

# InvisiPac<sup>®</sup> HM10 Hot Melt Delivery System

3A7259D

EN

*For delivering and dispensing hot melt adhesive pellets. For professional use only.*

*Not approved for use in explosive atmospheres or hazardous (classified) locations.*

1200 psi (8.3 MPa, 83 bar) Maximum Fluid Working Pressure

400°F (204°C) Maximum Fluid Operating Temperature

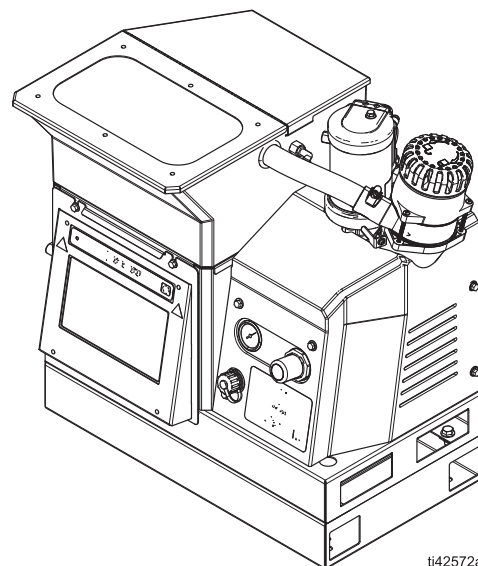
100 psi (0.7 MPa, 7 bar) Maximum Air Inlet Pressure.



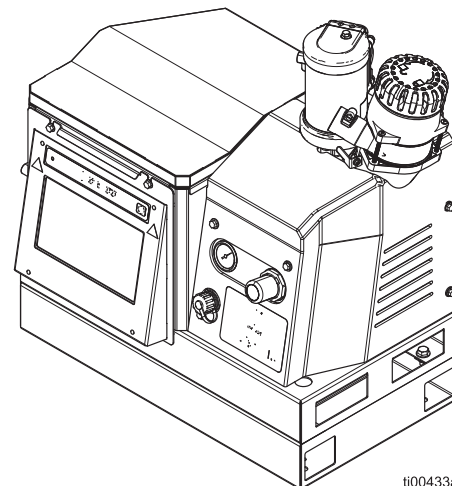
## Important Safety Instructions

Read all warnings and instructions in this manual and in the applicator and hose manuals. Save all instructions.

**On-Board Hopper Models**



**Remote Vacuum Feed Models**



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## Related Manuals

English Manual	Manual Title
334627	InvisiPac GM100 Plug-Free™ Hot Melt Applicator
3A2805	InvisiPac GS35 Hot Melt™ Applicator
332072	InvisiPac Heated Hose
334784	InvisiPac Pattern Controller
3A4937	InvisiPac Feed System
334629	InvisiPac Advanced Feed System
3A5256	Auto Multi-Zone (AMZ) Repair Kit
312864	Communications Gateway Module (CGM)
3A9350	InvisiPac CGM Interface

## Models

### On-Board Hopper Models

Model	Voltage (VAC)	Channels	Maximum Fluid Pressure	Maximum Air Inlet Pressure
20B715	200-240	2	1200 psi	100 psi
20B716	200-240	4	(8.3 MPa, 83 bar)	(0.7 MPa, 7 bar)
20B717	400-480	2		
20B718	400-480	4		

### Remote Vacuum Feed Models

Models that use a separate drum vacuum feed system. Purchase separately. See **Compatible Drum Vacuum Feed Systems**, page 3.

Model	Voltage (VAC)	Channels	Maximum Fluid Pressure	Maximum Air Inlet Pressure
20B725	200-240	2	1200 psi	100 psi
20B726	200-240	4	(8.3 MPa, 83 bar)	(0.7 MPa, 7 bar)
20B727	400-480	2		
20B728	400-480	4		

### Compatible Drum Vacuum Feed Systems

Compatible with **On-Board Hopper Models**. Purchase feed system separately.

Part	Description	English Manual
25C193	InvisiPac Feed System Drum feed system for standard pellet feed applications	3A4937
17D749	InvisiPac Advanced Feed System Drum feed system for chicket feed applications	334629

## Required Tools

- Standard allen wrench set
- Metric allen wrench set
- Various sizes of crescent wrenches
- 11/16 in. wrench
- 3/8 in. ratchet
- 3/8 in. socket
- 5/16 in. driver
- 7/16 in. socket
- 7/8 in. deep well socket
- 1 in. socket
- 13 mm socket
- 10 mm socket
- 1/2 in. ratchet
- Side cutter
- Phillips head screwdriver
- Flat head screwdriver
- Multimeter
- Tubing cutter




## Approvals















# Warnings

The following are general warnings related to the setup, use, grounding, maintenance, and repair of this equipment. Additional, more specific warnings may be found throughout the body of this manual where applicable. Symbols that appear in the body of the manual refer to these general warnings. When these symbols appear throughout the manual, refer back to these pages for a description of the specific hazard.

 <b>DANGER</b>	
 	<p><b>SEVERE ELECTRIC SHOCK HAZARD</b></p> <p>This equipment can be powered by more than 240V. Contact with this voltage will cause death or serious injury.</p> <ul style="list-style-type: none"> <li>• Turn off and disconnect all power before disconnecting any cables and before servicing equipment.</li> <li>• This equipment must be grounded. Connect only to grounded power source.</li> <li>• All electrical wiring must be done by a qualified electrician and comply with all local codes and regulations.</li> </ul>

 <b>WARNING</b>	
	<p><b>BURN HAZARD</b></p> <p>Equipment surfaces and fluid that is heated can become very hot during operation. To avoid severe burns:</p> <ul style="list-style-type: none"> <li>• Do not touch hot fluid or equipment.</li> </ul>
    	<p><b>SKIN INJECTION HAZARD</b></p> <p>High-pressure fluid from dispensing device, hose leaks, or ruptured components will pierce skin. This may look like just a cut, but it is a serious injury that can result in amputation. <b>Get immediate surgical treatment.</b></p> <ul style="list-style-type: none"> <li>• Do not point dispensing device at anyone or at any part of the body.</li> <li>• Do not put your hand over the fluid outlet.</li> <li>• Do not stop or deflect leaks with your hand, body, glove, or rag.</li> <li>• Follow the <b>Pressure Relief Procedure</b> when you stop dispensing and before cleaning, checking, or servicing equipment.</li> <li>• Tighten all fluid connections before operating the equipment.</li> <li>• Check hoses and couplings daily. Replace worn or damaged parts immediately.</li> </ul>

# ! WARNING

	<p><b>FIRE AND EXPLOSION HAZARD</b></p> <p>Flammable fumes, such as solvent and paint fumes, in <b>work area</b> can ignite or explode. Solvent flowing through the equipment can cause static sparking. To help prevent fire and explosion:</p> <ul style="list-style-type: none"> <li>• Do not use solvent-based adhesives that can create an explosive atmosphere when processed.</li> <li>• Use equipment only in well ventilated area.</li> <li>• Eliminate all ignition sources; such as pilot lights, cigarettes, portable electric lamps, and plastic drop cloths (potential static sparking).</li> <li>• Ground all equipment in the work area. See <b>Grounding</b> instructions.</li> <li>• Never dispense or flush at high pressure</li> <li>• Keep work area free of debris, including solvent, rags and gasoline.</li> <li>• Do not plug or unplug power cords, or turn power or light switches on or off when flammable fumes are present.</li> <li>• Use only grounded hoses.</li> <li>• <b>Stop operation immediately</b> if static sparking occurs or you feel a shock. Do not use equipment until you identify and correct the problem.</li> <li>• Keep a working fire extinguisher in the work area.</li> </ul>
	<p><b>MOVING PARTS HAZARD</b></p> <p>Moving parts can pinch, cut or amputate fingers and other body parts.</p> <ul style="list-style-type: none"> <li>• Keep clear of moving parts.</li> <li>• Do not operate equipment with protective guards or covers removed.</li> <li>• Equipment can start without warning. Before checking, moving, or servicing equipment, follow the <b>Pressure Relief Procedure</b> and disconnect all power sources.</li> </ul>
	<p><b>EQUIPMENT MISUSE HAZARD</b></p> <p>Misuse can cause death or serious injury.</p> <ul style="list-style-type: none"> <li>• Do not operate the unit when fatigued or under the influence of drugs or alcohol.</li> <li>• Do not exceed the maximum working pressure or temperature rating of the lowest rated system component. See <b>Technical Specifications</b> in all equipment manuals.</li> <li>• Use fluids and solvents that are compatible with equipment wetted parts. See <b>Technical Specifications</b> in all equipment manuals. Read fluid and solvent manufacturer's warnings. For complete information about your material, request Safety Data Sheets (SDSs) from distributor or retailer.</li> <li>• Do not leave the work area while equipment is energized or under pressure.</li> <li>• Turn off all equipment and follow the <b>Pressure Relief Procedure</b> when equipment is not in use.</li> <li>• Check equipment daily. Repair or replace worn or damaged parts immediately with genuine manufacturer's replacement parts only.</li> <li>• Do not alter or modify equipment. Alterations or modifications may void agency approvals and create safety hazards.</li> <li>• Make sure all equipment is rated and approved for the environment in which you are using it.</li> <li>• Use equipment only for its intended purpose. Call your distributor for information.</li> <li>• Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces.</li> <li>• Do not kink or over bend hoses or use hoses to pull equipment.</li> <li>• Keep children and animals away from work area.</li> <li>• Comply with all applicable safety regulations.</li> </ul>



# WARNING

**TOXIC FLUID OR FUMES HAZARD**

Toxic fluids or fumes can cause serious injury or death if splashed in the eyes or on skin, inhaled, or swallowed.

- Read Safety Data Sheets (SDSs) to know the specific hazards of the fluids you are using.
- Store hazardous fluid in approved containers, and dispose of it according to applicable guidelines.

**PERSONAL PROTECTIVE EQUIPMENT**

Wear appropriate protective equipment when in the work area to help prevent serious injury, including eye injury, hearing loss, inhalation of toxic fumes, and burns. Protective equipment includes but is not limited to:

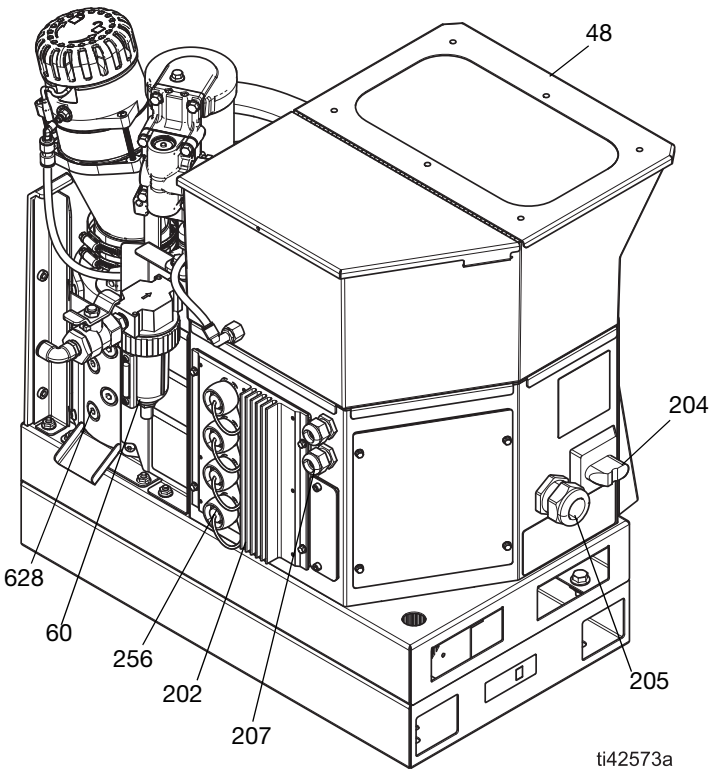
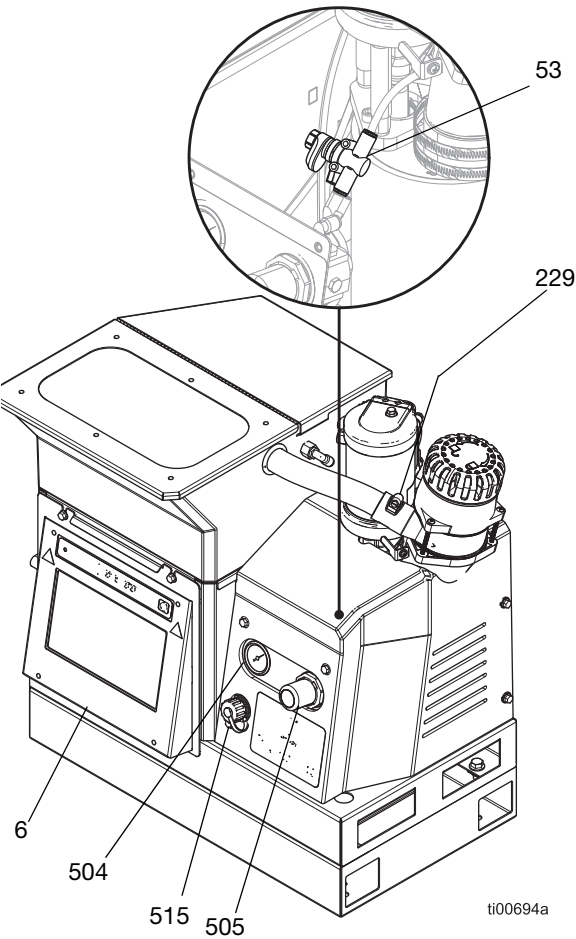
- Protective eyewear, and hearing protection.
- Respirators, protective clothing, and gloves as recommended by the fluid and solvent manufacturer.

**PRESSURIZED ALUMINUM PARTS HAZARD**

Use of fluids that are incompatible with aluminum in pressurized equipment can cause serious chemical reaction and equipment rupture. Failure to follow this warning can result in death, serious injury, or property damage.

- Do not use 1,1,1-trichloroethane, methylene chloride, other halogenated hydrocarbon solvents or fluids containing such solvents.
- Do not use chlorine bleach.
- Many other fluids may contain chemicals that can react with aluminum. Contact your material supplier for compatibility.

# Component Identification



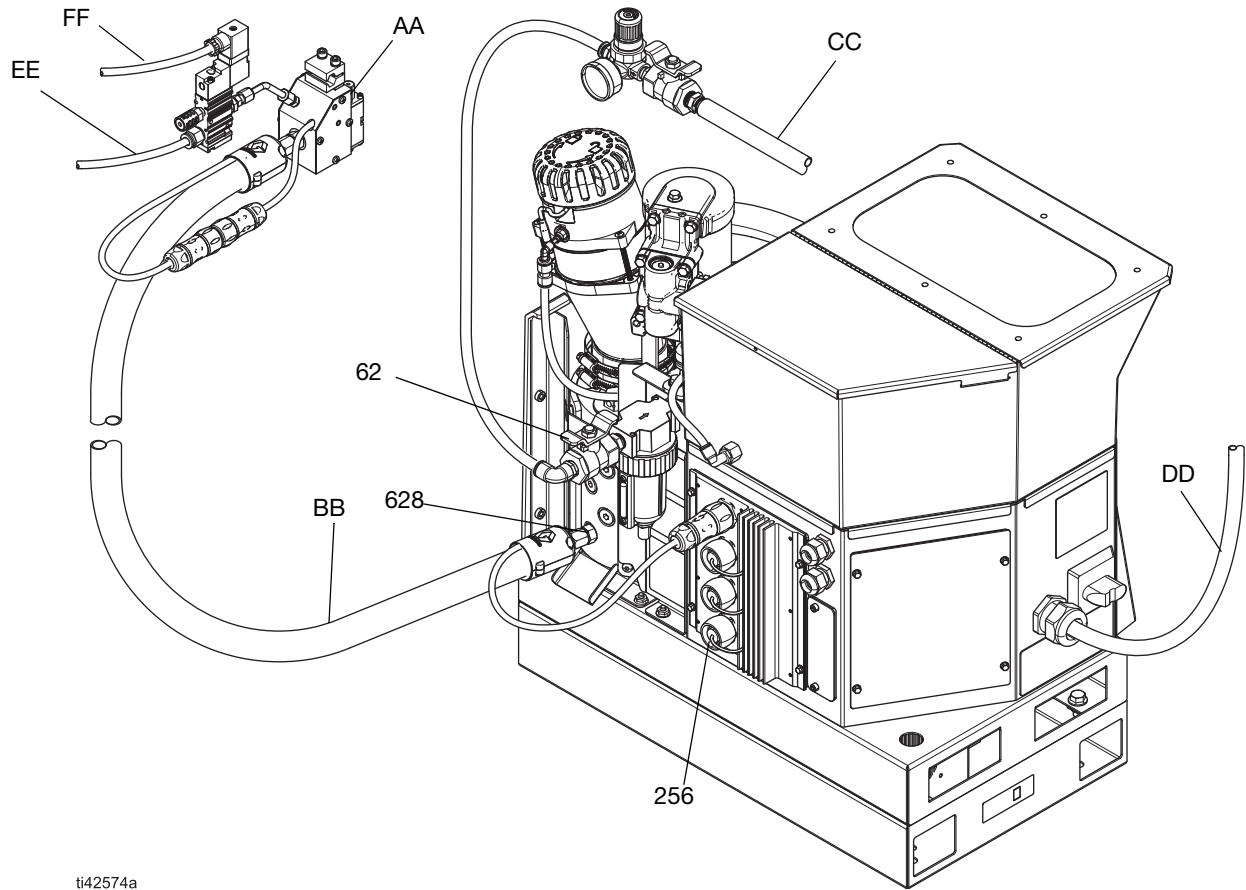
Ref.	Description
6	Advanced Display Module (ADM)
204	Main Power Switch
48	Hopper Lid
53	Air Venturi Restrictor
60	System Air Filter with System Air Inlet
202	AMZ Circuit Board Assembly
205	Incoming Power Strain Relief Bushing
207	I/O cable gland

Ref.	Description
229	Funnel Inlet
504	Pump Air Pressure Gauge
505	Pump Air Pressure Regulator
515	USB Port Cover
256	Electrical Port Covers for Heated Hose Connection Ports
628	Melter Fluid Outlets Plugs for Heated Hose Connection

# Typical Installation

The installation shown is only a guide for selecting an installing system components. The components in the typical installation illustrations are not included with the system.

## On-Board Hopper Models Typical Installation

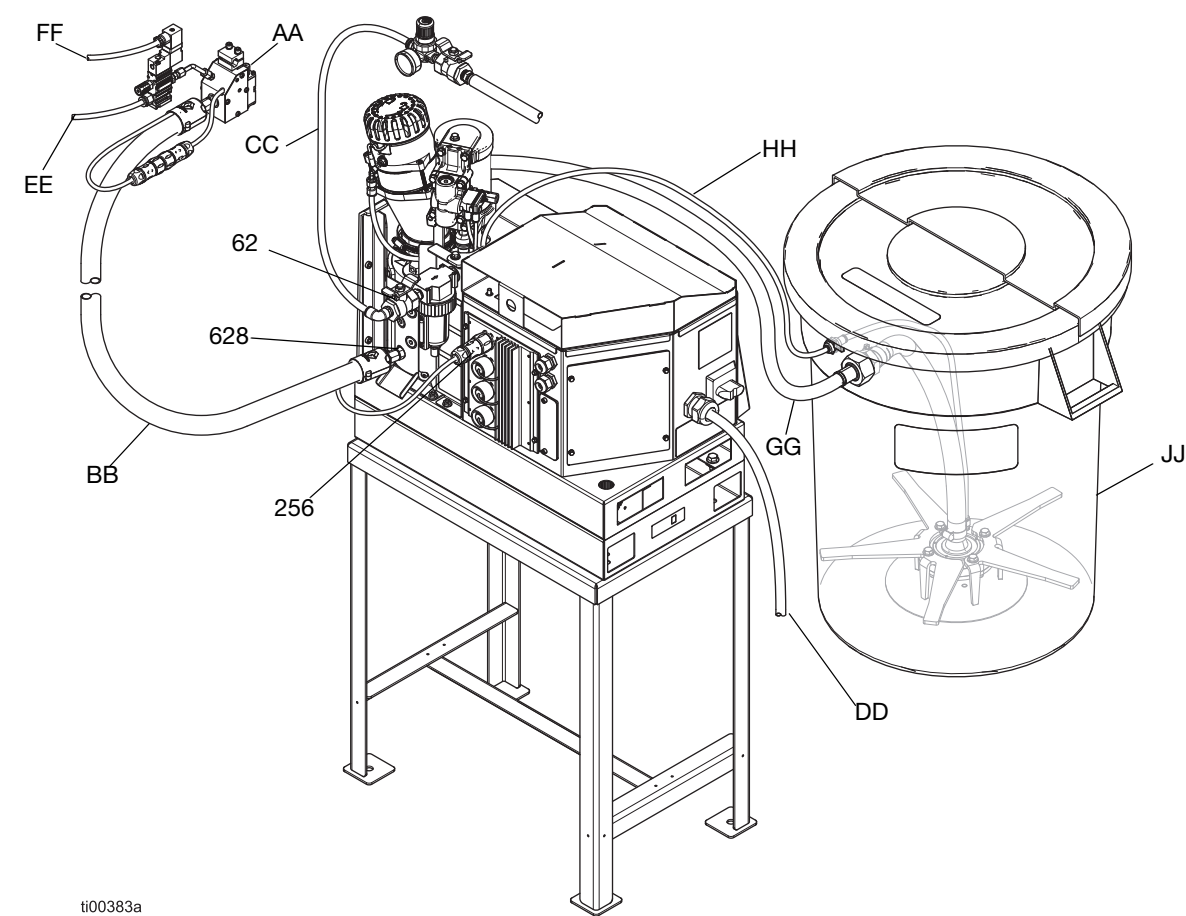


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Ref.	Description
256‡	Electrical Port Covers for Heated Hose Connection Ports
628‡	Melter Fluid Outlets Plugs for Heated Hose Connection
62‡	Bleed-Type Air Valve
AA	Applicator
BB	Heated Hose
CC	Main Air Line
DD	Power Cord
EE	Applicator Air Line
FF	Applicator Electrical Line

‡ Included with the system

# Remote Vacuum Feed Models Typical Installation



ti00383a

Ref.	Description
256‡	Electrical Port Covers for Heated Hose Connection Ports
628‡	Melter Fluid Outlets Plugs for Heated Hose Connection
62‡	Bleed-Type Air Valve
AA	Applicator
BB	Heated Hose
CC	Main Air Line
DD	Power Cord
EE	Applicator Air Line
FF	Applicator Electrical Line
GG	Feed Tube
HH	Feed Air Supply Hose
JJ	Feed System

‡ Included with the system

# Installation

## Grounding



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.

**Hot Melt Delivery System:** The system is equipped with a ground terminal. A qualified electrician must ground the system using this terminal. See **Connect Electrical Cord** on page 18.

**Applicator:** The applicator is grounded through electrical connection to the fluid hose and system.

**Heated Hose:** The heated hose is grounded through electrical connection to a grounded hot melt delivery system.

## Location

Select a location for the equipment that meets the following criteria:

- Ambient temperature must be 32°–120°F (0°–49°C).
- The heated hoses (BB) must reach from the melter fluid outlets (628) to the applicators (AA). The maximum hose length is 25 ft (7.6 m).
- For ease of operation and maintenance:
  - Place the display slightly below eye-level.
  - Position the system so that all sides are easily accessible and have sufficient lighting.

Permanently fasten the system base in the location selected using the mounting holes provided. See **Mounting Hole Dimensions**, page 134.

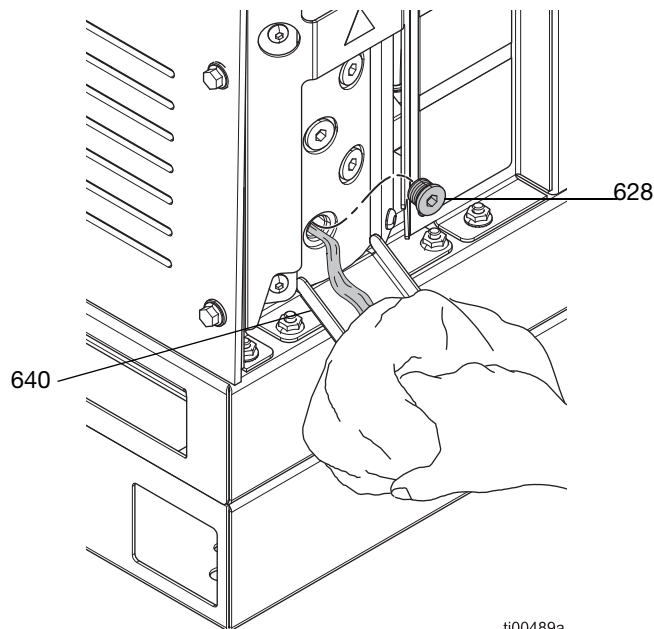
## System Installation Kits

- **System Stand Kit 17S264.** See details on page 127.
- **Adapter Plate Kit 25M528.** See details on page 127.

## Drain Before Using

Residual oil may remain in the system from factory testing. Drain residual oil from the system before using.

1. Ensure power is disconnected.
2. Place a rag on the melter drain tray (640).
3. Use a 1/4 in. hex key to remove the bottom fluid port plug (628).
4. When fluid stops draining, reinstall the port plug and remove the rag from the melter drain tray (640).





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**FIG. 1: Draining Test Oil from Melter Pump**

# System Requirements

## Power Requirements

				
To help prevent fire and explosion, a qualified electrician must determine the proper circuit breaker size to use for the power supplied to the system.				

The system requires a dedicated circuit protected with a circuit breaker in each ungrounded phase. See FIG. 7: Main Power Switch Wiring on page 18 for details. Follow all national, state, and local electrical codes and regulations.

## Heated Hose Requirements

All heated hoses attached to the system must be rated for 1200 psi (8.3 MPa, 83 bar), 400°F (204°C), have an RTD type sensor, and use no more than 1250W at 240 VAC. Non-Graco heated hoses require an electrical adapter cable.

## Applicator Requirements

All applicators attached to the system must be rated for 1200 psi (8.3 MPa, 83 bar), 400°F (204°C), have an RTD type sensor, and use no more than 400W at 240 VAC. Non-Graco applicators require an electrical adapter cable.

## Air Line Requirements

If using the same air for actuating the applicator(s), install the tee in the air supply line before connecting the main air line to the system. See your applicator manual for applicator air pressure requirements. If necessary, use an applicator air regulator before the applicator to decrease air pressure.

- **Main air line (CC):** 3/8 in. (9.5 mm) minimum air supply line. 1/2 in. (12.7 mm) required for lines more than 50 ft (15.2 m).

For best performance, supply pressure should be between 80 psi (550 MPa, 5.5 bar) and 100 psi (690 MPa, 6.9 bar). If air supply is not able to sustain pressure at the flow rate required by the InvisiPac system, or if pressure is expected to drop due to other equipment sharing the supply, an Air Reservoir Kit 16W366 is available that allows the system to operate on lower pressure or restricted air supply lines.

30 scfm capacity.

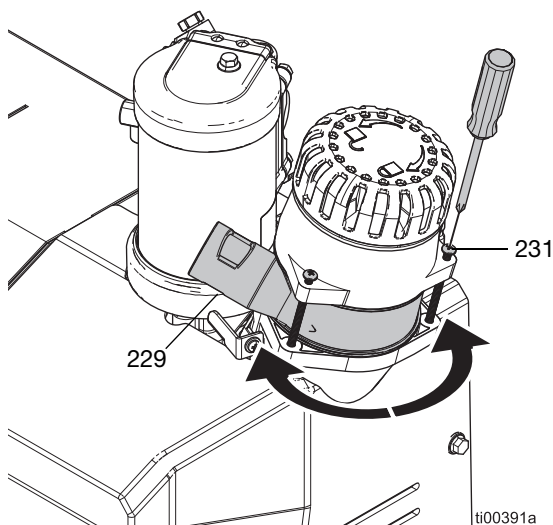
- **Applicator air regulator:** Set to 70 psi (4.8 bar, 0.48 MPa). Not supplied with system. Purchase separately.



## Setup Adhesive Supply

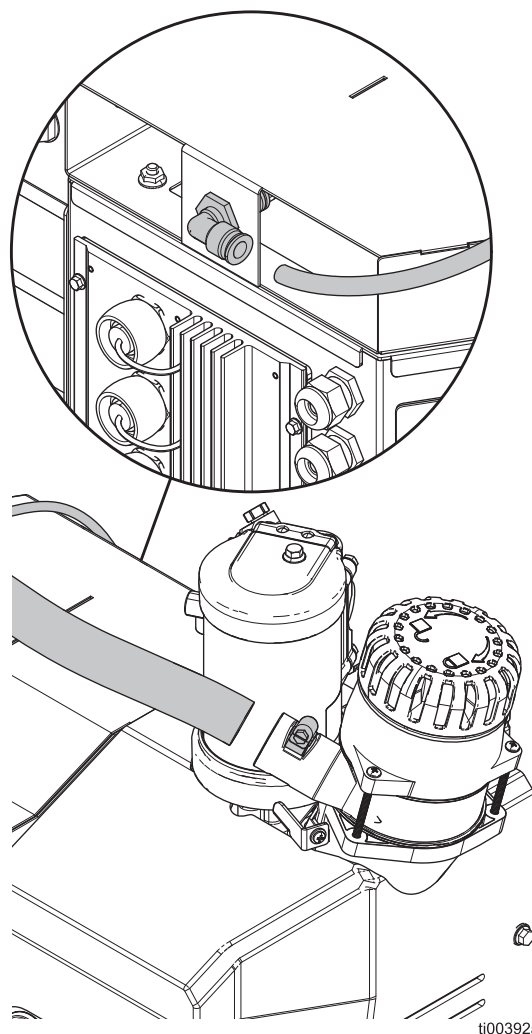
### Remote Vacuum Feed Models: Connect Feed System

1. Refer to the feed system manual to install the feed system. See **Compatible Drum Vacuum Feed Systems**, page 3.
2. Adjust the funnel inlet if desired.
  - a. Loosen the funnel fasteners (231) to adjust the funnel inlet.
  - b. Rotate the funnel inlet (229) to the desired position.
  - c. Tighten the fasteners (231) to secure the funnel inlet position.



**FIG. 2: Funnel Inlet Adjustment**

3. Connect the feed hose to the funnel inlet (229).
  - a. Insert a 1.3 in. (33 mm) OD clear feed hose into the funnel inlet (229).
  - b. Tighten the hose clamp over the cutouts in the funnel inlet to secure the feed hose.



**FIG. 3: Feed Hose Connection**

4. Connect the feed system 3/8 in. (9.525 cm) OD air supply hose to the system.

### On-Board Hopper Models: Add Adhesive Pellets to the Hopper

1. Open the hopper lid.
2. Pour adhesive pellets into the hopper.

## Heated Hose and Applicator Connections



The equipment surfaces and components can become very hot. To avoid severe burns, wear protective equipment, such as thermally insulated gloves.

To help prevent serious injury from pressurized fluid, such as skin injection, follow the **Pressure Relief Procedure**, page 26 before connecting a hose to the equipment.

### Prepare For Connections

- **Drain Before Using.** Follow the steps on page 11.
- Follow the **Pressure Relief Procedure**, page 26 if connecting to a system already in service.

### Connect the Heated Hose to System

Connect up to four heated hoses starting with the bottom connectors first. Follow your heated hose manual for installation details. See **Related Manuals**, page 3. See FIG. 4 for reference.

1. **Prepare For Connections.** Follow the steps on page 14.
2. Make an electrical connection (HC1) between the system and the heated fluid hose.
  - a. Remove the electrical port cover (256) from the electrical port.
  - b. Connect the hose electrical connector to a system electrical port.
3. Make a fluid connection between the system and the heated fluid hose.
  - a. Remove the fluid port plug (628).
  - b. Install a port connector (33, 34, or 67) on each melter fluid outlet. Torque to 180 in-lb (20 N•m).

- c. Connect the heated hose (BB) to the melter fluid outlet starting with the bottom port. Use two wrenches to torque hose to 300 in-lb (33 N•m).

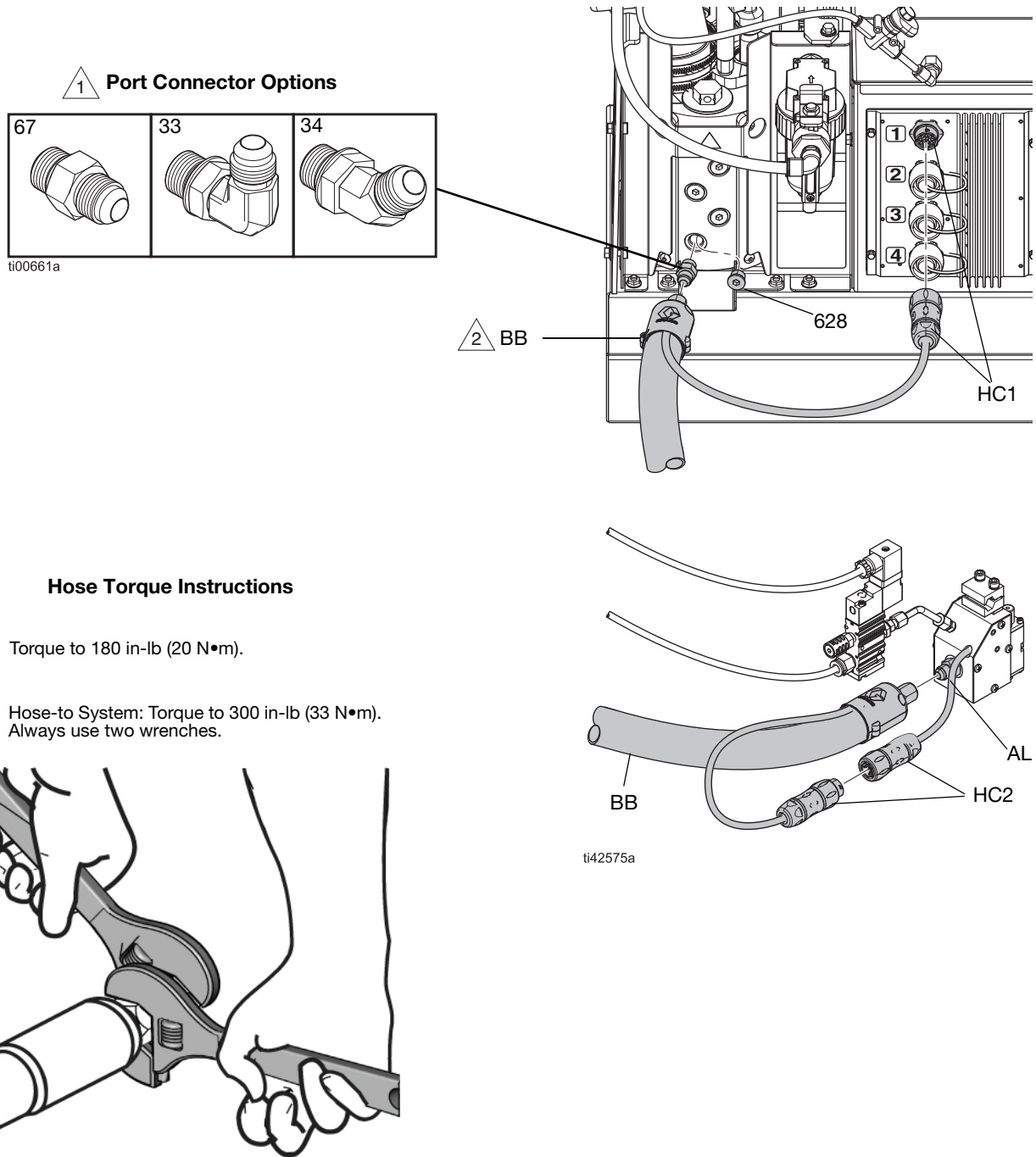
### NOTICE

Over-tightening the hose port connector will damage the connector seal and cause fluid leaks. Do not overtighten the port connector. Use two wrenches to torque the hose to the melter pump.

### Connect the Applicator to the Heated Hose

Install and configure the applicator following your applicator instructions. See **Related Manuals**, page 3. See FIG. 4 for reference

1. Connect the hose fluid outlet to the applicator fluid inlet (AL). Tighten the connector with a wrench.
2. Connect the heated hose and applicator electrical connectors (HC2).



**FIG. 4: Heated Hose and Applicator Typical Installation**

## Air Supply Installation

### NOTICE

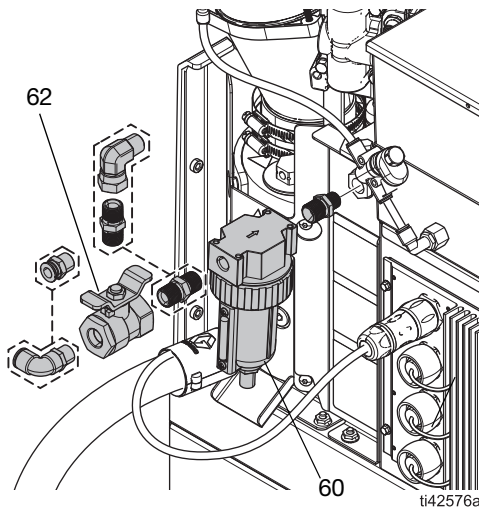
Oiling the air supply can damage the air controls components. Do not install an oiler on the air supply to the system.

- **System inlet air filter (60):** The system must use an air filter with a minimum flow rate of 30 scfm.
- **Bleed-type air valve (62):** The system must use a bleed-type ball valve that bleeds pressure downstream when closed.

**NOTE:** The system air gauge lens (504) is plastic to allow for use in food and beverage industries.

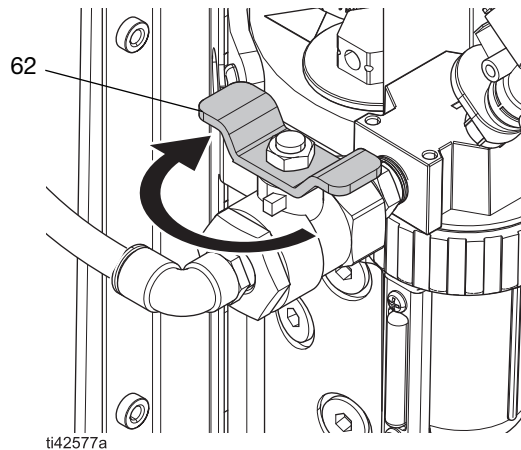
### Connect to the Air Supply

1. Install the bleed-type air valve (62) and the air filter (60) at the 1/4 NPT female system air inlet. **NOTE:** Additional fittings are included with the bleed-type air valve to use as needed.



**Fig. 5: Bleed-Type Air Valve and Air Filter Installation**


2. Close the bleed-type air valve (62).



**Fig. 6: Bleed-Type Air Valve Closed**

3. Connect an air supply line to the bleed-type air valve (60). See **Air Line Requirements**, page 12.

# Connect Material Tracking Input



**DANGER**

**SEVERE ELECTRIC SHOCK HAZARD**

This equipment can be powered by more than 240V. Contact with this voltage will cause death or serious injury.

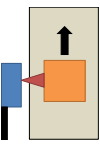
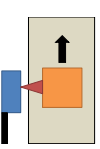
- Turn off and disconnect power at main switch before disconnecting any cables and before servicing equipment.

A trigger sensor or dry contact input can be used to add material tracking to InvisiPac HM10 systems. See **Repair Kits** (starting on page 117) for additional details.

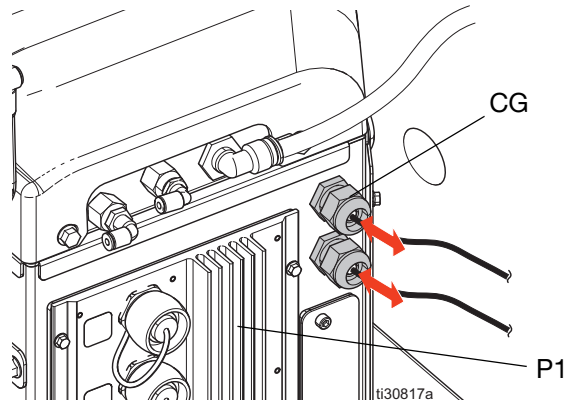
**NOTE:** See **Material Tracking**, page 43 for detailed information regarding how to view setup and material tracking information in the software.

Perform the following steps to connect a trigger sensor to the InvisiPac system:

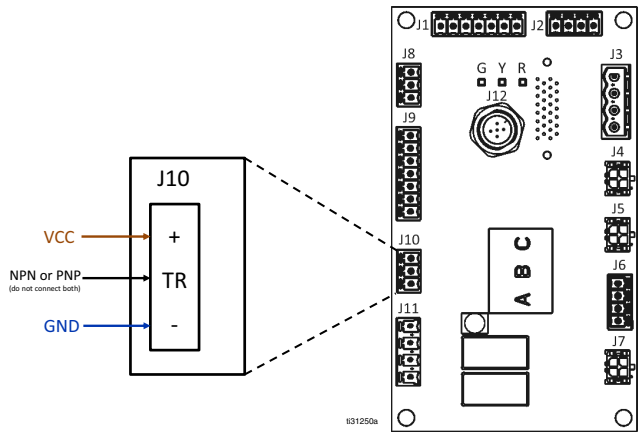
1. Mount the trigger sensor according to the guidelines in the table below:

Kit	Sensor Type	Notes	Image
24X446	Diffuse	<ul style="list-style-type: none"> <li>Align sensor perpendicular to line.</li> <li>Adjust sensitivity for proper operation.</li> <li>Ensure sensor trips once per unit.</li> <li>Range: 200 mm</li> </ul>	
24X447	Retro Reflective	<ul style="list-style-type: none"> <li>Align sensor perpendicular to line.</li> <li>Align reflector and sensor.</li> <li>Ensure sensor trips once per unit.</li> <li>Range: 3.5 mm</li> </ul>	

2. Connect the M12 end of the supplied cable to the trigger sensor.
3. Route the flying lead end of cable through one of the cable grommets (CG) on the back of the InvisiPac electrical enclosure.



4. Refer to the table and image below to connect flying leads to the System I/O Board on AMZ #1 (P1).

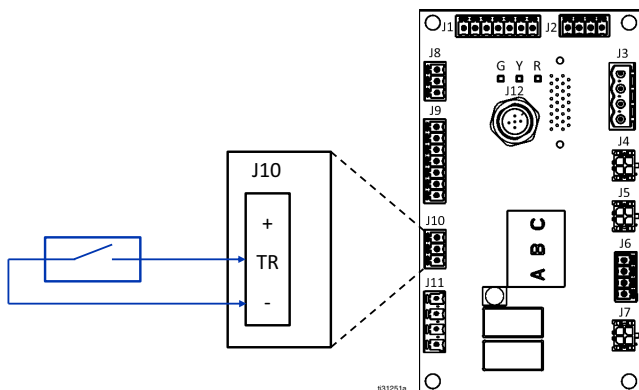


Flying Lead Signal (color)	J10 Pin
VCC (brown)	+
PNP (black)	TR*
NPN (white)	
GND (blue)	-

**\*NOTE:** Only connect one wire (trim and terminate the other wire).

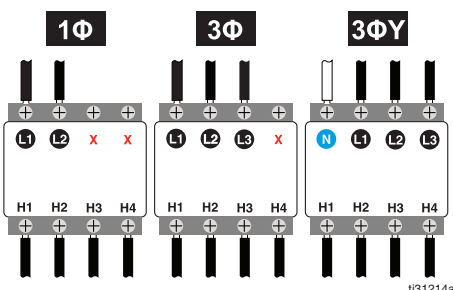
Perform the following steps to connect a dry contact to the InvisiPac system:

1. Route cable through one of the cable grommets (CG) in back of the InvisiPac electrical enclosure.
2. Refer to the table and image below to connect flying leads to the System I/O Board on AMZ #1.



**NOTE:** The strain relief bushing (205) fits a 0.71–0.98 in. (18–25 mm) OD electrical cord.

5. Attach insulated ferrules to the end of each wire.
6. Connect ground wire to the chassis ground (14). Ensure the other end of the ground wire is connected to a true earth ground.
7. Connect power wires to the main power switch. Tighten terminals to 7–10 in-lb (0.8–1.1 N•m).



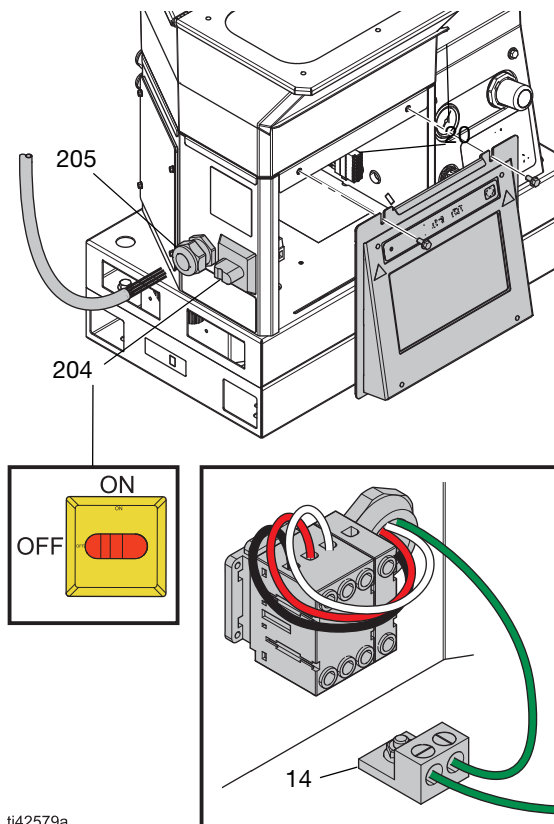
**Fig. 7: Main Power Switch Wiring**

8. Tighten strain relief bushing (205) around electrical cord. **Install the ADM Screen.** Follow the steps on page 81.

**DANGER**  
**SEVERE ELECTRIC SHOCK HAZARD**  
 This equipment can be powered by more than 240V. Contact with this voltage will cause death or serious injury.

- Turn off and disconnect all power before disconnecting any cables and before servicing equipment.
- This equipment must be grounded. Connect only to grounded power source.
- All electrical wiring must be done by a qualified electrician and comply with all local codes and regulations.
- To reduce the risk of electric shock, perform the previous **Installation** sections (beginning on page 11) prior to connecting the electrical cord.


1. Turn the main power switch (204) OFF.
2. Ensure that the electrical disconnect is shut off and locked out.
3. **Access the Electrical Enclosure.** Follow the steps on page 81.
4. Insert the electrical cord through the electrical enclosure strain relief bushing (205).

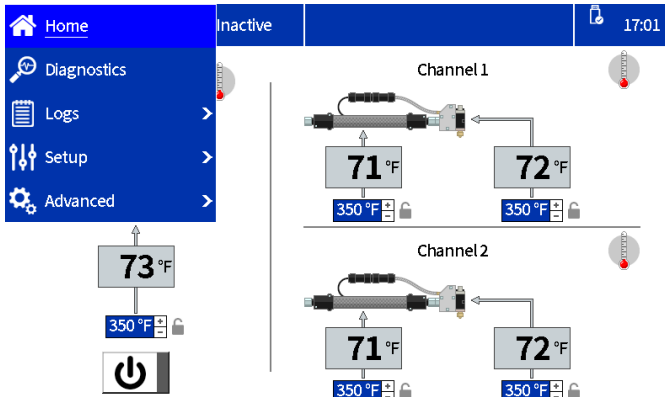


**Fig. 8: Electrical Cord Connections**

# Set Baseline ADM Settings

**Menu Symbol**  > Setup Screens

1. Turn main power switch (204) ON.
2. Select the **Menu Symbol**  to open the navigation menu.



**FIG. 9: ADM Menu Navigation**

3. Set the following baseline settings before operation:

## Setup Screens

- **Set System Settings in the General Settings.** Follow the steps on page 19
- **Setup Applicators on the Gun Setup Screen.** Follow the steps on page 19
- Set the specific Gravity on the material tracking screen.
- See **Material Tracking**, page 43.


## Advanced Screens

- **Set or Disable a Password.** Follow the steps on page 20
- Set Material Unit





## Home Screen

- **Set Temperatures on the Home Screen.** Follow the steps on page 20

# Setup Applicators on the Gun Setup Screen

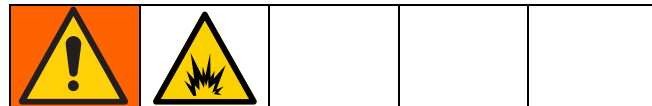
1. Select the **Menu Symbol**  > **Setup** > **Gun Setup**.
2. Check the **Installed** box for each channel that has a heated hose and an applicator installed.
3. Select the **Gun RTD Type** used on each installed applicator. Refer to the applicator manual for details on RTD type selection.

**NOTE:** The settings automatically save as they are entered. Navigate to another screen after the settings are accurately entered.


Gun Setup				
Inactive		17:02		
Installed	Temperature	Gun RTD Type		
Gun 1: <input checked="" type="checkbox"/>	72 °F	Pt, 100Ω/1000Ω		
Gun 2: <input checked="" type="checkbox"/>	71 °F	Pt, 100Ω/1000Ω		
Gun 3: <input type="checkbox"/>	--- °F	Pt, 100Ω/1000Ω		
Gun 4: <input type="checkbox"/>	--- °F	Pt, 100Ω/1000Ω		

**FIG. 10: Gun Setup Screen Capture**

# Set System Settings in the General Settings



To help prevent fire and explosion, a qualified electrician must determine the proper circuit breaker size to use for the power supplied to the system.

1. Select the **Menu Symbol**  > **Setup** > **General**.
2. Enter **Pump idle time to system inactive** to allow the system to automatically go to the Inactive state after the desired duration of pump inactivity.
3. Select the **circuit breaker size** used. Use the size of the circuit breaker used to supply power to the system. The circuit breaker is external to the system and provided by the user.



**NOTE:** The system limits current draw on incoming power lines based on the circuit breaker size entered. The minimum value for the setting is 15 A, and a larger circuit breaker will allow the system to draw more power and reduce startup time. See **Technical Specifications**, page 136 for maximum system current draw.

4. The **Enable slow refill alert** setting triggers a slow refill error (L3FX) if the refill system is taking longer than expected to transport glue into the funnel. For more information on refill speed, see **Fill/Pump Diagnostics Screen**, page 39.
5. Select the **Refill setting**.
  - **Hopper auto:** provides short pulses to load material into the melter.
    - Enable this setting for On-Board Hopper Models.
  - **Bin auto:** provides long pulses to load material into the melter.
    - Enable this setting for Remote Vacuum Feed Models.
    - Use with remote bin or with viscous material that is having trouble being fed from the on-board hopper.
  - **Bin adapting:** changes the pulse based on the previous fill to maintain a five second refill.

**NOTE:** Only use Manual refill for maintenance. See **Drain the System**, page 30.

## Set Temperatures on the Home Screen

1. Select the **Menu Symbol** > **Home**.
2. Select the melter temperature.
3. Set the melter temperature and press the button to apply the temperature to the channels.

### NOTICE

To prevent adhesive degradation, regularly disable the heating system and do not set the hose temperature higher than the melter temperature.

- Use the + or - buttons to make small adjustments.

**FIG. 11: Temperature Change Screen**

## Set or Disable a Password

### Set Password

Users have the option to enable a password lock to protect their configured settings. With a password enabled, attempting to modify a setting brings up a password dialog. Entering the password on any setting unlocks all settings for two minutes.




1. **Menu Symbol** > **Advanced** > **Display**
2. Select Set Password.
3. Enter a four-digit numerical password.
4. Press the check mark button to save.

### Disable Password

1. **Menu Symbol** > **Advanced** > **Display**
2. Set Password: Enter 0000 to disable the password.
3. Press the check mark button to save.



# Setup

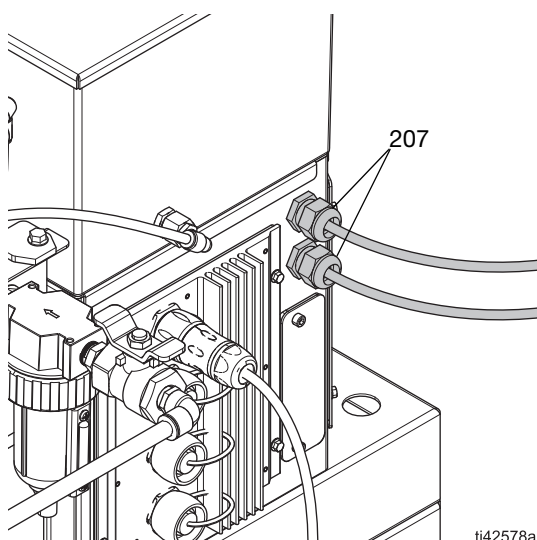
				
<p><b>DANGER</b>  <b>SEVERE ELECTRIC SHOCK HAZARD</b>          This equipment can be powered by more than 240V. Contact with this voltage will cause death or serious injury.</p> <ul style="list-style-type: none"> <li>• Turn off and disconnect all power before disconnecting any cables and before servicing equipment.</li> </ul>				

Follow the desired setup procedures to install accessories and configure the system for your application.

## Connect PLC Inputs

Configure up to six PLC inputs to perform one of the following options:

- Turn the system on/off
  - Disable the system (turn off the pump)
  - Enable/Disable individual channels (1 - 4)
1. **Access the Electrical Enclosure.** Follow the steps on page 81.
  2. Route a multi-conductor cable through an I/O cable gland. See FIG. 12.



**FIG. 12: I/O Cable Gland Location**

3. Wire the desired PLC inputs to the System I/O Board on AMZ.
  - **Digital Inputs Wiring (0–30 VDC)**, page 22. See FIG. 13 for reference.
  - **Dry Contact Inputs Wiring (Open/Closed Circuit)**, page 23. See FIG. 14 for reference.
4. **Set PLC Settings on the ADM.** Follow the steps on page 25.

Digital Inputs Wiring (0–30 VDC)

Item	Specifications
Digital Input	0-30 VDC
	Signal Low: 0-2.5 V
	Signal High: 10-30 V

- 1. **Access the Electrical Enclosure.** Follow the steps on page 81.
- 2. Connect the PLC GND wire (16-28 AWG) to the “ISO GND” terminal on J9.

- 3. Connect an input signal wire to the desired input terminal on J9. Terminals are labeled by input number. Connect all remaining inputs.

**NOTICE**

The system I/O board and the PLC could become damaged if connections are made to J8. Do not connect any wires to J8 while using Digital Input type PLC inputs. Signals on J8 are provided for Dry Contact type inputs only.

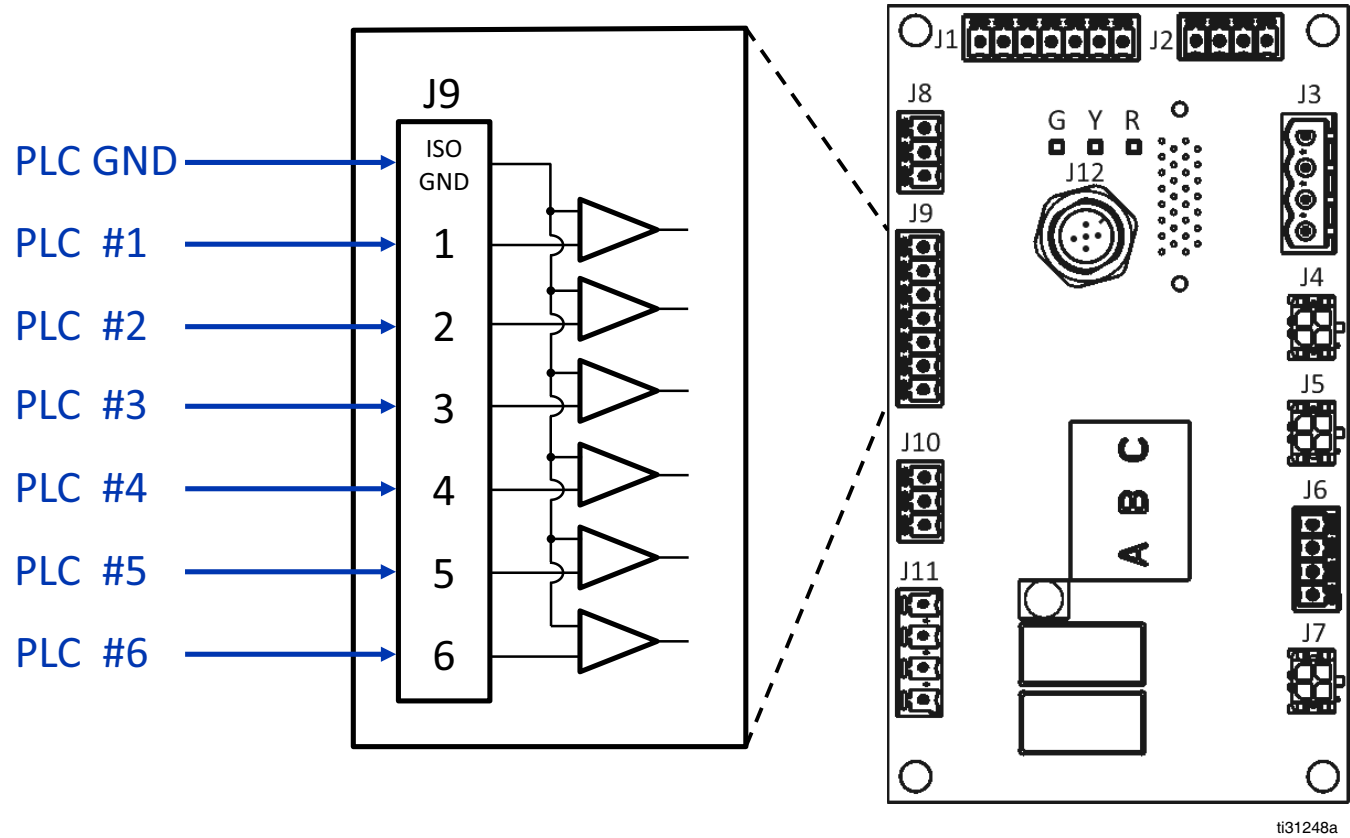
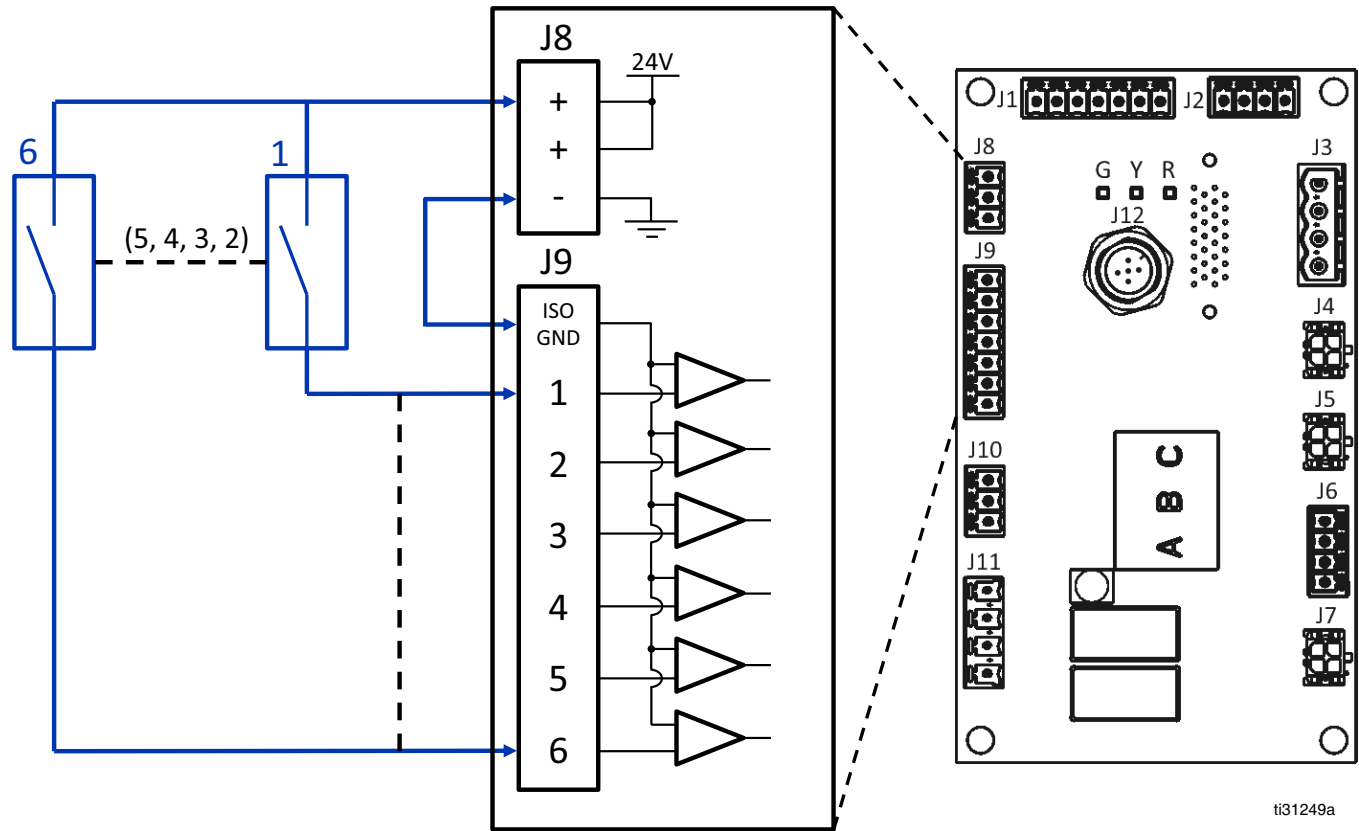


FIG. 13: Digital Inputs Wiring (J9)

# **Dry Contact Inputs Wiring (Open/Closed Circuit)**

Item	Specifications
Dry Contact	Open/Closed Circuit
	Signal Low: Open Circuit
	Signal High: Closed Circuit

1. **Access the Electrical Enclosure.** Follow the steps on page 81.
2. Connect a jumper wire (16-28 AWG) between “-” terminal on J8 and “ISO GND” terminal on J9.
3. Connect one side of the input to one of the “+” terminals on J8. Connect the other side of the input to the desired input terminal on J9 (labeled by input number). Repeat for remaining inputs.



**FIG. 14: Dry Contact Inputs (Open/Closed Circuit) Wiring (J8 and J9)**

## Wire PLC Outputs

Configure up to two PLC outputs to indicate the following states:

- InvisiPac System Ready
- Error Present
- Maintenance Due

## PLC Output Specifications

Item	Specification
Output Type	Dry Contact (Open/Close Circuit)
Max Voltage	24 VDC / 240 VAC
Max Current	2A

1. **Access the Electrical Enclosure.** Follow the steps on page 81.
2. Route a multi-conductor cable through one of the I/O cable glands (207).
3. Wire PLC outputs to the system J11 on the AMZ.
4. **Set PLC Settings on the ADM.** Follow the steps on page 25.

## DRY CONTACT OUTPUTS (24VDC / 240VAC, 2A MAX)

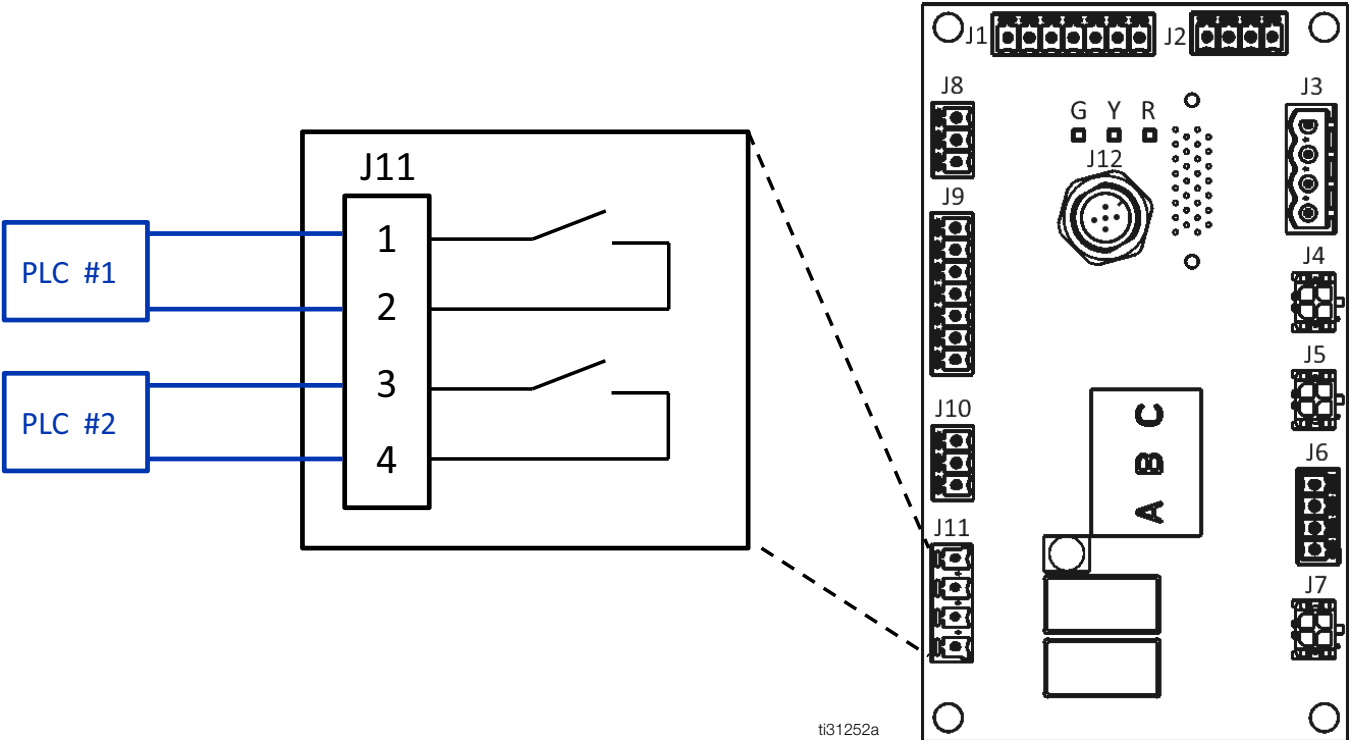
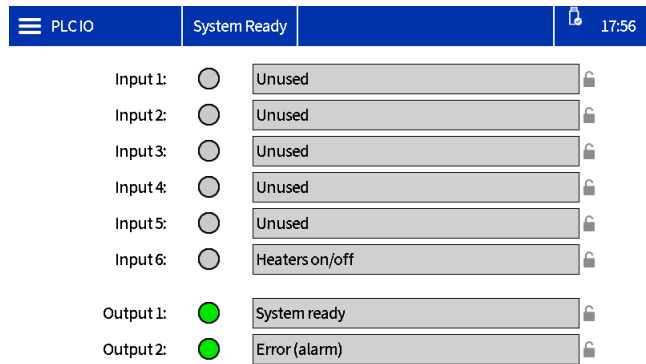


FIG. 15: Dry Contact Outputs (24VDC/240VAC, 2A MAX) (J11)

## Set PLC Settings on the ADM



**FIG. 16**

### Input Options

All input options except Pump Enable/Disable are transition-based.

Input	Action
Unused	Input disabled
Heaters On/Off	Turn system ON
Pump Enable/Disable	Enable or disable the pump. The pump remains disabled if the input signal is in the disabled state (voltage absent)
Chanel Enable/Disable	Enable or disable a channel

### Output Options

Output	Action
Unused	Output disabled
System Ready	Close contact when the system is ready
Error (Alarm)	Open contact when the alarm is present. NOTE: alarms disable the system heat and pump.
Error (Deviation/Advisory)	Close contact when a deviation or advisory is present. Deviations and advisories do not disable the system heater or pump.
Maintenance Due	Close contact when selected maintenance interval is reached.

### PLC Indicators

Indicator Color	Input	Output
Green	Voltage Present	Contact Closed
Gray	Voltage Absent	Contact Open

# Operation



Heating and dispensing hot melt adhesive may create potentially harmful vapors. Read material manufacturer's warnings and material SDSs to know specific hazards and precautions. Ventilation of the work area may be required.

The equipment surfaces and components can become very hot. To avoid severe burns, wear protective equipment, such as thermally insulated gloves. Do not touch hot fluid.

Moving parts can pinch, cut or amputate fingers and other body parts. Keep clear of moving parts.

High-pressure fluid from dispensing device will pierce skin. To avoid a skin injection injury, keep clear of the applicator during operation.

## Operation Overview

Turning on the system enables the heaters and pump. After the system warms up, adhesive pellets release into the melter. Users set the melting temperature on the ADM screen to melt the pellets into adhesive glue. Air pressure is supplied to the pump to pump adhesive into the heated fluid hose and the heated applicators.

The adhesive dispenses when the applicators open. The system continuously releases pellets into the system during operation.

## Operation Requirements

- Only use hot melt adhesive pellets in the system.
- The **On-Board Hopper Models** have a 20 pound weight capacity.
- It is recommended to maintain a minimum flow rate of 1.5 lb/hr to prevent material from melting within the feed cap and funnel. System flow rate can be monitored on the **Fill/Pump Diagnostics Screen**, page 39.
- Pump air pressure regulator (505):** Set pump to 20–100 psi (1.4–6.9 bar, 0.14–0.69 MPa).

## Pressure Relief Procedure



Follow the Pressure Relief Procedure whenever you see this symbol.



This equipment stays pressurized until pressure is manually relieved. To help prevent serious injury from pressurized fluid, such as skin injection, splashing fluid and moving parts, follow the Pressure Relief Procedure when you stop dispensing and before cleaning, checking, or servicing the equipment.

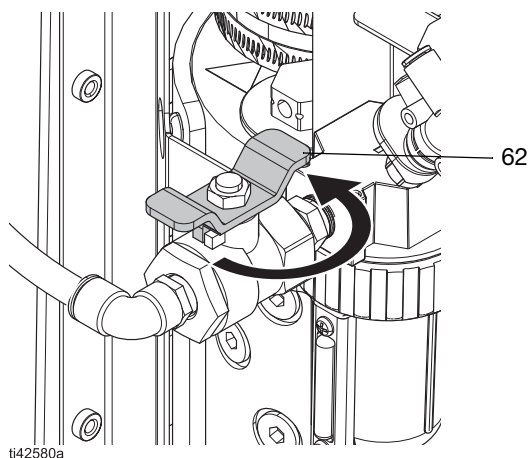
- Turn main power switch (204) OFF.
  - Close the bleed-type air valve (62).
- NOTE:** Closing the bleed-type air valve (62) also depressurizes the hoses and applicators.
- Manually verify the pressure is relieved by opening the applicator and ensuring no adhesive dispenses.

## Initial Startup and Prime Procedure

**NOTE:** Complete all installation and setup procedures prior to initial startup.

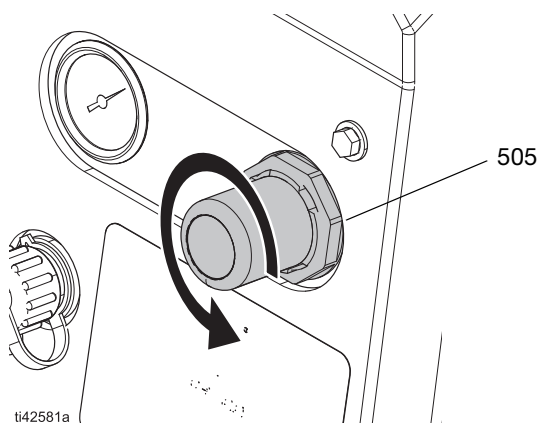
- Direct the applicator into an appropriate waste container.
- Supply adhesive pellets to the system. See **Setup Adhesive Supply**, page 13.
- Turn the main power switch (204) ON.

4. Open the bleed-type air valve (62).



**FIG. 17: Open Bleed-Type Air Valve**

5. Use pump air pressure regulator (505) to adjust pump air pressure to 0.



**FIG. 18: Air Pressure Regulator Adjustment**

<p>To help prevent fire and explosion, never exceed the cleaning fluid's rated temperature. If the system was just flushed, residual cleaning fluid is still in the system until the system is primed with adhesive. Do not raise temperature above cleaning fluid rated temperature until system is primed with adhesive.</p>				

6. Navigate to the **Home** screen and set the melter, hose, and applicator temperatures. See **Set Temperatures on the Home Screen**, page 20.

*On new systems only:* A new system may have residual oil in the melter from factory testing prior to shipping. To prevent smoking, temporarily adjust the melter temperature to 250°F (121°C).

7. Press the power button on the ADM Home Screen to begin system warm-up. See FIG. 19.

**NOTE:** Pellets will not move into the melter until the system reaches operating temperature. See FIG. 20.

8. Open the applicators and keep them open.
9. With the applicators open and the system up to temperature, slowly increase the pump air pressure until the pump begins to run very slowly. Approximately 20 psi (1.4 bar, 0.14 MPa) should be sufficient.

#### NOTICE


To prevent damage to the pump due to pump cavitation, do not supply more than 20 psi (1.4 bar, 0.14 MPa) air pressure to the pump until the system is fully primed.

**NOTE:** Pump operation may be erratic below 20 psi (1.4 bar, 0.14 MPa).

10. Continue running the pump until clean, air-free material is dispensed from each applicator.
11. Once each applicator is fully primed, adjust pump to desired pressure setting.
  - a. Adjust pump pressure to 20–100 psi (1.4–6.9 bar, 0.14–0.69 MPa).
  - b. Repeatedly open and close each applicator while inspecting the dispense pattern.
  - c. Repeat until the desired dispense pattern is achieved.

## Dispense Adhesive

If the system is empty or has air in the lines, perform the **Initial Startup and Prime Procedure**, page 26 before dispensing.

1. Turn main power switch ON.
2. Prepare for dispensing.
  - a. Verify the bleed-type air valve (62) is open.
  - b. Check pump air pressure gauge (504) to verify pressure is set as desired.
  - c. Verify applicators are closed.
3. Check the ADM settings. See **Set Baseline ADM Settings**, page 19.
4. Supply adhesive pellets to the system. See **Setup Adhesive Supply**, page 13.
5. Press the power button  on the ADM Home Screen to enable the heaters and pump.

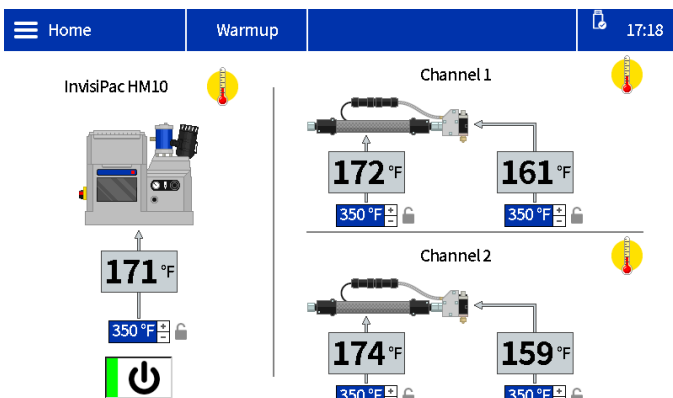


FIG. 19: System Warming Home Screen

6. When the system is up to temperature, the pump will start automatically.

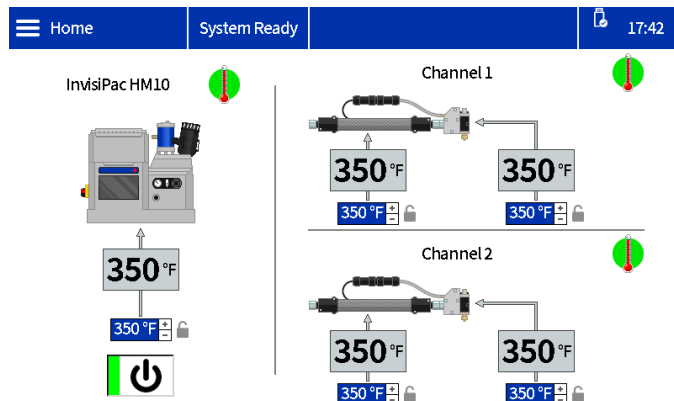


FIG. 20: System to Temperature Home Screen

7. Open and close the applicators as desired to dispense material.

## Check the Adhesive Fill Rate

The Fill/Pump Diagnostics Screen displays the fill rate between the hopper and the melter.

1. **Navigate to the Fill/Pump Diagnostics Screen:** Home > Diagnostics > Select the Fill/Pump tab.

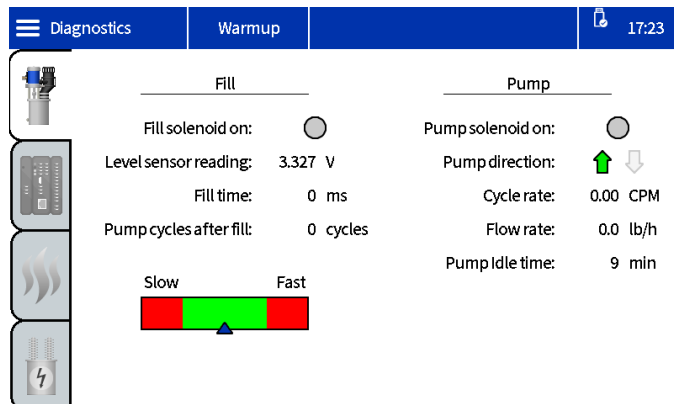


FIG. 21: Fill/Pump Diagnostics Screen: Correct Fill Rate

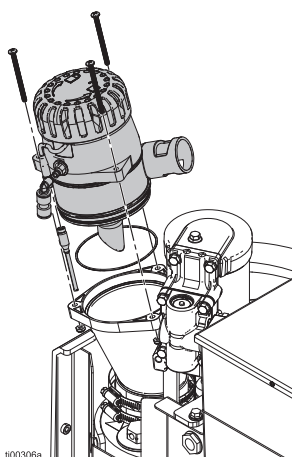
2. Adjust the air venturi if the fill rate is slow or fast. See **Fill Rate Troubleshooting and Venturi Air Adjustment**, page 70 for details.



## Manual Refill Dispensing

Only use Manual Refill during maintenance or if the or automatic refill setting is not functioning properly and cannot be fixed in a timely manner. Perform service to the automatic feed system as soon as possible to limit debris buildup on the feed funnel.

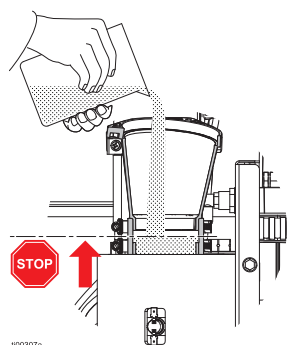
1. Change the refill settings to manual in the system settings. See **Set System Settings in the General Settings**, page 19.
2. Loosen the fasteners and disconnect the level sensor to remove the top of the funnel assembly.



**FIG. 22: Funnel Assembly**

3. Fill the funnel with adhesive pellets.

**NOTE:** Do not fill pellets above the metal ring. Bridging may occur if the funnel is overfilled.

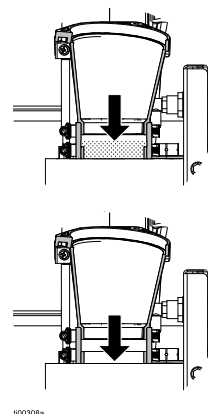


**FIG. 23: Manual Funnel Fill**


4. Manually refill the funnel as needed to maintain the required flow rate.

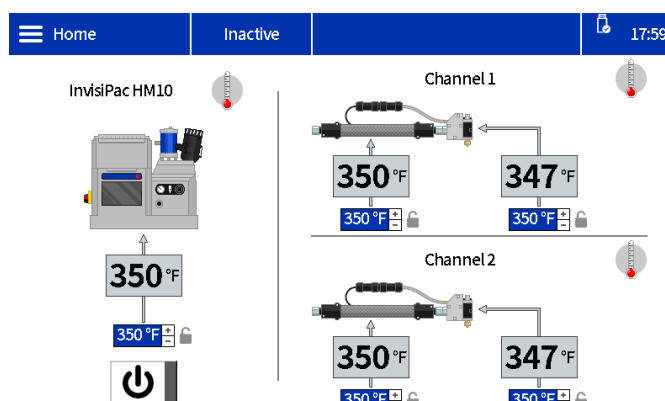
## Shutdown

1. Dispense adhesive into a waste container until the material level is down into the melter core. This will ensure all melted pellets re-melt when the system is re-heated.



**FIG. 24: Empty Funnel**

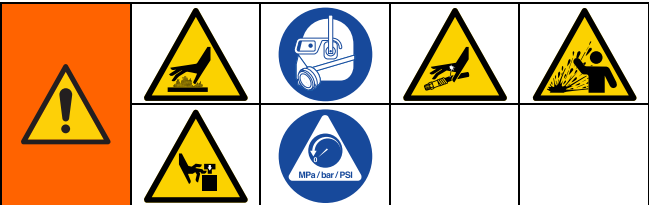
2. Press the power button  on the ADM Home Screen.



**FIG. 25: System Inactive Home Screen**


# Maintenance

## Drain the System



The equipment surfaces and components can become very hot. To avoid severe burns, wear protective equipment, such as thermally insulated gloves. Do not touch hot fluid or hot surfaces.

To help prevent serious injury from pressurized fluid, such as skin injection and splashing fluid, follow the **Pressure Relief Procedure**, page 26 before disconnecting a hose from the equipment.

1. Change the refill setting to Manual on the ADM. See FIG. 26.
  - a. Select the **Menu Symbol**  > **Setup** > **General**.
  - b. Select **Manual** from the Refill setting.

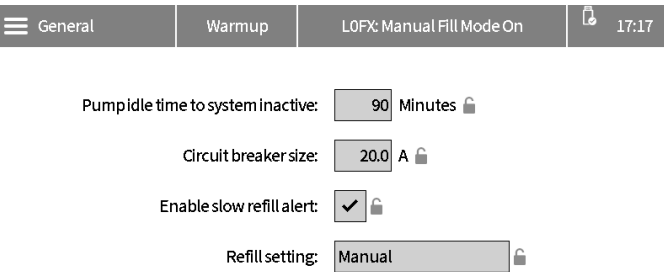




FIG. 26: Manual Refill Settings

2. If the system is inactive, Press the power button  on the ADM Home Screen to enable the heater and pump.
3. Depressurize the system.
  - a. Decrease pump air pressure (505) to 0.
  - b. Close the bleed-type air valve (62).

4. Disconnect hose from applicator inlet then place hose outlet in a waste container. Repeat for all hoses. Keep hose to applicator electrical connector connected.
5. Open applicator to allow residual fluid in applicator to drain.
6. Open the bleed-type air valve (62).
7. When system is at operating temperature, slowly increase pump air pressure (505) until fluid begins flowing into the waste container.

**NOTE:** It may take several minutes to empty the system. When there is no melter fluid at the pump, the pump will begin to cycle faster.

8. When the pump begins to cycle faster, close the bleed-type air valve (62).
9. Press the power button  on the ADM Home Screen to disable the heaters and pump.
10. Disconnect hose from melter fluid outlet (N).
11. Wait until system stops draining or at most 10 minutes.




**NOTE:** There will be some residual adhesive in the system.

12. Reset the refill setting on the ADM to Hopper or Bin Auto. See **Set System Settings in the General Settings**, page 19.
13. **Connect the Heated Hose to System.** Follow the steps on page 14.

**NOTICE**

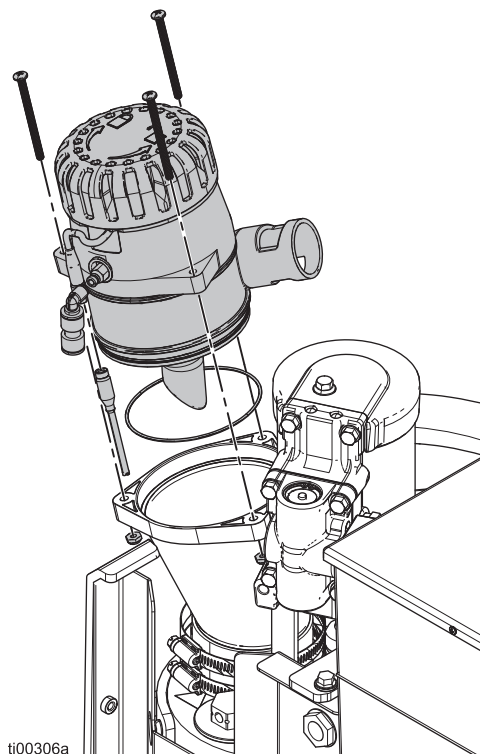
Over-tightening the hose port connector will damage the connector seal and cause fluid leaks. Do not overtighten the port connector. Use two wrenches to torque the hose to the melter pump.

## Flushing Procedure

				
<p>To help prevent fire and explosion, use the adhesive manufacturer's recommended cleaning fluid.</p> <ul style="list-style-type: none"> <li>• Never exceed the cleaning fluid's rated temperature.</li> <li>• Never flush your system or clean any aluminum components with halogenated hydrocarbon cleaning solution.</li> </ul>				

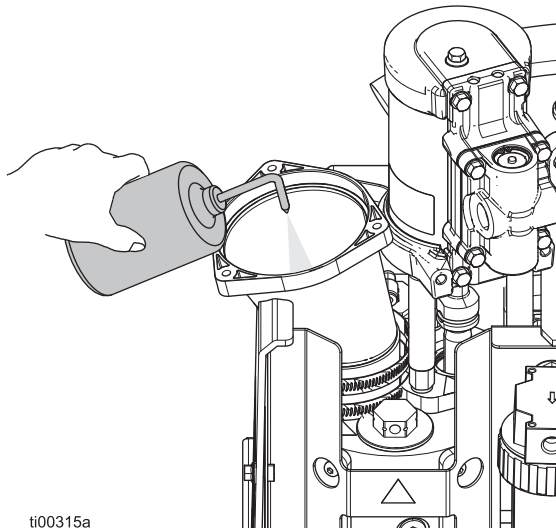
See the hot melt adhesive technical data sheet or SDS for the recommended cleaning fluid and cleaning fluid temperature requirements.

1. **Drain the System.** Follow the steps on page 30.
2. Depressurize the system.
  - a. Decrease pump air pressure (505) to 0.
  - b. Close the bleed-type air valve (62).
3. Set the refill setting to **Manual**. See FIG. 26.
4. Remove the funnel bolts and the top portion of the funnel.



**FIG. 27**

5. Change temperature setpoints to the manufacturer's recommended temperature for the cleaning fluid. Allow all system zones to heat or cool to the recommended setpoint. See **Set Temperatures on the Home Screen**, page 20.
6. Verify the bleed-type air valve (62) is closed and pump air pressure is set to 0.
7. Fill melter with hot melt cleaning fluid. To avoid overfill and spilling, do not fill above the metal portion of the melter.

**FIG. 28**

8. Allow hot melt cleaning fluid to soak in the melter for the duration specified by the cleaning fluid manufacturer.
9. Disconnect all hoses from the applicator manifolds and route into a waste container.
10. Open the bleed-type air valve (62) and slowly increase pressure to purge into the waste container.
11. After flushing, set the refill setting to **Hopper or Bin Auto**. See page **Set Baseline ADM Settings**, page 19.
12. Perform **Initial Startup and Prime Procedure**, page 26. Maintain the manufacturers recommended temperature settings until the system is primed with adhesive.

## Inspection Schedule

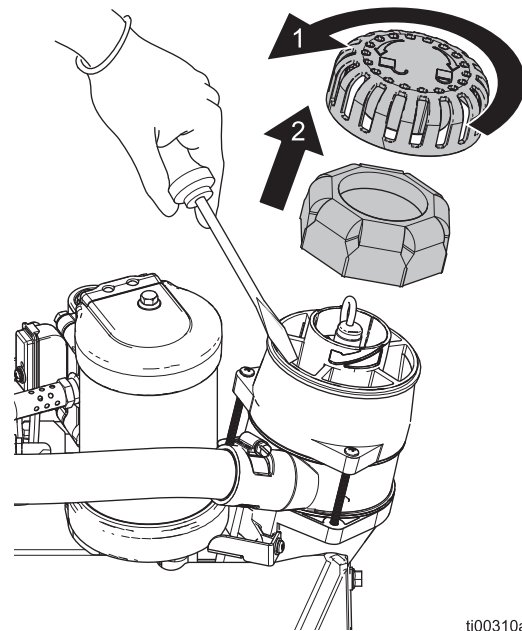
Task	Maintenance Interval
Inspect Funnel Filter	6-12 months
Replace Pump Outlet Filter	50,000 lb (25,000 kg) of adhesive pumped
Replace Pump Inlet Filter	As needed

## Funnel Maintenance




### Inspect the Funnel Cover and Funnel Filter

Inspect and clean the funnel and funnel filter to ensure clear melter air and pellet flow. The funnel cover and filter can be inspected without interrupting production.

- Remove, inspect, and clean the funnel cover.
- Replace or clean the filter as needed.
- Remove adhesive, pellets, or buildup in the funnel.

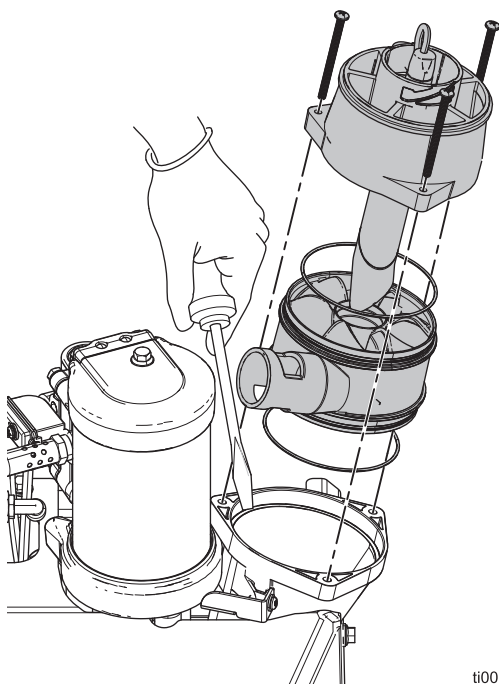
**FIG. 29: Funnel Cover and Funnel Filter Assembly**

## Clean Funnel Base

				
<p>The equipment surfaces and components can become very hot. To avoid severe burns, wear protective gloves and clothing that will insulate your hands and body from the hot surfaces and adhesive material.</p>				

Clear built-up adhesive in the lower portion of the funnel as needed.






1. Turn main power switch (204) OFF.
2. Remove the fasteners.
3. Separate the funnel and funnel seals.
4. Remove built-up adhesive from the base of the funnel.



ti00311a

**FIG. 30: Funnel Disassembly**

## Pump Filter Maintenance

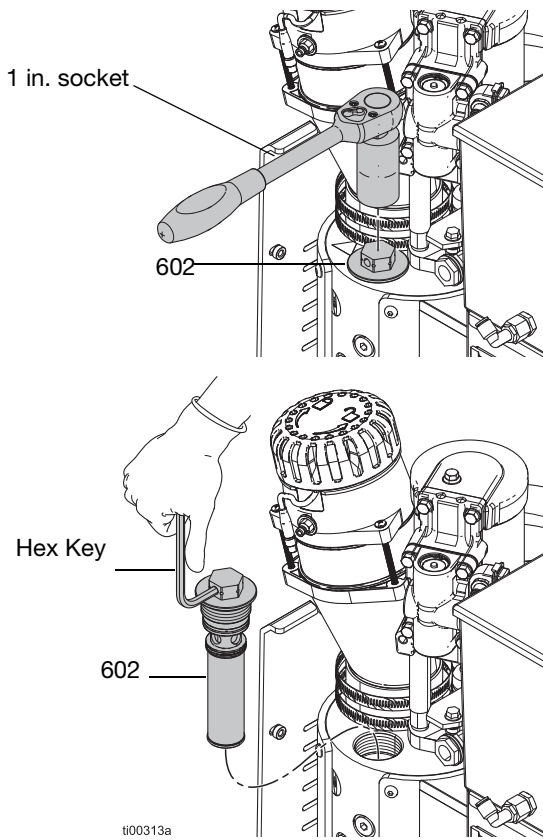
				
<p>The equipment surfaces and components can become very hot. To avoid severe burns, wear protective gloves and clothing that will insulate your hands and body from the hot surfaces and adhesive material.</p>				

Moving parts can pinch, cut, or amputate body parts. To help prevent serious injury from moving parts, follow the **Pressure Relief Procedure**, page 26 before servicing the equipment.

### Replace the Pump Outlet Filter

The pump outlet filter prevents small contaminants from entering the hoses and applicators.

1. Warm the system to operating temperature. The adhesive must be fluid to perform this procedure. Replace the component before the system cools.
2. **Prepare Equipment for Service.** Follow the steps on page 80.
3. **Remove Equipment Covers.** Follow the steps on page 80.
4. Use a socket wrench to unscrew the outlet filter (602).
5. Insert a hex key through the outlet filter cap to lift the outlet filter out.
6. Install the outlet filter (602) into the melter housing and tighten with a socket wrench.

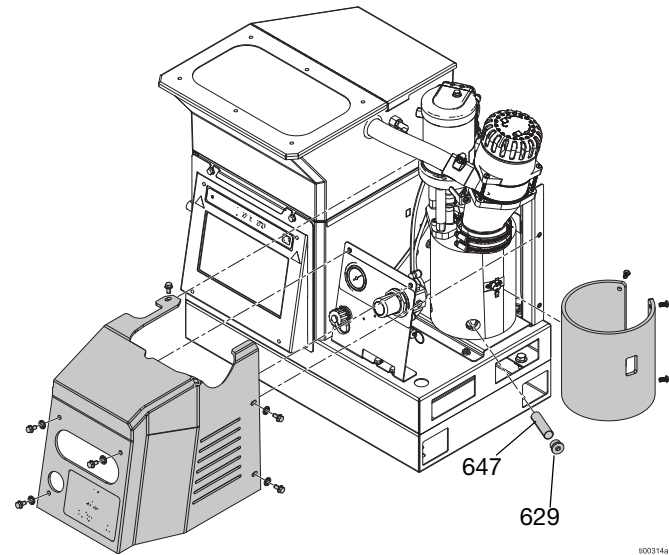


**FIG. 31: Pump Outlet Filter Replacement**

## Replace the Pump Inlet Filter

The pump inlet filter prevents large items from entering the system.


1. Warm the system to operating temperature. The adhesive must be fluid to perform this procedure. Replace the component before the system cools.
2. **Prepare Equipment for Service.** Follow the steps on page 80.
3. **Remove Equipment Covers.** Follow the steps on page 80.
4. Remove the thermal insulation from the melter.
5. Remove the inlet filter plug (629) with a hex key.
6. Use pick or a small hex key to remove the inlet filter (647).
7. Install a new pump inlet filter screen (647) into the melter manifold.
8. Install the filter plug (629) with a hex key.



**FIG. 32: Pump Inlet Filter Replacement**

## Software Update Procedure

The latest software version for the system can be found at [help.graco.com](http://help.graco.com). Drag and drop the software files from [help.graco.com](http://help.graco.com) onto the root directory of the flash drive.

1. Remove the USB port Cover (515).
2. Plug the USB with software updates into the USB Port.
3. A window will appear on the ADM screen to show that a new software update is available. Press the  icon.

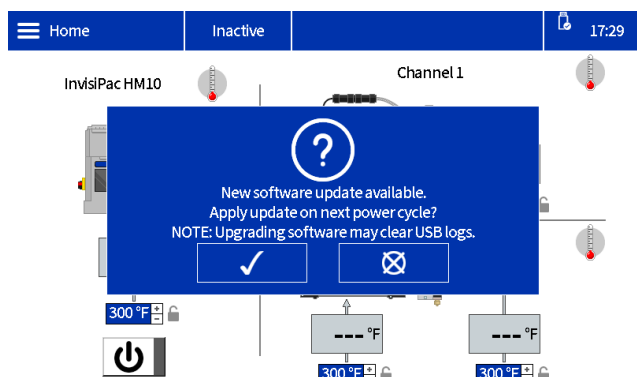



FIG. 33

4. After the  icon appears in the top right corner of the ADM screen, remove the USB and replace the USB Port Cover (515).

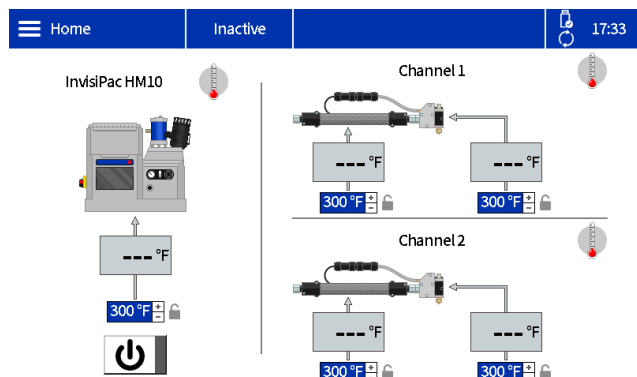


FIG. 34

5. Turn the Main Power Switch (204) OFF.
6. Turn the Main Power Switch (204) ON.

7. The system startup screen will include “Updates in Progress” text, and the time remaining to complete the software updates.



FIG. 35

8. The following screen will appear when the software upgrade is complete.



FIG. 36


9. Press the  icon.
10. The current software information will be displayed.



FIG. 37

# ADM Guide

## Screen Navigation

Select the **Menu Symbol**  on the home screen to open the screen menu.

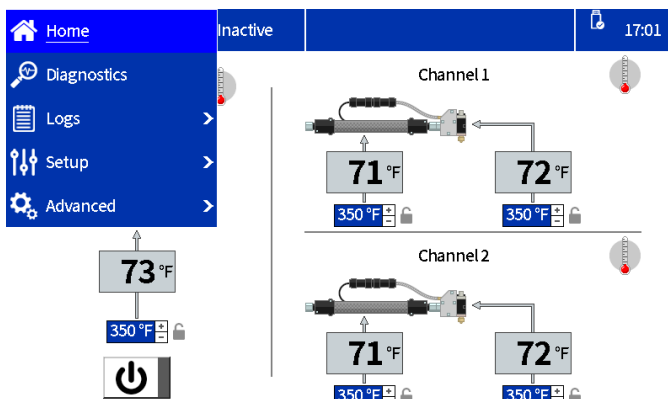











FIG. 38: ADM Menu Navigation

## Screen Symbols

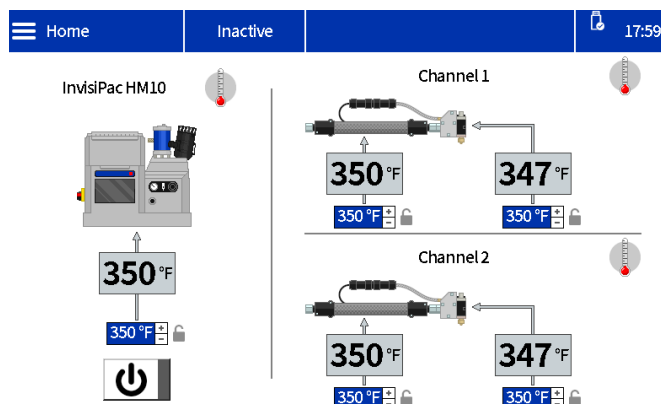
Symbol	Description
<b>Channel 1</b>	Channel 1 Applicator and Hose Settings
<b>Channel 2</b>	Channel 2 applicator and hose settings
<b>Invisipac HM10</b>	Melter Pump temperature settings
	Menu Symbol
	ADM power button. Power ON
	ADM power button. Power OFF
	Actual temperature of the melter, hose, and applicator
	Set temperature for the melter, hose, and applicator
	Temperature adjustments locked by a password. See Password
	The associated melter, hose, or applicator is off or not warming.

Symbol	Description
	The associated melter, hose, or applicator is on and warming up to temperature.
	The associated melter, hose, or applicator is ready for operation.

## Screen Navigation Overview

### Home Screen

View and adjust temperatures and operate the system power. See **Set Temperatures on the Home Screen**, page 20 for details. See **Set or Disable a Password**, page 20 to lock temperature settings.



### Diagnostics Screens

Read-only view of the important system diagnostic information. See page 39 for details.

- Fill/Pump Diagnostics
- I/O Diagnostics
- Heat Diagnostics
- Power Diagnostics

### Logs Screens

Read-only view of errors, events and usage. See page 42 for details.

- Errors
- Events
- Usage



## Setup Screens

Set system and component settings. See Set Baseline ADM Settings, page 19 for basic configurations and instructions. See page 43 for additional screen details.

- Gun Setup
- General
- PLC I/O
- Material Tracking
- Maintenance

## Advanced Screens

Configure and view system settings and preferences. See page 45 for details.

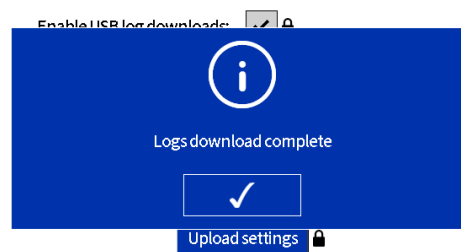
- Display
- Units
- USB
- Software
- EtherNet/IP (if the respective CGM is attached)
- PROFINET (if the respective CGM is attached)

# Data Management

## Download Log Files to a USB

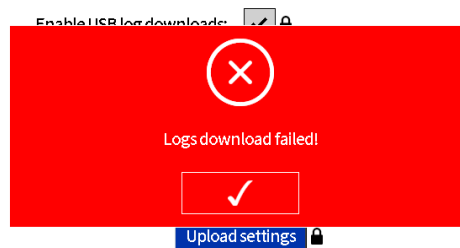
The InvisiPac HM10 has the ability to download runtime information to a USB drive. The information is stored as a collection of CSV files containing information including event/error history, material usage, diagnostic data, and system settings and temperatures.

1. Navigate to the USB Screen: **Advanced > USB** Screen.
2. Ensure **Enable USB log downloads** is checked.
3. Insert a USB drive into the USB slot.
4. A Logs Download in Progress message will generate on the screen. Press the check mark.
5. A download complete message generates when a download completes.



**FIG. 39: Logs Download Complete Screen**

**NOTE:** Removing the USB drive before the download completes or a faulty USB drive will generate a download has failed message.

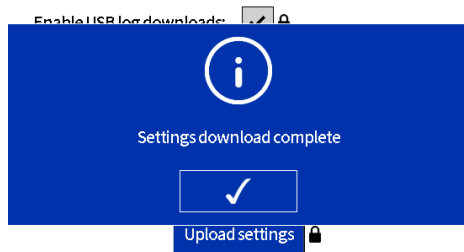


**FIG. 40: Logs Download Failure Screen**

## Download System Settings

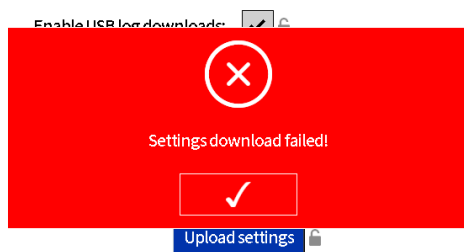
The InvisiPac HM10 is able to download configured settings and temperatures to a USB drive. Once downloaded, the user can keep the file as a backup or upload the settings to additional InvisiPac HM10 units.

1. Insert a USB drive into the USB slot.
2. Navigate to the USB Screen: Advanced > USB Screen.
3. Press the download settings button.
4. A download complete message generates when a download completes. The settings file will be in the root of the USB drive.



**FIG. 41: Settings Download Complete Screen**

**NOTE:** If the AMZ board is not connected, or if there is an issue with the USB drive, a download has failed message will generate.



**FIG. 42: Settings Download Failure Screen**

## Upload System Settings

1. Download the system settings to a USB drive.
2. Insert the USB drive into the USB slot.
3. Navigate to the USB Screen: Advanced > USB Screen.
4. Press the Upload settings button.
5. An upload complete message generates when an upload completes. The settings file on the USB drive will be unchanged.

**NOTE:** An error message will generate if the settings file is invalid or cannot be found.

**NOTE:** If the AMZ board is not connected, or if there is an issue with the USB drive, an upload has failed message will generate.

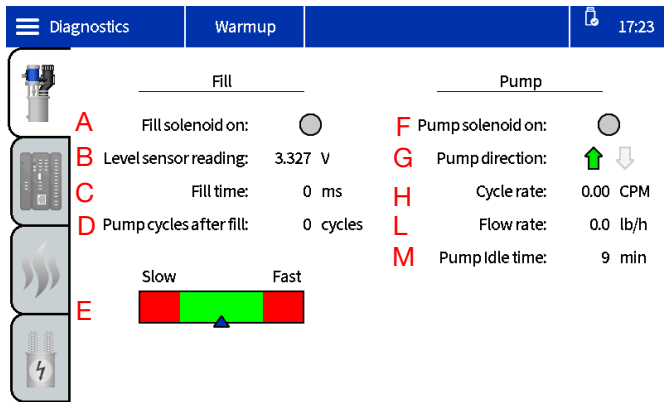
# ADM Screens

## Diagnostics Screens

Read-only view of the important system diagnostic information.

### Fill/Pump Diagnostics Screen

Select the **Menu Symbol**  > **Diagnostics** > select the first tab.



**A** - The indicator turns green when the system is performing a refill. Note that the solenoid will pulse on and off while the indicator is green.

**B** - This is a voltage from an ultrasonic distance sensor located in the refill funnel of the InvisiPac. It is measuring the distance between itself and the surface of the glue located in the melter. As the glue is consumed, the distance between the sensor and the glue surface increases - this corresponds to a higher voltage on the screen. The voltage from this sensor will typically fluctuate between 3.111 V (full) and 3.296 (nominal trip). Deviations outside of this range by 0.200 mV are not uncommon. The trip point will adjust with the flow rate to avoid thermal shocks to the melter during periods of higher demand.

Nominal Trip	Nominal Full	Flow Rate
3.297	3.111	< 8 lbs/hr (3.6 kg/hr)
3.204	3.111	> 8 lbs/hr (3.6 kg/hr)
3.173	3.111	> 11 lbs/hr (5kg/hr)

**C** - The amount of time it took for the previous fill event to complete. When using **Hopper Auto** or **Bin Auto** a refill time of 4000ms is ideal, please refer to section E for optimization of these devices. Auto-Adaptive will typically seek out 5000ms. Ranges that will work are 1000ms - 8000ms.

If the refill time is above 6500ms, open up the airflow on the restrictor by turning the knob counter-clockwise.

If the refill time is below 2500ms, restrict the airflow on the restrictor by turning the knob clockwise.

If the number is in range, and the pump is running away, check the following:

1. Is the material temperature hot enough to keep up with the melt rate requirements of the application.
2. The application is not overrunning the system.
3. Inspect the funnel for bridged glue around the walls obstructing the level sensor's view of the glue.

**D** - The number of pump cycles occurred after the last refill. Typically, this will be around 3 pump cycles. If it is over 4, inspect the system setup for overfilling.

**E** - This graphic is present for **Hopper Auto** and **Bin Auto**. This is an aid for optimizing how much restriction to apply to the venturi feed system. If the system is filling too fast, it could overfill the melter. If it fills too slow, it may not be able to keep up with production.

If the indicator is sitting near the fast red zone, apply more restriction by turning the knob clockwise.

If the indicator is sitting near the slow red zone, first confirm that the hopper or bin has sufficient pellets in it. If there are enough pellets to cover the venturi, allow more air to flow to the venturi by turning the knob on the restrictor counter-clockwise.

**F** - This indicates that the pump solenoid is energized whenever it is green.

**G** - The up/down indicators turn green when the pump is traveling in the respective direction.

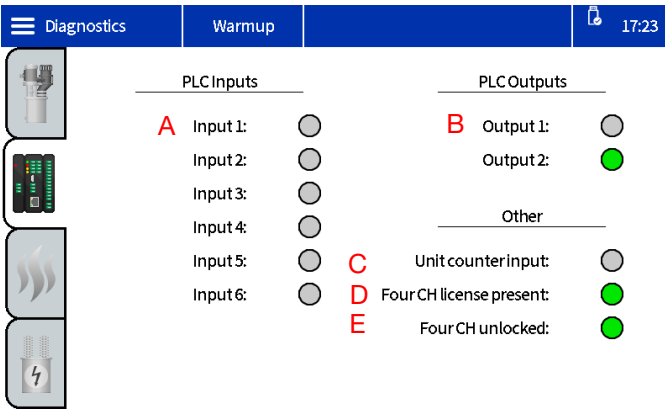
**H** - The number of pump cycles that occur per minute.

**L** - This indicates how much material the HM10 is dispensing per hour. This value is calculated using the cycle rate above, the known volume of the pump, and the specific gravity set on the Material Tracking screen.

**M** - The number of minutes that have passed since the last pump cycle completed. If your application requires a slow dispense rate, and a pump cycle takes longer than a minute, you may see this number increase when actively pumping. This is not a cause for concern. It is just an artifact of how pump cycles are measured. If the pump idle timeout feature is going to be used, this is a good tool for choosing a value that fits your application.

I/O Diagnostics Screen

Select the **Menu Symbol**  > **Diagnostics** > select the second tab.



**A** - There is a colored indicator for each discrete input. An indicator turns green when the respective input is activated. The functions for each input can be set on the PLC I/O setup screen.

**B** - There is a colored indicator for each discrete output. An indicator turns green when the function configured for the respective output is true (or false in the case of the Error (Alarm) function). The functions for each output can be set on the PLC I/O setup screen.

**C** - The indicator is green when the unit counter input is active. This input is used to track how many units the HM10 has produced, and can be used for material tracking information found on other screens.

**D** - The indicator is green when the 20B695 4 channel upgrade USB license key is detected by the machine. If the license key is plugged into the hub, but the indicator is not illuminated, check all connections

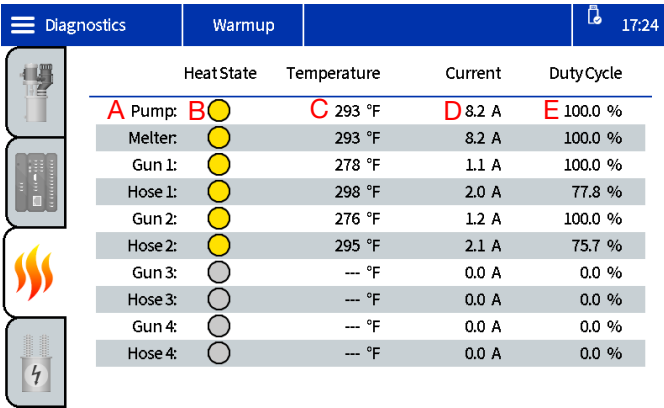
between the hub and the ADM to insure a proper connection is made.

**E** - The indicator is green when the 4 channel upgrade is enabled. If the token has been removed for any reason, the system will remain unlocked for 2 hours before downgrading to 2 channels. If the timer expires, it will keep the first two channels it detects, but will remove all subsequent channels and turn the heat off. An advisory will be present in the condition when it can't detect the hardware license (ECUL), and an alarm will be generated if it uninstalls any channels when the timer expires (ER4L).

Heat Diagnostics Screen

Select the **Menu Symbol**  > **Diagnostics** > select the third tab.

This screen provides information for all of the heat zones on the system. It will show all channels, regardless of if they are installed or not.



**A** - This indicates what zone the data will correspond to.

**B** - Heat State: Grey is off, yellow is warming up, green is at temperature.

**C** - This is the temperature of the device being detected. If the device is not installed on the Gun Setup Screen, but is plugged in, the temperature will still appear. "---" indicates a valid temperature could not be detected.

If a valid temperature is expected:

1. Check the connections in the back of the unit to confirm the corresponding bulkhead has the right cable connected.

2. Inspect the connection to make sure the plug is fully seated and the connector is locked in place.
3. If the gun shows a valid temperature, but the hose does not, the hose is likely damaged and should be replaced.
4. If the gun temperature does not show up, but the hose does, check the connections at the end of the hose where the gun connects. Check to make sure the correct RTD has been selected as well. Graco guns will always use a Pt100/1000 setting on the Gun Setup Screen.

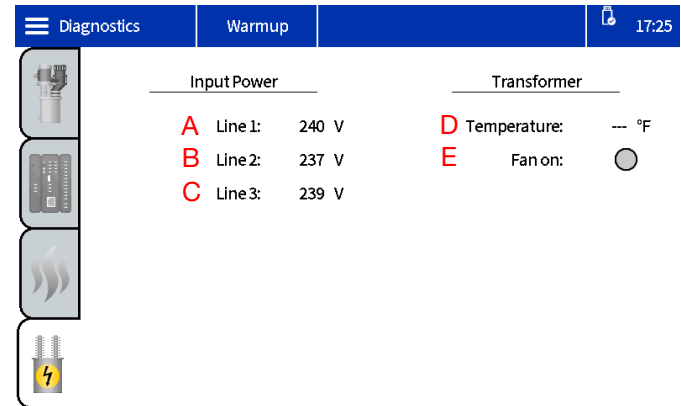
**D** - This shows the current being drawn by each device. It can be used to validate the device is drawing the correct amount of current based on the wattage rating on its label.  $\text{Wattage/Voltage} = \text{Nominal Current}$ . The current draw will change with the Duty Cycle, explained below.

1. If the current is lower than expected, make sure to take the duty cycle into account. 50% duty should be roughly half the expected current. It is best to evaluate the device at 100% duty cycle.
2. If the current is 0A, and the duty cycle is 100%, follow the proper procedures to check the fuses on the AMZ. If the fuses are damaged, check the device's heater for a short to ground. If the fuses are undamaged, check the heater for an open circuit.

**E** - Duty Cycle: This indicates how much power is being applied to the heated device. During the warmup process, it is expected to observe the melter at 100% duty cycle, hoses and guns will fluctuate anywhere from 0% to 100% during this process.

## Power Diagnostics Screen

Select the **Menu Symbol**  > **Diagnostics** > select the fourth tab.



**A, B, C** - The AMZ will detect incoming voltages, and report them here.

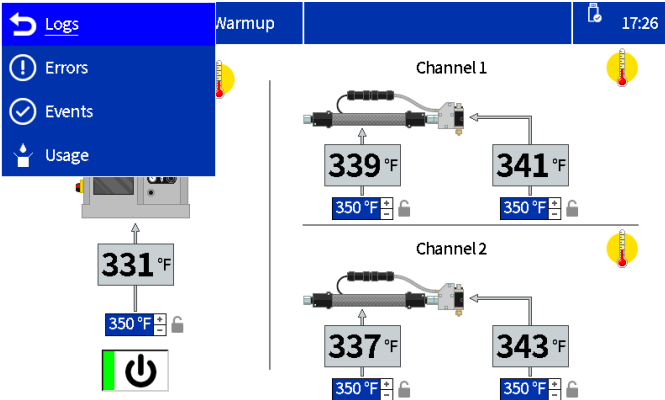
**D** - The transformer is equipped with a temperature sensor, this indicates the temperature here.

**E** - Indicates when the fan output is energized. The system will monitor the current draw of the fan, and generate advisories for under and over current conditions. This is also a useful indicator to validate the fan is circulating air when it is illuminated.

Logs Screens

Read-only view of errors, events and usage.

Select the **Menu Symbol**  > **Logs**. Press the up and down arrows to read the log entries.




Errors Screen

Select the **Menu Symbol**  > **Logs** > **Errors**.

The user can bring up the QR code for an error by tapping on the respective error code.

Errors		System Ready		17:34
Date	Time	Code	Description	
06/08/23	17:32:37	T6D8	Sensor Err. CH4 Hose	⬆
06/08/23	17:32:37	T4D8	High Temp. CH4 Hose	
06/08/23	17:32:37	T6D7	Sensor Err. CH4 Gun	⬆
06/08/23	17:32:32	T6D6	Sensor Err. CH3 Hose	
06/08/23	17:32:32	T4D6	High Temp. CH3 Hose	⬆
06/08/23	17:32:32	T6D5	Sensor Err. CH3 Gun	
06/08/23	17:28:03	L8FX	Refill Error	⬇
06/08/23	17:14:33	L0FX	Manual Fill Mode On	

Errors		System Ready		17:44
Date	Time	Code	Description	
06/08/23			T6D8: Sensor Err. CH4 Hose	⬆
06/08/23				
06/08/23				⬆
06/08/23				
06/08/23				⬆
06/08/23				
06/08/23	17:28:03	L8FX	Refill Error	⬇
06/08/23	17:14:33	L0FX	Manual Fill Mode On	


Events Screen



Select the **Menu Symbol**  > **Logs** > **Events**.

Events		System Ready		17:36
Date	Time	Code	Description	
06/08/23	17:34:33	EAPX	Pump On	⬆
06/08/23	17:34:24	EC0X	Setup Value(s) Changed	
06/08/23	17:33:50	EADX	Heat On	⬆
06/08/23	17:32:44	EMD4	Channel Disabled CH4	
06/08/23	17:32:42	EMD3	Channel Disabled CH3	⬆
06/08/23	17:32:37	ELD4	Channel Enabled CH4	
06/08/23	17:32:33	EBDX	Heat Off	⬇
06/08/23	17:32:32	EBPX	Pump Off	

Usage Screen

Select the **Menu Symbol**  > **Logs** > **Usage**.

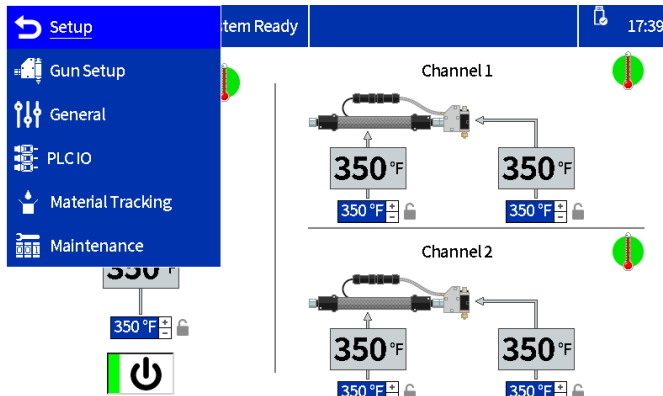
Usage		System Ready		 17:37	
Date	Cycles	lbs	# Units	g/unit	
05/31/23	0	0.000	0	0.000	
05/25/23	80	2.890	0	0.000	
05/24/23	202	7.299	0	0.000	
05/23/23	630	22.765	0	0.000	
05/22/23	65	2.348	0	0.000	
05/21/23	2710	97.926	0	0.000	
05/19/23	268	9.684	0	0.000	
05/18/23	224	8.094	0	0.000	



Page: 1/5

## Setup Screens

Set system and component settings. See **Set Baseline ADM Settings**, page 19 for basic configurations and instructions.



### Gun Setup

Install heat channels and select gun RTD type. See **Setup Applicators on the Gun Setup Screen**, page 19 for screen details.

### General

See **Set System Settings in the General Settings**, page 19 for screen details.

### PLC I/O

Configure and view the current state of the system PLC inputs and outputs. See **Set PLC Settings on the ADM**, page 25 for screen details.

PLC IO	System Ready	17:56
Input 1:	<input type="radio"/>	Unused
Input 2:	<input type="radio"/>	Unused
Input 3:	<input type="radio"/>	Unused
Input 4:	<input type="radio"/>	Unused
Input 5:	<input type="radio"/>	Unused
Input 6:	<input type="radio"/>	Heaters on/off
Output 1:	<input checked="" type="radio"/>	System ready
Output 2:	<input checked="" type="radio"/>	Error (alarm)

## Material Tracking

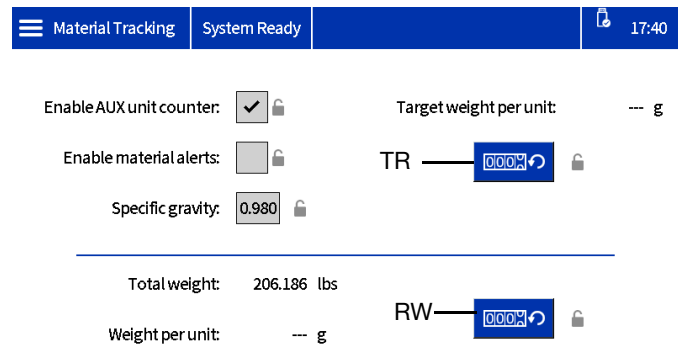


FIG. 43: Material Tracking Screen Capture

Name	Description
Enable AUX unit counter	Check to enable the AUX unit counter on the System I/O Board. See <b>Setup</b> section for AUX Unit Counter wiring details.
Enable material alerts	Check to enable material alerts when the current material unit deviates 20% from the established target.
Specific gravity	Specific gravity of the material in use.
Target weight per unit	The system automatically learns the target usage after running for several minutes.
TR Button	Press the TR Reset button to reset and relearn the target usage.
Weight per unit	Current weight per unit.
Calibration Weight Totalizer	Resettable totalizer that can be used for determining Specific Gravity.
Reset Weight Totalizer (RW)	Press the button (RW) to reset the calibration weight totalizer.

Maintenance

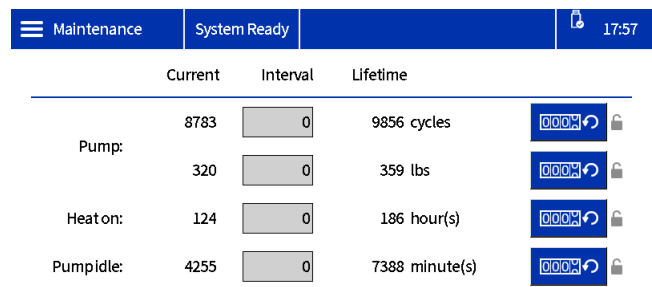


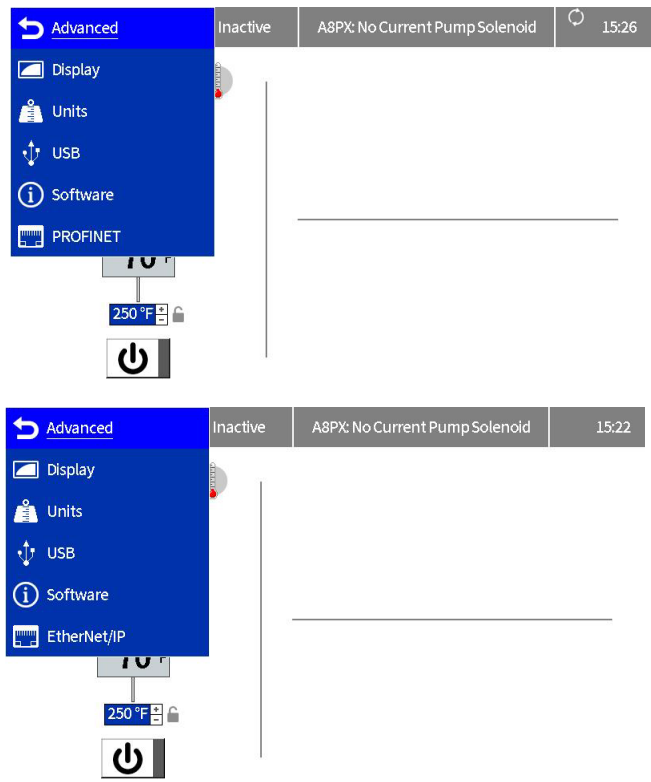
FIG. 44: Maintenance Screen

Name	Description
Current	Resettable counter for the variable in the row. <b>NOTE:</b> to reset to zero and clear an existing advisory, select the counter and press the reset softkey.
Interval	Maintenance interval period for variable in the row. <b>NOTE:</b> set to a non-zero value to generate advisories when the current counter reaches this value.
Lifetime	Lifetime counter of the variable in the row.
Pump Cycles	Pump cycle totalizers.
Pump Weight	Pump weight totalizers.
Heat On Time	Heat on time totalizers (time spent with heat on).
Pump Idle Time	Pump idle time totalizer (time spent with system at temperature, but no pump activity).



# Advanced Screens

Configure and view system settings and preferences.



## Display

General display settings including language, time and password protection.

Display	System Ready	17:46
Language:	English	🔒
Number Format:	1,234.5	🔒
Date format:	mm/dd/yy	🔒
Date:	06/08/23 17:46	🔒
Set password:	****	🔒
Screen saver:	5 Minutes	🔒

Name	Description
Language	Select the display language.
Number Format	Select number format
Date Format	Select the display date format.
Date	Enter the date and time.
Set password	Enter the password to restrict modification of system settings and temperatures.  A value of "0000" disables the password for all lockable settings.
Screen Saver	Enter the timeout for the display screen saver. After the configured timeout, the display back-light is dimmed. This is intended to increase the life of the display. A value of "0" disables the screen saver.

Units

Select the system units to be used on the display.

Units

System Ready

17:47

Temperature units:

°F

Mass units:

lbs

Name	Description
Temperature Units	Select the system temperature units.
Mass Units	Select the system mass units.

USB Settings

Select USB download settings.

Select the **Advanced > USB**.

USB

System Ready

17:52

Enable USB log downloads:

☒

Download depth:

0

days

Download settings

Upload settings

Name	Description
Enable USB log downloads	Enables download of log files when a USB drive is inserted.
Download Depth	Sets the length of the data logs to be downloaded (affects the download time).
Download settings	Use to download the system settings. See <b>Download System Settings</b> , page 38.
Upload settings	Use to upload system settings. See <b>Upload System Settings</b> , page 38.

Software

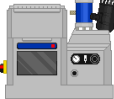
Read only display of system software.

Select the **Advanced > Software**.

Software

System Ready

17:53



System Software Part #: 20B812

System Software Version: 1.01.006


Module	Software Part #	Software Version
Advanced Display 2	26D928	1.01.003
Auto Multi-Zone	19Y520	1.04.005
System I/O Board	26D959	1.01.006
Gatewav	17P796	3.01.004

Name	Description
System Software Part #	Part number of the software on the most recently loaded system software token.
System Software Version	Version of the software on the most recently loaded system software token.

EtherNet/IP

This screen displays the hardware revision, system serial number, and data map identification information. It also enables the user to set the IP address, DHCP settings, subnet mask, gateway, and DNS information.

Select the  **Advanced > EtherNet/IP.**

 EtherNet/IP	Inactive	16:26
---	----------	-------

Hardware revision: 0000

System serial #: 00000000

Map ID: 00000

Map name:

Map revision: 000.000

Map date: --/--/--

IP address:

DHCP: ☐

Subnet mask:

Gateway:


DNS 1:

DNS 2:

PROFINET

This screen displays the hardware revision, system serial number, and data map identification information. It also enables the user to set the station name, install the date location tag, function tag, and description. This screen also allows the user to set the IP address, DHCP settings, subnet mask, gateway, and DNS information.

Select the  **Advanced > PROFINET.**

 PROFINET	Inactive	16:39
--	----------	-------

Hardware revision: 0000

System serial #: 00000000

Map ID: 00000

Map name:

Map revision: 000.000

Map date: --/--/--

IP address:

DHCP: ☐

Subnet mask:

Gateway:

DNS 1:

DNS 2:

Station name:

Install date:

Location tag:

Function tag:

Description:

# Communications Gateway Module (CGM)

## Overview

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

**NOTE:** The following system network configuration files are available at [help.graco.com](http://help.graco.com).

- **Add On Instructions:** Allen Bradley
- **EDS file:** DeviceNet or EtherNet/IP fieldbus networks
- **GSD file:** PROFIBUS fieldbus networks
- **GSDML:** PROFINET fieldbus networks

**NOTE:** See **Related Manuals**, page 3. For InvisiPac and PLC Connection Setup, verify that the PLC parameters are set up correctly. See the Gateway Map table. If the PLC connection parameters are not setup correctly, the connection between the InvisiPac and PLC will not be made.

InvisiPac Map	
Gateway Map Token: 2000409 Map Name On ADM: IP MP2	
Comm. Format	Data - DINT
Input Assembly Instance:	100
Input Instance Size:	49
Output Assembly Instance:	150
Output Instance Size:	15

## Available Internal Data

Unless stated otherwise, bytes are stored in each instance in little endian order (byte order within instance: most significant to least significant).

**NOTE:** Automation Outputs can be monitored by the corresponding Automation Inputs to verify that the InvisiPac received the data.

**NOTE:** See **Automation Outputs**, page 49, and the **Automation Inputs**, page 60 for a full list of CGM inputs and outputs.

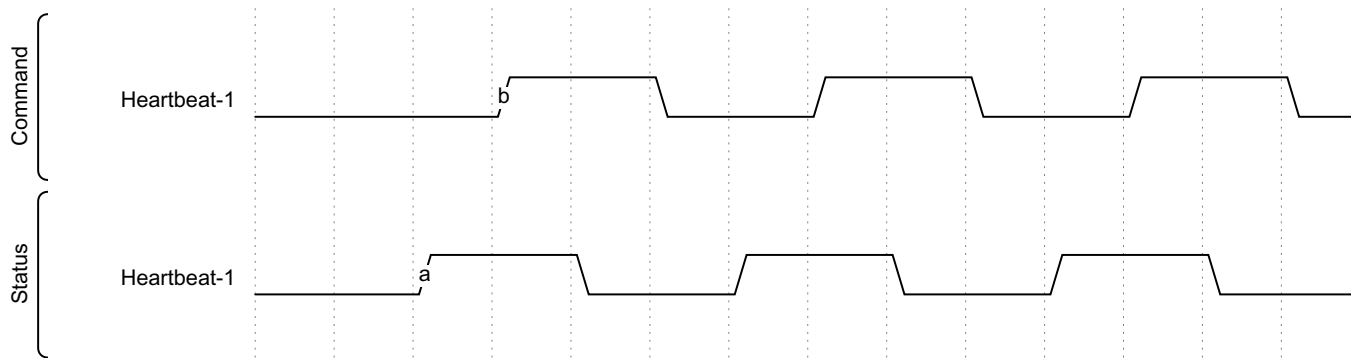
## Automation Outputs

The map is organized into three categories: Command/Feedback Bitmasks, DINT variables, and a command interface.

### Command Bitmasks

The first 64 Tag IDs are reserved for command bits, their usage is covered below.

**Heartbeat** – The InvisiPac unit will supply a heartbeat that toggles on a 3 second timer. The PLC must mirror the bit state back through the command bitmask. If the InvisiPac does not see the signal mirrored back after 9 seconds, it will assume there was a logical communication loss and turn the system off.



**FIG. 45**

**Enable PLC Control** – This is a bit to indicate to the InvisiPac that the PLC will be initiating commands through the gateway. Keep this bit high as long as the PLC is in control, dropping the bit low will relinquish control to the InvisiPac, resulting in the system turning off.

**Activate System** – Keep this bit high as long as the InvisiPac should be heating and dispensing glue. Pulling this bit low will turn off the system.

If the system is turned off while “Activate System” is high, it must be toggled low and then high again to re-energize the system. Conditions that could turn the system off:

- Heartbeat Expiration
- Enable PLC Control was pulled low
- Immediate Stop bit was energized
- System Power Button on the ADM was pressed
- Red Stop Button on the ADM was pressed
- System alarm was detected
- Pump Idle Timer expired

**Quick Start:** The system needs a minimum of 3 bits controlled by the PLC to become operational (Heartbeat, Enable PLC Control, and Activate System). As seen below, the Heartbeat from the PLC mirrors the heartbeat from the InvisiPac. The InvisiPac will change the heartbeat state every 3 seconds. Next, the PLC will need to bring “Enable PLC Control” and “Activate System” bits high. If there are no alarms present and the “Immediate Stop” bit is low, the system will begin heating any devices that are enabled on the system.

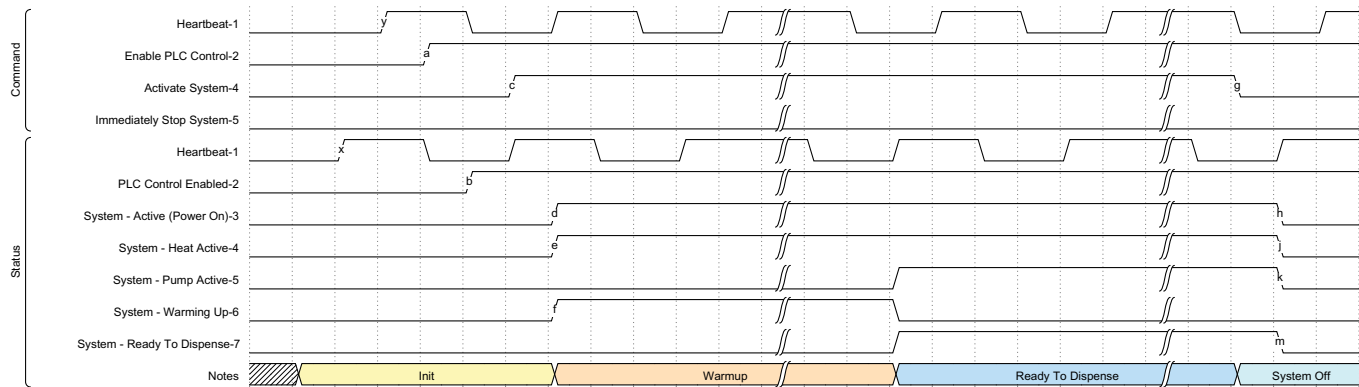


FIG. 46

**Immediately Stop System** – Stops the system on the rising edge of this bit, regardless of the Activate System status. The system will set a bit indicating why the system turned for reasons other than pulling “Activate System” low.

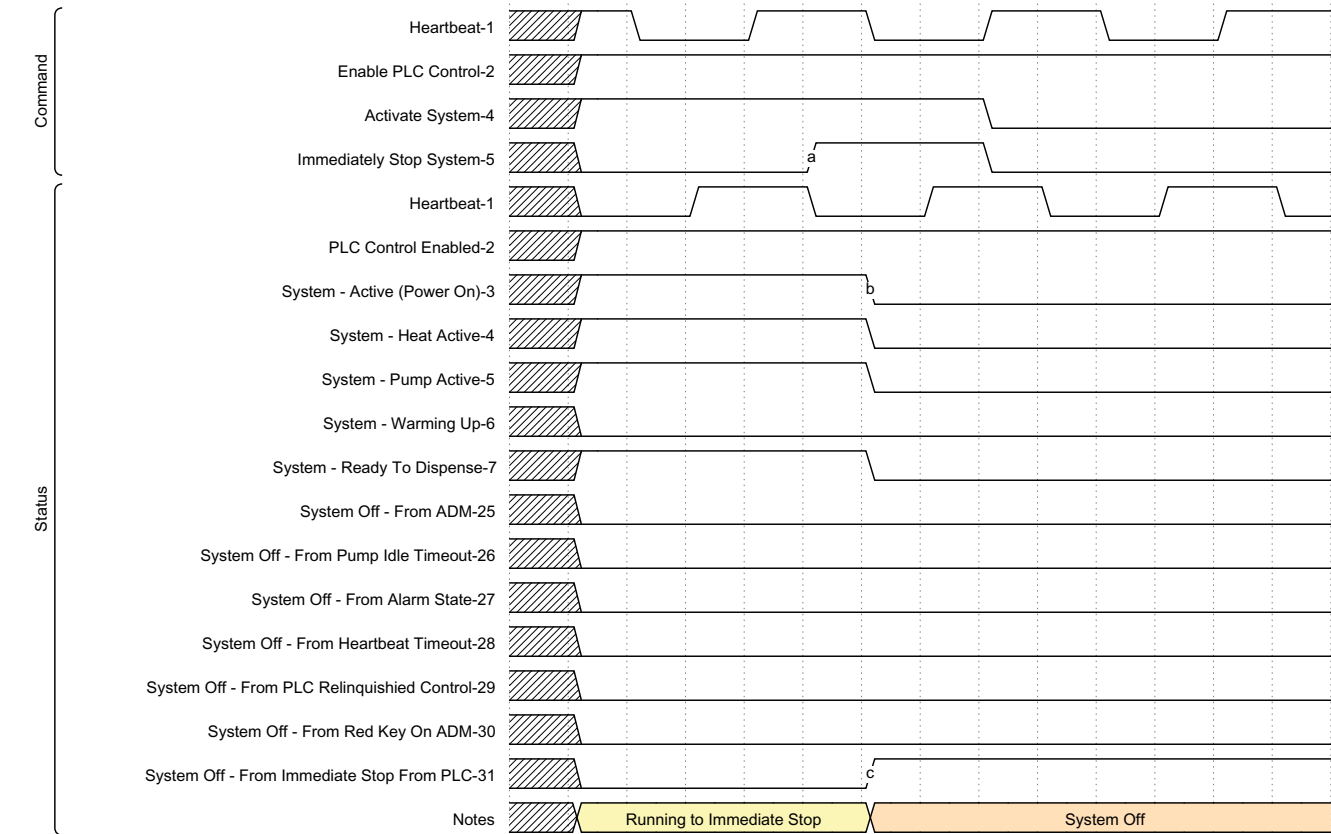


FIG. 47

**Acknowledge Current Alarm** – This is equivalent to pressing the check mark on the ADM Screen to clear the alarm pop-up screen. It acknowledges the alarm present, but the alarm will only clear once the alarm conditions on the system are resolved. This bit should be toggled when the InvisiPac status bit “System Event Code Needs Acknowledgement” is high. The rising edge of the “Acknowledge Current Alarm” bit from the PLC will acknowledge the current alarm code shown in the “Event Code To Acknowledge” output.

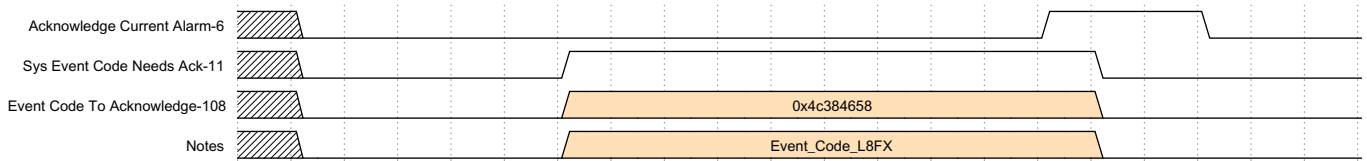


FIG. 48

**Enabling Channels:** On a production line that handles multiple configurations, one may elect to enable different channels according to what is being produced in that moment. All channels to be enabled should be pulled high, and then the “Strobe Enabled Channels” bit is used to commit the proposed changes. The example below shows enabling channels 1 and 3 when no channels were installed:

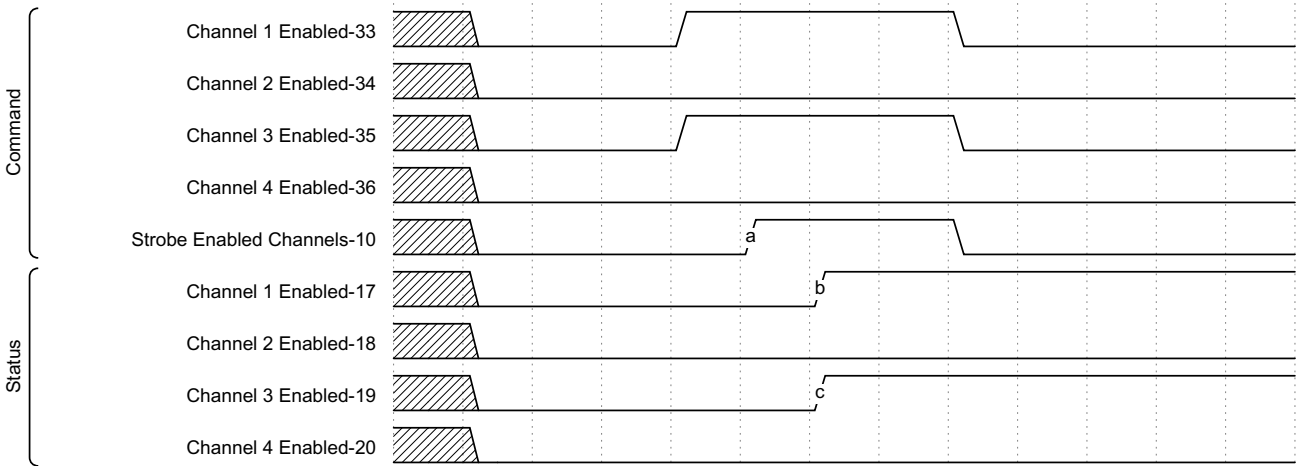


FIG. 49

The following example shows disabling channels 1 and 3, and enabling channels 2 and 4. The command bits are set up to show what channels should be enabled, and then the strobe bit is toggled to read in the new data:

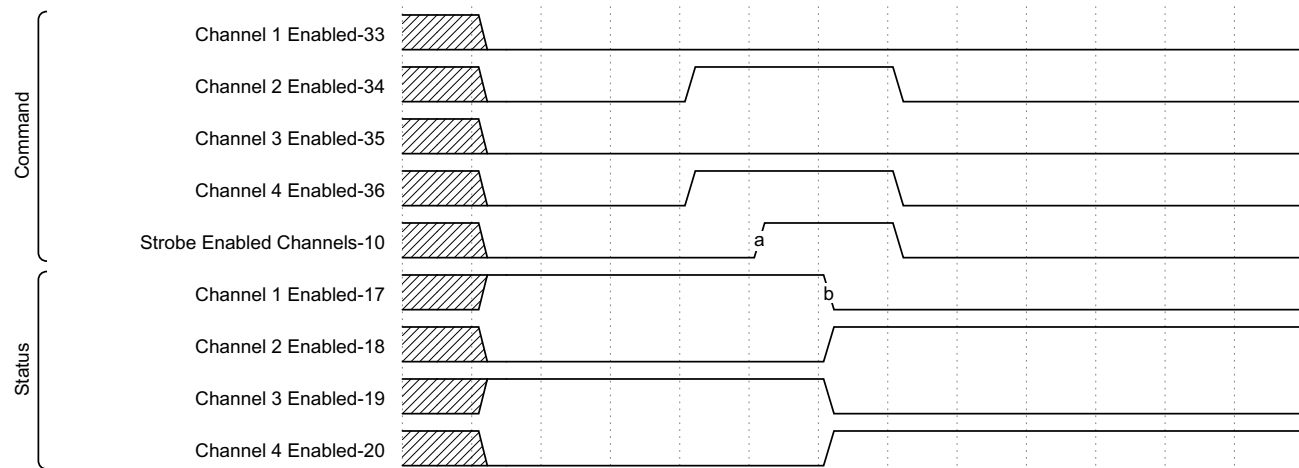


FIG. 50

**NOTE:** On an HM10 without the 4 channel unlock token present, the system will enable the first two channel requests, and will ignore the remaining. For example, if a request was presented for channels 1, 3, and 4, only channels 1 and 3 would be enabled.

**Temperature Setpoint Adjustment:** Adjusting a temperature setpoint is accomplished by specifying the zone to adjust, the new setpoint, and finally setting a bit to accept the new data. The new temperature is to be specified using whole numbers presented in the operating units selected on the InvisiPac (verify by checking the units bit).

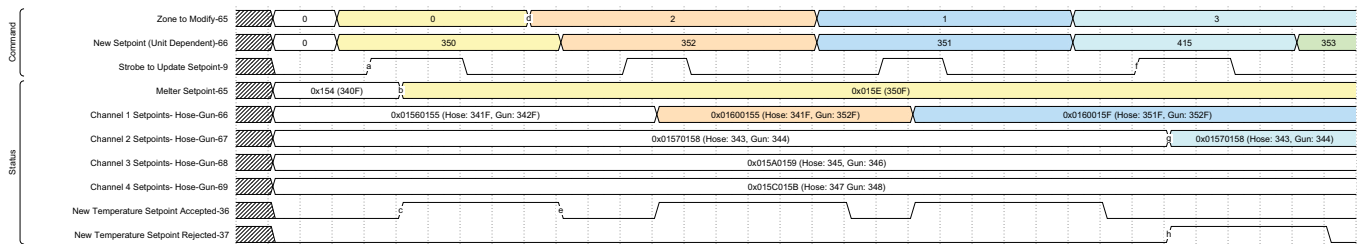


FIG. 51

**NOTE:** The setpoint is always specified in a single digit format, and is assigned to the specified zone enumeration. Setpoint feedback is bitpacked for each channel, while the melter is a singular number. Each setpoint is presented as a 16 bit number – The hose is contained in bits 31-16, the gun is contained in bits 15-0.

When strobing a new setpoint, the InvisiPac will verify it is in range before accepting the request. Tag IDs 36 & 37 will indicate that the setpoint was either accepted or rejected. As shown above, the first 3 requests are accepted, while the last uses a temperature setpoint that is greater than the maximum allowable setpoint of 400F. In this condition, the InvisiPac raises the rejected bit. Note that the accepted/rejected bits are both set to 0 whenever parameters that affect a setpoint request change (zone to modify, new setpoint, a user changing the temperature on the screen after the CGM sent a request).

**Operating Unit Selection:** Operating units are specified as individual bits, where 0 represents metric, and 1 represents US units. The example below shows moving all units from Metric to US. When strobing units, be sure to specify all three units together: Temperature, Weight, and Distance. On the Strobe's rising edge, the new units will be selected.

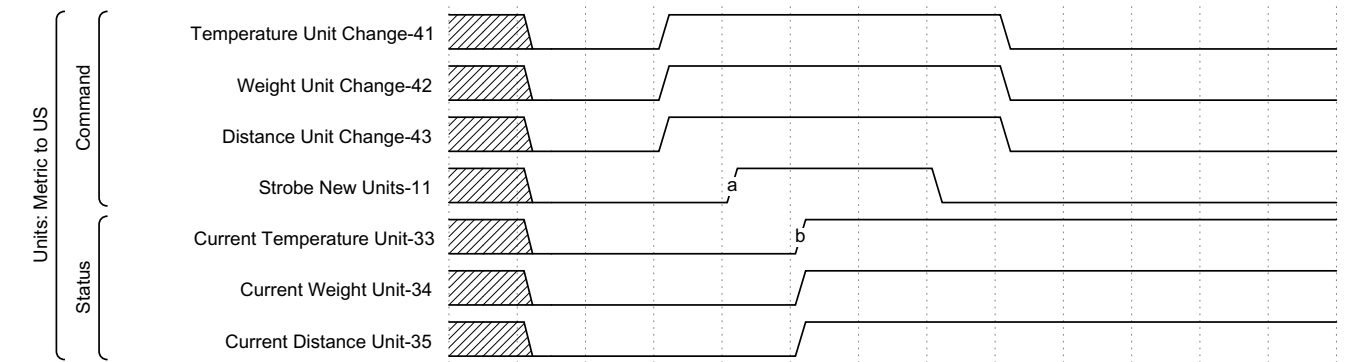
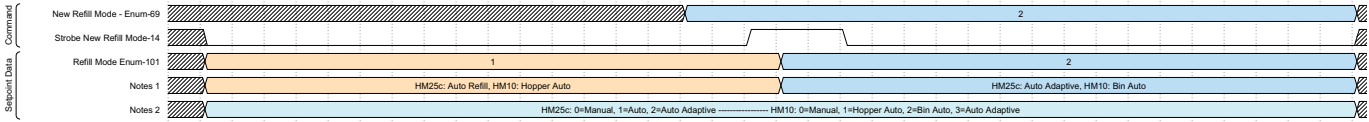


FIG. 52



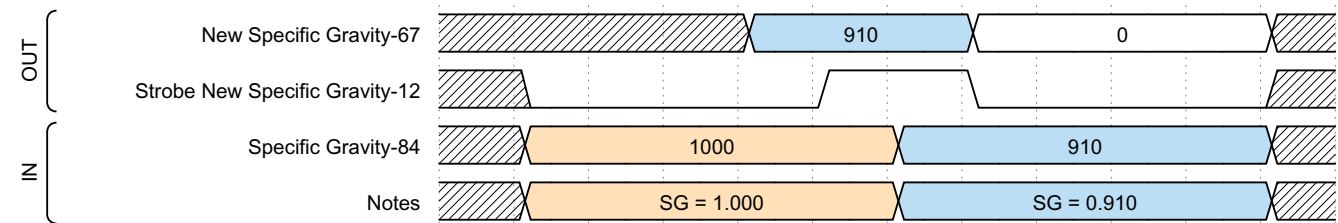
**Refill Mode Selection:** Refill modes are selected using an enumeration and a strobe bit, as shown below.



**FIG. 53**

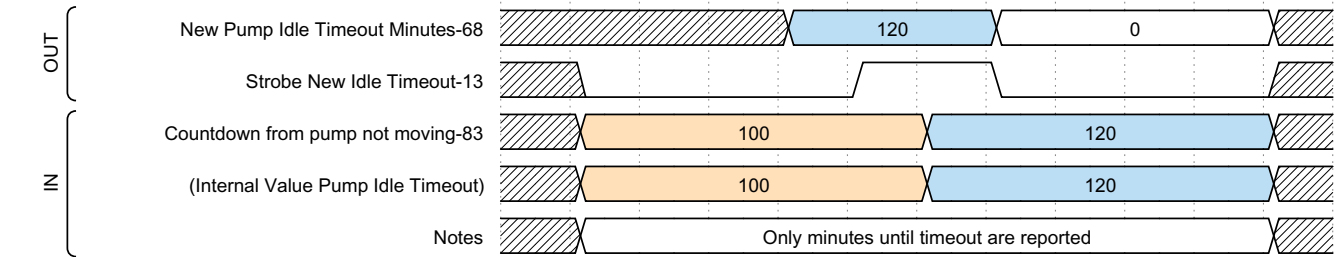
**NOTE:** HM25c and HM10 have different enumeration values. Hopper Auto uses a shorter pulse duration than “Bin Auto” or “Auto Adaptive” modes. See **Set System Settings in the General Settings** step 5 on page 20 for details on what mode works best for your application.

**Changing Specific Gravity:** The specific gravity of the glue is used in material tracking and maintenance intervals. Be sure to update this value when changing materials in order to maintain accurate logs.



**FIG. 54**

**Updating Pump Idle Timeout:** The pump idle timeout turns off the heat automatically after x minutes has passed without detecting a change in direction on the pump. If this occurs, a bit will be set indicating the timeout occurred. As noted below, only the time remaining until timeout is shown on the PLC input.



**FIG. 55**

**Material Tracking:** The InvisiPac will provide material tracking information through the gateway as well as through the HMI. Units Produced and Weight Dispensed are items that may be ideal for daily production tracking. Weight dispensed is reported in thousandths of kilograms or pounds, depending on the weight unit selection. They can be reset by toggling “Reset Material Tracker – Totalizers-31”, both totalizers will reset as shown below.

Grams/Unit is a learned value that utilizes the “Unit Counter” input of the AMZ to correlate glue consumption to how many units have been produced. It is always in milligram units, regardless of the unit selection. This is ideal for long term collection. A large difference between the target and actual values can be used to identify if the air pressure was adjusted unexpectedly, or if there’s an issue with any of the equipment. “Reset Material Tracker-Targets-32” will reset these values, and is best performed when changing glue, box configurations, or if significant adjustments were made to the production process.

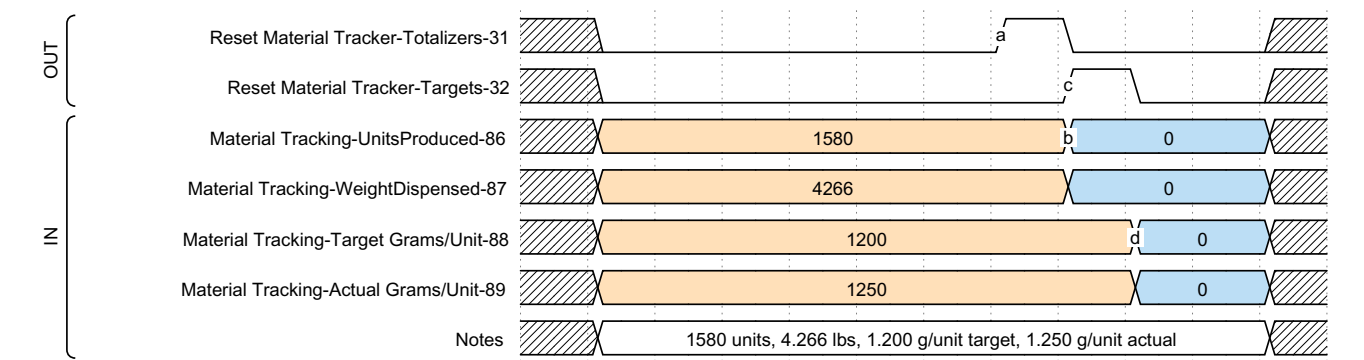


FIG. 56

**Maintenance Intervals – Heat On and Pump Idle Time:** Heat On (measured in hours) and Pump Idle (measured in hours) are set and reported back as 16 bit integers in a bitpacked format. Heat On is stored in bits 31-16, Pump idle is stored in bits 15-0. The table below shows how to read and set time based maintenance intervals:

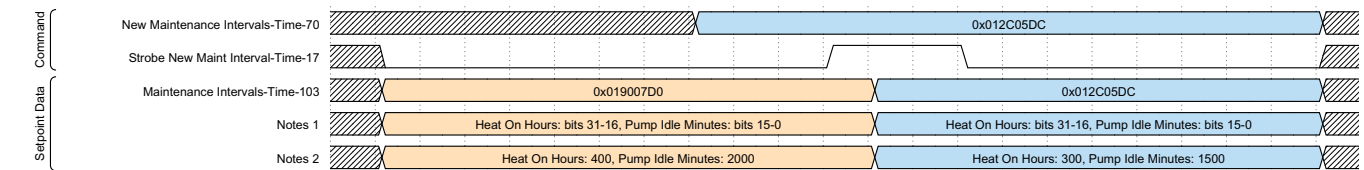


FIG. 57

**Maintenance Intervals – Pump Cycles and Weight Dispensed:** Because of their similarity, these are grouped together. They can be set individually, as shown in the timing diagram below. When the resettable counter meets or exceeds the values set below, a corresponding event is generated to indicate maintenance is due. To disable these events, set the maintenance interval to 0.

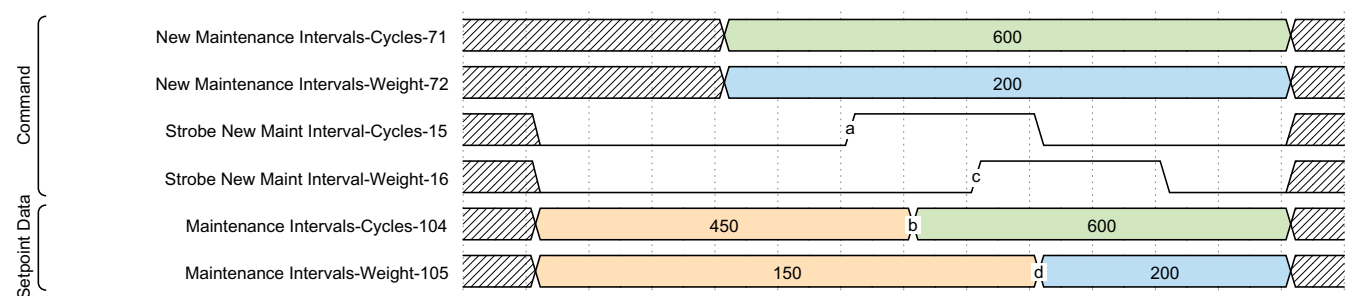


FIG. 58

**Maintenance Counters:** Maintenance counters count up from zero and can be reset on an individual bases by toggling their corresponding bit high. When the maintenance counter is greater than or equal to the maintenance interval, a corresponding advisory will be generated by the system to indicate maintenance is due. Once the appropriate maintenance actions have been performed, a reset can be performed by toggling the corresponding reset bit.

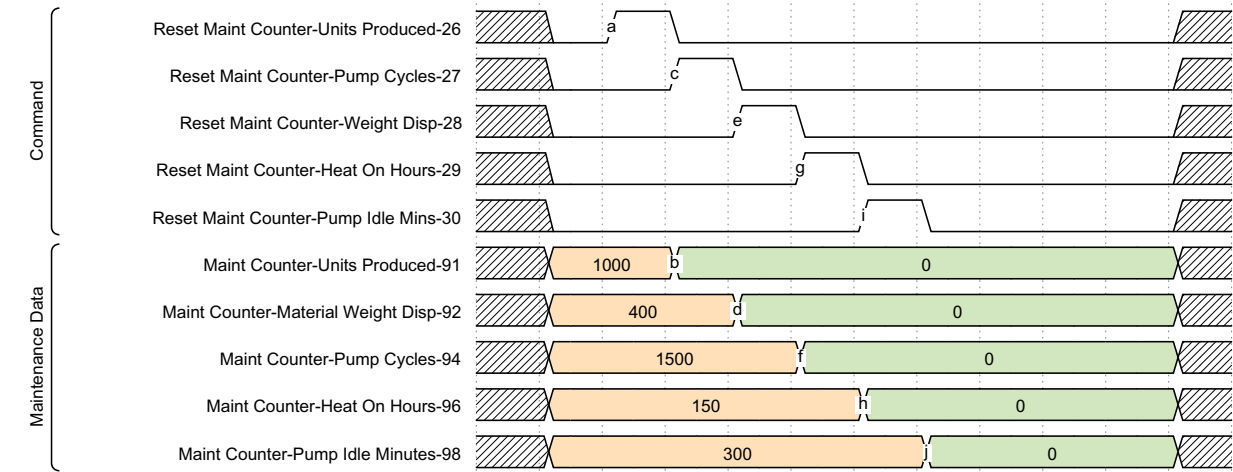


FIG. 59

**Lifetime Counters:** Lifetime counters are not resettable. Weight Dispensed will be displayed in the user selected units for weight, in whole number values. Pump cycles are complete cycles, meaning a full motion in the up and down direction. Lifetime Heat On Time and Lifetime Pump Idle Time (time the pump hasn't moved with the heat on) are reported in hours, unlike in the resettable maintenance counters.

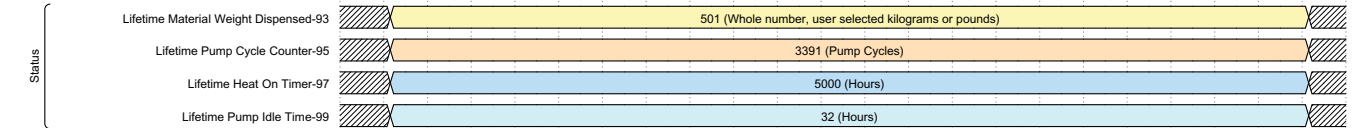


FIG. 60

**Alarm Deviation Advisory Counts:** This combines the total number of each type of condition into a single bitpacked data form. While the numbers are large in the example below, they are only to represent how the data is combined and presented in a hexadecimal value.

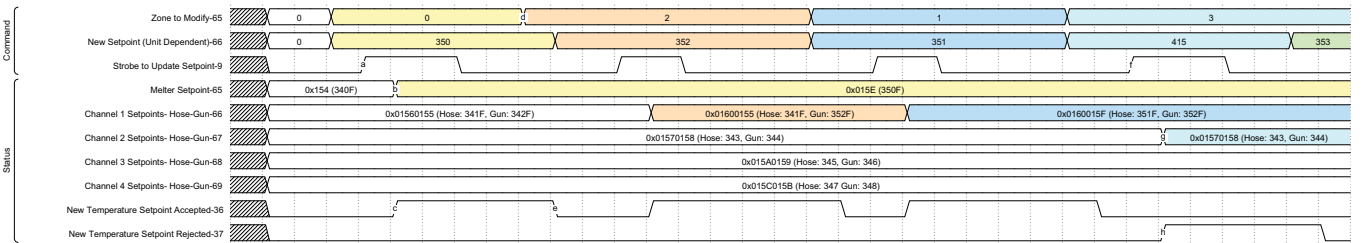


FIG. 61

**Flow Rate:** Indicates the mass of material being dispensed per hour. It is represented in thousandths of a kilogram or pound, depending on the units selected.

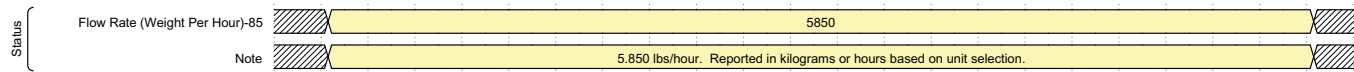


FIG. 62

**Refill Optimization:** The HM10 has an adjustable air restrictor installed to help regulate the flow of glue pellets. This variable helps find the optimal resistance for the type of pellets being fed into the melter. The range is 0-100, where 50 is ideal. If the value is 30 or below with a full hopper, consider opening the restrictor by turning the knob counter-clockwise to allow more air to the venturi. Start with going to the next higher number, and evaluating on the next refill. If the value is 70 or higher, move the knob clockwise to the next lower number to apply restriction to the venturi. See **Fill/Pump Diagnostics Screen**, page 39 for information on refill optimization.

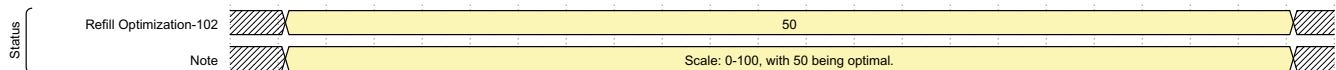


FIG. 63

InvisiPac Map2, 2000409								
Automation Outputs (signals from PLC to InvisiPac)								
Tag ID	Description	Data Type	Units	Min Value	Max Value	Format	Bit	Byte
1	Heartbeat	Boolean		0	1		0	0
2	Enable PLC Control	Boolean		0	1		1	
3	Reserved Bit	Boolean		0	1		2	
4	Activate System	Boolean		0	1		3	
5	Immediately Stop System	Boolean		0	1		4	
6	Acknowledge Current Alarm	Boolean		0	1		5	
7	Reserved Bit	Boolean		0	1		6	
8	Reserved Bit	Boolean		0	1		7	
9	Strobe New Setpoint	Boolean		0	1		0	1
10	Strobe Enabled Channels	Boolean		0	1		1	
11	Strobe New Units	Boolean		0	1		2	
12	Strobe New Specific Gravity	Boolean		0	1		3	
13	Strobe New Idle Timeout	Boolean		0	1		4	
14	Strobe New Refill Mode	Boolean		0	1		5	
15	Strobe New Maintenance Interval - Elapsed Times (Bitpacked Data)	Boolean		0	1		6	
16	Strobe New Maintenance Interval - Pump Cycles	Boolean		0	1		7	

InvisiPac Map2, 2000409								
Automation Outputs (signals from PLC to InvisiPac)								
Tag ID	Description	Data Type	Units	Min Value	Max Value	Format	Bit	Byte
17	Strobe New Maintenance Interval - Weight Dispensed	Boolean		0	1		0	2
18	Reserved Bit	Boolean		0	1		1	
19	Reserved Bit	Boolean		0	1		2	
20	Reserved Bit	Boolean		0	1		3	
21	Reserved Bit	Boolean		0	1		4	
22	Reserved Bit	Boolean		0	1		5	
23	Reserved Bit	Boolean		0	1		6	
24	Reserved Bit	Boolean		0	1		7	
25	Reset Calibration Weight Counter	Boolean		0	1		0	3
26	Reset Maintenance Counter - Units Produced	Boolean		0	1		1	
27	Reset Maintenance Counter - Weight Dispensed	Boolean		0	1		2	
28	Reset Maintenance Counter - Pump Cycles	Boolean		0	1		3	
29	Reset Maintenance Counter - Heat On (Hours)	Boolean		0	1		4	
30	Reset Maintenance Counter - Pump Idle (Hours)	Boolean		0	1		5	
31	Reset Material Tracker Totalizers	Boolean		0	1		6	
32	Reset Material Tracker Targets	Boolean		0	1		7	
33	Enable Channel 1	Boolean		0	1		0	4
34	Enable Channel 2	Boolean		0	1		1	
35	Enable Channel 3	Boolean		0	1		2	
36	Enable Channel 4	Boolean		0	1		3	
37	Enable Channel 5 (HM25c Only)	Boolean		0	1		4	
38	Enable Channel 6 (HM25c Only)	Boolean		0	1		5	
39	Enable Channel 7 (HM25c Only)	Boolean		0	1		6	
40	Enable Channel 8 (HM25c Only)	Boolean		0	1		7	

InvisiPac Map2, 2000409								
Automation Outputs (signals from PLC to InvisiPac)								
Tag ID	Description	Data Type	Units	Min Value	Max Value	Format	Bit	Byte
41	Units - Temperature	Boolean		0: °C	1: °F		0	5
42	Units - Mass	Boolean		0: kg	1: lbs		1	
43	Units - Distance	Boolean		0: mm	1: in.		2	
44	Clear System Off Status Bits	Boolean		0	1		3	
45	Reserved Bit	Boolean		0	1		4	
46	Reserved Bit	Boolean		0	1		5	
47	Reserved Bit	Boolean		0	1		6	
48	Reserved Bit	Boolean		0	1		7	
49	Reserved Bit	Boolean		0	1		0	6
50	Reserved Bit	Boolean		0	1		1	
51	Reserved Bit	Boolean		0	1		2	
52	Reserved Bit	Boolean		0	1		3	
53	Reserved Bit	Boolean		0	1		4	
54	Reserved Bit	Boolean		0	1		5	
55	Reserved Bit	Boolean		0	1		6	
56	Reserved Bit	Boolean		0	1		7	
57	Reserved Bit	Boolean		0	1		0	7
58	Reserved Bit	Boolean		0	1		1	
59	Reserved Bit	Boolean		0	1		2	
60	Reserved Bit	Boolean		0	1		3	
61	Reserved Bit	Boolean		0	1		4	
62	Reserved Bit	Boolean		0	1		5	
63	Reserved Bit	Boolean		0	1		6	
64	Reserved Bit	Boolean		0	1		7	
65	Zone Temperature To Modify	Integer	<b>Zone Enum:</b> 0: Melter 1: Hose 1 2: Applicator 1 3: Hose 2 4: Applicator 3 ... 15: Hose 8 16: Applicator 8	1	17	XX	0-31	8-11
66	Zone New Temperature Setpoint	Integer	<b>Whole Deg C/F</b> °C: 37-204 °F: 100-400	°C: 38 °F: 100	°C: 204 °F: 400	XXX	0-31	12-15
67	New Material SG	Integer	Specific Gravity	0.100	5.000	XXXX		16-19
68	New Pump Idle Timeout Minutes	Integer	Whole Minutes	0	120	XXX	0-31	20-23
69	New Refill Mode	Integer	<b>Refill Mode Enum:</b> 0: Manual 1: Hopper Auto 2: Bin Auto 3: Bin Auto Adaptive	0	3	X	0-31	24-27

InvisiPac Map2, 2000409								
Automation Outputs (signals from PLC to InvisiPac)								
Tag ID	Description	Data Type	Units	Min Value	Max Value	Format	Bit	Byte
70	New Maintenance Intervals - Elapsed Times (Bitpacked)	Integer	Heat On Hours(16-31) Pump Idle Hours (0-15)	Heat On: 0 Pump Idle: 0	Heat On: 65535 Pump Idle: 65535	XXXXXX	16-31 0-15	28-31
71	New Pump Maintenance Interval - Pump Cycles	Integer	Pump Cycles	0	65536	XXXXXX	0-31	32-35
72	New Pump Maintenance Interval - Material Weight Dispensed	Integer	Whole KG/LBS	0	65536	XXXXXX	0-31	36-39
73	Reserved Integer	Integer	---	---	---	---	0-31	40-43
74	Reserved Integer	Integer	---	---	---	---	0-31	44-47
75	Command Interface - Command ID	Integer	See Command Interface	---	---	---	0-31	48-51
76	Command Interface - Value (Write)	Integer	See Command Interface	---	---	---	0-31	52-55
77	Command Interface - Control Bits	Integer	See Command Interface	---	---	---	0-31	56-59

## Automation Inputs

InvisiPac Map2, 2000409								
Automation Inputs (signals from InvisiPac to PLC)								
Tag ID	Description	Data Type	Units	Min Value	Max Value	Format	Bit	Byte
1	Heartbeat	Boolean		0	1		0	0
2	PLC Control Enabled	Boolean		0	1		1	
3	System - Active (Power On)	Boolean		0	1		2	
4	System - Heat Active	Boolean		0	1		3	
5	System - Pump Active	Boolean		0	1		4	
6	System - Warming Up	Boolean		0	1		5	
7	System - Ready To Dispense	Boolean		0	1		6	
8	PLC Heartbeat Missing	Boolean		0	1		7	
9	Advisory/Deviation Present	Boolean		0	1		0	1
10	Alarm Present	Boolean		0	1		1	
11	Event Code Needs Acknowledgement	Boolean		0	1		2	
12	Scrolling Event Code Changed	Boolean		0	1		3	
13	Maintenance Due	Boolean		0	1		4	
14	Slow Refill Detected	Boolean		0	1		5	
15	Refill Failure Detected	Boolean		0	1		6	
16	Reserved Bit	Boolean		0	1		7	
17	Channel 1 Enabled	Boolean		0	1		0	2
18	Channel 2 Enabled	Boolean		0	1		1	
19	Channel 3 Enabled	Boolean		0	1		2	
20	Channel 4 Enabled	Boolean		0	1		3	
21	Channel 5 Enabled	Boolean		0	1		4	
22	Channel 6 Enabled	Boolean		0	1		5	
23	Channel 7 Enabled	Boolean		0	1		6	
24	Channel 8 Enabled	Boolean		0	1		7	
25	System Off - From ADM	Boolean		0	1		0	3
26	System Off - From Pump Idle Timeout	Boolean		0	1		1	
27	System Off - From Alarm State	Boolean		0	1		2	
28	System Off - From Heartbeat Timeout	Boolean		0	1		3	
29	System Off - PLC Relinquished Control	Boolean		0	1		4	
30	System Off - Red Key From ADM	Boolean		0	1		5	
31	System Off - Immediate Stop From PLC	Boolean		0	1		6	
32	Reserved Bit	Boolean		0	1		7	



InvisiPac Map2, 2000409								
Automation Inputs (signals from InvisiPac to PLC)								
Tag ID	Description	Data Type	Units	Min Value	Max Value	Format	Bit	Byte
33	Units - Temperature	Boolean		0: °C	1: °F		0	4
34	Units - Mass	Boolean		0: kg	1: lbs		1	
35	Units - Distance	Boolean		0: mm	1: in.		2	
36	New Tenoerature Setpoint Accepted	Boolean		0	1		3	
37	New Temperature Setpoint Rejected	Boolean		0	1		4	
38	New Channel Enabled Bitmask - Accepted	Boolean		0	1		5	
39	New Channel Enabled Bitmask - Rejected	Boolean		0	1		6	
40	Reserved Bit	Boolean		0	1		7	5
41	Reserved Bit	Boolean		0	1		0	
42	Reserved Bit	Boolean		0	1		1	
43	Reserved Bit	Boolean		0	1		2	
44	Reserved Bit	Boolean		0	1		3	
45	Reserved Bit	Boolean		0	1		4	
46	Reserved Bit	Boolean		0	1		5	
47	Reserved Bit	Boolean		0	1		6	6
48	Reserved Bit	Boolean		0	1		7	
49	Reserved Bit	Boolean		0	1		0	
50	Reserved Bit	Boolean		0	1		1	
51	Reserved Bit	Boolean		0	1		2	
52	Reserved Bit	Boolean		0	1		3	
53	Reserved Bit	Boolean		0	1		4	
54	Reserved Bit	Boolean		0	1		5	7
55	Reserved Bit	Boolean		0	1		6	
56	Reserved Bit	Boolean		0	1		7	
57	Reserved Bit	Boolean		0	1		0	
58	Reserved Bit	Boolean		0	1		1	
59	Reserved Bit	Boolean		0	1		2	
60	Reserved Bit	Boolean		0	1		3	
61	Reserved Bit	Boolean		0	1		4	8-11
62	Reserved Bit	Boolean		0	1		5	
63	Reserved Bit	Boolean		0	1		6	
64	Reserved Bit	Boolean		0	1		7	
65	Zone Setpoint Temperature - Melter	Integer	Whole Degrees (C or F)	°C: 38 °F: 100	°C: 204 °F: 400	XXX	0-15	
66	Zone Setpoint Temperature: Channel 1 Hose & Gun Bitpack	Integer	Whole Degrees (C or F) Gun (Bits 31-16) Hose (Bits 15-0)	°C: 38 °F: 100	°C: 204 °F: 400	XXXXXX	Gun: 16-31 Hose: 0-15	12-15
67	Zone Setpoint Temperature: Channel 2 Hose & Gun Bitpack	Integer	Whole Degrees (C or F) Gun (Bits 31-16) Hose (Bits 15-0)	°C: 38 °F: 100	°C: 204 °F: 400	XXXXXX	Gun: 16-31 Hose: 0-15	16-19

InvisiPac Map2, 2000409								
Automation Inputs (signals from InvisiPac to PLC)								
Tag ID	Description	Data Type	Units	Min Value	Max Value	Format	Bit	Byte
68	Zone Setpoint Temperature: Channel 3 Hose & Gun Bitpack	Integer	Whole Degrees (C or F) Gun (Bits 31-16) Hose (Bits 15-0)	°C: 38 °F: 100	°C: 204 °F: 400	XXXXXX	Gun: 16-31 Hose: 0-15	20-23
69	Zone Setpoint Temperature: Channel 4 Hose & Gun Bitpack	Integer	Whole Degrees (C or F) Gun (Bits 31-16) Hose (Bits 15-0)	°C: 38 °F: 100	°C: 204 °F: 400	XXXXXX	Gun: 16-31 Hose: 0-15	24-27
70	Zone Setpoint Temperature: Channel 5 Hose & Gun Bitpack (HM25c Only)	Integer	Whole Degrees (C or F) Gun (Bits 31-16) Hose (Bits 15-0)	°C: 38 °F: 100	°C: 204 °F: 400	XXXXXX	Gun: 16-31 Hose: 0-15	28-31
71	Zone Setpoint Temperature: Channel 6 Hose & Gun Bitpack (HM25c Only)	Integer	Whole Degrees (C or F) Gun (Bits 31-16) Hose (Bits 15-0)	°C: 38 °F: 100	°C: 204 °F: 400	XXXXXX	Gun: 16-31 Hose: 0-15	32-35
72	Zone Setpoint Temperature: Channel 7 Hose & Gun Bitpack (HM25c Only)	Integer	Whole Degrees (C or F) Gun (Bits 31-16) Hose (Bits 15-0)	°C: 38 °F: 100	°C: 204 °F: 400	XXXXXX	Gun: 16-31 Hose: 0-15	36-39
73	Zone Setpoint Temperature: Channel 8 Hose & Gun Bitpack (HM25c Only)	Integer	Whole Degrees (C or F) Gun (Bits 31-16) Hose (Bits 15-0)	°C: 38 °F: 100	°C: 204 °F: 400	XXXXXX	Gun: 16-31 Hose: 0-15	40-43
74	Zone Actual Temperature - Melter	Integer	Whole Degrees (C or F)	°C: 38 °F: 100	°C: 204 °F: 400	XXX	0-15	44-47
75	Zone Actual Temperature: Channel 1 Hose & Gun Bitpack	Integer	Whole Degrees (C or F) Gun (Bits 31-16) Hose (Bits 15-0)	°C: 38 °F: 100	°C: 204 °F: 400	XXXXXX	Gun: 16-31 Hose: 0-15	48-51
76	Zone Actual Temperature: Channel 2 Hose & Gun Bitpack	Integer	Whole Degrees (C or F) Gun (Bits 31-16) Hose (Bits 15-0)	°C: 38 °F: 100	°C: 204 °F: 400	XXXXXX	Gun: 16-31 Hose: 0-15	52-55
77	Zone Actual Temperature: Channel 3 Hose & Gun Bitpack	Integer	Whole Degrees (C or F) Gun (Bits 31-16) Hose (Bits 15-0)	°C: 38 °F: 100	°C: 204 °F: 400	XXXXXX	Gun: 16-31 Hose: 0-15	56-59
78	Zone Actual Temperature: Channel 4 Hose & Gun Bitpack	Integer	Whole Degrees (C or F) Gun (Bits 31-16) Hose (Bits 15-0)	°C: 38 °F: 100	°C: 204 °F: 400	XXXXXX	Gun: 16-31 Hose: 0-15	60-63
79	Zone Actual Temperature: Channel 5 Hose & Gun Bitpack (HM25c Only)	Integer	Whole Degrees (C or F) Gun (Bits 31-16) Hose (Bits 15-0)	°C: 38 °F: 100	°C: 204 °F: 400	XXXXXX	Gun: 16-31 Hose: 0-15	64-67
80	Zone Actual Temperature: Channel 6 Hose & Gun Bitpack (HM25c Only)	Integer	Whole Degrees (C or F) Gun (Bits 31-16) Hose (Bits 15-0)	°C: 38 °F: 100	°C: 204 °F: 400	XXXXXX	Gun: 16-31 Hose: 0-15	68-71

InvisiPac Map2, 2000409								
Automation Inputs (signals from InvisiPac to PLC)								
Tag ID	Description	Data Type	Units	Min Value	Max Value	Format	Bit	Byte
81	Zone Actual Temperature: Channel 7 Hose & Gun Bitpack (HM25c Only)	Integer	Whole Degrees (C or F) Gun (Bits 31-16) Hose (Bits 15-0)	°C: 38 °F: 100	°C: 204 °F: 400	XXXXXX	Gun: 16-31 Hose: 0-15	72-75
82	Zone Actual Temperature: Channel 8 Hose & Gun Bitpack (HM25c Only)	Integer	Whole Degrees (C or F) Gun (Bits 31-16) Hose (Bits 15-0)	°C: 38 °F: 100	°C: 204 °F: 400	XXXXXX	Gun: 16-31 Hose: 0-15	76-79
83	Material Specific Gravity	Integer	SG In Thousandths	100	5000	XXXX	0-31	80-83
84	Countdown until system turns off from pump not moving	Integer	Minutes	0	120	XXX	0-31	84-87
85	Flow Rate (Weight Per Hour)	Integer	Thousandths kg/hr Thousandths lb/hr	kg/hr: 0 lbs/hr: 0	kg/hr: 9072 lbs/hr: 20000	XXXXX	0-31	88-91
86	Material Tracking - Units Produced	Integer	Whole Number	---	---	---	0-31	92-95
87	Material Tracking - Total Weight Dispensed	Integer	Tenths kg Tenths lbs	---	---	---	0-31	96-99
88	Material Tracking - Target grams/unit	Integer	Thousandths Grams	---	---	---	0-31	100-103
89	Material Tracking - Actual grams/unit	Integer	Thousandths Grams			---	0-31	104-107
90	Calibration Weight Counter (Separate from Material Tracking)	Integer	Thousandths KG/LBS	0	65536	XXXXX	0-31	108-111
91	Resettable Product Counter (Separate from Material Tracking)	Integer	Whole Number	---	---	---	0-31	112-115
92	Resettable Material Weight Dispensed	Integer	---	---	---	---	0-31	116-119
93	Lifetime Material Weight Dispensed	Integer	---	---	---	---	0-31	120-123
94	Resettable Pump Cycle Counter	Integer	---	---	---	---	0-31	124-127
95	Lifetime Pump Cycle Counter	Integer	---	---	---	---	0-31	128-131
96	Resettable Heat On Time (Hours)	Integer	---	---	---	---	0-31	132-135
97	Lifetime Heat On Time (Hours)	Integer	---	---	---	---	0-31	136-139
98	Resettable Pump Idle Time (Hours)	Integer	---	---	---	---	0-31	140-143
99	Lifetime Pump Idle Time (Hours)	Integer	---	---	---	---	0-31	144-147
100	Alarm Deviation Advisory Counts	Integer	uint8-uint8-uint8	---	---	---	0-31	148-151

InvisiPac Map2, 2000409								
Automation Inputs (signals from InvisiPac to PLC)								
Tag ID	Description	Data Type	Units	Min Value	Max Value	Format	Bit	Byte
101	Refill Mode Enum	Integer	Enumeration: 0: Manual 1: Hopper Automatic 2: Bin Automatic 3: Bin Auto-Adaptive	---	---	---	0-31	152-155
102	Refill Optimization For Hopper Auto & Bin Auto. (HM10 Only)	Integer	Whole Percent: 0 = too slow 50 = ideal 100 = too fast	0	100	XXX	0-31	156-159
102	Maintenance Intervals - Time Based	Integer		---	---	---	0-31	160-163
103	Maintenance Intervals - Elapsed Times (Bitpacked)	Integer	Heat On Hours(16-31) Pump Idle Hours (0-15)	Heat On: 0 Pump Idle: 0	Heat On: 65535 Pump Idle: 65535	XXXXX	16-31 0-15	164-167
104	Pump Maintenance Interval - Pump Cycles	Integer	Pump Cycles	0	65536	XXXXX	0-31	168-171
105	Pump Maintenance Interval - Material Weight Dispensed	Integer	Whole KG/LBS	0	65536	XXXXX	0-31	172-175
106	Reserved Int	Integer	---				0-31	176-179
107	Reserved Int	Integer	---				0-31	180-183
108	Event Code To Acknowledge	Char	4 Character Code: 0xDDCCBBAA Example Code: L8FX AA - first character (X) BB - Second Character (F) CC - Third Character (8) DD - Fourth Character (L)	0000	FFFF	XXXX	0-31	184-187
109	Scrolling Event Code	Char	4 Character Code: 0xDDCCBBAA Example Code: L8FX AA - first character (X) BB - Second Character (F) CC - Third Character (8) DD - Fourth Character (L)	0000	FFFF	XXXX	0-31	188-191
110	Command Interface - Status Bits	Integer	See Command Interface				0-31	192-195
111	Command Interface Value (Read/Write Return)	Integer	See Command Interface				0-31	196-199

# Command Interface

This section provides details about the CGM Command Interface.

The command interface portion of the map, allows the user to request further information or control more parameters of the InvisiPak system, which are not part of the other assigned memory locations. The command interface variables are assigned instance locations 40, 41, 61, 62 and 63 outlined in the **Automation Inputs**, page 60 and **Automation Outputs**, page 49.

The **Command Interface Timing Diagram** along with the **Command Interface Read operation**, should be used in order to read/write the command interface variables.

**NOTE:** When changes are made using the Command Interface, the ADM screen may not update immediately. It may be necessary to navigate to another screen, then back to the original screen.

## Command Interface Timing Diagram

Automation Outputs (InvisiPac Inputs)	Read Command	Write Command
Command Interface- Command Bytes	Bytes Set	Bytes Set
Command Interface- Value Bytes		Bytes Set
Command Interface- Control Bits Write (bit 0)		
Command Interface- Control Bits Read (bit 1)		
<b>Automation Inputs (InvisiPac Inputs)</b>		
Command Interface- Value Bytes	Bytes Set	Bytes Set
Command Interface- Status Bits - Active (bit 0)		
Command Interface- Status Bits - Success (bit 1)		
Command Interface- Status Bits - Failure (bit 2)		
Command Interface- Status Bits - Value Coerced (bit 3)		

### Command Interface Read operation

1. Set Command Interface - Command ID Byte to the desired value. See **Command Interface Table** page 66 for available values.
2. Set Command Interface - Control - Read Bit (bit 0).
3. Wait for the Command Interface - Status bits Active (bit 0) to become set.

- Wait for the Command Interface - Status Bits Success (bit 1) to become set.

**NOTE:** if the Command Interface - Success has been set , valid data will be present within the Command Interface Value (Read/Write Return) Bytes (automation input).

- Clear the Command Interface - Control - Read Bit (bit - 0) to the end the read command operation.

## Command Interface Write Operation

- Set Command Interface - Command ID (Write) Byte to the desired value. See **Command Interface Table** page 66 for available values.
- Set Command Interface \_ Value (Automation Output) byte to the value that is desired to be written.
- Set Command Interface - Write Bit (bit 1).
- Wait for the Command Interface - Status Bits - Active (bit 0) to become set. This indicates than an operation is in process.
- Wait for the Command Interface - Status Bits - Success (bit 1), Command Interface - Status bits - Failure (bit 2), or Command Interface - Status bits - Value Coerced (bit 3) to become set.

**NOTE:** The Command Interface - Value (Read/Write Return) (automation input) bytes will now contain the value that was actually written.

- Clear the Command Interface - Control - Write Bit (bit 1) to end the write command operation.

## Command Interface Table

Command Interface - Command ID	Description	Variable Definition	Read/Write
0x0100	System Date	A 32-bit string in the format of 0xDDCCBBAA.# 0xDD...Year (0x0D corresponds to 2013)# 0xCC...Month (0x0A corresponds to October)# 0xBB...Day# 0xAA...Day of Week (0x01 corresponds to Monday)	Read
0x0101	System Time	A 32-bit string in the format of 0xDDCCBBAA.# 0xDD...Unused# 0xCC...Hours# 0xBB...Minutes# 0xAA...Seconds	Read
0x010A	Weight Per Box	Weight per unit in thousandths # (a value of 1000 corresponds to 1.000 grams per unit)	Read
0x0303	Temperature Units	Value - Setting# 0 - °F# 1 - °C	Read/Write
0x0304	Mass Units	Value - Setting# 0 - kg# 1 - lb	Read/Write
0x0305	Distance Units	Value - Setting# 0 - in# 1 - mm	Read/Write

Command Interface - Command ID	Description	Variable Definition	Read/Write
0x0306	Specific Graviyt	Specific Gravity in thousands (a value of 1000 corresponds to 1.000 grams/cc)	Read/Write
0x0307	Customer Input 1 Type	Value - Setting# 0 - Unused# 1 - Heaters On/Off# 2 - Pump Enable/Disable# 3 - Channel 1 Enable/Disable# 4 - Channel 2 Enable/Disable# 5 - Channel 3 Enable/Disable# 6 - Channel 4 Enable/Disable# 7 - Channel 5 Enable/Disable# 8 - Channel 6 Enable/Disable# 9 - Channel 7 Enable/Disable# 10 - Channel 8 Enable/Disable	Read/Write
0x0308	Customer Input 2 Type	Customer Input 2 Type	Read/Write
0x0309	Customer Input 3 Type	See Customer Input 1 Type	Read/Write
0x030A	Customer Input 4 Type	See Customer Input 1 Type	Read/Write
0x030B	Customer Input 5 Type	See Customer Input 1 Type	Read/Write
0x030C	Customer Input 6 Type	See Customer Input 1 Type	Read/Write
0x030D	Customer Output 1 Type	Value - Setting# 0 - Unused# 1 - System Ready# 2 - Error (Alarm)# 3 - Error (Deviation/Advisory)# 4 - Maintenance Due	Read/Write
0x030E	Customer Output 2 Type	See Customer Output 1 Type	Read/Write
0x030E	Channel installed Bitmask	Bit...Channel 0.....Channel1 1.....Channel 2 2.....Channel 3 3.....Channel 4 4.....Channel 5 5.....Channel 6 6.....Channel 7 7.....Channel 8 A value of 0x0F enables channels 1-4 and disables channels 5-8. A value of 0 x F0 disables this feature and enables channels 5-8.	Read/Write
0x0310	Pump Idle Time to System Inactive	Pump idle time to system inactive in minutes# <b>NOTE:</b> a value of 0 disables this feature (system will never go inactive due to pump inactivity)	Read/Write
0x0311	Circuit Breaker Size	Circuit breaker size in mA# (a value of 20000 corresponds to a 20 A breaker on the power supplied to the system)	Read/Write
0x0313	Refill Setting	Value - Setting# 0 - Manual Refill# 1 - Automatic Refill	Read/Write
0x0318	CH1 Gun RTD type	See CH1 Gun RTD Type	Read/Write

Command Interface - Command ID	Description	Variable Definition	Read/Write
0x0319	CH2 Gun RTD type	See CH1 Gun RTD Type	Read/Write
0x031A	CH3 Gun RTD type	See CH1 Gun RTD Type	Read/Write
0x031B	CH4 Gun RTD type	See CH1 Gun RTD Type	Read/Write
0x031C	CH5 Gun RTD type	See CH1 Gun RTD Type	Read/Write
0x031D	CH6 Gun RTD type	See CH1 Gun RTD Type	Read/Write
0x031E	CH7 Gun RTD type	See CH1 Gun RTD Type	Read/Write
0x031E	CH8 Gun RTD type	See CH1 Gun RTD Type	Read/Write
0x0401	Resettable Pump Cycle Counter	Resettable pump cycle count. Write value of 0 to reset counter.	Read/Write
0x0402	Pump Lifetime Cycle Counter	Lifetime pump cycle count.	Read
0x0403	Resettable AUX Unit Counter	Resettable AUX unit count. Write value of 0 to reset counter. <b>NOTE:</b> this counter only includes units counted using the sensor on the System IO Board, not units counted using the pattern controller.	Read/Write
0x0404	Lifetime AUX Unit Counter	Lifetime AUX unit count. # <b>NOTE:</b> this counter only includes units counted using the sensor on the System IO Board, not units counted using the pattern controller	Read
0x0407	Resettable Pump Weight Totalizer	Resettable pump weight totalizer in tenths of lbs or kgs (follows the Mass Units setting selected). Write value of 0 to reset totalizer.	Read/Write
0x0408	Pump Lifetime Weight Totalizer	Lifetime pump weight totalizer in tenths of lbs or kgs (follows the Mass Units setting selected).	Read
0x0605	Acknowledge All Events	Value - Setting# Any - Acknowledges all system events requiring acknowledgment (if any are present)	Write
0x0606	Acknowledge Event	Returns current event (flashing on ADM screen) requiring acknowledgment (if any are present) in the format of 0xDDCCBBAA.# AA - first character of error code# BB - second character of error code# CC - third character of error code# DD - fourth character of error code	Write
0x0607	Acknowledge Current Event	Acknowledges current event (flashing on ADM screen) that requires acknowledgment (if any are present)	Write
0x0608	Current Event	Returns current event (flashing on ADM screen) requiring acknowledgment (if any are present) in the format of 0xDDCCBBAA.# AA - first character of error code# BB - second character of error code# CC - third character of error code# DD - fourth character of error code	Read



# Troubleshooting

## Melter Pump and Fluid Hose Leak Troubleshooting

1. **Drain the System.** Follow the steps on page 30.
2. Disconnect the hose from the fluid port connector and electrical port connector. Then disconnect the fluid port connector from the melter pump.
3. Inspect the fluid port connector seal for damage. If damaged, then replace the port connector. Replacement components are available in **Fluid Port Connectors Kit 24V504**. See page 118 for kit details.

**NOTE:** Fluid hose leaks are often caused by damaged port connector seals. For persistent leaks, replace the fluid port connector.

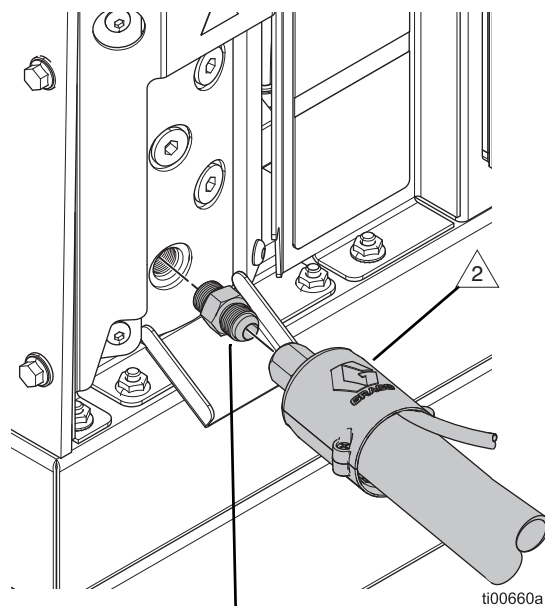
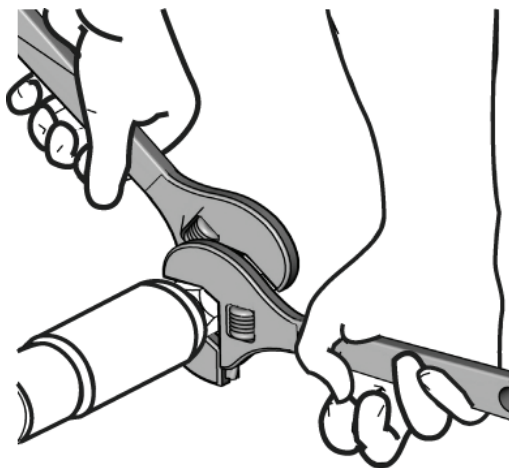
4. Install the port connector onto the melter pump. Torque the fluid port connector to 180 in-lb (20 N•m).
5. Use two wrenches to install the heated fluid hose onto the port connector. Torque the hose to 300 in-lb (33 N•m).

### NOTICE

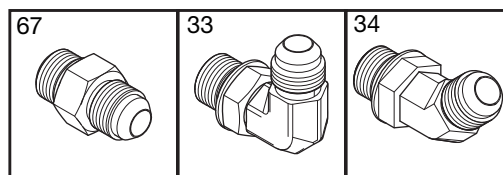
Over-tightening the hose port connector will damage the connector seal and cause fluid leaks. Do not over-tighten the port connector. Use two wrenches to torque the hose to the melter pump.

### Hose Torque Instructions

- 1 Torque the port connector to 180 in-lb (20 N•m).
- 2 Hose-to-connector: Torque to 300 in-lb (33 N•m). Always use two wrenches.



### 1 Fluid Port Connector Options



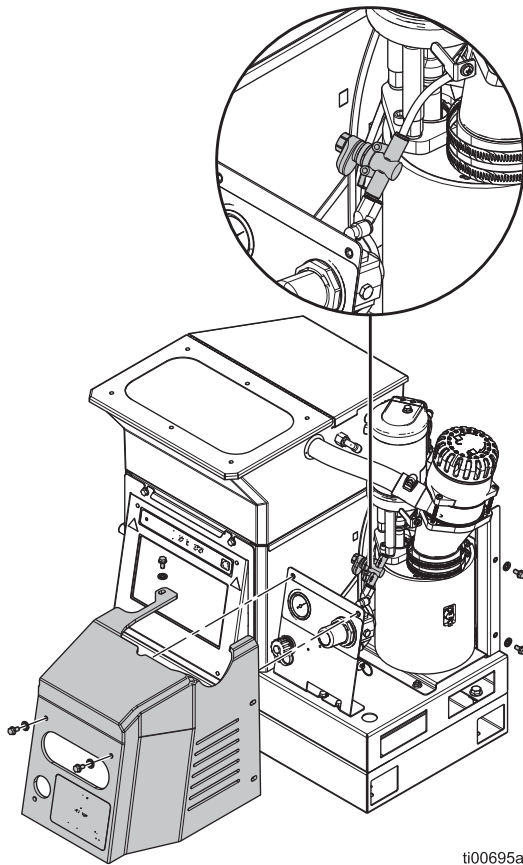
ti00661a

**FIG. 64: Pump and Hose Troubleshooting**

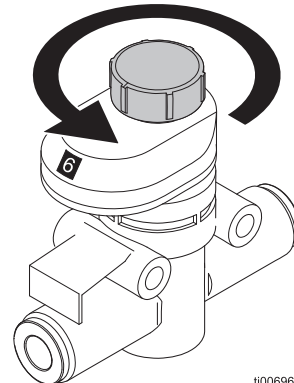
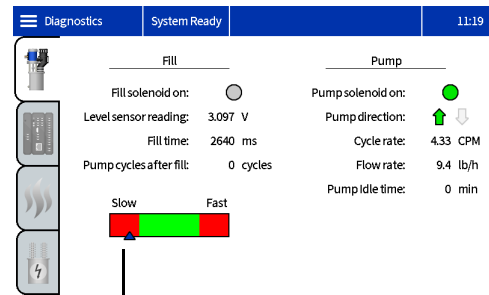
# Fill Rate Troubleshooting and Venturi Air Adjustment

The Fill/Pump Diagnostics Screen displays the fill rate between the hopper and the melter.

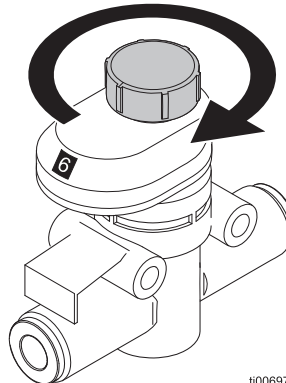
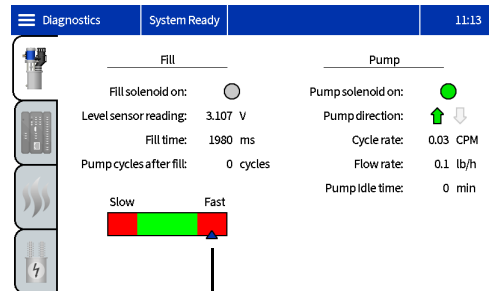
1. **Navigate to the Fill/Pump Diagnostics Screen:**  
**Home > Diagnostics > Select the Fill/Pump tab.**
2. Adjust the air venturi if the fill rate is slow or fast.
  - a. **Prepare Equipment for Service.** Follow the steps on page 80.
  - b. Loosen the fasteners on the front melter cover to remove the front cover.



**FIG. 65: Air Venturi Location**



**FIG. 66: Slow Fill and Increase Air**





**FIG. 67: Fast Fill and Restrict Air**

## Fill System Verification Checklist

Follow this checklist to troubleshoot common refill or dispensing-related errors.

- ? Check air filter by removing quick turn cap on top of funnel. Clean or replace if needed. See **Inspect the Funnel Cover and Funnel Filter**, page 32.
- ? Remove funnel cover and inspect. Remove stuck debris if needed. Ensure level sensor sight tube is clear of debris. See **Inspect the Funnel Cover and Funnel Filter**, page 32.
- ? Verify level sensor readings on diagnostic screen are consistent and slowly increase as material is dispensed.
- ? Verify air supply to system is strong and between 50 and 100 psi (80 to 100 psi preferred).
- ? Inspect air line and vacuum tubing to feed bin. Dips or kinks in the vacuum tubing can lead to a blocked flow path.
- ? Check number of pump cycles in between refills (8 to 10 cycles is desired). Short fills of 3 or fewer cycles can be caused by clogged funnel filter or debris in funnel.
- ? Monitor pellet flow and time to refill. Refills in excess of 15 seconds can be caused by low adhesive level in feed bin, insufficient air pressure, restricted feed hose, or clogged funnel filter.
- ? Verify size and shape of adhesive being fed is compatible with feed system and that melt rate ability is not exceeded.
- ? Check if glue is excessively dusty or releases oily vapor when heated. Fill system maintenance will be minimal given typical glue selection.


## Power Input Verification Checklist

				
<p>This equipment can be powered by more than 240V. Contact with this voltage will cause death or serious injury. Turn off and disconnect all power before servicing electrical components.</p>				

Follow this checklist to troubleshoot common power-related errors.

- ? Verify that the wires are tightly secured into the electrical disconnect.
- ? Confirm wiring matches label on electrical disconnect.
- ? Measure incoming line voltage. For a transformer system, also measure transformer output voltage at the terminal block.
- ? Verify power connections to J22 on the AMZ circuit board are fully seated.
- ? Check internal wiring against the **Electrical Schematics**, page 103.

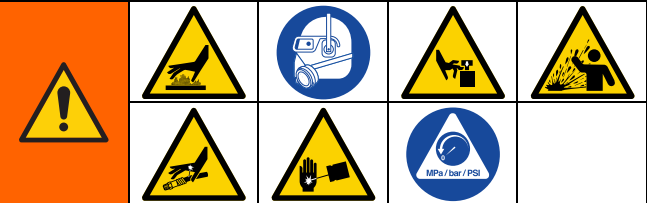
# Error Codes



**DANGER**  
**ELECTRIC SHOCK HAZARD**

This equipment can be powered by more than 240V. Contact with this voltage will cause death or serious injury.


- Turn off and disconnect power at main switch before disconnecting any cables and before troubleshooting and servicing equipment.
- All electrical wiring must be done by a qualified electrician and comply with all local codes and regulations.

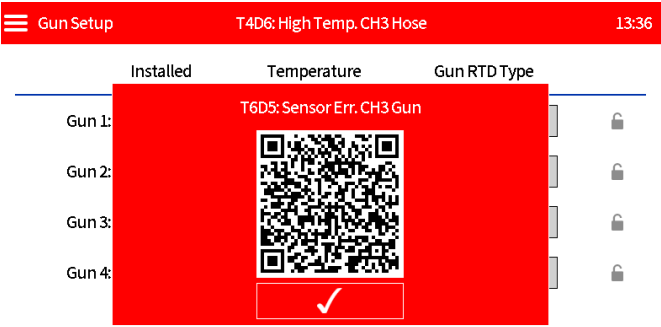


The equipment surfaces and components can become very hot. To avoid severe burns, wear protective gloves and clothing that will insulate your hands and body from the hot surfaces and adhesive material.

This equipment stays pressurized until pressure is manually relieved. To help prevent serious injury from pressurized fluid, such as skin injection, splashing fluid, and moving parts, follow the **Pressure Relief Procedure**, page 26 when you stop spraying and prior to troubleshooting and servicing the equipment.

To avoid injury due to unexpected machine operation initiated by a remote controller, disconnect the I/O cable from the system prior to troubleshooting.

- **View error codes on the ADM Screen:** Select the Menu Symbol  > Logs > Errors.
- **Acknowledge an Error:** Press the check mark button.



## Zone (C) Lookup Table

Some error codes are zone and component-specific. Use the Zone Lookup Table to identify which component caused the error.

For example: T4D(C) means an applicator or hose deviated above the temperature setpoint. T4D2 means Channel 1 Hose deviated above the setpoint.

(C)	Channel and Component
1	Channel 1 Applicator
2	Channel 1 Hose
3	Channel 2 Applicator
4	Channel 2 Hose
5	Channel 3 Applicator
6	Channel 3 Hose
7	Channel 4 Applicator
8	Channel 4 Hose

# Alarms

## Shuts system down

Code	Description	Cause	Solution
A2D0*	Low Current: Melter	Current through the melter heating rods is less than expected	?One or more of the fuses in the fuse harness assembly is blown. ?Remove short with corresponding melter heating rod and replace the fuse.
A4D0	High Current: Melter	High current through the melter heater rods	?Check melter heat rods resistance. See <b>Check Melter and Pump Heater Resistance</b> , page 96. ?Check for excessively high system line voltage.
A4D(C)	High Current: Applicator Zone or Hose Zone (AMZ)	Heater rods in applicator manifold Heater wires in hose	?Install a properly functioning applicator or hose. ?Refer to your applicator and hose manual for nominal heater wire resistance. Check resistance and replace the hose if necessary.
A4FX	High Current: Fill Solenoid	The fill solenoid wire shorted The fill solenoid drew excessive current	?Check for damaged wiring. ?Verify the fill solenoid connection to J6-FILL of the AMZ circuit board. See <b>Electrical Schematics</b> , page 103. ?Replace the fill solenoid. See <b>Replace an Air Control Solenoid</b> , page 85.
A4PX	High Current: Pump Solenoid	The pump solenoid wire shorted The pump solenoid drew an excessive current	?Check for damaged wiring. ?Verify the pump solenoid connection to J6-PUMP of the AMZ circuit board. See <b>Electrical Schematics</b> , page 103. ?Verify the solenoid resistance is 97 to 115 ohms. ?Replace the pump solenoid. See <b>Replace an Air Control Solenoid</b> , page 85.
A4SX	High Current: 24 VDC Supply	Short in PLC I/O wiring	?Unplug PLC I/O wiring from J8 of the AMZ circuit board. ?Check the resistance from power to ground.
		Short in the material tracking wiring	?Unplug unit counter from J10 of the AMZ circuit board. ?Check the resistance from power to ground. ?Verify the solenoid resistance is 97 to 115 ohms.
		Short in the level sensor wiring	?Unplug the level sensor from J4 of the AMZ circuit board. ?Verify the level sensor connection to J4 of the AMZ circuit board

(C): Channel and component-specific error. See **Zone (C) Lookup Table**, page 72 for component error zone.

\* Does not shut down system or melter zone

Code	Description	Cause	Solution
A7D0	Unexpected Current: Melter	Unexpected current to the melter	<p>?Check for damaged wiring.</p> <p>?Check heater resistance to ground See <b>Check Melter and Pump Heater Resistance</b>, page 96.</p> <p>?Replace all faulty heaters. See <b>Replace a Heater Rod</b>, page 97.</p> <p>?Replace the AMZ circuit board. See <b>Replace Auto Multi-Zone (AMZ) Circuit Board</b>, page 98.</p>
A7D(C)	Unexpected Current: Applicator Zone or Hose Zone	Unexpected current to an applicator or hose	<p>?Install a properly functioning applicator or hose.</p> <p>?Check for damaged wiring in the hose.</p> <p>?Check heater resistance to ground. See <b>Check Melter and Pump Heater Resistance</b>, page 96.</p> <p>?Replace the AMZ circuit board. See <b>Replace Auto Multi-Zone (AMZ) Circuit Board</b>, page 98(ref Procedure)</p>
A8D0	No Current: Melter	No current to the melter	<p>?Check J24 is plugged into the AMZ circuit board.</p> <p>?Check fuses FHA and FHB on the AMZ circuit board.</p>
A8D(C)	No Current: Applicator Zone or Hose Zone	No current to an applicator or hose	<p>?Install a properly functioning applicator or hose.</p> <p>?Check the F1–F4 fuses on the AMZ circuit board.</p> <p>?Check for damaged wiring.</p> <p>?Check for heater resistance. See <b>Check Melter and Pump Heater Resistance</b>, page 96.</p>
CAC1	Communication Error: AMZ	System is unable to communicate with the AMZ circuit board	<p>?Check the dial position. Set the AMZ circuit board to position 1. See FIG. 92 on page 99.</p> <p>?Verify CAN cable is plugged in Remove and reconnect, taking care not to cross-thread the connector nut</p> <p>?Verify solid green LED and blinking yellow LED on the AMZ circuit board.</p> <p>?Update the software</p>
CACX	Communication Error: SIOB (System I/O Board)	System is unable to communicate with SIOB	<p>?Verify solid green LED and blinking yellow LED on the AMZ System I/O board</p>

**(C):** Channel and component-specific error. See **Zone (C) Lookup Table**, page 72 for component error zone.

\* Does not shut down system or melter zone

Code	Description	Cause	Solution
DADX*	Pump Runaway	Melter ran out of adhesive	?Add pellets to the feed system. ?Reduce the adhesive flow rate. ?Verify the adhesive temperature setting. ?See <b>Fill System Verification Checklist</b> , page 71.
		Worn or damaged pump seals	?Inspect the pump seals. ?Replace if necessary. See <b>Prepare for Melter Pump Repairs</b> , page 86.
ER4L	Downgraded 2 Channel	The license key removal timer has expired, and one or more channels were disabled.	?If 4 channel operation is still desired, reinstall the license key.
L6FX	Level Sensor Error	Level sensor is not reading within expected range	?Check the level sensor connection. See <b>Install the Level Sensor</b> , page 82. ?See <b>Fill System Verification Checklist</b> , page 71.
L8FX*	Refill Error	Adhesive refill timed out before completing	?Refill the feed system and inspect for bridging or blocking. ?Check the feed hose and wand for plugged material. ?Verify the air supply and pressure are sufficient for the system. ?See <b>Fill System Verification Checklist</b> , page 71.
T4D0	High Temperature: Melter	Melter temperature deviated above setpoint	?Check that the melter temperature sensor RTD is fully seated in the melter. ?Verify the over-temperature switch connection to J1-OT on the AMZ circuit board. Check continuity. ?Replace melter temperature sensor RTD if fully seated and the temperature on the screen is not stable. See <b>Replace the Temperature Sensor (RTD)</b> , page 83.

**(C):** Channel and component-specific error. See **Zone (C) Lookup Table**, page 72 for component error zone.

\* Does not shut down system or melter zone

Code	Description	Cause	Solution
T4D(C)	High Temperature: Applicator Zone or Hose Zone	An applicator or hose temperature deviated above setpoint	<p>?Install a properly functioning applicator or hose.</p> <p>?Turn on the system without dispensing. Verify the hose maintains a stable setpoint temperature.</p> <p>?Verify the melter temperature setting is not set above the hose.</p> <p>?Check the applicator temperature sensor RTD. See <b>Typical Hose and Applicator Wiring</b>, page 104.</p>
T4MX	High Temperature: Transformer	Transformer thermistor reads above 212°F (100°C)	<p>?Verify the transformer fan is free of obstructions.</p> <p>?Fan only spins when the transformer is warm, and for a 5 second check each time electrical power is cycled</p>
T6D0	Sensor Error: Melter	No reading from the melter temperature sensor (RTD)	<p>?Verify the melter temperature sensor (RTD) connection to J1-RTD1 on the AMZ circuit board. See <b>Common Schematic</b>, page 103</p> <p>?Check the melter temperature sensor RTD for continuity.</p> <p>?Replace the melter temperature sensor RTD. See <b>Replace the Temperature Sensor (RTD)</b>, page 83.</p>
T6D(C)	Sensor Error: Applicator Zone or Hose Zone	No reading from an applicator or hose RTD	<p>?Verify hose and applicator connections. See <b>Typical Hose and Applicator Wiring</b>, page 104.</p> <p>?Install a properly functioning applicator or hose.</p>
T6MX	Sensor Error: Transformer	No reading from transformer thermistor	<p>?Verify temperature sensor connection to J2 on the AMZ circuit board.</p> <p>?Check the transformer sensor wiring for damage.</p> <p>?See <b>Incoming Power: 480V Models</b>, page 104.</p>
T8D0	No Temperature: Rise Melter	The melter temperature reading does not increase toward setpoint.	<p>?Check that the temperature sensor RTD is installed in the melter.</p> <p>?Compare temperature displayed on screen and the actual melter temperature.</p> <p>?Replace the temperature sensor RTD. See <b>Replace the Temperature Sensor (RTD)</b>, page 83.</p>
T8D(C)	No Temperature: Applicator Zone or Hose Zone	The applicator or hose temperature reading does not increase toward setpoint.	<p>?Verify the component is not wet.</p> <p>?Install a properly functioning applicator or hose.</p> <p>?Check gun heater rods for proper resistance.</p>

**(C):** Channel and component-specific error. See **Zone (C) Lookup Table**, page 72 for component error zone.

\* Does not shut down system or melter zone



Code	Description	Cause	Solution
V4M1	High Line Voltage: AMZ	Refer to the <b>Power Input Verification Checklist</b> , page 71.	
V6M1	Invalid Power Type: AMZ	Refer to the <b>Power Input Verification Checklist</b> , page 71.	

**(C):** Channel and component-specific error. See **Zone (C) Lookup Table**, page 72 for component error zone.

\* Does not shut down system or melter zone

## Advisories and Deviations

### Does not shut the system down

Code	Description	Cause	Solution
A4MF	High Current: Transformer Fan	Excessive current draw above 600mA	?Check for pinched or shorted fan wiring. ?Replace fan. ?See <b>Incoming Power: 480V Models</b> , page 104.
A8FX	No Current: Fill Solenoid		?See <b>Fill System Verification Checklist</b> , page 71. ?Check for damaged wiring. ?Verify connection from fill solenoid to J6-FILL on the AMZ circuit board. ?Verify solenoid resistance is 97 to 115 ohms.
A8MF	No Current: Transformer Fan	The transformer fan is not connected.	?Verify the fan power cable is connected to J2 on the AMZ circuit board. See <b>Incoming Power: 480V Models</b> , page 104.
		The transformer fan blocked from spinning.	?Verify fan is free of obstructions and can spin freely.
A8PX	No Current: Pump Solenoid	The pump solenoid is disconnected from the AMZ.	?Check for damaged wiring. ?Verify connection from pump solenoid to J6-PUMP on the AMZ circuit board. ?Verify the pump solenoid resistance is 97 to 115 ohms.
B2AX	Low Glue per Unit	Pump pressure is too low.	?Check if pump pressure has been reduced from desired level.
		Glue per unit target needs to be reset.	?Navigate to material tracking page from home screen and reset target setting.
		Applicator module filter may be restricting flow.	?Replace applicator module filter.

**(C):** Zone and component-specific error. See **Zone (C) Lookup Table**, page 72 for component error zone.

Code	Description	Cause	Solution
B3AX	High Glue per Unit	Pump pressure too high.	?Check if pump pressure as been increased from desired level.
		Glue per unit target needs to be reset.	?Navigate to material tracking page from home screen and reset target setting.
		Nozzle size was increased.	?Check if desired nozzle size is installed.
DDDX	Pump Diving	The melter ran out of adhesive.	?Refill feed bin or hopper. ?Reduce adhesive flow rate. ?Verify adhesive temperature setting. ?See <b>Fill System Verification Checklist</b> , page 71.
		Worn or damaged pump seals.	?Inspect pump seals. Replace if necessary.
DE0X	Cycle Switch Error	No signal from the cycle switch.	?Verify connection from cycle switch to J5 on the AMZ. ?Replace cycle switch. See <b>Replace Cycle Switch Sensor</b> , page 82.
ECUL	License Key Missing	A previously installed license key was removed from the unit	?If 4 channel operation is still desired, reinstall the license key. Otherwise, 4 channel operation will be disabled after 2 hours.
EVUX	USB Disabled	USB logging disabled.	?Enable USB logging.
L0FX	Manual Fill Mode	System is operating in manual fill mode.	?Change to auto fill mode.
L3FX	Slow Refill	Refills are taking longer than expected and may soon result in failure to fill.	?See <b>Fill System Verification Checklist</b> , page 71.
MNDX	Pump maintenance due	Pump maintenance is due according to the user-defined settings for pump cycles, material dispensed, or time while hot.	?Perform maintenance.
T2D(C)	Low Temperature: Applicator Zone or Hose Zone	An applicator or hose temperature deviated below setpoint.	?Install a properly functioning applicator or hose. ?Check the component RTD. See <b>Typical Hose and Applicator Wiring</b> , page 104.  ? <b>Applicator:</b> Turn on system without dispensing. Check if the applicator maintains a stable setpoint temperature.  ? <b>Hose:</b> Turn on the system without dispensing. Verify melter temperature setting is not higher than hose setting. Check if hose maintains stable setpoint temperature.



(C): Zone and component-specific error. See **Zone (C) Lookup Table**, page 72 for component error zone.









Code	Description	Cause	Solution
T2D0	Low Temperature: Melter	The melter temperature deviated below setpoint.	?Check that the temperature sensor RTD is fully seated in melter.  ?Replace RTD if fully seated and temperature on screen is not stable. See <b>Replace the Temperature Sensor (RTD)</b> , page 83.
WNU0	Invalid USB License Key	The USB license key is not for an InvisiPac HM10.	?Use a compatible license key.  ?Ensure that the USB license key is correctly inserted to the USB hub behind the ADM.  ?Remove and reinsert the USB license key.  ?Reboot the machine.
		The Graco License Image on the USB license key does not match the USB license key.	
		There has been a failure with the USB license key or the USB hardware on the ADM.	
V2M1	Low Line Voltage: AMZ		Refer to <b>Power Input Verification Checklist</b> , page 71.

**(C):** Zone and component-specific error. See **Zone (C) Lookup Table**, page 72 for component error zone.

# Repair

## Prepare Equipment for Service

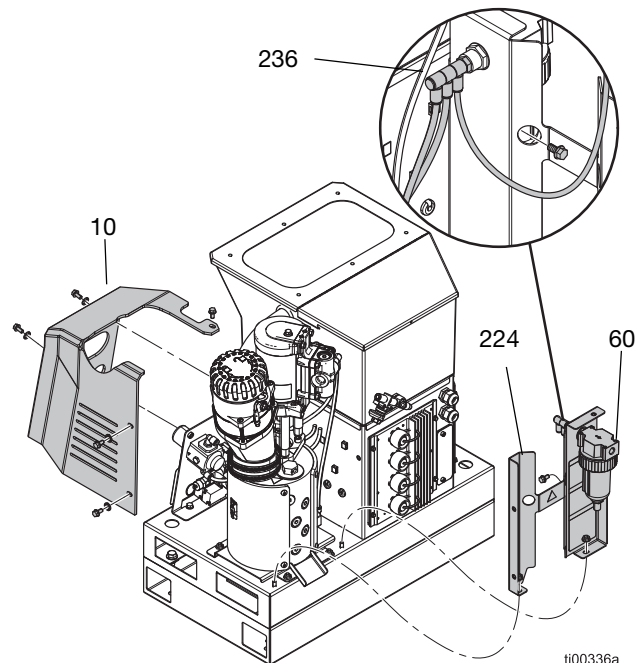
				
<b>DANGER</b> <b>SEVERE ELECTRIC SHOCK HAZARD</b> <p>This equipment can be powered by more than 240V. Contact with this voltage will cause death or serious injury.</p> <ul style="list-style-type: none"> <li>Turn off and disconnect all power before disconnecting any cables and before servicing equipment.</li> </ul>				

				
				
<p>This equipment stays pressurized until pressure is manually relieved. To help prevent serious injury from pressurized fluid, such as skin injection, splashing fluid and moving parts, follow the <b>Pressure Relief Procedure</b>, page 26 before servicing the equipment.</p> <p>The equipment surfaces and components can become very hot. To avoid severe burns, wear protective gloves and clothing that will insulate your hands and body from the hot surfaces and adhesive material.</p> <p>Moving parts can pinch, cut, or amputate body parts. To help prevent serious injury from moving parts, do not operate equipment with the protective covers removed.</p>				

- Follow the **Pressure Relief Procedure**, page 26.
- Drain the System.** Follow the steps on page 30.
- Flush the system if desired. See **Flushing Procedure**, page 31.
- Press the power button on the ADM screen to shut down the system.
- Disconnect power from the equipment.

## Remove Equipment Covers

- Prepare Equipment for Service.** Follow the steps on page 80.
- Loosen the fasteners on the front melter cover (10) to remove the front cover.
- Remove the rear melter cover (224) as needed.
  - Disconnect the air filter (60).
  - Disconnect the air lines from the triple union fitting (236).
  - Loosen the fasteners to remove the rear melter cover (224).



**FIG. 68: Equipment Covers**



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## Install Equipment Covers

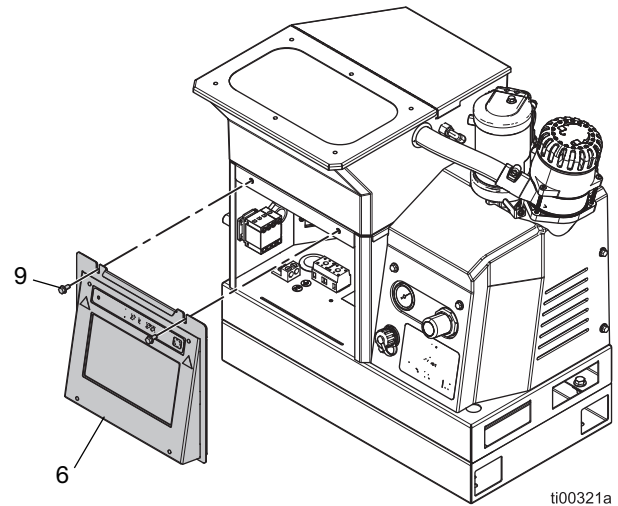
Refer to FIG. 68.

1. Tighten the fasteners to install the rear melter cover (224).
2. Connect the air lines to the triple union fitting (236).
3. Install the air filter (60).
4. Tighten the fasteners to install the front melter cover (10).

## Access the Electrical Enclosure

				
<p><b>DANGER</b>  <b>SEVERE ELECTRIC SHOCK HAZARD</b></p> <p>This equipment can be powered by more than 240V. Contact with this voltage will cause death or serious injury.</p> <ul style="list-style-type: none"> <li>• Turn off and disconnect all power before disconnecting any cables and before accessing the electrical enclosure.</li> </ul>				

1. Follow the **Pressure Relief Procedure**, page 26.
2. Press the power button on the ADM screen to shut down the system.
3. Disconnect power from the equipment.
4. Loosen the ADM fasteners (9) to separate the ADM (6) screen from the equipment.
5. On 2 channel units, disconnect the bulkhead USB cable from the right angle USB cable (67). On 4 channel units, disconnect the bulkhead USB cable from the USB hub (73).
6. Disconnect the CAN cable from the back of the ADM.
7. Remove the ADM screen (6) to access the electrical components inside the enclosure.



**FIG. 69: Electrical Enclosure Access**

## Install the ADM Screen

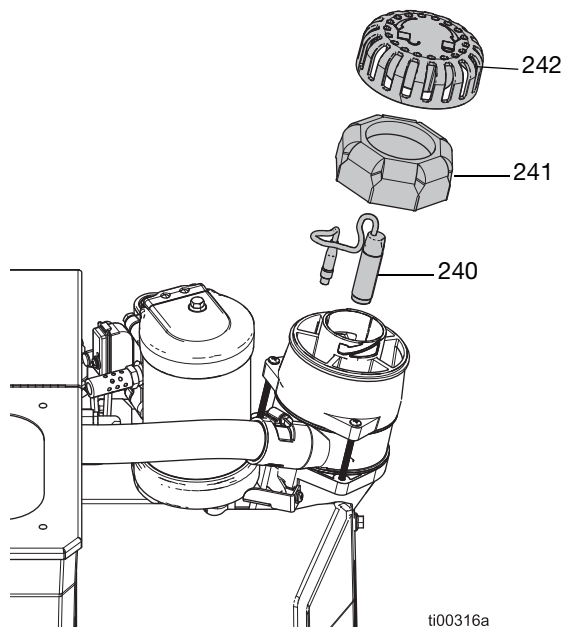
Refer to FIG. 69.

1. **Prepare Equipment for Service.** Follow the steps on page 80.
2. On 2 channel units, insert the bulkhead USB cable into the right angle USB cable (67). On 4 channel units, insert the bulkhead USB cable into the USB hub (73).
3. Connect the CAN cable between the AMZ circuit board and ADM screen.
4. Install the ADM screen (6) to the equipment with the ADM fasteners (9).

## Sensor and Switch Repairs

<p><b>DANGER</b>  <b>SEVERE ELECTRIC SHOCK HAZARD</b></p> <p>This equipment can be powered by more than 240V. Contact with this voltage will cause death or serious injury.</p> <ul style="list-style-type: none"> <li>Turn off and disconnect all power before disconnecting any cables and before accessing the electrical enclosure or servicing electrical components.</li> </ul>				

### Remove the Level Sensor



**FIG. 70: Level Sensor Location**

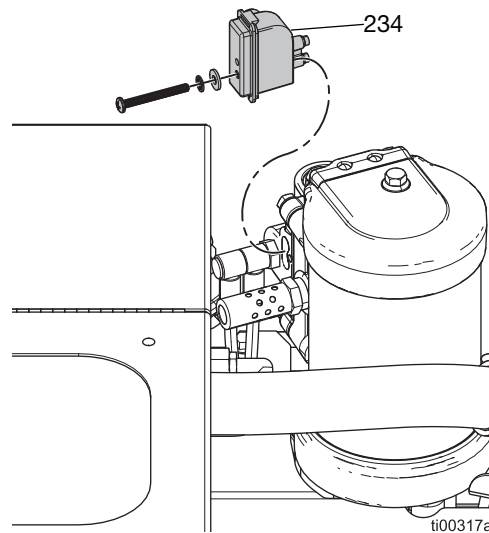
1. Turn the main power switch (204) OFF.
2. Remove the funnel cover (242) and funnel filter (241).
3. Disconnect the cable on the level sensor (240) from the equipment and pull the cable through the top of the sensor housing.
4. Unscrew the level sensor (240) and remove it from the funnel.

### Install the Level Sensor

1. Thread the level sensor (240) into the sensor housing until it bottoms out, then back it out 1/4 turn. Hand tighten the jam nut.
2. Feed the level sensor cable through the top of the sensor housing.
3. Reconnect the level sensor cable.
4. Install the funnel filter (241) and funnel cover (242).

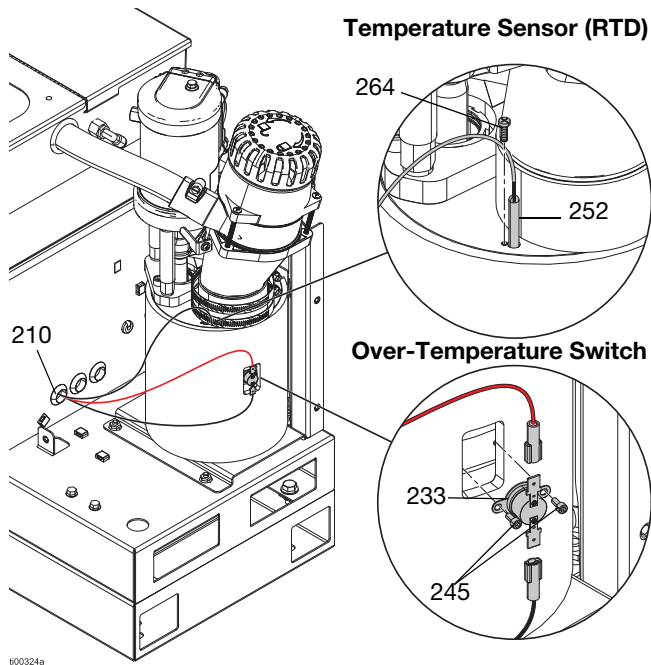
### Replace Cycle Switch Sensor

1. **Prepare Equipment for Service.** Follow the steps on page 80.
2. Disconnect the cable from the cycle switch (234).
3. Remove the cycle switch fastener and washers to separate the cycle switch (234) from the motor.
4. Install the cycle switch (234) replacement and secure with the washers and fastener. Torque to 7–10 in-lb (0.7–1.0 N•m).
5. Reconnect the cycle switch cable.



**FIG. 71: Cycle Switch Location**

## Melter Sensor Repairs

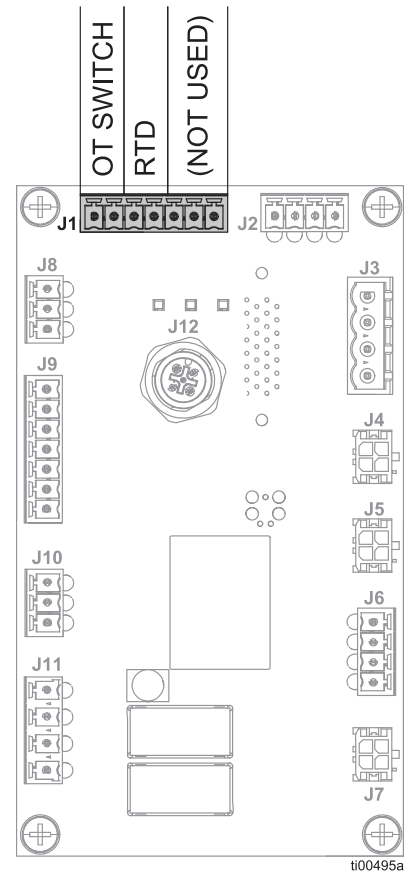


**FIG. 72: Temperature Sensor and Over-Temperature Switch Locations**

### Replace the Temperature Sensor (RTD)

See FIG. 72 for details.

1. **Prepare Equipment for Service.** Follow the steps on page 80.
2. Remove the melter cover (10). See **Remove Equipment Covers**. Follow the steps on page 80.
3. **Access the Electrical Enclosure.** Follow the steps on page 81
4. See FIG. 73 and **Electrical Schematics**, page 103 for wiring details.
  - a. Disconnect the temperature sensor (RTD) from the circuit board.
  - b. Pull the RTD lead out of the electrical enclosure grommet (210).
  - c. Connect the new RTD sensor to the melter circuit board.
  - d. Pull the new RTD sensor through the electrical enclosure grommet (210).
5. **Install the ADM Screen.** Follow the steps on page 81.
6. Install the new temperature sensor (252) in the melter.
  - a. Remove the temperature sensor retaining screw (264). Remove and discard the old temperature sensor (252).
  - b. Install the new temperature sensor (252) in the melter and fasten with the retaining screw (264). Torque to 7-10 in-lb (0.7-1.0 N•m).
7. Install the melter cover (10) onto the equipment. See **Install Equipment Covers**, page 81.



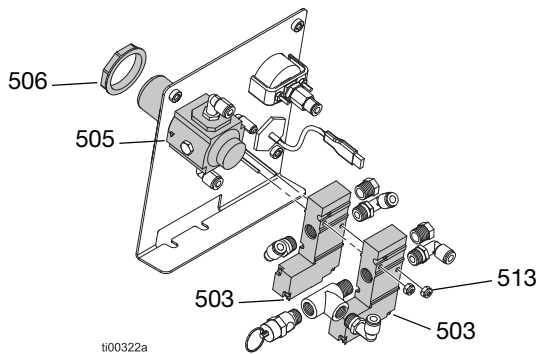
**FIG. 73: Melter Control Connections (J1)**

## Replace Over-Temperature Switch

See FIG. 72 for details.

1. **Prepare Equipment for Service.** Follow the steps on page 80.
2. Remove the melter cover (10). See **Remove Equipment Covers**. Follow the steps on page 80.
3. Remove the spade connectors from the over-temperature switch (233).
4. Remove the fasteners (245) retaining the over-temperature switch.
5. Replace the spade connectors from the over-temperature switch cable onto the new switch.
6. Replace the over-temperature switch and retaining screws. Torque to 7-10 in-lb (0.7-1.0 N•m).
7. Install the melter cover (10) onto the equipment.

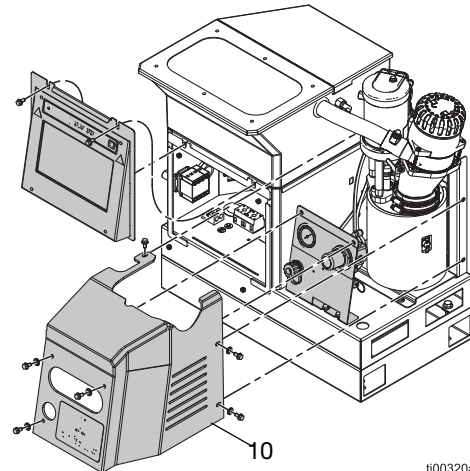
## Air Control Repairs



**FIG. 74: Air Control Assembly**

## Access Air Controls

1. **Prepare Equipment for Service.** Follow the steps on page 80.
2. Remove the melter cover (10). See **Remove Equipment Covers**. Follow the steps on page 80.
3. **Access the Electrical Enclosure.** Follow the steps on page 81.



**FIG. 75: Access Air Controls**

## Replace the Air Control Regulator and Gauge

1. **Access Air Controls.** Follow the steps on page 84.
2. Disconnect the air tubing from regulator (505) and remove the panel nut (506).
3. Remove the regulator (505) from the panel.
4. Install a new regulator (505) onto the panel
5. Connect the air tubing and install the panel nut (506).



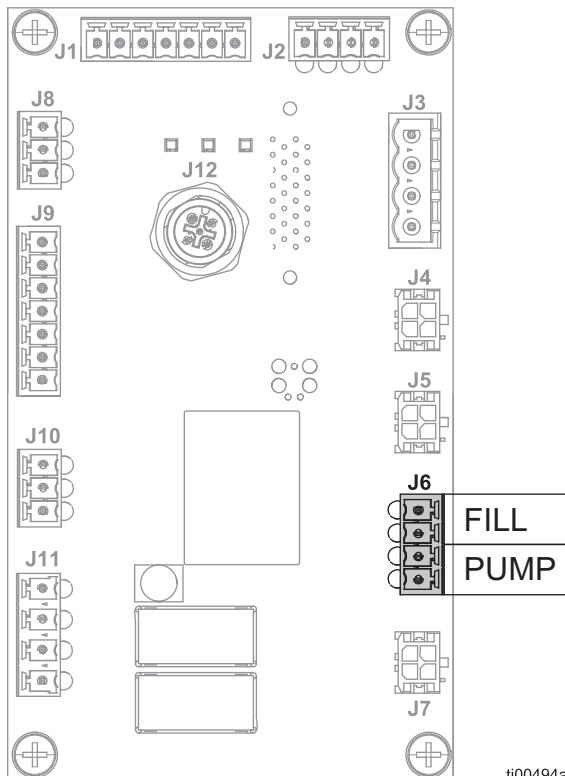
## Replace an Air Control Solenoid

The air control assembly has two solenoids. Replace the pump or fill solenoid as needed.

1. **Access Air Controls.** Follow the steps on page 84. Disconnect the air tubing from the solenoid (503) getting replaced.
2. **Access the Electrical Enclosure.** Follow the steps on page 81. Disconnect the air control electrical connector from the AMZ board. Remove the solenoid leads.
3. Remove the nuts (513) with a socket wrench and remove the solenoid (503).

**NOTE:** Fittings from the old air control solenoid will be used with the new air control solenoid.

4. Pull the new solenoid leads through the grommet into the electrical enclosure.
5. Secure the solenoid (503) to the panel with the nuts (513).
6. Connect the electrical connector to the AMZ board. See **Electrical Schematics**, page 103.
7. Connect air tubing to the solenoid (503).



**FIG. 76: Air Control Solenoid Wiring (J6)**

## Hopper Repair

Refer to **Hopper Assembly (On-Board Hopper Models only)**, page 110.

1. Turn the main power switch (204) OFF.
2. Remove screws (64) and lift the lid off of the hopper.
3. Loosen the hose clamp (51) around the top of the venturi (53) and disconnect the hose.
4. Pull the hose through the grommet (41) on the side of the hopper.

**NOTE:** Lightly spray the area with rubbing alcohol to allow the hose to pass more easily through the grommet.

5. Disconnect the air line between the side of the hopper and the venturi.
6. Remove the nuts (14).
7. While lifting up the bowl assembly, disconnect the air line connected to the fitting (50) in the shaker (42).
8. If necessary, replace the bowl assembly by transferring the shaker (42) and venturi to the new bowl assembly and following steps 2 through 7 in reverse.

**NOTE:** The bowl assembly comes with the seals attached.

9. Disconnect the two air lines connected to the fittings (47) on the outside of the hopper.
10. Unscrew the four studs (38) that have isolators (39) still attached.
11. Lift the hopper off of the chassis and transfer the grommets and fittings to the new hopper.
12. Place the new hopper on the chassis and apply medium strength thread locker on the studs.
13. Thread on the studs (38) with the isolators (39) still attached.
14. Reconnect the air lines on the outside of the hopper.

- 15. While installing the bowl assembly, reconnect the air line from the bottom rear of the hopper to the fitting (50) in the shaker (42).
- 16. Apply medium strength thread locker to the four studs sticking up and tighten the nuts (14) to secure the bowl.
- 17. Reconnect the air line from the side of the hopper to the venturi (53).
- 18. Slide the tube (54) through the grommet (42) and secure it to the venturi (53) with the hose clamp (51).

- NOTE:** Lightly spray the area with rubbing alcohol to allow the hose to pass more easily through the grommet.
- 19. Put the lid (48) back on top of the hopper (37) and ensure the tabs are in the slots.
  - 20. Reinstall the screws (64) through the lid into the back of the hopper.

Melter Pump Assembly Repairs

<p><b>DANGER</b> <b>SEVERE ELECTRIC SHOCK HAZARD</b></p> <p>This equipment can be powered by more than 240V. Contact with this voltage will cause death or serious injury.</p> <ul style="list-style-type: none"><li>• Turn off and disconnect all power before disconnecting any cables and before accessing the electrical enclosure or servicing electrical components.</li></ul>				

Prepare for Melter Pump Repairs


This equipment stays pressurized until pressure is manually relieved. To help prevent serious injury from pressurized fluid, such as skin injection, splashing fluid and moving parts, follow the **Pressure Relief Procedure**, page 26 before servicing the equipment.

The equipment surfaces and components can become very hot. To avoid severe burns, wear protective gloves and clothing that will insulate your hands and body from the hot surfaces and adhesive material.

Moving parts can pinch, cut, or amputate body parts. To help prevent serious injury from moving parts, do not operate equipment with the protective covers removed.

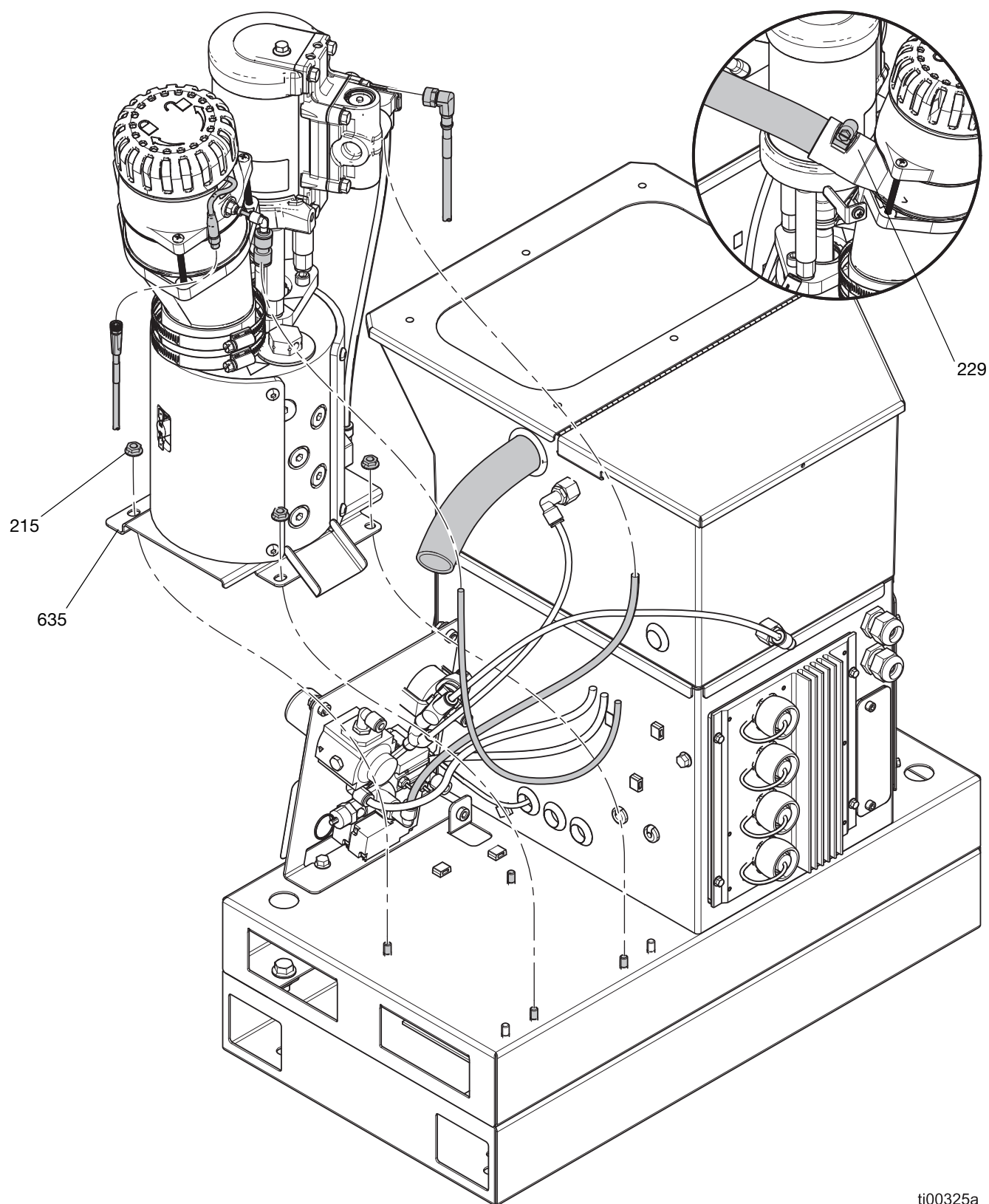
- 1. Warm the system to operating temperature. The adhesive must be fluid to perform this procedure. Replace the components before the system cools.

<p><b>NOTICE</b></p> <p>Hardened adhesive will damage seals or other soft parts during installation. Reassemble the pump components within 30 minutes of disassembling the pump to avoid adhesive hardening.</p>
--

- 2. Follow the **Pressure Relief Procedure**, page 26.
- 3. **Drain the System.** Follow the steps on page 30.
- 4. Flush the system if desired. See **Flushing Procedure**, page 31.
- 5. Press the power button on the ADM screen to shut down the system.
- 6. Disconnect power from the equipment.
- 7. **Remove Equipment Covers** as needed. Follow the steps on page 80.

## Disconnect the Melter Pump Assembly from the System



1. **Prepare for Melter Pump Repairs.** Follow the steps on page 86.
2. **Access the Electrical Enclosure.** Follow the steps on page 81.
3. Disconnect the heater rod (623) wires from the fuse harness on the AMZ. See **Disconnect the Heater Rods**, page 97 for reference.
4. Pull the heater rod (623) wires through the grommet (210) out of the electrical enclosure.
5. Disconnect the following sensors on the outside of the equipment.
  - Disconnect the cycle cable from the cycle switch (234). Reference FIG. 71.
  - Disconnect the level sensor cable from the level sensor (240). Reference FIG. 70.
  - Disconnect the melter temperature sensor (252). Reference FIG. 72.
  - Disconnect the over-temperature switch (233). Reference FIG. 72.
6. Remove the melter pump assembly from the system.
  - a. Loosen the hose clamp and remove the feed tube from the funnel inlet (229).
  - b. Use a socket wrench to remove the nuts (215) from the melter base plate (635).
  - c. Grasp the air motor to lift and rotate the melter assembly off from the system base.



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**FIG. 77: Melter Pump Connections**

## Install the Melter to the System

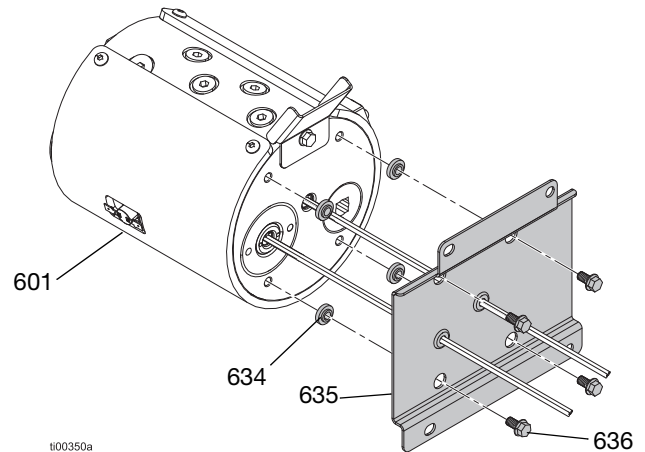
				
<p><b>DANGER</b>  <b>SEVERE ELECTRIC SHOCK HAZARD</b></p> <p>This equipment can be powered by more than 240V. Contact with this voltage will cause death or serious injury.</p> <ul style="list-style-type: none"> <li>Turn off and disconnect all power before disconnecting any cables and before accessing the electrical enclosure or servicing electrical components.</li> </ul>				

See FIG. 77 for details.

- Grasp the air motor tie rods to lift the melter pump assembly. Position the equipment onto the system base.
- Connect the following sensors on the outside of the equipment.
  - Connect the cycle cable from the cycle switch (234). Reference FIG. 71.
  - Connect the level sensor cable from the level sensor (240). Reference FIG. 70.
  - Connect the melter temperature sensor (252). Reference FIG. 72.
  - Connect the over-temperature switch (233). Reference FIG. 72.
- Access the Electrical Enclosure.** Follow the steps on page 81.
- Connect the Heaters Rod Wires to the AMZ.** Follow the steps on page 97.
- Install the ADM Screen.** Follow the steps on page 81.
- Tighten the nuts (215) with a socket wrench to secure the melter base plate (635) to the system base (1).
- Connect the feed tube to the funnel inlet (229) and tighten the hose clamp.
- Install Equipment Covers.** Follow the steps on page 81.

## Remove the Melter Plate

Remove the melter plate (635) as needed to access the bottom of the melter. Reinstall the melter plate before installing the melter to the system.



**FIG. 78: Melter Plate Assembly**

- Prepare for Melter Pump Repairs.** Follow the steps on page 86.
- Turn the melter (601) onto its side to access the bottom of the melter.

### NOTICE

Resting the melter on the over-temperature switch will damage the component. Do not rest the melter on the over-temperature switch.

- Remove the fasteners (636) and lift the melter (601) from the plate (635).
- Retain thermal insulators (634) for reassembly.

## Install Melter Plate

- Apply a small amount of grease to insulators (634) and place into holes in the melter base plate (635).

**NOTE:** The grease will hold them in place during assembly. Do not grease the heater leads.

- Slide the heater wires through the grommets.
- Secure the melter (601) to the base plate (635) with fasteners (636).
- Install the melter into the system. **Connect the Heaters Rod Wires to the AMZ.** Follow the steps on page 97.

## Melter Pump Component Repairs

### Air Motor Repairs

See FIG. 79 on page 91 for details.

#### Remove the Air Motor from the Melter

1. **Prepare Equipment for Service.** Follow the steps on page 80.
2. **Remove Equipment Covers.** Follow the steps on page 80.
3. Disconnect the level sensor cable from the level sensor (240) and air line going into the sensor housing.
4. Loosen the fastener (246) on the funnel support bracket (639). Loosen the funnel retaining rings (244) and remove the funnel.
5. Disconnect air tubes from the air motor air inlet fitting (648).
6. Slide the retaining ring (607) up the shaft of the air motor.
7. Remove the pump connecting pin (606) to separate the air motor and pump.
8. Use a hex key to remove the fasteners (608) from the air motor mounting plate (603) and lift air motor off of the melter.

#### Disassemble the Air Motor

1. **Remove the Air Motor from the Melter.** Follow the steps on page 90.
2. Loosen the fasteners (609) from the air motor mounting plate (603) and remove the mounting plate.
3. Remove the tie rods (604) from the air motor (605).
4. Remove the fastener (649) holding the funnel motor support bracket (639) from the air motor.
5. Remove the cycle switch (234). See **Replace Cycle Switch Sensor**, page 82.

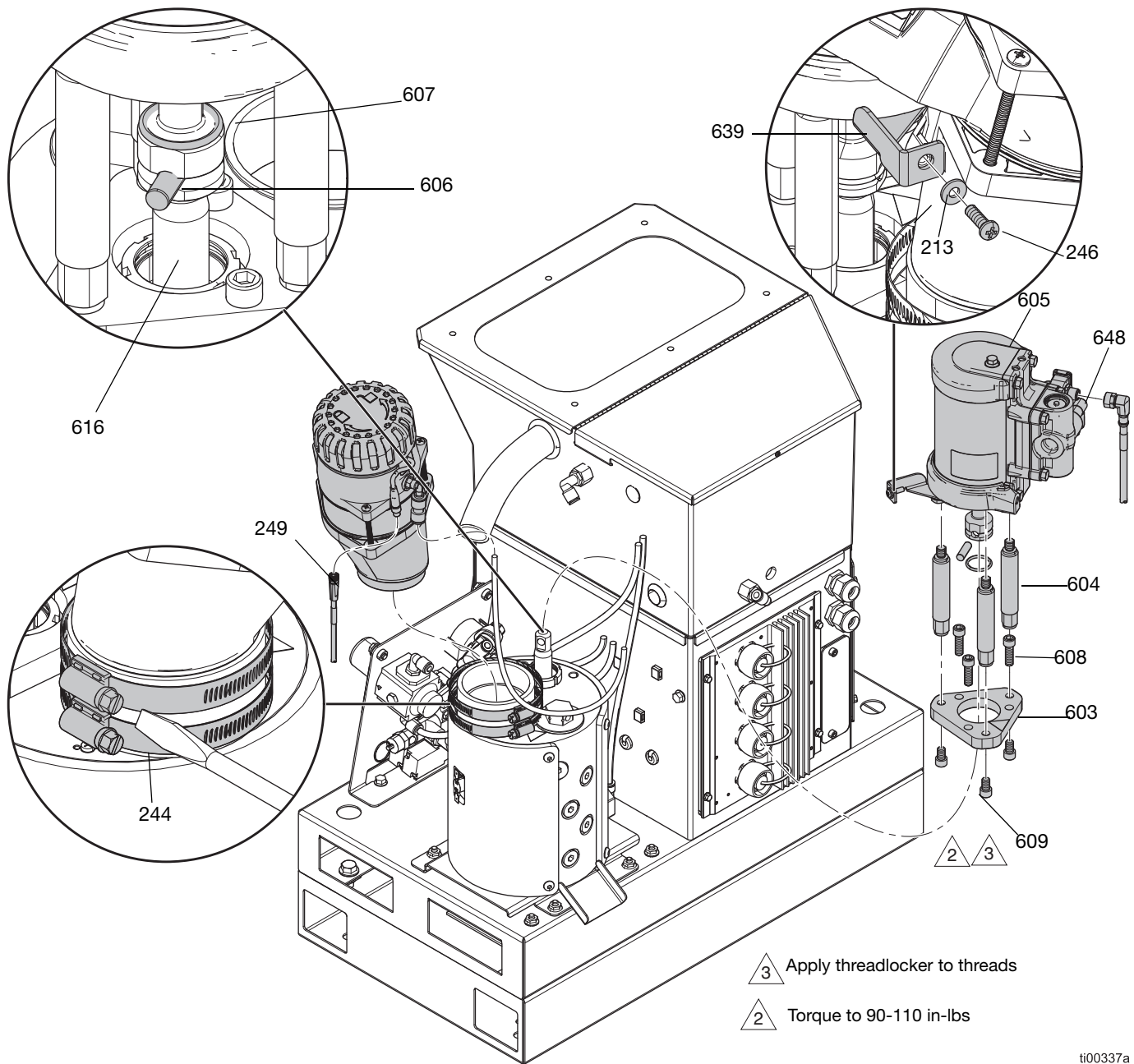
#### Assemble the Air Motor

1. Install the motor retaining o-ring (607) onto the motor.
2. Install cycle switch (234) and the funnel motor support bracket (639) on the air motor.
3. Install tie rods (604) into the motor. Torque to Torque to 24-30 ft-lb.
4. Apply threadlocker to the tie rod fastener (609) threads.
5. Secure the tie rods (604) to the mounting plate (603) with the tie rod fasteners (609). Torque the fasteners (609) to 90-110 in-lbs.

#### Install the Air Motor onto the Melter

See FIG. 79 for reference.

1. Place the assembled air motor onto the melter.
2. Place the pump connecting pin (606) through the motor and pump shaft (616). The motor shaft may need to be manually raised, lowered, or rotated to the correct position.
3. Slide retaining o-ring (607) into place over the connecting pin (606).
4. Install fasteners (608) to secure the air motor onto the melter.
5. Replace the funnel assembly.
6. Install the equipment covers. See FIG. 68 on page page 80.



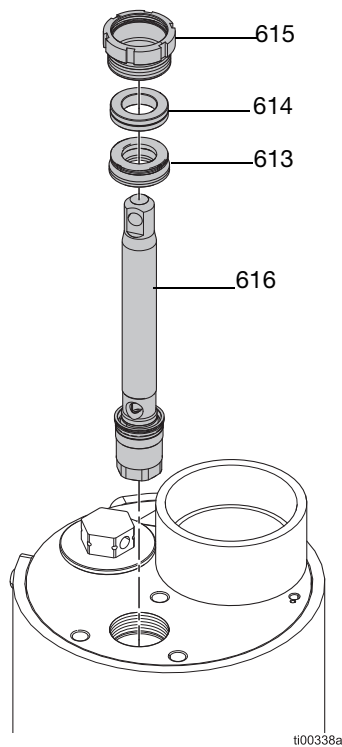
ti00337a

FIG. 79: Funnel and Air Motor Removal

## Remove Pump Components from the Melter

1. **Prepare for Melter Pump Repairs.** Follow the steps on page 86.
2. **Remove the Piston Rod, Throat Seal, and Throat Bearing.** Follow the steps on page 92.
3. **Remove Pump Inlet Housing.** Follow the steps on page 93.
4. **Remove the Pump Cylinder.** Follow the steps on page 93.

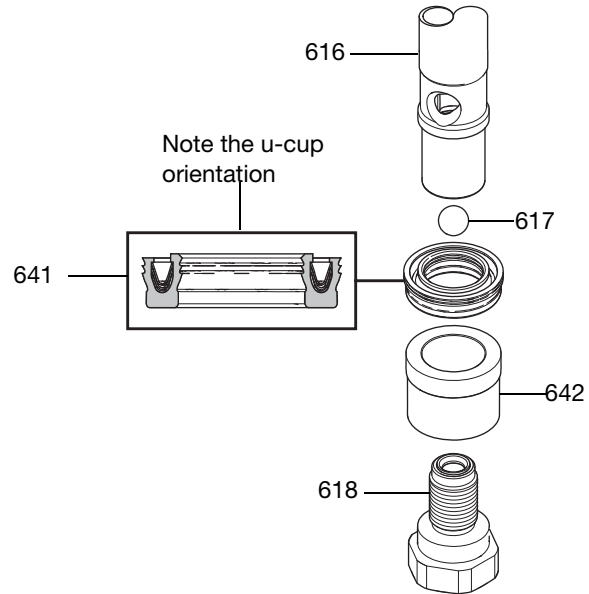
## Remove the Piston Rod, Throat Seal, and Throat Bearing



**FIG. 80 Piston Rod Assembly Installation**

1. **Prepare for Melter Pump Repairs.** Follow the steps on page 86.
2. Use a screwdriver and rubber mallet to loosen the retaining nut (615).
3. Insert a hex key through piston rod hole (616) to lift the piston rod assembly (616), throat seal (613), and throat bearing (614) out of the pump.

## Piston Foot Service Procedure

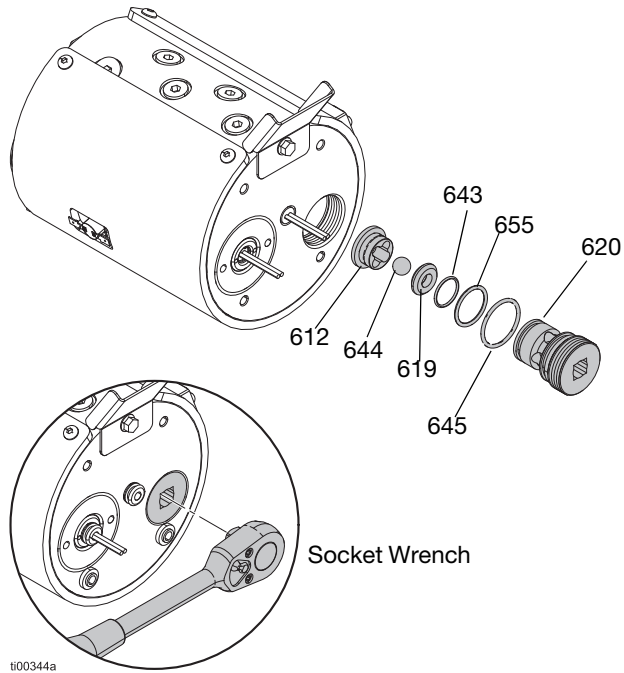


**FIG. 81: Piston Foot Assembly**

1. **Remove the Piston Rod, Throat Seal, and Throat Bearing.** Follow the steps on page 92.
2. Loosen the piston valve (618) from the piston rod (616).
3. Separate the piston bearing (642), piston u-cup seal (641), and the piston ball (617).
4. Reassemble the piston assembly. Torque the piston valve (618) to 47–53 ft-lbs.



## Remove Pump Inlet Housing

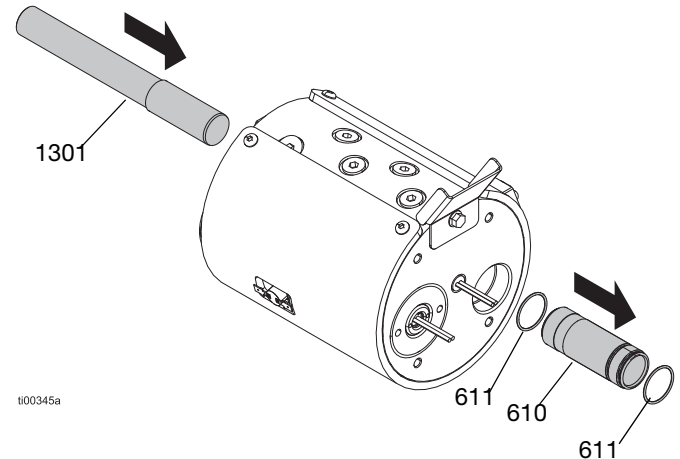


**Fig. 82: Inlet Housing Assembly**

1. **Remove the Melter Plate.** Follow the steps on page 89
2. Use a 1/2 in. square-drive ratchet (without socket) to remove the pump inlet housing (620) from the melter.
3. Remove the inlet seat (619) and o-rings (643, 645, 655) and inlet check ball (644).
4. Discard seals and replace components as needed. See **Install Pump Inlet Housing**, page 94.

## Remove the Pump Cylinder

Use **Cylinder Repair Tools Kit 24R227**, page 118 to remove the cylinder from the melter.

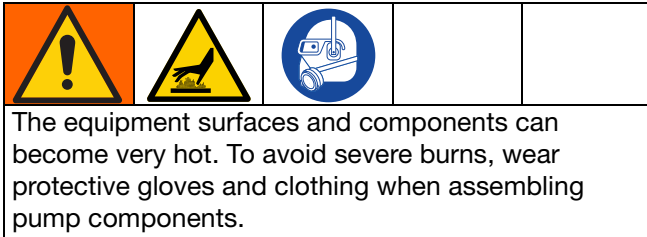


**Fig. 83: Cylinder Assembly Removal**

1. **Prepare for Melter Pump Repairs.** Follow the steps on page 86.
2. **Remove the Piston Rod, Throat Seal, and Throat Bearing** from the top of the melter. Follow the steps on page 92.
3. **Remove Pump Inlet Housing** from the bottom of the melter. Follow the steps on page 93.
4. Insert the cylinder removal tool (1301) into the pump throat.
5. Gently tap the cylinder removal tool with a rubber mallet to remove cylinder (610) through the bottom of the melter.
6. Discard o-rings (611).

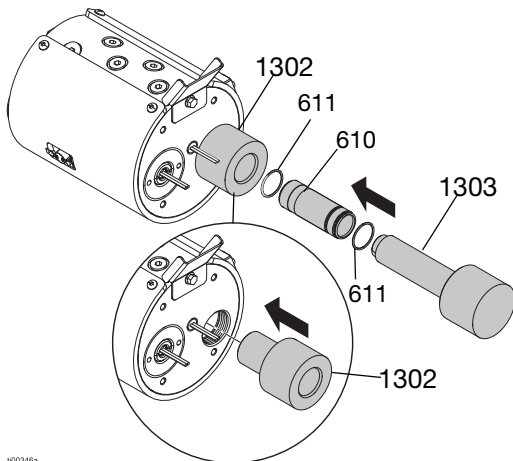
**NOTE:** An o-ring (611) may fall off the cylinder during removal and remain in the melter. Ensure there are no o-rings in the melter before reassembling.

## Assemble Pump Components



### Install the Pump Cylinder

Install the pump cylinder assembly in the bottom of the melter. Use the **Cylinder Repair Tools Kit 24R227**, page 118 to install the cylinder seals.



**FIG. 84: Cylinder Assembly Installation**

1. Install new o-rings (611) onto cylinder and apply grease.
2. Place the cylinder female installation tool (1302) into the pump inlet bore to protect the seals.
3. Use the male installation tool (1303) to gently press the cylinder into the melter.

### Install Pump Inlet Housing

See FIG. 82 for reference.

1. Install o-rings (645) and (655) onto the inlet housing.
2. Install the o-ring (643), seat (619), and ball (644) into the housing.
3. Apply grease to all the seals before reassembling.
4. Thread the new pump inlet housing (620) and check (612) in the bottom of the melter.

**NOTE:** Hold the check seat in place to keep the assembly together during installation.



**FIG. 85: Check Seat Installation Tip**

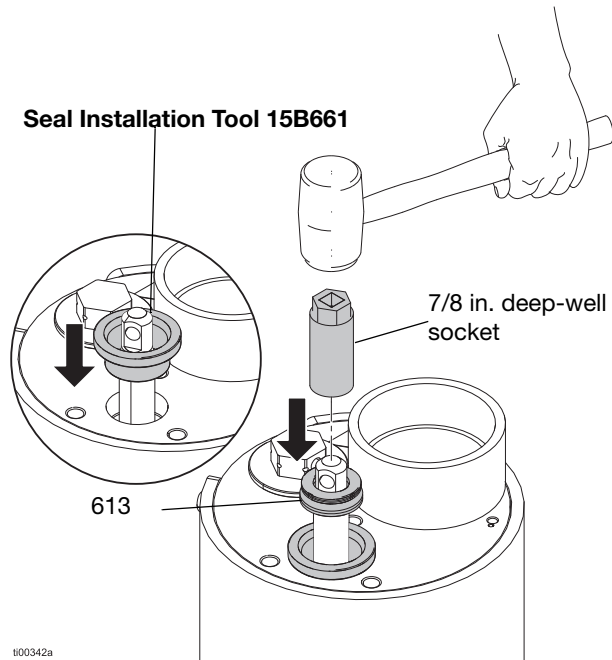
5. Tighten the inlet housing with a Use a 1/2 in. square-drive ratchet (without socket).

### Install the Melter Base

1. Apply a small amount of grease to insulators (634) and place into holes in the melter base plate. The grease will hold them in place during assembly. Take care not to grease the heater leads.
2. Line up the melter base plate and tighten screws (636).
3. Reassemble the melter onto the system. See **Install the Melter to the System**, page 89.

## Install the Piston Rod, Throat Seal, and Throat Bearing

Use seal installation tool to protect the seals from the threads. See **Seal Installation Tool 15B661**, page 118.

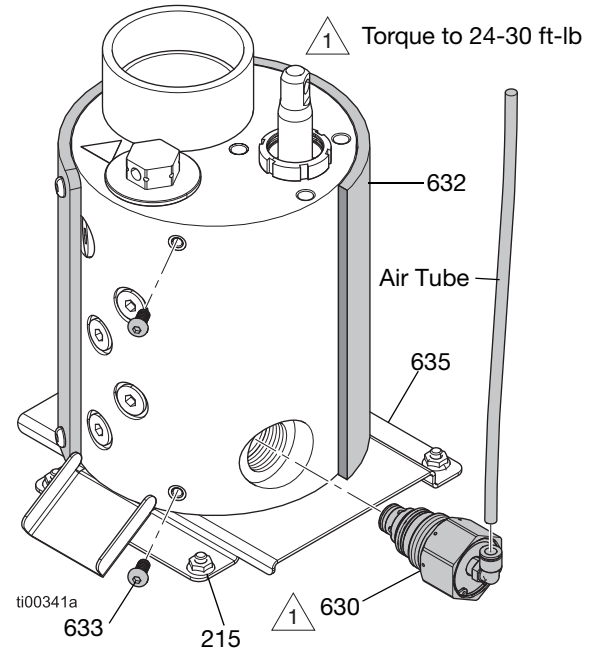


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**FIG. 86:**

1. Push the piston rod assembly (616) into the top of the pump.
2. Place the **Seal Installation Tool 15B661**, page 118 into the melter.
3. Grease throat seal (613) and slide over the piston rod with the lips facing down.
4. Place a 7/8 in. deep-well socket (3/8 in. drive) over the piston rod and use a rubber mallet to gently tap throat seal (613) into place.
5. Slide throat bearing (614) over piston rod. Use a socket and mallet to press the throat bearing into place.
6. Remove the seal installation tool.
7. Install retaining nut (615).
8. Install the air motor onto the pump. See **Replace the Air Motor** on page 90.

## Replace the Fluid Pressure Relief Valve



**FIG. 87: Pressure Relief Valve Location**



### Remove the Fluid Pressure Relief Valve








1. **Prepare for Melter Pump Repairs.** Follow the steps on page 86.
2. **Remove Equipment Covers.** Follow the steps on page 80.
3. Remove the nuts from the melter bracket plate (215) and rotate the melter to access the pressure relief valve (630).
4. Disconnect the air tube from the pressure relief valve (630).
5. Remove the melter jacket fasteners (633) closest to the relief valve.
6. Roll the melter jacket (632) back past the relief valve (630). This will prevent fluid from soaking it during repair.
7. Place a rag or cloth between the melter and melter bracket plate beneath the relief valve to catch any fluid.
8. Use a wrench to remove the pressure relief valve (630) from the melter.

Install the Fluid Pressure Relief Valve

- 1. Install the pressure relief valve (630). Torque to 24-30 ft-lb.
- 2. Clean drained fluid from the side of the melter.
- 3. Roll the melter jacket (632) back around the melter and secure with fasteners (633).
- 4. Reconnect the air tube to the pressure relief valve (630).
- 5. Rotate the melter back into place on the mounting studs. Secure the melter bracket plate (635) with fasteners (215).
- 6. Install the equipment covers. See FIG. 68 on page page 80.

Heater Repairs

				
<p><b>DANGER</b> <b>SEVERE ELECTRIC SHOCK HAZARD</b></p> <p>This equipment can be powered by more than 240V. Contact with this voltage will cause death or serious injury.</p> <ul style="list-style-type: none"><li>• Turn off and disconnect all power before disconnecting any cables and before accessing the electrical enclosure or servicing electrical components.</li></ul>				

				
				
<p>This equipment stays pressurized until pressure is manually relieved. To help prevent serious injury from pressurized fluid, such as skin injection, splashing fluid and moving parts, follow the <b>Pressure Relief Procedure</b>, page 26 before servicing the equipment.</p> <p>The equipment surfaces and components can become very hot. To avoid severe burns, wear protective gloves and clothing that will insulate your hands and body from the hot surfaces and adhesive material.</p> <p>Moving parts can pinch, cut, or amputate body parts. To help prevent serious injury from moving parts, do not operate equipment with the protective covers removed.</p>				

Check Melter and Pump Heater Resistance

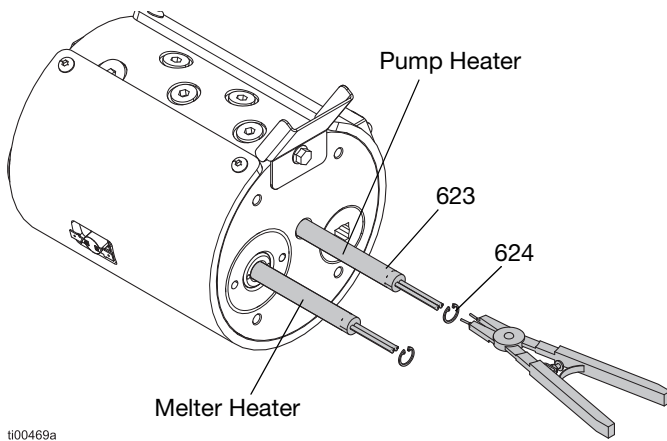
- 1. **Access the Electrical Enclosure.** Follow the steps on page 81.
- 2. Remove the heater wires from the AMZ.
- 3. Verify that the resistance of each heater is between 52–64 ohms.

**NOTE:** If the heater connector is plugged in, the heaters should have a parallel resistance value of 26–32 ohms.

## Disconnect the Heater Rods

1. **Prepare for Melter Pump Repairs**, page 86.
2. **Access the Electrical Enclosure.** Follow the steps on page 81.
3. Remove the heater rod wires from AMZ terminal J24 pins 1-2 or 5-6.
4. Allow the melter to cool to a safe, warm temperature just below the adhesive melting point.

## Replace a Heater Rod



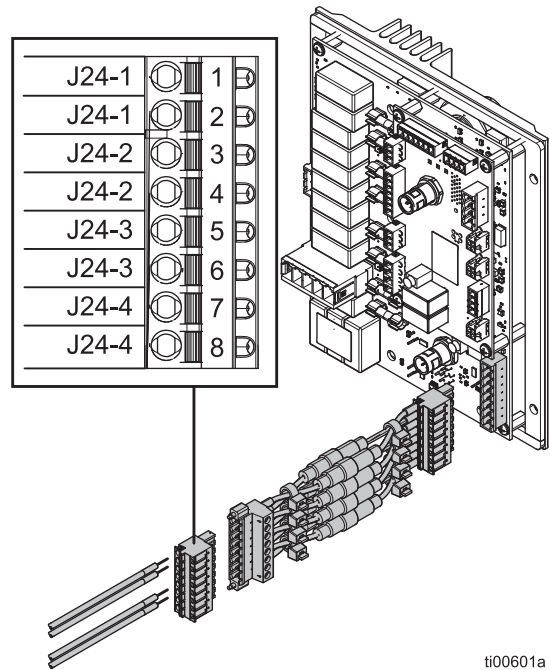
**FIG. 88: Heater Rod Location**

1. **Disconnect the Heater Rods.** Follow the steps on page 97.
2. **Disconnect the Melter Pump Assembly from the System.** Follow the steps on page 87.
3. **Remove the Melter Plate.** Follow the steps on page 89. Retain the insulators (634) for reassembly.
4. Remove the internal retaining ring (624) and slide the heater rod (623) out of the housing bore.
5. Insert new heater (623) into the housing bore.
6. Replace internal retaining rings (624).

## Connect the Heaters Rod Wires to the AMZ

1. **Access the Electrical Enclosure.** Follow the steps on page 81.
2. Thread the heater rod wires through the melter base plate (635) grommets.
3. Pull the heater wires through the grommet into the electrical enclosure.

4. Connect the heater wires to fuse holder harness holder (221) on the AMZ circuit board.

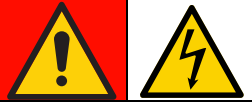


**FIG. 89: Heater Rod Wiring (J24)**

Item	Heater Rod Wire Label	AMZ Plug Connector (222)
Pump Heater Rod	J24-1 (2 wires)	J24-1 (2 terminals)
Melter Heater Rod	J24-3 (2 wires)	J24-3 (2 terminals)

5. **Install the ADM Screen.** Follow the steps on page 81.

Electrical Component Repairs



**DANGER**  
**SEVERE ELECTRIC SHOCK HAZARD**  
This equipment can be powered by more than 240V. Contact with this voltage will cause death or serious injury.

- Turn off and disconnect all power before servicing electrical components.

Replace Auto Multi-Zone (AMZ) Fuse

**NOTICE**

To prevent system damage, always use fast acting fuses. Fast acting fuses are required for short-circuit protection.

Fuse	Part	Identification
F1A-F4B	129346	250VAC, 12.5A, fast acting
FHA-FHB**	-----	250VAC, 25A

\*\*Fuses FHA and FHB are not replaceable. Replace the AMZ circuit board if the FHA or FHB fuses are blown.

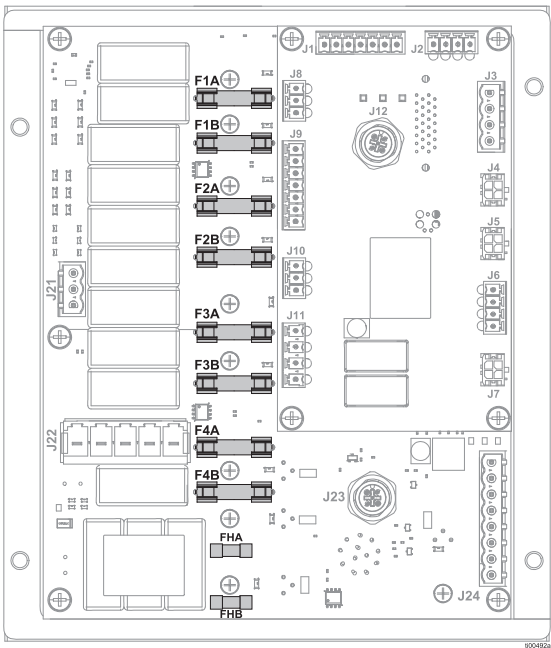


FIG. 90: AMZ Fuse Connections

1. **Access the Electrical Enclosure.** Follow the steps on page 81.

2. Use a non-conductive fuse puller tool to remove the blown fuse.

**NOTICE**

Using an improper tool, such as a screwdriver or pliers may break fuse or cause damage to board. Use a fuse puller.

3. Install a new fuse into the empty fuse holder.
4. **Install the ADM Screen.** Follow the steps on page 81.

Replace Auto Multi-Zone (AMZ) Circuit Board

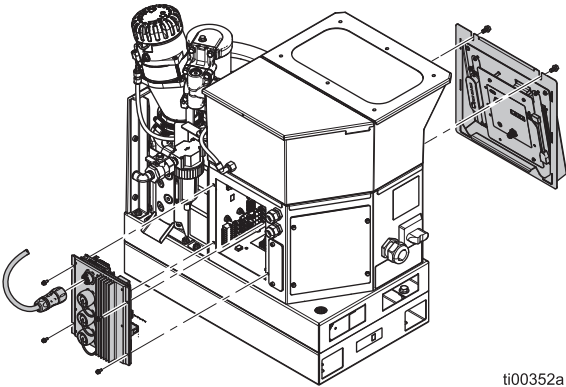
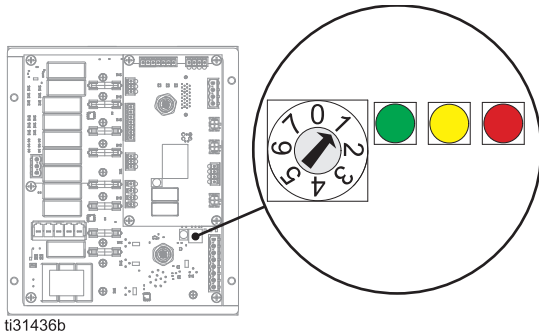


FIG. 91: AMZ Circuit Board Removal

1. **Access the Electrical Enclosure.** Follow the steps on page 81. Disconnect cables from the circuit board.
2. Disconnect heated hose electrical connections.
3. Loosen the AMZ mounting screws and remove the AMZ from the enclosure.
4. Mount the AMZ to the back of the electrical enclosure with mounting screws.

5. Set the AMZ dial position to 1.



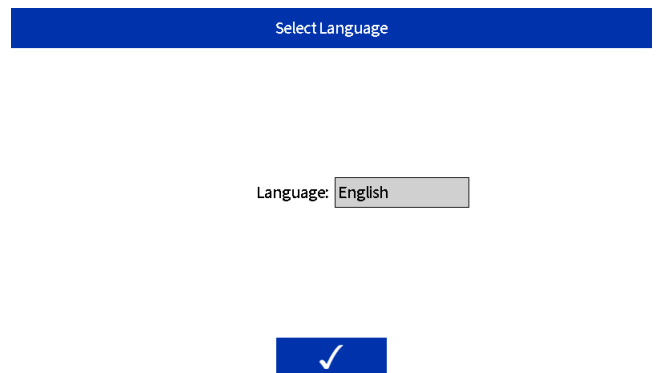
**FIG. 92: AMZ Dial Position**

6. Reconnect the cables on the inside of the electrical enclosure to the AMZ. See **Electrical Schematics**, page 103 for connections.
7. Reconnect the heated hose electrical connections to the back AMZ.
8. **Install the ADM Screen.** Follow the steps on page 81

## Replace Advanced Display Module (ADM)

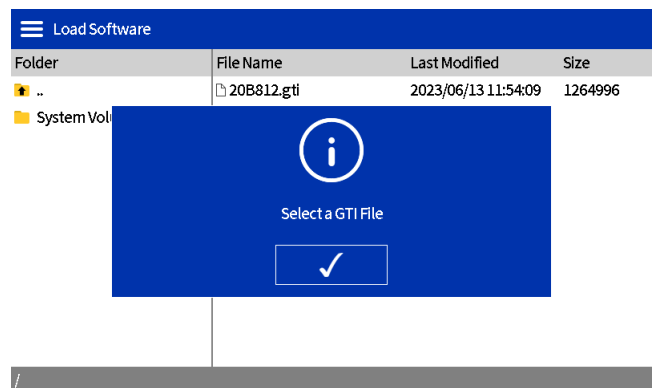
1. Turn the main power switch (204) OFF.
2. Remove the retaining bolts above the ADM.
3. Lift and remove the ADM and panel.
4. Disconnect the USB right angle cable from the left side of ADM.
5. On 2 channel units, disconnect the bulkhead USB cable from the right angle USB cable (67). On 4 channel units, disconnect the bulkhead USB cable from the USB hub (73).
6. Disconnect the M12 cable from the rear of the ADM.
7. Remove the four retaining nuts holding the ADM to the panel.
8. Replace the ADM and reinstall the four retaining nuts.
9. On 4 channel units, remove the USB hub (73) with the USB key and the right angle USB cable (67) from the old ADM, and secure it to the back of the new ADM.

10. Place the new ADM in front of the unit and connect the M12 cable. Connect the right angle USB to the ADM and USB bulkhead cable. For 4 channel units, the USB hub should not be connected to anything at this point as it cannot be used during programming.
11. Reinstall the removable panel and retaining bolts.
12. Turn the main power switch (204) ON.
13. Plug in the USB drive containing the HM10 software into the front panel USB connection.
14. Select your preferred language from the drop down, and press the check mark to confirm.



**FIG. 93**

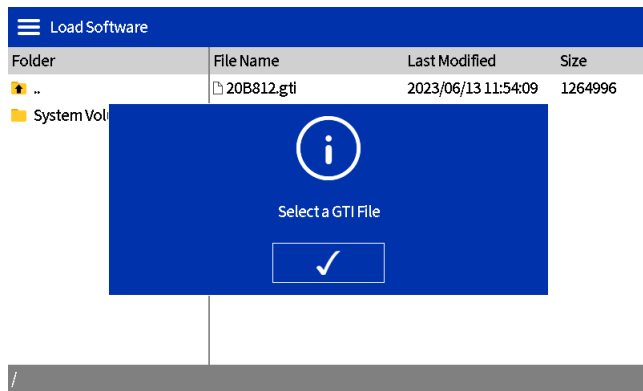
15. Press the check mark to confirm you will select a .gti file.



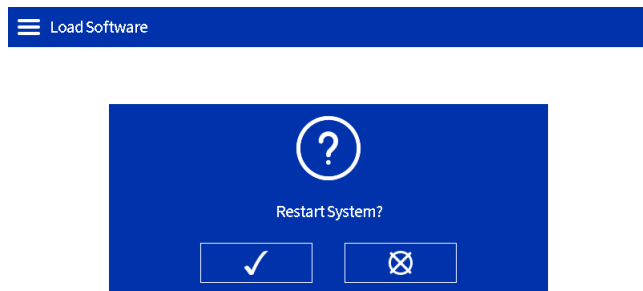
**FIG. 94**

16. Select the 20B812.gti file, and press the check mark to confirm.



**FIG. 95**

17. After waiting for the software to load, press the check mark to restart the system.

**FIG. 96**

18. Once the software is installed, press the check mark on the confirmation screen to continue.

**FIG. 97**

19. Remove the USB stick.
20. If using a 4 channel unit:

- Remove the ADM and panel as described above.
- Disconnect the front panel USB bulkhead from the right angle cable.
- Plug the front panel USB bulkhead into the USB hub.
- Plug the USB hub into the right angle cable.
- Install the ADM onto the unit as described above.

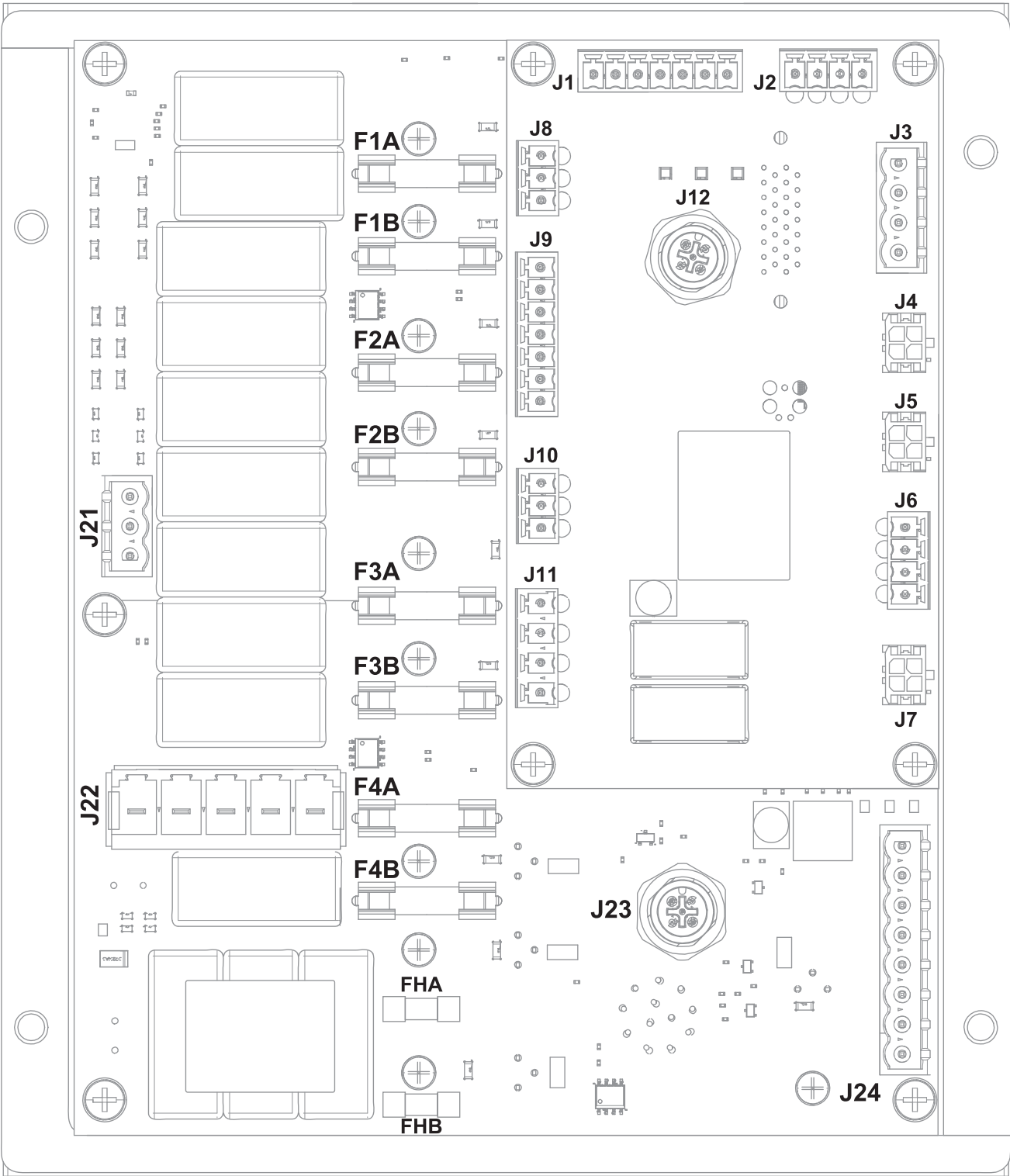
## Replace the Power Supply

Use **Black Disconnect Handle Kit 17S164**, page 120.

- Access the Electrical Enclosure.** Follow the steps on page 81.
- Disconnect power supply cables from the AMZ (headers J3 and J21).
- Loosen the power supply fasteners (212) and washers (213) to remove the power supply (211) from electrical enclosure.
- Disconnect power supply cables from J3 and J21 plugs on the AMZ circuit board.
- Make connections between new power supply cables and J3 and J21 plugs. See **Electrical Schematics**, page 103 for connections.
- Mount the new power supply to the top of the electrical enclosure with fasteners (212) and washers (213).
- Connect power supply cables AMZ (headers J3 and J21).
- Install the ADM Screen.** Follow the steps on page 81.



# AMZ Wiring Connections



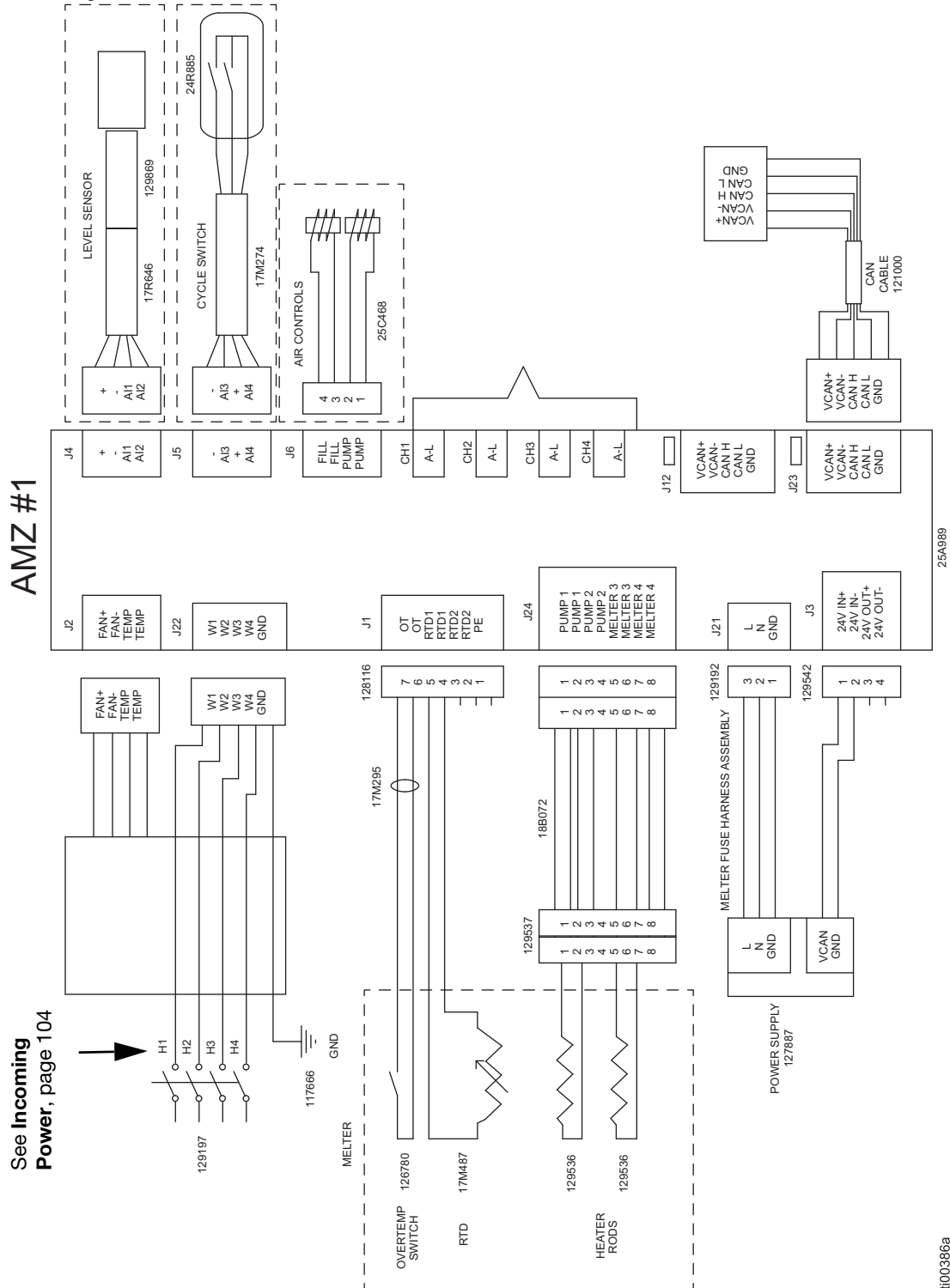
AMZ Ref.	Component Connection	Instructional Information	Wiring Details?
J1	Melter Sensors: Over-Temperature Switch (233) and Temperature Sensor RTD (252)	<b>Melter Sensor Repairs</b> , page 83	Fig. 73 on page 83
J2	Transformer Fan	<b>Transformer Installation</b> , page 130	Fig. 99 on page 104
J4	Level Sensor (240)	<b>Install the Level Sensor</b> , page 82	---
J5	Cycle Switch (234)	<b>Replace Cycle Switch Sensor</b> , page 82	---
J6	Air Control Solenoids (503): Fill Solenoid and Pump Solenoid	<b>Replace an Air Control Solenoid</b> , page 85	Fig. 76 on page 85
J8	PLC Inputs: Dry Contact	<b>Dry Contact Inputs Wiring (Open/Closed Circuit)</b> , page 23	Fig. 14 on page 23
J9	PLC Inputs: Dry Contacts		
	PLC Inputs: Digital	<b>Digital Inputs Wiring (0–30 VDC)</b> , page 22	Fig. 13 on page 22
J11	PLC Outputs	<b>Wire PLC Outputs</b> , page 24	Fig. 15 on page 24
J12	ADM CAN Cable Connection	<b>Install the ADM Screen</b> , page 81	---
J21	Grounding Connections	<b>Connect Electrical Cord</b> , page 18	Fig. 8 on page 18
J22	Incoming Power: 240V Models	<b>Incoming Power</b> , page 104	Fig. 98 on page 104
	Incoming Power: 480V Models		Fig. 99 on page 104
J23	CGM CAN Cable Connection	See manual <b>312864 Communications Gateway Module (CGM)</b>	---
J24	Heater Rod Wires (623)	<b>Connect the Heaters Rod Wires to the AMZ</b> , page 97	FIG. 89 on page 97
F1A, F1B, F2A, F2B, F3A, F3B, F4A, F4B,	AMZ Fuses: 250VAC, 12.5A, fast acting	<b>Replace Auto Multi-Zone (AMZ) Fuse</b> , page 98	FIG. 90 on page 98
FHA and FHB	AMZ Fuses: 250VAC, 25A	Fuses are not replaceable. <b>Replace Auto Multi-Zone (AMZ) Circuit Board</b> , page 98	---

? Check all internal wiring against the **Electrical Schematics** starting on page 103.

# Electrical Schematics

## Common Schematic

Applicable to All Systems



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# Incoming Power

## Incoming Power: 240V Models

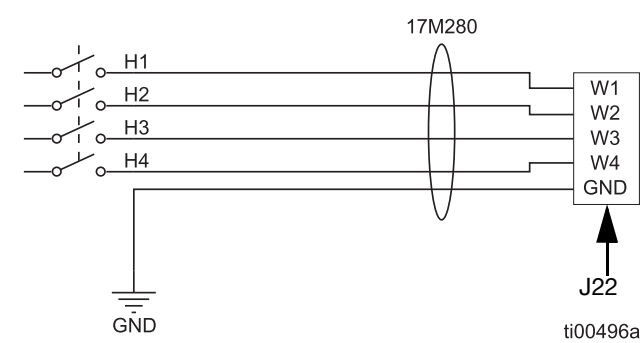


FIG. 98: 240V Incoming Power (J22)

## Incoming Power: 480V Models

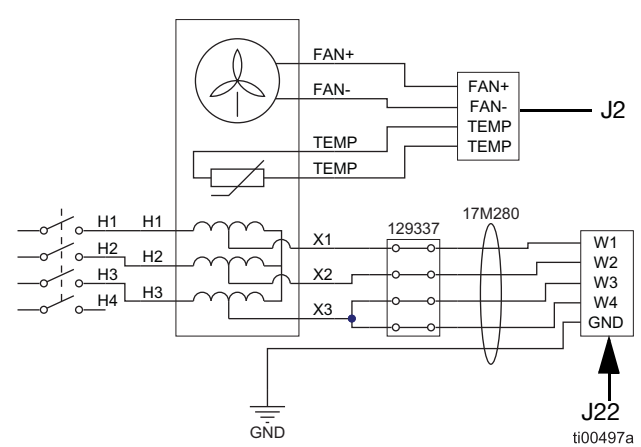


FIG. 99: 480V Incoming Power and Transformer Fan Connections (J2 and J22)

# Typical Hose and Applicator Wiring

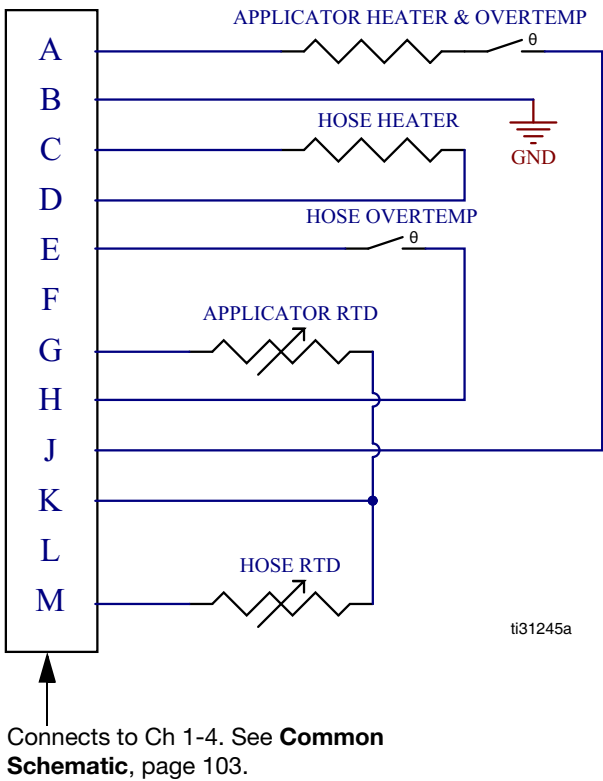
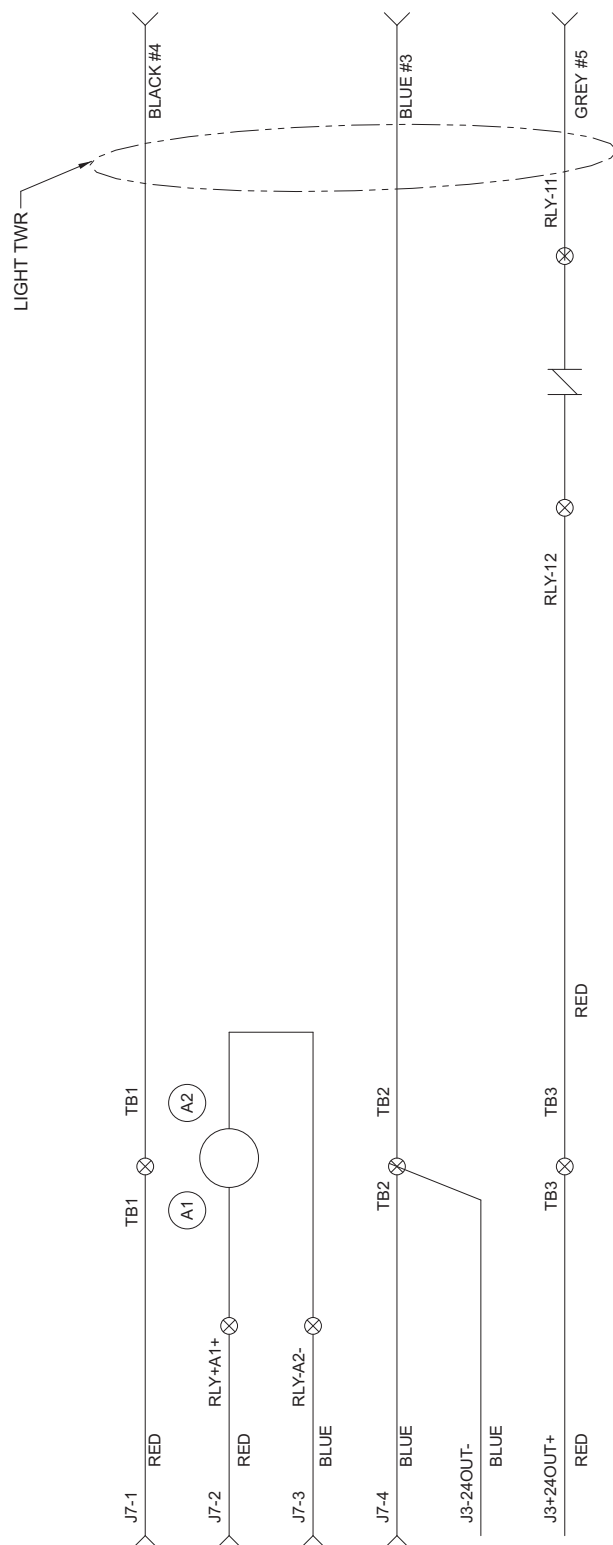


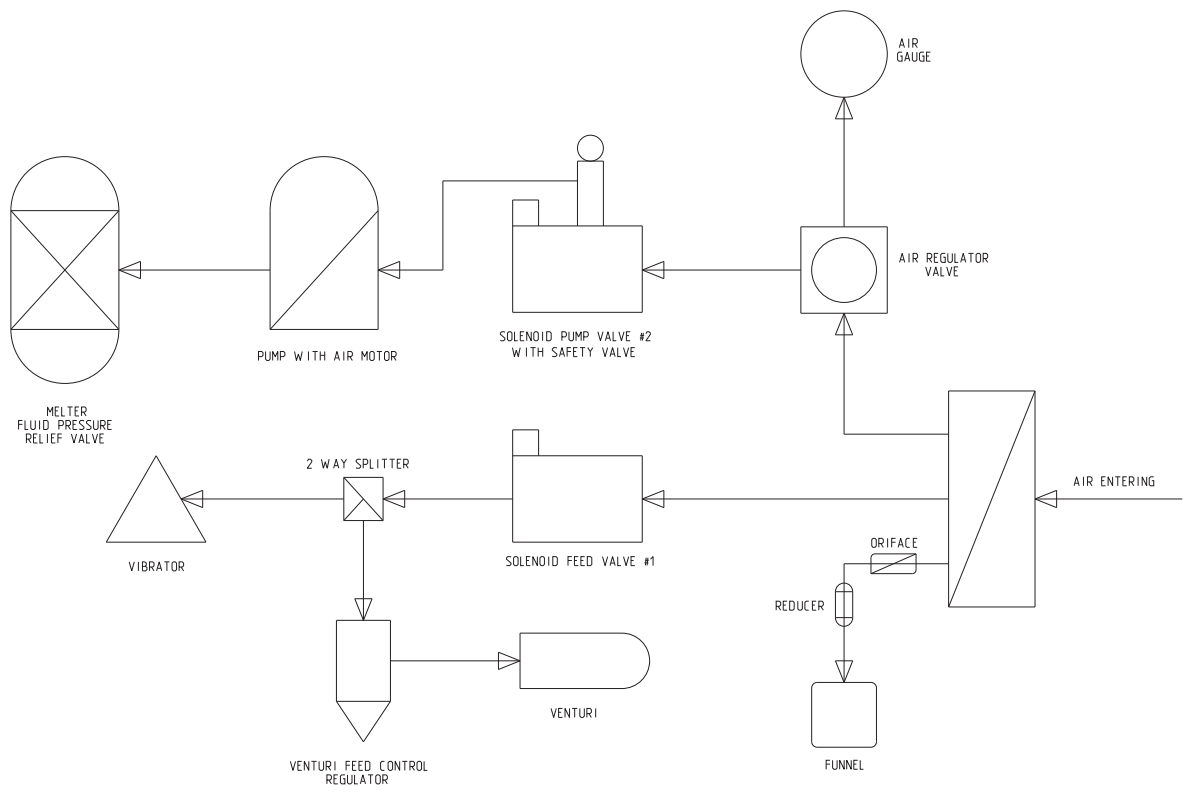
FIG. 100: Channel Wiring Connections (23)

# Light Tower Wiring



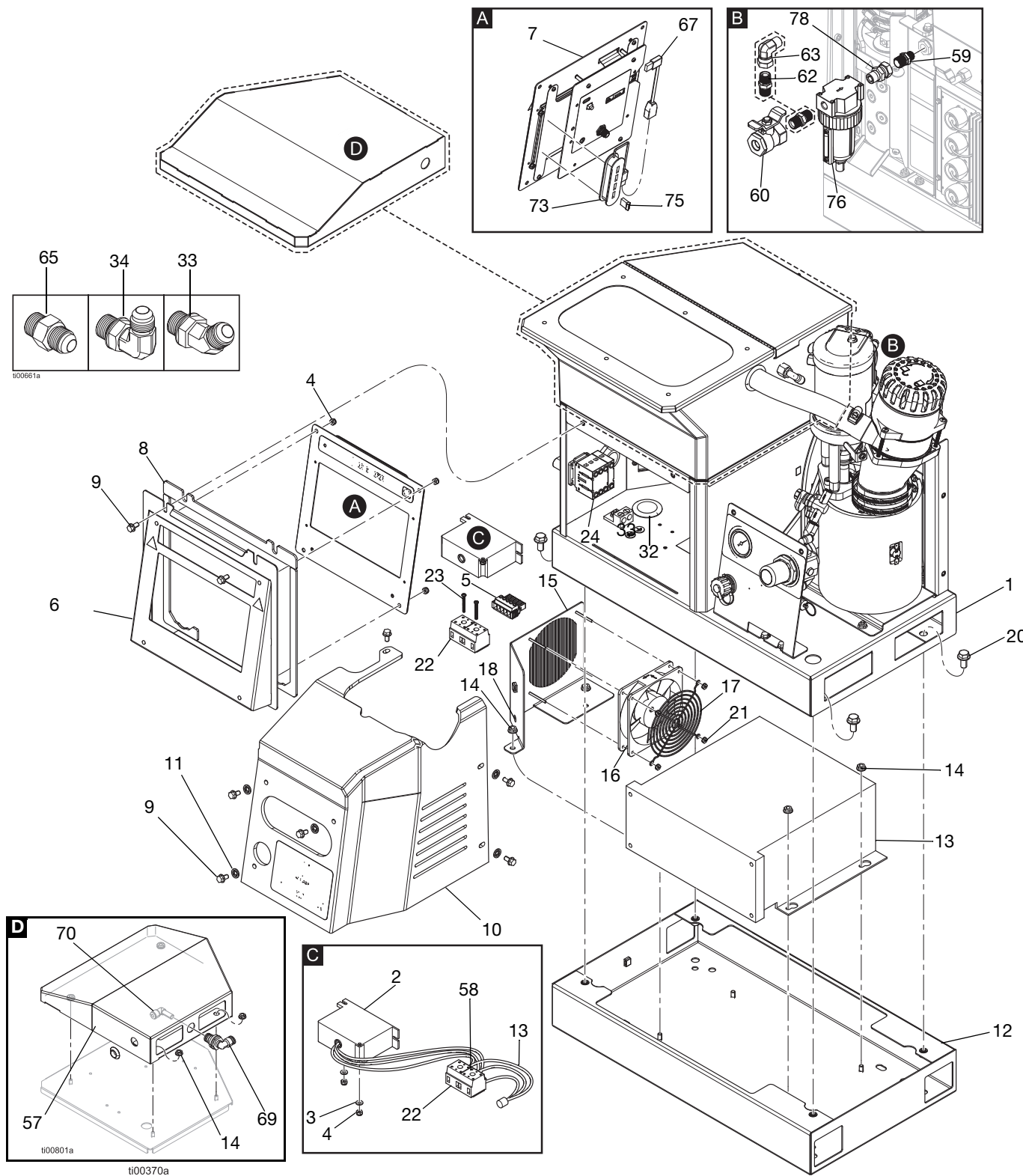
**FIG. 101: Light Tower Kit 20B729 Wiring**

Pneumatic Schematic



# Parts

## System Structure



## System Structure

Ref.	Part	Description	Qty.
1	-----	System Base	1
2?	128014	Transient Voltage Filter	1
3‡ ?	102360	Washer	‡
		240V <b>Remote Vacuum Feed Models</b>	0
		480V <b>Remote Vacuum Feed Models</b>	2
		240V <b>On-Board Hopper Models</b>	6
		480V <b>On-Board Hopper Models</b>	8
4‡ ?	109466	Lock Nut, Hex	‡
		240V <b>Remote Vacuum Feed Models</b>	4
		480V <b>Remote Vacuum Feed Models</b>	6
		240V <b>On-Board Hopper Models</b>	10
		480V <b>On-Board Hopper Models</b>	12
5	17M280	Disconnect Harness	1
6	-----	ADM Door	1
7	20B929	ADM User Interface (includes USB with software)	1
8	-----	Gasket Door Foam	1
9	113161	Hex Flange Head Screw	8
10	20B930	Front Melter Cover	1
11	16V153	Retaining Washer	6
12?	-----	Transformer Base	1
13?	-----	480V Transformer	1
14‡?	115942	Hex Flange Head Nut	‡
		240V <b>On-Board Hopper Models</b>	4
		480V <b>On-Board Hopper Models</b>	9
		240V <b>Remote Vacuum Feed Models</b>	2
		480V <b>Remote Vacuum Feed Models</b>	7
15?	-----	Transformer Fan Plate	1
16?	-----	Fan, 24 DC	1
17?	-----	Fan Guard	1
18?	-----	Grommet, 1/4 ID	1
19?	-----	Label (not shown)	1

Ref.	Part	Description	Qty.
20?	112395	Flange Head Cap Screw	4
21?	127278	Keps Nut	4
22?	129337	Terminal Block	1
23?	867551	Pan Head Screw, #6-32 x 1.25	2
24?	17P381	Safety Label	1
27	-----	Screw Driver (not shown)	1
28	114271	Retaining Strap (not shown)	10
29	-----	Cable Tie (7.5 in.) (not shown)	2
31	129346	Fuse 250V, 12.5 A	1
32?	-----	Grommet	1
35	-----	HM10 Label	1
56	-----	Software (not shown)	1
57?	-----	Cover, Remote Feed	1
58?	-----	Ferrule, Wire, 10 awg	2
61	C12509	Tube 1/4 OD (not shown)	10 ft
67	-----	Connector, USB, Right Angle	1
69?	-----	Tube Bulkhead, Elbow 3/8 x 3/8 (remote only)	1
70?	-----	Tube Adapter, Elbow 1/4 x 3/8 (remote only)	1
73?	-----	Hub, USB, 4 Port (4 channel systems only)	1
75?	-----	Flash Drive, 4 Channel Upgrade ((4 channel systems only))	1

? Included with 480V models only. See **Models**, page 3.

? Included with **Remote Vacuum Feed Models** only.

‡ Quantity varies by model.

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

? Included in a repair kit. See **Repair Kits**, page 117 for details.

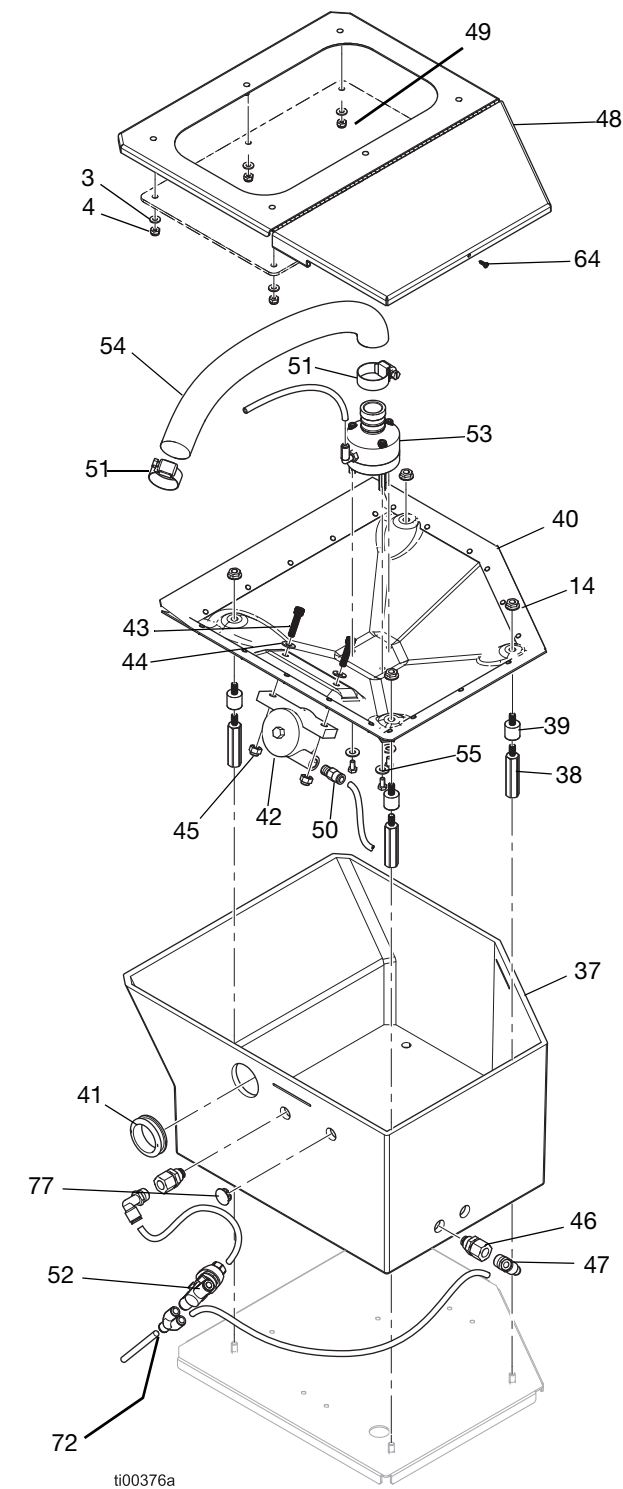


## Shipped Loose Parts

Ref.	Part	Description	Qty.
30	129189	Fuse Puller Tool (not shown)	1
33?	127129	45° Swivel Elbow Fitting, MxF JIC-6	‡
		2 Channel Systems	2
		4 Channel Systems	4
34?	122719	90° Swivel Elbow Fitting, JIC 06, FM, MS	‡
		2 Channel Systems	2
		4 Channel Systems	4
59	157350	Adapter, 3/8 to 1/4 npt	1
60?	110224	Valve, Vented 2-Way	1
62	156849	Nipple Pipe	1
63?	15Y397	Swivel Fitting, 90°	1
65?	-	Adapter Fitting, JIC 06 X SAE 06, mm, cs	‡
		2 Channel Systems	2
		4 Channel Systems	4
76?	106148	Air Filter, 3/8 npt	1
78	155665	Adapter, 3/8 NPT to 3/8 NPSM	1

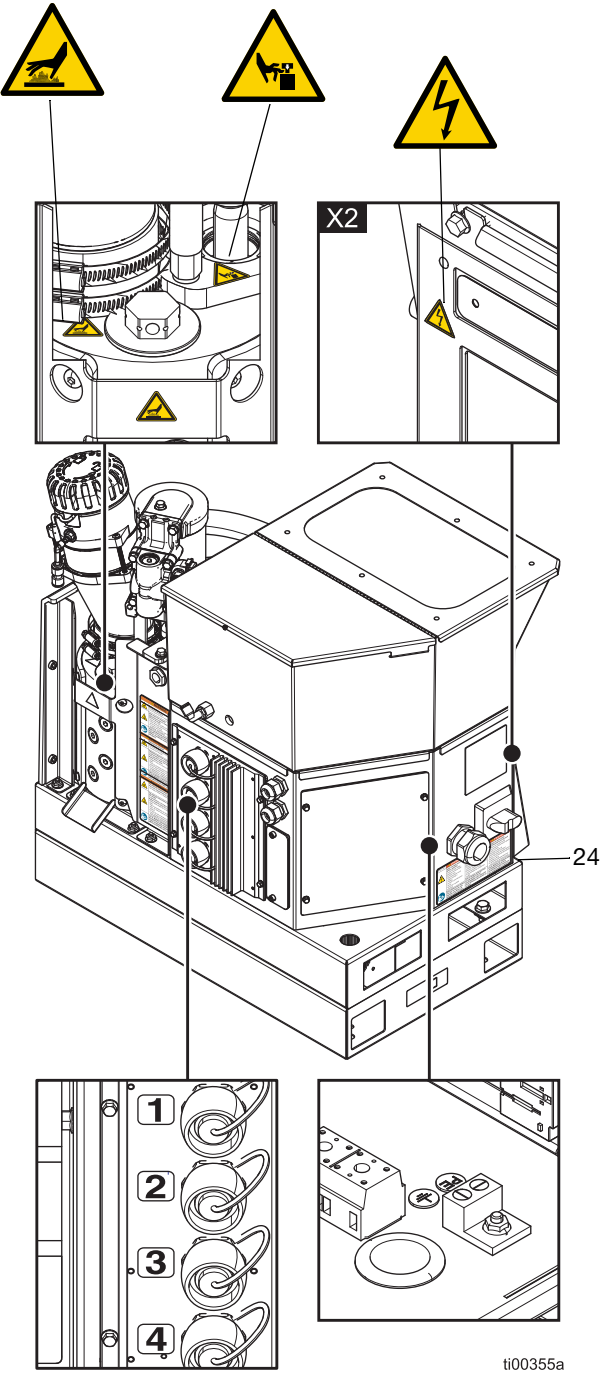
? Included in a repair kit. See **Repair Kits**, page 117 for details.

Hopper Assembly (On-Board Hopper Models only)



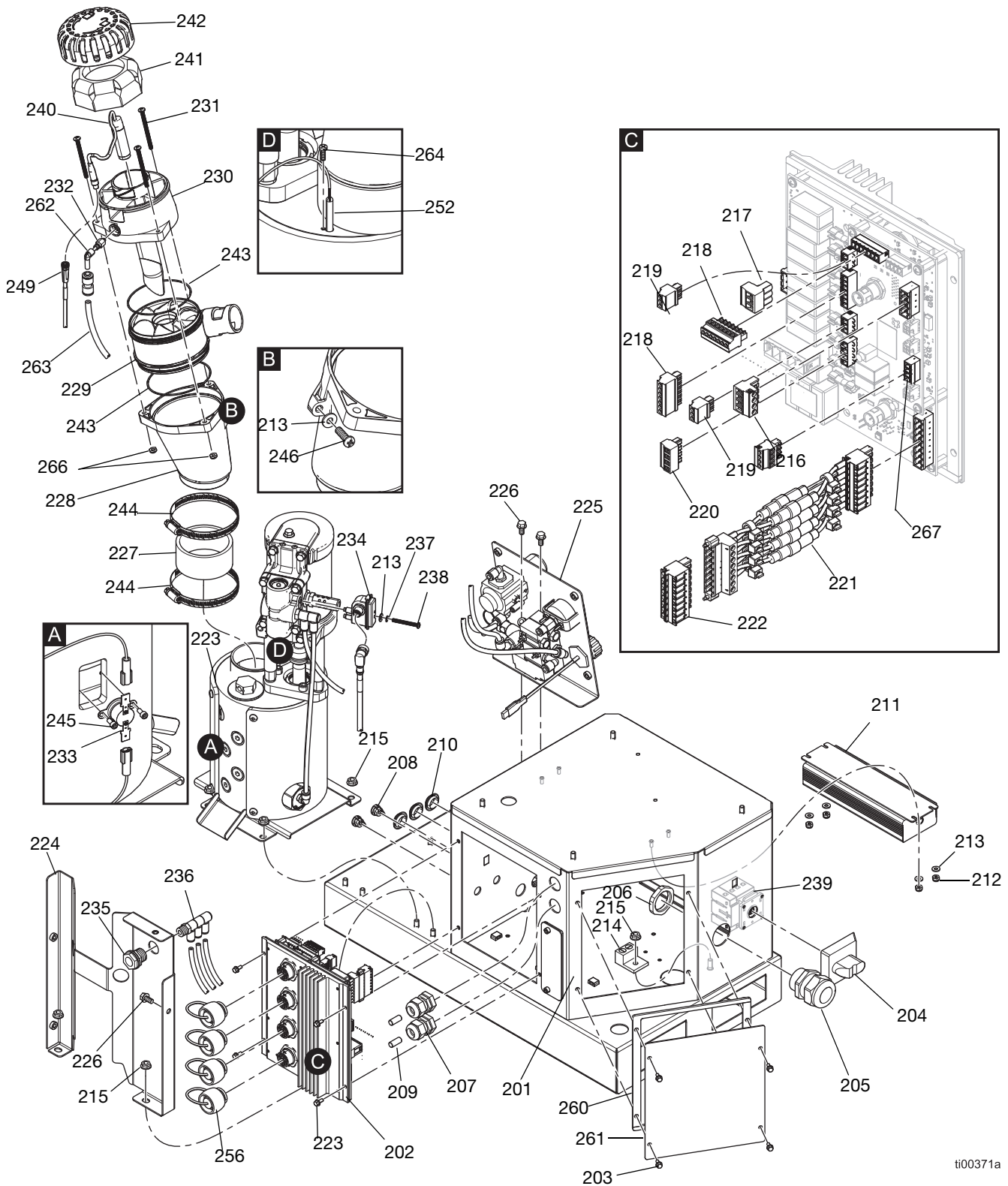
Ref.	Part	Description	Qty.
37	20B923	Hopper	1
38?	-----	Threaded Hex Stud	4
39?	-----	Threaded Damper Stud	4
40	20B913	Skirt Bowl Assembly (Includes 14 qty 4)	1
41	-----	Grommet, 1.313 ID	1
42	25V441	Pneumatic Turbine Vibrator	1
43	-----	Socket Head Screw, 1/4-20 x 1 in.	2
44	100086	Plain Washer 3/16 in.	5
45	102040	Hex Lock Nut	2
46	-----	Bulkhead, 1/4 npt x 1/4 tube	2
47	110937	Elbow Fitting, male	2
48?	-----	Hopper Lid	1
49?	-----	Hopper Window	1
50	104172	Fitting, 1/8 NPT x 1/4 tube	1
51?	125370	Hose Clamp, 11/16-1-1/2 in diameter	2
52	20B724	Speed Controller Valve	1
53	20B914	Venturi Assembly (Includes 44 and 55)	1
54?	-----	Clear Tube, pvc	1.44 ft
55	17R563	Hex Head Cap Screw, 10-24 x .38	3
64	-----	Screw, #4, Thread Forming	1
72	115287	Tube, Y, 1/4 in.	1
77	-----	Plug, Hose, .56 in. diameter	1
? Included in a repair kit. See <b>Repair Kits</b> , page 117 for details.			

# Safety Labels



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## Common System Parts



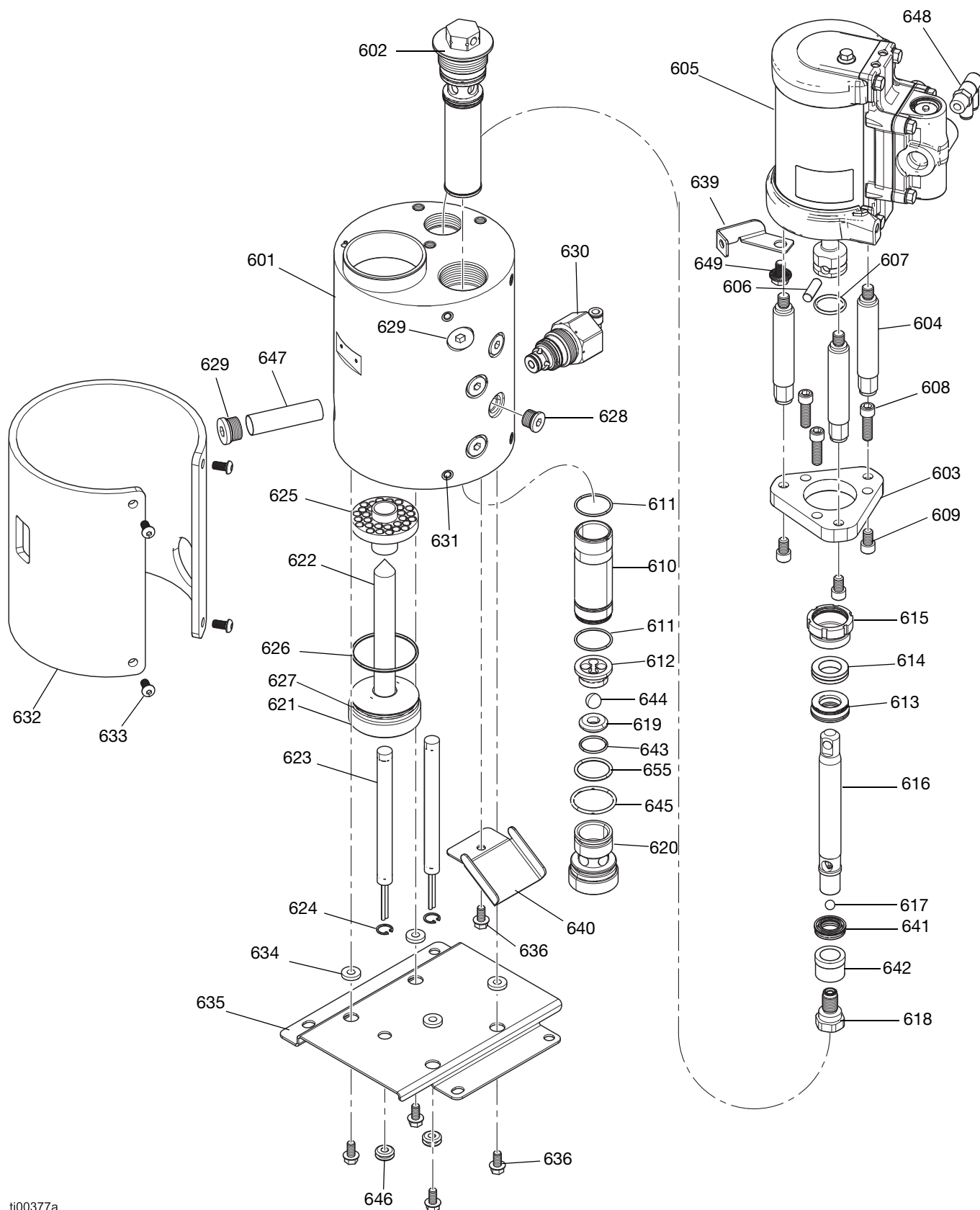
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## Common System Parts

Ref.	Part	Description	Qty.
201	- - - - -	Electrical Enclosure	1
202	25M525	AMZ Circuit Board Assembly	1
203	125856	Serrated Flange Screw, 8-32	8
204	123967	Operator Disconnect Knob	1
205	126881	Strain Relief Bushing	1
206	126891	Bushing Nut	1
207	114421	Strain Relief Bushing	2
208	129598	Snap-In Grip Cord	2
209	- - - - -	Dowel Pin	2
210	121487	Grommet (electrical enclosure)	3
211	127887	Power Supply, 24 DC, 6.3 A	1
212	109466	Lock Hex Nut	4
213	102360	Flat Washer	6
214	117666	Ground Terminal	1
215	115942	Flange Head Hex Nut	7
216	129542	Plug Connector, 5.08 mm (4 position)	1
217	129192	Plug Connector, 5.08 mm (3 position)	1
218	128116	Plug Connector, 3.81 mm (7 position)	2
219	129539	Plug Connector, 3.81 mm (3 position)	2
220	129541	Plug Connector, 5.08 mm (4 position)	1
221	25P567	Fuse Holder Harness Assembly, 8 Leads	1
222	129537	Plug Connector, 5.08 mm (8 position)	1
223	- - - - -	Melter Pump with Air Motor, See <b>Melter Pump Assembly: 20B911</b> , page 114	1
224	- - - - -	Rear Melter Cover	1
225	- - - - -	Air Control Assembly, see <b>Air Regulator Assembly</b> , page 116	1
226	113161	Hex Head Flange Screw	3
227?	- - - - -	Funnel Coupler	1
228?	- - - - -	Melter Funnel	1
229?	278871	Funnel Inlet	1
230?	- - - - -	Sensor Housing	1
231	130165	Machine Screw, Pan Head, 10-32 x 2.5 in.	3
232	110932	Male Connector	1

Ref.	Part	Description	Qty.
233	126780	Over-Temperature Switch	1
234?	24R885	Reed Switch Assembly (cycle switch kit)	1
235	104641	Bulkhead Fitting	1
236	- - - - -	Triple Union Fitting, 1/4 tube	1
237	157021	Lock Washer (Cycle Switch)	1
238?	- - - - -	Pan Head Screw, 8-32 x 1.5 in.	1
239	129197	Disconnect Switch	1
240	129869	Level Sensor (Ultrasonic)	1
241?	129908	Funnel Air Filter	1
242?	278873	Funnel Cover	1
243?	129813	O-Ring, Viton	2
244?	17J898	Hose Clamp, 2-9/16-3-1/2	2
245?	297331	Cap Screw (Over-Temperature Switch)	2
246	126901	Thread Forming Screw, #10-16	1
248	17M274	Molex Cable, M12	1
249	17R646	Molex Cable, M8	1
250	598095	Nylon Tube, 5/32 OD	1.34 ft
252	17M487	Melter Temperature Sensor, 1000 ohm rtd	1
254	17M295	Harness, OT	1
255?	- - - - -	PTFE Tube, 1/4 in. OD	1.13 ft
256	16T440	Electrical Cap	4
260	- - - - -	Electrical Enclosure Foam Gasket	1
261	24P175	Electrical Enclosure Plate	1
262	19A770	PTC Elbow Fitting, 1/4 in. to 5/32 in.	1
263	129902	Restrictor, .023, 1/4 tube x 1/4 tube	1
264	107388	Temperature Sensor Screw, Pan Head Machine Screw	1
265	121000	Can Cable, female 0.5m	1
266	102920	Lock Nut	3
267	129538	Plug Connector, 3.81 mm (4 position)	1
? Included in a repair kit. See <b>Repair Kits</b> , page 117 for details.			

# Melter Pump Assembly: 20B911



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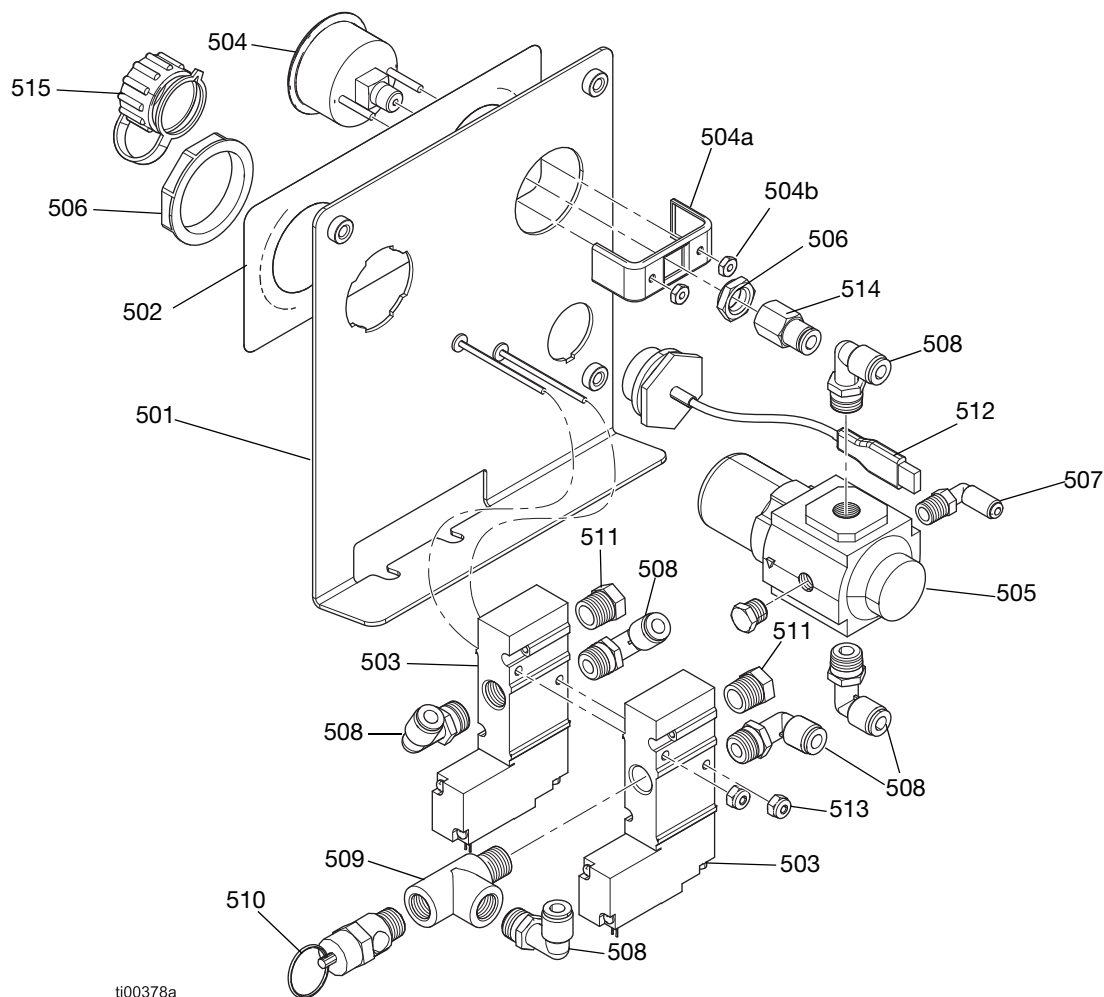
**Melter Pump Assembly: 20B911**

Ref.	Part	Description	Qty.
601?	- - - - -	Melter Manifold	1
602	24P855	Outlet Filter Assembly, 100 mesh, welded	1
603	17M475	Mounting Plate, air motor	1
604	- - - - -	Tie Rods, tie, 1.5 in. stroke, short	3
605	25C160	Air Motor, 2.5 in., hi temp, 1.5 strk	1
606	196762	Straight Pin	1
607	514129	O-Ring Packing	1
608	128167	Cap Screw SCREW, cap, socket head, 5/16-18	3
609	128190	Cap Screw, Socket Head, 5/16-18	3
610?	- - - - -	Cylinder Sleeve	1
611?	108526	PTFE O-ring Packing	2
612	192624	Ball Guide	1
613?	17L995	Throat Seal	1
614?	17L996	Throat Bearing	1
615?	193046	Packing Nut	1
616?	- - - - -	Piston Rod	1
617?	105444	Piston Ball, .31250)	1
618?	- - - - -	Piston Valve	1
619?	192642	Seat, Carbide	1
620	17M477	Valve Housing, foot	1
621	17M473	Melter Plug	1
622	17M474	Fire Rod Housing	1
623?	- - - - -	Heater Rod, fire rod, 1000 watts, 240V	2
624?	111317	Retaining Rings, Internal	2
625	17M476	Melter Heat Sink	1
626	102867	O-Ring Packing	1
627	558722	O-Ring, Heater Rod	1
628	15H304	Plug Fitting, 9/16 sae	4
629	295607	Hex Plug	2
630	26A242	Pressure Relief Valve	1
631	556431	Plug, sae, 5/16-24	1
632	133779	Melter Insulation, heat jacket	1
633	111831	Cap Screw, skt, button head	4
634	167002	Insulator, heat	4
635	- - - - -	Melter Bracket Plate	1
636	113161	Hex Screw, flange, melter bracket	5
639	17R610	Funnel Bracket	1

Ref.	Part	Description	Qty.
640	- - - - -	Drip Tray	1
641?-	- - - - -	Piston U-Cup Seal	1
642?	- - - - -	Piston Bearing	1
643?	107079	O-Ring Packing	1
644?	105445	Ball .5000	1
645?	113944	O-Ring Packing	1
646	- - - - -	Grommets, 1/4 ID	2
647	133788	Pump Inlet Filter, wire screen	1
648	129810	Air Inlet Fitting, double union, 1/4 tube	1
649	129746	Bolt Bracket	1
655?	105802	O-Ring Seal	1

? Part is included in a repair kit. See **Repair Kits**, page 117.

Air Regulator Assembly



ti00378a

Ref.	Part	Description	Qty.
501	—	Regulator Bracket	1
502	—	Air Control Label	1
503	129477	Solenoid Valve, 3 way	2
504	128260	Pressure Gauge	1
504a	—	Pressure Gauge Bracket	1
504b	—	Pressure Gauge Fastener	2
505	129805	Air Pressure Regulator	1
506	116514	Air Regulator Nut	1
507	111162	Elbow Fitting	1
508	110937	Elbow Fitting, Male	6
509	106228	Tee Fitting	1

Ref.	Part	Description	Qty.
510	113498	Safety Valve, 110 psi	1
511	—	Muffler Vent	2
512	15R324	USB Plug Harness, Bulkhead, 32 in.	1
513	109466	Hex Nut, Lock	2
514	114320	Female Connector Fitting, 1/8 npt	1
515	15R325	Bulkhead Receptacle Dust Cover	1



# Repair Kits

## Melter Manifold Pump Repair Kits

### Melter Pump Repair Kit 20B919

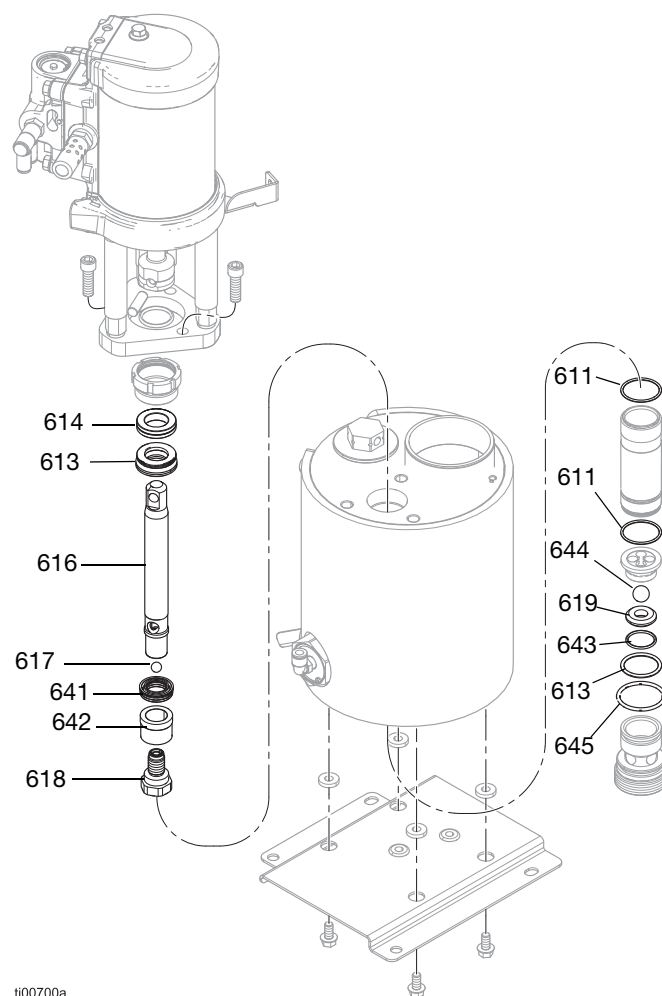
See page 90 for repair instructions.

Ref	Description	Qty.
611	PTFE O-ring Packing	2
613	Throat Seal	1
614	Throat Bearing	1
616	Piston Rod	1
617	Piston Ball, .31250)	1
618	Piston Valve	1
619	Seat, Carbide	1
641	Piston U-Cup Seal	1
642	Piston Bearing	1
643	O-Ring Packing	1
644	Ball .5000	1
645	O-Ring Packing	1
655	O-Ring Seal	1
-	Seal Installation Tool	1

### Piston Rod Assembly Kit 25C513

See Fig. 80 on page 92 for assembly details.

Ref.	Description	Qty.
616	Piston Rod	1
617	Ball, .31250	1
641	U-Cup, Piston Seal	1
642	Piston Bearing	1
618	Piston Valve	1



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**FIG. 102: Melter Pump Components**

### Melter Pump Assembly: 20B911

See page 114 for part details.

### Melter Manifold Kit 20B917

Ref.	Description	Qty.
601	Melter Manifold	1
623	Fire Rod Heater, 240 V	1
624	Internal Retaining Ring	1

## Heater Rod Replacement Kit 17P347

See **Heater Repairs**, page 96 for repair instructions.

Ref.	Description	Qty.
623	Pump Heaters, fire rod, 1000 watts, 240V	4

## Melter Manifold Repair Tools

See **Melter Pump Component Repairs**, page 90 for instructions.

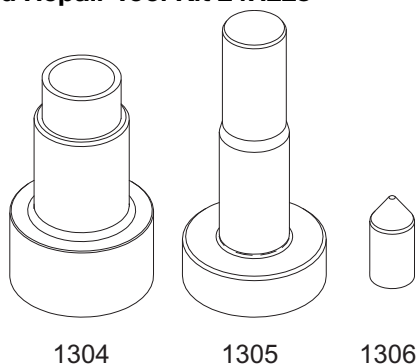
### Heater Rod Spanner Wrench 129804

Used to remove the melter heater rod housing.

### Cylinder Repair Tools Kit 24R227

Ref.	Purpose
1301	Remove Cylinder
1302	Install Cylinder - Female
1303	Install Cylinder - Male

### Pump Rod Repair Tool Kit 24R228

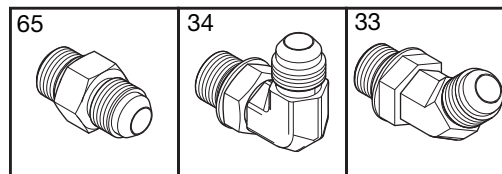


### Seal Installation Tool 15B661

Ref.	Purpose
1304	Install Rod - Female
1305	Install Rod - Male
1306	Install Rod - Bullet

## Air and Fluid Connection Kits

### Fluid Port Connectors Kit 24V504



ti00661a

Ref.	Description	Qty.
33	45° Swivel Elbow Fitting, MxF JIC-6	6
34	90° Swivel Elbow Fitting, JIC 06, FM, MS	6
65	Adapter Fitting, JIC 06 X SAE 06, mm, cs	6

### Inlet Air Filter Kit 24R707

Ref.	Description	Qty.
76	Air Filter, 3/8 npt	1
59	Adapter	1
60	Ball Valve, Vented 2-way	1
63	90° Swivel Fitting	1
-	Adapter Union	1
-	Nipple Fitting	1
-	90° Union Fitting	1
-	Adapter Nipple Fitting	1

## Hopper Kits

See **Hopper Repair**, page 85 for repair instructions.

### Hopper Standoff Kit 20B927

Ref.	Description	Qty.
38	Threaded Hex Stud	4
39	Threaded Damper Stud	4
14	Hex Flange Head Nut	4

### Hopper Feed Tube and Clamp Kit 20B915

Ref.	Description	Qty.
51	Hose Clamp, 11/16-1-1/2 in diameter	2
54	Clear Tube, pvc	1.44 ft

### Hopper Lid Replacement Kit 20B916

Ref.	Description	Qty.
48	Hopper Lid	1
49	Hopper Window	1
4	Lock Hex Nut	6
3	Flat Washer	6

### Hopper Bowl Kit 20B913

Ref.	Description	Qty.
40	Bowl Assembly	1
14	Flange Head Hex Nut	4

### Venturi Feed Assembly Kit 20B914

Ref.	Description	Qty.
53	Venturi Assembly	1
44	Plain Washer 3/16 in.	3
55	Hex Head Cap Screw, 10-24 x .38	3

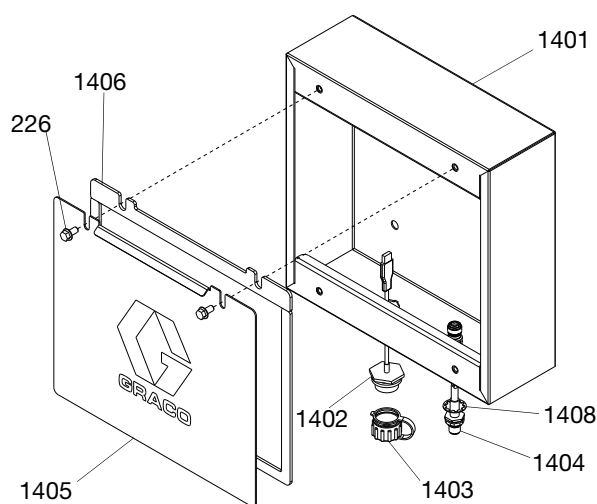
## ADM Kits

### ADM Screen Protector Kit 18D314PKG

Tear-off screen protector for ADM screen. 10-pack.

### Remote Mount for ADM 20B690

1. Switch the front door panel (1405) with the ADM panel on the unit.
2. Attach the USB and CAN connectors in the enclosure to the back of the ADM.
3. For 2 channel units, plug the USB bulkhead into the right angle cable, and the right angle cable into the USB port on the side of the ADM. For 4 channel units, plug the USB bulkhead into the USB hub mounted on the back of the ADM, and plug the USB hub into the right angle USB cable that plugs into the ADM.
4. Connect the CAN cable (1409) (not shown) between the bulkhead (1404) and the HM10.



Ref.	Description	Qty.
1401	Enclosure, Remote Mount Painted	1
1402	USB Plug Harness, Bulkhead, 32 in.	1
1403	Dust Cover, Bulkhead Receptical	1
1404	GCA Cable, M12-5P	1
1405	Front Door, Painted	1
1406	Foam Gasket, Door	1
226	Hex Head Flange Screw	2
1408	Washer Lock, Internal	1
1409	CAN Cable, 6 m	1

ADM with Software USB 20B929

See **Replace Advanced Display Module (ADM)**, page 99 for instructions.

Ref.	Description	Qty.
1410	ADM GCA Module, 9 in.	1
1411	Flash Drive, HM10 Programmed	1

Electrical Kits

Cycle Switch Kit 24R885

Ref.	Description	Qty.
234	Cycle Switch Sensor	1
213	Cycle Switch Washer	1
238	Cycle Switch Screw	1

Black Disconnect Handle Kit 17S164

Used to replace a red disconnect handle with a black disconnect handle.

Funnel Assembly Kit 20B912

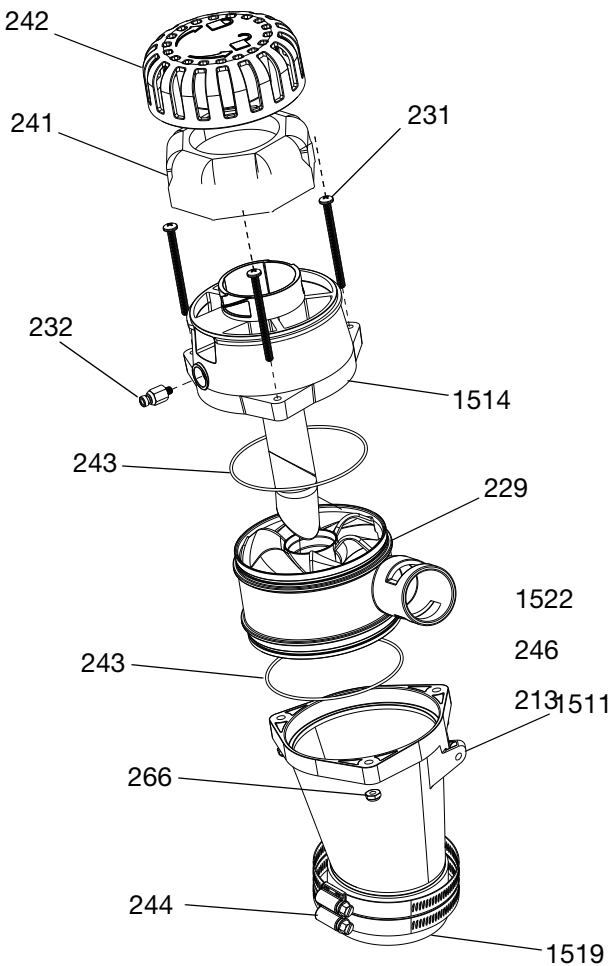
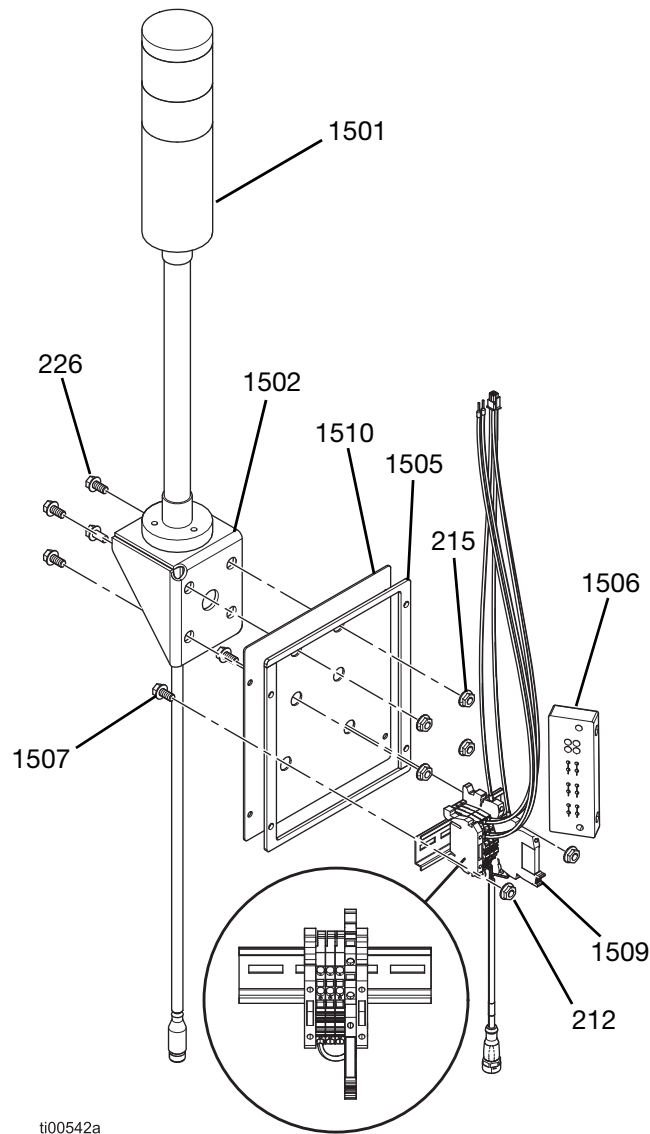


FIG. 103: Funnel Assembly Kit

Ref.	Description	Qty.
1511	Funnel Melter	1
229	Funnel Inlet, HM25C	1
243	O-Ring	2
1514	Sensor Housing, Deflector Assembly	1
232	Male Connector	1
231	Mach Screw, PNH, 10-32 x 2.5 in.	3
242	Funnel Filter Cap, HM25C	1
241	Funnel Air Filter, Coarse	1
1519	Funnel Coupler	1
244	Hose Clamp, 2-9/16 - 3-1/2	2
266	Lock Nut	3
1522	Lubricant, Grease	1
246	Flat Washer	1
213	Thread Forming Screw, #10-16	1

# Light Tower Kit 20B729

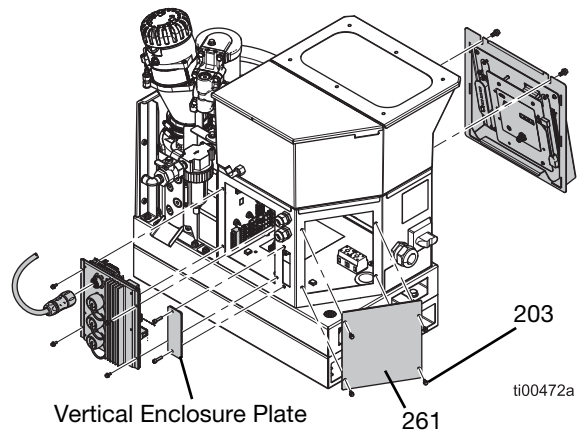


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**FIG. 104: Light Tower Kit**

Ref.	Description	Qty.
1501	Light Tower, Red-Green, M12	1
1502	InvisiPac Light Tower Bracket	1
226	Hex Head Flange Screw	4
215	Flange Head Hex Nut	4
1505	Light Tower Panel, Painted	1
1506	Frame Cord Grip, 4-Position	1
1507	Mach Screw, MZTCM	2
212	Hex Lock Nut	2
1509	HM10 Light Tower Module	1
1510	Foam Gasket	1

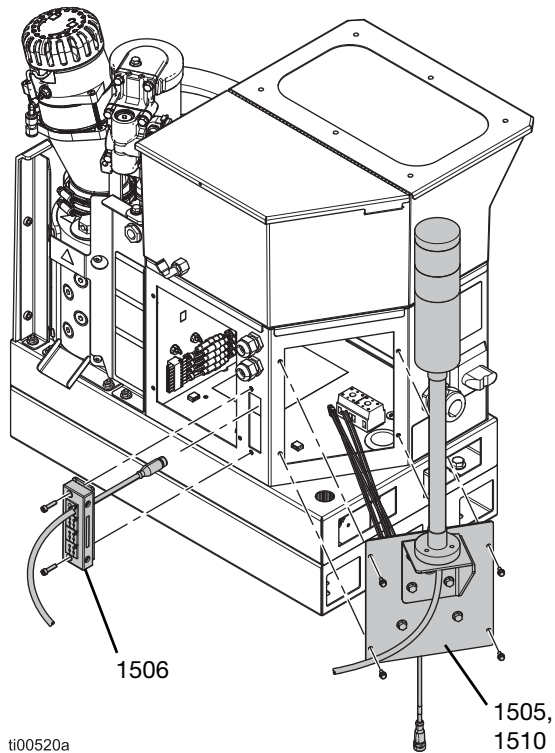
1. Follow the procedure to **Access the Electrical Enclosure**, page 81.
2. Remove the two screws on the back of the unit and remove the vertical enclosure plate.
3. Remove the screws (203) and remove the electrical enclosure plate (261) from the back corner of the unit.



ti00472a

**FIG. 105**

4. Install the cord grip frame (1506) as shown in FIG. 106, and secure it with two screws.
5. Install the new light tower kit assembly by securing the foam gasket (1510) and light tower panel (1505) to the back corner of the unit with four screws (203).



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**FIG. 106**

6. Mount the light tower (1501) to the bracket (1502) using the supplied hardware.
7. Run the light tower communication cable through the cord grip frame (1506) and into the electrical enclosure.
8. Connect the light tower cable to the mating cable labeled LIGHT\_TWR that is attached to the terminal blocks.
9. Connect the square plug lead labeled J7-1, J7-2, etc. to terminal J7 on the AMZ.
10. Connect the assembly to 24V via terminal J3.
  - a. Connect the red lead labeled J3-24 OUT+ to terminal 24V OUT+.
  - b. Connect the blue lead labeled J3-24 OUT- to terminal 24V OUT-.

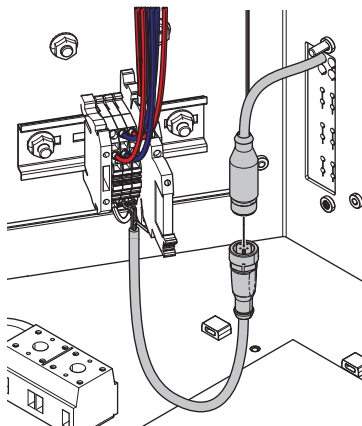
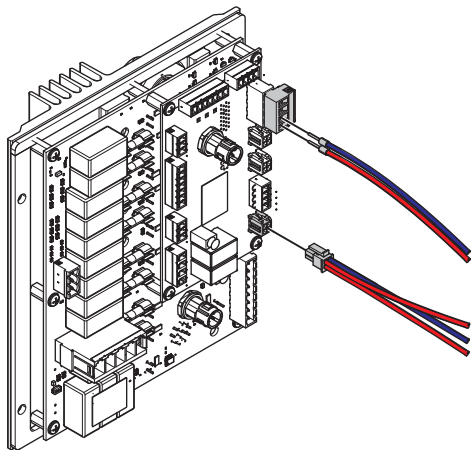


FIG. 107

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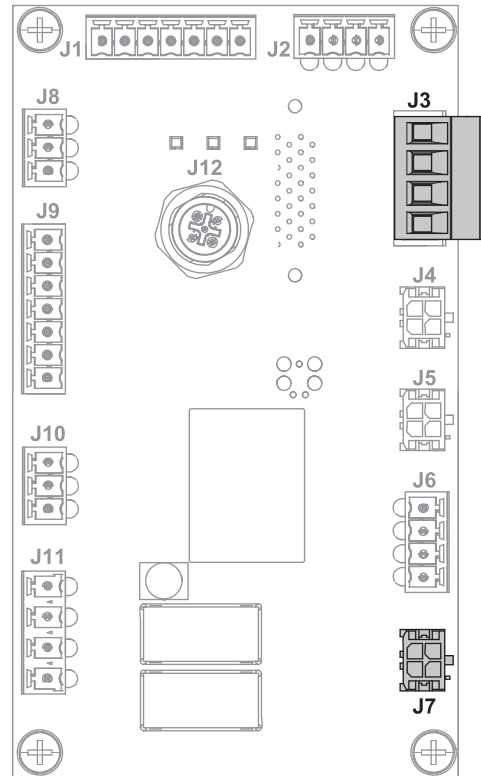
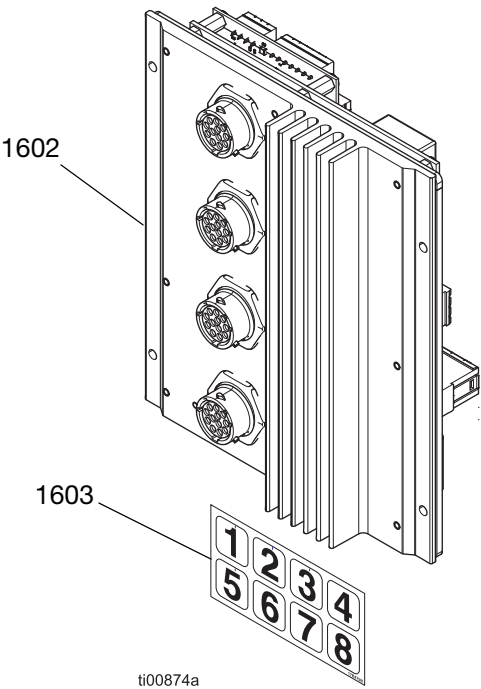


FIG. 108

11. Follow instructions to **Install the ADM Screen**, page 81.

# AMZ Circuit Board Replacement Kit 25M525

See **Replace Auto Multi-Zone (AMZ) Circuit Board**,  
page 98 for instructions.



Ref.	Description	Qty.
1602	GCA Module, MZLP4	1
1603	Identification Label	1

# Communications Gateway Module and Fieldbus Kits

See **Communications Gateway Module (CGM) and Fieldbus Setup**, page 125 for requirements and installation instructions.

## HM10 CGM Installation Kit 20B839

See **Communications Gateway Module (CGM) and Fieldbus Setup**, page 125 for installation instructions.

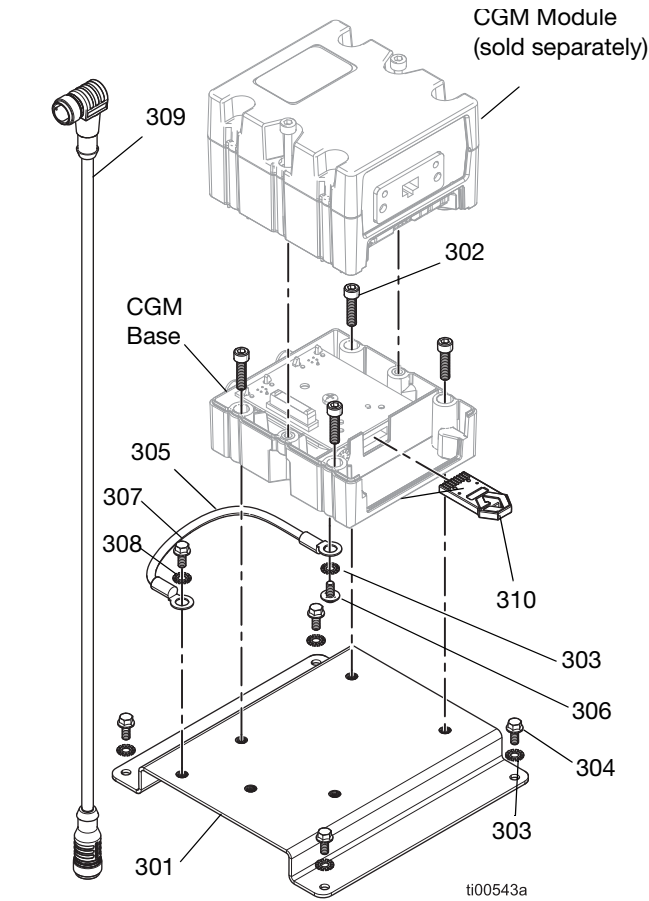


FIG. 109

Ref.	Description	Qty.
310	CGM Map Token	1
301	Bracket	1
302	Socket Head Cap Screw, #10-32 X .75	4
303	Lock Washer	5
304	Serrated Flange Screw, 8-32	4
305	Grounding Wire	1
306	Pan Wash Head Machine Screw	1
307	Socket Head Cap Screw, #10-32 X .375	1
308	Lock Washer, External Tooth, .196 in. ID	1
309	CAN Cable, 90 degree Female / Female 0.5M	1

## CGM Module Housing Kits

Fieldbus-specific module housing. Purchase the HM10 CGM Installation Kit 20B839 separately.

Module	Fieldbus	English Instruction Manual
CGMEP0	EtherNet/IP	312864
CGMPN0	PROFINET	

## CGM Standard Map Token 20B926

Ref.	Description	Qty.
310	Standard CGM Map Token	1
311	Installation Manual	1



## CGM Legacy Map Token 17S927

Ref.	Description	Qty.
300	Legacy CGM Map Token	1
-	Installation Manual	1

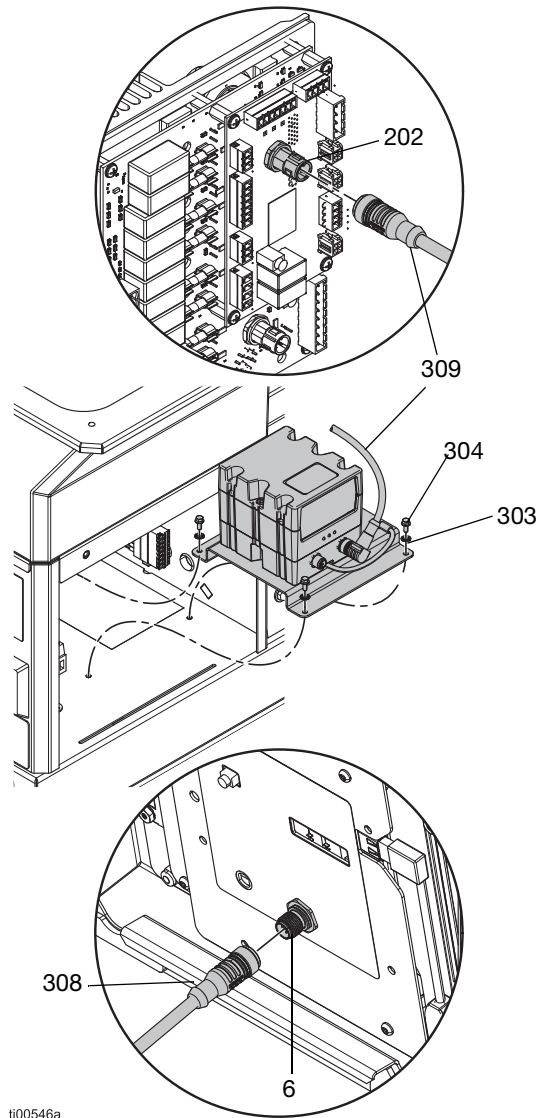




## Install the CGM in the Electrical Enclosure

				
<p><b>DANGER</b>  <b>SEVERE ELECTRIC SHOCK HAZARD</b>          This equipment can be powered by more than 240V. Contact with this voltage will cause death or serious injury.</p> <ul style="list-style-type: none"> <li>Turn off and disconnect all power before servicing electrical components.</li> </ul>				

1. **Access the Electrical Enclosure.** Follow the steps on page 81.
2. Connect one end of a CAN cable (307) to the CGM and the other end to the AMZ (202).
3. Connect one end of a CAN Cable (308) to the CGM and the other end to the ADM (6).
4. Install the assembled CGM inside the electrical enclosure with the washers (303) and fasteners (304).

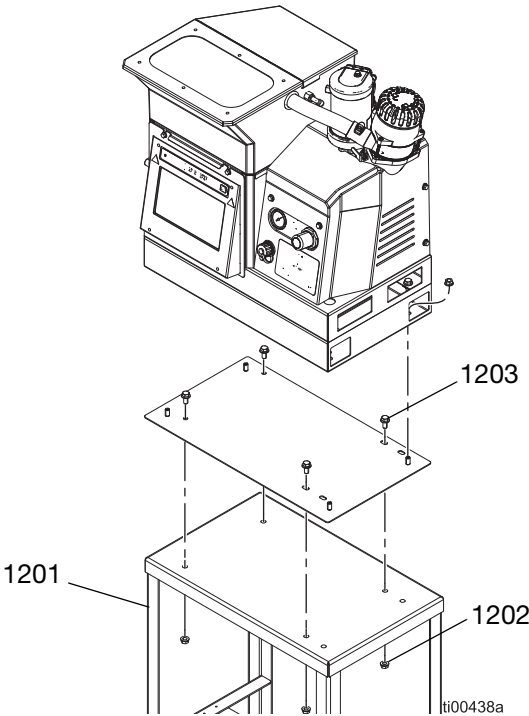


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**FIG. 112: CGM Installation and Connections**

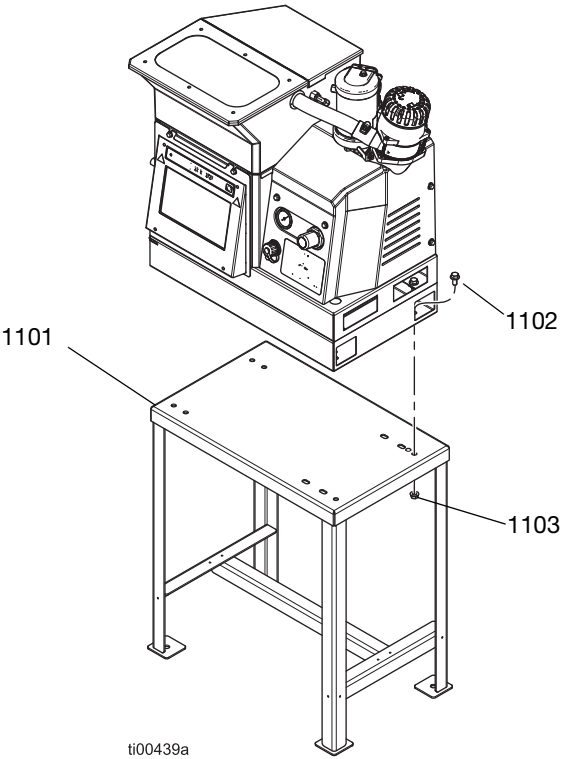
Installation Kits

System Stand Kit 17S264



Ref.	Description	Qty.
1201	Stand	1
1202	Flange Hex Nut	4
1203	Flange Head Cap Screw	4

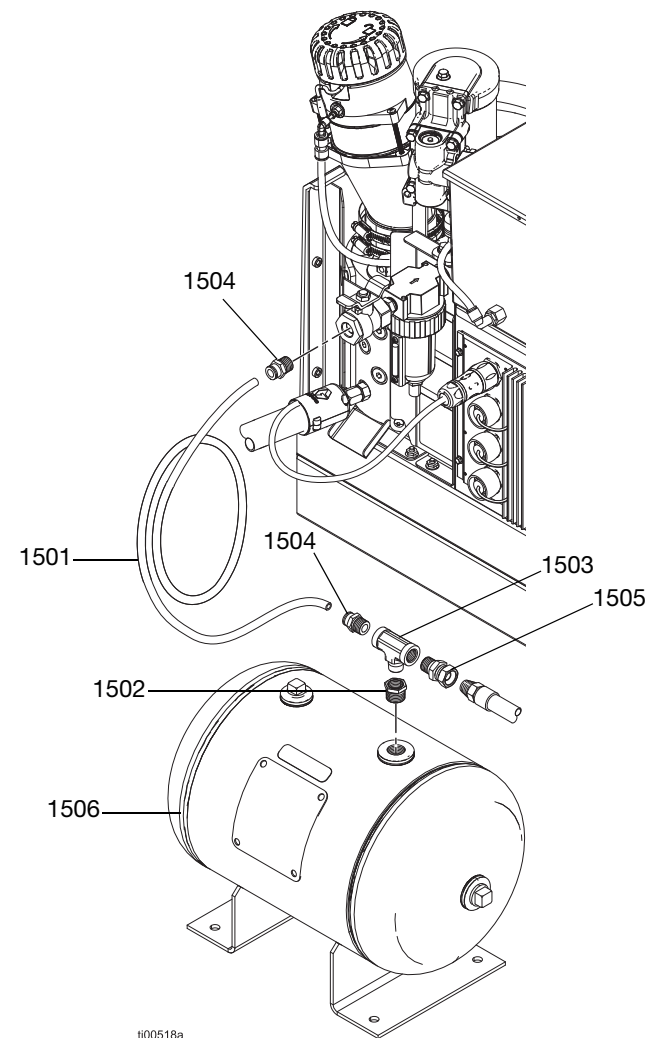
Adapter Plate Kit 25M528



Ref.	Description	Qty.
1101	Adapter Plate	1
1102	Flanged Head Cap Screw	4
1103	Flanged Hex Nut	8

Air Reservoir Kit 16W366

Allows the system to operate on lower pressure or restricted air supply lines.



t00518a

Ref.	Description	Qty.
1501	Nylon Hose (6 ft)	1
1502	Pipe Bushing	1
1503	Pipe Tee	1
1504	Male Connector, 3/8 npt	2
1505	Adapter Union	1
1506	Air Accumulator Tank	1

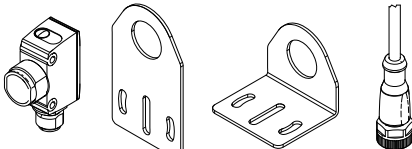
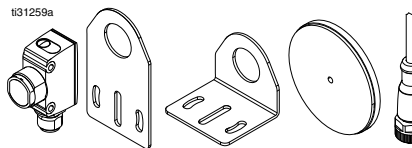
## Upgrade Kits

### Material Tracking Kit

Used to track material consumption per product without a pattern controller.

#### Installation

1. See **Connect Material Tracking Input**, page 17, for details on hardware installation.
2. Navigate to the Material Tracking Setup screen (see **Material Tracking**, page 43) and check “Enable AUX Counter” setting.
3. Navigate to the **Usage Screen** screen (see page 42). Verify # units counts once per product.

Part	Description	Contents	Image
24X446	KIT, photoeye, # diffuse, 18 mm	128073 - SENSOR, photoelectric diffuse# 128071 - BRACKET, sensor mount, straight# 128070 - BRACKET, sensor mount, angled# 24X449 - CABLE, M12, 4-pin, 5.0 m	 ti31235a
24X447	KIT, photoeye, pol ret ref, 18 mm	128072 - SENSOR, photoelectric, polarized# 128071 - BRACKET, sensor mount, straight# 128070 - BRACKET, sensor mount, angled# 128069 - SENSOR, reflector# 24X449 - CABLE, M12, 4-pin, 5.0 m	 ti31259a

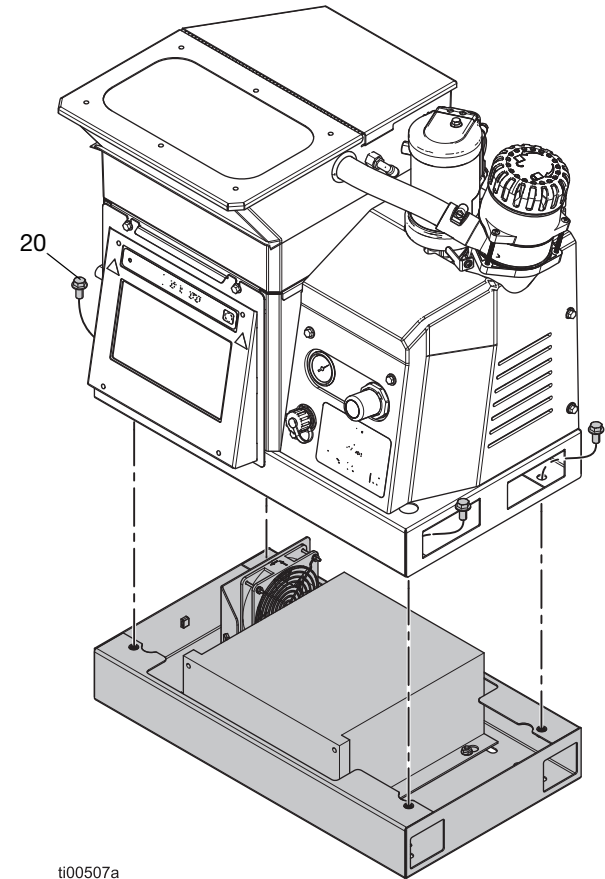
### Pattern Controller Kit 24X525 and 24X526

See instruction manual 334784 for installation and configuration instructions. Only External Stand Alone Pattern Controllers may be used with this system.



480V Transformer Upgrade Kit 17S265

Used to upgrade to a 240 VAC system for 480 VAC incoming power.

Ref.	Description	Qty.
12	Transformer Base	1
13	480V Transformer	1
14	Hex Flange Head Nut	4
15	Transformer Fan Plate	1
16	Fan, 24 DC	1
17	Fan Guard	1
18	Grommet, 1/4 ID	1
21	Keps Nut	4
20	Flange Head Cap Screw	4
22	Terminal Block	1
23	Pan Head Screw, #6-32 x 1.25	2
32	Air Fitting Grommet	1



Transformer Installation



**DANGER**  
**SEVERE ELECTRIC SHOCK HAZARD**  
This equipment can be powered by more than 240V. Contact with this voltage will cause death or serious injury.

- Turn off and disconnect all power before servicing electrical components.

1. Turn the main power switch (204) OFF and disconnect power from the system.
2. **Access the Electrical Enclosure**, page 81.
3. Remove the knockout on the bottom of electrical enclosure. Insert the grommet (18) into the knockout hole.
4. Mount the terminal block (22) to the bottom of the electrical enclosure using the terminal block mounting screws (21).

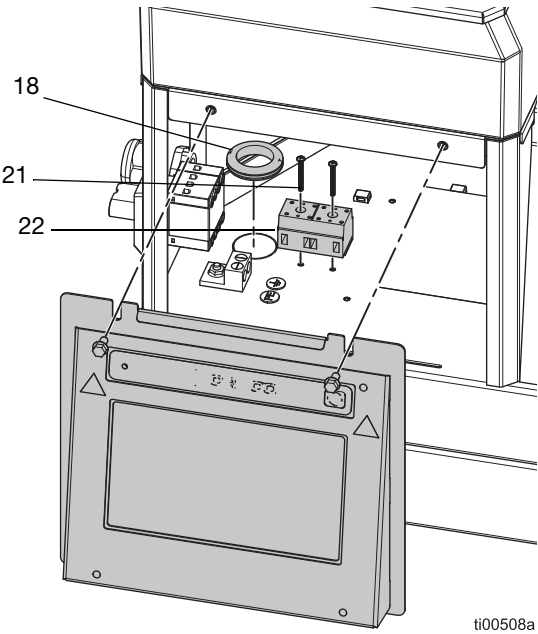
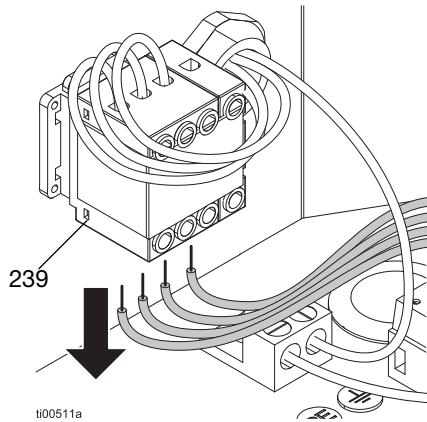


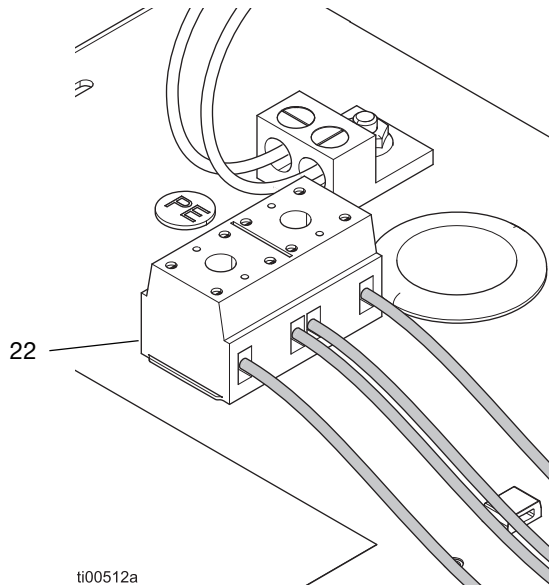
FIG. 113

5. Disconnect wire harness from disconnect switch (239).



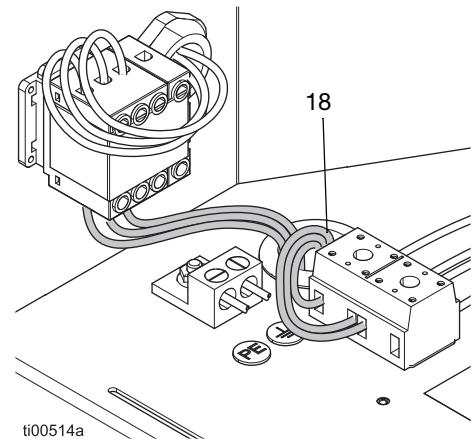
**FIG. 114**

6. Connect wire harness to the back side of terminal block (22). See **Electrical Schematics**, page 103 for details.



**FIG. 115**

7. Route wires from the transformer base through the grommet (18).



**FIG. 116**

8. Make electrical connections. See **Electrical Schematics**, page 103 for details.
  - a. Connect the fan connector to AMZ J2.
  - b. Connect free wires labeled H1-H3 to the disconnect switch (239).
  - c. Connect free wires labeled X1-X3 to the terminal block (22).
9. **Install the ADM Screen.** Follow the steps on page 81.

4 Channel Upgrade Kit 20B918

Upgrade HM10 2-channel systems to a 4-channel system.

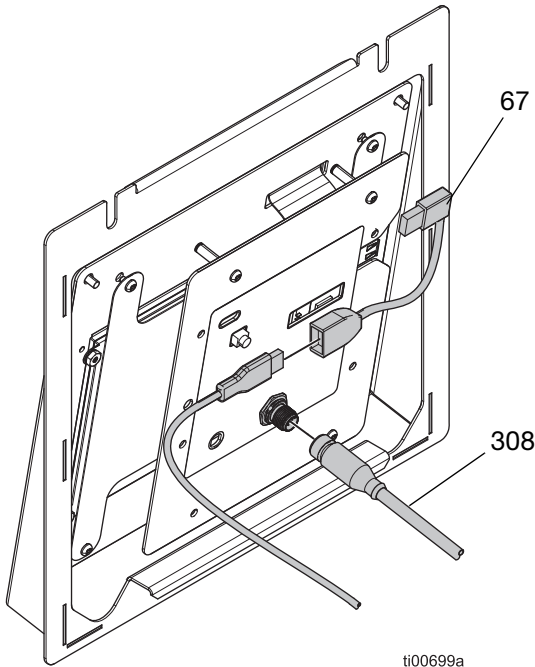


FIG. 117: 2 Channel ADM Connections

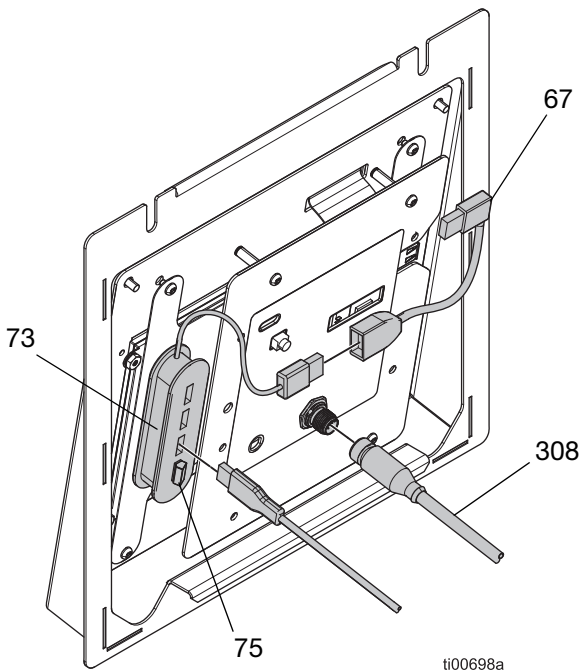




FIG. 118: 4 Channel ADM Connections

Ref.	Description	Qty.
73	Hub, USB, 4 Port	1
75	Flash Drive, 4 Channel Upgrade	1
1601	Double-Sided Tape	1

Channel Upgrade Instructions



**DANGER**  
**SEVERE ELECTRIC SHOCK HAZARD**  
This equipment can be powered by more than 240V. Contact with this voltage will cause death or serious injury.

- Turn off and disconnect all power before servicing electrical components.

1. Turn the main power switch (204) OFF and disconnect power from the system.
2. **Access the Electrical Enclosure**, page 81.
3. Attach the 4 port USB hub (73) to the back of the ADM in the location shown in FIG. 118, using the included double-sided tape.
4. Connect the right angle USB connector (67) to the USB hub cord (73).
5. Plug the 4 channel upgrade flash drive (75) into the USB hub (73).
6. Plug the USB bulkhead cable into the USB hub (73).
7. **Install the ADM Screen**, page 81.
8. Reconnect power to the system and turn the main power switch (204) ON.
9. Verify **Four CH license present** and **Four CH unlocked** are both green on the I/O tab of the diagnostic screen.



## Adapter Kits

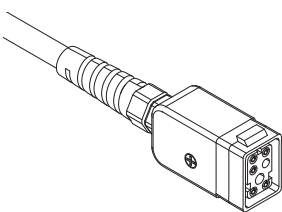
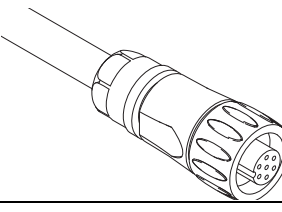
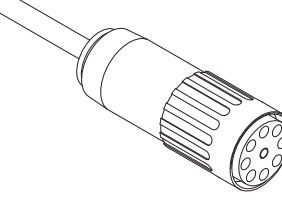
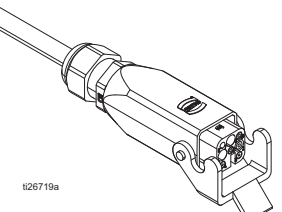
### Hose Adapters

Use to connect non-Graco hoses to an InvisiPac system.

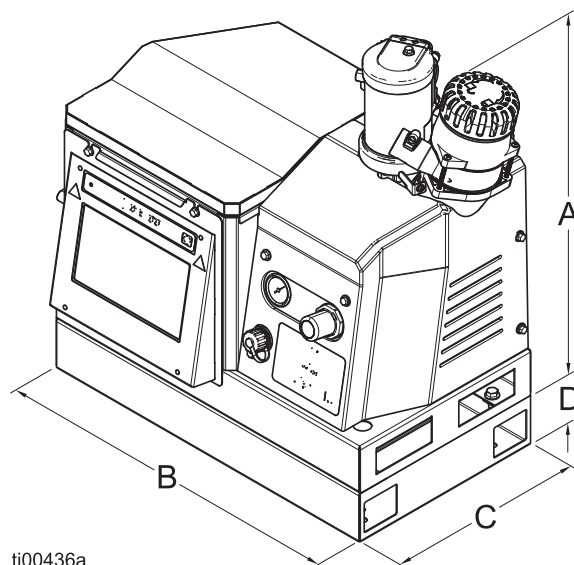
Part	Description
128621	For connecting to non-Graco hoses that use a NI 120 RTD.

### Applicator Adapters

Use to connect non-Graco applicators to Graco heated hoses.

Part	Description	Image
16T916	For connecting to non-Graco applicators that use a rectangular, 6-pin connector.	
16Y828	For connecting to non-Graco applicators that use a circular, 6-pin connector. IPx6 rated.	
16T917	For connecting to non-Graco applicators that use a circular, 9-pin connector.	
128372	For connecting to non-Graco applicators that use a rectangular, 8-pin connector.	

## Dimensions

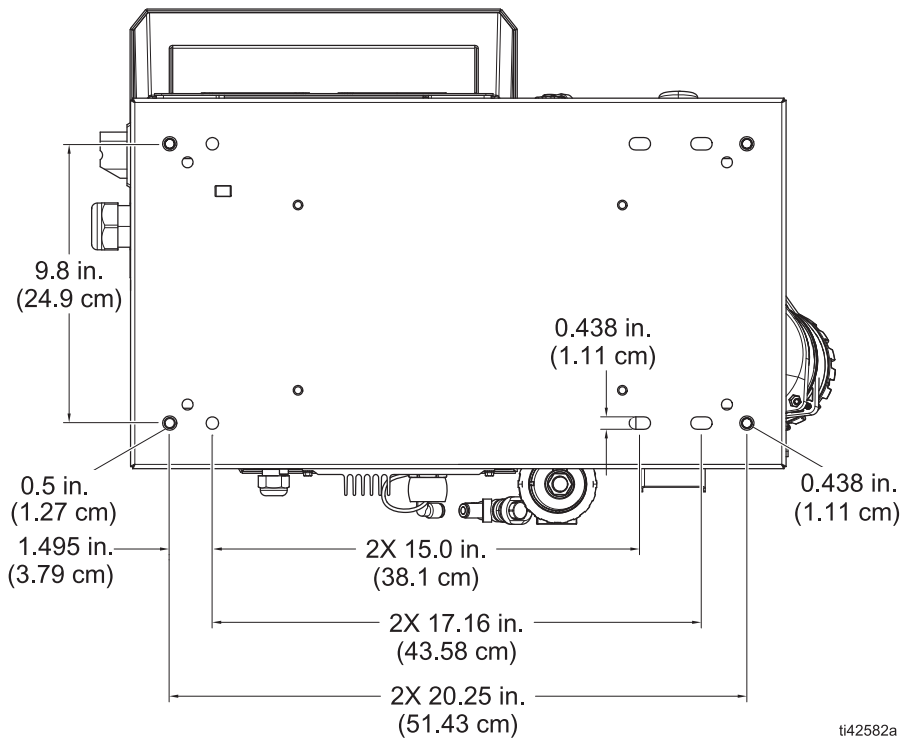


**NOTE:** The dimension image is a product representation. Actual product appearance may vary.

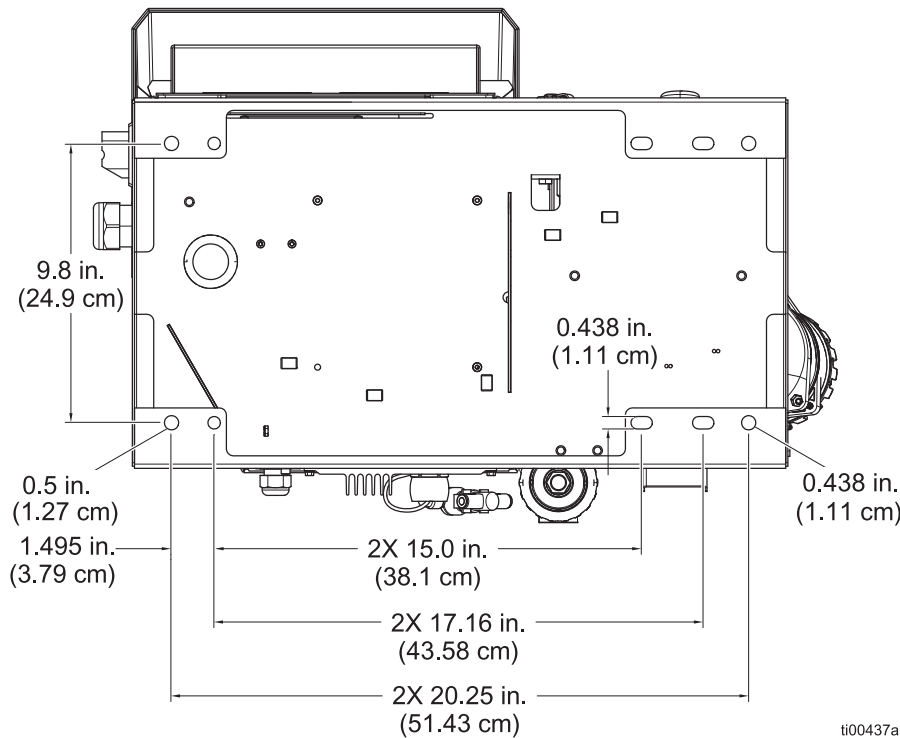
A	21.8 in. (554 mm)
B	23 in. (584 mm)
C	13 in. (330 mm)
D*	3.25 in. (83 mm) (480 V models only)

# Mounting Hole Dimensions

## 480V Models



## 240V Models



This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

# Technical Specifications

## InvisiPac HM10 Hot Melt Delivery System

### Electrical Specifications

Incoming Power					
Model	Nominal Voltage Range	Type	Description	Frequency	Max Amps
20B715, 20B716, 20B725, 20B726	200–240 VAC	1(Ø)	<ul style="list-style-type: none"> <li>1-phase</li> <li>2 wire</li> </ul>	50/60 Hz	32 A
	200–240 VAC	3(Ø) Δ	<ul style="list-style-type: none"> <li>3-Phase without neutral</li> <li>3 wire</li> </ul>	50/60 Hz	32 A
	350–415 VAC	3(Ø) Y	<ul style="list-style-type: none"> <li>3-Phase with neutral</li> <li>350-415 VAC line -to-line</li> <li>200-240 VAC line-to-neutral</li> <li>4 wire</li> </ul>	50/60 Hz	32 A
20B717, 20B718, 20B727, 20B728	400–480 VAC	3(Ø) Δ	<ul style="list-style-type: none"> <li>3-Phase without neutral</li> <li>3 wire</li> </ul>	50/60 Hz	16 A

Channels	
<b>Channels: Models 20B715, 20B717, 20B725, 20B727</b>	2 channels
<b>Channels: Models 20B716, 20B718, 20B726, 20B728</b>	4 channels
Minimum Applicator Wattage Per Channel	90 W (at 240 VAC)
Maximum Applicator Wattage Per Channel	400 W (at 240 VAC)
Minimum Hose Wattage Per Channel	90 W (at 240 VAC)
Maximum Hose Wattage Per Channel	1250 W (at 240 VAC)

PLC	
PLC Inputs	6 inputs (0–30 VDC)
PLC Outputs	2 outputs (240 VAC / 24 VDC, 2 A max)

HM10	US	Metric
Pump Specifications		
Pump	Pneumatic Piston, 12:1	
Pump Output	19.3 cc/cycle	
Pump Flow Rate	96 lb/hr	43.5 kg/hr
Melt Rate / Constant Throughput	10 lb/hr	4.5 kg/hr

HM10	US	Metric
Temperature Specifications		
Time to Temperature*	Less than 10 minutes	
Control Temperature Range	100°–400°F	38°–204°C
Ambient Temperature Range	32°–122°F	0°–50°C
Pressure Specifications		
System Air Supply Inlet	80–100 psi	0.55–0.69 MPa (5.5–7 bar)
Pump Operating Air Pressure Range (set with regulator on front of system)	20–100 psi	0.14–0.69 MPa (0.7–7 bar)
Pump Operating Fluid Pressure Range	240–1200 psi	1.7–8 MPa (17–80 bar)
Air Consumption Specifications		
Average air use at 5 lb/hr**	1.9 scfm	3.3 scmh
Average air use at 10 lb/hr**	2.78 scfm	4.78 scmh
Required Supply Air Tubing Size		
Minimum Air Tubing Inner Diameter	3/8 in.	9.5 mm
Minimum Air Tubing Inner Diameter (50 ft, 15.2 m or longer tubing)	1/2 in.	12.7 mm
Other Specifications		
Sound Pressure Level***	77 db(A)	
Weight		
240V On-Board Hopper Models	80 lb	36 kg
480V On-Board Hopper Models	154 lb	70 kg
240V Remote Vacuum Feed Models	72 lb	32 kg
480 Remote Vacuum Feed Models	146 lb	66 kg
Wetted Parts		
HM10 Wetted Parts	PTFE, chemically resistant o-rings, aluminum, stainless steel, zinc plating, carbon steel, brass, carbide, chrome	
* From 70°F–350°F (21°C–177°C), dependent upon power supply and machine configuration.		
** Includes intermittent air use up to 13 scfm (22 scmh) when vacuum system is feeding.		
*** Sound pressure level measured 3.1 ft (1 meter) from equipment.		

## California Proposition 65

### CALIFORNIA RESIDENTS



**WARNING:** Cancer and reproductive harm. – [www.P65warnings.ca.gov](http://www.P65warnings.ca.gov).

# Graco Standard Warranty

Graco warrants all equipment referenced in this document which is manufactured by Graco and bearing its name to be free from defects in material and workmanship on the date of sale to the original purchaser for use. With the exception of any special, extended, or limited warranty published by Graco, Graco will, for a period of twelve months from the date of sale, repair or replace any part of the equipment determined by Graco to be defective. This warranty applies only when the equipment is installed, operated and maintained in accordance with Graco's written recommendations.

This warranty does not cover, and Graco shall not be liable for general wear and tear, or any malfunction, damage or wear caused by faulty installation, misapplication, abrasion, corrosion, inadequate or improper maintenance, negligence, accident, tampering, or substitution of non-Graco component parts. Nor shall Graco be liable for malfunction, damage or wear caused by the incompatibility of Graco equipment with structures, accessories, equipment or materials not supplied by Graco, or the improper design, manufacture, installation, operation or maintenance of structures, accessories, equipment or materials not supplied by Graco.

This warranty is conditioned upon the prepaid return of the equipment claimed to be defective to an authorized Graco distributor for verification of the claimed defect. If the claimed defect is verified, Graco will repair or replace free of charge any defective parts. The equipment will be returned to the original purchaser transportation prepaid. If inspection of the equipment does not disclose any defect in material or workmanship, repairs will be made at a reasonable charge, which charges may include the costs of parts, labor, and transportation.

**THIS WARRANTY IS EXCLUSIVE, AND IS IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.**

Graco's sole obligation and buyer's sole remedy for any breach of warranty shall be as set forth above. The buyer agrees that no other remedy (including, but not limited to, incidental or consequential damages for lost profits, lost sales, injury to person or property, or any other incidental or consequential loss) shall be available. Any action for breach of warranty must be brought within two (2) years of the date of sale.

**GRACO MAKES NO WARRANTY, AND DISCLAIMS ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, IN CONNECTION WITH ACCESSORIES, EQUIPMENT, MATERIALS OR COMPONENTS SOLD BUT NOT MANUFACTURED BY GRACO.** These items sold, but not manufactured by Graco (such as electric motors, switches, hose, etc.), are subject to the warranty, if any, of their manufacturer. Graco will provide purchaser with reasonable assistance in making any claim for breach of these warranties.

In no event will Graco be liable for indirect, incidental, special or consequential damages resulting from Graco supplying equipment hereunder, or the furnishing, performance, or use of any products or other goods sold hereto, whether due to a breach of contract, breach of warranty, the negligence of Graco, or otherwise.

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For patent information, see [www.graco.com/patents](http://www.graco.com/patents).

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**Toll Free Phone Number:** 1-800-328-0211

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Original instructions. This manual contains English. MM 3A7259

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