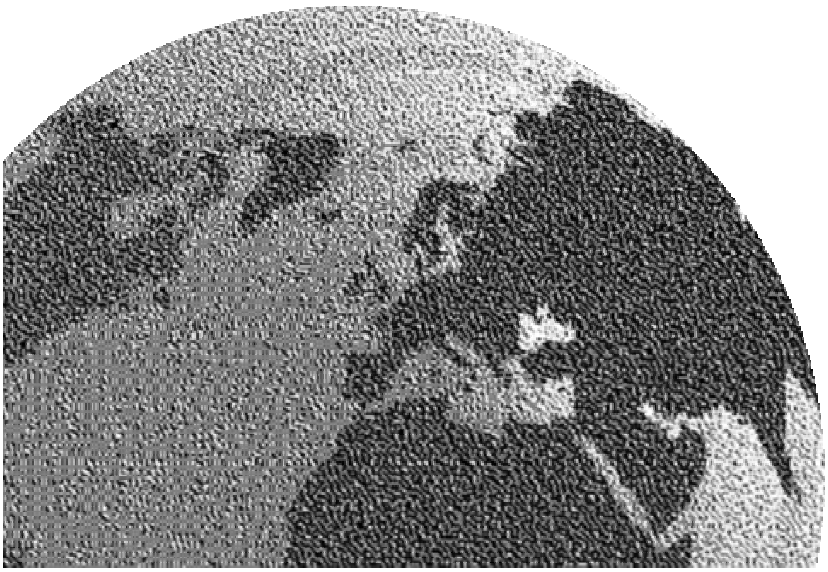
GUSMER®
CORPORATION

"Success through Unity"

H-20/35 Series Proportioning Unit

Operating Manual 42942-1



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GUSMER CORPORATION ®

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NOTICE: *This manual contains important information about your GUSMER equipment. Read and retain for future reference.*

NOTICE:
The equipment described in this technical manual must only be operated or serviced by properly trained individuals, thoroughly familiar with the operating instructions and limitations of the equipment. For technical service, call your local distributor. Call: 1-800-FOR-GSMR (1-800-367-4767) for the name and telephone number of your local distributor.

NOTICE:
All statements, information and data given herein are believed to be accurate and reliable but are presented without guarantee, warranty or responsibility of any kind expressed or implied. Statements or suggestions concerning possible use of GUSMER equipment are made without representation or warranty that any such use is free of patent infringement, and are not recommendations to infringe any patent. The user should not assume that all safety measures are indicated or that other measures may not be required.

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WARRANTY

Gusmer Corporation (Gusmer) provides a limited warranty to the original purchaser (Customer) of Gusmer manufactured parts and equipment (Product) against any defects in material or workmanship for a period of one year from the date of shipment from Gusmer facilities.

In the event Product is suspected to be defective in material or workmanship, it must be returned to Gusmer, freight prepaid. If Product is found to be defective in material or workmanship, as determined solely by Gusmer, Gusmer will issue full credit to Customer for the freight charges incurred in returning the defective Product, and either credit will be issued for the replacement cost of the Product or a replacement part will be forwarded no-charge, freight prepaid to Customer.

This warranty shall not apply to Product Gusmer finds to be defective resulting from: installation, use, maintenance, or procedures not accomplished in accordance with our instructions; normal wear; accident; negligence; alterations not authorized in writing by Gusmer; use of "look alike" parts not manufactured or supplied by Gusmer; or Product used in conjunction with any other manufacturer's pumping or proportioning equipment. Further, the terms and conditions of this warranty shall not apply to services or repairs made to Product by any third party not authorized in writing by Gusmer. For such Product, a written estimate will be submitted to Customer at a nominal service charge, itemizing the cost for repair. Disposition of Product will be done in accordance with the terms stated on the written estimate.

The warranty provisions applied to product that are not manufactured by Gusmer will be solely in accordance with the warranty provided by the original manufacturer of the product.

GUSMER MAKES NO WARRANTY WHATSOEVER AS TO THE MERCHANTABILITY OF, OR SUITABILITY FOR, ITS PRODUCT TO PERFORM ANY PARTICULAR PURPOSE. CREDIT FOR, OR REPLACEMENT OF, PRODUCT DEFECTIVE IN MATERIAL OR WORKMANSHIP SHALL CONSTITUTE COMPLETE FULFILLMENT OF GUSMER OBLIGATIONS TO CUSTOMER. NO OTHER WARRANTY, EXPRESS OR IMPLIED ON ANY PRODUCT IT MANUFACTURES AND/OR SELLS, WILL BE RECOGNIZED BY GUSMER UNLESS SAID WARRANTY IS IN WRITING AND APPROVED BY AN OFFICER OF GUSMER.

Under no circumstances shall Gusmer be liable for loss of prospective or speculative profits, or special, indirect, incidental or consequential damages. Further, Gusmer shall have no liability for any expenses including, but not limited to personal injury or property damage resulting from failure of performance of the product, use of the product, or application of the material dispensed through the product. Any information provided by Gusmer that is based on data received from a third source, or that pertains to product not manufactured by Gusmer, while believed to be accurate and reliable, is presented without guarantee, warranty, or responsibility of any kind, express or implied.

Gusmer through the sale, lease, or rental of Product in no way expresses or implies a license for the use of, nor encourages the infringement of any patents or licenses.

To insure proper validation of your warranty, please complete the warranty card and return it to Gusmer within two weeks of receipt of equipment.

Revised 11/12/98

GENERAL SAFETY INFORMATION

It is necessary to understand and follow the instructions in this manual to ensure proper and safe operation of the equipment.

As with most mechanical equipment, certain safety precautions must be taken when the equipment discussed in this manual is operated or serviced. Severe bodily injury or damage to equipment and property may result if the instructions and precautions listed throughout this manual are not followed.

Needless to say, sufficient guidelines cannot be developed to eliminate the need for good common sense in the use and servicing of this equipment, and in the use and application of the products, this equipment has been designed to process. Users of this equipment must therefore, make their own determination as to the suitability of the information contained in this manual to their specific operation and requirements. There should be no assumption made that the safety measures and instructions contained herein are all-inclusive, and that other safety measures may not be required for specific use or application.

The following safety guidelines are generally applicable to the safe and efficient use of the equipment.

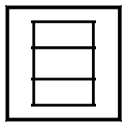
Acceptable Equipment Uses

The equipment is designed for the dispensing of polyurethane foams, two-component coating systems, and some two-component epoxy systems, specifically polyureas. Under no circumstances should any acid or corrosive chemicals be used in the unit. Consult GUSMER if there is any doubt about the compatibility of the chemical system to be used in this equipment.

Any use of this equipment other than as indicated above constitutes misuse unless express written approval is obtained from GUSMER.

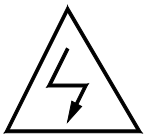
Operational Safety Procedures

This safety information will not be repeated in the text of this manual. The symbols pertaining to this information will appear where appropriate to alert the operator to potential hazards.



Solvents and Chemicals

WARNING: *THE SOLVENTS AND CHEMICALS USED WITH THIS EQUIPMENT EXPOSE THE OPERATOR TO CERTAIN HAZARDS. ADEQUATE PERSONAL PROTECTIVE MEASURES MUST BE TAKEN SO AS TO AVOID EXCEEDING THE THRESHOLD LIMIT VALUE (TLV) OF THE PRODUCTS BEING USED, AS ESTABLISHED BY THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) OR OTHER QUALIFIED AGENCY. OBTAIN INFORMATION CONCERNING PERSONAL PROTECTION AND PROPER HANDLING FROM THE SUPPLIER OF SUCH CHEMICALS.*

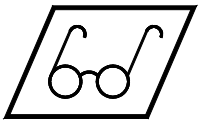


High Voltage

WARNING: *TO PREVENT SERIOUS BODILY INJURY FROM ELECTRICAL SHOCK, NEVER OPEN THE ELECTRIC CONSOLES OR OTHERWISE SERVICE THIS EQUIPMENT AND/OR EQUIPMENT USED WITH IT BEFORE SWITCHING OFF THE MAIN POWER DISCONNECT AND INTERRUPTING SUPPLY VOLTAGE AT THE SOURCE. THE ELECTRICAL SERVICE MUST BE INSTALLED AND MAINTAINED BY A QUALIFIED ELECTRICIAN.*

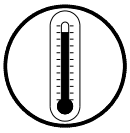
High Pressure

WARNING: *THIS EQUIPMENT HAS OR IS USED WITH EQUIPMENT THAT HAS HYDRAULIC AND CHEMICAL COMPONENTS CAPABLE OF PRODUCING UP TO 3500 PSI. TO AVOID SERIOUS BODILY INJURY FROM INJECTION OF FLUID, NEVER OPEN OR SERVICE ANY CONNECTIONS OR COMPONENTS WITHOUT BLEEDING ALL PRESSURES TO ZERO.*



Personal Protective Equipment

WARNING: *TO AVOID SERIOUS BODILY INJURY, PROPER PROTECTIVE GEAR MUST BE WORN WHEN OPERATING, SERVICING, OR BEING PRESENT IN THE OPERATIONAL ZONE OF THIS EQUIPMENT. THIS INCLUDES, BUT IS NOT LIMITED TO, EYE AND FACE PROTECTION, GLOVES, SAFETY SHOES, AND RESPIRATORY EQUIPMENT AS REQUIRED.*



High Temperature

WARNING: *THIS EQUIPMENT HAS OR IS USED WITH EQUIPMENT THAT HAS HIGH TEMPERATURE COMPONENTS SUCH AS PRIMARY HEATERS AND HEATED HOSES. TO PREVENT SERIOUS BODILY INJURY FROM HOT FLUID OR HOT METAL, NEVER ATTEMPT TO SERVICE THE EQUIPMENT BEFORE ALLOWING IT TO COOL.*

Warning

WARNING: *FAILURE TO READ AND FOLLOW THIS SAFETY INFORMATION MAY RESULT IN PERSONAL INJURY AND/OR DAMAGE TO THE EQUIPMENT FROM ONE OR MORE OF THE ABOVE LISTED HAZARDS.*

DESCRIPTION

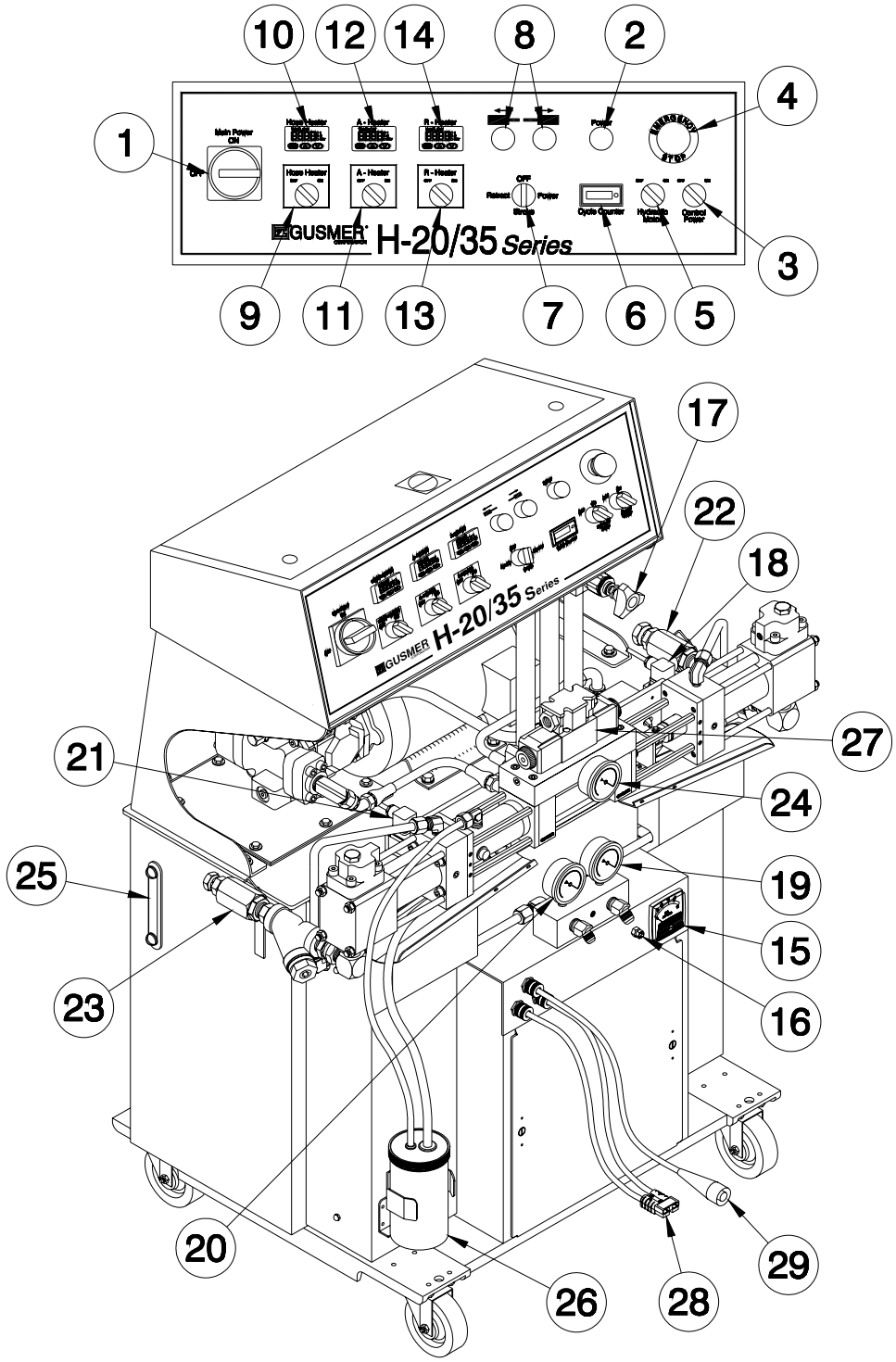


Figure 1. Major Components

1. **MAIN POWER DISCONNECT**- Controls power to all circuits. Must be ON for any function of the proportioning unit to operate. The disconnect can be locked in the OFF position for OSHA required lockout/tagout during machine maintenance.

2. **MAIN POWER LIGHT (WHITE)**- Lights up when the Main Disconnect Switch is in the ON position and the control power transformer is operational.

3. **CONTROL POWER SWITCH**- Turns the unit's 120VAC control power circuit on and off. In the ON position, the amber light within the switch lights up. Removal of control power stops all machine operation including motion and heating.

4. **EMERGENCY STOP SWITCH**- Interrupts the units control power circuit to stop all motion and heating. Switch mechanically locks in the stop position. Turn the switch clockwise to reset it and restore normal operation.

5. **HYDRAULIC MOTOR SWITCH**- Controls power to motor circuit. In the ON position, the green light within the switch lights up.

6. **COUNTER**- Records the cycle count of the proportioning pumps. One cycle equals two strokes (one in each direction).

7. **PUMP SWITCH**- Controls operation of the proportioning pump Hydraulic Drive System

    - **OFF**- Deactivates the pump system. Hydraulic Directional Valve is off and cannot generate hydraulic pressure in this position.

    - **NORMAL**- Must be in this position for the pump system to operate. This position is used for all normal operation of the pump system, including pressurizing of the system and dispensing of chemical.

    - **RETRACT**- The pump system is energized so that the Isocyanate pump shaft is retracted into the pump cylinder. This shields the Isocyanate pump shaft from air to limit crystallization during periods of machine inactivity. The retract position should be used during any period of machine inactivity

8. **PUMP DIRECTIONAL INDICATOR LIGHTS**- Indicates the direction of the proportioning pump travel. Both lights will be OFF when the Pump Switch is in the OFF position or when the chemical pump pressure exceeds the setting of the overpressure safety switches.

9. **HOSE HEATER SWITCH**- Energizes the Hose Heat System circuit. In the ON position, the green light within the switch lights up.

10. **HOSE HEAT TEMPERATURE CONTROLLER**- Digital display of controller will be energized when Control Power Switch is activated. Controller will display set point temperature. Press the "SET" button to display the process temperature. Display will shift back to set point after 10 seconds. The Hose Heater Switch must be in the ON position before heating process will begin.

11. **A- (ISOCYANATE) PRIMARY HEATER SWITCH**- Energizes the A-Primary Heater system circuit. In the ON position, the green light within the switch lights up.

12. **A- (ISOCYANATE) PRIMARY HEATER TEMPERATURE CONTROLLER**- Digital display of controller will be energized when Control Power Switch is activated. Controller will display set point temperature. Press the "SET" button to display the process temperature. Display will shift back to set point after 10 seconds. A- Primary Heater Switch must be in the ON position before heating process will begin.

13. **R- (RESIN) PRIMARY HEATER SWITCH**- Energizes the R-Primary Heater system circuit. In the ON position, the green light within the switch lights up.

14. **R- (RESIN) PRIMARY HEATER TEMPERATURE CONTROLLER**- Digital display of controller will be energized when Control Power Switch is activated. Controller will display set point temperature. Press the "SET" button to display the process temperature. Display will shift back to set point after 10 seconds. R- Primary Heater Switch must be in the ON position before heating process will begin.

15. **HOSE HEAT AMMETER**- Displays the amperage (power) flowing in the Hose Heat System.

16. **HOSE HEAT POWER SET**- Controls and adjusts the amount of amperage in the Hose Heat System. Loosen lock nut before adjusting potentiometer. Tighten lock nut after adjustment is completed.

17. **HYDRAULIC PRESSURE CONTROL-** Controls the hydraulic pressure available to the Hydraulic Drive System.

18. **R- (RESIN) OVER-PRESSURE SAFETY SWITCH-** Turns off the Hydraulic Drive System when the Resin Proportioning Pump exceeds the safe pressure limitation.

19. **R- (RESIN) PRESSURE GAUGE-** Indicates the pressure in the Resin proportioning system.

20. **A- (ISOCYANATE) PRESSURE GAUGE-** Indicates the pressure in the Isocyanate proportioning system.

21. **A- (ISOCYANATE) OVER-PRESSURE SAFETY SWITCH-** Turns off the Hydraulic Drive System when the Isocyanate proportioning pump exceeds the safe pressure limitation.

22. **R- (RESIN) INLET SUPPLY BALL VALVE**- Allows delivery of Resin to the proportioning unit.

23. **A- (ISO) INLET SUPPLY BALL VALVE**- Allows delivery of Isocyanate to the proportioning unit.

24. **HYDRAULIC PRESSURE GAUGE**- Indicates the pressure in the Hydraulic Drive System.

25. **HYDRAULIC TANK LEVEL GAUGE-** Shows the level of oil in the tank.

26. **LUBE PUMP SYSTEM** *(Iso side only)*- Continuously circulates Pump Lube to prevent the crystallization of Isocyanate on the pump shaft.

27. **HYDRAULIC DIRECTIONAL VALVE-** Controls the direction of hydraulic flow.

28. **HOSE HEAT POWER-LOCK CONNECTION**- Provides power to the Heated Hoses.

29. **TSU HARNESS**- Carries the electrical signal from the TSU Sensor in the Iso Hose to the Hose Heat Temperature Controller.

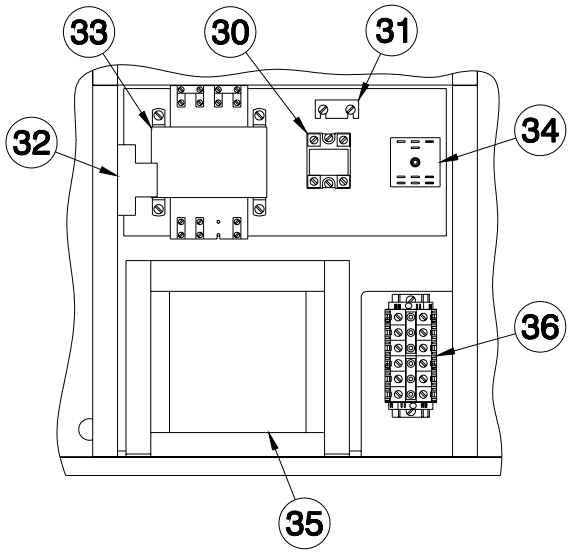


Figure 2. Transformer Compartment Electrical Components

30. **HOSE HEAT SYSTEM SOLID STATE RELAY (SSR)-** The Hose Heat System SSR is controlled by the Hose Heat Temperature Controller. The SSR acts as a switch allowing current to flow in the Hose Heat System Heating Element as required by the Temperature Controller.

31. **HOSE HEAT SSR JUMPER-** The jumper is used to bypass the hose heat system SSR in the event that the SSR fails. This allows continued to operation of the machine by running the Hose Heat System manually.
(See step 10 on page 35.)

32. **HOSE HEAT SYSTEM CIRCUIT BREAKER-** A 50-amp circuit breaker that protects the Hose Heat System by limiting current to the Hose Heat Element.

33. **CONTROL CIRCUIT TRANSFORMER-** Steps down the incoming line voltage to 120 VAC for use by the control circuit system.

34. **PHASE CONTROLLER-** Used in conjunction with the hose heat transformer tap settings to adjust and fine tune the amperage supplied to the hose heat system heating elements.

35. **HOSE HEAT SYSTEM TRANSFORMER-** Steps down incoming line voltage to lower voltages used to heat various lengths of hose.

36. **HOSE HEAT SYSTEM TERMINAL BLOCK ASSEMBLY-** Used to select voltage of 15, 30, 45, 60, 75, or 90 VAC for heating various lengths of hose.
(See Hose Heat Transformer on page 22.)

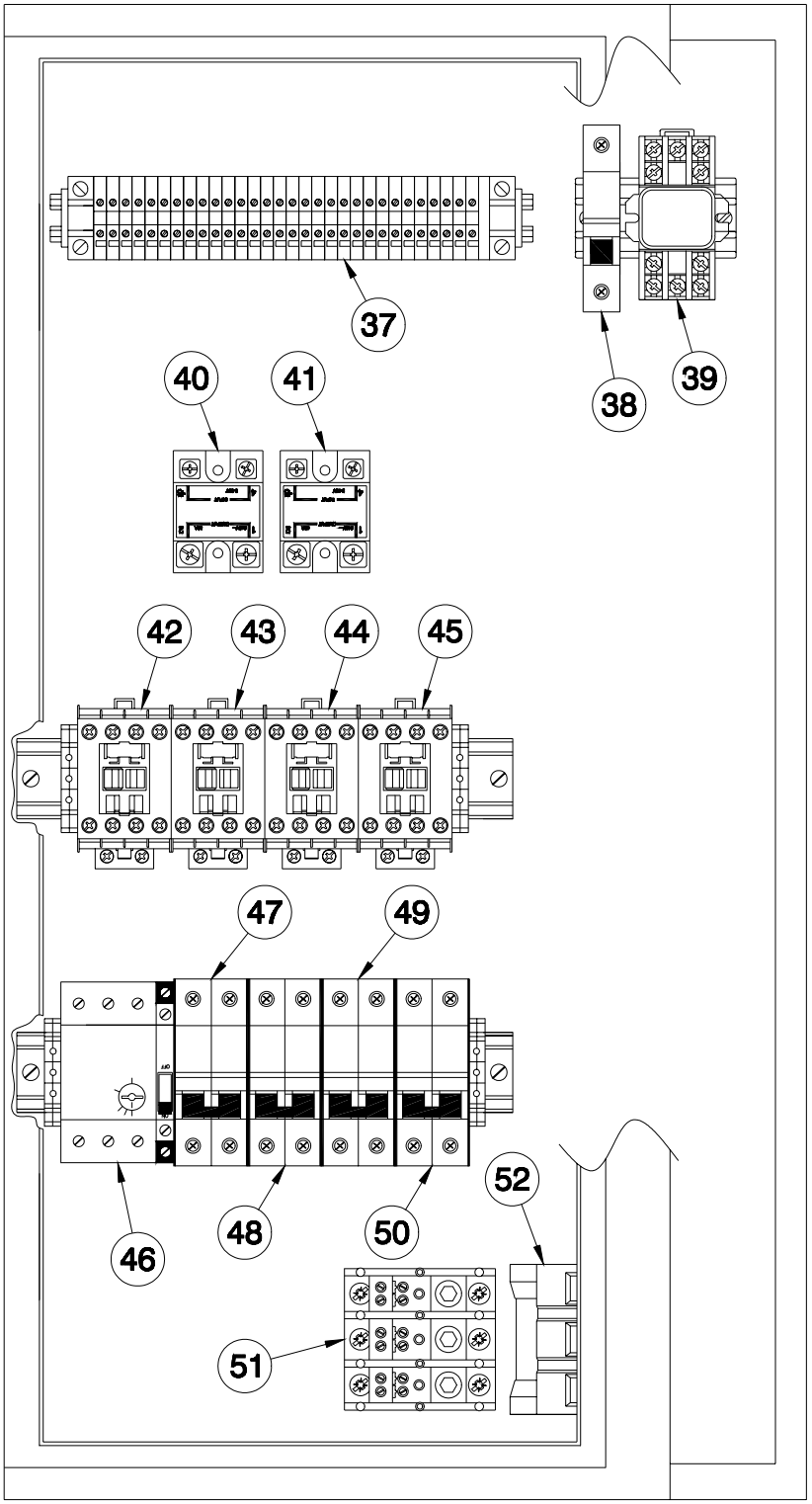


Figure 3. Electrical Console Components

37. **CONTROL MAIN TERMINAL BLOCK**- Termination/distribution point for control system component wires.

38. **CONTROL TRANSFORMER SECONDARY CIRCUIT BREAKER**- Provides over-current protection for the control transformer secondary 120 volt AC output.

39. **MASTER RELAY**- Controls distribution of 120 volt AC to control power system. The Control Power Switch energizes the relay.

40. **A- (ISOCYANATE) HEATER CONTROL RELAY**- Controls distribution of line voltage to A-Primary heater circuit. The A-Primary Heater Temperature Controller controls the relay.

41. **R- (RESIN) PRIMARY HEATER CONTROL RELAY**- Controls distribution of line voltage to R-Primary heater circuit. The R-Primary Heater Temperature Controller controls the relay.

42. **MOTOR CONTACTOR**- Supplies line voltage to electric motor. The Hydraulic Motor Switch controls the contactor.

43. **A- (ISOCYANATE) PRIMARY HEATER CONTACTOR**- Supplies line voltage to the A-Primary Heater. The A- Primary Heater Switch controls the contactor.

44. **R- (RESIN) PRIMARY HEATER CONTROL CONTACTOR**- Supplies line voltage to R-Primary Heater. The R- Primary Heater Switch controls the contactor.

45. **HOSE HEAT CONTACTOR**- Supplies line voltage to Hose Heat System. The Hose Heater Switch controls the contactor.

46. **MOTOR CIRCUIT PROTECTOR**- Provides thermal overload and over-current protection for the hydraulic motor circuit.

47. **A- (ISOCYANATE) HEATER CIRCUIT BREAKER**- Provides over-current protection for the A- Primary Heater circuit.

48. **R- (RESIN) PRIMARY HEATER CIRCUIT BREAKER**- Provides over-current protection for the R- Primary Heater circuit.

49. **HOSE HEAT TRANSFORMER PRIMARY CIRCUIT BREAKER**- Provides over-current protection for the Hose Heat Transformer Primary circuit.

50. **CONTROL TRANSFORMER PRIMARY CIRCUIT BREAKER**- Provides over-current protection for the hose transformer primary circuit.

51. **POWER DISTRIBUTION BLOCK**- Provides power distribution point for incoming line voltage to the circuit breaker bank.

52. **MAIN POWER DISCONNECT** (Inside View)- Provides termination point for incoming power. Disconnects incoming power from machine circuits.

SPECIFICATIONS

AIR: The Model H-20/35 is hydraulically driven. There are no air requirements for the proportioning unit itself.

MATERIAL SUPPLY: The temperature of the chemical supply must be as specified by your chemical supplier.

Protect the chemical supply from moisture in the atmosphere with a blanket of dry nitrogen or desiccated air.

Resin Inlet-3/4" NPT (FE) swivel

Isocyanate Inlet-1/2" NPT (FE) swivel

CHEMICAL VISCOSITY: 250-1500 cps

HYDRAULIC SERVICING: 34 gallons (129 Liters)

Recommended operating temperature: 120°F (48°C)

Maximum operating temperature: 160°F (71°C)

WEIGHT: Empty: 385 pounds (175 kilograms)
Serviced: 735 pounds (333 kilograms)

DIMENSIONS: Height: 47 inches (119 centimeters)

Width: 40 inches (102 centimeters)

Depth: 22 inches (56 centimeters)

STATIC PRESSURE: H-20 - 2000 psi maximum (138 Bars)

H-25 - 2500 psi maximum (172 Bars)

H-35 - 3500 psi maximum (240 Bars)

SUPPLY PRESSURE: 400 psi maximum (27 Bars)

OUTPUT: H-20 - 38 lb./min. maximum (17.3 kg/min)

H-25 - 34 lb./min. maximum (15.4 kg/min)

H-35 - 24-lb./min. maximum (10.8 kg/min.)

INLET FILTER: 80 Mesh Standard (Optional - 60/40 Mesh)

PRIMARY HEATER: 6000 Watts per heater at 220 Volts*

H-20: Δ t=47°F @ 38 lb./min. (17.3 kg/min) *

H-25: Δ t=49°F @ 34 lb./min. (15.4 kg/min) *

H-35: Δ t=70°F @ 24 lb./min. (10.8 kg/min) *

HOSE LENGTH: 310 feet (94.5 meters) maximum for heating purposes

* Ideal values obtained in laboratory testing and may not be duplicated under working conditions.

INITIAL MACHINE SET-UP

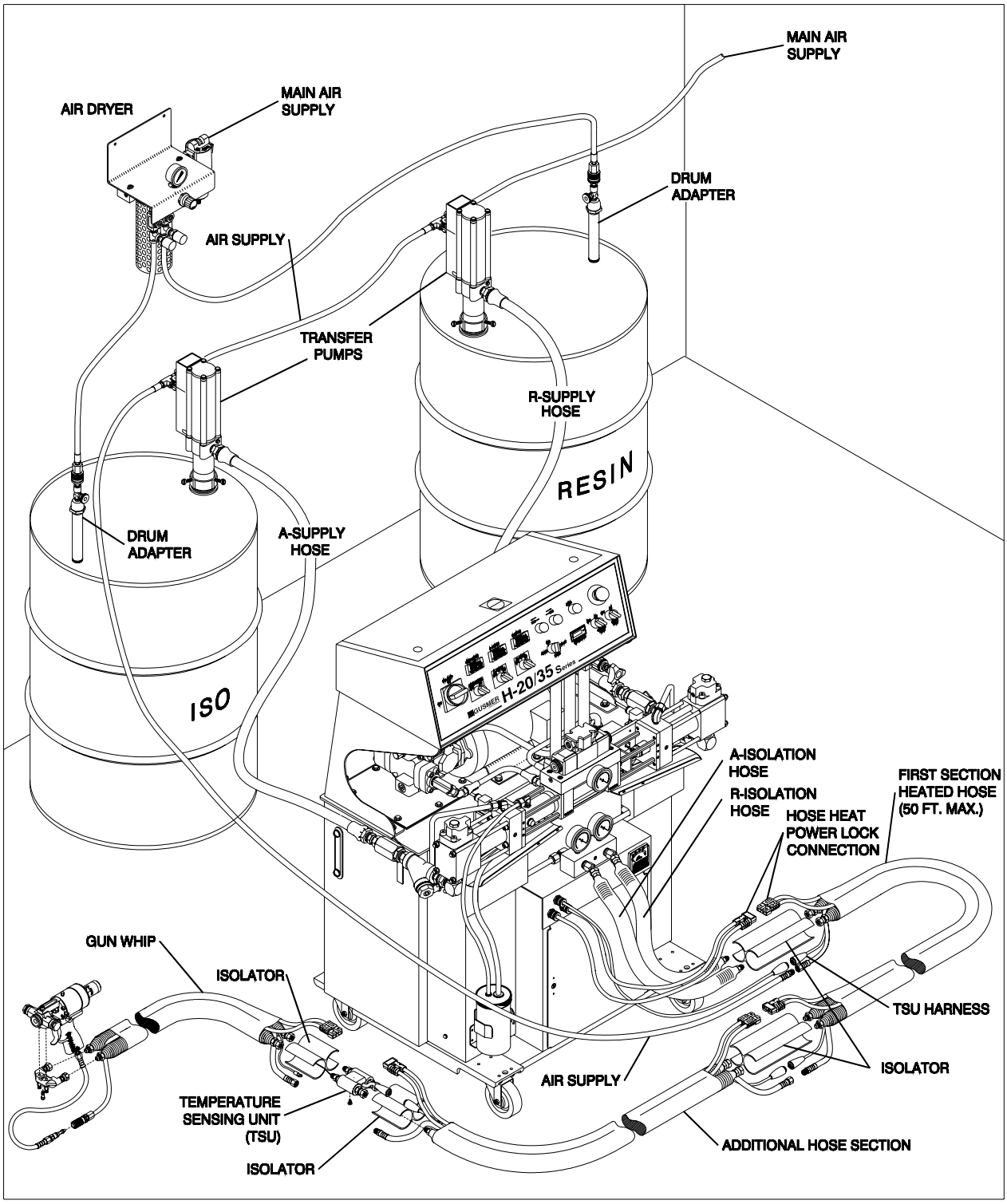


Figure 4. Typical Installation

** Consult Gusmer Sales for the correct hose sizes for your application*

WARNING: *PROPER PROTECTIVE GEAR MUST BE WORN WHEN SERVICING OR OPERATING THIS EQUIPMENT, WHICH INCLUDES BUT IS NOT LIMITED TO GLOVES, EYE PROTECTION, AND RESPIRATORY PROTECTION AS REQUIRED.*

The Accessory Package included with the unit contains the following parts required for set-up:

- **Tape Roll**
- **Binder**
- **Electrical Isolator**
- **(2) Swivel Unions**
- **Lube Reservoir**
- **Operating Manual**
- **Parts Identification Manual**
- **Isolation Hoses**
  Blue – Resin
  Red – Isocyanate
- **Temperature Sensing Unit (TSU)**
- **Warranty Card**

*** Refer to Figure 4 for additional parts required for set-up.**

IMPORTANT: *Complete and return the Warranty Validation Card within 2 weeks of receipt of equipment.*

WARNING: *THE PROPORTIONING UNIT ELECTRIC SERVICE MUST BE INSTALLED BY A QUALIFIED ELECTRICIAN IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND ALL APPLICABLE STATE AND LOCAL CODES.*

IMPORTANT: *Before proceeding, be sure that the main power is disconnected and locked out at the source.*

NOTE:
The dashed lines in Figure 5 signify the additional wires found on three-phase units.

NOTE:
The power source must be capable of meeting the electrical requirements specified on the nameplate of the proportioning unit and an accessible quick disconnect provided.

1. Connect the main power cord to the electrical console as follows. (See Figure 5 and Figure 6.)
   a) Feed the power cord through the strain relief in the bottom of the console. For Single Phase Units connect the power leads to L1 and L2. For Three-Phase units, connect the power leads to L1, L2, and L3. For 380V, Three-Phase units, connect the neutral wire to the blue neutral terminal block on the circuit breaker rail.
   b) Connect the ground wire to the Ground Lug located inside the console near the strain relief opening.
2. Set up the air supply and moisture control systems as required. Refer to the system's instruction manuals for the proper procedures. (See Figure 4.)

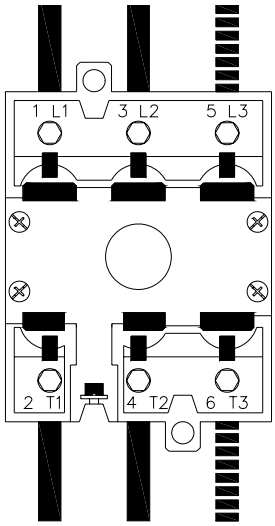


Figure 5. Main Power Connection

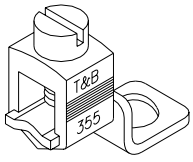


Figure 6. Ground Lug

3. Fill the hydraulic reservoir through the vented filler neck with approximately 34 gallons of hydraulic fluid. . Refer to the listing in the Appendix on page 42 for the recommended types of fluid.

   IMPORTANT: *DO NOT overfill the reservoir. The Level Indicator should read approximately 1/2 full with liquid.*

4. Check the hydraulic pump to ensure that it is full with hydraulic fluid. Remove the 90° fitting from the top of the pump and determine that the fluid level is to the top of the threaded hole. Add fluid as required and reattach fitting.

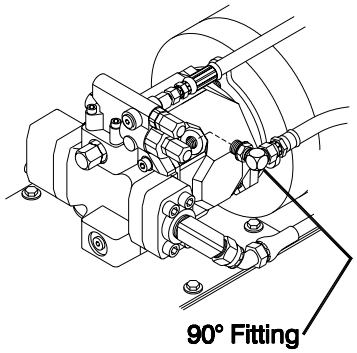


Figure 7. Hydraulic Fluid Level

5. Locate the Pump Lube Reservoir included with the Accessory Package. Prepare the Lube System for use as follows:

NOTE:
Use only Gusmer Pump Lube (P/N 0960-1-GAL)

   a) Fill the Lube Reservoir.

   b) Thread the reservoir onto the Reservoir Cap Assembly and place it into the bracket.

NOTE:
The tube that supplies Pump Lube to the Lube Cup must be at the upper level of the reservoir and the return tube at the lower level of the reservoir. This will ensure that any Isocyanate Crystals will settle to the bottom of the reservoir and not return to the Lube Cup.

   c) Push the Supply Tube approximately 1/3 of the way down into the Lube Reservoir.

   d) Push the Return Tube down into the Lube Reservoir until it reaches the bottom.

   e) Place the Lube Reservoir into the Bracket. The Lube System is now ready for operation. No priming of the system is required.

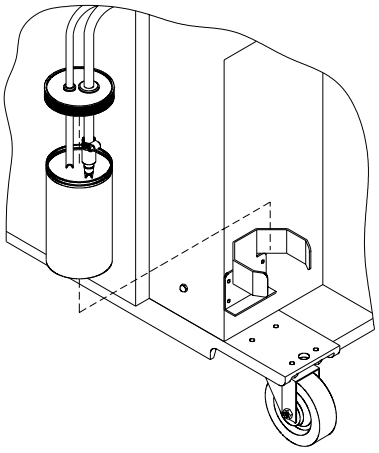


Figure 8. Lube Reservoir Installation

6. Connect the Isolation Hoses to their respective Primary Heater outlet fittings.

   IMPORTANT: *To prevent the inadvertent connection of a hose to the wrong chemical source the Isocyanate hoses are color-coded red and the Resin hoses are color-coded blue for easy identification. In addition, the Resin and Isocyanate hose fittings thread sizes are different, making it virtually impossible to improperly connect the hoses.*

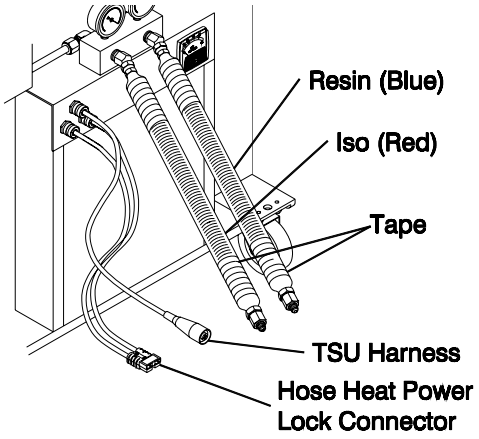


Figure 9. Isolation Hose Connections

NOTE:
The hoses are Connected end to end during shipment to protect them from moisture intrusion. Do not separate the hoses until they are ready to couple to the proportioning unit.

7. Connect the Heated Hose Assemblies to the Isolation Hoses as follows:

   IMPORTANT: *Be sure to make proper hose connections. The connection points are a potential source of chemical and air leaks and are the points most exposed to damage from scuffing and snagging on abrasive surfaces. A liberal amount of duct tape can be used in this area to make the bundle as compact as possible. Gusmer strongly recommends installing the optional scuff jacket to protect the hose insulation and TSU Extension Harness from damage. A proper hose connection is shown in sequence on the following page.*

a) Connect the Heated Hoses to the Isolation Hoses. Take care not to cross thread or over-tighten the fittings, assuring a leak proof chemical connection.

b) Connect the TSU Harness Plugs together. To assure a secure electrical connection: place the protective electrical isolator boot over each plug and tape together.

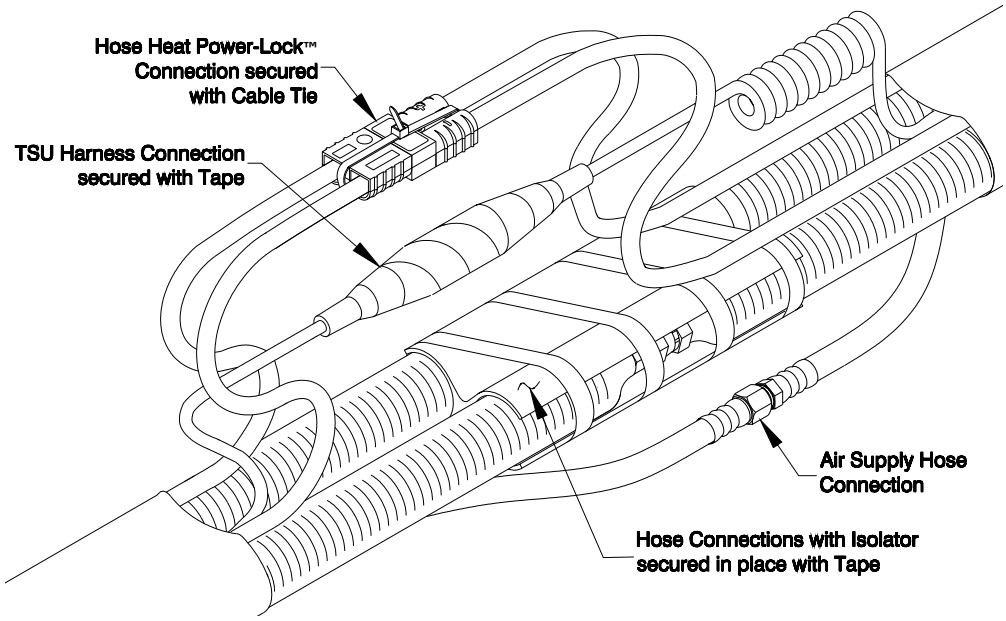


Figure 10. Heated Hose Assembly Connections

c) Connect the Air Hoses.

d) Tape the Isolator securely in place between the hydraulic fittings.

IMPORTANT: *While the Isolator is no longer used to prevent an electrical short, its purpose is now to protect the fittings.*

e) Plug the Hose Heat Power-Lock™ Connectors together. Secure the connection in place with the Cable Tie provided; failure to do so could cause a disruption in the Hose Heat System.

***** Repeat Step 7 for adding additional Hose Assemblies. *****

8. Install the Temperature Sensing Unit (TSU) on the Gun Whip as follows:

a) Pull out and carefully straighten the loose end of the temperature probe from the TSU.

b) Insert the Temperature Probe into the Isocyanate Hose and connect the TSU to the Hose Whip taking care not to cross thread or over-tighten the fittings, thereby assuring a leak proof chemical connection.

c) Connect the ground wire on the gun hose to the Ground Point on the TSU.

d) Connect the Heated Hose Assemblies to the TSU taking care not to cross thread or over-tighten the fittings, there by assuring a leak proof chemical connection.

e) Connect the TSU Harness to the TSU. To assure a secure electrical connection: place the protective electrical isolator boot over each plug and tape together.

f) Cut the Isolator in two and secure the two pieces in place between the hydraulic

fittings.

g) Plug the Hose Heat Power-Lock™ Connectors together. Secure the connection in place with the Cable Tie provided; failure to do so could cause a disruption in the Hose Heat System.

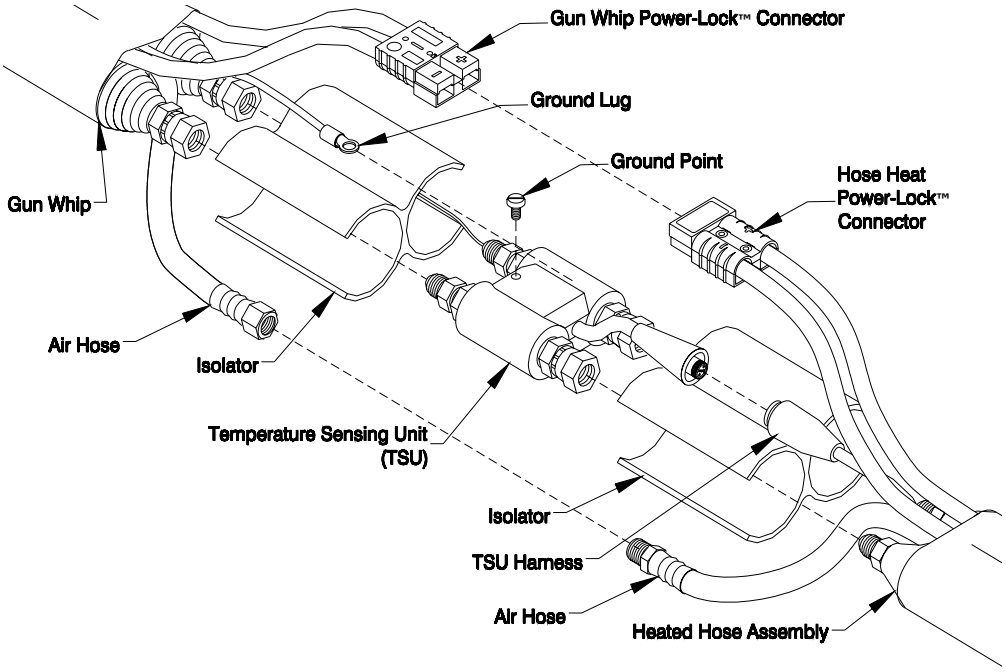


Figure 11. Temperature Sensing Unit (TSU) Connection

WARNING: *THE TEMPERATURE SENSOR EXTENDS APPROXIMATELY 8 INCHES INTO THE ISOCYANATE HOSE AND ALTHOUGH IT IS A RUGGEDLY BUILT ASSEMBLY, IT WILL NOT WITHSTAND REPEATED ABUSE. CARE MUST BE TAKEN NOT TO CRUSH THE HOSE OR SUBJECT IT TO SEVERE BENDING IN THE AREA WHERE THE SENSOR IS LOCATED. TAKE CARE NOT TO COIL THE HOSE TIGHTER THAN THE RECOMMENDED 3 FT. MINIMUM BEND RADIUS.*

9. Connect the Main Air Source to the end of the Air Hose included with the Heated Hose Assemblies.

10. If the unit is a Single-Phase Unit, proceed to Step 11

    If the unit is a Three-Phase unit, it is important to check that the electric motor is correctly rotating clockwise. A Counterclockwise rotation indicates an incorrectly connected Main Power Supply. (See step 1 on page 16)

WARNING: *THIS STEP SHOULD BE PERFORMED BY A QUALIFIED ELECTRICIAN.*

To check for correct rotation proceed as follows:

a) Check that the Pump, Hose Heat, A-Primary Heater and R-Primary Heater Switches are in the OFF position.

b) Turn ON the red Main Disconnect. The white pilot light will light up.

c) Turn ON the amber Control Power Switch. The light within the switch and the Temperature Controllers will light up.

d) While observing the fan on the end of the electric motor, turn the Hydraulic Motor Switch ON and OFF. The fan's direction of rotation must be clockwise. If this is not the case, turn OFF the machine Main Disconnect, disconnect, and lock out the main power supply at the source. Open the electric console and switch any two of the three main power leads on the Main Disconnect. (See Figure 5 on page 16.) Recheck the direction of rotation and check for hydraulic leaks.

11. Connect the Coupling Block to the Gun Hose and determine that the Manual Valves are closed. (See the Spray Gun Operating Manual.)

12. Properly ground all auxiliary equipment. The high velocity flow of fluid can create static sparking which may cause fire or explosion. Certain solvents that are commonly in use with this equipment are flammable and may present a flash danger to the operator.

    a) Ground the material supply. (Transfer Pumps/Day Tanks)

    b) The 2:1 Transfer Pump has a ground lug. Ground the pump in accordance with the instructions provided with the pump.

    c) Check that the Proportioning Unit ground at the main electrical source is installed in accordance with the National Electrical Code. If a generator will be powering the unit, consult with your electrician about additional grounding measures that may be required.

    d) Connect the material supply system to the inlet of the proportioning unit. Use caution when connecting the chemical hoses to the appropriate Proportioning Pump.

Air Purge

Before using the equipment, it is necessary to purge the entire chemical system of air and mineral oil left over from the functional testing of the equipment at the factory.

To purge the machine proceed as follows:

1. Turn on the Main Air Supply to the Transfer Pumps and drums/day tanks.

2. Open both A- and R-Inlet Supply Valves. It is a good practice at this point to check for chemical leaks.

3. Turn the Hydraulic Pressure Control counter-clockwise.

4. Turn ON the red Main Disconnect. The white Main Power Light and the Temperature Controllers will light up.

5. Turn ON the amber Control Power Switch. The light within the switch and the Temperature Controllers will light up.

6. Take the Coupling Block and hold it with the A- and R- Ports over separate containers, open both manual valves.

7. Turn ON the Hydraulic Motor Switch.

8. Turn the Pump Switch to the NORMAL Position.

9. Allow material to flow out of the coupling block until all spitting of air stops and all

traces of residual material have disappeared.

NOTE:
Disposal of waste chemicals must be in accordance with local, state, and federal codes.

10. Turn OFF the Pump Switch.
11. Close both manual valves and flush any residual material from the outside of the coupling block.
12. Mount the spray gun to the Coupling Block.

IMPORTANT: *During the initial start-up, slowly increase the hydraulic pressure and check all fittings for signs of hydraulic and chemical leakage. Tighten as required.*

Digital Hose Heater Temperature Controller

The H-20/35 has separate Temperature Controllers that automatically control the temperature for the Primary Heaters and the Hose Heater. To enter the set point, proceed as follows:

WARNING: *DO NOT TURN THE TEMPERATURE CONTROLLER ON UNTIL ALL PURGING PROCEDURES ARE COMPLETED AND THE HEATERS COMPLETELY FILLED WITH CHEMICAL. ADDITIONALLY, DO NOT CHANGE ANY OF THE PREPROGRAMMED PARAMETERS.*

a) Check that the red Main Disconnect is ON. The white pilot light and the Temperature Controllers should be lit.

b) Check that the amber Control Power Switch is ON. The light within the switch should be lit.

NOTE:
The Temperature Controller normally displays the Set Point. The red LED number1 on the Temperature Controller, when illuminated indicates that the heater is in heating mode. The LED goes out when the liquid in the heater reaches the set temperature. The LED will continue to cycle on and off, indicating that the controller is maintaining the set point temperature.

c) To enter or change the set point, press and hold the "Set" Button down while pressing the ⩔ or ⩒ button to increase or decrease the value. After entering the set point release the "Set" Button and the Set Point should display after 10 seconds.

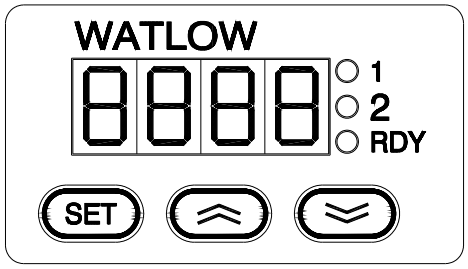


Figure 12. Temperature Controller

WARNING: *THE CONROLLERS ARE FACTORY PROGRAMMED AND ARE NOT FIELD PROGRAMMABLE. IF YOU ENCOUNTER ANY PROBLEMS WITH EITHER CONTROLLER CONTACT GUSMER FOR A REPLACEMENT. DO NOT SUBSTITUTE A CONTROLLER FROM AN ALTERNATE SUPPLIER AS ITS USE MAY RESULT IN DAMAGE TO THE EQUIPMENT AND/OR BODILY INJURY.*

Hose Heat Transformer

The Hose Heat Transformer tap settings must match the length of hose in use. To set-up the Transformer, proceed as follows:

a) Using the chart below establish what voltage is required for the length of hose to be used.

NOTE:
These procedures are not required on a daily basis but may have to be executed periodically as part of the daily start-up routine or when adding Hose Assemblies.

Hose Length (feet)	Voltage
35	15
60	15
110	30
160	45
210	60
260	75
310	90

**** Tests performed at 240V Transformer Primary Voltage. Adjust Tap Settings as required for specific applications. Set Hose Heat Amperage between 40-50 Amps.***

b) Check that the Main Power Disconnect is OFF.

c) Remove the Transformer Compartment Cover and locate the Hose Heat System Terminal Block Assembly.

d) Move the Tap Wire to a position matching the voltage required as shown in Figure 13.

e) Reinstall the Transformer Compartment Cover.

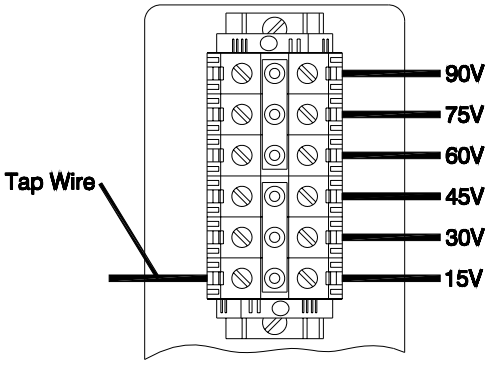


Figure 13. Tap Settings

f) Loosen the shaft lock on the Hose Heat Power Set and turn it counterclockwise until the Ammeter reads zero.

g) Turn ON the Main Power Disconnect.

h) Turn ON the amber Control Power Switch. The light within the switch and the Temperature Controllers will light up.

i) Turn ON the green Hose Heater Switch. The light within the switch will light up. The Hose Heat Ammeter should read zero.

j) Adjust the Hose Temperature Controller for the required temperature. (See Digital Hose Heater Temperature Controller on page 21)

NOTE:
As the hoses warm up, the amperage will drop slightly and will not need readjusting.

k) Adjust the Hose Heat Power Set (clockwise) to a maximum setting of 45 to 50 Amps. Tighten the shaft lock nut, as no further adjustments to this control will be required. The Temperature Controller should begin to cycle toward the new set point.

If all steps have been followed and no problems have been encountered the H-20/35 should now be ready for operation.

OPERATION

Daily Start-up Procedures

NOTE:
The Daily Start-up Procedures describe normal operation and assume that all calibrations have been properly executed.

1. Check the condition of the Hydraulic and Lube System and service as required. Change the Pump Lube when it shows signs of color change.
2. Determine that the supply system is at the proper temperature as recommended by the chemical system supplier, the individual chemicals are properly mixed within their drums/day tanks, and the moisture protection system is properly set for operation.
3. Check the inlet screens and service as required.
4. Turn on the Main Air Supply to the Transfer Pumps and drums/day tanks.
5. Open both A- and R-Inlet Supply Valves.
6. If the red Emergency Stop Switch has been activated, reset it by turning the knob clockwise.
7. Turn ON the red Main Disconnect. The white Main Power Light will light up.
8. Turn ON the amber Control Power Switch. The light within the switch and the Temperature Controllers will light up.
9. Turn ON the green Hose Heater Switch. The light within the switch will light up and the Temperature Controller should begin to cycle toward its set point. If the set point needs to be changed see Digital Hose Heater Temperature Controller on page 21.
10. Adjust the Hose Heat Power Set (clockwise) to a maximum of 45 to 50 Amps. Tighten the shaft lock nut.

    IMPORTANT: *To prevent excessive pressure buildup in the heated hoses, always bring the hose up to temperature before turning on the Hydraulic system. The red LED number 1 on the Hose Heat Controller, when illuminated, indicates that the heater is in heating mode. The LED goes out when the liquid in the heater reaches the set temperature. The LED will continue to cycle on and off, indicating that the controller is maintaining the set point temperature.*

NOTE:
Primary heating is virtually instantaneous. Do not turn on the primary heaters until required for operation. It is also a good practice to turn off the primary heaters during shutdowns exceeding one half-hour.

11. Turn ON the green A- and R- Heater Switches. The lights within the switches will light up and the Temperature Controllers should begin to cycle toward their set points. If either set point needs to be changed see Digital Hose Heater Temperature Controller on page 21.
12. Turn ON the green Hydraulic Motor Switch. The light within the switch will light up.

NOTE:
The Pump Switch must be in the RETRACT or NORMAL position to adjust the hydraulic pressure

13. Turn the Pump Switch to NORMAL. One of the amber Directional Indicator Lights will light and the proportioning pumps should move a short distance and pressurize.

14. Adjust the hydraulic pressure as required.

15. Check the pressure of each proportioning pump.

    After setting the to NORMAL, observe both pressure gauges. The Resin and Isocyanate pressures should be approximately equal and the pressures must remain fixed. Observe the pressures again; they must remain fixed. If the pressure bleeds off on either stroke, consult the Troubleshooting Procedures before continuing.

16. The proportioning unit is now ready for operation. Connect air to the spray gun. Consult the spray gun operating manual and test spray as per the directions.

Daily Shut-down Procedures

1. Turn the Pump Switch to RETRACT.

2. Trigger the spray gun off target until the Isocyanate Proportioning Pump stops in the retracted position and the pressure of both pumps bleed off to a point where the spray pattern begins to diminish.

3. Turn OFF the green Hydraulic Motor Switch. The light within the switch will go out.

4. Turn OFF the green A- and R- Heater Switches. The lights within the switches will go out.

5. Adjust the Hose Heat Power Set counterclockwise until the Ammeter reads zero.

6. Turn OFF the green Hose Heater Switch. The light within the switch will go out.

7. Turn OFF the amber Control Power Switch. The light within the switch and the Temperature Controllers should go out.

8. Turn OFF the red Main Disconnect. The white Main Power Light will go out.

9. Close both A- and R-Inlet Supply Valves.

10. Shut down the chemical supply system as required.

11. Turn OFF the Main Air Supply to the Transfer Pumps/Day Tanks.

12. Shut down and service the spray gun as required.

IMPORTANT: *DO NOT bleed the pressure to zero, as some pressure is required to keep the packings operating normally and prevent weepage during shutdown.*

TROUBLESHOOTING

General Information

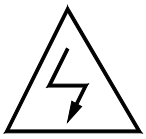
When properly maintained and operated, GUSMER equipment will provide long and faithful service. However, occasional problems will arise which must be resolved before operation can continue. The purpose of this section is to give an explanation of what problems may arise, how to detect them, and how to resolve them.

This manual is written to give the operator a general overview of the operation of the equipment. Therefore it is imperative that before any troubleshooting process begins, the operators have read and understood the applicable portions of this manual.

Training schools held on a regular basis further develop the necessary knowledge for proper operation, maintenance and troubleshooting of GUSMER equipment. These schools give concentrated training on the equipment and help to develop an operator into a competent Certified Gusmer Technician. Obtain information on these schools from our sales office.

GUSMER maintains a competent staff of Technical Representatives and authorized Distributors who can resolve almost any problem you may encounter with GUSMER equipment. Feel free to call on these people for assistance when you need it.

WARNING: *THE TROUBLESHOOTING SECTION OF THIS MANUAL ASSUMES THAT THE INDIVIDUAL PERFORMING THE WORK ON THE EQUIPMENT IS QUALIFIED TO DO SO. THIS INDIVIDUAL MUST HAVE A WORKING KNOWLEDGE OF BASIC HYDRAULICS AND PNEUMATICS; MUST FOLLOW ALL GENERALLY ACCEPTED SAFETY PRECAUTIONS USED WHEN WORKING WITH HYDRAULICS, PNEUMATIC AND ELECTRICAL EQUIPMENT; MUST HAVE READ AND UNDERSTOOD THE APPLICABLE SECTIONS OF THIS MANUAL; AND MUST WEAR PERSONAL PROTECTION APPROPRIATE TO THE TASK BEING UNDERTAKEN.*



WARNING: *ELECTRICAL TROUBLESHOOTING DESCRIBED IN THIS MANUAL MUST BE DONE WITH THE MAIN POWER DISCONNECT SWITCHED OFF AND SUPPLY VOLTAGE INTERRUPTED AT THE SOURCE. ANY ELECTRICAL TROUBLESHOOTING REQUIRED BEYOND THE SCOPE OF THIS MANUAL MUST BE DONE BY A QUALIFIED ELECTRICIAN, THOROUGHLY FAMILIAR WITH THE OPERATION OF GUSMER EQUIPMENT.*

Primary Heaters

WARNING: *TO AVOID SEVERE BODILY INJURY OR DEATH FROM ELECTRIC SHOCK,* ***DO NOT*** *PERFORM THESE TROUBLESHOOTING PROCEDURES WITHOUT FIRST SWITCHING OFF THE MAIN POWER DISCONNECT AND INTERRUPTING SUPPLY VOLTAGE AT THE SOURCE.* ***DO NOT*** *ENTER THE ELECTRIC CONSOLE WITH THE MAIN POWER DISCONNECT ON.*

WARNING: *HIGH VOLTAGE EXISTS INSIDE THE PRIMARY HEATER COVERS. DO NOT REMOVE EITHER COVER BOX WITHOUT FIRST SWITCHING OFF THE MAIN POWER DISCONNECT.*

WARNING: *HIGH TEMPERATURE EXISTS INSIDE THE PRIMARY HEATER COVERS. NEVER OPERATE THE PROPORTIONING UNIT WITH EITHER HEATER COVER BOX REMOVED. COOL THE FLUID IN THE HEATER BY PUMPING UNHEATED FLUID THROUGH THE HEATER WITH THE HEATER OFF TO AVOID BODILY INJURY FROM HOT FLUID AND HOT METAL.*

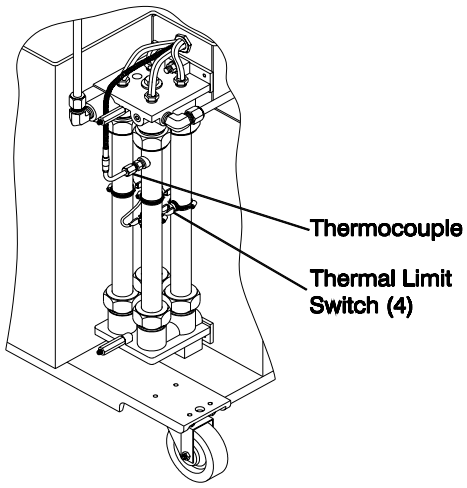


Figure 14. Primary Heater

Try the recommended solutions in the order given for each problem to avoid unnecessary repairs. Also, determine that all circuit breakers, switches, and controls are properly set and wiring is correct before assuming there is a problem.

Problems	Solutions
Primary Heater Circuit Breaker trips.	1
Primary Heater does not heat; red LED light on the Primary Heater Controller is ON.	2, 4, 3, 6
Primary Heater does not heat; Primary Heater Controller is ON.	4, 5
Primary Heater heats but red LED on the Primary Heater Controller is ON continuously.	3, 4, 6
Primary Heater partially heats but red LED on the Primary Heater Controller is ON continuously.	6, 7, 8
When flow starts the red LED on the Primary Heater Controller comes on and stays ON for 30 seconds or more.	6

SOLUTIONS

1. THERMAL LIMIT SAFETY SWITCH- A completely independent over-temperature safety circuit has been provided, consisting of four (4) thermal limit safety switches attached to the heating tube(s). When the surface temperature of the tube(s) exceeds 230° F, the thermal limit safety switch will automatically interrupt the Primary Heater Control Contactor circuit. The temperature of the Primary Heater must cool down to within limits before you can reset the Primary Heater

ON/OFF Switch. DO NOT attempt to reset the circuit breaker more than once. You must determine the cause of the problem and correct it.

2. PRIMARY HEATER CIRCUIT BREAKER- Turn OFF the red Main Disconnect. Open The Console Cover. Reset the Primary Heater Circuit Breaker if necessary.

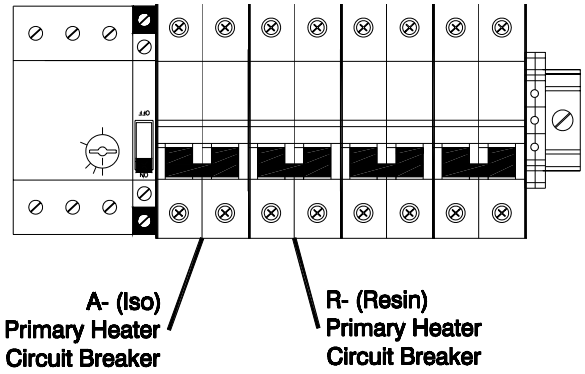


Figure 15. Primary Heater Circuit Breakers

3. PRIMARY HEATER SOLID STATE RELAY (SSR)- Checking for normal SSR operation is not possible without electric power. Therefore, if all other testing fails to determine the source of problem, assume the SSR is inoperative and replace it.

4. PRIMARY HEATER CONTROL UNIT- The three Temperature Controllers on the H-20/35 are directly interchangeable with one another. To determine if a controller is operating correctly, turn OFF the red Main Disconnect and replace the suspected controller with one known to be good.

5. THERMOCOUPLE- The temperature controller has a fail-safe feature that prevents the heating system from operating in the event of a signal failure from the thermocouple. In this case, replace the thermocouple. Refer to the Maintenance section of this manual for the proper procedures.

6. HEATING ELEMENTS- the heater contains four 1500-Watt (32-ohm) heating elements wired in parallel. To check operation of the elements proceed as follows:

   a) With Main Power OFF, read the resistance across terminal #2 on the Resin SSR and terminal T2 on the Resin Heater Contactor.

   b) With Main Power OFF, read the resistance across terminal #2 on the Isocyanate SSR and terminal T2 on the Isocyanate Heater Contactor.

   The resistance should be 8 ohms. A higher resistance indicates that one or more heating elements are inoperative. If this is the case, disconnect the heating elements and measure the resistance of each element. Each heating element should measure 32 ohms. If not replace the damaged element or elements.

   The positioning of the thermocouple in the outlet heat exchanger is critical to the proper operation of the primary heater. Therefore, two conditions must be satisfied:

   1) The thermocouple must make positive contact with the heating element.

   2) The heating element must be functioning properly.

   The lack of either of these conditions may cause erratic temperature control and possible overheating. The thermocouple is properly positioned and mechanically locked in place at the factory. However, during maintenance or changing of the thermocouple, the positioning may have changed. Refer to the Maintenance section of the manual for proper thermocouple positioning. Check the resistance of the

heating element; it should be 32 ohms.

7. The primary heater rating is 6000 Watts at a voltage of 220 Volts. Low line voltage will significantly reduce the power available and the primary heater will not perform to its full capability.

8. The H-20/35 Primary Heater is designed to maximize the heat transfer from the power available. However, under certain conditions, the heater will not be able to reach the required temperature and will require a reduction in flow or the use of an auxiliary hose heat system. Call Gusmer Sales for information.

Proportioning System

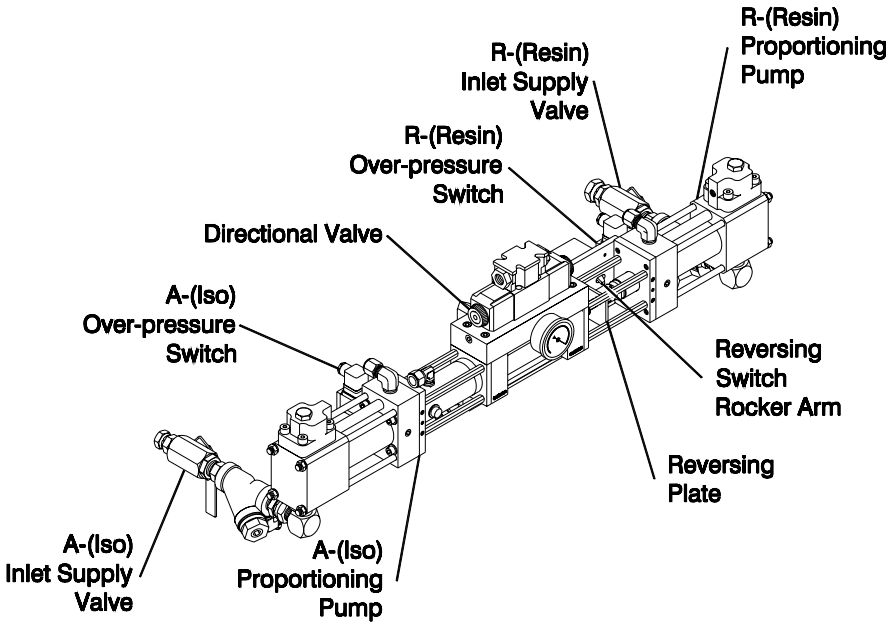
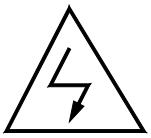
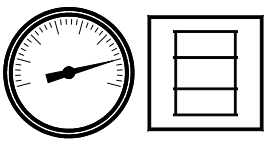


Figure 16. Proportioning System



WARNING: *TO AVOID SEVERE BODILY INJURY OR DEATH FROM ELECTRIC SHOCK,* ***DO NOT*** *PERFORM THESE TROUBLESHOOTING PROCEDURES WITHOUT FIRST, SWITCHING OFF THE MAIN POWER DISCONNECT AND INTERRUPTING SUPPLY VOLTAGE AT THE SOURCE. DO NOT ENTER THE ELECTRIC CONSOLE WITH THE MAIN POWER DISCONNECT ON.*



WARNING: *BEFORE OPENNING ANY CHEMICAL CONNECTIONS OR SERVICING THE PUMP OR PUMP BASE, THE OPERATOR MUST USE EXTREME CAUTION TO ENSURE THAT THE PRESSURE IN BOTH THE SUPPLY AND DELIVERY SIDES OF THE PUMP HAS BEEN BLED OFF TO ZERO TO AVOID SERIOUS BODILY INJURY FROM FLUID INJECTION. NEVER SERVICE COMPONENTS CONTAINING CHEMICALS WITHOUT WEARING PROPER PROTECTIVE EQUIPMENT.*

Try the recommended solutions in the order given for each problem to avoid unnecessary repairs. Also, determine that all circuit breakers, switches, and controls and controls are properly set before assuming there is a problem.

Problems	Solutions
Proportioning pump does not hold pressure when stalled.	1
Pressure imbalance between pumps.	2, 3, 1
Cavitation in the proportioning pumps.	3, 2, 1
Failure of the pump to reverse.	4
Pumps do not move, and both directional indicator lights are out.	5, 4
Pump movement is erratic.	5

SOLUTIONS

1. LEAKING BALL CHECK VALVE -

   a) Determine which pump is losing pressure by observing the gauges.

   b) Determine in which direction the pump has stalled by observing which directional indicator light is ON.

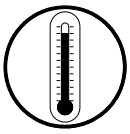
   Refer to the chart below to isolate the problem

LEFT PUMP DIRECTIONAL INDICATOR LIGHT ILLUMINATED	*RIGHT PUMP DIRECTIONAL INDICATOR LIGHT ILLUMINATED*
R-Discharge Ball Check Valve or components fouling.	R- Pump Inlet Ball Check Valve or components fouling.
A-Inlet Ball Check Valve or components fouling	A-Pump Discharge Ball Check Valve or components fouling

   To service perform the following procedure:

   a) Shut off all electrical switches, breakers, and the main power supply.

   b) Close the appropriate Inlet Material Supply Valve and disconnect the air supply to the transfer pump.



WARNING: *ALLOW THE HOSE(S) AND PRIMARY HEATER(S) TO COOL PRIOR TO SERVICING THE UNIT.*

   c) Bleed off chemical until the pressure gauge(s) read zero.

   d) Remove the appropriate ball guide. Inspect the ball seat gasket and replace as required. Flush and wipe clean the valve ball and ball seat of all residual material.

   Using the ball seat removal tool, check the seat for proper seat compression. Snug the seat up to a ¼ turn maximum. The gasket should extend beyond the seat by approximately 1/16 of an inch. If this does not resolve the problem remove the seat inspect the gasket and replace as required.

   In most cases, the cause of a leaking valve is a particle of foreign material preventing the ball from seating properly. If cleaning the valve ball and seat does not resolve the problem, replace these parts along with the gasket.

2. PRESSURE IMBALANCE - The success of the troubleshooting procedure for this problem will depend on the determination of two points:

   a) Which chemical did not exit the mixing chamber?

   b) Why did the chemical fail to get there?

   Which chemical is missing can usually be determined by observing the color of the pattern as it exits the gun. Foam systems are usually a combination of light and dark material. Therefore, by observing the color of the liquid exiting the gun, you can determine which material is not reaching the mixing chamber. The determination as to why the chemical did not reach the mixing chamber may be more difficult to resolve. A restriction at the gun or the proportioning pump not properly pumping its designed volume is the usual cause for a lack of material at the mixing chamber.

   Once it has been determined which chemical is missing, the chemical pressure gauges on the problem side of the proportioning unit will show if the malfunction is due to a restriction at the gun or a lack of material produced by the pump. To prevent misinterpretation, the focus must be on the pressure gauge corresponding to the missing chemical.
   Assume that the R-component is not reaching the mixing chamber. Spray off target and note the Resin pressure gauge. If the Resin gauge is considerably higher than the Isocyanate gauge, the problem is within the gun. Refer to the gun manual to resolve the problem.

3. CAVITATION- Cavitation is the formation of a partial vacuum or void created within the pump cylinder during the fill stroke. It is actually a “short fill” since the fill chamber is not completely full when the pump reverses to start the discharge stroke. This void occurs when the proportioning pump demands a greater volume of material during its fill stroke than the supply system can supply. The most common causes of Cavitation are as follows:

   a) The transfer pump cannot handle the supply requirement or is malfunctioning. The Gusmer 2:1 Transfer Pump is recommended for use with the H-20/35. Also recommended is a minimum of three-quarter inch diameter supply hose as short as practical.

   b) The chemical is too viscous (thick) to pump properly. Consult your Chemical Supplier for the recommended supply temperature.

   c) Inlet strainer screen is restricted. Service as described in the Maintenance section of this manual.

   d) An inlet valve ball and/or a leaking seat gasket that does not properly seat will permit some of the proportioned material to flow back towards the supply drum. When this happens, the proportioning pump will not pump the proper volume of material during the discharged stroke and an off-ratio condition will result. This malfunction will evidence itself identically to Cavitation, perhaps somewhat less severe however.

4. REVERSING MALFUNCTION- For the proportioning pumps to change direction or reverse, the Activator plate must contact the rocker arm to activate the reversing switch. Failure of the activator plate to make proper contact is usually caused by something physical such as a bent or loose activator plate.

   Should the above not be the cause, the problem is likely to be a result of the pump piston packing retaining bolt having loosened. This would cause the piston to contact the inner face of the pump inlet flange before the activator plate contacts the rocker arm. To resolve this, shut down the unit and disassemble the appropriate

pump for repair.

When the directional valve fails to shift, the activator plate will have passed the rocker arm and stopped. When this happens, the first thing to do is to relocate the activator plate so that it is in the center of the rocker arm as follows:

a) Turn Pump Switch OFF.

b) Determine in which direction the plate must move: this is predicated upon which stroke is overrun.

c) Go to the hydraulic manifold and locate the Manual Operator Coil, on the same side of the machine toward which the activator plate must travel. For example: if the plate over ran to the left, and requires moving it to the right, toward the Resin pump, activate the Manual Operator on the Resin side of the Directional Valve.

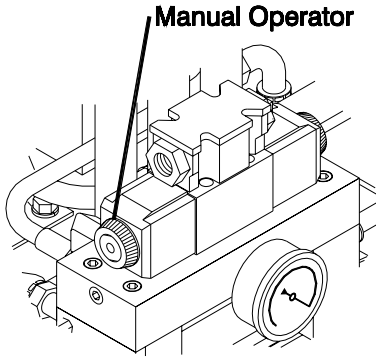


Figure 17. Hydraulic Manifold

Bleed chemical pressure to zero. With the gun (or coupling block) open, the Main Disconnect and Motor Control ON, and the Pump Switch OFF, push in the manual operator (a 3/16 Allen wrench is ideal for this) and hold it in until the activator plate is approximately centered. Release it when properly positioned and close the gun or coupling block.

If the spool seemed to move freely when pushed the cause of the overrun was probably an electrical problem. Turn off the motor and place the Pump Switch in the NORMAL position. Push in each end of the rocker arm, listen for the shifting of the spool, and note the directional indicators light appropriately. If the spool does not shift, or if the lights do not light, there is an electrical problem with the reversing switch, directional valve coil, or Pump Switch.

Should the spool hang up or be hard to push, it is likely that there is a mechanical problem within the directional valve, which will necessitate shutting down the unit and disassembling the directional valve for service.

5. OVER-PRESSURE PROTECTION- Each proportioning pump contains a pressure switch set to 2200 psi / 2700 psi / 3700 psi depending upon the pump pressure rating. Upon reaching this pressure, the switch will automatically remove power from the directional valve causing the pumps to stall. When the power is removed, both directional indicator lights will go off, which is the indication to the operator of over-pressure. This is not a lockout type of system and when the pressure bleeds off below approximately 2200 psi / 2700 psi / 3700 psi the system will be restored to normal operation; however, the cause of the over pressure should be determined and corrected. The three most likely causes are:

a) A restriction in the gun

b) Cavitation of the opposite pump

c) Hydraulic pressure set too high

Hydraulic Drive System

WARNING: *TO AVOID SEVERE BODILY INJURY OR DEATH FROM ELECTRIC SHOCK,* ***DO NOT*** *PERFORM THESE TROUBLESHOOTING PROCEDURES WITHOUT FIRST, SWITCHING OFF THE MAIN POWER DISCONNECT AND INTERRUPTING SUPPLY VOLTAGE AT THE SOURCE. DO NOT ENTER THE ELECTRIC CONSOLE WITH THE MAIN POWER DISCONNECT ON.*

Try the recommended solutions in the order given for each problem to avoid unnecessary repairs. Also, determine that all circuit breakers, switches, and controls are properly set before assuming there is a problem.

Problems	Solution
Electric motor will not start or stops during operation.	1
Hydraulic pump does not develop pressure.	2
Low or zero pressure with screeching noises.	2, 3

SOLUTIONS

1. MOTOR CIRCUIT PROTECTOR- The Motor Circuit Protector is set to trip when the electric motor draws too much current. To restore the motor to operation, allow it to cool and with power OFF, reset the ON/OFF Switch to ON.

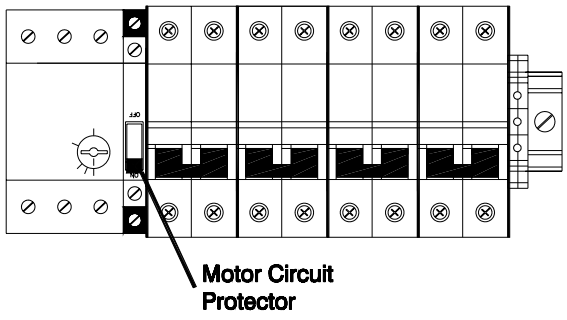


Figure 18. Motor Circuit Protector

IMPORTANT: *Always determine the cause of a tripped Motor Circuit Protector. It may indicate improper low line voltage, which may damage the motor due to overheating.*

2. ZERO OR LOW PRESSURE- Remember when the Hydraulic Motor Switch or Pump Switch is in the OFF position hydraulic pressure cannot be generated.

   Assuming the pump is in proper working order, and the Pump Switch is set to NORMAL, the major factors, which can cause it not to produce pressure, are that the pump is either not primed or loses its prime. To assure a positive prime, check the following:

   a) Check Electric Motor Rotation. (See step 10 page 19.)

   b) Hydraulic reservoir serviced to the proper level.

   c) Pump case is full with Hydraulic fluid.

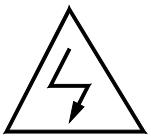
   d) Inlet fitting is fully tight to ensure no air is leaking into the pump case.

3. SCREECHING-the screeching noise is a characteristic of Cavitation and is normal at initial start-up for a maximum of 30 seconds. If the screeching continues for more than 30 seconds, check that the inlet fittings are tight and that the pump has not lost

its prime.

A second cause of screeching can be excessive hydraulic oil temperature. Determine that the reservoir is properly serviced and if necessary provide better ventilation to permit the reservoir to dissipate heat more efficiently.

Hose Heat System



WARNING: *TO AVOID SEVERE BODILY INJURY OR DEATH FROM ELECTRIC SHOCK,* ***DO NOT*** *PERFORM THESE TROUBLESHOOTING PROCEDURES WITHOUT FIRST, SWITCHING OFF THE MAIN POWER DISCONNECT AND INTERRUPTING SUPPLY VOLTAGE AT THE SOURCE. DO NOT ENTER THE ELECTRIC CONSOLE WITH THE MAIN POWER DISCONNECT ON.*

Try the recommended solutions in the order given for each problem to avoid unnecessary repairs. Also, determine that all circuit breakers, switches, and controls are properly set before assuming there is a problem.

Problems	Solutions
Hose warms but does not reach temperature or takes too long to reach temperature.	1, 2, 8
Hose does not heat; red LED on the Hose Heat Controller is ON.	2, 3, 4, 6, 9, 11
Hose Heat Controller does not cycle automatically, red light on the controller is ON.	4, 5, 6, 11
Hose Heat Circuit Breaker trips.	2, 3
Hose temperature not maintained during flow.	2, 7, 8
Hose or hoses adjacent to the unit are warm, hoses downstream are cold.	9

SOLUTIONS

1. HOSE LENGTH- The design of the H-20/35 Hose Heat System allows it to operate with up to 310 feet of hose. Hose lengths greater than this require the use of an auxiliary hose heat system. Call Gusmer Sales for details. In addition, if chemical or ambient temperature is too cold, the hose circuit may not have enough power to bring the chemical up to temperature.

2. HOSE HEAT POWER SET - Adjust the power set, clockwise, to achieve maximum amperage. (40-50 Amps Max.)

3. HOSE HEAT CIRCUIT BREAKER- Turn OFF the red Main Disconnect. Open the Console and locate the Hose Heat Circuit Breaker. Reset the breaker if necessary. (See Figure 20)

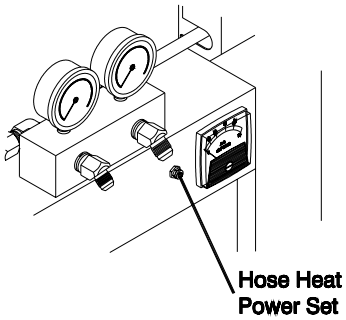


Figure 19. Hose Heat Power Set

4. HOSE HEAT CONTROL UNIT- The three Temperature Controllers on the H-20/35 are directly interchangeable with one another. To determine if the control unit is operating correctly, turn OFF the red Main Disconnect and swap the suspected controller with one known to be good.

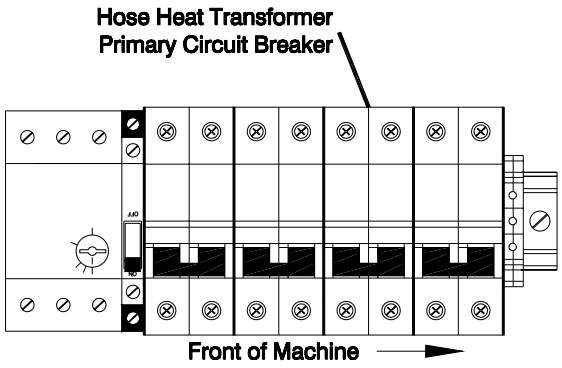


Figure 20. Hose Heat Circuit Breaker

5. HOSE HEAT SOLID STATE RELAY (SSR)- Checking for normal SSR operation is not possible without electric power. Therefore, if all other testing fails to determine the source of problem, assume the SSR is inoperative and replace it.

6. TEMPERATURE SENSING UNIT (TSU)- Two conditions must be satisfied for proper operation:

   - The sensor must be functional.
   - The signal must travel uninterrupted from the sensor to the control unit.

   Unplug the TSU from its extension. Without undoing any chemical connections, move the hose section with the TSU to the Proportioning Unit and plug the TSU directly into the TSU Extension Harness. Change the TSU, if control is not restored. If control is restored, systematically check each section of the TSU Wire Harness out to the gun.

7. PRIMARY HEAT AND HOSE HEAT SETTINGS- The purpose of the Hose Heat System is not to add heat but rather to maintain the temperature developed by the Primary Heater. If it appears that the Hose Heat System is not maintaining temperature during flow, check that the Primary Heat and Hose Heat Controllers are set for the same temperature or reduce the output.

8. LOW LINE VOLTAGE- The Hose Heat System operates at 220 Volts. Low line voltage may significantly reduce power available and the heater will not perform to its full capability at maximum hose length. Determine the secondary amperage of the Hose Heat circuit and adjust the tap setting as required to achieve 40-50 Amps.

9. HOSE HEATING ELEMENT- First, check to see that the Power-Lock™ Connectors on the hoses and all electrical connections between the hoses and Proportioning Unit are tight. If these connections are secure and hose heat is not present, then make a systematic search for the electrical fault as follows:

   a) Starting at the Gun Whip, unplug the Power-Lock™ Connectors and plug the Hose Jumper Plug (P/N 0684-3) into the last “upstream” segment of hose.

   b) Turn ON power to the Hose Heat System and adjust the Hose Heat Power Set (clockwise) to a maximum of 45 to 50 Amps;
   If hose heat is restored, then the fault is within the Gun Whip.

If hose heat is not restored, adjust the Hose Heat Power Set counterclockwise until the Ammeter reads zero, then turn OFF power to the Hose Heat System and proceed with the Steps below.

IMPORTANT: READ FIRST BEFORE PROCEEDING

ALWAYS reduce the Hose Heat Transformer voltage by adjusting the tap setting LOWER to match the shorter hose length each time an additional hose segment is unplugged. Too much power will cause the hose heat fuse to fail. (See Figure 21)

c) Adjust the tap settings of the Hose Heat Transformer to match the next shortest length of heated hose (see Figure 21).

d) Unplug the next set of Power-Lock™ Connectors and plug the Hose Jumper Plug into the last "upstream" segment of hose.

e) Turn ON power to the Hose Heat System and adjust the Hose Heat Power Set to a maximum of 45 to 50 Amps;
If hose heat is restored, then the fault is within the last unplugged segment of hose.

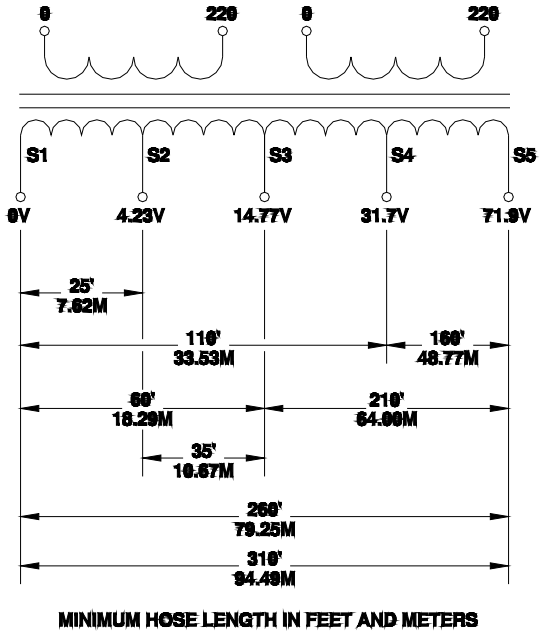


Figure 21. Transformer Tap Settings

If hose heat is not restored, adjust the Hose Heat Power Set counterclockwise until the Ammeter reads zero, then turn OFF power to the Hose Heat System and repeat Steps c) through e) until the fault is located.

10. MANUAL HOSE HEAT CONTROL- It is possible to bypass the Hose Heat System and operate the Hose Heat System manually. This feature allows for continued operation of the Hose Heat System in case of signal or SSR failure. To convert to manual control, proceed as follows:

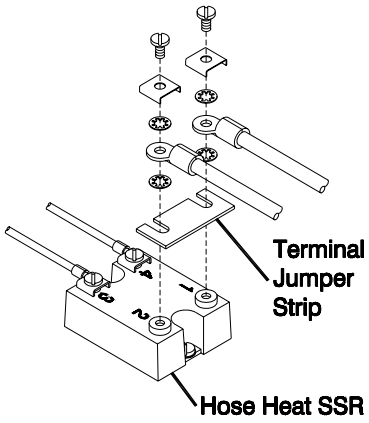


Figure 22. Terminal Jumper Strip Installation

a) Turn OFF the red Main Disconnect. Open the transformer cover plate. Remove the terminal jumper strip located near the SSR. Install it across terminals #1 and #2 on the Hose Heat SSR.

NOTE:
The Hose Thermometer (P/N 0928) will read approximately 20°F lower than the actual temperature inside the hose.

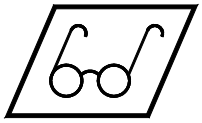
b) Manual Hose Heat control requires the installation of a Hose Thermometer. Insert the thermometer through the sponge so that the stem follows the twist of the hoses and lies between the butyl inner hose and the outer sponge insulation. This gives the most accurate temperature indication. The thermometer should be located toward the gun end in a position where the operator can see it while spraying.

c) Maintaining hose temperature now requires manual adjustment of the Hose Heat Power Set. (See Figure 19) Adjust the control clockwise to a maximum of 50 Amps for initial warm up and then adjust as required to maintain the hose temperature.

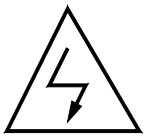
WARNING: *DO NOT ALLOW HOSE TO OVERHEAT DURING MANUAL CONTROL OF THE HOSE HEAT SYSTEM. HOSE TEMPERATURE, AS INDICATED BY A PROPERLY INSTALLED HOSE THERMOMETER, CANNOT EXCEED 170°F (76°C). CLOSELY MONITOR HOSE TEMPERATURE TO AVOID POSSIBLE INJURYAND/OR DAMAGE TO PROPERTY.*

MAINTENANCE

To realize full productivity from the Model H-20/35, it is necessary to perform certain maintenance procedures daily or periodically.



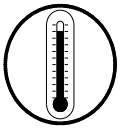
WARNING: *WORKING WITH THIS EQUIPMENT REQUIRES PROPER EYE PROTECTION IS WORN AND THAT SKIN IS PROTECTED AGAINST EXPOSURE TO CHEMICALS AND SOLVENTS BEING USED. WORK SHOULD ALWAYS BE DONE IN A WELL-VENTILATED AREA TO PREVENT HARMFUL FUMES AND VAPORS. INFORMATION CONCERNING THE TOXICITY AND PROPER HANDLING PROCEDURES OF YOUR CHEMICALS IS AVAILABLE FROM YOUR SUPPLIER.*



WARNING: *UNLESS SPECIFIED OTHERWISE, SWITCH OFF THE MAIN POWER DISCONNECT AND INTERRUPT SUPPLY VOLTAGE AT THE SOURCE PRIOR TO ENTERING THE ELECTRICAL CONSOLE TO AVOID SEVERE BODILY INJURY FROM ELECTRICAL SHOCK.*

Primary Heaters

WARNING: *THE CHEMICAL COMPONENTS ARE PRESSURIZED UP TO 3500PSI. BEFORE OPENING ANY HYDRAULIC CONNECTIONS OR SERVICING HYDRAULIC COMPONENTS, USE EXTREME CAUTUION TO ENSURE THAT ALL PRESSURES HAVE BEEN BLED TO ZERO TO AVOID SERIOUS BODILY INJURY.*



WARNING: *HIGH TEMPERTATURE EXISTS INSIDE THE PRIMARY HEATER COVERS. BEFORE PERFORMING MAINTENANCE, ALLOW HEATER TO COOL TO AVOID BODILY INJURY FROM HOT FLUID OR HOT METAL.*

The sheath on the H-20/35 Heating Rods are made from a special alloy designed to be resistant to corrosion and erosion. However, eventually the service life of the rod will be reached and if the sheath should fail, fluid under pressure will leak into the heating element. This may result in leakage through the potting at the junction end of the rod. Therefore, it is imperative that the unit **NEVER** be operated with the guard removed and furthermore, you must never remove the guard for servicing without bleeding the material pressure in the heater to zero and disconnecting all electrical power.

HEATING ELEMENT REPLACEMENT

1. Turn OFF the Main Disconnect

2. Using an open-end wrench, loosen the Compression Nut, which holds the Thermocouple in place. Remove the Thermocouple.

3. Disconnect the lead wires, and using an open-end wrench, loosen the Heating Element and remove it. Since fluid surrounds each element, be prepared to catch the residual fluid as the element is withdrawn. Inspect the element; it should be relatively smooth and shiny. If there is crusted burnt ash like material adhered to the rod or the sheath shows pitting marks; replace the heating element(s).

4. Apply thread sealant to the threads of the Heating Element and install it using an open-end wrench.

5. Install the Thermocouple and using an open-end wrench, tighten the Compression Nut.

THERMOCOUPLE REPLACEMENT

The Thermocouple includes the compression nut and ferrule, and once locked in place the ferrule becomes a permanent part of the thermocouple and cannot be relocated or removed. The location of the thermocouple is critical to the operation of the heater and requires proper positioning before tightening the compression nut

1. Using an open-end wrench, securely tighten the compression fitting body into the heat exchanger tube to prevent any leakage. Remember, once the ferrule has been set, the position of the body cannot be changed.

NOTE:
The Thermal Couple must be removed before removing the Heating Element from the Heater Tube.

2. Insert the Thermocouple into the body until it makes positive contact with the heating element. Make sure that the Heat Exchanger Spring does not obstruct the placement of the element.

3. Firmly hold the Thermocouple in place against the element and using an open-end wrench tighten the Compression Nut. Note the correct ferrule positioning.

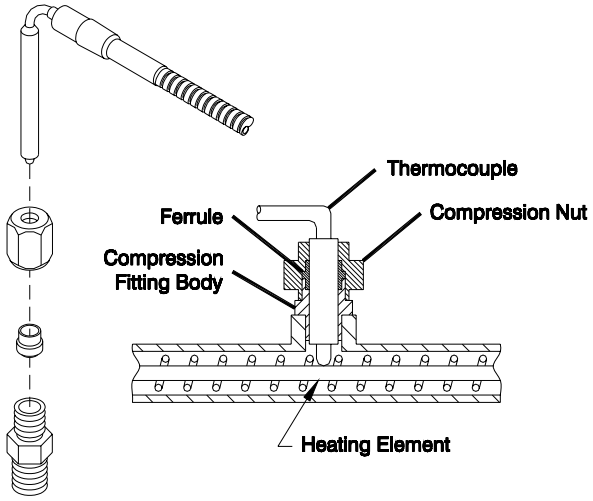


Figure 23. Thermocouple Components

Proportioning System

PROPORTIONING PUMPS

WARNING: *THE CHEMICAL COMPONENTS ARE PRESSURIZED UP TO 3500PSI. BEFORE OPENING ANY CHEMICAL CONNECTIONS OR SERVICING CHEMICAL COMPONENTS, USE EXTREME CAUTUION TO ENSURE THAT ALL PRESSURES HAVE BEEN BLED TO ZERO TO AVOID SERIOUS BODILY INJURY.*

Disassemble and clean the Proportioning Pumps annually. Inspect the pistons and cylinder for mars or scratches, which may cause leakage or damage to packings. Gusmer also recommends replacing the piston and cylinder packings, expanders, and packing springs on an annual basis as a preventative maintenance precaution.
(Refer to the Proportioning Pump Assembly section of the Parts I.D. for reference.)

WARNING: *TO AVOID SERIOUS BODILY INJURY, PRECISELY TORQUE THE PUMP TIE RODS AFTER SERVICING: H-20/35 TORQUE TO 30 FT/LBS.*

PUMP BASES

WARNING: *PUMP BASES OPERATE UNDER HIGH PRESSURE. USE EXTREME CAUTION TO AVOID SERIOUS BODILY INJURY. BLEED ALL PRESSURE FROM BOTH THE SUPPLY AND DELIVERY SIDE OF THE PUMP BASE TO ZERO BEFORE SERVICING.*

Disassembled and clean both Pump Bases annually. To do so follow these steps:
(Refer to the Pump Base Assembly section of the Parts I.D. for reference.)

1. De-pressurize the system.

2. Using the supply ball seat removal tool, (5/8 hex stock) unthread and remove the supply ball seat. Using the discharge ball seat removal tool (P/N 17928A), unthread and remove the discharge ball seat.
   a) Clean the gasket seating surfaces on the underside of the each seat and inside the each pump base cavity.
   b) Inspect the each seat gasket and replace as required.
   c) Inspect the each ball seat for nicks or scratches. Replace as required.
   d) Thoroughly clean the thread on the each seat before replacement. It is also a good practice to coat the threads with a liberal amount of lubricant.
   e) Install the each seat with gasket by threading the seat into the base by hand until the gasket bottoms inside the pump base. Use a 6" adjustable wrench to snug the seat approximately ¼ turn.
   f) DO NOT OVERTIGHTEN. It may be necessary to periodically retighten the each seat throughout the life of the gasket.
3. Wipe the each valve ball clean and inspect for nicks. Replace as required and complete the Pump Base Assembly.

Inlet Strainer Screen

A strainer screen in each proportioning pump filters out solid matter that could adversely effect the operation of the ball check valves in the pump base. You will note that the Daily Start-up procedure indicates these screens should be inspected daily.

For the first week or so of operation, you should clean both pump screens on a daily basis.

The Isocyanate component can crystallize from either moisture contamination or from freezing. Following proper storage, transfer, and operating procedures, and if the chemicals you receive are clean, you should have little problem with the Isocyanate screen. In practice though, it is good preventative maintenance to daily clean the Isocyanate screen. NEVER clean the Isocyanate pump screen during the shutdown operation. This is because the cleaning of the screen exposes it and its related parts to moisture and solvent, which can cause the Isocyanate to crystallize. Performing the cleaning operation during the start-up procedure will minimize contamination problems because dispensing will immediately flush out any Isocyanate residue.

Removal and cleaning of the strainer screen is accomplished as follows:

1. Close the material supply valve at the inlet of the appropriate proportioning pump. This prevents material being pumped when the strainer screw is removed.

2. Place a container beneath the strainer base to catch the drain-off of chemical when removing the strainer screw.

NOTE:
More than 25% restriction of the screen can prevent proper filling of the pump during operation. If more than 25% is blocked, the screen should be replaced

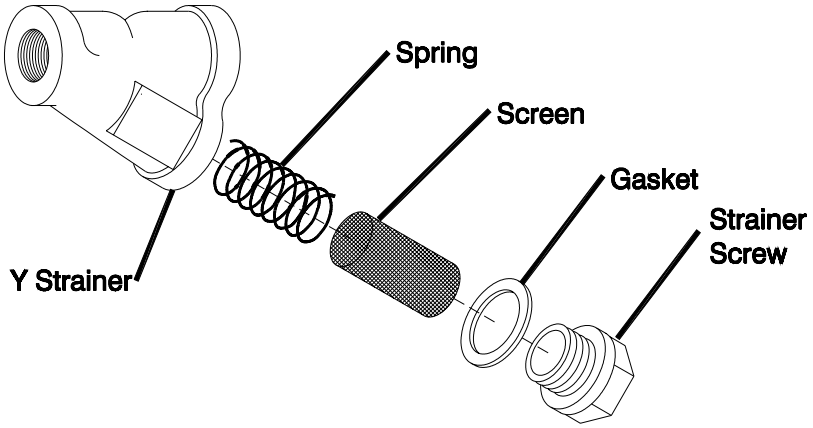


Figure 24. Y Strainer Components

3. Remove the screen from the strainer base. Thoroughly flush the screen with gun cleaner and shake it dry. Inspect the screen to ensure that no more than 25% of the mesh is restricted. Inspect the strainer screw gasket and replace as required.

4. Install the strainer screw with the strainer in place and tighten. Important: Take care not to over-tighten, let the gasket make the seal.

5. Open the material supply valve; ensure there are no leaks and wipe the equipment clean.

6. Proceed with operation.

Pump Lube System

To ensure that the pump lube will do its job, check its condition on a daily basis. Change the pump lube before it becomes a gel, or when its color becomes the same as the Isocyanate.

The gel formation is due to moisture absorption by the pump lube. The time interval between changes due to gel formation depends entirely upon the environment in which the equipment is operating. The enclosed pump lube system in the H-20/35 minimizes exposure to moisture, but moisture contamination is still possible.

Discoloration of the pump lube is inevitable due to the continual weepage of Isocyanate during pump operation. However, if the packing within the Isocyanate pump is functioning properly, pump lube replacement due to discoloration should not be more frequent than 3 or 4-week intervals.

To change the Pump Lube proceed as follows:

1. Position the Isocyanate Proportioning Pump to the extreme right by jogging the Pump Switch.

2. Lift the lube reservoir out of the bracket and remove the cap from the container. Holding the Cap over a suitable container, remove the Check Valve and allow pump lube to drain. Reattach the Check Valve to the inlet hose.

3. Drain the reservoir and flush it with pump lube.

4. Fill the Lube Reservoir with fresh Pump Lube.

5. Thread the reservoir onto the Reservoir Cap Assembly and place it into the bracket. (See Figure 8 on page 17.)

6. Push the Supply Tube approximately 1/3 of the way down into the Lube Reservoir.

7. Push the Return Tube down into the Lube Reservoir until it reaches the bottom.

8. Place the Lube Reservoir into the Bracket. The Lube System is now ready for operation. No priming of the system is required.

Hydraulic Drive System

WARNING: *THE HYDRAULIC COMPONENTS ARE PRESSURIZED UP TO 1500 PSI. BEFORE OPENING ANY HYDRAULIC CONNECTIONS OR SERVICING HYDRAULIC COMPONENTS, USE EXTREME CAUTION TO ENSURE THAT ALL PRESSURES HAVE BEEN BLED TO ZERO TO AVOID SERIOUS BODILY INJURY.*

The Hydraulic Drive System should be checked annually for cleanliness as follows:

1. Thoroughly clean the tank top, the access cover plate, and the components in the area of the cover plate. This will ensure that no foreign matter will enter the hydraulic reservoir when removing the cover plate.

2. Remove the six (6) cover plate mounting screws. Separate the hydraulic suction pipe from the fitting connecting the pipe to the hydraulic pump.

3. Remove the cover and pipe from the hydraulic reservoir.

4. Inspect the bottom of the reservoir for sediment. If sediment is present, drain the hydraulic fluid, thoroughly clean the tank, and refill with new fluid.

5. Replace the cover and the suction pipe; connect and tighten the suction pipe to the fitting on the hydraulic pump; and secure the cover in place with the mounting screws.

6. Check to ensure the hydraulic pump is full with hydraulic fluid.

7. Proceed with normal operation.

IMPORTANT: *Upon starting the motor, the hydraulic pump may make a screeching noise for a short time upon initial start-up. Should this noise continue for more than 30 seconds, switch off the motor control and refer to the troubleshooting section of this manual*

APPENDIX

OUTPUT (lbs./min.)	OUTPUT (gpm)	S (strokes/min)	MAXIMUM PRESSURE OPERATING
20	2.0	65	1800
25	2.5	80	1350
30	3.0	97	1150
38	3.8	124	1200

Chart based upon 220 Volts, 3 Phase

Formula: This formula is useful for calculating the output of the proportioning unit

Q (lbs/min) = **S** (strokes/min x .31)

Recommended Hydraulic fluid or equivalent

1. Mobil DTE 24
2. Mobil DTE 25
3. Cooks Albavis 10

The H-20/35 Series interfaces with all of the following equipment.

- GX-7 High Pressure Spray Guns
- GX-7 Auto High Pressure Spray Gun
- TX-50 Automatic Shot Timer/Counter
- GX-8 Spray Gun
- GX10 Pour Head
- AR-C/D High Pressure Pour Gun
- Model D High Pressure Spray Gun

IMPORTANT: *Refer to gun specifications for maximum pressure rating.*

INSTRUCTION MANUAL DISCREPANCY REPORT

Field Number	Field Title	Description
1	Date	
2	Name	
3	IM Number	
4	Issue Number	
5	Date of Issue	
6	Page Number	
7	Discrepancy	

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1	**Date**	Enter date report is submitted.
2	**Name**	Enter name of person making report.
3	**IM Number**	Enter the Part Number of the Instruction Manual from the title page.
4	**Issue Number**	Enter the Issue number of the Instruction Manual from the title page. If there is no issue number, enter **NONE.**
5	**Date of Issue**	Enter the date of Issue of the Instruction Manual from the title page. If there is no issue date, enter **NONE.**
6	**Page Number**	Enter the page number containing the discrepancy.
7	**Discrepancy**	Provide a brief description of discrepancy. **NOTE:** You may send a marked copy of the page as an attachment to your submittal.