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SECS/GEM Interface Option for Fluidmove for Windows®

FmXP Version 5.3
FmNT Version 4.9.3

User Guide

P/N 7223396 Rev A

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Table of Contents

Table of Figures

Table of Tables

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1 Introduction

1.1 Overview

This manual describes the SECS/GEM interface used with Fluidmove for Windows XP (FmXP) version 5.3 and higher and Fluidmove for Windows NT (FmNT) version 4.93 and higher. The term "Fluidmove" as used in this manual refers to the applicable software (FmXP or FmNT) used on the Equipment.

This document is a modification of the GW Associates GES-1993 SECS/GEM Interface document and has been especially prepared to support Fluidmove. The content and structure of this document follows the original GES-1993 document. User information and GEM interface with Fluidmove were added. Fluidmove supports the GW Associates GEM subset of the SECS communication standard. Future references to the SECS/GEM interface will use only the GEM identification to acknowledge the specific approach used by Fluidmove.

The interface between Fluidmove and a Host computer is explained in detail. The interface conforms to the GEM standard. The GEM standard defines a standard implementation of the SECS-II communication interface for all semiconductor manufacturing equipment.

GW Associates (Software Model GEM-NT-100) is used to implement approximately 90% of SECS and GEM features, with Fluidmove implementing the remaining equipment-specific features.

1.2 Terminology

Abbreviations and terms used in this manual are defined in Table 1-1.

Table 1-1   Definition of Terms

Term	Definition
Alarm	An alarm is related to any abnormal situation on the Equipment. GEM allows the Host to be notified when alarm conditions are detected and cleared.
ALID	Equipment Alarm ID. The identifier for a specific alarm condition.
CEID	Collection Event ID. The identifier for a specific collection event.
Collection Event	A collection event is a detectable occurrence significant to the Equipment that is considered to be significant to the Host. GEM allows the Host to be notified when a collection event occurs. This allows the Host to track the Equipment's activity.
Data Values	Also known as Discrete Data. Meant to be temporary or ephemeral statuses that disappear after an event is complete. Sometimes known as 'DVs' (Data Values), 'DVVALs' (Discrete Data Values).
Data Variable (DV)	Data variables may only be valid upon the occurrence of a particular collection event. The Host may gather data variable values from the GEM Equipment.
Equipment	An intelligent system which communicates with a Host and complies with the GEM standard. In this manual it refers to the dispensing system.
Equipment Constant (EC)	Equipment Constants are settable by the Host. The Host may gather Equipment constant values from the GEM Equipment. The Host may also set Equipment constant values on the GEM Equipment to control the Equipment's behavior.

Table 1-1   Definition of Terms (continued)

Term	Definition
Fluidmove	The Fluidmove® for Windows XP® (FmXP) or Fluidmove® for Windows NT® (FmNT) software application which controls GEM.
GCD	GWGEM Configuration Data (an ASCII file compiled for GWGEM).
GEM	Generic Equipment Model. The GEM (E30) standard defines the generic behavior of semiconductor Equipment as viewed through a communications link in terms of SECS-II messages communicated over that link. The GEM standard impacts Equipment control and Equipment-to-Host communications.
High-Speed SECS Message Services (HSMS)	HSMS (E37) is a high-speed replacement and an alternative to SECS-I for applications where higher speed communication is needed or where simple point-to-point technology is insufficient. HSMS defines a communication interface via TCP/IP suitable for the exchange of (SECS-II) messages between computers in a semiconductor factory.
Host	The computer which is connected to, and communicates with, the Equipment via the SECS interface. The GEM standard defines a set of messages the Host must use when interacting with the Equipment. The Equipment communicates with one Host, but the Host may communicate with multiple Equipment units.
HSMS-GS	High Speed Message Service-General Session. This standard defines TCP/IP network communication used by GEM for Host/Equipment communication. It is intended to be applied for complex systems containing multiple independently accessible subsystems and uses an extended state machine.
HSMS-SS	High Speed Message Service-Single Session. This standard defines TCP/IP network communication used by GEM for Host/Equipment communication. It replaces the SECS-I standard.
ID	Identifier or Identification.
Operator	The person who physically has access to the Equipment's material port(s) and control panel. This is the person who is operating the dispensing system.
PP	Process Program
Recipe	A file containing a set of instructions for the Equipment.
Report	A set of variables predefined by the Equipment or defined by the Host. The Host uses reports to gather status variable, data variable, and Equipment constant values. The Host may request a report explicitly or attach a set of reports to a collection event.
SECS	SEMI Equipment Communications Standard. SECS I (E4): SEMI Equipment Communications Standard 1 Message Transfer. Defines RS-232 serial communication used by GEM for Host/Equipment communication. SECS II (E5): SEMI Equipment Communications Standard 2 Message Content. A standard for communications between intelligent Equipment and a Host. The standard defines the communication protocol interface (SECS-I) and the messages exchanged (SECS-II).
Message	All GEM Equipment and Host communication is accomplished using SECS-II messages. Each unique SECS-II message is identified by its stream number (S) and function number (F). The SECS-II standard defines a large set of SECS-II messages determining each one's purpose, content, and usage. The GEM standard defines how to use a subset of these SECS-II messages yet allows other SECS-II messages to be used in addition to this subset.

Table 1-1   Definition of Terms (continued)

Term	Definition
SEMI	Semiconductor Equipment and Materials International (SEMI) is a global trade association that represents the semiconductor and flat panel display equipment and materials industries. SEMI maintains and publishes standards that relate to Equipment automation and software.
Status Variable (SV)	Status Variable. Status variables may include any parameters that can be sampled in time such as temperature or quantity of a consumable. The Host may gather status variable values from the GEM Equipment.
UFPP	Unformatted Process Program
VID	Variable Identifier. A unique string representing the name of a variable.

1.3   SECS/GEM – Fluidmove Compatibility

Compatibility between Fluidmove and SECS/GEM version is as follows:

- FmXP 5.3 requires SECS/GEM version 5.0.
- FmNT 4.9.3 requires SECS/GEM version 4.8.3.

1.4   SECS Standard

The SEMI Equipment Communication Standard (SECS) is published by Semiconductor Equipment and Materials International (SEMI). It defines a computer to computer communications interface between a unit of factory Equipment and a Host Computer.

This Equipment complies to the complete SECS-I standard (excluding the physical RS-232 hardware connection) and to the generic portions of the SECS-II standard. The Equipment implements an appropriate subset of the SECS-II standard messages and complies with the following versions of standards:

- E4-1991 (SECS-I)
- E5-1993 (SECS-II)

NOTES   There were no changes to the SEMI E4 standard for 1993.

GWGEM Software is used to meet the SECS standard.

SECS default parameters will be used wherever possible; differences will be noted.

1.4.1   SECS-I Clarifications

The Equipment was designed to avoid using any of the unusual features of the SECS standard, so as to simplify the job of implementing Equipment support on the Host. This section clarifies the Equipment/Host SECS interface.

Fluidmove supports only Ethernet High Speed SECS Message Services (HSMS) in conjunction with communication drivers supplied by GW Associates.

Fluidmove does not support RS-232 interfaces.

1.4.2   Physical Connection

The GEM hardware interface must be a TCP/IP network card connection through a Ten-Base-T connector or BNC jack (SECS-II interface).

✍ **NOTE**   The following information is provided only as a reference for RS-232 connections (SECS-I interface) and is currently not implemented by Fluidmove:

- The RS-232 connector on the equipment deviates from the standard SECS-I DB25F connector.

- The Equipment provides a male 25-pin RS-232 "DB25M" connector on its back panel as the SECS port. Table 1-2 lists the pins used on the RS-232 connector.

Table 1-2   RS-232 Pins

Pin No.	Description
1	Shield.
2	TX Data (Equipment-to-Host).
3	RX Data (Host-to-Equipment).
4	Request to send (RTS). The Equipment raises this output signal when activating SECS. Not required by SECS standard, but you may find it useful for modem control.
7	Signal Ground.
20	Data Terminal Ready (DTR). The Equipment raises this output signal when activating SECS. This is not required by the SECS standard, but you may find it useful for modem control.

Note: Optional SECS power pins 18 and 25 are not provided.

1.4.3   SECS-I Blocks Transmitted

The Equipment uses the following SECS-I conventions in the blocks it sends:

- The Device ID is present in every block, with the R-bit always set to "1".

- The Block Number is always one (0x0001) for the first block of a message.

- For Primary messages, the System Bytes are generated unique for each message. For Secondary messages, the System Bytes are replicated from the received Primary message.

- SECS-I Blocks Received

Blocks received by the Equipment should be formatted as described above (except with the R-bit set to "0"), although the rules are more relaxed:

If a message consists of a single block, the Block Number may be zero (0x0000) or one (0x0001).

The Equipment is indifferent to the R-bit setting.

1.4.4   Interleaved Blocks

The Equipment never sends interleaved blocks to the Host. That is, the Equipment always sends all blocks of one message before sending the first block of the next message. This simplifies the job of the Host. However, the Equipment allows the Host to send interleaved blocks, if it so chooses.

1.4.5   Simultaneous Transactions

The Equipment may initiate several simultaneous outstanding SECS transactions. That is, the Equipment may send a secondary primary message before the Host has sent the Reply to a previous primary message. Mainly, this occurs when the Equipment reports Alarms and Events. The Host can reduce the number of outstanding transactions initiated by the Equipment by setting equipment constants appropriately so that the Equipment sends no W-Bit for Stream 5 (Alarm), Stream 6 (Event), and Stream 10 (Free Text) messages.

The Equipment allows the Host to initiate at least two (2) simultaneous outstanding transactions.

1.5   SECS-II Clarifications

The Equipment uses the following SECS-II conventions:

1.5.1   Data Format Types

Where the Standards permit a choice of data item types, the choice has been made as described in *Section 4 - SECS Message Detail*.

For outgoing messages, the Equipment always sends Data Items of the exact format shown. For some incoming messages, the Equipment "forgives" minor Host errors. For example, the Equipment may accept a U1 Data Item where a U2 format was expected. We recommend the Host attempt to use the formats shown.

1.5.2   Data Item Length Bytes

For messages sent by the Equipment, the number of length bytes in Data Items is always the minimum required to contain the Data Item length.

For messages received from the Host, the number of length bytes in Data Items can be 1, 2, or 3, provided that the length parameter can accurately be specified.

1.5.3   ASCII Data

Unless otherwise specified, all ASCII data items must contain printable ASCII data—that is, characters in the range 0x20 to 0x7E.

1.5.4   Multi-Block Messages

Wherever the Host is supposed to send a single-block message, this Equipment will also accept multi-block format.

The maximum size for a single SECS message is approximately 1000 blocks (256,000 bytes).

1.5.5   Function Zero

The Equipment sends a Reply message using Function zero (F0) according to the requirements of the GEM Control State.

Wherever this Equipment expects a Reply message from the Host, the Host can send F0. The Equipment will instantly abort the outstanding transaction. The Equipment will not take any additional action.

1.6   GEM Standard

The SEMI Generic Equipment Model for Effective Factory Automation (GEM) is another document published by SEMI. The GEM standard defines some useful conventions for designing the communications interface on a unit of factory Equipment to improve operations with a Host Computer. The Equipment complies with SEMI E30-1993.

1.7   GEM Compliance

The following items and Table 1-3 clarify which GEM functions are implemented in this Equipment:

- The Equipment never sends S2F25 (Loopback Diagnostic) to the Host. It will send the appropriate S2F26 in response to an S2F25 from the Host.

- The Equipment never sends S9F13 (Conversation Timeout) to the Host. The Equipment can be defined as having an "infinite timeout" for conversations.

- The Equipment never sends S10F7 (Multi-Block Not Allowed) to the Host. It will accept incoming messages consisting of printable characters and a maximum size of 320 characters.

- The Equipment will accept, but does not require, the Inquire/Grant transaction (S2F39/S2F40, S6F5/S6F6, S7F1/S7F2) for incoming primary multi-block messages.

- GWGEM Software Model GEM-NT-100 is used by Fluidmove to meet the SECS standard.

Table 1-3   GEM Compliance Statement

FUNDAMENTAL GEM REQUIREMENTS	IMPLEMENTED	COMPLIANT
State Models	☒ Yes ☐ No	☒ Yes ☐ No
Equipment Processing States	☒ Yes ☐ No	☒ Yes ☐ No
S1F13/S1F14 Auto Connection Scenario	☒ Yes ☐ No	☒ Yes ☐ No
Event Notification	☒ Yes ☐ No	☒ Yes ☐ No
On-line Identification	☒ Yes ☐ No	☒ Yes ☐ No
Error Messages	☒ Yes ☐ No	☒ Yes ☐ No
Control (Operator Initiated)	☒ Yes ☐ No	☒ Yes ☐ No
Documentation	☒ Yes ☐ No	☒ Yes ☐ No
ADDITIONAL CAPABILITIES	**IMPLEMENTED**	**COMPLIANT**
Establish Communications	☒ Yes ☐ No	☒ Yes ☐ No
Dynamic Event Report Configuration	☒ Yes ☐ No	☒ Yes ☐ No
Variable Data Collection	☒ Yes ☐ No	☒ Yes ☐ No
Trace Data Collection	☒ Yes ☐ No	☒ Yes ☐ No
Status Data Collection	☒ Yes ☐ No	☒ Yes ☐ No
Alarm Management	☒ Yes ☐ No	☒ Yes ☐ No
Remote Control	☒ Yes ☐ No	☒ Yes ☐ No
Equipment Constants	☒ Yes ☐ No	☒ Yes ☐ No
Process Program Management	☒ Yes ☐ No	☒ Yes ☐ No
Material Movement	☒ Yes ☐ No	☒ Yes ☐ No
Equipment Terminal Services	☒ Yes ☐ No	☒ Yes ☐ No
Clock	☒ Yes ☐ No	☒ Yes ☐ No
Limits Monitoring	☒ Yes ☐ No	☒ Yes ☐ No
Spooling	☒ Yes ☐ No	☒ Yes ☐ No
Control (Host Initiated)	☒ Yes ☐ No	☒ Yes ☐ No

1.8   SEMI E10 Standard

📝 **NOTE**   Fluidmove does not upload the E10 states through the SECS/GEM interface.

SEMI E10 provides a guideline for the definition and measurement of Equipment reliability, availability, and maintainability (RAM). This document defines six basic Equipment States which define how Equipment time is categorized.

A status bar on the Equipment reflects the current E10 state. These Equipment states are as defined in SEMI E10-1992 (Section 3, 'Equipment States').

1.9   SECS I / SECS II Parameters

1.9.1   SECS-I Parameters

This section provides hardware settings that apply only to the RS-232 hardware interface.

📝 **NOTE**   Fluidmove currently does not support this interface.

Table 1-4   SECS Installation Parameters

Parameter	Default	Description
Device ID	1	Specified as a value from 0 to 32767 (15 bits).
Baud Rate	9600	Allowable speeds are 110, 150, 300, 600, 1200, 2400, 4800, 9600, and 19200 Baud.
T1	0.5 Sec	Inter-character Timeout. Range allowed is 0.1 to 10.0 seconds, at increments of 0.1 seconds.
T2	10.0 Sec	Protocol Timeout. Range allowed is 0.2 to 25.0 seconds, at increments of 0.1 seconds.
T3	45 Sec	Transaction Timeout. Range allowed is 1 to 120 seconds, at increments of 1 second.
T4	45 Sec	Inter-Block Timeout. Range allowed is 1 to 120 seconds, at increments of 1.
RTY	3	Transmit Failure Retry Limit. Range allowed is 0 to 31, at increments of 1.
DUPLIC	Off	Duplicate Block Detect. May be Enabled (On) or Disabled (Off).

1.9.2   SECS-II Parameters

This section applies only to the Ethernet hardware interface defined in the SECS II standard.

There are no Operator adjustable parameters involved in configuring the SECS II interface.

⚠️ The operating system of the Equipment computer must be made aware of the network connection or the SECS/GEM feature will not operate.

1.9.3   GEM Configuration

This Equipment is configurable for operation with most older Host computers which do not support the GEM message set, or support an older version of GEM.

1. Equipment constant "CONFIGALARMS" (VID 1) selects the message the Equipment will send for Alarm Reports. "ConfigAlarms" may be 0, 1, or 2, selection S5F1, S5F71, or S5F73, respectively.

2. Equipment constant "CONFIGCONNECT" (VID 2) selects the message the Equipment will send for Connect Request. "ConfigConnect" may be 0, 1, or 2, selecting S1F1, S1F65, or S1F13, respectively.

3. Equipment constant "CONFIGEVENTS" (VID 3) selects which message the Equipment will send for Event Reports. If "ConfigEvents" is 0, the Equipment will send S6F9 for normal (unannotated) Event Reports or S6F3 for annotated Event Reports. If "ConfigEvents" is 1, the Equipment will send S6F11 for normal Event Reports or S6F13 for annotated Event Reports.

4. Equipment constant "RPTYPE" (VID 17) selects whether the Equipment will send "normal" Event Reports (S6F9 or S6F11) or annotated Event Reports (S6F3 or S6F13).

    RpType = "False". Equipment will send "normal" Event Reports.

    RpType = "True". Equipment will send annotated Event Reports.

Table 1-5   GemRPType

	GemConfigEvents = 0	GemConfigEvents = 1
GemRPType = FALSE	S6F9	S6F11
GemRPType = TRUE	S6F3	S6F13

5. For a non-GEM Host, build appropriate Report Definitions, Links, and Enables (S2F33, S2F35, S2F37) so that S6F9 or S6F3 Event Reports contain the desired data.

6. Equipment constant "WBITS5" (VID 19) selects whether Stream 5 primary message (S5F1, S5F71, and S5F73) sent by the Equipment will have the W-bit set to "0" or "1".

7. Equipment constant "WBITS6" (VID 20) selects whether Stream 6 primary messages (S6F1, S6F3, S6F9, S6F11, and S6F13) sent by the Equipment will have the W-bit set to "0" or "1".

8. Equipment constant "WBITS10" (VID 18) selects whether Stream 10 primary message S10F1 sent by the Equipment will have the W-bit set to "0" or "1".

9. Equipment constant "CONFIGSPOOL" (VID 63) configures whether the Equipment will transition to "Spool Active" state when a RTY error occurs.

Table 1-6 shows the recommended settings for compatibility with various types of Hosts. Factory (Default) settings are shown in bold.

Table 1-6   Compatibility Settings

Equipment Constant	E30-93	GEM 3.1	GEM 3.0	GEM 2.0	GEM 1.7	Non-GEM
CONFIGALARMS	0	2	2	2	1	0
CONFIGCONNECT	2	2	2	1	1	0
CONFIGEVENTS	1	1	1	1	1	0
RPTYPE	False	False	False	False	False	False or True
WBITS5	1	1 or 0	1 or 0	1 or 0	1 or 0	1 or 0
WBITS6	1	1	1	1	1	1 or 0
WBITS10	1	1 or 0	1 or 0	1 or 0	1 or 0	0
CONFIGSPOOL	1	0	0	0	0	0

1.10   State Diagrams

This document uses several Finite State Machine diagrams to describe the current condition of the Equipment's SECS link, material handling mechanisms, and process cycle. Each Finite State Machine diagram includes a State Diagram and a complete description of the states and state transitions.

All Finite State Diagrams have been prepared in the format specified in the GEM standard. This notation is required as a fundamental part of GEM compliance and must be included in the Equipment SECS Interface Documentation. This notation is the "Statechart" notation developed by David Harel.

The following are the major characteristics of this notation as it is used in this document:

1.   Each state is represented by a rectangle with rounded corners.

2.   A collection of sub-states may be grouped into a super-state.

3.   The entity described by the diagrams will be in one and only one of the sub-states at all times.

4.   Variables representing the current state of an entity do not contain values for super-states, only the lowest sub-state is represented.

5.   State transitions are represented by single-headed arrows.

6.   Each state transition is a Collection Event, and it has a unique Collection Event ID (CEID).

7.   An arrow directly from a super-state to another state describes a Collection Event that can occur while the entity is in any one of the sub-states contained in the super-state.

8. An arrow directly into a super-state to the H* (history) symbol describes a transition to the lowest sub-state which described the entity just before the transition out of the super-state.

9. An arrow directly into a super-state to the C (conditional) symbol describes a transition to a particular sub-state based on some other relevant data. The conditional data is not represented in the diagram but is described in the associated text.

1.11   Machine Operation and the GEM Interface

1.11.1 Connecting to the Host

Fluidmove loads the GEM communications driver immediately upon startup. Once connection to the driver is established, the device enters its default communication state as set by the Operator. This default state can be set via the SECS/GEM Setup dialog box in Fluidmove. The recommended selection is "Enabled". If enabled, the Communications State Machine in the GEM driver sends the Establish Communications Request message (S1F13) every ESTABLISHCOMMUNICATIONSTIMER seconds until a reply is received from the Host. The Communication State changes to reflect this response.

Unlike other state machines, transitions in this state machine do not produce events or message reports to the Host.

In the Main Window of Fluidmove, the GEM Status control can be seen in the lower part of the screen in a status bar display format. The COMM section displays the GEM communication state of the program. The CTRL section displays the control state of the program. The SPOOL section displays the spooling state of the program. General GEM controls are available to the user by clicking on the SECS/GEM button from the main window.

The initial (default) control state is set through Fluidmove's SECS/GEM Setup dialog box. "ONLINE/REMOTE" is recommended for this setting. This way, the Host has control of the machine once the application has started and communication has been established. Refer to *1.11.7 SECS/GEM Setup Dialog Box in Fluidmove* for further details.

Normally, communications are established without fault, and going to the GEM setup dialog would only be used by the Operator to manually go off line for maintenance reasons.

1.11.2 Device Identification

The Host periodically sends the Are You There message (S1F1) to the Equipment. If the communication link is operational the Equipment automatically responds with the acknowledgment message (S1F2) which contains Fluidmove model type (MDLN) and software revision number (SOFTREV). The Host may receive more detailed information by requesting the MachineID variable from the Equipment.

1.11.3 Clock

The Host updates the GEM TIME structure periodically using the Date and Time Send message (S2F31). Fluidmove will update its system clock to reflect the data presented by the Host. Current values of the system time are used extensively in event logging and will be required to synchronize with comparable events logged by the Host.

1.11.4 Loss of Communications Link: Spooling

Communications may be temporarily lost with the Host from time to time. GEM message responses and requests are automatically spooled to disk when this happens. When communications are restored the messages on the SPOOL file are automatically sent to the Host.

Spooling is enabled for Fluidmove. The Host may query the SPOOLSTSATE and CONTROLSTATE variables with the Selected Equipment Status Request message (S1F3) in order to establish the success of REMOTE operations. In addition, the Host will receive spooling update messages from Fluidmove.

The default spool state can be set through the Fluidmove SECS/GEM Setup dialog box.

1.11.5 Communications Error Messages

Occasionally messages are garbled between Fluidmove and the Host. Garbled message device IDs and streams result in Fluidmove replying to the Host with S9F1 and S9F3 messages. Further distortion of the message results in the device ignoring the message which causes the Host to resend the message. See *4.2.92 S9F1 – Unrecognized Device ID* and *4.2.93 S9F3 – Unrecognized Stream* for details of the message exchange.

1.11.6 Normal Communications

1.11.6.1 Alarm Notification

Alarms are reports of errors (caused by the program or the operator) or events which may result in production or Equipment damage or events which may cause a safety hazard to workers. When an alarm state occurs, Fluidmove initiates an alarm notification (message S5F1) to the Host. The Process State transfers into the Alarm-Paused state and the Equipment stops dispensing and retracts the dispenser apparatus from the board.

The Operator will need to correct the alarm condition and guide the machine through the Paused state to the Idle State.

The Host may poll the Equipment to receive lists of enabled or existing alarms. When the Host sends a List Alarm Data message (S5F6) the Equipment replies with a list of the current active alarms. The Host may receive a list of the currently enabled alarms with the List Enabled Alarms Request (S5F7).

1.11.6.2 Remote Control Operations

Both the Host and the Operator are allowed to request runtime control of Fluidmove from each other. When the control state is Local, only the Operator has the ability to command Fluidmove, and Host run commands are rejected. Conversely, when the Host has control of Fluidmove, the Operator is limited to requesting Fluidmove status displays and Help screens. The Operator can stop, abort, or pause the process from the Run Window. Host will receive an event if the Operator presses any of the buttons from the Run Window. Refer to *Appendix B* for the list of these events.

Both the Host and the Operator may request that control be turned over to the requester. Each change in the control state machine generates a notification event to the Host.

Remote run commands are described in Table 1-7.

<div align="center">Table 1-7   Remote Run Commands</div>

Command	Description
START	This command is successful when the Control State is OnLine - REMOTE , the board is in the Dispensing position, the machine is configured for a run, and the process program has been selected. This event begins the continuous processing of substrate trays. Processing can be interrupted by STOP, PAUSE, and ABORT commands. The Operator can also initiate PAUSE and STOP commands from the Run Window.
STOP	This command is successful when the Control State is OnLine - REMOTE, and the Process State is Running. It causes a halt in dispensing following completion of the current substrate cycle. The Process State changes to IDLE when this command is delivered and the process program is terminated. Further processing of the substrate tray is not possible after completing this command.
PAUSE	This command is successful when the Control State is OnLine - REMOTE and the Process State is Running. It causes a halt in dispensing following completion of the current instruction. The board and the process program are retained without change. The Process State changes to PAUSED. Diagnostics and status checks may be performed at this time. The substrate processing may be continued in the Running State by delivering the RESUME command.
RESUME	This command is successful when the Control State is OnLine - REMOTE, and the Process State is PAUSED. Processing of the substrate tray continues exactly from the PAUSED point and the current process program executes from the beginning of the next unprocessed instruction.
LOCAL	This command is successful if the current Control State is OnLine -REMOTE, otherwise it is ignored. The Host may request local operation for an Operator to perform maintenance or inspection of the machine. The Host may request a return to operation under its command by delivering the REMOTE command.
REMOTE	This command is successful if the current Control State is OnLine - LOCAL, the Process State is IDLE and the configuration allows remote operation. Return to the REMOTE state following an ALARM or ABORT command without proper Operator inspection and delivery of a Proceed event may return the machine to the same error state which initially caused the machine to leave the REMOTE state.
ABORT	This command is successful if the current Control State is OnLine - REMOTE, the Process State is Running, and the configuration allows remote operation. This command indicates an error status which prevents further dispensing operation until the error is corrected. Dispensing is immediately stopped and the current process program is terminated. Operator intervention and maintenance is generally required in order to resume operation past this point

1.11.6.3   Material Movement

Fluidmove declares two material movement events. The event notifications to the Host are: Dispensing and DispensingDone.

Movement of the board into the ready position for dispensing invokes the Dispensing event. Transfer of the board out of the ready position after dispensing invokes the DispensingDone event.

1.11.6.4 Terminal Message Notification

After a terminal message has been received from the Host, the GEM status bar at the bottom of the Fluidmove Run Window will start blinking. See Figure 1-1. GEM status bar displays the current communication, control, and spooling state. If the user has selected the beeping option (through the SECS/GEM Setup dialog box) a half-second interval beep is also provided to catch the user's attention.

During run-time, the GEM status bar is displayed. The Run Window's SECS/GEM tab is responsible for displaying the incoming terminal message. See Figure 1-7 for all screen features.
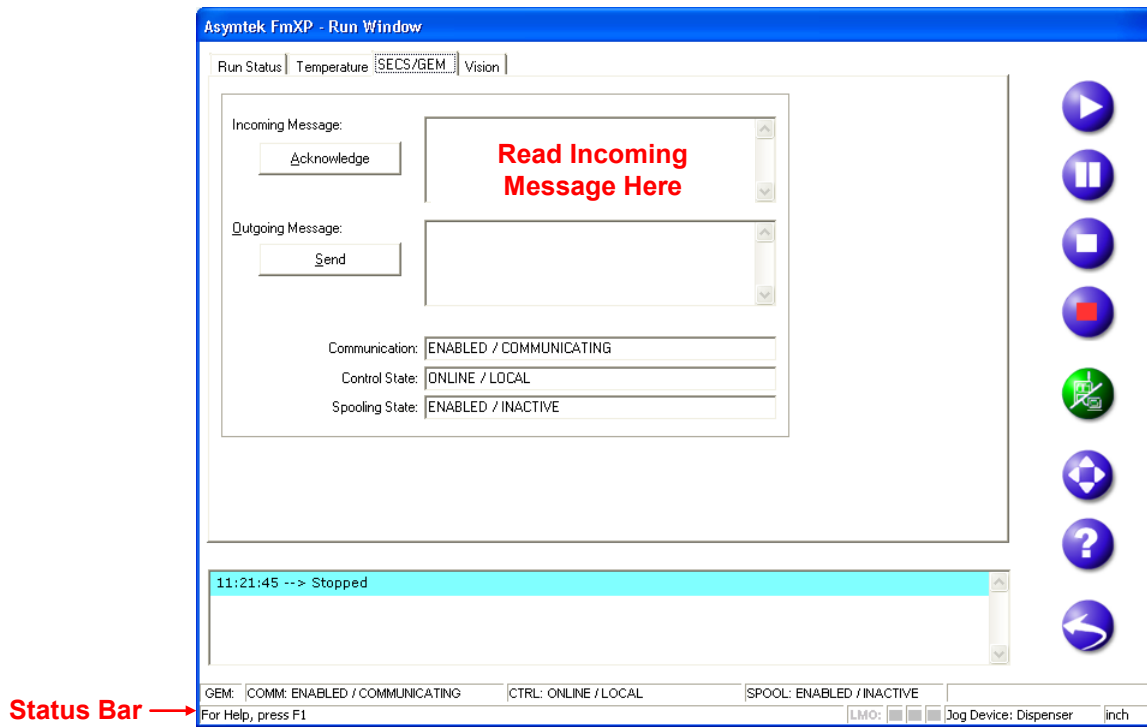
Figure 1-1   Terminal Message Notification (FmXP shown)

1.11.7 SECS/GEM Setup Dialog Box in Fluidmove

The SECS/GEM Setup dialog box can be accessed by pressing the SECS/GEM button in the Fluidmove Main Window. The dialog box contains tabs with buttons and drop-down menus for control and setup of GEM features. These tabs are described in Figure 1-2 through Figure 1-7.

Item	Name	Description
1	Control	On-Line Local: The Operator has control of the system. The system will reject most Host commands. The Host can monitor operations, but cannot control processing. In this state, the system will not accept a REMOTE command from the Host. On-Line Remote: The Host has control of the system. The Operator may issue a Pause, Stop, or Abort command. Off-Line: Puts the system Off-Line.
2	Get Date & Time	Requests current date and time from the Host.
3	Status Box	Displays the current communication state, control state, and spooling state.
4	Spooling	Disable: Neither messages nor commands will be spooled and re-sent if the communications link between the Host and the dispensing system is temporarily disrupted. Enable: Messages and commands will be spooled and re-sent if the communications link between the Host and the dispensing system is temporarily disrupted.
5	Communication	Disable: The SECS/GEM link with the Host is disconnected. Enable: The SECS/GEM link with the Host is established and communication can take place.

Figure 1-2   SECS/GEM Setup Dialog Box – Control Tab (FmXP shown)
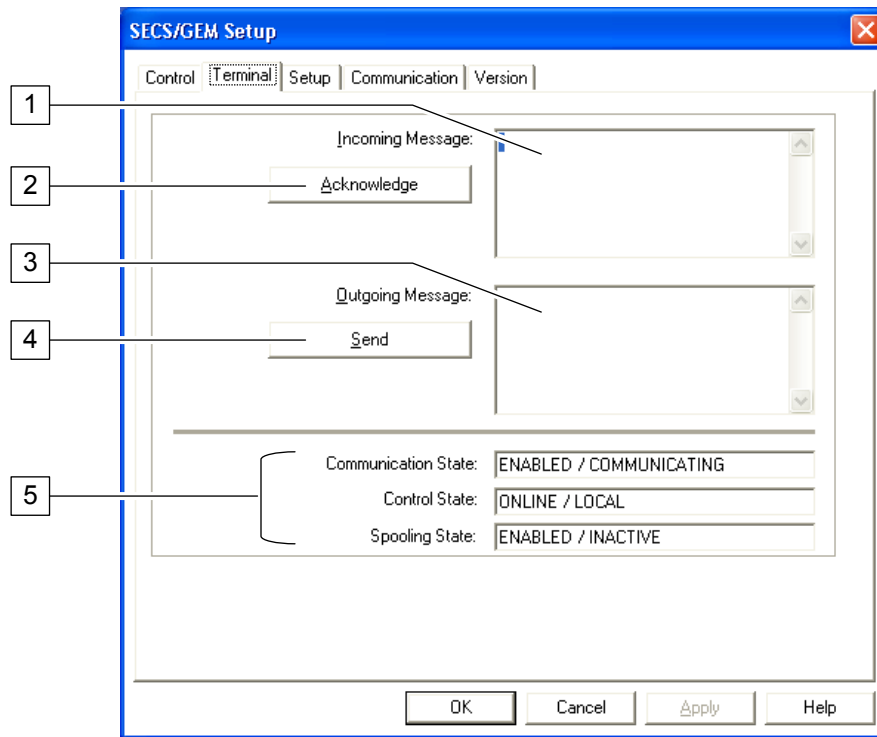
Item	Name	Description
1	Incoming Message	Messages from the Host are displayed in this box.
2	Acknowledge	Press to acknowledge receipt of the incoming message from the Host.
3	Outgoing Message	Enter messages to the Host in this box.
4	Send	Press to send the message in the Outgoing Message box.
5	Status Box	Displays the current communication state, control state, and spooling state.

Figure 1-3   SECS/GEM Setup Dialog Box – Terminal Tab (FmXP shown)

Item	Name	Description
1	Establish Communication Timeout	The user-configurable equipment constant that defines the delay, in seconds, between attempts to send S1F13. This value is used to initialize the CommDelay timer.
2	Default Communication State	Allows the user define the default communication state upon Fluidmove's startup. The valid choices are: ENABLED: Fluidmove will attempt to establish communication link upon startup. DISABLED: Fluidmove will not attempt to establish communication link upon startup. **Recommended: ENABLED**
3	Default Control State	Allows the user define the default control state upon Fluidmove's startup. The valid choices are: OFFLINE/ATTEMPT ONLINE, OFFLINE/EQUIPMENT OFFLINE, OFFLINE/HOST OFFLINE, ONLINE/LOCAL, ONLINE/REMOTE Refer to *5.4 Control State* for descriptions. **Recommended: ONLINE/REMOTE**
4	If On-line Attempt Fails Go To	Allows the user to select what to do if attempting to go on-line fails for any reason. The valid choices are: OFFLINE/HOST OFFLINE, OFFLINE/EQUIPMENT OFFLINE Refer to *5.4 Control State* for descriptions. **Recommended: OFFLINE/HOST OFFLINE**
5	Beep Until Incoming Message Acknowledged	If selected, Fluidmove will beep twice a second to notify the user of arrival an incoming terminal message from the Host. The GEM status bar blinks at the same rate to catch user's attention regardless of this option being selected or not. The user should then go to the Terminal tab to view and acknowledge the message.
6	Status Box	Displays the current communication state, control state, and spooling state.

Figure 1-4   SECS/GEM Setup Dialog Box – Setup Tab (FmXP shown)
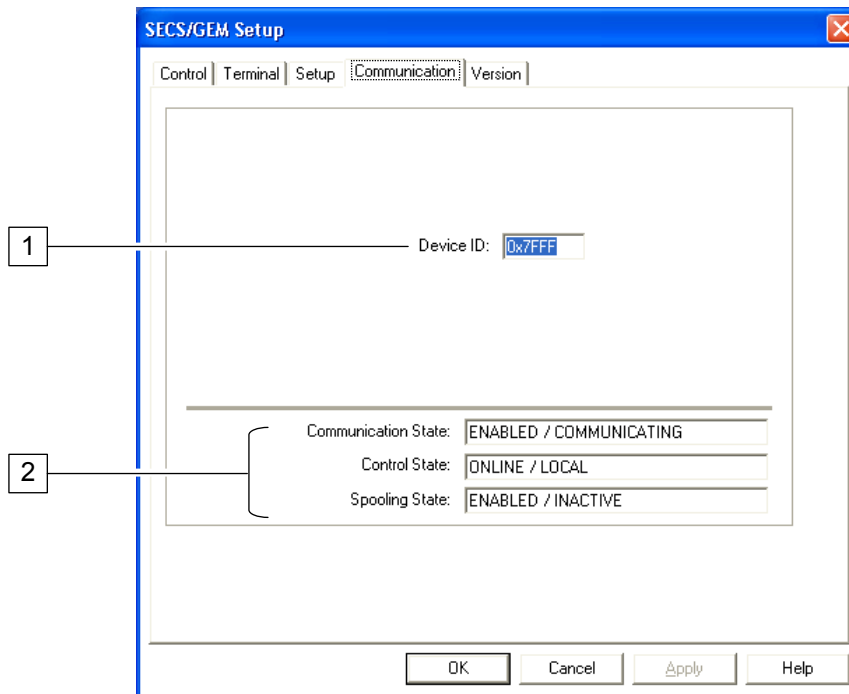
Item	Name	Description
1	Device ID	Displays the unique identifier for the Equipment.
2	Status Box	Displays the current communication state, control state, and spooling state.

Figure 1-5   SECS/GEM Setup Dialog Box – Communication Tab (FmXP shown)
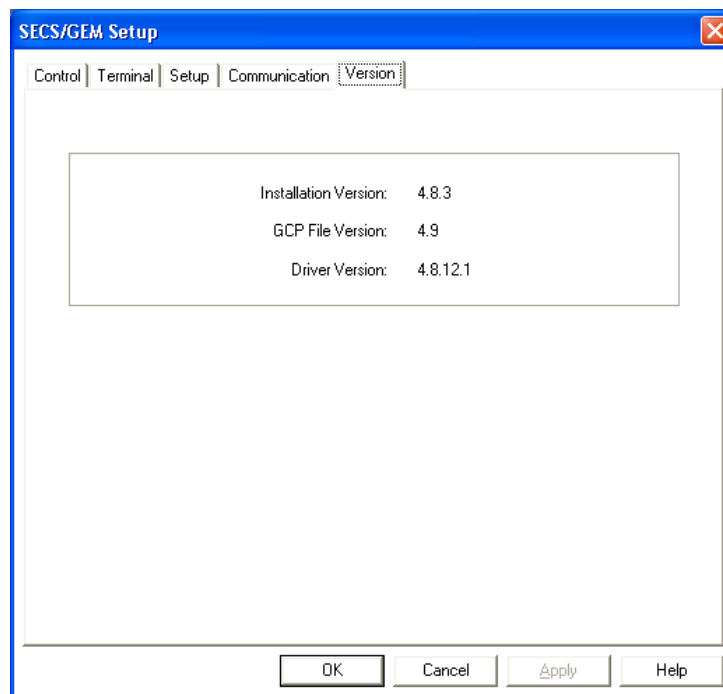
Figure 1-6   SECS/GEM Setup Dialog Box – Version Tab (FmXP shown)

1.11.8 Fluidmove Run Window Interface

The Fluidmove Run Window includes a SECS/GEM tab that shows communication status and allows messages to be sent between the Host and the Operator. This tab is described in Figure 1-7.

Item	Name	Description
1	Incoming Message	Messages from the Host are displayed in this box.
2	Acknowledge	Click to acknowledge receipt of the incoming message from the Host.
3	Outgoing Message	Enter messages to the Host in this box.
4	Send	Click to send the message in the Outgoing Message box to the Host.
5	Status Box	Displays the current communication state, control state, and spooling state.
6	GEM Status Bar	COMM: Displays the GEM communication state of the program. CTRL: Displays the control state of the program. SPOOL: Displays the spooling state of the program.
7	SECS/GEM Communication Indicator	A green button is present when the communication link is established. Otherwise, the button is not displayed.

Figure 1-7   Run Window – SECS/GEM Tab (FmXP shown)

2   Message Summary

2.1   Overview

This section covers the primary SECS messages sent and received between the Host and the Equipment.

2.2   Host-to-Equipment Messages

Table 2-1 describes primary SECS messages sent by the Host, and the associated reply messages from the Equipment.

The **CState** column indicates the control state the Equipment must be in to accept the message. The current value of the Equipment Control State can be found in variable CONTROLSTATE (VID 28). Possible control state values for this column are listed in Table 2-2.

Unlawful messages sent to the Equipment while Control State is Off-Line (1, 2, or 3) will be replied to with a SnF0 message. Thus, the Host will see only values of 4 or 5 for CONTROLSTATE.

Refer to Table 7-1 for further message detail.

In the **Notes** column, those messages marked with "E" are extensions beyond GEM. Those messages marked with "N" are provided for non-GEM or older GEM compatibility.

Table 2-1   SECS Messages – Host-to-Equipment

Primary	Reply	CState	Description	Notes
S1F1	S1F2	4,5	Are You There	
S1F3	S1F4	4,5	Selected Status	
S1F11	S1F12	4,5	Status Variable Namelist Request	
S1F13	S1F14	All	Connect Request	
S1F15	S1F16	4,5	Request Off-Line	
S1F17	S1F18	1,2,3	Request On-Line	
S1F65	S1F66	All	Connect Request	N
S2F13	S2F14	4,5	Equipment Constant Request	
S2F15	S2F16	4,5	New Equipment Constant Send	
S2F17	S2F18	4,5	Date and Time Request	
S2F21	S2F22	5	Remote Command	N
S2F23	S2F24	4,5	Trace Initialize	
S2F25	S2F26	4,5	Loopback Diagnostic	E
S2F27	S2F28	5	Initiate Processing Request	N
S2F29	S2F30	4,5	Equipment Constant Namelist Request	E
S2F31	S2F32	4,5	Date and Time Send	
S2F33	S2F34	4,5	Define Report	

Table 2-1   SECS Messages – Host-to-Equipment (continued)

Primary	Reply	CState	Description	Notes
S2F35	S2F36	4,5	Link Event Report	
S2F37	S2F38	4,5	Enable/Disable Event Report	
S2F39	S2F40	4,5	Multi-Block Inquire/Grant	
S2F41	S2F42	5	Remote Command with Parameters	
S2F43	S2F44	4,5	Reset Spooling Streams and Functions	
S2F45	S2F46	4,5	Define Variable Limits Attributes	
S2F47	S2F48	4,5	Variable Limit Attribute Request	
S5F3	S5F4	4,5	Enable/Disable Alarm	
S5F5	S5F6	4,5	List Alarms	
S5F7	S5F8	4,5	List Enabled Alarms	E
S6F15	S6F16	4,5	Request Event Report	
S6F17	S6F18	4,5	Request Annotated Event Report	E
S6F19	S6F20	4,5	Request Report	
S6F21	S6F22	4,5	Request Annotated Report	E
S6F23	S6F24	4,5	Request Spooled Data	
S7F1	S7F2	4,5	Process Program Inquire/Grant	
S7F3	S7F4	4,5	Unformatted Process Program Send	
S7F5	S7F6	4,5	Unformatted Process Program Request	
S7F17	S7F18	4,5	Process Program Delete	
S7F19	S7F20	4,5	Process Program Directory	
S10F3	S10F4	4,5	Terminal Display, Single	
S10F5	S10F6	4,5	Terminal Display, Multiple	
S10F9	S10F10	4,5	Broadcast	E

Table 2-2   Control State Values

Value	State
1	Off-Line/Equipment Off-Line
2	Off-Line/Attempt On-Line
3	Off-Line/Host Off-Line
4	On-Line/Local
5	On-Line/Remote

2.3 Equipment-to-Host Messages

Table 2-3 describes primary SECS messages sent by the Equipment, and the associated reply messages from the Host.

Refer to Table 8-1 for further details.

In the **Notes** column, those messages marked with "N" are provided for non-GEM or older GEM compatibility.

Table 2-3   SECS Messages – Equipment-to-Host

Primary	Reply	Description	Notes
-- (any)	SnF0	Primary rejected while Off-Line	
S1F1	S1F2	Are You There	
S1F13	S1F14	Connect Request	
S1F65	S1F66	Connect Request	N
S2F17	S2F18	Date and Time Request	
S5F1	S5F2	Alarm Report	N
S5F71	S5F72	Alarm Report Block Send	
S5F73	S7F74	Alarm Notification Send	
S6F1	S6F2	Trace Data Send	
S6F3	S6F4	Annotated Event Report Send	N
S6F5	S6F6	Multi-Block Data Send Inquire/Grant	
S6F9	S6F10	Event Report Send	N
S6F11	S6F12	Event Report Send	
S6F13	S6F14	Annotated Event Report Send	N
S7F1	S7F2	Process Program Inquire/Grant	
S7F3	S7F4	Unformatted Process Program Send	
S7F5	S7F6	Unformatted Process Program Request	
S9F1	--	Error, Device ID	
S9F3	--	Error, Stream	
S9F5	--	Error, Function	
S9F7	--	Error, Data	
S9F9	--	Error, Transaction Timeout	
S9F11	--	Error, Data Too Long	
S10F1	S10F2	Terminal Request	

3   Operating Characteristics

3.1   Overview

This section describes the operating characteristics of the Equipment.

3.2   Communications States

The Equipment represents the current state of its SECS link using a Communication Finite State Machine diagram. The purpose is to make clear how this link is initiated and terminated. The Communications State is displayed in the GEM status bar and the SECS/GEM tab of the Fluidmove Run Window.

Initially, the INITCOMMSTATE variable is set to place the Equipment into the Disabled state at power-up. Once Fluidmove has completed initialization, Fluidmove will change the Communications State to the default communication state selected by the user. The loss of communications during Running or Pausing will not affect the ability of Fluidmove to complete operations in the Process Program. However, automatic reestablishment of the Process State may require manual intervention if Fluidmove has changed state during the loss of communications period.

3.2.1   Communications Finite State Description

Figure 3-1 illustrates the Communications Finite State Machine that the Equipment maintains.

✐ *NOTE*   Refer to Table 3-1 for definition of numbers used in Figure 3-1.
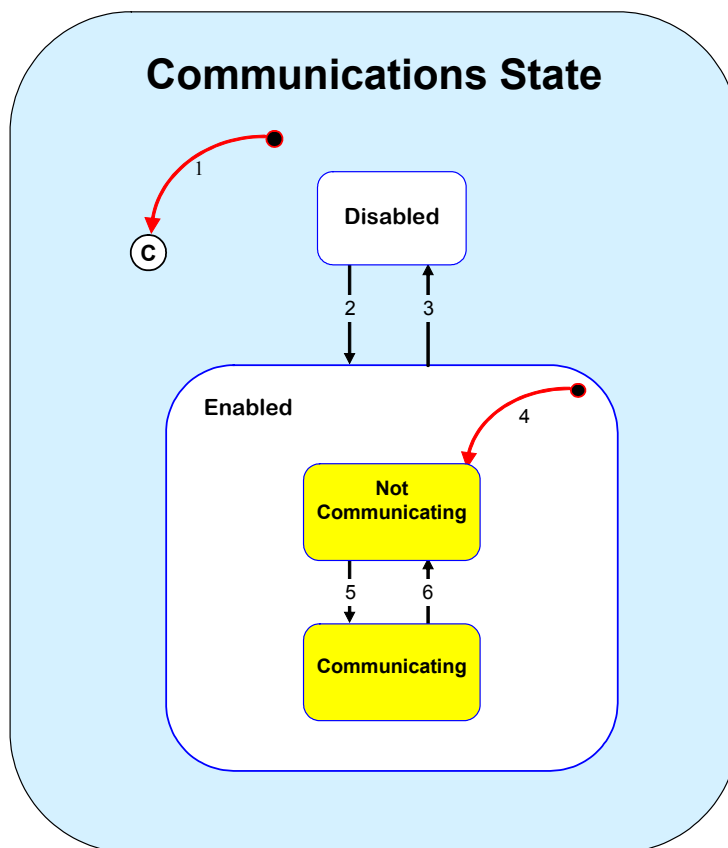
Figure 3-1   Communication Finite State Diagram

3.2.1.1   State Transitions

The following table describes the transitions that can occur. Transitions shown in Figure 3-1 do not cause the Equipment to signal any Collection Event ID (CEID) or to send Event Reports to the Host.

✎ **NOTE**   The numbers in the # column refers to those in Figure 3-1.

Table 3-1   State Transitions

#	From	Trigger	To	Description
1	Unknown	Power-Up	Conditional	Equipment will initialize itself to either the Disabled or Enabled state, depending on the configuration of the EC INITCOMMSTATE (VID 7).
2	Disabled	Operator enables SECS link.	Enabled	Equipment will attempt to establish communications with the Host. The Equipment will periodically send a Connect Request at an interval dictated by the EC ESTABLISHCOMMUNICATIONS-TIMER (VID 44).
3	Enabled	Operator disables the SECS link.	Disabled	Communications are abruptly terminated. Any outstanding messages queued for send are discarded. The Equipment will not respond to a Host-initiated ENQ.
4	Disabled or Power-Up	Request has been made for the Equipment to start communicating.	Not Communicating	Equipment immediately attempts to establish communications with the Host. The Equipment will periodically send a Connect Request message at an interval dictated by the EC ESTABLISHCOMMUNICATIONS-TIMER (VID 44).
5	Not Communicating	Successful completion of Connect Request transaction.	Communicating	The Host / Equipment link is "up". Normal SECS transactions can occur.
6	Communicating	A Communications failure has occurred.	Not Communicating	Equipment immediately attempts to establish communications with the Host. The Equipment will periodically send a Connect Request message at an interval dictated by the EC ESTABLISHCOMMUNICATIONS-TIMER (VID 44).

3.2.1.2 Communications States

The current communication state will be one of the values specified in Table 3-2. There is no variable indicating the communication state. The communication state is presented to the Operator on the main Operator interface screen.

Table 3-2   Communication State Values

Value	Description
DISABLED	The SECS link to the Host is disabled at the Equipment. The Equipment will send no messages to the Host. The Equipment will not respond to a Host-initiated ENQ.
ENABLED	When communications are Enabled, the Equipment's intention is to be in communication with the Host. Whether or not the Equipment is currently communicating with the Host determines which sub-state of the Enabled super-state the Equipment is in.
ENABLED/COMMUNICATING	The SECS link between the Equipment and the Host is operating normally. Periodically, the Equipment will send a "Heartbeat" message S1F1 to ensure that the link is still operating. The heartbeat frequency is controlled by equipment constant "HEARTBEAT". "HEARTBEAT" (VID 26) can range from 0 to 32000, with default value 30. If the Equipment encounters a SECS-I Retry Limit (RTY) error when attempting to send a block to the Host, it discards any messages queued for send and the communication state transits to ENABLED.
ENABLED/NOT COMMUNICATING	The SECS link to the Host is enabled at the Equipment, and the Equipment is attempting to determine if the link is active. The Equipment periodically sends S1F13 (Establish Communications Request). If the connect is not successful for any reason, the Equipment will try again periodically forever. The time between attempts is controlled by the equipment constant "ESTABLISHCOMMUNICATIONSTIMER". This variable (VID 44) can range from 0 to 32000 seconds, with default of 60 seconds. Once the Host has responded with S1F14 (Establish Communications Acknowledge), the Communication State will change to COMMUNICATING. The Host can also attempt to establish communications by sending S1F13. The Equipment will accept the message and respond with S1F14 and the Communication State will change to COMMUNICATING. In ENABLED state, the Equipment will accept messages from the Host, but will ignore any messages except S1F13 and S1F14. The Equipment will respond to the S1F13 while the Communication State is ENABLED or COMMUNICATING, but it will not send S1F13 once communications have been established.

3.2.2 Power Up

At Power Up (or System Start), the equipment constant "INITCOMMSTATE" (VID 7) controls whether the state is initialized to DISABLED or ENABLED. The factory setting is DISABLED.

3.2.3 Related Variables

Table 3-3 lists the variables (SVs, ECs, or DVs) which are relevant to establishing communications. For a more complete description of these variables, refer to *Appendix A*.

Table 3-3   Related Variables

Variable Name	VID
CONFIGCONNECT	2
INITCOMMSTATE	8
ESTABLISHCOMMUNICATIONSTIMER	6
HEARTBEAT	10
CONFIGSPOOL	63

3.2.4 Compatibility

If the Host intends to use the Control State Off-Line feature, CONFIGCONNECT should always be set to S1F13/14.

3.3   Control States

This section describes the Control characteristics of the Equipment. The Equipment may be in one of the control states in the following table. This value is reflected in status variable CONTROLSTATE (VID 28).

Table 3-4   Control States

Value	State
1	Off-Line/Equipment Off-Line
2	Off-Line/Attempt On-Line
3	Off-Line/Host Off-Line
4	On-Line/Local
5	On-Line/Remote

GWGEM software maintains the GEM Control State finite state machine.

Fluidmove provides the following:

- GUI display of the current State.

- Provide Operator commands for Go Local and Go Remote.

- When ControlState is LOCAL, reject remote commands are appropriately rejected.

- When ControlState is REMOTE, reject local commands are appropriately rejected.

The current Control State is displayed in the GEM status bar in lower portion of all windows. In Remote State configuration, teaching, and tools features are not available to the Operator. This prevents the Operator form interfering with remote operations.

3.3.1 Control Finite State Description

Figure 3-2 and Table 3-5 describe the Equipment Control State. The Equipment behaves differently and will accept different messages depending on its current control state. The purpose of this diagram is to make clear to the Host exactly what is happening at the Equipment. The logic for these states and transitions is the logic specified in the GEM standard.

✎ **NOTE**   Refer to Table 3-5 for definition of numbers used in Figure 3-2.
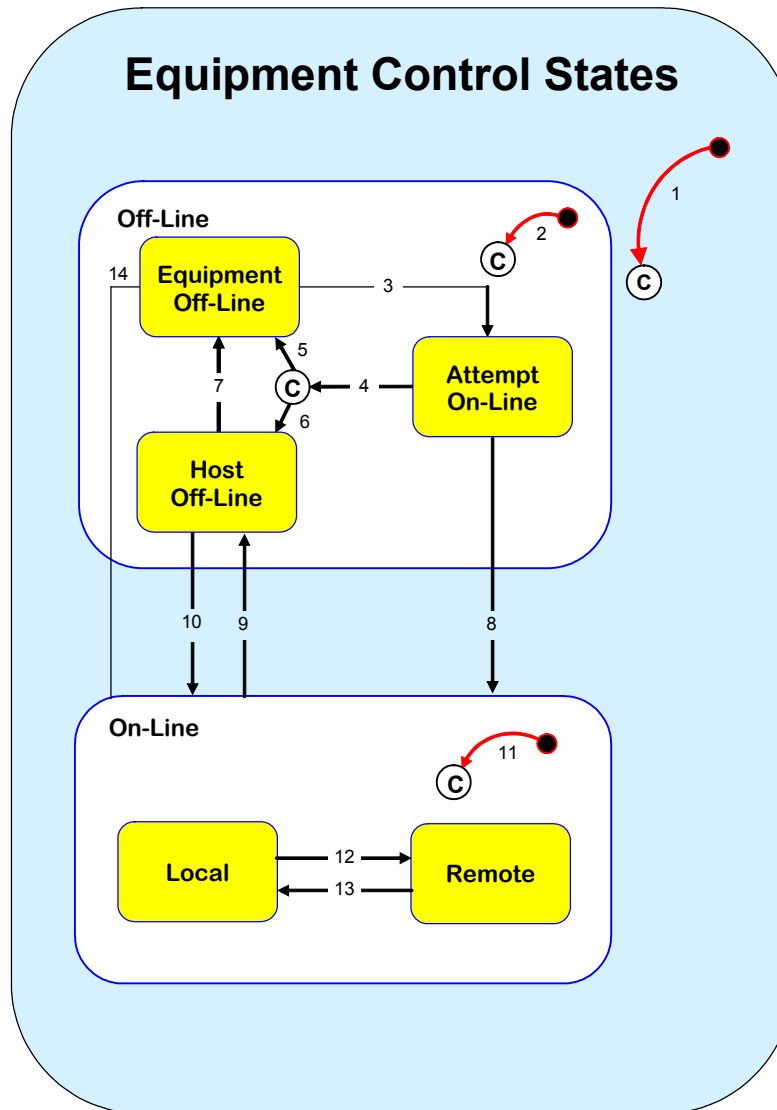
Figure 3-2   Equipment Control State Diagram

3.3.1.1 Control State Transitions

Certain state transitions will cause a collection event to be signaled. If the event is enabled, this event will be sent to the Host along with the appropriate reports if appropriate. Table 3-5 lists the state transitions and notes when events will be sent to the Host.

✎ **NOTE**   The numbers in the # column refer to those in Figure 3-2.

Table 3-5   Control State Transitions

#	From	Trigger	To	Description
1	Unknown	Power-Up	Conditional	This transition is made to either the Off-Line or On-Line state, depending on the EC INITCONTROLSTATE (VID 9).
2	Unknown	Power-Up	Conditional	This conditional transition is governed by the value of the OFFLINESUBSTATE EC (VID 42).
3	Equipment Off-Line	Operator requests to go On-Line.	Attempt On-Line	The Equipment will immediately send an S1F1 to request to go On-Line.
4	Attempt On-Line	Unsuccessful On-Line request	Conditional	This transition occurred because the Host did not reply to an S1F1 with an S1F2 or because the S1F1 was not successfully sent.
5	Conditional	ONLINEFAILED Equipment Constant configured to Equipment Off-Line.	Equipment Off-Line	Equipment will allow the Operator to attempt to go On-Line again.
6	Conditional	ONLINEFAILED Equipment Constant configured to Host Off-Line.	Host Off-Line	The Equipment will accept a Host initiated request to go On-Line by replying to the S1F17 with ONLACK = 0x00.
7	Host Off-Line	Operator requests to go Off-Line.	Equipment Off-Line	A Host request to go On-Line will not be accepted.
8	Attempt On-Line	Successful On-Line request.	On-Line	The Equipment is now On-Line.
9	On-Line	Host puts the Equipment Off-Line by sending S1F15 and receiving the S1F16 with OFLACK = 0x00.	Host Off-Line	EVENT: GemEquipmentOFFLINE (CEID 22). The Equipment will accept a Host initiated request to go On-Line by replying to the S1F17 with ONLACK = 0x00.
10	Host Off-Line	Successful completion of S1F17 / S1F18 transaction, with ONLACK = 0x00.	On-Line	The Equipment is now On-Line.
11	Unknown	Entry into On-Line super-state.	Conditional (Local or Remote)	EVENT: GemControlStateLOCAL (CEID 8) or GemControlStateREMOTE (CEID 9). The Equipment will transition to whichever state is specified in the EC ONLINE- SUBSTATE (VID 44).
12	Local	Operator or Host requests to go Remote.	Remote	EVENT: GemControlStateREMOTE (CEID 9). All documented messages will be accepted in this state, including remote commands.
13	Remote	Operator or Host requests to go Local.	Local	EVENT: GemControlStateLOCAL (CEID 8). Remote commands will be rejected. Except for the REMOTE command.
14	On-Line	Operator requests to go Off-Line.	Equipment Off-Line.	EVENT: GemEquipmentOFFLINE (CEID 3). A Host request to go On-Line will not be accepted.

3.3.1.2   Control States

The variable CONTROLSTATE (VID 28) represents the current control state, and will be one of the values listed in Table 3-6.

Table 3-6   Control State Values

Value	Description
Off-Line/EQUIPMENT OFF-LINE	The Operator has put the Equipment off-line. In this state, only the Operator can put the Equipment on-line. Any Host-initiated primary message (except S1F13 and S1F17) will be replied to with an SnF0 ABORT message by the Equipment. The Equipment will not send any primary messages except for S1F13 when necessary to establish communications, and the S9F1 and S9F9 messages for SECS errors.
Off-Line/HOST OFF-LINE	While in this state, the Equipment will accept either the S1F17 (Go Online), or the S1F13 (Connect Request) message. When in this state, the Operator has allowed the Host to put the Equipment on-line, but the Host has not yet done so, or the Host has just put the Equipment off-line by sending S1F15. The Host may request for the Equipment to come on-line by sending the S1F17 (Go Online) message. The Operator cannot put the Equipment on-line from this state. The S1F13/S1F14 messages are used to maintain the Communications Finite State Machine. All messages (except S1F13 and S1F17) received will be replied to with the SnF0 ABORT message. The Equipment will not send any primary messages except for S1F13 when necessary to establish communications, and the S9F1 and S9F9 messages for SECS errors.
Off-Line/ATTEMPT ON-LINE	The Operator has requested that the Equipment go On-Line, causing the transition to this state. The Equipment sends a single S1F1, indicating its desire to go on-line. When either a transmission failure (T3 or RTY errors) occurs or a successful reply to the S1F1 has been received, a transmission is made out of this state.
On-Line/LOCAL	The local Operator has control of the Equipment. The Host can send S2F41 (Remote Command), but the Equipment will reject it with 0x40 return code. The REMOTE command sent by the Host will not be rejected by the Equipment. See *3.8 Remote Commands* or *4.2.41 S2F42 - Remote Command Acknowledge* for details. In LOCAL mode, the Equipment continues to send event and alarm reports to the Host. The Host can monitor operations, but cannot control processing. However, the Host can still exert "controls" other than S2F41 which do not directly affect processing. For example, the Host can enable/disable alarms and set the clock.
On-Line/REMOTE	The remote Host Computer has control of the Equipment using S2F41 (Remote Command). For details refer to *3.8 Remote Commands*. The Operator may issue the PAUSE, STOP, and ABORT commands while in Remote state. These commands will generate an OperatorCommand event (CEID 4) as well as other messages attached to these activities. Refer to *Appendix B* for further detail.

3.3.2   Power Up

At power-up, the equipment constant "INITCONTROLSTATE" (VID 9) controls whether ControlState is initialized to ONLINE or OFFLINE. Within the Off-Line super-state, the equipment constant "OFFLINESUBSTATE" (VID 42) controls whether the Control State defaults to:

1. Equipment Off-Line

2. Host Off-Line

3. Attempt On-Line

If INITCONTROLSTATE (VID 9) initializes to On-Line, the variable ONLINESUBSTATE (VID 44) determines whether the default state is:

1. Local

2. Remote

When the Operator changes the default control state through Fluidmove's SECS/GEM Setup dialog box, INITCONTROLSTATE gets updated. ONLINE/REMOTE is recommended for this value.

3.3.3   Related Variables

Table 3-7 lists the variables (SVs, ECs, or DVs) which are relevant to the Control State. For a more complete description of these variables, refer to *Appendix A*.

Table 3-7   Control State Variables

Variable Name	VID
INITCONTROLSTATE	9
OFFLINESUBSTATE	42
ONLINEFAILED	43
ONLINESUBSTATE	44
CONTROLSTATE	28
PREVIOUSCONTROLSTATE	35

3.3.4   Related Events

Table 3-8 lists the collection events (CEIDs) which are relevant to the Control State. For a more complete description of these events, refer to *Appendix B* or the description in this chapter.

Table 3-8   Control State CEIDS

Collection Event	CEID
GemControlStateLOCAL	8
GemControlStateREMOTE	9
GemEquipmentOFFLINE	22

3.4 Process States

See Figure 3-4 for a description of the Fluidmove processing state model.

The Process State changes in response to either Operator or Host command inputs. Change of control state from local to remote or vice versa is only allowed in the Idle Process State. This prevents loss of command synchronization.

The Host may command Start, Stop, Pause, Resume, Local, Remote, and Abort. The Operator may command Start, Stop, Pause, Resume, Local, Remote, and Abort.

3.4.1 E10 State

Figure 3-3 illustrates the state of the Equipment in relationship to overall factory production. The E10 state diagram is implemented in the Equipment according to the details specified in the SEMI E10 document. The following summarizes the Equipment's implementation of the E10 standard:

The Equipment can transition from any state to any other state except for "Productive". The "Productive" state can only be entered from the "Standby" state. Upon startup, the Equipment is in "Non-Scheduled Time".

E10 states are not available to the host computer via SECS/GEM.

✎ **NOTE**   Refer to Table 3-9 for definition of numbers used in Figure 3-3.
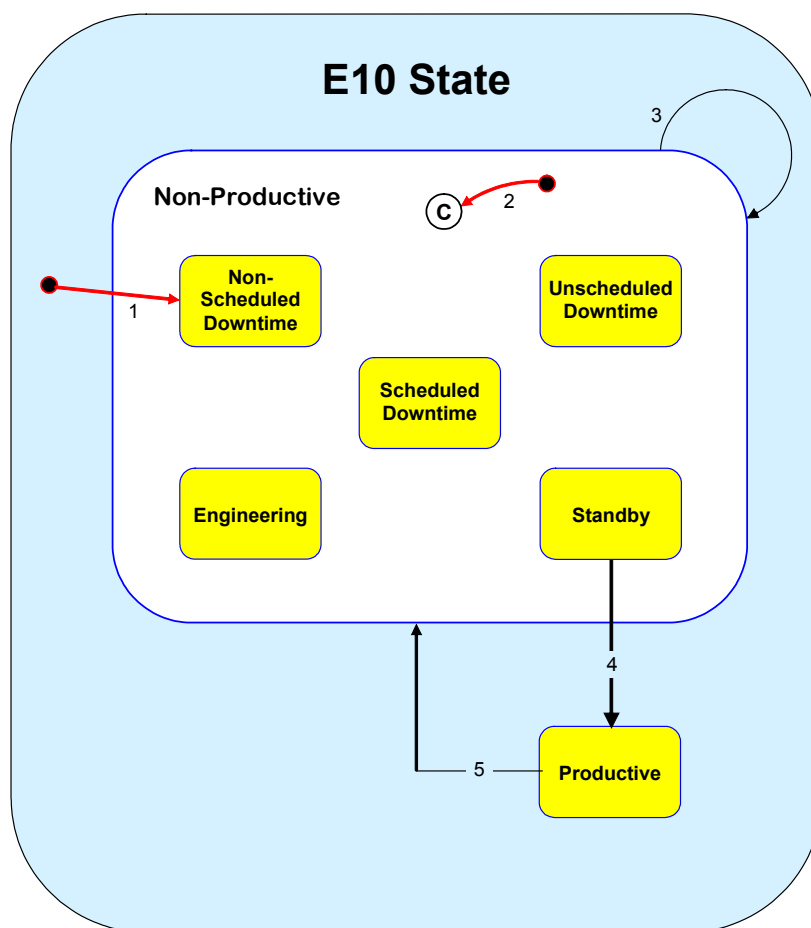
Figure 3-3   E10 State Diagram

3.4.1.1 E10 State Transitions

Certain state transitions will cause a collection event to be signaled. If the event is enabled, this event will be sent to the Host along with the appropriate reports if appropriate. Table 3-9 lists the state transitions and notes when events will be sent to the Host.

✎ **NOTE**   The numbers in the # column refer to those in Figure 3-3.

Table 3-9   E10 State Transitions

#	From	Trigger	To	Description
1	Unknown	Power-Up	Non-Scheduled Time	Upon Power-Up, the Equipment defaults to this state.
2	Unknown	Operator Request	Conditional	The Operator changes states from the previous state to the new state. The conditional depends on the Operator's intentions.
3	Non-Productive	Operator Request	Non-Productive	–
4	Standby	Processing of material begins.	Productive	Equipment is processing material.
5	Productive	Operator Request	Non-Productive	The Operator changes states from Productive to a new Non-Productive state. Transition will be made according to conditional transition #2.

3.4.1.2 E10 STATE Values

The values for E10 states are listed in Table 3-10.

Table 3-10   E10 State Values

Value	Description
Non-Productive/ Non-Scheduled Time	The Equipment is not scheduled to be used in production. An Operator can put the Equipment into this state at any time.
Non-Productive/ Unscheduled Downtime	The Equipment has been scheduled to be used in production, but is unable to be used because of unforeseen events. Possible reasons for transitions into this state include: 1) maintenance delay 2) repair 3) replacement of a disposable 4) bad input (bad boards, etc.) 5) facility related downtime
Non-Productive/ Scheduled Downtime	The Equipment has been scheduled to be out of production so that maintenance can be performed.
Non-Productive/ Engineering	The Equipment may be actively running boards, but these are not intended to be used in normal production. This state signifies that Engineering data is being gathered from the Equipment separate from an actual productive run.
Non-Productive/ Standby	The Equipment is ready for production, but is awaiting resources. These resources may be in the form of physical material (boards) or in the form of information (process program, and START command).
Productive	The Equipment is actively processing boards for use in production.

3.4.2   Equipment Process States

Figure 3-4 illustrates in greater detail the processing at the Equipment. This diagram depicts the working states of the Equipment.

✐ *NOTE*   Refer to Table 3-11 for definition of numbers used in Figure 3-4.
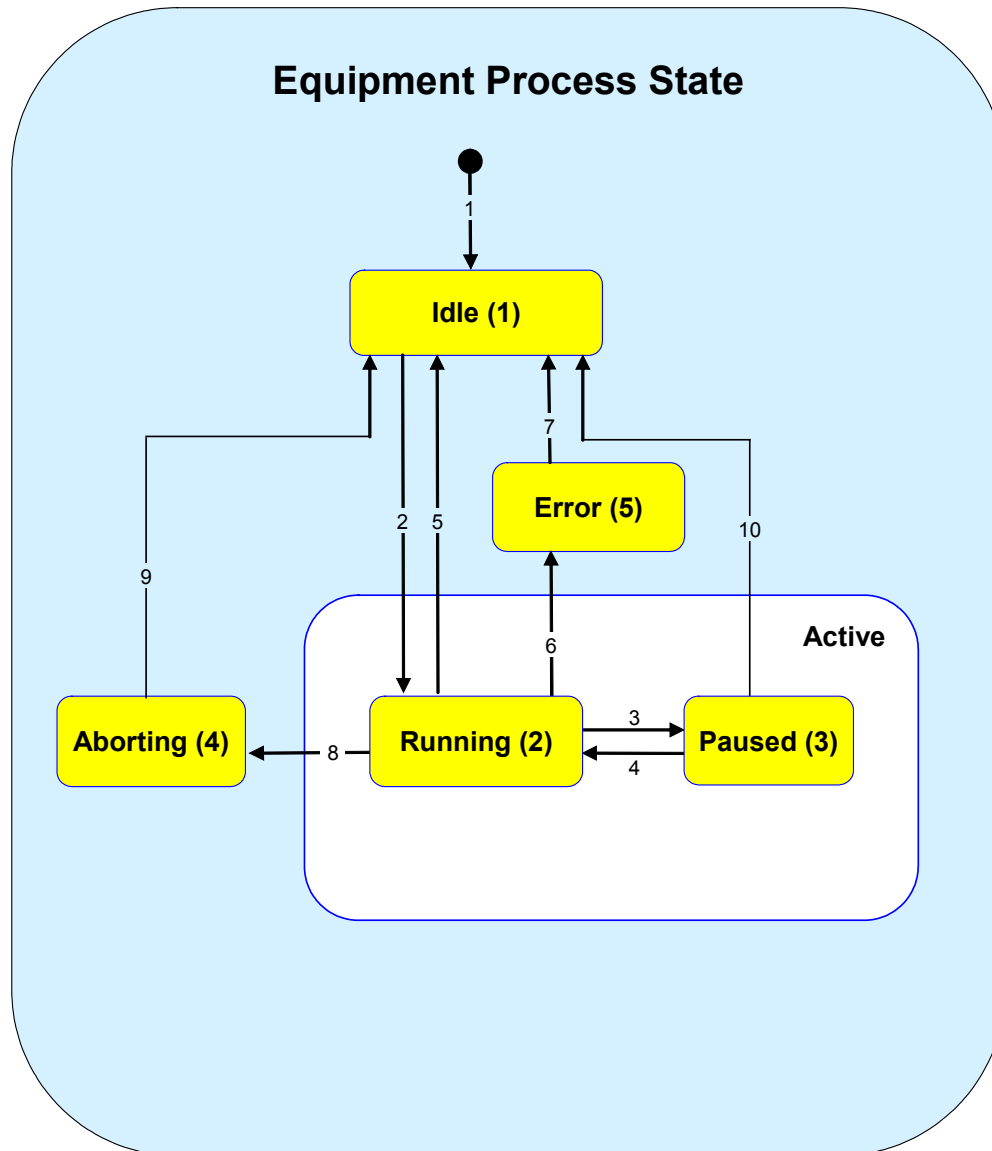
Figure 3-4   Equipment Process States

3.4.2.1 Equipment Process State Transitions

✍ *NOTE*   The numbers in the # column refer to those in Figure 3-4.

Table 3-11   Process State Transitions

#	From	Trigger	To	Description
1	Unknown	Power-Up	Idle	At power-up, the Equipment defaults to the IDLE state.
2	Idle	Run Command	Running	Either the Host or Operator issues a run command. This command can be issued by a remote command from the Host or by local Operator.
3	Running	Pause Command	Paused	Either the Host or Operator issues a pause command. This command can be issued by a remote command from the Host or by local Operator.
4	Paused	Unpause Command	Running	Either the Host or Operator issues an Unpause command. This command can be issued by a remote command from the Host or by local Operator.
5	Running	Stop Command	Idle	Either the Host or Operator issues a Stop command. This command can be issued by a remote command from the Host or by the local Operator. This command will stop processing after the current board has completed.
6	Running	Error Occurrence	Error	An error has occurred on the Equipment.
7	Error	Operator Error Acknowledge	Idle	Once the Operator has acknowledged the error, the Equipment will transition to the Idle state.
8	Running	Abort Command	Aborting	Either the Host or Operator issues an Abort command. This command can be issued by a remote command from the Host or by the local Operator.
9	Aborting	Machine stopped	Idle	Once the machine has halted, the Equipment will transition to the Idle state.
10	Paused	Stop Command	Idle	Either the Host or Operator issues a Stop command. This command can be issued by a remote command from the Host or by the local Operator.

3.4.2.2 Equipment Process State Values

The values for Equipment process states are listed in Table 3-12.

Table 3-12   Equipment Process State Values

Value	Description
Idle	The Equipment is initialized to this state. This state indicates that the Equipment is not dispensing on a board nor is it waiting for a board to arrive at the dispense station.
Active	The Active state includes the following: **Running** - While in this state, the Equipment is either currently waiting for a board to arrive at the dispense station, processing a board, or unloading a processed board out of the dispense station. **Paused -** This state indicates that the Equipment is paused during the processing of a board. Processing continues on the current board when the UNPAUSE command is issued. The transition to the Idle state can occur if the stop command is issued.
Aborting	When in the Running state, upon receiving an ABORT command, the Equipment will command the machine to stop all processing immediately. This state indicates that this is currently occurring. Once all processing has been halted, the transition to the Idle state will occur.
Error	An error has occurred while in the Running state. A description of the error will be displayed to the user. Upon acknowledgment of the error, the Equipment will transition to the Idle state.

3.4.3   Related Variables

Table 3-13 lists the variables (SVs, ECs, or DVs) which are relevant to the Equipment processing states. For a more complete description of these variables, refer to *Appendix A*.

Table 3-13   Equipment Processing Variables

Variable Name	VID
PREVIOUSPROCESSSTATE	36
PROCESSSTATE	37

3.4.4   Related Collection Events

Many of the Equipment's collection events relate to process state changes. For a complete listing of these, refer to *Appendix B*.

3.5   Data Collection

Note the three types of variables: Status Variable (SV), Data Variable (DV), and Equipment Constants (EC). The Host sets only ECs. DVs are time stamped by being associated with Collection Events IDs (CEID), and will be reported by Fluidmove in Event Reports.

3.5.1   Variables

The Equipment has a fixed set of Variables which can be read by the Host. Each variable is identified by a unique Variable ID (VID). *Appendix A* lists all variables for both Fluidmove and standard GEM operations.

There are three types of variables: Status Variables, Data Variables, and Equipment Constants. The Host can read variables of any type, but can set values only for equipment constants. The Host can read values for Status variables and equipment constants whenever the Equipment is on-line, but values for Data Variables are typically meaningful only immediately after certain Collection Events (CEIDs), and so are typically reported only in Event Reports (S6F11).

3.5.2   Are You There

The Host can send S1F1 at any time to determine if the SECS link is operational. The Equipment responds with S1F2, if the Equipment is in the ONLINE & COMMUNICATING states. This indicates Model Number (MDLN) and Software Revision Number (SOFTREV).

3.5.3   Host Requests Status

The Host can send S1F3 when the Equipment is on-line to read equipment constants.

The Host can send S2F13 when the Equipment is on-line to read equipment constants.

For this Equipment, S1F3 and S2F13 with a list of VIDs are essentially the same. That is, either message can return Variables of any type. However, S1F3 with a zero-length list will return only VIDs of type SV, and S2F13 with a zero-length list will return only VIDs of type EC.

3.5.4   Setting Equipment Constants

The Operator can change the value for equipment constants. Once the Operator has changed an EC value, the Equipment will note the EqConstChange event. The VID for the changed EC will be reported to the Host in the variable ECIDCHANGE.

3.5.5   Event Reports

The Equipment has a fixed set of Events which can occur. Each Event is identified by a unique Collection Event ID (CEID). The CEIDs are listed in *Appendix B*.

When an event occurs, the Equipment sends the appropriate S6F11 Event Report message to the Host (if that particular event has been enabled). Event Reports are defined by the Host (S2F33) and linked to a specific CEID (S2F35).

The Equipment allows the Host to enable and disable Event Reports using S2F37. If the Host enables a CEID, for which no Event Report is defined, the Equipment will send a "null" (no data) report when the event occurs.

The Host can "force" Event Reports on the Equipment using the following Event Report Request messages:

S6F15   Host requests an Event Report associated with a CEID.

S6F17   Host requests an Annotated Event Report associated with a CEID.

S6F19   Host requests an Event Report associated with a Report ID.

S6F21   Host requests an Annotated Event Report associated with a Report ID.

3.5.6   Time Driven Trace

The Equipment supports Time Driven Trace initiated from the Host. The Host initializes a trace using S2F23. The Equipment will send the data requested after the specified time interval has expired. The data will be sent using the S6F1 (Trace Data Send) message.

The Equipment can handle several concurrent traces. The number of concurrent traces is determined by the size of the trace data requested. The Equipment can support at least four concurrent traces to a maximum size (i.e. all variables requested).

The Equipment allows Host definition of trace data to exceed the one-block limit when reported. That is, the SEMI E5 standard states that the S6F1 (Trace Data Send) message is limited to a single SECS block; but the Equipment will allow this point to be overlooked at the Host's request. If the Host does define trace data to be larger than one SECS block, then the Equipment will send the multiple blocks, not preceded by the S6F5/S6F6 Inquire/Grant scenario.

3.5.7   Limits Monitoring

The Host can define limits for various Variables on the Equipment. When the appropriate limits transitions occur, the Equipment will report this occurrence by sending an event to the Host (if the event is enabled). The Host may define limits for a particular Variable through the S2F45 (Define Variable Limit Attributes). Through this message, the Host may define up to seven limits for each eligible Variable. For each limit (LIMITID), the Host defines an UPPERDB and a LOWERDB. The Equipment generates events when a transition across these boundaries occurs. The Host may set the rate at which the Equipment polls the Variables to determine if a limit has been crossed by setting the GEMLIMITSDELAY variable (VID 60).

3.5.7.1 Event Signaling

For any event that exists on the Equipment, the event message will be sent to the Host only if the reporting for that particular event has been enabled. In this "EVENT SIGNALING" section, assume that the Host has enabled the proper reporting so that these events will be sent to the Host.

After the Host sets UPPERDB and LOWERDB values for a particular limit, the Equipment will send an event message when a transition occurs across these boundaries. The procedure for reporting is illustrated in Figure 3-5 and Figure 3-6.
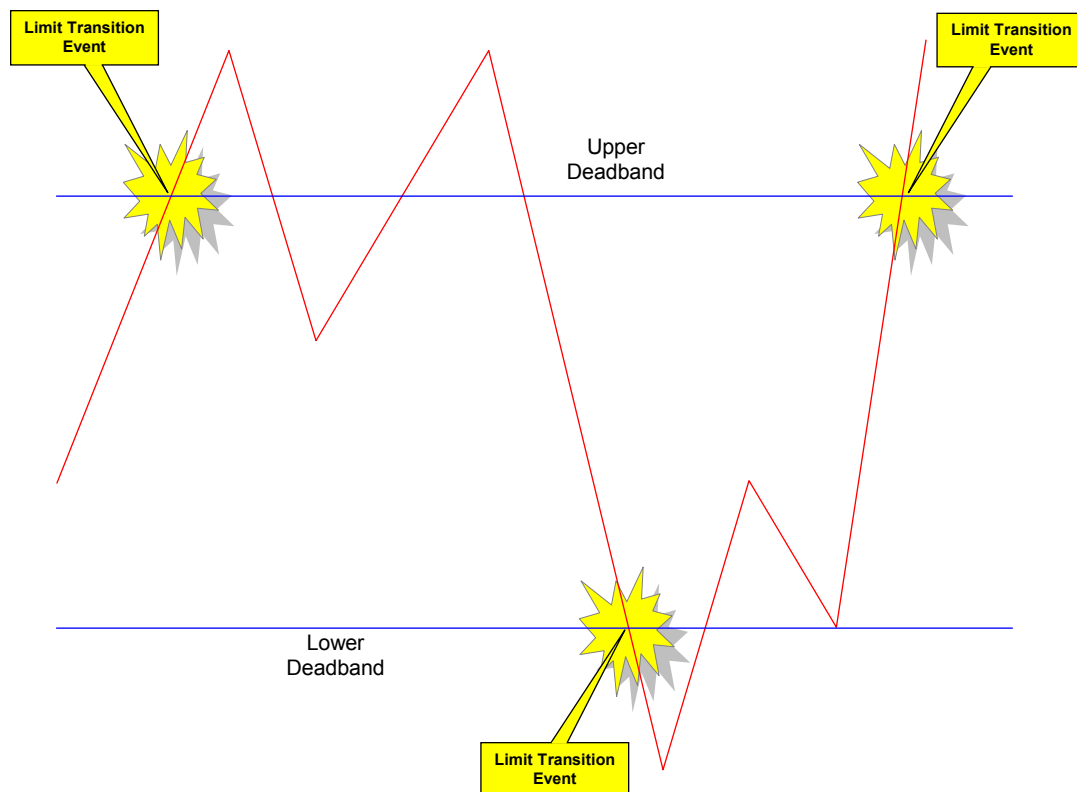
Figure 3-5   Limits Events Signaling
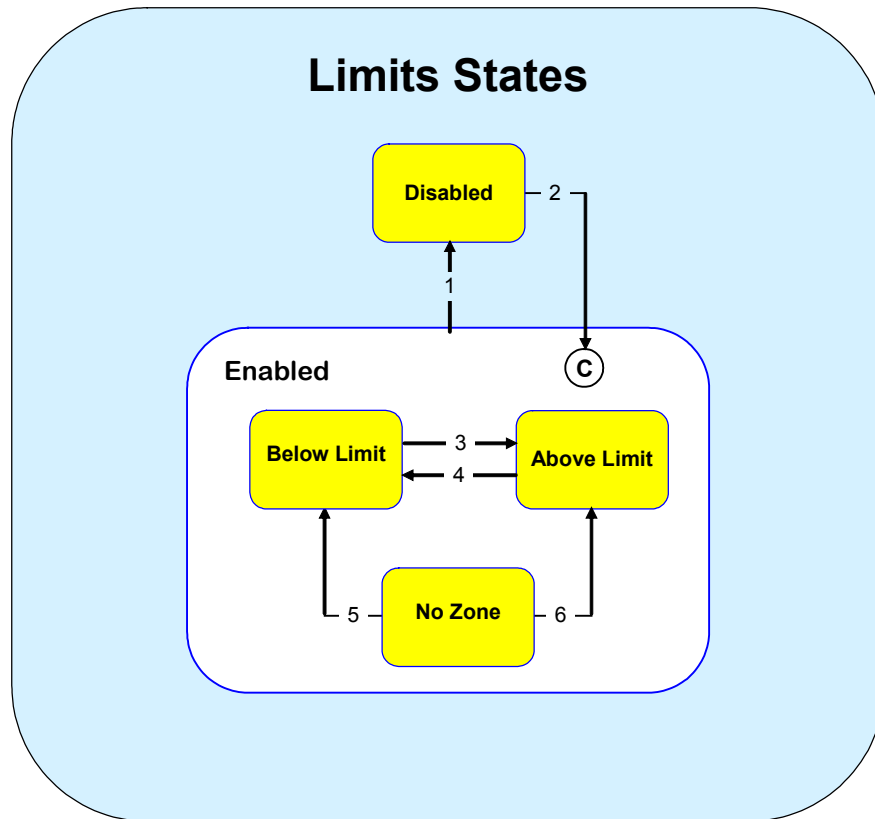
Limits States

Figure 3-6   Limits State Diagram

3.5.8 Limits State Transitions

Table 3-14 Limits State Transitions

#	From	Trigger	To	Description
1	Enabled	Host undefines limits attributes.	Disabled	Host sends S2F45 to undefine limits.
2	Disabled	Host defines limits.	Conditional	Host sends S2F45 to define limits.
3	Below Limit	Variable changes to greater than or equal to UPPERDB.	Above Limit	Limit transition event is signaled to Host if enabled.
4	Above Limit	Variable changes to less than or equal to LOWERDB.	Below Limit	Limit transition event is signaled to Host if enabled.
5	No Zone	Variable changes to less than or equal to LOWERDB from No Zone.	Below Limit	Limit transition event is signaled to Host if enabled.
6	No Zone	Variable changes to greater than or equal to UPPERDB from No Zone.	Above Limit	Limit transition event is signaled to Host if enabled.

3.5.8.1 Limits States

A variable's defined limits may be in any of the states specified in Table 3-15:

Table 3-15 Limits States

State	Limits
Enabled	Within this super-state, a limit has been defined, and monitoring of the variable is taking place.
Disabled	Limits are not defined.
Below Limit	The value of the variable is less than or equal to LOWERDB.
Above Limit	The value of the variable is greater than or equal to UPPERDB.
No Zone	This limit has just been defined, and the value of the variable is less than UPPERDB and greater than LOWERDB. No limits transitions have occurred.

3.5.9   Disk Files

The Equipment maintains a disk file which contains the current equipment constant settings. The file is updated each time the Operator or Host changes an equipment constant. The most recent settings for some of the equipment constants are read from the file when the Equipment is powered-on.

All Event Report definitions, links, and enable status as well as Limits attributes are also maintained on separate disk files.

3.5.10   Related Variables

The following table lists the variables (SVs, ECs, or DVs) which are relevant to data collection setup and maintenance. This section does not list the variables which contain Equipment-specific information. For a more complete description of specific variables, refer to *Appendix A*.

Table 3-16   Data Collection / Setup Variables

Variable Name	VID
ECIDCHANGE	67

3.5.11   Related Events

The following table lists the collection events (CEIDs) which are relevant to data collection. In addition to these, each variable which is eligible for limits monitoring must have a specific collection event associated with it. For a more complete description of these events, refer to *Appendix B* or the description in this section.

Table 3-17   Data Collection CEIDS

Collection Event	CEID
EqConstChange	20

3.6 Alarm Management

The Equipment has a fixed set of alarm conditions which can occur. Each alarm is identified by a unique Alarm ID (ALID), and has an associated severity code (ALCD) and alarm text (ALTX). Examples of possible alarms are shown in *Appendix C*.

3.6.1 Alarm States

Each alarm (ALID) can be in either of two states: CLEAR (off) or SET (on). Several alarms can be SET simultaneously. At power-up, all alarms are cleared.

3.6.2 Reporting

The Equipment reports alarms to the Host when they occur, without Host action, using the alarm report message S5F1 or configurable option, depending on CONFIGALARMS. The transition of an ALID from OFF to ON is referred to as "going on" or "leading edge", and the transition from ON to OFF as "going off" or "trailing edge". The Equipment reports both leading and trailing edge transitions.

The Equipment has two CEIDs for each ALID, one for the "going on" transition and one for the "going off" transition. In addition to the Alarm Report, the Equipment sends an Event Report if the CEID associated with the alarm change is enabled. If the CEID is enabled and no report is defined, a "null" Event Report is sent. The Event Report for an alarm transition is sent if it is enabled, even if the reporting for the alarm is disabled.

3.6.3 Enable/Disable

The Host can use S5F3 (Enable/Disable Alarms) to control which alarms the Equipment should report. Using S5F3, the Host can specify for each ALID whether the Equipment should report that alarm when it occurs. When an alarm transition occurs, if that ALID is enabled the Equipment will send an alarm report message to the Host. If the ALID is disabled, the Equipment will not send the alarm message. The Host can use S2F37 to enable or disable the CEIDs associated with these alarm transitions.

The Equipment saves Alarm Enable/Disable settings on a disk file. When the Equipment powers up, it will restore Alarm Enable/Disable settings to the same condition they had at power off.

3.6.4 Host Requests Alarm Status

The Host can use S5F5 to request the Equipment to report all alarms which exist and the ON/OFF state for each.

The Host can use S5F7 which is similar, but which causes the Equipment to report only those alarms (ALIDs) which are Enabled, regardless of whether the alarm is ON or OFF.

3.6.5   Compatibility

The Equipment supports the following Alarm Report message formats for older Host implementations (refer to *1.9.3 GEM Configuration*.)

- S5F71/S5F72

- S5F73/S5F74

3.6.6   Related Variables

The following table lists the variables (SVs, ECs, or DVs) which are relevant to alarm management. For a more complete description of these variables, refer to *Appendix A*.

Table 3-18   Alarm Management Variables

Variable Name	VID
CONFIGALARMS	1
WBITS5	19
ALARMID	22
ALARMSENABLED	23
ALARMSSET	24
ALARMSTATE	25
ALARMSERIAL	26

3.6.7   Related Collection Events

Each alarm defined in the Equipment has two unique collection events associated with it: a "Going-On" event, and a "Going-Off" event. The CEIDs are listed in *Appendix B*.

3.7 Process Program Management

Processing on the Equipment is controlled by Process Programs. The Equipment requires selection of a Process Program for each process. The Equipment supports the use of unformatted process programs.

Fluidmove uses proprietary ASCII and binary image files to define process programs (recipes).

3.7.1 Equipment Management of Process Programs

The Equipment provides a Process Program Library, implemented as a set of binary files maintained on a hard disk. Each Process Program is identified by a unique Process Program ID (PPID). Upper and lower case alphabetic characters are not considered distinct, and the Equipment will not distinguish between them.

For Fluidmove, the PPID corresponds to the name of a recipe file which is the culmination of the main program and various support files.

The Operator may modify any one of the Process Programs stored on the Equipment. The Host will be notified via the GemPPChangeEvent Collection Event if the Operator creates, changes, or deletes a Process Program. The Operator can also select a PPID to be uploaded to the Host (S7F3), or download from the Host (S7F5).

3.7.2 Host Management of Process Programs

Process Programs are saved to disk on the Equipment. Process Programs are typically created and updated at the Equipment. However, the Equipment provides complete facilities for the Host to manage the storage and use of Process Programs. This allows the Equipment to operate cooperatively Host-implemented systems. The Host has the following capabilities:

- The Host can upload a Process Program from the Equipment Library by using S7F5 (Process Program Request). The Operator can also initiate a Process Program Upload through the Equipment's user interface.

- The Host can download a Process Program to the Equipment library by using S7F3 (Process Program Send). The Host may send S7F1 (Multi-block Inquire) to the Equipment before sending a multi-block Process Program. The Operator can also initiate a Process Program Download through the Equipment's user interface.

- The Host can delete one or more Process Programs from the Equipment library by using S7F17 (Process Program Delete).

- The Host can determine which Process Programs are currently stored in the Equipment library by using S7F19 (Process Program Directory).

3.7.3   Related Variables

The following table lists the variables (SVs, ECs, or DVs) which are relevant to process program management. For a more complete description of these variables, refer to *Appendix A*.

Table 3-19   Process Program Management Variables

Variable Name	VID
PPCHANGENAME	40
PPEXECNAME	32
PPCHANGESTATUS	41

3.7.4   Related Events

The following table lists the collection events (CEIDs) which are relevant to process program management. For a more complete description of these events, refer to *Appendix B*.

Table 3-20   Process Program Management CEIDS

Collection Event	CEID
GemPPChangeEvent	3
GemBadDownloadEvent	7

3.8   Remote Commands

Processing at the Equipment can be guided by either a local Operator or by a Host computer. This section describes the remote commands available to the Host.

Much of the behavior of the Equipment and its acceptance of remote commands is directed by requirements of the Control State. For a complete description of the Control State, refer to *3.3 Control States*.

The Equipment will accept remote commands only when the Control State is Remote.

The Host has the ability to configure whether the Equipment will transition to Remote or Local as a default upon entering the On-Line state from Off-Line. This can also be done through the SECS/GEM Setup dialog box in Fluidmove.

Once in the Remote state, the Host has the authority to issue any of these remote commands and they will not be rejected because of an invalid control state. Commands may be rejected for other reasons (trying to start a process with no material loaded, etc.).

While in Remote state, the Operator still has the ability to issue commands and change the control state. If the Operator issues a command while in Remote state, the Equipment will send the Operator Command collection event if enabled. When the Operator "grabs" control away from the Host by changing the Control State to Local, the Equipment will send either the GemControlStateLOCAL or GemEquipmentOFFLINE event to the Host. The Host also has the ability to put the Equipment into a Local state by sending the LOCAL remote command while in Remote state. Furthermore, if the Operator presses any of the buttons on the Run Window (GO, PAUSE, STOP, ABORT), the Host will get the corresponding events (StartCmd, PauseCmd, StopCmd, AbortCmd - refer to *Appendix B*).

3.8.1   S2F41 Commands

The general format for remote commands using the S2F41 message is:

```
S2F41 [W]                                  * H->E

      <L [2]

            <A RCMD>                        * Remote command string

            <L

                  <L [2]

                        <A CPNAME>    * Command Parameter Name

                        <CPVAL>       * Command Parameter Value

                  >

                  …

            >

      > .
```

The following commands may be sent by the Host to the Equipment:

START

This command starts processing on the Equipment assuming all proper initialization has taken place and material is present.

```
S2F41 [W]

        <L [2]

                <A 'START'>

                <L>

        > .
```

STOP

This command will stop the processing of material at the Equipment. Boards currently in process will be completed, but no new boards will be loaded.

```
S2F41 [W]

        <L [2]

                <A 'STOP'>

                <L>

        > .
```

PAUSE

The PAUSE command will cause the Equipment to complete the current instruction in process, but not to start the next instruction until the RESUME command has been given.

```
S2F41 [W]

        <L [2]

                <A 'PAUSE'>

                <L>

        > .
```

RESUME

After a PAUSE command has been given, the RESUME command will continue to process the existing board according to the recipe.

```
S2F41 [W]

        <L [2]

                <A 'RESUME'>

                <L>

        > .
```

LOCAL

While the Equipment is in Remote state, the Host can put the Equipment into Local state by sending the LOCAL command.

```
S2F41 [W]

        <L [2]

                <A 'LOCAL'>

                <L>

        > .
```

ABORT

The Host can abort processing at the next safe stopping point by sending the ABORT command with the AbortLevel parameter as follows:

```
S2F41 [W]

        <L [2]

                <A 'ABORT'>

                <L

                        <L

                                <A 'AbortLevel'>      *CPNAME

                                <U1 1>                *CPVAL

                        >

                >

        > .
```

3.8.2   Related Variables

The following table lists the variables (SVs, ECs, or DVs) which are relevant to remote control. For a more complete description of these variables, refer to *Appendix A*.

Table 3-21   Remote Control Variable

Variable Name	VID
ABORTLEVEL	21
PREVIOUSCOMMAND	34

3.8.3   Related Events

The following table lists the collection events (CEIDs) which are relevant to remote control. For a more complete description of these events, refer to *Appendix B* or the description in this chapter.

Table 3-22   Remote Control CEIDS

Collection Event	CEID
OperatorCommand	4
StartCmd	14
StopCmd	15
PauseCmd	16
ResumeCmd	17
AbortCmd	18

3.9   Material Movement

Material movement on the Equipment consists of the following three board holding areas:

- Pre-dispense Area

- Dispensing Area

- Post-dispense Area

In order for processing to begin, a board must arrive from the upstream machine. The Equipment then conveys the board to the pre-dispense area, conveys it to the dispensing area, processes it, and then conveys the board to the post-dispense area. Before a new lot can be started, the board must be removed from the dispensing area. Collection events can be triggered only when a board arrives and leaves the dispensing area.

3.9.1   Related Variables

For a complete description of the variables relevant to material movement, refer to *Appendix A*.

3.9.2   Related Collection Events

Many collection events relate directly to material movement or imply that material movement has taken place. For a complete listing of these collection events, refer to *Appendix B*.

3.10   Equipment Terminal Services

The Equipment supports exchange of free text messages with the Host (SECS Stream 10). This Equipment accepts the following messages from the Host, and responds accordingly if the W-Bit is set to 1:

S10F3   /* Single Line Data   */

S10F5   /* Multi-Line Data */

S10F9   /* Broadcast */

The message text will be displayed on the Equipment's CRT. Collection Event S10Ack (CEID 21) occurs once the Operator has acknowledged the message and an Event Report will be sent to the Host (if enabled).

The S10F3 and S10F9 are restricted to a single TEXT data item, but S10F5 can contain multiple TEXT data items. Each TEXT data item is limited to 160 characters.

If the Operator has not acknowledged an existing message when the Host sends another message, the new message will be displayed and the old one discarded.

The Host can send a message with a 0-length text to clear the Operator text display.

Also, the Equipment allows the Operator to send a single block message to the Host via S10F1. The maximum length of this text is 160 characters. The S10F2 response from the Host is ignored.

Fluidmove provides this functionality by allowing an operator to enter his message through the SECS/GEM Setup dialog box (Terminal tab), or via the SECS/GEM tab in the Run Window. The message will be sent when the Operator presses the Send button on screen.

Fluidmove also provides a Terminal Display to display text received from the Host from the SECS/GEM Setup dialog box (Terminal tab) or via the SECS/GEM tab in the Run Window.

Fluidmove notifies the Operator that a text message has arrived from the Host by blinking the GEM status bar at lower portion of screen. If the beep option has been selected a beep once every half a second will be used to catch Operator's attention. The Operator can then view the incoming message through the SECS/GEM Setup dialog box (Terminal tab), or via the SECS/GEM tab in the Run Window. In the same locations, there are provisions for the Operator to send a message to the Host.

3.11   Error Messages

The Equipment provides standard Stream 9 messages to report SECS-I errors. Refer to *5.7 SECS Error Messages* for detailed description of these messages:

S9F1   Unrecognized Device ID

S9F3   Unrecognized Stream

S9F5   Unrecognized Function

S9F7   Invalid Data

S9F9   Transaction Timeout

S9F11   Data Too Long

Fluidmove can reject a primary message received from the Host as incorrectly formatted for SECS-II (invalid data, or data too long).

3.12   Clock

The Equipment contains Clock/Calendar hardware, by which it knows the current date and time. This allows the following:

- The Host can send S2F31 to set the Equipment's Clock/Calendar hardware.

- The Host can send S2F17 to read the Equipment's Clock/Calendar hardware.

- The Operator can initiate a Date/Time request from the Host. This is done through the SECS/GEM Setup dialog box (Control tab).

3.12.1   Related Variables

Table 3-23 lists the relevant clock variables (SVs, ECs, or DVs). For a complete description of these variables, refer to *Appendix A*.

Table 3-23   Clock Variables

Variable Name	VID
CLOCK	27

When time update messages from the Host are not arriving, a time update request to the Host shall be made approximately once per hour until the Host resumes time update messages.

3.13 Spooling

When the SECS link between the Host and the Equipment goes down (RTY error on the Equipment side), the Equipment will spool appropriate messages so that the Host can read them once the link comes back up (after a successful Connect Request transaction).

The Host can set spooling attributes on the Equipment by setting certain equipment constants with the S2F15/16 transaction.

The Host can define streams and functions of messages to be spooled through the S2F43/44 transaction. Stream one (S1Fx) messages are not eligible for spooling. The Host can also disable spooling for messages through this S2F43/44 transaction. Stream 9 messages are not spooled.

The Host may read spooled messages or purge the Equipment's spool through the S6F23/24 transaction.

3.13.1 A Word of Caution

If the Host does not intend to use the spooling features of the Equipment, the equipment constant ConfigSpool should be set to zero. Setting this EC to zero disables the spooling feature. If this is not set to zero, and the Host does not support spooling, the SECS connection with the Equipment will be crippled. This happens because of the following:

1. When spooling becomes active (transmission error), the Equipment will not send "Non-Stream 1" primary messages to the Host. That is, it will not send events, alarms, process programs, terminal display, etc.

2. When spooling becomes active, the ONLY way to deactivate it is to read (purge) or delete the spool from the Host. In complying with the GEM standard, the Equipment does not have the ability to reset its spooling state.

3. Therefore, if your Host does not support spooling and spooling becomes active, you will never again receive non stream 1 messages from the Equipment. If this occurs, you will need to use a Host simulator such as SECSIM to delete the spool.

3.13.2 Spooling Sequence

Messages are sent to the spool only if the Host has enabled these messages for spooling. This precondition will not be repeated throughout this section. Assume that the messages referred to in this section have been enabled for spooling.

While spooling is active, the Host may initiate primary messages and the Equipment will respond, if it is in the COMMUNICATING state.

Figure 3-7 and Table 3-24 describe the spooling sequence. Refer to Table 3-24 for definition of numbers used in the figure.
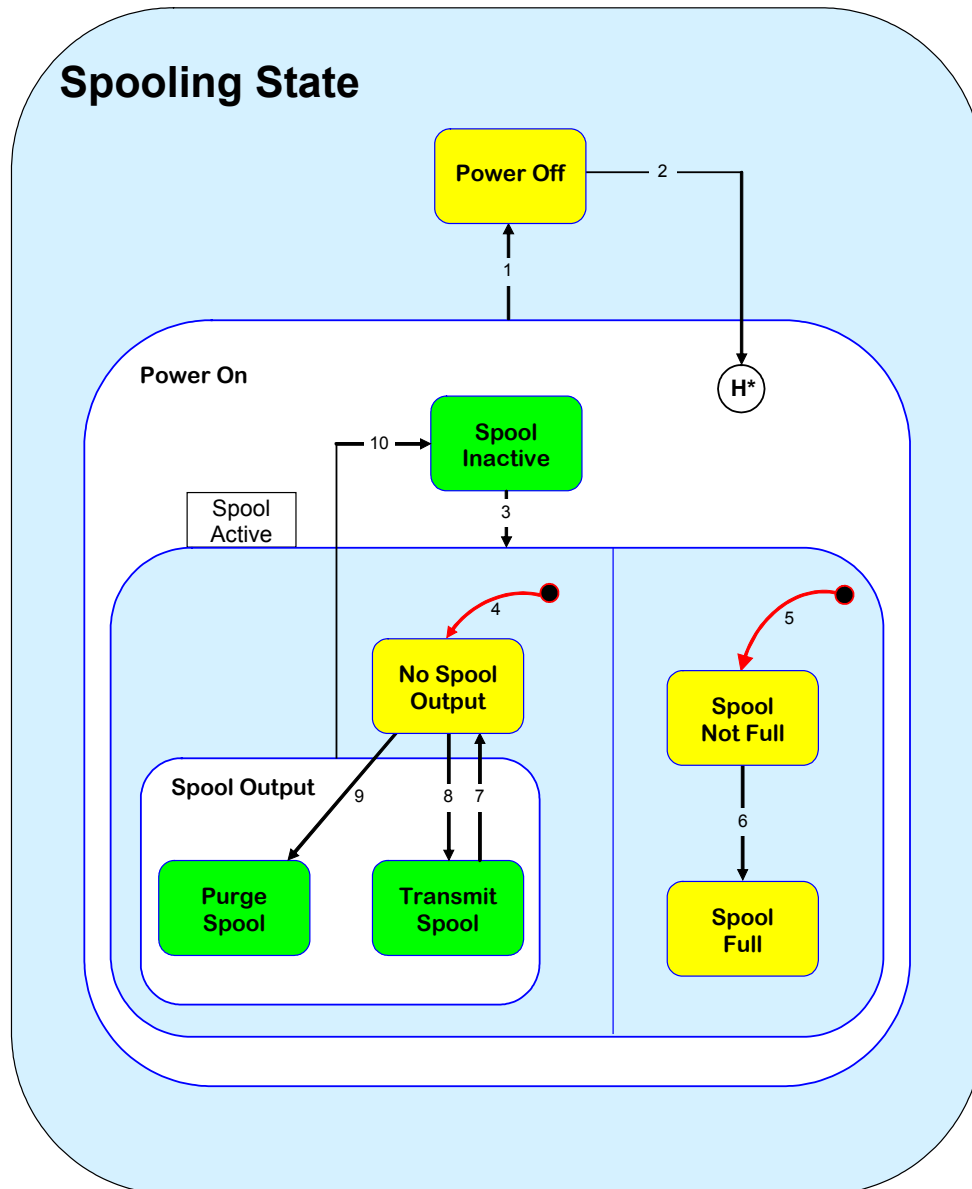
Figure 3-7   Spooling State Diagram

✎ **NOTE**   The numbers in the # column refer to those in Figure 3-7.

Table 3-24   Spooling State Transitions

#	From	Trigger	To	Description
1	Power On	Equipment shutdown	Power Off	The Equipment may power off at any time.
2	Power Off	Equipment Startup	History* (Power On)	Equipment re-boots after a shutdown. Spooling will continue according to its state when the Equipment was powered off.
3	Spool Inactive	The Equipment experiences a transmission failure and the variable GemConfigSpool (VID 66) is set to "1" (enabled).	Spool Active	The Equipment will now start spooling any messages which have been defined by the Host. If the Host does not wish to implement Spooling, the EC GemConfigSpool should be set to "0" and the spool state will never become active.
4	Default	Entry into Spool Active	No Spool Output	No spooled messages are being read by the Host.
5	Default	Entry into Spool Active	Spool Not Full	The spool file has not yet filled up.
6	Spool Not Full	The Equipment's spool has reached capacity.	Spool Full	The Equipment will start to either discard new messages destined for the spool or overwrite the beginning of the spool, depending on the setting of GemOverWriteSpool (VID 62).
7	Transmit Spool	The Equipment has de-spooled some messages, but not all have been sent to the Host.	No Spool Output	No spooled messages are being read by the Host.
8	No Spool Output	The Host has requested spooled messages to be sent by sending S6F23.	Transmit Spool	The Equipment will send messages according to the setting of GemMaxSpoolTransmit (VID 46). If GemMaxSpoolTransmit is zero, all messages will be sent, otherwise only the number of messages specified in this variable will be sent.
9	No Spool Output	The Host requests the Equipment to purge its spool.	Purge Spool	The Equipment will delete its spool.
10	Spool Output	Entire spool has either been read or purged by the Host.	Spool Inactive	The Equipment will continue normal SECS communicating.

3.13.2.1   Spooling Starts

When a transmission failure occurs, the first message sent to the spool is the event message GemSpoolingActivated. The next message sent to the spool is the message which caused the communications failure. Table 3-25 depicts the activity at the Equipment when spooling starts.

Table 3-25   Spooling Activity

#	Equipment Send Sequence	Spool Sequence	Description
1	S5F1 (Alarm Report 1)	S6F11 (Spool Activated Event Report)	Equipment attempts to send an alarm report to the Host, but experiences a transmit failure. The GemSpoolingActivated event (CEID 23) is sent to the spool. Variable GEMSPOOLSTARTTIME (VID 52) is updated.
2		S5F1 (Alarm Report 1)	The Alarm Report message is sent to the spool.
3	S6F11 (Event Report 1)	S6F11 (Event Report 1)	The Equipment generates an Event Report and it is sent to the spool.
4	S5F1 (Alarm Report 2)	S5F1 (Alarm Report 2)	The Equipment generates an alarm report and it is sent to the spool.

3.13.2.2   Equipment Spools Messages

While spooling messages, the Equipment will increment the GEMSPOOLCOUNTACTUAL and GEMSPOOLCOUNTTOTAL status variables for each message spooled. Messages which require an inquire/grant scenario are spooled along with the inquire message as a single message. That is, if a multi-block S6F11 (Event Report) message is being sent to the Host and spooling is active, the S6F5 (inquire) as well as the S6F1 are sent to the spool and GEMSPOOLCOUNTTOTAL and GEMSPOOLCOUNTACTUAL are incremented by one.

The Equipment maintains two equipment constants which affect the spooling of messages. The first is CONFIGSPOOL. If this is set to zero, then spooling will never become active. If it is set to one, spooling will become active when a transmission failure occurs.

The EC OVERWRITESPOOL determines if the Equipment should over-write the oldest messages with new ones when the spool becomes full. If OVERWRITESPOOL is TRUE, old messages will be over-written with new ones. If FALSE, new messages will be discarded when the spool is full.

3.13.2.3 Host Reads Spooled Data

The Host can read spooled messages by sending the S6F23 message. Upon receipt of this message, the Equipment will reply and attempt to send spooled messages. Messages are sent in order of oldest to newest, with no priority given to a particular kind of message. The EC MAXSPOOLTRANSMIT determines the maximum number of spooled messages which are sent per S6F23 message received from the Host. If zero, all spooled messages are sent, if any other number, that number of messages are sent.

During the de-spooling of messages, the Equipment maintains only one outstanding Equipment-initiated transaction. The Equipment will wait for either a reply to the primary or a T3 timeout before starting another transaction. If the de-spooled message requires an inquire/grant scenario, the Equipment will initiate this transaction first. If the Host accepts the inquiry, the message is sent. If not, then the Equipment removes the message from the spool and discards it.

If a transmission failure occurs while attempting to send the spool, the event GemSpoolTransmitFailure is sent to the spool and spooling will remain active. While the spool is active, any new (spoolable) messages generated by the Equipment are also sent to the spool.

When the spool has been completely transmitted, the event GemSpoolingDeactivated is sent to the Host.

Instead of reading spooled messages, the Host can purge the spool by sending S6F23 with RSDC = 1. For details, refer to *4.2.80 S6F23 – Request Spooled Data*.

3.13.3 Spool States

3.13.3.1 Power Off

The Equipment is completely shut down.

3.13.3.2 Power On

The Equipment is "on" and in a stable state. Table 3-26 describes the substates.

Table 3-26 Power On Spool Substates

Substate	Description
Spool Inactive	Spooling is not activated. This is either because GemConfigSpool is "0" (disabled) in which case, spooling will never be active, or because while GemConfigSpool is enabled ("1"), a RTY error has not occurred. In this state, no messages are sent to the spool. The Host may define or un-define messages eligible for spooling should the link go down.
Spool Active	While GemConfigSpool is enabled ("1"), the Equipment has experienced a transmission failure (RTY error). Upon entry into this state, the first message sent to the spool is the GemSpoolingActivated event, assuming that this event is enabled and that spooling for the particular stream and function have been enabled. This message will enter the spool even before the message which originally caused the RTY error.
	Spool Not Full - The file containing the spooled messages has not reached its capacity.
	Spool Full - The file containing the spooled messages has reached its capacity.
	No Spool Output - In this state, the Host is not reading or purging the Equipment's spool.
	Spool Output - This super-state contains the two sub-states in which the Equipment's spool is either being read or purged by the Host.
	Purge Spool - The Equipment is purging its spool, erasing all spooled messages.
	Transmit Spool - The Equipment is transmitting spooled messages to the Host.

3.13.4   Related Variables

The following table lists the variables (SVs, ECs, or DVs) which are relevant to spooling. For a more complete description of these variables, refer to *Appendix A*.

Table 3-27   Spooling Variables

Variable Name	VID
MAXSPOOLTRANSMIT	46
SPOOLCOUNTACTUAL	48
SPOOLCOUNTTOTAL	49
SPOOLFULLTIME	50
SPOOLLOADSUBSTATE	51
SPOOLSTARTTIME	52
SPOOLSTATE	53
SPOOLUNLOADSUBSTATE	54
OVERWRITESPOOL	62
CONFIGSPOOL	63

3.13.5   Related Events

The following table lists the collection events (CEIDs) which are relevant to spooling. For a more complete description of these events, refer to *Appendix B* or the description in this chapter.

Table 3-28   Spooling CEIDS

Collection Event	CEID
GemSpoolingActivated	23
GemSpoolingDeactivated	24
GemSpoolTransmitFailure	25

4   SECS Message Detail

This section describes the basics of SML notation and lists each message sent or understood by the Equipment.

4.1   SML Notation

Message descriptions are shown using "SECS Message Language" (SML) notation. SML is a general notation developed by GW Associates for describing SECS messages. SML is similar to the notation used in the SECS Standards documents, but SML is a more precise and regular notation.

4.1.1   Data Item Format

In SML, the format for a Data Item is as follows:

> < type [count] value >

The components of a Data Item are listed and described in Table 4-1.

Table 4-1   Components of a SML Data Item

Component	Description
< >	Angle Brackets. Each Data Item is enclosed within angle brackets ("less than", "greater than"). This notation implies that each Data Item has a Data Item Format and Data Item Length as required by SECS-II.
Type	This specifies the SECS-II Data Item format. It will have one of the following values: A ASCII B Binary J JIS-8 I1, I2, I4, I8 Signed Integers U1, U2, U4, U8 Unsigned Integers F4, F8 Floating Point BOOLEAN True/False
Count	Count of the element values that make up the item. If present, the count is enclosed within square brackets "[ ]". The count may be omitted, in which case the square brackets are also omitted. The "count" specifies the number of value elements in the Data Item Value. For String formats (ASCII, Binary, JIS-8), "count" specifies the number of characters in the string. For Numeric formats (I1, I2, I4, I8, U1, U2, U4, U8, F4, F8, BOOLEAN), "count" specifies the number of values in the array. For simple scalar numeric values, "count" is usually "1". For LIST items, "count" specifies the number of items in the list. If "count" is omitted, then the length of the Data Item is implied by the value which follows. The "count" can range between known limits. It may be specified as minimum and maximum "counts", separated by two dots. (For example, [0..40]).

Table 4-1   Components of a SML Data Item (continued)

Component	Description
Value	Value of a single item element. Values are shown in a notation that depends on the item type. For example, ASCII values are shown as characters enclosed in quotes, Unspecified Binary values are shown in hexadecimal. An ellipsis (…) is used to indicate additional elements may occur, as for example where substructures may repeat in a List structure. As an example, a two-byte unsigned integer Data Item with an array of three values 21, 22, and 23 is represented as: <U2 [3] 21 22 23> Numeric values shown are considered decimal integers unless otherwise indicated. Negative values are shown with a leading minus sign "–". Hexadecimal values are shown in C-Language convention, with a leading "0x". 10 Decimal Ten 0x10 Hexadecimal 10 -10 Decimal Negative 10 Where a value is not fixed, the SECS variable name is used directly. For Example: <A [6] SOFTREV>

4.1.2 Message Format

The format of a complete message is as follows:

SnFn W item .

The components of a complete message are described in Table 4-2.

Table 4-2   Components SML Notation

Component	Description
SnFn	The Stream and Function Codes, S1F1 for example.
W	The W-Bit, if set. Omitted if not set. If the W-Bit is optional, it is coded within brackets "[W]".
Item	A Data Item that is formatted as described in 4.1.1.
.	A period (.) ends the message definition.

For example, the S1F3 message might be described in SML as follows:

S1F3 W
    \<L
        \<U4 13\>
        \<U4 7\>
        \> .

4.2   SECS Messages

The following subsections describe the SECS messages sent or understood by the Equipment.

4.2.1   S1F1 - Are You There

```
S1F1  W.                            * H<->E
```

The Host may send this message to the Equipment at any time.

The Equipment sends this message periodically as a "heartbeat" to determine if the SECS link is operational.

The equipment constant ConfigConnect can be set to cause the Equipment to send S1F1 instead of S1F13 for Connect Request.

4.2.2   S1F2 - On Line Data (Equipment to Host)

```
S1F2                                * H<-E
<L
    <A MDLN>                        * MDLN Model Number
    <A SOFTREV>                     * SOFTREV Software Revision
    > .
```

The Equipment reports its Model Number and Software Revision.

4.2.3   S1F2 - On Line Data (Host to Equipment)

```
S1F2                                * H->E
<L> .
```

4.2.4   S1F3 - Selected Status Request

```
S1F3  W                              * H-> E
<L
      <U4  VID>                      * Variable ID
      …
      >  .
```

The Host requests status from the Equipment. The Host sends the VIDs of interest. Several VIDs can be specified if desired.

Normally, only VIDs of class SV (i.e. Status Variables) are used in this message. However, the Equipment allows the Host to use any VID of class DV, EC, or SV.

If S1F3 contains a zero-length list, then the Equipment will report all variables of class SV, in order by VID.

For compatibility with older Host implementations, the Equipment allows the following alternative form for this message using an array format:

```
S1F4  W                              * H->E
      <U4  VID…>.
```

4.2.5   S1F4 - Selected Status Data

```
S1F4  W                              * H<-E
<L
      <V>                            * Status Variable Value
      …
      >  .
```

The Equipment returns the Variable Values in the order requested by S1F3. If any VID specified in S1F3 is invalid, the corresponding V in S1F4 has the following error format:

```
      <L>                            * V for Invalid VID
```

4.2.6   S1F11 - Status Variable Namelist Request

```
S1F11 W                              * H->E
<L
        <U4 VID>                     * Status Variable ID
        …
        >.
```

The Host format descriptions for the specified Variables. Several VIDs can be specified if desired.

Normally, only VIDs of class SV (i.e. Status Variables) are used in this message. However, any VID of class DV, EC, or SV can be used.

If S1F11 contains a zero-length list, then the Equipment will report all variables of class SV, in order by VID.

```
S1F11 W                              * H->E
<L> .
```

4.2.7   S1F12 - Status Variable Namelist Reply

```
S1F12                                * H<-E
<L
        <L [3]
                <U4 VID>             * Variable ID
                <A SVNAME>           * Status Variable Name
                <A UNITS>            * Units of Measure
        …
        >  .
```

The Equipment returns the Variable descriptions in order requested in S1F11. If any VID specified in S1F11 is invalid, the corresponding List in S1F12 has the following error format:

```
<L>                                  * Instead of L [3]
```

4.2.8   S1F13 - Connect Request

The Equipment sends this message using the following format:

```
S1F13 W                          * H<-E
<L
     <A MDLN>
     <A SOFTREV>
     > .
```

The Host sends this message using the following format:

```
S1F13 W                          * H->E
<L> .
```

Either end of the link may send S1F13 as the first message to establish connection of the link.

Under the Equipment's initialization logic, the Equipment will always attempt to establish the link. If no Host acceptance reply is received, the Equipment sends this message periodically.

4.2.9   S1F14 - Connect Request Acknowledge

The Equipment sends this message using the following format:

```
S1F14                            * H<-E
<L
     <B [1] 00>                   * COMMACK
     <L
          <A MDLN>
          <A SOFTREV>
          >
     > .
```

The Host sends this message using the following format:

```
S1F14                            * H->E
<L
     <B [1] 00>                   * COMMACK
     <L>
     > .
```

The Equipment always sends the value 0x00 for COMMACK. In messages received from the Host, COMMACK value 0x00 indicates acceptance of the connect request. Any other value indicates refusal.

4.2.10   S1F15 - Request Off-Line

S1F15 W .   * H -> E

Host requests the Equipment to go Off-Line.

4.2.11   S1F16 - Off-Line Acknowledge

S1F16   * H <- E
  <B [1] 0x00> .   * OFLACK

Equipment Control State transits to Host Off-Line and sends this message in response to S1F15 primary. OFLACK is always zero.

4.2.12   S1F17 - Request On-Line

S1F17 W .   * H -> E

Host requests the Equipment to go On-Line.

4.2.13   S1F18 - On-Line Acknowledge

S1F18   * H <- E
  <B [1] ONLACK> .

Equipment responds to S1F17 primary in an attempt to go On-Line. Data item ONLACK indicates the success or failure of the attempt.

Table 4-3   On-Line Acknowledge

ONLACK	Description
0x00	OK. Equipment On-Line transition successful. Equipment Control State transits to either Local or Remote while On-Line as guided by the EC "GemOnlineSubstate".
0x01	On-Line not allowed.
0x02	Equipment already On-Line.

4.2.14 S1F65 - Connect Request

✍ **NOTE**   This message is provided only for compatibility with Host computers which support an older version of GEM.

The equipment constant ConfigConnect can be set to cause the Equipment to send S1F65 instead of S1F13 for Connect Request.

The Equipment sends this message using the following format:

```
S1F65 W                          * H<-E
<L
    <A MDLN>
    <A SOFTREV>
    > .
```

Format 1: The Host sends this message using the following format:

```
S1F65 W                          * H->E
<L> .
```

Format 2: The Equipment also accepts the following form of this message:

```
S1F65 W .                        * H->E
```

Either end of the link may send S1F65 as the first message to establish connection of the link.

Under the Equipment's initialization logic, the Equipment will always attempt to establish the link. If no Host acceptance reply is received, the Equipment sends this message periodically.

4.2.15   S1F66 - Connect Request Acknowledge

✎ *NOTE*   This message is provided only for compatibility with Host computers which support an older version of GEM.

If the Host sends S1F65, Format 1, the Equipment replies S1F66 using the following format:

```
S1F66                                * H<-E
<L
      <B [1] 00>                     * COMMACK
      <L
            <A MDLN>
            <A SOFTREV>
            >
      > .
```

If the Host sends S1F65, format 2, the Equipment replies S1F66 using the following format:

```
S1F66                                * H<-E
<B [1] 00> .                         * COMMACK
```

The Host sends this message using the following format:

```
S1F66                                * H->E
<L
      <B [1] 00>
      <L>
   > .
```

The Equipment also accepts the following form of this message.

```
S1F66                                * H->E
   <B [1] 00> .                      * COMMACK
```

The Equipment always sends the value 0x00 for COMMACK.

In messages received from the Host, COMMACK value 0x00 indicates acceptance of the connect request. Any other values indicates refusal.

4.2.16   S2F13 - Equipment Constant Request

```
S2F13 W                              * H->E
<L
    <U4 VID>                         * Equipment Constant ID
    …
    > .
```

The Host requests the VIDs of interest. Several VIDs can be specified if desired.

Normally, only VIDs of class EC (i.e. equipment constants) are used in this message. However, any VID of class DV, EC, or SV can be used.

If S2F13 contains a zero-length list, then the Equipment will report all variables of class EC, in order by VID.

For compatibility with older Host implementations, the Equipment allows the following alternative form for this message, using an array format:

```
S2F13 W                              * H->E
    <U4 VID VID …> .                 * Equipment Constant ID
```

4.2.17   S2F14 - Equipment Constant Data

```
S2F14                                * H<-E, Multiblock
<L
    <V>                              * Equipment Constant Value
    …
    > .
```

The Equipment returns the equipment constants in the order requested in S2F13. If any VID specified in S2F13 is invalid, the corresponding V in S2F14 has the following error format:

```
<L>                                  * V for Invalid VID
```

4.2.18   S2F15 - New Equipment Constant Send

```
S2F15 W                              * H->E
<L
    <L [2]
        <U4 VID>                     * Equipment Constant ID
        <V>
        >
    …
    > .
```

The Host sends new values for desired equipment constants. Several equipment constants can be specified if desired.

Only VIDs of class EC can be used in this message.

4.2.19   S2F16 - Equipment Constant Send Acknowledge

```
S2F16                                * H<-E
    <B [1] EAC> .                    * Equipment Acknowledge Code
```

Normal completion returns a zero (0) in EAC. If any ECID or ECV in S2F15 is invalid, then EAC contains a non-zero value, and the Equipment rejects the entire S2F15.

Table 4-4   EAC Values

EAC	Description
0x00	OK.
0x01	At least one ECID is invalid.
0x03	At least one ECV is out of range.

4.2.20 S2F17 - Date and Time Request

S2F17 W .   * H<->E

The Host may send this message at any time to determine the Date and Time base that the Equipment is currently using.

The Equipment sends this message at the request of the Operator.

4.2.21 S2F18 - Date and Time Data

S2F18   * H<->E

                                       * TIME - Date and Time

<A 'YYMMDDhhmmss'> .   * If TIMEFORMAT = 0

                                       – OR –

<A 'YYYYMMDDhhmmsscc'> .   * If TIMEFORMAT = 1

This message contains the current Date and Time:

YY	Year (last two digits), 00 to 99	(TIMEFORMAT = 0)
YYYY	Year (all four digits)	(TIMEFORMAT = 1)
MM	Month, 01 to 12	
DD	Day, 01 to 31	
hh	Hours, 00 to 23	
mm	Minutes, 00 to 59	
ss	Seconds, 00 to 59	
cc	Centiseconds, 00 to 99	(TIMEFORMAT = 1)

When the Equipment receives a good S2F18, it sets its internal clock/calendar. When receiving S2F18, the Equipment will discard an invalid date or time. For example, if the date is good but the time is bad, the Equipment sets its date but not its time.

4.2.22   S2F23 - Trace Initialize Send

```
S2F23 W                              * H->E
<L [5]
      <U4 TRID>                      * Trace ID
      <A 'hhmmss'>                   * DSPER - Data Sample Period
      <U4 TOTSMP>                    * Total Number of Samples
      <U4 REPGSZ>                    * Reporting Group Size
      <L
            <U4 SVID>                * Status Variable ID
            …
            >
      > .
```

The Host requests the Equipment to initiate a time driven trace operation.

The Equipment will send trace data using S6F1.

If TRID in S2F23 matches TRID of an existing trace, the existing trace operation is canceled, and replaced by the new one.

Up to four (4) separate TRIDs can be in operation simultaneously.

Within DSPER, must be a valid hour/minute/second format (hh 0-23, mm 0-59, ss 0-59), and cannot be 000000. The practical minimum value of DSPER is application dependent.

The Equipment will send the first S6F1 at one time period (DSPER * REPGSZ) after receiving S2F23.

If TOTSMP is zero, then S2F23 is a request to cancel an existing trace. Any trace with the specified TRID is canceled.

REPGSZ minimum value is 1. REPGSZ may not be so large that S6F1 would be a multi-block message. Typical value is 1.

Several SVIDs can be specified if desired. You must not specify so many SVIDs that S6F1 becomes a multi-block message.

Normally, only Variables of class SV are used in this message. However, any VID of class DV, EC, or SV can be used.

For compatibility with older Host implementations, the Equipment allows the following alternative form for this message, using an array format:

```
S2F23 W                          * H->E
<L [5]
     <U4 TRID>                    * Trace ID
     <A 'hhmmss'>                 * DSPER - Data Sample Period
     <U4 TOTSMP>                  * Total Number of Samples
     <U4 REPGSZ>                  * Reporting Group Size
     <U4 SVID SVID ...>           * Status Variable ID array
     > .
```

4.2.23   S2F24 - Trace Initialize Acknowledge

```
S2F24                            * H<-E
     <B [1] TIAACK> .            * TIAACK - Trace Init. Ack. Code
```

Table 4-5   Trace Initialize Acknowledge

TIAACK	Description
0x00	Normal. Everything correct.
0x03	Invalid period. DSPER is incorrect. The Equipment does not start the trace.

The Equipment does not signal an error if a Host error in S2F23 causes S6F1 to be multi-block. Instead, this Equipment sends multi-block S6F1 as requested by the Host.

This Equipment does not signal an error if the Host initiates more than four (4) simultaneous traces. The maximum number of traces supported depends on the size of the trace data, but is always at least 4.

4.2.24   S2F25 - Diagnostic Loopback Request

```
S2F25 W                          * H->E
     <B ABS> .                   * ABS - Any Binary String
```

The Host sends an arbitrary binary string to test operation of the link.

The Equipment never sends this message to the Host.

4.2.25   S2F26 - Diagnostic Loopback Data

```
S2F26                                   * H<-E
    <B ABS> .                           * ABS - Any Binary String
```

The Equipment "echoes" back the binary data from the Host's S2F25.

4.2.26   S2F27 - Initiate Process Request

```
S2F27 [W]                               * H->E
<L [3]
        <B LOC>                         * Location (always '0')
        <A [1..12] PPID>                * Process Program ID
        <L [1]
                <A [1..16] MID>         * Lot ID
                >
        > .
```

The Host sends this command to initiate a new lot for processing.

The Equipment ignores case when performing validity checks on the PPID string.

The Host may optionally set the W-Bit to "1" in S2F27. If so, the Equipment replies with S2F28.

PPID is the DOS 8.3 file name for the recipe. It should include the extension (RCP).

4.2.27   S2F28 - Initiate Process Acknowledge

```
S2F28                                   * H<-E
    <B [1] CMDA> .                      * Command Ack. Code
```

Normal completion returns a zero (0) in CMDA.

A non-zero value for CMDA indicates that the Equipment has rejected the Remote Command.

Table 4-6   CMDA Values

CMDA	Description
0x00	OK. All normal.
0x01	Invalid command. Equipment rejects command.
0x02	Cannot perform now. Equipment rejects command.
0x40	Control State is Local. Equipment rejects command.
0x41	Incorrect Process State for this command. Equipment rejects command.
0x42	Process program format error.

4.2.28   S2F29 - Equipment Constant Namelist Request

```
S2F29 W                                    * H->E
  <L
        <U4 VID>                           * Equipment Constant ID
        …
        > .
```

The Host requests format descriptions for the specified equipment constants. Several VIDs can be specified if desired.

Only VIDs of class EC (i.e. equipment constants) can be used in this message.

If S2F29 contains a zero-length list, then the Equipment will report all variables of class EC, in order by VID.

4.2.29   S2F30 - Equipment Constant Namelist Reply

```
S2F30                                      * H<-E, Multiblock
<L
        <L [6]
                <U4 VID>           * Equipment Constant ID
                <A ECNAME>         * Equipment Constant Name
                <ECMIN>            * ECV Minimum Value
                <ECMAX>            * ECV Maximum Value
                <ECDEF>            * ECV Default Value
                <A UNITS>          * Units of Measure
                >
        …
        > .
```

The Equipment returns the equipment constant descriptions in the order requested in S2F29. If any VID specified in S2F29 is invalid, the corresponding List in S2F30 has the following error format:

```
        <L>                                * Instead of L [6]
```

4.2.30   S2F31 - Date and Time Send

S2F31 W   * H->E

* TIME - Date and Time

<A 'YYMMDDhhmmss'> .   * If TIMEFORMAT = 0
                                                 - OR -
<A 'YYYYMMDDhhmmsscc'> .   * If TIMEFORMAT = 1

The Host commands the Equipment to set its Date and Time base to the specified value.

When the Equipment receives a good S2F31, it sets its internal clock/calendar. When receiving S2F31, the Equipment will discard an invalid date or time. For example, if the date is good but the time is bad, the Equipment sets its date but not its time.

4.2.31   S2F32 - Date and Time Acknowledge

S2F32   * H<-E
   <B [1] TIACK> .   * TIACK - Acknowledge Code

Table 4-7   TIACK

TIACK	Description
0x00	Normal. Everything correct.
0x01	Invalid Date and/or Time.

4.2.32   S2F33 - Define Report

S2F33 W   * H->E, Multiblock
<L [2]
     <U4 DATAID>   * DATAID
     <L
          <L [2]
               <U4 RPTID>   * Report ID
               <L
                    <U4 VID>   * Variable ID
                    …
                    >
               >
          …
          >
     > .

The Host specifies one or more Report IDs, and defines which Variables should be included in each report.

If S2F33 is multi-block, the Host may optionally send the S2F39/S2F40 Inquire/Grant Transaction before sending S2F33, but this Equipment does not require it.

The Equipment ignores DATAID.

If the Equipment already contains existing Report Definitions, then this message can be used to download additional definitions for RPTIDs not yet defined. The Host cannot download a new Report Definition for a RPTID for which a Report Definition already exists in the Equipment. Instead, to change a Report Definition the Host must first delete the old Report Definition and then send a new Report Definition for that RPTID.

The Host can delete selected report definitions and associated links in the Equipment by using the following specifications in S2F33:

```
        …
          <L [2]
          <U4 RPTID>                        * Report ID to delete
          <L>
        …
```

The Host can delete all report definitions and associated links in the Equipment by using the following special format:

```
        S2F33 W                            * H->E
        <L [2]
            <U4 DATAID>                     * DATAID
            <L>
            > .
```

4.2.33   S2F34 - Define Report Acknowledge

```
        S2F34                              * H<-E
          <B [1] DRACK> .                   * DRACK - Acknowledge Code
```

Normally, DRACK is zero. Any non-zero DRACK indicates the Equipment has rejected the entire S2F33 message.

Table 4-8   DRACK Values

DRACK	Description
0x00	OK.
0x02	Denied. Invalid format.
0x03	Denied. At least one RPTID already defined.
0x04	Denied. At least one VID does not exist.

4.2.34   S2F35 - Link Event Report

```
S2F35 W                          * H->E, Multiblock
<L [2]
     <U4 DATAID>                 * DATAID
     <L
          <L [2]
               <U4 CEID>         * Collection Event ID
               <L
                    <U4 RPTID>   * Report ID
                    …
                    >
               >
          …
          >
     > .
```

The Host links Report Ids to selected Collection Event Ids. The Specified CEIDs are initialized to "disabled". See 4.2.36 *S2F37 - Enable/Disable Event Report* for enabling CEIDs.

If S2F35 is multi-block, the Host may optionally send the S2F39/S2F40 Inquire/Grant transaction before sending S2F35, but the Equipment does not require it.

The Equipment ignores DATAID.

The Host can eliminate all links for a CEID by sending the following format in S2F35 for that CEID:

```
     …
        <L [2]
        <U4 CEID>                * Collection Event ID
        <L>
        >
        …
```

4.2.35   S2F36 - Link Event Report Acknowledge

```
S2F36                                * H<-E
    <B [1] LRACK> .                  * LRACK - Acknowledge Code
```

Normally, LRACK is zero. Any non-zero LRACK indicates the Equipment has rejected the entire S2F35 message.

Table 4-9   LRACK Values

LRACK	Description
0x00	OK.
0x02	Denied. Invalid format.
0x03	Denied. At least one CEID link already defined.
0x04	Denied. At least one CEID does not exist.
0x05	Denied. At least one RPTID does not exist.
Other	Equipment has rejected the S2F35 message.

4.2.36   S2F37 - Enable/Disable Event Report

```
S2F37 W                              * H<-E
<L [2]
    <BOOLEAN CEED>                   * Coll. Event Enable
    <L
        <U4 CEID>                    * Collection Event ID
        …
        >
    > .
```

The Host enables reporting for a list of Collection Event IDs, or disables reporting for the list.

CEED is "True" to indicate Enabling, or "False" to indicate Disabling reporting for the specified CEIDs.

The Host can enable or disable all CEIDs by using the following special format:

```
S2F37 W                              * H->E
<L [2]
    <BOOLEAN CEED>                   * Coll. Event Enable
    <L>
    > .
```

4.2.37 S2F38 - Enable/Disable Event Report Acknowledge

```
S2F38                              * H<-E
   <B [1] ERACK> .                 * ERACK - Acknowledge Code
```

Table 4-10 describes the ERACK values. Normally, ERACK is zero. Any non-zero ERACK indicates the Equipment has rejected the entire S2F37 message.

Table 4-10   ERACK Values

ERACK	Description
0x00	OK.
0x01	Denied. At least one CEID does not exist.

4.2.38 S2F39 - Multi-Block Inquire

```
S2F39 W                            * H->E
<L [2]
     <U4 DATAID>                   * DATAID
     <U4 DATALENGTH>
     > .
```

The Host may send this Inquire/Grant transaction preceding any multiblock S2F33 or S2F35. For this Equipment, this Inquire/Grant is optional. The Equipment accepts it, but ignores it, commits no resources, and initiates no Conversation Timeout. The Equipment accepts multiblock S2F33 or S2F35 even if not preceded by the Inquire/Grant.

4.2.39 S2F40 - Multi-Block Grant

```
S2F40                              * H<-E
   <B [1] 00> .                    * GRANT
```

The Equipment always sends GRANT value "0".

4.2.40   S2F41 - Remote Command with Parameters

```
S2F41 [W]                          *H->E
<L [2]
      <A RCMD>                     *Remote command string
      <L
          <L [2]
                <A CPNAME>    *Command Parameter Name
                <CPVAL>       *Command Parameter Value
          >
          …
      >
  >  .
```

The Host sends a command with parameters to the Equipment. If a command has no parameters, S2F41 has the following format:

```
S2F41 [W]                          * H->E
<L [2]
      <A RCMD>                     * Remote Command String
      <L>
  >  .
```

The Equipment ignores case when performing validity checks on the RCMD and CPNAME strings. The ASCII strings described in may be sent in any combination of upper and lower case characters.

Table 4-11   ERACK Values

RCMD String	Function
"START"	Starts a Process Program.
"STOP"	Stops a running Process Program.
"ABORT"	Aborts a running Process Program.
"PAUSE"	Pauses a running Process Program.
"RESUME"	Resumes a paused Process Program.
"REMOTE"	Switches Equipment to "Remote" state.
"LOCAL"	Switches Equipment to "Local" state.

The Host may optionally set the W-Bit to "1" in S2F41. If so, the Equipment replies with S2F42.

4.2.41   S2F42 - Remote Command Acknowledge

```
S2F42                                    * H<-E

<L [2]
      <B [1] HCACK>                      * Host Command Ack. Code
      <L [n]
            <L [2]
                  <A CPNAME>    * Name of Parameter
                  <B [1] CPACK>  * Cmd Param Ack Code
            >
            …
      >
> .
```

Normal completion returns a zero (0) in HCACK. The number of erroneous parameters "N" in S2F42 will be zero.

A non-zero value for HCACK indicates that the Equipment has rejected the Remote Command. The number of erroneous parameters "n" can be zero or greater.

Table 4-12   HCACK Values

HCACK	Description
0x00	OK. All normal.
0x01	Invalid command. Equipment rejects command.
0x02	Cannot perform now. Equipment rejects command. Fluidmove is not in Run Window screen.
0x03	At least one parameter is invalid. Equipment rejects the command.
0x40	Control State is Local. Equipment rejects command.
0x41	Incorrect Process State for this command. Equipment rejects command.
0x42	Process Program contains an invalid format. Unable to load program.

✍ *NOTE*   Fluidmove is currently not returning the HCACK rejection codes (upon successful completion HCACK will still be returned as zero). To indicate command rejection, the RCMD string will be echoed back to the Host with no HCACK value.

Table 4-13   CPACK Values

CPACK	Description
0x01	Invalid parameter name (CPNAME). The CPNAME is not a valid parameter for this command.
0x02	Illegal parameter value (CPVAL). The parameter value is out of range.
0x03	Illegal format for parameter (CPVAL). The value for this parameter does not use the correct SECS-II data item type.
0x40	Duplicate parameter name. This parameter name occurred at least twice in the S2F41 command.

4.2.42   S2F43 - Reset Spooling Streams and Functions

```
S2F43 W                          * H -> E
<L
    <L [2]
        <U1 STRID>               * Message Stream
        <L
            <U1 FCNID>           * Message Function
            …
        >
    >
    …
  > .
```

The Host sends message to specify which messages the Equipment should spool in the event of a communications loss. When this message is received by the Equipment, all previous definitions of messages to spool are replaced.

The following version of S2F43 will enable spooling for all messages within the specified stream:

```
S2F43 W                          * H -> E
<L
    <L [2]
        <U1 STRID>               * Message Stream
        <L>
    >
    …
  > .
```

To disable spooling of all messages, the following version of S2F43 may be used.

```
S2F43 W                          * H -> E
<L>.
```

Spooling is not allowed for even-numbered function messages (replies) or stream one messages.

4.2.43 S2F44 - Reset Spooling Acknowledge

The S2F44 message has two forms, depending on the return code in RSPACK. If there are no errors in S2F43, the format of S2F44 is as follows.

```
S2F44                                * H <- E

<L [2]
    <B [1] 00>                       * RSPACK
    <L>
  > .
```

If S2F43 contains any errors, the Equipment will discard the entire S2F43, and return error information is S2F44, as follows:

```
S2F44                                * H <- E

<L [2]
    <B [1] 01>                       * RSPACK
    <L
        <L [3]
            <U1 STRID>      * Msg String
            <B STRACK>      * Stream Ack Code
            <L
                <U1 FCNID>      * Msg Function
                …
            >
        >
        …
    >
  > .
```

The RSPACK code indicates whether the Equipment accepted the S2F43 message:

Table 4-14   RSPACK Values

RSPACK	Description
0x00	Acknowledge, spooling setup accepted.
0x01	Spooling setup rejected. At least one message requested as spool-able could not be made so.

When errors exist in the request to set some messages as spool-able, the Equipment will return codes explaining the nature of the error. These codes are found in the STRACK data item.

Table 4-15   STRACK Values

STRACK	Description
0x01	Spooling not allowed for this stream. Spooling is never allowed for stream one.
0x04	Requested message is a secondary message and therefore ineligible for spooling.

4.2.44   S2F45 - Define Variable Limits Attributes

```
S2F45 W                               * H -> E

<L [2]
      <U4 DATAID>
      <L
            <L [2]
                  <U4 VID>          * Variable ID
                  <L
                        <L [2]
                              <B [1] LIMITID>
                              <L [2]
                                    <UPPERDB>
                                    <LOWERDB>
                              >
                        >
                  >
                  …
            >
            …
      >
> .
```

With this message, the Host defines a set of limits for a single variable or a series of variables.

DATAID may be any value, and is ignored by the Equipment.

VID must specify the Variable ID of a Variable for which Limits Monitoring is allowed.

LIMITID must be between 0x01 and 0x07. It specifies one of the seven allowable limits for the variable.

UPPERDB and LOWERDB must match the value format of the specified variable.

The Host may undefine all limits for all VIDs:

```
S2F45 W                                    * H -> E

<L [2]
     <U4 DATAID>
     <L>
  > .
```

The Host may undefine all limits for a specific VID:

```
S2F45 W                                    * H -> E

<L [2]
     <U4 DATAID>
     <L
          <L [2]
               <U4 VID>
               <L>
          >
          …
     >
  > .
```

The Host may undefine a specific limit for a specific VID:

```
S2F45 W                                    * H -> E

<L [2]
     <U4 DATAID>
     <L
          <L [2]
               <U4 VID>
               <L
                    <L [2]
                         <B [1] LIMITID>
                         <L>
                    >
               >
               …
          >
          …
     >
  > .
```

4.2.45   S2F46 - Variable Limit Attribute Acknowledge

This message acknowledges the successful setting of limits as defined in the Host-generated S2F45.

```
S4F46                                    * H <- E

<L [2]
      <B [1]                        * VLAACK
      <L>
   > .
```

If any of the limits proposed in S4F45 are invalid, all limits for all variables in this message are rejected. The following message is sent in the event of an error:

```
S4F46                                    * H <- E

<L [2]
      <B [1] VLAACK>
      <L
            <L [3]
                  <U4 VID>
                  <B [1] 0x00>      * LVACK
                  <L [2]
                        <B [1] LIMITID>
                        <B [1] LIMITACK>
                  >
            >
            …
      >
   > .
```

Data item VLAACK reports to the Host the status of the request to define limits for the requested variables.

Table 4-16   VLAACK Values

VLAACK	Description
0x00	OK. Limits successfully defined.
0x01	Limit attribute definition error.

The LVACK data item gives information to the Host about the status of setting a specific variable when the request to set it is unsuccessful.

Table 4-17   LVACK Values

LIMIT-ACK	Description
0x01	Requested variable does not exist.
0x02	Variable is not eligible for limits definition.
0x03	Requested variable was repeated in request message.
0x04	Error in setting limit due to reason specified in LIMITACK.

The LIMITACK data item indicates the status of an attempt to set an individual limit for a variable.

Table 4-18   VLACK Values

VLACK	Description
0x01	LIMITID does not exist.
0x02	Requested UPPERDB is greater than LIMITMAX.
0x03	Requested LOWERDB is lower than LIMITMIN.
0x04	UPPERDB < LOWERDB.
0x05	Illegal format specified for UPPERDB or LOWERDB.

4.2.46   S2F47 - Variable Limit Attribute Request

```
S2F47 W                              * H -> E
<L
      <U4 VID>                       * Requested Variable ID

      …
   > .
```

The Host sends this message to the Equipment to request the limits attributes for specific variables. The Host may request the limits attributes for all defined variables with the following message.

```
S2F47 W                              * H -> E
<L> .
```

In response to this message, the Equipment reports all limits attributes for all variables. If a variable is eligible for limits monitoring, but does not have any limits defined, it is not reported.

4.2.47   S2F48 - Variable Limit Attributes Send

```
S2F48                                * H <- E
<L
      <L [2]
            <U4 VID>                 * Variable ID
            <L [4]
                  <A  UNITS>      * Units of Measure
                  <LIMITMIN>      * Minimum Limit
                  <LIMITMAX>      * Maximum Limit
                  <L              * Up to 7 Possible
                        <L [3]
                              <B [1] LIMITID>        * Limit ID
                              <UPPERDB>      * Upper Deadband
                              <LOWERDB>      * Lower Deadband
                        >
                        …
                  >
            >
      >
      …
   > .
```

The Equipment sends this message in response to a Host S2F47 and reports the characteristics of limits for specified variables. In response to a request from the Host for all limits for all variables, only variables with limits defined are reported. If the Host requests specific variables which are not eligible for limits monitoring, the following message will be reported for that variable:

```
S2F48                              * H <- E

<L
     <L [2]
          <U4 VID>              * Variable ID
          <L>                   * Not eligible for Limits
     >
     …
   > .
```

If the Host requests the limits for a specific variable which is eligible for limits monitoring but does not have any limits defined, this variable will be reported as follows:

```
S2F48                              * H <- E
<L
     <L [2]
          <U4 VID>              * Variable ID
          <L [4]
               <A  UNITS>       * Units of Measure
               <LIMITMIN>       * Minimum Limit
               <LIMITMAX>       * Maximum Limit
               <L>              * No Limits Defined
          >
     >
     …
   > .
```

4.2.48 S5F1 - Alarm Report

```
S5F1 [W]                          * H<-E
<L [3]
      <B [1] ALCD>                * ALCD - Alarm On/Off and
      Severity
      <U4 ALID>                   * ALID - Alarm ID
      <A [40] ALTX>               * ALTX - Alarm Text
      > .
```

This message is the "normal" message that the Equipment uses to report alarms. In order for this message to be used, the equipment constant "ConfigAlarms" must be set to "0". If "ConfigAlarms" is set to "0", the Equipment sends S5F1 instead of the normal S5F73 Alarm Notification Send. The Equipment reports that an alarm condition has changed.

ALID identifies the Alarm.

The high-order bit of ALCD will be "1" if this alarm is currently On (Unsafe), or "0" if it is currently Off (Safe). The low-order seven bits of ALCD contain the severity code for this alarm.

ALTX contains up to 40 bytes of Alarm Text. Refer to *Appendix C* for a table of possible alarms.

Equipment constant "WBitS5" controls whether the Equipment sends S5F1 with W-Bit "1" (Reply Expected) or "0" (No Reply Expected).

4.2.49 S5F2 - Alarm Acknowledge

```
S5F2                              * H->E
   <B [1] 00>.                    * ACK5 - Alarm Acknowledge
```

The Host acknowledges the Alarm Report. This Equipment ignores the ACKC5.

4.2.50   S5F3 - Enable/Disable Alarm Send

```
S5F3 [W]                              * H->E

<L [2]
        <B [1] ALED>                  * ALED - Alarm Enable/Disable
        Code
        <U4 ALID>                     * ALID - Alarm ID
        > .
```

The Host commands the Equipment to enable or disable (depending on ALED) reporting for the specified Alarm ID in S5F1, S5F8, S5F71, and S5F73.

Table 4-19   ALED Values

ALED	Description
0x80	Enable sending alarm.
0x00	Disable sending alarm.

The following special format can be used to enable or disable all ALIDs.

```
S5F3 [W]                              * H->E

<L [2]
        <B [1] ALED>                  * ALED - Alarm Enable/Disable
        Code
        <U4>                          * ALID - Alarm ID
        > .
```

The Host may optionally set the W-Bit to "1" in S5F3. If so, the Equipment replies with S5F4.

4.2.51   S5F4 - Enable/Disable Alarm Acknowledge

```
S5F4                                  * H<-E
        <B [1] ACKC5> .               * ACKC5 - Acknowledge Code
```

Table 4-20   ACKC5 Values

ACKC5	Description
0x00	Normal. Everything correct.
0x01	Invalid ALID.

4.2.52　S5F5 - List Alarms Request

```
S5F5 W                              * H->E
    <U4 ALID ...> .                 * Alarm ID Array
```

The Host requests the Equipment to send the current status of the specified Alarm IDs.

The Host can use the following special format to request the status of all Alarm IDs:

```
S5F5 W
    <U4>.                           * ALID
```

4.2.53　S5F6 - List Alarm Data

```
S5F6                                * H<-E, Multiblock
<L
    <L [3]
        <B [1] ALCD>                * ALCD - Alarm On/Off and
        Severity Code
        <U4 ALID>                   * Alarm ID
        <A ALTX>                    * ALTX - Alarm Text
        >
    ...
    > .
```

The high-order bit of ALCD will be "1" if this alarm is currently On (Unsafe), or "0" if it is currently Off (Safe). The low-order seven bits of ALCD contain the severity code for this alarm.

For any invalid ALID specified in S5F5, the corresponding entry in S5F6 has the following special error format:

```
<L [3]
    <B>                             * ALCD - Alarm On/Off and
    Severity Code
    <U4 ALID>                       * Alarm ID
    <A>                             * ALTX - Alarm Text
    >
```

If S5F5 specified all alarms, S5F6 reports alarms in order by alarm ID.

4.2.54   S5F7 - List Enabled Alarms Request

```
S5F7 W .                              * H->E
```

The Host requests the Equipment to send the current status of all Alarm IDs which are currently enabled (refer to *4.2.50 S5F3 - Enable/Disable Alarm Send*).

4.2.55   S5F8 - List Enabled Alarm Data

```
S5F8                              * H<-E, Multiblock
<L
     <L [3]
          <B [1] ALCD>        * ALCD - Alarm On/Off and
          Severity Code
          <U4 ALID>           * Alarm ID
          <A ALTX>            * ALTX - Alarm Text
          >
     …
     > .
```

The high-order bit of ALCD will be "1" if this alarm is currently On (Unsafe), or "0" if it is currently Off (Safe). The low-order seven bits of ALCD contain the severity code for this alarm.

S5F8 contains only those ALIDs which are currently enabled for reporting (refer to *4.2.50 S5F3 - Enable/Disable Alarm Send*).

S5F8 reports alarms in order by Alarm ID.

4.2.56 S5F71 - Alarm Report Block Send

```
S5F71 [W]                            * H<-E
<L [2]
      <U1 0>                         * ALPY Alarm Priority
      <L [1]
            <L [4]
                  <U4 ALID>          * ALID - Alarm ID
                  <BOOLEAN ASTAT>    * T = Alarm On, F = Alarm Off
                  <U4 ASER>          * ASER Alarm Serial Number
                  <A [16] 'YYYYMMDDhhmmsscc'> * CLOCK
                  >
            >
      > .
```

✎ *NOTE*   This message is provided only for compatibility with Host computers which support an older version of GEM.

If the equipment constant "ConfigAlarms" is set to "1", the Equipment sends S5F71 instead of the normal S5F1 Alarm Notification Send.

The Equipment reports that an alarm condition has changed.

ALID identifies the Alarm.

ASTAT value is "True" (Non-zero) if this alarm is currently On (Unsafe), or "False" (Zero) if it is currently Off (Safe).

ASER (Alarm Serial Number) is assigned by the Equipment. Its value begins at "1" and is incremented by 1 for each alarm reported.

ALPY (Alarm Priority) is always zero.

CLOCK indicates the date and time of the alarm change.

Equipment constant "Wbits5" controls whether the Equipment sends S5F71 with W-bit "1" (Reply Expected) or "0" (No Reply Expected).

4.2.57   S5F72 - Alarm Report Block Acknowledge

```
S5F72                                    * H->E
<L> .
```

The Host acknowledges Alarm Report. This Equipment ignores the data portion of S5F72.

4.2.58   S5F73 - Alarm Report Block Acknowledge

```
S5F73 [W]                                * H<-E
<L [3]
     <U4 ALID>                    * ALID - Alarm ID
     <BOOLEAN ASTAT>              * T = Alarm On, F = Alarm Off
     <A [16] 'YYYYMMDDhhmmsscc'> * TIMESTAMP
     > .
```

✎ *NOTE*   This message is provided only for compatibility with older Host computers which support GEM 3.1 (refer to *1.9.3 GEM Configuration*).

In order for this message to be used, the equipment constant "ConfigAlarms" must be set to "2".

The Equipment reports that an alarm condition has changed.

ALID identifies the Alarm.

ASTAT value is "True" (Non-zero) if this alarm is currently On (Unsafe), or "False" (Zero) if it is currently Off (Safe).

TIMESTAMP indicates the date and time of the alarm change.

Equipment constant "WBitS5" controls whether the Equipment sends S5F73 with W-Bit "1" (Reply Expected) or "0" (No Reply Expected).

4.2.59   S5F74 - Alarm Notification Acknowledge

```
S5F74                                    * H->E
   <B [1] ACK5> .
```

The Host acknowledges Alarm Report. This Equipment ignores ACKC5.

4.2.60 S6F1 - Trace Data Send

```
S6F1 [W]                              * H<-E
<L [4]
        <U4 TRID>                     * Trace ID
        <U4 SMPLN>                    * Sample Number * STIME -
                                         Sample Date/Time


        <A 'YYMMDDhhmmss'>            * If TIMEFORMAT = 0


        •                              OR -


        <A 'YYYYMMDDhhmmsscc'>        * If TIMEFORMAT = 1
        <L
            <V>                       * Variable Value
            …
            >
        >.
```

The Equipment sends time driven trace data, as previously requested by the Host using S2F23.

TRID is the Trace ID as initiated by the Host.

SMPLN is the sample number. The first sample is "1", the next "2", and so on. If REPGSZ is greater than 1, SMPLN is the number of the last sample contained in this S6F1.

STIME is the date and time at which this sample was taken. If REPGSZ is greater than 1, STIME is the date and time of the last sample contained in this S6F1.

The V's appear in the same order they were specified in S2F23.

S6F1 is normally single block. However, if the Host erroneously initiates a multiblock trace using an incorrect S2F23, S6F1 may be multi-block. The Equipment never sends an Inquire/Grant message preceding S6F1.

Equipment constant "WBitS6" controls whether the Equipment sends S6F1 with W-Bit "1" (Reply Expected) or "0" (No Reply Expected).

4.2.61   S6F2 - Trace Data Acknowledge

S6F2 * H->E

                           `<B [1] 00> .`   `* ACKC6`

The Host acknowledges the data. The Equipment ignores ACKC6.

4.2.62   S6F3 - Annotated Event Report

```
S6F3 [W]                              * H<-E, Multiblock
<L [3]
       <U4 DATAID>              * DATAID
       <U4 CEID>                * Collection Event ID
       <L
            <L [2]
                  <U4 DSID>        * DSID=RPTID Report ID
                  <L
                        <U4 VID>        * Variable ID
                        <V>        * Variable Value
                        >
                  …
                  >
            >
       …
       >
> .
```

✍ *NOTE*   This message is provided only for compatibility with older Host computers which do not support GEM (refer to *1.9.3 GEM Configuration*).

If the equipment constant "ConfigEvents" is set to "0", the Equipment sends S6F3 instead of the normal S6F13 Annotated Event Report.

A Collection Event has occurred at the Equipment. The Host has enabled Event Reporting for this CEID (refer to *4.2.36 S2F37 - Enable/Disable Event Report*). The Host has set the Equipment constant RpType to "True" (Annotated report format desired). The Equipment sends one or more Event Reports which the Host has previously linked to that CEID (refer to *4.2.35 S2F36 - Link Event Report Acknowledge*). Each report contains specific Variables which the Host has previously defined for that Report (See *4.2.32 S2F33 - Define Report*).

The Equipment generates a value for DATAID to uniquely identify this Conversation. If S6F3 is multiblock, the Equipment first sends the S6F5/S6F6 Inquire/Grant transaction, and DATAID in S6F3 will match DATAID in S6F5.

If the CEID is enabled, but no Reports are linked to this CEID, S6F3 has the following special format:

```
S6F3 [W]                        * H<-E
<L [3]
    <U4 DATAID>                  * DATAID
    <U4 CEID>                    * Collection Event ID
    <L>
    > .
```

Equipment constant "Wbits6" controls whether the Equipment sends S6F3 with W-Bit "1" (Reply Expected) or "0" (No Reply Expected).

4.2.63   S6F4 - Annotated Event Report Acknowledge

```
S6F4  * H->E
        <B [1] 00> .            * ACKC6
```

The Host acknowledges the Event Report. The Equipment ignores ACKC6.

4.2.64   S6F5 - Multi-Block Data Send Inquire

```
S6F5 W                          * H<-E
<L [2]
    <U4 DATAID>                  * DATAID
    <U4 DATALENGTH>
    > .
```

The Equipment sends this Inquire/Grant transaction preceding any multiblock S6F3, S6F9, S6F11, or S6F13.

The DATAID specified here will appear in the following S6F3, S6F9, S6F11, S6F13.

DATALENGTH value is the total number of text bytes (excluding SECS block headers) in the following S6F3, S6F9, S6F11, or S6F13 message.

4.2.65   S6F6 - Multi-Block Grant

```
S6F6                                    * H->E
    <B [1] GRANT6> .                    * GRANT6
```

The Host grants permission for the Equipment to send a multi-block Event Report.

Table 4-21   Multi-Block Event Values

GRANT6	Description
0x00	Normal. Permission granted.
Other	Permission not granted. The Equipment will not send the following S6F3, S6F9, S6F11, or S6F13, and will discard the data.

4.2.66   S6F9 - Event Report

✍ **NOTE**   This message is provided only for compatibility with older Host computers which do not support GEM. (Refer to *1.9.3 GEM Configuration*.)

```
S6F9 [W]                            * H<-E, Multiblock

<L [4]
    <B [1] 00>                      * PFCD (always zero)
    <U4 DATAID>                     * DATAID
    <U4 CEID>                       * Collection Event ID
    <L
        <L [2]
            <U4 DSID>       * DSID=RPTID Report ID
            <L
                <V>         * Variable Value
                …
                >
        >
        …
        >
    > .
```

If the equipment constant "ConfigEvents" is set to "0", the Equipment sends S6F9 instead of the normal S6F11 Event Report.

An Event Report will be sent if a Collection Event has occurred at the Equipment. The Host has enabled Event Reporting for this CEID (refer to *4.2.36 S2F37 - Enable/Disable Event Report*). The Host has set the equipment constant "RpType" to "False" (normal report format desired). The Equipment sends one or more Event Reports which the Host has previously linked to that CEID (refer to *4.2.34 S2F35 - Link Event Report*). Each report contains specific Variables which the Host has previously defined for that Report (refer to *4.2.32 S2F33 - Define Report*).

The Equipment generates a value for DATAID to uniquely identify this Conversation. If S6F9 is multiblock, the Equipment first sends the S6F5/S6F6 Inquire/Grant transaction, and the DATAID in S6F9 will match DATAID in S6F5.

If the CEID is enabled, but no Reports are linked to this CEID, S6F9 has the following special format:

```
S6F9 [W]                          * H<-E
<L [4]
    <B [1] 00>                    * PFCD (always zero)
    <U4 DATAID>                   * DATAID
    <U4 CEID>                     * Collection Event ID
    <L>
> .
```

Equipment constant "WBitS6" controls whether the Equipment sends S6F9 with W-Bit "1" (Reply Expected) or "0" (No Reply Expected).

4.2.67 S6F10 - Event Report Acknowledge

```
S6F10 * H->E
        <B [1] 00> .              * ACKC6
```

The Host acknowledges the Event Report. The Equipment ignores ACKC6.

4.2.68 S6F11 - Event Report Send

```
S6F11 W                           * H<-E
<L [3]
    <U4 DATAID>                   * DATAID
    <U4 CEID>                     * Collection Event ID
    <L
        <L [2]
            <U4 RPTID>       * Report ID
            <L
                <V>          * Variable Value
                …
                >
            >
        …
        >
    > .
```

This message is the "normal" message that the Equipment uses to report events. In order for this message to be used, the equipment constant "ConfigEvents" must be set to "1".

An Event Report will be sent if a Collection Event has occurred at the Equipment. The Host has enabled Event Reporting for this CEID (refer to *4.2.36 S2F37 - Enable/Disable Event Report*). The Host has set the equipment constant "RpType" to "False" (normal report format desired). The Equipment sends one or more Event Reports which the Host has previously linked to that CEID (refer to *4.2.34 S2F35 - Link Event Report*). Each report contains specific Variables which the Host has previously defined for that Report (refer to *4.2.32 S2F33 - Define Report*).

The Equipment generates a value for DATAID to uniquely identify this Conversation. If S6F11 is multiblock, the Equipment first sends the S6F5/S6F6 Inquire/Grant transaction, and the DATAID in S6F11 will match DATAID in S6F5.

If the CEID is enabled, but no Reports are linked to this CEID, S6F11 has the following special format:

```
S6F11 W                          * H<-E
<L [3]
      <U4 DATAID>                 * DATAID
      <U4 CEID>                   * Collection Event ID
      <L>
      > .
```

4.2.69   S6F12 - Event Report Acknowledge

```
S6F12                            * H->E
   <B [1] 00> .                  * ACKC6
```

The Host acknowledges the Event Report. The Equipment ignores ACKC6.

4.2.70   S6F13 - Annotated Event Report Send

```
S6F13 W                              * H<-E, Multiblock

<L [3]
       <U4 DATAID>              * DATAID
       <U4 CEID>               * Collection Event ID
       <L
            <L [2]
                 <U4 RPTID>     * Report ID
                 <L
                      <L [2]
                           <U4 VID>        * Variable ID
                           <V>        * Variable Value
                           >
                      …
                      >
                 >
            …
            >
       > .
```

✍ **NOTE**   This message is provided only for compatibility with older Host computers which support older versions of GEM (refer to *1.9.3 GEM Configuration*).

An Event Report will be sent if a Collection Event has occurred at the Equipment. The Host has enabled Event Reporting for this CEID (refer to *4.2.36 S2F37 - Enable/Disable Event Report*). The Host has set the equipment constant "RpType" to "True" (annotated report format desired). The equipment constant "ConfigEvents" has been set to 1.The Equipment sends one or more Event Reports which the Host has previously linked to that CEID (refer to *4.2.34 S2F35 - Link Event Report*)). Each report contains specific Variables which the Host has previously defined for that Report (refer to *4.2.32 S2F33 - Define Report*).

The Equipment generates a value for DATAID to uniquely identify this Conversation. If S6F11 is multiblock, the Equipment first sends the S6F5/S6F6 Inquire/Grant transaction, and the DATAID in S6F11 will match DATAID in S6F5.

If the CEID is enabled, but no Reports are linked to this CEID, S6F11 has the following special format:

```
S6F13 W                           * H<-E
<L [3]
      <U4 DATAID>                  * DATAID
      <U4 CEID>                    * Collection Event ID
      <L>
      > .
```

4.2.71   S6F14 - Annotated Event Report Acknowledge

```
S6F14                             * H->E
   <B [1] 00> .                   * ACKC6
```

The Host acknowledges the Event Report. The Equipment ignore ACKC6.

4.2.72   S6F15 - Event Report Request

```
S6F15 W                           * H->E
   <U4 CEID> .                    * Collection Event ID
```

The Host sends the CEID of interest, requesting normal format reports.

4.2.73   S6F16 - Event Report Data

```
S6F16                              * H<-E, Multiblock
<L [3]
      <U4 DATAID>           * DATAID
      <U4 CEID>             * Collection Event ID
      <L
           <L [2]
                 <U4 RPTID>     * Report ID
                 <L
                       <V>      * Variable Value
                       …
                       >
                 >
           …
           >
      > .
```

The Equipment sends one or more Event Reports which the Host has previously linked to that CEID (refer to *4.2.34 S2F35 - Link Event Report*)). Each report contains specific Variables which the Host has previously defined for that Report (refer to *4.2.32 S2F33 - Define Report*).

This message occurs whether or not the Host has enabled Event Reporting for this CEID (refer to *4.2.36 S2F37 - Enable/Disable Event Report*), and regardless of how the Host has set the equipment constant "RpType" (report format).

The Equipment generates a meaningless value for DATAID.

CEID contains the CEID specified in S6F15.

If the CEID specified in S6F15 is invalid, or if no reports are linked to this CEID, this message has the following special format:

```
S6F16                              * H<-E, Multiblock
<L [3]
      <U4 DATAID>           * DATAID
      <U4 CEID>             * Collection Event ID
      <L>
      > .
```

4.2.74　S6F17 - Annotated Event Report Request

```
S6F17 W                              * H->E
     <U4 CEID> .                     * Collection Event ID
```

The Host sends the CEID of interest, requesting annotated format reports.

4.2.75　S6F18 - Annotated Event Report Data

```
S6F18                                * H<-E
<L [3]
      <U4 DATAID>              * DATAID
      <U4 CEID>               * Collection Event ID
      <L
           <L [2]
                <U4 RPTID>      * Report ID
                <L
                     <L [2]
                          <U4 VID>        * Variable ID
                          <V>        * Variable Value
                     >
                   …
                   >
                >
            …
            >
         > .
```

The Equipment sends one or more Event Reports which the Host has previously linked to that CEID (refer to *4.2.34 S2F35 - Link Event Report*)). Each report contains specific Variables which the Host has previously defined for that Report (refer to *4.2.32 S2F33 - Define Report*).

This message occurs whether or not the Host has enabled Event Reporting for this CEID (refer to *4.2.36 S2F37 - Enable/Disable Event Report*), and regardless of how the Host has set the equipment constant "RpType" (report format).

The Equipment generates a meaningless value for DATAID.

CEID contains the CEID specified in S6F17.

If the CEID specified in S6F17 is invalid, or if no reports are linked to this CEID, this message has the following format:

```
S6F18                          * H<-E, Multiblock
<L [3]
      <U4 DATAID>              * DATAID
      <U4 CEID>               * Collection Event ID
      <L>
      > .
```

4.2.76   S6F19 - Request Report Request

```
S6F19 W                         * H->E
      <U4 RPTID> .              * Report ID
```

The Host requests a Report for the specified RPTID.

4.2.77   S6F20 - Request Report Data

```
S6F20                          * H<-E, Multiblock
<L
      <V>
      …
      > .
```

The Equipment sends the Report.

If no report is defined for the RPTID in S6F19, S6F20 has the following special error format:

```
S6F20                          * H<-E
<L> .
```

4.2.78   S6F21 - Request Annotated Report Request

```
S6F21 W                         * H->E
      <U4 RPTID> .              * Report ID
```

The Host requests an Annotated Report for the specified RPTID.

4.2.79   S6F22 - Request Annotated Report Data

```
S6F22                                    * H<-E, Multiblock
<L
      <L [2]
            <U4 VID>                * VID - Variable ID
            <V>
            >
      …
      > .
```

The Equipment sends the Annotated Report.

If no Report is defined for the RPTID in S6F21, S6F22 has the following special error format:

```
S6F22                                    * H<-E
<L> .
```

4.2.80   S6F23 - Request Spooled Data

```
S6F23 W                                  * H -> E
      <U1 RSDC> .
```

The Host sends this message to start the transfer of spooled messages from the Equipment to the Host, or to delete the contents of the spool file, depending on the value of RSDC.

When the Host requests the spooled messages (RSDC is zero), the Equipment will send messages according to EC "MaxSpoolTransmit". All messages are sent from oldest to newest, and once the message is successfully sent, it is removed from the spool. If MaxSpoolTransmit is zero, all messages will be sent one at a time until the last message has been delivered. If MaxSpoolTransmit is set to a non-zero value, the Equipment will send the lesser of MaxSpoolTransmit or messages left in spool. If in this case the Equipment sends MaxSpoolTransmit messages, and messages remain in the spool, the Equipment will wait for another S6F23 to deliver the next messages.

If the Host sends S6F23 with RSDC set to one, this will be interpreted by the Equipment as a request to purge the spool.

Table 4-22   RSDC

RSDC	Description
0	Transmit spooled messages.
1	Purge spooled messages.

4.2.81   S6F24 - Request Spooled Data Acknowledge

```
S6F24                                      * H <- E

    <B [1] RSDA> .
```

Equipment acknowledges the Host's request to either purge spooled messages or send spooled messages to the Host.

Table 4-23   RSDA Values

RSDA	Description
0x00	Normal. Equipment will start to send spooled data or optionally purge the spool. Action performed will depend on value for RSDC in S6F23.
0x02	Denied. Spooled data does not exist.

4.2.82   S7F1 - Process Program Load Inquire

```
S7F1 W                              * H<->E

<L [2]
    <A PPID>                        * Process Program ID
    <U4 LENGTH>                     * Length of text
    > .
```

PPID should be the recipe file name and should include the extension RCP.

The Sender requests permission to send a Process Program. The Process Program may be either a Load Recipe or Process Recipe.

The Equipment always sends this Inquire/Grant transaction before sending any multi-block S7F3. LENGTH specifies the number of bytes in the following S7F3 message, excluding SECS-I block-length bytes, block headers, and checksums.

For Host-to-Equipment transfers, this Inquire/Grant is optional. The Equipment accepts it, but ignores it, commits no resources, and initiates no Conversation timeout. The Equipment will accept a multi-block S7F3 even if not preceded by the Inquire/Grant.

4.2.83   S7F2 - Process Program Load Grant

S7F2   * H<->E

                    <B [1] 00> .   * PPGNT

The Receiver grants permission to send a Process Program. The Receiver sends PPGNT value 0x00 to indicate it will accept the Process Program, and the Sender should send S7F3. If the Receiver sends any other value in S7F2, it refuses the Grant, and the Sender should not send S7F3.

The Process Program may be either a Load Recipe, Process Recipe, or Parameter Table.

When the Equipment sends S7F2, PPGNT may contain the following codes:

Table 4-24   S7F2 PPGNT Values

PPGNT	Description
0x00	Normal. Permission granted.

When the Host sends S7F2, the Equipment interprets PPGNT as follows:

Table 4-25   S7F2 PPGNT Interpretations

PPGNT	Description
0x00	Normal. The Equipment sends S7F3.
Other	Refusal. The Equipment does not send S7F3 and the upload operation fails.

4.2.84   S7F3 - Process Program Send

S7F3 W   * H<->E, Multiblock

<L [2]

        <A PPID>   * PPID - Process Program ID

        <A PPBODY>   * PPBODY – Process Program

                                               Body

PPID is the recipe file name and should include the extension RCP.

Send an Unformatted Process Program. Before sending a multi-block S7F3, the Equipment always first sends the S7F1/S7F2 Inquire/Grant transaction. The Host may send S7F1/S7F2 before sending S7F3. The Equipment accepts it, but does not require it.

4.2.85   S7F4 - Process Program Acknowledge

```
S7F4                               * H<->E

    <B [1] ACKC7> .                * ACKC7
```

The Receiver acknowledges the receipt of the Process Program. If the transfer succeeds, ACKC7 will contain 0x00, and the Receiver stores the new Process Program into its library. Any previous Process Program with the same PPID is deleted. Any non-zero ACKC7 indicates refusal of the Process Program.

When the Equipment sends S7F4, ACKC7 may contain the following codes. Any non-zero code indicates that S7F3 has not changed the Equipment Library.

Table 4-26   S7F4 ACKC7 Values

ACKC7	Description
0x00	Normal. Process Program Accepted and stored into Library.
0x01	Permission Not Granted. Insufficient space in Library.
0x40	Process Program Format Error.
0x41	Process Program Data Error (Verify Failed).

When the Host sends S7F4, the Equipment interprets ACKC7 as follows:

Table 4-27   S7F4 ACKC7 Interpretations

ACKC7	Description
0x00	Normal.
Other	Refusal. The upload operation fails.

4.2.86   S7F5 - Process Program Request

```
S7F5 W                             * H<->E

    <A PPID> .                     * Process Program ID
```

PPID is the recipe file name and should include the extension RCP.

Request the other end of the link to send a specified Process Program from its library.

4.2.87   S7F6 - Process Program Data

```
S7F6                              * H<->E, Multiblock
<L [2]
     <A PPID>                     * Process Program ID
     <A PPBODY>                   * PPBODY - Process Program Body
```

PPID is the recipe file name and should include the extension RCP.

Send the requested Process Program.

If the specified PPID is not found in the library, S7F6 has the following special format:

```
S7F6                              * H<->E
<L> .
```

If the Equipment receives S7F6 and cannot store the Process Program in its library, the CEID BadDownload is signaled, with PPChangeName set to the PPID of the requested Process Program. This occurs if the received S7F6 is of the special "not found" form, if the S7F6 message is not in the expected format, or if an error is detected in PPBODY (for example, a parameter out of range).

4.2.88   S7F17 - Process Program Delete

```
S7F17 W                           * H->E
<L
     <A PPID>                     * Process Program ID
     …
     > .
```

PPID is the recipe file name and should include the extension RCP.

The Host deletes one or more Process Programs from the Equipment library.

If S7F17 contains a zero-length List, the entire library is deleted.

4.2.89   S7F18 - Process Program Delete Acknowledge

```
S7F18                              * H<-E
    <B [1] ACKC7> .                * ACKC7 - Acknowledge Code
```

The Equipment acknowledges the Process Program delete.

Table 4-28   S7F18 ACKC7 Values

ACKC7	Description
0x00	Normal. All specified PPIDs have been deleted.
0x04	Error: At least one specified PPID was not found. However, correct PPIDs have been deleted from the Equipment Library.

4.2.90   S7F19 - Process Program Directory Request

```
S7F19 W .                          * H->E
```

The PPIDs returned are the recipe file names and should include the extension RCP.

The Host requests a directory of the Process Programs currently in the Equipment library.

4.2.91   S7F20 - Process Program Directory

```
S7F20                              * H<-E

<L
    <A PPID>                       * Process Program ID
    …
    > .
```

The Equipment sends a directory of its Process Program library. If the library is empty, the list will be zero length.

4.2.92   S9F1 - Unrecognized Device ID

```
S9F1                               * H<-E
    <B [10] MHEAD> .               * MHEAD - Header of bad msg
```

4.2.93 S9F3 - Unrecognized Stream

```
S9F3                                    * H<-E
    <B [10] MHEAD> .                    * MHEAD - Header of bad msg
```

4.2.94 S9F5 - Unrecognized Function

```
S9F5                                    * H<-E
    <B [10] MHEAD> .                    * MHEAD - Header of bad msg
```

4.2.95 S9F7 Invalid Data

```
S9F7                                    * H<-E
    <B [10] MHEAD> .                    * MHEAD - Header of bad msg
```

4.2.96 S9F9 Transaction Timer Timeout

```
S9F9                                    * H<-E
    <B [10] SHEAD> .                    * SHEAD - Stored Header
```

4.2.97 S9F11 - Data Too Long

```
S9F11                                   * H<-E
    <B [10] MHEAD> .                    * MHEAD - Header of bad msg
```

4.2.98 S10F1 - Terminal Request

```
S10F1 [W]                               * H<-E
<L [2]
            <B [1] TID>                 * Terminal ID
            <A [160] TEXT>              * Message Text
            > .
```

The Equipment sends text to the Host. This Equipment may send the following values for TID:

Table 4-29   S10F1 TID Values

TID	Description
0x00	Always sent.

Equipment constant "WBitS10" controls whether the Equipment sends S10F1 with W-Bit "1" (Reply Expected) or "0" (No Reply Expected).

4.2.99 S10F2 - Terminal Request Acknowledge

```
S10F2                              * H->E
    <B [1] ACKC10> .               * Acknowledge Code
```

The Host may send the following values for ACKC10:

Table 4-30   S10F2 ACKC10 Values

ACKC10	Description
0x00	Normal. Host accepts the S10F1.
Other	Host rejects the S10F1.

4.2.100 S10F3 - Terminal Display, Single

```
S10F3 [W]                          * H->E
<L [2]
    <B [1] TID>                    * Terminal ID
    <A [160] TEXT>                 * Message Text
    > .
```

The Host sends to the Equipment. The Equipment interprets TID as follows:

Table 4-31   S10F3 TID Values

TID	Description
Any	Equipment displays the text on its CRT.

The Host may optionally set the W-Bit to "1" in S10F3. If so, the Equipment replies with S10F4.

4.2.101 S10F4 - Terminal Display Single Acknowledge

```
S10F4                              * H<-E
    <B [1] ACKC10> .               * Acknowledge Code
```

This Equipment may send the following values for ACKC10:

Table 4-32   S10F4 ACKC10 Values

ACKC10	Description
0x00	Normal.

4.2.102 S10F5 - Terminal Display, Multiblock

```
S10F5 [W]                        * H->E, Multiblock
<L [2]
      <B [1] TID>                * Terminal ID
      <L
            <A [160] TEXT>       * Message Text
            …
            >
      > .
```

S10F5 can contain multiple TEXT data items. Each TEXT data item is limited to 160 characters. Each data item in S10F5 will be displayed on a separate line at the Equipment.

The Host sends text to the Equipment. The Equipment interprets TID as follows:

Table 4-33   S10F5 TID Values

TID	Description
Any	Equipment displays the text on its CRT.

The Host may optionally set the W-Bit to "1" in S10F5. If so, the Equipment replies with S10F6.

4.2.103 S10F6 - Terminal Display Multiblock Acknowledge

```
S10F6                            * H<-E
   <B [1] ACKC10> .              * Acknowledge Code
```

This Equipment may send the following values for ACKC10:

Table 4-34   S10F6 ACKC10 Values

ACKC10	Description
0x00	Normal.

4.2.104 S10F9 - Broadcast

```
S10F9 [W]                           * H->E
    <A [160] TEXT> .                * Message Text
```

The Host sends text to the Equipment. The Equipment displays the text on its CRT.

The Host may optionally set the W-Bit to "1" in S10F9. If so, the Equipment replies with S10F10.

4.2.105 S10F10 - Broadcast Acknowledge

```
S10F10                              * H<-E
    <B [1] ACKC10> .                * Acknowledge Code
```

This Equipment may send the following values for ACKC10:

Table 4-35   S10F10 ACKC10 Values

ACKC10	Description
0x00	Normal.

5 SECS Scenarios

Unless otherwise noted in this section, the Communications State is "Communicating" and the Control state is either "On-Line/Local" or "On-Line/Remote".

5.1 Equipment Communications

5.1.1 Equipment Establishes Communications

Assumption: Equipment's Communication state is "Enabled/Not Communicating".

Table 5-1   SECS Messages Equipment Establishes Communications

Step	SECS Message	Description
1	H <- E S1F13 W	Equipment attempts to send Establish Communications Request.
2		If the send is not successful, or if no reply is received from the Host, wait "ESTABLISHCOMMUNICATIONSTIMER" seconds, then go to Step 1.
3	H -> E S1F14	The Host responds with Establish Communications Acknowledge. If COMMACK in this message is non-zero, wait "ESTABLISHCOMMUNICATIONSTIMER" seconds, then go to Step 1. If COMMACK is zero, proceed to the next step.
4		Communications is successfully established. The Equipment changes its communication state to Communicating. Normal SECS message processing begins.

5.1.2 Host Establishes Communications

Assumption: Equipment's Communication state is either "Enabled/Not Communicating" or "Enabled/Communicating".

Table 5-2   SECS Messages Host Establishes Communications

Step	SECS Message	Description
1	H -> E S1F13 W	Host sends Establish Communications Request.
2	H <- E S1F14	The Equipment responds with Establish Communications Acknowledge, with COMMACK set to zero. After this message is successfully sent, communications is established. If the current communication state is "Not Communicating", the Equipment changes its communication state to "Communicating". If the state is "Communicating", no change in communication state occurs. In either case, subsequently received messages are processed normally.

5.1.3   Simultaneous Establish Communications

Assumption: Equipment's Communication state is "Enabled/Not Communicating".

Table 5-3   SECS Messages Simultaneous Establish Communications

Step	SECS Message	Description
1	H <- E S1F13 W	Equipment sends Establish Communications Request.
2	H -> E S1F13 W	Host sends Establish Communications Request.
3	H <- E S1F14	The Equipment responds with Establish Communications Acknowledge, with COMMACK set to zero. After this message is successfully sent, communications is established. The Equipment changes its communication state to Communicating.
4	H -> E S1F14	The Host responds with Establish Communications Acknowledge, with COMMACK set to zero. This step could occur before Step 3, in which case communications would be established at this step.

5.1.4   Losing Connection, Re-Connecting

Table 5-4   SECS Messages Losing Connection, Re-Connecting

Step	SECS Message	Description
1	H <- E SxFy	Any Message. The Equipment encounters SECS block transmission errors while attempting to send a message to the Host., and reaches its Retry Limit (RTY). The Equipment considers the SECS link as disconnected. Spooling will become Active if enabled.
2	H <-E S1F13 W	Connect Request. The Equipment attempts to re-establish the link.
3		If the send is not successful, or if no reply is received from the Host, the Equipment waits for "EstablishCommunicationsTimer" seconds and then goes back to Step 2.
4	H -> E S1F14	The Host acknowledges, sending COMMACK of "0". The link is now re-connected.

5.1.5   Heartbeat

Table 5-5   SECS Messages Heartbeat

Step	SECS Message	Description
1	H <- E S1F1 W	Are You There. The Equipment sends this message periodically to determine if the SECS link is still intact.
2	H -> E S1F2	On Line Data. The Host replies. The Equipment knows that the link is still intact.

5.2 Data Collection

5.2.1 Host Initializes Event Reporting

Table 5-6   SECS Messages Host Initializes Event Reporting

Step	SECS Message	Description
1	H -> E S2F37 W	Disable Event Reports. The Host disables reporting for all Collection Events. S2F37 W <L [2] <BOOLEAN F> <L> > .
2	H <- E S2F38	The Equipment acknowledges. Temporarily, the Equipment will make no event reports.
3	H ->E S2F33 W	Define Report. The Host erases all previous report definitions and links: S2F33 W <L [2] <U4 DATAID> <L> > .
4	H <- E S2F34	The Equipment acknowledges.
5	H -> E S2F33 W	Define Report. The Host sends report definitions.
6	H <-E S2F34	The Equipment acknowledges.
7	H -> E S2F35 W	Link Events/Reports. The Host links reports to the desired Collection Events. Linked Reports are initially "disabled".
8	H <- E S2F36	The Equipment acknowledges.
9	H -> E S2F15 W	Equipment constant "Send". The Host sets equipment constant "RpType" to indicate whether event reports should be in "Normal" or "Annotated" format.
10	H <- E S2F16	The Equipment acknowledges.
11	H -> E S2F37 W	Enable event reports. The Host enables reporting for desired collection events.
12	H <- E S2F38	The Equipment acknowledges. From this point on, the Equipment will report events as they occur.

5.2.2 Equipment Reports Event

Table 5-7 SECS Messages Equipment Reports Event

Step	SECS Message	Description
1		The Equipment recognizes that an event has occurred. The Host has enabled reporting for the CEID, and possibly has defined one or more Reports and linked them to the CEID. The equipment constant "RpType" is set to "False", requesting normal reports.
2	H <- E S6F5 W	Inquire. If S6F13 will be multi-block, the Equipment first sends this Inquire to request permission. If S6F11 is single-block, skip this and the next step.
3	H -> E S6F6	Grant. The Host grants permission to send multi-block Event Report. If GRANT6 is non-zero, this scenario fails here, and the event data is discarded.
4	H <- E S6F11 W	The Equipment sends Event reports for the CEID that occurred.
5	H -> E S6F12	The Host acknowledges the report.

5.2.3 Equipment Reports Annotated Event

Table 5-8 SECS Messages Equipment Reports Annotated Event

Step	SECS Message	Description
1		The Equipment recognizes that an event has occurred. The Host has enabled reporting for the CEID, and possibly has defined one or more Reports and linked them to the CEID. The equipment constant "RpType" is set to "True", requesting Annotated reports.
2	H <- E S6F5 W	Inquire. If S6F13 will be multi-block, the Equipment first sends this Inquire to request permission. If S6F13 is single-block, skip this and the next step.
3	H -> E S6F6	Grant. The Host grants permission to send multi-block Event Report. If GRANT6 is non-zero, this scenario fails here, and the event data is discarded.
4	H <- E S6F13 W	The Equipment sends annotated Event Reports for the CEID that occurred.
5	H -> E S6F14	The Host acknowledges the report.

✎ **NOTE**   In all other scenarios in which Event Reports occur, the Events or Annotated Events are shown in abbreviated form (S6F11/S6F12 only). The complete Event Report Scenarios are shown here.

5.2.4   Host Initiates Trace

Table 5-9   SECS Messages Host Initiates Trace

Step	SECS Message	Description
1	H -> E S2F23 W	The Host initiates a trace.
2	H <- E S2F24	The Equipment acknowledges the trace request. If the data in S2F23 is not valid, the acknowledge code in this message is non-zero and the scenario ends. Otherwise, the following steps are done "TOTSMP" times, where TOTSMP is the total number of samples to be done.
3		The Equipment waits "DSPER" (data sample period). While waiting, the Equipment continues to operate normally, responding to any SECS messages that may be received, etc. After the wait is finished, the values of the variable(s) to be traced are obtained and saved. If "REPGSZ" samples have been saved, or if this is the last sample, do the following steps.
4	H <- E S6F1 W	The Equipment sends trace data.
5	H -> E S6F2	If the S6F1 has its W-bit set to 1, the Host acknowledges the trace data.
6		If this is the last sample, the Equipment terminates this trace and the scenario ends. Otherwise, go back to the beginning of Step 3.

5.2.5   Host Terminates Trace

Assumption: The Host started a Trace report as in the above scenario.

Table 5-10   SECS Messages Host Terminates Trace

Step	SECS Message	Description
1	H -> E S2F23 W	The Host initiates a trace, with the same trace ID as the currently running trace, and with TOTSMP (number of samples) set to "0".
2	H <- E S2F24	The Equipment acknowledges the trace request. If the data in S2F23 is valid, the Equipment terminates the trace.
3		If the Equipment has saved trace data that has not yet been sent to the Host, it discards the saved data.

5.2.6   Host Requests Status

Table 5-11   SECS Messages Host Requests Status

Step	SECS Message	Description
1	H -> E S1F3 W	Discrete Variable Request. The Host requests the VIDs of interest.
2	H <- E S1F4	The Equipment sends the Variable values.

5.2.7   Host Defines Limits

Table 5-12   SECS Messages Host Defines Limits

Step	SECS Message	Description
1	H -> E S2F45 W	Host defines new variable limits attributes.
2	H <- E S2F46	Equipment accepts new limits definitions, and responds with VLAACK = 0x00.

5.2.8   Host Queries Defined Limits

Table 5-13   SECS Messages Host Queries Defined Limits

Step	SECS Message	Description
1	H -> E S2F47 W	Host requests listing of defined limits. This request may be for limits of individual variables listed in this message, or if this message is an empty list, all limits will be replied.
2	H <- E S2F48	Equipment sends limits values as required.

5.2.9   Host Requests Report by CEID

Table 5-14   SECS Messages Host Requests Report by CEID

Step	SECS Message	Description
1	H -> E S6F15 W	Request Event Report. The Host requests a report for the specified CEID. In this way, the Host requests the Equipment to "pretend" that the specified CEID has occurred.
2	H <- E S6F16	The Equipment sends reports linked to that CEID.

5.2.10   Host Requests Annotated Report by CEID

Table 5-15   SECS Messages Host Requests Annotated Report by CEID

Step	SECS Message	Description
1	H -> E S6F17 W	Request Annotated Event Report. The Host requests a report for the specified CEID. In this way, the Host requests the Equipment to "pretend" that the specified CEID has occurred.
2	H <- E S6F18	The Equipment sends annotated reports linked to that CEID.

5.2.11 Host Requests Report by RPTID

Table 5-16   SECS Messages Host Requests Report by RPTID

Step	SECS Message	Description
1	H -> E S6F19 W	Request Report. The Host requests a report for the specified RPTID.
2	H <- E S6F20	The Equipment sends the report.

5.2.12 Host Requests Annotated Report by RPTID

Table 5-17   SECS Messages Host Requests Annotated Report by RPTID

Step	SECS Message	Description
1	H -> E S6F21 W	Request Annotated Report. The Host requests an annotated report for the specified RPTID.
2	H <- E S6F22	The Equipment sends the annotated report.

5.2.13 Are You There

Table 5-18   SECS Messages Are You There

Step	SECS Message	Description
1	H -> E S1F1 W	Are You There. The Host sends this simple message.
2	H <- E S1F2	The Equipment reports its MDLN and SOFTREV.

5.2.14 Host Reads Equipment Constants

Table 5-19   SECS Messages Host Reads Equipment Constants

Step	SECS Message	Description
1	H -> E S2F13 W	Host requests the values of one or more equipment constants.
2	H <- E S2F14	The Equipment responds with the values of the requested equipment constants.

5.2.15 Host Sets Equipment Constants

Table 5-20   SECS Messages Host Sets Equipment Constants

Step	SECS Message	Description
1	H -> E S2F15 W	Host sends new values for one or more equipment constants.
2	H <- E S2F16	If all new values are valid, the Equipment saves the new values and sends this message with an acknowledge code of "0". If one or more new values are not valid, no equipment constants are changed and the acknowledge code in this message is non-zero.

5.3   Alarms

5.3.1   Equipment Reports Alarm

Table 5-21   SECS Messages Equipment Reports Alarm

Step	SECS Message	Description
1	H <- E S5F1 [W]	If reporting for this alarm ID is disabled, skip this and the following step. Otherwise send the alarm. The equipment constant "WBitS5" determines whether the W-bit is "0" or "1" in this message.
2	H -> E S5F2	If the W-bit in S5F1 is 1, the Host acknowledges the alarm report. Otherwise, skip this step.
3	H <- E S6F11 W	If the event ID associated with this alarm state is enabled, send the Event Report. Otherwise, the scenario ends.
4	H -> E S6F12	The Host acknowledges the Event Report.

5.3.2   Host Enables/Disables Alarms

Table 5-22   SECS Messages Host Enables/Disables Alarms

Step	SECS Message	Description
1	H -> E S5F3 [W]	The Host specifies ALIDs to be enabled or disabled.
2	H <- E S5F4	If the W-bit in S5F3 is 1, the Equipment acknowledges.

5.3.3   Host Requests Alarms

Table 5-23   SECS Messages Host Requests Alarms

Step	SECS Message	Description
1	H -> E S5F5 W	The Host requests whether specified ALIDs are "on" or "off".
2	H <- E S5F6	The Equipment sends Alarm status.

5.3.4   Alarm Report (GEM, Ver 3.1 Compatibility)

✎ *NOTE*   This scenario is provided only for compatibility with Host computers which support GEM, Version 3.1.

Table 5-24   SECS Messages Alarm Report (GEM, Ver 3.1 Compatibility)

Step	SECS Message	Description
1		The equipment constant "ConfigAlarms" is set to 2 for non-GEM compatibility. The Equipment recognizes that an alarm condition has gone "on" (i.e. has become Unsafe).
2	H <- E S5F73 [W]	The Equipment reports the Alarm going on. The high-order bit of ALCD is "1".
3	H -> E S5F74	If the W-bit of S5F74 is 1, the Host acknowledges the Alarm.
4		The Equipment recognizes that the alarm condition has gone "off" (i.e. has become Safe).
5	H <- E S5F73 [W]	The Equipment reports the Alarm going off. The high-order bit of ALCD is "0".
6	H -> E S5F74	If the W-bit in S5F74 is 1, the Host acknowledges the Alarm.

5.3.5   Alarm Report (GEM, Ver 1.7 Compatibility)

✎ *NOTE*   This scenario is provided only for compatibility with Host computers which support GEM, Version 1.7.

Table 5-25   SECS Messages Alarm Report (GEM, Ver 1.7 Compatibility)

Step	SECS Message	Description
1		The equipment constant "ConfigAlarms" is set to 1 for GEM, Version 1.7 compatibility. The Equipment recognizes that an alarm condition has gone "on" (i.e. has become Unsafe).
2	H <- E S5F71 [W]	The Equipment reports the Alarm going on. The high-order bit of ALCD is "1".
3	H -> E S5F72	If the W-bit in S5F71 is 1, the Host acknowledges the Alarm.
4		The Equipment recognizes that the alarm condition has gone "off" (i.e. has become Safe).
5	H <- E S5F71 [W]	The Equipment reports the Alarm going off. The high-order bit of ALCD is "0".
6	H -> E S5F72	If the W-bit in S5F71 is 1, the Host acknowledges the Alarm.

5.4   Control State

5.4.1   Host Sends On-Line Command

Assumption: Control State is "Host Off-Line". Variable GemControlState = 3.

Table 5-26   SECS Messages Host Sends On-Line Command

Step	SECS Message	Description
1	H -> E S1F17 W	Host instructs the Equipment to go "On-Line".
2	H <- E S1F18	Equipment responds to successful On-Line transition with ONLACK=0. Control state transits to either Local or Remote as guided by EC GemOnlineSubstate.
3	H <- E S6F11 W	The Equipment signals CEID: GemControlState LOCAL or GemControlState REMOTE.
4	H -> E S6F12	The Host acknowledges the event.

5.4.2   Host Sends Off-Line Command

Assumption: Control State is "On-Line".

Table 5-27   SECS Messages Host Sends Off-Line Command

Step	SECS Message	Description
1	H -> E S1F15 W	Host instructs the Equipment to go "Off-Line".
2	H <- E S1F16	Equipment Control State transitions to "Host Off-Line" (GemControlState = 3) and responds to primary. OFLACK = 0.

5.4.3   Host Sends Remote Command

Assumption: Control State is on-line and Remote.

Table 5-28   SECS Messages Host Sends Remote Command

Step	SECS Message	Description
1	H -> E S2F41 [W]	The Host sends the command. The W-bit in this message bay be either 0 or 1.
2	H <- E S2F42	If the W-bit was 1, the Equipment acknowledges the command. If the Equipment cannot perform the command, the acknowledge code in this message is non-zero. If the command can be completed "immediately", the command is performed and the acknowledge code in this message is 0. Otherwise, if the command takes a significant amount of time to complete, the acknowledge code is 4. Successful completion of a command may trigger one or more events.

5.4.4   Equipment Rejects Host Command

Assumption: Control State is Local and On-Line

Table 5-29   SECS Messages Equipment Rejects Host Command

Step	SECS Message	Description
1	H -> E S2F41 [W]	The Host sends the command. The W-bit in this message may be either 0 or 1.
2	H <- E S2F42	If the W-bit in S2F41 is 1, the Equipment acknowledges the command. The acknowledge code in this message is 64 (Control State is incorrect). If the W-bit is 0, this message is not sent. In either case, the Equipment does not perform the command.

5.4.5   Go Remote, Operator-Initiated

Table 5-30   SECS Messages Go Remote, Operator-Initiated

Step	SECS Message	Description
1		ControlState is Local. The Operator switches the Equipment to Remote Control.
2	H <- E S6F11 W	The Equipment signals CEID GemControlState REMOTE. Event Reports as appropriate.
3	H -> E S6F12	The Host acknowledges the report.

5.4.6   Go Local, Operator-Initiated

Table 5-31   SECS Messages Go Local, Operator-Initiated

Step	SECS Message	Description
1		ControlState is Remote. The Operator switches the Equipment to Local control state.
2	H <- E S6F11 W	The Equipment signals CEID GemControlState LOCAL. Event Reports as appropriate.
3	H -> E S6F12	The Host acknowledges the report.

5.4.7 Go Local, Host-Initiated

Table 5-32   SECS Messages Go Local, Host-Initiated

Step	SECS Message	Description
1		ControlState is Remote.
2	H -> E S2F41 [W]	Remote Command (GO LOCAL). The Host commands the Equipment to go into Local control state.
3	H <- E S2F42	If the W-bit in S2F41 is 1, the Equipment acknowledges the command. HCACK is zero.
4	H <- E S6F11 W	The Equipment signals CEID GemControlState LOCAL. Event Reports as appropriate.
5	H -> E S6F12	The Host acknowledges the report.

5.4.8 Operator Command, Successful

Table 5-33   SECS Messages Operator Command, Successful

Step	SECS Message	Description
1		ControlState is Local. The Operator issues a front-panel INITIATE PROCESS command. The Equipment performs the command.
2	H <- E S6F11 W	The Equipment signals CEID LotStart. Event Reports as appropriate.
3	H -> E S6F12	The Host acknowledges the report.

5.5 Process Program Management

5.5.1 Unformatted, Host-Initiated Download

Table 5-34   SECS Messages Unformatted, Host-Initiated Download

Step	SECS Message	Description
1	H -> E S7F1 W	Host requests permission to send a multi-block Process Program to the Equipment. If the Process Program is single-block, this step and the next one may be skipped.
2	H <- E S7F2	The Equipment grants permission for the Host to send the Process Program.
3	H -> E S7F3 W	Host sends the process Program to the Equipment.
4	H <- E S7F4	The Equipment acknowledges receipt of the Process Program. The Equipment checks the received Process Program for validity. If the process Program is valid, the Equipment stores the Process Program in its library and sends an acknowledge code of zero in this message. If the Process Program is not valid, or could not be stored in the library, the acknowledge code in this message is non-zero.

5.5.2 Unformatted, Host-Initiated Upload

Table 5-35   SECS Messages Unformatted, Host-Initiated Upload

Step	SECS Message	Description
1	H -> E S7F5 W	Host requests a Process Program from the Equipment library.
2	H <- E S7F5	The Equipment sends the Process Program. If the Process Program does not exist, the data portion of this message is an empty list.

5.5.3 Unformatted, Equipment-Initiated Download

Table 5-36   SECS Messages Unformatted, Equipment-Initiated Download

Step	SECS Message	Description
1	H <- E S7F5 W	Equipment requests a Process Program.
2	H -> E S7F6	The Host sends the Process Program. If the Process Program is valid, the Equipment stores the Process Program in its library, and the scenario ends. If the data portion of S7F6 is an empty list, or if the Process Program is not valid, the Equipment does not store it in its library and the scenario continues.
3	H <- E S6F11 W	The Equipment sets "PPCHANGENAME" to the requested PPID and signals CEID GemBadDownloadEvent. Event reports as appropriate.
4	H -> E S6F12	The Host acknowledges the report.

5.5.4   Unformatted, Equipment-Initiated Upload

Table 5-37   SECS Messages Unformatted, Equipment-Initiated Upload

Step	SECS Message	Description
1	H <- E S7F1 W	Process Program Inquire. If S7F3 is multi-block, the Equipment requests permission to send a multi-block message. If S7F3 is single-block, skip this and the following step.
2	H -> E S7F2	Process Program Grant. The Host grants permission. If PPGNT is non-zero, the scenario fails here.
3	H <- E S7F3 W	Send Process Program. The Equipment uploads Process Program to Host.
4	H -> E S7F4	The Host acknowledges. The Equipment ignores ACKC7.

5.5.5   Host Deletes Process Program

Table 5-38   SECS Messages Host Deletes Process Program

Step	SECS Message	Description
1	H -> E S7F17 W	Host sends a request to delete one or more Process Programs from the Equipment's library of Process Programs.
2	H <- E S7F18	The Equipment replies with an acknowledge code. If all specified Process Program(s) were deleted successfully, the acknowledge code is 0. If one or more of the specified Process Programs could not be deleted, the acknowledge code is non-zero.

5.5.6 Host Requests Directory

Table 5-39   SECS Messages Host Requests Directory

Step	SECS Message	Description
1	H -> E S7F19 W	Host requests the names (PPIDs) of all Process Programs that are stored in the Equipment's Process Program library.
2	H <- E S7F20	The Equipment replies with the list of PPIDs.

5.5.7 Operator Changes Process Program Library

Table 5-40   SECS Messages Operator Changes Process Program Library

Step	SECS Message	Description
1		The Operator creates, changes, or deletes a Process Program in the Library.
2	H <- E S6F11 W	The Equipment sets PPCHANGESTATUS to "Create", "Change", or "Delete", as appropriate, sets PPCHANGENAME, and signals CEID GemPPChangeEvent. Event Reports as appropriate.
3	H -> E S6F12	The Host acknowledges the report.

5.6 Equipment Terminal Communications

5.6.1 Host to Equipment, Single Line

Table 5-41   SECS Messages Host to Equipment, Single Line

Step	SECS Message	Description
1		The Host has data to display at the Equipment's front panel.
2	H -> E S10F3 [W]	Terminal Display. The Host sends text. The Equipment displays the text on its front panel.
3	H <- E S10F4	If the W-bit in S10F3 is 1, the Equipment acknowledges.
4		The Operator acknowledges that he/she has read the message.
5	H <- E S6F11 W	The Equipment signals CEID S10Ack. Event Reports as appropriate.
6	H -> E S6F12	The Host acknowledges the report.

5.6.2 Host to Equipment, Multi-Line

Table 5-42   SECS Messages Host to Equipment, Multi-Line

Step	SECS Message	Description
1		The Host has a multi-line data to display at the Equipment front panel.
2	H -> E S10F5 [W]	Terminal Display Multiple. The Host sends text. The Equipment displays the text on its front panel.
3	H <- E S10F6	If W-bit in S10F5 is 1, the Equipment acknowledges.
4		The Operator acknowledges that he/she has read the message.
5	H <- E S10F11 W	The Equipment signals CEID HostMsgAck. Event Reports as appropriate.
6	H -> E S6F12	The Host acknowledges the report.

5.6.3 Equipment Sends Text to Host

Table 5-43   SECS Messages Equipment Sends Text to Host

Step	SECS Message	Description
1		The Operator enters data to send to the Host.
2	H <- E S10F1 [W]	Equipment sends text to Host. The W-bit in this message may be either 0 or 1. The Host displays the message for the Operator.
3	H -> E S10F2	If the W-bit in S10F1 is 1, the Host acknowledges the text message.

5.7   SECS Error Messages

5.7.1   Unrecognized Device ID

Table 5-44   SECS Messages Unrecognized Device ID

Step	SECS Message	Description
1	H -> E SnFn [W]	Host sends a message with a bad Device ID in the header. The W-bit can be either 0 or 1.
2	H <- E S9F1	Equipment replies with "Unrecognized Device ID".

5.7.2   Unrecognized Stream

Table 5-45   SECS Messages Unrecognized Stream

Step	SECS Message	Description
1	H -> E SnFn [W]	Host sends a primary message with a stream number that the Equipment does not support. The W-bit can be either 0 or 1.
2	H <- E S9F3	Equipment replies with "Unrecognized Stream".

5.7.3   Unrecognized Function

Table 5-46   SECS Messages Unrecognized Function

Step	SECS Message	Description
1	H -> E SnFn [W]	Host sends a primary message with a stream number for which the Equipment recognizes some messages, but with a function number that the Equipment does not support for that stream. The W-bit can be either 0 or 1.
2	H <- E S9F5	Equipment replies with "Unrecognized Function".

5.7.4   Illegal Data Format

Table 5-47   SECS Messages Illegal Data Format

Step	SECS Message	Description
1	H -> E SnFn [W]	Host sends a message with a stream and function that the Equipment recognizes, but with a data format that is incorrect. The W-bit can be either 0 or 1.
2	H <- E S9F7	

5.7.5   Data Too Long

Table 5-48   SECS Messages Data Too Long

Step	SECS Message	Description
1	H -> E SnFn [W]	Host sends a message with a stream and function that the Equipment recognizes, but contains more data than expected. The W-bit can be either 0 or 1.
2	H <- E S9F11	Equipment replies with "Data Too Long". If the erroneous message is a primary with the W-bit set to 1, then in come cases the Equipment will reply with the usual secondary response with an appropriate error code, instead of S9F11. If the erroneous message is a secondary, the Equipment makes no reply at all.

5.8 Clock

5.8.1 Host Sets Date and Time

Table 5-49   SECS Messages Host Sets Date and Time

Step	SECS Message	Description
1	H -> E S2F31 W	Date and Time Send. The Host sends a new Date and Time to the Equipment.
2	H <- E S2F32	The Equipment sets its Clock/Calendar hardware and acknowledges the command.

5.8.2 Host Requests Date and Time

Table 5-50   SECS Messages Host Requests Date and Time

Step	SECS Message	Description
1	H -> E S2F17 W	Date and Time Request. The Host requests Date and Time from the Equipment.
2	H <- E S2F18	The Equipment sends its Date and Time.

5.8.3 Equipment Requests Date and Time

Table 5-51   SECS Messages Equipment Requests Date and Time

Step	SECS Message	Description
1	H <- E S2F17 W	Date and Time Request. The Equipment requests Date and Time from the Host.
2	H -> E S2F18	The Host sends its Date and Time. The Equipment sets its Clock/Calendar hardware according to the contents of this message.

5.9　Spooling

For all of the spooling scenarios, spooling is meaningful only when Control State (CONTROLSTATE = 4 or 5) is "On-Line". When CONTROLSTATE is "Off-Line" (CONTROLSTATE = 1, 2, or 3), the Equipment sends only stream one primaries and SnF0 secondaries, neither of which are eligible for spooling.

5.9.1　Host Enables Spooling of Messages

Table 5-52　SECS Messages Host Enables Spooling of Messages

Step	SECS Message	Description
1	H -> E S2F43 W	Host requests that messages be eligible for spooling using the following message: S2F43 W　　　　　* H -> E 　<L 　　<L [2] 　　　<U1 STRID>　　* Msg Stream 　　　<L 　　　　<U1 FCNID>　* Msg Fcn 　　　　... 　　　> 　　... 　> .
2	H <- E S2F44	The Equipment enables spooling for the messages requested by the Host. Response has RSPACK set to zero as follows: S2F44 　<L [2] 　　<B [1] 00>　　* RSPACK 　　<L> 　> .

5.9.2   Messages Spooled and Transmitted

Assumption: Spool State is "Spool Inactive".

Table 5-53   SECS Messages Spooled and Transmitted

Step	SECS Message	Description
1	H <- E SnFn	Equipment attempts to send any message to the Host.
2		After failure to deliver message, the Equipment assumes that the link is down, and will start to spool all messages marked for spooling. The first message spooled is the collection event "SpoolActivated".
3	H <- E S1F13 W	Equipment attempts to establish communications. This message will repeat every "EstablishCommunicationsTimer" seconds until successful.
4	H -> E S1F14	Communications established. Communications state transits to "Communicating". If COMMACK is not zero, communications are not established and scenario proceeds at Step 3.
5	H -> E S6F23 W	Host requests that Equipment begin de-spooling messages. RSDC is zero in this message.
6	H <- E S6F24	Equipment indicates that it will start to send spooled messages with return code RSDA = 0x00.
7		Equipment will start to de-spool messages. This process is single-threaded. That is, when Equipment sends a de-spooled message with the W-bit set to "1", Equipment must be receive the Host reply before the Equipment will send next de-spooled message. If EC "MaxSpoolTransmit" is zero, all messages will be transmitted. If it is set to another number, this number of messages will be sent. The Equipment will await the next S6F23 to send the next messages.
8	H <- E S6F11 W	The Equipment signals CEID GemSpoolActivated. This was the first message in the spool if it was not over-written.
9	H -> E S6F12	Host acknowledges the start of the spool transfer.
10		Equipment will de-spool messages one at a time from oldest to youngest until one of the following criteria is met: 1. All messages have been transmitted (go to Step 13); or 2. When "MaxSpoolTransmit" is not zero, and the messages transmitted has reached MaxSpoolTransmit limit (go to Step 11). Some spooled messages (usually multi-block) consist of a SECS conversation of type "Inquire, Grant, Send, Acknowledge". During de-spool, if the Host rejects the Inquire, the multi-block message is removed from the spool and not transmitted. De-spooling continues.

Table 5-53   SECS Messages Spooled and Transmitted (Continued)

Step	SECS Message	Description
11	H -> E S6F23 W	The Host requests that the Equipment continue de-spooling messages.
12	H <- E S6F24	Equipment indicates that it will start to send spooled messages with return code RSDA = 0x00. Go to Step 10.
13	H <- E S6F11 W	Equipment notifies the Host that sending of spooled messages has been completed by sending CEID GemSpooling Deactivated.
14	H -> E S6F12	Host acknowledges that the spool has been cleared and is deactivated.

5.9.3   Host Purges Spool

Assumption: spool state is "Spool Active"

Table 5-54   SECS Messages Host Purges Spool

Step	SECS Message	Description
1	H -> E S6F23 W	Host sends S2F23, requesting that spool be discarded with RSDC set to one.
2	H <- E S6F24	Equipment deletes spooled data and returns RSDA code zero.

6   Machine Variable Definitions

The following data variables are collected by the Host to support intelligent communications with the Equipment:

- Status Variables

- Data Variables

- Equipment Constants

Each variable is given a header line with its associated ID value and its name. The storage type and the definition of the variable are listed below in smaller type. Variables listed in the header in capital letters are GEM standards. The others belong to Fluidmove.

All variables are listed in alphabetical order.

6.1   Status Variables

Table 6-1   Status Variables

Variable Name	ID	Storage Type	Description
ABORTLEVEL	21	U1	The abort level of the most recent ABORT command.
ALARMID	22	U4	This variable contains the ID of the last alarm to be reported to the Host.
ALARMSENABLED	23	List	This variable contains the list of the currently enabled alarms. Refer to *Appendix A* for the format.
ALARMSERIAL	26	U4	The sequence number (count) of the most recent alarm change (going on or going off). This number starts at zero at power-up and increments by one for each following alarm transition.
ALARMSSET	24	List	This variable contains the list of alarms which are currently set.
ALARMSTATE	25	U1	The state of the current alarm. Non zero values indicate the alarm is set.
BoardCount	106	U4	The number of boards processed since the Power On event or since the last Process entry into the Running state.
CameraXFieldMils	700	U2	The size in mils of the X coordinate axis field of view seen by the camera.
CameraYFieldMils	701	U2	The size in mils of the Y coordinate axis field of view seen by the camera.

Table 6-1   Status Variables (continued)

Variable Name	ID	Storage Type	Description
CLOCK	27	A[16]	The current value of the clock accurate to hundredths of a second. The format is: **YYYYMMDDHHmmsscc**. This format is always the same, regardless of TIMEFORMAT.
CONTROLSTATE	28	U1	The value indicating the current Control State Machine state: 1 - OffLine/Equipment OffLine 2 - OffLine/Attempt OnLine 3 - OffLine/Host OffLine 4 - OnLine/Local 5 - OnLine/Remote
DeviceID	115	A[12]	The SECS Device ID.
EventLogFilename	104	A[12]	The name of the file holding the event log.
EVENTSENABLED	30	List	This is the list of events which are enabled for reporting to the Host.
FluidFileName	300	A[12]	The name of the data file holding the dispensing fluid data. Fluid files have the ".flu" extension.
FluidLotNumber	301	A[20]	The lot number of the dispensing fluid.
FluidThawTime	302	A[14]	The time stamp, in the YYYYMMDDhhmmss format, at which the fluid was removed from the refrigerator and began to warm up.
MachineID	102	A[20]	The model number and serial number of the Asymtek machine. Refer to *Appendix A* for the format.
MDLN	31	A[6]	The model designation for this machine.
PPDirectory	103	A[30]	The directory path of the Process Programs on the hard disk.
PPEXECNAME	32	A[0..80]	The currently selected Process Program ID number.
PREVIOUSCEID	33	U4	The latest event ID to be sent to the Host.
PREVIOUSCOMMAND	34	A[0..9]	The latest remote command received from the Host.
PREVIOUSCONTROLSTATE	35	U1	The value indicating the previous Control State for the Equipment: 1 - Off-Line / Equipment Off-Line 2 - Off-Line /Attempt On-Line 3 - Off-Line/Host Off-Line 4 - On-Line Local 5 - On-Line Remote

Table 6-1   Status Variables (continued)

Variable Name	ID	Storage Type	Description
PREVIOUSPROCESSSTATE	36	U1	The previous Process State for the Equipment. The values for this state can be found in *Appendix A*.
PROCESSSTATE	37	U1	The current Process State for the Equipment. The values for this state can be found in *Appendix A*.
ProductionStartTime	105	A[14]	The time stamp at which the last production run began. Refer to *Appendix A* for the format.
RunMode	110	U1	The specific type of runtime operation being conducted; dry run, production run, pass-through, or prototype test run.
SOFTREV	38	A[6]	The software revision number in ASCII code.
SoftwareID	101	A[20]	Fluidmove name and version code.
SPOOLCOUNTACTUAL	48	U4	A count of the number of messages actually present on the spool disk, adjusted for any messages which have been overwritten or discarded.
SPOOLCOUNTTOTAL	49	U4	A count of the number of messages the Equipment attempted to write to the spool disk. This number includes messages actually present on the spool disk, and any messages which may have been overwritten or discarded.
SPOOLFULLTIME	50	A[16]	The date and time at which the Spool file became full. The format is : **YYYYMMDDhhmmsscc**.

SPOOLLOADSUBSTATE	51	U4	The current state within the SPOOL LOAD super-state.
			
			    1 - Spool Active
			    2 - Spool Inactive

SPOOLSTARTTIME	52	A[16]	See CLOCK variable above for this format.

SPOOLSTATE	53	U4	The current Spool State within the POWER ON super-state.
			
			    3 - Purge Spool
			    4 - Transmit Spool
			    5 - No Spool output

SPOOLUNLOADSUBSTATE	54	U4	The current Spool State within the SPOOLUNLOAD super-state.
			
			    6 - Spool not full
			    7 - Spool full

TIME	39	A[12]	The current time accurate to the second. The format is **YYMMDDhhmmss**. This format is always the same, regardless of TIMEFORMAT.

6.2 Data Variables

Table 6-2   Data Variables

Variable Name	ID	Storage Type	Description
ALARMTEXT	1000	A[0..40]	The Alarm Text (ALTX) for the most recent alarm transition.
ALARMSEVERITYCODE	1001	B[1]	The Severity Code (the low order seven bits) of the most recent alarm transition.
BarcodeRaw	350	A[30]	The barcode string exactly as it is read by the scanner from the barcode tag on the board at the dispense station.
BarcodeFiltered	351	A[30]	The barcode string read in from the scanner after unwanted characters are filtered out as specified by the Operator.
BoardCycleTime	114	U2	The number of seconds required to complete dispensing an entire board of substrates.
ConveyorSpeed1	500	F4	The Conveyor 1 belt speed during board transfer between dispensing positions. The units are in./sec.
ConveyorSpeed2	501	F4	The Conveyor 2 belt speed during board transfer between dispensing positions. The units are in./sec.
DWVRESULT	408	U2	Result of Dispense Weight Verification Routine: 0 = Pass 1 = Fail: Setup error (scale not ready, limits out of range, etc.) 2 = Fail: Out of Range 3 = Fail: Weight measured below min deviation 4 = Fail: Weight measured above max deviation 5 = Fail: User abort 6 = Fail: Other reason than listed above

Table 6-2   Data Variables (continued)

Variable Name	ID	Storage Type	Description
DWVVALVE	409	U2	Valve used during Dispense Weight Verification: 1 = Valve 1 2 = Valve 2 3 = Valve 3 Valid only after collection event "DispenseWeightComplete" occurs.
DWVTARGET	410	F8	Dispense Weight Verification target weight. Valid only after collection event "DispenseWeightComplete" occurs.
DWVTARGETRANGE	412	F8	Dispense Weight Verification Target Range: If range limit checking is enabled, this variable will contain the maximum allowable range for the dispense weight verification routine. If limit checking is not enabled, this variable will contain "-1". Valid only after collection event DispenseWeightComplete" occurs.
DWVTARGETMINLIMIT	413	F8	Minimum allowable deviation from the target weight of the dispense weight for the Dispense Weight Verification routine. Note that if the verification routine fails and the failed weight is required, the data variable "SCALEMEASUREMENT1" (if Valve 1) or "SCALEMEASUREMENT2" (if Valve 2) will have the last value read from the scale. Valid only after collection event "DispenseWeightComplete" occurs.
DWVTARGETMAXLIMIT	414	F8	Maximum allowable deviation from the target weight of the dispense weight for the Dispense Weight Verification routine. Note that if the verification routine fails and the failed weight is required, the data variable "SCALEMEASUREMENT1" (if Valve 1) or "SCALEMEASUREMENT2" (if Valve 2) will have the last value read from the scale. Valid only after collection event "DispenseWeightComplete" occurs.

Table 6-2   Data Variables (continued)

Variable Name	ID	Storage Type	Description
DWVMEASUREDRANGE	415	F8	Dispense Weight Verification Measured Range: If range limit checking is enabled, this variable will be compared against DMVTARGETRANGE and used as one of the conditions for a pass/fail result. If limit checking is not enabled, this value will still be valid but not used in the pass/fail decision. If the routine fails to due limit checking or is interrupted before it completes, the variable will contain "-1". Valid only after collection event "DispenseWeightComplete" occurs.
DWVMEASUREDAVG	416	F8	Dispense Weight Verification Average: average weight of all dispenses after the dispense weight verification completes or "-1" if the routine fails or is interrupted before it completes. Valid only after collection event "DispenseWeightComplete" occurs.
ECIDCHANGE	46	U4	The ID of the last event to be reported to the Host.
FluidState1	306	A[10]	Fluid level of syringe on Valve 1as reported by the low fluid sensor or fluid level monitoring software. This value is updated twice per board. Once when the board is loaded and ready for dispensing and again when dispensing is complete on that board. Possible values are: "FULL" – Fluid level is full. "LOW" – Fluid level has reached the low level. "EMPTY" – Fluid level is close to empty. This value is possible only with the two position hardware sensor. "NONE" – Fluid sensing sensors do not exist or software monitoring has not been turned on. "ERROR" – Error when using the two position hardware sensor. Signals indicate empty but not low.
FluidState2	307	A[10]	Same as FluidState1, but for Valve 2.
FlowRate1	400	F8	The most current fluid flow rate in mg. per second for Valve 1.
FlowRate2	403	F8	The most current fluid flow rate in mg. per second for Valve 2.
FlowRateMax1	402	F8	The maximum flow rate in mg./sec. allowed during this run for Valve 1.

Table 6-2   Data Variables (continued)

Variable Name	ID	Storage Type	Description
FlowRateMax2	405	F8	The maximum flow rate in mg./sec. allowed during this run for Valve 2.
FlowRateMin1	401	F8	The minimum flow rate in mg./sec. allowed during this run for Valve 1.
FlowRateMin2	404	F8	The minimum flow rate in mg./sec. allowed during this run for Valve 2.
GEMLIMITSVID	57	U4	Contains the VID of the variable whose value crossed defined limits.
NumFailedBoards	107	U4	The number of boards failed since PwrUp or since the Process State entered the Running state.
PPCHANGENAME	40	A[0..8]	The PPID of the Process Program most recently changed.
PPCHANGESTATUS	41	U1	The last action performed on the Process Program. 1 – Created 2 – Changed 3 - Deleted
ScaleMeasurement1	406	F8	The actual value read from the scale during a Flow Rate Verification Procedure when Valve 1 is being used.
ScaleMeasurement2	407	F8	The actual value read from the scale during a Flow Rate Verification Procedure when Valve 2 is being used.
TEMPHTR1CHAN1 – TEMPHTR1CHAN17	801 to 817	F8	Heater 1 temperatures for channels 1-17 respectively (DV 801 = channel 1, DV 802 = channel 2, etc.). The units are in degrees. No other information is supplied such as the unit of degrees (Centigrade or Fahrenheit) or what device the channel is mapped to (ie, pre-dispense station, needle heater, etc.). A value of negative one (-1) indicates the channel is not monitored or not turned on. **Note:** These variables are only updated between boats and only when monitored by "Verify Temperature Before Initial Dispense".
TEMPHTR2CHAN1 – TEMPHTR2CHAN17	818 to 834	F8	Identical to Data Variables 801-817 except that they refer to Heater 2 channels 1-17, respectively (DV 818 = channel 1 of heater 2, DV 819 = channel 2 of heater 2 etc.)
TEMPHTR3CHAN1 – TEMPHTR3CHAN17	835 to 851	F8	Identical to Data Variables 801-817 except that they refer to Heater 3 channels 1-17, respectively (DV 835 = channel 1 of heater 3, DV 836 = channel 2 of heater 3 etc.)

6.3 Equipment Constants

Table 6-3 Equipment Constants

Variable Name	ID	Storage Type	Description
BOARDFREQUENCY	610	U4	This value is set by the station controller to the board frequency it requires collection event 2010 to occur. The default is zero which prevents collection event 2010 from triggering.
CONFIGALARMS	1	U1	This EC determines the type of alarm message which is sent following an alarm. 0 – S5F1, 1 – S5F71, 2 – S5F73.
CONFIGCONNECT	2	U1	The EC which determines which message type the Equipment uses for Connection Request. 0 – S1F1, 1 – S1F65, 2 – S1F13
CONFIGEVENTS	3	U1	The EC which determines the choice of Event Report message. 0 – S6F9 or S6F3, 1 – S6F11, or S6F13.
CONFIGSPOOL	63	U4	This variable defines the current Spooling State: 0 - Disabled 1 - Enabled
DEVICENAME	29	A[20]	This is the name chosen by the Host in its references to the machine.
ESTABLISHCOMMUNI-CATIONSTIMER	6	U2	The delay in seconds between each attempt to reestablish communications.
GEMLIMITSDELAY	60	U2	Determines how often the Equipment checks if variables are within the defined limits (seconds).
INITCOMMSTATE	8	U1	Indicates weather Host communications should be enabled in the initial Communications State entered following Power Up. The two assignable values are: 1 - Enable Host Communications 2 - Disable
INITCONTROLSTATE	9	U1	The initial Control State to be entered following Power Up. The two values are: 1 - Off-Line 2 - On-Line
HEARTBEAT	10	U2	The time in seconds between each S1F1 "Are You There" message sent to the Host. These messages are sent to confirm that the communications link between the Host and the Equipment is still valid during light message traffic.

Table 6-3 Equipment Constants (continued)

Variable Name	ID	Storage Type	Description
MAXSPOOLTRANSMIT	46	U4	This is the largest number of messages that may be read from the Spool file during a single read. This limits the number of messages sent to the Host in response to the S6F23 message and helps to prevent clogging of the communications link during a link recovery after a long communications failure.
MeasFlowEnabled	601	BOOL	This Boolean flag indicates whether periodic flow rate calibration operations are enabled. 1 – Enabled 0 - Disabled
OFFLINESUBSTATE	42	U1	This variable determines the Control State that the Equipment enters when it enters the OffLine super-state. The allowable values are: 1 - Equipment Off-Line 2 - Attempt On-Line 3 - Host Off-Line
ONLINEFAILED	43	U1	This variable controls the entry state resulting from a failed attempt to go On-Line. The two values are: 1 - Equipment Off-Line 3 - Host Off-Line
ONLINESUBSTATE	44	U1	This variable controls the entry state resulting from a successful attempt to go On-Line. The two values are: 4 - On-Line – Local 5 - On-Line - Remote
OVERWRITESPOOL	62	BOOL	This variable enables overwriting the Spool when it becomes full.
PurgeEnabled	600	BOOL	The state of periodic purging operations. 1 – Enabled 0 - Disabled
RPTYPE	17	BOOL	This variable enables the Equipment to send annotated reports to the Host on request.
TEMPERATUREDVUPDATE	611	BOOL	Set by the station controller to turn heater temperature data variable updating on (TRUE) or off (FALSE). The default value is TRUE.
VisionFailures	112	U4	The number of vision system failures counted by the Fluidmove software since the Power On event or latest Process Program change. The Host may clear this variable to measure failures during a run.

Table 6-3   Equipment Constants (continued)

Variable Name	ID	Storage Type	Description
WBITS10	18	U1	This variable determines the default state of the W bit for all messages in stream 10 sent from the Equipment to the Host.
WBITS5	19	U1	This variable determines the default state of the W bit for all messages in stream 5 sent from the Equipment to the Host.
WBITS6	20	U1	This variable determines the default state of the W bit for all messages in stream 6 sent from the Equipment to the Host.

7   Host-to-Equipment Messages

✍ **NOTE**   In Table 7-1 "Primary" and "Reply" columns:

* = Fluidmove secondary message handlers

** = Fluidmove primary message handlers

Table 7-1   Host-to-Equipment Messages

Primary	Reply	Cstate	Description	Notes
S1F1	S1F2	4,5	Are You There	None
S1F3	S1F4	4,5	Selected Status	Possible variable access
S1F11	S1F12	4,5	Status Variable Namelist Request	None
S1F13	S1F14	All	Connect Request	None
S1F15	S1F16*	4,5	Request Off-Line	None
S1F17	S1F18*	1,2,3	Request On-Line	None
S1F65	S1F66*	All	Connect Request	None N
S2F13	S2F14	4,5	Equipment Constant Request	Possible variable access (only if non-ECs requested).
S2F15	S2F16*	4,5	New Equipment Constant Send	Possible EC validation routines. EC-Changed processing routine. Disk write occurs.
S2F17	S2F18*	4,5	Date and Time Request	None
S2F21	S2F22	5	Remote Command	Primary message handler N (for Non GEM Hosts).
S2F23	S2F24	4,5	Trace Initialize	None
S2F25	S2F26	4,5	Loopback Diagnostic	None E
S2F27	S2F28*	5	Initiate Processing Request	Primary Message Handler N
S2F29**	S2F30	4,5	Equipment Constant Namelist Request	None E

Table 7-1   Host-to-Equipment Messages (continued)

Primary	Reply	Cstate	Description	Notes
S2F31	S2F32	4,5	Date and Time Send	None
S2F33	S2F34	4,5	Define Report	None Disk write occurs.
S2F35	S2F36	4,5	Link Event Report	None Disk write occurs.
S2F37	S2F38	4,5	Enable/Disable Event Report	None. Disk write occurs.
S2F39	S2F40	4,5	Multi-Block Inquire/Grant	None
S2F41**	S2F42*	5	Remote Command with Parameters	Primary Message Handler
S2F43	S2F44	4,5	Reset Spooling Streams and Functions	None
S2F45	S2F46	4,5	Define Variable Limits Attributes	None
S2F47	S2F48	4,5	Variable Limit Attribute Request	None
S5F3	S5F4	4,5	Enable/Disable Alarm	None Disk write occurs.
S5F5**	S5F6*	4,5	List Alarms	None
S5F7	S5F8*	4,5	List Enabled Alarms	None E
S6F15	S6F16	4,5	Request Event Report	Possible variable access routines.
S6F17	S6F18	4,5	Request Annotated Event Report	Possible variable access routines. E
S6F19	S6F20	4,5	Request Report	Possible variable access routines.
S6F21	S6F22	4,5	Request Annotated Report	Possible variable access routines. E
S6F23	S6F24	4,5	Request Spooled Data	None
S7F1	S7F2	4,5	Process Program Inquire/Grant	None

Table 7-1   Host-to-Equipment Messages (continued)

Primary	Reply	Cstate	Description	Notes
S7F3	S7F4	4,5	Unformatted Process Program Send	UFPP verify Disk write occurs.
S7F5**	S7F6*	4,5	Unformatted Process Program Request	None Disk read occurs.
S7F17**	S7F18	4,5	Process Program Delete	None Disk write occurs.
S7F19	S7F20*	4,5	Process Program Directory	None Disk read occurs.
S10F3**	S10F4	4,5	Terminal Display, Single	Terminal display
S10F5**	S10F6	4,5	Terminal Display, Multiple	Terminal display
S10F9**	S10F10	4,5	Broadcast	Terminal display E

8   Equipment-to-Host Messages

✍ **NOTE**   In Table 8-1 "Reply" column:

* = Fluidmove secondary message handlers

Table 8-1   Equipment-to-Host Messages

Primary	Reply	Description	Notes
-- (any)	SnF0	Primary rejected while Off-Line	None
S1F1	S1F2	Are You There	None (heartbeat) GemGoAOnline (Attempt Online)
S1F13	S1F14	Connect Request	None
S1F65	S1F66	Connect Request	None N
S2F17	S2F18	Date and Time Request	GemHostTimeReq
S5F1	S5F2*****	Alarm Report	GemNoteAlarmEvent N
S5F71	S5F72	Alarm Report Block Send	GemNoteAlarmEvent
S5F73	S7F74	Alarm Notification Send	GemNoteAlarmEvent
S6F1	S6F2	Trace Data Send	Possible variable access routines.
S6F3	S6F4	Annotated Event Report Send	GemNoteEvent Possible variable access routines. N
S6F5	S6F6	Multi-Block Data Send Inquire/Grant	None
S6F9	S6F10	Event Report Send	GemNoteEvent Possible variable access routines. N
S6F11	S6F12	Event Report Send	GemNoteEvent Possible variable access routines.

Table 8-1   Equipment-to-Host Messages (continued)

Primary	Reply	Description	Notes
S6F13	S6F14	Annotated Event Report Send	GemNoteEvent Possible variable access routines. N
S7F1	S7F2	Process Program Inquire/Grant	GemUFPPSend or GEMFPPSend
S7F3	S7F4*	Unformatted Process Program Send	GemUFPPSend Disk Read occurs
S7F5	S7F6	Unformatted Process Program Request	GemUFPPLoad UFPPVerify Disk write occurs.
S9F1	--	Error, Device ID	None
S9F3	--	Error, Stream	None
S9F5	--	Error, Function	None
S9F7	--	Error, Data	None
S9F9	--	Error, Transaction Timeout	None
S9F11	--	Error, Data Too Long	None
S9F13	--	Error, Conversation timeout	Sent by application only if required.
S10F1	S10F2	Terminal Request	GemTerminalRequest
S13F1	S13F2	Send Data Set Send	GemDSNameSend

Appendix A All Variables

A.1 Overview

This appendix provides an explanation summary of the machine variables described in *Section 6 – Machine Variable Definitions*.

A.2 Data Formats

The data formats are as follows:

A[nn]	ASCII text of length nn. Where two numbers are indicated, they specify a range of acceptable lengths.
Boolean	A boolean flag indicating TRUE or FALSE.
F4,F8	A floating point number in four bytes.
I1,I2,I4,I8	Signed integers of the indicated length in bytes.
U1,U2,U4,U8	Unsigned integers of the indicated length in bytes.
List	An array of similar structures or primitive elements, as above. The list format is specified in the description field.

A.3 Variables

Table A-1 lists all variables by ID number and contains details of the content of each variable.

✍ *NOTE* See *Appendix D – FmConfig.ini File Variables* for Variable ID's 6000-6768.

Table A-1 All Variables

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
GemAlarmFileName	EC	0	A	None	Gem alarm file name
ConfigAlarms	EC	1	U1	None	An EC which controls which Alarm Report message this Equipment will send. 0 = S5F1 default 1 = S5F71 2 = S5F73
ConfigConnect	EC	2	U1	None	An EC which controls which SECS message this Equipment will use for Connect Request. 0 = S1F1 1 = S1F65 2 = S1F13 default
ConfigEvents	EC	3	U1	None	An EC which controls some aspects of the Event Reports sent by this Equipment. 0 = S6F9 or S6F3 1 = S6F11 or S6F13 default
GemConstantFileName	EC	4	A	None	Gem constant filename
DeviceName	EC	5	A[80]	None	The Host can change this EC to define a meaningful name for the equipment.
EstablishCommunicationsTimeout	EC	6	U2	None	Time in seconds of how long the equipment will delay after an unsuccessful Connect Request before sending another. Valid values are 0-32000.
InitCommState	EC	8	U1	None	Initial (power-up) Communications State. 0 = Disabled 1 = Enabled
InitControlState	EC	9	U1	None	Initial (power-up) control super-state. 1 = Off-Line 2 = On-Line
Heartbeat	EC	10	U2	None	The time in seconds that the equipment will delay before sending S1F1 to test the link. Units are seconds. Valid values are 0-3200 (a setting of zero will disable the heartbeat).

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
RpType	EC	17	Boolean	None	This EC controls some aspects of the format of Event Reports sent by this Equipment. FALSE = Normal Event Reports TRUE = Annotated Event Reports
WBitS10	EC	18	U1	None	An EC which controls the W-Bit setting used when sending S10F1. 0 = W-Bit not set 1 = W-Bit set
WBitS5	EC	19	U1	None	An EC which controls the W-Bit setting used when sending Alarm Reports (S5F1, S5F71, or S5F73). 0 = W-Bit not set 1 = W-Bit set
WBitS6	EC	20	U1	None	An EC which controls the W-Bit setting used when sending stream six messages (events, trace) 0 = W-Bit not set 1 = W-Bit set
AbortLevel	SV	21	U1	None	The AbortLevel of the most recent ABORT command.
AlarmID	DV	22	U1	None	The ALID of the most recent Alarm transition.
AlarmsEnabled	SV	23	L	None	A list of all Alarms which are currently enabled. Format as follows: <L,n 1.<U4 ALID> … n.<U4 ALID> >

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description

AlarmsSet	SV	24	L	None	A list of all Alarms which are currently in the SET (on) state. Format as follows:
					<L
					    1.\<U4 ALID>
					    …
					    n.\<U4 ALID>
					>

AlarmState	SV	25	U1	None	The Alarm State now in effect for the most recently transitioned alarm.
					  0 = Alarm transitioned OFF
					  1 = Alarm transitioned ON

AlarmSerial	SV	26	U4	None	The sequence number of the most recent alarm change (going on or going off). This number starts at zero at power-up and increments by one for each alarm transition which occurs.

Clock	SV	27	A	None	The Equipment's current Date and Time in the following format: YYYYMMDDhhmmsscc.
					    YYYY = year from 0000 to 9999
					    MM = month from 01 to 12
					    DD = day from 01 to 31
					    hh = hours from 00 to 59
					    mm = minutes from 00 to 59
					    ss = seconds from 00 to 59
					    cc = centiseconds from 00 to 99

Table A-1   All Variables (Continued)

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
ControlState	SV	28	U1	None	The current Control State. 1 = Off-Line/Equipment Off-Line 2 = Off-Line/Attempt On-Line 3 = Off-Line/Host Off-Line 4 = On-Line/Local 5 = On-Line/Remote
DataID	SV	29	U4	None	Gem data ID

EventsEnabled	SV	30	L	None	A list of all events which are currently enabled. Format as follows:
					<L,n
					    1.<U4 CEID>
					    …
					    n.<U4 CEID>
					>

MDLN	SV	31	A	None	Model number. The format is a one to six letters, left-justified acronym with blank fill on the right.
PPExecName	SV	32	A[80]	None	The PPID of the currently selected Process Program. This PPID is the DOS 8.3 file name of the recipe. It includes the extension RCP.
PreviousCeid	SV	33	U4	None	The CEID of the most recent collection event which has occurred.
PreviousCommand	SV	34	A	None	The name of the most recent command.
PreviousControlState	SV	35	U1	None	The Control State in effect before the most recent transition to the current Control State. 1 = Off-Line/Equipment Off-Line 2 = Off-Line/Attempt On-Line 3 = Off-Line/Host Off-Line 4 = On-Line/Local 5 = On-Line/Remote

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
PreviousProcessState	SV	36	U1	None	The Process State in effect before the most recent transition to the current Process State. 0 = Idle (Boot-up) 1 = Idle 2 = Running 3 = Paused 4 = Aborting 5 = Error
ProcessState	SV	37	U1	None	The current Process State. 0 = Idle (Boot-up) 1 = Idle 2 = Running 3 = Paused 4 = Aborting 5 = Error
SOFTREV	SV	38	A	None	Software revision number with Major and minor parts. Example: **"1.02 "** The revision is in Major and minor format with a period separating the parts.

Time	SV	39	A[16]	None	Time format depends on VID 71 "TIMEFORMAT".
					
					If TIMEFORMAT = 0, then:
					    A[12] = YYMMDDHHMMSS
					If TIMEFORMAT = 1, then:
					    A[16] = YYYYMMDDHHMMSSCC

PPChangeName	DV	40	A[80]	(GEM)	PPID of the Process Program most recently created, changed, or deleted. This variable is the DOS 8.3 file name of the recipe changed. It includes the extension RCP.

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
PPChangeStatus	DV	41	U1	(GEM)	The action (create, change, delete) taken on a Process Program. 1 = Created 2 = Changed 3 = Deleted
OfflineSubstate	EC	42	U1	None	The default (power-up) offline substate of the Control State Model. 1 = Equipment Off-Line 2 = Attempt On-Line 3 = Host Off-Line
OnlineFailed	EC	43	U1	None	The default Control State transition when Attempt On-Line fails. 1 = Equipment Off-Line 2 = Host Off-Line
OnlineSubstate	EC	44	U1	None	The default (power-up) online substate of the Control State Model. 4 = Local 5 = Remote
MaxSpoolTransmit	EC	46	U4	None	The maximum number of spooled messages the equipment will send each time the Host reads the spool. A setting of zero indicates that all spooled messages should be sent. Refer to the description of S6F23 in the "SECS Message Detail" section for further information.
SpoolCountActual	SV	48	U4	None	A count of the number of messages actually present on the spool disk, adjusted for any messages which have been overwritten or otherwise discarded.

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
SpoolCountTotal	SV	49	U4	None	A count of the number of messages the equipment attempted to write to the spool disk. This number includes messages actually present on the spool disk, and also any messages which may have been overwritten or otherwise discarded.
SpoolFullTime	SV	50	A	None	The date and time at which the spool file became full. Format is: YYYYMMDDhhmmsscc. See description of CLOCK variable (VID 27) above for format details.
SpoolLoadSubstate	SV	51	U1	None	The current state within the SPOOL LOAD super-state. 6 = Spool Not Full 7 = Spool Full
SpoolStartTime	SV	52	A	None	The date and time at which the first message was written to the current spool file. Format is: YYYYMMDDhhmmsscc. See description of CLOCK variable (VID 27)above for format details.
SpoolState	SV	53	U1	None	The current spool state within the POWER ON super-state. 1 = Spool Active 2 = Spool Inactive
SpoolUnloadSubstate	SV	54	U1	None	The current spool state within the SPOOL UNLOAD super-state. 3 = Purge Spool 4 = Transmit Spool 5 = No Spool Output
GemEventText	DV	55	A[5,24]	(GEM)	Gem event text (documentation states that GemEventText no longer used)
GemPPKeepSecsHeader	EC	56	Boolean	None	Gem PP keep secs header

Table A-1   All Variables (Continued)

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
GemLimitsVID	DV	57	U4	(GEM)	Contains the VID of the variable whose value crossed defined limits.
GemEventLimit	DV	58	Boolean	(GEM)	Gem event limit
GemTransType	DV	59	Boolean	(GEM)	Gem transaction type
GemLimitsDelay	EC	60	U2	None	Determines how often the Equipment checks if variables are within the defined limits (seconds).

OverWriteSpool	EC	62	Boolean	None	This EC determines the action to be taken by the Equipment when the Spool file reaches its capacity.
					    TRUE = Overwrite Spool
					    FALSE = Do Not Overwrite Spool

ConfigSpool	EC	63	U1	None	This EC determines whether spooling is enabled or disabled for this Equipment.
					    0 = Disabled
					    1 = Enabled

ECIDChanged	DV	67	U4	(GEM)	The VID of the Equipment Constant most recently changed by the Operator.
LinkState	SV	68	U1	None	Gem link state
None Defined	EC	69	I4	None	Gem terminal request send max

TimeFormat	EC	71	U1	None	Determines whether STIME is sent in 12-byte or 16-byte format.
					    0 = 12-byte data format
					    1 = 16-byte data format

StartUpDelay	EC	72	I2	None	Gem startup delay
MinimumInterval	EC	80	U4	None	Gem minimum interval
None Defined	SV	82	L	None	Gem VID list
None Defined	SV	83	L	None	Gem AL ID list
None Defined	SV	84	L	None	Gem collection event ID list

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
WBitS6F1	EC	85	U1	None	Gem WBIT S6F1
SoftwareID	SV	101	A[20]	None	The Fluidmove software name and version code. The version is in Major and minor format with a period separating the parts. Up to seven letters in an alphanumeric suffix follow the capitol A and hyphen in the name as shown. Spaces pack any remaining space to the right of the software ID.
MachineID	SV	102	A[30]	None	The machines Model number and Serial number. The MachineID format is: "Model SNXXXXX ". The Model field is fixed at twenty characters. The Serial Number field is fixed at ten characters and contains up to five characters in the serial number. Spaces pack any remaining space to the right of both fields.
PPDirectory	SV	103	A[30]	None	The directory path holding the Process Programs. The format is: "vol:\dir1[\dir2[\dir3]]". Brackets indicate optional directory levels. The volume indicator is a single letter.
EventLogFilename	SV	104	A[12]	None	The name of the file holding the event records log.
ProductionStartTime	SV	105	A[14]	None	The time stamp when production started. The format is: **YYYYMMDDhhmmss**. Similar to the TIME(39) variable format. YYYY = year from 0000 to 9999 MM = month from 01 to 12 DD = day from 01 to 31 hh = hours from 00 to 59 mm = minutes from 00 to 59 ss = seconds from 00 to 59
BoardCount	SV	106	U4	None	The number of boards processed since the Power On event or since the last Process entry into the Running state.

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
NumFailedBoards	DV	107	U4	9000 9001	The number of boards failed during this run.
GCP_BuildVersion	SV	108	U4	None	GCP file build number
RunMode	SV	110	U1	None	The various types of run operations: 0 = Standby 1 = Production Dry 2 = Production Wet 3 = Pass-through 4 = Lane 1 Continuous/Lane 2 Pass-through 5 = Lane 1 Pass-through /Lane 2 Continuous 6 = Manual Wet 7 = Manual Dry 8 = Not Ready 9 = Invalid
VisionFailures	EC	112	U4	None	The count of vision system failures counted by the Fluidmove software since the Power On event or since the last change of Process Programs. The Host may clear this variable to measure failures during a run.
BoardCycleTime	DV	114	U2	2002 2004	The time in seconds needed to complete dispensing a board.
DeviceID	SV	115	A[12]	None	The SECS Device ID.
FluidFileName1	SV	300	A[40]	None	This is the name of the file containing the dispensing fluid data for Valve1. The file extension is ".flu". The DOS 8.3 file name format is used. There are up to eight characters reserved for the name and up to three characters for the extension. The name and extension are thus separated by a period: "name.ext". The file name is left justified within the character string, and spaces pack any remaining space to the right of the file name.

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
FluidLotNumber1	SV	301	A[20]	None	This is the dispensing fluid lot number recorded by the Operator when the syringe was reloaded. The format is a twenty character ASCII alphanumeric string containing the lot number from the fluid syringe. The number is left justified and blanks fill the remaining space.
FluidThawTime1	SV	302	A[14]	None	This is the time stamp in the YYYYMMDDhhmmss format, at which the fluid was removed from the refrigerator and began to warm up. Similar to the TIME(39) variable format. YYYY = year from 0000 to 9999 MM = month from 01 to 12 DD = day from 01 to 31 hh = hours from 00 to 59 mm = minutes from 00 to 59 ss = seconds from 00 to 59
FluidFileName2	SV	303	A[40]	None	This is the name of the file containing the dispensing fluid data for Valve 2. See FluidFileName1 (VID 300) for a detailed description.
FluidLotNumber2	SV	304	A[20]	None	This is the dispensing fluid lot number for Valve 2. See FluidLotNumber1 (VID 301) for a detailed description.
FluidThawTime2	SV	305	A[14]	None	This is the time stamp for the fluid for Valve 2. See FluidThawTime1 (VID 302) for a detailed description.

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
FluidState1	DV	306	A[10]	2001	Fluid level of syringe on Valve 1as reported by the low fluid sensor or fluid level monitoring software. This value is updated twice per board. Once when the board is loaded and ready for dispensing and again when dispensing is complete on that board. Possible values are: "FULL" – Fluid level is full. "LOW" – Fluid level has reached the low level. "EMPTY" – Fluid level is close to empty. This value is possible only with the two position hardware sensor. "NONE" – Fluid sensing sensors do not exist or software monitoring has not been turned on. "ERROR" – Error when using the two position hardware sensor. Signals indicate empty but not low.
FluidState2	DV	307	A[10]	2003	Same as FluidState1 but for Valve 2.
OperatorLoginID	SV	340	A[100]	None	Operator login ID
BarcodeRaw	DV	350	A[30]	2050	The barcode string exactly as it is read by the scanner from the barcode tag on the board at the dispense station.
BarcodeFiltered	DV	351	A[30]	2050	The barcode string read in from the scanner after unwanted characters are filtered out as specified by the Operator.
FlowRate1	DV	400	F8	4012	The most current fluid flow rate for Valve 1 in mg./sec.
FlowRateMin1	DV	401	F8	4012	The minimum flow rate for Valve 1 in mg./sec. allowed during this run.
FlowRateMax1	DV	402	F8	4012	The maximum flow rate for Valve 1 in mg./sec. allowed during this run.
FlowRate2	DV	403	F8	4013	The most current fluid flow rate for Valve 2 in mg/sec.
FlowRateMin2	DV	404	F8	4013	The minimum flow rate for Valve 2 in mg./sec. allowed during this run.

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
FlowRateMax2	DV	405	F8	4013	The maximum flow rate for Valve 2 in mg./sec. allowed during this run.
ScaleMeasurement1	DV	406	F8	4010	The actual value read from the scale during a Dispense Weight Verification Procedure when Valve 1 is being used.
ScaleMeasurement2	DV	407	F8	4011	The actual value read from the scale during a Dispense Weight Verification Procedure when Valve 2 is being used.
DWVResult	DV	408	U2	4020	Result of Dispense Weight Verification Routine: 0 = Pass 1 = Fail: Setup error (scale not ready, limits out of range, etc.) 2 = Fail: Out of Range 3 = Fail: Weight measured below min deviation 4 = Fail: Weight measured above max deviation 5 = Fail: User abort 6 = Fail: Other reason than listed above
DWVValve	DV	409	U2	4020	Valve used during Dispense Weight Verification: 1 = Valve 1 2 = Valve 2 3 = Valve 3 Valid only after collection event "DispenseWeightComplete" occurs.
DWVTarget	DV	410	F8	4020	Dispense Weight Verification target weight. Valid only after collection event "DispenseWeightComplete" occurs.

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
DWVDispenses	DV	411	U4	4020	Dispense Weight Verification: number of dispenses that will be performed. Valid only after collection event "DispenseWeightComplete" occurs.
DWVTargetRange	DV	412	F8	4020	Dispense Weight Verification Target Range: If range limit checking is enabled, this variable will contain the maximum allowable range for the dispense weight verification routine. If limit checking is not enabled, this variable will contain "-1". Valid only after collection event "DispenseWeightComplete" occurs.
DWVTargetMinLimit	DV	413	F8	4020	Minimum allowable deviation from the target weight of the dispense weight for the Dispense Weight Verification routine. **Note:** If the verification routine fails and the failed weight is required, the data variable "SCALEMEASUREMENT1" (if valve 1) or "SCALEMEASUREMENT2" (if valve 2) will have the last value read from the scale. Valid only after collection event "DispenseWeightComplete" occurs.
DWVTargetMaxLimit	DV	414	F8	4020	Maximum allowable deviation from the target weight of the dispense weight for the Dispense Weight Verification routine. **Note:** If the verification routine fails and the failed weight is required, the data variable "SCALEMEASUREMENT1" (if valve 1) or "SCALEMEASUREMENT2" (if valve 2) will have the last value read from the scale. Valid only after collection event "DispenseWeightComplete" occurs.

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
DWVMeasuredRange	DV	415	F8	4020	This is the dispense weight verification measured range. If range limit checking is enabled, this variable will be compared against DMVTARGETRANGE and used as one of the conditions for a pass/fail result. If limit checking is not enabled, this value will still be valid but not used in the pass/fail decision. If the routine fails to due limit checking or is interrupted before it completes, the variable will contain "-1". Valid only after collection event "DispenseWeightComplete" occurs.
DWVMeasuredAvg	DV	416	F8	4020	Dispense Weight Verification Average: average weight of all dispenses after the dispense weight verification completes or "-1" if the routine fails or is interrupted before it completes. Valid only after collection event "DispenseWeightComplete" occurs.
DWVValveOnTime	DV	417	F8	4020	Dispense Weight Verification valve on time
RefillRate1	DV	418	A[40]	3672	DP refill rate for valve 1
RefillRate2	DV	419	A[100]	3672	DP refill rate for valve 2
CPJCheckResultStatus	DV	420	U2	3701 3702	CPJ check result status bytes
ValvePressure_V1	SV	421	F8	3703	Valve pressure on valve 1
FluidPressure_V1	SV	422	F8	3704	Fluid pressure on valve 1
CoolingPressure_V1	SV	423	F8	3705	Cooling pressure on valve 1
ValvePressure_V2	SV	424	F8	3706	Valve pressure on valve 2
FluidPressure_V2	SV	425	F8	3707	Valve pressure on valve 2
CoolingPressure_V2	SV	426	F8	3708	Cooling pressure on valve 2

Table A-1   All Variables (Continued)

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
CarrierLoadTime_L1	DV	428	A[100]	8403	Carrier load time on lane 1
CarrierUnloadTime_L1	DV	429	A[100]	8404	Carrier unload time on lane 2
ValvePressureSetPt_V1	SV	430	F8	3789	Valve pressure set point valve 1
FluidPressureSetPt_V1	SV	431	F8	3790	Fluid pressure set point valve 1
CoolingPressureSetPt_V1	SV	432	F8	3791	Cooling pressure set point valve 1
ValvePressureSetPt_V2	SV	433	F8	3792	Valve pressure set point valve 2
FluidPressureSetPt_V2	SV	434	F8	3793	Fluid pressure set point valve 2
CoolingPressureSetPt_V2	SV	435	F8	3794	Cooling pressure set point valve 2
ParameterChangedVid	DV	450	I4	3638 3639 3651 3652	Parameter changed VID. Set to the variable ID of the configuration, fluid or heater file parameter changed by operator
NewParameterString	DV	451	A[100]	3638 3651	New "string" value of a configuration, fluid or heater parameter changed by operator.
NewParameterInt	DV	452	I4	3639 3652	New "integer" value of a configuration, fluid, or heater parameter changed by operator.
OldParameterString	DV	453	A[100]	3638 3651	Old "string" value of configuration, fluid or heater parameter before changed by operator.
OldParameterInt	DV	454	I4	3639 3652	Old "integer" value of a configuration, fluid, or heater parameter before changed by operator.
FluidFilenameChanged	DV	455	A[100]	3651 3652	Fluid filename changed

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
FluidTypeChanged	DV	456	I2	3651 3652	Fluid type changed 0 = Characteristic 1 = Dot/Line Type 1 2 = Dot/Line Type2 ... 10 = Dot/Line Type 10
FluidFileChangedValveNumber	DV	457	I2	3651 3652	Fluid file changed valve number 1 = Valve 1 2 = Valve 2
HeaterFilename	DV	458	A[100]	3653 3654 3655 3656 3657 3658 3659 3660	Heater filename. Name of the heater file being modified, manually saved, manually uploaded (depending on collection event).
HeaterLoopChanged	DV	459	I2	3653 3654	Heater loop changed
HeaterFilenameOld	DV	460	A[100]	3655 3657	Heater filename old. Only valid during collection events 3655 and 3657. Name of heater file replaced when the heater file is saved (ce 3657) or a heater file is manually downloaded (ce 3655). The new (current) heater filename is stored in "HeaterFilename" (VID 458). Note that the old and new heater filename may be the same.

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
ProgramName	DV	461	A[100]	3663 3664 3669 3670 3671	Currently loaded program name
PatternName	DV	462	A[100]	3663 3670 3671	Name of pattern being edited.

PattInstructionChangeType	DV	463	I4	3663	Pattern instruction change type.
					
					   1 = Line Inserted
					   2 = Line Deleted
					   3 = Line Modified

PattInstructionNew	DV	464	A[200]	3663 3669	Modified or new pattern instruction
PattInstructionOld	DV	465	A[200]	3663 3669	Original instruction before modification or deleted instruction.
PattInstructionLineNum	DV	466	I4	3663	Pattern instruction line number modified.
PatternNameAddedOrDeleted	DV	467	A[100]	3664 3665	Name of pattern created (CE 3664) or deleted (CE 3665).
RecipeFilename	DV	468	A[100]	3 3667 3668	Recipe name for related collection event.
CarrierLoadTime_L2	DV	469	A[100]	8405	Carrier load time lane 2
CarrierUnloadTime_L2	DV	470	A[100]	8405 8406	Carrier unload time lane 2
SizeOfCanister	DV	499	A[100]	3700	Size of BFS canister (BFS system is not used)
ConveyorSpeed1	DV	500	F4	None	This is the Conveyor 1 belt speed in in./sec. when it is moving a board to the next dispensing position.

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
ConveyorSpeed2	DV	501	F4	None	This is the Conveyor 2 belt speed in in./sec. when it is moving a board to the next dispensing position.
ImageFilename	DV	520	A[100]	8002 8003 8004	Image filename. Name of image file saved after related collection event is triggered. Name contains entire path and name of image. The name will reflect the current date and time to make each file name unique.
LaneNumber	DV	521	I4	2001 2002 2003 2004 8000 8400	Active lane number. Lane number specifying what lane report data applies to when certain collection events are triggered.
ScaleNumber	DV	522	I4	None	Active scale number
RunningPatternName	DV	523	A[50]	None	Name of pattern when a pattern image is saved.
HSAtTactileZ	DV	524	F8	3732	Captured Z value when height sensor trips on tactile surface during needle to height sensor offsets. NOTE: This value is now in user units (as of FmXP 5.3a85).
NdlAtTactileZ_V1	DV	525	F8	3733	Captured Z value when valve 1 needle (nozzle) touches tactile during needle to height sensor offsets. NOTE: This value is now in user units (as of FmXP 5.3a85).
HSAtScaleLidZ	DV	526	F8	3734	Captured Z value when height sensor detects scale lid. "ScaleNumber" vid 522 denotes which scale. NOTE: This value is now in user units (as of FmXP 5.3a85).
NdlAtTactileZ_V2	DV	527	F8	3747	Height sense at tactile Z position valve 2
HSAtPurgeLidZ	DV	528	F8	3748	Height sense at purge lid Z position valve 1 (user units)
SubstrateCornerTL	DV	529	A[40]	3800	Substrate top left corner location
SubstrateCornerBR	DV	530	A[40]	3800	Substrate bottom left corner location

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
HSAtScale2LidZ	DV	531	F8	3734	Height sense at scale 2 lid Z position (user units)
TactileCenter	DV	532	A[40]	3802	Tactile center (user units)
SSPinXY	DV	533	A[40]	8005 8006	Service Station pin XY location
SSPinScore	DV	534	I2	8005	Service Station pin fiducial score
XYDotOffsetXY	DV	535	A[40]	8015 8016 8017 8018 8019 8020 8021	XY dot offset location
XYDotOffsetScore	DV	536	I2	8015 8016 8017 8018 8019 8020 8021	XY dot offset fiducial score
WaferCount	DV	550	U4	3632	Wafer count
WaferStatus	DV	551	U4	3635	Wafer status
WaferSlotNumber	DV	552	U4	3633	Wafer slot number
MultiFlowrates_V1	DV	560	F8[50]	4014	Multiple Flow Rates for valve 1
MultiFlowrates_V2	DV	561	F8[50]	4015	Multiple Flow Rates for valve 2
CarrierSeqAtDisp_L1	DV	571	I4	2001 2002 8404	Carrier sequence at dispense station lane 1
CarrierSeqAtDisp_L2	DV	572	I4	2003 2004 8406	Carrier sequence at dispense station lane 2

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
PromptedSetupScriptFilename	DV	573	A[100]	4001 4002 4022 4023	Prompted setup script filename
NewParameterDouble	DV	574	F8	8033	New parameter (double)
OldParameterDouble	DV	575	F8	8033	Old parameter (double)
PurgeEnabled1	EC	600	Boolean	None	This Boolean flag indicates whether periodic purging operations are enabled for Valve 1.
MeasFlowEnabled1	EC	601	Boolean	None	This Boolean flag indicates whether periodic flow rate calibration operations are enabled for Valve 1.
PurgeEnabled2	EC	602	Boolean	None	This Boolean flag indicates whether periodic purging operations are enabled for Valve 2.
MeasFlowEnabled2	EC	603	Boolean	None	This Boolean flag indicates whether periodic flow rate calibration operations are enabled for Valve 2.
BoardFrequency	EC	610	U4	None	This value is set by the station controller to the board frequency it requires collection event 2010 to occur. The default is zero which prevents collection event 2010 from triggering.
TemperatureDVUpdate	EC	611	Boolean	None	Set by the station controller to turn heater temperature data variable updating on (TRUE) or off (FALSE). The default value is TRUE.
FidLocTol	EC	620	U2	None	Fiducial location tolerance
DiagDistTol	EC	621	U2	None	Diagnostic distance tolerance (Vision – fiducials)
OperatorID	EC	630	A[6]	None	Operator ID
WaferLotNumber	EC	631	A[7]	None	Wafer lot number
WaferScribeNumber	EC	632	A[20]	None	Wafer scribe number
RecipeSelectionStatus	EC	633	I2	None	Recipe selection status

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
NumberOfRuns	EC	634	A[6]	None	Number of program runs (production)
NumberOfRunsEnabled	EC	635	Boolean	None	Number of program runs enabled (production)
LotID	EC	636	A[100]	None	Lot ID
ProgramProcessID	EC	637	A[100]	None	Program process ID
PPSelectStatus	SV	638	U2	None	PP select status
DWVCalibStatus	SV	639	U2	None	Dispense Weight Calibration status code
FlowRateCalibStatus	SV	640	U2	None	Flow Rate Calibration status code
DWCA_MaxPressure	DV	641	F8	5040 5042 5043	DWCA max fluid pressure
DWCA_DotWeightAtMaxPressure	DV	642	F8	5042 5043	DWCA dot weight at maximum pressure
DWCA_MinPressure	DV	643	F8	5040 5041 5043	DWCA minimum pressure
DWCA_DotWeightAtMinPressure	DV	644	F8	5041 5043	DWCA dot weight at minimum pressure
DWCA_DesiredDotWeight	DV	645	F8	5040 5043	DWCA desired dot weight
DWCA_FinalDotWeight	DV	646	F8	5043	DWCA final dot weight
DWCA_PressureAtFinalDotWeight	DV	647	F8	5043	DWCA pressure at final dot weight
DWCA_DeviationMaxPC	DV	648	F8	5040 5043	DWCA deviation max percent
DWCA_IntermediateDotWeight	DV	649	F8	5044	DWCA intermediate dot weight
DWCA_IntermediatePressure	DV	650	F8	5044	DWCA intermediate pressure
DWCA_StartingPressure	DV	651	F8	5046	DWCA starting pressure
DWCA_StartingDotWeight	DV	652	F8	5046	DWCA starting dot weight

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
CameraXFieldMils	SV	700	U2	None	The size in mils of the X coordinate axis field of view seen by the camera.
CameraYFieldMils	SV	701	U2	None	The size in mils of the Y coordinate axis field of view seen by the camera.
TempHtr1Chan1	DV	801	F8	5014	Temperature heater 1, channel 1
TempHtr1Chan2	DV	802	F8	5014	Temperature heater 1, channel 2
TempHtr1Chan3	DV	803	F8	5014	Temperature heater 1, channel 3
TempHtr1Chan4	DV	804	F8	5014	Temperature heater 1, channel 4
TempHtr1Chan5	DV	805	F8	5014	Temperature heater 1, channel 5
TempHtr1Chan6	DV	806	F8	5014	Temperature heater 1, channel 6
TempHtr1Chan7	DV	807	F8	5014	Temperature heater 1, channel 7
TempHtr1Chan8	DV	808	F8	5014	Temperature heater 1, channel 8
TempHtr1Chan9	DV	809	F8	5014	Temperature heater 1, channel 9
TempHtr1Chan10	DV	810	F8	5014	Temperature heater 1, channel 10
TempHtr1Chan11	DV	811	F8	5014	Temperature heater 1, channel 11
TempHtr1Chan12	DV	812	F8	5014	Temperature heater 1, channel 12
TempHtr1Chan13	DV	813	F8	5014	Temperature heater 1, channel 13
TempHtr1Chan14	DV	814	F8	5014	Temperature heater 1, channel 14
TempHtr1Chan15	DV	815	F8	5014	Temperature heater 1, channel 15
TempHtr1Chan16	DV	816	F8	5014	Temperature heater 1, channel 16
TempHtr1Chan17	DV	817	F8	5014	Temperature heater 1, channel 17
TempHtr2Chan1	DV	818	F8	5014	Temperature heater 2, channel 1
TempHtr2Chan2	DV	819	F8	5014	Temperature heater 2, channel 2
TempHtr2Chan3	DV	820	F8	5014	Temperature heater 2, channel 3
TempHtr2Chan4	DV	821	F8	5014	Temperature heater 2, channel 4

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
TempHtr2Chan5	DV	822	F8	5014	Temperature heater 2, channel 5
TempHtr2Chan6	DV	823	F8	5014	Temperature heater 2, channel 6
TempHtr2Chan7	DV	824	F8	5014	Temperature heater 2, channel 7
TempHtr2Chan8	DV	825	F8	5014	Temperature heater 2, channel 8
TempHtr2Chan9	DV	826	F8	5014	Temperature heater 2, channel 9
TempHtr2Chan10	DV	827	F8	5014	Temperature heater 2, channel 10
TempHtr2Chan11	DV	828	F8	5014	Temperature heater 2, channel 11
TempHtr2Chan12	DV	829	F8	5014	Temperature heater 2, channel 12
TempHtr2Chan13	DV	830	F8	5014	Temperature heater 2, channel 13
TempHtr2Chan14	DV	831	F8	5014	Temperature heater 2, channel 14
TempHtr2Chan15	DV	832	F8	5014	Temperature heater 2, channel 15
TempHtr2Chan16	DV	833	F8	5014	Temperature heater 2, channel 16
TempHtr2Chan17	DV	834	F8	5014	Temperature heater 2, channel 17
TempHtr3Chan1	DV	835	F8	5014	Temperature heater 3, channel 1
TempHtr3Chan2	DV	836	F8	5014	Temperature heater 3, channel 2
TempHtr3Chan3	DV	837	F8	5014	Temperature heater 3, channel 3
TempHtr3Chan4	DV	838	F8	5014	Temperature heater 3, channel 4
TempHtr3Chan5	DV	839	F8	5014	Temperature heater 3, channel 5
TempHtr3Chan6	DV	840	F8	5014	Temperature heater 3, channel 6
TempHtr3Chan7	DV	841	F8	5014	Temperature heater 3, channel 7
TempHtr3Chan8	DV	842	F8	5014	Temperature heater 3, channel 8
TempHtr3Chan9	DV	843	F8	5014	Temperature heater 3, channel 9
TempHtr3Chan10	DV	844	F8	5014	Temperature heater 3, channel 10
TempHtr3Chan11	DV	845	F8	5014	Temperature heater 3, channel 11
TempHtr3Chan12	DV	846	F8	5014	Temperature heater 3, channel 12

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
TempHtr3Chan13	DV	847	F8	5014	Temperature heater 3, channel 13
TempHtr3Chan14	DV	848	F8	5014	Temperature heater 3, channel 14
TempHtr3Chan15	DV	849	F8	5014	Temperature heater 3, channel 15
TempHtr3Chan16	DV	850	F8	5014	Temperature heater 3, channel 16
TempHtr3Chan17	DV	851	F8	5014	Temperature heater 3, channel 17
TempHtr4Chan1	DV	852	F8	5014	Temperature heater 4, channel 1
TempHtr4Chan2	DV	853	F8	5014	Temperature heater 4, channel 2
TempHtr4Chan3	DV	854	F8	5014	Temperature heater 4, channel 3
TempHtr4Chan4	DV	855	F8	5014	Temperature heater 4, channel 4
TempHtr4Chan5	DV	856	F8	5014	Temperature heater 4, channel 5
TempHtr4Chan6	DV	857	F8	5014	Temperature heater 4, channel 6
TempHtr4Chan7	DV	858	F8	5014	Temperature heater 4, channel 7
TempHtr4Chan8	DV	859	F8	5014	Temperature heater 4, channel 8
TempHtr4Chan9	DV	860	F8	5014	Temperature heater 4, channel 9
TempHtr4Chan10	DV	861	F8	5014	Temperature heater 4, channel 10
TempHtr4Chan11	DV	862	F8	5014	Temperature heater 4, channel 11
TempHtr4Chan12	DV	863	F8	5014	Temperature heater 4, channel 12
TempHtr4Chan13	DV	864	F8	5014	Temperature heater 4, channel 13
TempHtr4Chan14	DV	865	F8	5014	Temperature heater 4, channel 14
TempHtr4Chan15	DV	866	F8	5014	Temperature heater 4, channel 15
TempHtr4Chan16	DV	867	F8	5014	Temperature heater 4, channel 16
TempHtr4Chan17	DV	868	F8	5014	Temperature heater 4, channel 17
ALARMTEXT	DV	1000	A[40]	None	The Alarm Text (ALTX) for the most recently transitioned Alarm.

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
ALARMSEVERITYCODE	DV	1001	U1	None	The Severity Code (ALCD low-order 7 bits) for the most recently transitioned alarm.
FMWMostRecentError	DV	1002	U2	None	FMW most recent error
SpHtr1Chan1	SV	1101	F8	None	Set point heater 1 channel 1
SpHtr1Chan2	SV	1102	F8	None	Set point heater 1 channel 2
SpHtr1Chan3	SV	1103	F8	None	Set point heater 1 channel 3
SpHtr1Chan4	SV	1104	F8	None	Set point heater 1 channel 4
SpHtr1Chan5	SV	1105	F8	None	Set point heater 1 channel 5
SpHtr1Chan6	SV	1106	F8	None	Set point heater 1 channel 6
SpHtr1Chan7	SV	1107	F8	None	Set point heater 1 channel 7
SpHtr1Chan8	SV	1108	F8	None	Set point heater 1 channel 8
SpHtr1Chan9	SV	1109	F8	None	Set point heater 1 channel 9
SpHtr1Chan10	SV	1110	F8	None	Set point heater 1 channel 10
SpHtr1Chan11	SV	1111	F8	None	Set point heater 1 channel 11
SpHtr1Chan12	SV	1112	F8	None	Set point heater 1 channel 12
SpHtr1Chan13	SV	1113	F8	None	Set point heater 1 channel 13
SpHtr1Chan14	SV	1114	F8	None	Set point heater 1 channel 14
SpHtr1Chan15	SV	1115	F8	None	Set point heater 1 channel 15
SpHtr1Chan16	SV	1116	F8	None	Set point heater 1 channel 16
SpHtr1Chan17	SV	1117	F8	None	Set point heater 1 channel 17
SpHtr2Chan1	SV	1118	F8	None	Set point heater 2 channel 1
SpHtr2Chan2	SV	1119	F8	None	Set point heater 2 channel 2
SpHtr2Chan3	SV	1120	F8	None	Set point heater 2 channel 3
SpHtr2Chan4	SV	1121	F8	None	Set point heater 2 channel 4
SpHtr2Chan5	SV	1122	F8	None	Set point heater 2 channel 5

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
SpHtr2Chan6	SV	1123	F8	None	Set point heater 2 channel 6
SpHtr2Chan7	SV	1124	F8	None	Set point heater 2 channel 7
SpHtr2Chan8	SV	1125	F8	None	Set point heater 2 channel 8
SpHtr2Chan9	SV	1126	F8	None	Set point heater 2 channel 9
SpHtr2Chan10	SV	1127	F8	None	Set point heater 2 channel 10
SpHtr2Chan11	SV	1128	F8	None	Set point heater 2 channel 11
SpHtr2Chan12	SV	1129	F8	None	Set point heater 2 channel 12
SpHtr2Chan13	SV	1130	F8	None	Set point heater 2 channel 13
SpHtr2Chan14	SV	1131	F8	None	Set point heater 2 channel 14
SpHtr2Chan15	SV	1132	F8	None	Set point heater 2 channel 15
SpHtr2Chan16	SV	1133	F8	None	Set point heater 2 channel 16
SpHtr2Chan17	SV	1134	F8	None	Set point heater 2 channel 17
SpHtr3Chan1	SV	1135	F8	None	Set point heater 3 channel 1
SpHtr3Chan2	SV	1136	F8	None	Set point heater 3 channel 2
SpHtr3Chan3	SV	1137	F8	None	Set point heater 3 channel 3
SpHtr3Chan4	SV	1138	F8	None	Set point heater 3 channel 4
SpHtr3Chan5	SV	1139	F8	None	Set point heater 3 channel 5
SpHtr3Chan6	SV	1140	F8	None	Set point heater 3 channel 6
SpHtr3Chan7	SV	1141	F8	None	Set point heater 3 channel 7
SpHtr3Chan8	SV	1142	F8	None	Set point heater 3 channel 8
SpHtr3Chan9	SV	1143	F8	None	Set point heater 3 channel 9
SpHtr3Chan10	SV	1144	F8	None	Set point heater 3 channel 10
SpHtr3Chan11	SV	1145	F8	None	Set point heater 3 channel 11
SpHtr3Chan12	SV	1146	F8	None	Set point heater 3 channel 12

Table A-1   All Variables (Continued)

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
SpHtr3Chan13	SV	1147	F8	None	Set point heater 3 channel 13
SpHtr3Chan14	SV	1148	F8	None	Set point heater 3 channel 14
SpHtr3Chan15	SV	1149	F8	None	Set point heater 3 channel 15
SpHtr3Chan16	SV	1150	F8	None	Set point heater 3 channel 16
SpHtr3Chan17	SV	1151	F8	None	Set point heater 3 channel 17
SpHtr4Chan1	SV	1152	F8	None	Set point heater 4 channel 1
SpHtr4Chan2	SV	1153	F8	None	Set point heater 4 channel 2
SpHtr4Chan3	SV	1154	F8	None	Set point heater 4 channel 3
SpHtr4Chan4	SV	1155	F8	None	Set point heater 4 channel 4
SpHtr4Chan5	SV	1156	F8	None	Set point heater 4 channel 5
SpHtr4Chan6	SV	1157	F8	None	Set point heater 4 channel 6
SpHtr4Chan7	SV	1158	F8	None	Set point heater 4 channel 7
SpHtr4Chan8	SV	1159	F8	None	Set point heater 4 channel 8
SpHtr4Chan9	SV	1160	F8	None	Set point heater 4 channel 9
SpHtr4Chan10	SV	1161	F8	None	Set point heater 4 channel 10
SpHtr4Chan11	SV	1162	F8	None	Set point heater 4 channel 11
SpHtr4Chan12	SV	1163	F8	None	Set point heater 4 channel 12
SpHtr4Chan13	SV	1164	F8	None	Set point heater 4 channel 13
SpHtr4Chan14	SV	1165	F8	None	Set point heater 4 channel 14
SpHtr4Chan15	SV	1166	F8	None	Set point heater 4 channel 15
SpHtr4Chan16	SV	1167	F8	None	Set point heater 4 channel 16
SpHtr4Chan17	SV	1168	F8	None	Set point heater 4 channel 17
OffsetHtr1Chan1	SV	1201	F8	None	Offset heater 1 channel 1
OffsetHtr1Chan2	SV	1202	F8	None	Offset heater 1 channel 2
OffsetHtr1Chan3	SV	1203	F8	None	Offset heater 1 channel 3

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
OffsetHtr1Chan4	SV	1204	F8	None	Offset heater 1 channel 4
OffsetHtr1Chan5	SV	1205	F8	None	Offset heater 1 channel 5
OffsetHtr1Chan6	SV	1206	F8	None	Offset heater 1 channel 6
OffsetHtr1Chan7	SV	1207	F8	None	Offset heater 1 channel 7
OffsetHtr1Chan8	SV	1208	F8	None	Offset heater 1 channel 8
OffsetHtr1Chan9	SV	1209	F8	None	Offset heater 1 channel 9
OffsetHtr1Chan10	SV	1210	F8	None	Offset heater 1 channel 10
OffsetHtr1Chan11	SV	1211	F8	None	Offset heater 1 channel 11
OffsetHtr1Chan12	SV	1212	F8	None	Offset heater 1 channel 12
OffsetHtr1Chan13	SV	1213	F8	None	Offset heater 1 channel 13
OffsetHtr1Chan14	SV	1214	F8	None	Offset heater 1 channel 14
OffsetHtr1Chan15	SV	1215	F8	None	Offset heater 1 channel 15
OffsetHtr1Chan16	SV	1216	F8	None	Offset heater 1 channel 16
OffsetHtr1Chan17	SV	1217	F8	None	Offset heater 1 channel 17
OffsetHtr2Chan1	SV	1218	F8	None	Offset heater 2 channel 1
OffsetHtr2Chan2	SV	1219	F8	None	Offset heater 2 channel 2
OffsetHtr2Chan3	SV	1220	F8	None	Offset heater 2 channel 3
OffsetHtr2Chan4	SV	1221	F8	None	Offset heater 2 channel 4
OffsetHtr2Chan5	SV	1222	F8	None	Offset heater 2 channel 5
OffsetHtr2Chan6	SV	1223	F8	None	Offset heater 2 channel 6
OffsetHtr2Chan7	SV	1224	F8	None	Offset heater 2 channel 7
OffsetHtr2Chan8	SV	1225	F8	None	Offset heater 2 channel 8
OffsetHtr2Chan9	SV	1226	F8	None	Offset heater 2 channel 9
OffsetHtr2Chan10	SV	1227	F8	None	Offset heater 2 channel 10

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
OffsetHtr2Chan11	SV	1228	F8	None	Offset heater 2 channel 11
OffsetHtr2Chan12	SV	1229	F8	None	Offset heater 2 channel 12
OffsetHtr2Chan13	SV	1230	F8	None	Offset heater 2 channel 13
OffsetHtr2Chan14	SV	1231	F8	None	Offset heater 2 channel 14
OffsetHtr2Chan15	SV	1232	F8	None	Offset heater 2 channel 15
OffsetHtr2Chan16	SV	1233	F8	None	Offset heater 2 channel 16
OffsetHtr2Chan17	SV	1234	F8	None	Offset heater 2 channel 17
OffsetHtr3Chan1	SV	1235	F8	None	Offset heater 3 channel 1
OffsetHtr3Chan2	SV	1236	F8	None	Offset heater 3 channel 2
OffsetHtr3Chan3	SV	1237	F8	None	Offset heater 3 channel 3
OffsetHtr3Chan4	SV	1238	F8	None	Offset heater 3 channel 4
OffsetHtr3Chan5	SV	1239	F8	None	Offset heater 3 channel 5
OffsetHtr3Chan6	SV	1240	F8	None	Offset heater 3 channel 6
OffsetHtr3Chan7	SV	1241	F8	None	Offset heater 3 channel 7
OffsetHtr3Chan8	SV	1242	F8	None	Offset heater 3 channel 8
OffsetHtr3Chan9	SV	1243	F8	None	Offset heater 3 channel 9
OffsetHtr3Chan10	SV	1244	F8	None	Offset heater 3 channel 10
OffsetHtr3Chan11	SV	1245	F8	None	Offset heater 3 channel 11
OffsetHtr3Chan12	SV	1246	F8	None	Offset heater 3 channel 12
OffsetHtr3Chan13	SV	1247	F8	None	Offset heater 3 channel 13
OffsetHtr3Chan14	SV	1248	F8	None	Offset heater 3 channel 14
OffsetHtr3Chan15	SV	1249	F8	None	Offset heater 3 channel 15
OffsetHtr3Chan16	SV	1250	F8	None	Offset heater 3 channel 16
OffsetHtr3Chan17	SV	1251	F8	None	Offset heater 3 channel 17
OffsetHtr4Chan1	SV	1252	F8	None	Offset heater 4 channel 1

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
OffsetHtr4Chan2	SV	1253	F8	None	Offset heater 4 channel 2
OffsetHtr4Chan3	SV	1254	F8	None	Offset heater 4 channel 3
OffsetHtr4Chan4	SV	1255	F8	None	Offset heater 4 channel 4
OffsetHtr4Chan5	SV	1256	F8	None	Offset heater 4 channel 5
OffsetHtr4Chan6	SV	1257	F8	None	Offset heater 4 channel 6
OffsetHtr4Chan7	SV	1258	F8	None	Offset heater 4 channel 7
OffsetHtr4Chan8	SV	1259	F8	None	Offset heater 4 channel 8
OffsetHtr4Chan9	SV	1260	F8	None	Offset heater 4 channel 9
OffsetHtr4Chan10	SV	1261	F8	None	Offset heater 4 channel 10
OffsetHtr4Chan11	SV	1262	F8	None	Offset heater 4 channel 11
OffsetHtr4Chan12	SV	1263	F8	None	Offset heater 4 channel 12
OffsetHtr4Chan13	SV	1264	F8	None	Offset heater 4 channel 13
OffsetHtr4Chan14	SV	1265	F8	None	Offset heater 4 channel 14
OffsetHtr4Chan15	SV	1266	F8	None	Offset heater 4 channel 15
OffsetHtr4Chan16	SV	1267	F8	None	Offset heater 4 channel 16
OffsetHtr4Chan17	SV	1268	F8	None	Offset heater 4 channel 17
AF_L1S1	SV	1269	F8	None	Airflow lane 1 station 1
AF_L1S2	SV	1270	F8	None	Airflow lane 1 station 2
AF_L1S3	SV	1271	F8	None	Airflow lane 1 station 3
AF_L2S1	SV	1272	F8	None	Airflow lane 2 station 1
AF_L2S2	SV	1273	F8	None	Airflow lane 2 station 2
AF_L2S3	SV	1274	F8	None	Airflow lane 2 station 3
AF_L1S1_Limits_Enabled	SV	1275	A[4]	None	Airflow lane 1 station 1 limits enabled
AF_L1S1_UpperLimitOffset	SV	1276	F8	None	Airflow lane 1 station 1 upper limit offset

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
AF_L1S1_LowerLimitOffset	SV	1277	F8	None	Airflow lane 1 station 1 lower limit offset
AF_L1S2_Limits_Enabled	SV	1278	A[4]	None	Airflow lane 1 station 2 limits enabled
AF_L1S2_UpperLimitOffset	SV	1279	F8	None	Airflow lane 1 station 2 upper limit offset
AF_L1S2_LowerLimitOffset	SV	1280	F8	None	Airflow lane 1 station 2 lower limit offset
AF_L1S3_Limits_Enabled	SV	1281	A[4]	None	Airflow lane 1 station 3 limits enabled
AF_L1S3_UpperLimitOffset	SV	1282	F8	None	Airflow lane 1 station 3 upper limit offset
AF_L1S3_LowerLimitOffset	SV	1283	F8	None	Airflow lane 1 station 3 lower limit offset
AF_L2S1_Limits_Enabled	SV	1284	A[4]	None	Airflow lane 2 station 1 limits enabled
AF_L2S1_UpperLimitOffset	SV	1285	F8	None	Airflow lane 2 station 1 upper limit offset
AF_L2S1_LowerLimitOffset	SV	1286	F8	None	Airflow lane 2 station 1 lower limit offset
AF_L2S2_Limits_Enabled	SV	1287	A[4]	None	Airflow lane 2 station 2 limits enabled
AF_L2S2_UpperLimitOffset	SV	1288	F8	None	Airflow lane 2 station 2 upper limit offset
AF_L2S2_LowerLimitOffset	SV	1289	F8	None	Airflow lane 2 station 2 lower limit offset
AF_L2S3_Limits_Enabled	SV	1290	A[4]	None	Airflow lane 2 station 3 limits enabled
AF_L2S3_UpperLimitOffset	SV	1291	F8	None	Airflow lane 2 station 3 upper limit offset
AF_L2S3_LowerLimitOffset	SV	1292	F8	None	Airflow lane 2 station 3 lower limit offset
AF_L1S1_SetPoint	SV	1293	F8	None	Airflow lane 1 station 1 set point
AF_L1S2_SetPoint	SV	1294	F8	None	Airflow lane 1 station 2 set point
AF_L1S3_SetPoint	SV	1295	F8	None	Airflow lane 1 station 3 set point
AF_L2S1_SetPoint	SV	1296	F8	None	Airflow lane 2 station 1 set point
AF_L2S2_SetPoint	SV	1297	F8	None	Airflow lane 2 station 2 set point
AF_L2S3_SetPoint	SV	1298	F8	None	Airflow lane 2 station 3 set point
AF_L1S1_StandbyEnabled	SV	1300	A[4]	None	Airflow lane 1 station 1 standby enabled
AF_L1S1_StandbyTime	SV	1301	I4	None	Airflow lane 1 station 1 standby time
AF_L1S1_StandbyTemp	SV	1302	F8	None	Airflow lane 1 station 1 standby temperature

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
AF_L1S1_StandbyAF	SV	1303	F8	None	Airflow lane 1 station 1 standby airflow
AF_L1S1_RampEnabled	SV	1304	A[4]	None	Airflow lane 1 station 1 ramp enabled
AF_L1S1_RampTime	SV	1305	I4	None	Airflow lane 1 station 1 ramp time
AF_L1S1_RampTemp	SV	1306	F8	None	Airflow lane 1 station 1 ramp temperature
AF_L1S1_RampAF	SV	1307	F8	None	Airflow lane 1 station 1 ramp airflow
AF_L1S1_NonProdEnabled	SV	1308	A[4]	None	Airflow lane 1 station 1 non-production enabled
AF_L1S1_NonProdTemp	SV	1309	F8	None	Airflow lane 1 station 1 non-production temperature
AF_L1S1_NonProdAF	SV	1310	F8	None	Airflow lane 1 station 1 non-production airflow
AF_L1S2_StandbyEnabled	SV	1311	A[4]	None	Airflow lane 1 station 2 standby enabled
AF_L1S2_StandbyTime	SV	1312	I4	None	Airflow lane 1 station 2 standby time
AF_L1S2_StandbyTemp	SV	1313	F8	None	Airflow lane 1 station 2 standby temperature
AF_L1S2_StandbyAF	SV	1314	F8	None	Airflow lane 1 station 2 standby airflow
AF_L1S2_RampEnabled	SV	1315	A[4]	None	Airflow lane 1 station 2 ramp enabled
AF_L1S2_RampTime	SV	1316	I4	None	Airflow lane 1 station 2 ramp time
AF_L1S2_RampTemp	SV	1317	F8	None	Airflow lane 1 station 2 ramp temperature
AF_L1S2_RampAF	SV	1318	F8	None	Airflow lane 1 station 2 ramp airflow
AF_L1S2_NonProdEnabled	SV	1319	A[4]	None	Airflow lane 1 station 2 non-production enabled
AF_L1S2_NonProdTemp	SV	1320	F8	None	Airflow lane 1 station 2 non-production temperature
AF_L1S2_NonProdAF	SV	1321	F8	None	Airflow lane 1 station 2 non-production airflow
AF_L1S3_StandbyEnabled	SV	1322	A[4]	None	Airflow lane 1 station 3 standby enabled
AF_L1S3_StandbyTime	SV	1323	I4	None	Airflow lane 1 station 3 standby time
AF_L1S3_StandbyTemp	SV	1324	F8	None	Airflow lane 1 station 3 standby temperature
AF_L1S3_StandbyAF	SV	1325	F8	None	Airflow lane 1 station 3 standby airflow
AF_L1S3_RampEnabled	SV	1326	A[4]	None	Airflow lane 1 station 3 ramp enabled

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
AF_L1S3_RampTime	SV	1327	I4	None	Airflow lane 1 station 3 ramp time
AF_L1S3_RampTemp	SV	1328	F8	None	Airflow lane 1 station 3 ramp temperature
AF_L1S3_RampAF	SV	1329	F8	None	Airflow lane 1 station 3 ramp airflow
AF_L1S3_NonProdEnabled	SV	1330	A[4]	None	Airflow lane 1 station 3 non-production enabled
AF_L1S3_NonProdTemp	SV	1331	F8	None	Airflow lane 1 station 3 non-production temperature
AF_L1S3_NonProdAF	SV	1332	F8	None	Airflow lane 1 station 3 non-production airflow
AF_L2S1_StandbyEnabled	SV	1333	A[4]	None	Airflow lane 2 station 1 standby enabled
AF_L2S1_StandbyTime	SV	1334	I4	None	Airflow lane 2 station 1 standby time
AF_L2S1_StandbyTemp	SV	1335	F8	None	Airflow lane 2 station 1 standby temperature
AF_L2S1_StandbyAF	SV	1336	F8	None	Airflow lane 2 station 1 standby airflow
AF_L2S1_RampEnabled	SV	1337	A[4]	None	Airflow lane 2 station 1 ramp enabled
AF_L2S1_RampTime	SV	1338	I4	None	Airflow lane 2 station 1 ramp time
AF_L2S1_RampTemp	SV	1339	F8	None	Airflow lane 2 station 1 ramp temperature
AF_L2S1_RampAF	SV	1340	F8	None	Airflow lane 2 station 1 ramp airflow
AF_L2S1_NonProdEnabled	SV	1341	A[4]	None	Airflow lane 2 station 1 non-production enabled
AF_L2S1_NonProdTemp	SV	1342	F8	None	Airflow lane 2 station 1 non-production temperature
AF_L2S1_NonProdAF	SV	1343	F8	None	Airflow lane 2 station 1 non-production airflow
AF_L2S2_StandbyEnabled	SV	1344	A[4]	None	Airflow lane 2 station 2 standby enabled
AF_L2S2_StandbyTime	SV	1345	I4	None	Airflow lane 2 station 2 standby time
AF_L2S2_StandbyTemp	SV	1346	F8	None	Airflow lane 2 station 2 standby temperature
AF_L2S2_StandbyAF	SV	1347	F8	None	Airflow lane 2 station 2 standby airflow
AF_L2S2_RampEnabled	SV	1348	A[4]	None	Airflow lane 2 station 2 ramp enabled
AF_L2S2_RampTime	SV	1349	I4	None	Airflow lane 2 station 2 ramp time
AF_L2S2_RampTemp	SV	1350	F8	None	Airflow lane 2 station 2 ramp temperature
AF_L2S2_RampAF	SV	1351	F8	None	Airflow lane 2 station 2 ramp airflow

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
AF_L2S2_NonProdEnabled	SV	1352	A[4]	None	Airflow lane 2 station 2 non-production enabled
AF_L2S2_NonProdTemp	SV	1353	F8	None	Airflow lane 2 station 2 non-production temperature
AF_L2S2_NonProdAF	SV	1354	F8	None	Airflow lane 2 station 2 non-production airflow
AF_L2S3_StandbyEnabled	SV	1355	A[4]	None	Airflow lane 2 station 3 standby enabled
AF_L2S3_StandbyTime	SV	1356	I4	None	Airflow lane 2 station 3 standby time
AF_L2S3_StandbyTemp	SV	1357	F8	None	Airflow lane 2 station 3 standby temperature
AF_L2S3_StandbyAF	SV	1358	F8	None	Airflow lane 2 station 3 standby airflow
AF_L2S3_RampEnabled	SV	1359	A[4]	None	Airflow lane 2 station 3 ramp enabled
AF_L2S3_RampTime	SV	1360	I4	None	Airflow lane 2 station 3 ramp time
AF_L2S3_RampTemp	SV	1361	F8	None	Airflow lane 2 station 3 ramp temperature
AF_L2S3_RampAF	SV	1362	F8	None	Airflow lane 2 station 3 ramp airflow
AF_L2S3_NonProdEnabled	SV	1363	A[4]	None	Airflow lane 2 station 3 non-production enabled
AF_L2S3_NonProdTemp	SV	1364	F8	None	Airflow lane 2 station 3 non-production temperature
AF_L2S3_NonProdAF	SV	1365	F8	None	Airflow lane 2 station 3 non-production airflow
ULimitHtr1Chan1	SV	1401	F8	None	Heater 1 channel 1 airflow upper limit
ULimitHtr1Chan2	SV	1402	F8	None	Heater 1 channel 2 airflow upper limit
ULimitHtr1Chan3	SV	1403	F8	None	Heater 1 channel 3 airflow upper limit
ULimitHtr1Chan4	SV	1404	F8	None	Heater 1 channel 4 airflow upper limit
ULimitHtr1Chan5	SV	1405	F8	None	Heater 1 channel 5 airflow upper limit
ULimitHtr1Chan6	SV	1406	F8	None	Heater 1 channel 6 airflow upper limit
ULimitHtr1Chan7	SV	1407	F8	None	Heater 1 channel 7 airflow upper limit
ULimitHtr1Chan8	SV	1408	F8	None	Heater 1 channel 8 airflow upper limit
ULimitHtr1Chan9	SV	1409	F8	None	Heater 1 channel 9 airflow upper limit
ULimitHtr1Chan10	SV	1410	F8	None	Heater 1 channel 10 airflow upper limit

Table A-1   All Variables (Continued)

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
ULimitHtr1Chan11	SV	1411	F8	None	Heater 1 channel 11 airflow upper limit
ULimitHtr1Chan12	SV	1412	F8	None	Heater 1 channel 12 airflow upper limit
ULimitHtr1Chan13	SV	1413	F8	None	Heater 1 channel 13 airflow upper limit
ULimitHtr1Chan14	SV	1414	F8	None	Heater 1 channel 14 airflow upper limit
ULimitHtr1Chan15	SV	1415	F8	None	Heater 1 channel 15 airflow upper limit
ULimitHtr1Chan16	SV	1416	F8	None	Heater 1 channel 16 airflow upper limit
ULimitHtr1Chan17	SV	1417	F8	None	Heater 1 channel 17 airflow upper limit
ULimitHtr2Chan1	SV	1418	F8	None	Heater 2 channel 1 airflow upper limit
ULimitHtr2Chan2	SV	1419	F8	None	Heater 2 channel 2 airflow upper limit
ULimitHtr2Chan3	SV	1420	F8	None	Heater 2 channel 3 airflow upper limit
ULimitHtr2Chan4	SV	1421	F8	None	Heater 2 channel 4 airflow upper limit
ULimitHtr2Chan5	SV	1422	F8	None	Heater 2 channel 5 airflow upper limit
ULimitHtr2Chan6	SV	1423	F8	None	Heater 2 channel 6 airflow upper limit
ULimitHtr2Chan7	SV	1424	F8	None	Heater 2 channel 7 airflow upper limit
ULimitHtr2Chan8	SV	1425	F8	None	Heater 2 channel 8 airflow upper limit
ULimitHtr2Chan9	SV	1426	F8	None	Heater 2 channel 9 airflow upper limit
ULimitHtr2Chan10	SV	1427	F8	None	Heater 2 channel 10 airflow upper limit
ULimitHtr2Chan11	SV	1428	F8	None	Heater 2 channel 11 airflow upper limit
ULimitHtr2Chan12	SV	1429	F8	None	Heater 2 channel 12 airflow upper limit
ULimitHtr2Chan13	SV	1430	F8	None	Heater 2 channel 13 airflow upper limit
ULimitHtr2Chan14	SV	1431	F8	None	Heater 2 channel 14 airflow upper limit
ULimitHtr2Chan15	SV	1432	F8	None	Heater 2 channel 15 airflow upper limit
ULimitHtr2Chan16	SV	1433	F8	None	Heater 2 channel 16 airflow upper limit
ULimitHtr2Chan17	SV	1434	F8	None	Heater 2 channel 17 airflow upper limit
ULimitHtr3Chan1	SV	1435	F8	None	Heater 3 channel 1 airflow upper limit

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
ULimitHtr3Chan2	SV	1436	F8	None	Heater 3 channel 2 airflow upper limit
ULimitHtr3Chan3	SV	1437	F8	None	Heater 3 channel 3 airflow upper limit
ULimitHtr3Chan4	SV	1438	F8	None	Heater 3 channel 4 airflow upper limit
ULimitHtr3Chan5	SV	1439	F8	None	Heater 3 channel 5 airflow upper limit
ULimitHtr3Chan6	SV	1440	F8	None	Heater 3 channel 6 airflow upper limit
ULimitHtr3Chan7	SV	1441	F8	None	Heater 3 channel 7 airflow upper limit
ULimitHtr3Chan8	SV	1442	F8	None	Heater 3 channel 8 airflow upper limit
ULimitHtr3Chan9	SV	1443	F8	None	Heater 3 channel 9 airflow upper limit
ULimitHtr3Chan10	SV	1444	F8	None	Heater 3 channel 10 airflow upper limit
ULimitHtr3Chan11	SV	1445	F8	None	Heater 3 channel 11 airflow upper limit
ULimitHtr3Chan12	SV	1446	F8	None	Heater 3 channel 12 airflow upper limit
ULimitHtr3Chan13	SV	1447	F8	None	Heater 3 channel 13 airflow upper limit
ULimitHtr3Chan14	SV	1448	F8	None	Heater 3 channel 14 airflow upper limit
ULimitHtr3Chan15	SV	1449	F8	None	Heater 3 channel 15 airflow upper limit
ULimitHtr3Chan16	SV	1450	F8	None	Heater 3 channel 16 airflow upper limit
ULimitHtr3Chan17	SV	1451	F8	None	Heater 3 channel 17 airflow upper limit
ULimitHtr4Chan1	SV	1452	F8	None	Heater 4 channel 1 airflow upper limit
ULimitHtr4Chan2	SV	1453	F8	None	Heater 4 channel 2 airflow upper limit
ULimitHtr4Chan3	SV	1454	F8	None	Heater 4 channel 3 airflow upper limit
ULimitHtr4Chan4	SV	1455	F8	None	Heater 4 channel 4 airflow upper limit
ULimitHtr4Chan5	SV	1456	F8	None	Heater 4 channel 5 airflow upper limit
ULimitHtr4Chan6	SV	1457	F8	None	Heater 4 channel 6 airflow upper limit
ULimitHtr4Chan7	SV	1458	F8	None	Heater 4 channel 7 airflow upper limit
ULimitHtr4Chan8	SV	1459	F8	None	Heater 4 channel 8 airflow upper limit

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
ULimitHtr4Chan9	SV	1460	F8	None	Heater 4 channel 9 airflow upper limit
ULimitHtr4Chan10	SV	1461	F8	None	Heater 4 channel 10 airflow upper limit
ULimitHtr4Chan11	SV	1462	F8	None	Heater 4 channel 11 airflow upper limit
ULimitHtr4Chan12	SV	1463	F8	None	Heater 4 channel 12 airflow upper limit
ULimitHtr4Chan13	SV	1464	F8	None	Heater 4 channel 13 airflow upper limit
ULimitHtr4Chan14	SV	1465	F8	None	Heater 4 channel 14 airflow upper limit
ULimitHtr4Chan15	SV	1466	F8	None	Heater 4 channel 15 airflow upper limit
ULimitHtr4Chan16	SV	1467	F8	None	Heater 4 channel 16 airflow upper limit
ULimitHtr4Chan17	SV	1468	F8	None	Heater 4 channel 17 airflow upper limit
LLimitHtr1Chan1	SV	1469	F8	None	Heater 1 channel 1 airflow lower limit
LLimitHtr1Chan2	SV	1470	F8	None	Heater 1 channel 2 airflow lower limit
LLimitHtr1Chan3	SV	1471	F8	None	Heater 1 channel 3 airflow lower limit
LLimitHtr1Chan4	SV	1472	F8	None	Heater 1 channel 4 airflow lower limit
LLimitHtr1Chan5	SV	1473	F8	None	Heater 1 channel 5 airflow lower limit
LLimitHtr1Chan6	SV	1474	F8	None	Heater 1 channel 6 airflow lower limit
LLimitHtr1Chan7	SV	1475	F8	None	Heater 1 channel 7 airflow lower limit
LLimitHtr1Chan8	SV	1476	F8	None	Heater 1 channel 8 airflow lower limit
LLimitHtr1Chan9	SV	1477	F8	None	Heater 1 channel 9 airflow lower limit
LLimitHtr1Chan10	SV	1478	F8	None	Heater 1 channel 10 airflow lower limit
LLimitHtr1Chan11	SV	1479	F8	None	Heater 1 channel 11 airflow lower limit
LLimitHtr1Chan12	SV	1480	F8	None	Heater 1 channel 12 airflow lower limit
LLimitHtr1Chan13	SV	1481	F8	None	Heater 1 channel 13 airflow lower limit
LLimitHtr1Chan14	SV	1482	F8	None	Heater 1 channel 14 airflow lower limit
LLimitHtr1Chan15	SV	1483	F8	None	Heater 1 channel 15 airflow lower limit
LLimitHtr1Chan16	SV	1484	F8	None	Heater 1 channel 16 airflow lower limit

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
LLimitHtr1Chan17	SV	1485	F8	None	Heater 1 channel 17 airflow lower limit
LLimitHtr2Chan1	SV	1486	F8	None	Heater 2 channel 1 airflow lower limit
LLimitHtr2Chan2	SV	1487	F8	None	Heater 2 channel 2 airflow lower limit
LLimitHtr2Chan3	SV	1488	F8	None	Heater 2 channel 3 airflow lower limit
LLimitHtr2Chan4	SV	1489	F8	None	Heater 2 channel 4 airflow lower limit
LLimitHtr2Chan5	SV	1490	F8	None	Heater 2 channel 5 airflow lower limit
LLimitHtr2Chan6	SV	1491	F8	None	Heater 2 channel 6 airflow lower limit
LLimitHtr2Chan7	SV	1492	F8	None	Heater 2 channel 7 airflow lower limit
LLimitHtr2Chan8	SV	1493	F8	None	Heater 2 channel 8 airflow lower limit
LLimitHtr2Chan9	SV	1494	F8	None	Heater 2 channel 9 airflow lower limit
LLimitHtr2Chan10	SV	1495	F8	None	Heater 2 channel 10 airflow lower limit
LLimitHtr2Chan11	SV	1496	F8	None	Heater 2 channel 11 airflow lower limit
LLimitHtr2Chan12	SV	1497	F8	None	Heater 2 channel 12 airflow lower limit
LLimitHtr2Chan13	SV	1498	F8	None	Heater 2 channel 13 airflow lower limit
LLimitHtr2Chan14	SV	1499	F8	None	Heater 2 channel 14 airflow lower limit
LLimitHtr2Chan15	SV	1500	F8	None	Heater 2 channel 15 airflow lower limit
LLimitHtr2Chan16	SV	1501	F8	None	Heater 2 channel 16 airflow lower limit
LLimitHtr2Chan17	SV	1502	F8	None	Heater 2 channel 17 airflow lower limit
LLimitHtr3Chan1	SV	1503	F8	None	Heater 3 channel 1 airflow lower limit
LLimitHtr3Chan2	SV	1504	F8	None	Heater 3 channel 2 airflow lower limit
LLimitHtr3Chan3	SV	1505	F8	None	Heater 3 channel 3 airflow lower limit
LLimitHtr3Chan4	SV	1506	F8	None	Heater 3 channel 4 airflow lower limit
LLimitHtr3Chan5	SV	1507	F8	None	Heater 3 channel 5 airflow lower limit
LLimitHtr3Chan6	SV	1508	F8	None	Heater 3 channel 6 airflow lower limit

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
LLimitHtr3Chan7	SV	1509	F8	None	Heater 3 channel 7 airflow lower limit
LLimitHtr3Chan8	SV	1510	F8	None	Heater 3 channel 8 airflow lower limit
LLimitHtr3Chan9	SV	1511	F8	None	Heater 3 channel 9 airflow lower limit
LLimitHtr3Chan10	SV	1512	F8	None	Heater 3 channel 10 airflow lower limit
LLimitHtr3Chan11	SV	1513	F8	None	Heater 3 channel 11 airflow lower limit
LLimitHtr3Chan12	SV	1514	F8	None	Heater 3 channel 12 airflow lower limit
LLimitHtr3Chan13	SV	1515	F8	None	Heater 3 channel 13 airflow lower limit
LLimitHtr3Chan14	SV	1516	F8	None	Heater 3 channel 14 airflow lower limit
LLimitHtr3Chan15	SV	1517	F8	None	Heater 3 channel 15 airflow lower limit
LLimitHtr3Chan16	SV	1518	F8	None	Heater 3 channel 16 airflow lower limit
LLimitHtr3Chan17	SV	1519	F8	None	Heater 3 channel 17 airflow lower limit
LLimitHtr4Chan1	SV	1520	F8	None	Heater 4 channel 1 airflow lower limit
LLimitHtr4Chan2	SV	1521	F8	None	Heater 4 channel 2 airflow lower limit
LLimitHtr4Chan3	SV	1522	F8	None	Heater 4 channel 3 airflow lower limit
LLimitHtr4Chan4	SV	1523	F8	None	Heater 4 channel 4 airflow lower limit
LLimitHtr4Chan5	SV	1524	F8	None	Heater 4 channel 5 airflow lower limit
LLimitHtr4Chan6	SV	1525	F8	None	Heater 4 channel 6 airflow lower limit
LLimitHtr4Chan7	SV	1526	F8	None	Heater 4 channel 7 airflow lower limit
LLimitHtr4Chan8	SV	1527	F8	None	Heater 4 channel 8 airflow lower limit
LLimitHtr4Chan9	SV	1528	F8	None	Heater 4 channel 9 airflow lower limit
LLimitHtr4Chan10	SV	1529	F8	None	Heater 4 channel 10 airflow lower limit
LLimitHtr4Chan11	SV	1530	F8	None	Heater 4 channel 11 airflow lower limit
LLimitHtr4Chan12	SV	1531	F8	None	Heater 4 channel 12 airflow lower limit
LLimitHtr4Chan13	SV	1532	F8	None	Heater 4 channel 13 airflow lower limit
LLimitHtr4Chan14	SV	1533	F8	None	Heater 4 channel 14 airflow lower limit

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
LLimitHtr4Chan15	SV	1534	F8	None	Heater 4 channel 15 airflow lower limit
LLimitHtr4Chan16	SV	1535	F8	None	Heater 4 channel 16 airflow lower limit
LLimitHtr4Chan17	SV	1536	F8	None	Heater 4 channel 17 airflow lower limit
FluidLevelState	SV	1538	I4	None	Fluid syringe level sensor state
DHLinearFluidSensorPct	SV	1539	I4	None	Dispense head linear fluid sensor level %
DHLinearFluidSensorState	SV	1540	I4	None	Dispense head linear fluid sensor state
ActiveNozzleState	SV	1541	Boolean	None	Active Nozzle On/Off state
LibraryPatternFilename	SV	1546	A[100]	None	Library pattern filename
LibraryPatternPath	SV	1547	A[100]	None	Library pattern path
c_ScaleFMWPerUnit	SV	1552	A[30]	None	Scale of FMW units to machine units
FirmwareRev	SV	1553	F8	None	Main board firmware revision
FirmwareBuild	SV	1554	A[40]	None	Main board firmware build
c_ModuleAutoMode	SV	1555	A[4]	None	Module skip auto mode
c_ModuleOutgoingFlowControl	SV	1556	I4	None	Module skip outgoing flow control
c_ModuleIncomingFlowControl	SV	1557	I4	None	Module skip incoming flow control
c_ModuleNumberOfRetries	SV	1558	I4	None	Module skip number of retries
c_ModuleTeachWindowMode	SV	1559	I4	None	Module skip teach window mode
OperatingSystem	SV	1560	A[20]	None	Computer operating system
Software	SV	1561	A[20]	None	Fluidmove FmXP/FmNT
SoftwareRev	SV	1562	A[20]	None	Fluidmove version
GemInstallVersion	SV	1563	A[20]	None	SECS/GEM software version
GemGCPFileVersion	SV	1564	A[20]	None	SECS/GEM .gcp file version
GemDriverVersion	SV	1565	A[20]	None	SECS/GEM software driver version
c_UILanguage	SV	1566	I4	None	User interface language

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
ClearPinsMove	SV	1567	F8	None	Clear stop pins move distance
S2RequestDelayMove	SV	1568	F8	None	Station 2 request delay move time
S3RequestDelayMove	SV	1569	F8	None	Station 3 request delay move time
ClearDownPinDelay	SV	1570	F8	None	Clear down pin delay time
S3OutFirst	SV	1571	F8	None	Station 3 out first
ec_ValvePressSetLmoOffsetUsr_V1	EC	1800	F8	None	Electronic Valve Pressure setting LMO for valve 1
ec_CoolingPressSetLmoOffsetUsr_V1	EC	1801	F8	None	Electronic Cooling Pressure setting LMO for valve 1
ec_FluidPressSetLmoOffsetUsr_V1	EC	1802	F8	None	Electronic Fluid Pressure setting LMO for valve 1
ec_ValvePressReadLmoOffsetUsr_V1	EC	1803	F8	None	Electronic Valve Pressure reading LMO for valve 1
ec_CoolingPressReadLmoOffsetUsr_V1	EC	1804	F8	None	Electronic Cooling Pressure reading LMO for valve 1
ec_FluidPressReadLmoOffsetUsr_V1	EC	1805	F8	None	Electronic Fluid Pressure reading LMO for valve 1
ec_ValvePressSetLmoOffsetUsr_V2	EC	1806	F8	None	Electronic Valve Pressure setting LMO for valve 2
ec_CoolingPressSetLmoOffsetUsr_V2	EC	1807	F8	None	Electronic Cooling Pressure setting LMO for valve 2
ec_FluidPressSetLmoOffsetUsr_V2	EC	1808	F8	None	Electronic Fluid Pressure setting LMO for valve 2
ec_ValvePressReadLmoOffsetUsr_V2	EC	1809	F8	None	Electronic Valve Pressure reading LMO for valve 2
ec_CoolingPressReadLmoOffsetUsr_V2	EC	1810	F8	None	Electronic Cooling Pressure reading LMO for valve 2
ec_FluidPressReadLmoOffsetUsr_V2	EC	1811	F8	None	Electronic Fluid Pressure reading LMO for valve 2
sv_PressLmoOffsetUserUnit_V1	SV	1830	A[10]	None	Units that E/P LMO offsets are stored in for valve 1: "kPa" or "psi"
sv_PressLmoOffsetUserUnit_V2	SV	1831	A[10]	None	Units that E/P LMO offsets are stored in for valve 2: "kPa" or "psi"
ConfigParmRejectedID	DV	5999	I4	3650	This data variable contains the EC ID of the invalid configuration parameter rejected by the equipment.
FmConfig.ini File Variables		6000-6768			See *Appendix D – FmConfig.ini File Variables*

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
CurrentFidFoundXY	DV	7000	A[40]	8000 8001 8801 8802 8803 8804 8805 8806 8807 8808	XY location of currently found fiducials. As fiducials are found, this variable will be updated and either collection event 8000 (for pattern fiducials), 8001 (for workpiece 1 fiducials) or 8002 (for workpiece fiducials 2) will be triggered. By using this variable, fiducials can be collected at the moment they are found. The XY locations will also be stored in variables 7801 (for workpiece 1) or 7802 (for workpiece 2) or sequentially to variables 7001 to 7300 (for pattern fiducials) if it is more efficient to upload all Fiducial locations at once at the end of the program.
PATTFidFoundXY_1 – PATTFidFoundXY_300	DV	7001-7300	A[40]	8000 8001	Sequential XY location of found pattern fiducials in order dictated by program (300 max) Collection event 2002 is an existing event that is triggered when dispensing is done. A report can be created containing all or some of the Fiducial locations and then tied to CE 2002.
CurrentHsFoundXYZ	DV	7400	A[40]	8400	Current height sense location
HsFoundXYZ_1 - HsFoundXYZ_300	DV	7401 - 7700	A[40]	8400	Sequential height sense XYZ locations found by program (300 max)
HeightSenseOriginConv1	DV	7701	A[60]	8401	Height sense origin on conveyor 1
HeightSenseOriginConv2	EC	7702	F8	8402	Height sense origin on conveyor 2
LmoHeightSenseLane1UserUnits	EC	7703	F8	3717	Local machine offsets lane 1 user units
LmoHeightSenseLane2UserUnits	EC	7704	A[30]	3717	Local machine offsets lane 2 user units
LmoWpFrame	EC	7705	A[30]	3713	Local machine offsets workpiece frame
LmoWpFidFoundXY_1	DV	7706	A[50]	3718	Local machine offsets workpiece fid found XY location 1
LmoWpFidFoundXY_2	DV	7707	A[40]	3719	Local machine offsets workpiece fid found XY location 2

Caption: *Table A-1   All Variables (Continued)*

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
LmoWpFidFoundScore_1	DV	7708	A[40]	3718	Local machine offsets workpiece fid found XY location 1 score
LmoWpFidFoundScore_2	DV	7709	I2	3761	Local machine offsets workpiece fid found XY location 2 score
LucImageXY	DV	7710	I2	8002 8003	Lookup camera image XY location
LucImageScore	DV	7711	A[40]	8002 8003	Lookup camera image XY location score
BoardSequenceNumber	EC	7800	Boolean	None	Carrier Sequence # (sequential) This number is reset each time "GO" is pressed. For a running board count processed since power up, see existing SV 106 (BoardCount).
WPFidFoundXY_1	DV	7801	U4	8800	Workpiece fiducial #1 XY (actual found)
WPFidFoundXY_2	DV	7802	A[40]	8801	Workpiece fiducial #2 XY (actual found)
WPFidFoundScore_1	DV	7803	A[40]	8802	Workpiece fiducial #1 image score
WPFidFoundScore_2	DV	7804	I2	8802	Workpiece fiducial #2 image score
UseKeepoutZones	EC	7808	Boolean	None	Enable keep out zones
TrcWriteToFile	EC	7809	Boolean	None	Trace write to file enable
TrcWriteToDbgWindow	EC	7810	Boolean	None	Trace write to debug window enable
TrcBufferedWrite	EC	7811	Boolean	None	Trace buffered write enable
DbgWriteToFile	EC	7812	Boolean	None	Debug write to file enable
DbgWriteToDbgWindow	EC	7813	Boolean	None	Debug write to debug window enable
DbgBufferedWrite	EC	7814	Boolean	None	Debug buffered write enable
DbgSuppressFileCreation	EC	7815	Boolean	None	Debug suppress file creation enable
DbgEnableAllLogs	EC	7816	Boolean	None	Debug enable all logs (enable)
TrcEnableAllLogs	EC	7817	Boolean	None	Trace enable all logs (enable)

Table A-1   All Variables (Continued)

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
CurrentFidFoundScore	DV	10000	I2	8000 8001 8801 8802 8803 8804 8805 8806 8807 8808	Current fiducial found image score. This can be a workpiece or pattern image.
PattFidFoundScore_1 – PattFidFoundScore_300	DV	10001 to 10300	I2	2002	Sequential fiducial scores of found pattern fiducials in order dictated by program (300 max)
fd_OnTime	DV	11000	I2	3002 3004 3005 3009 3010 3011	Fluid on time
fd_DwellSecs	DV	11001	A[30]	3002 3004 3005 3009 3010 3011	Fluid dwell time

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
fd_DispenseGap	DV	11002	A[30]	3002 3004 3005 3009 3010 3011	Fluid dispense gap
fd_Notes	DV	11003	A[30]	3002 3004 3005 3009 3010 3011	Fluid file notes
fd_MidmoveCount1	DV	11004	A[100]	3002 3004 3005	Fluid mid-move count1
fd_MidmoveCount2	DV	11005	A[30]	3009 3010 3011	Fluid mid-move count2
fd_DownSpeed	DV	11006	A[30]	3002 3004 3005 3009 3010 3011	Fluid valve down speed
fd_DownAccel	DV	11007	A[30]	3002 3004 3005 3009 3010 3011	Fluid valve down acceleration

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
fd_SettleSecs	DV	11008	A[30]	3002 3004 3005 3009 3010 3011	Fluid valve dispense settling time
fd_OnVectorMode	DV	11009	A[30]	3002 3004 3005 3009 3010 3011	Fluid On vector mode
fd_OffVectorMode	DV	11010	I4	3002 3004 3005 3009 3010 3011	Fluid Off vector mode
fd_NumShots	DV	11011	I4	3002 3004 3005 3009 3010 3011	Fluid number of shots (Jet Valve)
fd_MultishotZDelta	DV	11012	I4	3002 3004 3005 3009 3010 3011	Fluid multi-shot Z delta

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
fd_UpSpeed	DV	11013	A[30]	3002 3004 3005 3009 3010 3011	Fluid valve up speed
fd_UpAccel	DV	11014	A[30]	3002 3004 3005 3009 3010 3011	Fluid valve up acceleration
fd_RetractDistance	DV	11015	A[30]	3002 3004 3005 3009 3010 3011	Fluid valve retract distance
fd_Suckback	DV	11016	A[30]	3002 3004 3005 3009 3010 3011	Fluid suck-back time
fd_PostRetractDwell	DV	11017	A[30]	3002 3004 3005 3009 3010 3011	Fluid post retract dwell time

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
fd_AssistDelay	DV	11018	A[30]	3002 3004 3005 3009 3010 3011	Fluid assist delay
fd_AssistDuration	DV	11019	A[30]	3002 3004 3005 3009 3010 3011	Fluid assist duration
fd_ValveOnTime	DV	11020	A[30]	3002 3004 3005 3009 3010 3011	Fluid valve on time
fd_DotSpacing	DV	11021	A[30]	3002 3004 3005 3009 3010 3011	Fluid dispensed dot spacing
fd_Acceleration	DV	11022	A[30]	3002 3004 3005 3009 3010 3011	Fluid acceleration

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
fd_EncEnable	DV	11023	A[30]	3002 3004 3005 3009 3010 3011	Fluid valve encoder acceleration
fd_EncForwardSpd	DV	11024	A[30]	3002 3004 3005 3009 3010 3011	Fluid valve encoder forward speed
fd_EncReverseSpd	DV	11025	A[30]	3002 3004 3005 3009 3010 3011	Fluid valve encoder reverse speed
fd_EncAccel	DV	11026	A[30]	3002 3004 3005 3009 3010 3011	Fluid valve encoder acceleration
fd_EncDecel	DV	11027	A[30]	3002 3004 3005 3009 3010 3011	Fluid valve encoder deceleration

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
fd_EncCounts	DV	11028	A[30]	3002 3004 3005 3009 3010 3011	Fluid valve encoder counts
fd_EncSuckback	DV	11029	I4	3002 3004 3005 3009 3010 3011	Fluid valve encoder suck-back
fl_PremoveDelay	DV	11100	I4	3002 3004 3005 3009 3010 3011	Fluid 1 pre-move delay
fl_ShutoffDistance	DV	11101	A[30]	3002 3004 3005 3009 3010 3011	Fluid 1 shut off distance
fl_DispenseGap	DV	11102	A[30]	3002 3004 3005 3009 3010 3011	Fluid 1 dispense gap

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
fl_Speed	DV	11103	A[30]	3002 3004 3005 3009 3010 3011	Fluid 1 line speed
fl_Weightcontrollinespeed	DV	11104	A[30]	3002 3004 3005 3009 3010 3011	Fluid 1 weight control line speed
fl_DwellTime	DV	11105	A[30]	3002 3004 3005 3009 3010 3011	Fluid 1 dwell time
fl_RetractDistance	DV	11106	A[30]	3002 3004 3005 3009 3010 3011	Fluid 1 retract distance
fl_BacktrackGap	DV	11107	A[30]	3002 3004 3005 3009 3010 3011	Fluid 1 back track gap

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
fl_BacktrackLength	DV	11108	A[30]	3002 3004 3005 3009 3010 3011	Fluid 1 back track length
fl_BacktrackSpeed	DV	11109	A[30]	3002 3004 3005 3009 3010 3011	Fluid 1 back track speed
fl_Notes	DV	11110	A[30]	3002 3004 3005 3009 3010 3011	Fluid 1 notes
fl_DownSpeed	DV	11111	A[100]	3002 3004 3005 3009 3010 3011	Fluid 1 valve down speed
fl_DownAccel	DV	11112	A[30]	3002 3004 3005 3009 3010 3011	Fluid 1 valve down acceleration

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
fl_UpSpeed	DV	11113	A[30]	3002 3004 3005 3009 3010 3011	Fluid 1 valve up speed
fl_UpAccel	DV	11114	A[30]	3002 3004 3005 3009 3010 3011	Fluid 1valve up acceleration
fl_Suckback	DV	11115	A[30]	3002 3004 3005 3009 3010 3011	Fluid 1 suck back time
fl_VelocityAdjustmentFactor	DV	11116	A[30]	3002 3004 3005 3009 3010 3011	Fluid 1 velocity adjustment factor
fl_FluidOnResponseTime	DV	11117	A[30]	3002 3004 3005 3009 3010 3011	Fluid 1 On response time

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
fl_FluidOffResponseTime	DV	11118	A[30]	3002 3004 3005 3009 3010 3011	Fluid 1 Off response fime
fl_Assist1OnResponseTime	DV	11119	A[30]	3002 3004 3005 3009 3010 3011	Fluid 1 assist On response time
fl_Assist1OffResponseTime	DV	11120	A[30]	3002 3004 3005 3009 3010 3011	Fluid 1 assist Off response time
fl_Assist2OnResponseTime	DV	11121	A[30]	3002 3004 3005 3009 3010 3011	Fluid 1 assist 2 On response time
fl_Assist2OffResponseTime	DV	11122	A[30]	3002 3004 3005 3009 3010 3011	Fluid 1 assist 2Off response time

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
fl_DispenseHeight	DV	11123	A[30]	3002 3004 3005 3009 3010 3011	Fluid 1 dispense height
fl_DispenseWidth	DV	11124	A[30]	3002 3004 3005 3009 3010 3011	Fluid 1 dispense width
fc_PurgeEnabled	DV	11200	A[30]	3652	Fluid purge enabled
fc_PurgeDuration	DV	11201	A[4]	3652	Fluid purge duration
fc_PurgeInterval	DV	11202	A[30]	3652	Fluid purge interval
fc_FlowRateEnabled	DV	11203	A[30]	3652	Fluid flow rate enabled
fc_FlowCalibrationInterval	DV	11204	A[4]	3652	Fluid flow rate calibration interval
fc_FlowCalibrationDuration	DV	11205	A[30]	3652	Fluid flow rate calibration duration
fc_DJFlowCalibrationMinWeight	DV	11206	A[30]	3652	Fluid DJ flow rate calibration minimum weight
fc_PercentofMaxDJWeightControlSpeed	DV	11207	A[30]	3652	Percent of maximum DJ weight control speed
fc_SetPurgeOnTimer	DV	11208	A[30]	3652	Fluid set purge on timer
fc_SetFlowRateOnTimer	DV	11209	I4	3651	Fluid set flow rate on timer
fc_PurgeonRunCount	DV	11210	I4	3651	Purge on run count #
fc_FlowRateCalibrationonRunCount	DV	11211	I4	3651	Do flow rate calibration on run count #
fc_FlowCalibrationDispenses	DV	11212	I4	3651	Flow rate calibration number of dispenses
fc_FlowCalibrationIntervalDelay	DV	11213	I4	3651	Flow rate calibration interval delay
fc_MinimumFlowRate	DV	11214	A[30]	3652	Fluid minimum flow rate limit
fc_MaximumFlowRate	DV	11215	A[30]	3652	Fluid maximum flow rate limit

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
fc_Fluidname	DV	11216	A[30]	3652	Fluid name
fc_PotLifeEnabled	DV	11217	A[100]	3652	Pot life check enabled
fc_Potlife	DV	11218	A[4]	3652	Pot life time (hours)
fc_Potlifenotify	DV	11219	A[30]	3652	Pot life notify when time is below (hours)
fc_ScaleBias	DV	11220	A[30]	3652	Scale bias
fc_ZeroScaleXOffset	DV	11221	A[30]	3652	Zero scale X offset
fc_ZeroScaleYOffset	DV	11222	A[30]	3652	Zero scale Y offset
fc_ZeroScaleZOffset	DV	11223	A[30]	3652	Zero scale Z offset
fc_FlowCalibrationPreMove	DV	11224	A[30]	3652	Flow rate calibration pre-move
fc_FlowCalibrationPostMove	DV	11225	A[100]	3652	Flow rate calibration post-move
fc_FilletBias	DV	11226	A[100]	3652	Fluid fillet bias
fc_BoardsafterLowFluidSensed	DV	11227	A[30]	3652	Boards to dispense after low fluid sensed
fc_LowFluidBoardsToGo	DV	11228	I4	3651	Low fluid detected – boards to go until stop
fc_EnableLowFluidCheck	DV	11229	I4	3651	Enable low fluid check
fc_LowFluidCheck	DV	11230	A[4]	3652	Low fluid check mode
fc_DefaultWeightofPrimedFluid	DV	11231	I4	3651	Default weight of primed fluid
fc_Initialsyringeweight	DV	11232	A[30]	3652	Initial syringe weight
fc_Warningsyringeweight	DV	11233	A[30]	3652	Warning level syringe weight
fc_Criticalsyringeweight	DV	11234	A[30]	3652	Critical syringe weight
fc_AllowFutureThawTime	DV	11235	A[30]	3652	Allow future thaw time
fc_DisplaywarningonlowFluidSense	DV	11236	A[4]	3652	Display warning on low fluid sense
fc_VacuumShutoffDelayTime	DV	11237	A[4]	3652	Vacuum shutoff delay time
fc_VacuumDelayEnabled	DV	11238	A[30]	3652	Vacuum delay enable
fc_VacuumPreShutoffTime	DV	11239	A[4]	3652	Vacuum pre-shutoff time

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
fc_VacuumPreShutoffEnabled	DV	11240	A[30]	3652	Vacuum pre-shutoff enable
fc_MultiFlowRateCalibrationEnable	DV	11241	A[4]	3652	Multi flow rate calibration enable
fc_MultiFlowRateCalibrationCount	DV	11242	A[4]	3652	Multi flow rate calibration enable
fc_ResetFlowRateTimer	DV	11243	I4	3651	Reset flow rate timer
fc_ResetPurgeTimer	DV	11244	A[4]	3652	Reset purge timer
fc_ResetDispenseWeightVerifyTimer	DV	11245	A[4]	3652	Reset dispense weight verification timer
fc_DispenseWeightBlockProduction	DV	11246	A[4]	3652	Disable dispense weigh calibration if block production active
fc_DispenseWeightTarget	DV	11247	A[4]	3652	Dispense weight calibration target
fc_DispenseWeightTimeBetweenDispenses	DV	11248	A[30]	3652	Dispense weight time between dispenses
fc_DispenseWeightMaximumLimit	DV	11249	A[30]	3652	Dispense weight calibration maximum limit
fc_DispenseWeightMinimumLimit	DV	11250	A[30]	3652	Dispense weight calibration minimum limit
fc_DispenseWeightNumberofDispenses	DV	11251	A[30]	3652	Dispense weight verification number of dispenses
fc_DispenseWeightCheckMaxRange	DV	11252	I4	3651	Dispense weight check maximum range enable
fc_DispenseWeightMaxRange	DV	11253	A[4]	3652	Dispense weight maximum range
fc_DispenseWeightPurgeBeforeVerify	DV	11254	A[30]	3652	Dispense weight purge before verify
fc_FlowRateBlockProduction	DV	11255	A[4]	3652	Disable flow rate calibration if block production active
fc_ValveAutoBiasBlockProduction	DV	11256	A[4]	3652	Disable valve auto bias if block production active
fc_ValveAutoBiasTargetWeight	DV	11257	A[4]	3652	Valve auto bias target weight
fc_LastComputedValveAutoBias	DV	11258	A[30]	3652	Last computed valve auto bias value
fc_ValveAutoBiasMaximumLimit	DV	11259	A[30]	3652	Valve auto bias maximum limit
fc_ValveAutoBiasMinimumLimit	DV	11260	A[30]	3652	Valve auto bias minimum limit
fc_ValveAutoBiasNumberofDispenses	DV	11261	A[30]	3652	Valve auto bias number of dispenses
fc_ValveAutoBiasTimeBetweenDispenses	DV	11262	I4	3651	Valve auto bias time between dispenses

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
fc_SkipFirstShotinMFR	DV	11263	A[30]	3652	Skip first shot in measured flow rate
fc_LoadPromptedSetupPSS	DV	11264	A[4]	3652	Load prompted setup PSS file
fc_LoadChangeSyringePSS	DV	11265	A[4]	3652	Load change syringe PSS file
fc_LoadLowFluidPSS	DV	11266	A[4]	3652	Load low fluid PSS file
fc_PromptedSetupPSSFilename	DV	11267	A[4]	3652	Prompted setup PSS filename
fc_ChangeSyringePSSFilename	DV	11268	A[100]	3652	Change syringe PSS filename
fc_LowFluidPSSFilename	DV	11269	A[100]	3652	Low fluid PSS filename
fc_FluxWtBlockProduction	DV	11270	A[100]	3652	Disable flux weight verification if block production active (enable)
fc_FluxWtValveOnTime	DV	11271	A[4]	3652	Flux weight verification valve on time
fc_FluxWtTarget	DV	11272	A[30]	3652	Flux weight verification target weight
fc_FluxWtTimeBetweenDispenses	DV	11273	A[30]	3652	Flux weight verification time between dispenses
fc_FluxWtMaxLimit	DV	11274	A[30]	3652	Flux weight verification maximum limit
fc_FluxWtMinLimit	DV	11275	A[30]	3652	Flux weight verification minimum limit
fc_FluxWtNumberofDispenses	DV	11276	A[30]	3652	Flux weight verification number of dispenses
fc_FluxWtCheckMaxRange	DV	11277	I4	3651	Flux weight verification check max range
fc_FluxWtMaxRange	DV	11278	A[4]	3652	Flux weight verification maximum range
fc_FluxWtCheckLimits	DV	11279	A[30]	3652	Flux weight verification check limits
fc_FluxWtPurgeBeforeVerify	DV	11280	A[4]	3652	Flux weight verification purge before verify
fc_FluxWtPurgeBetweenDispenses	DV	11281	A[4]	3652	Flux weight verification purge between dispenses
fc_DJvalveontime	DV	11282	A[4]	3652	DJ valve on time
fc_DJvalveofftime	DV	11283	A[30]	3652	DJ valve off time
fc_Numberofdotsininitialdispense	DV	11284	A[30]	3652	DJ valve – number of shots in initial dispense
fc_Fluxvalveontime	DV	11285	I4	3651	Flux valve on time

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
fc_RuntimeDispenseWeightVerificationEnabled	DV	11286	A[30]	3652	Runtime dispense weight verification
fc_DispenseWeightVerificationInterval	DV	11287	A[4]	3652	Dispense weight verification interval time
fc_DispenseWeightVerificationonRunCount	DV	11288	A[30]	3652	Dispense weight verification run count
fc_DoDispenseWeightVerificationonTimer	DV	11289	I4	3651	Do dispense weight verification on timer
fc_MaxDeviationAbovePreviousFlowrate	DV	11290	I4	3651	Maximum deviation above previous flow rate
fc_MaxDeviationBelowPreviousFlowrate	DV	11291	A[30]	3652	Maximum deviation below previous flow rate
fc_PressureSettingUnits_V1	DV	11292	A[30]	3652	Pressure setting user units valve 1
fc_FluidPressureSetting_V1	DV	11293	A[10]	3652	Fluid pressure setting valve 1
fc_ValvePressureSetting_V1	DV	11294	A[30]	3652	Valve pressure setting valve 1
fc_CoolingPressureSetting_V1	DV	11295	A[30]	3652	Cooling pressure setting valve 1
fc_FluidPressureTol_V1	DV	11296	A[30]	3652	Fluid pressure tolerance valve 1
fc_ValvePressureTol_V1	DV	11297	A[30]	3652	Valve pressure tolerance valve 1
fc_CoolingPressureTol_V1	DV	11298	A[30]	3652	Cooling pressure tolerance valve 1
fc_DotWeightPressureControlled_V1	DV	11299	A[30]	3652	Dot weight is pressure controlled
fc_DesiredDotWeight_V1	SV	11300	A[4]	None	Desired dot weight (pressure controlled)
fc_MinFluidPressure_V1	SV	11301	A[30]	None	Minimum fluid pressure (pressure controlled dot weight)
fc_MaxFluidPressure_V1	SV	11302	A[30]	None	Maximum fluid pressure (pressure controlled dot weight)
f_CBoolParm	DV	11387	A[4]	3651	Generic secs/gem variable when adding new fluid file parameters
f_CIntParm	DV	11389	I4	3652	Generic secs/gem variable when adding new fluid file parameters
f_CUintParm	DV	11390	I4	3652	Generic secs/gem variable when adding new fluid file parameters
f_CLongParm	DV	11391	I4	3652	Generic secs/gem variable when adding new fluid file parameters

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
f_CDblParm	DV	11392	A[30]	3651	Generic secs/gem variable when adding new fluid file parameters
f_CStrParm	DV	11393	A[100]	3651	Generic secs/gem variable when adding new fluid file parameters
f_CStrParmBlankOK	DV	11394	A[100]	3651	Generic secs/gem variable when adding new fluid file parameters
f_CXYFMWBaseParm	DV	11395	A[40]	3651	Generic secs/gem variable when adding new fluid file parameters
f_CXYFMWLocalParm	DV	11396	A[40]	3651	Generic secs/gem variable when adding new fluid file parameters
f_CXYZFMWLocalParm	DV	11397	A[50]	3651	Generic secs/gem variable when adding new fluid file parameters
f_CVariableParm	DV	11398	A[40]	3651	Generic secs/gem variable when adding new fluid file parameters
LastFluidFileParm	DV	11399	I2	3652	Generic secs/gem variable when adding new fluid file parameters
h_VerifyTimeout	DV	11400	I4	3654	Heater verify timeout
h_Numberofloops	DV	11401	I4	3654	Heater number of loops
h_Name	DV	11410	A[100]	3653	Heater name
h_TurnOffDuringFids	DV	11411	I4	3654	Turn heater off during fid search
h_OutputDuringFids	DV	11412	I4	3654	Report heater output during fid finding
h_VerifyBeforeDispense	DV	11413	I4	3654	Verify heater temp before dispensing
h_VerifyUpperLimit	DV	11414	I4	3654	Verify heater temp upper limit
h_VerifyLowerLimit	DV	11415	I4	3654	Verify heater temp lower limit
h_SetOffWhenIdle	DV	11416	I4	3654	Turn heater off when idle
h_WarnBeforeHeaterOff	DV	11417	I4	3654	Warn user before turning off heater

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
h_PreventFlowRateIfHtrOff	DV	11418	I4	3654	Prevent flow rate calibration if heater is off
h_PreventPurgeIfHtrOff	DV	11419	I4	3654	Prevent purge if heater is off
h_OnOff	DV	11420	I4	3654	Heater ON/OFF
h_AutoManual	DV	11421	I4	3654	Heater auto/manual temperature
h_ManualOutputLevel	DV	11422	A[30]	3653	Heater manual output level
h_ScaleUnits	DV	11423	I4	3654	Temp scale units (Fahrenheit /Celsius)
h_SetPoint	DV	11424	A[30]	3653	Heater set point
h_ProportionalBand	DV	11425	I4	3654	Heater proportional band
h_Integral	DV	11426	I4	3654	Heater integral
h_Derivative	DV	11427	I4	3654	Heater derivative
h_OutputFilter	DV	11428	I4	3654	Heater output filter
h_HotColdSpread	DV	11429	A[30]	3653	Heater hot – cold spread
h_InputType	DV	11430	I4	3654	Heater input type
h_InputReadingOffsetBias	DV	11431	I4	3654	Heater input reading offset bias
h_InputFilter	DV	11432	I4	3654	Heater input filter
h_OutputEnable	DV	11433	I4	3654	Heater output enable
h_OutputControlType	DV	11434	I4	3654	Heater output control type
h_OutputAction	DV	11435	I4	3654	Heater output action
h_OutputHeatCycleTime	DV	11436	I4	3654	Heater output heat cycle time
h_OutputHeatLimitPC	DV	11437	I4	3654	Heater output heat limit percent
h_OutputHeatLimitTime	DV	11438	I4	3654	Heater output heat limit time
h_Deadband	DV	11439	A[30]	3653	Heater temp dead band
h_Deviation	DV	11440	I4	3654	Heater temp deviation
h_ProcAlarmDelay	DV	11441	I4	3654	Heater process alarm delay
h_HighProcAlarmOutput	DV	11442	I4	3654	Heater high process alarm output

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
h_HighProcAlarmSetPoint	DV	11443	A[30]	3653	Heater high process alarm set point
h_HighProcAlarmMode	DV	11444	I4	3654	Heater high process alarm mode
h_LowProcAlarmOutput	DV	11445	I4	3654	Heater low process alarm output
h_LowProcAlarmSetPoint	DV	11446	A[30]	3653	Heater low process alarm set point
h_LowProcAlarmMode	DV	11447	I4	3654	Heater low process alarm mode
h_HighDevOutput	DV	11448	I4	3654	Heater high device output
h_HighDevMode	DV	11449	I4	3654	Heater high device mode
h_LowDevOutput	DV	11450	I4	3654	Heater low device output
h_LowDevMode	DV	11451	I4	3654	Heater low device mode
h_LocalMachineHeaterOffset	DV	11452	I4	3654	Heater local machine offset
LastHeaterFileParm	DV	11599	I2	3654	Last heater file parameter
p_version	DV	11600	A[30]	3672	First program header VID
p_units	DV	11601	A[30]	3672	User units
p_fluid1Filename	DV	11602	A[100]	3672	Fluid filename #1
p_fluid2Filename	DV	11603	A[100]	3672	Fluid filename #2
p_heater1Filename	DV	11604	A[100]	3672	Heater filename #1
p_heater2Filename	DV	11605	A[100]	3672	Heater filename #2
p_heater3Filename	DV	11606	A[100]	3672	Heater filename #3
p_heater4Filename	DV	11607	A[100]	3672	Heater filename #4
p_AttachFluidFile	DV	11608	A[4]	3672	Is fluid file attached
p_AttachHeaterFile	DV	11609	A[4]	3672	Is heater file attached
p_MovetoFirstFidLocation	DV	11610	A[4]	3672	Move to first fid location
p_MoveToSystemLocation	DV	11611	A[4]	3672	Move to system location
p_SystemLocationName	DV	11612	A[100]	3672	System location name

Variable Name	Data Type	ID	SECS Type	Related Collection Events	Description
p_SetActiveValve	DV	11613	I4	3673	Set active valve
p_BatchFids	DV	11614	A[4]	3672	Use batch fids
p_PipelineVision	DV	11615	A[4]	3672	Use pipeline vision
p_AutomaticConveyorWidth	DV	11616	A[30]	3672	Automatic conveyor width
p_AutomaticConveyorWidthTolerance	DV	11617	A[30]	3672	Automatic conveyor width tolerance
p_AutomaticConveyorWidthEnabled	DV	11618	A[4]	3672	Automatic conveyor width enable
p_AutomaticConveyor2Width	DV	11619	A[30]	3672	Automatic conveyor width conveyor #2
p_AutomaticConveyor2WidthTolerance	DV	11620	A[30]	3672	Automatic conveyor width tolerance #2
p_AutomaticConveyor2WidthEnabled	DV	11621	A[4]	3672	Automatic conveyor width enable #2
p_CADImportGeneratedFile	DV	11622	A[4]	3672	CAD import generated file
p_ForceHSonnewpattern	DV	11623	A[4]	3672	Force height sense on new pattern
p_FidSearchAtSafeZ	DV	11624	A[4]	3672	Fiducial search at safe Z
p_BatchHeightSenseCommands	DV	11625	A[4]	3672	Use batch height sense commands
p_BatchHeightSenseProbeDown	DV	11626	A[4]	3672	Batch height sense with probe down
p_PreHeatTime	DV	11627	I4	3673	Pre heat time
p_ApplyCameraRotationCorrection	DV	11628	A[4]	3672	Apply camera rotation correction
p_Maxtimeboardremainsatdispense	DV	11629	I4	3673	Maximum time board remains at dispense station
p_DualDispenseMFCTolerance	DV	11630	A[30]	3672	Dual dispense Measured Flow Rate Calibration tolerance
LastProgHeaderParm	DV	11799	I2	3673	Last program header VID

Appendix B Collection Events

B.1 Overview

This appendix lists the collection events that exist at the Equipment.

B.2 Collection Events

Table B-1 contains a list of collection events, related data variables, and a brief description of each event, sorted by CEID number.

NOTE CEID 1 – 65 are standard GEM.

Table B-1   Collection Events

Collection Event Name	CEID	Related Data Variables	Description
ControlStateChange	1	None	Collection event when there is a change in control state.
ProcessStateChange	2	None	Collection event when there is a change in process state.
GemPPChangeEvent	3	None	Collection event when the Operator creates, changes, or deletes a process program.
OperatorCommand	4	None	Collection event whenever the Operator attempts to control the machine while in the Online - REMOTE state.
AbortStarted	5	None	Collection event when an abort request was acknowledged and the abort process begins.
AbortCompleted	6	None	Collection event when the abort process is complete.
GemBadDownloadEvent	7	None	Collection event after the host downloads a recipe to the equipment upon the equipment's request, the equipment checks the recipe for accuracy. If the process program is invalid, the Collection event.
GemControlStateLOCAL	8	None	Collection event when Control State changes to LOCAL.
GemControlStateREMOTE	9	None	Collection event when Control State changes to REMOTE.
StartCmd	14	None	Collection event when the Operator clicks the GO button from Teach Window or Run Window.
StopCmd	15	None	Collection event when the Operator clicks the STOP button from Teach Window or Run Window.
PauseCmd	16	None	Collection event when the Operator clicks the PAUSE button from Teach Window or Run Window and the equipment is in RUNNING state.
ResumeCmd	17	None	Collection event when the Operator clicks the PAUSE button from Teach Window or Run Window and the equipment is in PAUSED state.
AbortCmd	18	None	Collection event when the Operator clicks the ABORT button from Teach Window or Run Window.
EqConstChange	20	None	Collection event to the Host when the Operator changes an Equipment Constant.
S10Ack	21	None	Collection event to acknowledge the reception of a Host text message.

Table B-1   Collection Events (Continued)

Collection Event Name	CEID	Related Data Variables	Description
GemEquipmentOFFLINE	22	None	Collection event when Control State changes to Off-Line.
GemSpoolingActivated	23	None	Collection event when Equipment attempts to send a primary message to the Host and gets a transmit failure while Spooling is enabled.
GemSpoolingDeactivated	24	None	Collection event after the entire spool file has been read by the Host.
GemSpoolTransmitFailure	25	None	Collection event if a transmission failure occurs during the period in which the Host is reading the Spooling file.
BoardAtDispenseLoc1	2001	521, 571	Collection event when the board is at the dispensing location for Conveyor 1 and ready for dispensing.
DispensingDone1	2002	521	Collection event when dispensing is completed for Conveyor 1. The board is ready to leave the dispensing location.
BoardAtDispenseLoc2	2003	521, 572	Collection event when the board is at the dispensing location for Conveyor 2 and ready for dispensing.
DispensingDone2	2004	521	Collection event when dispensing is completed for Conveyor 2. The board is ready to leave the dispensing location.
BoardFrequencyDataUpload	2010	106	Collection event per boat count during a production run. The boat count is specified by equipment constant 610.
BarcodeRead	2050	306, 307	Collection event after a barcode has been successfully read. This event will occur after events BoardAtDispenseLoc1 and BoardAtDispenseLoc2.
MachineEmpty	2051	None	Collection event when the machine has set idle waiting for a board after a user configurable timeout.
NewProgramLoaded	3001	461	Collection event when a new program is loaded.
NewFluidFileLoaded1	3002	SV300	Collection event when a new fluid parameter file for Valve 1 is loaded.
NewHeaterFileLoaded	3003	458	Collection event when a new heater parameter file is loaded.
FluidParametersModified1	3004	SV 300	Collection event when the fluid parameters for Valve 1 have been changed by an operator.
FluidParametersSaved1	3005	SV 300	Collection event when the fluid parameters for Valve 1 have been saved onto the local mass storage.

Collection Event Name	CEID	Related Data Variables	Description
ConveyorCodeDownloaded1	3008	None	Collection event when a new conveyor control code (atom) has been downloaded into the Conveyor 1 controller.
NewFluidFileLoaded2	3009	SV303	Collection event when a new fluid parameter file for Valve 2 is loaded by an operator.
FluidParametersModified2	3010	SV 303	Collection event when the fluid parameters for Valve 2 have been changed by an operator.
FluidParametersSaved2	3011	SV 303	Collection event when the fluid parameters for Valve 2 have been saved onto the local mass storage.
ConveyorCodeDownloaded2	3012	None	Collection event when a new conveyor control code (atom) has been downloaded into the Conveyor 2 controller.
ce_NewOperatorIDNeedsValidation	3630	630	Collection event after operator ID is entered.
ce_WaferLotNumberNeedsValidation	3631	552, 631	Collection event when verifying wafer lot number entered by operator.
ce_WaferCountUpdated	3632	550	Collection event when wafer count is updated.
ce_WaferScribeNeedsValidation	3633	552	Collection event when verifying each wafer scribe number sent from loader.
ce_WaferStart	3634	552, 631	Collection event when wafer processing is started.
ce_WaferComplete	3635	None	Collection event when wafer processing is complete.
ce_WaferLotComplete	3636	None	Collection event when wafer lot is complete.
ce_StartRecipeSelection	3637	None	Collection event to signal host that recipe download/selection may start.
ce_ConfigParmChangedString	3638	450, 451, 453	Collection event when a string configuration parameter is changed.
ce_ConfigParmChangedInt	3639	450, 452, 454	Collection event when an integer configuration parameter is changed.
ce_ConfigParmRejected	3650	5999	Collection event when a bad configuration parameter has been downloaded from the host
ce_FluidParmChangedString	3651	450, 451, 453, 455, 456, 457	Collection event when a string fluid file parameter is changed.
ce_FluidParmChangedInt	3652	450, 452, 454, 455, 456, 457	Collection event when a fluid file integer parameter is changed.

Table B-1   Collection Events (Continued)

Collection Event Name	CEID	Related Data Variables	Description
ce_HeaterParmChangedString	3653	458, 460	Collection event when a heater file string parameter is changed.
ce_HeaterParmChangedInt	3654	459	Collection event when a heater file integer parameter is changed.
ce_HeaterFileManualDownload	3655	458, 460	Collection event when a heater file is downloaded.
ce_HeaterFileManualUpload	3656	458	Collection event when a heater file is uploaded.
ce_HeaterFileSave	3657	458, 460	Collection event when a heater file is saved.
ce_HeaterFileLMOSave	3658	458	Collection event when heater local machine offsets are saved.
ce_HeaterLMODownload	3659	458	Collection event when heater local machine offsets are downloaded.
ce_HeaterLMORemoved	3660	458	Collection event when heater local machine offsets are removed.
ce_HeaterFileNotSaved	3661	458, 460	Collection event when heater file is not saved successfully.
ce_HeaterFileLMONotSaved	3662	458	Collection event when heater local machine offsets are not saved successfully.
ce_ProgInstructionChange	3663	461, 462, 463, 464, 465, 466	Collection event when a program line instruction is changed.
ce_ProgPatternCreated	3664	461, 467	Collection event when a program pattern is created.
ce_ProgPatternDeleted	3665	461, 467	Collection event when a program pattern is deleted.
ce_ProgSaved	3666	461	Collection event when the program is saved.
ce_RecipeLoadComplete	3667	468	Collection event when a recipe file is loaded successfully.
ce_RecipeLoadFailed	3668	468	Collection event when a recipe file fails to load successfully.
ce_ProgWorkpieceRealigned	3669	464, 465	Collection event when workpiece alignment is changed.
ce_ProgFiducialEdit	3670	None	Collection event when a program fiducial is edited.
ce_ProgSkipMarkEdit	3671	None	Collection event when a program skip mark is edited.
ce_ProgHeaderParmChangedString	3672	450, 451, 453	Collection event when a program header string parameter is changed.
ce_ProgHeaderParmChangedInt	3673	450, 452, 454	Collection event when a program header integer parameter is changed.
ce_LowFluid_V1	3696	None	Collection event when a low fluid alarm condition occurs on valve 1.

Collection Event Name	CEID	Related Data Variables	Description
ce_LowFluid_V2	3697	None	Collection event when a low fluid alarm condition occurs on valve 2.
ce_LowFluidCleared_V1	3698	None	Collection event when a low fluid alarm condition is cleared on valve 1.
ce_LowFluidCleared_V2	3699	None	Collection event when a low fluid alarm condition is cleared on valve 2.
ce_SizeOfCanister	3700	499	BFS system not used. Collection event when the bulk feed canister size is detected.
ce_CPJCheckComplete_V1Pass	3701	None	Collection event when CPJ check is complete on valve 1
ce_CPJCheckComplete_V2Pass	3702	None	Collection event when CPJ check is complete on valve 2
ce_ValvePressure_V1	3703	421	Collection event when valve pressure on valve 1 changes.
ce_FluidPressure_V1	3704	422	Collection event when fluid pressure on valve 1 changes.
ce_CoolingPressure_V1	3705	423	Collection event when cooling pressure on valve 1 changes.
ce_ValvePressure_V2	3706	424	Collection event when valve pressure on valve 2 changes. (Valve 2 EP hardware not installed)
ce_FluidPressure_V2	3707	425	Collection event when fluid pressure on valve 2 changes. (Valve 2 EP hardware not installed)
ce_CoolingPressure_V2	3708	426	Collection event when cooling pressure on valve 2 changes. (Valve 2 EP hardware not installed)
ce_LmoWpEnabled	3710	None	Collection event when local machine offsets workpiece is enabled.
ce_LmoWpDisabled	3711	None	Collection event when local machine offsets workpiece is disabled.
ce_LmoWpModified	3712	None	Collection event when local machine offsets workpiece is modified.
ce_LmoWpAlignSuccessful	3713	None	Collection event when local machine offsets workpiece alignment is successful.
ce_LmoWpAlignFailed	3714	None	Collection event when local machine offsets workpiece alignment failed.
ce_LmoHsEnabled	3715	None	Collection event when local machine offsets for height sensor are enabled.
ce_LmoHsDisabled	3716	None	Collection event when local machine offsets for height sensor are disabled.

Table B-1   Collection Events (Continued)

Collection Event Name	CEID	Related Data Variables	Description
ce_LmoHsModified	3717	None	Collection event when local machine offsets for height sensor are modified.
ce_LmoWpFidFound_1	3718	7706, 7708	Collection event when local machine offsets workpiece fids #1 are set.
ce_LmoWpFidFound_2	3719	7707, 7709	Collection event when local machine offsets workpiece fids #2 are set.
ce_PPSelectCompletePass	3720	468	Collection event when Program Process file (Recipe) selection is completed successfully.
ce_DWVCalibComplete_V1Pass	3721	408, 416, 639	Collection event when DWV calibration on valve 1 is completed successfully.
ce_DWVCalibComplete_V2Pass	3722	408, 416, 639	Collection event when DWV calibration on valve 2 is completed successfully.
ce_DWVCheckComplete_V1	3723	None	Collection event when DWV check on valve 1 is completed successfully.
ce_DWVCheckComplete_V2	3724	None	Collection event when DWV check on valve 1 is completed successfully.
ce_FlowRateCalibComplete_V1Pass	3730	None	Collection event after flow rate calibration on valve 1 is completed successfully.
ce_FlowRateCalibComplete_V2Pass	3731	None	Collection event after flow rate calibration on valve 2 is completed successfully.
ce_HSAtTactileZ	3732	524	Collection event when height sense at tactile Z position is set.
ce_NdlAtTactileZ_V1	3733	525	Collection event when needle at tactile Z position is set.
ce_HSAtScaleLidZ	3734	526	Collection event when height sense at scale lid Z position is set.
ce_HSXYOffsetsPass	3735	None	Collection event when height sense XY offsets are completed successfully.
ce_NeedleXYOffsetsPass	3736	None	Collection event when needle XY offsets is completed successfully.
ce_TeachScalePass	3737	None	Collection event when teach scale SECS/GEM remote command ran successfully.
ce_NeedleZOffsetsPass	3738	None	Collection event when needle XY offset SECS/GEM remote command ran successfully.
ce_PurgePass	3740	None	Collection event when purge is completed successfully.

Collection Event Name	CEID	Related Data Variables	Description
ce_PrimePass	3741	None	Collection event when prime SECS/GEM remote command completes successfully.
ce_LocateServiceStationPass	3742	None	Collection event when locate service station SECS/GEM remote command completes successfully.
ce_MoveHomeLocationPass	3743	None	Collection event when move home location SECS/GEM remote command completes successfully.
ce_MovePurgeLocationPass	3744	None	Not used.
ce_PrelimNeedleToCameraPass	3745	None	Collection event when preliminary needle to camera offsets SECS/GEM remote command completes successfully.
ce_DJ9KVAPrimePass	3746	None	Collection event when DJ9000 vacuum assisted prime SECS/GEM remote command completes successfully.
ce_NdlAtTactileZ_V2	3747	527	Collection event when needle at tactile Z position is set.
ce_HSAtPurgeLidZ	3748	528	Collection event when height sense at purge lid Z position is set.
ce_DJOffsetCalibrationPass	3749	None	Collection event when DJ offset calibration SECS/GEM remote command completes successfully.
ce_LoadBoardConv1Pass	3750	None	Collection event when SECS/GEM remote command to load board on conveyor 1 completes successfully.
ce_LoadBoardConv2Pass	3751	None	Collection event when SECS/GEM remote command to load board on conveyor 2 completes successfully.
ce_MoveCenterLocationPass	3752	None	Collection event when SECS/GEM remote command "MOVE CENTER" completes successfully.
ce_MoveFrontLocationPass	3753	None	Collection event when SECS/GEM remote command "MOVE FRONT" completes successfully.
ce_ResetElapsedPurgeTime	3754	None	Not used.
ce_SetPurgeCupOverflowTime	3755	None	Not used.
ce_VacuumOnPass	3756	None	Collection event when SECS/GEM remote command "VACUUM ON" completes successfully.

Collection Event Name	CEID	Related Data Variables	Description
ce_VacuumOffPass	3757	None	Collection event when SECS/GEM remote command "VACUUM OFF" completes successfully.
ce_NeedleXYOffsetsNoPurgePass	3758	None	Collection event when SECS/GEM remote command "NEEDLE XY OFFSETS NO PURGE" completes successfully.
ce_RestartApplication	3759	None	Collection event when SECS/GEM remote command "RESTART APPLICATION" completes successfully.
ce_LmoWpFidNotFound_1	3760	7706, 7708	Collection event when fiducial 1 of Local Machine Workpiece is not found.
ce_LmoWpFidNotFound_2	3761	7707, 7709	Collection event when fiducial 2 of Local Machine Workpiece is not found.
ce_DHLinearFluidSensorLevel	3762	1539, 1540	Collection event when level is checked by Fluidmove (Before each board). Collection event 3709 is used for level percent and state variables.
ce_HSXYOffsetsFail	3763	None	Collection event when SECS/Gem remote command "HS XY OFFSETS" fails.
ce_TeachScaleFail	3764	None	Collection event when SECS/Gem remote command "TEACH SCALE" fails.
ce_NeedleXYOffsetsFail	3765	None	Collection event when SECS/Gem remote command "NEEDLE XY OFFSETS" fails.
ce_PurgeFail	3766	None	Collection event when SECS/GEM remote command "PURGE" fails.
ce_PrimeFail	3767	None	Collection event when SECS/GEM remote command "PRIME" fails.
ce_LocateServiceStationFail	3768	None	Collection event when SECS/GEM remote command "LOCATE SERVICE STATION" fails.
ce_MoveHomeLocationFail	3769	None	Collection event when SECS/GEM remote command "MOVE HOME" fails.
ce_MovePurgeLocationFail	3770	None	Not used.
ce_PrelimNeedleToCameraFail	3771	None	Collection event when SECS/GEM remote command "PRELIM NEEDLE TO CAMERA" completes successfully.

Collection Event Name	CEID	Related Data Variables	Description
ce_DJ9KVAPrimeFail	3772	None	Collection event when SECS/GEM remote command "DJ9K VACUUM ASSISTED PRIME" fails.
ce_DJOffsetCalibrationFail	3773	None	Collection event when SECS/GEM remote command "DJ OFFSET CALIBRATION" fails.
ce_LoadBoardConv1Fail	3774	None	Collection event when SECS/GEM remote command to load board on conveyor 1 fails.
ce_LoadBoardConv2Fail	3775	None	Collection event when SECS/GEM remote command "LOAD BOARD" on conveyor 2 fails.
ce_MoveCenterLocationFail	3776	None	Collection event when SECS/GEM remote command "MOVE TO CENTER" fails.
ce_MoveFrontLocationFail	3777	None	Collection event when SECS/GEM remote command "MOVE TO FRONT" fails.
ce_VacuumOnFail	3778	None	Collection event when SECS/GEM remote command "VACUUM ON" fails.
ce_VacuumOffFail	3779	None	Collection event when SECS/GEM remote command "VACUUM OFF" fails.
ce_CPJCheckComplete_V1Fail	3780	None	Collection event when SECS/GEM remote command "CHECKCPJ" on valve 1 fails.
ce_CPJCheckComplete_V2Fail	3781	N one	Collection event when SECS/GEM remote command "CHECKCPJ" on valve 2 fails.
ce_DWVCalibComplete_V1Fail	3782	639	Collection event when SECS/GEM remote command "DWV" on valve 1 fails.
ce_DWVCalibComplete_V2Fail	3783	639	Collection event when SECS/GEM remote command "DWV" on valve 2 fails.
ce_FlowRateCalibComplete_V1Fail	3784	400, 640	Collection event when SECS/GEM remote command "FLOWRATECALIB" on valve 1 fails.
ce_FlowRateCalibComplete_V2Fail	3785	403, 640	Collection event when SECS/GEM remote command "FLOWRATECALIB" on valve 2 fails.

Collection Event Name	CEID	Related Data Variables	Description
ce_NeedleZOffsetsFail	3786	6294	Collection event when SECS/GEM remote command "NEEDLE Z OFFSETS".
ce_NeedleXYOffsetsNoPurgeFail	3787	None	Collection event when SECS/GEM remote command "NEEDLE XY OFFSETS NO PURGE" fails.
ce_PPSelectCompleteFail	3788	None	Collection event when host process program select (recipe file) fails to load.
ce_ValvePressureSetPt_V1	3789	430	Collection event when valve pressure set point changes on valve 1.
ce_FluidPressureSetPt_V1	3790	431	Collection event when fluid pressure set point changes on valve 1.
ce_CoolingPressureSetPt_V1	3791	432	Collection event when cooling pressure set point changes on valve 1.
ce_ValvePressureSetPt_V2	3792	433	Collection event when valve pressure set point changes on valve 2.
ce_FluidPressureSetPt_V2	3793	434	Collection event when fluid pressure set point changes on valve 2.
ce_CoolingPressureSetPt_V2	3794	435	Collection event when cooling pressure set point changes on valve 2.
ce_ValidationStarted	3795	None	Collection event when SECS/GEM remote command "VALIDATION START" begins process.
ce_CarrierReceivedFromDownstream	3796	None	Collection event when carrier is received from downstream during validation.
ce_ValidationComplete	3797	None	Collection event when carrier validation is complete.
ce_ControlDotWeightON	3798	11299	Collection event when SECS/GEM remote command "CONTROL DOT WEIGHT" enables fluid control dot weight.
ce_ControlDotWeightOFF	3799	11299	Collection event when SECS/GEM remote command "CONTROL DOT WEIGHT" disables fluid control dot weight.
ce_SubstrateCornerLocs	3800	530	Collection event when substrate corner locations are saved.
ce_HSAtScale2LidZ	3801	531	Collection event when height sense at scale 2 Z position is saved.
ce_TactileCenter	3802	532	Collection event when tactile center location is saved.
ce_SendCarrierDownstream	3803	None	Not used.
ce_SendCarrierUpstream	3804	None	No used

Collection Event Name	CEID	Related Data Variables	Description
ce_ValidationAbort	3805	None	Not used
ce_PurgePass_V2	3806	None	Collection event when purge on valve 2 is completed successfully.
ce_PurgeFail_V2	3807	None	Collection event when purge on valve 2 fails.
PromptedSetupStarted	4001	573	Collection event when scripted prompted setup has started either manually by the operator or remotely from a SECS/GEM host.
PromptedSetupCompleted	4002	573	Collection event when the Prompted Setup Process is completed.
FindNeedleXYZ (CE name incorrect) FindNeedle (gcd file name for 4003)	4003	None	Collection event when a needle XYZ calibration has been performed.
ManualMeasureFlowRate1	4004	None	Collection event when a flow rate measurement for Valve 1 has been initiated by an operator.
ManualPurgeNeedle1	4005	None	Collection event when a needle purging of Valve 1 has been initiated by an operator.
OperationLevelChanged	4006	None	Collection event when the system operation level has been changed from the dialog.
PasswordsModified	4007	None	Collection event when the system operation level passwords have been modified.
ManualMeasureFlowRate2	4008	None	Collection event when a flow rate measurement for Valve 2 has been initiated by an operator.
ManualPurgeNeedle2	4009	None	Collection event when a needle purging of Valve 2 has been initiated by an operator.
ScaleRead1	4010	406	Collection event when the Scale has been read after Valve 1 has dispensed material during the Dispense Weight Verification Procedure. Data Variable ScaleMeasurement1 holds the scale measurement.
ScaleRead2	4011	407	Collection event when the Scale has been read after Valve 2 has dispensed material during the Dispense Weight Verification Procedure. Data Variable ScaleMeasurement2 holds the scale measurement.
FlowRate1Updated	4012	400	Collection event when the Flow Rate for Valve 1 has been updated (Data Variable FlowRate1 has been modified).

Collection Event Name	CEID	Related Data Variables	Description
FlowRate2Updated	4013	403	Collection event when the Flow Rate for Valve 2 has been updated (Data Variable FlowRate2 has been modified).
ce_MultiFlowrates_V1	4014	560	Collection event when multiple flow rate variables are set for valve 1.
ce_MultiFlowrates_V2	4015	561	Collection event when multiple flow rate variables are set for valve 2.
DispenseWeightComplete	4020	DWVResult DWVValve DWVTarget DWVDispenses DWVTargetRange DWVTargetMinLimit DWVTargetMaxLimit DWVMeasuredRange DWVMeasuredAvg	Collection event upon completion of all dispenses during the Dispense Weight Verification routine. See related data variables:
ce_ActiveNozzleState	4021	ActiveNozzleState	Collection event when the Active Nozzle is changes from ON to OFF or OFF to ON
PromptedSetupIncomplete	4022	573	Collection event when prompted setup does not complete successfully.
PromptedSetupScriptFileLoaded	4023	573	Collection event when a prompted setup script file is loaded successfully.
ce_ScaleOverflow_S1	4024	6703, 6705, 6707, 6709, 6711, 6713, 6715	Collection event when scale 1 overflow condition has occurred. The operator has been notified that scale 1 has met or exceeded maximum weight capacity.
ce_ScaleOverflowWarning_S1	4025	6703, 6705, 6707, 6709, 6711, 6713, 6715	Collection event when scale 1 overflow warning has been issued. The operator has been notified that scale 1 has reached the warning level weight capacity.
ce_ScaleOverflowReset_S1	4026	6703, 6705, 6707, 6709, 6711, 6713, 6715	Collection event when operator has manually reset the overflow parameters from the scale configuration menu or has indicated that the cup has been replaced in response to a warning or overflow message.

Collection Event Name	CEID	Related Data Variables	Description
ce_ScaleOverflow_S2	4027	6704, 6706, 6708, 6710, 6712, 6714, 6716	Collection event when scale 2 overflow condition has occurred. The operator has been notified that scale 2 has met or exceeded maximum weight capacity.
ce_ScaleOverflowWarning_S2	4028	6704, 6706, 6708, 6710, 6712, 6714, 6716	Collection event when scale 2 overflow warning has been issued. The operator has been notified that scale 2 has reached the warning level weight capacity.
ce_ScaleOverflowReset_S2	4029	6704, 6706, 6708, 6710, 6712, 6714, 6716	Collection event when an operator has manually reset the overflow parameters from the scale configuration menu or has indicated that the cup has been replaced in response to a warning or overflow message.
HeaterMonitorTimeout	5001	None	Collection event when the heaters at the dispensing location failed to reach the specified temperature range within the timeout period.
HeaterMonitorSkipped	5002	None	Collection event when the Operator has selected to skip the temperature monitoring and proceed to dispensing.
HeaterMonitorAborted	5003	None	Collection event when the Operator has selected to abort the temperature monitoring and aborted the run.
PeriodicPurge1	5004	None	Collection event when a periodical purging of the needle for Valve 1 has been performed.
PeriodicFlowrateMeasurement1	5005	None	Collection event when a periodical flow rate measurement for Valve 1 has been performed.
PotLifeWarning1	5006	None	Collection event when the pot life of the dispensing material for Valve 1 has reached a warning level.
PotLifeExpire1	5007	None	Collection event when the pot life of the dispensing material for Valve 1 has expired.
AwaitingRecoveryCommand	5008	None	Collection event when the system has queried the Operator to recover the previous run.
OperatorAckedTerminalMsg	5009	None	Used by GEM drivers Collection event when the Operator acknowledged a terminal message.
PeriodicPurge2	5010	None	Collection event when a periodical purging of the needle for Valve 2 has been performed.

Collection Event Name	CEID	Related Data Variables	Description
PeriodicFlowrateMeasurement2	5011	None	Collection event when a periodical flow rate measurement for Valve 2 has been performed.
PotLifeWarning2	5012	None	Collection event when the pot life of the dispensing material for Valve 2 has reached a warning level.
PotLifeExpire2	5013	None	Collection event when the pot life of the dispensing material for Valve 2 has expired.
ce_HeaterTempsUpdated	5014	611, 801-868, SV 1101-1168 and SV 1201-1268	Collection event when the heater temperatures are updated.
ce_DoorOpen	5015	None	Collection event when the door is opened.
ce_DoorClose	5016	None	Collection event when the door is closed.
ce_DWCA_SetupStarted	5040	641, 643, 645, 648	Initial collection event signaling start of DWCA setup (DJ9K Dot Weight Pressure Setup).
ce_DWCA_MinPressureCompleted	5041	643, 644	Intermediate collection event when dot weight at minimum pressure has been completed.
ce_DWCA_MaxPressureCompleted	5042	641, 642	Intermediate collection event when dot weight at maximum pressure has been completed.
ce_DWCA_SetupCompleted	5043	641, 642, 643, 644, 645, 646, 647, 648	Final collection event when final dot weight and pressure has been computed and DWCA setup has completed successfully.
ce_DWCA_IntermediateValues	5044	649, 650	Intermediate collection event when a fluid pressure / dot weight has failed calibration and the routine is adjusting pressure. The tool will retry unless retries exhausted.
ce_DWCA_SetupFailed	5045	None	Collection event if DWCA setup failed or was aborted by user or tool error. This collection event signals that the DWCA setup routine (DJ9K Dot Weight Pressure Setup) has completed unsuccessfully.
ce_DWCA_CPJStarted	5046	645, 648, 651, 652	Collection event signaling start of DWCA CPJ (FLOWRATECALIB).

Collection Event Name	CEID	Related Data Variables	Description
ce_DWCA_CPJCompleted	5047	645, 646, 647, 648, 651, 652	Final collection event when final dot weight and pressure has completed. This collection event signals that the DWCA CPJ routine has completed successfully.
ce_DWCA_CPJFailed	5048	None	Collection event if CPJ failed or was aborted by user or tool error. This collection event signals that the DWCA CPJ routine (FLOWRATECALIB) has completed unsuccessfully.
ce_CurrentFidFoundXY	8000	7000, 10000	Collection event when the program pattern fiducial location is found.
ce_CurrentFidNotFoundXY	8001	7000, 10000	Collection event when the program pattern fiducial location is not found. Related XY locations indicate "expected" location.
ce_LucImageFound	8002	7000, 10000	Collection event when program workpiece fiducial 2 has been found.
ce_LucImageNotFound	8003	7710, 7711, 520	Collection event after running the script instruction "LUC MODEL FIND" or the program instruction "LUC MODEL FIND" and the model for the LUC is not found.
ce_LucImageTaught	8004	520	Collection event an image is taught using the script instruction "LUC MODEL TEACH".
ce_SSPin1Found	8005	553, 534	Collection event when the Service Station Pin 1 is found.
ce_SSPin1NotFound	8006	None	Collection event when service station pin1 is not found.
ce_SSPin2Found	8007	553, 554	Collection event when service station pin 2 is found.
ce_SSPin2NotFound	8008	None	Collection event when service station pin 2 is not found.
ce_SSPin1ImageSaved	8009	520	Collection event when the Service Station Pin 1 is found (or not found) and saved as an image.
ce_SSPin2ImageSaved	8010	520	Collection event when the Service Station Pin 2 is found (or not found) and saved as an image.
ce_XYDot1ImageSaved	8011	520	Collection event when Needle to Camera XY offset is executed and the first dot is found (or not found) and saved as an image.
ce_XYDot2ImageSaved	8012	520	Collection event when Needle to Camera XY offset is executed and the second dot is found (or not found) and saved as an image.

Collection Event Name	CEID	Related Data Variables	Description
ce_XYDot3ImageSaved	8013	520	Collection event when Needle to Camera XY offset is executed and the third dot is found (or not found) and saved as an image.
ce_XYDot4ImageSaved	8014	520	Collection event when Needle to Camera XY offset is executed and the fourth dot is found (or not found) and saved as an image.
ce_XYDot1Found	8015	535, 536	Collection event when the Needle to Camera XY Offset Dot 1 is found.
ce_XYDot1NotFound	8016	None	Collection event when the Needle to Camera XY Offset Dot 1 is not found.
ce_XYDot2Found	8017	535, 536	Collection event when the Needle to Camera XY Offset Dot 2 is found.
ce_XYDot2NotFound	8018	none	Collection event when the Needle to Camera XY Offset Dot 2 is not found.
ce_XYDot3Found	8019	535, 536	Collection event when the Needle to Camera XY Offset Dot 3 is found.
ce_XYDot3NotFound	8020	None	Collection event when the Needle to Camera XY Offset Dot 3 is not found.
ce_XYDot4Found	8021	535, 536	Collection event when the Needle to Camera XY Offset Dot 4 is found.
ce_XYDot4NotFound	8022	None	Collection event when the Needle to Camera XY Offset Dot 4 is not found.
ce_LUCModelFindImageSaved	8023	520	Collection event when the Lookup Camera LUC MODEL FIND program or script instruction is executed and the image is saved.
ce_LUCModelTeachImageSaved	8024	520	Collection event when the Lookup Camera LUC MODEL TEACH script instruction is executed and the image is saved.
ce_LmoWpFid1ImageSaved	8025	520	Collection event when the Local Machine Offset Workpiece is re-aligned and the first fiducial is found (or not found) and saved as an image.
ce_LmoWpFid2ImageSaved	8026	520	Collection event when the Local Machine Offset Workpiece is re-aligned and the second fiducial is found (or not found) and saved as an image.
ce_WpFoundImageSaved	8027	520	Collection event when a program Workpiece fiducial is found and saved as an image.
ce_WpNotFoundImageSaved	8028	520	Collection event when a program Workpiece fiducial is NOT found and saved as an image.

Collection Event Name	CEID	Related Data Variables	Description
ce_PattFoundImageSaved	8029	520, 523	Collection event when a program Pattern fiducial is found and saved as an image.
ce_PattNotFoundImageSaved	8030	520, 523	Collection event when a program Pattern fiducial is NOT found and saved as an image.
ce_ImageSaveInstructionImageSaved	8031	520	Collection event when the "IMAGE SAVE" instruction is executed and the image is saved.
ce_ImageSaveManualImageSaved	8032	520	Collection event when an image is manually saved from the video window.
ce_PressureOffsetChanged	8033	450, 574, 575	Collection event when operator changes an E/P LMO offset value.
ce_PressureOffsetUnitsChanged	8034	450, 451, 453	Collection event when the internal units of E/P LMO offset changes. This value will change when "Air Pressure" units are changed from the main configuration dialog and after the LMO offset dialog is visited and exited.
ce_CurrentHSFoundXYZ	8400	7400	Collection event when a program height sense has been performed.
ce_HeightSenseOriginConv1	8401	7701	Collection event when Height Sense origin on conveyor 1 is changed.
ce_HeightSenseOriginConv2	8402	7702	Collection event when Height Sense origin on conveyor 2 is changed.
ce_CarrierLoadTime_L1	8403	428	Collection event when carrier on lane 1 is loaded.
ce_CarrierUnloadTime_L1	8404	429	Collection event when carrier on lane 1 is unloaded.
ce_CarrierLoadTime_L2	8405	469	Collection event when carrier on lane 2 is loaded.
ce_CarrierUnloadTime_L2	8406	470	Collection event when carrier on lane 2 is unloaded.
ce_BoardSequenceNumber	8800	7800	Collection event when Carrier Sequence # (sequential) is changed. This number is reset each time "GO" is pressed. For a running board count processed since power up, see existing SV 106 (BoardCount).
ce_WPFidFoundXY_1	8801	7801	Collection event when Workpiece Fiducial #1 XY in machine units (actual found).
ce_WPFidFoundXY_2	8802	7802	Collection event Workpiece Fiducial #2 XY in machine units (actual found).

Collection Event Name	CEID	Related Data Variables	Description
ce_WPFidNotFoundXY_1	8803	None	Collection event when Workpiece Fiducial #1 XY in machine units not found.
ce_WPFidNotFoundXY_2	8804	None	Collection event Workpiece Fiducial #2 XY in machine units not found.
FMWError	9000	1002	Used by GEM drivers Collection event when a Fluidmove error has occurred. Use status variable FMWMostRecentError (1002) to retrieve the error code.
FMWErrorCleared	9001	None	Used by GEM drivers Collection event when a Fluidmove error has been acknowledged by the Operator and the message cleared.
EPTStateChange	9002	1542, 1543, 1544, 1545, 1546	Collection event when the EPT state changes.

Appendix C   Alarms

C.1   Overview

Since the number of alarms that Fluidmove reports to SECS/GEM is constantly growing, each individual alarm will not be listed here. The alarm section of the GWGEM GCD file is automatically generated from the Fluidmove source code using a custom software tool. Use the SECS/GEM message S5F5 to retrieve a list of all alarms currently reported by your version of Fluidmove.

C.2   Alarm Format

The format for each alarm is described below:

> **ALID**   Alarm ID. This number is the same as the resource identification number used by Fluidmove.
>
> **ALCD**   Alarm Severity Code. The low-order 7-bits of ALCD specifies the severity code. The high-order bit (bit-8) shows the current alarm state (1=SET, 0=CLEAR). Currently all Fluidmove errors have a default severity code of 64.
>
> **ALTX**   Alarm Text. This is the actual string sent to the Host in the Alarm Report (S5F1) and is a truncated version (first 40 characters) of the resource item used by Fluidmove.
>
> **ON CEID**   This is the Collection Event that is signaled when the alarm state changes from CLEAR to SET ("going-on"). For all of the Fluidmove errors the event is FMWError.
>
> **OFF CEID** This is the Collection Event that is signaled when the alarm state changes from SET to CLEAR ("going-off"). For all of the Fluidmove errors the event is FMWErrorCleared.

C.3   Alarms

Table C-1 provides some examples of common alarms and how the ALID, ALCD, ALTX, and ON/OFF CEIDs related to them.

Table C-1   Alarms

ALID	ALCD	ALTX	Alarm Description	ON CEID	OFF CEID
4	64	Heater Temperature is Too Low	Current Temp < setpoint - band	**9000**	9001
5	64	Heater Temperature is Too High	Current Temp > setpoint + band.	9000	9001
30002	64	Run Aborted	The currently running program has been aborted.	9000	9001
30167	64	Error during fiducial finding	An error occurred during the fiducial finding process.	9000	9001
30172	64	Loss of air pressure detected	Fluidmove has detected low air pressure.	9000	9001

Appendix D   FmConfig.ini File Variables

D.1   Overview

The following variables are defined as Equipment Constants.

✎ **NOTE**   Floating point variables in the FmConfig.ini file have been converted to and uploaded as ASCII strings to prevent rounding and truncation errors that would occur if uploaded as floating point values. This method guarantees an exact match to the FmConfig.ini entry.

Also, configuration parameters which contain more than one value, such as XY coordinates and light states, are converted to a single string with each value separated by a comma. This prevents having multiple ECs represent a single parameter as well as avoiding the rounding/truncation problem.

In the table below, these cases have been identified in the "Storage Type" column where:

- ASCII is ASCII

- INT is Integer

- FLT is Float

If an ASCII string represents more than one value, such as an XY coordinate that contains two floating point values separated by a comma, "FLT,FLT" will be added to the storage type.

Finally, "(none)" will be returned by the equipment for those integer, floats or arrays which have no value. For instance, light states, defined as A[30], may contain four integer values "INT,INT,INT,INT" but if the light state has not been defined the equipment will return a single string "(none)".

D.2   FmConfig.ini File Variables

Table D-1 lists FmConfig.ini file variables sorted by ID number.

Table D-1   FmConfig.ini File

Variable Name	Data Type	ID	SECS Type	Storage Type	Fmconfig.ini File Description [Group] (configuration item =)
c_MachineSetupMode	EC	6000	A[20]	ASCII	[Misc Parms] Machine Setup Mode =
c_ScriptedVOFileName	EC	6001	A[60]	ASCII	[Misc Parms] Scripted VO File Name =
c_CameraAssistedScripts	EC	6002	A[4]	ASCII	[Misc Parms] Camera Assisted Scripts =
c_EnableFindTeachXYZ	EC	6003	A[4]	ASCII	[Misc Parms] Enable Find/Teach XYZ =
c_CheckLocalRecipeFiles	EC	6004	A[4]	ASCII	[Misc Parms] Check Local Recipe Files =
c_ChangeOperationLevel	EC	6005	A[4]	ASCII	[Misc Parms] Change operation level when program idle =
c_GemInstalled	EC	6006	A[4]	ASCII	[Gem Manager] Gem Installed =
c_GemEnabled	EC	6007	A[4]	ASCII	[Gem Manager] Gem Enabled =
c_DefaultCommState	EC	6008	I4	INT	[Gem Manager] Default Comm State =
c_DefaultControlState	EC	6009	I4	INT	[Gem Manager] Default Control State =
c_OnlineFailedState	EC	6010	I4	INT	[Gem Manager] Online Failed State =
c_StartinProdOplevel	EC	6011	A[4]	ASCII	[Password] Start in Prod operation level =
c_PollInterval	EC	6012	I4	INT	[Heater Manager] Poll Interval =
c_DisableAfterRun	EC	6013	A[4]	ASCII	[Heater Manager] Disable After Run =
c_EnabledPurgeBeforeResume	EC	6014	A[4]	ASCII	[Heater Manager] Enabled Purge Before Resume =
c_EnableSkipWhileWaitingforTemp	EC	6015	A[4]	ASCII	[Heater Manager] Enable Skip While Waiting for Temp =
c_TurnheatersoffwhenFmntexits	EC	6016	A[4]	ASCII	[Heater Manager] Turn heaters off when Fmnt exits =
c_Enabled_H1	EC	6017	A[4]	ASCII	[Heater 1] Enabled =
c_ControlType_H1	EC	6018	A[4]	ASCII	[Heater 1] Control Type =
c_PreRunPurgeTime	EC	6019	A[30]	FLT	[Runtime Preferences] Pre-Run Purge Time =
c_HomeZAxisatProd	EC	6020	A[4]	ASCII	[Runtime Preferences] Home Z Axis at Prod. Start =

Variable Name	Data Type	ID	SECS Type	Storage Type	Fmconfig.ini File Description [Group] (configuration item =)
c_HomeAllAxesatProd	EC	6021	A[4]	ASCII	[Runtime Preferences] Home All Axes at Prod. Start =
c_MovetoLocationatProd	EC	6022	A[4]	ASCII	[Runtime Preferences] Move to Location at Prod. Start =
c_StartLocation	EC	6023	A[30]	ASCII	[Runtime Preferences] Start Location =
c_AudibleAlarmStatus	EC	6024	I4	INT	[Beacon] Audible =
c_EnableRunSetupForProduction	EC	6025	A[4]	ASCII	[Runtime Preferences] Enable Run Setup For Production =
c_CheckSystemAirPressure	EC	6026	A[4]	ASCII	[Runtime Preferences] Check System Air Pressure =
c_DispenseMotionTimeout	EC	6027	I4	INT	[Runtime Preferences] Dispense Motion Timeout =
c_DefaultMotionTimeout	EC	6028	I4	INT	[Runtime Preferences] Default Motion Timeout =
c_MovetoFirstFidLocation	EC	6029	A[4]	ASCII	[Default Post Run Park] Move to First Fid Location =
c_MoveToSystemLocation	EC	6030	A[4]	ASCII	[Default Post Run Park] Move To System Location =
c_SystemLocationName	EC	6031	A[30]	ASCII	[Default Post Run Park] System Location Name =
c_SetValveNumber	EC	6032	I4	INT	[Default Post Run Park] Set Valve Number =
c_HeightSensorType	EC	6033	A[30]	ASCII	[Height Sensor] Type =
c_HeightSensorControlType	EC	6034	A[30]	ASCII	[Height Sensor] Control Type =
c_DownSpeed	EC	6035	A[30]	FLT	[Height Sensor] Down Speed =
c_UpSpeed	EC	6036	A[30]	FLT	[Height Sensor] Up Speed =
c_Accel	EC	6037	A[30]	FLT	[Height Sensor] Accel =
c_MaxDist	EC	6038	A[30]	FLT	[Height Sensor] Max Dist =
c_RetractHt	EC	6039	A[30]	FLT	[Height Sensor] Retract Ht (FMW) =
c_ProbeInput	EC	6040	I4	INT	[Height Sensor] Probe Input =
c_ProbePositionOverTactile	EC	6041	A[40]	FLT, FLT	[Height Sensor] Probe Position Over Tactile =

Variable Name	Data Type	ID	SECS Type	Storage Type	Fmconfig.ini File Description [Group] (configuration item =)
c_ProbeToggleDelay	EC	6042	A[30]	FLT	[Height Sensor] Probe Toggle Delay (ms) =
c_MaximumVelocityforHStest	EC	6043	A[30]	FLT	[Height Sensor] Maximum Velocity for HS test(FMW) =
c_MinimumAccelforHStest	EC	6044	A[30]	FLT	[Height Sensor] Minimum Accel for HS test(FMW) =
c_MaximumAccelforHStest	EC	6045	A[30]	FLT	[Height Sensor] Maximum Accel for HS test(FMW) =
c_DownVelocityforSingleHStest	EC	6046	A[30]	FLT	[Height Sensor] Down Velocity for Single HS test(FMW) =
c_DownAccelforSingleHStest	EC	6047	A[30]	FLT	[Height Sensor] Down Accel for Single HS test(FMW) =
c_InitXPosforSingleHStest	EC	6048	A[30]	FLT	[Height Sensor] Init X Pos for Single HS test (FMW) =
c_InitYPosforSingleHStest	EC	6049	A[30]	FLT	[Height Sensor] Init Y Pos for Single HS test (FMW) =
c_MaxCycleCountforSingleHStest	EC	6050	I4	INT	[Height Sensor] Max Cycle Count for Single HS test =
c_CycleCountforSingleHStest	EC	6051	I4	INT	[Height Sensor] Cycle Count for Single HS test =
c_DownVelocityforMultHStest	EC	6052	A[30]	FLT	[Height Sensor] Down Velocity for Mult HS test(FMW) =
c_DownAccelforMultHStest	EC	6053	A[30]	FLT	[Height Sensor] Down Accel for Mult HS test(FMW) =
c_MotionControllerName	EC	6054	A[20]	ASCII	[Camera] Name =
c_CameraType	EC	6055	A[20]	ASCII	[Camera] Type =
c_CameraOffset	EC	6056	A[40]	FLT, FLT	[Camera] Offset =
c_MotionControllerType	EC	6057	A[20]	ASCII	[Motion Controller] Type =
c_MachineUnitsPerEncoderUnit	EC	6058	A[30]	FLT	[Motion Controller] Machine Units Per Encoder Unit =
c_XAxisSWLimitMin	EC	6059	A[30]	FLT	[Motion Controller] X Axis SW Limit Min =
c_XAxisSWLimitMax	EC	6061	A[30]	FLT	[Motion Controller] X Axis SW Limit Max =
c_YAxisSWLimitMin	EC	6062	A[30]	FLT	[Motion Controller] Y Axis SW Limit Min =

Variable Name	Data Type	ID	SECS Type	Storage Type	Fmconfig.ini File Description [Group] (configuration item =)
c_YAxisSWLimitMax	EC	6063	A[30]	FLT	[Motion Controller] Y Axis SW Limit Max =
c_ZAxisSWLimitMin	EC	6064	A[30]	FLT	[Motion Controller] Z Axis SW Limit Min =
c_ZAxisSWLimitMax	EC	6065	A[30]	FLT	[Motion Controller] Z Axis SW Limit Max =
c_Jog1XYRate	EC	6066	A[30]	FLT	[Motion Controller] Jog 1 XY Rate =
c_Jog1XYAccel	EC	6067	A[30]	FLT	[Motion Controller] Jog 1 XY Accel =
c_Jog1XYDist	EC	6068	A[30]	FLT	[Motion Controller] Jog 1 XY Dist =
c_Jog2XYRate	EC	6069	A[30]	FLT	[Motion Controller] Jog 2 XY Rate =
c_Jog2XYAccel	EC	6070	A[30]	FLT	[Motion Controller] Jog 2 XY Accel =
c_Jog2XYDist	EC	6071	A[30]	FLT	[Motion Controller] Jog 2 XY Dist =
c_JogMaxXYRate	EC	6072	A[30]	FLT	[Motion Controller] Jog Max XY Rate =
c_JogMaxXYAccel	EC	6073	A[30]	FLT	[Motion Controller] Jog Max XY Accel =
c_JogMaxXYDist	EC	6074	A[30]	FLT	[Motion Controller] Jog Max XY Dist =
c_Jog1Zrate	EC	6075	A[30]	FLT	[Motion Controller] Jog 1 Z Rate =
c_Jog1Zaccel	EC	6076	A[30]	FLT	[Motion Controller] Jog 1 Z Accel =
c_Jog1Zdist	EC	6077	A[30]	FLT	[Motion Controller] Jog 1 Z Dist =
c_Jog2Zrate	EC	6078	A[30]	FLT	[Motion Controller] Jog 2 Z Rate =
c_Jog2Zaccel	EC	6079	A[30]	FLT	[Motion Controller] Jog 2 Z Accel =
c_Jog2Zdist	EC	6080	A[30]	FLT	[Motion Controller] Jog 2 Z Dist =
c_JogMaxZRate	EC	6081	A[30]	FLT	[Motion Controller] Jog Max Z Rate =
c_JogMaxZAccel	EC	6082	A[30]	FLT	[Motion Controller] Jog Max Z Accel =
c_JogMaxZDist	EC	6083	A[30]	FLT	[Motion Controller] Jog Max Z Dist =

Variable Name	Data Type	ID	SECS Type	Storage Type	Fmconfig.ini File Description [Group] (configuration item =)
c_StartupFileName	EC	6084	A[60]	ASCII	[Motion Controller] Startup File Name =
c_AtResetFileName	EC	6085	A[60]	ASCII	[Motion Controller] At Reset File Name =
c_PreBoardRunFileName	EC	6086	A[60]	ASCII	[Motion Controller] Pre-Board Run File Name =
c_AtAbortFileName	EC	6087	A[60]	ASCII	[Motion Controller] At Abort File Name =
c_ErrorMapEnabled	EC	6088	A[4]	ASCII	[Motion Controller] Error Map Enabled =
c_ErrorCorrectionDataFile	EC	6089	A[60]	ASCII	[Motion Controller] Error Correction Data File =
c_WeightCtrlCalWithAcceleration	EC	6090	A[4]	ASCII	[Motion Controller] Weight Ctrl Cal With Acceleration =
c_EnableXTravelLimitChecking	EC	6091	A[4]	ASCII	[Motion Controller] Enable X Travel Limit Checking =
c_EnableYTravelLimitChecking	EC	6092	A[4]	ASCII	[Motion Controller] Enable Y Travel Limit Checking =
c_EnableZTravelLimitChecking	EC	6093	A[4]	ASCII	[Motion Controller] Enable Z Travel Limit Checking =
c_TimedPurge	EC	6094	A[4]	ASCII	[Purge Station] Timed Purge =
c_EnablePurgeBeforeResume	EC	6095	A[4]	ASCII	[Purge Station] Enable Purge Before Resume =
c_VacuumOutput	EC	6096	I4	I4	[Purge Station] Vacuum Output =
c_FlowRate1	EC	6097	A[30]	FLT	[Flow Rate Manager] Flow Rate 1 =
c_DispenseWeightVerificationOutOfRange	EC	6098	A[4]	ASCII	[Flow Rate Manager] Dispense Weight Verification Out Of Range =
c_ValveAutoBiasOutOfRange	EC	6099	A[4]	ASCII	[Flow Rate Manager] Valve Auto Bias Out Of Range =
c_ScaleType	EC	6100	A[20]	ASCII	[Scale Manager] Scale Type =
c_Enabled	EC	6101	A[4]	ASCII	[Scale Manager] Enabled =
c_ReadDelay	EC	6102	A[30]	FLT	[Scale Manager] Read Delay =
c_ScaleUnits	EC	6103	A[10]	ASCII	[Scale Manager] Units =
c_StabilityTimeout	EC	6104	A[30]	FLT	[Scale Manager] Stability Timeout =

Table D-1   FmConfig.ini File Variables (Continued)

Variable Name	Data Type	ID	SECS Type	Storage Type	Fmconfig.ini File Description [Group] (configuration item =)
c_CheckScaleCup	EC	6105	A[4]	ASCII	[Scale Manager] Check Scale Cup =
c_ScaleCupBit	EC	6106	I4	INT	[Scale Manager] Scale Cup Bit =
c_NumberofConveyors	EC	6107	I4	INT	[Conveyor Manager] Number of Conveyors =
c_Jog1Dist	EC	6108	A[30]	FLT	[Conveyor Manager] Jog1Dist =
c_Jog2Dist	EC	6109	A[30]	FLT	[Conveyor Manager] Jog2Dist =
c_JogMaxDist	EC	6110	A[30]	FLT	[Conveyor Manager] Jog Max Dist =
c_ConveyorControlType1	EC	6111	A[20]	ASCII	[Conveyor Manager] Control Type 1 =
c_ConveyorControlType2	EC	6112	A[20]	ASCII	[Conveyor Manager] Control Type 2 =
c_ConfirmACWMove	EC	6113	A[4]	ASCII	[Conveyor Manager] Confirm ACW Move =
c_ConveyorControlType_C1	EC	6114	A[20]	ASCII	[Conveyor] Control Type =
c_IsCustomConveyor_C1	EC	6115	A[4]	ASCII	[Conveyor] Is Custom Conveyor =
c_StyleType_C1	EC	6116	A[100]	ASCII	[Conveyor] Style Type =
c_ConveyorMode_C1	EC	6117	I4	INT	[Conveyor] Mode =
c_FMWsPerUnit_C1	EC	6118	A[30]	FLT	[Conveyor] FMW's Per Unit =
c_ResetOutput_C1	EC	6119	I4	INT	[Conveyor] Reset Output =
c_RunNumberEnabled_C1	EC	6120	A[4]	ASCII	[Conveyor] Run Number Enabled =
c_NumberofRuns_C1	EC	6121	I4	INT	[Conveyor] Number of Runs =
c_WetRunEnabled_C1	EC	6122	A[4]	ASCII	[Conveyor] Wet Run Enabled =
c_UseConveyorEnabled_C1	EC	6123	A[4]	ASCII	[Conveyor] Use Conveyor Enabled =
c_EnableXTravelLimitChecking_C1	EC	6124	A[4]	ASCII	[Conveyor] Enable X Travel Limit Checking =
c_EnableYTravelLimitChecking_C1	EC	6125	A[4]	ASCII	[Conveyor] Enable Y Travel Limit Checking =

Variable Name	Data Type	ID	SECS Type	Storage Type	Fmconfig.ini File Description [Group] (configuration item =)
c_TwinConveyorWait_C1	EC	6126	I4	INT	[Conveyor] Twin Conveyor Wait =
c_BeltSpeed_C1	EC	6127	A[30]	INT, FLT	[Conveyor] Belt Speed =
c_BeltAccel_C1	EC	6128	A[30]	INT, FLT	[Conveyor] Belt Accel =
c_LongMove_C1	EC	6129	A[30]	INT, FLT	[Conveyor] Long Move =
c_ShortMove_C1	EC	6130	A[30]	INT, FLT	[Conveyor] Short Move =
c_Retries_C1	EC	6131	A[30]	INT, FLT	[Conveyor] Retries =
c_BackMove_C1	EC	6132	A[30]	INT, FLT	[Conveyor] Back Move =
c_TypesFile_C1	EC	6133	A[60]	ASCII	[Conveyor] Types File =
c_StartupFileName_C1	EC	6134	A[60]	ASCII	[Conveyor] Startup File Name =
c_AtResetFileName_C1	EC	6135	A[60]	ASCII	[Conveyor] At Reset File Name =
c_PreBoardRunFileName_C1	EC	6136	A[60]	ASCII	[Conveyor] Pre-Board Run File Name =
c_AtAbortFileName_C1	EC	6137	A[60]	ASCII	[Conveyor] At Abort File Name =
c_AtRunCompletionFileName_C1	EC	6138	A[60]	ASCII	[Conveyor] At Run Completion File Name =
c_VisionSystem	EC	6139	A[30]	ASCII	[Vision] Vision System =
c_VideoMixer	EC	6140	A[30]	ASCII	[Vision] Video Mixer =
c_VisionSubdir	EC	6141	A[40]	ASCII	[Vision] Vision Subdir =
c_ACSFilename	EC	6142	A[60]	ASCII	[Vision] ACS Filename =

Variable Name	Data Type	ID	SECS Type	Storage Type	Fmconfig.ini File Description [Group] (configuration item =)
c_Xpel	EC	6143	A[30]	FLT	[Vision] X/pel =
c_Ypel	EC	6144	A[30]	FLT	[Vision] Y/pel =
c_DfltMotionAntibacklash	EC	6145	A[4]	ASCII	[Vision] Dflt Motion Anti-backlash =
c_DfltUsePipeline	EC	6146	A[4]	ASCII	[Vision] Dflt Use Pipeline =
c_AnnouncePipelineMiss	EC	6147	A[4]	ASCII	[Vision] Announce Pipeline Miss =
c_DfltImagegain	EC	6148	I4	INT	[Vision] Dflt Image gain =
c_DfltImageoffset	EC	6149	I4	INT	[Vision] Dflt Image offset =
c_DfltImagesettlingtime	EC	6150	I4	INT	[Vision] Dflt Image settling time =
c_DfltTextlevel	EC	6151	I4	INT	[Vision] Dflt Text level =
c_DfltGraphicslevel	EC	6152	I4	INT	[Vision] Dflt Graphics level =
c_DfltPausemode	EC	6153	A[4]	ASCII	[Vision] Dflt Pause mode =
c_DfltMarkPausemode	EC	6154	A[4]	ASCII	[Vision] Dflt Mark Pause mode =
c_DfltMFacceptthold	EC	6157	A[30]	FLT	[Vision] Dflt MF accept thold =
c_DfltMFconfusionthold	EC	6158	A[30]	FLT	[Vision] Dflt MF confusion thold =
c_DfltMFwidth	EC	6159	A[30]	FLT	[Vision] Dflt MF width =
c_DfltMFheight	EC	6160	A[30]	FLT	[Vision] Dflt MF height =
c_DfltMFsearchwinwidth	EC	6161	A[30]	FLT	[Vision] Dflt MF search win width =
c_DfltMFsearchwinheight	EC	6162	A[30]	FLT	[Vision] Dflt MF search win height =
c_DfltMFwinloc	EC	6163	A[30]	FLT	[Vision] Dflt MF win loc =
c_DfltCFanchorpt	EC	6164	A[30]	FLT	[Vision] Dflt CF anchor pt =
c_DfltCFscanlen	EC	6165	A[30]	FLT	[Vision] Dflt CF scan len =

Variable Name	Data Type	ID	SECS Type	Storage Type	Fmconfig.ini File Description [Group] (configuration item =)
c_DfltCFsearchinward	EC	6166	A[30]	FLT	[Vision] Dflt CF search inward =
c_DfltCFdensity	EC	6167	A[30]	FLT	[Vision] Dflt CF density =
c_DfltCFsearchlen	EC	6168	I4	INT	[Vision] Dflt CF search len =
c_DfltCFprojlen	EC	6169	I4	INT	[Vision] Dflt CF proj len =
c_DfltCFEFsize	EC	6170	A[30]	FLT	[Vision] Dflt CF EF size =
c_DfltCFEFleniency	EC	6171	A[30]	FLT	[Vision] Dflt CF EF leniency =
c_DfltCFmincontrast	EC	6172	A[30]	FLT	[Vision] Dflt CF min contrast =
c_DfltCFpolarity	EC	6173	A[30]	FLT	[Vision] Dflt CF polarity =
c_DfltCFacceptthold	EC	6174	A[30]	FLT	[Vision] Dflt CF accept thold =
c_DfltCFscorefunc	EC	6175	A[30]	FLT	[Vision] Dflt CF score func =
c_DfltCFLSFconsectol	EC	6176	I4	INT	[Vision] Dflt CF LSF consec tol =
c_DfltCFLSFminpoints	EC	6177	I4	INT	[Vision] Dflt CF LSF min points =
c_DfltCForthogonality	EC	6178	A[30]	FLT	[Vision] Dflt CF orthogonality =
c_ErrDetrepositionradius	EC	6179	A[30]	FLT	[Vision] ErrDet reposition radius =
c_ErrDetfidloctol	EC	6180	A[30]	FLT	[Vision] ErrDet fid loc tol =
c_ErrDetdiagdisttol	EC	6181	A[30]	FLT	[Vision] ErrDet diag dist tol =
c_ErrDetspiralarc	EC	6182	A[30]	FLT	[Vision] ErrDet spiral arc =
c_ErrDetfidskipmode	EC	6183	A[4]	ASCII	[Vision] ErrDet fid skip mode =
c_ErrDetPurge	EC	6184	A[4]	ASCII	[Vision] ErrDet Purge =
c_ErrDetMoveToPurgeStation	EC	6185	A[4]	ASCII	[Vision] ErrDet Move To Purge Station =
c_ErrDetPurgeBeforeResume	EC	6186	A[4]	ASCII	[Vision] ErrDet Purge Before Resume =

Variable Name	Data Type	ID	SECS Type	Storage Type	Fmconfig.ini File Description [Group] (configuration item =)
c_ScaleCalMove	EC	6187	A[30]	FLT	[Vision] Scale Cal Move =
c_Xcalib	EC	6188	A[30]	FLT	[Vision] Xcalib =
c_Ycalib	EC	6189	A[30]	FLT	[Vision] Ycalib =
c_UseFidZPosition	EC	6191	A[4]	ASCII	[Vision] Use Fid Z Position =
c_DfltFidSearchAtSafeZ	EC	6192	A[4]	ASCII	[Vision] Dflt Fid Search At Safe Z =
c_SensorType	EC	6193	A[20]	ASCII	[Needle Finder] Sensor Type =
c_Dottype	EC	6194	I4	INT	[Needle Finder] Dot type =
c_NSBeam1toCorner	EC	6195	A[30]	FLT	[Needle Finder] NS Beam1 to Corner =
c_NSBeam2toCorner	EC	6196	A[30]	FLT	[Needle Finder] NS Beam2 to Corner =
c_NSBeam1torefdot	EC	6199	A[30]	FLT	[Needle Finder] NS Beam 1 to ref dot =
c_NSBeam2torefdot	EC	6200	A[30]	FLT	[Needle Finder] NS Beam 2 to ref dot =
c_NSSlot1Width	EC	6203	A[30]	FLT	[Needle Finder] NS Slot1Width =
c_NSSlot2Width	EC	6204	A[30]	FLT	[Needle Finder] NS Slot2Width =
c_NSZBeam1toCorner	EC	6205	A[30]	FLT	[Needle Finder] NSZ Beam1 to Corner =
c_NSZBeam2toCorner	EC	6206	A[30]	FLT	[Needle Finder] NSZ Beam2 to Corner =
c_NSZBeam1torefdot	EC	6207	A[30]	FLT	[Needle Finder] NSZ Beam 1 to ref dot =
c_NSZBeam2torefdot	EC	6208	A[30]	FLT	[Needle Finder] NSZ Beam 2 to ref dot =
c_NSZSlot1Width	EC	6211	A[30]	FLT	[Needle Finder] NSZ Slot1Width =
c_NSZSlot2Width	EC	6212	A[30]	FLT	[Needle Finder] NSZ Slot2Width =
c_TactileSensorInput	EC	6213	I4	INT	[Needle Finder] Tactile Sensor Input =
c_NSBeamInput	EC	6214	I4	INT	[Needle Finder] NS Beam Input =

Variable Name	Data Type	ID	SECS Type	Storage Type	Fmconfig.ini File Description [Group] (configuration item =)
c_NSZBeamInput	EC	6215	I4	INT	[Needle Finder] NSZ Beam Input =
c_Slot1XY	EC	6216	A[40]	FLT, FLT	[Needle Finder] Slot1XY =
c_Slot2XY	EC	6217	A[40]	FLT, FLT	[Needle Finder] Slot2XY =
c_refDot1	EC	6218	A[40]	FLT, FLT	[Needle Finder] refDot1 =
c_refDot2	EC	6219	A[40]	FLT, FLT	[Needle Finder] refDot2 =
c_refDot3	EC	6220	A[40]	FLT, FLT	[Needle Finder] refDot3 =
c_refDot4	EC	6221	A[40]	FLT, FLT	[Needle Finder] refDot4 =
c_XsearchDir	EC	6222	I4	INT	[Needle Finder] XsearchDir =
c_YsearchDir	EC	6223	I4	INT	[Needle Finder] YsearchDir =
c_GoldenSafeZ	EC	6224	A[30]	FLT	[Needle Finder] Golden Safe Z =
c_CurSafeZ	EC	6225	A[30]	FLT	[Needle Finder] Cur Safe Z =
c_SafeZOffset	EC	6226	A[30]	FLT	[Needle Finder] Safe Z Offset =
c_SafeZCamXY	EC	6227	A[40]	FLT, FLT	[Needle Finder] Safe Z Cam XY =
c_suckbackPeriod	EC	6228	A[30]	FLT	[Needle Finder] Suckback Period =
c_SuckbackLength	EC	6229	A[30]	FLT	[Needle Finder] Suckback Length =
c_PurgeTimeBeforeDispense	EC	6230	I4	INT	[Needle Finder] Purge Time Before Dispense =

Variable Name	Data Type	ID	SECS Type	Storage Type	Fmconfig.ini File Description [Group] (configuration item =)
c_RevTimeBeforeXYZ	EC	6231	A[30]	FLT	[Needle Finder] Rev Time Before XYZ =
c_NSZVerticalSearchExt	EC	6232	A[30]	FLT	[Needle Finder] NSZ Vertical Search Ext =
c_CamCurOffset	EC	6233	A[40]	FLT, FLT	[Needle Finder] CamCurOffset =
c_Autoenable	EC	6234	I4	INT	[Needle Finder] Auto enable =
c_MaxStep	EC	6235	A[30]	FLT	[Needle Finder] Max Step =
c_RevTimeBeforeTouch	EC	6236	A[30]	FLT	[Needle Finder] Rev Time Before Touch =
c_MinProbedz_N1	EC	6237	A[30]	FLT	[Ndl Finder 1] Min Probe dz =
c_RatetoTactile_N1	EC	6238	A[30]	FLT	[Ndl Finder 1] Rate to Tactile =
c_AcceltoTactile_N1	EC	6239	A[30]	FLT	[Ndl Finder 1] Accel to Tactile =
c_RateatTactile_N1	EC	6240	A[30]	FLT	[Ndl Finder 1] Rate at Tactile =
c_AccelatTactile_N1	EC	6241	A[30]	FLT	[Ndl Finder 1] Accel at Tactile =
c_BackupatTactile_N1	EC	6242	A[30]	FLT	[Ndl Finder 1] Backup at Tactile =
c_CurrentNdlXYinSlot_N1	EC	6243	A[40]	FLT, FLT	[Ndl Finder 1] Current Ndl XY in Slot =
c_CurrentNdlTipinSlot2_N1	EC	6244	A[30]	FLT	[Ndl Finder 1] Current Ndl Tip in Slot2 =
c_forwardtime	EC	6245	A[30]	FLT	[Prompted Setup] forward time =
c_reversetime	EC	6246	A[30]	FLT	[Prompted Setup] reverse time =
c_purgetime	EC	6247	A[30]	FLT	[Prompted Setup] purge time =
c_extraZ	EC	6248	A[30]	FLT	[Prompted Setup] extra Z =
c_PrimeextraZ	EC	6249	A[30]	FLT	[Prompted Setup] Prime extra Z =
c_Valvelocwhilecheckforpurgecup	EC	6250	A[40]	FLT, FLT	[Prompted Setup] Valve loc while check for purge cup =

Variable Name	Data Type	ID	SECS Type	Storage Type	Fmconfig.ini File Description [Group] (configuration item =)
c_TeachZJogMove	EC	6251	A[30]	FLT	[Prompted Setup] Teach Z Jog Move =
c_TeachZJogMoveLimit	EC	6252	A[30]	FLT	[Prompted Setup] Teach Z Jog Move Limit =
c_PurgeLocTeachZJogMove	EC	6253	A[30]	FLT	[Prompted Setup] Purge Loc Teach Z Jog Move =
c_ScaleLocTeachZJogMove	EC	6254	A[30]	FLT	[Prompted Setup] Scale Loc Teach Z Jog Move =
c_UseScript	EC	6255	A[4]	ASCII	[Prompted Setup] Use Script =
c_EnableValveOffsetsVerificationStep	EC	6256	A[4]	ASCII	[Prompted Setup] Enable Valve Offsets Verification Step =
c_ValveOffsetsVerificationTolerance	EC	6257	A[30]	FLT	[Prompted Setup] Valve Offsets Verification Tolerance (.1 mil) =
c_RequireNameandLot	EC	6258	A[4]	ASCII	[Prompted Setup] Require Name and Lot =
c_Valve1PromptedSetupScriptFile	EC	6259	A[60]	ASCII	[Prompted Setup] Valve 1 Prompted Setup Script File =
c_Valve1ChangeSyringeScriptFile	EC	6260	A[60]	ASCII	[Prompted Setup] Valve 1 Change Syringe Script File =
c_Valve1LowFluidScriptFile	EC	6261	A[60]	ASCII	[Prompted Setup] Valve 1 Low Fluid Script File =
c_Light1Controller	EC	6262	A[20]	ASCII	[Light Manager] Light 1 Controller =
c_Light1DfltLevel	EC	6263	I4	INT	[Light Manager] Light 1 Dflt Level =
c_Light1ShutterOutput	EC	6264	I4	INT	[Light Manager] Light 1 Shutter Output =
c_Light2Controller	EC	6265	A[20]	ASCII	[Light Manager] Light 2 Controller =
c_Light2DfltLevel	EC	6266	I4	INT	[Light Manager] Light 2 Dflt Level =
c_Light2ShutterOutput	EC	6267	I4	INT	[Light Manager] Light 2 Shutter Output =
c_MaxRBBlueOutput	EC	6268	I4	INT	[Light Manager] Max RB Blue Output =
c_MaxRBRedOutput	EC	6269	I4	INT	[Light Manager] Max RB Red Output =
c_MaxRedOutput	EC	6270	I4	INT	[Light Manager] Max Red Output =
c_LightType	EC	6271	A[30]	ASCII	[Light Manager] Light Type =

Variable Name	Data Type	ID	SECS Type	Storage Type	Fmconfig.ini File Description [Group] (configuration item =)
c_Turnlightoffonexit	EC	6272	A[4]	ASCII	[Light Manager] Turn light off on exit =
c_ControlType	EC	6273	A[20]	ASCII	[Valve Manager] Control Type =
c_DualActionHead	EC	6274	A[4]	ASCII	[Valve Manager] Dual Action Head =
c_Valve1Type	EC	6275	A[20]	ASCII	[Valve Manager] Valve 1 Type =
c_DefaultValve	EC	6276	I4	INT	[Valve Manager] Default Valve =
c_DualActionOutput	EC	6277	I4	INT	[Valve Manager] Dual Action Output =
c_ToggleDelay	EC	6278	A[30]	FLT	[Valve Manager] Toggle Delay (ms) =
c_Valve1FluidSensor	EC	6279	A[4]	ASCII	[Valve Manager] Valve 1 Fluid Sensor =
c_Valve2FluidSensor	EC	6280	A[4]	ASCII	[Valve Manager] Valve 2 Fluid Sensor =
c_Name_V1	EC	6281	A[30]	ASCII	[Valve 1] Name =
c_Type_V1	EC	6282	A[20]	ASCII	[Valve 1] Type =
c_Number_V1	EC	6283	I4	INT	[Valve 1] Number =
c_Enabled_V1	EC	6284	A[4]	ASCII	[Valve 1] Enabled =
c_HasHS_V1	EC	6285	A[4]	ASCII	[Valve 1] Has HS =
c_BitMask_V1	EC	6286	I4	INT	[Valve 1] Bit Mask =
c_OnState_V1	EC	6287	I4	INT	[Valve 1] On State =
c_OffState_V1	EC	6288	I4	INT	[Valve 1] Off State =
c_ReverseBitMask_V1	EC	6289	I4	INT	[Valve 1] Reverse Bit Mask =
c_ReverseOnState_V1	EC	6290	I4	INT	[Valve 1] Reverse On State =
c_ReverseOffState_V1	EC	6291	I4	INT	[Valve 1] Reverse Off State =
c_ForwardIObit_V1	EC	6292	I4	INT	[Valve 1] Forward IO bit =

Variable Name	Data Type	ID	SECS Type	Storage Type	Fmconfig.ini File Description [Group] (configuration item =)
c_ReverseIObit_V1	EC	6293	I4	INT	[Valve 1] Reverse IO bit =
c_ZneedleOffset_V1	EC	6294	A[30]	FLT	[Valve 1] Z Needle Offset =
c_XYNeedleOffset_V1	EC	6295	A[40]	FLT, FLT	[Valve 1] XY Needle Offset =
c_NdltoHSoffset_V1	EC	6296	A[40]	FLT, FLT	[Valve 1] Ndl to HS Offset =
c_PurgeLocName_V1	EC	6297	A[30]	ASCII	[Valve 1] Purge Loc Name =
c_ScaleLocName_V1	EC	6298	A[30]	ASCII	[Valve 1] Scale Loc Name =
c_ZstorageVariable_V1	EC	6299	I4	INT	[Valve 1] Z Storage Variable =
c_FluidPressure_V1	EC	6300	I4	INT	[Valve 1] Fluid Pressure =
c_ForwardValveSpeed_V1	EC	6301	A[30]	FLT	[Valve 1] Forward Valve Speed =
c_ReverseValveSpeed_V1	EC	6302	A[30]	FLT	[Valve 1] Reverse Valve Speed =
c_Acceleration_V1	EC	6303	A[30]	FLT	[Valve 1] Acceleration =
c_Proportional_V1	EC	6304	I4	INT	[Valve 1] Proportional =
c_Integral_V1	EC	6305	I4	INT	[Valve 1] Integral =
c_Derivative_V1	EC	6306	I4	INT	[Valve 1] Derivative =
c_EncoderFollowingError_V1	EC	6307	I4	INT	[Valve 1] Encoder Following Error =
c_UseAdvancedPID_V1	EC	6308	A[4]	ASCII	[Valve 1] Use Advanced PID =
c_AdvProportional_V1	EC	6309	A[30]	FLT	[Valve 1] Adv Proportional =
c_AdvIntegral_V1	EC	6310	A[30]	FLT	[Valve 1] Adv Integral =
c_AdvDerivative_V1	EC	6311	A[30]	FLT	[Valve 1] Adv Derivative =
c_FeedForwardAccel_V1	EC	6312	A[30]	FLT	[Valve 1] Feed Forward Accel =

Variable Name	Data Type	ID	SECS Type	Storage Type	Fmconfig.ini File Description [Group] (configuration item =)
c_FeedForwardVelocity_V1	EC	6313	A[30]	FLT	[Valve 1] Feed Forward Velocity =
c_StateMachineForwardSpeed_V1	EC	6314	A[30]	FLT	[Valve 1] State Machine Forward Speed =
c_StateMachineReverseSpeed_V1	EC	6315	A[30]	FLT	[Valve 1] State Machine Reverse Speed =
c_StateMachineDispenseDelay_V1	EC	6316	I4	INT	[Valve 1] State Machine Dispense Delay =
c_StateMachineRefillDelay_V1	EC	6317	I4	INT	[Valve 1] State Machine Refill Delay =
c_ResetOutput_V1	EC	6318	I4	INT	[Valve 1] Reset Output =
c_ValveControlOutput_V1	EC	6319	I4	INT	[Valve 1] Valve Control Output =
c_ValvePressureOutput_V1	EC	6320	I4	INT	[Valve 1] Valve Pressure Output =
c_FluidPressureModeOutput_V1	EC	6321	I4	INT	[Valve 1] Fluid Pressure Mode Output =
c_FluidPressureMode_V1	EC	6322	I4	INT	[Valve 1] Fluid Pressure Mode =
c_CamtoNdlDottype_V1	EC	6323	I4	INT	[Valve 1] Cam to Ndl Dot type =
c_AlignmentDotLocation1_V1	EC	6324	A[40]	FLT, FLT	[Valve 1] Alignment Dot Location 1 =
c_AlignmentDotLocation2_V1	EC	6325	A[40]	FLT, FLT	[Valve 1] Alignment Dot Location 2 =
c_AlignmentDotLocation3_V1	EC	6326	A[40]	FLT, FLT	[Valve 1] Alignment Dot Location 3 =
c_AlignmentDotLocation4_V1	EC	6327	A[40]	FLT, FLT	[Valve 1] Alignment Dot Location 4 =
c_NeedlePositionoverTactile_V1	EC	6328	A[40]	FLT, FLT	[Valve 1] Needle Position over Tactile =
c_PrimeForwardTime1_V1	EC	6329	A[30]	FLT	[Valve 1] Prime Forward Time 1 (sec) =
c_PrimeForwardTime2_V1	EC	6330	A[30]	FLT	[Valve 1] Prime Forward Time 2 (sec) =

Variable Name	Data Type	ID	SECS Type	Storage Type	Fmconfig.ini File Description [Group] (configuration item =)
c_PrimeReverseTime_V1	EC	6331	A[30]	FLT	[Valve 1] Prime Reverse Time (sec) =
c_PrimeExtraZ_V1	EC	6332	A[30]	FLT	[Valve 1] Prime Extra Z =
c_IsDlgForForward_V1	EC	6333	A[4]	ASCII	[Valve 1] Is Dlg For Forward =
c_ForwardTime_V1	EC	6334	A[30]	FLT	[Valve 1] Forward Time (sec) =
c_ReverseTime_V1	EC	6335	A[30]	FLT	[Valve 1] Reverse Time (sec) =
c_ForwardOnlyTime_V1	EC	6336	A[30]	FLT	[Valve 1] Forward Only Time (sec) =
c_ReverseOnlyTime_V1	EC	6337	A[30]	FLT	[Valve 1] Reverse Only Time (sec) =
c_FloatingHead_V1	EC	6338	A[4]	ASCII	[Valve 1] Floating Head =
c_FloatingHeadZOvertravel_V1	EC	6339	A[30]	FLT	[Valve 1] Floating Head Z Overtravel =
c_ConstantSyringePressure_V1	EC	6340	A[4]	ASCII	[Valve 1] Constant Syringe Pressure =
c_SyringePressureOutput_V1	EC	6341	I4	INT	[Valve 1] Syringe Pressure Output =
c_LineCharLocation1_V1	EC	6343	A[40]	FLT, FLT	[Valve 1] Line Char Location 1 =
c_LineCharLocation2_V1	EC	6344	A[40]	FLT, FLT	[Valve 1] Line Char Location 2 =
c_DotCharLocation_V1	EC	6345	A[40]	FLT	[Valve 1] Dot Char Location =
c_AutoRefillafterPrimingFluid_V1	EC	6346	A[4]	ASCII	[Valve 1] Auto Refill after Priming Fluid =
c_FluidPrimingTimeoutEnabled_V1	EC	6347	A[4]	ASCII	[Valve 1] Fluid Priming Timeout Enabled =
c_FluidPrimingTimeoutDuration_V1	EC	6348	I4	INT	[Valve 1 (Type] Fluid Priming Timeout Duration =
c_PrimeHomeTimeout_V1	EC	6349	A[30]	FLT	[Valve 1] Prime/Home Timeout (ms) =
c_RefillAfterPurge_V1	EC	6351	A[4]	ASCII	[Valve 1] Refill After Purge =
c_RefillAfterMeasFlowRate_V1	EC	6352	A[4]	ASCII	[Valve 1] Refill After Meas Flow Rate =

Variable Name	Data Type	ID	SECS Type	Storage Type	Fmconfig.ini File Description [Group] (configuration item =)
c_TopGearRatio_V1	EC	6353	A[30]	ASCII	[Valve 1] Top Gear Ratio =
c_PlanetaryGearRatio_V1	EC	6354	A[30]	ASCII	[Valve 1] Planetary Gear Ratio =
c_ChamberSize_V1	EC	6355	A[30]	ASCII	[Valve 1] Chamber Size =
c_CleanPurgeTime	EC	6356	A[30]	FLT	[Valve Clean Parms] Clean Purge Time =
c_CleanFlushCount	EC	6357	I4	INT	[Valve Clean Parms] Clean Flush Count =
c_CleanAirDryTime	EC	6358	A[30]	FLT	[Valve Clean Parms] Clean Air Dry Time =
c_CleanFlushOnTime	EC	6359	A[30]	FLT	[Valve Clean Parms] Clean Flush On Time =
c_CleanFlushOffTime	EC	6360	A[30]	FLT	[Valve Clean Parms] Clean Flush Off Time =
c_UserDefineROMVersion	EC	6361	A[30]	FLT	[Valve Clean Parms] User Define ROM Version =
c_PrelimNeedleLocation_V1	EC	6362	A[40]	FLT, FLT	[VO Valve 1] Prelim Needle Location =
c_PurgeLocHSOffset_V1	EC	6363	A[40]	FLT, FLT	[VO Valve 1] Purge Loc HS Offset =
c_PurgeLocCircumPt1_V1	EC	6364	A[40]	FLT, FLT	[VO Valve 1] Purge Loc Circum Pt1 =
c_PurgeLocCircumPt2_V1	EC	6365	A[40]	FLT, FLT	[VO Valve 1] Purge Loc Circum Pt2 =
c_PurgeLocCircumPt3_V1	EC	6366	A[40]	FLT, FLT	[VO Valve 1] Purge Loc Circum Pt3 =
c_PurgeXtraZ_V1	EC	6367	A[30]	FLT	[VO Valve 1] Purge Xtra Z =
c_PurgeTeachCenter_V1	EC	6368	A[4]	ASCII	[VO Valve 1] Purge Teach Center =
c_ScaleLocHSOffset_V1	EC	6369	A[40]	FLT, FLT	[VO Valve 1] Scale Loc HS Offset =

Variable Name	Data Type	ID	SECS Type	Storage Type	Fmconfig.ini File Description [Group] (configuration item =)
c_ScaleLocCircumPt1_V1	EC	6370	A[40]	FLT, FLT	[VO Valve 1] Scale Loc Circum Pt1 =
c_ScaleLocCircumPt2_V1	EC	6371	A[40]	FLT, FLT	[VO Valve 1] Scale Loc Circum Pt2 =
c_ScaleLocCircumPt3_V1	EC	6372	A[40]	FLT, FLT	[VO Valve 1] Scale Loc Circum Pt3 =
c_ScaleXtraZ_V1	EC	6373	A[30]	FLT	[VO Valve 1] Scale Xtra Z =
c_ScaleTeachCenter_V1	EC	6374	A[4]	ASCII	[VO Valve 1] Scale Teach Center =
c_ZoffsetCircumPt1_V1	EC	6375	A[40]	FLT, FLT	[VO Valve 1] Zoffset Circum Pt1 =
c_ZoffsetCircumPt2_V1	EC	6376	A[40]	FLT, FLT	[VO Valve 1] Zoffset Circum Pt2 =
c_ZoffsetCircumPt3_V1	EC	6377	A[40]	FLT, FLT	[VO Valve 1] Zoffset Circum Pt3 =
c_ZoffsetTeachCenter_V1	EC	6378	A[4]	ASCII	[VO Valve 1] Zoffset Teach Center =
c_TeachDotsCorner1_V1	EC	6379	A[40]	FLT, FLT	[VO Valve 1] Teach Dots Corner 1 =
c_TeachDotsCorner2_V1	EC	6380	A[40]	FLT, FLT	[VO Valve 1] Teach Dots Corner 2 =
c_ZoffsetLightStateCenterPt_V1	EC	6381	A[40]	INT, BOOL, INT, BOOL, INT, BOOL	[VO Valve 1] Zoffset LightState Center Pt = light level 1, shutter 1 open, light level 2, shutter 2 open, light level 3, shutter 3 open If no light levels assigned, the value is = (none)

Variable Name	Data Type	ID	SECS Type	Storage Type	Fmconfig.ini File Description [Group] (configuration item =)
c_ZoffsetLightStateCircumPt1_V1	EC	6382	A[40]	INT, BOOL, INT, BOOL, INT, BOOL	[VO Valve 1] Zoffset LightState Circum Pt1 = light level 1, shutter 1 open, light level 2, shutter 2 open, light level 3, shutter 3 open
c_ZoffsetLightStateCircumPt2_V1	EC	6383	A[40]	INT, BOOL, INT, BOOL, INT, BOOL	[VO Valve 1] Zoffset LightState Circum Pt2 = light level 1, shutter 1 open, light level 2, shutter 2 open, light level 3, shutter 3 open
c_ZoffsetLightStateCircumPt3_V1	EC	6384	A[40]	INT, BOOL, INT, BOOL, INT, BOOL	[VO Valve 1] Zoffset LightState Circum Pt3 = light level 1, shutter 1 open, light level 2, shutter 2 open, light level 3, shutter 3 open
c_PurgeLocLightStateCenterPt_V1	EC	6385	A[40]	INT, BOOL, INT, BOOL, INT, BOOL	[VO Valve 1] Purge Loc LightState Center Pt = light level 1, shutter 1 open, light level 2, shutter 2 open, light level 3, shutter 3 open
c_PurgeLocLightStateCircumPt1_V1	EC	6386	A[40]	INT, BOOL, INT, BOOL, INT, BOOL	[VO Valve 1] Purge Loc LightState Circum Pt1 = light level 1, shutter 1 open, light level 2, shutter 2 open, light level 3, shutter 3 open

Variable Name	Data Type	ID	SECS Type	Storage Type	Fmconfig.ini File Description [Group] (configuration item =)
c_PurgeLocLightStateCircumPt2_V1	EC	6387	A[40]	INT, BOOL, INT, BOOL, INT, BOOL	[VO Valve 1] Purge Loc LightState Circum Pt2 = light level 1, shutter 1 open, light level 2, shutter 2 open, light level 3, shutter 3 open
c_PurgeLocLightStateCircumPt3_V1	EC	6388	A[40]	INT, BOOL, INT, BOOL, INT, BOOL	[VO Valve 1] Purge Loc LightState Circum Pt3 = light level 1, shutter 1 open, light level 2, shutter 2 open, light level 3, shutter 3 open
c_PurgeLocLightStateHSPt_V1	EC	6389	A[40]	INT, BOOL, INT, BOOL, INT, BOOL	[VO Valve 1] Purge Loc LightState HS Pt = light level 1, shutter 1 open, light level 2, shutter 2 open, light level 3, shutter 3 open
c_ScaleLocLightStateCenterPt_V1	EC	6390	A[40]	INT, BOOL, INT, BOOL, INT, BOOL	[VO Valve 1] Scale Loc LightState Center Pt = light level 1, shutter 1 open, light level 2, shutter 2 open, light level 3, shutter 3 open
c_ScaleLocLightStateCircumPt1_V1	EC	6391	A[40]	INT, BOOL, INT, BOOL, INT, BOOL	[VO Valve 1] Scale Loc LightState Circum Pt1 = light level 1, shutter 1 open, light level 2, shutter 2 open, light level 3, shutter 3 open

Variable Name	Data Type	ID	SECS Type	Storage Type	Fmconfig.ini File Description [Group] (configuration item =)
c_ScaleLocLightStateCircumPt2_V1	EC	6392	A[40]	INT, BOOL, INT, BOOL, INT, BOOL	[VO Valve 1] Scale Loc LightState Circum Pt2 = light level 1, shutter 1 open, light level 2, shutter 2 open, light level 3, shutter 3 open
c_ScaleLocLightStateCircumPt3_V1	EC	6393	A[40]	INT, BOOL, INT, BOOL, INT, BOOL	[VO Valve 1] Scale Loc LightState Circum Pt3 = light level 1, shutter 1 open, light level 2, shutter 2 open, light level 3, shutter 3 open
c_ScaleLocLightStateHSPt_V1	EC	6394	A[40]	INT, BOOL, INT, BOOL, INT, BOOL	[VO Valve 1] Scale Loc LightState HS Pt = light level 1, shutter 1 open, light level 2, shutter 2 open, light level 3, shutter 3 open
c_TactileLightStateCenterPt_V1	EC	6395	A[40]	INT, BOOL, INT, BOOL, INT, BOOL	[VO Valve 1] Tactile LightState Center Pt = light level 1, shutter 1 open, light level 2, shutter 2 open, light level 3, shutter 3 open
c_TactileLightStateCircumPt1_V1	EC	6396	A[40]	INT, BOOL, INT, BOOL, INT, BOOL	[VO Valve 1] Tactile LightState Circum Pt1 = light level 1, shutter 1 open, light level 2, shutter 2 open, light level 3, shutter 3 open

Table D-1   FmConfig.ini File Variables (Continued)

Variable Name	Data Type	ID	SECS Type	Storage Type	Fmconfig.ini File Description [Group] (configuration item =)
c_TactileLightStateCircumPt2_V1	EC	6397	A[40]	INT, BOOL, INT, BOOL, INT, BOOL	[VO Valve 1] Tactile LightState Circum Pt2 = light level 1, shutter 1 open, light level 2, shutter 2 open, light level 3, shutter 3 open
c_TactileLightStateCircumPt3_V1	EC	6398	A[40]	INT, BOOL, INT, BOOL, INT, BOOL	[VO Valve 1] Tactile LightState Circum Pt3 = light level 1, shutter 1 open, light level 2, shutter 2 open, light level 3, shutter 3 open
c_SafeZLightStatePt_V1	EC	6399	A[40]	INT, BOOL, INT, BOOL, INT, BOOL	[VO Valve 1] Safe Z LightState Pt = light level 1, shutter 1 open, light level 2, shutter 2 open, light level 3, shutter 3 open
c_NdlToCamLightStatePt_V1	EC	6400	A[40]	INT, BOOL, INT, BOOL, INT, BOOL	[VO Valve 1] Ndl To Cam LightState Pt = light level 1, shutter 1 open, light level 2, shutter 2 open, light level 3, shutter 3 open
c_HSToCamLightStatePt_V1	EC	6401	A[40]	INT, BOOL, INT, BOOL, INT, BOOL	[VO Valve 1] HS To Cam LightState Pt = light level 1, shutter 1 open, light level 2, shutter 2 open, light level 3, shutter 3 open

Variable Name	Data Type	ID	SECS Type	Storage Type	Fmconfig.ini File Description [Group] (configuration item =)
c_SubstrateLightStateCorner1_V1	EC	6402	A[40]	INT, BOOL, INT, BOOL, INT, BOOL	[VO Valve 1] Substrate LightState Corner1 = light level 1, shutter 1 open, light level 2, shutter 2 open, light level 3, shutter 3 open
c_SubstrateLightStateCorner2_V1	EC	6403	A[40]	INT, BOOL, INT, BOOL, INT, BOOL	[VO Valve 1] Substrate LightState Corner2 = light level 1, shutter 1 open, light level 2, shutter 2 open, light level 3, shutter 3 open
c_ZoffsetTolerance_V1	EC	6404	A[30]	FLT	[VO Valve 1] Zoffset Tolerance =
c_ZoffsetRepeat_V1	EC	6405	I4	INT	[VO Valve 1] Zoffset Repeat =
c_DispDotLightStatePt_V1	EC	6406	A[40]	INT, BOOL, INT, BOOL, INT, BOOL	[VO Valve 1] Disp Dot LightState Pt = light level 1, shutter 1 open, light level 2, shutter 2 open, light level 3, shutter 3 open
c_NdltoNdlPt_V1	EC	6407	A[40]	FLT, FLT	[VO Valve 1] Ndl to Ndl Pt =
c_NdlBeam1_V1	EC	6408	A[40]	FLT, FLT	[Needle XYZ Valve 1] Ndl Beam 1 =
c_NdlBeam2_V1	EC	6409	A[40]	FLT, FLT	[Needle XYZ Valve 1] Ndl Beam 2 =
c_SubstrateHSLoc_V1	EC	6410	A[40]	FLT, FLT	[Needle XYZ Valve 1] Substrate HS Loc =

Variable Name	Data Type	ID	SECS Type	Storage Type	Fmconfig.ini File Description [Group] (configuration item =)
c_SubstrateHSZ_V1	EC	6411	A[30]	FLT	[Needle XYZ Valve 1] Substrate HS Z =
c_SubstrateNdlLoc_V1	EC	6412	A[40]	FLT, FLT	[Needle XYZ Valve 1] Substrate Ndl Loc =
c_SubstrateNdlZ_V1	EC	6413	A[30]	FLT	[Needle XYZ Valve 1] Substrate Ndl Z =
c_CurrentHSXYinSlot_V1	EC	6414	A[40]	FLT, FLT	[Needle XYZ Valve 1] Current HS XY in Slot =
c_CurrentNdlTipinSlot2_V1	EC	6415	A[30]	FLT	[Needle XYZ Valve 1] Current Ndl Tip in Slot2 =
c_CurrentHSTipinSlot2_V1	EC	6416	A[30]	FLT	[Needle XYZ Valve 1] Current HS Tip in Slot2 =
c_HSTDXY_V1	EC	6417	A[40]	FLT, FLT	[Needle XYZ Valve 1] HS TD XY =
c_HSTDZ_V1	EC	6418	A[30]	FLT	[Needle XYZ Valve 1] HS TD Z =
c_NdlTDXY_V1	EC	6419	A[40]	FLT, FLT	[Needle XYZ Valve 1] Ndl TD XY =
c_NdlTDZ_V1	EC	6420	A[30]	FLT	[Needle XYZ Valve 1] Ndl TD Z =
c_ForceReteachBeams_V1	EC	6431	A[4]	ASCII	[Needle XYZ Valve 1] Force Re-teach Beams =
c_SkipHeightSenseforXYOffsets_V1	EC	6432	A[4]	ASCII	[Needle XYZ Valve 1] Skip Height Sense for XY Offsets =
c_HeaterOffsets	EC	6433	A[4]	ASCII	[Local Machine Offsets] Heater Offsets =
c_HeaterMaint	EC	6434	A[4]	ASCII	[Local Machine Offsets] Heater Maint =
c_HeaterWarn	EC	6435	I4	INT	[Local Machine Offsets] Heater Warn =
c_HeaterFail	EC	6436	I4	INT	[Local Machine Offsets] Heater Fail =
c_WorkpieceOrigin	EC	6437	A[4]	ASCII	[Local Machine Offsets] Workpiece Origin =
c_WorkpieceOriginName	EC	6438	A[30]	ASCII	[Local Machine Offsets] Workpiece Origin Name =

Variable Name	Data Type	ID	SECS Type	Storage Type	Fmconfig.ini File Description [Group] (configuration item =)
c_WorkpieceMaint	EC	6439	A[4]	ASCII	[Local Machine Offsets] Workpiece Maint =
c_WorkpieceWarn	EC	6440	I4	INT	[Local Machine Offsets] Workpiece Warn =
c_WorkpieceFail	EC	6441	I4	INT	[Local Machine Offsets] Workpiece Fail =
c_ValveBias	EC	6442	A[4]	ASCII	[Local Machine Offsets] Valve Bias =
c_ValveMaint	EC	6443	A[4]	ASCII	[Local Machine Offsets] Valve Maint =
c_ValveWarn	EC	6444	I4	INT	[Local Machine Offsets] Valve Warn =
c_ValveFail	EC	6445	I4	INT	[Local Machine Offsets] Valve Fail =
c_ValveBiasMax	EC	6446	A[30]	FLT	[Local Machine Offsets] Valve Bias Max =
c_ValveBiasMin	EC	6447	A[30]	FLT	[Local Machine Offsets] Valve Bias Min =
c_PurgeUseFids	EC	6448	A[4]	ASCII	[Machine Fiducial Setup] Purge Use Fids =
c_PurgeNumberofFids	EC	6449	I4	INT	[Machine Fiducial Setup] Purge Number of Fids =
c_Purge1FidTaught	EC	6450	A[4]	ASCII	[Machine Fiducial Setup] Purge 1 Fid Taught =
c_Purge3FidsTaught	EC	6451	A[4]	ASCII	[Machine Fiducial Setup] Purge 3 Fids Taught =
c_PurgeOffsetFromCenter	EC	6452	A[40]	FLT, FLT	[Machine Fiducial Setup] Purge Offset From Center =
c_PurgeUseOffsetFromCenter	EC	6453	A[4]	ASCII	[Machine Fiducial Setup] Purge Use Offset From Center =
c_PurgeConfirmLocLightstate	EC	6454	A[40]	INT, BOOL, INT, BOOL, INT, BOOL	[Machine Fiducial Setup] Purge Confirm Loc Lightstate = light level 1, shutter 1 open, light level 2, shutter 2 open, light level 3, shutter 3 open
c_PurgeOpAutoLoc	EC	6455	A[4]	ASCII	[Machine Fiducial Setup] Purge Op Auto Loc =
c_PurgeOpVerifyFinalLoc	EC	6456	A[4]	ASCII	[Machine Fiducial Setup] Purge Op Verify Final Loc =

Variable Name	Data Type	ID	SECS Type	Storage Type	Fmconfig.ini File Description [Group] (configuration item =)
c_PurgeOpAdjustFinalLoc	EC	6457	A[4]	ASCII	[Machine Fiducial Setup] Purge Op Adjust Final Loc =
c_PurgeOpFinalLocPause	EC	6458	A[4]	ASCII	[Machine Fiducial Setup] Purge Op Final Loc Pause =
c_PurgeOpFinalLocPauseSecs	EC	6459	I4	INT	[Machine Fiducial Setup] Purge Op Final Loc Pause Secs =
c_PurgeOpManualFidFind	EC	6460	A[4]	ASCII	[Machine Fiducial Setup] Purge Op Manual Fid Find =
c_PurgeOpSkipHSAdjust	EC	6461	A[4]	ASCII	[Machine Fiducial Setup] Purge Op Skip HS Adjust =
c_ScaleUseFids	EC	6462	A[4]	ASCII	[Machine Fiducial Setup] Scale Use Fids =
c_ScaleNumberofFids	EC	6463	I4	INT	[Machine Fiducial Setup] Scale Number of Fids =
c_Scale1FidTaught	EC	6464	A[4]	ASCII	[Machine Fiducial Setup] Scale 1 Fid Taught =
c_Scale3FidsTaught	EC	6465	A[4]	ASCII	[Machine Fiducial Setup] Scale 3 Fids Taught =
c_ScaleOffsetFromCenter	EC	6466	A[40]	FLT, FLT	[Machine Fiducial Setup] Scale Offset From Center =
c_ScaleUseOffsetFromCenter	EC	6467	A[4]	ASCII	[Machine Fiducial Setup] Scale Use Offset From Center =
c_ScaleConfirmLocLightstate	EC	6468	A[40]	INT, BOOL, INT, BOOL, INT, BOOL	[Machine Fiducial Setup] Scale Confirm Loc Lightstate = light level 1, shutter 1 open, light level 2, shutter 2 open, light level 3, shutter 3 open
c_ScaleOpAutoLoc	EC	6469	A[4]	ASCII	[Machine Fiducial Setup] Scale Op Auto Loc =
c_ScaleOpVerifyFinalLoc	EC	6470	A[4]	ASCII	[Machine Fiducial Setup] Scale Op Verify Final Loc =
c_ScaleOpAdjustFinalLoc	EC	6471	A[4]	ASCII	[Machine Fiducial Setup] Scale Op Adjust Final Loc =
c_ScaleOpFinalLocPause	EC	6472	A[4]	ASCII	[Machine Fiducial Setup] Scale Op Final Loc Pause =
c_ScaleOpFinalLocPauseSecs	EC	6473	I4	INT	[Machine Fiducial Setup] Scale Op Final Loc Pause Secs =

Variable Name	Data Type	ID	SECS Type	Storage Type	Fmconfig.ini File Description [Group] (configuration item =)
c_ScaleOpManualFidFind	EC	6474	A[4]	ASCII	[Machine Fiducial Setup] Scale Op Manual Fid Find =
c_ScaleOpSkipHSAdjust	EC	6475	A[4]	ASCII	[Machine Fiducial Setup] Scale Op Skip HS Adjust =
c_TactileUseFids	EC	6476	A[4]	ASCII	[Machine Fiducial Setup] Tactile Use Fids =
c_TactileNumberofFids	EC	6477	I4	INT	[Machine Fiducial Setup] Tactile Number of Fids =
c_Tactile1FidTaught	EC	6478	A[4]	ASCII	[Machine Fiducial Setup] Tactile 1 Fid Taught =
c_Tactile3FidsTaught	EC	6479	A[4]	ASCII	[Machine Fiducial Setup] Tactile 3 Fids Taught =
c_TactileOffsetFromCenter	EC	6480	A[40]	FLT, FLT	[Machine Fiducial Setup] Tactile Offset From Center =
c_TactileUseOffsetFromCenter	EC	6481	A[4]	ASCII	[Machine Fiducial Setup] Tactile Use Offset From Center =
c_TactileConfirmLocLightstate	EC	6482	A[40]	INT, BOOL, INT, BOOL, INT, BOOL	[Machine Fiducial Setup] Tactile Confirm Loc Lightstate = light level 1, shutter 1 open, light level 2, shutter 2 open, light level 3, shutter 3 open
c_TactileOpAutoLoc	EC	6483	A[4]	ASCII	[Machine Fiducial Setup] Tactile Op Auto Loc =
c_TactileOpVerifyFinalLoc	EC	6484	A[4]	ASCII	[Machine Fiducial Setup] Tactile Op Verify Final Loc =
c_TactileOpAdjustFinalLoc	EC	6485	A[4]	ASCII	[Machine Fiducial Setup] Tactile Op Adjust Final Loc =
c_TactileOpManualFidFind	EC	6486	A[4]	ASCII	[Machine Fiducial Setup] Tactile Op Manual Fid Find =
c_SubstrateUseFids	EC	6487	A[4]	ASCII	[Machine Fiducial Setup] Substrate Use Fids =
c_SubstrateNumberofFids	EC	6488	I4	INT	[Machine Fiducial Setup] Substrate Number of Fids =
c_Substrate2FidsTaught	EC	6489	A[4]	ASCII	[Machine Fiducial Setup] Substrate 2 Fids Taught =
c_SubstrateOpManualFidFind	EC	6490	A[4]	ASCII	[Machine Fiducial Setup] Substrate Op Manual Fid Find =
c_NdlFinderUseFids	EC	6491	A[4]	ASCII	[Machine Fiducial Setup] NdlFinder Use Fids =

Variable Name	Data Type	ID	SECS Type	Storage Type	Fmconfig.ini File Description [Group] (configuration item =)
c_NdlFinderNumberofFids	EC	6492	I4	INT	[Machine Fiducial Setup] NdlFinder Number of Fids =
c_NdlFinder1FidTaught	EC	6493	A[4]	ASCII	[Machine Fiducial Setup] NdlFinder 1 Fid Taught =
c_NdlFinderConfirmLocLightstate	EC	6494	A[40]	INT, BOOL, INT, BOOL, INT, BOOL	[Machine Fiducial Setup] NdlFinder Confirm Loc Lightstate = light level 1, shutter 1 open, light level 2, shutter 2 open, light level 3, shutter 3 open
c_NdlFinderOpAutoLoc	EC	6495	A[4]	ASCII	[Machine Fiducial Setup] NdlFinder Op Auto Loc =
c_NdlFinderOpVerifyFinalLoc	EC	6496	A[4]	ASCII	[Machine Fiducial Setup] NdlFinder Op Verify Final Loc =
c_DJTactileHSOffset_V1	EC	6501	A[40]	FLT, FLT	[VO Valve 1] DJ Tactile HS Offset =
c_DJCycleCount_V1	EC	6502	A[30]	FLT	[Valve 1] DJ Cycle Count =
c_CheckDJFlowRate_V1	EC	6504	A[30]	FLT	[Flow Rate Manager] Check DJ Flowrate Valve 1 (mg/dot) =
c_CheckDJFlowRate_V2	EC	6505	A[30]	FLT	[Flow Rate Manager] Check DJ Flowrate Valve 2 (mg/dot) =
c_LmoHeightSenseEnabled	EC	6506	A[4]	ASCII	[Local Machine Offsets] Height Sense =
c_LmoHeightSenseMaintEnabled	EC	6507	A[4]	ASCII	[Local Machine Offsets] Height Sense Maint =
c_LmoHeightSenseMaintWarnDays	EC	6508	I4	INT	[Local Machine Offsets] Height Sense Warn =
c_LmoHeightSenseMaintFailDays	EC	6509	I4	INT	[Local Machine Offsets] Height Sense Fail =
c_PrimeForwardMaxRetriesDJ9K_V1	EC	6510	I4	INT	[Valve 1] Prime Forward Max Retries For DJ 9K (times) =
c_PrimeForwardInitTimeDJ9K_V1	EC	6511	A[30]	FLT	[Valve 1] Prime Forward Init Time For DJ 9K (sec) =
c_PrimeForwardInitWeightDJ9K_V1	EC	6512	A[30]	FLT	[Valve 1] Prime Forward Init Weight For DJ 9K (mg) =
c_PrimeForwardTimeDJ9K_V1	EC	6513	A[30]	FLT	[Valve 1] Prime Forward Time For DJ 9K (sec) =

Variable Name	Data Type	ID	SECS Type	Storage Type	Fmconfig.ini File Description [Group] (configuration item =)
c_PrimeForwardWeightDJ9K_V1	EC	6514	A[30]	FLT	[Valve 1] Prime Forward Weight For DJ 9K (mg) =
c_PrimeForwardWeightDiffDJ9K_V1	EC	6515	A[30]	FLT	[Valve 1] Prime Forward Stop Weight Difference For DJ 9K (mg) =
c_PrimeForwardAutoRun_V1	EC	6516	A[4]	ASCII	[Valve 1] Prime Forward Auto Run Next Time =
c_LmoHeightSenseLane1	EC	6517	A[30]	FLT	[Local Machine Offsets] Height Sense Value Lane 1 =
c_LmoHeightSenseLane2	EC	6518	A[30]	FLT	[Local Machine Offsets] Height Sense Value Lane 2 =
c_AirflowUnits	EC	6520	I4	INT	[Airflow Manager] Units =
c_DJFlowrate_V1	EC	6521	A[30]	FLT	[Flow Rate Manager] DJ Flowrate 1 (mg/dot) =
c_DJFlowrate_V2	EC	6522	A[30]	FLT	[Flow Rate Manager] DJ Flowrate 2 (mg/dot) =
c_CpH_Enabled	EC	6523	A[4]	ASCII	[Heater Manager] Controlled Process Heat =
c_Scale2LocName_V1	EC	6524	A[30]	ASCII	[Valve 2] Scale 2 Loc Name =
c_ServiceStationFidXY_1	EC	6526	A[40]	FLT, FLT	[Service Station Setup] Left Pin Location =
c_ServiceStationFidXY_2	EC	6527	A[40]	FLT, FLT	[Service Station Setup] Right Pin Location =
c_DJOffsetHeadSpeed_V1	EC	6539	A[30]	FLT	[Valve 1] DJ Offset Calibration Speed (FMW/sec) =
c_DJOffsetDispenseGap_V1	EC	6540	A[30]	FLT	[Valve 1] DJ Offset Calibration Dispense Gap (FMW) =
c_Scale2LocLightStateCenterPt_V1	EC	6544	A[40]	INT, BOOL, INT, BOOL, INT, BOOL	[VO Valve 1] Scale 2 Loc LightState Center Pt = light level 1, shutter 1 open, light level 2, shutter 2 open, light level 3, shutter 3 open

Variable Name	Data Type	ID	SECS Type	Storage Type	Fmconfig.ini File Description [Group] (configuration item =)
c_Scale2LocLightStateCircumPt1_V1	EC	6545	A[40]	INT, BOOL, INT, BOOL, INT, BOOL	[VO Valve 1] Scale 2 Loc LightState Circum Pt1 = light level 1, shutter 1 open, light level 2, shutter 2 open, light level 3, shutter 3 open
c_Scale2LocLightStateCircumPt2_V1	EC	6546	A[40]	INT, BOOL, INT, BOOL, INT, BOOL	[VO Valve 1] Scale 2 Loc LightState Circum Pt2 = light level 1, shutter 1 open, light level 2, shutter 2 open, light level 3, shutter 3 open
c_Scale2LocLightStateCircumPt3_V1	EC	6547	A[40]	INT, BOOL, INT, BOOL, INT, BOOL	[VO Valve 1] Scale 2 Loc LightState Circum Pt3 = light level 1, shutter 1 open, light level 2, shutter 2 open, light level 3, shutter 3 open
c_Scale2LocLightStateHSPt_V1	EC	6548	A[40]	INT, BOOL, INT, BOOL, INT, BOOL	[VO Valve 1] Scale 2 Loc LightState HS Pt = light level 1, shutter 1 open, light level 2, shutter 2 open, light level 3, shutter 3 open
c_Scale2LocHSOffset_V1	EC	6549	A[40]	FLT, FLT	[VO Valve 1] Scale 2 Loc HS Offset =
c_Scale2LocCircumPt1_V1	EC	6550	A[40]	FLT, FLT	[VO Valve 1] Scale 2 Loc Circum Pt1 =

Variable Name	Data Type	ID	SECS Type	Storage Type	Fmconfig.ini File Description [Group] (configuration item =)
c_Scale2LocCircumPt2_V1	EC	6551	A[40]	FLT, FLT	[VO Valve 1] Scale 2 Loc Circum Pt2 =
c_Scale2LocCircumPt3_V1	EC	6552	A[40]	FLT, FLT	[VO Valve 1] Scale 2 Loc Circum Pt3 =
c_Scale2XtraZ_V1	EC	6553	A[30]	FLT	[VO Valve 1] Scale 2 Xtra Z =
c_Scale2TeachCenter_V1	EC	6554	A[4]	ASCII	[VO Valve 1] Scale 2 Teach Center =
c_Scale2UseFids	EC	6555	A[4]	ASCII	[Machine Fiducial Setup] Scale 2 Use Fids =
c_Scale2NumberofFids	EC	6556	I4	INT	[Machine Fiducial Setup] Scale 2 Number of Fids =
c_Scale2_1FidTaught	EC	6557	A[4]	ASCII	[Machine Fiducial Setup] Scale 2 1 Fid Taught =
c_Scale2_3FidsTaught	EC	6558	A[4]	ASCII	[Machine Fiducial Setup] Scale 2 3 Fids Taught
c_Scale2OffsetFromCenter	EC	6559	A[40]	FLT, FLT	[Machine Fiducial Setup] Scale 2 Offset From Center =
c_Scale2UseOffsetFromCenter	EC	6560	A[4]	ASCII	[Machine Fiducial Setup] Scale 2 Use Offset From Center =
c_Scale2ConfirmLocLightstate	EC	6561	A[40]	INT, BOOL, INT, BOOL, INT, BOOL	[Machine Fiducial Setup] Scale 2 Confirm Loc Lightstate = light level 1, shutter 1 open, light level 2, shutter 2 open, light level 3, shutter 3 open
c_Scale2OpAutoLoc	EC	6562	A[4]	ASCII	[Machine Fiducial Setup] Scale 2 Op Auto Loc =
c_Scale2OpVerifyFinalLoc	EC	6563	A[4]	ASCII	[Machine Fiducial Setup] Scale 2 Op Verify Final Loc =
c_Scale2OpAdjustFinalLoc	EC	6564	A[4]	ASCII	[Machine Fiducial Setup] Scale 2 Op Adjust Final Loc =
c_Scale2OpFinalLocPause	EC	6565	A[4]	ASCII	[Machine Fiducial Setup] Scale 2 Op Final Loc Pause =
c_Scale2OpFinalLocPauseSecs	EC	6566	I4	INT	[Machine Fiducial Setup] Scale 2 Op Final Loc Pause Secs =

Variable Name	Data Type	ID	SECS Type	Storage Type	Fmconfig.ini File Description [Group] (configuration item =)
c_Scale2OpManualFidFind	EC	6567	A[4]	ASCII	[Machine Fiducial Setup] Scale 2 Op Manual Fid Find =
c_Scale2OpSkipHSAdjust	EC	6568	A[4]	ASCII	[Machine Fiducial Setup] Scale 2 Op Skip HS Adjust =
c_ElectronicPressureEnabled	EC	6569	A[4]	ASCII	[E/P Control Manager] Enabled =
c_ElectronicPressureUnits	EC	6570	A[10]	ASCII	[E/P Control Manager] Setting Units =
c_OverflowTimeLimit	EC	6571	I4	INT	[Purge Station] Overflow time limit (minutes) =
c_ElapsedPurgeTime	EC	6572	A[30]	FLT	[Purge Station] Elapsed purge time (minutes) =
c_DJOffset_V2	EC	6573	A[30]	FLT	[Valve 2] DJ dispense offset time (ms) (valve 2) =
c_DJOffsetInitialDotXY_V2	EC	6574	A[40]	FLT, FLT	[Valve 2] DJ Offset Calibration Line Start Pt (valve 2) =
c_DJOffsetHeadSpeed_V2	EC	6575	A[30]	FLT	[Valve 2] DJ Offset Calibration Speed (FMW/sec) (valve 2) =
c_DJOffsetDispenseGap_V2	EC	6576	A[30]	FLT	[Valve 2] DJ Offset Calibration Dispense Gap (FMW) (valve 2) =
c_DJOffsetUseDotFinder	EC	6577	I[2]	INT	[Valve 1] DJ Offset Calibration Use Dot Finder =
c_DJOffsetRunUnassisted	EC	6578	A[4]	ASCII	[Valve 1] DJ Offset Calibration Run Unassisted =
c_ActiveNozzleEnabled	EC	6580	A[4]	ASCII	[Valve 1] Active Nozzle Enabled =
c_DJOffsetCalEndPtXY_V2	EC	6581	A[40]	FLT, FLT	[Valve 2] DJ Offset Calibration Line End Pt (valve 2) =
c_ServiceStationSubstrateTL	EC	6582	A[40]	FLT, FLT	[Service Station Setup] Substrate Top Left Offset =
c_ServiceStationSubstrateBR	EC	6583	A[40]	FLT, FLT	[Service Station Setup] Substrate Bottom Right Offset =
c_ImageCaptureWpFidsFound	EC	6584	A[4]	ASCII	[Image Capture] Workpiece Fids Found =
c_ImageCaptureWpFidsNotFound	EC	6585	A[4]	ASCII	[Image Capture] Workpiece Fids Not Found =

Variable Name	Data Type	ID	SECS Type	Storage Type	Fmconfig.ini File Description [Group] (configuration item =)
c_ImageCapturePattFidsFound	EC	6586	A[4]	ASCII	[Image Capture] Pattern Fids Found =
c_ImageCapturePattFidsNotFound	EC	6587	A[4]	ASCII	[Image Capture] Pattern Fids Not Found =
c_ImageCaptureServiceStationPins	EC	6588	A[4]	ASCII	[Image Capture] Service Station Pins =
c_ImageCaptureLUCModelTeachFind	EC	6589	A[4]	ASCII	[Image Capture] Lookup Camera Teach/Find =
c_FindWorkpieceFids	EC	6590	A[4]	ASCII	[Gem Manager] Find Workpiece Fids =
c_FindPatternFids	EC	6591	A[4]	ASCII	[Gem Manager] Find Pattern Fids =
c_ImageCaptureXYOffsetDots	EC	6597	A[4]	ASCII	[Image Capture] Needle XY Offset Dots =
c_ImageCaptureLmoWpFids	EC	6598	A[4]	ASCII	[Image Capture] LMO Workpiece Fids =
c_ImageCaptureFilenamePrefix	EC	6599	A[50]	ASCII	[Image Capture] Image Filename Prefix =
c_OperatorLevel	EC	6600	I4	INT	[Password] Mode =
c_UseSeviceStationData	EC	6601	A[4]	ASCII	[Service Station Setup] Use Service Station Data =
c_PurgeBeforeRun_V1	EC	6602	A[4]	ASCII	[Runtime Preferences] Valve 1 Purge Before Run =
c_LotControlEnabled	EC	6604	A[4]	ASCII	[Runtime Preferences] Lot Control Enabled =
c_CheckAirPressEveryInstruction	EC	6605	I4	INT	[Runtime Preferences] Check System Air Pressure Every Instruction =
c_ConveyorEmptyTimeLimit	EC	6606	I4	INT	[Runtime Preferences] Conveyor Empty Time Limit (sec) =
c_EnableToolingVacuum_1	EC	6607	A[4]	ASCII	[Runtime Preferences] Check Tooling Vacuum (ON/OFF) =
c_ToolingVacuumInput_1	EC	6608	I4	INT	[Runtime Preferences] Tooling Vacuum Input =
c_EnableToolingVacuum_2	EC	6609	A[4]	ASCII	[Runtime Preferences] Check Tooling Vacuum 2 (ON/OFF) =
c_ToolingVacuumInput_2	EC	6610	I4	INT	[Runtime Preferences] Tooling Vacuum Input 2 =
c_E10StatesEnabled	EC	6611	A[4]	ASCII	[E10 States] E10 States Enabled =
c_GenErrStateEnabledBeacon	EC	6612	A[4]	ASCII	[Beacon] General Error State Enabled Beacon

Variable Name	Data Type	ID	SECS Type	Storage Type	Fmconfig.ini File Description [Group] (configuration item =)
c_GenErrStateEnabledAudAlarm	EC	6613	A[4]	ASCII	[Beacon] General Error State Enabled Aud Alarm =
c_GenErrStateOutputBit	EC	6614	I4	INT	[Beacon] General Error State Output Bit =
c_GenErrStateOutputLevel	EC	6615	A[40]	ASCII	[Beacon] General Error State Output Level =
c_VisionErrStateEnabledBeacon	EC	6616	A[4]	ASCII	[Beacon] Vision Error State Enabled Beacon =
c_VisionErrStateEnabledAudAlarm	EC	6617	A[4]	ASCII	[Beacon] Vision Error State Enabled Aud Alarm =
c_VisionErrStateOutputBit	EC	6618	I4	INT	[Beacon] Vision Error State Output Bit =
c_VisionErrOutputLevel	EC	6619	A[40]	ASCII	[Beacon] Vision Error State Output Level =
c_HeaterErrStateEnabledBeacon	EC	6620	A[4]	ASCII	[Beacon] Heater Error State Enabled Beacon =
c_HeaterErrStateEnabledAudAlarm	EC	6621	A[4]	ASCII	[Beacon] Heater Error State Enabled Aud Alarm =
c_HeaterErrStateOutputBit	EC	6622	I4	INT	[Beacon] Heater Error State Output Bit =
c_HeaterErrStateOutputLevel	EC	6623	A[40]	ASCII	[Beacon] Heater Error State Output Level =
c_ProdRunStateEnabledBeacon	EC	6624	A[4]	ASCII	[Beacon] Production Run State Enabled Beacon =
c_ProdRunStateEnabledAudAlarm	EC	6625	A[4]	ASCII	[Beacon] Production Run State Enabled Aud Alarm =
c_ProdRunStateOutputBit	EC	6626	I4	INT	[Beacon] Production Run State Output Bit =
c_ProdRunStateOutputLevel	EC	6627	A[40]	ASCII	[Beacon] Production Run State Output Level =
c_ProgRunStateEnabledBeacon	EC	6628	A[4]	ASCII	[Beacon] Programming Run State Enabled Beacon =
c_ProgRunStateEnabledAudAlarm	EC	6629	A[4]	ASCII	[Beacon] Programming Run State Enabled Aud Alarm =
c_ProgRunStateOutputBit	EC	6630	I4	INT	[Beacon] Programming Run State Output Bit =
c_ProgRunStateOutputLevel	EC	6631	A[40]	ASCII	[Beacon] Programming Run State Output Level =
c_SECSGEMRunStateEnabledBeacon	EC	6632	A[4]	ASCII	[Beacon] SECS/GEM Run State Enabled Beacon =
c_SECSGEMRunStateEnabledAudAlarm	EC	6633	A[4]	ASCII	[Beacon] SECS/GEM Run State Enabled Aud Alarm =

Variable Name	Data Type	ID	SECS Type	Storage Type	Fmconfig.ini File Description [Group] (configuration item =)
c_SECSGEMRunStateOutputBit	EC	6634	I4	INT	[Beacon] SECS/GEM Run State Output Bit =
c_SECSGEMRunStateOutputLevel	EC	6635	A[40]	ASCII	[Beacon] SECS/GEM Run State Output Level =
c_DryRunStateEnabledBeacon	EC	6636	A[4]	ASCII	[Beacon] Dry Run State Enabled Beacon =
c_DryRunStateEnabledAudAlarm	EC	6637	A[4]	ASCII	[Beacon] Dry Run State Enabled Aud Alarm =
c_DryRunStateOutputBit	EC	6638	I4	INT	[Beacon] Dry Run State Output Bit =
c_DryRunStateOutputLevel	EC	6639	A[40]	ASCII	[Beacon] Dry Run State Output Level =
c_LowFluidStateEnabledBeacon	EC	6640	A[4]	ASCII	[Beacon] Low Fluid State Enabled Beacon =
c_LowFluidStateEnabledAudAlarm	EC	6641	A[4]	ASCII	[Beacon] Low Fluid State Enabled Aud Alarm =
c_LowFluidOutputBit	EC	6642	I4	INT	[Beacon] Low Fluid State Output Bit =
c_LowFluidAuxOutputBit	EC	6643	I4	INT	[Beacon] Low Fluid State Auxiliary Output Bit =
c_LowFluidOutputLevel	EC	6644	A[40]	ASCII	[Beacon] Low Fluid State Output Level =
c_LowFluidBoardCntDwnStateEnabledBeacon	EC	6645	A[4]	ASCII	[Beacon] Low Fluid Board Countdown State Enabled Beacon =
c_LowFluidBoardCntDwnStateEnabledAudAlarm	EC	6646	A[4]	ASCII	[Beacon] Low Fluid Board Countdown State Enabled Aud Alarm =
c_LowFluidBoardCntDwnOutputBit	EC	6647	I4	INT	[Beacon] Low Fluid Board Countdown State Output Bit =
c_LowFluidBoardCntDwnOutputLevel	EC	6648	A[40]	ASCII	[Beacon] Low Fluid Board Countdown State Output Level =
c_PotLifeLowStateEnabledBeacon	EC	6649	A[4]	ASCII	[Beacon] Pot Life Low State Enabled Beacon =
c_PotLifeLowStateEnabledAudAlarm	EC	6650	A[4]	ASCII	[Beacon] Pot Life Low State Enabled Aud Alarm =
c_PotLifeLowOutputBit	EC	6651	I4	INT	[Beacon] Pot Life Low State Output Bit =
c_PotLifeLowOutputLevel	EC	6652	A[40]	ASCII	[Beacon] Pot Life Low State Output Level =
c_PotLifeExpStateEnabledBeacon	EC	6653	A[4]	ASCII	[Beacon] Pot Life Expired State Enabled Beacon =

Variable Name	Data Type	ID	SECS Type	Storage Type	Fmconfig.ini File Description [Group] (configuration item =)
c_PotLifeExpStateEnabledAudAlarm	EC	6654	A[4]	ASCII	[Beacon] Pot Life Expired State Enabled Aud Alarm =
c_PotLifeExpOutputBit	EC	6655	I4	INT	[Beacon] Pot Life Expired Output Bit =
c_PotLifeExpOutputLevel	EC	6656	A[40]	ASCII	[Beacon] Pot Life Expired State Output Level =
c_FMIdleStateEnabledBeacon	EC	6657	A[4]	ASCII	[Beacon] FmNT Idle State Enabled Beacon =
c_FMIdleStateEnabledAudAlarm	EC	6658	A[4]	ASCII	[Beacon] FmNT Idle State Enabled Aud Alarm =
c_FMIdleOutputBit	EC	6659	I4	INT	[Beacon] FmNT Idle State Output Bit =
c_FMIdleOutputLevel	EC	6660	A[40]	ASCII	[Beacon] FmNT Idle State Output Level =
c_LowAirThreshold	EC	6661	I4	INT	[Motion Controller] Low Air DAC Threshold
c_FlowmeterEnabled		6662	A[4]	ASCII	[Flowmeter] Enabled =
c_MELaserRangeFinderMode	EC	6663	A[4]	ASCII	[Height Sensor] ME Laser Range Finder Mode =
c_HeightSenseMode	EC	6664	I4	INT	[Height Sensor] Height Sense Mode =
c_MELaserHSDownSpeed	EC	6665	A[30]	FLT	[Height Sensor] Down Speed ME Laser HS =
c_MELaserHSUpSpeed	EC	6666	A[30]	FLT	[Height Sensor] Up Speed ME Laser HS =
c_MELaserHSAccel	EC	6667	A[30]	FLT	[Height Sensor] Accel ME Laser HS =
c_MELaserHSMaxDist	EC	6668	A[30]	FLT	[Height Sensor] Max Dist ME Laser HS =
c_MELaserHSMaxDistRunTime	EC	6669	A[30]	FLT	[Height Sensor] Max Dist ME Laser HS Run Time =
c_MELaserHSRetractDist	EC	6670	A[30]	FLT	[Height Sensor] Retract Ht (FMW) ME Laser HS =
c_RetractBeforeHeightSense	EC	6671	A[4]	ASCII	[Height Sensor] Retract Before Height Sense =
c_MonitorPurgeCupOverflowTime	EC	6672	A[4]	ASCII	[Purge Station] Monitor purge cup overflow time =
c_ScaleCalibWeight	EC	6673	A[30]	FLT	[Scale Manager] Calibration Weight =
c_WorkpieceNumberOfFids	EC	6675	I4	INT	[Wkpc Align Options] Num Fids =

Variable Name	Data Type	ID	SECS Type	Storage Type	Fmconfig.ini File Description [Group] (configuration item =)
c_VerifyWkpcOrgNoFids	EC	6676	A[4]	ASCII	[Wkpc Align Options] Verify Origin When No Fids =
c_AutoConveyorWidthEnable	EC	6677	A[4]	ASCII	[Conveyor Manager] Automatic Conveyor Width =
c_AutoConveyorWidthEnable2	EC	6678	A[4]	ASCII	[Conveyor Manager] Automatic Conveyor 2 Width =
c_ConfirmACWMove2	EC	6679	A[4]	ASCII	[Conveyor Manager] Confirm ACW Move Conveyor 2 =
c_AutoPurgeEnabled	EC	6680	A[4]	ASCII	[Heater Manager] Enabled Autopurge =
c_PreHeatTimerEnabled	EC	6681	A[4]	ASCII	[Heater Manager] Enable Pre-Heat Timer =
c_DefaultPreHeatTime	EC	6683	I4	INT	[Heater Manager] Default Pre-Heat Time =
c_WarnHeaterFileChange	EC	6684	A[4]	ASCII	[Heater Manager] Warn If Heater File Modified =
c_RunRecoveryEnabled	EC	6685	A[4]	ASCII	[Motion Controller] Enable Run Recovery =
c_RecoveryPromptPosition	EC	6686	I4	INT	[Motion Controller] Recovery Prompt Position =
c_SkipDryRunRecovery	EC	6687	A[4]	ASCII	[Motion Controller] Skip Dry Run Recovery =
c_WarnIfRecoverySkipped	EC	6688	A[4]	ASCII	[Motion Controller] Warn if Recovery Skipped =
c_DoHSRunRecovery	EC	6689	A[4]	ASCII	[Motion Controller] Do Height Sense in Run Recovery =
c_ModuleReaderEnabled	EC	6690	A[4]	ASCII	[Module Status Manager] Enable =
c_CheckDiskSpaceProd	EC	6691	A[4]	ASCII	[Misc Parms] Event Log Chk Disk Space Prod =
c_LowFluidWarnStateEnabledAudAlarm	EC	6692	A[4]	ASCII	[Beacon] Low Fluid Warning State Enabled Aud Alarm =
c_LowFluidWarnOutputBit	EC	6693	I4	INT	[Beacon] Low Fluid Warning State Output Bit =
c_LowFluidWarnOutputLevel	EC	6694	A[40]	ASCII	[Beacon] Low Fluid Warning State Output Level =
c_LowFluidWarnStateEnabledBeacon	EC	6696	A[4]	ASCII	[Beacon] Low Fluid Warning State Enabled Beacon =
c_PurgeBeforeRun_V2	EC	6698	A[4]	ASCII	[Runtime Preferences] Valve 2 Purge Before Run =
c_PurgeAfterRun_V1	EC	6699	A[4]	ASCII	[Runtime Preferences] Valve 1 Purge After Run =

Variable Name	Data Type	ID	SECS Type	Storage Type	Fmconfig.ini File Description [Group] (configuration item =)
c_PurgeAfterRun_V2	EC	6700	A[4]	ASCII	[Runtime Preferences] Valve 2 Purge After Run =
c_CheckForDisabledInstructions	EC	6701	A[4]	ASCII	[Runtime Preferences] Check for Disabled Instructions =
c_LearnWorkpieceAngleFirst	EC	6702	A[4]	ASCII	[Wkpc Align Options] Learn Wkpc Angle
c_OverflowProtectionEnabled_S1	EC	6703	A[4]	ASCII	[Scale Manager] Overflow Protection Enabled =
c_OverflowProtectionEnabled_S2	EC	6704	A[4]	ASCII	[Scale Manager] Scale 2 Overflow Protection Enabled =
c_OverflowMaxCapacityMG_S1	EC	6705	A[30]	FLT	[Scale Manager] Max Capacity (mg) =
c_OverflowMaxCapacityMG_S2	EC	6706	A[30]	FLT	[Scale Manager] Scale 2 Max Capacity (mg) =
c_OverflowWarningPercentage_S1	EC	6707	A[30]	FLT	[Scale Manager] Warning Percentage =
c_OverflowWarningPercentage_S2	EC	6708	A[30]	FLT	[Scale Manager] Scale 2 Warning Percentage =
c_OverflowCurrentCupWeightMG_S1	EC	6709	A[30]	FLT	[Scale Manager] Current Cup Weight (mg) =
c_OverflowCurrentCupWeightMG_S2	EC	6710	A[30]	FLT	[Scale Manager] Scale 2 Current Cup Weight (mg) =
c_OverflowAccumulatedTotalMG_S1	EC	6711	A[30]	FLT	[Scale Manager] Accumulated Total (mg) =
c_OverflowAccumulatedTotalMG_S2	EC	6712	A[30]	FLT	[Scale Manager] Scale 2 Accumulated Total (mg) =
c_OverflowPreTareMG_S1	EC	6713	A[30]	FLT	[Scale Manager] Pre-Tare Total (mg) =
c_OverflowPreTareMG_S2	EC	6714	A[30]	FLT	[Scale Manager] Scale 2 Pre-Tare Total (mg) =
c_OverflowLastWeightReadingStable_S1	EC	6715	A[4]	ASCII	[Scale Manager] Last Weight Reading Stable =
c_OverflowLastWeightReadingStable_S2	EC	6716	A[4]	ASCII	[Scale Manager] Scale 2 Last Weight Reading Stable =
c_ProgramIdleTimeLimit	EC	6717	I4	INT	[Misc Parms] Program idle limit =
c_AskBeforeUpdatingPatternLibrary	EC	6718	A[4]	ASCII	[Pattern Library] Ask Before Updating Library =
c_ReticleCircle1Enable	EC	6719	A[4]	ASCII	[Vision] Reticle Circle 1 Enable =
c_ReticleCircle1Diameter	EC	6720	A[30]	FLT	[Vision] Reticle Circle 1 Diameter =

Variable Name	Data Type	ID	SECS Type	Storage Type	Fmconfig.ini File Description [Group] (configuration item =)
c_ReticleCircle2Enable	EC	6721	A[4]	ASCII	[Vision] Reticle Circle 2 Enable =
c_ReticleCircle2Diameter	EC	6722	A[30]	FLT	[Vision] Reticle Circle 2 Diameter =
c_ReticleAdditionalCircles	EC	6723	I4	INT	[Vision] Reticle Additional Circles
c_ReticleRectangleEnable	EC	6724	A[4]	ASCII	[Vision] Reticle Rectangle Enable =
c_ReticleRectangleXSize	EC	6725	A[30]	FLT	[Vision] Reticle Rectangle X size =
c_ReticleRectangleYSize	EC	6726	A[30]	FLT	[Vision] Reticle Rectangle Y size =
c_ReticleGraduationsEnable	EC	6727	A[4]	ASCII	[Vision] Reticle Graduations Enable =
c_ReticleGraduationsSpacing	EC	6728	A[30]	FLT	[Vision] Reticle Graduations Spacing =
c_ReticleColor	EC	6729	I4	INT	[Vision] Reticle Cognex color (B/W) =
c_ApplyCameraRotationCorrection	EC	6730	A[4]	ASCII	[Vision] Correct for camera rotation =
c_FidDripControlEnabled	EC	6731	A[4]	ASCII	[Fid Search Fluid Control - Valve 1] Enabled =
c_SuppressLogFile	EC	6732	A[4]	ASCII	[Misc Parms] Suppress Log File Creation =
c_AutoDeleteLogFiles	EC	6733	A[4]	ASCII	[Misc Parms] Auto-delete .log files =
c_AutoDeleteTrcFiles	EC	6734	A[4]	ASCII	[Misc Parms] Auto-delete .trc files =
c_AutoDeleteDbgFiles	EC	6735	A[4]	ASCII	[Misc Parms] Auto-delete .dbg files =
c_AutoDeleteFilesDaysAfterCreation	EC	6736	I4	INT	[Misc Parms] Auto-delete interval (days) =
c_AutoDeleteFreqDays	EC	6737	I4	INT	[Misc Parms] Auto-delete frequency (days) =
c_AutoDeleteFilesUserConfirm	EC	6738	A[4]	ASCII	[Misc Parms] Auto-delete confirm =
c_CheckDiskSpaceInterval	EC	6739	I4	INT	[Misc Parms] Check Disk Space Interval =
c_MinDiskSpaceNeeded	EC	6740	I4	INT	[Misc Parms] FmNT Min Disk Space =
c_DiskSpaceTooLow	EC	6741	I4	INT	[Misc Parms] Log Files Min Disk Space =

Variable Name	Data Type	ID	SECS Type	Storage Type	Fmconfig.ini File Description [Group] (configuration item =)
c_OutputToFile	EC	6742	A[4]	ASCII	[Motion Controller] Output to File =
c_ConveyorControlType_C2	EC	6743	A[20]	ASCII	[Conveyor2] Control Type =
c_ConveyorMode_C2	EC	6744	I4	INT	[Conveyor2] Mode =
c_StartupFileName_C2	EC	6745	A[60]	ASCII	[Conveyor2] Startup File Name =
c_StyleType_C2	EC	6746	A[100]	ASCII	[Conveyor2] Style Type =
c_BeltSpeed_C2	EC	6747	A[30]	INT, FLT	[Conveyor2] Belt Speed = VID, VALUE
c_BeltAccel_C2	EC	6748	A[30]	INT, FLT	[Conveyor2] Belt Accel = VID, VALUE
c_LongMove_C2	EC	6749	A[30]	INT, FLT	[Conveyor2] Long Move = VID, VALUE
c_ShortMove_C2	EC	6750	A[30]	INT, FLT	[Conveyor2] Short Move = VID, VALUE
c_BackMove_C2	EC	6751	A[30]	INT, FLT	[Conveyor2] Back Move = VID, VALUE
c_Retries_C2	EC	6752	A[30]	INT, FLT	[Conveyor2] Retries = VID, VALUE
c_TwinConveyorWait_C2	EC	6753	I4	INT	[Conveyor2] Twin Conveyor Wait =
c_ConveyorWidthSpeed	EC	6754	A[30]	FLT	[Conveyor Manager] Runtime Width Speed =
c_ConveyorWidthAccel	EC	6755	A[30]	FLT	[Conveyor Manager] Runtime Width Accel =
c_AutoConveyorWidthClearance	EC	6756	A[30]	FLT	[Conveyor Manager] Automatic Conveyor Width Clearance =
c_AutoConveyorWidthClearance2	EC	6757	A[30]	FLT	[Conveyor Manager] Automatic Conveyor 2 Width Clearance =

Variable Name	Data Type	ID	SECS Type	Storage Type	Fmconfig.ini File Description [Group] (configuration item =)
c_E116StatesEnabled	EC	6758	A[4]	ASCII	[E116 States] E116 States Enabled =
c_WorkpieceLane2Origin	EC	6759	A[4]	ASCII	[Local Machine Offsets] WorkpieceLane2 Origin =
c_WorkpieceLane2OriginName	EC	6760	A[30]	ASCII	[Local Machine Offsets] WorkpieceLane2 Origin Name =
c_AddWorkpieceLane2	EC	6761	A[4]	ASCII	[Wkpc Align Options] Add Workpiece for Lane 2 =
c_LastConfigECID	EC	6768	I2	INT	Last configuration equipment constant

Appendix E   SECS/GEM Remote Commands

E.1   Overview

The SECS/GEM interface on equipment enables the host to control equipment actions such as processing by sending Remote Commands.

E.2   SECS/GEM Remote Commands

SECS/GEM remote commands are listed in Table E-1.

Table E-1   SECS/GEM Remote Commands

Remote Command	Description	Optional Parameters	Return Status Code Description
"ABORT"	Abort production run See Appendix F – "ABORT" remote command	None	0x00 Command received successfully and is executing 0x02 Not in Production window 0x40 Not in REMOTE mode 0x41 Program running – cannot execute command
"CHECKCPJ"	Check Calibrated Process Jetting for DJ valve See Appendix F – "CHECKCPJ" remote command	Valve 1 Valve 2 Scale 1 Scale 2	0x00 Command received successfully and is executing 0x01 Command invalid in current configuration 0x02 Not in Production window 0x03 Command has a bad parameter 0x40 Not in REMOTE mode 0x41 Program running – cannot execute command
"DJ OFFSET CALIBRATION"	Start DJ Offset calibration See Appendix F – "DJ OFFSET CALIBRATION" remote command	Valve 1 Valve 2	0x00 Command received successfully and is executing 0x01 Command invalid in current configuration 0x02 Not in Production window 0x03 Command has a bad parameter 0x40 Not in REMOTE mode 0x41 Program running – cannot execute command
"DJ9K VACUUM ASSISTED PRIME"	Start DJ9K Vacuum Assisted Prime See Appendix F – "DJ9K VACUUM ASSISTED PRIME" remote command	Valve 1 Valve 2	0x00 Command received successfully and is executing 0x01 Command is not recognized 0x02 Not in Production window 0x03 Command has a bad parameter 0x40 Not in REMOTE mode 0x41 Program running – cannot execute command
"DWV"	Start Dispense Weight Verification See Appendix F – "DWV" remote command	Valve 1 Valve 2 Scale 1 Scale 2	0x00 Command received successfully and is executing 0x01 Command invalid in current configuration 0x02 Not in Production window 0x03 Command has a bad parameter 0x40 Not in REMOTE mode 0x41 Program running – cannot execute command

Remote Command	Description	Optional Parameters	Return Status Code Description
"FLOWRATECALIB"	Start Flow Rate Calibration See Appendix F – "FLOWRATECALIB" remote command	Valve 1 Valve 2 Scale 1 Scale 2	0x00 Command received successfully and is executing 0x01 Command invalid in current configuration 0x02 Not in Production window 0x03 Command has a bad parameter 0x40 Not in REMOTE mode 0x41 Program running – cannot execute command
"HS XY OFFSETS"	Start Height Sense XY Offsets setup See Appendix F – "HS XY OFFSETS" remote command	Valve 1 Valve 2	0x00 Command received successfully and is executing 0x01 Command invalid in current configuration 0x02 Not in Production window 0x03 Command has a bad parameter 0x40 Not in REMOTE mode 0x41 Program running – cannot execute command
"LMO_WP_ALIGN"	Run LMO Workpiece alignment See Appendix F – Local Machine Offsets Workpiece Align	None	0x00 Command received successfully and is executing 0x40 Not in REMOTE mode 0x45 LMO Workpiece is not enabled 0x46 LMO Workpiece fiducials were not taught 0x47 Cannot execute LMO while program is running 0x48 Cannot execute LMO in programming window
"LOAD BOARD 1"	Load board on conveyor 1 See Appendix F – "LOAD BOARD" remote command	None	0x00 Command received successfully and is executing 0x02 Not in Production window 0x40 Not in REMOTE mode 0x41 Program running – cannot execute command
"LOAD BOARD 2"	Load board on conveyor 2 See Appendix F – "LOAD BOARD" remote command	None	0x00 Command received successfully and is executing 0x02 Not in Production window 0x40 Not in REMOTE mode 0x41 Program running – cannot execute command

Remote Command	Description	Optional Parameters	Return Status Code Description
"LOCAL"	Change SECS/GEM control state to "Local" mode See Appendix F – "LOCAL" remote command	None	0x00 Command received successfully and is executing
"LOCATE SERVICE STATION"	Locate Service Station See Appendix F – "LOCATE SERVICE STATION" remote command	None	0x00 Command received successfully and is executing 0x01 Command invalid in current configuration 0x02 Not in Production window 0x40 Not in REMOTE mode 0x41 Program running – cannot execute command
"MOVE HOME"	Move dispense head to home location See Appendix F – "MOVE HOME" remote command	None	0x00 Command received successfully and is executing 0x01 Command invalid in current configuration 0x02 Not in Production window 0x40 Not in REMOTE mode 0x41 Program running – cannot execute command
"MOVE TO CENTER"	Move dispense head to center location See Appendix F – "MOVE TO CENTER" remote command	None	0x00 Command received successfully and is executing 0x01 Command invalid in current configuration 0x02 Not in Production window 0x40 Not in REMOTE mode 0x41 Program running – cannot execute command
"MOVE TO FRONT"	Move dispense head to front location See Appendix F – "MOVE TO FRONT" remote command	None	0x00 Command received successfully and is executing 0x01 Command invalid in current configuration 0x02 Not in Production window 0x40 Not in REMOTE mode 0x41 Program running – cannot execute command

Remote Command	Description	Optional Parameters	Return Status Code Description
"NEEDLE XY OFFSETS" "NEDDLE XY OFFSETS NO PURGE"	Start Needle XY Offsets setup with or without purge during the process. See Appendix F – "NEEDLE XY OFFSETS" and "NEEDLE XY OFFSETS NO PURGE" remote commands	Valve 1 Valve 2	0x00 Command received successfully and is executing 0x01 Command invalid in current configuration 0x02 Not in Production window 0x03 Command has a bad parameter 0x40 Not in REMOTE mode 0x41 Program running – cannot execute command
"NEEDLE Z OFFSETS"	Start Needle Z Offset setup See Appendix F – "NEEDLE Z OFFSETS" remote command	Valve 1 Valve 2	0x00 Command received successfully and is executing 0x01 Command invalid in current configuration 0x02 Not in Production window 0x03 Command has a bad parameter 0x40 Not in REMOTE mode 0x41 Program running – cannot execute command
"PAUSE"	Pause production run See Appendix F – "PAUSE" remote command	None	0x00 Command received successfully and is executing 0x01 Command invalid in current configuration 0x02 Not in Production window 0x40 Not in REMOTE mode 0x41 Program is paused – cannot execute command
"PP-SELECT"	Load Recipe file See Appendix F – "PP-SELECT" remote command	Lot ID Lot Name PP ID PP Name	0x00 Command received successfully and is executing 0x01 Command invalid in current configuration 0x02 Not in Production window 0x03 Command has a bad parameter 0x40 Not in REMOTE mode 0x41 Program running – cannot execute command

Remote Command	Description	Optional Parameters	Return Status Code Description
"PRELIM NEEDLE TO CAMERA"	Start preliminary Needle to Camera Offset setup See Appendix F – "PRELIM NEEDLE TO CAMERA" remote command	Valve 1 Valve 2	0x00 Command received successfully and is executing 0x01 Command invalid in current configuration 0x02 Not in Production window 0x03 Command has a bad parameter 0x40 Not in REMOTE mode 0x41 Program running – cannot execute command
"PRIME"	Prime valve See Appendix F – "PRIME" remote command	Valve 1 Valve 2	0x00 Command received successfully and is executing 0x01 Command invalid in current configuration 0x02 Not in Production window 0x03 Command has a bad parameter 0x40 Not in REMOTE mode 0x41 Program running – cannot execute command
"PURGE"	Purge Valve See Appendix F – "PURGE" remote command	Valve 1 Valve 2	0x00 Command received successfully and is executing 0x01 Command invalid in current configuration 0x02 Not in Production window 0x03 Command has a bad parameter 0x40 Not in REMOTE mode 0x41 Program running – cannot execute command
"REMOTE"	Change SECS/GEM control state to "Remote" mode See Appendix F – "REMOTE" remote command	None	0x00 Command received successfully and is executing
"RESTART_APPLICATION"	Restart Fluidmove application See Appendix F – "RESTART_APPLICATION" remote command	None	0x00 Command received successfully and is executing 0x02 Not in Production window 0x40 Not in REMOTE mode 0x41 Program running – cannot execute command

Remote Command	Description	Optional Parameters	Return Status Code Description
"RESUME"	Resume production run See Appendix F – "RESUME" remote command	None	0x00 Command received successfully and is executing 0x02 Not in Production window 0x40 Not in REMOTE mode 0x41 Program not paused – cannot execute command
"RUN PSS FILE"	Run Prompted Setup Script file See Appendix F – "RUN PSS FILE" remote command	Prompted Setup Script Filename Valve 1 Valve 2	0x00 Command received successfully and is executing 0x01 Command invalid in current configuration 0x02 Not in Production window 0x03 Command has a bad parameter 0x40 Not in REMOTE mode 0x41 Program running – cannot execute command 0x43 PP Select file not found
"START"	Start production run See Appendix F – "START" remote command	None	0x00 Command received successfully and is executing 0x02 Not in Production window 0x40 Not in REMOTE mode 0x41 Program running – cannot execute command 0x46 Production start blocked by RFID validation
"STOP"	Stop production run See Appendix F – "STOP" remote command	None	0x00 Command received successfully and is executing 0x02 Not in Production window 0x40 Not in REMOTE mode 0x41 Program not running – cannot execute command
"TEACH SCALE"	Teach scale location See Appendix F – "TEACH SCALE" remote command	Valve 1 Valve 2 Scale 1 Scale 2	0x00 Command received successfully and is executing 0x01 Command invalid in current configuration 0x02 Not in Production window 0x03 Command has a bad parameter 0x40 Not in REMOTE mode 0x41 Program running – cannot execute command

Remote Command	Description	Optional Parameters	Return Status Code Description
"VACUUM OFF"	Turn purge cup vacuum off See Appendix F – "VACUUM OFF" remote command	None	0x00 Command received successfully and is executing 0x01 Command invalid in current configuration 0x02 Not in Production window 0x40 Not in REMOTE mode 0x41 Program running – cannot execute command
"VACUUM ON"	Turn purge cup vacuum on See Appendix F – "VACUUM ON" remote command	None	0x00 Command received successfully and is executing 0x01 Command invalid in current configuration 0x02 Not in Production window 0x40 Not in REMOTE mode 0x41 Program running – cannot execute command

Appendix F   Variables Grouped by Fluidmove Activity

F.1   Overview

This appendix lists various Fluidmove activities that have some type of associated SECS/GEM capability. Each activity lists associated SECS/GEM variables, events and remote commands. The SECS/GEM data listed in this appendix is listed in previous appendices, but this appendix can be used to determine what SECS/GEM capabilities exist for a specific Fluidmove activity.

The following abbreviations will be used:

CE	Collection Event
CEID	CEID
DV	Data Variable
EC	Equipment Constant
ECID	Equipment Constant ID
SV	Status Variable

This appendix covers the following topics:

F.2   Setup Level Variables

Table F.2-1   Setup Level Variables

Variable Name	Data Type	ID	SECS Type	Description
c_PurgeLocationXYZ_V1	EC	6498	A[50]	Purge XYZ location for Valve 1
c_NeedlePositionoverTactile_V1	EC	6328	A[40]	Tactile Sensor XY location for Valve 1
c_CurSafeZ	EC	6225	A[30]	Safe Height Z
c_XYNeedleOffset_V1	EC	6295	A[40]	Camera to needle XY offset for Valve 1
c_XYNeedleOffset_V2	EC	6543	A[40]	Camera to needle XY offset for valve 2
c_ZNeedleOffset_V1	EC	6294	A[30]	Needle tip to height sense probe Z offset for Valve 1
c_ScaleLocationXYZ_V1	EC	6497	A[50]	Scale XYZ location for Valve 1
c_ScaleLocationXYZ_V2	EC	6499	A[50]	Scale XYZ Location for valve 2
c_Scale2LocationXYZ_V1	EC	6525	A[50]	Scale 2 XYZ Location for Valve 1
c_Scale2LocationXYZ_V2	EC	6542	A[50]	Scale 2 XYZ Location for valve 2

F.3 Lot Level Variables

Table F.3-1   Lot Level Variables

Variable Name	Data Type	ID	SECS Type	Related CEID	Description
FlowRate1	DV	400	F8	4012	Flow rate for Valve 1
ScaleMeasurement1	DV	406	F8	4010	Scale measurement for Valve 1
DWVMEASUREDAVG	DV	416	F8	4020	Average measured weight of all dispenses during the dispense weight verification procedure.
RefillRate1	DV	418	A[100]	3001	DP refill rate for Valve 1
SPHTR1CHAN1-SPHTR1CHAN17	SV	1101 to 1117	F8	3003	Set Points for Heater 1 channels 1 to 17.
SPHTR2CHAN1-SPHTR2CHAN17	SV	1118 to 1134	F8	3003	Set Points for Heater 2 channels 1 to 17.
SPHTR3CHAN1-SPHTR3CHAN17	SV	1135 to 1151	F8	3003	Set Points for Heater 3 channels 1 to 17.
SPHTR4CHAN1-SPHTR4CHAN17	SV	1152 to 1168	F8	3003	Set Points for Heater 4 channels 1 to 17.
OFFSETHTR1CHAN1-OFFSETHTR1CHAN17	SV	1201 to 1217	F8	3003	Offsets for Heater 1 channels 1 to 17.
OFFSETHTR2CHAN1-OFFSETHTR2CHAN17	SV	1218 to 1234	F8	3003	Offsets for Heater 2 channels 1 to 17.
OFFSETHTR3CHAN1-OFFSETHTR3CHAN17	SV	1235 to 1251	F8	3003	Offsets for Heater 3 channels 1 to 17.
OFFSETHTR4CHAN1-OFFSETHTR4CHAN17	SV	1252 to 1268	F8	3003	Offsets for Heater 4 channels 1 to 17.

Table F.3-2   Lot Level Variables – Related Collection Events

Collection Event Name	CEID	Related Data Variables	Description
ce_HeaterTempsUpdated	5014	801-851	Collection event triggered when heater temperatures are updated.

F.4 Carrier Level Variables and Equipment Constants

All variables in this table are defined as "Data Variables". There is some redundancy here to allow the SECS/GEM host to collect the data real time as the fiducials are found or by waiting until the board has been processed and collecting all of the data at once at the end of the program.

These variables will be overwritten each time a new board (carrier) is processed. The SECS/GEM host must collect the data immediately as each corresponding collection event occurs or create a report containing the desired variables and attach the report to a collection event signaling processing of the board is complete (such as "DispensingDone1" collection event 2002).

Table F.4-1 Carrier Level Variables

Variable Name	ID	SECS Type	Related CEID	Description
BoardSequenceNumber	7800	U4	8800	Carrier Sequence # (sequential) This number is reset each time "GO" is pressed. For a running board count processed since powerup, see existing SV 106 (BoardCount).
WPFidFoundXY_1	7801	A[40]	8801	Workpiece Fiducial #1 XY in machine units (actual found)
WPFidFoundXY_2	7802	A[40]	8802	Workpiece Fiducial #2 XY in machine units (actual found)
CurrentFidFoundXY	7000	A[40]	8000 8801 8802	XY location of currently found fiducial in machine units. As fiducials are found, this variable will be updated and either collection event 8000 (for pattern fiducials), 8001 (for workpiece 1 fiducial) or 8002 (for workpiece fiducial 2) will be triggered. By using this variable, fiducials can be collected at the moment they are found. The XY locations will also be stored in variables 7801 (for workpiece 1) or 7802 (for workpiece 2) or sequentially to variables 7001 to 7300 (for pattern fiducials) if it is more efficient to upload all fiducial locations at once at the end of the program.
PATTFidFoundXY_1 – PATTFidFoundXY_300	7001 – 7300	A[40]	2002	Sequential XY location (machine units) of found pattern fiducials in order dictated by program (300 max) Collection event 2002 is an existing event that is triggered when dispensing is done. A report can be created containing all or some of the fiducial locations and then tied to CE 2002.

Variable Name	ID	SECS Type	Related CEID	Description
WPFidFoundScore_1	7803	I2	8801	Workpiece fiducial #1 score.
WPFidFoundScore_2	7804	I2	8802	Workpiece fiducial #2 score.
CurrentFidFoundScore	10000	I2	8000 8801 8802	Fiducial score of currently found fiducial. As fiducials are found, this variable will be updated and either collection event 8000 (for pattern fiducials), 8801 (for workpiece 1 fiducial) or 8802 (for workpiece fiducial 2) will be triggered. By using this variable, fiducial scores can be collected at the moment they are found. The scores will also be stored in variables 7803 (for workpiece fid 1) or 7804 (for workpiece fid 2) or sequentially to variables 10001 to 10000 (for pattern fiducials) if it is more efficient to upload all fiducial scores at once at the end of the program.
PATTFidFoundScore_1 – PATTFidFoundScore_300	10001 - 10300	I2	2002	Sequential fiducial scores of found pattern fiducials in order dictated by program (300 max) Collection event 8000 is triggered as each pattern fidicual is found. A report can be linked to event 8000 containing DV 10000 to upload the currently found pattern fiducial score or a report can be linked to event 2002 (dispensing done) to upload all or some of the fiducial scores (DVs 10001-10300) after dispensing completes on the current board.
CurrentHSFoundXYZ	7400	A[50]	8400	XYZ location of current height sense. As locations are recorded, this variable will be updated each time and collection event 8400 will be triggered. Using this method, height sense locations can be collected at the moment they occur. The XYZ locations will also be set sequentially to variables 7401 to 7700 if it is more efficient to upload all height sense locations at once at the end of the program.
HSFoundXYZ_1 – HSFoundXYZ_300	7401 – 7700	A[50]	2002	Sequential XY location and Z height detected of height senses in order dictated by program (300 max) Collection event 2002 is an existing event that is triggered when dispensing is done. A report can be created containing all or some of the height sense locations and then tied to CE 2002.

Table F.4-2   Carrier Level Variables – Related Collection Events

Collection Event Name	CEID	Related Data Variables	Description
ce_CurrentFidFoundXY	8000	7000 10000	Program pattern fiducial has been found
ce_CurrentFidNotFoundXY	8001	7000 10000	Program pattern fiducial was not found Related XY locations indicate "expected" location.
ce_WPFidFoundXY_1	8801	7000 10000	Program workpiece fiducial 1 has been found.
ce_WPFidFoundXY_2	8802	7000 10000	Program workpiece fiducial 2 has been found.
ce_CurrentHSFoundXYZ	8400	7400	Collection event triggered when a program height sense has been performed.

F.5 Configuration Parameter Download Rejection Variables

If the SECS/GEM host downloads a parameter that is rejected by the equipment, the equipment set variable "ConfigParmRejectedID" to the invalid status variable ID and will trigger a "ce_ConfigParmRejected" collection event.

Reasons for rejection include:

- Invalid format such as (FLT,FLT) expected but (FLT) received.

- Parameter is not defined for this machine such as DP Valve setting downloaded but machine is not using a DP valve.

Table F.5-1   Configuration Parameter Download Rejection Variables

Variable Name	ID	Storage Type	Class	Related CEID	Description
ConfigParmRejectedID	5999	I2	DV	3650	This data variable contains the EC ID of the invalid configuration parameter rejected by the equipment.

Table F.5-2   Configuration Parameter Download Rejection Variables – Related Collection Events

Variable Name	CEID	Related Status Variable	Description
ce_ConfigParmRejected	3650	5999	Collection event that is triggered when the host attempts to download an invalid configuration parameter. Status Variable 5999 will contain the EC ID of the rejected configuration parameter.

F.6 Configuration Change Notification

The SECS/GEM host will be notified when the operator modifies a configuration variable on the equipment. Associated data variables will contain the variable ID of the changed parameter, the new and the old values.

There are two categories of configuration parameters: strings and integers.

When a *string* configuration parameter has been modified, data variable "ConfigParmChanged" will be set to the variable ID of the changed parameter. Data variable "ConfigParmStringNew" will be set to the new parameter, data variable "ConfigParmStringOld" will be set to the old value of the parameter and collection event "ce_ConfigParmChangedString" will be triggered.

When an *integer* configuration parameter has been modified, data variable "ConfigParmChanged" will be set to the variable ID of the changed parameter. Data variable "ConfigParmIntNew" will be set to the new parameter, data variable "ConfigParmIntOld" will be set to the old value of the parameter and collection event "ce_ConfigParmChangedInt" will be triggered.

New Collection Events

Table F.6-1   Configuration Change Notification - New Collection Events

Collection Event Name	CEID	Related Data Variables	Description
ce_ConfigParmChangedString	3638	450 451 453	Event triggered when operator changes a "string" type configuration parameter
ce_ConfigParmChangedInt	3639	450 452 454	Event triggered when operator changes an "integer" type configuration parameter

New Data Variables

These data variables are also used for recipe change notification.

Table F.6-2   Configuration Change Notification - New Data Variables

Data Variable Name	ID	Storage Type	Related CEID	Description
ParameterChangedVid	450	I4	3638 3639 3651 3652	Set to the variable ID of the configuration, fluid or heater file parameter changed by operator.
NewParameterString	451	A[100]	3638 3651	New "string" value of configuration, fluid or heater file parameter changed by operator.
OldParameterString	453	A[100]	3638 3651	Old "string" value of configuration, fluid or heater file parameter before changed by operator.
NewParameterInt	452	I4	3639 3652	New "integer" value of configuration, fluid or heater file parameter changed by operator.
OldParameterInt	454	I4	3639 3652	Old "integer" value of configuration, fluid or heater file parameter before changed by operator.

F.7 Recipe Change Notification

Table F.7-1   Recipe Change Notification – Related Report Variables

Variable Name	CEID	Related Report Variables	Description
GemPPChangeEvent	3	468 41	Event triggered when a recipe file is saved or deleted. Vid 468 contains the name of the affected recipe. Vid 41 (PPCHANGESTATUS) contains 1 = New recipe file has been created 2 = Existing recipe file has been overwritten 3 = Recipe file has been deleted
ce_RecipeLoadComplete	3667	468	Event triggered upon successful completion of a recipe load. Note: if recipe load is initiated from gem host, and the load if successful, the S2F28 command acknowledge field will contain 0x00.
ce_RecipeLoadFailed	3668	468	Event triggered upon unsuccessful completion of an attempted recipe load. Note: if recipe load is initiated from gem host, and the load fails, the S2F28 command acknowledge field will contain 0x42 (process program format error).

Table F.7-2   Recipe Change Notification – Related Collection Events

Data Variable Name	ID	SECS Type	Related CEID	Description
RecipeFilename	468	A[100]	3 3667 3668	Recipe name for related collection event.

F.8   Program Instruction Variables

Program Modification Collection Events

The following collection events are triggered when a program instruction is modified.

Table F.8-1   Program Modification - Collection Events

Collection Event Name	CEID	Related Report Variables	Description
ce_ProgInstructionChange	3663	461 462 463 464 465 466	Event triggered when a program instruction is modified, added or deleted.
ce_ProgPatternCreated	3664	467 461	Event triggered when a new pattern is created in the program. DV 467 stores the name of the pattern created.
ce_ProgPatternDeleted	3665	467 461	Event triggered when a pattern is deleted from program. DV 467 stores the name of the pattern created.
ce_ProgSaved	3666	461	Event triggered when program is saved. DV 461 will contain saved program name.
ce_ProgWorkpieceRealigned	3669	464 465 461	Event triggered when workpiece is re-aligned.
ce_ProgFiducialEdit	3670	462 461	Event triggered when the fiducial(s) of a pattern are edited.
ce_ProgSkipMarkEdit	3671	462 461	Event triggered when the skip mark of a pattern is modified.

Table F.8-2   Program Instruction Change Collection Events – Related Data Variables

Data Variable Name	ID	SECS Type	Related CEID	Description
ProgramName	461	A[100]	3663 3664 3669 3670 3671	Currently loaded program name
PatternName	462	A[100]	3663 3670 3671	Name of pattern being edited
PattInstructionChangeType	463	I4	3663	1 = Line Inserted 2 = Line Deleted 3 = Line Modified
PattInstructionNew	464	A[200]	3663 3669	Modified or new instruction.
PattInstructionOld	465	A[200]	3663 3669	Original instruction before modification or deleted instruction
PattInstructionLineNum	466	I4	3663	Pattern line number modified
PatternNameAddedOrDeleted	467	A[100]	3664 3665	Name of pattern created (CE 3664) or deleted (CE 3665).

Program Header Change Collection Events

Table F.8-3   Program Header Change - Collection Events

Collection Event Name	CEID	Related Data Variables	Description
ce_ProgHeaderParmChangedString	3672	450 451 453	Event triggered when operator changes a "string" type program header parameter
ce_ProgHeaderParmChangedInt	3673	450 452 454	Event triggered when operator changes an "integer" type program header parameter

Heater Parameter Change Collection Events

The following collection events are triggered when heater parameters are modified.

Table F.8-4   Heater Parameter Change - Collection Events

Collection Event Name	CEID	Related Report Variables	Description
ce_HeaterParmChangedString	3653	450 451 453	Event triggered when operator changes a "string" heater file parameter.
ce_HeaterParmChangedInt	3654	450 452 454	Event triggered when operator changes an "integer" heater file parameter.
ce_HeaterFileManualDownload	3655	458 460	Event triggered when a heater file is manually downloaded from the heater terminal window. DV 458 will contain the new heater filename. DV 460 will contain the heater filename being replaced.
ce_HeaterFileManualUpload	3656	458	Event triggered when a heater file is manually uploaded from the heater terminal window. DV 458 will contain the heater filename the parameters are uploaded to.

Table F.8-4   Heater Parameter Change - Collection Events (Continued)

Collection Event Name	CEID	Related Report Variables	Description
ce_HeaterFileSave	3657	458 460	Event triggered when a heater file is manually saved in the heater terminal window. DV 458 will contain the new heater filename. DV 460 will contain the heater filename being replaced.
ce_HeaterFileLMOSave	3658	458	Event triggered when heater local machine offsets are saved. DV 458 will contain the heater filename the offsets are linked to.
ce_HeaterLMODownload	3659	458	Event triggered when heater local machine offsets are downloaded. DV 458 will contain the heater filename the offsets are linked to.
ce_HeaterLMORemoved	3660	458	Event triggered when heater local machine offsets are removed (turned off). DV 458 will contain the current heater filename when the offsets were turned off.
ce_HeaterFileNotSaved	3661	None	Heater file was modified but saved.
ce_HeaterLMONotSaved	3662	None	Local machine offsets were modified but not saved.

Table F.8-5   Heater File Parameter Change - Data Variables

Data Variable Name	ID	SECS Type	Related CEID	Description
HeaterFilename	458	A[100]	3653 3654 3655 3656 3657 3658 3659 3660	Name of the heater file being modified, manually saved, manually uploaded (depending on collection event).
HeaterLoopChanged	459	I2	3653 3654	Loop number of heater file parameter being modified.
HeaterFilenameOld	460	A[100]	3655 3657	Only valid during collection events 3655 and 3657. Name of heater file replaced when the heater file is saved (ce 3657) or a heater file is manually downloaded (ce 3655). The new (current) heater filename is stored in "Y (VID 458). Note that the old and new heater filename may be the same.

Heater File Data Variables

The following data variables and their IDs are for reference only and their values should not be directly requested. They are valid only at the time of one of the collection events listed above.

Table F.8-6   Heater File - Data Variables

Data Variable Name	ID	SECS Type	Storage Type	Heater File Entry
				[GLOBAL]
h_VerifyTimeout	11400	I4	INT	Verify Timeout
h_Numberofloops	11401	I4	INT	Number of loops
				[RUNTIME_LOOP]
h_Name	11410	A[100]	ASCII	Name
h_TurnOffDuringFids	11411	I4	INT	Turn Off During Fids
h_OutputDuringFids	11412	I4	INT	Output During Fids
h_VerifyBeforeDispense	11413	I4	INT	Verify Before Dispense
h_VerifyUpperLimit	11414	I4	INT	Verify Upper Limit
h_VerifyLowerLimit	11415	I4	INT	Verify Lower Limit
h_SetOffWhenIdle	11416	I4	INT	Set Off When Idle
h_WarnBeforeHeaterOff	11417	I4	INT	Warn Before Heater Off
h_PreventFlowRateIfHtrOff	11418	I4	INT	*Not stored in heater file
h_PreventPurgeIfHtrOff	11419	I4	INT	*Not stored in heater file
				[SETTINGS_LOOP]
h_OnOff	11420	I4	INT	On/Off
h_AutoManual	11421	I4	INT	Auto/Manual
h_ManualOutputLevel	11422	A[30]	FLT	Manual Output Level
h_ScaleUnits	11423	I4	INT	Scale Units
h_SetPoint	11424	A[30]	FLT	Set Point
h_ProportionalBand	11425	I4	INT	Proportional Band
h_Integral	11426	I4	INT	Integral

Table F.8-6   Heater File - Data Variables (Continued)

Data Variable Name	ID	SECS Type	Storage Type	Heater File Entry
h_Derivative	11427	I4	INT	Derivative
h_OutputFilter	11428	I4	INT	Output Filter
h_HotColdSpread	11429	A[30]	FLT	Integral Preload
h_InputType	11430	I4	INT	Input Type
h_InputReadingOffsetBias	11431	I4	INT	Input Reading Offset Bias
h_InputFilter	11432	I4	INT	Input Filter
h_OutputEnable	11433	I4	INT	Output Enable
h_OutputControlType	11434	I4	INT	Output Control Type
h_OutputAction	11435	I4	INT	Output Action
h_OutputHeatCycleTime	11436	I4	INT	Output Heat Cycle Time
h_OutputHeatLimitPC	11437	I4	INT	Output Heat Limit PC
h_OutputHeatLimitTime	11438	I4	INT	Output Heat Limit Time
h_Deadband	11439	A[30]	FLT	Deadband
h_Deviation	11440	I4	INT	Deviation
h_ProcAlarmDelay	11441	I4	INT	Proc Alarm Delay
h_HighProcAlarmOutput	11442	I4	INT	High Proc Alarm Output
h_HighProcAlarmSetPoint	11443	A[30]	FLT	High Proc Alarm Set Point
h_HighProcAlarmMode	11444	I4	INT	High Proc Alarm Mode
h_LowProcAlarmOutput	11445	I4	INT	Low Proc Alarm Output
h_LowProcAlarmSetPoint	11446	A[30]	FLT	Low Proc Alarm Set Point
h_LowProcAlarmMode	11447	I4	INT	Low Proc Alarm Mode
h_HighDevOutput	11448	I4	INT	High Dev Output
h_HighDevMode	11449	I4	INT	High Dev Mode

Data Variable Name	ID	SECS Type	Storage Type	Heater File Entry
h_LowDevOutput	11450	I4	INT	Low Dev Output
h_LowDevMode	11451	I4	INT	Low Dev Mode
h_LocalMachineHeaterOffset	11452	I4	INT	*Not stored in heater file

Fluid File Variables

A fluid file contains "characteristics", "dot" and "line" parameters. Each set of dot and line parameters are duplicated 10 times to represent 10 possible dot and line types. Fluid files are also linked to a particular valve (if the equipment contains more than one valve). Note that a single fluid file can be linked to both valves.

Characteristic, dot and line parameters are internally represented by either an ASCII string or INTEGER value. A separate collection event will be triggered for each of these two data types to facilitate creating and linking reports based on the data type. In general, a report should be created for each collection event defining the old and new values, the ID of the variable changed, the fluid filename, the valve number linked to the fluid file and the dot/line type.

The following collection events are triggered when a fluid file parameter is modified.

Table F.8-7 Fluid File Parameter Change – Collection Events

Collection Event Name	CEID	Related Report Variables	Description
ce_FluidParmChangedString	3651	450 451 453 455 456 457	Event triggered when operator changes a "string" fluid file parameter.
ce_FluidParmChangedInt	3652	450 452 454 455 456 457	Event triggered when operator changes an "integer" fluid file parameter.

Table F.8-8   Fluid File Parameter Change – Data Variables

Data Variable Name	ID	SECS Type	Related CEID	Description
FluidFilenameChanged	455	A[100]	3651 3652	Name of the fluid file being modified. Note that the parameters will not be persistent unless the fluid file is saved.
FluidTypeChanged	456	I2	3651 3652	Type changed: 0 = Characteristic 1 = Dot/Line Type 1 2 = Dot/Line Type 2 3 = Dot/Line Type 3 4 = Dot/Line Type 4 5 = Dot/Line Type 5 6 = Dot/Line Type 6 7 = Dot/Line Type 7 8 = Dot/Line Type 8 9 = Dot/Line Type 9 10 = Dot/Line Type 10
FluidFileChangedValveNumber	457	I2	3651 3652	Valve Number Fluid File is currently mapped to: 1 = Valve 1 2 = Valve 2

Fluid File Data Variables

The following data variables and their IDs are for reference only and their values should not be directly requested. They are valid only at the time of their modification and one of the collection events listed above.

Table F.8-9   Fluid File - Data Variables

Data Variable Name	ID	SECS Type	Storage Type	Fluid File Entry
				[Dot Parameters]
fd_OnTime	11000	A[30]	FLT	On Time
fd_DwellSecs	11001	A[30]	FLT	Dwell Secs
fd_DispenseGap	11002	A[30]	FLT	Dispense Gap
fd_Notes	11003	A[100]	ASCII	Notes
fd_MidmoveCount1	11004	A[30]	FLT	Midmove Count 1

Data Variable Name	ID	SECS Type	Storage Type	Fluid File Entry
fd_MidmoveCount2	11005	A[30]	FLT	Midmove Count 2
fd_DownSpeed	11006	A[30]	FLT	Down Speed
fd_DownAccel	11007	A[30]	FLT	Down Accel
fd_SettleSecs	11008	A[30]	FLT	Settle Secs
fd_OnVectorMode	11009	I4	INT	On Vector Mode
fd_OffVectorMode	11010	I4	INT	Off Vector Mode
fd_NumShots	11011	I4	INT	Num Shots
fd_MultishotZDelta	11012	A[30]	FLT	Multishot Z Delta
fd_UpSpeed	11013	A[30]	FLT	Up Speed
fd_UpAccel	11014	A[30]	FLT	Up Accel
fd_RetractDistance	11015	A[30]	FLT	Retract Distance
fd_Suckback	11016	A[30]	FLT	Suckback
fd_PostRetractDwell	11017	A[30]	FLT	Post Retract Dwell
fd_AssistDelay	11018	A[30]	FLT	Assist Delay
fd_AssistDuration	11019	A[30]	FLT	Assist Duration
fd_ValveOnTime	11020	A[30]	FLT	Valve On Time
fd_DotSpacing	11021	A[30]	FLT	Dot Spacing
fd_Acceleration	11022	A[30]	FLT	Acceleration
fd_EncEnable	11023	A[4]	ASCII	Enc Enable
fd_EncForwardSpd	11024	A[30]	FLT	Enc Forward Spd
fd_EncReverseSpd	11025	A[30]	FLT	Enc Reverse Spd
fd_EncAccel	11026	A[30]	FLT	Enc Accel
fd_EncDecel	11027	A[30]	FLT	Enc Decel
fd_EncCounts	11028	I4	INT	Enc Counts
fd_EncSuckback	11029	I4	INT	Enc Suckback
				[Line Parameters]
fl_PremoveDelay	11100	A[30]	FLT	Pre-move Delay
fl_ShutoffDistance	11101	A[30]	FLT	Shutoff Distance
fl_DispenseGap	11102	A[30]	FLT	Dispense Gap

Data Variable Name	ID	SECS Type	Storage Type	Fluid File Entry
fl_Speed	11103	A[30]	FLT	Speed
fl_Weightcontrollinespeed	11104	A[30]	FLT	Weight-control line speed (FMW/sec)
fl_DwellTime	11105	A[30]	FLT	Dwell Time
fl_RetractDistance	11106	A[30]	FLT	Retract Distance
fl_BacktrackGap	11107	A[30]	FLT	Backtrack Gap
fl_BacktrackLength	11108	A[30]	FLT	Backtrack Length
fl_BacktrackSpeed	11109	A[30]	FLT	Backtrack Speed
fl_Notes	11110	A[100]	ASCII	Notes
fl_DownSpeed	11111	A[30]	FLT	Down Speed
fl_DownAccel	11112	A[30]	FLT	Down Accel
fl_UpSpeed	11113	A[30]	FLT	Up Speed
fl_UpAccel	11114	A[30]	FLT	Up Accel
fl_Suckback	11115	A[30]	FLT	Suckback
fl_VelocityAdjustmentFactor	11116	A[30]	FLT	Velocity Adjustment Factor
fl_FluidOnResponseTime	11117	A[30]	FLT	Fluid On Response Time
fl_FluidOffResponseTime	11118	A[30]	FLT	Fluid Off Response Time
fl_Assist1OnResponseTime	11119	A[30]	FLT	Assist 1 On Response Time
fl_Assist1OffResponseTime	11120	A[30]	FLT	Assist 1 Off Response Time
fl_Assist2OnResponseTime	11121	A[30]	FLT	Assist 2 On Response Time
fl_Assist2OffResponseTime	11122	A[30]	FLT	Assist 2 Off Response Time
fl_DispenseHeight	11123	A[30]	FLT	Dispense Height
fl_DispenseWidth	11124	A[30]	FLT	Dispense Width
				[Characteristics]
fc_PurgeEnabled	11200	A[4]	ASCII	Purge Enabled
fc_PurgeDuration	11201	A[30]	FLT	Purge Duration
fc_PurgeInterval	11202	A[30]	FLT	Purge Interval
fc_FlowRateEnabled	11203	A[4]	ASCII	Flow Rate Enabled
fc_FlowCalibrationInterval	11204	A[30]	FLT	Flow Calibration Interval
fc_FlowCalibrationDuration	11205	A[30]	FLT	Flow Calibration Duration

Data Variable Name	ID	SECS Type	Storage Type	Fluid File Entry
fc_DJFlowCalibrationMinWeight	11206	A[30]	FLT	DJ Flow Calibration Min Weight (mg)
fc_PercentofMaxDJWeightControlSpeed	11207	A[30]	FLT	Percent of Max DJ Weight-Control Speed
fc_SetPurgeOnTimer	11208	I4	INT	Set Purge On Timer
fc_SetFlowRateOnTimer	11209	I4	INT	Set FlowRate On Timer
fc_PurgeonRunCount	11210	I4	INT	Purge on Run Count
fc_FlowRateCalibrationonRunCount	11211	I4	INT	Flow Rate Calibration on Run Count
fc_FlowCalibrationDispenses	11212	I4	INT	Flow Calibration Dispenses
fc_FlowCalibrationIntervalDelay	11213	A[30]	FLT	Flow Calibration Interval Delay
fc_MinimumFlowRate	11214	A[30]	FLT	Minimum Flow Rate
fc_MaximumFlowRate	11215	A[30]	FLT	Maximum Flow Rate
fc_Fluidname	11216	A[100]	ASCII	Fluid name
fc_PotLifeEnabled	11217	A[4]	ASCII	Pot Life Enabled
fc_Potlife	11218	A[30]	FLT	Pot life
fc_Potlifenotify	11219	A[30]	FLT	Pot life notify
fc_ScaleBias	11220	A[30]	FLT	Scale Bias (%)
fc_ZeroScaleXOffset	11221	A[30]	FLT	Zero Scale X Offset
fc_ZeroScaleYOffset	11222	A[30]	FLT	Zero Scale Y Offset
fc_ZeroScaleZOffset	11223	A[30]	FLT	Zero Scale Z Offset
fc_FlowCalibrationPreMove	11224	A[100]	ASCII	Flow Calibration Pre-Move
fc_FlowCalibrationPostMove	11225	A[100]	ASCII	Flow Calibration Post-Move
fc_FilletBias	11226	A[30]		Fillet Bias (%)
fc_BoardsafterLowFluidSensed	11227	I4	INT	Boards after Low Fluid Sensed
fc_LowFluidBoardsToGo	11228	I4	INT	Low Fluid Boards To Go
fc_EnableLowFluidCheck	11229	A[4]	ASCII	Enable Low Fluid Check
fc_LowFluidCheck	11230	I4	INT	Low Fluid Check
fc_DefaultWeightofPrimedFluid	11231	A[30]	FLT	Default Weight of Primed Fluid (mg)
fc_Initialsyringeweight	11232	A[30]	FLT	Initial syringe weight (mg)
Fc_Warningsyringeweight	11233	A[30]	FLT	Warning syringe weight (mg)
fc_Criticalsyringeweight	11234	A[30]	FLT	Critical syringe weight (mg)

Data Variable Name	ID	SECS Type	Storage Type	Fluid File Entry
fc_AllowFutureThawTime	11235	A[4]	ASCII	Allow Future Thaw Time
fc_DisplaywarningonlowFluidSense	11236	A[4]	ASCII	Display warning on low Fluid Sense
fc_VacuumShutoffDelayTime	11237	A[30]	FLT	Vacuum Shutoff Delay Time (ms)
fc_VacuumDelayEnabled	11238	A[4]	ASCII	Vacuum Delay Enabled
fc_VacuumPreShutoffTime	11239	A[30]	FLT	Vacuum Pre-Shutoff Time (ms)
fc_VacuumPreShutoffEnabled	11240	A[4]	ASCII	Vacuum Pre-Shutoff Enabled
fc_MultiFlowRateCalibrationEnable	11241	A[4]	ASCII	Multi Flow Rate Calibration Enable
fc_MultiFlowRateCalibrationCount	11242	I4	INT	Multi Flow Rate Calibration Count
fc_ResetFlowRateTimer	11243	A[4]	ASCII	Reset Flow Rate Timer
fc_ResetPurgeTimer	11244	A[4]	ASCII	Reset Purge Timer
fc_ResetDispenseWeightVerifyTimer	11245	A[4]	ASCII	Reset Dispense Weight Verify Timer
fc_DispenseWeightBlockProduction	11246	A[4]	ASCII	Dispense Weight Block Production
fc_DispenseWeightTarget	11247	A[30]	FLT	Dispense Weight Target
fc_DispenseWeightTimeBetweenDispenses	11248	A[30]	FLT	Dispense Weight Time Between Dispenses
fc_DispenseWeightMaximumLimit	11249	A[30]	FLT	Dispense Weight Maximum Limit
fc_DispenseWeightMinimumLimit	11250	A[30]	FLT	Dispense Weight Minimum Limit
fc_DispenseWeightNumberofDispenses	11251	I4	INT	Dispense Weight Number of Dispenses
fc_DispenseWeightCheckMaxRange	11252	A[4]	ASCII	Dispense Weight Check Max Range
fc_DispenseWeightMaxRange	11253	A[30]	FLT	Dispense Weight Max Range
fc_DispenseWeightPurgeBeforeVerify	11254	A[4]	ASCII	Dispense Weight Purge Before Verify
fc_FlowRateBlockProduction	11255	A[4]	ASCII	Flow Rate Block Production
fc_ValveAutoBiasBlockProduction	11256	A[4]	ASCII	Valve Auto Bias Block Production
fc_ValveAutoBiasTargetWeight	11257	A[30]	FLT	Valve Auto Bias Target Weight
fc_LastComputedValveAutoBias	11258	A[30]	FLT	Last Computed Valve Auto Bias (%)
fc_ValveAutoBiasMaximumLimit	11259	A[30]	FLT	Valve Auto Bias Maximum Limit
fc_ValveAutoBiasMinimumLimit	11260	A[30]	FLT	Valve Auto Bias Minimum Limit
fc_ValveAutoBiasNumberofDispenses	11261	I4	INT	Valve Auto Bias Number of Dispenses
fc_ValveAutoBiasTimeBetweenDispenses	11262	A[30]	FLT	Valve Auto Bias Time Between Dispenses
fc_SkipFirstShotinMFR	11263	A[4]	ASCII	Skip First Shot in MFR

Data Variable Name	ID	SECS Type	Storage Type	Fluid File Entry
fc_LoadPromptedSetupPSS	11264	A[4]	ASCII	Load Prompted Setup PSS
fc_LoadChangeSyringePSS	11265	A[4]	ASCII	Load Change Syringe PSS
fc_LoadLowFluidPSS	11266	A[4]	ASCII	Load Low Fluid PSS
fc_PromptedSetupPSSFilename	11267	A[100]	ASCII	Prompted Setup PSS Filename
fc_ChangeSyringePSSFilename	11268	A[100]	ASCII	Change Syringe PSS Filename
fc_LowFluidPSSFilename	11269	A[100]	ASCII	Low Fluid PSS Filename
fc_FluxWtBlockProduction	11270	A[4]	ASCII	Flux Wt Block Production
fc_FluxWtValveOnTime	11271	A[30]	FLT	Flux Wt Valve On Time
fc_FluxWtTarget	11272	A[30]	FLT	Flux Wt Target
fc_FluxWtTimeBetweenDispenses	11273	A[30]	FLT	Flux Wt Time Between Dispenses
fc_FluxWtMaxLimit	11274	A[30]	FLT	Flux Wt Max Limit
fc_FluxWtMinLimit	11275	A[30]	FLT	Flux Wt Min Limit
fc_FluxWtNumberofDispenses	11276	I4	INT	Flux Wt Number of Dispenses
fc_FluxWtCheckMaxRange	11277	A[4]	ASCII	Flux Wt Check Max Range
fc_FluxWtMaxRange	11278	A[30]	FLT	Flux Wt Max Range
fc_FluxWtCheckLimits	11279	A[4]	ASCII	Flux Wt Check Limits
fc_FluxWtPurgeBeforeVerify	11280	A[4]	ASCII	Flux Wt Purge Before Verify
fc_FluxWtPurgeBetweenDispenses	11281	A[4]	ASCII	Flux Wt Purge Between Dispenses
fc_DJvalveontime	11282	A[30]	FLT	DJ valve on time (ms)
fc_DJvalveofftime	11283	A[30]	FLT	DJ valve off time (ms)
fc_Numberofdotsininitialdispense	11284	I4	INT	Number of dots in initial dispense
fc_Fluxvalveontime	11285	A[30]	FLT	Flux valve on time (ms)
fc_RuntimeDispenseWeightVerificationEnabled	11286	A[4]	ASCII	Runtime Dispense Weight Verification Enabled
fc_DispenseWeightVerificationInterval	11287	A[30]	FLT	Dispense Weight Verification Interval (sec)
fc_DispenseWeightVerificationonRunCount	11288	I4	INT	Dispense Weight Verification on Run Count
fc_DoDispenseWeightVerificationonTimer	11289	I4	INT	Do Dispense Weight Verification on Timer
fc_MaxDeviationAbovePreviousFlowrate	11290	A[30]	FLT	Max % Deviation Above Previous Flowrate
fc_MaxDeviationBelowPreviousFlowrate	11291	A[30]	FLT	Max % Deviation Below Previous Flowrate
fc_PressureSettingUnits_V1	11292	A[10]	ASCII	Setting units

Table F.8-9   Fluid File - Data Variables (Continued)

Data Variable Name	ID	SECS Type	Storage Type	Fluid File Entry
fc_FluidPressureSetting_V1	11293	A[30]	FLT	Fluid Pressure Setting
fc_ValvePressureSetting_V1	11294	A[30]	FLT	Valve Pressure Setting
fc_CoolingPressureSetting_V1	11295	A[30]	FLT	Cooling Pressure Setting
fc_FluidPressureTol_V1	11296	A[30]	FLT	Fluid Pressure Tolerance
fc_ValvePressureTol_V1	11297	A[30]	FLT	Valve Pressure Tolerance
fc_CoolingPressureTol_V1	11298	A[30]	FLT	Cooling Pressure Tolerance
fc_DotWeightPressureControlled_V1	11299	A[4]	ASCII	"ON" = Dot Weight Pressure Control is enabled "OFF" = Dot Weight Pressure Control is disabled
fc_DesiredDotWeight_V1	11300	A[30]	FLT	Desired dot weight when running pressure controlled setup
fc_MinFluidPressure_V1	11301	A[30]	FLT	Minimum fluid pressure when running pressure controlled setup
fc_MaxFluidPressure_V1	11302	A[30]	FLT	Maximum fluid pressure when running pressure controlled setup

F.9   Local Machine Offsets (LMO) - Workpiece Origin

Table F.9-1   LMO Workpiece Origin - Collection Events

Collection Event Name	CEID	Related Data Variables	Description
ce_LmoWpEnabled	3710	6438	Collection event that is triggered when Local Machine Offsets Workpiece Origin has been enabled.
ce_LmoWpDisabled	3711	6438	Collection event that is triggered when Local Machine Offsets Workpiece Origin has been disabled.
ce_LmoWpModified	3712	6438	Collection event that is triggered when the Local Machine Offsets Workpiece Origin has been modified.
ce_LmoWpAlignSuccessful	3713	7705	Collection event that is triggered after Local Machine Offsets Workpiece Origin realignment has completed and was successfully realigned.

Table F.9-1   LMO Workpiece Origin - Collection Events (Continued)

Collection Event Name	CEID	Related Data Variables	Description
ce_LmoWpAlignFailed	3714	7705	Collection event that is triggered after Local Machine Offsets Workpiece Origin realignment has completed and did not succeed.
ce_LmoWpFidFound_1	3718	7706 7708	Collection event triggered when fiducial 1 of Local Machine Workpiece is found.
ce_LmoWpFidFound_2	3719	7707 7709	Collection event triggered when fiducial 2 of Local Machine Workpiece is found.
ce_LmoWpFidNotFound_1	3760	7706 7708	Collection event triggered when fiducial 1 of Local Machine Workpiece is not found.
ce_LmoWpFidNotFound_2	3761	7707 7709	Collection event triggered when fiducial 2 of Local Machine Workpiece is not found.

Table F.9-2   LMO Workpiece Origin – Data Variables

Data Variable Name	ID	SECS Type	Storage Type	Fluid File Entry
LmoWpFrame	7705	A[50]	FLT,FLT,FLT	Current X, Y,Theta origin of the Local Machine Workpiece Offset name selected. If LMO workpiece is not enabled or the LMO name selected is not valid, this string will contain "-1, -1, -1". These values are in user units.
LmoWpFidFoundXY_1	7706	A[40]	FLT,FLT	Fiducial 1 XY location (in machine units) found during LMO workpiece re-alignment. Valid after collection event 3718 or 3760 occurs. Note that this is the "expected" location for CEID 3760.
LmoWpFidFoundXY_2	7707	A[40]	FLT,FLT	Fiducial 2 XY location (in machine units) found during LMO workpiece re-alignment. Valid after collection event 3719 or 3761occurs. Note that this is the "expected" location for CEID 3761.
LmoWpFidFoundScore_1	7708	I2	INT	Fiducial 1 found score during LMO workpiece re-alignment. Valid after collection event 3718 or 3760 occurs.
LmoWpFidFoundScore_2	7709	I2	INT	Fiducial 2 found score during LMO workpiece re-alignment. Valid after collection event 3719 or 3761 occurs.

F.10 LMO Workpiece Align – Remote Command

LMO Workpiece Align is a remote command to execute Local Machine Offsets Workpiece Origin realignment.

SECS/GEM host can start this process with a remote command sent to the client machine. The following tables describe the SECS/GEM remote command and variables related to LMO_WP_ALIGN.

Table F.10-1   LMO Workpiece Align – Remote Command

Remote Command	Related CEID	Related Data and Status Variables	Description
Remote Command String = "LMO_WP_ALIGN"	See Local Machine Offsets – Workpiece Origin CE table	See Local Machine Offsets – Workpiece Origin data table	Remote control command to execute Local Machine Offsets Workpiece Origin realignment on the tool. The tool must be in remote mode, have Local Machine Offsets Workpiece Origin enabled, the workpiece alignment points must be taught with fiducials and the tool must not be running a program and must not be in the programming window.

LMO Workpiece Align HCACK Rejection Codes

Table F.10-2   LMO Workpiece Align – HCACK Rejection Codes

HCACK	Description
0x40	Tool is not is not in ON-LINE REMOTE state
0x45	LMO Workpiece Origin is not enabled
0x46	LMO Workpiece is not aligned using fiducials
0x47	Cannot execute while program is running
0x48	Cannot execute while in programming window

F.11 LMO Height Sense

Table F.11-1 LMO Height Sense – Equipment Constants

Variable Name	ID	SECS Type	Storage Type	Description
c_LmoHeightSenseEnabled	6506	A[4]	ASCII	Enables / disables LMO Height Sense. Set variable string to "ON" to enable LMO Height Sense. Set variable string to "OFF" to disable LMO Height Sense. (FmConfig.ini entry: Height Sense =)
c_LmoHeightSenseLane1	6517	A[30]	FLT	Height sense value used for Lane 1 when LMO Height Sense is active. **NOTE: THIS VALUE IS IN 0.1 MIL UNITS** (FmConfig.ini entry: Height Sense Value Lane 1=)
c_LmoHeightSenseLane2	6518	A[30]	FLT	Height sense value used for Lane 2 when LMO Height Sense is active. **NOTE: THIS VALUE IS IN 0.1 MIL UNITS** (FmConfig.ini entry: Height Sense Value Lane 2=)
LmoHeightSenseLane1UserUnits	7703	A[30]	FLT	Height sense value used for Lane 1 when LMO Height Sense is active. **NOTE: THIS VALUE IS IN USER UNITS** (inch, mm, …)
LmoHeightSenseLane2UserUnits	7704	A[30]	FLT	Height sense value used for Lane 2 when LMO Height Sense is active. **NOTE: THIS VALUE IS IN USER UNITS** (inch, mm, …)

Table F.11-2 LMO Height Sense - Collection Events

Collection Event Name	CEID	Related Data Variables	Description
ce_LmoHsEnabled	3715		Collection event that is triggered when Local Machine Offsets Height Sense has been enabled.
ce_LmoHsDisabled	3716		Collection event that is triggered when Local Machine Offsets Height Sense has been disabled.
ce_LmoHsModified	3717		Collection event that is triggered when the Local Machine Offsets Height Sense has been modified.

F.12   Dispense Head Linear Fluid Sensor Level Percent

Table F.12-1   Dispense Head Linear Fluid Sensor Level Percent –Status Variables and Collection Events

Variable Name	ID	Storage Type	SECS Type	CEID	Description
DHLinearFluidSensorPct	1539	I4	SV	---	Dispense head linear fluid sensor level percent.
ce_DHLinearFluidSensorLevel	---	---	CEID	3762	Collection event is triggered when level is checked by Fluidmove. (Before each board) Collection event 3709 is used for level percent and state variables.

F.13   Dispense Head Linear Fluid Level State

Table F.13-1   Dispense Head Linear Fluid Sensor Level Percent – Status Variables and Collection Events

Variable Name	ID	Storage Type	SECS Type	CEID	Description
DHLinearFluidSensorState	1540	I4	SV	---	Dispense head linear fluid sensor level state of sensors.
ce_DHLinearFluidSensorLevel	---	---	CEID	3762	Collection event is triggered when level is checked by Fluidmove. (Before each board)

F.14   Limited Start Number of Runs

The Limited Start Number of Runs feature is a method for the Remote Host to set the number of program run cycles to complete.

Table F.14-1   Limited Start Number of Runs – Equipment Constants

Constant Name	ID	Storage Type	SECS Type	CEID	Description
NumberOfRuns	634	A[6]	EC	None	Number of runs (production window.) Host sets the number of runs to complete. Dual Conveyor systems will complete 2 boards for each run. Number of Runs Enabled (635) must be set to TRUE to use this feature.
NumberOfRunsEnabled	635	Boolean	EC	None	Number of runs enabled (production window.)

Usage Scenario

The Host will set the **NumberOfRuns** and **NumberOfRunsEnabled** equipment constants prior to starting the machine run. When the program is started, it will run the number of program cycles specified by **NumberOfRuns** and then stop.

F.15   Remote Restart Application – Remote Command

Restart Application is a remote command to restart the Fluidmove application.

SECS/GEM host can start this process with a remote command sent to the client machine. The following tables describe the SECS/GEM remote command and variables related Locate Service Station.

Table F.15-1   Remote Restart Application - Remote Commands

Remote Command	Related CEID	Related Data and Status Variables	Description
Remote Command String = "RESTART_APPLICATION"	None	None	Remote control command to restart Fluidmove application. This command is valid if Fluidmove program is not running production.

Usage Scenario

The SECS/GEM host initiates the Restart Application process by sending the remote command to the dispensing tool.

SECS/GEM Scripts for Restart Application Remote Command

```
RESTARTAPP_CMD: S2F41 W

  <L [2]

    <A 'RESTART APPLICATION'>      /* RCMD */

    <L

    >

  > .
```

F.16 Calibrated Process Jetting (CPJ) – Remote Command

Check Calibrated Process Jetting is a process to check dispensed fluid flow rate accuracy and consistency. This is accomplished by taking several sequential dispense measurements and computing the average of the weight data and valve flow rate. The SECS/GEM host can start this process with a remote command sent to the client machine. The following tables describe the SECS/GEM remote command and variables relating to Check Calibrated Process Jetting.

Table F.16-1   Calibrated Process Jetting (CPJ) - Remote Command

Remote Command	CEID	Related Data and Status Variables	Description
Remote Command String = "CHECKCPJ" Remote control command may include the valve and scale name and number in the command parameters. (SECS/GEM S2F41 format) No parameters will default to Valve 1, Scale 1.		Valve 1 = 6504 Valve 2 = 6505 Status = 420	Remote control command to start Calibrated Process Jetting Check. (mg/dot flowrate) The actual valve flow rate is not changed.
	3701		ce_CPJCheckComplete_V1Pass
	3780		ce_CPJCheckComplete_V1Fail
	3702		ce_CPJCheckComplete_V2Pass
	3781		ce_CPJCheckComplete_V2Fail

The remote command can include the valve and scale name and number parameters:

(SECS/GEM S2F41 format, Remote Command with Parameters)

No parameters in the command message will default to Valve 1, Scale 1.

Table F.16-2   CPJ Check Remote Command – Related Variables, Equipment Constants and Collection Events

Variable Name	ID	Storage Type	SECS Type	CEID	Description
c_DJFlowRateCheck_V1	6504	A[30]	EC	3701	Results of Check CPJ process (DJ Valve 1)
c_DJFlowRateCheck_V2	6505	A[30]	EC	3702	Results of Check CPJ process (DJ valve 2)
ce_CPJCheckComplete_V1Pass	3701	---	CE	---	Collection event triggered when Check CPJ process is completed (DJ Valve 1)
ce_CPJCheckComplete_V2Pass	3702	---	CE	---	Collection event triggered when Check CPJ process is completed (DJ valve 2)
ce_CPJCheckComplete_V1Fail	3780	---	CE	---	Collection event triggered when Check CPJ process fails (DJ Valve 1)
ce_CPJCheckComplete_V2Fail	3781	---	CE	---	Collection event triggered when Check CPJ process fails (DJ valve 2)
CPJCheckResultStatus	420	U2	DV	3701 3702	Return status of CPJ Check process

Table F.16-3   Calibrated Process Jetting - Check CPJ Results Status

Return Value	Description
0	Passed
1	Failed Setup Error
2	Failed Out-of-Range
5	Failed User Aborted
6	Failed Other

Usage Scenario

The SECS/GEM host starts the Check CPJ process by sending the remote command **CHECKCPJ**. After the Check CPJ process is finished, a collection event **3701** or **3702** is triggered and the dispensed average valve flow rate value (**6504** or **6505**) is updated on the host. The completion status of the Check CPJ process is saved to SECS Gem variable **420**.

SECS/GEM Scripts for Testing CHECKCPJ Remote Command

```
        REMOTE_CPJCHECK_VALVE_1: S2F41 W
    <L [2]
       <A 'CHECKCPJ'>          /* REMOTE COMMAND */
       <L
          <L [2]
             <A 'VALVE'>      /* COMMAND PARAMETER NAME */
             <U2 1>           /* COMMAND PARAMETER VALUE  */
          >
       >
    > .
```

F.17 Flow Rate Calibration – Remote Command

Flow Rate Calibration is a process to measure dispensed fluid weight accuracy and consistency. This is accomplished by taking several sequential dispense measurements and computing the average fluid weight and flow rate data. The SECS/GEM host can start this process with a remote command sent to the client machine. The following tables describe the SECS/GEM remote command and variables related Flow Rate Calibration process.

Table F.17-1   Flow Rate Calibration – Remote Command – Collection Events

Collection Event Name	CEID	Related Data and Status Variables	Description
Remote Command String = "FLOWRATECALIB" Remote control command may include the valve and scale name and number in the command parameters. (SECS/GEM S2F41 format) No parameters will default to Valve 1, Scale 1.		Valve 1 = 400 Valve 2 = 403 Status = 640	Remote control command to start Flow Rate Calibration. When a DJ valve is used, this command will perform the Calibrated Process Jetting routine. (mg/dot flowrate) The valve flow rate is changed to the new calibrated value.
	3730		ce_FlowRateCalibComplete_V1Pass
	3731		ce_FlowRateCalibComplete_V2Pass
	3784		ce_FlowRateCalibComplete_V1Fail
	3785		ce_FlowRateCalibComplete_V2Fail

The remote command can include the valve and scale name and number parameters:

(SECS/GEM S2F41 format, Remote Command with Parameters)

No parameters in the command message will default to Valve 1, Scale 1.

Table F.17-2   Flow Rate Calibration – Remote Command – Related Data Variables and Collection Events

Variable Name	ID	Storage Type	SECS Type	CEID	Description
FlowRate1	400	F8	DV	3730	Flow Rate value (Valve 1)
FlowRate2	403	F8	DV	3731	Flow Rate value (valve 2)
ce_FlowRateCalibComplete_V1	3730	---	CE	---	Collection event triggered when Valve 1 Flow Rate Calibration process is completed
ce_FlowRateCalibComplete_V2	3731	---	CE	---	Collection event triggered when valve 2 Flow Rate Calibration process is completed
FlowRateCalibStatus	640	U2	DV	3730 3731	Return status of Flow Rate Calibration process. (Valve 1&2)

Table F.17-3   Flow Rate Calibration Results Status

Return Value	Description
0	Passed
1	Failed Setup Error
2	Failed Out-of-Range
5	Failed User Aborted
6	Failed Other

Usage Scenario

The SECS/GEM host starts the Flow Rate Calibration process by sending the remote command **FLOWRATECALIB**. After the Flow Rate Calibration process is finished, a collection event **3730** or **3731** is triggered and the calibrated flow rate value (400 or 403) is updated on the host. The completion status of the Flow Rate Calibration process is saved to SECS Gem variable **640**.

SECS/GEM Scripts for Testing Flow Rate Calibration

```
FLOWRATE_DEFINE_REPORTS: S2F33 W
  <L [2]
    <U2 0>              /* DATAID */
    <L
      <L [2]
        <U2 102>      /* RPTID */
        <L
          <U2 640>    /* VID FLOW RATE CALIB STATUS */
          <U2 400>    /* VID FLOW RATE AVG VALUE */
        >
      >
      <L [2]
        <U2 103>      /* RPTID */
        <L
          <U2 640>  /* VID FLOW RATE CALIB STATUS */
          <U2 403>  /* VID FLOW RATE 2 AVG VALUE */
        >
      >
    >
  > .
```

SECS/GEM Scripts for Testing Flow Rate Calibration (Continued)

```
FLOWRATE_LINK_REPS_TO_EVENTS: S2F35 W
  <L [2]
    <U2 0>              /* DATAID */
    <L
      <L [2]
        <U2 3730>     /* CEID */
        <L
          <U2 102> /* RPTID */
        >
      >
      <L [2]
        <U2 3731>     /* CEID */
        <L
          <U2 103> /* RPTID */
        >
      >
    >
  >.


FLOWRATE_ENABLE_CE_: S2F37 W
  <L
    <BOOLEAN 0x1>
    <L
      <U4 3730>  /* FLOW RATE CALIB complete */
      <U4 3731>  /* FLOW RATE CALIB complete */
    >
  > .
```

SECS/GEM Scripts for Testing Flow Rate Calibration (Continued)

```
REMOTE_FLOW_RATE_CALIB_VALVE_1: S2F41 W
  <L [2]
    <A 'FLOWRATECALIB'>      /* REMOTE COMMAND */
    <L
      <L [2]
        <A 'VALVE'>      /* COMMAND PARAMETER NAME */
        <U2 1>           /* COMMAND PARAMETER VALUE  */
      >
    >
  > .


REMOTE_FLOW_RATE_CALIB_VALVE_2: S2F41 W
  <L [2]
    <A 'FLOWRATECALIB'>      /* REMOTE COMMAND */
    <L
      <L [2]
        <A 'VALVE'>      /* COMMAND PARAMETER NAME */
        <U2 2>           /* COMMAND PARAMETER VALUE  */
      >
    >
  > .
```

F.18   Dispense Weight Verification (DWV) – Remote Command

Dispense Weight Verification is a process to calibrate dispensed weight accuracy and consistency. This is accomplished by taking several sequential weight controlled dispenses and computing the average of the weight data. The SECS/GEM host can start this process with a remote command sent to the client machine. The following tables describe the SECS/GEM remote command and variables related Dispense Weight Verification.

Table F.18-1   Dispense Weight Verification – Remote Command

Remote Command	CEID	Related Data and Status Variables	Description
Remote Command String = "DWV" Remote control command may include the valve and scale name and number in the command parameters. (SECS/GEM S2F41 format) No parameters will default to Valve 1, Scale 1.	416		Remote control command to start Dispense Weight Verification.
	3721		ce_DWVCalibComplete_V1Pass
	3722		ce_DWVCalibComplete_V2Pass
	3782		ce_DWVCalibComplete_V1Fail
	3783		ce_DWVCalibComplete_V2Fail

The remote command can include the valve and scale name and number parameters:

(SECS/GEM S2F41 format, Remote Command with Parameters)

No parameters in the command message will default to Valve 1, Scale 1.

Table F.18-2   Dispense Weight Verification – Data Variables and Collection Events

Variable Name	ID	Storage Type	SECS Type	CEID	Description
DWVRESULT	408	U2	DV	4020	DWV result status.
DWVMEASUREDAVG	416	F8	DV	4020	Average measured weight of all dispenses during the dispense weight verification procedure.
DWVSTATUS	639	U2	DV	3721 3722	Return status of Dispense Weight Verification process.
ce_DWVComplete_V1	3721	--	CE	--	Collection event is triggered when DWV process is complete. (Valve 1)
ce_DWVComplete_V2	3722	--	CE	--	Collection event is triggered when DWV process is complete. (valve 2)

Usage Scenario

The SECS/GEM host can read and change the dispense weight target value **DWVTarget, 410,** before starting the DWV procedure. The host starts the DWV procedure by sending the remote command **DWV**. After the DWV procedure is finished, collection events **4020** and **3721 or 3722** are triggered and DWV measured average variable **416** is updated for the host.

SECS/GEM script for testing DWV

```
DWV_DEFINE_REPORTS: S2F33 W
  <L [2]
    <U2 0>              /* DATAID */
    <L
      <L [2]
        <U2 101>              /* RPTID DWV DATA */
        <L
          <U2 639>            /* VID DWVSTATUS */
          <U2 408>            /* VID DWVRESULT Status */
          <U2 416>            /* VID DWVMEASUREDAVG */
        >
      >
    >
  > .

DWV_LINK_REPS_TO_EVENTS: S2F35 W
  <L [2]
    <U2 0>              /* DATAID */
    <L
      <L [2]
        <U2 3721>             /* CEID */
        <L
          <U2 101>            /* RPTID */
        >
      >
      <L [2]
        <U2 3722>             /* CEID */
        <L
          <U2 101>            /* RPTID */
        >
      >
    >
  >.
```

SECS/GEM script for testing DWV (Continued)

```
DWV_ENABLE_CE_: S2F37 W
  <L
    <BOOLEAN 0x1>
    <L
      <U4 3721>              /* DWV start complete */
      <U4 3722>        /* DWV start complete */
    >
  > .


REMOTE_DWV_VALVE_1: S2F41 W
  <L [2]
    <A 'DWV'>          /* REMOTE COMMAND */
    <L
      <L [2]
        <A 'VALVE'>          /* COMMAND PARAMETER NAME */
        <U2 1>               /* COMMAND PARAMETER VALUE  */
      >
    >
  > .
```

F.19   DJ9K Vacuum Assisted Prime – Remote Command

DJ9K Vacuum Assisted Prime is a script command used during machine setup to prime the DJ9K valve with vacuum on to improve fluid priming. The SECS/GEM host can start this process with a remote command sent to the client machine. The following tables describe the SECS/GEM remote command and variables related DJ9K Vacuum Assisted Prime.

Table F.19-1   DJ9K Vacuum Assisted Prime – Remote Command

Remote Command	CEID	Related Data Variables	Description
Remote Command String = "DJ9K VACUUM ASSISTED PRIME" Remote control command may include the valve and scale name and number in the command parameters. (SECS/GEM S2F41 format) No parameters will default to Valve 1, Scale 1.	6247		Remote control command to start DJ9K prime.
	3746		ce_DJ9KVAPrimePass
	3772		ce_DJ9KVAPrimeFail

The remote command can include the valve and scale name and number parameters:

(SECS/GEM S2F41 format, Remote Command with Parameters)

No parameters in the command message will default to Valve 1, Scale 1.

Usage Scenario

The SECS/GEM host starts the priming process by sending the remote command **DJ9K VACUUM ASSISTED PRIME** to the dispensing tool. After the priming process is finished, collection event **3746** is triggered to notify the host.

SECS/GEM Scripts for Testing DJ9K Vacuum Assisted Prime Remote Command

```
DJ9K VA PRIME_DEFINE_REPORTS: S2F33 W
    <L [2]
        <U2 0>              /* DATAID */
        <L
            <L [2]
                <U2 102>       /* RPTID */
                <L
                >
            >
        >
    > .
DJ9K VA PRIME_LNK_REPS_TO_EVT: S2F35 W
    <L [2]
        <U2 0>              /* DATAID */
        <L
            <L [2]
                <U2 3746>      /* CEID */
                <L
                    <U2 102>  /* RPTID */
                >
            >
        >
    >.
DJ9K VA PRIME_ENABLE_CE_: S2F37 W
    <L
        <BOOLEAN 0x1>
        <L
            <U4 3746>  /* CEID */
        >
    > .
```

SECS/GEM Scripts for Testing DJ9K Vacuum Assisted Prime Remote Command (Continued)

```
DJ9K VA PURGE_NO_PARM: S2F41 W
   <L [2]
     <A 'DJ9K VACUUM ASSISTED PRIME'>     /* RCMD */
     <L
     >
   > .
DJ9K VA PRIME_VALVE_1: S2F41 W
   <L [2]
     <A 'DJ9K VACUUM ASSISTED PRIME'>     /* REMOTE COMMAND */
     <L
       <L [2]
         <A 'VALVE'>     /* COMMAND PARAMETER NAME */
         <U2 1>          /* COMMAND PARAMETER VALUE */
       >
     >
   > .
DJ9K VA PURGE_VALVE_2: S2F41 W
   <L [2]
     <A 'DJ9K VACUUM ASSISTED PRIME'>     /* REMOTE COMMAND */
     <L
       <L [2]
         <A 'VALVE'>     /* COMMAND PARAMETER NAME */
         <U2 2>          /* COMMAND PARAMETER VALUE */
       >
     >
   > .
```

F.20   Run PSS File – Remote Command

Run PSS File remote command to run a prompted setup script file on dispenser. The requested PSS file must already be loaded onto the dispensing machine in the Fluidmove directory or an error will result. The SECS/GEM host can start this process with a remote command sent to the client machine. The following tables describe the SECS/GEM remote command and variables related to Run PSS File process.

Table F.20-1   Run PSS File – Remote Command

Remote Command	CEID	Related Data and Status Variables	Description
Remote Command String = "RUN PSS FILE" Remote control command includes the filename and valve number in the command parameters. (SECS/GEM S2F41 format) No parameters will default to Valve 1, Scale 1.		---	Remote command runs a prompted setup script file from the host command.
	4001		PromptedSetupStarted
	4002		PromptedSetupCompleted

The remote command includes the PSS filename and valve number parameters:

(SECS/GEM S2F41 format, Remote Command with Parameters)

No valve parameter in the command message will default to Valve 1

Run PSS File Variables

Table F.20-2   Run PSS File - Related Collection Events

Variable Name	ID	Storage Type	SECS Type	CEID	Description
PromptedSetupStarted	4001	---	CE	---	Collection event triggered when PSS starts.
PromptedSetupCompleted	4002	---	CE	---	Collection event trigged when PSS is complete.

Usage Scenario

The SECS/GEM host starts the Run PSS File process by sending the remote command with the filename and valve number parameters. When the Run PSS File process is started, collection event **4001** is triggered and when it is finished, collection event **4002** is triggered to notify the host.

SECS/GEM Scripts to Test Run PSS File Command

```
REMOTE_PSSFILE_DJ_SETUP: S2F41 W
  <L [2]
    <A 'RUN PSS FILE'>          /* RCMD */
    <L
      <L [2]
        <A 'PSS FILE'>          /* CPNAME */
        <A '_DJ SETUP.PSS'>     /* CPVAL */
      >
      <L [2]
        <A 'VALVE'>             /* COMMAND PARAMETER NAME */
        <U2 1>                  /* COMMAND PARAMETER VALUE */
      >
    >
  > .
```

SECS/GEM Scripts to Test Run PSS File Command (Continued)

```
REMOTE_PSSFILE_TENSION: S2F41 W
  <L [2]
    <A 'RUN PSS FILE'>          /* RCMD */
    <L
      <L [2]
        <A 'PSS FILE'>           /* CPNAME */
        <A '_AUTO TENSION.PSS'>    /* CPVAL */
      >
      <L [2]
        <A 'VALVE'>              /* COMMAND PARAMETER NAME */
        <U2 1>                   /* COMMAND PARAMETER VALUE */
      >
    >
  > .
REMOTE_PSSFILE_GP_SETUP: S2F41 W
  <L [2]
    <A 'RUN PSS FILE'>          /* RCMD */
    <L
      <L [2]
        <A 'PSS FILE'>           /* CPNAME */
        <A '_GENERIC PROMPTED SETUP.PSS'>    /* CPVAL */
      >
      <L [2]
        <A 'VALVE'>              /* COMMAND PARAMETER NAME */
        <U2 1>                   /* COMMAND PARAMETER VALUE */
      >
    >
  > .
```

F.21 Height Sense XY Offsets – Remote Command

Height Sense XY Offsets is a script command used during machine setup to locate the XY offset of the height sensor probe or laser beam relative to the valve. The SECS/GEM host can start this process with a remote command sent to the client machine. The following tables describe the SECS/GEM remote command and variables related Height Sense XY Offsets.

Table F.21-1   Height Sense XY Offsets – Remote Command

Remote Command	CEID	Related Data Variables	Description
Remote Command String = "HS XY OFFSETS" Remote control command may include the valve and scale name and number in the command parameters. (SECS/GEM S2F41 format) No parameters will default to Valve 1, Scale 1.	6296		Remote control command to start Height Sense XY Offsets.
	3735		ce_HSXYOffsetsPass
	3763		ce_HSXYOffsetsFail

The remote command can include the valve and scale name and number parameters:

(SECS/GEM S2F41 format, Remote Command with Parameters)

No parameters in the command message will default to Valve 1, Scale 1.

Table F.21-2   Height Sense XY Offsets –Related Equipment Constants

Variable Name	ID	Storage Type	SECS Type	CEID	Description
c_NdltoHSoffset_V1	6296	A40	EC	None	Needle to height sense offset for Valve 1.

Usage Scenario

The SECS/GEM host starts the height sensor offset setup process by sending the remote command **HS XY OFFSETS** to the dispensing tool. After the offsets process is finished, collection event **3735** is triggered to notify the host.

SECS/GEM Scripts for Testing HS XY OFFSETS Remote Command

```
HSXYOFFSETS_DEFINE_REPORTS: S2F33 W
  <L [2]
    <U2 0>              /* DATAID */
    <L
      <L [2]
        <U2 102>       /* RPTID */
        <L
          <U2 400>   /* VID HS XY OFFSETS */
        >
      >
    >
  > .
HSXYOFF_LINK_REPS_TO_EVENTS: S2F35 W
  <L [2]
    <U2 0>              /* DATAID */
    <L
      <L [2]
        <U2 3735>     /* CEID HEIGHT SENSE XY OFFSETS */
        <L
          <U2 102>  /* RPTID */
        >
      >
    >
  >.
```

SECS/GEM Scripts for Testing HS XY OFFSETS Remote Command (continued)

```
HSXYOFFSETS_ENABLE_CE_: S2F37 W
  <L
    <BOOLEAN 0x1>
    <L
      <U4 3735>   /* height sense xy offsets complete */
    >
  > .
HSXYOFFSETS_NO_PARM: S2F41 W
  <L [2]
    <A 'HS XY OFFSETS'>      /* RCMD */
    <L
    >
  > .
HSXYOFFSETS_VALVE_1: S2F41 W
  <L [2]
    <A 'HS XY OFFSETS'>      /* REMOTE COMMAND */
    <L
      <L [2]
        <A 'VALVE'>      /* COMMAND PARAMETER NAME */
        <U2 1>           /* COMMAND PARAMETER VALUE  */
      >
    >
  > .
HSXYOFFSETS_VALVE_2: S2F41 W
  <L [2]
    <A 'HS XY OFFSETS'>      /* REMOTE COMMAND */
    <L
      <L [2]
        <A 'VALVE'>      /* COMMAND PARAMETER NAME */
        <U2 2>           /* COMMAND PARAMETER VALUE */
      >
    >
  > .
```

F.22   Needle XY Offsets – Remote Command

Needle XY Offsets is a script command used during machine setup to locate the XY offset of the Needle/Jet relative to the camera. The SECS/GEM host can start this process with a remote command sent to the client machine. The following tables describe the SECS/GEM remote command and variables related Needle XY Offsets.

Table F.22-1   Needle XY Offsets – Remote Command

Remote Command	CEID	Related Data Variables	Description
Remote Command String = "NEEDLE XY OFFSETS" or "NEEDLE XY OFFSETS NO PURGE" Remote control command may include the valve and scale name and number in the command parameters. (SECS/GEM S2F41 format) No parameters will default to Valve 1, Scale 1.	6295		Remote control command to start Height Sense XY Offsets with or without valve purge during the process.
	3736		ce_NeedleXYOffsetsPass
	3765		ce_NeedleXYOffsetsFail

The remote command can include the valve and scale name and number parameters:

(SECS/GEM S2F41 format, Remote Command with Parameters)

No parameters in the command message will default to Valve 1, Scale 1.

Table F.22-2   Needle XY Offsets Variables

Variable Name	ID	Storage Type	SECS Type	CEID	Description
c_XYNeedleOffset_V1	6295	A40	EC	3736	Needle offset for Valve 1.
c_XYNeedleOffset_V2	6543	A40	EC	3736	Needle Offset for valve 2.

Usage Scenario

The SECS/GEM host starts the needle offset setup process by sending the remote command **NEEDLE XY OFFSETS** to the dispensing tool. After the offsets process is finished, collection event **3736** is triggered to notify the host.

SECS/GEM Scripts for Testing NEEDLE XY OFFSETS Remote Command

```
NEEDLEXYOFF_DEFINE_REPORTS: S2F33 W
  <L [2]
    <U2 0>              /* DATAID */
    <L
      <L [2]
        <U2 102>            /* RPTID */
        <L
          <U2 6295>         /* VID HS XY OFFSETS VALVE 1 */
          <U2 6543>         /* VID HS XY OFFSETS VALVE 2 */
        >
      >
    >
  > .
NEEDLEXYOFF_LINK_REPS_TO_EVT: S2F35 W
  <L [2]
    <U2 0>              /* DATAID */
    <L
      <L [2]
        <U2 3736>     /* CEID HEIGHT SENSE XY OFFSETS */
        <L
          <U2 102>   /* RPTID */
        >
      >
    >
  >.
```

SECS/GEM Scripts for Testing NEEDLE XY OFFSETS Remote Command (Continued)

```
NEEDLEXYOFF_ENABLE_CE_: S2F37 W
  <L
    <BOOLEAN 0x1>
    <L
      <U4 3736>                /* needle xy offsets complete */
    >
  > .
NEEDLEXYOFF_NO_PARM: S2F41 W
  <L [2]
    <A 'NEEDLE XY OFFSETS'>     /* RCMD */
    <L
    >
  > .
NEEDLEXYOFF_VALVE_1: S2F41 W
  <L [2]
    <A 'NEEDLE XY OFFSETS'>     /* REMOTE COMMAND */
    <L
      <L [2]
        <A 'VALVE'>           /* COMMAND PARAMETER NAME */
        <U2 1>          /* COMMAND PARAMETER VALUE */
      >
    >
  > .
```

SECS/GEM Scripts for Testing NEEDLE XY OFFSETS Remote Command (Continued)

```
NEEDLEXYOFF_VALVE_2: S2F41 W
  <L [2]
     <A 'NEEDLE XY OFFSETS'>      /* REMOTE COMMAND */
     <L
       <L [2]
         <A 'VALVE'>           /* COMMAND PARAMETER NAME */
         <U2 2>                /* COMMAND PARAMETER VALUE */
       >
     >
  > .
```

F.23   Needle Z Offsets – Remote Command

Needle Z Offsets is a script command used during machine setup calculate the Z offset of the Needle/Jet relative to the height sensor origin. The SECS/GEM host can start this process with a remote command sent to the client machine. The following tables describe the SECS/GEM remote command and variables related Needle Z Offsets.

Table F.23-1   Needle Z Offsets – Remote Command

Remote Command	CEID	Related Data and Status Variables	Description
Remote Command String = "NEEDLE Z OFFSETS" Remote control command may include the valve and scale name and number in the command parameters. (SECS/GEM S2F41 format) No parameters will default to Valve 1, Scale 1.		6294	Remote control command to start Needle Z Offsets
	3738		ce_NeedleZOffsetsPass
	3786		ce_NeedleZOffsetsFail

The remote command can include the valve and scale name and number parameters:

(SECS/GEM S2F41 format, Remote Command with Parameters)

No parameters in the command message will default to Valve 1, Scale 1.

Needle Z Offsets

Table F.23-2   Needle Z Offsets – Equipment Constants

Variable Name	ID	Storage Type	SECS Type	CEID	Description
c_ZNeedleOffset_V1	6294	A40	EC	3738	Needle Z offset for Valve 1.

Usage Scenario

The SECS/GEM host starts the needle offset setup process by sending the remote command **NEEDLE Z OFFSETS** to the dispensing tool. After the offsets process is finished, collection event **3738** is triggered to notify the host.

SECS/GEM Scripts for Testing NEEDLE Z OFFSETS Remote Command

```
NEEDLEZOFF_DEFINE_REPORTS: S2F33 W
  <L [2]
    <U2 0>              /* DATAID */
    <L
      <L [2]
        <U2 102>              /* RPTID */
        <L
          <U2 6294>           /* VID HS XY OFFSETS VALVE 1 */
        >
      >
    >
  > .
NEEDLEZOFF_LINK_REPS_TO_EVT: S2F35 W
  <L [2]
    <U2 0>              /* DATAID */
    <L
      <L [2]
        <U2 3738>     /* CEID HEIGHT SENSE Z OFFSETS */
        <L
          <U2 102>   /* RPTID */
        >
      >
    >
  >.
```

SECS/GEM Scripts for Testing NEEDLE Z OFFSETS Remote Command (continued)

```
NEEDLEZOFF_ENABLE_CE_: S2F37 W
  <L
    <BOOLEAN 0x1>
    <L
      <U4 3738>                /* needle z offsets complete */
    >
  > .
NEEDLEZOFF_NO_PARM: S2F41 W
  <L [2]
    <A 'NEEDLE Z OFFSETS'>     /* RCMD */
    <L
    >
  > .
NEEDLEZOFF_VALVE_1: S2F41 W
  <L [2]
    <A 'NEEDLE Z OFFSETS'>     /* REMOTE COMMAND */
    <L
      <L [2]
        <A 'VALVE'>            /* COMMAND PARAMETER NAME */
        <U2 1>          /* COMMAND PARAMETER VALUE */
      >
    >
  > .
```

F.24 Locate Service Station – Remote Command

The Locate Service Station process will locate each fiducial and perform a height sense on the purge cup. Once this is complete, the tactile center, the substrate corners, and the purge location are defined.

SECS/GEM host can start this process with a remote command sent to the client machine. The following tables describe the SECS/GEM remote command and variables related Locate Service Station.

Table F.24-1   Locate Service Station – Remote Command

Collection Event Name	CEID	Related Data and Status Variables	Description
Remote Command String = "LOCATE SERVICE STATION" Remote control command may include the valve name and number in the command parameters. (SECS/GEM S2F41 format) No parameters will default to Valve 1.			Remote control command to start Locate Service Station process.
	3742		ce_LocateServiceStationPass
	3768		ce_LocateServiceStationFail

Table F.24-2   Locate Service Station - Equipment Constants and Collection Events

Variable Name	ID	Storage Type	SECS Type	Related CEID	Description
c_ServiceStationFidXY_1	6526	A40	EC	3742	Service Station Fid 1 location.
c_ServiceStationFidXY_2	6527	A40	EC	3742	Service Station Fid 2 location.
ce_LocateServiceStation	3742	---	---	---	Collection event triggered when Locate Service Station is complete.

Usage Scenario

The SECS/GEM host starts the Locate Service Station process by sending the remote command to the dispensing tool. After the process is finished, collection event **3742** is triggered to notify the host.

SECS/GEM Scripts for Locate Service Station Remote Command

```
LOCSERVSTAT_DEFINE_REPORTS: S2F33 W
    <L [2]
      <U2 0>              /* DATAID */
      <L
        <L [2]
          <U2 102>             /* RPTID */
          <L
            <U2 6526 >        /* VID */
            <U2 6527 >        /* VID */
          >
        >
      >
    > .
LOCSERVSTAT_LNK_REPS_TO_EVENTS: S2F35 W
    <L [2]
      <U2 0>              /* DATAID */
      <L
        <L [2]
          <U2 3742>     /* CEID */
          <L
            <U2 102>   /* RPTID */
          >
        >
      >
    >.
```

SECS/GEM Scripts for Locate Service Station Remote Command (continued)

```
LOCSERVSTAT_ENABLE_CE_: S2F37 W
  <L
    <BOOLEAN 0x1>
    <L
      <U4 3742>                /* CEID */
    >
  > .
LOCSERVSTAT_CMD: S2F41 W
  <L [2]
    <A 'LOCATE SERVICE STATION'>     /* RCMD */
    <L
    >
  > .
```

F.25   Prime – Remote Command

Prime is a script command used during machine setup to valves. The SECS/GEM host can start this process with a remote command sent to the client machine. The following tables describe the SECS/GEM remote command and variables related Prime remote command.

Table F.25-1   Prime – Remote Command

Remote Command	CEID	Related Data Variables	Description
Remote Command String = "PRIME" Remote control command may include the valve and scale name and number in the command parameters. (SECS/GEM S2F41 format) No parameters will default to Valve 1, Scale 1.			Remote control command to start Prime process.
	3741		ce_PrimePass
	3767		ce_PrimeFail

The remote command can include the valve and scale name and number parameters:

(SECS/GEM S2F41 format, Remote Command with Parameters)

No parameters in the command message will default to Valve 1, Scale 1.

Table F.25-2   Prime Variables

Variable Name	ID	Storage Type	SECS Type	CEID	Description
ce_Prime	--	--	--	3741	Collection event for priming valves.

Usage Scenario

The SECS/GEM host starts the purge process by sending the remote command **PRIME** to the dispensing tool. After the priming process is finished, collection event **3741** is triggered to notify the host.

SECS/GEM Scripts for Testing Prime Remote Command

```
PRIME_DEFINE_REPORTS: S2F33 W
  <L [2]
    <U2 0>              /* DATAID */
    <L
      <L [2]
        <U2 102>      /* RPTID */
        <L
          <U2 400>   /* VID */
        >
      >
    >
  > .
PRIME_LNK_REPS_TO_EVENTS: S2F35 W
  <L [2]
    <U2 0>              /* DATAID */
    <L
      <L [2]
        <U2 3741>     /* CEID */
        <L
          <U2 102>  /* RPTID */
        >
      >
    >
  >.
```

SECS/GEM Scripts for Testing Prime Remote Command (continued)

```
PRIME_ENABLE_CE_: S2F37 W
  <L
    <BOOLEAN 0x1>
    <L
      <U4 3741>  /* CEID */
    >
  > .
PRIME_NO_PARM: S2F41 W
  <L [2]
    <A 'PRIME'>     /* RCMD */
    <L
    >
  > .
PRIME_VALVE_1: S2F41 W
  <L [2]
    <A 'PRIME'>            /* REMOTE COMMAND */
    <L
      <L [2]
        <A 'VALVE'>        /* COMMAND PARAMETER NAME */
        <U2 1>             /* COMMAND PARAMETER VALUE */
      >
    >
  > .
PRIME_VALVE_2: S2F41 W
  <L [2]
    <A 'PRIME'>            /* REMOTE COMMAND */
    <L
      <L [2]
        <A 'VALVE'>        /* COMMAND PARAMETER NAME */
        <U2 2>             /* COMMAND PARAMETER VALUE */
      >
    >
  > .
```

F.26 Purge – Remote Command

Purge is a script command used during machine setup to valves. The SECS/GEM host can start this process with a remote command sent to the client machine. The following tables describe the SECS/GEM remote command and variables related Prime remote command.

Table F.26-1   Purge – Remote Command

Remote Command	CEID	Related Data Variables	Description
Remote Command String = "PURGE" Remote control command may include the valve and scale name and number in the command parameters. (SECS/GEM S2F41 format) No parameters will default to Valve 1, Scale 1.			Remote control command to start Purge process.
	3740		ce_PurgePass
	3766		ce_PurgeFail

The remote command can include the valve and scale name and number parameters:

(SECS/GEM S2F41 Format, Remote Command with Parameters)

No parameters in the command message will default to Valve 1, Scale 1.

Table F.26-2   Purge – Collection Events

Variable Name	ID	Storage Type	SECS Type	CEID	Description
ce_PurgePass	--	--	--	3740	Collection event when purge completes successfully
ce_PurgeFail	--	--	--	3766	Collection event when purge does not complete successfully.

Usage Scenario

The SECS/GEM host starts the purge process by sending the remote command **PURGE** to the dispensing tool. After the priming process is finished, collection event **3740** is triggered to notify the host.

SECS/GEM Scripts for Testing Purge Remote Command

```
PURGE_DEFINE_REPORTS: S2F33 W
  <L [2]
    <U2 0>            /* DATAID */
    <L
      <L [2]
        <U2 102>      /* RPTID */
        <L
          <U2 400>   /* VID */
        >
      >
    >
  > .
PURGE_LNK_REPS_TO_EVENTS: S2F35 W
  <L [2]
    <U2 0>            /* DATAID */
    <L
      <L [2]
        <U2 3740>     /* CEID */
        <L
          <U2 102>  /* RPTID */
        >
      >
    >
  >.
```

SECS/GEM Scripts for Testing Purge Remote Command (continued)

```
PURGE_ENABLE_CE_: S2F37 W
  <L
    <BOOLEAN 0x1>
    <L
      <U4 3740>   /* CEID */
    >
  > .
PURGE_NO_PARM: S2F41 W
  <L [2]
    <A 'PURGE'>     /* RCMD */
    <L
    >
  > .
PURGE_VALVE_1: S2F41 W
  <L [2]
    <A 'PURGE'>              /* REMOTE COMMAND */
    <L
      <L [2]
        <A 'VALVE'>         /* COMMAND PARAMETER NAME */
        <U2 1>              /* COMMAND PARAMETER VALUE */
      >
    >
  > .
PURGE_VALVE_2: S2F41 W
  <L [2]
    <A 'PURGE'>              /* REMOTE COMMAND */
    <L
      <L [2]
        <A 'VALVE'>         /* COMMAND PARAMETER NAME */
        <U2 2>              /* COMMAND PARAMETER VALUE */
      >
    >
  > .
```

F.27 Teach Scale – Remote Command

Teach Scale is a script command used during machine setup to locate the XY offset of the Scale relative to the needle/Jet. The SECS/GEM host can start this process with a remote command sent to the client machine. The following tables describe the SECS/GEM remote command and variables related Teach Scale.

Table F.27-1   Teach Scale – Remote Command

Remote Command	CEID	Related Data Variables	Description
Remote Command String = "TEACH SCALE" Remote control command may include the valve and scale name and number in the command parameters. (SECS/GEM S2F41 format) No parameters will default to Valve 1, Scale 1.		6497 6499 6525 Scale 2, Valve 2 variable is not yet defined.	Remote control command to start Teach Scale process.
	3737		ce_TeachScalePass
	3764		ce_TeachScaleFail

Table F.27-2   Teach Scale – Equipment Constants

Variable Name	ID	Storage Type	SECS Type	Related CEID	Description
c_ScaleLocationXYZ_V1	6497	A50	EC	3737	Scale XYZ location for Valve 1.
c_ScaleLocationXYZ_V2	6499	A50	EC	3737	Scale XYZ location for valve 2.
c_Scale2LocationXYZ_V1	6525	A50	EC	3737	Scale 2 XYZ location for Valve 1.
c_Scale2LocationXYZ_V2	6542	A50	EC	3737	Scale 2 XYZ location for valve 2.

Usage Scenario

The SECS/GEM host starts the needle offset setup process by sending the remote command **TEACH SCALE** to the dispensing tool. After the Teach Scale process is finished, collection event 3737 is triggered to notify the host.

SECS/GEM Scripts for Testing TEACH SCALE Remote Command

```
TEACH_SCALE_DEFINE_REPORTS: S2F33 W
  <L [2]
    <U2 0>              /* DATAID */
    <L
      <L [2]
        <U2 102>            /* RPTID */
        <L
          <U2 400>            /* VID HS XY OFFSETS */
        >
      >
    >
  > .
TEACH_SCALE_LNK_REPS_TO_EVENTS: S2F35 W
  <L [2]
    <U2 0>              /* DATAID */
    <L
      <L [2]
        <U2 3737>     /* CEID HEIGHT SENSE XY OFFSETS */
        <L
          <U2 102>   /* RPTID */
        >
      >
    >
  >.
```

SECS/GEM Scripts for Testing TEACH SCALE Remote Command

```
TEACH_SCALE_ENABLE_CE_: S2F37 W
  <L
    <BOOLEAN 0x1>
    <L
      <U4 3737>              /* Height Sense XY offsets complete */
    >
  > .
TEACH_SCALE_NO_PARM: S2F41 W
  <L [2]
    <A 'TEACH SCALE'>      /* RCMD */
    <L
    >
  > .
TEACH_SCALE_VALVE_1: S2F41 W
  <L [2]
    <A 'TEACH SCALE'>      /* REMOTE COMMAND */
    <L
      <L [2]
        <A 'VALVE'>        /* COMMAND PARAMETER NAME */
        <U2 1>             /* COMMAND PARAMETER VALUE (Valve 1)*/
      >
      <L [2]
        <A 'SCALE'>        /* COMMAND PARAMETER NAME */
        <U2 1>             /* COMMAND PARAMETER VALUE (Scale 1)*/
      >
    >
  > .
```

SECS/GEM Scripts for Testing TEACH SCALE Remote Command

```
TEACH_SCALE_VALVE_2: S2F41 W
  <L [2]
    <A 'TEACH SCALE '>       /* REMOTE COMMAND */
    <L
      <L [2]
        <A 'VALVE'>          /* COMMAND PARAMETER NAME */
        <U2 2>               /* COMMAND PARAMETER VALUE (Valve 2) */
      >
      <L [2]
        <A SCALE'>           /* COMMAND PARAMETER NAME */
        <U2 2>               /* COMMAND PARAMETER VALUE (Scale 2)*/
      >
    >
  > .
```

F.28   PP-Select – Remote Command

PP-Select is a SECS/GEM standard remote function to select which Process Program (Fluidmove Recipe) to run on the machine. The requested Process Program must already be loaded onto the dispensing machine or an error will result. The SECS/GEM host can start this process with a remote command sent to the client machine. The following tables describe the SECS/GEM remote command and variables related PPSelect process.

Table F.28-1   PP-Select – Remote Command

Remote Command	CEID	Related Data Variables	Description
Remote Command String = "PP-SELECT" The remote command must include: LOTID, LOTNAME, PPID, and PPID NAME parameters. (PP-Select S2F41 format)		PP-Select status = 638	Remote control command to initiate PP-Select recipe.
	3720		ce_PPSelectCompletePass
	3788		ce_PPSelectCompleteFail

The remote command must include: LOTID, LOTNAME, PPID, and PPID NAME parameters.

(PP-Select S2F41 format)

Table F.28-2   PP-Select – Status Variables and Collection Events

Variable Name	ID	Storage Type	SECS Type	Related CEID	Description
PPSelectStatus	638	U2	SV	3720	Results of PPSelect process.
ce_PPSelectCompleted	3720	---	CE	---	Collection event triggered when PPSelect process is completed.

Table F.28-3   PP-Select – Results

Return Value	Description
0	PPSelect Passed
6	PPSelect Failed

Usage Scenario

The SECS/GEM host starts the PPSelect process by sending the remote command **PP-SELECT** with lot and process program parameters. After the PP-Select process is finished, a collection event **3720** is triggered and the PPSelectStatus variable **638** is available to the host.

SECS/GEM script to test PP-SELECT command:

```
REMOTE_PPSELECT_A: S2F41 W
  <L [2]
    <A 'PP-SELECT'>              /* RCMD */
    <L
      <L [2]
        <A ' '>            /* CPNAME */
        <A ' '>            /* CPVAL */
      >
      <L [2]
        <A 'PPID'>            /* CPNAME */
        <A 'TEST_TIMEX.RCP'>    /* CPVAL */
      >
    >
  > .
REMOTE_PPSELECT_B: S2F41 W
  <L [2]
    <A 'PP-SELECT'>              /* RCMD */
    <L
      <L [2]
        <A ' '>            /* CPNAME */
        <A ' '>            /* CPVAL */
      >
      <L [2]
        <A 'PPID'>            /* CPNAME */
        <A 'FLUX_JET.RCP'>      /* CPVAL */
      >
    >
  > .
```

F.29   DJ Offset Calibration – Remote Command

DJ Offset Calibration is a script command used during machine setup to calibrate jet valve start/stop timing to the actual dispensed line. The remote command uses the **DJ Unassisted Offset** script routine which does not require operator interaction.

The SECS/GEM host can start this process with a remote command sent to the client machine. The following tables describe the SECS/GEM remote command and variables related DJ Offset Calibration.

Table F.29-1   DJ Offset Calibration – Remote Command

Remote Command	CEID	Related Data Variables	Description
Remote Command String = "DJ OFFSET CALIBRATION" Remote control command may include the valve name and number in the command parameters. (SECS/GEM S2F41 format) No parameters will default to Valve 1.		6538 6539 6540 6541 6574 6575 6576 6577 6578	Remote control command to start DJ Offset Calibration.
	3749		ce_DJOffsetCalibrationPass
	3773		ce_DJOffsetCalibrationFail

The remote command can include the valve name and number parameters:

(SECS/GEM S2F41 format, Remote Command with Parameters) No parameters in the command message will default to Valve 1.

Table F.29-2   DJ Offset Calibration – Equipment Constants

Variable Name	ID	Storage Type	SECS Type	CEID	Description
c_DJOffsetInitialDotXY_V1	6538	A40	EC	3749	DJ Offset initial dot XY location Valve 1.
c_DJOffsetCalEndPtXY_V1	6579	A40	EC	3749	DJ Offset XY end pt location for Valve 1.
c_DJOffsetHeadSpeed_V1	6539	A40	EC	3749	DJ Offset dispense speed Valve 1.
c_DJOffsetDispenseGap_V1	6540	A40	EC	3749	DJ Offset dispense gap Valve 1.
c_DJOffset_V1	6541	A40	EC	3749	DJ Offset value for Valve 1.
c_DJOffsetInitialDotXY_V2	6574	A40	EC	3749	DJ Offset initial dot XY location valve 2.
c_DJOffsetHeadSpeed_V2	6575	A40	EC	3749	DJ Offset dispense speed valve 2
c_DJOffsetDispenseGap_V2	6576	A40	EC	3749	DJ Offset dispense gap valve 2.
c_DJOffset_V2	6573	A40	EC	3749	DJ Offset value for valve 2.
c_DJOffsetUseDotFinder	6577	I4	EC	---	DJ Offset calibration Use Dot Finder option.
c_DJOffsetRunUnassisted	6578	Boolean	EC	---	DJ Offset calibration Run Unassisted option.

Usage Scenario

The SECS/GEM host starts the DJ Offset Calibration setup process by sending the remote command DJ OFFSET CALIBRATION to the dispensing tool. After the offset process is finished, collection event 3749 is triggered to notify the host.

The DJ Offset Calibration must be done manually the first time to setup parameters for initial dot location, dispense speed, dispense gap, and dot finder calibration. After the initial setup is completed, the following options must be checked to run this feature without operator interaction:

- Use Dot Finder

- Run calibration at last taught position with no further operator interaction
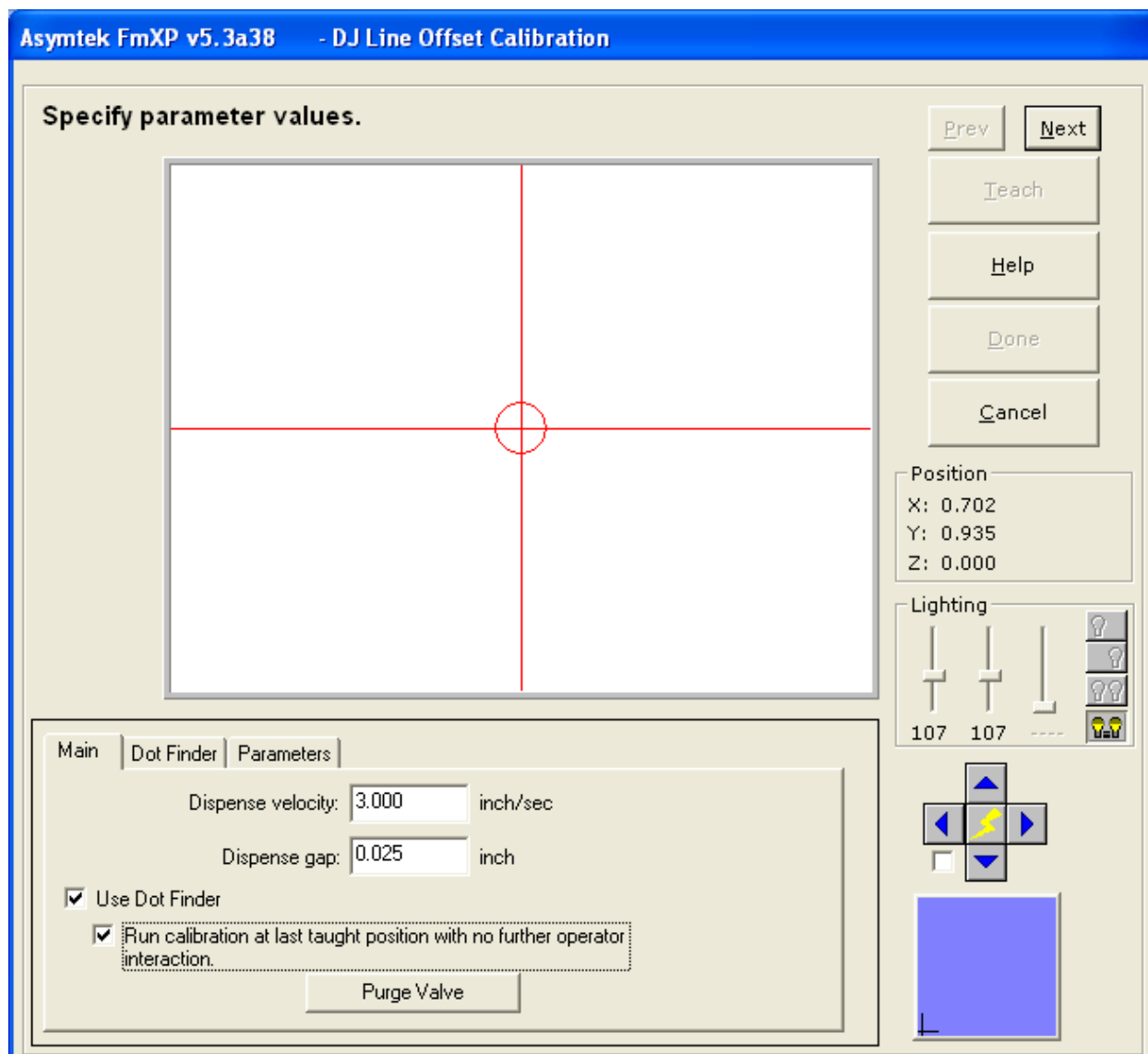
Figure F.29-1   DJ Line Offset Calibration

SECS/GEM Scripts for Testing DJ OFFSET CALIBRATION Remote Command

```
DJOFFSETCALIB_DEFINE_REPORTS: S2F33 W
  <L [2]
    <U2 0>              /* DATAID */
    <L
      <L [2]
        <U2 102>        /* RPTID */
        <L
          <U2 6541>   /* Variable ID Valve 1 */
          <U2 6573>   /* Variable ID valve 2 */
        >
      >
    >
  > .
DJOFFSETCALIB_LNK_REPS_TO_EVT: S2F35 W
  <L [2]
    <U2 0>              /* DATAID */
    <L
      <L [2]
        <U2 3749>     /* CEID */
        <L
          <U2 102>   /* RPTID */
        >
      >
    >
  >.
DJOFFSETCALIB_ENABLE_CE_: S2F37 W
  <L
    <BOOLEAN 0x1>
    <L
      <U4 3749>  /* CEID */
    >
  > .
```

SECS/GEM Scripts for Testing DJ OFFSET CALIBRATION Remote Command (continued)

```
DJOFFSETCALIB_NO_PARM: S2F41 W
  <L [2]
    <A 'DJ OFFSET CALIBRATION'>     /* RCMD */
    <L
    >
  > .
DJOFFSETCALIB_VALVE_1: S2F41 W
  <L [2]
    <A 'DJ OFFSET CALIBRATION'>     /* REMOTE COMMAND */
    <L
      <L [2]
        <A 'VALVE'>      /* COMMAND PARAMETER NAME*/
        <U2 1>                /* COMMAND PARAMETER VALUE*/
      >
    >
  > .


DJOFFSETCALIB_VALVE_2: S2F41 W
  <L [2]
    <A 'DJ OFFSET CALIBRATION'>      /* REMOTE COMMAND */
    <L
      <L [2]
        <A 'VALVE'>      /* COMMAND PARAMETER NAME*/
        <U2 2>                /* COMMAND PARAMETER VALUE*/
      >
    >
  > .
```

F.30   Move Home – Remote Command

Move Home is a script command used during machine setup to move the dispense head to the home location. The SECS/GEM host can start this process with a remote command sent to the client machine. The following table describes the SECS/GEM remote command and variables related Move Home command.

Table F.30-1   Move Home – Remote Command

Remote Command	CEID	Related Data Variables	Description
Remote Command String = "MOVE HOME"		---	Remote control command to start Move Home.
	3743		ce_MoveHomeLocationPass
	3769		ce_MoveHomeLocationFail

Usage Scenario

The SECS/GEM host moves the dispense head by sending the remote command **MOVE HOME** to the dispensing tool. After the move is finished, collection event **3743** is triggered to notify the host.

SECS/GEM Scripts for Testing Move Home Remote Command

```
MOVEHOME_DEFINE_REPORTS: S2F33 W
  <L [2]
    <U2 0>              /* DATAID */
    <L
      <L [2]
        <U2 102>      /* RPTID */
        <L
          <U4 27>     /* GEM CLOCK     Test collection event */
        >
      >
    >
  > .
```

SECS/GEM Scripts for Testing Move Home Remote Command (continued)

```
MOVEHOME_LNK_REPS_TO_EVENTS: S2F35 W
   <L [2]
     <U2 0>             /* DATAID */
     <L
        <L [2]
          <U2 3743>     /* CEID */
          <L
             <U2 102>  /* RPTID */
          >
        >
     >
   >.
MOVEHOME_ENABLE_CE_: S2F37 W
   <L
     <BOOLEAN 0x1>
     <L
        <U4 3743>   /* CEID */
     >
   > .
MOVEHOME: S2F41 W
   <L [2]
     <A 'MOVE HOME'>     /* RCMD */
     <L
     >
   > .
```

F.31   Move To Center – Remote Command

Move to Center is a script command used during machine setup to move the dispense head to the center of the machine while servicing the purge and scale. The SECS/GEM host can start this process with a remote command sent to the client machine. The following table describes the SECS/GEM remote command and variables related Move to Center command.

Table F.31-1   Move to Center – Remote Command

Remote Command	CEID	Related Data and Status Variables	Description
Remote Command String = "MOVE TO CENTER"		---	Remote control command to start Move To Center.
	3752		ce_MoveCenterLocationPass
	3776		ce_MoveCenterLocationFail

Usage Scenario

The SECS/GEM host moves the dispense head by sending the remote command **MOVE TO CENTER** to the dispensing tool. After the move is finished, collection event **3752** is triggered to notify the host.

SECS/GEM Scripts for Testing MOVE TO CENTER Remote Command

```
MOVECENTER_DEFINE_REPORTS: S2F33 W
  <L [2]
    <U2 0>              /* DATAID */
    <L
      <L [2]
        <U2 102>      /* RPTID */
        <L
          <U4 27>     /* GEM CLOCK    Test collection event */
        >
      >
    >
  > .
```

SECS/GEM Scripts for Testing MOVE TO CENTER Remote Command (continued)

```
MOVECENTER_LNK_REPS_TO_EVENTS: S2F35 W
  <L [2]
    <U2 0>            /* DATAID */
    <L
      <L [2]
        <U2 3752>     /* CEID */
        <L
          <U2 102>  /* RPTID */
        >
      >
    >
  >.


MOVECENTER_ENABLE_CE_: S2F37 W
  <L
    <BOOLEAN 0x1>
    <L
      <U4 3752>   /* CEID */
    >
  > .
MOVECENTER: S2F41 W
  <L [2]
    <A 'MOVE TO CENTER'>      /* RCMD */
    <L
    >
  > .
```

F.32   Move To Front – Remote Command

Move to Front is a script command used during machine setup to move the dispense head to the front of the machine to service the valve. The SECS/GEM host can start this process with a remote command sent to the client machine. The following table describes the SECS/GEM remote command and variables related Move to Front command.

Table F.32-1   Move to Front – Remote Command

Remote Command	CEID	Related Data and Status Variables	Description
Remote Command String = "MOVE TO FRONT"		---	Remote control command to start Move To Front.
	3753		ce_MoveFrontLocationPass
	3777		ce_MoveFrontLocationFail

Usage Scenario

The SECS/GEM host moves the dispense head by sending the remote command **MOVE TO FRONT** to the dispensing tool. After the move is finished, collection event **3753** is triggered to notify the host.

SECS/GEM Scripts for Testing MOVE TO FRONT Remote Command

```
MOVEFRONT_DEFINE_REPORTS: S2F33 W
  <L [2]
    <U2 0>              /* DATAID */
    <L
      <L [2]
        <U2 102>       /* RPTID */
        <L
          <U4 27>      /* GEM CLOCK    Test collection event */
        >
      >
    >
  > .
```

SECS/GEM Scripts for Testing MOVE TO FRONT Remote Command (continued)

```
MOVEFRONT_LNK_REPS_TO_EVENTS: S2F35 W
  <L [2]
    <U2 0>            /* DATAID */
    <L
      <L [2]
        <U2 3753>     /* CEID */
        <L
          <U2 102>  /* RPTID */
        >
      >
    >
  >.


MOVEFRONT_ENABLE_CE_: S2F37 W
  <L
    <BOOLEAN 0x1>
    <L
      <U4 3753>   /* CEID */
    >
  > .
MOVEFRONT: S2F41 W
  <L [2]
    <A 'MOVE TO FRONT'>     /* REMOTE COMMAND */
    <L
    >
  > .
```

F.33   Load Board – Remote Command

Load Board is a script command used to load boards onto the conveyor. The SECS/GEM host can start this process with a remote command sent to the client machine. The following tables describe the SECS/GEM remote command and variables related Load Board.

Table F.33-1   Load Board – Remote Command

Remote Command	CEID	Related Data Variables	Description
Remote Command String = "LOAD BOARD 1" or "LOAD BOARD 2"		---	Remote control command to load board on conveyor 1 or conveyor 2.
	3750		ce_LoadBoardConv1Pass
	3751		ce_LoadBoardConv2Pass
	3774		ce_LoadBoardConv1Fail
	3775		ce_LoadBoardConv2Fail

Usage Scenario

The SECS/GEM host starts the Load Board process by sending the remote command **Load Board 1 or Load Board 2** to the dispensing tool. After the offsets process is finished, collection event **3750 or 3751** is triggered to notify the host.

SECS/GEM Scripts for Testing Load Board Remote Command

```
LOADBOARD_DEFINE_REPORTS: S2F33 W
  <L [2]
    <U2 0>              /* DATAID */
    <L
      <L [2]
        <U2 102>            /* RPTID */
        <L
          <U2 6107>          /* VID Number of Conveyors TEST ONLY*/
        >
      >
    >
  > .
LOADBOARD_LNK_REPS_TO_EVENTS: S2F35 W
  <L [2]
    <U2 0>             * DATAID */
    <L
      <L [2]
        <U2 3750>     /* CEID */
        <L
          <U2 102>   /* RPTID */
        >
      >
      <L [2]
        <U2 3751>     /* CEID */
        <L
          <U2 102>   /* RPTID */
        >
      >
    >
  >.
```

SECS/GEM Scripts for Testing Load Board Remote Command

```
LOADBOARD_ENABLE_CE_: S2F37 W
  <L
    <BOOLEAN 0x1>
    <L
      <U4 3750>              /* CEID */
      <U4 3751>              /* CEID */
    >
  > .
LOADBOARD1: S2F41 W
 <L [2]
    <A 'LOAD BOARD 1'>     /* REMOTE COMMAND */
    <L
    >
 > .


LOADBOARD2: S2F41 W
 <L [2]
    <A 'LOAD BOARD 2'>     /* REMOTE COMMAND */
    <L
    >
 > .
```

F.34   Vacuum On/Off – Remote Command

Vacuum On and Vacuum Off are script commands used control purge vacuum. The SECS/GEM host can start this process with a remote command sent to the client machine. The following table describes the SECS/GEM remote command and variables related Vacuum On and Vacuum Off commands.

Table F.34-1   Vacuum On/Off – Remote Command

Remote Command	CEID	Related Data and Status Variables	Description
Remote Command String = "VACUUM ON" or "VACUUM OFF"		---	Remote control command to turn purge vacuum on or off.
	3756		ce_VacuumOnPass
	3757		ce_VacuumOffPass
	3778		ce_VacuumOnFail
	3779		ce_VacuumOffFail

Usage Scenario

The SECS/GEM host sends the remote command **VACUUM ON** or **VACUUM OFF** to the dispensing tool. Collection event **3756 or 3757** is triggered to notify the host.

SECS/GEM Scripts for Testing Vacuum On and Vacuum Off Remote Commands

```
VACUUMON_DEFINE_REPORTS: S2F33 W
  <L [2]
    <U2 0>              /* DATAID */
    <L
      <L [2]
        <U2 102>      /* RPTID */
        <L
          <U4 27>     /* GEM CLOCK    Test collection event */
        >
      >
    >
  > .
VACUUMON_LNK_REPS_TO_EVENTS: S2F35 W
  <L [2]
    <U2 0>            /* DATAID */
    <L
      <L [2]
        <U2 3756>     /* CEID */
        <L
          <U2 102>  /* RPTID */
        >
      >
    >
  >.

VACUUMON_ENABLE_CE_: S2F37 W

  <L

    <BOOLEAN 0x1>

    <L

      <U4 3756>   /* CEID */

    >
  > .
```

SECS/GEM Scripts for Testing Vacuum On and Vacuum Off Remote Commands (continued)

```
VACUUMON: S2F41 W
  <L [2]
    <A 'VACUUM ON'>      /* RCMD */
    <L
    >
  > .
/////////////////////////////////////////////////////////////
//   VACUUM OFF REMOTE COMMAND TEST
/////////////////////////////////////////////////////////////
VACUUMOFF_DEFINE_REPORTS: S2F33 W
  <L [2]
    <U2 0>              /* DATAID */
    <L
      <L [2]
        <U2 102>        /* RPTID */
        <L
          <A 'Vacuum Off Test'>   /* VID */
        >
      >
    >
  > .
VACUUMOFF_LNK_REPS_TO_EVENTS: S2F35 W
  <L [2]
    <U2 0>              /* DATAID */
    <L
      <L [2]
        <U2 3757>      /* CEID */
        <L
          <U2 102>  /* RPTID */
        >
      >
    >
  >.
```

SECS/GEM Scripts for Testing Vacuum On and Vacuum Off Remote Commands (continued)

```
VACUUMOFF_ENABLE_CE_: S2F37 W
  <L
    <BOOLEAN 0x1>
    <L
      <U4 3757>   /* CEID */
    >
  > .
VACUUMOFF: S2F41 W
  <L [2]
    <A 'VACUUM OFF'>      /* RCMD */
    <L
    >
  > .
```

F.35   Preliminary Needle To Camera Offsets – Remote Command

Preliminary Needle to Camera XY Offsets is a script command used during machine setup to locate the Needle/Jet relative to the camera. The SECS/GEM host can start this process with a remote command sent to the client machine. The following tables describe the SECS/GEM remote command and variables related Preliminary Needle to Camera XY Offsets.

Table F.35-1   Preliminary Needle to Camera Offsets – Remote Command

Remote Command	CEID	Related Data Variables	Description
Remote Command String = " PRELIM NEEDLE TO CAMERA"			Remote control command to start Preliminary Needle To Camera Offsets process.
	3745		ce_PrelimNeedleToCameraPass
	3771		ce_PrelimNeedleToCameraFail

The remote command can include the valve name and number parameters:

(SECS/GEM S2F41 format, Remote Command with Parameters)

No parameters in the command message will default to Valve 1.

Table F.35-2   Preliminary Needle to Camera Offsets – Equipment Constants

Variable Name	ID	Storage Type	SECS Type	CEID	Description
c_PrelimNeedleLocation_V1	6362	A40	EC	3745	Preliminary Needle to Camera Location Valve 1.
c_PrelimNeedleLocation_V2 ***Valve 2 variable is not defined in the current GCP file.***	------	A40	EC	3745	Preliminary Needle to Camera Location Valve 2.

Usage Scenario

The SECS/GEM host starts the needle offset setup process by sending the remote command **"PRELIM NEEDLE TO CAMERA"** to the dispensing tool. After the offsets process is finished, collection event **3745** is triggered to notify the host.

SECS/GEM Scripts for Testing Preliminary Needle to Camera Offset Remote Command

```
PRELIMNDLTOCAM_DEFINE_REPORTS: S2F33 W
  <L [2]
    <U2 0>             /* DATAID */
    <L
      <L [2]
        <U2 102>             /* RPTID */
        <L
          <U2 6362>          /* VID PRELIM NDL CAMERA VALVE 1 */
        >
      >
    >
  > .
PRELIMNDLTOCAM _LINK_REPS_TO_EVT: S2F35 W
  <L [2]
    <U2 0>             /* DATAID */
    <L
      <L [2]
        <U2 3745>     /* CEID HEIGHT SENSE XY OFFSETS */
        <L
          <U2 102>   /* RPTID */
        >
      >
    >
  >.
```

Preliminary Needle To Camera Offsets – Remote Command (continued)

```
PRELIMNDLTOCAM _ENABLE_CE_: S2F37 W
  <L
    <BOOLEAN 0x1>
    <L
      <U4 3745>                  /* Prelim needle camera */
    >
  > .
PRELIMNDLTOCAM _NO_PARM: S2F41 W
  <L [2]
    <A 'PRELIM NEEDLE TO CAMERA'>     /* RCMD */
    <L
    >
  > .
PRELIMNDLTOCAM _VALVE_1: S2F41 W
  <L [2]
    <A 'PRELIM NEEDLE TO CAMERA'>     /* REMOTE COMMAND */
    <L
      <L [2]
        <A 'VALVE'>           /* COMMAND PARAMETER NAME */
        <U2 1>         /* COMMAND PARAMETER VALUE */
      >
    >
  > .
PRELIMNDLTOCAM _VALVE_2: S2F41 W
  <L [2]
    <A 'PRELIM NEEDLE TO CAMERA'>     /* REMOTE COMMAND */
    <L
      <L [2]
        <A 'VALVE'>           /* COMMAND PARAMETER NAME */
        <U2 2>             /* COMMAND PARAMETER VALUE */
      >
    >
  > .
```

F.36   Control Dot Weight – Remote Command

Control Dot Weight option controls the jet valve dispense dot weight using the electronic fluid pressure control. The SECS/GEM host can turn this feature on or off with a remote command sent to the client machine. The following tables describe the SECS/GEM remote command and collection events related Control Dot Weight.

Table F.36-1   Control Dot Weight – Remote Command

Remote Command	CEID	Related Data Variables	Description
Remote Command String = " CONTROL DOT WEIGHT" Remote control command will include the enable value and the optional valve name and number in the command parameters. (SECS/GEM S2F41 format) No valve parameter defaults to Valve 1.			Remote command to enable/disable Control Dot Weight fluid parameter.
	3798		ce_ControlDotWeightON
	3799		ce_ControlDotWeightOFF

The remote command includes an argument to turn the fluid Control Dot Weight parameter on and off and an optional valve name and number to select the valve. No valve parameter will set Valve 1 by default. (SECS/GEM S2F41 format, Remote Command with Parameters)

Usage Scenario

The SECS/GEM host sends the remote command "CONTROL DOT WEIGHT" with parameters 1 to enable and 0 to disable the feature. Confirmation collection events are generated after the fluid file parameter is set.

Table F.36-2   Control Dot Weight – Collection Events

CEID	Description
3798	ce_ControlDotWeightON
3799	ce_ControlDotWeightOFF

SECS/GEM Scripts for Testing Control Dot Weight

```
//////////////////////////////////////////////////////////////////
//  REMOTE COMMAND CONTROL DOT WEIGHT
//////////////////////////////////////////////////////////////////
CONTROL_DOT_WEIGHT_ON: S2F41 W
  <L [2]
    <A 'CONTROL DOT WEIGHT'>      /* RCMD */
    <L
      <L [2]
        <A 'ENABLED'>         /* NAME */
        <BOOLEAN 0X1>          /* VALUE */
      >
      <L [2]
        <A 'VALVE'>          /* COMMAND PARAMETER NAME */
        <U2 1>             /* COMMAND PARAMETER VALUE */
      >
    >
  > .
CONTROL_DOT_WEIGHT_OFF: S2F41 W
  <L [2]
    <A 'CONTROL DOT WEIGHT'>      /* RCMD */
    <L
      <L [2]
        <A 'ENABLED'>         /* NAME */
        <BOOLEAN 0X0>          /* VALUE */
      >
      <L [2]
        <A 'VALVE'>          /* COMMAND PARAMETER NAME */
        <U2 1>             /* COMMAND PARAMETER VALUE */
      >
    >
  > .
```

SECS/GEM Scripts for Testing Control Dot Weight (continued)

```
CNT_DOT_WT_ON_NVP: S2F41 W
  <L [2]
    <A 'CONTROL DOT WEIGHT'>      /* RCMD */
    <L
      <L [2]
        <A 'ENABLED'>          /* NAME */
        <BOOLEAN 0X1>          /* VALUE */
      >
    >
  > .
CNT_DOT_WT_OFF_NVP: S2F41 W
  <L [2]
    <A 'CONTROL DOT WEIGHT'>      /* RCMD */
    <L
      <L [2]
        <A 'ENABLED'>          /* NAME */
        <BOOLEAN 0X0>        /* VALUE */
      >
    >
  > .
CONTROL_DOT_WT_DEFINE_REPORTS: S2F33 W
  <L [2]
    <U2 0>              /* DATAID */
    <L
      <L [2]
        <U2 102>       /* RPTID */
        <L
          <U4 39>    /* SECS GEM TIME */
        >
      >
    >
  > .
```

SECS/GEM Scripts for Testing Control Dot Weight (continued)

```
CONTROL_DOT_WT_LNK_REPS_TO_EVT: S2F35 W
  <L [2]
    <U2 0>              /* DATAID */
    <L
      <L [2]
        <U2 3798>     /* CEID */
        <L
          <U2 102>   /* RPTID */
        >
      >
      <L [2]
        <U2 3799>     /* CEID */
        <L
          <U2 102>   /* RPTID */
        >
      >
    >
  >.


CONTROL_DOT_WT_ENABLE_CE_: S2F37 W
  <L
    <BOOLEAN 0x1>
    <L
      <U4 3798>  /* CEID */
      <U4 3799>  /* CEID */
    >
  > .
```

F.37   Auto Setup – Remote commands

Locate Service Station

Script Instruction

LOCATE SERVICE STATION

Host Command

```
REMOTE_LOCATESERVICESTATION: S2F41 W
  <L [2]
    <A 'LOCATE SERVICE STATON'>
    <L
    >
  > .
```

Collection event 3742 is issued when task is complete.

Needle Z Offsets

Script Instruction

Needle Z Offsets

Host Command

```
REMOTE_NDL_Z_OFFSET: S2F41 W
  <L [2]
    <A 'NEEDLE Z OFFSETS'>
    <L
    >
  >
```

Collection event 3738 is issued when task is complete.

Teach Scale

Script Instruction

Teach Scale

Host Command

```
TEACH_SCALE: S2F41 W
  <L [2]
    <A 'TEACH SCALE '>      /* REMOTE COMMAND */
    <L
      <L [2]
        <A 'VALVE'>         /* OPTIONAL COMMAND PARAMETER NAME */
        <U2 1>              /* 1 = Valve 1, 2 = Valve 2 */
      >
      <L [2]
        <A SCALE'>          /* OPTIONAL COMMAND PARAMETER NAME */
        <U2 1>              /* 1 = Scale 1, 2 = Scale 2 */
      >
    >
  > .
```

Collection event 3737 is issued when task is complete.

If optional command parameters are not used, scale and valve will default to 1.

Setup Required Before Running

Scale Locations must be taught using "FASVO" (Fiducial Assisted Scripted Valve Offsets).

Needle XY Offsets

Script Instruction

Needle XY Offsets

Host Command

```
NEEDLEXYOFF: S2F41 W
  <L [2]
    <A 'NEEDLE XY OFFSETS'>     /* REMOTE COMMAND */
    <L
      <L [2]
        <A 'VALVE'>           /* OPTIONAL COMMAND PARAMETER NAME */
        <U2 1>                /* 1 = Valve 1, 2 = Valve 2 */
      >
    >
  > .
```

If optional command parameter is not used, valve will default to 1.

Collection event 3736 is issued when task is complete.

Setup Required Before Running

This procedure requires prior setup to automatically find the dots dispensed. This is accomplished during "Service Station" setup.

DJ Offset Calibration

Script Instruction

DJ Offset Calibration

Host Command

```
DJOFFSETCALIB_VALVE_1: S2F41 W
  <L [2]
    <A 'DJ OFFSET CALIBRATION'>      /* REMOTE COMMAND */
    <L
      <L [2]
        <A 'VALVE'>      /* OPTIONAL COMMAND PARAMETER NAME*/
        <U2 1>            /* 1 = Valve 1, 2 = Valve 2 */
      >
    >
  > .
```

Collection event 3749 is issued when task is complete.

If optional command parameter is not used, valve will default to 1.

Setup Required Before Running

The DJ Offset Calibration must be performed manually the first time to setup parameters for initial dot location, dispense speed, dispense gap, and dot finder calibration.

Note: dispense location, speed, and gap can be configured by the SECS/GEM host.

Flowrate (dot weight)

Script Instruction

Flowrate

Host Command

```
REMOTE_FLOW_RATE_CALIB: S2F41 W
  <L [2]
    <A 'FLOWRATECALIB'>   /* REMOTE COMMAND */
    <L
      <L [2]
        <A 'VALVE'>                /* OPTIONAL COMMAND PARAMETER NAME */
        <U2 1>                     /* 1 = Valve 1, 2 = Valve 2 */
      >
    >
  > .
```

If optional command parameter is not used, valve will default to 1.

Collection event 3730 (for Valve 1) or 3731 (for valve 2) is issued when task is complete.

DV 640 contains completion status (0 = PASS).

F.38   Abort – Remote Command

Abort is a remote command used to abort the production run of the Fluidmove application.

SECS/GEM host can start this process with a remote command sent to the client machine. The following table describes the SECS/GEM remote command and variables related to Abort command.

Table F.38-1   Abort - Remote Command

Remote Command	CEID	Related Data and Status Variables	Description
Remote Command String = "ABORT"	None	None	Remote control command to abort production run of the Fluidmove application. This command is valid if the Fluidmove program is running production.

SECS/GEM Script for ABORT Application Remote Command

ABORTAPP_CMD: S2F41 W

```
<L [2]
   <A 'ABORT'>      /* RCMD */
   <L
   >
> .
```

F.39   Local – Remote Command

Local is a remote command to change SECS/GEM control state to "Local" mode.

SECS/GEM host sends this remote command to the client machine. The following table describes the SECS/GEM remote command and variables related to Local command.

Table F.39-1   Local - Remote Command

Remote Command	CEID	Related Data and Status Variables	Description
Remote Command String = "LOCAL"	None	None	Remote control command to change SECS/GEM control state to "Local" mode. This command is valid anytime SECS/GEM is enabled.

SECS/GEM Script for LOCAL Remote Command

LOCAL_CMD: S2F41 W

```
<L [2]

  <A 'LOCAL'>      /* RCMD */

  <L

  >

> .
```

F.40   Pause – Remote Command

Pause is a remote command to pause production mode.

SECS/GEM host sends this remote command to the client machine. The following table describes the SECS/GEM remote command and variables related to Pause command.

Table F.40-1   Pause - Remote Command

Remote Command	CEID	Related Data and Status Variables	Description
Remote Command String = "PAUSE"	None	None	Remote control command to pause a Fluidmove program. This command is valid if in the tool is in remote mode and the program is running.

SECS/GEM Script for PAUSE Remote Command

```
PAUSE_CMD: S2F41 W

  <L [2]

    <A 'PAUSE'>      /* RCMD */

    <L

    >

  > .
```

F.41   Remote – Remote Command

Remote is a remote command to change SECS/GEM control state to "Remote" mode.

SECS/GEM host sends this remote command to the client machine. The following table describes the SECS/GEM remote command and variables related to Remote command.

Table F.41-1   Remote - Remote Command

Remote Command	CEID	Related Data and Status Variables	Description
Remote Command String = "REMOTE"	None	None	Remote control command to change SECS/GEM control state to "Remote" mode. This command is valid anytime SECS/GEM is enabled.

SECS/GEM Script for REMOTE Remote Command:

```
REMOTE_CMD: S2F41 W
   <L [2]
     <A 'REMOTE'>     /* RCMD */
     <L
     >
   > .
```

F.42   Resume – Remote Command

Resume is a remote command to resume the production run after a pause command.

SECS/GEM host sends this remote command to the client machine. The following table describes the SECS/GEM remote command and variables related to Resume command.

Table F.42-1   Resume - Remote Command

Remote Command	CEID	Related Data and Status Variables	Description
Remote Command String = "RESUME"	None	None	Remote control command to resume production running after a pause command. This command is valid if in remote mode and the program is paused.

SECS/GEM Script for RESUME Remote Command

```
RESUME_CMD: S2F41 W

  <L [2]

    <A 'RESUME'>      /* RCMD */

    <L

    >

  > .
```

F.43   Start – Remote Command

Start is a remote command to start a program in production mode.

SECS/GEM host sends this remote command to the client machine. The following table describes the SECS/GEM remote command and variables related to Start command.

Table F.43-1   Start - Remote Command

Remote Command	CEID	Related Data and Status Variables	Description
Remote Command String = "START"	None	None	Remote control command to start a program in production mode. This command is valid if remote mode is active, the programming window is active, the program is not running, and production is not blocked by RFID validation.

SECS/GEM Script for START Remote Command

START_CMD: S2F41 W

   <L [2]

     <A 'START'>   /* RCMD */

     <L

     >

   > .

F.44 Stop – Remote Command

Stop is a remote command to stop program execution.

SECS/GEM host sends this remote command to the client machine. The following table describes the SECS/GEM remote command and variables related to Stop command.

Table F.44-1   Stop - Remote Command

Remote Command	CEID	Related Data and Status Variables	Description
Remote Command String = "STOP"	None	None	Remote control command to stop program execution. This command is valid when remote mode is active, Production window is active, and a program is running.

SECS/GEM Script for STOP Remote Command

```
STOP_CMD: S2F41 W

  <L [2]

    <A 'STOP'>      /* RCMD */

    <L

    >

  > .
```

F.45   Auto Setup *Variables*

The following SECS/GEM variables pertain to "auto setup" of the Asymtek tool.

Table F.45-1   Auto Setup - Remote Command

Variable Name	ID	SECS Type	Storage Type	Class	Related CEIDS	Description
HSAtTactileZ	524	FLT	FLT	DV	3732	Captured Z value when height sensor trips on tactile surface during needle to height sensor offsets. NOTE: This value is now in user units.
NdlAtTactileZ_V1	525	FLT	FLT	DV	3733	Captured Z value when Valve 1 needle (nozzle) touches tactile during needle to height sensor offsets. NOTE: This value is now in user units.
HSAtScaleLidZ	526	FLT	FLT	DV	3734	Captured Z value when height sensor detects scale lid. "ScaleNumber" vid 522 denotes which scale. NOTE: This value is now in user units.
c_ServiceStationFidXY_1	6526	A[40]	FLT,FLT	EC	3638 3742	XY location of service station fiducial 1 (left pin).
c_ServiceStationFidXY_2	6527	A[40]	FLT,FLT	EC	3638 3742	XY location of service station fiducial 2 (right pin).

Table F.45-2   Auto Setup – Collection Events

Collection Event Name	CEID	Related Data Variables	Description
ce_HSAtTactileZ	3732	524	Collection event when height sensor Z value is captured during needle to height sensor offsets. Note: this CE can occur multiple times during a single offset session if multiple reps are configured.
ce_NdlAtTactileZ_V1	3733	525	Collection event when Valve 1 needle (nozzle) Z value is captured during needle to height sensor offsets. Note: this CE can occur multiple times during a single offset session if multiple reps are configured.
ce_HSAtScaleLidZ	3734	526	Collection event when height sensor Z value is captured on scale lid during "teach scale location". "ScaleNumber" vid denotes which scale.

F.46   Controlled Process Heat (CpH) Air Flow Variables

The following status variables reflect the current air flow for the specified lane and station.

"-1" indicates air flow is not available. Units are specified by variable c_AirflowUnits (see below).

NOTE: These status variables are valid only if CpH is enabled (see ECID 6523 - c_CpH_Enabled).

Table F.46-1   CPH Air Flow - Status Variables

Status Variable Name	ID	SECS Type	Storage Type	Description
AF_L1S1	1269	F8	FLT	Current air flow for Lane 1 Station 1.
AF_L1S2	1270	F8	FLT	Current air flow for Lane 1 Station 2.
AF_L1S3	1271	F8	FLT	Current air flow for Lane 1 Station 3.
AF_L2S1	1272	F8	FLT	Current air flow for Lane 2 Station 1.
AF_L2S2	1273	F8	FLT	Current air flow for Lane 2 Station 2.
AF_L2S3	1274	F8	FLT	Current air flow for Lane 2 Station 3.
AF_L1S1_Limits_Enabled	1275	A[4]	ASCII	Air flow limits enabled for Lane 1 station 1. Value will be "ON" or "OFF".
AF_L1S1_UpperLimitOffset	1276	F8	FLT	Upper limit air flow offset for Lane 1 station 1.
AF_L1S1_LowerLimitOffset	1277	F8	FLT	Lower limit air flow offset for Lane 1 station 1.
AF_L1S2_Limits_Enabled	1278	A[4]	ASCII	Air flow limits enabled for Lane 1 station 2. Value will be "ON" or "OFF".
AF_L1S2_UpperLimitOffset	1279	F8	FLT	Upper limit air flow offset for Lane 1 station 2.
AF_L1S2_LowerLimitOffset	1280	F8	FLT	Lower limit air flow offset for Lane 1 station 2.
AF_L1S3_Limits_Enabled	1281	A[4]	ASCII	Air flow limits enabled for Lane 1 station 3. Value will be "ON" or "OFF".
AF_L1S3_UpperLimitOffset	1282	F8	FLT	Upper limit air flow offset for Lane 1 station 3.
AF_L1S3_LowerLimitOffset	1283	F8	FLT	Lower limit air flow offset for Lane 1 station 3.

Status Variable Name	ID	SECS Type	Storage Type	Description
AF_L2S1_Limits_Enabled	1284	A[4]	ASCII	Air flow limits enabled for Lane 2 station 1. Value will be "ON" or "OFF".
AF_L2S1_UpperLimitOffset	1285	F8	FLT	Upper limit air flow offset for Lane 2 station 1.
AF_L2S1_LowerLimitOffset	1286	F8	FLT	Lower limit air flow offset for Lane 2 station 1.
AF_L2S2_Limits_Enabled	1287	A[4]	ASCII	Air flow limits enabled for Lane 2 station 2. Value will be "ON" or "OFF".
AF_L2S2_UpperLimitOffset	1288	F8	FLT	Upper limit air flow offset for Lane 2 station 2.
AF_L2S2_LowerLimitOffset	1289	F8	FLT	Lower limit air flow offset for Lane 2 station 2.
AF_L2S3_Limits_Enabled	1290	A[4]	ASCII	Air flow limits enabled for Lane 2 station 3. Value will be "ON" or "OFF".
AF_L2S3_UpperLimitOffset	1291	F8	FLT	Upper limit air flow offset for Lane 2 station 3.
AF_L2S3_LowerLimitOffset	1292	F8	FLT	Lower limit air flow offset for Lane 2 station 3.
AF_L1S1_SetPoint	1293	F8	FLT	Air flow set point for Lane 1 Station 1.
AF_L1S2_SetPoint	1294	F8	FLT	Air flow set point for Lane 1 Station 2.
AF_L1S3_SetPoint	1295	F8	FLT	Air flow set point for Lane 1 Station 3.
AF_L2S1_SetPoint	1296	F8	FLT	Air flow set point for Lane 2 Station 1.
AF_L2S2_SetPoint	1297	F8	FLT	Air flow set point for Lane 2 Station 2.
AF_L2S3_SetPoint	1298	F8	FLT	Air flow set point for Lane 2 Station 3.

Table F.46-2   CPH Air Flow - Related Configuration Variables

Data Variable Name	ID	SECS Type	Storage Type	FmConfig.ini Entry	Description
				[Airflow Manager]	
c_AirflowUnits	6520	I4	INT	Units =	0 = scfm 1 = slpm
				[Heater Manager]	
c_CpH_Enabled	6523	A[4]	ASCII	Controlled Process Heat =	Value will be "ON" or "OFF"

Table F.46-3   Heater/Air Flow States Status Variables

Status Variable Name	ID	SECS Type	Storage Type	Description
AF_L1S1_StandbyEnabled	1300	A[4]	ASCII	Standby state enabled for Lane 1 Station 1. Value will be "ON" or "OFF"
AF_L1S1_StandbyTime	1301	I4	INT	Standby time for Lane 1 Station 1
AF_L1S1_StandbyTemp	1302	F8	FLT	Standby temperature for Lane 1 Station 1
AF_L1S1_StandbyAF	1303	F8	FLT	Standby air flow for Lane 1 Station 1
AF_L1S1_RampEnabled	1304	A[4]	ASCII	Ramp state enabled for Lane 1 Station 1. Value will be "ON" or "OFF"
AF_L1S1_RampTime	1305	I4	INT	Ramp time for Lane 1 Station 1
AF_L1S1_RampTemp	1306	F8	FLT	Ramp temperature for Lane 1 Station 1
AF_L1S1_RampAF	1307	F8	FLT	Ramp air flow for Lane 1 Station 1
AF_L1S1_NonProdEnabled	1308	A[4]	ASCII	Non-Production state enabled for Lane 1 Station 1. Value will be "ON" or "OFF"
AF_L1S1_NonProdTemp	1309	F8	FLT	Non-Production temperature for Lane 1 Station 1
AF_L1S1_NonProdAF	1310	F8	FLT	Non-Production air flow for Lane 1 Station 1
AF_L1S2_StandbyEnabled	1311	A[4]	ASCII	Standby state enabled for Lane 1 Station 2. Value will be "ON" or "OFF"
AF_L1S2_StandbyTime	1312	I4	INT	Standby time for Lane 1 Station 2
AF_L1S2_StandbyTemp	1313	F8	FLT	Standby temperature for Lane 1 Station 2
AF_L1S2_StandbyAF	1314	F8	FLT	Standby air flow for Lane 1 Station 2
AF_L1S2_RampEnabled	1315	A[4]	ASCII	Ramp state enabled for Lane 1 Station 2. Value will be "ON" or "OFF"
AF_L1S2_RampTime	1316	I4	INT	Ramp time for Lane 1 Station 2
AF_L1S2_RampTemp	1317	F8	FLT	Ramp temperature for Lane 1 Station 2
AF_L1S2_RampAF	1318	F8	FLT	Ramp air flow for Lane 1 Station 2
AF_L1S2_NonProdEnabled	1319	A[4]	ASCII	Non-Production state enabled for Lane 1 Station 2. Value will be "ON" or "OFF"
AF_L1S2_NonProdTemp	1320	F8	FLT	Non-Production temperature for Lane 1 Station 2
AF_L1S2_NonProdAF	1321	F8	FLT	Non-Production air flow for Lane 1 Station 2

Status Variable Name	ID	SECS Type	Storage Type	Description
AF_L1S3_StandbyEnabled	1322	A[4]	ASCII	Standby state enabled for Lane 1 Station 3. Value will be "ON" or "OFF"
AF_L1S3_StandbyTime	1323	I4	INT	Standby time for Lane 1 Station 3
AF_L1S3_StandbyTemp	1324	F8	FLT	Standby temperature for Lane 1 Station 3
AF_L1S3_StandbyAF	1325	F8	FLT	Standby air flow for Lane 1 Station 3
AF_L1S3_RampEnabled	1326	A[4]	ASCII	Ramp state enabled for Lane 1 Station 3. Value will be "ON" or "OFF"
AF_L1S3_RampTime	1327	I4	INT	Ramp time for Lane 1 Station 3
AF_L1S3_RampTemp	1328	F8	FLT	Ramp temperature for Lane 1 Station 3
AF_L1S3_RampAF	1329	F8	FLT	Ramp air flow for Lane 1 Station 3
AF_L1S3_NonProdEnabled	1330	A[4]	ASCII	Non-Production state enabled for Lane 1 Station 3. Value will be "ON" or "OFF"
AF_L1S3_NonProdTemp	1331	F8	FLT	Non-Production temperature for Lane 1 Station 3
AF_L1S3_NonProdAF	1332	F8	FLT	Non-Production air flow for Lane 1 Station 3
AF_L2S1_StandbyEnabled	1333	A[4]	ASCII	Standby state enabled for Lane 2 Station 1. Value will be "ON" or "OFF"
AF_L2S1_StandbyTime	1334	I4	INT	Standby time for Lane 2 Station 1
AF_L2S1_StandbyTemp	1335	F8	FLT	Standby temperature for Lane 2 Station 1
AF_L2S1_StandbyAF	1336	F8	FLT	Standby air flow for Lane 2 Station 1
AF_L2S1_RampEnabled	1337	A[4]	ASCII	Ramp state enabled for Lane 2 Station 1. Value will be "ON" or "OFF"
AF_L2S1_RampTime	1338	I4	INT	Ramp time for Lane 2 Station 1
AF_L2S1_RampTemp	1339	F8	FLT	Ramp temperature for Lane 2 Station 1
AF_L2S1_RampAF	1340	F8	FLT	Ramp air flow for Lane 2 Station 1
AF_L2S1_NonProdEnabled	1342	A[4]	ASCII	Non-Production state enabled for Lane 2 Station 1. Value will be "ON" or "OFF"
AF_L2S1_NonProdTemp	1342	F8	FLT	Non-Production temperature for Lane 2 Station 1
AF_L2S1_NonProdAF	1343	F8	FLT	Non-Production air flow for Lane 2 Station 1

Table F.46-3   Heater/Air Flow States Status Variables (continued)

Status Variable Name	ID	SECS Type	Storage Type	Description
AF_L2S2_StandbyEnabled	1344	A[4]	ASCII	Standby state enabled for Lane 2 Station 2. Value will be "ON" or "OFF"
AF_L2S2_StandbyTime	1345	I4	INT	Standby time for Lane 2 Station 2
AF_L2S2_StandbyTemp	1346	F8	FLT	Standby temperature for Lane 2 Station 2
AF_L2S2_StandbyAF	1347	F8	FLT	Standby air flow for Lane 2 Station 2
AF_L2S2_RampEnabled	1348	A[4]	ASCII	Ramp state enabled for Lane 2 Station 2. Value will be "ON" or "OFF"
AF_L2S2_RampTime	1349	I4	INT	Ramp time for Lane 2 Station 2
AF_L2S2_RampTemp	1350	F8	FLT	Ramp temperature for Lane 2 Station 2
AF_L2S2_RampAF	1351	F8	FLT	Ramp air flow for Lane 2 Station 2
AF_L2S2_NonProdEnabled	1352	A[4]	ASCII	Non-Production state enabled for Lane 2 Station 2. Value will be "ON" or "OFF"
AF_L2S2_NonProdTemp	1353	F8	FLT	Non-Production temperature for Lane 2 Station 2
AF_L2S2_NonProdAF	1354	F8	FLT	Non-Production air flow for Lane 2 Station 2
AF_L2S3_StandbyEnabled	1355	A[4]	ASCII	Standby state enabled for Lane 2 Station 3. Value will be "ON" or "OFF"
AF_L2S3_StandbyTime	1356	I4	INT	Standby time for Lane 2 Station 3
AF_L2S3_StandbyTemp	1357	F8	FLT	Standby temperature for Lane 2 Station 3
AF_L2S3_StandbyAF	1358	F8	FLT	Standby air flow for Lane 2 Station 3
AF_L2S3_RampEnabled	1359	A[4]	ASCII	Ramp state enabled for Lane 2 Station 3. Value will be "ON" or "OFF"
AF_L2S3_RampTime	1360	I4	INT	Ramp time for Lane 2 Station 3
AF_L2S3_RampTemp	1361	F8	FLT	Ramp temperature for Lane 2 Station 3
AF_L2S3_RampAF	1362	F8	FLT	Ramp air flow for Lane 2 Station 3
AF_L2S3_NonProdEnabled	1363	A[4]	ASCII	Non-Production state enabled for Lane 2 Station 3. Value will be "ON" or "OFF"
AF_L2S3_NonProdTemp	1364	F8	FLT	Non-Production temperature for Lane 2 Station 3
AF_L2S3_NonProdAF	1365	F8	FLT	Non-Production air flow for Lane 2 Station 3

F.47 Multiple Flow Rates

The tool will report a list of intermediate flow rate values when "Multiple Flow Rate Calibration" is selected in the fluid file and a flow rate is run.

Table F.47-1   Multiple Flow Rates - Data Variables

Variable Name	ID	SECS Type	Storage Type	Class	Related CEIDs	Description
MultiFlowrates_V1	560	FLT[0..50]	FLT LIST	DV	4014	List of "intermediate" flow rates when "Multiple Flow Rate Calibration" is run for Valve 1.
MultiFlowrates_V2	561	FLT[0..50]	FLT LIST	DV	4015	List of "intermediate" flow rates when "Multiple Flow Rate Calibration" is run for valve 2.

Table F.47-2   Multiple Flow Rates - Collection Events

Collection Event Name	CEID	Related Data Variables	Description
ce_MultiFlowrates_V1	4014	560	Collection event triggered when "Multiple Flow Rate Calibration" has been selected in the fluid file and a flow rate is run for Valve 1.
ce_MultiFlowrates_V2	4015	561	Collection event triggered when "Multiple Flow Rate Calibration" has been selected in the fluid file and a flow rate is run for valve 2.

Description

Report intermediate flow rate values to the SECS/GEM host when "Multiple Flow Rate Calibration" is active in the fluid file and a flow rate is performed. This example shows four multiple flow rate calibrations selected:

Figure F.47-1   Fluid Manager – Enable Multiple Flow Rate Calibration

After all flow rate calibrations have been run, the tool will display the results on the screen and report the results to the SECS/GEM host in a floating point list.

The following SECS/GEM message detail was produced by creating a report containing variable 560 (MultiFlowrates_V1) and linked to collection event 4014 (ce_MultiFlowrates_V1).

```
08/01/17 08:24:29 (8) Received Primary Message...
08/01/17 08:24:29    <S6F11 W
08/01/17 08:24:29    <L[3/1]
08/01/17 08:24:29       <U4[1/1] 30>
08/01/17 08:24:29       <U4[1/1] 4014>          ce_MultiFlowrates_V1


08/01/17 08:24:29       <L[1/1]
08/01/17 08:24:29         <L[2/1]
08/01/17 08:24:29            <U4[1/1] 438>
08/01/17 08:24:29            <L[1/1]
08/01/17 08:24:29               <F8[4/1] 4.198123e+001 3.316357e+001 2.657014e+001   MultiFlowrates_V1
08/01/17 08:24:29                        4.027362e+001>
08/01/17 08:24:29            >
08/01/17 08:24:29         >
08/01/17 08:24:29       >
08/01/17 08:24:29    >
08/01/17 08:24:29 >
```

This matches the data displayed on the screen:
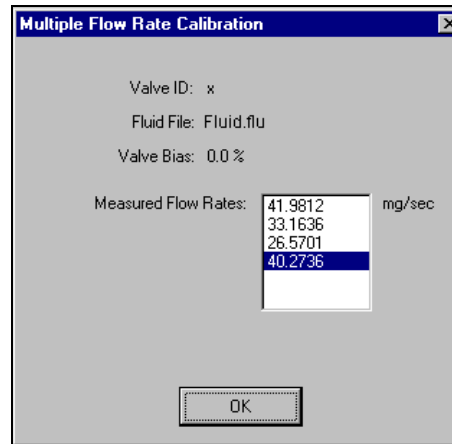
Figure F.47-2   Multiple Flow Rate Calibration

A separate collection "FlowRate1Updated" (4012) will be triggered when the flow rate dialog is exited with "OK" (canceling the dialog will not save the flow rate and a collection event will not be triggered).

In this example, the multiple flow rate variable (MultiFlowrates_V1 VID 560) and the updated flow rate value (FlowRate1 VID 400) were linked to the flow rate updated collection event (FlowRate1Updated CEID 4012):

```
08/01/17 08:41:57 (8) Received Primary Message...
08/01/17 08:41:57    <S6F11 W
08/01/17 08:41:57    <L[3/1]
08/01/17 08:41:57       <U4[1/1] 34>
08/01/17 08:41:57       <U4[1/1] 4012>        FlowRate1Updated
08/01/17 08:41:57       <L[2/1]
08/01/17 08:41:57          <L[2/1]
08/01/17 08:41:57             <U4[1/1] 440>
08/01/17 08:41:57             <L[1/1]
08/01/17 08:41:57                <F8[1/1] 4.027362e+001>
08/01/17 08:41:57             >
08/01/17 08:41:57          >
08/01/17 08:41:57          <L[2/1]
08/01/17 08:41:57             <U4[1/1] 438>
08/01/17 08:41:57             <L[1/1]
08/01/17 08:41:57                <F8[4/1] 4.198123e+001 3.316357e+001 2.657014e+001
08/01/17 08:41:57                        4.027362e+001>
08/01/17 08:41:57             >
08/01/17 08:41:57          >
08/01/17 08:41:57       >
08/01/17 08:41:57    >
08/01/17 08:41:57 >
```

The updated flow rate matches the flow rate displayed in the dialog:
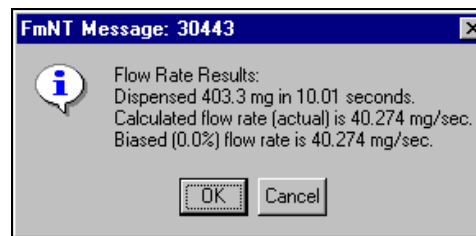
Figure F.47-3   Fluidmove Message – Flow Rate Results

Note: Although the above example linked the "multiple flow rate" variable to the "flow rate updated" collection event, this is not recommended. It is better to link the multiple flow rate variables only to the multiple flow rate collection events (4014 / 4015). The "flow rate updated" collection event will be triggered whenever the flow rate is updated, not necessarily after running multiple flow rates. Linking multiple flow rates to this collection event may produce misleading results as old data will be reported with a new value.

F.48   Carrier Sequence Number

Two data variables have been added to track carrier sequence number in each lane of a dual lane conveyor system.

The variables are initially set when a carrier arrives at the dispense station of a given lane indicated by collection events "BoardAtDispenseLoc1" (2001) and "BoardAtDispenseLoc2 (2003)". They are valid until dispensing is complete on the same carrier indicated by "DispensingDone1" (2002) and "DispensingDone2" (2004).

Table F.48-1   Carrier Sequence Number – Data Variables

Variable Name	ID	SECS Type	Storage Type	Class	Related CEIDs	Description
CarrierSeqAtDisp_L1	571	I4	INT	DV	2001 2002 8404	Carrier sequence number of carrier on Lane 1.
CarrierSeqAtDisp_L2	572	I4	INT	DV	2003 2004 8406	Carrier sequence number of carrier on Lane 1.

Note: CarrierSeqAtDisp_L1 is valid only when collection events pertaining to Lane 1 are received. CarrierSeqAtDisp_L2 is valid only when collection events pertaining to Lane 2 are received.

F.49   Lane Number

LaneNumber reflects the lane number associated with the data collected during certain collection events. It is not valid for all collection events as the lane number may refer to data currently being collected on a specific lane when a collection event for the opposite lane occurs.

See Related CEIDs in the table below for the valid collection events LaneNumber is valid for.

Table F.49-1   Lane Number – Data Variables

Variable Name	ID	SECS Type	Storage Type	Class	Related CEIDs	Description
LaneNumber	521	I4	INT	DV	2001 2002 2003 2004 8000 8400	Lane number specifying what lane report data applies to when certain collection events are triggered.

Note 1: Workpiece fiducials are not lane dependent and if LANENUMBER is reported during workpiece fiducial location collection events, it will always reflect Lane 1. "Pattern" fiducials are lane dependent and LANENUMBER will reflect the lane in which the pattern fiducial locations are reported.

Note 2: LaneNumber will be updated to lane "2" only when there are "USE CONVEYOR 2:" conveyor block instructions in the FMW program. It is possible for a program to be written for both lanes without the use of these blocks (which is not recommended), in which case "LaneNumber" will never change from lane "1" to lane "2".

F.50 Carrier Load/Unload Time Stamps

Carrier load / unload data variables are valid only when the "Related CEIDs" occur listed in the table below.

Table F.50-1 Carrier Load/Unload Time Stamps – Data Variables

Variable Name	ID	SECS Type	Storage Type	Class	Related CEIDs	Description
CarrierLoadTime_L1	428	A[0..100]	ASCII	DV	8403	Time stamp when carrier on Lane 1 was loaded.
CarrierUnloadTime_L1	429	A[0..100]	ASCII	DV	8403 8404	Time stamp when carrier on Lane 1 was unloaded. Note: unloading occurs after dispensing is completed (after CEID 2002 -DispensingDone1)
ce_CarrierLoadTime_L1	8403	-	-	CEID	-	Collection event when carrier on Lane 1 is loaded.
ce_CarrierUnloadTime_L1	8404	-	-	CEID	-	Collection event when carrier on Lane 1 is unloaded.
CarrierLoadTime_L2	469	A[0..100]	ASCII	DV	8405	Time stamp when carrier on Lane 2 was loaded.
CarrierUnloadTime_L2	470	A[0..100]	ASCII	DV	8405 8406	Time stamp when carrier on Lane 2 was unloaded. Note: unloading occurs after dispensing is completed (after CEID 2004 –DispensingDone2)
ce_CarrierLoadTime_L2	8405	-	-	CEID	-	Collection event when carrier on Lane 2 is loaded.
ce_CarrierUnloadTime_L2	8406	-	-	CEID	-	Collection event when carrier on Lane 2 is unloaded.

F.51 Lookup Camera (LUC) Model Teach/Find

Table F.51-1   Lookup Camera Model Teach/Find – Collected Events

Collection Event Name	CEID	Related Data Variables	Description
ce_LucImageFound	8002	7710 7711 520	Collection event that is triggered after running the script instruction "LUC MODEL FIND" or the program instruction "LUC MODEL FIND" and the model for the LUC is successfully found.
ce_LucImageNotFound	8003	7710 7711 520	Collection event that is triggered after running the script instruction "LUC MODEL FIND" or the program instruction "LUC MODEL FIND" and the model for the LUC is not found.
ce_LucImageTaught	8004	520	Collection event that is triggered when an image is taught using the script instruction "LUC MODEL TEACH".

Table F.51-2   Lookup Camera Model Teach/Find – Related Data Variables

Variable Name	ID	Storage Type	SECS Type	CEID	Description
LucImageXY	7710	A[40]	DV	8002 8003	XY location of LUC model if found and expected location if model not found.
LucImageScore	7711	I2	DV	8002 8003	Score of LUC model if found or not found.
ImageFilename	520	A[100]	DV	8002 8003 8004	Name of image file saved after related collection event is triggered. Name contains entire path and name of image. The name will reflect the current date and time to make each file name unique.

F.52   Pressure Controlled CPJ (DWCA) Variables

Control Dot Weight – Remote Command

This is the remote command for changing pressure control from ON to OFF or vice versa.

This command will alter the contents of the fluid file currently loaded.

The command will be rejected if not in remote mode or if a program is running.

When changing pressure states, the dot weight computed from the previous state will still be in effect. I.e., the pressure controlled dot weight and the non-pressure controlled dot weight is not stored separately and will not automatically change to match the pressure setting when pressure control is turned on or off. Therefore, when changing states, the appropriate CPJ or DWCA setup routine must be executed:

When changing from the non-pressure controlled state to the pressure controlled state, DWCA "setup" should be run using the remote command "DJ9K DOT WEIGHT PRESSURE SETUP". When changing from the pressure controlled state to the non-pressure controlled state, CPJ should be run using the remote command "FLOWRATECALIB".

DJ9K Dot Weight Pressure Setup – Remote Command

Use this command to initiate the dot weight pressure "setup" routine. To run this routine, pressure control must be enabled, a program must be running and the tool must be in remote mode.

Table F.52-1   Dot Weight Pressure Setup – Rejection HCACK

Rejection HCACK	Reason
0x01	Valve is not a Jet
0x02	Not in valid Fluidmove Window
0x40	Not in remote mode
0x41	Programming is running
0x45	Pressure Control is not enabled

Dot Weight Pressure Setup Data Variables and Collection Events

Dot Weight Pressure Setup can be run remotely or manually from the Fluid Manager. When run remotely, setup variables such as desired dot weight and min and max pressure are initialized directly from the currently loaded Fluid File. When run manually from the Fluid Manager, these variables reflect the values entered by an operator in the user interface, which may or may not be the same values stored in the Fluid File.

The three "coordinate" pairs that define the calibration curve are:

DWCA_MinPressure, DWCA_DotWeightAtMinPressure

DWCA_PressureAtFinalDotWeight, DWCA_FinalDotWeight

DWCA_MaxPressure, DWCA_DotWeightAtMaxPressure

Intermediate "failed" attempts when determining a final dot weight/pressure are stored in DWCA_IntermediatePressure and DWCA_IntermediateDotWeight.

Table F.52-2   Dot Weight Pressure Setup – Data Variables

Data Variable Name	ID	SECS Type	Class	Related Collection Events	Description
DWCA_MaxPressure	641	FLT	DV	5040 5042 5043	Maximum pressure used when determining calibration curve
DWCA_DotWeightAtMaxPressure	642	FLT	DV	5042 5043	Dot weight measured at maximum pressure
DWCA_MinPressure	643	FLT	DV	5040 5041 5043	Minimum pressure used when determining calibration curve
DWCA_DotWeightAtMinPressure	644	FLT	DV	5041 5043	Dot weight measured at minimum pressure
DWCA_DesiredDotWeight	645	FLT	DV	5040 5043	Desired dot weight during setup routine
DWCA_FinalDotWeight	646	FLT	DV	5043	Final dot weight when setup completes successfully
DWCA_PressureAtFinalDotWeight	647	FLT	DV	5043	Final pressure at dot weight when setup completes successfully
DWCA_DeviationMaxPC	648	FLT	DV	5040 5043	Maximum dot weight deviation (percentage)

Table F.52-2   Dot Weight Pressure Setup – Data Variables (continued)

Data Variable Name	ID	SECS Type	Class	Related Collection Events	Description
DWCA_IntermediateDotWeight	649	FLT	DV	5044	Out of tolerance dot weight measured. Tool will retry unless retries exhausted.
DWCA_IntermediatePressure	650	FLT	DV	5044	Pressure when dot weight failed. Tool will retry unless retries exhausted.

Table F.52-3   Dot Weight Pressure Setup – Related Collection Events

Collection Event Name	CEID	Related Data Variables	Description
ce_DWCA_SetupStarted	5040	641 643 645 648	Initial collection event signaling start of DWCA setup (DJ9K Dot Weight Pressure Setup).
ce_DWCA_MinPressureCompleted	5041	643 644	Intermediate collection event when dot weight at minimum pressure has been completed.
ce_DWCA_MaxPressureCompleted	5042	641 642	Intermediate collection event when dot weight at maximum pressure has been completed.
ce_DWCA_SetupCompleted	5043	641 642 643 644 645 646 647 648	Final collection event when final dot weight and pressure has been computed and DWCA setup has completed successfully.
ce_DWCA_IntermediateValues	5044	649 650	Intermediate collection event when a fluid pressure / dot weight has failed calibration and the routine is adjusting pressure. The tool will retry unless retries exhausted.
ce_DWCA_SetupFailed	5045	-	Collection event if setup failed or was aborted by user or tool error. This collection event signals that the DWCA setup routine (DJ9K Dot Weight Pressure Setup) has completed unsuccessfully.

FlowRateCalib - Remote Command (existing command)

Use this command to run CPJ. If pressure control is not enabled, CPJ without pressure control will be executed. If pressure control is enabled, CPJ with pressure control (DWCA) will be executed.

CPJ with Pressure Control Data Variables and Collection Events

Table F.52-4   CPJ with Pressure Control – Data Variables

Data Variable Name	ID	SECS Type	Class	Related Collection Events	Description
DWCA_DesiredDotWeight	645	FLT	DV	5046	Desired dot weight during CPJ routine
DWCA_FinalDotWeight	646	FLT	DV	5047	Final dot weight when CPJ completes successfully
DWCA_PressureAtFinalDotWeight	647	FLT	DV	5047	Final pressure at dot weight when CPJ completes successfully
DWCA_DeviationMaxPC	648	FLT	DV	5046	Maximum dot weight deviation (percentage)
DWCA_IntermediateDotWeight	649	FLT	DV	5044	Out of tolerance dot weight measured before reiteration
DWCA_IntermediatePressure	650	FLT	DV	5044	Pressure when out of tolerance dot weight failed
DWCA_StartingPressure	651	FLT	DV	5046	Beginning pressure when CPJ is started
DWCA_StartingDotWeight	652	FLT	DV	5046	Beginning dot weight when CPJ is started

Table F.52-5   CPJ with Pressure Control – Related Collection Events

Collection Event Name	CEID	Related Data Variables	Description
ce_DWCA_CPJStarted	5046	645 648 651 652	Initial collection event signaling start of DWCA CPJ (FLOWRATECALIB).
ce_DWCA_CPJCompleted	5047	645 646 647 648 651 652	Final collection event when final dot weight and pressure has completed. This collection event signals that the DWCA CPJ routine has completed successfully.
ce_DWCA_IntermediateValues	5044	649 650	Intermediate collection event when a fluid pressure / dot weight has failed calibration and the routine is adjusting pressure and retrying.
ce_DWCA_CPJFailed	5048	-	Collection event if CPJ failed or was aborted by user or tool error. This collection event signals that the DWCA CPJ routine (FLOWRATECALIB) has completed unsuccessfully.

F.53   Setup "Offset" Data

Table F.53-1   Setup Offset – Data Variables

Variable Name	ID	SECS Type	Storage Type	Related CEID	Description
HSAtPurgeLidZ	528	DV	F8 FLT	3748	Reported when the height sensor measures the Z value of the purge cup lid. The value reported is the Z height when the sensor is tripped in user units.
HSAtScaleLidZ*	526	DV	F8 FLT	3734	Reported when the height sensor measures the Z value of the Scale 1 cover. The value reported is the Z height when the sensor is tripped in user units.
HSAtScale2LidZ	531	DV	F8 FLT	3801	Reported when the height sensor measures the Z value of the scale 2 cover. The value reported is the Z height when the sensor is tripped in user units.
HSAtTactileZ*	524	DV	F8 FLT	3732	Reported during Needle Z Offsets. The value reported is the Z Position when the height sensor measures the height of the tactile in user units.
NdlAtTactileZ_V1*	525	DV	F8 FLT	3733	Reported during Needle Z Offsets. The value reported is the Z position when the needle (nozzle) touches the tactile (2nd touch / slow speed) in user units.
SubstrateCornerTL	529	DV	A[40] FLT,FLT	3800	The top left (TL) corner location of the substrate in user units. Reported during Needle to Camera XY Offsets when the corners of the substrate are used to determine the locations of the four dispense dots.
SubstrateCornerBR	530	DV	A[40] FLT,FLT	3800	The bottom right (BR) corner location of the substrate in user units. Reported during Needle to Camera XY Offsets when the corners of the substrate are used to determine the locations of the four dispense dots.
TactileCenter	532	DV	A[40] FLT,FLT	3802	Reported during Needle Z Offsets. The value reported is the center of the tactile in user units.

F.54   Image Capture

Table F.54-1   Image Capture – Equipment Constants

Equipment Constant Variable Name	ID	SECS Type	Description
c_ImageCaptureWpFidsFound	6584	A[4]	"ON" enables image capturing of "Found" Workpiece fiducials. "OFF" disables image capturing.
c_ImageCaptureWpFidsNotFound	6585	A[4]	"ON" enables image capturing of "Not Found" Workpiece fiducials. "OFF" disables image capturing.
c_ImageCapturePattFidsFound	6586	A[4]	"ON" enables image capturing of "Found" Pattern fiducials. "OFF" disables image capturing.
c_ImageCapturePattFidsNotFound	6587	A[4]	"ON" enables image capturing of "Not Found" Pattern fiducials. "OFF" disables image capturing.
c_ImageCaptureServiceStationPins	6588	A[4]	"ON" enables image capturing of Service Station Pins. "OFF" disables image capturing.
c_ImageCaptureLUCModelTeachFind	6589	A[4]	"ON" enables image capturing of "LUC MODEL" teach and find program and script instructions. "OFF" disables image capturing.
c_ImageCaptureXYOffsetDots	6597	A[4]	"ON" enables image capturing of the 4 dots found when performing "XY Needle to Camera Offsets". "OFF" disables image capturing.
c_ImageCaptureLmoWpFids	6598	A[4]	"ON" enables image capturing of Local Machine Offsets Workpiece fiducials. "OFF" disables image capturing.
c_ImageCaptureFilenamePrefix	6599	A[50]	Specifies an ASCII string that will be prefixed to the image capture filename.

Table F.54-2   Image Capture – Collection Events

Collection Event Name	CEID	Related Data Variables	Description
ce_WpFoundImageSaved	8027	520	Collection event when a program Workpiece fiducial is found and saved as an image
ce_WpNotFoundImageSaved	8028	520	Collection event when a program Workpiece fiducial is NOT found and saved as an image
ce_PattFoundImageSaved	8029	520 523	Collection event when a program Pattern fiducial is found and saved as an image

Table F.54-2   Image Capture – Collection Events (Continued)

Collection Event Name	CEID	Related Data Variables	Description
ce_PattNotFoundImageSaved	8030	520 523	Collection event when a program Pattern fiducial is NOT found and saved as an image
ce_SSPin1ImageSaved	8009	520	Collection event when the Service Station Pin 1 is found (or not found) and saved as an image
ce_SSPin2ImageSaved	8010	520	Collection event when the Service Station Pin 2 is found (or not found) and saved as an image
ce_LUCModelFindImageSaved	8023	520	Collection event when the Lookup Camera LUC MODEL FIND program or script instruction is executed and the image is saved
ce_LUCModelTeachImageSaved	8024	520	Collection event when the Lookup Camera LUC MODEL TEACH script instruction is executed and the image is saved
ce_XYDot1ImageSaved	8011	520	Collection event when Needle to Camera XY offset is executed and the first dot is found (or not found) and saved as an image
ce_XYDot2ImageSaved	8012	520	Collection event when Needle to Camera XY offset is executed and the second dot is found (or not found) and saved as an image
ce_XYDot3ImageSaved	8013	520	Collection event when Needle to Camera XY offset is executed and the third dot is found (or not found) and saved as an image
ce_XYDot4ImageSaved	8014	520	Collection event when Needle to Camera XY offset is executed and the fourth dot is found (or not found) and saved as an image
ce_LmoWpFid1ImageSaved	8025	520	Collection event when the Local Machine Offset Workpiece is re-aligned and the first fiducial is found (or not found) and saved as an image
ce_LmoWpFid2ImageSaved	8026	520	Collection event when the Local Machine Offset Workpiece is re-aligned and the second fiducial is found (or not found) and saved as an image
ce_ImageSaveInstructionImageSaved	8031	520	Collection event when the "IMAGE SAVE" instruction is executed and the image is saved
ce_ImageSaveManualImageSaved	8032	520	Collection event when an image is manually saved from the video window

Table F.54-3   Image Capture – Data Variables

Data Variable Name	ID	SECS Type	Description
ImageFilename	520	A[100]	Name and path of image file
RunningPatternName	523	A[50]	Name of pattern when a pattern image is saved.

F.55   Additional Offset Variables

Table F.55-1   Additional Offset Variables – Collection Events

Collection Event Name	CEID	Related Data Variables	Description
ce_SSPin1Found	8005	553 534	Collection event when the Service Station Pin 1 is found
ce_SSPin1NotFound	8006	-	Collection event when the Service Station Pin 1 is not found
ce_SSPin2Found	8007	553 554	Collection event when the Service Station Pin 2 is found
ce_SSPin2NotFound	8008	-	Collection event when the Service Station Pin 2 is not found
ce_XYDot1Found	8015	535 536	Collection event when the Needle to Camera XY Offset Dot 1 is found
ce_XYDot1NotFound	8016	-	Collection event when the Needle to Camera XY Offset Dot 1 is not found
ce_XYDot2Found	8017	535 536	Collection event when the Needle to Camera XY Offset Dot 2 is found
ce_XYDot2NotFound	8018	-	Collection event when the Needle to Camera XY Offset Dot 2 is not found
ce_XYDot3Found	8019	535 536	Collection event when the Needle to Camera XY Offset Dot 3 is found
ce_XYDot3NotFound	8020	-	Collection event when the Needle to Camera XY Offset Dot 3 is not found
ce_XYDot4Found	8021	535 536	Collection event when the Needle to Camera XY Offset Dot 4 is found
ce_XYDot4NotFound	8022	-	Collection event when the Needle to Camera XY Offset Dot 4 is not found

Table F.55-2   Additional Offset Variables – Data Variables

Data Variable Name	ID	SECS Type	Description
SSPinXY	533	A[40] FLT,FLT	XY location of Service Station Pin found
SSPinScore	534	I2	Score of found Service Station fiducial
XYDotOffsetXY	535	A[40] FLT,FLT	XY location of Needle to Camera XY Offset Dot found
XYDotOffsetScore	536	INT	Score of Needle to Camera XY Offset Dot fiducial found

F.56   Prompted Setup, Flowrate and Purge Collection Events

GEM variables and collection events have been added to notify the SECS/GEM host when a scripted prompted setup file has started and completed and when a purge or flow rate has been performed. Some existing collection events have been expanded and are now triggered whenever a purge or flowrate is performed (previously some were only triggered in response to a remote request to purge or to perform a flowrate).

Table F.56-1   Prompted Setup, Flowrate and Purge - Collection Events

Collection Event Name	CEID	Related Data Variables	Description
ce_PromptedSetupStarted	4001	573	Scripted prompted setup has started either manually by the operator or remotely from a SECS/GEM host.
ce_PromptedSetupCompleted	4002	573	Scripted prompted setup has finished and all tasks have been successfully completed.
ce_PromptedSetupIncomplete	4022	573	Scripted prompted setup has finished but all tasks were not successfully completed.
ce_PromptedSetupScriptLoaded	4023	573	A scripted prompted setup file has been loaded and is ready to run.
ce_PurgePass	3740	---	A purge has successfully completed using Valve 1.
ce_PurgePass_V2	3806	---	A purge has successfully completed using Valve 2.
ce_PurgeFail	3766	---	A purge was started but did not successfully complete using Valve 1.
ce_PurgeFail_V2	3807	---	A purge was started but did not successfully complete using Valve 2.
ce_FlowRateCalibComplete_V1Pass	3730	---	A flowrate has successfully completed using Valve 1. This collection event will also occur when an operator selects OK when running flowrate manually.
ce_FlowRateCalibComplete_V2Pass	3731	---	A flowrate has successfully completed using Valve 2. This collection event will also occur when an operator selects OK when running flowrate manually.
ce_FlowRateCalibComplete_V1Fail	3784	---	A flowrate was performed but did not successfully complete using Valve 1. This collection event will also occur when an operator selects CANCEL when running flowrate manually.
ce_FlowRateCalibComplete_V2Fail	3785	---	A flowrate was performed but did not successfully complete using Valve 2. This collection event will also occur when an operator selects CANCEL when running flowrate manually.

Table F.56-2   Prompted Setup, Flowrate and Purge – New Data Variable

Variable Name	ID	Storage Type	Related CEID	Description
PromptedSetupScriptFilename	573	A[100]	4001 4002 4022 4073	Name of currently loaded prompted setup script file.

F.57   DJ Cycle Count

Table F.57-1   DJ Cycle Count - Equipment Constants

Variable Name	ID	Storage Type	Class	Related CEID	Description
c_DJCycleCount_V1	6502	A[30] *See Description	EC	None	Running total of DJ shots for Valve 1. *The machine format of this variable is floating point that has been converted to a SECS/GEM string variable to prevent rounding and truncation errors that would occur if uploaded as a float. To reset this value from the SC, EC 6502 should be set to the ASCII string "0".
c_DJCycleCount_V2	6503	A[30] *See Description	EC	None	Running total of DJ shots for valve 2. *The machine format of this variable is floating point that has been converted to a SECS/GEM string variable to prevent rounding and truncation errors that would occur if uploaded as a float. To reset this value from the SC, EC 6503 should be set to the ASCII string "0".

F.58   Low Fluid Collection Events

Table F.58-1   Low Fluid – Collection Events

Collection Event Name	CEID	Class	Description
ce_LowFluid_V1	3696	CEID	Collection event triggered when low fluid is detected on Valve 1.
ce_LowFluid_V2	3697	CEID	Collection event triggered when low fluid is detected on valve 2.

F.59   Height Sense

Table F.59-1   Height Sense –Data Variables and Collection Events

Variable Name	ID	Storage Type	Class	Related CEID	Description
HeightSenseOriginConv1	7701	F8	EC	8401	Height Sense on Conveyor 1
ce_HeightSenseOriginConv1	8401	--	CEID	--	Collection event is triggered when Height Sense is changed.
HeightSenseOriginConv2	7702	F8	EC	8402	Height Sense on Conveyor 2
ce_HeightSenseOriginConv2	8402	--	CEID	--	Collection event is triggered when Height Sense is changed.

F.60   Electronic Pressure

Table F.60-1   Electronic Pressure –Data Variables and Collection Events

Variable Name	ID	Storage Type	Class	Related CEID	Description
VALVEPRESSUREV1	421	F8	DV	3703	Electronic controlled valve pressure 1.
ce_VavlePressureValve_V1	3703	--	CEID	--	Collection event is triggered when valve pressure is checked.
FLUIDPRESSUREV1	422	F8	DV	3704	Electronic controlled fluid pressure 1.
ce_FluidPressureValve_V1	3704	--	CEID	--	Collection event is triggered when fluid pressure is checked.
COOLINGPRESSUREV1	423	F8	DV	3705	Electronic controlled cooling pressure 1.
ce_CoolingPressureValve_V1	3705	--	CEID	--	Collection event is triggered when cooling pressure is checked.
VALVEPRESSUREV2	424	F8	DV	3706	Electronic controlled valve pressure 2.
ce_VavlePressureValve_V2	3706	--	CEID	--	Collection event is triggered when valve pressure is checked.
FLUIDPRESSUREV2	425	F8	DV	3707	Electronic controlled fluid pressure 2.
ce_FluidPressureValve_V2	3707	--	CEID	--	Collection event is triggered when fluid pressure is checked.
COOLINGPRESSUREV2	426	F8	DV	3708	Electronic controlled cooling pressure 2.
ce_CoolingPressureValve_V2	3708	--	CEID	--	Collection event is triggered when cooling pressure is checked.
LaneNumber	521	I4	DV	8000 8801 8802 8400	Lane number (1 or 2) where event has occurred.
ScaleNumber	522	I4	DV	TBD	Scale number (1 or 2) where dispense related operation has occurred.

F.61 Scale Number

Table F.61-1   Scale Number – Data Variables

Variable Name	ID	Storage Type	Class	Related CEID	Description
ScaleNumber	522	I4	DV	TBD	Scale number (1 or 2) where dispense related operation has occurred.

F.62 Program Fiducial ON/OFF Control

Turning fiducials ON or OFF is controlled solely by the SECS/GEM host. There will be no user interface other than the configuration editor.

There are two levels of control: Workpiece fiducials may be turned ON or OFF.

Patterns enabled for SECS/GEM control may have their fiducials turned ON or OFF. Turning fiducial finding ON or OFF by individual pattern name or by lane number will not be supported.

Vision "pipelining" must be turned off. If "pipelining" is active, the SECS/GEM host will not have the capability to turn ON or OFF fiducials. This should not be a concern as pipelining should not be used when running with dual lanes.

When fiducial finding is turned OFF, the workpiece and/or pattern(s) will not be translated or rotated – the parts will be dispensed on in the same location and orientation in which they were taught.

The SECS/GEM host will have the ability to change fiducial finding from ON to OFF and vice versa between carriers while production is running. The change will not take effect until the carrier(s) currently being processed have finished and the next carrier(s) have arrived at the dispense station.

Pattern Fiducials

Patterns with fiducials that will be turned ON or OFF by the SECS/GEM host must have SECS/GEM control of fiducial finding enabled. All enabled patterns will be controlled by a single equipment constant.

If SECS/GEM control is not enabled, the pattern will ignore SECS/GEM host control and will always find fiducials. This allows individual selection of those patterns that should always find fiducials and those that should be controlled by the SECS/GEM host.

SECS/GEM Control

When a pattern is created, a dialog requesting the name of the pattern and the number of fiducials is presented.

If SECS/GEM is enabled on the tool, a checkbox will appear to enable SECS/GEM control of fiducial finding. This checkbox is accessible only if a selection other than "None" is chosen for the number/type of fiducials.

By default, this box will not be checked.

- Check this box to allow the SECS/GEM host to control fiducial finding.

- Do not check this box if the pattern should always find fiducials and should not be controlled by the SECS/GEM host.
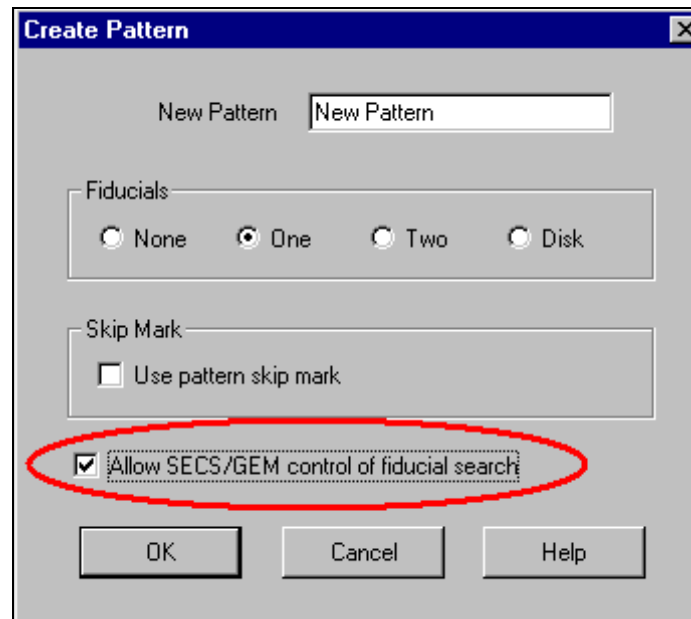
Figure F.62-1   Create Pattern – Allow SECS/GEM Control of Fiducial Search

To alter control of an existing pattern or to change the control after a pattern has been created, open the desired pattern in the Programming Window. Select **Edit>Edit SECS/GEM Fid Control**. Note that his selection is available only if a pattern that uses fiducials is currently being displayed.
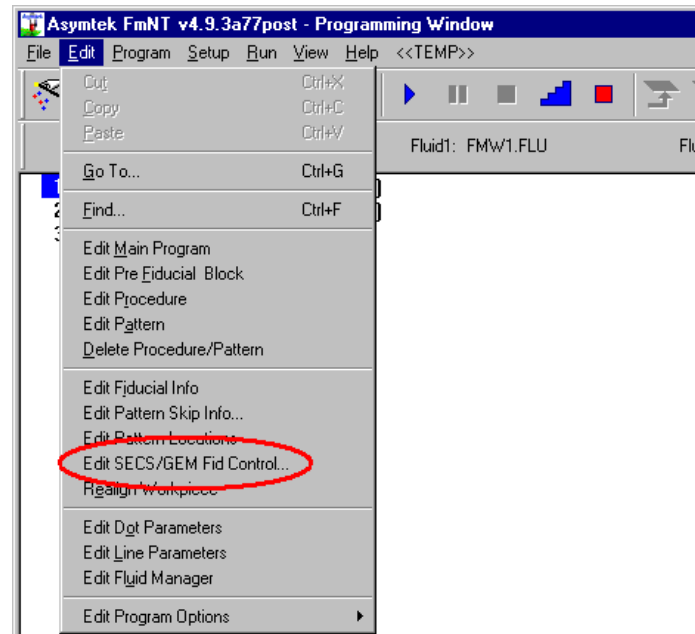
Figure F.62-2   Edit SECS/GEM Fid Control

A dialog will be displayed reflecting the current state of this pattern and to allow SECS/GEM control to be changed.

Figure F.62-3   Multiple Flow Rate Calibration

SECS/GEM Variables

Fiducial finding control is achieved through equipment constants. The SECS/GEM host does not have to be in remote mode.

Table F.62-1   Program Fiducial ON/OFF Control – Equipment Constants

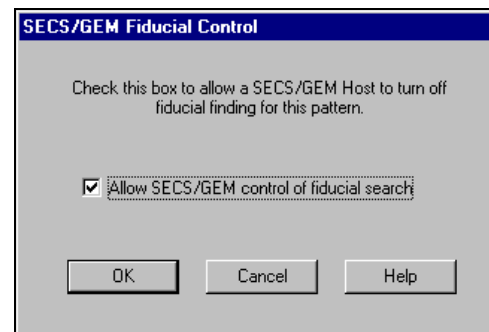| Equipment Constant	Data Type	ID	Description
ec_WorkpieceFindFids	A[4] "ON" or "OFF"	6590	If set to "ON", workpiece fiducials will be found (normal operating mode). If set to "OFF", workpiece fiducials will be skipped.
ec_PatternFindFidsLane	A[4] "ON" or "OFF"	6591	If set to "ON", ALL pattern fiducials will be found (normal operating mode). If set to "OFF", patterns flagged for SECS/GEM control will skip fiducial finding.

Log File

To turn on logging, select "SECS/GEM Host Configuration Change" under the "SECS/GEM" button in the event manager. This selection is normally turned on by default. The log file will indicate when one of the equipment constants has changed or when the workpiece or pattern fiducials are being skipped. These entries will appear when one of the equipment constants are changed:

```
2008-06-30,17:05:58.953,SECS/GEM Host Configuration Change,VID=6590,Old Value=ON,New Value=OFF

2008-07-01,18:04:52.732,SECS/GEM Host Configuration Change,VID=6591,Old Value=ON,New Value=OFF
```

These entries will appear only if finding fiducials has been turned off:

```
2008-07-01,18:05:02.105,SECS/GEM Host Configuration Change,Pattern Find Fiducials=OFF

2008-07-01,18:05:02.105,SECS/GEM Host Configuration Change,Workpiece Find Fiducials=OFF
```

Dual Lanes

For pattern fiducials, the SECS/GEM host will not be able to selectively turn fiducial finding on or off by lane number. When turned on, both lanes will find fiducials. When turned off, neither lane will attempt to find fiducials.

For processing fiducials on just the first board of each lane during recipe validation, the SECS/GEM host should enable workpiece and pattern fiducial finding until collection events are received from each lane indicating the first board has been processed. Fiducial finding can then be turned off for subsequent boards.

Configuration Editor

With normal operation, the SECS/GEM host will control turning fiducials ON or OFF. However, if the SECS/GEM host is not available and has left the tool in an undesirable state (ie, has turned fiducials OFF but this state is no longer desired), the workpiece and pattern control variables can be changed manually via the configuration editor.

1. In the left window, select the Configuration Group "Gem Manager".

2. In the right window, "Find Pattern Fids" controls pattern fiducial finding. Set this parameter to "ON" to allow pattern fiducials to be found (normal running state) or "OFF" to turn off fiducial finding for those patterns with SECS/GEM control enabled.

3. "Find Workpiece Fids" in the right window controls workpiece fiducial finding. Set this parameter to "ON" to allow workpiece fiducials to be found (normal running state) or "OFF" to turn off workpiece fiducial finding.
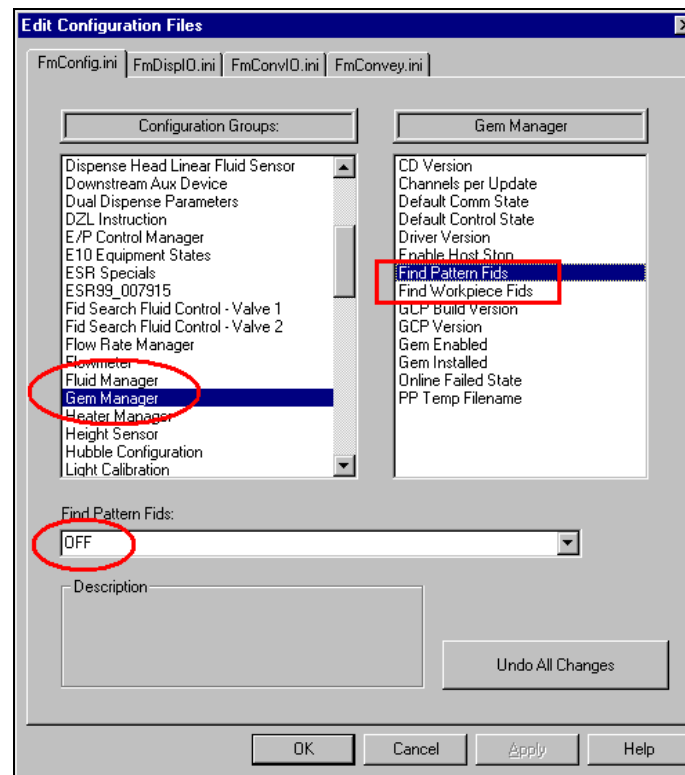
Figure F.62-4   Editing Configuration Files

File Versioning Note

When opening existing Fluidmove programs that have been created with a previous version of FmXP, a message will appear:
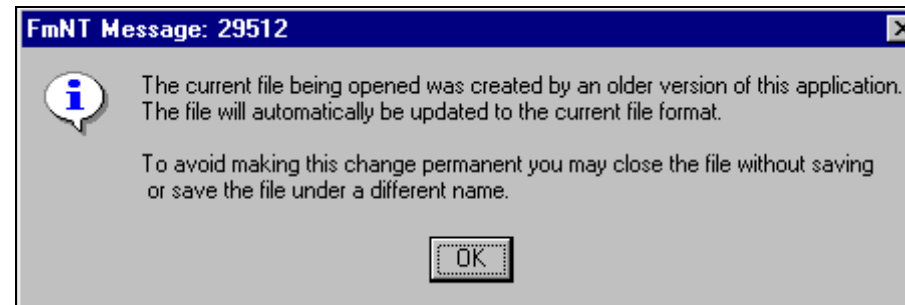

Figure F.62-5   Fluidmove – File Versioning Error Message

This prompt is displayed because the SECS/GEM control information is being added to the program. This message will appear only once if the program is saved and will not appear when creating new programs.

F.63   Scale Overflow

Equipment Constants

The following equipment constants will affect scale overflow detection as described. Variables ending in _S1 refer to Scale 1 and variables ending in _S2 refer to scale 2.

The SECS/GEM host should monitor c_OverflowCurrentCupWeightMG_S1/S2 for the current total weight in the cup.
c_OverflowAccumulatedTotalMG_S1/S2 and c_OverflowPreTareMG_S1/S2 are for internal use and individually are only part of the total cup weight.

Read carefully the affect that changing each equipment constant will have on overflow detection. It is recommended that the SECS/GEM host should not alter the weight variables.

c_OverflowProtectionEnabled_S1/S2

- Enables or disables the overflow protection feature.

- Set variable to ASCII string "ON" to enable the feature or "OFF" to disable the feature.

c_OverflowMaxCapacityMG_S1/S2

- Contains the maximum scale overflow capacity for the scale.

c_OverflowWarningPercentage_S1/S2

- Contains the percentage of the maximum scale overflow capacity of the scale when the operator is warned to change the cup.

- Note that 1.0 = 100%, 0.5 = 50%, 0.25 = 25%, …

c_OverflowCurrentCupWeightMG_S1/S2

- Contains the current total weight in cup in milligrams.

- This equipment constant contains the total of the accumulated weight plus the pre-tared weight.

- Zeroing this value will also zero c_OverflowAccumulatedTotalMG_S1/S2 and c_OverflowPreTareMG_S1/S2.

- Normally this equipment constant should not be changed by the SECS/GEM host. The equipment will keep track of the weight in the cup.

- If this value is changed by the host, it is recommended that only a zero is written to this equipment constant to clear the total weight in the scale cup. A non-zero value will have the following affect on the accumulated and tare value equipment constants:

  c_OverflowAccumulatedTotalMG_S1/S2 will be set to the value of c_OverflowCurrentCupWeightMG_S1/S2.
  c_OverflowPreTareMG_S1/S2 will be zeroed out.

c_OverflowAccumulatedTotalMG_S1/S2

- Contains the current accumulated weight of scale in milligrams.

- This is NOT the total weight in the cup. Total weight in the cup is the total of this variable (accumulated weight) plus pre-tared weight.

- It is recommended that the SECS/GEM host does not change this variable and if changed will indirectly affect the total weight.

- If this value is changed, c_OverflowCurrentCupWeightMG_S1/S2 will also be changed to the new value plus the existing pre-tare value.

c_OverflowPreTareMG_S1/S2

- Contains the current "pre-tare" weight in milligrams.

- This is NOT the total weight in the cup. Total weight in the cup is the total of accumulated weight plus this value (pre-tared weight).

- It is recommended that the SECS/GEM host does not change this variable and if changed will indirectly affect the total weight.

- If this value is changed, c_OverflowCurrentCupWeightMG_S1/S2 will also be changed to the new value plus the existing accumulated value.

c_OverflowLastWeightReadingStable_S1/S2

- Indicates if the last weight reading returned from the scale was "stable"

- This equipment constant is for internal use and it is recommended that the SECS/GEM host does not change this value

In general, c_OverflowCurrentCupWeightMG_S1/S2 (total weight) = c_OverflowAccumulatedTotalMG_S1/S2 (accumulated weight) + c_OverflowPreTareMG_S1/S2 (pre-tare weight).

Table F.63-1   Scale Overflow – Equipment Constants

Variable Name	ECID	SECS Type	Storage Type	FmConfig.ini Entry
				[Scale Manager]
c_OverflowProtectionEnabled_S1	6703	A[4]	ASCII	Overflow Protection Enabled =
c_OverflowProtectionEnabled_S2	6704	A[4]	ASCII	Scale 2 Overflow Protection Enabled =
c_OverflowMaxCapacityMG_S1	6705	A[30]	FLT	Max Capacity (mg) =
c_OverflowMaxCapacityMG_S2	6706	A[30]	FLT	Scale 2 Max Capacity (mg) =
c_OverflowWarningPercentage_S1	6707	A[30]	FLT	Warning Percentage =

Table F.63-1   Scale Overflow – Equipment Constants (continued)

Constant Name	ECID	SECS Type	Storage Type	FmConfig.ini Entry
c_OverflowWarningPercentage_S2	6708	A[30]	FLT	Scale 2 Warning Percentage =
c_OverflowCurrentCupWeightMG_S1	6709	A[30]	FLT	Current Cup Weight (mg) =
c_OverflowCurrentCupWeightMG_S2	6710	A[30]	FLT	Scale 2 Current Cup Weight (mg) =
c_OverflowAccumulatedTotalMG_S1	6711	A[30]	FLT	Accumulated Total (mg) =
c_OverflowAccumulatedTotalMG_S2	6712	A[30]	FLT	Scale 2 Accumulated Total (mg) =
c_OverflowPreTareMG_S1	6713	A[30]	FLT	Pre-Tare Total (mg) =
c_OverflowPreTareMG_S2	6714	A[30]	FLT	Scale 2 Pre-Tare Total (mg) =
c_OverflowLastWeightReadingStable_S1	6715	A[4]	ASCII	Last Weight Reading Stable =
c_OverflowLastWeightReadingStable_S2	6716	A[4]	ASCII	Scale 2 Last Weight Reading Stable =

Collection Events

Table F.63-2   Scale Overflow – Collection Events

Collection Event Name	CEID	Related Data Variables	Description
ce_ScaleOverflow_S1	4024	6703 6705 6707 6709 6711 6713 6715	The operator has been notified that Scale 1 has met or exceeded maximum weight capacity.
ce_ScaleOverflow_S2	4027	6704 6706 6708 6710 6712 6714 6716	The operator has been notified that scale 2 has met or exceeded maximum weight capacity.

Table F.63-2   Scale Overflow – Collection Events (Continued)

Collection Event Name	CEID	Related Data Variables	Description
ce_ScaleOverflowWarning_S1	4025	6703 6705 6707 6709 6711 6713 6715	The operator has been notified that Scale 1 has reached the warning level weight capacity.
ce_ScaleOverflowWarning_S2	4028	6704 6706 6708 6710 6712 6714 6716	The operator has been notified that scale 2 has reached the warning level weight capacity.
ce_ScaleOverflowReset_S1	4026	6703 6705 6707 6709 6711 6713 6715	Scale 1 overflow parameters have been reset. This collection event will occur when an operator has manually reset the overflow parameters from the scale configuration menu or has indicated that the cup has been replaced in response to a warning or overflow message.
ce_ScaleOverflowReset_S2	4029	6704 6706 6708 6710 6712 6714 6716	Scale 2 overflow parameters have been reset. This collection event will occur when an operator has manually reset the overflow parameters from the scale configuration menu or has indicated that the cup has been replaced in response to a warning or overflow message.

F.64 Electronic Pressure LMO

Each E/P device (valve, cooling and fluid) contains two offsets. A "setting" offset that is added before writing a value to the E/P controller and a "reading" offset that is applied to the value read from the E/P controller before making computations or displaying the value.

When the SECS/GEM host changes an LMO value, the change will be logged into the Asymtek log file:

2008-12-16,10:13:02.671,SECS/GEM Host Configuration Change,Pressure Offset Change,VID=1800,Old Value=3.000000,New Value=5.000000

When modifying the offsets, the SECS/GEM host must ensure the values are downloaded in the same units as indicated as the "units" status variable described below.

Note that currently the E/P hardware supports only Valve 1.

Equipment Constants

Table F.64-1   Electronic Pressure LMO - Equipment Constants

Constant Name	ECID	SECS Type	Storage Type	Description
ec_ValvePressSetLmoOffsetUsr_V1	1800	F8	FLT	Electronic Valve Pressure setting LMO for Valve 1
ec_CoolingPressSetLmoOffsetUsr_V1	1801	F8	FLT	Electronic Cooling Pressure setting LMO for Valve 1
ec_FluidPressSetLmoOffsetUsr_V1	1802	F8	FLT	Electronic Fluid Pressure setting LMO for Valve 1
ec_ValvePressReadLmoOffsetUsr_V1	1803	F8	FLT	Electronic Valve Pressure reading LMO for Valve 1
ec_CoolingPressReadLmoOffsetUsr_V1	1804	F8	FLT	Electronic Cooling Pressure reading LMO for Valve 1
ec_FluidPressReadLmoOffsetUsr_V1	1805	F8	FLT	Electronic Fluid Pressure reading LMO for Valve 1
ec_ValvePressSetLmoOffsetUsr_V2	1806	F8	FLT	Electronic Valve Pressure setting LMO for valve 2
ec_CoolingPressSetLmoOffsetUsr_V2	1807	F8	FLT	Electronic Cooling Pressure setting LMO for valve 2
ec_FluidPressSetLmoOffsetUsr_V2	1808	F8	FLT	Electronic Fluid Pressure setting LMO for valve 2
ec_ValvePressReadLmoOffsetUsr_V2	1809	F8	FLT	Electronic Valve Pressure reading LMO for valve 2
ec_CoolingPressReadLmoOffsetUsr_V2	1810	F8	FLT	Electronic Cooling Pressure reading LMO for valve 2
ec_FluidPressReadLmoOffsetUsr_V2	1811	F8	FLT	Electronic Fluid Pressure reading LMO for valve 2

Status Variables

The following status variables indicate what units the LMO offsets are stored in ("psi" or "kPa"). These variables are for internal use and cannot be modified.

Table F.64-2   Electronic Pressure LMO – Status Variables

Status Variable Name	ID	SECS Type	Description
sv_PressLmoOffsetUserUnit_V1	1830	A[10]	Units that E/P LMO offsets are stored in for Valve 1: "kPa" or "psi"
sv_PressLmoOffsetUserUnit_V2	1831	A[10]	Units that E/P LMO offsets are stored in for valve 2: "kPa" or "psi"

When an E/P LMO offset is changed by the operator via the user interface, a collection event will occur and the associated data variables will contain the old and new values.

Collection Events

Table F.64-3   Electronic Pressure LMO – Collection Events

Collection Event Name	CEID	Related Data Variables	Description
ce_PressureOffsetChanged	8033	450 575 574	Collection event when operator changes an E/P LMO offset value.
ce_PressureOffsetUnitsChanged	8034	450 453 451	Collection event when the internal units of E/P LMO offset changes. This value will change when "Air Pressure" units are changed from the main configuration dialog and after the LMO offset dialog is visited and exited.

Table F.64-4   Electronic Pressure LMO – Data Variables

Variable Name	ID	SECS Type	Related CEID	Description
ParameterChangedVid	450	I4	8033 8034	The VID of the E/P LMO offset or unit that is being changed.
OldParameterDouble	575	F8	8033	The current "old" E/P LMO offset before changed.
NewParameterDouble	574	F8	8033	The new E/P LMO offset after changed.
OldParameterString	453	A[100]	8034	The current "old" units of E/P LMO offsets before changed.
NewParameterString	451	A[100]	8034	The new units of E/P LMO offsets after changed.

F.65   Operator ID

NOTE: there is currently no Fluidmove interface for Operator ID.

Table F.65-1   Operator ID – Status Variables

Status Variable Name	ID	Storage Type	SECS Type	Related CEID	Description
OperatorLoginID	340	A[100]	SV	3640 3641	Operator log in ID. Collection event 3640 will be triggered when an operator logs in. Collection event 3641 will be triggered when an operator logs out.

F.66 Additional Configuration Parameter Variables

Table F.66-1 Additional Configuration Parameter Variables

Variable Name	ID	Storage Type	Class	Related CEID	Description/Default
Model					
Software	1561	A[20]	SV	None	Fluidmove software FmXP
OperatingSystem	1560	A[20]	SV	None	Computer operating system XP
SoftwareRev	1562	A[20]	SV	None	Dispenser/Heater Module software version
Setup Language					
c_UILanguage	1566	I4	SV	None	User interface language
Setup Units					
p_Units	11601	A[30]	DV	3672	System units (inch, mm, mach)
c_ElectronicPressureUnits	6570	A[10]	EC	None	Pressure units
c_AirflowUnits	6520	I4	EC	None	Airflow units
Change Operator Level					
c_OperatorLevel	6600	I4	EC	None	(Production = 1, System = 2, Service = 3)
c_StartinProdOplevel	6011	A4	EC	None	Startup operator level
c_ChangeOperatorLevel	6005	A[4]	EC	None	Set operator level when idle
c_ProgramIdleTimeLimit	6717	I4	EC	None	Program idle time limit operator level
Machine Offsets					
c_HeightSensorType	6033	A[30]	EC	None	Sensor Type
c_NSZBeamInput	6215	I4	EC	None	Sensor I/O bit
c_TactileSensorInput	6213	I4	EC	None	Sensor I/O bit
c_SuckbackPeriod	6228	A[30]	EC	None	Reverse period
C_SuckbackLength	6229	A[30]	EC	None	Reverse time

Variable Name	ID	Storage Type	Class	Related CEID	Description/Default
c_MachineSetupMode	6000	A[20]	EC	None	Scripted valve offset
c_ScriptedVOFileName	6001	A[60]	EC	None	Script file name
c_CameraAssistedScripts	6002	A[4]	EC	None	Camera assisted mode
c_UseSeviceStationData	6601	A[4]	EC	None	Service station mode
Setup Scripts Options					
c_UseScript	6255	A[4]	EC	None	Use setup script
c_Valve1PromptedSetupScriptFile	6259	A[60]	EC	None	Prompted setup filename
c_Valve1ChangeSyringeScriptFile	6260	A[60]	EC	None	Change syringe script filename
c_Valve1LowFluidScriptFile	6261	A[60]	EC	None	Low fluid script filename
Setup Runtime Preferences – Start Production					
c_HomeZAxisatProd	6020	A[4]	EC	None	Home Z at production start
c_HomeAllAxesatProd	6021	A[4]	EC	None	Home all axis at production start
c_MoveToSystemLocation	6030	A[4]	EC	None	Move to system location at production start
c_CheckForDisabledInstructions	6701	A[4]	EC	None	Check for disabled instructions
Setup Runtime Preferences – Purge					
c_PurgeBeforeEachRun_V1	6602	A[4]	EC	None	Purge before each board
c_PurgeAfterEachRun_V1	6603	A[4]	EC	None	Purge after each board
Setup Runtime Preferences – Production					
c_EnableRunSetupForProduction	6025	A[4]	EC	None	Enable run setup/production
c_LotContolEnabled	6604	A[4]	EC	None	Enable lot control for production
c_CheckSystemAirPressure	6026	A[4]	EC	None	Check system air pressure
c_CheckAirPressEveryInstruction	6605	I4	EC	None	Check air every instruction
c_ConveyorEmptyTimeLimit	6606	I4	EC	None	Alert if conveyor empty after time limit

Table F.66-1 Additional Configuration Parameter Variables (Continued)

Variable Name	ID	Storage Type	Class	Related CEID	Description/Default
c_EnableToolingVacuum_1	6607	A[4]	EC	None	Enable tooling vacuum 1
c_ToolingVacuumInput_1	6608	I4	EC	None	Tooling vacuum I/O input 1
c_EnableToolingVacuum_2	6609	A[4]	EC	None	Enable tooling vacuum 2
c_ToolingVacuumInput_2	6610	I4	EC	None	Tooling vacuum I/O input 2
p_MoveToFirstFidLocation	11610	A[4]	DV	3672	Post run park location
p_MoveToSystemLocation	11611	A[4]	DV	3672	Post run park location
p_SystemLocationName	11612	A[100]	DV	3672	System location name
Setup Runtime Preferences – E10 Equipment States					
c_E10StatesEnabled	6611	A[4]	EC	None	Enable E10 States
Setup Runtime Preferences – Beacon Control General Error					
c_GenErrStateEnabledBeacon	6612	A4	EC	None	Enable beacon general error
c_GenErrStateEnabledAudAlarm	6613	A4	EC	None	Enable beacon audible alarm
c_GenErrStateOutputBit	6614	I4	EC	None	Beacon state I/O output
c_GenErrStateOutputLevel	6615	A[40]	EC	None	Gen error state output level
Setup Runtime Preferences – Beacon Control Vision Error					
c_VisionErrStateEnabledBeacon	6616	A4	EC	None	Enable beacon vision error
c_VisionErrStateEnabledAudAlarm	6617	A4	EC	None	Enable beacon vision audible alarm
c_VisionErrStateOutputBit	6618	I4	EC	None	Vision error I/O output bit
c_VisionErrOutputLevel	6619	A[40]	EC	None	Vision error output level
Setup Runtime Preferences – Beacon Control Heater Error					
c_HeaterErrStateEnabledBeacon	6620	I4	EC	None	Enable beacon heater error
c_HeaterErrStateEnabledAudAlarm	6621	A4	EC	None	Enable beacon heater audible alarm
c_HeaterErrStateOutputBit	6622	I4	EC	None	Heater error state I/O output bit
c_HeaterErrStateOutputLevel	6623	A[40]	EC	None	Heater error state output level

Variable Name	ID	Storage Type	Class	Related CEID	Description/Default
Setup Runtime Preferences – Beacon Control Production Run					
c_ProdRunStateEnabledBeacon	6624	I4	EC	None	Enable beacon production run program states
c_ProdRunStateEnabledAudAlarm	6625	A4	EC	None	Enable beacon audible alarm prod run prog states
c_ProdRunStateOutputBit	6626	I4	EC	None	Prod run state I/O output bit
c_ProdRunStateOutputLevel	6627	A[40]	EC	None	Prod run state output level
Setup Runtime Preferences – Beacon Control Programming Run					
c_ProgRunStateEnabledBeacon	6628	A4	EC	None	Enable beacon programming run states
c_ProgRunStateEnabledAudAlarm	6629	A4	EC	None	Enable beacon audible alarm programming run states
c_ProgRunStateOutputBit	6630	I4	EC	None	Programming run state I/O output bit
c_ProgRunStateOutputLevel	6631	A[40]	EC	None	Programming run state output level
Setup Runtime Preferences – Beacon Control Run from SECS/GEM					
c_SECSGEMRunStateEnabledBeacon	6632	A4	EC	None	Enable beacon run state SECS/GEM
c_SECSGEMRunStateEnabledAudAlarm	6633	A4	EC	None	Enable beacon audible alarm SECS/GEM
c_SECSGEMRunStateOutputBit	6634	I4	EC	None	SECS/GEM run beacon output bit
c_SECSGEMRunStateOutputLevel	6635	A[40]	EC	None	SECS/GEM run beacon output level
Setup Runtime Preferences – Beacon Control Dry Run					
c_DryRunStateEnabledBeacon	6636	A4	EC	None	Enable beacon dry run state
c_DryRunStateEnabledAudAlarm	6637	A4	EC	None	Enable beacon dry run audible alarm
c_DryRunStateOutputBit	6638	I4	EC	None	Dry run beacon output bit
c_DryRunStateOutputLevel	6639	A[40]	EC	None	Dry run beacon output level
Setup Runtime Preferences – Beacon Control Low Fluid Critical					
c_LowFluidStateEnabledBeacon	6640	A4	EC	None	Enable beacon low fluid
c_LowFluidStateEnabledAudAlarm	6641	A4	EC	None	Enabled beacon audible alarm low fluid

Table F.66-1   Additional Configuration Parameter Variables (Continued)

Variable Name	ID	Storage Type	Class	Related CEID	Description/Default
c_LowFluidOutputBit	6642	I4	EC	None	Beacon low fluid I/O output bit
c_LowFluidAuxOutputBit	6643	I4	EC	None	Beacon low fluid I/O aux output bit
c_LowFluidOutputLevel	6644	A[40]	EC	None	Beacon low fluid output level
Setup Runtime Preferences – Beacon Control Low Fluid Warning					
c_LowFluidBoardCntDwnStateEnabledBeacon	6645	A4	EC	None	Enabled beacon audible alarm low fluid warning
c_LowFluidBoardCntDwnStateEnabledAud Alarm	6646	A4	EC	None	Beacon low fluid warning I/O output bit
c_LowFluidBoardCntDwnOutputBit	6647	I4	EC	None	Beacon low fluid warning I/O aux output bit
c_LowFluidBoardCntDwnOutputLevel	6648	A[40]	EC	None	Beacon low fluid warning output level
Setup Runtime Preferences – Beacon Control Pot Life Low					
c_PotLifeLowStateEnabledBeacon	6649	A4	EC	None	Enable beacon pot life low state
c_PotLifeLowStateEnabledAudAlarm	6650	A4	EC	None	Enable beacon pot life low audible alarm
c_PotLifeLowOutputBit	6651	I4	EC	None	Beacon pot life low I/O output bit
c_PotLifeLowOutputLevel	6652	A[40]	EC	None	Beacon pot life low output level
Setup Runtime Preferences – Beacon Control Pot Life Expired					
c_PotLifeExpStateEnabledBeacon	6653	I4	EC	None	Enable beacon pot life expired state
c_PotLifeExpStateEnabledAudAlarm	6654	I4	EC	None	Enable beacon pot life expired audible alarm
c_PotLifeExpOutputBit	6655	I4	EC	None	Beacon pot life expired I/O output bit
c_PotLifeExpOutputLevel	6656	A[40]	EC	None	Beacon pot life expired output level
Setup Runtime Preferences – Beacon Control Fluidmove Idle State					
c_FMIdleStateEnabledBeacon	6657	A4	EC	None	Enable beacon idle state
c_FMIdleStateEnabledAudAlarm	6658	I4	EC	None	Enable beacon idle audible alarm
c_FMIdleOutputBit	6659	I4	EC	None	Beacon idle state output bit
c_FMIdleOutputLevel	6660	A[40]	EC	None	Beacon idle state output level

Variable Name	ID	Storage Type	Class	Related CEID	Description/Default
Setup Runtime Preferences – Library Pattern					
LibraryPatternFilename	1546	A[100]	SV	None	Library pattern filename
LibraryPatternPath	1547	A[30]	SV	None	Library pattern path
c_AskBeforeUpdatingPatternLibrary	6718	A[4]	EC	None	Prompt before updating pattern library
Setup Runtime Preferences – Low Pressure Detect					
c_LowAirThreshold	6661	I4	EC	None	Low pressure detect threshold
Setup Runtime Preferences – Flowmeter					
c_FlowmeterEnabled	6662	A[4]	EC	None	Flowmeter enabled
Setup Height Sensor					
c_HeightSensorType	6033	A[30]	EC	None	Height sensor type
c_MELaserRangeFinderMode	6663	A[4]	EC	None	Enable ME range finder mode
c_HeightSenseMode	6664	I4	EC	None	Height sense mode
p_BatchHeightSenseCommands	11625	A[4]	DV	3672	Use batch height sense
c_MELaserHSDownSpeed	6665	A[30]	EC	None	ME laser down speed
c_MELaserHSUpSpeed	6666	A[30]	EC	None	ME laser up speed
c_MELaserHSAccel	6667	A[30]	EC	None	ME laser acceleration
c_MELaserHSMaxDist	6668	A[30]	EC	None	ME laser max search distance
c_MELaserHSMaxDistRunTime	6669	A[30]	EC	None	ME laser max search distance at runtime
c_MELaserHSRetractDist	6670	A[30]	EC	None	ME laser retract distance
c_RetractBeforeHeightSense	6671	A[4]	EC	None	Enable retract before HS
Setup Purge Station					
c_PurgeLocName_V1	6297	A[30]	EC	None	Purge location name Valve 1
c_MonitorPurgeCupOverflowTime	6672	A[4]	EC	None	Enable monitor purge cup overflow time

Table F.66-1   Additional Configuration Parameter Variables (Continued)

Variable Name	ID	Storage Type	Class	Related CEID	Description/Default
c_OverflowTimeLimit	6571	I4	EC	None	Purge cup overflow time limit (minutes)
c_ElapsedPurgeTime	6572	A[30]	EC	None	Overflow time
fc_PurgeDuration	11201	A[30]	DV	3651	Purge duration
c_TimedPurge	6094	A[4]	EC	None	Enable timed purge
Setup Scale					
c_Enabled	6101	A[4]	EC	None	Enable Scale 1
c_ScaleType	6100	A[20]	EC	None	SART-WZ
c_ReadDelay	6102	A[30]	EC	None	Scale read delay
c_StabilityTimeout	6104	A[30]	EC	None	Scale stability timeout
c_CheckScaleCup	6105	A[4]	EC	None	Check for missing scale cup
c_ScaleLocName_V1	6298	A[4]	EC	None	Scale location Valve 1
c_ScaleCalibWeight	6673	A[30]	EC	None	Scale calibration weight
Setup Vision					
c_VisionSystem	6139	A[30]	EC	None	Vision system type
c_VideoMixer	6140	A[30]	EC	None	Video mixer type
c_DfltGraphicslevel	6152	I4	EC	None	Graphics level
c_LightType	6271	A[30]	EC	None	Light controller type
c_Turnlightoffonexit	6272	A[4]	EC	None	Turn light off on exit
Setup Vision - Reticles					
c_ReticleCircle1Enable	6719	A[4]	EC	None	Enable reticle circle 1
c_ReticleCircle1Diameter	6720	A[30]	EC	None	Reticle circle 1 diameter
c_ReticleCircle2Enable	6721	A[4]	EC	None	Enable reticle circle 2
c_ReticleCircle2Diameter	6722	A[30]	EC	None	Reticle circle 2 diameter
c_ReticleAdditionalCircles	6723	I4	EC	None	Reticle additional circles

Variable Name	ID	Storage Type	Class	Related CEID	Description/Default
c_ReticleRectangleEnable	6724	A[4]	EC	None	Enable reticle rectangle
c_ReticleRectangeXSize	6725	A[30]	EC	None	Reticle rectangle X size
c_ReticleRectangleYSize	6726	A[30]	EC	None	Reticle rectangle Y size
c_ReticleGraduationslEnable	6727	A[4]	EC	None	Reticle graduations enable
c_ReticleGraduationsSpacing	6728	A[30]	EC	None	Reticle graduations spacing
c_ReticleColor	6729	I4	EC	None	Reticle color: Black = 0 White = 1 Red = 2
Setup Vision - General					
c_DfltMotionAntibacklash	6145	A[4]	EC	None	Use anti-backlash move
Setup Vision - Tolerances					
c_ErrDetfidloctol	6180	A[30]	EC	None	Fid location tolerance
c_ErrDetdiagdisttol	6181	A[30]	EC	None	Diagonal distance tolerance
c_DfltCForthogonality	6178	A[30]	EC	None	Orthogonality tolerance
Setup Vision – Skip Mark Options					
c_DfltMarkPausemode	6154	A[4]	EC	None	Pause after search
Setup Vision – Fiducial Options					
c_ErrDetfidskipmode	6183	A[4]	EC	None	Fid skip if not found
c_DfltPausemode	6153	A[4]	EC	None	Fid pause after search
c_UseFidZPosition	6191	A[4]	EC	None	Enable Z positioning
c_ApplyCameraRotationCorrection	6730	A[4]	EC	None	Apply camera rotation
c_FidDripControlEnabled	6731	A[4]	EC	None	Enable FID drip control

Variable Name	ID	Storage Type	Class	Related CEID	Description/Default
Setup Vision – New Program Defaults					
c_DfltImagesettlingtime	6750	I4	EC	None	Post move settling time
p_BatchFids	11614	A[4]	DV	3672	Find fids at program start
c_DfltUsePipeline	6146	A[4]	EC	None	Use pipeline vision
Setup Workpiece Alignment					
c_LearnWorkpieceAngle	6674	A[4]	EC	None	Learn WP angle first
c_WorkpieceNumberOfFids	6675	I4	EC	None	Number of fiducials
c_VerifyWkpcOrgNoFids	6676	A[4]	EC	None	Verify WP origin when opening program with no fids.
Setup Conveyor 1					
c_ConveyorControlType_C1	6114	A[20]	EC	None	Conveyor 1 control type
c_ConveyorMode_C1	6117	I4	EC	None	Disabled = 0, Run Continuous = 1, Pass Through = 2
c_StartupFileName_C1	6134	A[60]	EC	None	Conveyor startup filename
c_StyleType_C1	6116	A[100]	EC	None	Conveyor style
c_BeltSpeed_C1	6127	A[30]	EC	None	Belt speed
c_BeltAccel_C1	6128	A[30]	EC	None	Belt acceleration
c_LongMove_C1	6129	A[30]	EC	None	Long move
c_ShortMove_C1	6130	A[30]	EC	None	Short move
c_Retries_C1	6131	A[30]	EC	None	Retries
c_BackMove_C1	6132	A[30]	EC	None	Back move
c_TwinConveyorWait_C1	6126	I4	EC	None	Wait for 2nd board time(dual conveyor)
c_ConfirmACWMove	6113	A[4]	EC	None	Confirm move to taught width
c_ConveyorWidthSpeed	6754	A[30]	EC	None	Conveyor width speed
c_ConveyorWidthAccel	6755	A[30]	EC	None	Conveyor width accel

Variable Name	ID	Storage Type	Class	Related CEID	Description/Default
Setup Conveyor 2					
c_ConveyorControlType_C2	6743	A[20]	EC	None	Conveyor 2 control type
c_ConveyorMode_C2	6744	I4	EC	None	Disabled = 0, Run Continuous = 1, Pass Through = 2
c_StartupFileName_C2	6745	A[60]	EC	None	Conveyor startup filename
c_StyleType_C2	6746	A[100]	EC	None	Conveyor style
c_BeltSpeed_C2	6747	A[30]	EC	None	Belt speed
c_BeltAccel_C2	6748	A[30]	EC	None	Belt acceleration
c_LongMove_C2	6749	A[30]	EC	None	Long move
c_ShortMove_C2	6750	A[30]	EC	None	Short move
c_Retries_C2	6752	A[30]	EC	None	Retries
c_BackMove_C2	6751	A[30]	EC	None	Back move
c_TwinConveyorWait_C2	6753	I4	EC	None	Wait for 2nd board time(dual conveyor)
c_ConfirmACWMove2	6679	A[4]	EC	None	Confirm move to taught width 2
c_ConveyorWidthSpeed	6754	A[30]	EC	None	Conveyor width speed
c_ConveyorWidthAccel	6755	A[30]	EC	None	Conveyor width accel
Conveyor Configuration – FmConvey.ini					
ClearPinsMove	1567	F8	SV	None	Clear pins move distance
S2RequestDelayMove	1568	F8	SV	None	Station 2 request delay move
S3RequestDelayMove	1569	F8	SV	None	Station 3 request delay move
ClearDownPinDelay	1570	F8	SV	None	Clear down pin delay
S3OutFirst	1571	F8	SV	None	Station 3 out first
Automatic Conveyor Width					
c_AutoConveyorWidthEnable	6677	A[4]	EC	None	Enable automatic conveyor width

Table F.66-1   Additional Configuration Parameter Variables (Continued)

Variable Name	ID	Storage Type	Class	Related CEID	Description/Default
c_AutoConveyorWidthEnable2	6678	A[4]	EC	None	Enable automatic conveyor width 2
c_ConfirmACWMove	6113	A[4]	EC	None	Confirm move to taught width
c_ConfirmACWMove2	6679	A[4]	EC	None	Confirm move to taught width 2
c_AutoConveyorWidthClearance	6756	A[30]	EC	None	Automatic conveyor width clearance
c_AutoConveyorWidthClearance2	6757	A[30]	EC	None	Automatic conveyor width clearance 2
c_ConveyorWidthSpeed	6754	A[30]	EC	None	Conveyor width speed
c_ConveyorWidthAccel	6755	A[30]	EC	None	Conveyor width accel
Heater Configuration					
c_ControlType_H1	6018	A[20]	EC	None	Heater 1 control type
c_CpH_Enabled	6523	A[4]	EC	None	Enable control process heat
c_AutoPurgeEnabled	6680	A[4]	EC	None	Auto purge during wait
c_EnableSkipWhileWaitingforTemp	6015	A[4]	EC	None	Enable skip during wait for temp
c_EnabledPurgeBeforeResume	6014	A[4]	EC	None	Enable purge before resume
c_TurnheatersoffwhenFmntexits	6016	A[4]	EC	None	Turn heaters off when Fluidmove exits
c_PreHeatTimerEnabled	6681	A[4]	EC	None	Enable pre heat timer
c_DefaultPreHeatTime	6683	A[4]	EC	None	Default pre heat time
c_WarnHeaterFileChange	6684	A[4]	EC	None	Warn if heater file changed
Setup Dispenser					
c_MotionControllerType	6057	A[20]	EC	None	Motion controller type
c_ScaleFMWPerUnit	1552	A[30]	EC	None	FMW units/encoder step
FirmwareRev	1553	F8	SV	None	Firmware revision
FirmwareBuild	1554	A[40]	SV	None	Firmware build
c_RunRecoveryEnabled	6685	A[4]	EC	None	Run recovery enabled
c_RecoveryPromptPosition	6686	I4	EC	None	Recovery instruction position

Variable Name	ID	Storage Type	Class	Related CEID	Description/Default
c_SkipDryRunRecovery	6687	A[4]	EC	None	Skip dry run recovery
c_WarnIfRecoverySkipped	6688	A[4]	EC	None	Warn if recovery skipped
c_DoHSRunRecovery	6689	A[4]	EC	None	Do height sense in run recovery
c_ErrorMapEnabled	6088	A[4]	EC	None	Enable correction map
c_StartupFileName	6084	A[60]	EC	None	Dispenser startup filename
Setup Dispenser – Keep Out Zones					
UseKeepoutZones	7808	Boolean	EC	None	Enable keep out zones
Setup Module Skip					
c_ModuleReaderEnabled	6690	A[4]	EC	None	Enable module skipping
c_ModuleAutoMode	1555	A[4]	EC	None	Automatic mode
c_ModuleOutgoingFlowControl	1556	I4	SV	None	Flow control number
c_ModuleNumberOfRetries	1558	I4	SV	None	# of read/write retries
c_ModuleTeachWindowMode	1559	I4	SV	None	Module teach window mode
Setup Event Logging					
c_SuppressLogFile	6732	A[4]	EC	None	Suppress log file creation
c_CheckDiskSpaceProd	6691	A[4]	EC	None	Check disk space for log file during production
Setup Trace/Debug Logging					
TrcEnableAllLogs	7817	Boolean	EC	None	Enable all trace logs
DbgEnableAllLogs	7816	Boolean	EC	None	Enable all debug logs
DbgSuppressFileCreation (same for trace log)	7815	Boolean	EC	None	Suppress file creation
DbgWriteToFile	7812	Boolean	EC	None	Debug write to file
DbgBufferedWrite	7814	Boolean	EC	None	Debug buffered write
DbgWriteToDbgWindow	7813	Boolean	EC	None	Write to debug window

Table F.66-1   Additional Configuration Parameter Variables (Continued)

Variable Name	ID	Storage Type	Class	Related CEID	Description/Default
c_CheckDiskSpaceInterval	6739	I4	EC	None	Check disk space board interval
c_MinDiskSpaceNeeded	6740	I4	EC	None	Min disk space need to start Fluidmove
c_DiskSpaceTooLow	6741	I4	EC	None	Disk space limit - too low to write log files
DbgSuppressFileCreation (same for debug log)	7815	Boolean	EC	None	Suppress file creation
TrcWriteToFile	7809	Boolean	EC	None	Trace write to file
TrcBufferedWrite	7811	Boolean	EC	None	Trace buffered write
TrcWriteToDbgWindow	7810	Boolean	EC	None	Trace write to debug window
c_OutputToFile	6742	A[4]	EC	None	Run to file
Setup Logging – Automatic file deletion					
c_AutoDeleteLogFiles	6733	A[4]	EC	None	Automatic log file delete
c_AutoDeleteTrcFiles	6734	A[4]	EC	None	Auto delete trace files
c_AutoDeleteDbgFiles	6735	A[4]	EC	None	Auto delete debug files
c_AutoDeleteFilesDaysAfterCreation	6736	I4	EC	None	Auto delete files # days after creation
c_AutoDeleteFreqDays	6737	I4	EC	None	Auto delete files every X days
c_AutoDeleteFilesUserConfirm	6738	A[4]	EC	None	Confirm auto delete files
SECS/GEM Configuration					
GemLinkState	68	U1	SV	None	Gem link state
GemControlState	28	U1	SV	None	Gem control state
GemSpoolState	53	U1	SV	None	Gem spool state
GemEstabCommDelay Name = ESTABLISHCOMMUNICATIONSTIMEOUT	6	U20	EC	None	Gem communication timeout
DeviceID	115	A[12]	SV	None	Gem device id
GemInstallVersion	1563	A[20]	SV	None	Gem installed version

Table F.66-1   Additional Configuration Parameter Variables (Continued)

Variable Name	ID	Storage Type	Class	Related CEID	Description/Default
GemGCPFileVersion	1564	A[20]	SV	None	Gem GCP file version
GemDriverVersion	1565	A[20]	SV	None	Gem driver version

Glossary

TestAlarm	An alarm is related to any abnormal situation on the Equipment that may endanger people, Equipment, or material being processed. GEM allows the Host to be notified when alarm conditions are detected and cleared.
ALID	Equipment Alarm ID
CEID	Collection Event ID
Collection Event	A collection event is a detectable occurrence significant to the Equipment that is considered to be significant to the Host. GEM allows the Host to be notified when a collection event occurs. This allows the Host to track the Equipment's activity.
Data Values	Also known as Discrete Data. Meant to be temporary or ephemeral statuses that disappear after an event is complete. Sometimes known as 'DVs' (Data Values), 'DVVALs' (Discrete Data Values).
Data Variable (DV)	Data variables may only be valid upon the occurrence of a particular event. The Host may gather data variable values from the GEM Equipment.
Equipment	An intelligent system which communicates with a Host and complies with the GEM standard. In this manual it refers to an Asymtek dispensing system.
Equipment Constant (EC)	Equipment Constants are settable by the Host. The Host may gather Equipment constant values from the GEM Equipment. The Host may also set Equipment constant values on the GEM Equipment to control the Equipment's behavior.
Fluidmove	The Fluidmove® for Windows NT® or Fluidmove® for Windows XP® software application which controls GEM.
GCD	GWGEM Configuration Data (an ASCII file compiled for GWGEM).
GEM	Generic Equipment Model. The GEM (E30) standard defines the generic behavior of semiconductor Equipment as viewed through a communications link in terms of SECS-II messages communicated over that link. The GEM standard impacts Equipment control and Equipment-to-Host communications.
High-Speed SECS Message Services (HSMS)	HSMS (E37) is a high-speed replacement and an alternative to SECS-I for applications where higher speed communication is needed or where simple point-to-point technology is insufficient. HSMS defines a communication interface via TCP/IP suitable for the exchange of (SECS-II) messages between computers in a semiconductor factory.
Host	The computer which is connected to, and communicates with, the Equipment via the SECS interface. he GEM standard defines a set of messages the Host must use when interacting with the Equipment. The Equipment communicates with one Host, but the Host may communicate with multiple Equipment units.

HSMS-GS	High Speed Message Service-General Session. This standard defines TCP/IP network communication used by GEM for Host/Equipment communication. It is intended to be applied for complex systems containing multiple independently accessible subsystems and uses an extended state machine.
HSMS-SS	High Speed Message Service-Single Session. This standard defines TCP/IP network communication used by GEM for Host/Equipment communication. It replaces the SECS-I standard.
ID	Identifier or Identification.
Operator	The person who physically has access to the Equipment's material port(s) and control panel. This is the person who is operating the dispensing system.
PP	Process Program
Recipe	A file containing a set of instructions for the Equipment.
Report	A set of variables predefined by the Equipment or defined by the Host. The Host uses reports to gather status variable, data variable, and Equipment constant values. The Host may request a report explicitly or attach a set of reports to a collection event.
SECS	SEMI Equipment Communications Standard.
	SECS I (E4): SEMI Equipment Communications Standard 1 Message Transfer. Defines RS-232 serial communication used by GEM for Host/Equipment communication.
	SECS II (E5): SEMI Equipment Communications Standard 2 Message Content. A standard for communications between intelligent Equipment and a Host. The standard defines the communication protocol interface (SECS-I) and the messages exchanged (SECS-II).
Message	All GEM Equipment and Host communication is accomplished using SECS-II messages. Each unique SECS-II message is identified by its stream number (S) and function number (F). The SECS-II standard defines a large set of SECS-II messages determining each one's purpose, content, and usage. The GEM standard defines how to use a subset of these SECS-II messages yet allows other SECS-II messages to be used in addition to this subset.
SEMI	Semiconductor Equipment and Materials International (SEMI) is a global trade association that represents the semiconductor and flat panel display equipment and materials industries. SEMI maintains and publishes standards that relate to Equipment automation and software.
Status Variable (SV)	Status Variable. Status variables may include any parameters that can be sampled in time such as temperature or quantity of a consumable. The Host may gather status variable values from the GEM Equipment.
UFPP	Unformatted Process Program
VID	Variable Identifier. A unique string representing the name of a variable.