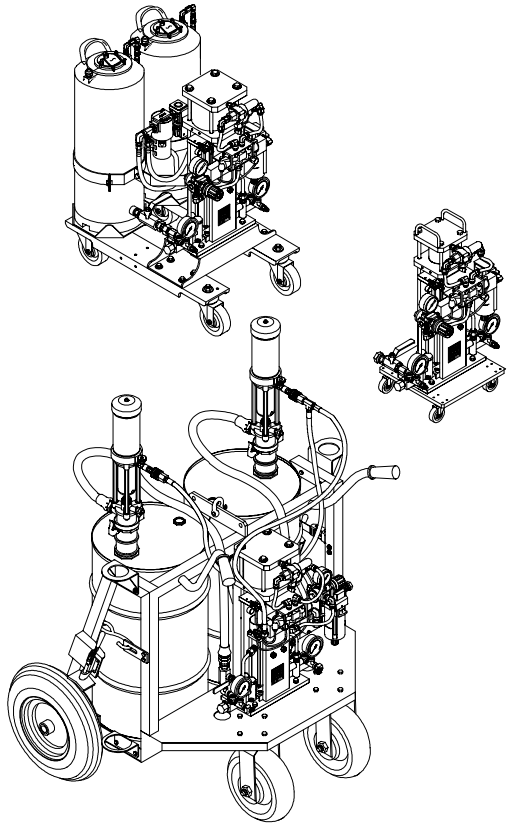
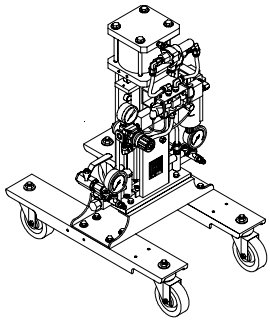
GUSMER®
CORPORATION

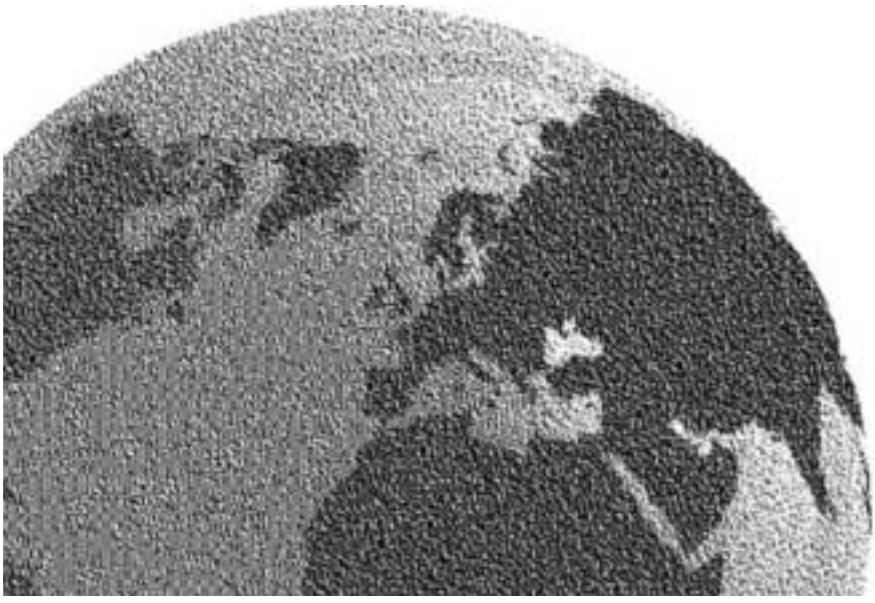
"Teamwork & Communication"





Predator/ Multi Purpose Proportioning Unit

Operating Manual 46942-1



November 30, 2000

Issue 6

GUSMER CORPORATION ®

A Subsidiary of Gusmer Machinery Group, Inc.
One Gusmer Drive
Lakewood, New Jersey, USA 08701-8055

Toll Free 1-800-367-4767 (USA & Canada)
Phone: (732) 370-9000
Fax: (732) 905-8968

http://www.gusmer.com

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

CONTENTS

LIST OF FIGURES

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, EXPRESSED 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, expressed 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

To insure proper and safe operation of the equipment, it is necessary to understand and follow the instructions in this manual

As with most mechanical equipment, one must take certain safety precautions when operating or servicing the equipment discussed in this manual. If the instructions and precautions listed throughout this manual are not followed, severe bodily injury or damage to equipment and property may result.

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.

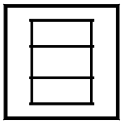
Acceptable Equipment Uses

The equipment is designed for the proportioning and dispensing of two-component urethane foam, or coating systems and some two-component epoxy systems. 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 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.

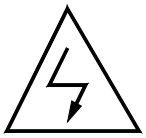
Operational Safety Procedures

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 SOVENTS AND CHEMICAL USED WITH THIS EQUIPMENT EXPOSE THE OPERATOR TO CERTAIN HAZARDS. ADEQUATE PERSONAL PROTECTIVE MEASURES MUST BETAKEN 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. INFORMATION CONCERNING PERSONAL PROTECTION AND PROPER HANDLING FROM THE SUPPLIER OF SUCH CHEMICALS.*

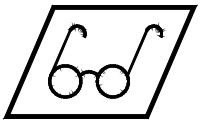


High Voltage

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.*

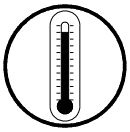
High Pressure

WARNING: *THIS EQUIPMENT HAS OR IS USED WITH EQUIPMENT THAT HAS HYDRAULIC COMPONENTS CAPABLE OF PRODUCING UP TO 3500 PSI. TO AVOID SERIOUS BODILY INJURY FROM HYDRAULIC INJECTION OF FLUID, NEVER OPEN ANY HYDRAULIC CONNECTIONS OR SERVICE HYDRAULIC 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*

GENERAL DESCRIPTION

46000-1

Specifications

Maximum Output	16 lbs./min. (7.25 kg/min)
Operating Pressure	580 psi (40 bars)
Viscosity	250-1500 cps
Air Requirement	10 SCFM @100 psi (4.7 liters/sec @7 bars)
Weight	60 pounds (27 kg)
Actual Dimensions	25 inches high (64 cm high) 18 inches wide (46 cm wide) 14 inches long (36 cm long)

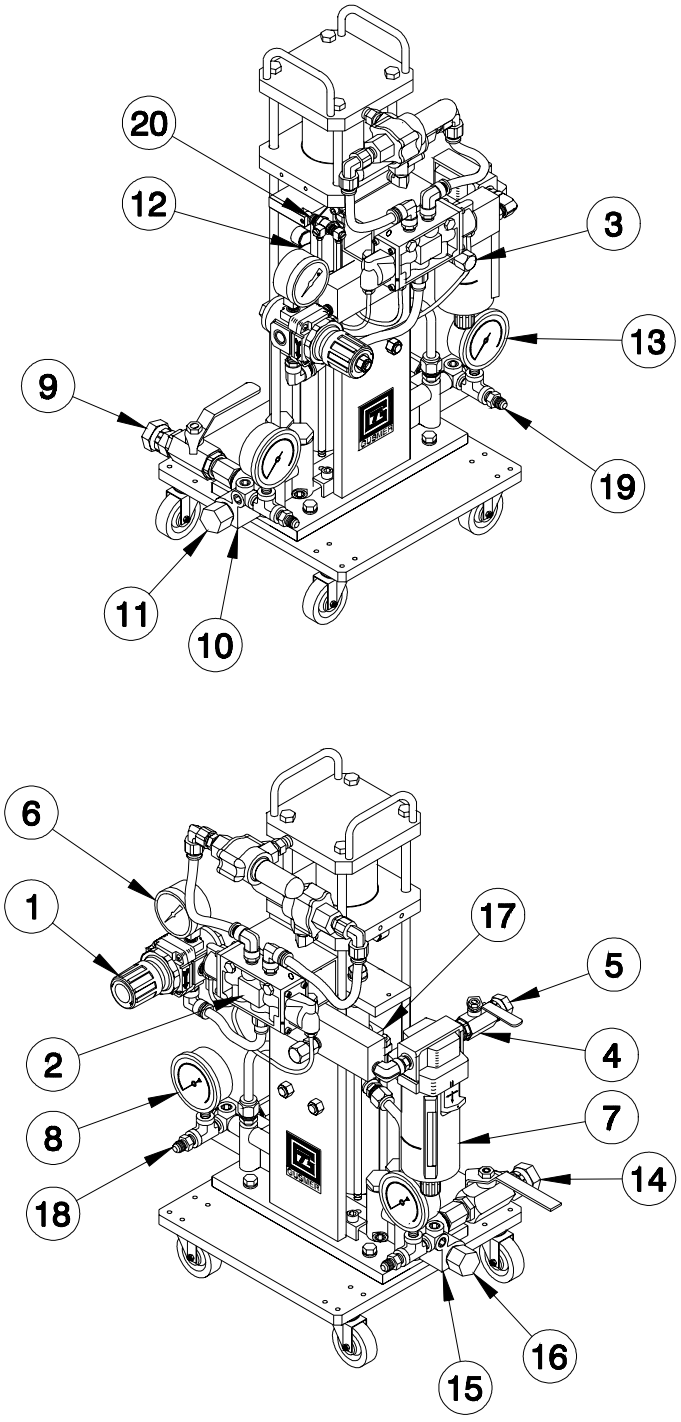


Figure 1. Model 46000-1 Proportioning Unit

1. **AIR PRESSURE REGULATOR**- Controls the speed of the air motor on the up and down stroke.
2. **DIRECTIONAL CONTROL VALVE-** Controls the direction of the Proportioning Pump.
3. **GUN AIR OUTLET**- 1/4 MPT Fitting
4. **AIR SUPPLY SHUT OFF VALVE**- Controls the flow of air into the machine.
5. **AIR INLET**- 3/8 Female Thread
6. **AIR PRESSURE GAUGE-** Displays the air pressure in the air drive system during the up and downstroke.
7. **MAIN AIR FILTER-** Filters the system air supply. (3/8 FPT)
8. **A-(ISOCYANATE) PRESSURE GAUGE-** Displays the pump out put pressure in the Isocyanate Proportioning Pump.
9. **A-INLET SUPPLY VALVE-** 1/2 FPT Swivel Fitting
10. **A-PUMP BASE**
11. **A-INLET FILTER SCREEN**
12. **A-PACKING NUT, LUBE CUP**
13. **R-(RESIN) PRESSURE GAUGE**- Displays the pump out put pressure in the Resin Proportioning Pump.
14. **R-INLET SUPPLY VALVE-** 3/4 FPT Swivel Fitting
15. **R-PUMP BASE**
16. **R-INLET FILTER SCREEN**
17. **R-PACKING NUT**
18. **A-(ISOCYANATE) OUTLET-** 1/2 –20 JIC Male Fitting
19. **R-(RESIN) OUTLET-** 9/16-18 JIC Male Fitting
20. **PILOT VALVES**- Reverse direction of the Pumps

46000 and 46000-2

Specifications

Maximum Output	16 lbs./min. (7.25 kg/min)
Operating Pressure	1600 psi (110 bars)
Viscosity	250-1500 cps
Air Requirement	26 SCFM @100 psi (12 liters/sec @7 bars)
Weight	80 lbs. (36 kg) 100 lbs. (45 kg) with tanks
Actual Dimensions	32 inches high (81 cm high) 18 inches wide (46 cm wide) 24 inches long (61 cm long)

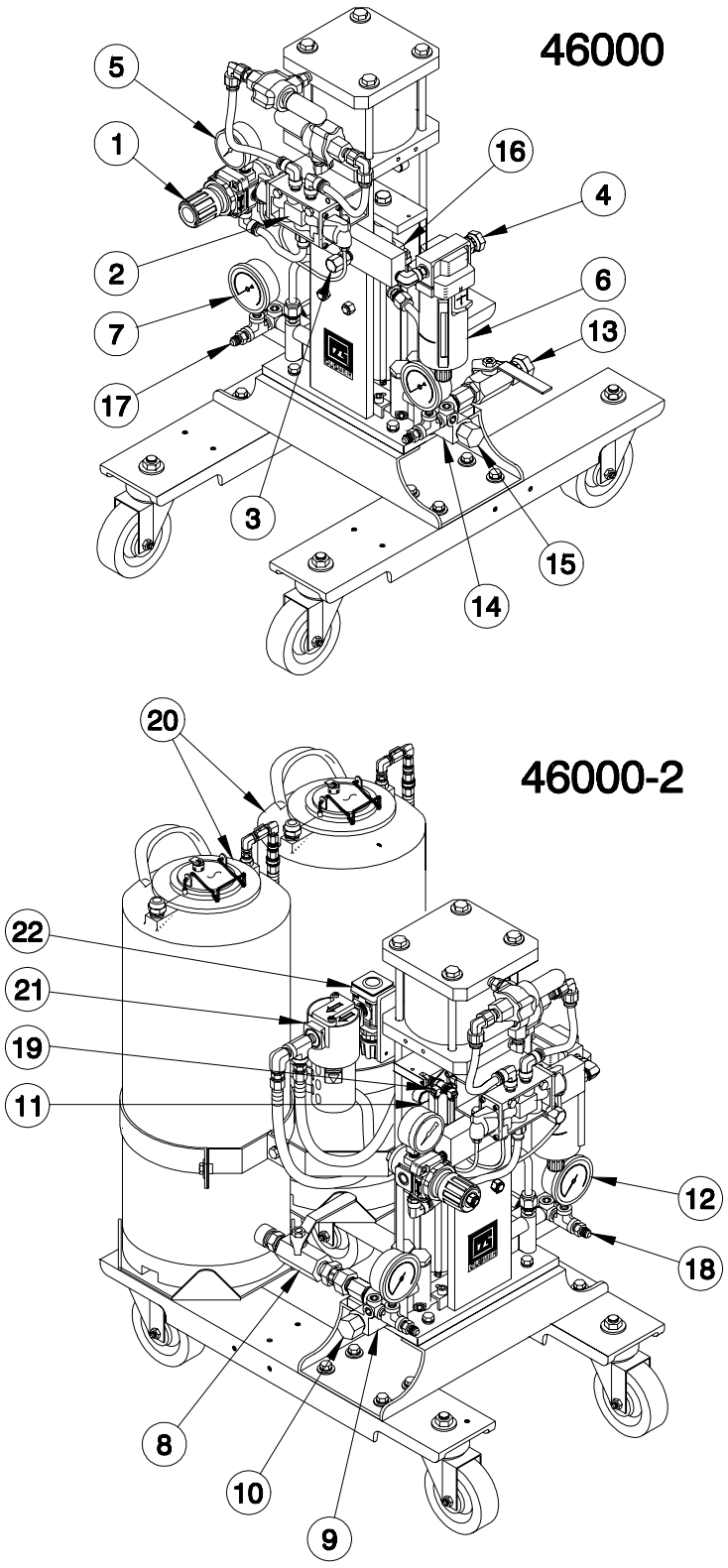


Figure 2. Model 46000 and 46000-2 Proportioning Units

1. **AIR PRESSURE REGULATOR**- Controls the speed of the air motor on the up and down stroke.
2. **DIRECTIONAL CONTROL VALVE-** Controls the direction of the Proportioning Pump.
3. **GUN AIR OUTLET**- 1/4 MPT Fitting
4. **AIR INLET**- 3/8 Female Swivel
5. **AIR PRESSURE GAUGE-** Displays the air pressure in the air drive system during the up and downstroke.
6. **MAIN AIR FILTER-** Filters the system air supply. (3/8 FPT)
7. **A-(ISOCYANATE) PRESSURE GAUGE-** Displays the pump out put pressure in the Isocyanate Proportioning Pump.
8. **A-INLET SUPPLY VALVE-** 1/2 FPT Swivel Fitting
9. **A-PUMP BASE**
10. **A-INLET FILTER SCREEN**
11. **A-PACKING NUT, LUBE CUP** (R on other side)
12. **R-(RESIN) PRESSURE GAUGE**- Displays the pump out put pressure in the Resin Proportioning Pump.
13. **R-INLET SUPPLY VALVE-** 3/4 FPT Swivel Fitting
14. **R-PUMP BASE**
15. **R-INLET FILTER SCREEN**
16. **R-PACKING NUT**
17. **A-(ISOCYANATE) OUTLET-** 1/2 –20 JIC Male Fitting
18. **R-(RESIN) OUTLET-** 9/16-18 JIC Male Fitting
19. **PILOT VALVES**- Reverse direction of the Pumps
20. **5 GALLON DAY TANKS**
21. **AIR DRYER**- Conditions Air supplied to Day Tanks.
22. **DAY TANK REGULATOR**- Controls air pressure to Day Tanks.

46000-3 and 46000-4 (Predator)

Specifications

Maximum Output	16 lbs./min. (7.25 kg/min)
Operating Pressure	1600 psi (110 bars)
Viscosity	250-1500 cps
Air Requirement	26 SCFM @100 psi (12 liters/sec @7 bars)
Weight	225 lbs. (102 kg.) Proportioning Unit, cart, and gun.
Actual Dimensions	50” high (127 cm high) 41” wide (104 cm wide) 28” long (71 cm long)

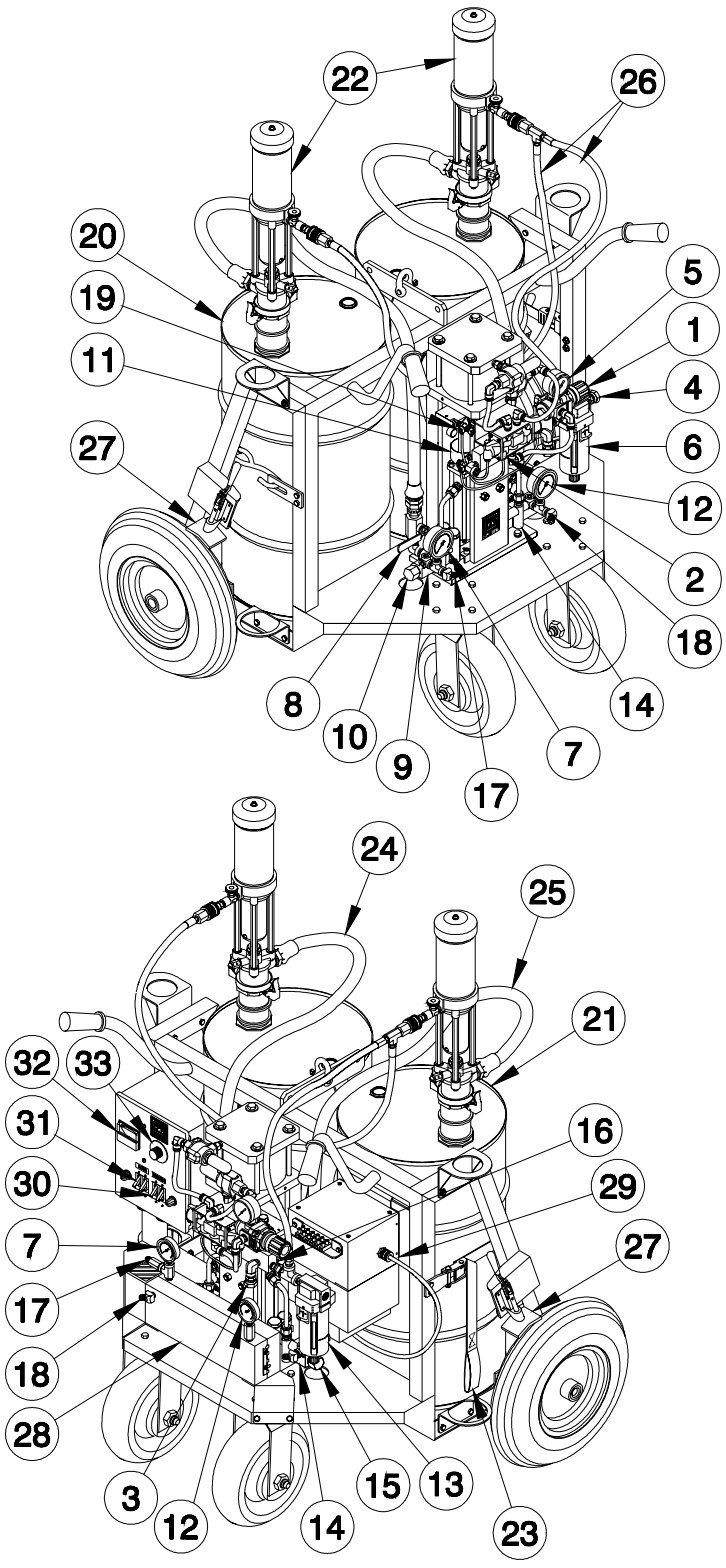
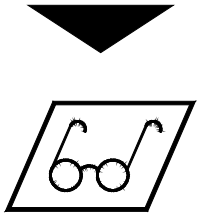


Figure 3. Model 46000-3 and 46000-4 Proportioning Units (Predator)

1. **AIR PRESSURE REGULATOR**- Controls the speed of the air motor on the up and down stroke.
2. **DIRECTIONAL CONTROL VALVE**- Controls the direction of the Proportioning Pump.
3. **GUN AIR OUTLET**- 1/4 MPT Swivel Fitting
4. **AIR INLET**- 3/8 Female Swivel
5. **AIR PRESSURE GAUGE**- Displays the air pressure in the air drive system during the up and downstroke.
6. **MAIN AIR FILTER**- Filters the system air supply. (3/8 FPT)
7. **A- (ISOCYANATE) PRESSURE GAUGE**- Displays the pump out put pressure in the Isocyanate Proportioning Pump.
8. **A- INLET SUPPLY VALVE**- 1/2 FPT Swivel Fitting
9. **A- PUMP BASE-**
10. **A- INLET FILTER SCREEN-**
11. **A- PACKING NUT, LUBE CUP-**
12. **R- (RESIN) PRESSURE GAUGE**- Displays the pump out put pressure in the Resin Proportioning Pump.
13. **R- INLET SUPPLY VALVE**- 3/4 FPT Swivel Fitting
14. **R- PUMP BASE-**
15. **R- INLET FILTER SCREEN-**
16. **R- PACKING NUT-**
17. **A- (ISOCYANATE) OUTLET**- 1/2 –20 JIC Male Fitting
18. **R-(RESIN) OUTLET**- 9/16-18 JIC Male Fitting
19. **PILOT VALVES**- Reverse direction of the Pumps
20. **A-SUPPLY TANK-**
21. **R-SUPPLY TANK-**
22. **TRANSFER PUMP(S)-**

s

23. **TIE DOWN STRAP**-
24. **A- SUPPLY HOSE-**
25. **R- SUPPLY HOSE-**
26. **TRANSFER PUMP AIR HOSE ASS'Y-**
27. **BRAKE**-
28. **PRIMARY HEATER ASSEMBLY**-
29. **TRANSFORMER ASSEMBLY**-
30. **HEATER CIRCUIT BREAKER**-
31. **HOSE CIRCUIT BREAKER**-
32. **AMMETER**-
33. **TEMPERATURE CONTROL KNOB**-



INITIAL MACHINE SET-UP

WARNING: *PROPER PROTECTIVE GEAR AS SPECIFIED BY THE CHEMICAL AND SOLVENT SUPPLIER MUST BE WORN WHEN SERVICING OR OPERATING THIS EQUIPMENT. IT INCLUDES BUT IS NOT LIMITED TO GLOVES, EYE PROTECTION, AND RESPIRATORY PROTECTION. REFER TO THE GENERAL SAFETY INFORMATION SECTION OF THIS MANUAL.*

An Accessory Package is included with the unit and contains the following parts that are required for set-up:

- Tape Roll*
- Electrical Isolator*
- Isolation Hoses*
  Blue – Resin
  Red-Isocyanate
- (2) Swivel Unions
- Quick Disconnect Coupler
- Quick Disconnect Coupler Plug
- Warranty Card
- Operating Manual
- Parts Identification Manual
- Binder
- Warranty Card

* AP46000-4 Only

Set-Up for Multi Purpose and Predator without Heat

1. Setup the supply and air control system as follows:

   For 46000 and 46000-1 Machines:

   a) Connect the R-Supply Hose from the Transfer Pump to the R-Inlet fitting.

   b) Connect the A-Supply Hose from the Transfer Pump to the A-Inlet fitting.

   c) Connect the air supply to the Transfer pump.

   For 46000-2 Machines:

   a) Fill R-Day Tank with 5 gallons of material.

   b) Fill A-Day Tank with 5 gallons of material.

   c) Secure covers on both Tanks.

   d) Connect Air Hoses to both Day Tanks.

   For 46000-3 (Predator) Machines:

   a) Secure A- and R- Chemical Drums in place on the unit.

   b) Place the appropriate Transfer Pump in the A- and R- Chemical Drums.

   c) Connect the R- Supply Hose from the Transfer Pump to the R-Inlet fitting.

   d) Connect the A- Supply Hose from the Transfer Pump to the A-Inlet fitting.

   e) Connect the Transfer Pump Air Hose Assembly between the Transfer pump and the Proportioning Unit.

2. Connect the Main Air Supply to the machine. (See Figure 4)

***IMPORTANT**: The Main Air Supply must be clean and free of contaminants. A minimum of 3/8 inch inside diameter air line (not supplied) should be used to deliver the air supply to the unit.*

3. Connect the Isocyanate and Resin Hose Assemblies to the machine. (See Figure 4)

***IMPORTANT**: The Resin and Isocyanate hose fittings are different sizes, making improper hose connections virtually impossible.*

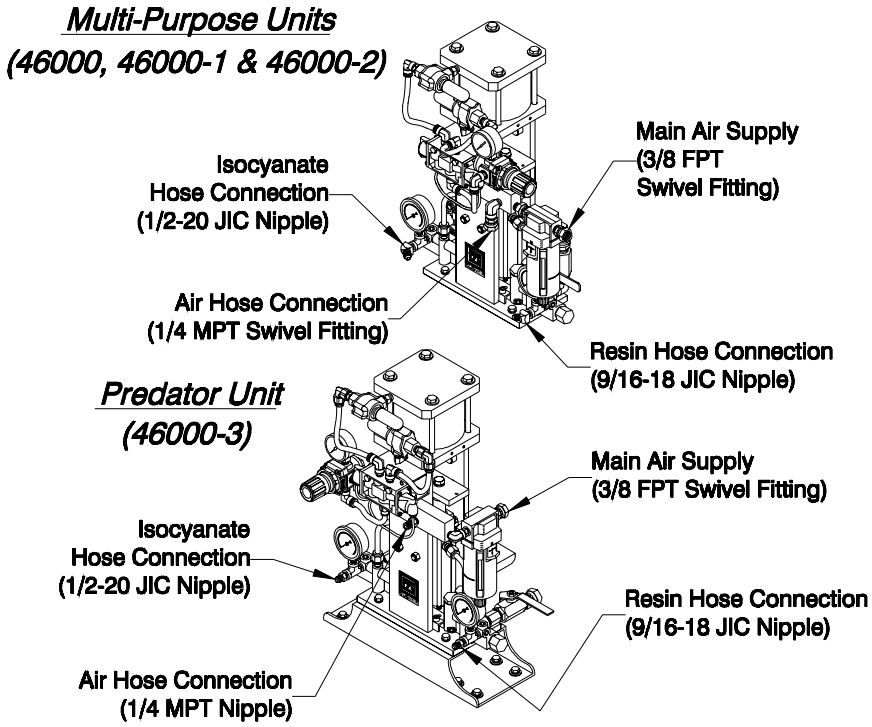


Figure 4. Hose Connection Locations

4. Connect the hose assemblies together as follows:

***IMPORTANT**: It is important to make proper hose connections. The connection points are a potential source of chemical and airs leaks and are susceptible 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.*

a) Lay out Hose Assemblies as shown.

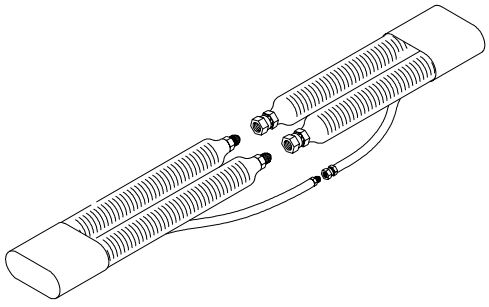


Figure 5. Hose Connection Step (a)

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

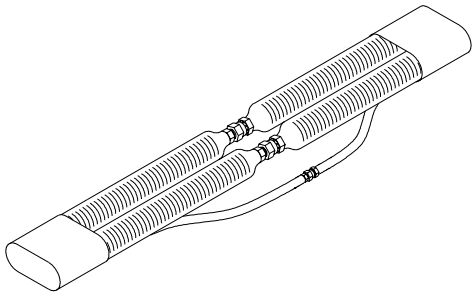
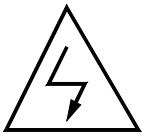


Figure 6. Hose Connection Step (b)

****** Repeat Step 4 for adding additional hoses. ******

5. Connect the coupling block to the gun hose and check that the manual valves are closed.
6. Proceed to the Air Purge Procedure on page 19.

Set-Up for Predator with Heat



WARNING: *THE ELECTRIC SERVICE MUST BE INSTALLED BY A QUALIFIED ELECTRICIAN ACCORDING TO NATIONAL ELECTRIC CODE AND ALL APPLICABLE LOCAL CODES.*

NOTE:
To obtain the best possible results, the power source must be capable of meeting the electrical requirements specified on the nameplate and must be provided with a dedicated fuse disconnect.

1. Connect the Main Power Cord (not supplied) to the electric console. Open the electric console. Feed the power cord through the strain relief.
2. Setup the chemical supply and air control system as required.
   a) Connect the Resin supply to the R-Inlet 3/4 FPT (Swivel) Fitting.
   b) Connect the Isocyanate supply to the A-Inlet 1/2 FPT (Swivel) Fitting.

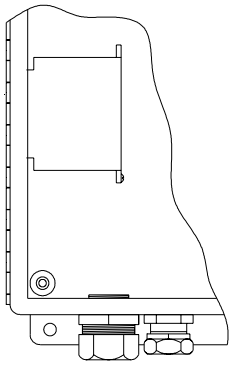


Figure 7. Main Power Connection

   c) Connect the air supply to the1/4 MPT nipple on the Transfer Pump.
3. Connect the Isolation Hoses to the Primary Heater.

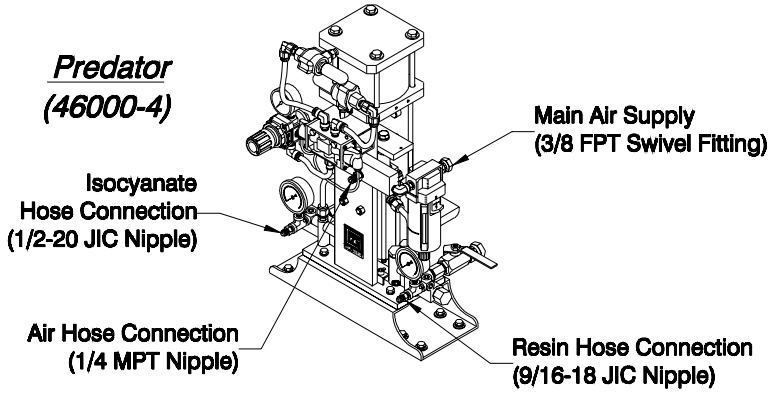


Figure 8. Hose Connection Locations (46000-4)

IMPORTANT: *Resin hoses are color-coded blue and isocyanate hoses are color coded red for easy identification. In addition, the resin and isocyanate hose fittings are different sizes, making it virtually impossible to improperly connect the hoses*

4. Connect the hose heater wire leads from the electric console to each Isolation Hose. It does not matter which wire is connected to which hose. Take care to make each connection tight. Apply electrical tape be to all connections. It prevents loosening from vibration and provides insulation.

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 for coupling to the proportioning unit.

5. Connect the heated hose assemblies as follows:

IMPORTANT: *It is important to make proper hose connections. The connection points are a potential source of chemical and airs leaks and are susceptible 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 recommends the installing of the optional scuff jacket to protect the hose insulation from damage.*

NOTE:
These views show a TSU Harness, which is not included with Manual Hose Heat Machines.

a) Lay out the heated hose assemblies as shown.

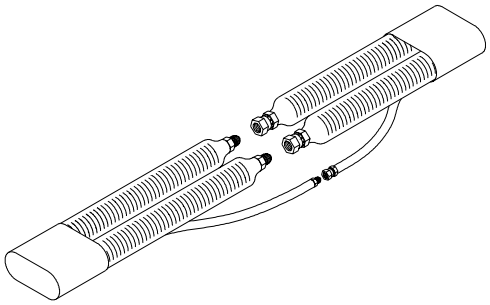


Figure 9. Hose Connection Step (a)

b) Connect hoses as shown taking care not to cross thread or over-tighten the fittings, there by assuring a leak proof chemical connection.

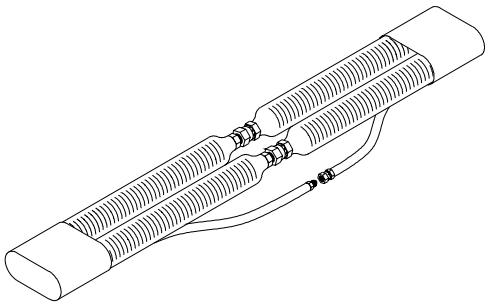


Figure 10. Hose Connection Step (b)

c) Connect the Air Hose.

Insert the Electrical Isolator between the hydraulic fittings and tape securely in place along with the air line as shown. Failure to do so will cause a short circuit in the hose heating system.

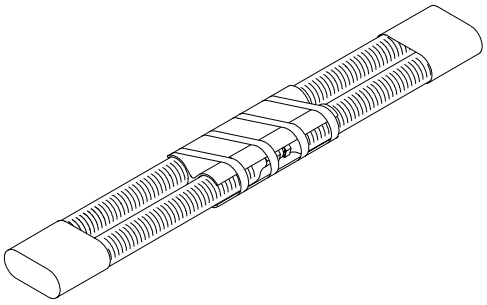


Figure 11. Hose Connection Step (c)

***** Repeat Step 5 for adding additional hoses. *****

6. Connect the main air source to the heated hose lengths.

   IMPORTANT: *The Main Air Supply must be clean and free of contaminants A minimum of 3/8 inch inside diameter air line (not supplied) should be used to deliver the air supply to the gun.*

7. Connect the Coupling Block to the gun hose and determine that the manual valves are closed.

WARNING: *THE TEMPERATURE MUST BE CLOSELY MONITORED DURING MANUAL CONTROL OF THE HOSE HEAT SYSTEM AS THE HOSE CAN OVERHEAT AND CAUSE SEROIUS DAMAGE TO PROPERTY AND PERSONNEL.* ***HOSE TEMPERATURE, AS INDICATED BY A PROPORLY INSTALLLED HOSE THERMOMETER, CAN NOT EXCED 170 °(76 °C).***

8. Install the 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 while spraying can see it.

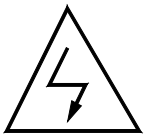
9. Properly ground all equipment. The high velocity flow of fluid can create static sparking which may cause fire or explosion. Certain solvents, which are commonly in use with this equipment are flammable and may present a flash danger to the operator

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

   b) Ground the Unit at the main electrical source in accordance with the National Electrical Code. In the event, that a generator is powering the unit, consult with your electrician about additional grounding measures that may be required.

WARNING: *DURING THE INITIAL START-UP, SLOWLY INCREASE THE AIR PRESSURE AND CHECK ALL FITTINGS FOR SIGNS OF LEAKAGE. TIGHTEN AS REQUIRED.*

Hose Heater Set-Up



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

1. Set the tap on the Low Voltage Power Pack in accordance to Figure 12**.**

   IMPORTANT: *The power pack must be set to match the hose length used. Too much power will cause the circuit fuse to open and too little power will result in insufficient hose heating.*

NOTE:
With the Hose Heater Controller turned fully clockwise, the secondary amperage should not exceed 50 Amps.

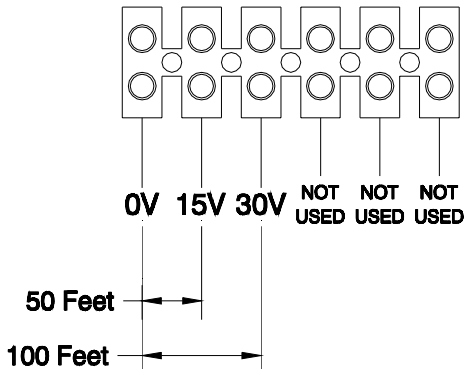


Figure 12. Temperature Control Transformer Schematic

Air Purge Procedure

Prior to operation, it is necessary to purge the entire system of air and mineral oil left over from the functional testing of the equipment.

To purge the machine proceed as follows:

1. Turn on the main air supply.

NOTE:
(46000-2 Machines Only) Day Tank Air Regulator should be adjusted to a minimum of 60 psi. A higher pressure setting may be necessary if material viscosity exceeds 350 cps.

2. Pressurize the Transfer Pumps/Day Tanks and open the A and R-Inlet Supply Valves. It is a good practice at this point to check for material leaks

3. Adjust the Air Pressure Regulator to zero. (Full counter clockwise).

4. Adjust the Air Pressure Regulator clockwise until the pumps begin to move (approximately 15-psi air pressure). Stop the pumps when they reach the top of their stroke, by turning the Regulator counter clockwise to off. This will facilitate easy access to the pump lube cup on the Isocyanate pump. Fill the lube cup to about 1/4-inch from the top with pump lube.

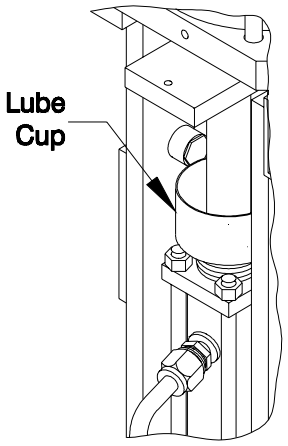


Figure 13. Pump Lube Cup

NOTE:
Properly discard both materials in accordance with applicable environmental regulations.

5. Adjust the Air Pressure Regulator clockwise until the pumps begin to move. (approximately 15-psi air pressure) Hold the coupling block over separate containers, open both manual valves and allow both materials to flow out of the coupling block simultaneously. Wait until all spitting of air stops and all traces of residual material have disappeared and there is a solid flow of each material.

6. Close both manual valves and wipe off any residual material from the coupling block.

7. Balance chemical pressures on unit.

8. Mount the gun to the coupling block

The unit is now ready for operation!

NORMAL OPERATING PROCEDURES

Daily Start-up Procedure

1. Check the condition of the Isocyanate Lube Cup and service as required.

2. Adjust the packings. The Isocyanate Lube Cup/Packing Nut on the unit is adjustable and will require tightening when the pump lube is changed. In addition check the Resin Packing Nut and adjust as required.

3. Check the inlet screens and service as required.

4. Determine that the chemical system is at the proper temperature as recommended by the chemical supplier and that the moisture protection system, is in working order.

5. Turn on the Main Air Supply to the Transfer Pump or on units equipped with Day Tanks adjust the air pressure to 60 psi.

6. Open both the A and R-Inlet Supply Valves.

7. Set the Air Pressure Regulator as required.

NOTE:
Steps 8 through 11 apply to heated units only. Skip to step 12 for all other units.

8. Switch ON the Main Disconnect Switch.

9. Switch ON the hose heat circuit breaker. The amber pilot light should be on.

WARNING: *THE TEMPERATURE MUST BE CLOSELY MONITORED DURING MANUAL CONTROL OF THE HOSE HEAT SYSTEM AS THE HOSE CAN OVERHEAT AND CAUSE SEROIUS DAMAGE TO PROPERTY AND PERSONNEL.* ***HOSE TEMPERATURE, AS INDICATED BY A PROPORLY INSTALLLED HOSE THERMOMETER, CAN NOT EXCED 170°(76°C).***

10. Set the hose heater Power control to Max. (Do Not exceed 12 Amps) for quick warm-up. Check the hose thermometer for proper spray temperature and readjust the power control as necessary to maintain temperature.

11. Switch ON the Primary Heater Circuit Breaker. The amber pilot light should be on and then cycle to off as the heater comes up to temperature.

    Set the desired temperature (clockwise to increase, counter clockwise to decrease) by making small adjustments and allowing the heater to stabilize in between.

12. Connect air to the gun, open the manual valves, and test spray while observing the chemical pressure gauges on both the up and down strokes. Readjust the regulator as required.

    The unit is now ready for operation!

Daily Shut-Down Procedure

1. Switch OFF the Hose Heater and Primary Heater Circuit Breakers if so equipped.
2. Switch OFF the Main Switch if so equipped.
3. Disconnect the air from the Transfer Pumps or on units equipped with Day Tanks bleed off all air in the system.
4. Adjust Air Pressure Regulator to zero.
5. Trigger the gun off target until the Iso and Resin Gauges read zero. Close both manual valves on the Gun.
6. Turn OFF both Inlet Supply Valves.
7. Remove the Hose Thermometer from hose if so equipped.
8. Coil or secure the hose in a manner that prevents damage.
9. Turn OFF the Main Air Supply.
10. Disconnect the Side Blocks from the GAP Gun, or the GX-7 or D Gun from the Coupling Block and service as required.

TROUBLESHOOTING PROCEDURES

General Information

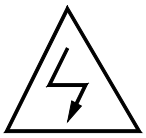
When properly maintained and operated, GUSMER equipment will provide long and faithful service. However, occasional problems will arise which must be resolved before operation can continue. The purpose of this section is to give an explanation of what problems may arise, how to detect them, and how to 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 trouble shooting 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 trouble shooting of GUSMER equipment. These schools give concentrated training on the equipment and help to develop an operator into a competent Certified Gusmer Technician.

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 TROUBLE SHOOTING 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 AND PNEUMATIC EQUIPMENT; MUST HAVE READ AND UNDERSTOOD THE APPLICABLE SECTIONS OF THIS MANUAL; AND MUST WEAR PERSONAL PROTECTION APPROPRIATE TO THE TASK BEING UNDERTAKEN.*



***WARNING:** ALL ELECTRICAL TROUBLE SHOOTING DESCRIBED IN THIS MANUAL MUST BE DONE WITH POWER OFF TO AVOID SEVERE BODILY INJURY FROM ELECTRICAL SHOCK. THIS MEANS, THAT IN ADDITION TO ALL CIRCUIT BREAKERS "OFF," DISCONNECT THE MAIN POWER AT THE SOURCE. ANY ELECTRICAL TROUBLE SHOOTING REQUIRED BEYOND THE SCOPE OF THIS MANUAL MUST BE DONE BY A QUALIFIED ELECTRICIAN, THOROUGHLY FAMILIAR WITH THE OPERATION OF GUSMER EQUIPMENT.*

Primary Heating System

NOTE:
Shown with cover removed for clarity to troubleshoot ONLY. Otherwise, never remove cover from the machine during normal use.

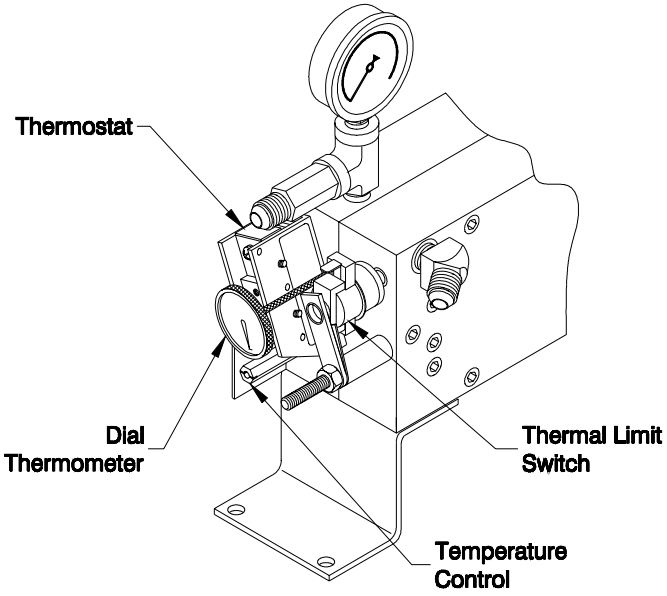
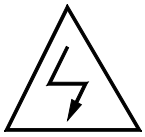
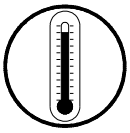


Figure 14. Primary Heater Features





***WARNING**: BEFORE PERFORMING THESE TROUBLESHOOTING PROCEDURES, DETERMINE THAT ALL CIRCUIT BREAKERS ARE OFF AND MAIN POWER IS DISCONNECTED AT THE SOURCE TO AVOID BODILY INJURY FROM ELECTRICAL SHOCK. DO NOT ENTER THE ELECTRICAL CONSOLE WITH POWER ON.*
THERE IS HIGH VOLTAGE INSIDE THE PRIMARY HEATER COVER BOX. DO NOT REMOVE THE COVER BOX WITH POWER ON.
THERE IS HIGH TEMPERATURE INSIDE THE COVER BOX. NEVER OPERATE THE HEATER WITH COVER BOX REMOVED.
COOL THE FLUID IN THE HEATER BY PUMPING UNHEATED FLUID THROUGH THE HEATER TO AVOID BODILY INJURY FROM HOT FLUID AND HOT METAL.

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

Problems	**Solutions**
No heat, amber pilot light does not cycle on	1
Partial heat, amber pilot light on continuously	2

SOLUTIONS

1. The Thermostat or Thermal Limit Switch is not functioning properly.

    a) THERMOSTAT CHECK- the amber pilot light will only be on when the temperature of the Primary Heater is below the temperature setting of the thermostat. Turn the thermostat up (clockwise) to check the operation of the heater and then reset to the desired setting.
    If this does not solve the problem continue to step (b)

b) THERMAL LIMIT SWITCH - When moving the Proportioning Unit, it is probable that the Thermal Limit Switch will trip in transit. Nevertheless, if the heater functions properly after the limit switch has been reset it is imperative that the operation of the heater be closely monitored to insure the switch has not tripped as a result of a heater malfunction.

To reset the Limit Switch, proceed as follows:

1) Switch off the Main Switch and Primary Heater Circuit Breaker.
2) Remove the cover box by removing the acorn nut and sliding the cover box away from the heater.
3) Recheck to insure all electrical power is OFF.
4) Reset the Thermal Limit Switch by pushing in the red button on the switch.
5) If the Thermal Limit Switch does not feel as though it reset, then disconnect one lead from the Thermal Limit Switch and read continuity across the switch. If no continuity, the switch is defective and must be replaced.
6) If this does not solve the problem, replace the thermostat.
7) Slide the cover box back into place and tighten the acorn nut.
8) Switch on the electrical power and monitor the operation of the primary heater to insure it is functioning properly.

2. HEATING RODS - The Primary Heater contains four 1250-watt (38.7 ohms each) Heating Rods wired in parallel. To check that all elements are operational, proceed as follows:

a) With power OFF and the Primary Heater Circuit Breaker OFF, read the resistance across the four Heating Rods. The resistance should be 9.6 ohms. A higher resistance indicates that one or more rods are not working. If this is the case, proceed to step (b).

b) Disconnect the Heating Rods and measure the resistance of each rod. Each rod should measure 38.7 ohms. If not replace the damaged rod or rods.

Proportioning System

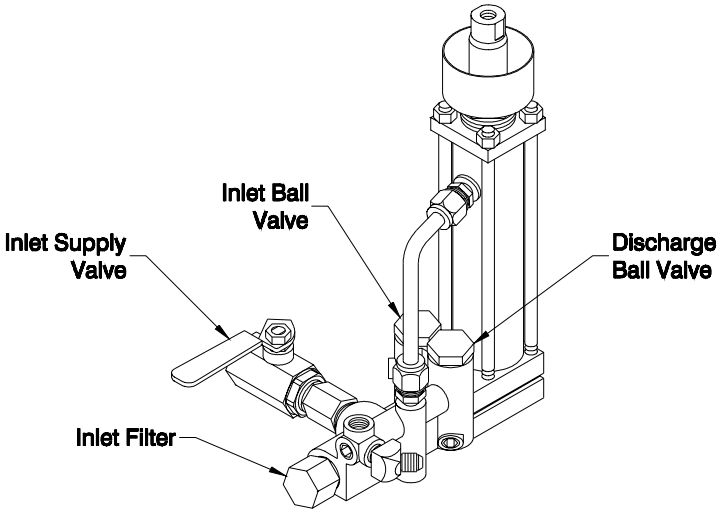


Figure 15. Proportioning Pump Features

To avoid unnecessary repairs, try the recommended solutions in the order given for each problem. Before assuming there is a problem, determine that all controls are properly set.

Problems	**Solutions**
Proportioning pump does not hold pressure when stalled.	1
Proportioning pump does not build pressure on the upstroke.	7
Pressure unbalance between pumps.	2,3,4
Cavitation in the Proportioning Pump.	2,3,4
Pump movement is erratic.	5
Failure of pump to reverse	5,6

SOLUTIONS

1. Determine which inlet or discharge valve is leaking. If the pump (A or R) is losing pressure on the upstroke then check the discharge valve of the respective pump. If the pump is losing pressure on the downstroke then check the inlet valve of the respective pump.
   a) Close the Inlet Supply Valve and de-pressurize the Transfer Pump.
   b) De-pressurize the Proportioning Pump.
   c) Remove the appropriate valve cover and, using a magnet remove the valve ball.
   d) Flush and wipe clean the valve ball and ball seat of all residual material. Inspect these parts for damage.
   e) In most cases, the cause of the leaking valve is a particle of foreign material preventing the ball from seating properly. If cleaning the ball and seat does not resolve the problem, then replace the valve ball and or pump base.

2. Trouble shooting this problem requires that two points be determined:

   First- Which chemical did not reach the gun?

   Second- Why did that chemical fail to get there?

   Determine the first point by checking the color of the material exiting the gun. Foam systems are usually a combination of light and dark material. Therefore, by observing the color of the liquid exiting the gun, one can determine which material is missing.

   The second point either is due to a restriction in the gun or because the Proportioning Pump did not perform properly in pumping it's designed volume.

   This is determined by checking the chemical pressure gauges on the unit. Focus on the pressure gauge corresponding to the missing chemical.

   Assume that the R-component is not reaching the gun. If the Resin pressure gauge is considerably lower than normal, the problem is the pump. If the Resin gauge is considerably higher than normal the problem is usually in the gun and must be resolved by referring to the gun manual.

3. CAVITATION is the formation of a partial vacuum or void within the pump cylinder during the fill/upstroke stroke.

   It is actually a "short fill" since the fill chamber does not fill completely with liquid when the pump reverses to start the discharge/down stroke. This "short fill" occurs when the Proportioning Pump demands a greater volume of material during its fill stroke than can be supplied.

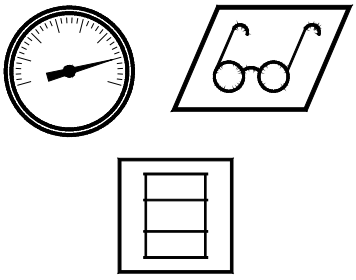
   The most common causes of cavitation are as follows:

   a) The Transfer Pump (If so equipped) can not handle the supply requirement. A GUSMER 2:1 Transfer Pump is recommended for use with this unit. Also recommended is a minimum of 3/4" diameter supply hose, as short as practical.

   b) The Day Tank (If so equipped) can not handle the supply requirement.

   c) The chemical is too viscous (thick) to pump properly. The recommended supply temperature is 65° F, to 75° F. At temperatures below 65° F, the material thickens and becomes increasingly harder to pump.

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



WARNING: *EXTREME CAUTION MUST BE EXERCIZED BEFORE OPENING ANY HYDRAULIC CONNECTIONS OR SERVICING THE PUMP OR PUMP BASE. THE OPERATOR MUST BLEED OFF THE PRESSURE IN BOTH THE SUPPLY AND DELIVERY SIDES OF THE PUMP TO ZERO TO AVOID SERIOUS BODILY INJURY FROM FLUID INJECTION. NEVER SERVICE COMPONENTS CONTAINING CHEMICALS WITHOUT WEARING APPROVED SAFETY GLASSES AND PROTECTIVE GLOVES TO PREVENT PROLONGED SKIN CONTACT.*

4. LEAKING INLET CHECK VALVE - An inlet check valve and/or leaking seat that does not properly seal will permit some of the proportioned material to flow back towards the supply drum. When this happens the proper volume of material will not pump during the discharge stroke and an off-ratio condition will result.

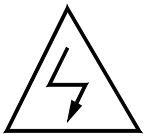
5. ROLLER BEARINGS- Occasionally the roller bearings may become clogged with

dirt or Isocyanate and seize. Replace them if this occurs.

6. PILOT VALVES- Check each valve for proper operation. If the either is defective, replace it.

7. DAMAGED PISTON PACKING- Check the Piston Packing Set for mars or scoring. Replace if required.

Hose Heat Systems



WARNING: *BEFORE PERFORMING THESE TROUBLE SHOOTING PROCEDURES DETERMINE THAT ALL CIRCUIT BREAKERS ARE OFF AND THE MAIN POWER IS DISCONNECTED AT THE SOURCE TO AVOID SEVERE BODILY INJURY FROM ELECTRICAL SHOCK. DO NOT ENTER THE ELECTRICAL CONSOLE WITH POWER ON.*

WARNING: *THE TEMPERATURE MUST BE CLOSELY MONITORED DURING MANUAL CONTROL OF THE HOSE HEAT SYSTEM AS THE HOSE CAN OVERHEAT AND CAUSE SEROIUS DAMAGE TO PROPERTY AND PERSONNEL.* ***HOSE TEMPERATURE, AS INDICATED BY A PROPORLY INSTALLLED HOSE THERMOMETER, CAN NOT EXCED 170 °(76 °C).***

NOTE:
Refer to the Primary Heater trouble shooting section for additional solutions. Trouble Shooting techniques for the Digital Temperature Process Controllers are equally valid for both the Primary Heater Controller and the Hose Heater Controller.

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

Problems	Solutions
Hose warm but does not reach temperature or takes too long to reach temperature	1, 2, 6
Hose does not heat; Light on	2, 3, 4,
Hose Heat Circuit Breaker trips or fuse blows	2
Hose temperature not maintained during flow	1, 2, 5, 6,
Hose or hoses adjacent to the unit are warm - hoses downstream are cold	4

SOLUTIONS

1. HOSE LENGTH- The design of the Hose Heater allows it to operate with up to 310 feet of hose. Hose lengths greater than that reduce the ability of the hose heat to reach temperature. (See Initial Machine Set up) 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 HEATER POWER SET - The power set should be adjusted, clockwise, to achieve maximum amperage. Using a clamp type ammeter set it to 35-40 Amps for optimum temperature control. Never set above 50 Amps.

3. HOSE HEAT FUSE- With the power OFF, remove the fuse and check it for continuity or simply replace it with one known to be good.

WARNING: *REPLACE THE FUSE WITH ONE OF THE SAME RATING. A SUBSTITUTE MAY DAMAGE THE EQUIPMENT AND WOULD CREATE A POTENTIAL SOURCE OF INJURY TO THE OPERATOR.*

4. HOSE HEATING ELEMENT- First check to see that the screw terminals on the isolation hoses and all electrical connections are tight. If these connections are secure, then, with the power OFF, remove one of the isolation hose heater leads to permit continuity testing of the hose-heating element. If continuity is not present, then make a systematic search for the failed hose or connection.

   To check for improper electrical isolation, just remember that the low voltage hoses are electrically connected in series, and that the hose fittings make the electrical connection between hoses. Thus, if the resin fittings contact the isocyanate fittings all hoses from the point of contact out to the gun will be "cold" while those hoses back to the Proportioning Unit will be heated.

   The most common causes are:

- The Electrical Isolator is not installed between the fittings.
- The Electrical Isolator has slipped out of position.

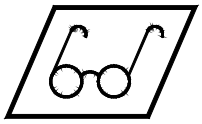
   If either occur, it is a matter of finding where the fittings are in contact and isolating them.

5. The purpose of the hose heater is not to add heat but rather to maintain the temperature developed by the Primary Heater. If indications are that the hose heater is not maintaining temperature during flow, check that the primary heat and hose heat are set for the same temperature or reduce the output.

6. Low voltage may significantly reduce power available and the heater will not perform to its full capability at maximum hose length. Using a clamp type Ammeter determine the secondary amperage of the Hose Heat circuit and adjust the tap setting as required to achieve 35-40 Amps.

MAINTENANCE

To realize the full productivity of the unit it is necessary to perform maintenance on a daily or periodic basis.



WARNING: *WHENEVER WORKING ON THE EQUIPMENT, WEAR EYE AND SKIN PROTECTION TO GUARD AGAINST EXPOSURE TO THE CHEMICALS AND SOLVENTS IN USE. ALWAYS WORK IN A WELL VENTILATED AREA TO PREVENT EXPOSURE TO HARMFUL FUMES AND VAPORS. INFORMATION CONCERNING THE TOXICITY AND PROPER HANDLING PROCEDURES OF YOUR CHEMICALS AND SOLVENTS IS AVAILABLE FROM YOUR SUPPLIER.*

PRESSURE EXISTS IN THE HYDRAULIC COMPONENTS. BEFORE OPENING ANY HYDRAULIC CONNECTIONS OR SERVICING HYDRAULIC COMPONENTS USE EXTREME CAUTION TO INSURE BLEEDING OF ALL PRESSURES TO ZERO TO AVOID SERIOUS BODILY INJURY FROM FLUID INJECTION.

Pump Lube System

Check the condition of the pump DAILY, to insure that lube will do its job. Change the Pump Lube before it becomes a gel, turns cloudy, or becomes the same color 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.

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 to 4 week intervals.

To change the Pump Lube proceed as follows:

1. Stop the unit with the pump yoke at the top reverse and disconnect the air from the Unit.

2. Remove the pump lube from the lube cup by dipping a dry rag into the cup to absorb the contaminated liquid. Wipe the cup and pump shaft clean. Remove any hardened material from the shaft taking care not to scratch the shaft.

3. Fill the lube cup with Pump Lube to about 1/4 inch below the top.

Inlet Filter Screen

A filter screen in each Proportioning Pump filters out solid matter that could adversely effect the operation of the valve balls 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. However, you will probably find that the Resin pump screen remains clean and that weekly checking of this part will be sufficient.

The Isocyanate pump screen is another matter. The Isocyanate component can crystallize from either moisture contamination or from freezing. If you follow 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, findings suggest that daily cleaning of the Isocyanate screen is sound preventative maintenance. It is important not to 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. By accomplishing the cleaning operation during the Start-up Procedure, contamination problems will flush out immediately when dispensing commences.

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

1. Close the material supply valve at the inlet of the appropriate Proportioning Pump. This prevents the pumping of material with the screen screw removed.

2. Disconnect air from the unit. Bleed chemical pressure from the side you are working on by opening the corresponding manual valve on the coupling block while pointing it into an appropriate container.

3. Place a cup, in the space provided beneath the filter base to catch the chemical, which will drain-off upon removing the screen screw.

4. Loosen the screen screw sufficiently to allow the material in the screen screw cavity to drain out into the cup.

   Remove the screen screw from the pump base by continuing to unthread it until it comes loose.

5. Remove the retainer ring at the end of the screen screw and slide the screen from the screen screw. Thoroughly flush the screen screw, the retainer ring, and the screen with the gun cleaner, and shake them dry. Inspect the screen and replace if the mesh is restricted.

6. Slide the screen on the screen screw and replace the retainer ring.

7. Flush the cavity in the pump base with gun cleaner and wipe the cavity clean using caution not to push foreign matter into the ball seat.

8. Install the screen screw assembly into the pump base by inserting the screen screw with the threaded portion sliding along the top cavity. This prevents pushing foreign matter into the ball seats.

9. Open the material supply valve; insure there are no leaks and wipe the equipment clean.

Proportioning Pumps

Disassemble and clean both Proportioning Pumps annually. Inspect the pistons and cylinders for mars or scratches, which may cause leakage or damage to the packings, and replace as necessary. As a preventative maintenance precaution, replace the piston and cylinder packings on an annual basis.

Pump Bases

1. Completely depressurize the system.

2. Remove the valve cover using an adjustable wrench.

   Inspect the valve cover o-ring and replace as required. It is a good practice to liberally coat the o-ring with grease before inserting the valve cover back into the pump base. Also, check the chamfer around the cavity to insure that there are no sharp edges, which could damage the o-ring and prevent proper seal.

3. Remove the valve ball and inspect it for nicks and scratches. Replace as required.

   Remove the ball seat with the special tool provided and inspect it for nicks and scratches. Replace as required

4. Inspect the face of the gasket for damage and replace as required. Reassemble the pump base.

NOTES

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	

Instructions:

Complete the above fields of the form by following the instructions listed on the reverse side of this sheet and mail to:

Gusmer Corporation

One Gusmer Drive PO Box 2055

Lakewood, NJ 08701

Field Number	Field Title	Description
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.