.

Remarks, Constraints, and Special Case
None

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.56 Command Code RA: Request Alarm Status

This command requests current alarm conditions from the AccuLoad IV.

Command

RA_DD

where:

- DD = major directory

- P1 = product 1

- P2 = product 2

- P3 = product 3

- P4 = product 4

- P5 = product 5

- P6 = product 6

- AR = arm

- IN = injector 1 - 24

- I2 = injector 25 - 44

- M1 = meter 1

- M2 = meter 2 (ratio, hybrid blending configuration only)

- M3 = meter 3 (ratio, hybrid blending configuration only)

- M4 = meter 4 (ratio, hybrid blending configuration only)

- M5 = meter 5 (ratio, hybrid blending configuration only)

- M6 = meter 6 (ratio, hybrid blending configuration only)

Responses

Good responses:

- HF OA TP = character string consisting of 1 to 5 status codes separated by a single space. Each status code is two characters.

- OK = is returned if there are no alarms for that directory.

Error response is NOXX.

Remarks

- See AR for alarm mnemonics.

- If alarms exist for any injector, the two-character alarm code will be included in the response string. To determine the specific injector experiencing the alarm condition, the EA command must be used.

Constraints

NO31 will be returned if the command format does not match the current configuration of the arm.

Special Case

If no alarm condition is set, an OK response is issued.

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.57 Command Code RB: Request Batch Totals

This command retrieves batch data from the AccuLoad IV.

Command

Current transaction:

- RB = current batch volume, delivery volume type

- RB_Px = current batch, specified product (ratio, sequential, hybrid)

- RB_YY = completed batch volume, delivery volume type

- RB_YY_T = completed batch volume, specified volume type

- RB_YY_Px = product volume of batch, delivery volume type

- RB_YY_T_Px = product volume of batch, specified volume type

Local storage transaction:

- RB_YY_NNN = historic transaction requests

- RB_YY_Px_NNN = returns the product volume type

- RB_YY_T_NNN = returns the batch in the volume type requested if that volume type was stored.

- RB_YY_T_Px_NNN = returns the product in the volume type requested if that volume type was stored.

where T =

- R for raw(indicated) volume—(IV)

- G for gross volume (GV)

- N for gross @ standard temperature volume (GST)

- P for net pressure and temperature volume (GSV)

- M for mass total

Px = product 1, 2, 3, 4, 5, or 6

YY = batch number requested (01-10)

NNN = number of transactions back into local storage to retrieve data.

Responses

Current transaction

- RB_YY_T_A1A2A3A4A5A6_RR_VVVVVVV for RB, RB_YY, and RB_YY_X

- RB_YY_T_A1A2A3A4A5A6_Px_VVVVVVV for RB_YY_Px, RB_YY_Px_X, and RB_Px

Local storage transaction

- RB_YY_T_A1A2A3A4A5A6_RR_VVVVVVV_NNN for RB_XX_NNN and RB_XX_X_NNN

- RB_YY_T_A1A2A3A4A5A6_Px_VVVVVVV_NNN for RB_XX_Px_NNN and RB_XX_Px_X_NNN

where:

YY = batch number requested or current batch

T =

- R for raw total

- G for gross total

- N for gross at standard temperature total

- P for net temperature and pressure

- M for mass totals

A1A2...A6 = additive selection code characters 1-6

Px = product 1, 2, 3, 4, 5, or 6

RR = recipe number 01—50

VVVVVVV = total amount delivered for this batch in the requested amount type

NNN = number of transactions back into local storage to retrieve data

Error Response: NOXX

Remarks

- The batch is not considered complete until the start key is pressed for the next batch, or the transaction is ended. RB_YY will always fail on the current batch even

after BD status is reported in Command EQ or RS.

- See Command Codes AU and AP for additive code (A1A2A3…).

- If bays are configured, the returned value is the bay-based batch total.

- Support for additional additive injectors (up to 44 total) was added in revision 1.9. If more than 24 additives are being used, see the new 'RX - Request Batch Totals Extended' command, which returns similar information but includes a larger (11-character) additive mask field needed to encode the additional injectors in the response.

Constraints

- Batch volume units are assumed as the type programmed into AccuLoad IV.

- NO03 will be returned for a product request if the product requested was not delivered in the batch.

- NO30 will be returned if the product specified is not currently configured to the arm to which the command was directed.

- NO31 will be returned if the product batch totals are requested for an arm currently configured for straight product delivery.

Special Case

None

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.58 Command Code RC: Request Recipe Composition

This command requests the blend composition of the completed batch.

Command

Current transaction

- RC_YY Request composition of the completed batch

Local storage transaction

- RC_YY_NNN Request composition of a transaction stored in local storage

where:

- YY = batch number

- NNN = number of transactions back into local storage

Responses

Current transaction

- RC_YY_RR_AAA.A_BBB.B_CCC.C_DDD.D_EEE.E_FFF.F

Good response is sequential blending.

Local transaction storage

- RC_YY_RR_AAA.A_BBB.B_CCC.C_DDD.D_EEE.E_FFF.F_NNN

Good responses

where:

- RR = recipe number 01—50

- YY = batch number

- AAA.A = percentage of product 1

- BBB.B = percentage of product 2

- CCC.C = percentage of product 3

- DDD.D = percentage of product 4

- EEE.E = percentage of product 5

- FFF.F = percentage of product 6

- NNN = number of transactions back (for historical recall)

Error response is NOXX = the value was not read.

> **Note:** Percentages are returned only for products configured for the arm. For example, if three products are configured for the load arm, the response will be shortened as the AccuLoad will suppress the product 4 percentage. Products appear in order, (for example, Product 1, Product 2…)

Remarks

- Zero will be returned for products not delivered in the batch.

- If bays are configured, the returned value is the bay-based batch number's recipe composition.

Constraints

- NO03 will be returned if the requested batch is incomplete or has not been delivered.

- NO31 will be returned if the recipe composition is requested for an arm currently configured for straight product delivery.

Special Case

None

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.59 Command Code RD: Request Current Transducer Value

This command requests the value of one of the probes or transducers installed and wired to the AccuLoad IV.

Command

- RD_Z Request transducer value

- RD_Z_Px Request transducer value for the specified product

where Z =

- T (current temperature)

- P (current pressure)

- D (current density)

Px = product 1, 2, 3, 4, 5, or 6

Responses

Good responses:

- RD_Z_VVVV.V = pressure or density, straight product

- RD_Z_SVVVV.V Temperature, straight product.

- RD_Z_VVVV.V_Px Pressure or density, ratio or sequential or hybrid blending

- RD_Z_SVVVV.V_Px Temperature, ratio or sequential or hybrid blending.

- RD_Z_VVVV.V_VVVV.V_VVVV.V_VVVV.V Pressure or density, ratio blender

> **Note:** The length of response depends on the number of meters programmed for the arm.

- RD_Z_SVVVV.V_SVVVV.V Temperature, ratio blender

- RD_Z_SVVVV.V_SVVVV.V_SVVVV.V_SVVVV.V Temperature, ratio blender

> **Note:** The length of response depends on the number of meters programmed for the arm.

Where: Z =

- T (current temperature)

- P (current pressure)

- D (current density)

VVVV.V = current pressure or density value

SVVVV.V = current temperature value

Px = product 1, 2, 3, 4, 5, or 6

Error response is NOXX = the value was not read.

Remarks

The length of response depends on the number of meters programmed for the arm.

Constraints

- NO30 will be returned if the requested product is not allocated to the arm to which the command was directed.

- NO31 will be returned if the command format does not match the current configuration for the arm.

- On a hybrid arm RD_Z returns value for the sequential products meter. RD_Z_Px is for ratio assigned products only.

Special Case

None

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.60 Command Code RE: Reset Status Conditions

This command resets or acknowledges pending status conditions of the AccuLoad IV.

Command

RE_XX

where XX = two-character code as detailed below.

Responses

Good response is OK = status condition has been reset. Status condition will no longer appear in response to status requests (EQ and RS).

Error response is NOXX = the status condition has not been reset.

Remarks

For bay configurations, the RE TD command clears the transaction done flag for the bay. RE BD still affects only the arm addressed.

Constraints

When using a card reader, RE CD will cancel card validation and prevent additional transactions without another card-in (if AccuLoad IV is configured for card-in required options).

Special Case

TD and BD statuses are also reset on authorize commands.

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

Table 69: Valid Status Codes for RE

Code	Condition
BD	Batch done status
CD	Card data is present
NC	Nedap reader communications fail
PC	Program mode value has changed
PF	Unit has power-failed
SA	Standby mode
TD	Transaction done status (also resets BD)
VT	Vehicle data request

Note: If the status code is already reset, a NO06 will be returned.

4.61 Command Code RF: Recipe Flow Rates

This command returns calculated first and second high flow rates and low flow rates for each of the products for a ratio blender. These flow rates are not the programmed flow rates. They represent the flow rates calculated by the AccuLoad according to the percentages programmed for this recipe.

Command

RF_RR

where RR = recipe number (01—50).

Responses

Good response is RF_RR_HHHHH_SSSSS_LLLLL_HHHHH_SSSSS_LLLLL [_ HHHHH_SSSSS_LLLLL] [_ HHHHH_SSSSS_LLLLL] [_HHHHH_SSSSS_LLLLL] [_ HHHHH_SSSSS_LLLLL]

where:

- HHHHH = product high flow rate

- SSSSS = product second high flow rate

- LLLLL = product low flow rate

> **Note:** [ ] denote optional values; data is returned starting with product 1 and counting up until the number of products configured for that arm is reached.

Error response is NOXX = flow rates not returned.

Remarks

These flow rates are not the programmed flow rates, they represent the flow rates calculated by the AccuLoad to create a ratio blend which remains in spec throughout the duration of the batch, given the programmed blend ratio.

Constraints

NO31 will be returned if the command format does not match the current configuration of the arm/bay.

Special Case

None

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.62 Command Code RK: Read Keypad

This command instructs the AccuLoad IV to transmit any pending data entered at the keypad to the requesting device.

Command

RK

Responses

Good response is RK_NNNN. N

where:

- NNNN. N is a string of from one to 25 characters, where the final character is a non-numeric terminating key represented as indicated below:

- Numeric keypad data zero through nine will be represented by their ASCII character equivalents.

The following are accepted as terminating keys only and will be represented as follows:

- Enter key (ENTER) = "E"

- Print key (PRINT) = "P"

- Start key (START) = "A"

- Set key (SET) = "B"

The clear key (CLEAR) has a function and therefore will not be represented on the display. If pressed, the last character entered will be cleared and another character may be entered in its place. If pressed a second time, the entire field will be cleared and the entry will have to be repeated.

Error response is NOXX = pending data was not available.

Remarks

The response string NNNN...N will contain leading zeros to the length of response specified in the prompt that was issued. If the expected input length for a prompt is four digits and only two digits are entered, two leading zeros and the two digits input at the keypad will be displayed in the response to the RK. If the prompt was issued with the option for variable input field length (adding 40 to expected data length), leading

zeros are still returned. If the prompt was issued with the delimiter [or], the initiating keystroke is NOT returned in the response to the RK.

Constraints

Once a terminating key is pressed at the keypad the message PLEASE WAIT will be displayed. Keypad data is not cleared from the AccuLoad IV until a WX, WD, or DA command has been issued. After data pending, the keypad is locked until a WX or WD command has been issued for prompt or a DA command removes minicomputer control. If none of these occur within three minutes, AccuLoad IV will time-out and release the keypad and display from minicomputer control.

Special Case

None

Command Modes

- Poll and authorize (1)

- Remote control (2)

4.63 Command Code RL: Show Recipes Loaded

This command requests a bitmap of recipes that have been loaded in the current or previous transaction.

Command

Current transaction

- RL = requests recipes loaded in the transaction

Local storage transaction

- RL_NNN = requests recipes loaded in an historical transaction

where NNN = number of transactions back into local storage

Responses

Good responses

Current transaction

- RL_C1C2C3…C13 = bitmap of the loaded recipes

Local storage transaction

- RL_C1C2C3…C13_NNN = bitmap of the loaded recipes

where C1…C13 are bit-mapped characters indicating recipes 01-50 (See 4.42: Command Code MP: Minimum Preset tables.)

NNN = number of transactions back into local storage

Error response: NOXX The bit map has not been returned.

Remarks

The recipes loaded bitmap will be cleared on authorization of a transaction (if poll/authorize or remote control) or when the AccuLoad is released for delivery for the first batch of a transaction (polling only). For bay-based transactions, this bitmap will show all recipes loaded for the bay.

Constraints

NO05 will be returned if no transaction has ever been completed.

Special Case

None

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.64 Command Code RN: Show Recipe Numbers

This command returns the recipe numbers for each of the batches loaded in the current or previous transaction.

Command

Current transaction

- RN = requests recipe numbers loaded in the transaction.

Local storage transaction

- RN_NNN = requests recipes numbers loaded in an historical transaction

where NNN = number of transactions back into local storage.

Responses

Good response

Current transaction

RN_RR_RR_RR_RR_RR_RR_RR_RR_RR_RR Good response. Recipe numbers.

Local storage transaction

RN_RR_RR_RR_RR_RR_RR_RR_RR_RR_RR_NNN Good Response. Recipes loaded in the historical transaction

where:

- RR = recipe number 01-50

- NNN = number of transactions back into local storage

Error response is NOXX = the recipe number has not been returned.

Remarks

Up to 10 batches may be reported. The number of batches reported will be determined by the number of batches per transaction parameter and not the number of batches actually loaded in any given transaction. For bay-based transactions, the response will include all recipes loaded for the bay.

Constraints

- NO05 will be returned if no transaction has ever been completed.

- If a batch was not delivered, 00 will be returned as the recipe number for the undelivered batch.

Special Case

None

Command Modes

- Polling only

- Poll and authorize

- Remote Control

- Poll and program

4.65 Command Code RP: Request Preset

This commands requests the current preset value being loaded at the AccuLoad IV.

Command

RP

Responses

Good response is RP_XXXXXX

where XXXXXX = preset volume.

Error response: NOXX The current preset value was not read.

Remarks

The preset value is returned with leading spaces, for example, RP_ __1000.

Constraints

The preset value is only available from the AccuLoad IV while the AccuLoad IV is authorized, released, Flowing, and transaction in progress. RP will return the actual preset value from the time the load is started (SA command or pressing the START key) until batch done status is set.

Special Case

None. If bays are configured, an RP to an arm on the bay with no batch in progress will return NO39 = no current batch on arm.

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.66 Command Code RQ: Request Current Flow Rate

This command retrieves the current flow rates from the AccuLoad IV.

Command

- RQ : flow rate for the current product or system flow rate

- RQ_Px: flow rate for the specified product (ratio, hybrid ratio products)

- RQ_P: flow rate for all component products (ratio blending, hybrid blending)

where:

- P: constant for ratio blending applications

- Px: products 1, 2, 3, 4, 5, or 6 (P is a constant for ratio and hybrid blending applications)

Responses

Good responses

- RQ_XXXXX: current flow rate

- RQ_XXXXX_Px: flow rate of a specific product

- RQ_XXXXX_XXXXX [_XXXXX] [_XXXXX] [_XXXXX] [_XXXXX]: flow rates for component products (ratio only)

where:

- XXXX: current flow rate

- Px: products 1, 2, 3, 4, 5, or 6

Error response is NOXX = flow rate was not returned.

Remark

None

Constraints

NO31 will be returned if the command format is inconsistent with the currently configured mode of operations.

Special Case

- Hybrid blending: RQ_P will return flow rates for all ratio products.

- RQ returns flow rate for the sequential product currently flowing.

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.67 Command Code RR: Request Recipe

This command requests the current recipe number from AccuLoad IV.

Command

RR

Responses

Good response is RQ_NN

where NN = recipe number (01—50).

Error response is NOXX = recipe number not returned.

Remarks

The recipe number returned by the RR will remain in effect until another recipe is selected, either by allocating a single recipe (AB command) or by selection at the AccuLoad keypad. Neither batch done nor transaction done clears the recipe number from the RR response.

Constraints

- NO05 will be returned if no transaction has ever been completed.

- NO39 will be returned if bays are configured and an RR is sent to an arm with no batch in progress, when a bay transaction is in progress.

Special Case

None

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.68 Command Code RS: Request Status

This command requests the operational status of the AccuLoad IV. Data is returned as two-character mnemonics for each status reported. A maximum of 20 status codes will be reported.

Command

RS request status

Responses

Good response:

XX_XX_XX_XX … A character string consisting of from one to 20 status codes separated by a single space. Each status code is two characters. See Table 70: Request Status Codes for RS below for more information about status codes.

Remarks

- The AccuLoad IV is considered released whenever the valve is open and has not been commanded to close.

- Some alarm conditions cannot be reset through the communication channel. See 4.42: Command Code MP: Minimum Preset.

- For bay configurations—SA, SF, TD, and TP—refer to the bay. Other flags continue to be specific to the load arm.

Constraints and Special Case

None

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

Table 70: Request Status Codes for RS

Code	Condition
AL	Alarm active
AU	Arm authorized
BD	Arm batch done
CD	Card data present
CE	Checking entries
DP	Delayed prompt is in effect (WP or WQ command)
FL	Arm flowing
I1	Input 1 on
I2	Input 2 on
I3	Input 3 on
I4	Input 4 on
I5	Input 5 on
I6	Input 6 on
I7	Input 7 on
I8	Input 8 on
I9	Input 9 on
IA	Input 10 on
IB	Input 11 on
IC	Input 12 on
ID	Input 13 on
IE	Input 14 on
IF	Input 15 on
IG	Input 16 on
IH	Input 17 on
II	Input 18 on
IJ	Input 19 on
IK	Input 20 on
IL	Input 21 on
IM	Input 22 on
IN	Input 23 on
JA	Input 24 (A4I, optional) on
JB	Input 25 (A4I, optional) on
JC	Input 26 (A4I, optional) on
JD	Input 27 (A4I, optional) on
JE	Input 28 (A4I, optional) on
JF	Input 29 (A4I, optional) on
JG	Input 30 (A4I, optional) on
JH	Input 31 (A4I, optional) on
JI	Input 32 (A4I, optional) on
JJ	Input 33 (A4I, optional) on
JK	Input 34 (A4I, optional) on
JL	Input 35 (A4I, optional) on

Code	Condition
JM	Input 36 (A4I, optional) on
JN	Input 37 (A4I, optional) on
JO	Input 38 (A4I, optional) on
JP	Input 39 (A4I, optional) on
JQ	Input 40 (A4I, optional) on
JR	Input 41 (A4I, optional) on
JS	Input 42 (A4I, optional) on
JT	Input 43 (A4I, optional) on
KY	Keyboard data pending
LR	Pending (locked) reports
NC	Nedap Reader Communications Fail
PC	Program parameter changed
PD	Permissive delay active
PF	Power-fail has occurred since last reset
PP	Printing in progress
PR	Preset in Progress
PS	Printer standby (printer is down)
PW	In program mode
RL	Arm released
RS	Pending report storage full
TD	Arm transaction done
TO	Display message timed out
TP	Arm transaction in progress
SA	In standby mode
SF	Storage full
ST	Standby transactions exist
VT	New vehicle ID tag available

4.69 Command Code RT: Request Transaction Totals

This command instructs AccuLoad IV to transmit the transaction data.

Command

Current transaction

- RT_Z: transaction volume; sum of the recipes

- RT_Z_RR: transaction single recipe volume

- RT_Z_Px: transaction volume for the product specified

Local storage transaction

- RT_Z_NNN: transaction volume; sum of the recipes

- RT_Z_RR_NNN: transaction single recipe volume

- RT_Z_Px_NNN: transaction volume for the product specified

where Z =

- R for raw (indicated) volume (IV)

- G for gross volume (GV)

- N for gross @ standard temperature volume (GST)

- P for gross @ standard temperature and pressure volume (GSV)

- M for mass total

Px = product 1, 2, 3, 4, 5, or 6

RR = recipe 01—50, or MR to indicate multiple recipes

NNN = number of transactions back into local storage to retrieve data

Responses

Current transaction

- RT_Z_YY_RR_VVVVVVV: good response. transaction volume—sum of the recipes.

- RT_Z_YY_Px_VVVVVVV: good response. transaction volume—specified product.

Local storage transaction

- RT_Z_YY_RR_VVVVVVV_NNN: good response. transaction volume—sum of the products.

- RT_Z_YY_Px_VVVVVVV_NNN: good response. transaction volume—specified product.

where Z =

- R for raw (indicated) volume (IV)

- G for gross volume (GV)

- N for gross @ standard temperature volume (GST)

- P for gross @ standard temperature and pressure volume (GSV)

- M for mass total

Px = products 1, 2, 3, 4, 5, or 6

YY = total number of batches

RR = recipe 01-50

VVVVVVV = total transaction volume

NNN = number of transactions back into local storage to retrieve data

Error response is NOXX = no transaction data was returned.

Remarks

- For total volume requests: (RT_Z and RT_Z_NNN) MR as the recipe number on the response indicates a multiple recipe transaction. Recipes delivered in batches can be determined via batch volume requests RB or by using the RL or RN commands.

- For bay configurations, the returned values represent bay transaction totals.

Constraints

- Transaction volume units are assumed to be as programmed into AccuLoad IV.

- NO03 will be returned for a product or recipe request if the product or recipe requested was not delivered in the transaction.

- NO30 will be returned if the product or recipe specified is not currently configured to the arm to which the command was directed.

- NO31 will be returned if product transaction totals are requested for an arm currently configured for straight product delivery.

Special Case

None

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.70 Command Code RX: Request Batch Totals Extended

This command retrieves batch data from the AccuLoad IV.

Command

Current transaction:

- RX = current batch volume, delivery volume type

- RX_Px = current batch, specified product (ratio, sequential, hybrid)

- RX_YY = completed batch volume, delivery volume type

- RX_YY_T = completed batch volume, specified volume type

- RX_YY_Px = product volume of batch, delivery volume type

- RX_YY_T_Px = product volume of batch, specified volume type

Local storage transaction:

- RX_YY_NNN = historic transaction requests

- RX_YY_Px_NNN = returns the product volume type

- RX_YY_T_NNN = returns the batch in the volume type requested if that volume type was stored.

- RX_YY_Z_Px_NNN = returns the product in the volume type requested if that volume type was stored.

where T =

- R for raw (indicated) volume (IV)

- G for gross volume (GV)

- N for gross @ standard temperature volume (GST)

- P for net pressure and temperature volume (GSV)

- M for mass total

Px = product 1, 2, 3, 4, 5, or 6

YY = batch number requested (01-10)

NNN = number of transactions back into local storage to retrieve data.

Responses

Current transaction

- RX_YY_T_A1A2A3A4A5A6A7A8A9A10A11_RR_VVVVVVV for RB, RB_YY, and RB_YY_X

- RX_YY_T_A1A2A3A4A5A6A7A8A9A10A11_Px_VVVVVVV for RB_YY_Px, RB_YY_Px_X, and RB_Px

Local storage transaction

- RX_YY_T_A1A2A3A4A5A6A7A8A9A10A11_RR_VVVVVVV_NNN for RB_XX_NNN and RB_XX_X_NNN

- RX_YY_T_A1A2A3A4A5A6A7A8A9A10A11_Px_VVVVVVV_NNN for RB_XX_Px_NNN and RB_XX_Px_X_NNN

where:

YY = batch number requested or current batch

T =

- R for raw total (IV)

- G for gross total (GV)

- N for gross at standard temperature total (GST)

- P for net temperature & pressure (GSV)

- M for mass totals

A1 - A11 = additive selection code characters 1-11

Px = product 1, 2, 3, 4, 5, or 6

RR = recipe number 01—50

VVVVVVV = total amount delivered for this batch in the requested amount type

NNN = number of transactions back into local storage to retrieve data

Error Response: NOXX

Remarks

- The batch is not considered complete until the start key is pressed for the next batch, or the transaction is ended. RB_YY will always fail on the current batch even after BD status is reported in Command EQ or RS.

- See Command Codes AU and AP for additive code (A1A2A3…).

- If bays are configured, the returned value is the bay-based batch total.

- The RX command was added in revision 1.9 to support the additional additive injectors (up to 44 total) that can be configured in the AccuLoad. If not using more than the original 24 additive limit, the legacy 'RB - Request Batch Totals' command is still valid. These commands differ only in the length of the returned additive mask field in the response (RB returns a 6-character additive mask, the RX response additive mask field contains 11 characters).

Constraints

- Batch volume units are assumed as the type programmed into AccuLoad IV.

- NO03 will be returned for a product request if the product requested was not delivered in the batch.

- NO30 will be returned if the product specified is not currently configured to the arm to which the command was directed.

- NO31 will be returned if the product batch totals are requested for an arm currently configured for straight product delivery.

Special Case

None

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.71 Command Code SA: Remote Start

This command remotely starts the AccuLoad IV as though the START key was pressed.

Command

SA

Responses

Good response is OK = AccuLoad IV is released for flow to begin.

Error response is NOXX = AccuLoad IV is not released for remote start.

Remarks and Special Case

None

Constraints

NO01 will be returned if the AccuLoad is in the program mode locally or via communications.

Command Modes

- Poll and authorize

- Remote control

4.72 Command Code SB: Set Batch

This command authorizes a batch and presets batch volumes for a transaction.

Command

- SB_VVVVVV: authorize and preset with a batch amount of VVVVVV

- SB_A1A2A3A4A5A6_VVVVVV: authorize with specific additives 1-24 and preset a batch amount of VVVVVV

- SB_A1A2A3A4A5A6A7A8A9A10A11_VVVVVV: authorize with specific additives 1-44 and preset to VVVVVV

where:

- A1A2... = additive selection code

- VVVVVV = volume to preset

Responses

Good response is OK = batch volume has been accepted.

Error response is NOXX = the batch volume has not been set.

Remarks

- If the additive qualifier (A1A2A3…) is not used, the additive selection will operate as currently programmed in the AccuLoad IV. For authorization with additives, only one recipe may be allotted. Additives selected in the qualifier must be programmed for use. Additives will be injected for all components of the blend recipe. If more than one recipe is enabled, the Select Recipe prompt will be displayed.

- See also remarks for AB = allocate blend recipes command. (*)

- See command codes AP and AU for a description of A1A2…characters.

- The 11-character additive qualifier variant should be used when > 24 additives are in use (Revision 1.9 and up)

Constraints

Batch volume must not exceed programmed maximum batch size and must not be below the programmed minimum batch size. Units value must correspond to what is programmed into AccuLoad IV for units of measurement.

Special Case

An authorization command with batch size of zero allows the driver to select batch size. Driver may clear any preset batch size and enter a new batch volume providing that it is less than the preset batch size. A batch amount of zero while in the auto preset mode will result in the maximum batch amount being displayed; a non-zero set batch amount will override the maximum batch amount as the auto preset amount and cannot be overridden by the driver while in the auto preset mode.

Command Modes

Remote control

4.73 Command Code SD: Set Date and Time

This command sets the date and time in the AccuLoad IV.

Command

SD_DDDDDDDD_HHNN_X

where:

- DDDDDDDD = MMDDYYYY (standard time)

- DDDDDDDD = DDMMYYYY (military time)

- MM = month

- DD = day

- YYYY = year

- HH = hours

- NN = minutes

X =

- A (standard time—A.M.)

- P (standard time—P.M.)

- M (military time)

Responses

Good response is OK = time and date value accepted and seconds reset to zero

Error response is NOXX = the time and date were not accepted.

Remarks

None

Constraints

Time value must be within range programmed into AccuLoad IV - 0000 to 2359 for military; 0000 to 1259 for standard. Month must be within the range of one to 12; day

must be in the range valid for the month chosen.

Special Case

Leading spaces may be used in place of leading zeros for month, day, year, hours, and minutes. However, this is not recommended.

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.74 Command Code SF: Authorize and Set Fixed Amount Batch (without Override)

This command is similar to the SB—Set batch command in that it allows an automation system to authorize a batch in remote control with a predefined batch volume. However unlike with SB the amount specified cannot be overridden by the driver. The display appears in full screen mode.

Command

- SF_VVVVVV: authorize and preset with a batch amount of VVVVVV

- SF_A1A2A3A4A5A6_VVVVVV: authorize with specific additives 1-24 and preset a batch amount of VVVVVV

- SF_A1A2A3A4A5A6A7A8A9A10A11_VVVVVV: authorize with specific additives 1-44 and preset to VVVVVV

where:

- A1A2...

- ... = additive selection code

- VVVVVV = volume to preset

Responses

Good response is OK = batch volume has been accepted.

Error response is NOXX = the batch volume has not been set.

Remarks

- If the additive qualifier (A1A2A3…) is not used, the additive selection will operate as currently programmed in the AccuLoad IV. For authorization with additives, only one recipe may be allotted. Additives selected in the qualifier must be programmed for use. Additives will be injected for all components of the blend recipe. If more than one recipe is enabled, the Select Recipe prompt will be displayed.

- See also : Remarks for AB - Allocate Blend Recipes command. (*)

- See command codes AP and AU for a description of A1A2A3…characters.

- The 11-character additive qualifier variant should be used when > 24 additives are in use (Revision 1.9 and up)

Constraints

Batch volume must not exceed programmed maximum batch size and must not be below the programmed minimum batch size. Units value must correspond to what is programmed into AccuLoad IV for units of measurement.

Command Modes

Remote Control

4.75 Command Code SP: Remote Stop

This command instructs the AccuLoad IV to stop, halting product delivery on all arms.

Command

SP

Responses

Good response is OK.

Error response is NOXX = the AccuLoad IV was not stopped.

Remarks and Special Case

None

Constraints

Valve and pump are shut down whether flow is present or not. If a batch is in progress, the START key or the remote start command SA must be used to continue the batch.

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.76 Command Code SR: Show Recipes Currently Allocated

This command requests from the AccuLoad IV recipes that are currently allocated.

Command

SR

Responses

Good response is SR_C1C2C3…C13

where C1…C13 are bit-mapped characters indicating recipes 01-50. See 4.42: Command Code MP: Minimum Preset for recipe bit maps for C1—C13.

Remarks

- Before recipes are allocated with the AB command, the response from the SR will show all recipes that are currently programmed for this load arm at the AccuLoad IV. After recipes are allocated, the response from the SR will show only those recipes selected in the AB. Recipe allocation is canceled when transaction done status is set.

- See also remarks for AB - Allocate Blend recipes command. (*)

Constraints and Special Case

None

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.77 Command Code ST: Remote Stop on Arm

This command instructs the AccuLoad IV to stop flow on an individual arm, halting product delivery on that arm only. Any other arms with flow in progress are not affected.

Command

ST: Stop Arm Flow

Responses

Good response is OK.

Error response is NOXX = the flow to the arm was not stopped.

Remarks and Special Case

None

Constraints

Valve and pump are shut down whether flow is present or not. If a batch is in progress, the START key or the remote start command SA must be used to continue the batch.

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.78 Command Code SV: Extended Services Routines

This command is for factory use.

Command

SV_<packet>

where <packet> is a binary buffer, no longer than 1K bytes.

Responses

Good response is SV_<packet>

where <packet> is a binary buffer, no longer than 1K bytes.

Error response is NOXX = data not retrieved.

Remarks, Constraints, and Special Case

None

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.79 Command Code SW: Swing Arm Position

This command allows the host communications protocol to detect the current position of the swing arm.

Command

SW

Responses

Good response is SW_S

where X =

- A for side A

- B for side B

- ? for arm in transit

Error response is NOXX

where XX =

- 03 value rejected

- 07 wrong control mode

- 19 option not installed

Remarks and Constraints

None

Special Case

A NO19 response occurs when there are no detect switches configured for that arm.

Command Modes

- Polling only

- Poll and program

- Poll and authorize

- Remote control

4.80 Command Code TA: Set Transaction

This command sets the maximum transaction volume.

Command

TA_V...V

where V...V = maximum preset total for transaction.

Range is 0—999999.

Responses

Good response is OK = the transaction volume has been accepted

Error response is NOXX = the transaction volume was not accepted.

Remarks and Special Case

None

Constraints

- Unit value must correspond to what is programmed into the AccuLoad IV for units of measurement and for delivery and preset display.

- A NO19 response occurs when there are no detect switches configured for that arm.

Command Modes

- Poll and authorize

- Remote control

4.81 Command Code TI: Show Prompt Data Entry

This command retrieves the current or stored prompts data entered in the AccuLoad IV by the operator in response to one of five local prompts configured at and issued by the AccuLoad.

Command

Current transaction

TI_X

Local storage transaction

TI_X_NNN

where:

- X = prompt number (1 through 5)
- NNN = number of transactions back into local storage to retrieve data

Responses

Good responses

Current transaction

TI_X_AAAAAAAAA

Local storage transaction

TI_X_AAAAAAAAA_NNN

where:

- X = prompt number (1—5)
- AAAAAAAAA = prompt data entry (numeric)
- NNN = number of transactions back into local storage to retrieve data

Error response is NOXX = no prompt data retrieved.

Remarks and Special Case

None

Constraints

This information does not include responses to prompts issued by the communication commands WA, WD, WP, WQ, or WX.

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.82 Command Code TN: Show Transaction Stop Date and Time

This command retrieves the transaction stop date and time and internal transaction number.

Command

Current transaction

TN

Local storage transaction

TN_NNN

where NNN = number of transactions back into local storage to retrieve data.

Responses

Good responses

Current transaction

TN_IIII_DDDDDDDD_AAAA_X

Local storage transaction

TN_IIII_DDDDDDDD_AAAA_X

where:

- IIII = internal transaction number

- DDDDDDDD = transaction stop date; (MMDDYYYY for standard time), (DDMMYYYY for military time)

- AAAA = transaction stop time (HHMM)

X =

- A (standard time - A.M.)

- P (standard time - P.M.)

- M (military time)

Error response is NOXX = the transaction stop date and time were not retrieved.

Remarks, Constraints, and Special Case

None

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.83 Command Code VB: Batch Vapor Recovered Mass

This command retrieves the vapor recovered mass for a batch.

Command

VB: current batch recovered mass

VB_YY: completed batch mass

VB_YY_NNN: historical transaction request

Responses

Good responses

- VB_MMMMMMM.MM = current batch mass

- VB_YY_MMMMMMM.MM: completed batch mass

- VB_YY_NNN_MMMMMMM.MM: historic

where:

- YY = batch number (1-10)

- NNN = number of transactions back into local storage to retrieve data

- MMMMMMM.MM = batch mass

Error responses is NOXX.

Remarks, Constraints, and Special Case
None

Command Modes

- Polling only

- Poll and program

- Poll and authorize

- Remote control

4.84 Command Code VC: Control Valve Solenoid Actuation Diagnostic Counters

This command retrieves the solenoid actuation counts from the AccuLoad IV.

Command

VC: read solenoid actuation counts (straight, sequential, unloading arms).

VC_Mx: read solenoid actuation counts (specific meter's control valve on ratio/ hybrid arm).

VC_Ix: flow-controlled injector

VC_S_VVVVVVVVV: set/reset actuation count (straight, sequential, unloading arms).

VC_Mx_S_VVVVVVVVV: set/reset actuation count (ratio, hybrid arms).

VC_Ix_S_VVVVVVVV: set/reset actuation count for flow-controlled injector valve.

Responses

Good responses

- VC_ XXXXXXXXX_YYYYYYYYY Solenoid counts (straight, sequential arms)

- VC_Mx_XXXXXXXXX_YYYYYYYYY Solenoid counts (straight, hybrid arms)

- VC_Ix_XXXXXXXX_YYYYYYYYY Solenoid counts (flow-controlled injector)

- OK Sets/resets actuation count (VC_S_VVV.V; VC_Mx_S_VVV.V)

Note: The solenoid actuation count values returned will be padded with leading zeroes.

where:

- x = "1" through "6" for meter one through six respectively, or "1" through "4" for flow-controlled injector one through four

- S = "U" for Upstream solenoid, "D" for Downstream solenoid

- VVVVVVVVV = count value (reset to zero assumed if not specified)

- XXXXXXXXX = current value of upstream solenoid counter

- YYYYYYYYY = current value of downstream solenoid counter

Constraints

Not available with transaction in progress NOXX.

Special Case

For injectors Ix, must be a flow-controlled type.

Command Modes

- Polling only

- Poll and program

- Poll and authorize

- Remote control

4.85 Command Code VD: Valve (Closure) Diagnostic

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

Command

- VD: capture latest valve diagnostic data for valve on meter 1 (straight, sequential, unloading arms)

- VD_Mx: capture latest valve diagnostic data for specified valve (ratio/hybrid arms)

- VD_R: reset valve diagnostic data on load arm (straight, sequential, unloading arms).

- VC_Mx_R: reset valve diagnostic data for a specified valve on a load arm (ratio/hybrid arms)

where meter number on load arm.

Responses

Good responses

- VD_TT.T_AAA_FFFFFFF

- VD_Mx_TT.T_AAA_FFFFFFF

- OK = valve diagnostic reset

- OK = specific valve diagnostic reset

where

- TT.T = time in seconds that was required before zero flow occurred

- AAA = amount of volume delivered after valve commanded to close

- FFFFFFF = flow rate of product when batch was commanded to stop

- x = meter number on load arm

Error responses

- NO31 - invalid for current configuration.

Remarks

To indicate to the host computer system that a new set of valve diagnostic data is available, the response from the EE command will be updated with a "New Valve Diagnostic Data Available" flag. The bit for the status condition will be set when the batch is stopped due to the conditions indicated above. When the batch is resumed or ended the flag will be cleared.

Constraints

- NO31 will be returned if the command format does not match the current configuration of the arm.

- NO31 will be returned if the arm is not configured for "Straight with VRS."

Special Case

None

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.86 Command Code VT: Request Meter Totalizer Data

This command requests a totalizer value from the AccuLoad IV.

Command

- VT_Z_Px: product non-resettable totals. Valid for sequential and ration blending configurations.

- VT_Aaa: additive non-resettable totals.

- VT_Z_RR: recipe non-resettable totals. Valid for any configuration.

- VT_Z_Y_Px: product starting or ending non-resettable total for current transaction.

- VT_Z_Y_Px_NNN: product starting or ending non-resettable totals for previous transactions.

- VT_V: non-resettable totals for the vapor recovered mass for the load arm (straight with VRS)

where Aaa =

- A01 (additive 1)

- A02 (additive 2)

- • :

- • :

- • :

- A44 (additive 44)

Z =

- R for raw (indicated) volume (IV)

- G for gross volume (GV)

- N for gross at standard temperature volume (GST)

- P for gross at standard temperature and pressure volume (GSV)

- M for mass totals

- Px = product 1, 2, 3, 4, 5, or 6

- RR = recipe number 01-50

- Y = S for starting non-resettable total, E for ending non-resettable

- NNN = number of transactions back

- V = vapor recovered mass for the load arm

Responses

Good responses

- VT_Z_Px_VVVVVVVVV: product totals, blending configuration

- VT_Aaa_VVVVVV.VVV: additive totals

- VT_Z_RR_VVVVVVVVV: recipe totals

- VT_Z_Y_Px_VVVVVVVVV: product starting or ending non-resettable total for current transaction

- VT_Z_RR_VVVVVVVVV_NNN: product starting or ending non-resettable totals for previous transactions

- VT_V_VVVVVVVVV: vapor recovered mass

where Z =

- R for raw (indicated) volume (IV)

- G for gross volume (GV)

- N for gross volume at standard temperature (GST)

- P for net volume temperature and pressure (GSV)

- M for mass totals

- VVVVVVVVV = 9-digit totalizer volume

Aaa =

- A01 (additive 1)

- A02 (additive 2)

- A03 (additive 3)

- • :

- • :

- A44 (additive 44)

- Px = product 1, 2, 3, 4, 5, or 6

- RR = recipe number 01—50

Y =

- S for starting non-resettable total

- E for ending non-resettable

- NNN = number of transactions back

Error responses is NOXX = totals were not retrieved.

Remarks

- If the AccuLoad is programmed for "dynamic leakage update" (System 336), the non-resettable totals will be updated with leakage volume while the AccuLoad is idle. The VT Z Px command will return the current value of the non-resettable totals which will include any leakage that has occurred since the end of the last transaction.

- If the AccuLoad is programmed for "update non-resettables with leakage at transaction start" (System 336), the non-resettable totals will remain static while the AccuLoad is idle (i.e. leakage will not be added until start of next transaction). The VT Z Px command will return the value of the non-resettable totals captured at the end of the last transaction.

- As always, if a transaction is in progress, the VT Z Px command will return the current value of the dynamically updated non-resettable totals.

- The VT Z S command may be sent at any time during or after a transaction to retrieve the non-resettable totals captured at the start of the transaction.

- If VT X E is sent while the AccuLoad is idle, the non-resettable totals captured at the end of the last transaction will be returned. This value will not include any leakage that may have occurred after the last transaction is ended.

- If VT Z E is sent to retrieve the ending transaction non- resettable totals while a transaction is still in progress, an asterisk will be appended to the volume indicating the value returned may not be the final value.

- Products, recipes, and additives must be allocated to the arm addressed.

Constraints

- NO30 will be returned if the additive component, or recipe requested is not currently configured to the arm to which the request was directed.

- NO31 will be returned if the arm is not configured for straight with VRS.

Special Case

None

Command Modes

- Polling only

- Poll and authorize

- Remote control

- Poll and program

4.87 Command Code VX: Transaction Vapor Recovered Mass

This command retrieves the vapor recovered mass for a transaction.

Command

- VX: current transaction recovered mass

- VX _NNN: historic transaction request

Responses

Good responses

- VX_MMMMMMM.MM: current transaction recovered mass

- VX_ NNN_MMMMMMM.MM: historic transaction request

where:

- NNN: number of transactions back into local storage to retrieve data

- MMMMMMM.MM: batch mass

Error response is NOXX.

Remarks, Constraints, and Special Case
None

Command Modes

- Polling only

- Poll and program

- Poll and authorize

- Remote control

4.88 Command Code WA: Write Second Line of Message to Appear on Display

This command instructs the AccuLoad IV to display the second line of a message, up to 30 characters in length. The message is displayed on the line below the message specified with a WD, WP, WQ, or WX command. The format is identical to these commands; however, the time out value is ignored. The delimiter character is not ignored; the last command set determines the expected input form.

Command

WA_NNN_X...Xd99

where:

- X...X: an alphanumeric character string of up to 30 characters (see Remarks).

- NNN: timeout value in seconds. An entry of 000 will cause the timeout value to default to what was entered for the first display message or if a non-zero entry is used, it will override the previous value entered.

- d: a required delimiter used to signify the input field. There are three different delimiters each indicating a unique handling of the input process. They are as follows:

- &: input data is entered directly with no initiator required; any function key except the CLEAR or the STOP may be used to terminate the input sequence.

- [: an ENTER key must initiate the input sequence; any function key except the CLEAR or STOP may be used to terminate the input sequence.

-]: an ENTER key must initiate the input sequence; only an ENTER key will be accepted for terminating the input sequence.

> **Note:** The above delimiters are acceptable as part of the alphanumeric message.

- 99: represents the input field length. This may be encoded to allow a variable length input field up to the length specified here. The range of the input length is 00 to 20. To encode the option of the variable length input, add 40 to the desired input field length.

Example: To request an input field length of five, enter 05. To also include the option, enter 45. If the option is not included the operator will have to put in five digits and then

press the terminating key, any more than 5 digits and the message Error Press Clear will appear on the AccuLoad IV display. If the option is included, the terminating key can be pressed at any time sending data to the Host.

Responses

Good response is OK = message has been accepted for the alphanumeric display (left justified).

Error response is NOXX = the message was not accepted.

Remarks

The following characters can be displayed on the AccuLoad IV display. (X...X part of command).

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

a b c d e f g h i j k l m n o p q r s t u v w x y z 0 1 2 3 4 5 6 7 8 9

+ ! " # $ % & ' ( ) - . / : ; < = > @ [\ ^ _ ' {l} ° ? * space

The message will be displayed on the third line of the display and will wrap to the fourth line where necessary.

Constraint

- WD or WX must be issued first. Input field length must be zero if one was previously defined in the first message issued. If it is not, a NO06 will be returned. WA cannot be used with delayed prompts WP or WQ.

- NO01 will be returned if another load arm is in the program mode locally or via communications.

Special Case

None

Command Modes

- Poll and authorize

- Remote control

4.89 Command Code WB: Write Third Line of Message to Appear on Display

The WB command allows writing a 30-character message which is displayed two lines below the message specified with a WD, WP, WQ, or WX command. The format is identical to these commands; however, the timeout value is ignored. The delimiter character is not ignored. The last command set determines the expected input form.

The commands that write to lines other than the first (WA, WB, WC, WE) must be preceded by one of the prompt commands that write to the first line (WD, WP, WQ, WX).

Command

WB_NNN_X...Xd99

where:

- X...X: an alphanumeric character string of up to 30 characters

- NNN: prompt timeout value (001-999)

- d: a required delimiter used to signify the input field. There are three different delimiters each indicating a unique handling of the input process. They are as follows:

- &: input data is entered directly with no initiator required; any function key except the CLEAR or the STOP may be used to terminate the input sequence.

- [: an ENTER key must initiate the input sequence; any function key except the CLEAR or STOP may be used to terminate the input sequence.

-]: an ENTER key must initiate the input sequence; only an ENTER key will be accepted for terminating the input sequence.

> **Note:** The above delimiters are acceptable as part of the alphanumeric message.

- 99: represents the input field length. This may be encoded to allow a variable length input field up to the length specified here. The range of the input length is 00 to 20. To encode the option of the variable length input, add 40 to the desired input field length.

Example: To request an input field length of five, enter 05. To also include the option, enter 45. If the option is not included the operator will have to put in five digits and then press the terminating key, any more than five digits and the message Error Press Clear will appear on the AccuLoad IV display. If the option is included, the terminating key can be pressed at any time sending data to the Host appear on the AccuLoad IV display. If the option is included, the terminating key can be pressed at any time sending data to the Host.

Responses

Good response is OK = message has been accepted for the alphanumeric display (left justified)

Error response isNOXX = the message was not accepted.

Remarks

The following characters can be displayed on the AccuLoad IV display. (X...X part of command).

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

a b c d e f g h i j k l m n o p q r s t u v w x y z 0 1 2 3 4 5 6 7 8 9

+ ! " # $ % & ' ( ) - . / : ; < = > @ [\ ^ _ ' {l} º ? * space

The message will be displayed on the third line of the display and will wrap to the fourth line where necessary.

Constraints

- WD or WX must be issued first. Input field length must be zero if one was previously defined in the first message issued. If it is not, a NO06 will be returned. WA cannot be used with delayed prompts WP or WQ.

- NO01 will be returned if another load arm is in the program mode locally or via communications.

Special Case

None

Command Modes

- Poll and authorize

- Remote control

4.90 Command Code WC: Write Fourth Line of Message to Appear on Display

The WC command allows writing a 30-character message which is displayed three lines below the message specified with a WD, WP, WQ, or WX command. The format is identical to these commands; however, the timeout value is ignored. The delimiter character is not ignored. The last command set determines the expected input form.

The commands that write to lines other than the first (WA, WB, WC, WE) must be preceded by one of the prompt commands that write to the first line (WD, WP, WQ, WX).

Command

WC_NNN_X...Xd99

where:

- X...X: an alphanumeric character string of up to 30 characters

- NNN: prompt timeout value (001-999).

- d: a required delimiter used to signify the input field. There are three different delimiters each indicating a unique handling of the input process. They are as follows:

- &: input data is entered directly with no initiator required; any function key except the CLEAR or the STOP may be used to terminate the input sequence.

- [: an ENTER key must initiate the input sequence; any function key except the CLEAR or STOP may be used to terminate the input sequence.

-]: an ENTER key must initiate the input sequence; only an ENTER key will be accepted for terminating the input sequence.

> **Note:** The above delimiters are acceptable as part of the alphanumeric message.

- 99: represents the input field length. This may be encoded to allow a variable length input field up to the length specified here. The range of the input length is 00 to 20. To encode the option of the variable length input, add 40 to the desired input field length.

Example: To request an input field length of five, enter 05. To also include the option, enter 45. If the option is not included the operator will have to put in five digits and then press the terminating key, any more than five digits and the message Error Press Clear will appear on the AccuLoad IV display. If the option is included, the terminating key can be pressed at any time sending data to the Host.

Responses

Good Response: OK Message has been accepted for the alphanumeric display (left justified)

Error Response: NOXX The message was not accepted.

Remarks

The following characters can be displayed on the AccuLoad IV display. (X...X part of command).

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

a b c d e f g h i j k l m n o p q r s t u v w x y z 0 1 2 3 4 5 6 7 8 9

+ ! " # $ % & ' ( ) - . / : ; < = > @ [\ ^ _ ' {l} º ? * space

The message will be displayed on the third line of the display and will wrap to the fourth line where necessary.

Constraints

- WD or WX must be issued first. Input field length must be zero if one was previously defined in the first message issued. If it is not, a NO06 will be returned. WA cannot be used with delayed prompts WP or WQ.

- NO01 will be returned if another load arm is in the program mode locally or via communications.

Special Case

None

Command Modes

- Poll and authorize

- Remote control

4.91 Command Code WD: Write to Display

This command instructs the AccuLoad IV to display a 30-character message. The time displayed and length of response are also specified in the command. Data will be echoed to the screen upon input by the operator. This command may be used alone or it may be used in conjunction with any combination of the WA, WB, WC, or WE commands.

Command

WD_NNN_X...Xd99

where:

- X...X: An alphanumeric character string of up to 30 characters (see : Remarks).

- NNN: time-out value in seconds. An entry of 000 will cause the time-out value to default to what was entered for the first display message or if a non-zero entry is used, it will override the previous value entered.

- d: a required delimiter used to signify the input field. There are three different delimiters each indicating a unique handling of the input process. They are as follows:

  - &: Input data is entered directly with no initiator required; any function key except the CLEAR or the STOP may be used to terminate the input sequence.

  - [: an ENTER key must initiate the input sequence; any function key except the CLEAR or STOP may be used to terminate the input sequence.

  -]: an ENTER key must initiate the input sequence; only an ENTER key will be accepted for terminating the input sequence.

> **Note:** The above delimiters are acceptable as part of the alphanumeric message.

- 99 = represents the input field length. This may be encoded to allow a variable length input field up to the length specified here. The range of the input length is 00 to 20. To encode the option of the variable length input, add 40 to the desired input field length.

Example: To request an input field length of five, enter 05. To also include the option, enter 45. If the option is not included the operator will have to put in five digits and then press the terminating key, any more than five digits and the message Error Press

Clear will appear on the AccuLoad IV display. If the option is included, the terminating key can be pressed at any time sending data to the host.

Responses

Good response is OK = message has been accepted for the alphanumeric display (left justified)

Error response isNOXX = the message was not accepted.

Remarks

The following characters can be displayed on the AccuLoad IV display. (X...X part of command).

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

a b c d e f g h i j k l m n o p q r s t u v w x y z 0 1 2 3 4 5 6 7 8 9

+ ! " # $ % & ' ( ) - . / : ; < = > @ [\ ^ _ ' {l} ° ? * space

The message will wrap to the second line of the display where necessary.

Constraints

NO01 will be returned if another load arm is in the program mode locally or via communications.

Special Case

Keypad data pending flag and data are cleared.

Command Modes

- Poll and authorize
- Remote control

4.92 Command Code WE: Write Fifth Line of Message to Appear on Display

The WE command allows writing a 30-character message which is displayed four lines below the message specified with a WD, WP, WQ, or WX command. The format is identical to these commands; however, the timeout value is ignored. The delimiter character is not ignored. The last command set determines the expected input form.

The commands that write to lines other than the first (WA, WB, WC, WE) must be preceded by one of the prompt commands that write to the first line (WD, WP, WQ, WX).

Command

WB_NNN_X...Xd99

where:

- X...X: an alphanumeric character string of up to 30 characters

- NNN: prompt timeout value (001-999)

- d: a required delimiter used to signify the input field. There are three different delimiters each indicating a unique handling of the input process. They are as follows:

  - &: input data is entered directly with no initiator required; any function key except the CLEAR or the STOP may be used to terminate the input sequence.

  - [: an ENTER key must initiate the input sequence; any function key except the CLEAR or STOP may be used to terminate the input sequence.

  -]: an ENTER key must initiate the input sequence; only an ENTER key will be accepted for terminating the input sequence.

> **Note:** The above delimiters are acceptable as part of the alphanumeric message.

- 99: represents the input field length. This may be encoded to allow a variable length input field up to the length specified here. The range of the input length is 00 to 20. To encode the option of the variable length input, add 40 to the desired input field length.

Example: To request an input field length of five, enter 05. To also include the option, enter 45. If the option is not included the operator will have to put in five digits and then press the terminating key, any more than five digits and the message Error Press Clear will appear on the AccuLoad IV display. If the option is included, the terminating key can be pressed at any time sending data to the Host.

Responses

Good response is OK = message has been accepted for the alphanumeric display (left justified)

Error response is NOXX = the message was not accepted.

Remarks

The following characters can be displayed on the AccuLoad IV display. (X...X part of command).

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

a b c d e f g h i j k l m n o p q r s t u v w x y z 0 1 2 3 4 5 6 7 8 9

+ ! " # $ % & ' ( ) - . / : ; < = > @ [\ ^ _ ' {l} º ? * space

The message will be displayed on the third line of the display and will wrap to the fourth line where necessary.

Constraints

- WD or WX must be issued first. Input field length must be zero if one was previously defined in the first message issued. If it is not, a NO06 will be returned. WB cannot be used with delayed prompts WP or WQ.

- NO01 will be returned if another load arm is in the program mode locally or via communications.

Special Case

None

Command Modes

- Poll and authorize

- Remote control

4.93 Command Code WP: Write Delayed Prompt with Echo

This command sends a delayed prompt message to the AccuLoad IV. This message will be displayed when the SET key is pressed enabling the keypad for input. The time displayed and length of response are also specified in the command. Data will be echoed to the screen upon input by the operator. This command may be used alone or it may be used in conjunction with any combination of the WA, WB, WC, or WE commands.

Command

WP_NNN_X...Xd99

where:

- X...X: An alphanumeric character string of up to 30 characters (see Remarks).

- NNN: time-out value in seconds. An entry of 000 will cause the time-out value to default to what was entered for the first display message or if a non-zero entry is used, it will override the previous value entered.

- d: a required delimiter used to signify the input field. There are three different delimiters each indicating a unique handling of the input process. They are as follows:

  - &: input data is entered directly with no initiator required; any function key except the CLEAR or the STOP may be used to terminate the input sequence

  - [: an ENTER key must initiate the input sequence; any function key except the CLEAR or STOP may be used to terminate the input sequence.

  -]: an ENTER key must initiate the input sequence; only an ENTER key will be accepted for terminating the input sequence.

> **Note:** The above delimiters are acceptable as part of the alphanumeric message.

- 99: Represents the input field length. This may be encoded to allow a variable length input field up to the length specified here. The range of the input length is 00 to 20. To encode the option of the variable length input, add 40 to the desired input field length.

Example: To request an input field length of five, enter 05. To also include the option, enter 45. If the option is not included the operator will have to put in five digits and then press the terminating key, any more than five digits and the message Error Press Clear will appear on the AccuLoad IV display. If the option is included, the terminating key can be pressed at any time sending data to the host.

Responses

Good response is message has been accepted and will be displayed when the SET key is pressed at the start of a transaction only. Sets keypad pending status when keypad input is completed. Timer is not started until the SET key is pressed.

Error response is NOXX: the message was not accepted.

Remarks

The following characters can be displayed on the AccuLoad IV display. (X...X part of command).

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

a b c d e f g h i j k l m n o p q r s t u v w x y z 0 1 2 3 4 5 6 7 8 9

+ ! " # $ % & ' ( ) - . / : ; < = > @ [\ ^ _ ' {|} º ? * space

The prompt will wrap to the second line of the display where necessary.

Constraints

- Cancellation occurs on receiving a DA command or on power-down.

- NO01 will be returned if another load arm is in the program mode locally or via communications.

Special Case

The DP status bit will be set on acceptance of the WP command and cleared on cancellation (issuance of DA). The TO status bit will be cleared on acceptance of a DA.

Command Modes

- Poll and authorize

- Remote control

4.94 Command Code WQ: Write Delayed Prompt with Security Echo

This command sends a delayed prompt message to the AccuLoad IV. This message is displayed when the SET key is pressed enabling the keypad for input with security echo (X). The time displayed and length of response are also specified in the command. Data will be echoed to the screen upon input by the operator. This command may be used alone or it may be used in conjunction with any combination of the WA, WB, WC, or WE commands.

Command

WQ_NNN_X...Xd99

Where

- X...X: an alphanumeric character string of up to 30 characters (see : Remarks).

- NNN: time-out value in seconds. An entry of 000 will cause the time-out value to default to what was entered for the first display message or if a non-zero entry is used, it will override the previous value entered.

- d: a required delimiter used to signify the input field. There are three different delimiters each indicating a unique handling of the input process. They are as follows:

  - &: input data is entered directly with no initiator required. Any function key except the CLEAR or the STOP may be used to terminate the input sequence.

  - [: an ENTER key must initiate the input sequence; any function key except the CLEAR or STOP may be used to terminate the input sequence.

  -]: an ENTER key must initiate the input sequence; only an ENTER key will be accepted for terminating the input sequence.

> **Note:** The above delimiters are acceptable as part of the alphanumeric message.

- 99 : represents the input field length. This may be encoded to allow a variable length input field up to the length specified here. The range of the input length is 00 to 20. To encode the option of the variable length input, add 40 to the desired input field length.

Examples: To request an input field length of five, enter 05. To also include the option, enter 45. If the option is not included the operator will have to put in five digits and then press the terminating key, any more than five digits and the message Error Press Clear will appear on the AccuLoad IV display. If the option is included, the terminating key can be pressed at any time sending data to the Host.

Responses

Good response is message has been accepted and will be displayed when the SET key is pressed at the start of a transaction only. Sets keypad pending status when keypad input is completed. Timer is not started until the SET key is pressed.

Error response is NOXX = the message was not accepted.

Remarks

The following characters can be displayed on the AccuLoad IV display. (X...X part of command).

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

a b c d e f g h i j k l m n o p q r s t u v w x y z 0 1 2 3 4 5 6 7 8 9

+ ! " # $ % & ' ( ) - . / : ; < = > @ [\ ^ _ ' {l} º ? * space

The prompt will wrap to the second line of the display where necessary.

Constraints

- Cancellation occurs on receiving a DA command or on power-down.

- NO01 will be returned if another load arm is in the program mode locally or via communications.

Special Case

The TO status bit will be cleared on acceptance of a DA command. The DP status bit will be set on acceptance of the WQ command and cleared on cancellation (issuance of a DA).

Command Modes

- Poll and authorize

- Remote control

4.95 Command Code WX: Write to the Display in Security Mode

This command sends a message to the AccuLoad IV and enables the keypad for input in an echo X or security mode. The time displayed and length of response are also specified in the command. Data will be echoed to the screen upon input by the operator. This command may be used alone or it may be used in conjunction with any combination of the WA, WB, WC, or WE commands.

Command

WX_NNN_X...Xd99

where:

- X...X: an alphanumeric character string of up to 30 characters (see Remarks).

- NNN: time-out value in seconds. An entry of 000 will cause the time-out value to default to what was entered for the first display message or if a non-zero entry is used, it will override the previous value entered.

- d: a required delimiter used to signify the input field. There are three different delimiters each indicating a unique handling of the input process. They are as follows:

  - &: input data is entered directly with no initiator required; any function key except the CLEAR or the STOP may be used to terminate the input sequence.

  - [: an ENTER key must initiate the input sequence; any function key except the CLEAR or STOP may be used to terminate the input sequence.

  -]: an ENTER key must initiate the input sequence; only an ENTER key will be accepted for terminating the input sequence.

> **Note:** The above delimiters are acceptable as part of the alphanumeric message.

- 99: represents the input field length. This may be encoded to allow a variable length input field up to the length specified here. The range of the input length is 00 to 20. To encode the option of the variable length input, add 40 to the desired input field length.

Example: To request an input field length of five, enter 05. To also include the option, enter 45. If the option is not included the operator will have to put in five digits and then

press the terminating key, any more than five digits and the message Error Press Clear will appear on the AccuLoad IV display. If the option is included, the terminating key can be pressed at any time sending data to the host.

Responses

Good response is message has been accepted for the alphanumeric display (left justified). keypad enabled for input in Echo X mode.

Error responses is NOXX = the message was not accepted.

Remarks

The following characters can be displayed on the AccuLoad IV display. (X...X part of command).

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

a b c d e f g h i j k l m n o p q r s t u v w x y z 0 1 2 3 4 5 6 7 8 9

+ ! " # $ % & ' ( ) - . / : ; < = > @ [\ ^ _ ' {l} ° ? * space

The prompt will wrap to the second line of the display where necessary.

Constraints

NO01 will be returned another load arm is in the program mode locally or via communications.

Special Case

The TO status bit will be cleared on acceptance of a WD, WX, WP, or WQ command. Also, keypad data pending flag and data are cleared.

Command Modes

- Poll and authorize

- Remote control

4.96 Command Code XC: Change Parameter Security Level

This command sets the current security levels for a program mode parameter using the AccuLoad III style directory code plus program code number. This mechanism is deprecated and included for backward compatibility with AccuLoad III legacy automation interfaces. New implementations should use the AccuLoad IV specific XW command.

Command

- XC_XX_YYY...Z
- XC_XX_YYYY...Z

where:

- X...X: program mode major directory
- CF: configuration
- SY: system
- AR: arm
- Mx: meter (1-6)
- Px: product (1-6)
- 01…50: recipe
- Y...Y: parameter number
- Z: security level (1-5)

Responses

Good responses

- XC_XX_YYY_Z_A..A = message was accepted
- XC_XX_YYYY_Z_A..A = message was accepted

where:

- X...X = program mode major directory

- CF = configuration

- SY = system

- AR = arm

- Mx = meter (1-6)

- Px = product (1-6)

- 01…50 = recipe

- Y...Y = parameter number

- Z = security Level (1-5)

- A..A = the programmed value

Error response is NOXX.

Remarks and Special Case

None

Constraints

Security level for parameters in the security directory cannot be modified (pass codes etc.).

Command Modes

- Poll and authorize

- Remote control

- Poll and program

4.97 Command Code XV: Read Parameter Security Level

This command requests the current security levels for a program mode parameter using the AccuLoad III style directory code and program code number. This mechanism is deprecated and included for backward compatibility with AccuLoad III legacy automation interfaces. New implementations should use the AccuLoad IV specific XR command.

Command

- XV_XX_YYY
- XV_XX_YYYY

where:

- X...X = program mode major directory
- CF = configuration
- SY = system
- AR = arm
- Mx = meter (1-6)
- Px = product (1-6)
- 01…50 = recipe
- Y...Y = parameter number

Responses

Good responses

- XV_XX_YYY_Z_A..A = message was accepted
- XV_XX_YYYY_Z_A..A = message was accepted

where:

- XX = program mode major directory
- CF = configuration

- SY = system

- AR = arm

- Mx = meter (1-6)

- Px = product (1-6)

- 01…50 = recipe

- Y...Y = parameter number

- Z = currently programmed security level

- A..A = the programmed value

Error response is NOXX = message was not accepted.

Remarks and Special Case

None.

Constraints

Security level for parameters in the security directory cannot be modified (pass codes, etc.).

Command Modes

- Poll and authorize

- Remote control

- Poll and program

Appendix 1: Reference for NOXX Responses

Code	Condition
XX	**Description**
00	Command Nonexistent
01	In Program Mode
02	Released
03	Value Rejected
04	Flow Active
05	No Transaction Ever Done
06	Operation Not Allowed
07	Wrong Control Mode
08	Transaction In Progress
09	Alarm Condition
10	Storage Full
11	Operation Out Of Sequence
12	Power Fail During Transaction
13	Authorized
14	Program Code Not Used
15	Display/Keypad In Use
16	Ticket Not In Printer
17	No Keypad Data Pending
18	No Transaction In Progress
19	Option Not Installed
20	Start After Stop Delay
21	Permissive Delay Active
22	Print Request Pending
23	No Meter Enabled
24	Must Be In Program Mode
25	Ticket Alarm During Transaction
26	Volume Type Not Selected
27	Exactly One Recipe Must Be Enabled
28	Batch Limit Reached
29	Checking Entries
30	Product/Recipe/Additive Not Assigned
31	Invalid Argument for Configuration

Code	Condition
32	No Key Ever Pressed
33	Maximum Active Arms in Use
34	Transaction Not Standby
35	Comm Swing Arm Out of Position
36	Card-In Required
37	Data Not Available
38	Too Many Shared Additives Selected
39	No Current Batch on This Arm
41	No Pending Reports
42	Valve Opening Delay
89	Database Access Error
90	Must Use Mini Protocol
91	Buffer Error
92	Keypad Locked
93	Data Recall Error
94	Not In Program Mode
95	Security Access Not Available
96	Data Request Queued Ask Later
99	Internal Error

Appendix 2: Alphanumeric Character Set Used By the AccuLoad IV

ASCII	Decimal	Hexidecimal
NUL	0	0
STX	2	2
ETX	3	3
LF	10	A
CR	13	D
SP	32	20
!	33	21
"	34	22
#	35	23
$	36	24
%	37	25
&	38	26
`	39	27
(	40	28
)	41	29
*	42	2A
+	43	2B
'	44	2C
-	45	2D
.	46	2E
/	47	2F
0	48	30
1	49	31
2	50	32
3	51	33
4	52	34
5	53	35
6	54	36
7	55	37
8	56	38
9	57	39
:	58	3A
;	59	3B

ASCII	Decimal	Hexidecimal
<	60	3C
=	61	3D
>	62	3E
?	63	3F
@	64	40
A	65	41
B	66	42
C	67	43
D	68	44
E	69	45
F	70	46
G	71	47
H	72	48
I	73	49
J	74	4A
K	75	4B
L	76	4C
M	77	4D
N	78	4E
O	79	4F
P	80	50
Q	81	51
R	82	52
S	83	53
T	84	54
U	85	55
V	86	56
W	87	57
X	88	58
Y	89	59
Z	90	5A
[	91	5B
\	92	5C
]	93	5D
^	94	5E
-	95	5F
`	96	60
a	97	61
b	98	62
c	99	63
d	100	64
e	101	65
f	102	66

ASCII	Decimal	Hexidecimal
g	103	67
h	104	68
i	105	69
j	106	6A
k	107	6B
l	108	6C
m	109	6D
n	110	6E
o	111	6F
p	112	70
q	113	71
r	114	72
s	115	73
t	116	74
u	117	75
v	118	76
w	119	77
x	120	78
y	121	79
z	122	7A
{	123	7B
|	124	7C
}	125	7D
~	126	7E
DEL	127	7F

Appendix 3: Unauthorized Flow

Unauthorized flow occurs when the AccuLoad picks up and accumulates stray pulses from the meter between transactions. This could be leakage or it could be product moving back and forth in the meter. These raw pulse counts are accumulated in the flow counter and can be viewed in the response to the FL command. These raw pulses can be converted to units (such as gallons or liters) by dividing the accumulated pulse count by the programmed k factor. For example, if the meter's k factor is set to 50, an accumulated pulse count of 104 reflects unauthorized flow of a little more than 2 units.

When the AccuLoad is authorized for a transaction, the flow counter is restarted at zero. This updates the non-resettable total for the product by the amount accumulated in the flow counter, if the option in System Volume Accuracy Directory Program Code 336 is set to Transaction Start. (If the option is set to Dynamic, the non-resettable totalizer is updated in near real-time.)

The presence of unauthorized flow is indicated by a status of Flowing without a corresponding Released status in the response to the EQ or RS commands.

Appendix 4:
Using the Bitmap Tables

Many command codes in this manual use bitmapping to encode information as concisely as possible. Up to four discrete bits of information may be represented by a single ASCII character, both as commands to and responses from the AccuLoad. Most command codes that use bitmapping consist of two or more ASCII characters. This appendix describes how to encode or decode a single ASCII character; the process can be repeated for each additional character.

Each option listed across the top of the table carries a binary weighted value associated with it. From right to left, the values are 1, 2, 4, and 8. Special characters are used to represent hexadecimal values A through F, which equate to decimal values 10 through 15, when the bit values for selected options are added together. The Char column (not the Hex column) is used to encode and decode ASCII characters.

4.1 Encoding a Bitmapped Character

The letter X in the table indicates a selected option. First, determine which of the four column heading options will be encoded. Find the row that contains Xs for the options selected. The character listed along the left axis is equal to the value of the options selected.

For example, consider the AB command in a scenario that you want to enable recipes 1, 3, 6, 7, and 8. Recipes 1 and 3 can be represented in the first ASCII character. The row containing Xs for 1 and 3 only corresponds to the ASCII character 5; therefore, the first character of the AB command would be 5. Recipes 6, 7, and 8 can be represented in the second ASCII character. The character corresponding to these values is E, so the second character of the AB command would be E. Because no recipes were selected that can be encoded in the third, fourth, fifth, or sixth characters of the AB command, these characters will be zeroes.

The complete AB command to enable recipes 1, 3, 6, 7 and 8 is "AB 5E0000".

4.2 Decoding a Bit-mapped Character

The letter X in the table indicates an asserted value. Decoding a character is the opposite of encoding a character. Find the returned ASCII character in the left column. For each X in that row, refer to the column header to determine what option or condition is asserted.

For example, consider the following response to the EQ command: "580027", where:

- 5 represents AccuLoad IV Authorized and AccuLoad IV Released

- 8 represents Transaction in Progress

- 0 represents no conditions met in character 3

- 0 represents no conditions met in character 4

- 2 represents Input #2 contact

- 7 represents Input #5, Input #6, and Input #7

- 0 represents no conditions met in character 7

- 0 represents no conditions met in character 8

Appendix 5: Communications

5.1 Communications Primer

Samuel F.B. Morse's dot-dash telegraph code is the earliest example of a practical, time sequential, data-coding scheme for transmission of information by communication equipment. This code is considered the predecessor of the ones and zeros modern digital communication codes now used for serial data transmission of time sequenced information over a pair of wires.

Like Morse Code, digital codes provide a means of representing numbers, letters of the alphabet, or other special characters in a digital information system. A digital code is a pattern of binary digits or bits, zeros and ones arranged in a predefined order.

One familiar code used for arithmetic computations in digital systems is the Binary Coded Decimal, commonly known as BCD code. The BCD code is a weighted code in that a numerical weight is assigned to each bit position in the code. Using a 4-bit BCD code for an example, the left-most bit has a numeric weighted value of 8, the next bit has a numeric weighted value of 4, the next to the last bit a weight value of 2 and the last bit, a value of 1. The total value of the coded number is equal to the sum of the numerical weights of the bits represented by the binary digit 1. Four-bit BCD codes are valid only for numbers between 0 and 9. For example, the number 3 is represented by a BCD code of "0011," and the number 9 is "1001." To represent 39, the respective BCD code is "0011 1001."

There are many different codes used to perform specific tasks in digital systems, but the one most widely used in digital communications systems is the American Standard Code for Information Interchange, or simply ASCII code. Like other binary codes, the ASCII code is a weighted code.

The ASCII code is a more complex code than BCD since it uses patterns of seven bits to represent 128 characters consisting of either upper or lowercase letters of the alphabet, punctuation characters, and control characters in addition to numbers. For example, the ASCII code representation of the number 39 is "0110011 0111001." A complete ASCII code character table is shown in Table 1.

A computer system always requires some digital data transmission between its various parts: CPU to peripherals, CPU to memory, or memory to peripherals. Data transmission to and from these devices must conform to some accepted standard. To

date, the only widely used transmission standards deal with serial digital data. There are essentially three organizations that issue standards that define serial digital communication interface circuits, their electrical and timing characteristics, the manner in which they operate, and the mechanical details of the appropriate connectors. These organizations are the Electronics Industries Association (EIA), the International Consultative Committee for Telephony and Telegraphy (CCITT), and the International Standards Organization (ISO).

EIA Standard, EIA-232 (formerly known as RS-232) is a venerable yet still prevalent serial interface standard. This standard is extensively used by terminals, data sets, measuring instruments, and controllers for data transmission rates typically up to 115,200 bits per second for transmission cables up to 50 feet in length. EIA-232 is a single-ended voltage mode transmission system standard that defines data communication between equipment using alternating pulses which can be in one of two states - either high (logic 1) or low (logical 0). These states are often called "mark" (logic 1) or "space" (logic 0). Per EIA, the logical 1 level must be within +3.75 to +25 volts DC, while the logical 0 level must be within -3.75 to -25 volts DC; any other voltage levels are unacceptable.

EIA-232 is not the only serial interface standard or system. EIA-422, 485 and 20mA current loop are other long-distance current mode digital communication

standards. These differential voltage or current mode standards are better suited for longer distance, high speed communications than the single-ended voltage mode predecessor. Although not a revolutionary concept, the current mode system dates to the oldest form of binary serial transmission: the telegraph. In this system, a current, usually 20mA, flows through a single loop to represent a logic level one, and turns off, "open key" to represent logic zero.

Serial data is typically transmitted among or between devices in an asynchronous fashion. In asynchronous data transmission, each transmitted character is formed by using a start bit which signals the beginning of the character before the ASCII code pattern, and one or two stop bits after the code pattern signaling the end of the character. The ASCII character is described fully by seven bits with an optional parity bit in the eighth position for error control. Therefore, each transmitted ASCII character requires at least ten bits for complete definition. As the communication equipment receives the asynchronously transmitted characters, the start and stop bits are stripped off, parity is checked, and the character itself is interpreted and treated accordingly whether it is alphanumeric data or control information.

"Baud rate" and "bit rate" are two distinct terms used to describe the speed of data transmission. These terms are often used synonymously and cause much confusion if not completely understood. The baud is a measurement unit dating back to the days of Morse Code, and it is defined as the shortest signaling element. In modern

telecommunications language, the data rate is more often specified in bits per second (bps), because a single change of state in a signal can represent a group of two

or more data bits. If each signal event represents only one bit condition, baud rate equals bps. Typical asynchronous serial baud rates are 1200, 2400, 4800, 9600, 19200, 38400, 57.6K, and 115.2K bps. To have an interactive session between two computing devices, both devices must be transmitting and receiving at the same baud rate, or there must be an intermediate memory device, called a buffer, that accommodates the differences in speed. Refer to the AccuLoad.net installation manual to determine the appropriate baud rate based on cable length for each unique installation site.

ASCII Character	Decimal	Hex	Binary
NUL	0	0	000 0000
STX	2	2	000 0010
ETX	3	3	000 0011
LF	10	A	000 1010
CR	13	D	000 1101
SP	32	20	010 0000
!	33	21	010 0001
"	34	22	010 0010
#	35	23	010 0011
$	36	24	010 0100
%	37	25	010 0101
&	38	26	010 0110
'	39	27	010 0111
(	40	28	010 1000
)	41	29	010 1001
*	42	2A	010 1010
+	43	2B	010 1011
,	44	2C	010 1100
-	45	2D	010 1101
.	46	2E	010 1110
/	47	2F	010 1111
0	48	30	011 0000
1	49	31	011 0001
2	50	32	011 0010
3	51	33	011 0011
4	52	34	011 0100
5	53	35	011 0101
6	54	36	011 0110
7	55	37	011 0111
8	56	38	011 1000
9	57	39	011 1001
:	58	3A	011 1010

ASCII Character	Decimal	Hex	Binary
;	59	3B	011 1011
<	60	3C	011 1100
=	61	3D	011 1101
>	62	3E	011 1110
?	63	3F	011 1111
@	64	40	100 0000
A	65	41	100 0001
B	66	42	100 0010
C	67	43	100 0011
D	68	44	100 0100
E	69	45	100 0101
F	70	46	100 0110
G	71	47	100 0111
H	72	48	100 1000
I	73	49	100 1001
J	74	4A	100 1010
K	75	4B	100 1011
L	76	4C	100 1100
M	77	4D	100 1101
N	78	4E	100 1110
O	79	4F	100 1111
P	80	50	101 0000
Q	81	51	101 0001
R	82	52	101 0010
S	83	53	101 0011
T	84	54	101 0100
U	85	55	101 0101
V	86	56	101 0110
W	87	57	101 0111
X	88	58	101 1000
Y	89	59	101 1001
Z	90	5A	101 1010
[	91	5B	101 1011
\	92	5C	101 1100
^	94	5E	101 1101
_	95	5F	101 1111
`	96	60	110 0000
a	97	61	110 0001
b	98	62	110 0010
c	99	63	110 0011
d	100	64	110 0100
e	101	65	110 0101
f	102	66	110 0110

ASCII Character	Decimal	Hex	Binary
g	103	67	110 0111
h	104	68	110 1000
i	105	69	110 1001
j	106	6A	110 1010
k	107	6B	110 1011
l	108	6C	110 1100
m	109	6D	110 1101
n	110	6E	110 1110
o	111	6F	110 1111
p	112	70	111 0000
q	113	71	111 0001
r	114	72	111 0010
s	115	73	111 0011
t	116	74	111 0100
u	117	75	111 0101
v	118	76	111 0110
w	119	77	111 0111
x	120	78	111 1000
y	121	79	111 1001
z	122	7A	111 1010
{	123	7B	111 1011
/	124	7C	111 1100
}	125	7D	111 1101
º	126	7E	111 1110
DEL	127	7F	111 1111

5.2 Ethernet and TCP/IP Communications

The proliferation of personal computing beginning in the 1970s gave rise to the need to interconnect groups of computers to better share data, communicate to peripheral devices (printers, modems, etc.) and now interface to instruments. The most popular of these groups are known as Local Area Networks (LANs). These networks consist of nodes, where computers, peripherals and instruments are connected to the network, and interconnecting wire or fiber optic cable to interconnect the nodes. A LAN can consist of a few nodes up to several hundred but will be confined to a few buildings within a few thousand meters of one another. Technologies were developed to establish standard interface hardware as well as secure control of the flow of data on the LAN. Ethernet emerged as the primary medium for LANs. The Ethernet technology equipment; interface cards, hubs, switches, and cabling have become commodity items. Software protocols were developed to standardize sharing and transfer of files, mail messages, access to peripherals, and access to the internet.

Again, a primary standard has emerged in the TCP/IP protocol. The acronym TCP/IP comes from two protocols developed for the internet: Transmission Control Protocol and Internet Protocol.

The AccuLoad IV provides an integral Ethernet host port for networking.

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