

Operation



# H-20/35 Pro<sup>TM</sup> Proportioner

311392C

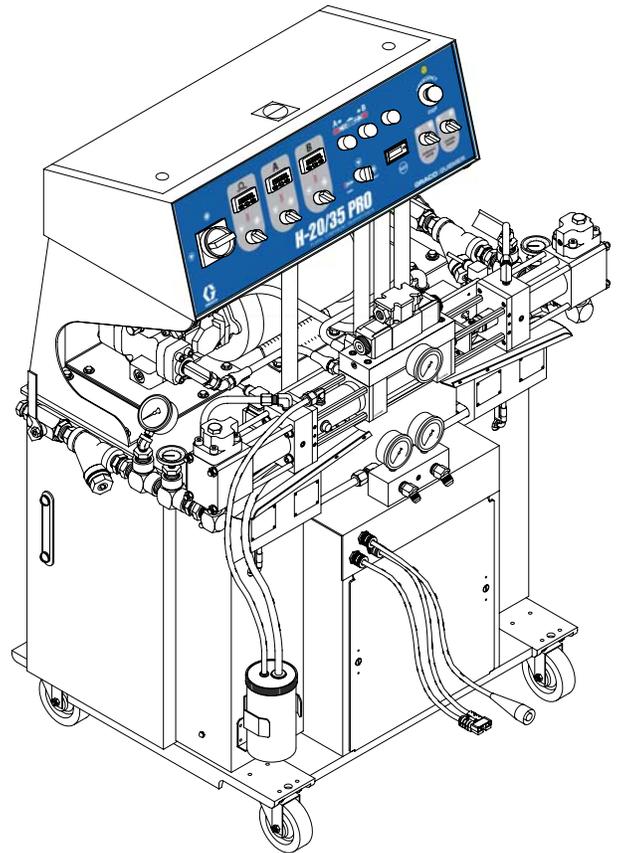
*For spraying polyurethane foam and polyurea coatings.  
Not for use in explosive atmospheres.*



#### **Important Safety Instructions**

Read all warnings and instructions in this manual.  
Save these instructions.

See page 3 for model information, including  
maximum working pressure.



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## Related Manuals

For Repair instructions and parts, see manual 311393.

# Models

Part No., Series	Model	Maximum Working Pressure psi (MPa, bar)	Voltage	Amps	Total Heater Watts
295500, A	H20 Pro	2000 (13.8, 138)	230V, 60 Hz, 1 phase	100	12000
295501, A	H20 Pro	2000 (13.8, 138)	230V, 60 Hz, 3 phase	60	12000
295502, A	H20 Pro	2000 (13.8, 138)	230V, 60 Hz, 3 phase	74	18000
295503, A	H20 Pro	2000 (13.8, 138)	380V, 60 Hz, 3 phase	48	12000
295504, A	H20 Pro	2000 (13.8, 138)	380V, 60 Hz, 3 phase	62	18000
295505, A	H20 Pro	2000 (13.8, 138)	460V, 60 Hz, 3 phase	30	12000
295506, A	H20 Pro	2000 (13.8, 138)	460V, 60 Hz, 3 phase	37	18000
295507, A	H25 Pro	2500 (17.2, 172)	230V, 60 Hz, 1 phase	100	12000
295508, A	H25 Pro	2500 (17.2, 172)	230V, 60 Hz, 3 phase	60	12000
295509, A	H25 Pro	2500 (17.2, 172)	230V, 60 Hz, 3 phase	74	18000
295510, A	H25 Pro	2500 (17.2, 172)	380V, 60 Hz, 3 phase	48	12000
295511, A	H25 Pro	2500 (17.2, 172)	380V, 60 Hz, 3 phase	62	18000
295512, A	H25 Pro	2500 (17.2, 172)	460V, 60 Hz, 3 phase	30	12000
295513, A	H25 Pro	2500 (17.2, 172)	460V, 60 Hz, 3 phase	37	18000
295514, A	H35 Pro	3500 (24.0, 240)	230V, 60 Hz, 1 phase	100	12000
295515, A	H35 Pro, 104 size	2800 (19.3, 193)	230V, 60 Hz, 1 phase	100	12000
295516, A	H35 Pro	3500 (24.0, 240)	230V, 60 Hz, 3 phase	60	12000
295517, A	H35 Pro, 104 size	2800 (19.3, 193)	230V, 60 Hz, 3 phase	60	12000
295518, A	H35 Pro	3500 (24.0, 240)	230V, 60 Hz, 3 phase	74	18000
295519, A	H35 Pro, 104 size	2800 (19.3, 193)	230V, 60 Hz, 3 phase	74	18000
295520, A	H35 Pro	3500 (24.0, 240)	380V, 60 Hz, 3 phase	48	12000
295521, A	H35 Pro	3500 (24.0, 240)	380V, 60 Hz, 3 phase	62	18000
295522, A	H35 Pro	3500 (24.0, 240)	460V, 60 Hz, 3 phase	30	12000
295523, A	H35 Pro	3500 (24.0, 240)	460V, 60 Hz, 3 phase	37	18000

# Warnings

The following general warnings are for 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 appearing 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>WARNING</b>	
	<p><b>ELECTRIC SHOCK HAZARD</b></p> <p>Improper grounding, setup, or usage of the system can cause electric shock.</p> <ul style="list-style-type: none"> <li>• Turn off and disconnect power cord before servicing equipment.</li> <li>• Use only grounded electrical outlets.</li> <li>• Use only 3-wire extension cords.</li> <li>• Ensure ground prongs are intact on sprayer and extension cords.</li> <li>• Do not expose to rain. Store indoors.</li> </ul>
	<p><b>TOXIC FLUID OR FUMES HAZARD</b></p> <p>Toxic fluids or fumes can cause serious injury or death if splashed in the eyes or on skin, inhaled, or swallowed.</p> <ul style="list-style-type: none"> <li>• Read MSDS's to know the specific hazards of the fluids you are using.</li> <li>• Store hazardous fluid in approved containers, and dispose of it according to applicable guidelines.</li> </ul>
	<p><b>PERSONAL PROTECTIVE EQUIPMENT</b></p> <p>You must wear appropriate protective equipment when operating, servicing, or when in the operating area of the equipment to help protect you from serious injury, including eye injury, inhalation of toxic fumes, burns, and hearing loss. This equipment includes but is not limited to:</p> <ul style="list-style-type: none"> <li>• Protective eyewear</li> <li>• Clothing and respirator as recommended by the fluid and solvent manufacturer</li> <li>• Gloves</li> <li>• Hearing protection</li> </ul>
 	<p><b>SKIN INJECTION HAZARD</b></p> <p>High-pressure fluid from gun, 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 gun at anyone or at any part of the body.</li> <li>• Do not put your hand over the spray tip.</li> <li>• Do not stop or deflect leaks with your hand, body, glove, or rag.</li> <li>• Do not spray without tip guard and trigger guard installed.</li> <li>• Engage trigger lock when not spraying.</li> <li>• Follow <b>Pressure Relief Procedure</b> in this manual, when you stop spraying and before cleaning, checking, or servicing equipment.</li> </ul>

 <b>WARNING</b>	
	<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. To help prevent fire and explosion:</p> <ul style="list-style-type: none"> <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 arc).</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>• Ground all equipment in the work area. See <b>Grounding</b> instructions.</li> <li>• Use only grounded hoses.</li> <li>• Hold gun firmly to side of grounded pail when triggering into pail.</li> <li>• If there is static sparking or you feel a shock, <b>stop operation immediately</b>. Do not use equipment until you identify and correct the problem.</li> <li>• Keep a fire extinguisher in the work area.</li> </ul>
	<p><b>PRESSURIZED ALUMINUM PARTS HAZARD</b></p> <p>Do not use 1,1,1-trichloroethane, methylene chloride, other halogenated hydrocarbon solvents or fluids containing such solvents in pressurized aluminum equipment. Such use can cause serious chemical reaction and equipment rupture, and result in death, serious injury, and property damage.</p>
	<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 Data</b> in all equipment manuals.</li> <li>• Use fluids and solvents that are compatible with equipment wetted parts. See <b>Technical Data</b> in all equipment manuals. Read fluid and solvent manufacturer's warnings. For complete information about your material, request MSDS forms from distributor or retailer.</li> <li>• Check equipment daily. Repair or replace worn or damaged parts immediately with genuine Graco (ASM) replacement parts only.</li> <li>• Do not alter or modify equipment.</li> <li>• Use equipment only for its intended purpose. Call your Graco 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>
	<p><b>MOVING PARTS HAZARD</b></p> <p>Moving parts can pinch 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>• Pressurized equipment can start without warning. Before checking, moving, or servicing equipment, follow the <b>Pressure Relief Procedure</b> in this manual. Disconnect power or air supply.</li> </ul>
	<p><b>BURN HAZARD</b></p> <p>Equipment surfaces and fluid that's heated can become very hot during operation. To avoid severe burns, do not touch hot fluid or equipment. Wait until equipment/fluid has cooled completely.</p>

# Pressure Relief Procedure

1. Select **Park** on Pump Control Switch.
2. Turn off feed pumps.
3. Trigger gun to relieve pressure.
4. Close gun inlet valves.
5. Close fluid supply inlet valves.

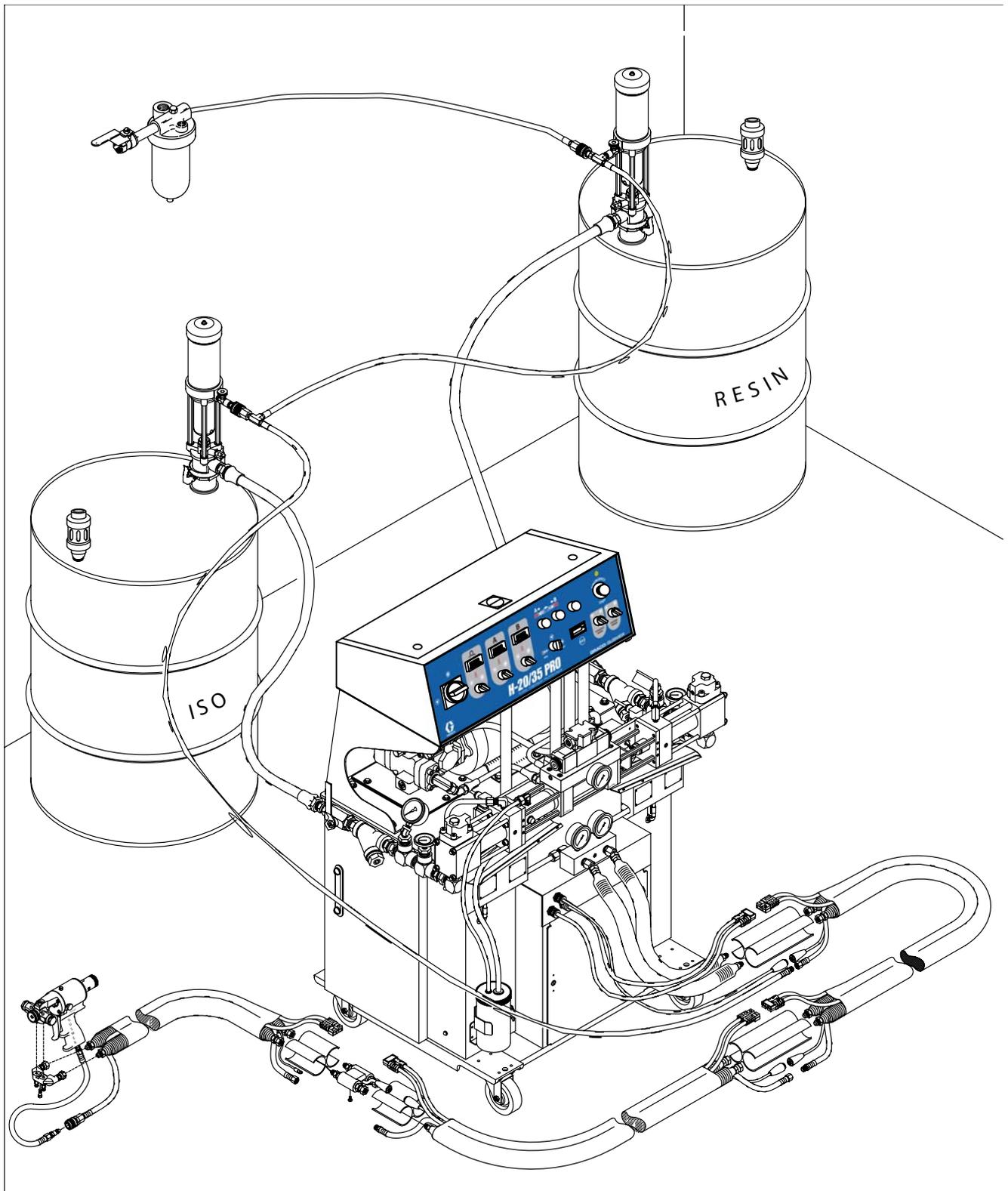
# Flushing

						
Flush equipment only in a well-ventilated area. Do not spray flammable fluids. Do not turn on heaters while flushing with flammable solvents.						

- Flush out old fluid with new fluid, or flush out old fluid with a compatible solvent, such as toluene, naphtha, or mineral spirits before introducing new fluid.
- Use lowest possible pressure when flushing.
- To flush entire system, circulate through gun fluid manifold (with manifold removed from gun).
- Always leave some type of fluid in system. Do not use water.

						
Only use flush solvents that are compatible with fluoroelastomer seals. Non-compatible solvents will damage seals and cause hazardous conditions, such as high pressure leaks and pressure switch failure.						

# Typical Installation



**FIG. 1: H-20/35 Proportioner Typical Installation**

# Component Identification

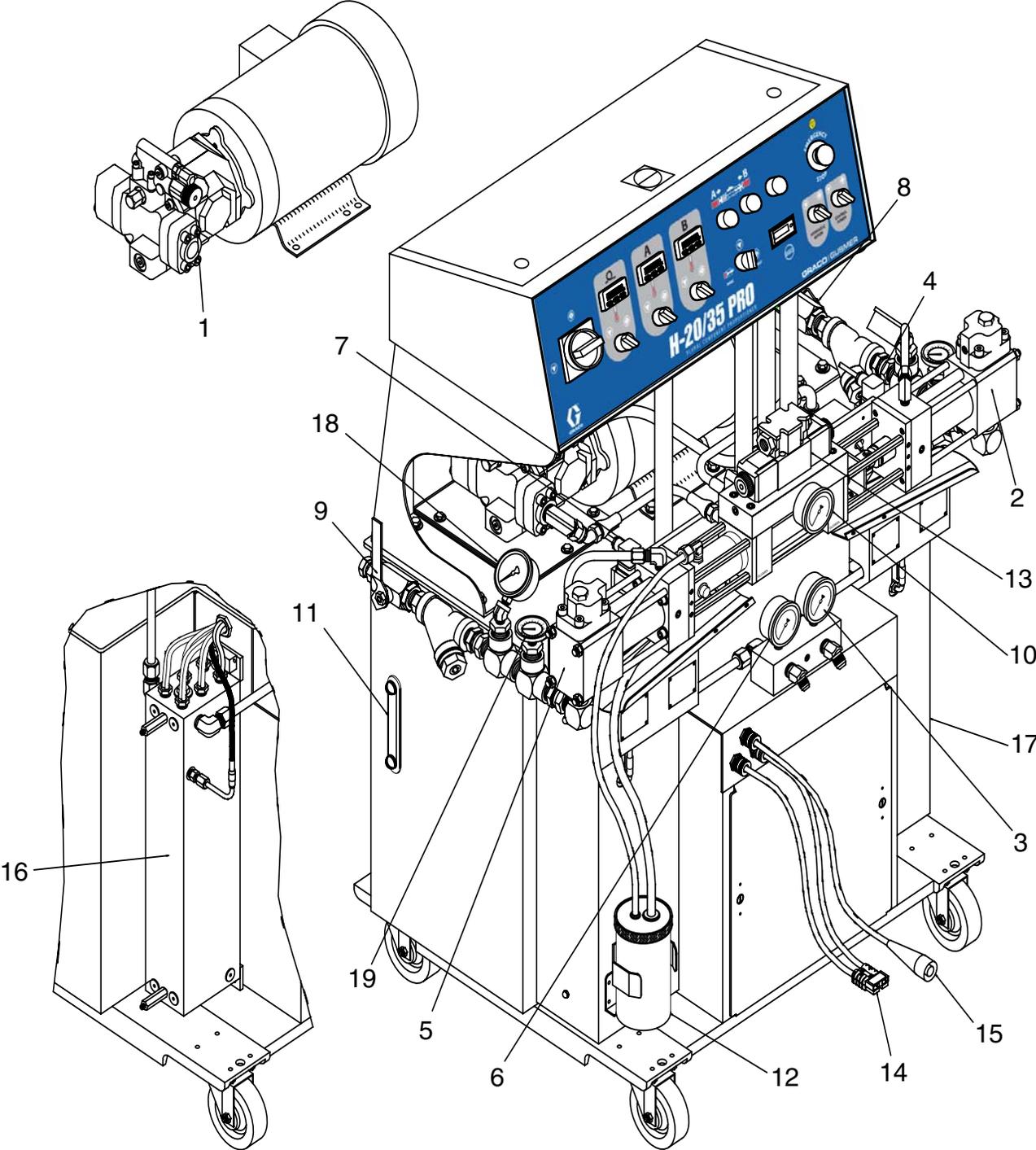
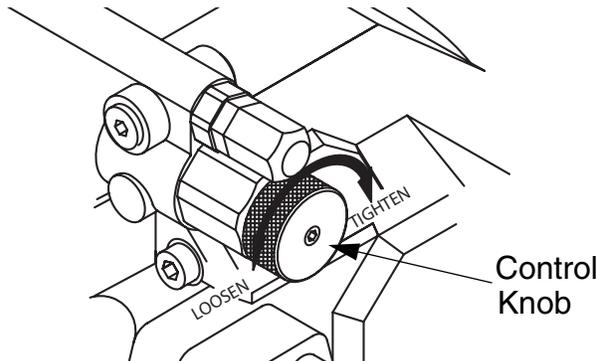


FIG. 2: Component Identification - Main Components

- 1 Hydraulic Pressure Control**  
Pressure control knob is factory-set (full clockwise) to maximum rated hydraulic pressure. To decrease hydraulic pressure, turn knob counterclockwise (knob will stop after approximately 2 turns). To return to maximum pressure, turn knob clockwise until it stops. (See FIG. 3.)



**FIG. 3: Hydraulic Pressure Adjustment**

- 2 B- (Resin) Proportioning Pump**  
Draws in and dispenses a fixed volume of resin material for delivery to mixing chamber of spray gun or pour head.
- 3 B- (Resin) Pressure Gauge**  
Indicates pressure in resin proportioning system.
- 4 B- (Resin) Over-Pressure Safety Switch**  
Factory set to turn off hydraulic drive system when resin proportioning pump exceeds safety switch operating pressure limit. Restarts when pressure drops below limit.
- 5 A- (Isocyanate) Proportioning Pump**  
Draws in and dispenses a fixed volume of isocyanate material for delivery to mixing chamber of spray gun or pour head.
- 6 A- (Isocyanate) Pressure Gauge**  
Indicates pressure in isocyanate proportioning system.
- 7 A- (Isocyanate Over-Pressure Safety Switch)**  
Factory set to turn off hydraulic drive system when isocyanate proportioning pump exceeds safety switch operating pressure limit. Restarts when pressure drops below limit.
- 8 B- (Resin) Inlet Supply Ball Valve**  
Allows delivery of resin to proportioning unit.
- 9 A- (Isocyanate) Inlet Supply Ball Valve**  
Allows delivery of isocyanate to proportioning unit.
- 10 Hydraulic Pressure Gauge**  
Indicates pressure in hydraulic drive system.
- 11 Hydraulic Tank Level Gauge**  
Shows level and temperature of hydraulic fluid in tank.
- 12 Lube Pump System (Iso side only)**  
Continuously circulates pump lube to prevent crystallization of isocyanate on pump shaft.
- 13 Hydraulic Directional Valve**  
Controls direction of hydraulic flow.
- 14 Hose Heat Connector**  
Connects power to heated hoses.
- 15 FTS Harness**  
Carries electrical signal from FTS sensor in isocyanate hose to digital hose temperature controller.
- 16 A- (Isocyanate) Primary Heater**  
Heats isocyanate to required dispensing temperature.
- 17 B- (Resin) Primary Heater**  
(Located behind cover) Heats resin to required dispensing temperature.
- 18 Inlet Pressure Gauge**  
(Both sides) Indicates chemical supply pressure at proportioner inlet.
- 19 Inlet Temperature Gauge**  
(Both sides) Indicates chemical supply temperature at proportioner inlet.

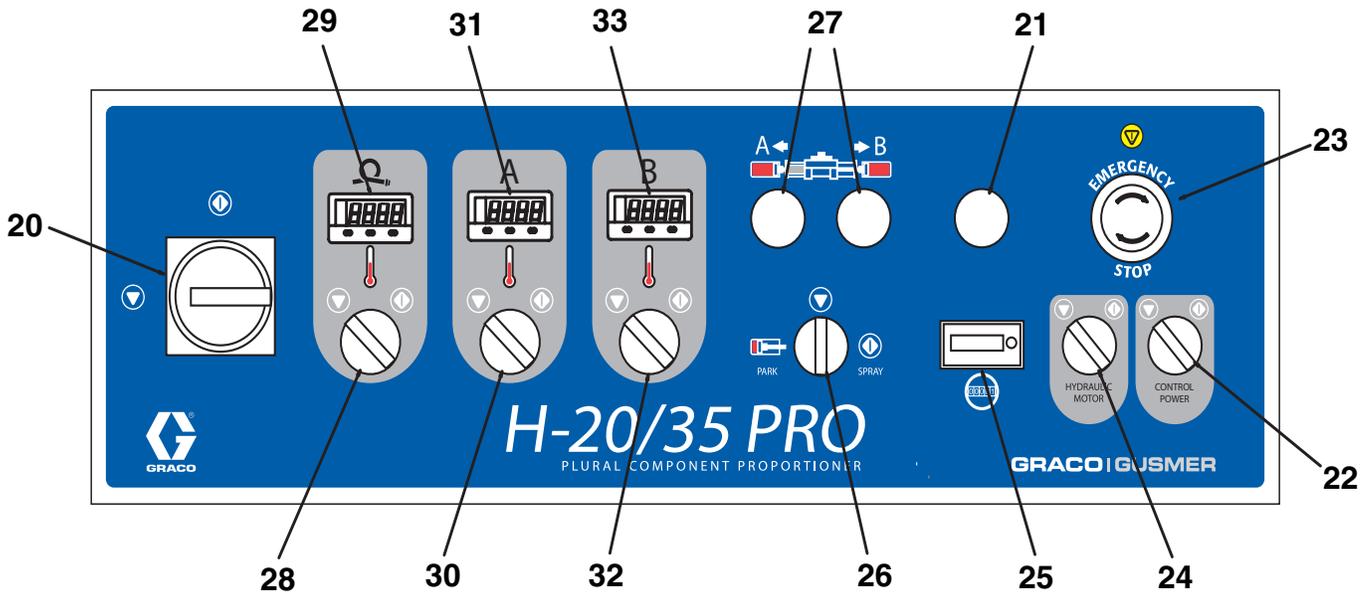


FIG. 4: Component Identification - Front Controls

**20 Main Power Disconnect**

Controls power to all circuits. Must be ON for any function of proportioning unit to operate. Lock disconnect in OFF position during machine maintenance.

<p>Incoming power leads from main electrical source remain energized when main power disconnect is off. To fully de-energize the electrical console, switch off and lock out incoming power at source.</p>						

**21 Main Power Light (White)**

Illuminates when main disconnect switch is in ON position and control power transformer is operational.

**22 Control Power Switch**

Controls 120 VAC control power circuit. In ON position, amber light within switch illuminates. In OFF position, all machine operation stops including motion and heating.

**23 Emergency Stop Switch**

Interrupts units control power circuit to stop all motion and heating. Switch mechanically locks in stop position. Turn switch clockwise to reset and restore normal operation.

**24 Motor Control Switch**

Controls power to electric motor circuit. In ON position, green light within switch illuminates and hydraulic oil begins circulating.

**25 Counter**

Records cycle count of proportioning pumps. One cycle equals two strokes (one in each direction).

**26 Pump Switch**

Controls operation of proportioning pump hydraulic drive cylinder. Pump switch has 3 settings:

- **Off** - Deactivates pump system and shuts off hydraulic directional valve. Hydraulic pressure cannot be generated in this position.
- **Spray**- Powers pump; must be set for system to operate. Used for all normal operation of the pump system, including pressurizing system and dispensing chemical.
- **Park** - Use during any period of machine inactivity. Pump system is energized so that isocyanate pump shaft is retracted into pump cylinder. Also, shields isocyanate pump shaft from moisture to limit crystallization during periods of machine inactivity.

**27 Pump Directional Indicator Lights**

Indicate direction of proportioning pump travel. Both lights are off when pump switch is in OFF position or when chemical pump pressure exceeds setting of overpressure safety switches.

**28 Hose Heater Switch**

Energizes hose heat system circuit. In ON position, green light within switch illuminates.

**29 Hose Heat Temperature Controller**

Digital display of controller is energized when control power switch is activated. Hose heater switch must be in ON position before heating process begins. (See **Digital Temperature Controllers**, page 20.)

**30 A- (Isocyanate) Primary Heater Switch**

Energizes A-primary heater system circuit. In ON position, green light within switch illuminates.

**31 A- (Isocyanate) Primary Heater Temperature Controller**

Digital display of controller is energized when control power switch is activated. A- primary heater switch must be in the ON position before heating process begins. (See **Digital Temperature Controllers**, page 20.)

**32 B- (Resin) Primary Heater Switch**

Energizes B-primary heater system circuit. In ON position, green light within switch illuminates.

**33 B- (Resin) Primary Heater Temperature Controller**

Digital display of controller is energized when control power switch is activated. B- primary heater switch must be in ON position before heating process begins. (See **Digital Temperature Controllers**, page 20.)

**34 Hose Heat Secondary Circuit Breaker**

50-amp circuit breaker; protects hose heat system by limiting current to hose heat element. Must be ON for heated hoses to function.

**35 Control Circuit Transformer**

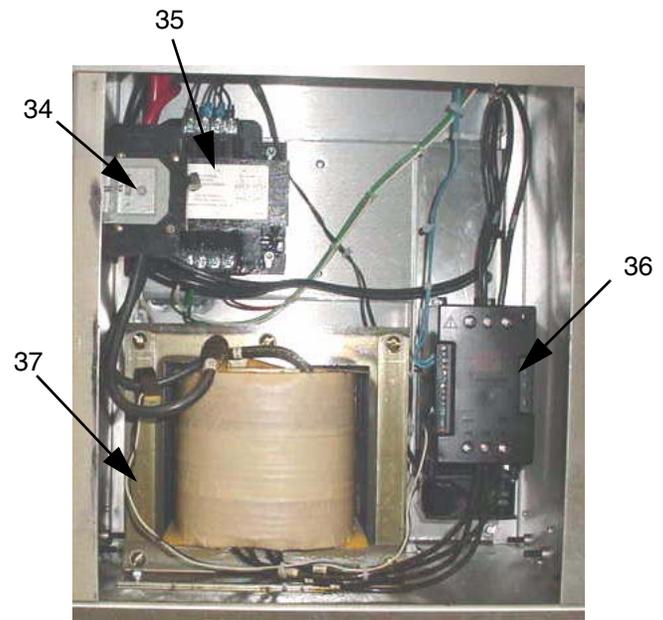
Reduces incoming line voltage to 120 VAC for use by control circuit system.

**36 Hose Power System Controller**

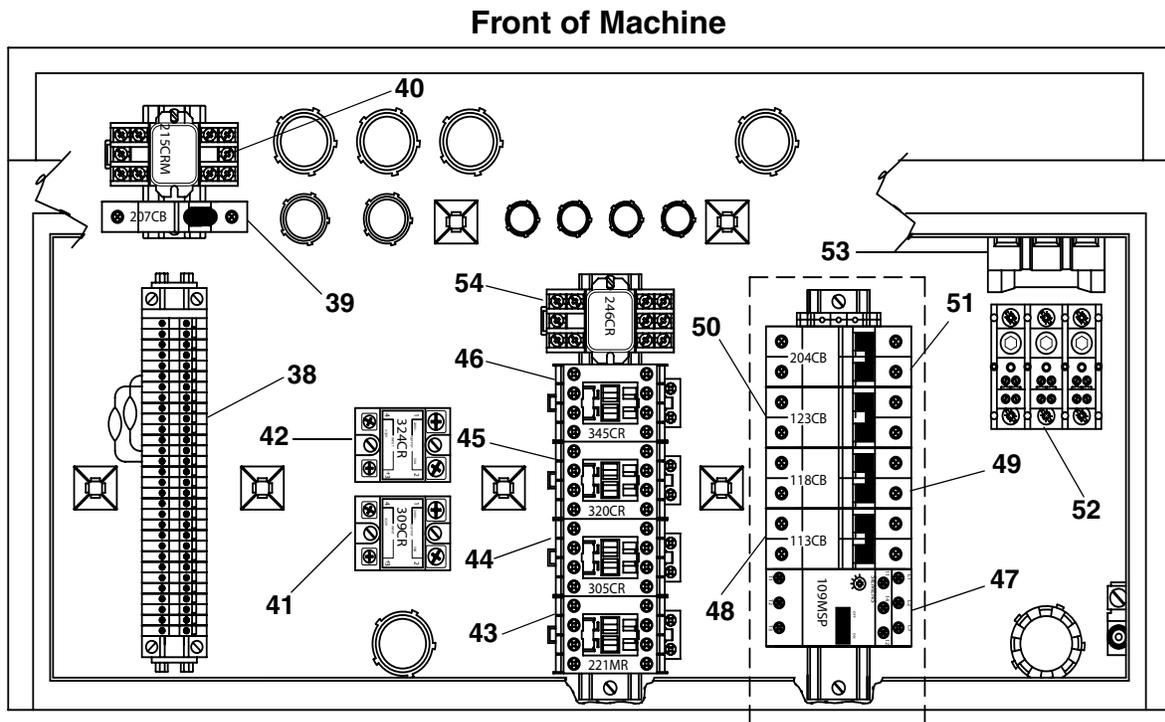
Automatically manages electrical current supplied to hose heat system.

**37 Hose Heat System Transformer**

Provides isolated low-voltage output for heating various chemical hose lengths.



**FIG. 5: Transformer Compartment Electrical Components**



**FIG. 6: Electrical Console Components**

- |   |  |
|---|--|
| <p><b>38 Control Main Terminal Block</b><br/>Termination/distribution point for control system component wires.</p> <p><b>39 Control Transformer Secondary Circuit Breaker</b><br/>Provides over-current protection for control transformer secondary 120 VAC output.</p> <p><b>40 Master Relay</b><br/>Controls distribution of 120 VAC to control power system. Control power switch energizes relay.</p> <p><b>41 A- (Isocyanate) Heater Control Relay</b><br/>Controls distribution of line voltage to A-primary heater circuit. A-primary heater temperature controller controls relay.</p> <p><b>42 B- (Resin) Primary Heater Control Relay</b><br/>Controls distribution of line voltage to B-primary heater circuit. B-primary heater temperature controller controls relay.</p> <p><b>43 Motor Contractor</b><br/>Supplies line voltage to electric motor. Hydraulic motor switch controls contractor.</p> | <p><b>44 A- (Isocyanate) Primary Heater Contractor</b><br/>Supplies line voltage to A-primary heater. A-primary heater switch controls contractor.</p> <p><b>45 B- (Resin) Primary Heater Control Contractor</b><br/>Supplies line voltage to B-primary heater. B-primary heater switch controls contractor.</p> <p><b>46 Hose Heat Contractor</b><br/>Supplies line voltage to hose heat system. Hose heater switch controls contractor.</p> <p><b>47 Motor Circuit Protector</b><br/>Provides thermal overload and over-current protection for hydraulic motor circuit.</p> <p><b>48 A- (Isocyanate) Heater Circuit Breaker</b><br/>Provides over-current protection for A-primary heater circuit.</p> <p><b>49 B- (Resin) Primary Heater Circuit Breaker</b><br/>Provides over-current protection for B-primary heater circuit.</p> |
|---|--|

- 50 **Hose Heat Transformer Primary Circuit Breaker**  
Provides over-current protection for hose heat transformer primary circuit.
  
- 51 **Control Transformer Primary Circuit Breaker**  
Provides over-current protection for control transformer primary circuit.
  
- 52 **Power Distribution Block**  
Provides power distribution point for incoming line voltage to circuit breaker bank.
  
- 53 **Main Power Disconnect (Inside View)**  
Provides termination point for incoming power.  
Disconnects incoming power from machine circuits.
  
- 54 **Latching Relay**  
Provides electrical power to directional valve solenoid coils and directional indicator lights.

# Initial Set-up

## Main Power Installation

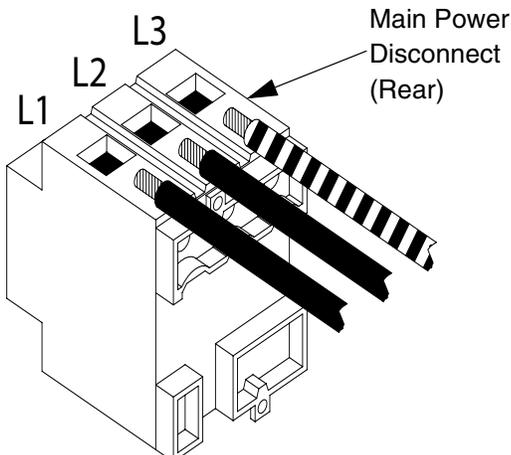


Installing this equipment requires access to parts that may cause electric shock or other serious injury if work is not performed properly. Have a qualified electrician connect power and ground to main power switch terminals. Ensure your installation complies with all National, State, and Local safety and fire codes.

### CAUTION

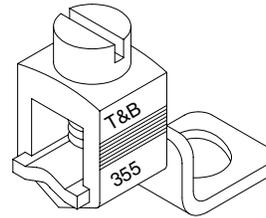
Ensure main power source meets all electrical requirements specified on nameplate of proportioning unit. Also ensure main power source has a dedicated fuse disconnect. Power cord is not supplied.

1. Open electrical console and connect main power cord as follows:
  - a. Feed power cord through strain relief in bottom of console.
    - Single-Phase Units:* connect power leads to L1 and L2.
    - Three-Phase Units:* connect power leads to L1, L2, and L3.
    - 380V Three-Phase Units:* also connect neutral wire to blue neutral terminal block on circuit breaker rail.



**FIG. 7: Main Power Connection**

- b. Connect ground wire to Ground Lug located inside console near strain relief opening.

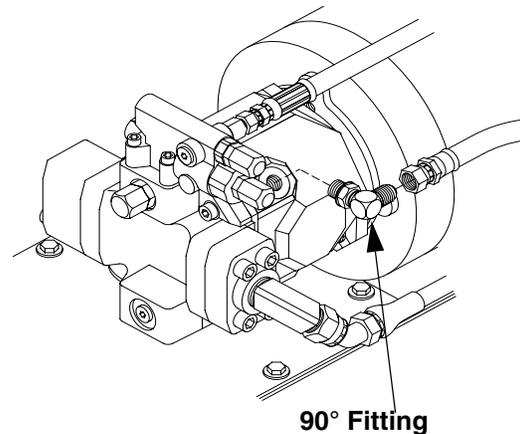


**FIG. 8: Ground Lug**

2. Fill hydraulic reservoir through vented filler neck with approximately 24 gallons of hydraulic fluid. Recommended fluid: Mobil DTE 24 or 25. (Iso Grade 32/46, Viscosity Index 98-100, Superior Anti-wear Type.)

Do **not** overfill reservoir. Level indicator should read approximately 1/2 full with fluid.

3. Check hydraulic pump to ensure it is full with hydraulic fluid as follows:



**FIG. 9: Hydraulic Fluid Level**

- a. Disconnect hydraulic hose from 90° fitting on top of pump.
- b. Remove 90° fitting from top of pump and determine that fluid level is to top of threaded hole.

Add fluid as required and reattach fitting and hose.

4. *Single-Phase Units:* proceed to Step 5.  
*Three-Phase Units only:* Ensure electrical motor is rotating clockwise. A counterclockwise rotation indicates that incoming power leads are incorrectly wired to unit. (See Step 1.)

To check for clockwise rotation:

- Ensure pump, heat hose, A-primary heater switch, and B-primary heater switch are in OFF position and main power source is ON.
  - Turn ON red main disconnect; white pilot light will illuminate.
  - Turn ON amber control power switch; light within switch and temperature controllers will illuminate.
  - While observing fan on end of electric motor, turn hydraulic motor switch ON and OFF. Ensure fan rotates clockwise. If it does not, turn OFF red main disconnect switch and disconnect; lockout incoming power at source.
  - Open electric console and switch any two of the three main power leads on main disconnect. (See FIG. 7.) Recheck direction of rotation and check hydraulic connections for leaks.
5. Set up chemical supply, air supply, and moisture control systems as required. Refer to system instructions for proper set-up and operating procedures.

6. Properly ground all auxiliary equipment.

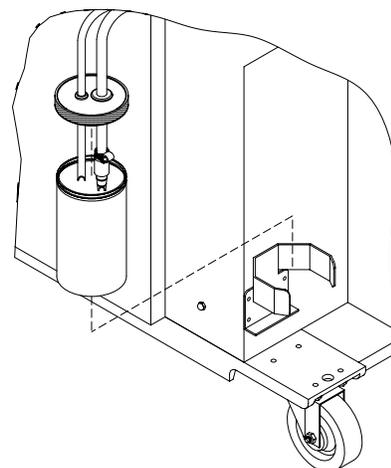
						
<p>If not grounded, high velocity fluid flow can create a static charge, which may spark and cause a fire or explosion. Certain solvents commonly used with this equipment are flammable and present a fire and explosion hazard.</p>						

- Ground material supply (transfer pumps/day tanks).

- The 2:1 Transfer Pump has a ground lug. Ground pump in accordance with the 2:1 Transfer Pump manual.
- Ensure proportioning unit ground at main electrical source is installed in accordance with the National Electrical Code. If generator will power unit, consult an electrician regarding additional grounding measures that may be required.

## Lubrication System Set-up

- Fill lubricant reservoir with pump lubricant (TSL, one quart; 206995).
- Thread reservoir onto reservoir cap assembly and place into bracket.



**FIG. 10: Lubricant Reservoir Installation**

- Push larger diameter supply tube approximately 1/3 of the way into reservoir.
- Push smaller diameter return tube into reservoir until it reaches bottom.

 Ensure larger diameter supply tube is at upper level of reservoir and return tube is at lower level of reservoir. This ensures any isocyanate crystals settle to bottom of reservoir and not return to isocyanate pump shaft.

Lubrication system is ready for operation. No priming is required.

## Material Supply Connections

Connect material supply to inlets of proportioning unit as follows:

 Main air supply must be clean and free of contaminants. Use a minimum of 3/8 in. (10 mm.) ID air line (not supplied) to deliver air supply to heated hoses. A main air shutoff valve to transfer pumps and heated hoses is recommended.

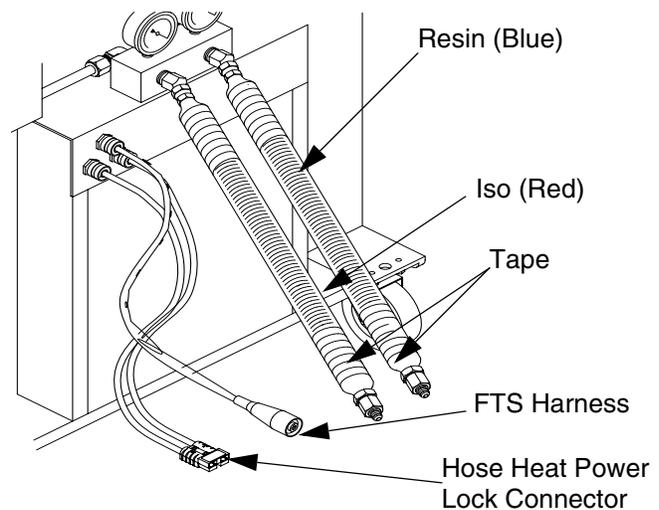
1. Ensure that A- and B-inlet ball valves on proportioning unit are closed.
2. Connect and tighten B- (resin) supply hose to 3/4 FPT swivel fitting on B-inlet ball valve and to resin transfer pump.
3. Connect and tighten A- (isocyanate) supply hose to 1/2 FPT swivel fitting on A-inlet ball valve and to isocyanate transfer pump.
4. Connect air supply to 1/4 npt nipple on the 2:1 Transfer Pump. Remove cap to access nipple.

## Heated Hose Installation

						
<p>Hose connection points are a potential source of chemical and air leaks. These areas are also most exposed to damage due to scuffing and snagging. It is strongly recommended to install a scuff jacket to protect hoses and a FTS extension harness to protect from damage.</p>						

1. Connect isolation hoses to respective primary heater outlet fittings.

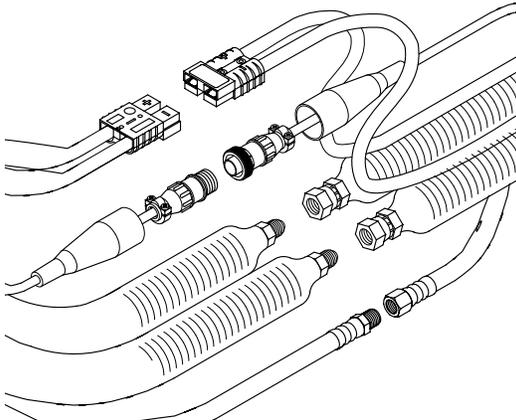
 Heated hose assemblies are connected end to end when shipped to protect them from moisture. Do not separate hoses until you are ready to connect them to proportioning unit.



**FIG. 11: Isolation Hose Connections**

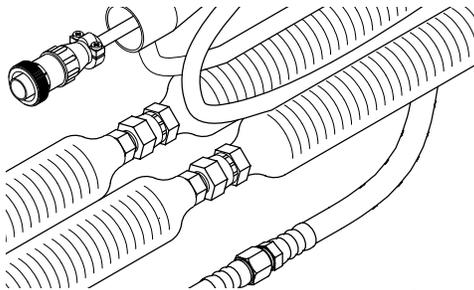
2. Connect heated hose assembly to isolation hoses:

- a. Lay out hose assemblies end-to-end as shown in FIG. 12. A- (isocyanate) hoses are RED. B- (resin) hoses are BLUE.



**FIG. 12: Hose Connection (step a)**

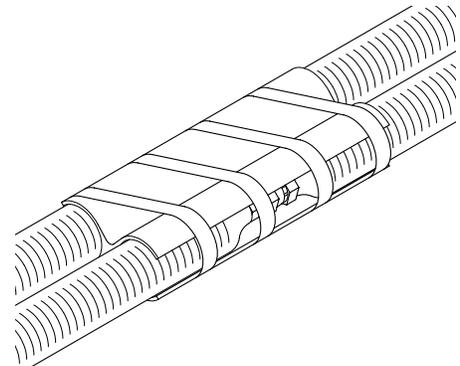
- b. Connect heated hoses to isolation hoses. To ensure a leak-proof chemical connection, do not cross-thread or over-tighten fittings. See FIG. 13.
- c. Connect air hoses and tighten fittings. See FIG. 13.



**FIG. 13: Hose Connection (steps b and c)**

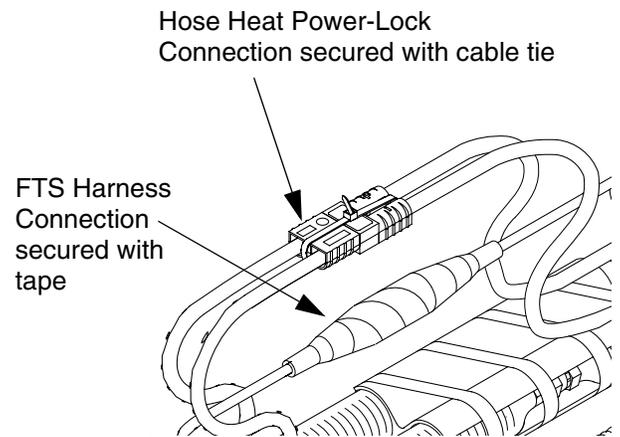
- d. Install isolator between chemical hose fittings. Use small amount of tape to hold in place. See FIG. 14.

 Always install isolator to prevent damage to fittings, but do not tape fully in place until after hoses are pressurized and free of leaks.



**FIG. 14: Hose Connection (step d)**

- e. Connect FTS harness plugs. To ensure a secure electrical connection, place protective isolator boot over each plug and tape together. See FIG. 15.



**FIG. 15: Hose Connection (steps e and f)**

- f. Plug Power-Lock™ hose heat connectors. Secure connection with cable tie provided; failure to do so will disrupt hose heat system if connectors separate. See FIG. 15.

3. Repeat Step 2 to add additional hose assemblies.

4. Install Fluid Temperature Sensing unit (FTS) to gun whip hose as follows:
  - a. Pull out and carefully straighten loose end of temperature probe from FTS.
  - b. Insert temperature probe into isocyanate hose and connect FTS to gun whip hose. To ensure a leak-proof chemical connection, do not cross-thread or over tighten fittings.

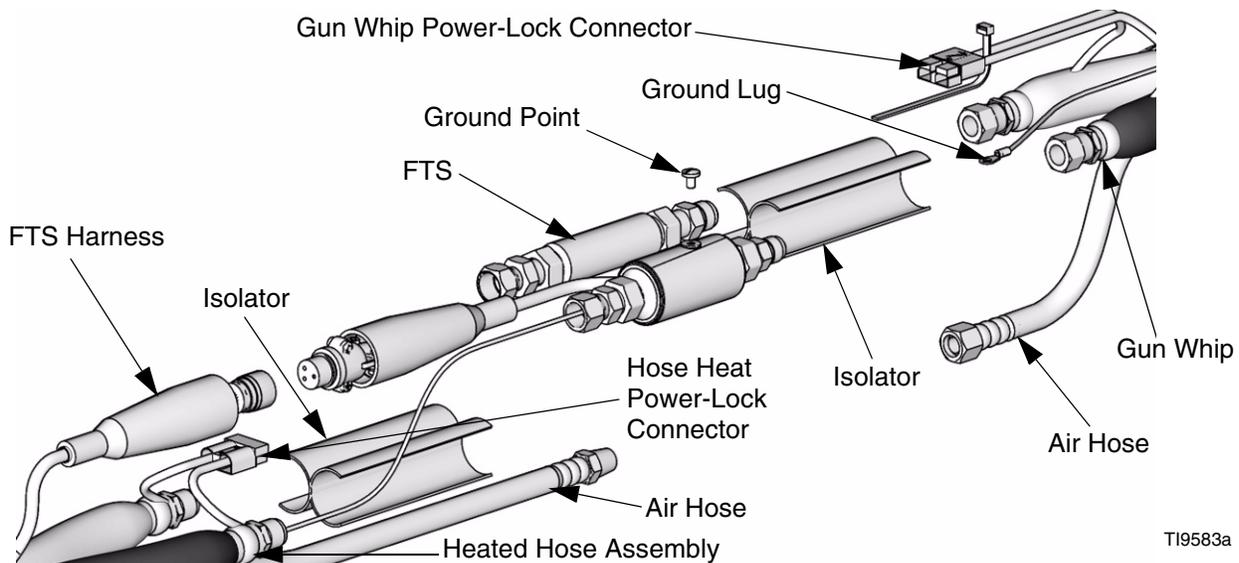
 Ensure hose that contains FTS is kept insulated for accurate hose bundle temperature readings.

- c. Connect ground wire on gun whip hose to ground point on FTS.
- d. Connect heated hose assemblies to FTS. To ensure a leak-proof chemical connection, do not cross-thread or overtighten fittings.

 Do not crush hose or bend hose where sensor is located. Do not coil hose tighter than the recommended 3 ft. (0.9 m.) minimum bend radius.

- e. Connect FTS harness to FTS. To ensure a secure electrical connection, place protective electrical isolator boot over each plug and tape together.
- f. Connect and tighten air hoses.
- g. Cut isolator in half crosswise and secure two pieces in place between hydraulic fittings.
- h. Plug Power-Lock hose heat connectors. Secure connection with cable tie provided; failure to do so will disrupt hose heat system if connectors separate.

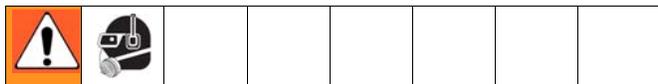
5. Connect main air source to end of air hose included with heated hose assemblies.
6. Install optional hose scuff jacket (if used) over hose lengths.
7. Connect coupling block to gun whip hose; ensure manual valves are closed. See Gun Operation Manual.



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**FIG. 16: FTS Connection**

## Air Purge



Prior to using equipment, purge chemical system of air and test oil residual from functional testing at factory.

1. Turn on main air supply to transfer pumps and drums/day tanks.
2. Open A- and B-inlet supply valves. Check for chemical leaks.
3. Turn hydraulic pressure control fully counterclockwise.
4. Turn ON red main disconnect. White main power light will illuminate.
5. Turn ON amber control power switch; light within switch will illuminate.
6. Hold coupling block with A- and B-ports over separate containers and open both manual valves.
7. Turn ON hydraulic motor switch.
8. Turn pump switch to NORMAL position. If necessary, gradually increase hydraulic pressure by turning hydraulic pressure control clockwise to start proportioning pumps moving slowly.

 A screeching noise is a characteristic of cavitation and is normal at initial start-up for a maximum of 30 seconds. If screeching continues for more than 30 seconds, switch off pump switch and hydraulic motor switch, and ensure that inlet fittings are tight and that pump has not lost its prime.

9. Allow material to flow out of coupling block until spitting of air stops and all traces of residual material have disappeared. Close manual valves and flush any residual chemical from outside of coupling block. See Gun Operation Manual.

 Properly dispose of waste chemicals in accordance with applicable local, state, and federal codes.

10. Slowly increase hydraulic pressure and check all fittings for signs of hydraulic chemical leaks. Tighten fittings as required.
11. Turn OFF pump switch.
12. Mount spray gun to coupling block.

 After proportioning unit is at operating pressure and hose connections are tight and free of leaks, use duct tape to wrap hoses and electrical wires around rubber isolators forming a compact bundle. If using a scuff jacket, pull it over bundle and secure with duct tape.

## Hose Power Control System

The Hose Power Control System automatically maintains optimum power setting for hose heat systems with any hose length from 50 ft. (15 m.) up to 410 ft. (125 m.). There are no operator controls or adjustments required. The system eliminates the need for manual adjustment of transformer tap settings or manual hose heat power control.

## Digital Temperature Controllers

The proportioner has three temperature controllers that automatically manage the temperature for the primary heaters and the hose heater.

 To prevent damage to primary heaters and hoses, do not turn on heat controller switches under temperature controllers until purging procedures are complete and heater and hoses are filled with chemical.

To change or enter the set point, proceed as follows:

1. Ensure red main disconnect is ON. White pilot light will illuminate.
2. Ensure amber control power switch is ON. Light within switch and controllers will illuminate.

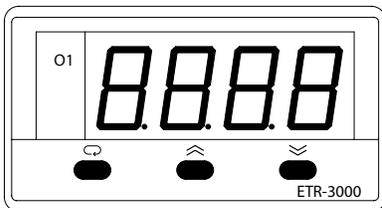


FIG. 17: Temperature Controller

3. Press and release  button. Display will read "SP1". Press and release  or  button to display set point.

 Temperature controller normally displays actual temperature. When illuminated, red "01" display at upper left indicates that heater is in heating mode. The "01" disappears when liquid in heater reaches set point temperature. The "01" cycles on and off to indicate temperature maintenance.

4. Press and hold  button or  button to increase or decrease value.

5. After set point is entered, press and release  and  buttons together to display actual temperature.

						
<p>Controllers are factory programmed and are not field programmable. If you encounter problems with a controller, order a replacement. Do not change any programmed parameters. Do not substitute with controller from alternate supplier; its use may damage equipment and/or cause bodily injury.</p>						

### Change Between Fahrenheit and Celsius

The temperature controller is factory-set to display in Fahrenheit units.

#### To change to Celsius units:

1. Press and release  button 3 times. Controller will display "UNIT".
2. Press and release  button once to display "F".
3. Press and release  button once again to display "C".
4. Press and release  button 2 times. Controller will display Celsius units.

#### To change back to Fahrenheit units:

1. Press and release  button 3 times. Controller will display "UNIT".
2. Press and release  button once to display "C".
3. Press and release  button once again to display "F".
4. Press and release  button 2 times. Controller will display Fahrenheit units.

# Operation

## Daily Start-up Procedure



This procedure describes normal operation. Assume all calibrations have been correctly executed and heating system is not at operating temperature.

1. Check condition of hydraulic and isocyanate lubrication systems and service as required. Change pump lubricant when it shows signs of color change.
2. Ensure supply system is at correct temperature as recommended by chemical system supplier. Also ensure individual chemicals are correctly mixed within their drums/day tanks, and moisture protection system is properly set for operation.
3. Check inlet screens and service as required.
4. Turn on main air supply to transfer pumps.
5. Open A- and B-inlet supply valves.
6. If red emergency stop switch has been activated, turn knob to reset it.
7. Turn ON red main disconnect; white main power light will illuminate.
8. Turn ON amber control power switch; light within switch will illuminate.

**CAUTION**

Uncoil heated hoses before turning on hose heater switch to prevent overheating and hot spots within hose.

9. Turn ON green hose heater switch; light within will illuminate. Temperature controller will cycle toward set point. If you need to change set point, see **Digital Temperature Controllers**, page 20.
10. After hose comes up to temperature, turn ON green A- and B-heater switches; lights within switches will illuminate. Temperature controllers will cycle toward

set point. If you need to change either set point, see **Digital Temperature Controllers**, page 20.

Primary heating ramps up at 10°F (5.5°C) per minute. Do not turn on primary heaters until required for operation. Turn off primary heaters during shutdowns that exceed 30 minutes.

To prevent excessive pressure build-up in heated hose, bring hose up to set point temperature before turning on hydraulic system.

11. Turn ON green hydraulic motor switch; light within switch will illuminate.
  12. Turn pump switch to NORMAL. One of the amber lights will illuminate and proportioning pumps will move a short distance and pressurize.
  13. Adjust hydraulic pressure as required. See Hydraulic Pressure Control section of **Component Identification**, page 8.
  14. Check pressure of each proportioning pump:
    - a. Ensure pump switch is set to NORMAL, and monitor both pressure gauges. Resin and isocyanate pressures should be approximately equal and pressures must remain fixed.
    - b. Set pump switch to RETRACT and monitor both pressure gauges; they must remain fixed. If pressure bleeds off on either stroke, see the Troubleshooting section of the Service and Repair Manual (311393).
- Pump switch must be in NORMAL or RETRACT position to adjust hydraulic pressure.
15. Proportioning unit is ready for operation. Connect air supply to spray gun. See Spray Gun Operation Manual for instructions.

## Daily Shutdown Procedure

1. Set pump switch to RETRACT.
2. Trigger spray gun off target until isocyanate pump stops in retracted position and spray pattern begins to diminish.

 Do not bleed pressure to 0. Some pressure is required to keep packings operating normally and to prevent seepage during shutdown.

3. Turn OFF green hydraulic motor switch; light will turn off.
4. Turn OFF green A- and B-heater switches; lights will turn off.

5. Turn OFF green hose heater switch; light will turn off.
6. Turn OFF amber control power; light will turn off and temperature controller will go out.
7. Turn OFF red main disconnect; white main power light will turn off.
8. Close A- and B-inlet supply valves.
9. Coil and store heated hose in manner that prevents damage.
10. Shut down chemical supply as required.
11. Turn OFF main air supply to transfer pumps.
12. Shut down and service spray gun as required. See Spray Gun Operation Manual.

# Technical Data

Category	Data
Maximum working pressure	<i>Model H20 Pro:</i> 2000 psi (13.8 MPa, 138 bar) <i>Model H25 Pro:</i> 2500 psi (17.2 MPa, 172 bar) <i>Model H35 Pro 104:</i> 2800 psi (19.3 MPa, 193 bar) <i>Model H35 Pro:</i> 3500 psi (24.0 MPa, 240 bar)
Maximum fluid temperature	190°F (88°C)
Maximum output (may vary due to operating conditions)	<i>Model H20 Pro:</i> 38 lb/min (17.3 kg/min) <i>Model H25 Pro:</i> 31 lb/min (14.1 kg/min) <i>Model H35 Pro 104:</i> 27 lb/min (12.3 kg/min) <i>Model H35 Pro:</i> 22 lb/min (10.0 kg/min)
Viscosity range	250-1500 centipoise
Maximum material inlet pressure	400 psi (2.7 MPa, 27 bar)
Voltage requirement +/- 10%	See <b>Models</b> , page 3
Amperage requirement	See <b>Models</b> , page 3
Total heater watts	<i>Part Nos. 295500, 295501, 295503, 295505, 295507, 295508, 295510, 295512, 295514, 295515, 295516, 295517, 295520, and 295522:</i> 12000 W  <i>Part Nos. 295502, 295504, 295506, 295509, 295511, 295513, 295518, 295519, 295521, and 295523:</i> 18000 W
Watts per heater	<i>Part Nos. 295500, 295501, 295503, 295505, 295507, 295508, 295510, 295512, 295514, 295515, 295516, 295517, 295520, and 295522:</i> 6000 W  <i>Part Nos. 295502, 295504, 295506, 295509, 295511, 295513, 295518, 295519, 295521, and 295523:</i> 9000 W
Hydraulic reservoir capacity	24 gal. (91 liters)
Recommended hydraulic fluid	Mobil DTE 24 or 25
Recommended hydraulic operating temperature	120°F (48°C)
Maximum hydraulic operating temperature	160°F (71°C)
Hydraulic operating pressure	<i>Model H20 Pro:</i> 250-1050 psi (1.7-7.4 MPa, 17-74 bar) <i>Model H25 Pro:</i> 250-1300 psi (1.7-9.1 MPa, 17-91 bar) <i>Model H30 Pro 104:</i> 250-1300 psi (1.7-9.1 MPa, 17-91 bar) <i>Model H30 Pro:</i> 250-1225 psi (1.7-8.6 MPa, 17-86 bar)
Inlet filter size	80 mesh standard
Component B (resin) inlet	3/4 npt(f)
Component A (isocyanate) inlet	1/2 npt(f)
Maximum heated hose length	410 ft (125 m)
Height	47 in. (119 cm)
Width	40 in. (102 cm)
Depth	22 in. (56 cm)
Weight	Empty: 385 lb (175 kg) Filled: 735 lb (333 kg)
Wetted parts	Carbon Steel, Stainless Steel, Chrome Aluminum, PTFE, Acetal, UHMWPE, fluoroelastomer

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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.

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