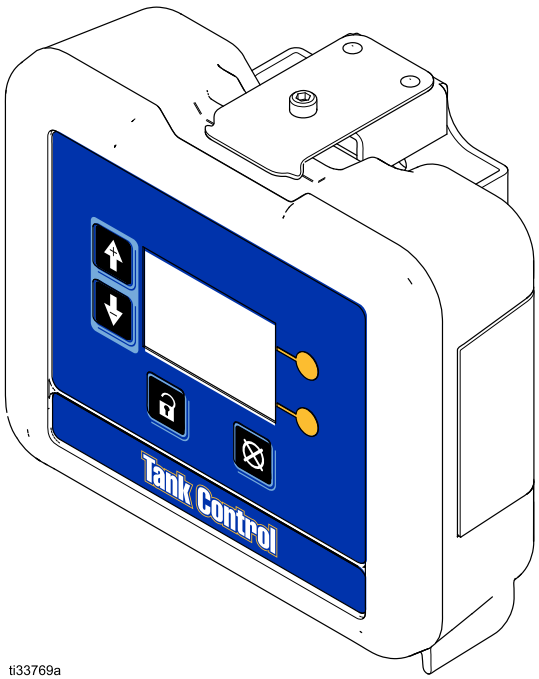
Instructions - Parts

Tank Control Module Kit 17S843

3A5991C
EN

User interface for controlling tank levels and agitators.
For professional use only.

Important Safety Instructions
Read all warnings and instructions in this manual, the supplied ADCM manual, and the Intelligent Paint Kitchen manual before using the equipment. Save these instructions.



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Contents

Related Manuals

Manual No.	Description
332013	Instructions-Parts, for Advanced Display Control Module (ADCM)
3A4030	Intelligent Paint Kitchen
3A4793	Variable Frequency Drives

Tank Control Module

The Tank Control Module provides the interface for users to enter selections and view information related to the setup and operation of tanks and agitators. The Tank Control Module is a variation of software for the Advanced Display Control Module (ADCM), which is used to monitor and control flow rate and track material use.

The screen backlight is factory set to turn off after 10 minutes of inactivity. See Setup Screen 9, page 13 to set the backlight timer to your preference. Press any key to restore.

Keys are used to input numerical data, enter setup screens, navigate within a screen, scroll through screens, and select setup values.

Installation

For installation and setup instructions, see the Advanced Display Control Module (ADCM) manual 332013.

Hazardous Locations

WARNING

INTRINSIC SAFETY

Do not substitute or modify system components as this may impair intrinsic safety. For installation, maintenance, or operation instructions, read the instruction manuals for the specific component. Do not install equipment approved only for non-hazardous location in a hazardous location. See the identification label for the intrinsic safety rating for your model.

Intrinsically safe equipment should not be used with a power supply that has no barrier. Do not move units from a non-IS installation to an IS installation. IS equipment that has been used with a non-IS power supply must not be returned to a hazardous location. Always use an intrinsically safe power supply with IS equipment.

- Install according to Control Drawing Number 16M169. See Appendix A in the Advanced Display Control Module (ADCM) manual 332013.
- Installation should be in accordance with ANSI/ISA RP12.06.01, “Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations,” and the National Electrical Code® (ANSI/NFPA 70).
- Installation in Canada should be in accordance with the Canadian Electrical Code, CSA C22.1, Part 1, Appendix F.
- For ATEX, install per EN 60079-14 and applicable local and national codes.
- Multiple earthing of components is allowed only if a high integrity equipotential system is realized between the points of bonding.
- Do not remove any cover until power has been removed.

WARNING

FIRE AND EXPLOSION HAZARD

The equipment must be grounded to reduce the risk of static sparking. Static sparking can cause fumes to ignite or explode. Grounding provides an escape wire for the electric current..

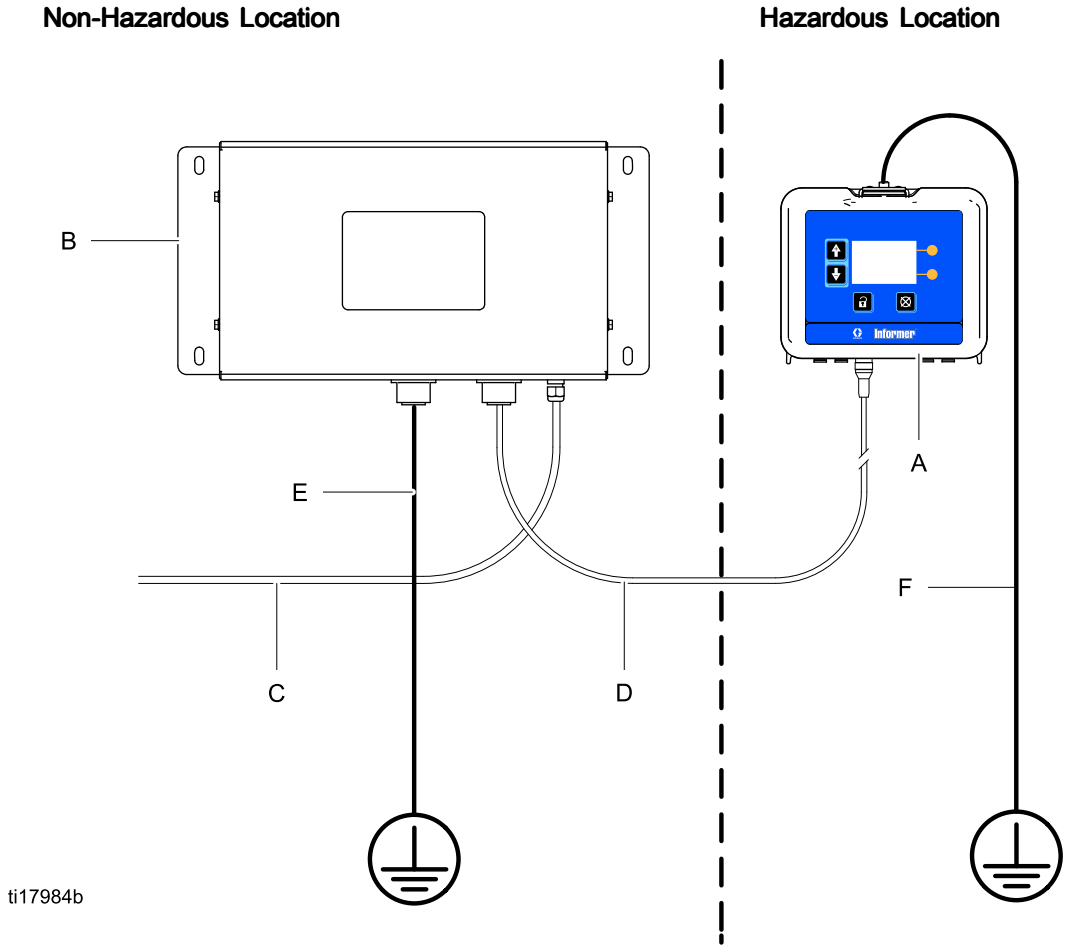


Figure 1 Installation in a Hazardous Location

KEY:

A Tank Control Module

B Power Supply with Barrier

C Power Accessory Cable (not supplied)

D Power Cable (50 ft., 15 m), to terminal 3. See Cable Connection, page 5 .

E Ground wire and clamp. PN 238909 is sold separately to ground the power supply.

F Ground wire and clamp for Tank Control Module. PN 244524 is not supplied.

Cable Connection

Order a power accessory cable (C) from Table 1. Connect the cable to Port 3 on the bottom of the control module (see Fig. 2). Connect the other end to the power barrier (see Fig. 1). Connect other cables as described in Table 2.

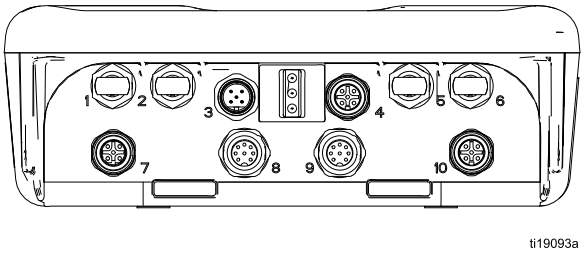


Figure 2 ADCM Connectors

Table 1 Power Accessory Cable

Cable Part No.	Description
16K509	Intrinsically safe power cable, 52 ft (16 m)
16K615	Intrinsically safe power cable, 105 ft (32 m)

Table 2 ADCM Cable Connections

ADCM Port Number	Connector Purpose	Connection	Notes
1	Fiber Optic Receiver	Fiber transmitted from fiber to serial converter or pump control module	
2	Fiber Optic Transmitter	Fiber received from fiber to serial converter or pump control module	
3	Power in/CAN Data	15V Input Power	Must be powered by external barrier.
4	Digital Input/Output	Pin 1 – Power	15V
		Pin 2 – Input	Reed Switch Input
			Agitator Halt*
		Pin 3 – Output	Fill Pump
		Pin 4 – Input/Output	Reed Switch Input
			Primary Agitator Halt Input
			Primary Tank High Alarm Output
			Primary Tank Low Alarm Output
			PLC Controlled Out/General Purpose Out
		Pin 5 – Common	15V Common
5	Fiber Optic Receiver	Not Used	
6	Fiber Optic Transmitter	Not Used	
7	Analog Input	Pressure Sensor 1	
8	Analog Output	Primary Tank Level Monitor	
9	Analog Output	Secondary Tank Level Monitor	
10	Analog Input	Pressure Sensor 2	

* If both inputs are set to agitator halt, this input will control just the primary agitator. Otherwise it will turn off both agitators.

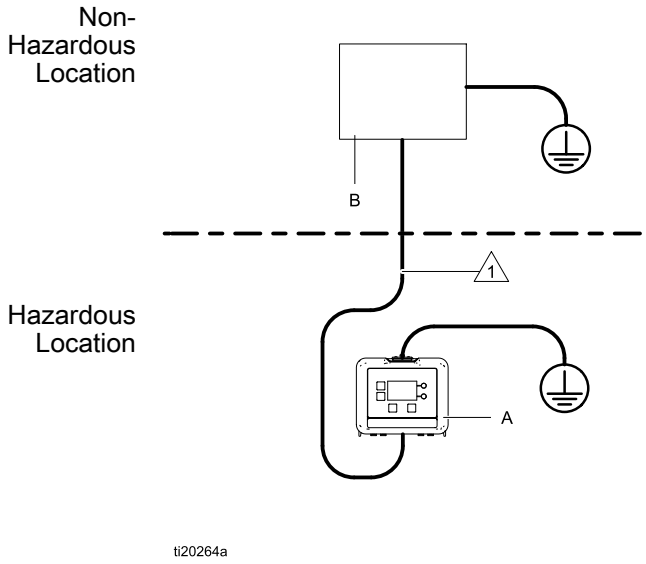
Grounding

WARNING

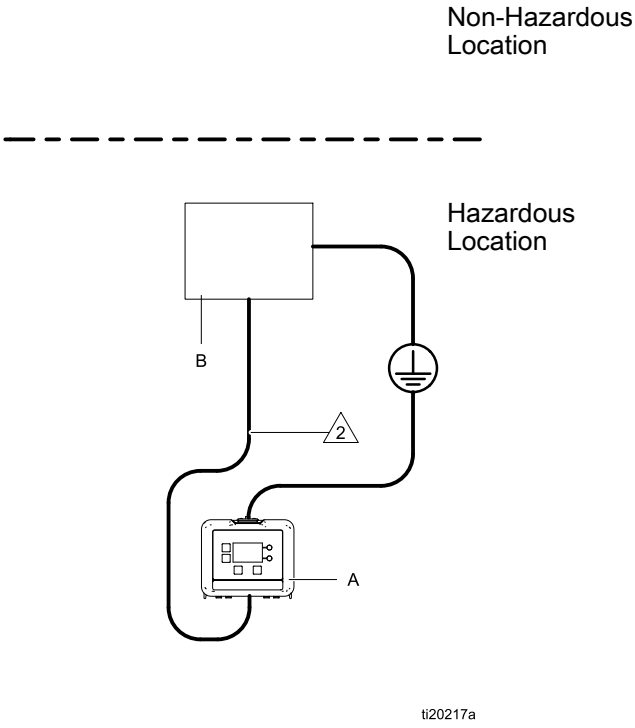
ELECTRIC SHOCK HAZARD

The equipment must be grounded to reduce the risk of static sparking and electric shock. Electric or static sparking can cause fumes to ignite or explode. Improper grounding can cause electric shock. Grounding provides an escape wire for the electric current.

Follow the instructions in your system manual for specific grounding requirements.



Power Supply Located in Non-Hazardous Location



Power Supply Located in Hazardous Location

KEY

A	Tank Control Module
B	Power Supply and Barrier
1	The power cable CANNOT have the cable shield tied to the coupling nut. 500 VAC isolation is required. The power cable and circuit board are isolated from the Tank Control Module enclosure. They have conductive paths to **SEPARATE grounds**.
2	The power cable CAN have the cable shield tied to the coupling nut. The power cable coupling nut and Tank Control Module have conductive paths to a **COMMON ground**.

Operation

Module Screens

The Control Module has two sets of screens: Run and Setup. For detailed information see Run Screens, page 9 , and Setup Screens, page 10.

Press  to toggle between the Run screens and the Setup screens.

NOTICE

To prevent damage to the softkey buttons, do not press the buttons with sharp objects such as pens, plastic cards, or fingernails.

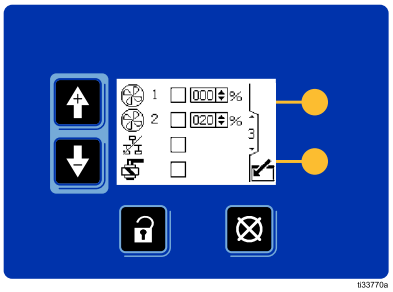


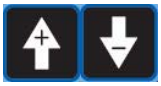
Figure 3 Control Module Keypad and Display

Module Keys

Figure 3 is a view of the control module display and keys. Table 3 explains the function of the membrane keys on the control module. As you move through the screens, you will notice that most information is communicated using icons rather than words to simplify global communication.

The detailed screen descriptions in Run Screens, page 9 , and Setup Screens, page 10, explain what each icon represents. The two softkeys are membrane buttons whose function correlates with the screen content to the immediate left of the button.

Table 3 Module Keys

Membrane Keys	Softkeys
 **Toggle:** Toggle between the Run screens and Setup screens.	 **Enter Screen:** Highlight data that can be edited. Also changes the function of the Up/Down arrows so they move between data fields on the screen, rather than between screens.
 **Cancel/Error Reset:** Clear the alarm after the cause has been fixed. Also used to cancel the data entered and return to the original data.	 **Exit Screen:** Exit data editing.
 **Up/Down Arrows:** Move between screens or fields on a screen, or to increase or decrease the digits in a field.	 **Enter:** Activate a field for editing or accept the highlighted selection on a menu.
 **Softkeys:** Varies by screen. See the Softkeys columns at right.	 **Right:** Move to the right when editing number fields. Press again to accept the entry when all digits are correct.
	 **Acknowledge:** Press to acknowledge that a software update has concluded.

Screen Navigation and Editing

Refer to this section for instructions on navigating screens, entering information, and making selections.

All Screens

- Use the up and down arrow keys to move between screens.
- Press the enter screen key to enter a screen. The first data field on the screen is highlighted.
- Use the arrow keys to highlight the data that you want to change.
- Press the enter key to edit.
- Press the cancel key to cancel.
- When all data is correct, press the exit screen key to exit the screen. Then use the up and down arrow keys to move to a new screen, or the lock icon to move between Setup screens and Run screens.

Menu Fields

- Use the up and down arrow keys to highlight the correct choice from the menu.
- Press the enter icon to select.

Number Fields

- The first digit in the field is highlighted. Use the up and down arrow keys to change the number.
- Press the right arrow key to move to the next digit.
- When all digits are correct, press the right arrow key again to accept.

Check Box Fields

A check box field is used to enable or disable features in the software.

- Press the enter key to toggle between a check and an empty box.
- The feature is enabled if a check is in the box.

Run Screens

The Run screens display current target values and performance for the tank control system. Alarms display in the sidebar at the right of the screen. Screens 4–7 display a log of the last 20 alarms for the system.

Information displayed on the Run screens corresponds to the Modbus Registers. See Appendix A: Modbus Variable Map, page 17.

Run Screens 1 and 2

This screen displays information for primary tank level (1) and secondary tank level (2).

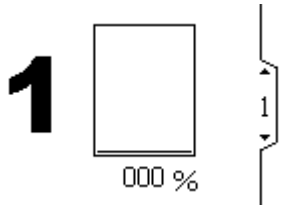


Figure 4 Run Screens 1 and 2 (Screen 1 shown)

Run Screen 3

This screen displays agitator controls.

NOTE: Some fields are grayed out, depending on setup selections.

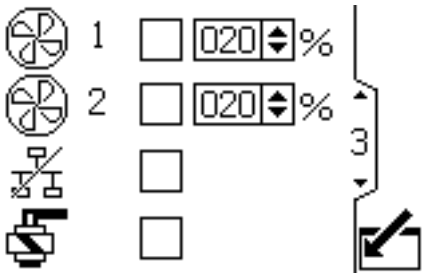


Figure 5 Run Screen 3, in Pressure Mode

Run Screen 3 Key	
1	Agitator Set Point 1: Select this box to turn agitator 1 on. Set the desired speed setpoint for the agitator from 11–100%. (Must run through Supervisor Box 25A830.) Note: The agitator motor cannot operate below 2 Hz (11%).
2	Agitator Set Point 2: Select this box to turn agitator 2 on (if present). Set the desired speed setpoint for the agitator from 11–100%. (Must run through Supervisor Box 25A830.) Note: The agitator motor cannot operate below 2 Hz (11%).
	Network Control: Select this box to disable network control of the agitator, for local operation of agitator speed.
	Fill Pump Solenoid Output: Select this box and hold the softkey button to manually control the fill pump solenoid output.

Run Screens 4-7

Run Screens 4–7 display a log of the last 20 alarms, with date and time.

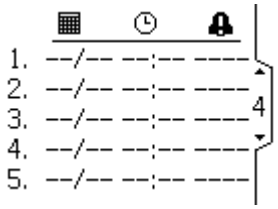


Figure 6 Run Screens 4-7 (Screen 4 shown)

Run Screens 4 - 7 Key	
	Date Column
	Time Column
	Alarm Code Column

- **Deviation:** The system alerts you to the problem, but the pump may continue to run past the maximum or minimum settings until the system's absolute pressure or flow boundaries are reached.
- **Alarm:** The system alerts you to the alarm cause and shuts down the associated peripheral.

Setup Screens

Use the Setup screens to set control parameters for the Tank Control System. See Screen Navigation and Editing, page 8, for information on how to make selections and enter data.

Inactive fields are grayed-out on a screen.

Information displayed on the Setup screens corresponds to the Modbus Registers. See Appendix A: Modbus Variable Map, page 17.

Setup Screen 1

Use this screen to set up the input scaling (radar level sensor) for 4–20mA devices and turn on the current loop (P8–Port 8 and P9–Port 9 of the ADCM).

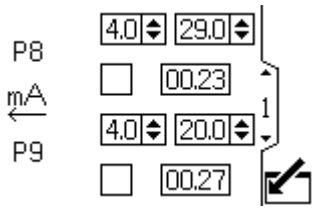
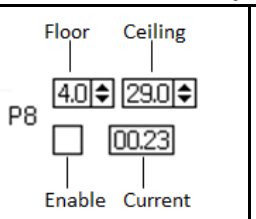
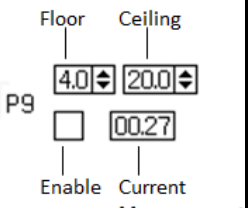


Figure 7 Setup Screen 1

Setup Screen 1 Key	
	Scaling for the 4-20mA signal on Port 8. • Floor: Enter a number for the floor scaling. • Ceiling: Enter a number for the ceiling scaling. • Enable: Press the box to enable. • Current measurement: Indicates current measurement.
	Current Input: Indicates that the screen contains current input.
	Scaling for the 4-20mA signal on Port 9. • Floor: Enter a number for the floor scaling. • Ceiling: Enter a number for the ceiling scaling. • Enable: Press the box to enable. • Current measurement: Indicates current measurement.

Setup Screen 2

Use this screen to configure and control the tank fill feature.

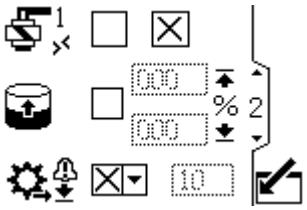


Figure 8 Setup Screen 2

NOTE: Alert trigger time varies based on how far active measurements are from their set limits.

Setup Screen 2 Key	
	Fill Solenoid Manual Control: Manually activate fill solenoid output (non-editable box shows status of PLC hand shake).
	Automatic Tank Fill: Enable auto tank fill and set fill window levels.
	Low Flow Alarm: Configure low fill pump flow notification for the deviation/alarm and timeout value in seconds.

Setup Screen 3

Use this screen to configure the peripherals to be controlled by the selectable digital inputs and outputs (Including reed switches, agitator halt switches, and the auxiliary output).

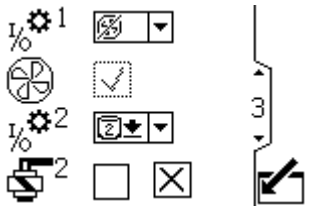


Figure 9 Setup Screen 3 (Reed Switch View Shown)

Setup Screen 3 Key	
1	Select the connected peripheral from the menu. ↕ Configures Port 4 pin 4 as an input to allow a reed switch to be connected. The current reed switch cycle rate appears next to the cycle rate icon in cycles per minute. Configures Port 4 pin 4 as an input to allow a pressure switch to be connected. If the drum cover is lifted while this configuration is properly connected, the agitator shuts down. The current input status appears in the agitator status field . NOTE: A Supervisor Module is required for this function.
2	Select the connected peripheral from the menu. ↕ Configures Port 4 pin 4 as an input to allow a reed switch to be connected. The current reed switch cycle rate appears next to the cycle rate icon in cycles per minute. Configures Port 4 pin 4 as an input to allow a pressure switch to be connected. If the drum cover is lifted while this configuration is properly connected, the agitator shuts down. The current input status appears in the agitator status field . NOTE: A Supervisor Module is required for this function. Configures Port 4 pin 4 as an output to allow for the connected device to receive an alarm when the level of the Primary Tank is above the value that is defined in the Primary Tank High field %. This value is a percentage of the total level of the Primary Tank. Configures Port 4 pin 4 as an output to allow for the connected device to receive an alarm when the level of the Primary Tank is below the value that is defined in the Primary Tank Low field %. This value is a percentage of the total level of the Primary Tank Configures Port 4 pin 4 as an output to allow for another solenoid to be connected and controlled from the device. Select the manual output box ☐ ☒ and hold the button to control the auxiliary solenoid manually. After you release the button, the manual activation is terminated.
2	Auxiliary Solenoid Output: Manually activate auxiliary solenoid output.

Setup Screen 4

Use this screen to set the tank level alarm trigger levels.

Alarm conditions will cause the agitator to stop. If connected to an IPK system with a pump, the pump will shut off.

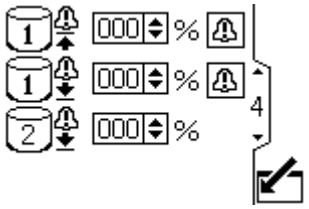


Figure 10 Setup Screen 4

Setup Screen 4 Key	
	Primary Tank High Alarm: Set the primary tank high trigger value.
	Configurable event type: Deviation Alarm
	Primary Tank Low Alarm: Set the primary tank low trigger value.
	Configurable event type: Deviation Alarm
	Secondary Tank Low Alarm: Set the secondary tank low trigger value.

Setup Screen 5

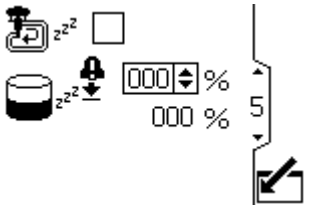


Figure 11 Setup Screen 5

Setup Screen 5 Key	
	Enable off production mode. The fill pump is disabled and the current primary tank level is recorded. If the primary tank level drops more than 3%, the system triggers the alarm and shuts off the pump.
	Current off production tank level.

Setup Screen 6

Use this screen to set the Modbus communication parameters.

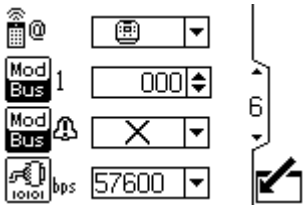


Figure 12 Setup Screen 6

Setup Screen 5 Key	
	Control Permissions: Select local or remote control.
	Modbus Node ID: Enter or change the Modbus node ID. Set a value from 1 to 247.
	Modbus Alarm Type: Select the type of failure notification. Select X for disabled or for deviation.
	Modbus Baud Rate: Select 38400 or 57600 for the serial port baud rate. 57600 bps is standard. Do not select 115200 because it is not compatible with the supervisor.

Setup Screens 7 and 8

Use these screens to configure the pressure transducer.

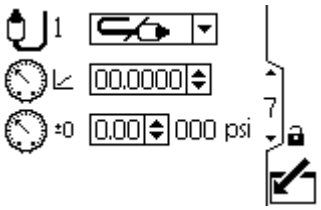


Figure 13 Setup Screens 7 and 8 (Screen 7 shown)

Setup Screens 7 and 8 Key	
	Pressure Sensor: Select to disable the pressure transducer. Select 500 psi or 5000 psi to enable the pressure transducer.
	Pressure Sensor Calibration Sensitivity: Set the sensitivity calibration value from the tag on the sensor.
	Pressure Sensor Calibration Offset: Set the offset calibration value from the tag on the sensor.

Setup Screen 9

Use this screen to set the units for pressure, totals, and flow.

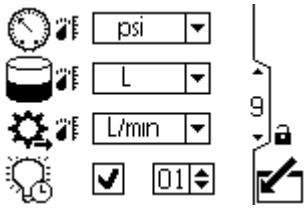


Figure 14 Setup Screen 9

Setup Screen 9 Key	
	Pressure Units: Select psi, bar, or MPa.
	Volume Units: Select liters, gallons, or cc.
	Flow Rate Units: Select L/min, G/min, cc/min, oz/min, or cycles/min.
	Backlight: Enable or disable the backlight and set the timeout value in minutes.

Setup Screen 10

Use this screen to set your date format, date, time, or force a restart of the system when updating the software (update token inserted into the display). After the software update is completed successfully, the token must be removed prior to selecting the Acknowledge key or power cycling the display. If an update was concluded and the token is not removed, pressing the Acknowledge key will restart the update process.

NOTE:
See Appendix B: Tank Control Module Programming, page 23 for instructions on software updating. Because the software update is disruptive to all pumps connected to the display, all pumps attached to the display must not be pumping material when the software update is initiated.

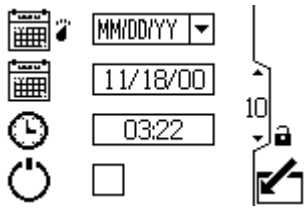


Figure 15 Setup Screen 10

Setup Screen 10 Key	
	Date Format: Select your preferred date format from the menu: MM/DD/YY DD/MM/YY YY/MM/DD
	Date: Set the correct date.
	Time: Set the correct time.
	System Reset: Select the box to restart the system.

Setup Screen 11

Use this screen to enter a password that will be required to access the Setup screens. This screen also displays the software version.

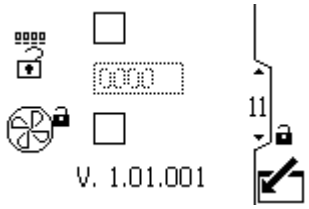


Figure 16 Setup Screen 11

Setup Screen 11 Key	
	When the checkbox is selected, the password is active. To temporarily disable the password, clear the checkbox. The Password field will be grayed out.
	Password: Enter the four-digit password.
	Agitator Password: Select the box to lock out the profile field in the Run screens.

Error Code Troubleshooting

Error codes can take three forms:

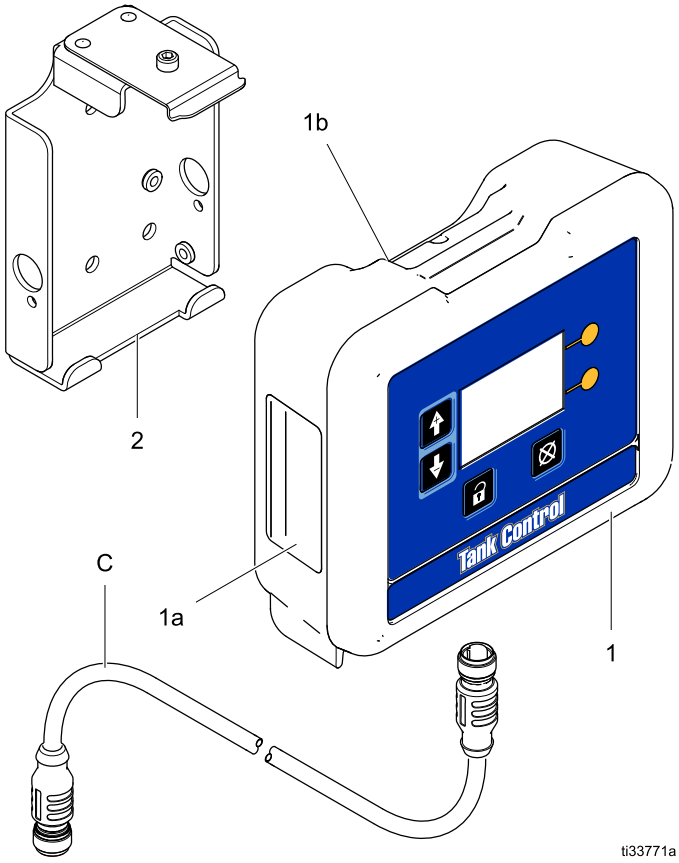
- Alarm : alerts you to the alarm cause and shuts down the fill pump.
- Deviation : alerts you to the problem, but pump may continue to run.
- Advisory : information only.

Display Code	Type	Description
C3GX	Deviation	Modbus communication is down
CAGX	Deviation	PLC handshake dropped while solenoid output on
F1F0	Alarm	No or low flow with fill pump
F2F0	Deviation	No or low flow with fill pump
L1A0	Alarm	Primary tank low
L1AF	Alarm	Primary tank level dropped below set point while in off production
L2A0	Deviation	Primary tank low
L3A0	Deviation	Primary tank high
L4A0	Alarm	Primary tank high
L1B0	Alarm	Secondary tank low
L6CA	Alarm	Radar level sensor A (Port 8) not detected
L6CB	Alarm	Radar level sensor A (Port 7) not detected
P6CA	Deviation	Pressure sensor A (Port 7) not detected
P6CB	Deviation	Pressure sensor B (Port 10) not detected

Notes

Parts

17S843 Tank Control Module Kit



Ref	Part	Description	Qty
1	— — —	DISPLAY KIT, control module; includes item 1a; see manual 332013 for approvals information about the bare ADCM module	1
1a▲	16P265	LABEL, warning, English	1
1b▲	16P265	LABEL, warning, French	1
1c▲	16P265	LABEL, warning, Spanish (shipped loose)	1
2	24P823	BRACKET KIT, control module; includes items 2a–2d	1

Ref	Part	Description	Qty
2a	— — —	BRACKET, control module	1
2b	— — —	LATCH, spring	1
2c	— — —	SCREW, cap, socket head; M5 x 16 mm	1
2d	— — —	RIVET, blind	2

▲ Replacement safety labels, tags, and cards are available at no cost.

Items marked — — — are not available separately.

Cable (C) is shown for reference but is not included in the kit. Order desired length separately. See Cable Connection, page 5 .

Appendix A: Modbus Variable Map

To communicate through fiber optics with the tank, refer to the appropriate hardware in the Intelligent Paint Kitchen manual 3A4030, which indicates various options for connecting fiber optic cables from the control module to the non-hazardous area. The following table lists Modbus registers available to a PC or PLC located in the non-hazardous area.

Table 4 shows the registers needed for basic operation, monitoring, and alarm control features.

Tables 5 and 6 provide bit definitions as needed for certain registers. Table 7 shows the units and how to convert the register value to a unit value.

Refer to the Modbus communication settings selected in Setup Screen 6, page 12.

Table 4 Modbus Registers

	ADCM Modbus Register	Pumpless IPK Parameter Name	Register Access	Notes/Units
RUN	406100	Secs Counter	Read Only	
	406101	Tank Control Status Bits	Read Only	See Table 7 Tank Control Status and Control Bits, page 21
	406102	ADCM Input Status Bits	Read Only	See Table 8 ADCM Input Bits, page 21
	406103	ADCM Output Bits	Read / Write	See Table 9 ADCM Output Bits, page 21
	406104	Analog Output #1 % (4 - 20 ma)	Read	0-100
	406105	Primary VFD Enable Status	Read / Write	0=Off 1=On
	406106	Primary Actual Tank Level #1 Pct	Read	0-100
	406107	TBD	Read / Write	
	406108	Analog Output #2 % (4 - 20 mA)	Read / Write	
	406109	Secondary VFD Enable Status	Read / Write	0=Off 1=On
	406110	Secondary Actual Tank Level #2 Pct	Read	0-100
	406111	TBD	Read / Write	
	406112	Fill Pump Reed Switch Count	Read / Write	0-65535
	406113	Primary Tank Freeze Level	Read	0-100

	ADCM Modbus Register	Pumpless IPK Parameter Name	Register Access	Notes/Units
CONFIGURATION	406119	Tank Control Events High Word	Read Only	See Table 5 Lower Word, page 19
	406120	Tank Control Events Low Word	Read Only	See Table 5 Lower Word, page 19
	406121	Configuration Bits	Read / Write	See Table 10 Configuration Bits, page 21
	406122	Primary Tank Level High Alarm Setpoint	Read / Write	0-100
	406123	Primary Tank Fill Target	Read / Write	0-100
	406124	Primary Tank Fill Level	Read / Write	0-100
	406125	Primary Tank Level Low Alarm Setpoint	Read / Write	0-100
	406126	Secondary Tank Level Low Deviation	Read / Write	0-100
	406127	Secondary Tank Level Low Alarm Setpoint	Read / Write	0-100
	406128	TBD	Read / Write	0-65535
	406129	TBD	Read / Write	0-65535
	406130	TBD	Read / Write	0-65535
	406131	TBD	Read / Write	0-65535
	406132	TBD	Read / Write	0-65535
	406133	TBD	Read / Write	0-65535
	406134	TBD	Read / Write	0-65535
	406135	TBD	Read / Write	0-65535
	406136	Pump Fill Timer Set Point (seconds)	Read / Write	0-65535
	406137	Fill Pump High Speed Alarm	Read / Write	0-65535
	406138	Fill Pump High Speed Deviations	Read / Write	0-65535
	406139	Pressure Units	Read / Write	0 = Psi 1 = bar 2 = Kpa
	406140	Agitator Speed Units	Read / Write	0 = Percent 1 = Hertz 2 = RPM
	406141	Flow Units	Read / Write	0 = Liter/min 1 = Gallons/min 2 = cc/min 3 = oz/min 4 = Cycles/min
	406142	Auxiliary I/O Function	Read / Write	0 = Reed Switch Count (Aux In) 1 = Agitator Halt (Aux In) 2 = High Level Primary (Aux Out) 3 = Low Level Primary (Aux Out) 4 = Low Level Secondary (Aux Out) 5 = PLC (Aux Out)
	406143	Auxiliary Input Function	Read / Write	0 = Reed Switch Count 1 = Agitator Halt
	406144	Primary Tank Freeze Low Alarm	Read / Write	0-100

NOTE: See Error Code Troubleshooting, page 14, for a description of each alarm.

Table 5 Lower Word

Bit	Event Type	Event Code	Event Name
0	Deviation	P6C(A/B)	Pressure Transducer Error
1	Deviation	CAGX	Modbus Communications Lost
2	Alarm	L4A0	Primary Tank High Alarm
3	Deviation	L3A0	Primary Tank High Deviaton
4	Alarm	L1A0	Primary Tank Low Alarm
5	Deviation	L2A0	Primary Tank Low Deviation
6	Alarm	L1B0	Secondary Tank Low Alarm
7	Deviation	F2F0	No Flow Fill Pump Deviation
8	Alarm	F1F0	No Flow Fill Pump Alarm
9	Deviation	C3GX	Modbus Communications Lost Deviation
10	Alarm	L6CA	Port 8 4 to 20 mA open circuit
11	Alarm	L6CB	Port 9 4 to 20 mA open circuit
12	Alarm	L1AF	Primary Tank Freeze Alarm
13	—	—	—
14	—	—	—
15	—	—	—

Table 6 Alarm Bits

404119 - Tank Control Events High Word			
Bit	Event Type	Event Code	Event Name
0	Reserved	Reserved	Reserved
2	Reserved	Reserved	Reserved
3	Reserved	Reserved	Reserved
4	Reserved	Reserved	Reserved
5	Reserved	Reserved	Reserved
6	Reserved	Reserved	Reserved
7	Reserved	Reserved	Reserved
8	Reserved	Reserved	Reserved
9	Reserved	Reserved	Reserved
10	Reserved	Reserved	Reserved
11	Reserved	Reserved	Reserved
12	Reserved	Reserved	Reserved
13	Reserved	Reserved	Reserved
14	Reserved	Reserved	Reserved
15	Reserved	Reserved	Reserved
404120 - Tank Control Events Low Word			
Bit	Event Type	Event Code	Event Name
0	Deviation	P6C(A/B)	Pressure Sensor A (Port 7) not detected Pressure Sensor B (Port 10) not detected
1	Deviation	CAGX	PLC handshake dropped while fill solenoid output on
2	Alarm	L4A0	Primary tank high
3	Alarm	L1A0	Primary tank low
4	Deviation	L2A0	Primary tank low
5	Deviation	L3B0	Primary tank high
6	Deviation	L1B0	Secondary tank low
7	Deviation	F2F0	No or low flow with fill pump on No tank level change detected
8	Alarm	F1F0	No or low flow with fill pump on No tank level change detected
9	Deviation	C3GX	Modbus communication is down
10	Alarm	L6CA	Radar level sensor A (Port 8) not detected
11	Alarm	L6CB	Radar level sensor B (Port 9) not detected
12	Alarm	L1AF	Primary tank level dropped below off production tank level percentage
13	Reserved	Reserved	Reserved
14	Reserved	Reserved	Reserved
15	Reserved	Reserved	Reserved

Table 7 Tank Control Status and Control Bits

406101 - Pump Status Bits	
Bit	**Description**
0	Reserved
1	Reserved
2	Reads 1 if there are any active alarms
3	Reads 1 if there are any active deviations
4	Reads 1 if there are any active advisories
5	Setup changed
others	Reserved for future use

Table 8 ADCM Input Bits

Bit	Description
0	Reserved
1	Reserved
2	Primary Agitator 0 = Run Agitator 1 = Halt Agitator
3	Secondary Agitator 0 = Run Agitator 1 = Halt Agitator
Others	Reserved for future use

Table 9 ADCM Output Bits

Bit	Description
0	Fill Pump Solenoid 0 = Off 1 = On
1	Auxiliary Solenoid 0 = Off 1 = On
2	Primary Agitator Enable 0 = Agitator Off 1 = Agitator On
3	Secondary Agitator Enable 0 = Agitator Off 1 = Agitator On
Others	Reserved for future use

Table 10 Configuration Bits

Bit	Description
0	Local/Remote Control 0 = Local 1 = Remote
1	Off Production 0 = Disabled 1 = Enabled
2	Primary Tank High Event Type 0 = Deviation 1 = Alarm
3	Secondary Tank High Event 0 = Deviation 1 = Alarm
Others	Reserved for future use

Table 11 Units

Unit Type	Selectable Units	Units Register	Converting registers to unit values	Register value for 1 unit
Pressure	Percent	n/a	Pressure = Register	1 = 1% Pressure
Pressure	psi	403208 = 0	Pressure = Register	1 = 1 psi
	Bar	403208 = 1	Pressure = Register/10	10 = 1.0 Bar
	MPa	403208 = 2	Pressure = Register/100	100 = 1.00 Mpa
Speed	Cycles/min	n/a	Speed = Register/10	10 = 1.0 cycle/min
Flow	Liters/min	403210 = 0	Flow = Register/10	10 = 1.0 L/min
	Gallons/min	403210 = 1	Flow = Register/10	10 = 1.0 Gal/min
	cc/min	403210 = 2	Flow = Register	1 = 1 cc/min
	oz/min	403210 = 3	Flow = Register	1 = 1 oz/min
	Cycles/min	403210 = 4	Flow = Register/10	10 = 1.0 cycle/min
Volume†	Liters	403209 = 0	Volume = 1000*High + Low/10	0 (High) / 10 (Low) = 1.0 L
	Gallons	403209 = 1	Volume = 1000*High + Low/10	0 (High) / 10 (Low) = 1.0 Gal
Cycles††	Pump Cycles	n/a	Cycles = 10000*High + Low	0 (High) / 1 (Low) = 1 cycle

† Example of converting volume register reading to units: If the reading for register 404106 (volume high word) is 12, and the reading for register 404107 (volume low word) is 34, the volume is 12003.4 liters. 12 * 1000 + 34/10 = 12003.4.

†† Example of converting cycles register reading to units: If the reading for register 404108 (cycles high word) is 75, and the reading for register 404109 (cycles low word) is 8000, the volume is 758,000 cycles. 75 * 10000 + 8000 = 758000.

Appendix B: Tank Control Module Programming

WARNING

FIRE AND EXPLOSION HAZARD

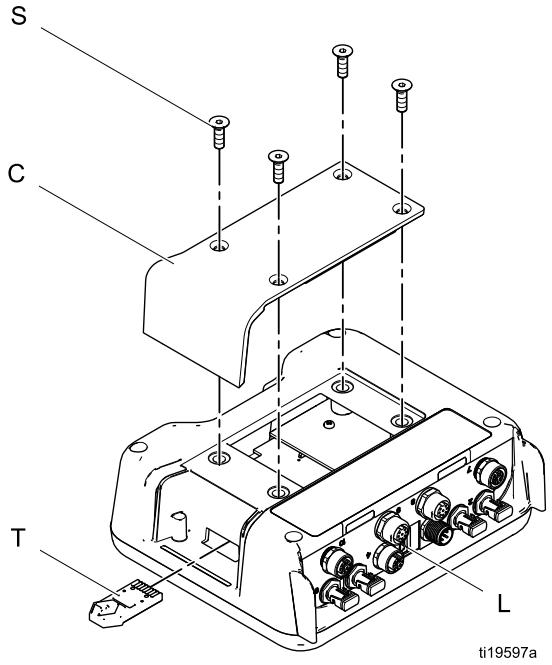
To help prevent fire and explosion, do not connect, download, or remove the token unless the Tank Control Module unit is removed from the hazardous (explosive atmosphere) location.

- During the upgrade, data in the module may be reset to factory default settings. Record all settings and user preferences before the upgrade, for ease of restoring them.
- The latest software version for each system can be found at www.graco.com.

Software Upgrade Instructions

NOTE: If the software on the token is the same version that is already programmed on the module, nothing will happen (including flashing red light). No harm can be done by attempting to program the module multiple times.

1. Remove power from the Graco Control Module by turning off the system power.
   NOTE: Alternately, the software update can be done without removing power by using the system reset button on Setup Screen 16 (date and time) to initiate the update after the token has been inserted.
2. Remove the module from the hazardous location.
3. Remove the access cover (C).



4. Insert and press the token (T) firmly into the slot.
   NOTE: The token has no preferred orientation.
5. Supply electrical power to the Graco Control Module.
6. The red indicator light (L) flashes while the software is being loaded on the display. When the software is completely loaded, the red light turns off.

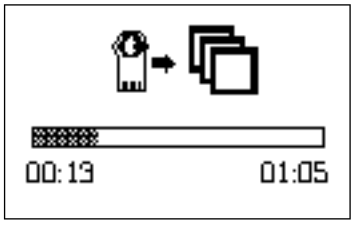
NOTICE

To prevent corrupting the software, do not remove the token, turn off the system power, or disconnect any modules until the status screen indicates that updates are complete.

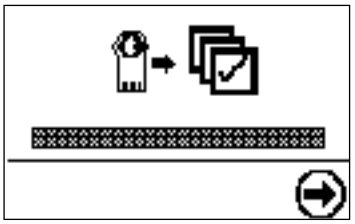
7. The following screen appears when the display turns on:

Communications with motors established.

8. Wait for the update to complete.
   NOTE: The approximate time until completion is shown along the bottom of the progress bar.



9. Verify that the update is complete. The icon indicates if the update succeeded or failed. If the update was successful, remove the token (T) from the slot.



Icon	Description
	Update successful
	Update unsuccessful
	Update complete; no change necessary

10. Press the software update key  to continue. If the token is still inserted, the remote loading procedure begins. Return to step 5 if the update restarts.
11. Remove power from the Graco Control Module by turning off the system power.
12. If the token is still inserted, remove it from the slot.
13. Reinstall the access cover and secure it with screws (S).

Technical Specifications

	US	Metric
Operating Temperature	32° to 122° F	0° to 50° C
Storage Temperature	-22° to 140° F	-30° to 60° C
Non-Hazardous Location Power Supply Requirements NOTE: Use recommended power supply PN 16V680	15 VDC, 500 mA minimum	
Weight		
Control Module	1.5 lb	0.68 kg
Mounting Bracket	1 lb	0.45 kg
Mounting Bracket Material	Painted and zinc-plated carbon steel. Contains less than 10% by mass of aluminum+magnesium+titanium+zirconium, AND Contains less than 7.5% by mass of magnesium+titanium+zirconium	
Humidity	0 to 95 percent, non-condensing	
Display housing is solvent resistant.		

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For patent information, see www.graco.com/patents.

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