Instructions - Parts

Communications Gateway Module Installation Kit

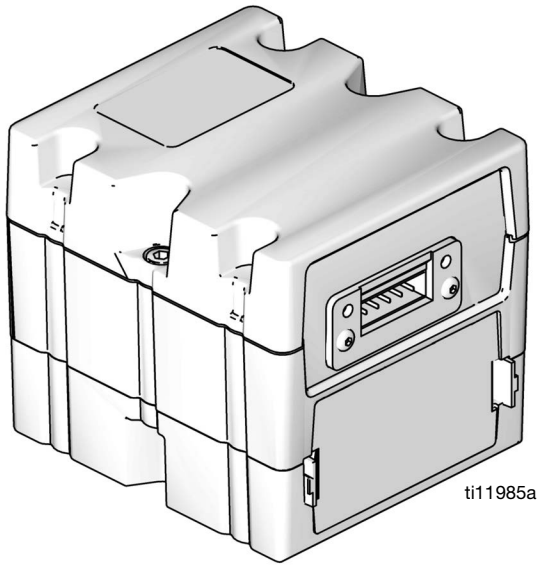
3A1704S
EN

For use with HFR™ systems to provide fieldbus communications abilities. For professional use only.

NOTE: Not for new designs. Use PLC/CGM interface outlined in Graco kit No. 26B872, map token No. 19C802 and flash drive No. 19C885 for new designs**.**

Kit 24J415

Important Safety Instructions
Read all warnings and instructions in your system manual. Save all instructions.



CGM with DeviceNet connector shown

Contents

Kits

The following kit is the Communications Gateway Module (CGM) hardware/software and is required for all installations. The kit is used in conjunction with the correct fieldbus device.

CGM Part No.	Description
24J415	CGM Installation Kit (Required)

The following kits work with kit 24J415 and includes all remaining parts necessary to install a CGM. See manual 312864 for repair parts for each assembly.

CGM Part No.	Fieldbus
CGMDN0	DeviceNet
CGMEP0	EtherNet/IP
CGMPB0	PROFIBUS
CGMPN0	PROFINET

Related Manuals

Manual	Description
3A1974	CAN Adapter Kit, Instructions
312864	Communications Gateway Module, Instructions - Parts
313997	HFR Operation
313998	HFR Repair - Parts
406987	GCA CAN Cables, Reference

Overview

The Communications Gateway Module (CGM) provides a control link between the HFR system and a selected fieldbus. This provides the means for remote monitoring and control by external automation systems.

The data available by the CGM to the fieldbus depends on which GCA based system is connected. Unique data maps are defined for each GCA system and are available on the token provided in the kit.

See **Available Internal Data** on page 9 for a list of internal data from the HFR system that can be viewed or modified by your fieldbus master.

NOTE: The following system network configuration files are available at www.graco.com.

- EDS file: DeviceNet or Ethernet/IP fieldbus networks
- GSD file: PROFIBUS fieldbus networks
- GSDML: PROFINET fieldbus networks

Installation

1. Install the CGM in the desired location.

   a. Remove access cover (D). Loosen two screws (C) and remove CGM (A) from base (B).

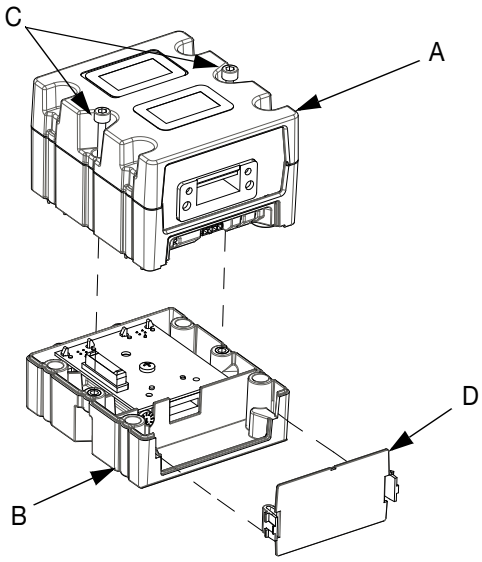
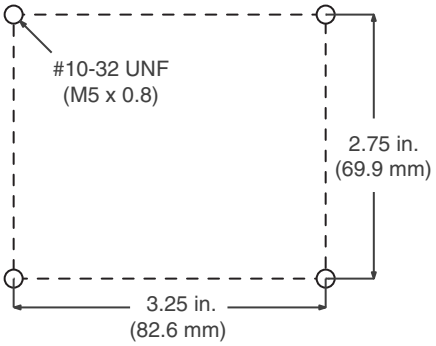


FIG. 1

   b. Mount base (B) in desired location with four screws supplied in this kit. See the following mounting dimensions.



   c. Mount CGM (A) on base (B) with two screws (C).

2. Install access cover (D).

3. Attach the ferrite suppressor to the CGM on each end of the CAN cable.

NOTICE

To avoid severe damage to GCA modules, ensure the CAN cable is connected to the appropriate CAN connection.

NOTICE

To avoid severe machine damage, do not connect any CAN device to connectors 2A, 2B, or 2C on the Motor Control Module. Connectors 2A, 2B, and 2C are not CAN connectors.

NOTE: CAN ports are located on the base of cube shaped GCA modules or port 6 on the High Power Temperature Control Module.

NOTE: If there are no free CAN ports, plug splitter (121807) into the CAN distribution block located in the Power Distribution Box (PDB). Connect the CAN cable into the splitter. For more detail, refer to the CAN Adapter Kit manual.

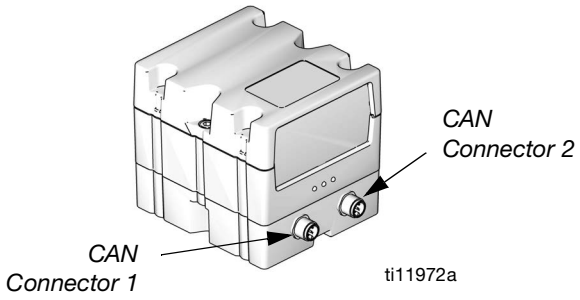


FIG. 2: Cable Connections

4. If used, connect the ethernet, DeviceNet, or PROFIBUS cable to the CGM as applicable. Connect the other end of the cable to the FieldBus device.

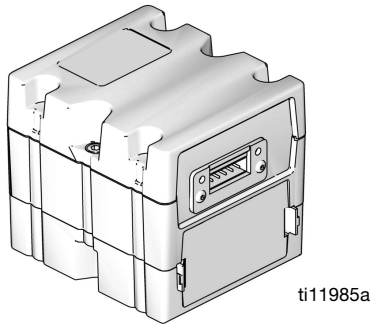


FIG. 3: Cable Connections

5. Connect cable (LC0032) to the MCM, port 2B, and a customer provided signal device. The signal device must have isolated, dry contacts.

6. Perform the Install or Update Data Map procedure in CGM manual 312864.

7. See **Available Internal Data** on page 9 for details on FieldBus pinout setup.

8. Perform **Setup** on page 5 to configure the fieldbus.

Setup

Gateway Screens

Fieldbus Screens	Page
PROFIBUS	5
PROFINET	6
DeviceNet	7
EtherNet/IP	7

The Gateway screens are used to configure the fieldbus. These screens are shown only if a CGM is correctly installed in your system. See **Installation** on page 3.

1. With the system on and enabled, press  to access the Setup screens.
2. Press the left arrow key once to navigate to the main Gateway screen. See FIG. 4.

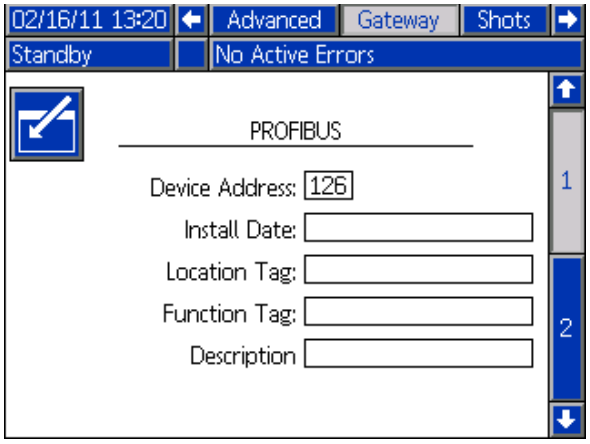


FIG. 4: Example Fieldbus Screen

PROFIBUS Fieldbus Screens

These screens are shown only if you have a PROFIBUS Fieldbus CGM installed. See **Kits** on page 2.

Screen 1

This screen enables the user to set the device address, install date, location tag, function tag, and description.

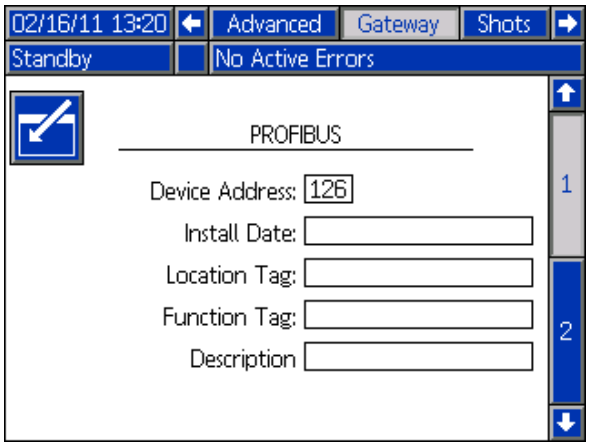


FIG. 5: PROFIBUS Fieldbus Screen 1

Screen 2

This screen displays the hardware revision, system serial number, and data map identification information.

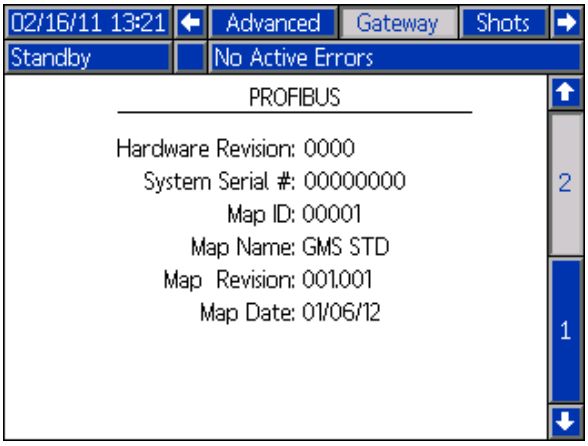


FIG. 6: PROFIBUS Fieldbus Screen 2

PROFINET Fieldbus Screens

These screens are shown only if you have a PROFINET Fieldbus CGM installed. See **Kits** on page 2.

Screen 1

This screen enables the user to set the IP address, DHCP settings, subnet mask, gateway, and DNS information.

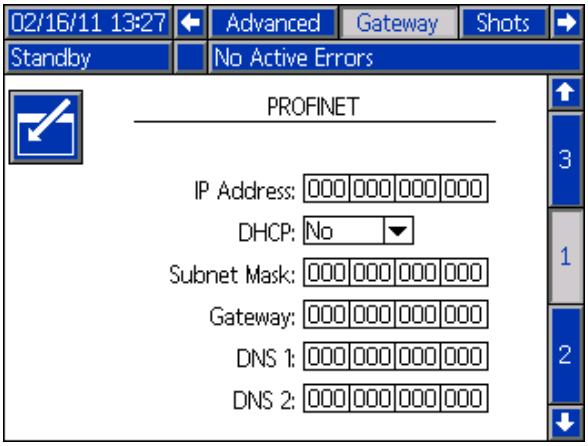


FIG. 7: PROFINET Fieldbus Screen 1

Screen 2

This screen enables the user to set the station name, install date, location tag, function tag, and description.

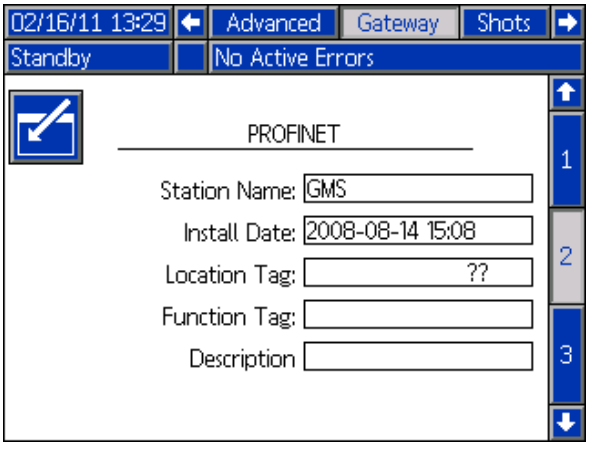


FIG. 8: PROFINET Fieldbus Screen 2

Screen 3

This screen displays the hardware revision, system serial number, and data map identification information.

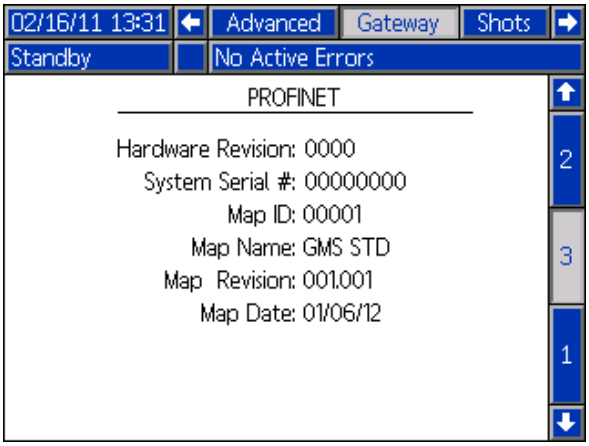


FIG. 9: PROFINET Fieldbus Screen 3

EtherNet/IP Fieldbus Screens

These screens are shown only if you have a EtherNet/IP Fieldbus CGM installed. See **Kits** on page 2.

Screen 1

This screen enables the user to set the IP address, DHCP settings, subnet mask, gateway, and DNS information.

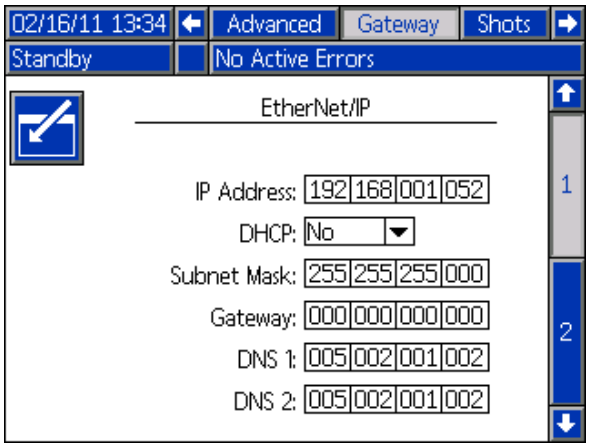


FIG. 10: EtherNet/IP Fieldbus Screen 1

Screen 2

This screen displays the hardware revision, system serial number, and data map identification information.

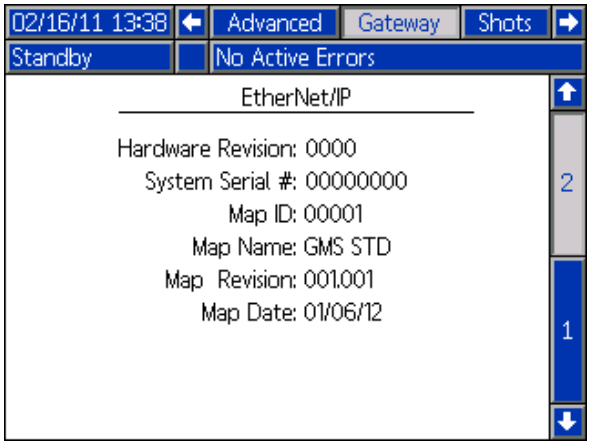


FIG. 11: EtherNet/IP Fieldbus Screen 2

DeviceNet Fieldbus Screen

This screen is shown only if you have a DeviceNet Fieldbus CGM installed. See **Kits** on page 2.

This screen enables the user to set the device address and baud rate, and to view the hardware revision, system serial number, data map identification information.

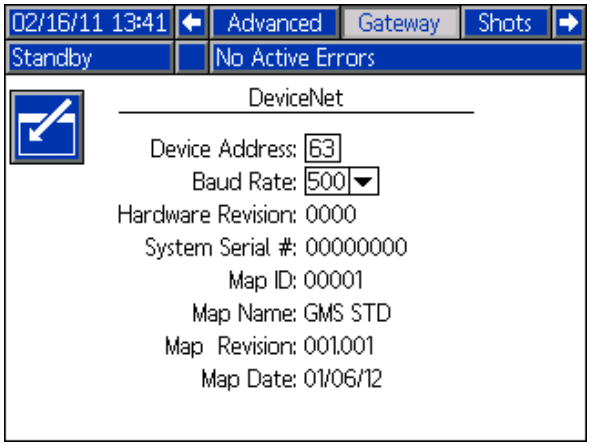


FIG. 12: DeviceNet Fieldbus Screen

Maintenance

Install Upgrade Tokens

NOTE: The Motor Control Module, Fluid Control Module, and Temperature Control Module connection to the system is temporarily disabled during the installation of upgrade tokens.

To install software upgrades:

1. Use correct software token stated in the table. See Graco Control Architecture™ Module Programming manual for instructions.

NOTE: Upgrade all modules in the system to the software version on the token, even if you are replacing only one or two modules. Different software versions may not be compatible.

All data in the module (System Settings, USB Logs, Recipes, Maintenance Counters) may be reset to factory default settings. Download all settings and user preferences to a USB before the upgrade, for ease of restoring them following the upgrade.

See manuals for locations of specific GCA components.

The software version history for each system can be viewed in the technical support section at www.graco.com.

Token	Application
16H821	**HFR**: - Communication Gateway Module

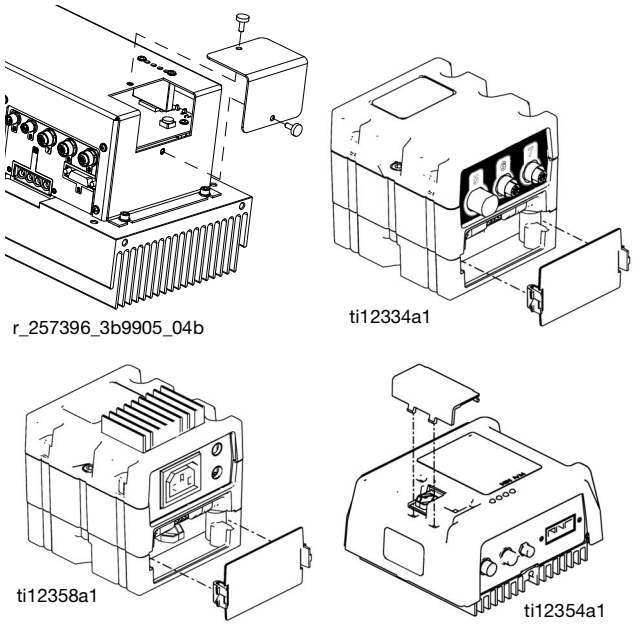


FIG. 13: Remove Access Cover

Available Internal Data

The following internal data with this system can be viewed (HFR outputs) and modified (PLC outputs) by your field-bus master.

NOTE: Refer to appropriate system manual for machine operation instructions.

	CGM Output from PLC Input (Read)																			
	Byte No.	Most Significant Byte								Least Significant Byte								Description	
		F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0		
0	0,1	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.0	0.7	0.6	0.5	0.4	0.3	0.2	0.1	0.0	Status	
1	2,3	3 SHOT NUMBER OR SEQUENCE. POSITION PART OF SHOT SEQUENCE								2 OPERATING MODE								Shot	Mode
2	4,5	5 CONDITIONING								4 SEQUENCE PART OF SHOT/SEQ								Cond.	Seq.
3	6,7	7 RED TANK FILL								6 BLUE TANK FILL								R Tank	B Tank
4	8,9	8,9,10,11 ERRORS TO ACKNOWLEDGE (ARRAY OF 2 WORDS)																Errors to Acknowledge	
5	10,11																		
6	12,13	13.7	13.6	13.5	13.4	13.3	13.2	13.1	13.0	12.7	12.6	12.5	12.4	12.3	12.2	12.1	12.0	Units	
7	14,15	14,15,16,17 FLOW RATE SET POINT (ARRAY OF 2 WORDS)																Flow Rate Set Point	
8	16,17																		
9	18,19	18,19,20,21 DISPENSE AMOUNT SET POINT (ARRAY OF 2 WORDS)																Dispense Amount Set Point	
10	20,21																		
11	22,23	22,23 MATERIAL RATIO SET POINT (1 WORD)																Ratio St PT	
12	24,25	24,25,26,27 RED PUMP PRESSURE ACTUAL (ARRAY OF 2 WORDS)																Red Pump Pressure Actual	
13	26,27																		
14	28,29	28,29,30,31 BLUE PUMP PRESSURE ACTUAL (ARRAY OF 2 WORDS)																Blue Pump Pressure Actual	
15	30,31																		
16	32,33	32,33,34,35 PUMP FLOW RATE ACTUAL (ARRAY OF 2 WORDS)																Flow Rate Actual	
17	34,35																		
18	36,37	36,37 MATERIAL RATIO ACTUAL (1 WORD)																Ratio Actual	
19	38,39	38,39,40,41 DISPENSE AMOUNT ACTUAL (ARRAY OF 2 WORDS)																Dispense Amount Actual	
20	40,41																		
21	42,43	42,43,44,45 DISPENSE DURATION ACTUAL (ARRAY OF 2 WORDS)																Dispense Duration Actual	
22	44,45																		
23	46,47	46,47 BLUE INLINE TEMPERATURE ACTUAL (1 WORD)																B Inline Act.	
24	48,49	48,49 BLUE HOSE TEMPERATURE ACTUAL (1 WORD)																B Hose Act.	
25	50,51	50,51 RED INLINE TEMPERATURE ACTUAL (1 WORD)																R Inline Act.	
26	52,53	52,53 RED HOSE TEMPERATURE ACTUAL (1 WORD)																R Hose Act.	
27	54,55	54,55 BLUE TANK TEMPERATURE ACTUAL (1 WORD)																B Tank Act.	
28	56,57	56,57 RED TANK TEMPERATURE ACTUAL (1 WORD)																R Tank Act.	
29	58,59	58,59 BLUE CHILLER TEMPERATURE ACTUAL (1 WORD)																B Chill Act.	
30	60,61	60,61 RED CHILLER TEMPERATURE ACTUAL (1 WORD)																R Chill Act.	
31	62,63	62,63 BLUE INLINE TEMPERATURE SETPOINT (1 WORD)																B Inline St Pt.	
32	64,65	64,65 BLUE HOSE TEMPERATURE SETPOINT (1 WORD)																B Hose St Pt.	
33	66,67	66,67, RED INLINE TEMPERATURE SET POINT (1 WORD)																R Inline St Pt.	
34	68,69	68,69 RED HOSE TEMPERATURE SETPOINT (1 WORD)																R Hose St Pt.	
35	70,71	70,71 BLUE TANK TEMPERATURE SETPOINT (1 WORD)																B Tank St Pt.	
36	72,73	72,73 RED TANK TEMPERATURE SETPOINT (1 WORD)																R Tank St Pt.	
37	74,75	74,75 BLUE CHILLER TEMPERATURE SETPOINT (1 WORD)																B Chill St Pt.	

	CGM Output from PLC Input (Read)																	
	Byte No.	**Most Significant Byte**								**Least Significant Byte**								**Description**
		F	**E**	**D**	**C**	**B**	**A**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	
38	**76,77**	76,77 RED CHILLER TEMPERATURE SETPOINT (1 WORD)																R Chill St Pt.
39	**78,79**	79 SCROLLING ERROR LOW WORD LOWBYTE								78 TANK LEVEL STATUS (1 BYTE)								S Error / Level
40	**80,81**	81SCROLLING ERROR HIGH WORD LOWBYTE								80 SCROLLING ERROR LOW WORD HIGH BYTE								S Error
41	**82,83**	83.7	83.6	83.5	83.4	83.3	83.2	83.1	83.0	82 SCROLLING ERROR HIGH WORD HIGH BYTE								Status / S Error

	PLC Output to CGM Input (Write)																	
	Byte No.	**Most Significant Byte**								**Least Significant Byte**								**Description**
		F	**E**	**D**	**C**	**B**	**A**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	
0	**0,1**	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.0	0.7	0.6	0.5	0.4	0.3	0.2	0.1	0.0	Status
1	**2,3**	3 SHOT PART OF SHOT/SEQ								2 OPERATING MODE								Shot / Mode
2	**4,5**	5 CONDITIONING								4 SEQUENCE PART OF SHOT/SEQ								Cond. / Seq.
3	**6,7**	7 RED TANK FILL								6 BLUE TANK FILL								R Tank / B Tank
4	**8,9**	8,9,10,11 ERRORS TO ACKNOWLEDGE (ARRAY OF 2 WORDS) (ECHO BACK)																Errors to Acknowledge
5	**10,11**																	
6	**12,13**	12,13,14,15 CHANGE FLOW RATE OR PRESSURE SET POINT (ARRAY OF 2 WORDS)																Flow Rate Set Point
7	**14,15**																	
8	**16,17**	16,17,18,19 CHANGE DISPENSE AMOUNT SET POINT (ARRAY OF 2 WORDS)																Dispense Amount Set Point
9	**18,19**																	
10	**20,21**	20,21 NOT USED (1 WORD)																N/A
11	**22,23**	22,23 CHANGE TEMPERATURE SET POINT IN 0.1 UNITS																Temp St Pt
12	**24,25**	24,25 SELECT TEMPERATURE ZONE TO CHANGE																Temp zone
13	**26**									26 TOGGLE SYSTEM POWER CHANGE (1 BYTE)								Power

HFR Output to PLC Inputs for Monitoring Descriptions

Byte	Bit	Data Type	State or Range	HFR Output to PLC Inputs for Monitoring Description
0	0	Bit	Square Wave Heart Beat: CGM initiates a square wave that toggles every 3 sec. The PLC must follow the heartbeat. If the heart beat is lost from the PLC or CGM then the system will shutdown if the CGM/PLC is controlling the HFR. If the PLC does not detect the heartbeat then the PLC should cycle the PLC output bit HI/LO in attempt to establish the heartbeat from the CGM.	
			0	Heartbeat pulse off
			1	Heartbeat pulse on
	1		Dispense Status: Monitor Only: On Circulation systems, this indicates that a dispense is pending or in progress (or when pre-dispense timer is active and during a dispense).On an L-head system Dispense Valve is considered open until the end of the clean out cycle. On other types of systems the bit will indicate a dispense is active. Note: Do not use for new designs. Use byte 83 bit 7.	
			0	Dispense not active
			1	Dispense active
	2		Dispense Valve Position: Used for diagnostics only. Not to be used to control a dispensed shot. Note: Do not use for new designs. Use byte 83 bit 7.	
			0	Dispense valve closed
			1	Dispense valve open
	3		Not used.	
			0	N/A
			1	N/A
	4		Pump Parked: Parking the pump involves moving the Red pump to the position which the pump shaft is least exposed to the atmosphere. System must be in Standby mode. Chemical will dispense out of the dispense valve if it is not a circulating system.	
			0	Not parked
			1	Parked
	5		Dispense Valve Lockout/Circulation Control: Used to lock out the dispense valve or configure circulation mode (if circulation valves are installed) when in standby, operator, shot or sequence modes only. If the PLC is controlling the dispense valve directly (P2/ Fusion DV option), operator mode only is available.	
			0	Unlocked
			1	Locked out
	6		Mix Head Cleanout: Used for L-Head systems cleanout /diagnostics only.	
			0	Cleanout is open
			1	Cleanout is closed
	7		System Startup Bit: Bit will initiate a controlled startup of the system. The temperature conditioning zones will be initiated when the bit is high. Low pressure recirculation is also enabled when the bit is set (Standby and night modes). Turning off this bit will turn OFF the temperature conditioning zones and circulation. For stall to pressure systems with a manual dispense valve, setting this bit will configure the pumps to stall to the pressure set point. For stall to pressure systems with a manual dispense valve, setting this bit will configure the pumps to stall to the pressure set point.	
			0	System startup is on
			1	system startup is off

Byte	Bit	Data Type	State or Range	HFR Output to PLC Inputs for Monitoring Description
1	0	Bit	Not used.	
			0	N/A
			1	N/A
	1		Not used.	
			0	N/A
			1	N/A
	2		Base Purge: Only valid for HFR's with MCM Software, U82329. The system must be in Standby Mode to get into Base Purge Mode.	
			0	N/A
			1	N/A
	3		Recirc Status: Valid for full circulation systems only. Indicates status of the pumping system when in circulation. If system is in low pressure recirc the pumps will shift to High pressure circ and then start the pre-dispense time. When the pre-dispense time expires, user can request dispenses. After expiration of post-dispense time, the system will return to low pressure modes. Pre and post dispense times are settable on the ADM system-2 sub screens.	
			0	Low pressure recirc on
			1	High pressure recirc on
	4		Purge Alarm: Indicates the status up the purging routine. Monitor only.	
			0	Purge shot not active
			1	Purge shot active
	5		PLC Disables Dispensing: PLC enables / disables dispensing from the GCA controller, footswitch or remote start via the MCM.	
			0	Dispensing enabled
			1	Dispensing disabled
	6		PLC Control: Monitor whether the PLC (CGM) has control of the system or the ADM has control of the system. If in PLC control, the ADM control keys will be disabled, user will not be able to enter the setup screens, but system information will still be visible on the ADM. When commanded to PLC control, the user should navigate away from the main home screen, then back for the screen to update.	
			0	ADM has control/CGM only monitors
			1	CGM has control
	7		Not used.	
			0	N/A
			1	N/A

Byte	Bit	Data Type	State or Range	HFR Output to PLC Inputs for Monitoring Description
2		Integer	System Mode Select (Operating Mode): Monitor the various modes of the dispensing system. CGM feedbacks the status of the system to the PLC. Night mode is only available on standard HFRs with full circulation, or Semi-automatic circulation valves installed. If using a manually controlled dispense valve (P2/ Fusion DV Option), shot and sequence modes are not available.	
			1	DISABLED mode
			2	STANDBY mode
			3	SHOT mode
			4	SEQUENCE mode
			5	OPERATOR mode
			6	N/A
			7	NIGHT mode
3		Integer	Selected Shot/Sequence Position Number: In Shot Mode, monitors the Active Shot number. In Sequence Mode, monitors the Active Sequence position number.	
			1-100	Shot mode
			1-20	Sequence mode
4		Integer	Selected sequence: In Sequence mode, set the active sequence.	
			1-5	Active sequence
5	0	Bit	Monitor Red Tank Heater	
			0	Red tank heater disabled
			1	Red tank heater enabled
	1		Monitor Blue Tank Heater	
			0	Blue tank heater disabled
			1	Blue tank heater enabled
	2		Monitor Red Inline Heater	
			0	Red inline heater disabled
			1	Red inline heater enabled
	3		Monitor Blue Inline Heater	
			0	Blue inline heater disabled
			1	Blue inline heater enabled
	4		Monitor Red Hose Heater	
			0	Red hose heater disabled
			1	Red hose heater enabled
	5		Monitor Blue Hose Heater	
			0	Blue hose heater disabled
			1	Blue hose heater enabled
	6		Monitor Red Chiller	
			0	Red chiller disabled
			1	Red chiller enabled
	7		Monitor Blue Chiller	
			0	Blue chiller disabled
			1	Blue chiller enabled

Byte	Bit	Data Type	State or Range	HFR Output to PLC Inputs for Monitoring Description
6	0	Bit	Blue Tank Fill: Monitors if the Blue Tank is Filling	
			0	Blue tank is not filling
			1	Blue tank is filling
	1		Not Used	
			0	N/A
			1	N/A
	2		Not Used	
			0	N/A
			1	N/A
	3		Not Used	
			0	N/A
			1	N/A
	4		Not Used	
			0	N/A
			1	N/A
	5		Not Used	
			0	N/A
			1	N/A
	6		Not Used	
			0	N/A
			1	N/A
	7		Not Used	
			0	N/A
			1	N/A

Byte	Bit	Data Type	State or Range	HFR Output to PLC Inputs for Monitoring Description
7	0	Bit	Red Tank Fill: Monitors if the Red Tank is Filling	
			0	Red tank is not filling
			1	Red tank is filling
	1		Not Used	
			0	N/A
			1	N/A
	2		Not Used	
			0	N/A
			1	N/A
	3		Not Used	
			0	N/A
			1	N/A
	4		Not Used	
			0	N/A
			1	N/A
	5		Not Used	
			0	N/A
			1	N/A
	6		Not Used	
			0	N/A
			1	N/A
	7		Not Used	
			0	N/A
			1	N/A
8, 9, 10, 11		ASCII	Errors requiring acknowledgment are presented on first in first out basis. The latest error is currently in the error register in the CGM. The PLC must send back the exact ASCII value for the error to be acknowledged in the CGM. If an incorrect ASCII error code is sent back to the CGM then the error will not clear and the CGM register will be overwritten with the incorrect error. If multiple error codes exist, then the PLC must acknowledge them in the order the errors are sent to the PLC from the CGM.	
			ASCII value for each Byte: Example Error A9C1 = Motor Over-current: Byte 8 = A Byte 9 = 9 Byte 10 = C Byte 11 = 1	

Byte	Bit	Data Type	State or Range	HFR Output to PLC Inputs for Monitoring Description
12	0	Bit	Units and operating Information: Volume Units 10 (bits) 00 = Gallons 01 = cc's 10 = Liter	
	1			
	2		Units and operating Information: Weight Units 32 (bits) 00 = Grams 01 = Kilograms 10 = Pounds	
	3			
	4		Units and operating Information: Pressure Units 54 (bits) 00 = Bar 01 = psi 10 = Mpa	
	5			
	6		Units and operating Information: Temperature Units	
			0	Fahrenheit
			1	Celsius
	7		Units and operating Information: Flow Unit	
			0	Volume
			1	Weight

Byte	Bit	Data Type	State or Range	HFR Output to PLC Inputs for Monitoring Description
13	0		Units and Operating Information: Rate Unit	
			0	Minute
			1	Second
	1		Units and Operating Information: Control Mode	
			0	Pressure
			1	Flow
	2		Units and Operating Information: Dispense Mode 32 (bits) 00 = Time 01 = Volume 10 = Weight	
	3			
	4		Not Used	
			0	N/A
			1	N/A
	5		Not Used	
			0	N/A
			1	N/A
	6		Not Used	
			0	N/A
			1	N/A
	7		Not Used	
			0	N/A
			1	N/A
14, 15, 16, 17		Double Integer	Flow Rate (or pressure if in constant pressure mode) Set point: Integer value of the flow rate set point if dispensing. This value does not reflect the flow rate set point if the system is recirculating material with the recirculation option.	
			The value from the CGM is an integer and must be multiplied by 0.0001 for the requested flow rate to be in system units. Example: Double word 14 = 291234 = 29.1234cc/sec (unit chosen is cc/sec)	
18, 19, 20, 21,		Double Integer	Dispense Amount (Shot Size) Set point: Integer value of the Dispense amount set point in the dispensing system.	
			The value from the CGM is an integer and must be multiplied by 0.001 for the requested dispense amount to be in system units. Example: Double word 18 = 5002499 = 5002.499cc (unit chosen is cc)	
22, 23		Integer	Ratio Set point: Integer value of the Red / Blue Material Ratio set point in the dispensing system. Note this value is dependent on the pump sizes and does not vary.	
			The value from the CGM is an integer and must be multiplied by 0.01 for the requested ratio to be in system units. xx.xx: 1 where xx.xx is Red and 1 is Blue Example: Word 22 = 2400 = 24.00:1 (red pump = 120, blue pump = 5)	
24, 25, 26, 27		Double Integer	Red Pump Pressure Actual: Integer value of the actual Red pump pressure.	
			The value from the CGM is an integer and must be multiplied by 0.0001 for the actual pressure to be in system units. Example: Double word 12345678 = 1234.5678psi (unit chosen is psi)	

Byte	Bit	Data Type	State or Range	HFR Output to PLC Inputs for Monitoring Description
28, 29, 30, 31		Double Integer		Blue Pump Pressure Actual: Integer value of the actual Blue pump pressure. The value from the CGM is an integer and must be multiplied by 0.0001 for the actual pressure to be in system units. Example: Double word 7561234 = 756.1234psi (unit chosen is psi)
32, 33, 34, 35		Double Integer		Flow Rate Actual: Integer value of the actual Flow Rate. The value from the CGM is an integer and must be multiplied by 0.0001 for the actual flow rate to be in system units. Example: Double word 259876 = 25.9876cc/sec (unit chosen is cc/sec)
36, 37		Integer		Ratio Value Actual: Integer value of the actual Material Ratio. Note this only can be monitored if the ratio monitoring option (flow meters) is installed. The value from the CGM is an integer and must be multiplied by 0.01 for the actual ratio to be in system units. xx.xx : 1 where xx.xx is Red and 1 is Blue. Example: Word 36 = 2368 = 23.68:1
38, 39, 40, 41		Double Integer		Dispense Amount Actual: Integer value of the actual dispense amount (shot size). The value from the CGM is an integer and must be multiplied by 0.001 for the actual dispense amount to be in system units. Example: Double word 875240 = 875.240cc (unit chosen is cc)
42, 43, 44, 45		Double Integer		Dispense Duration Actual: Integer value (mS) if the actual time the dispense lasts. The value from the CGM is an integer in milliseconds (1 second = 1000 mS). Example: Double Word 5695 = 5695mS = 5.695 sec
46, 47		Integer		Blue Inline Temperature Actual: Integer value of the actual Blue inline temperature. Depending on the system set up this is read in °C or °F The value from the CGM is an integer and must be multiplied by 0.1 for the actual temperature. Example: Word 46 = 1025 = 102.5°F (unit chosen is °F)
48, 49		Integer		Blue Hose Temperature Actual: Integer value of the actual Blue hose temperature. Depending on the system set up this is read in °C or °F The value from the CGM is an integer and must be multiplied by 0.1 for the actual temperature. Example: Word 48 = 1056 = 105.6°F (unit chosen is °F)
50, 51		Integer		Red Inline Temperature Actual: Integer value of the actual Red inline temperature. Depending on the system set up this is read in °C or °F The value from the CGM is an integer and must be multiplied by 0.1 for the actual temperature. Example: Word 50 = 985 = 98.5°F (unit chosen is °F)
52, 53		Integer		Red Hose Temperature Actual: Integer value of the actual Red hose temperature. Depending on the system set up this is read in °C or °F The value from the CGM is an integer and must be multiplied by 0.1 for the actual temperature. Example: Word 52 = 780 = 78.0°F (unit chosen is °F)
54, 55		Integer		Blue Tank Temperature Actual: Integer value of the actual Blue tank temperature. Depending on the system set up this is read in °C or °F The value from the CGM is an integer and must be multiplied by 0.1 for the actual temperature. Example: Word 54 = 1157 = 115.7°F (unit chosen is °F)
56, 57		Integer		Red Tank Temperature Actual: Integer value of the actual Red tank temperature. Depending on the system set up this is read in °C or °F The value from the CGM is an integer and must be multiplied by 0.1 for the actual temperature. Example: Word 56 = 322 =32.2°C (unit chosen is °C)

Byte	Bit	Data Type	State or Range	HFR Output to PLC Inputs for Monitoring Description
58, 59		Integer		Blue Chiller Temperature Actual: Integer value of the actual Blue chiller temperature. Depending on the system set up this is read in °C or °F The value from the CGM is an integer and must be multiplied by 0.1 for the actual temperature. Example: Word 58 = 345 = 34.5°C (unit chosen is °C)
60, 61		Integer		Red Chiller Temperature Actual: Integer value of the actual Red chiller temperature. Depending on the system set up this is read in °C or °F The value from the CGM is an integer and must be multiplied by 0.1 for the actual temperature. Example: Word 60 = 238 = 23.8°C (unit chosen is °C)
62, 63		Integer		Blue Inline Temperature Set Point: Integer value of the Blue inline temperature set point. Depending on the system set up this is read in °C or °F The value from the CGM is an integer and must be multiplied by 0.1 for the actual temperature. Example: Word 62 = 1000 = 100.0°F (unit chosen is °F)
64, 65		Integer		Blue Hose Temperature Set Point: Integer value of the Blue hose temperature set point. Depending on the system set up this is read in °C or °F The value from the CGM is an integer and must be multiplied by 0.1 for the actual temperature. Example: Word 64 = 950 = 95.0°F (unit chosen is °F)
66, 67		Integer		Red Inline Temperature Set Point: Integer value of the Red inline temperature set point. Depending on the system set up this is read in °C or ° The value from the CGM is an integer and must be multiplied by 0.1 for the actual temperature. Example: Word 66 = 900 = 90.0°F (unit chosen is °F)
68, 69		Integer		Red Hose Temperature Set Point: Integer value of the Red hose temperature set point. Depending on the system set up this is read in °C or °F The value from the CGM is an integer and must be multiplied by 0.1 for the actual temperature. Example: Word 68 = 1100 = 110.0°F (unit chosen is °F)
70, 71		Integer		Blue Tank Temperature Set Point: Integer value of the Blue tank temperature set point. Depending on the system set up this is read in °C or °F The value from the CGM is an integer and must be multiplied by 0.1 for the actual temperature. Example: Word 70 = 1050 = 105.0°F (unit chosen is °F)
72, 73		Integer		Red Tank Temperature Set Point: Integer value of the Red tank temperature set point. Depending on the system set up this is read in °C or °F The value from the CGM is an integer and must be multiplied by 0.1 for the actual temperature. Example: Word 72 = 300 = 30.0°C (unit chosen is °C)
74, 75		Integer		Blue Chiller Temperature Set Point: Integer value of the Blue chiller temperature set point. Depending on the system set up this is read in °C or °F The value from the CGM is an integer and must be multiplied by 0.1 for the actual temperature. Example: Word 74 = 320 = 32.0°C (unit chosen is °C)
76, 77		Integer		Red Chiller Temperature Set Point: Integer value of the Red chiller temperature set point. Depending on the system set up this is read in °C or °F The value from the CGM is an integer and must be multiplied by 0.1 for the actual temperature. Example: Word 76 = 350 = 35.0°C (unit chosen is °C)

Byte	Bit	Data Type	State or Range	HFR Output to PLC Inputs for Monitoring Description
78	0 1 2 3 4 5 6 7	Bit	Tank Material Level Status: The state of the level switches on the tank. 76543210 (bits) 00000001 = Blue Tank Level Low On 00000010 = Blue Tank Level Middle On 00000100 = Blue Tank Level High On 00010000 = Red Tank Level Low On 00100000 = Red Tank Level Middle On 01000000 = Red Tank Level High On	
79, 80, 81, 82		ASCII	Errors requiring acknowledgment are presented on first in first out basis. The latest error is currently in the error register in the CGM. The PLC must send back the exact ASCII value for the error to be acknowledged in the CGM. If an incorrect ASCII error code is sent back to the CGM then the error will not clear and the CGM register will be overwritten with the incorrect error. If multiple error codes exist, then the PLC must acknowledge them in the order the errors are sent to the PLC from the CGM.	
			ASCII value for each Byte: Example Error L6A1 = Red Auto Fill Refill Timeout: Byte 79 = L Byte 80 = 6 Byte 81 = A Byte 82 = 1	
83	0	Bit	Not Used	
			0	N/A
			1	N/A
	1		Not Used	
			0	N/A
			1	N/A
	2		Not Used	
			0	N/A
			1	N/A
	3		Not Used	
			0	N/A
			1	N/A
	4		ADM Status: System Power Status	
			0	Power OFF
			1	Power ON
	5		ADM Status: Dispense System Ready to Dispense	
			0	Not Ready
			1	Ready
	6		ADM Status: Dispense System Ready for External Requests	
			0	Not Ready
			1	Ready
	7		Dispense Valve Open, Dispense Active	
			0	Dispense Valve Closed, Dispense Not Active
			1	Dispense Valve Open, Dispense is Active

PLC Outputs to CGM Inputs for PLC Control Descriptions

Byte	Bit	Data Type	State or Range	PLC Outputs to CGM Inputs for PLC Control Description
0	0	Bit	Square Wave Heart Beat: CGM initiates a square wave that toggles every 3 sec. The PLC must follow the heartbeat. If the heart beat is lost from the PLC or CGM then the system will shutdown if the CGM/PLC is controlling the HFR. If the PLC does not detect the heartbeat then the PLC should cycle the PLC output bit HI/LO in attempt to establish the heartbeat from the CGM.	
			0	Heartbeat pulse off
			1	Heartbeat pulse on
	1		Dispense Status: Monitor Only: On Circulation systems, this indicates that a dispense is pending or in progress (or when pre-dispense timer is active and during a dispense).On an L-head system Dispense Valve is considered open until the end of the clean out cycle. On other types of systems the bit will indicate a dispense is active.	
			0	Dispense not active
			1	Dispense active
	2		Dispense Valve Position: Used for diagnostics only. Not to be used to control a dispensed shot. This command only works if the system is in standby mode.	
			0	Dispense valve closed
			1	Dispense valve open
	3		Not Used	
			0	N/A
			1	N/A
	4		Pump Parked: Parking the pump involves moving the Red pump to the position which the pump shaft is least exposed to the atmosphere. System must be in Standby mode. Chemical will dispense out of the dispense valve if it is not a circulating system.	
			0	Not parked
			1	Parked
	5		Dispense Valve Lockout/Circulation Control: Used to lock out the dispense valve or configure circulation mode (if circulation valves are installed) when in standby, operator, shot or sequence modes only. If the PLC is controlling the dispense valve directly (P2/ Fusion DV option), operator mode only is available.	
			0	Unlocked
			1	Locked out
	6		Mix Head Cleanout: Used for L-Head systems cleanout /diagnostics only.	
			0	Cleanout is open
			1	Mis head cleanout closed
	7		System Startup Bit: Bit will initiate a controlled startup of the system. The temperature conditioning zones will be initiated when the bit is high. Low pressure recirculation is also turned on when the bit is set in a full circulation system. Turning off this bit will turn off the temperature conditioning zones and circulation. For stall to pressure systems with a manual dispense valve, setting this bit will configure the pumps to stall to the pressure set point. Setting this bit is similar to pressing the mix head installed key when in night or standby modes. If the PLC is controlling the dispense valve directly (P2 / Fusion DV option only), setting this bit is similar to pressing the green start key on the ADM. If the “Auto Circulate Between Dispenses” function is active, setting or clearing this bit will start or stop the circulation.	
			0	System startup is on
			1	System startup is off

Byte	Bit	Data Type	State or Range	PLC Outputs to CGM Inputs for PLC Control Description
1	0	Bit	Not Used	
			0	N/A
			1	N/A
	1		Not Used	
			0	N/A
			1	N/A
	2		Base Purge: Only valid for HFR's with MCM Software, U82329. The system must be in Standby Mode to get into Base Purge Mode.	
			0	N/A
			1	N/A
	3		Recirc Status: Valid for full circulation systems only. Indicates status of the pumping system when in circulation. If system is in low pressure recirc the pumps will shift to High pressure circ and then start the pre-dispense time. When the pre-dispense time expires, user can request dispenses. After expiration of post-dispense time, the system will return to low pressure modes. Pre and post dispense times are settable on the ADM system-2 sub screens.	
			0	Low pressure recirc on
			1	High pressure recirc on
	4		Purge Alarm: Indicates the status up the purging routine. Monitor only.	
			0	Purge shot not active
			1	Purge shot active
	5		PLC Disables Dispensing: PLC enables / disables dispensing from the GCA controller, footswitch or remote start via the MCM.	
			0	Dispensing enabled
			1	Dispensing disabled
	6		PLC Control: Monitor whether the PLC (CGM) has control of the system or the ADM has control of the system. If in PLC control, the ADM control keys will be disabled, user will not be able to enter the setup screens, but system information will still be visible on the ADM. When commanded to PLC control, the user should navigate away from the main home screen, then back for the screen to update.	
			0	ADM has control/CGM only monitors
			1	CGM has control
	7		Not Used	
			0	N/A
			1	N/A

Byte	Bit	Data Type	State or Range	PLC Outputs to CGM Inputs for PLC Control Description
2		Integer	System Mode Select (Operating Mode): Monitor the various modes of the dispensing system. CGM feedbacks the status of the system to the PLC. Night mode is only available on standard HFRs with full circulation, or Semi-automatic circulation valves installed. If using a manually controlled dispense valve (P2/ Fusion DV Option), shot and sequence modes are not available.	
			1	DISABLED Mode
			2	STANDBY Mode
			3	SHOT Mode
			4	SEQUENCE Mode
			5	OPERATOR Mode
			6	N/A
			7	NIGHT Mode
3		Integer	Selected Shot/Sequence Position Number: In Shot Mode, , sets the active shot number (1-100). In sequence mode, sets the active sequence position number (1-20). The selected shot number or sequence position has to contain valid data before the HFR will accept the request.	
			1-100	Shot Mode
			1-20	Sequence Mode
4		Integer	Selected sequence: In Sequence mode, set the active sequence (1-26 for sequences A- Z). The selected sequence needs to contain a sequence of shot numbers programmed into the ADM screen before the HFR will accept the selected sequence number. This register is ignored in other modes.	
			1-26	Active Sequence

Byte	Bit	Data Type	State or Range	PLC Outputs to CGM Inputs for PLC Control Description
5	0	Bit	Enable/Disable Red Tank Heater	
			0	Disable red tank heater
			1	Enable red tank heater
	1		Enable/Disable Blue Tank Heater	
			0	Disable blue tank heater
			1	Enable blue tank heater
	2		Enable/Disable Red Inline Heater	
			0	Disable red inline heater
			1	Enable red inline heater
	3		Enable/Disable Blue Inline Heater	
			0	Disable blue inline heater
			1	Enable blue inline heater
	4		Enable/Disable Red Hose Heater	
			0	Disable red hose heater
			1	Enable red hose heater
	5		Enable/Disable Blue Hose Heater	
			0	Disable blue hose heater
			1	Enable blue hose heater
	6		Enable/Disable Red Chiller	
			0	Disable red chiller
			1	Enable red chiller
	7		Enable/Disable Blue Chiller	
			0	Disable blue chiller
			1	Enable blue chiller

Byte	Bit	Data Type	State or Range	PLC Outputs to CGM Inputs for PLC Control Description
6	0	Bit	Blue Tank Fill: Initiates a fill valve open. This bit can be used to initiate a manual fill cycle or an auto fill cycle if the auto fill mode is selected. The tank fill valve will close upon reaching the high level switch. See Byte 78 for tank level status. If the Tank fill bit is maintained the GCA will close the valve when the tank is full. Will time out and alarm if the High level is not reached within a preset time.	
			0	Set blue tank fill to inactive
			1	Begin filling blue tank
	1		Not Used	
			0	N/A
			1	N/A
	2		Not Used	
			0	N/A
			1	N/A
	3		Not Used	
			0	N/A
			1	N/A
	4		Not Used	
			0	N/A
			1	N/A
	5		Not Used	
			0	N/A
			1	N/A
	6		Not Used	
			0	N/A
			1	N/A
	7		Not Used	
			0	N/A
			1	N/A

Byte	Bit	Data Type	State or Range	PLC Outputs to CGM Inputs for PLC Control Description
7	0	Bit	Red Tank Fill: Initiates a fill valve open. This bit can be used to initiate a manual fill cycle or an auto fill cycle if the auto fill mode is selected. The tank fill valve will close upon reaching the high level switch. See Byte 78 for tank level status. If the Tank fill bit is maintained the GCA will close the valve when the tank is full. Will time out and alarm if the High level is not reached within a preset time.	
			0	Set red tank fill to inactive
			1	Begin filling red tank
	1		Not Used	
			0	N/A
			1	N/A
	2		Not Used	
			0	N/A
			1	N/A
	3		Not Used	
			0	N/A
			1	N/A
	4		Not Used	
			0	N/A
			1	N/A
	5		Not Used	
			0	N/A
			1	N/A
	6		Not Used	
			0	N/A
			1	N/A
	7		Not Used	
			0	N/A
			1	N/A
8, 9, 10, 11		ASCII	Errors requiring acknowledgment are presented on first in first out basis. The latest error is currently in the error register in the CGM. The PLC must send back the exact ASCII value for the error to be acknowledged in the CGM. If an incorrect ASCII error code is sent back to the CGM then the error will not clear and the CGM register will be overwritten with the incorrect error. If multiple error codes exist, then the PLC must acknowledge them in the order the errors are sent to the PLC from the CGM.	
			Send the PLC back the same ASCII value in input bytes 8,9,10,11: Example Error CUCN = Gateway Heart Beat Error: Byte 9 = C Byte 10 = U Byte 11 = C Byte 12 = N	

Byte	Bit	Data Type	State or Range	PLC Outputs to CGM Inputs for PLC Control Description
12, 13, 14, 15		Double Integer	Change Flow Rate or Pressure Set Point: Changes the flow or pressure set point if in operator mode, or the flow or pressure set point for the selected shot number if in shot mode. The set point change is either pressure or flow depending if the HFR is configured to constant pressure or flow mode. This register is for only setting the rate (flow or pressure) when dispensing. It can not be used to set the flow rate if the HFR is circulating material.	
			The PLC value to the CGM is an integer and must be multiplied by 1000 for the requested flow rate to be in system units. Example: Flow Rate desired is 17.125 cc/sec. Send double word 14 = 17125 (unit chosen is cc/sec)	
16, 17, 18, 19		Double Integer	Change Dispense Amount Set Point: Changes the current shot selected to a new dispense amount (shot size). The value sent to the CGM must be an integer. Units depend on what is chosen in the system setup.	
			The PLC value to the CGM is an integer and must be multiplied by 1000 for the requested flow rate to be in system units. Example: Dispense Amount desired is 150 grams. Send double word 18 = 150000 (unit chosen is grams)	
20		Byte	Not Used	
				N/A
21		Byte	Not Used	
				N/A
22, 23		Integer	Change the Temperature Set Point: Changes zone selected to a temperature in °C. The value sent to the CGM must be an integer. Units are °C regardless of the units chosen in the system setup. Note the temperature set points are limited by the temperature high and low alarm values. The alarm set points must be greater than 10 degrees from the requested set point. If the alarm is closer than 10 degrees the requested set point will be ignored. Note these bytes are combined with bytes 24,25 (zone to change).	
			The PLC value is xx.x and must be multiplied by 10 prior to being sent to the CGM. The value must be in °C. Example: Change Red Hose Temperature to 102°F. Send 238 (23.8°C) to the CGM along with the zone (see bytes 24,25)	

Byte	Bit	Data Type	State or Range	PLC Outputs to CGM Inputs for PLC Control Description
24, 25		Integer		Change the Temperature zone: Changes zone in which the temperature set point will be changed. Note these bytes are combined with bytes 22,23 (temperature to change). When changing a heat zone, select the appropriate zone number which will enable the CGM to write a new temperature set point to the heat zone selected. Only 1 heat zone can be selected at a time. Bytes 24,25 (MSW) + 22,23 (LSW) are combined to form a double word from the PLC output to CGM input.
				0 = Red Tank Heater 1 = Blue Tank Heater 2 = Red Inline Heater 3 = Blue Inline Heater 4 = Red Hose Heater 5 = Blue Hose Heater 6 = Red Chiller 7 = Blue Chiller 8 = Blue Inline Heater High Temperature Limit 9 = Blue Inline Low Temperature Limit 10 = Red Inline High temperature Limit 11 = Red Inline Low Temperature limit Example: Change Red Hose Temperature to 102°F. Send integer "4" to word 24 and combine with integer "238" in word 22 (23.8°C) to the CGM (see bytes 22,23).
26		Integer		Toggle System Power: Turn the system OFF or ON by changing the existing value in this byte. System power is ON when the ADM is in any active mode. System power is OFF when the power LED is in the yellow state. See Input Bit 83.4 for System Power Status.
				To turn the System power ON or OFF, write a different value to the System Power byte. Changing the value will toggle the state from ON to OFF or OFF to ON. Example: If the power is ON sending word 26 a "5" will turn the power OFF. To turn the power back ON, Send any value other than a "5".

Controlling Device

CGM Control and Night Mode

When the controlling device sets the HFR into night mode using the CGM, the controlling device will be responsible for turning on and off the pumps accordingly (by setting or clearing the “SYSTEM STARTUP BIT”, or bit 7 bytes 1-2) when the “CGM Control Enabled” bit is set (Bit 14, bytes 1-2). Any active night mode periodic or time of day timer will be over-ridden by the controlling device when the corresponding timer expires within the Advanced Display Module (ADM). If the controlling device clears the “CGM Control Enabled” bit after setting the HFR into night mode, the night mode timers will operate properly and condition the dispense material accordingly.

CGM Control and Parking the Pumps

After the HFR is set to Standby mode, the controlling device (and user by pressing the footswitch) will have the option to park the pumps. When the pumps are parked, the red material pump shaft will be immersed into the red material, hence preventing exposure of the shaft and red material on the shaft to the atmosphere.

If the system is a full circulation based system, the controller device will need to have the pumps cycling in low pressure mode (by setting the “SYSTEM STARTUP BIT”, or bit 7 bytes 1-2) prior to setting the “Pump Parked” bit (bit 4, bytes 1-2). For a standard HFR, the user will have to remove the “SYSTEM STARTUP BIT” immediately after the pump reaches the parked position. For a recirculation type system, the pump will remain in the park position, and ignore an active “SYSTEM STARTUP BIT” request. For a recirculation type system, to exit a parked state, the controlling device will need to clear the “Pump Parked” bit, then set the “SYSTEM STARTUP BIT” from a cleared state. When this occurs, the pumps will start cycling in the last low pressure flow rate executed.

If the system is a stall to pressure type system, the controlling device simply needs to set the “Pump Parked” bit from an idle state, then the pumps will move to the parked position. If the system has a manual dispense valve, the user will need to ensure the pump pressures are less than approximately 391 psi (2.7 MPa, 27 bar) prior to setting the “Pump Parked” bit, and ensure either the dispense valve is opened, or the material is diverted out of the pressure relief valves at the material manifold.

ADM Screen Information when CGM Control is Started or ended

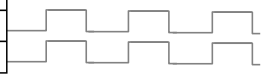
When the user or controlling device sets or clears the “CGM Control Enabled” bit, information provided on the ADM display may or may not be current. If the user navigates away, then back to the main home run screen, the information provided will be current.

Timing Diagrams

The following diagrams show the signal sequence of the CGM communication.

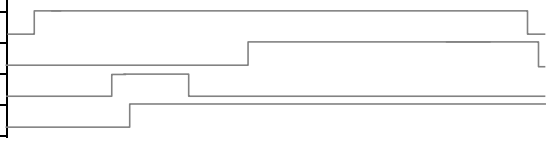
Heart Beat Timing Diagram

Heart Beat	CGM Input Bytes /Bit	CGM Output
CGM HB - Normal	I/O	
PLC HB - Normal		I/O



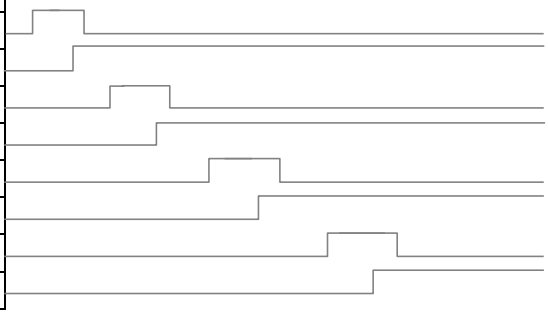
System Power Bit Diagram

System Power Bit	CGM Input Bytes /Bit	CGM Output
Set CGM Control	2/7	
Verify CGM Control		2/7
System Power ON	27	
Verify System Power ON		84/0



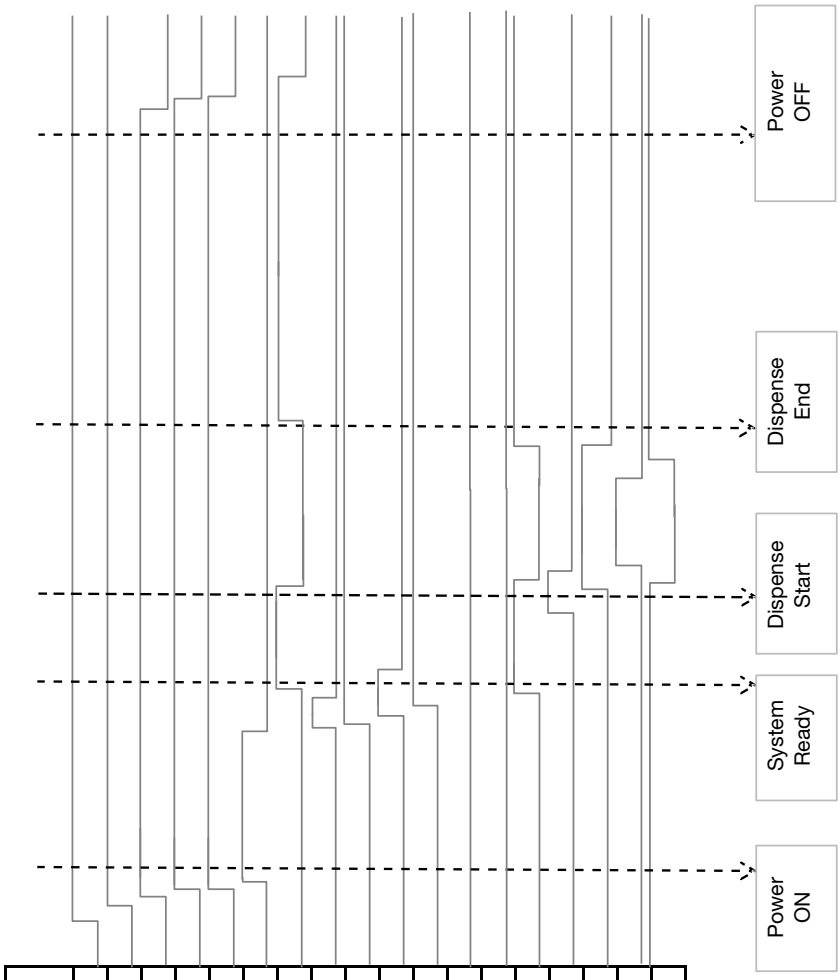
Shot Setup - Change Diagram

Shot Setup - Change	CGM Input Bytes /Bit	CGM Output
Select Shot Mode	3	
Verify Shot Mode		3
Select Shot Number	4	
Verify Shot Number		4
Set Flow Rate	13-16	
Verify Flow Rate		13-16
Set Shot Size	17-20	
Verify Shot Size		19-22



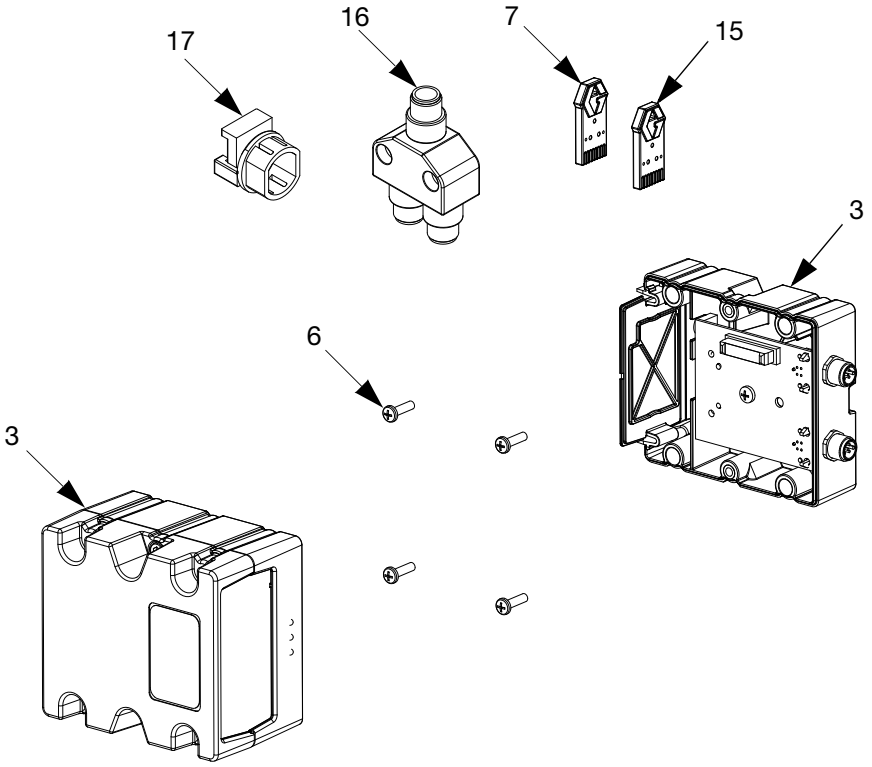
System Startup and Dispensing Recirculation Diagram

System Startup and Dispensing Recirculation System	CGM Input Bytes /Bit	CGM Output
Set CGM Control	2/7	
Verify CGM Control		2/7
System Startup Bit - Circ Only	3	
Verify System Startup Bit		1/7
Verify Heat Zones ON		6/0 thru 7
System Heat / Startup time	N/A	N/A
System Ready to Dispense		84/1
Select Shot Mode	3	
Verify Shot Mode		3
Select Shot Number	4	
Verify Shot Number		4
PLC Enable Dispense - 0 = Enabled	2/6	
Verify PLC Enabled Dispense		2/6
Circulation Status - 1 = Hi Press		2/4
Dispense Start - Direct to MCM	N/A	
Dispense Active		1/1
Dispense Valve Open		1/2
L-Head Cleanout (L-Head Only)		1/6



Parts

Model 24J415



Ref	Part	Description	Qty
3†	CGMxx0	MODULE, CGM	1
6	114984	SCREW, tapping, phillips pan head	4
7	16J526	TOKEN, map	1
12	121000	CABLE, CAN, female / female 0.5 m	1
13	121901	SUPPRESSOR, box snap, ferrite	3
15	16H821	TOKEN, GCA, upgrade, ADM32	1
16	121807	CONNECTOR, splitter	1
17	124005	BUSHING, strain relief	1

† *Not included in kit. See **Kits** on page 2 for available CGM modules. See the Communications Gateway Module manual 312864 for CGM parts list.*

Not shown.

California Proposition 65

CALIFORNIA RESIDENTS

⚠ **WARNING:** Cancer and reproductive harm – www.P65warnings.ca.gov.

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Original instructions. This manual contains English. MM 3A1704

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