

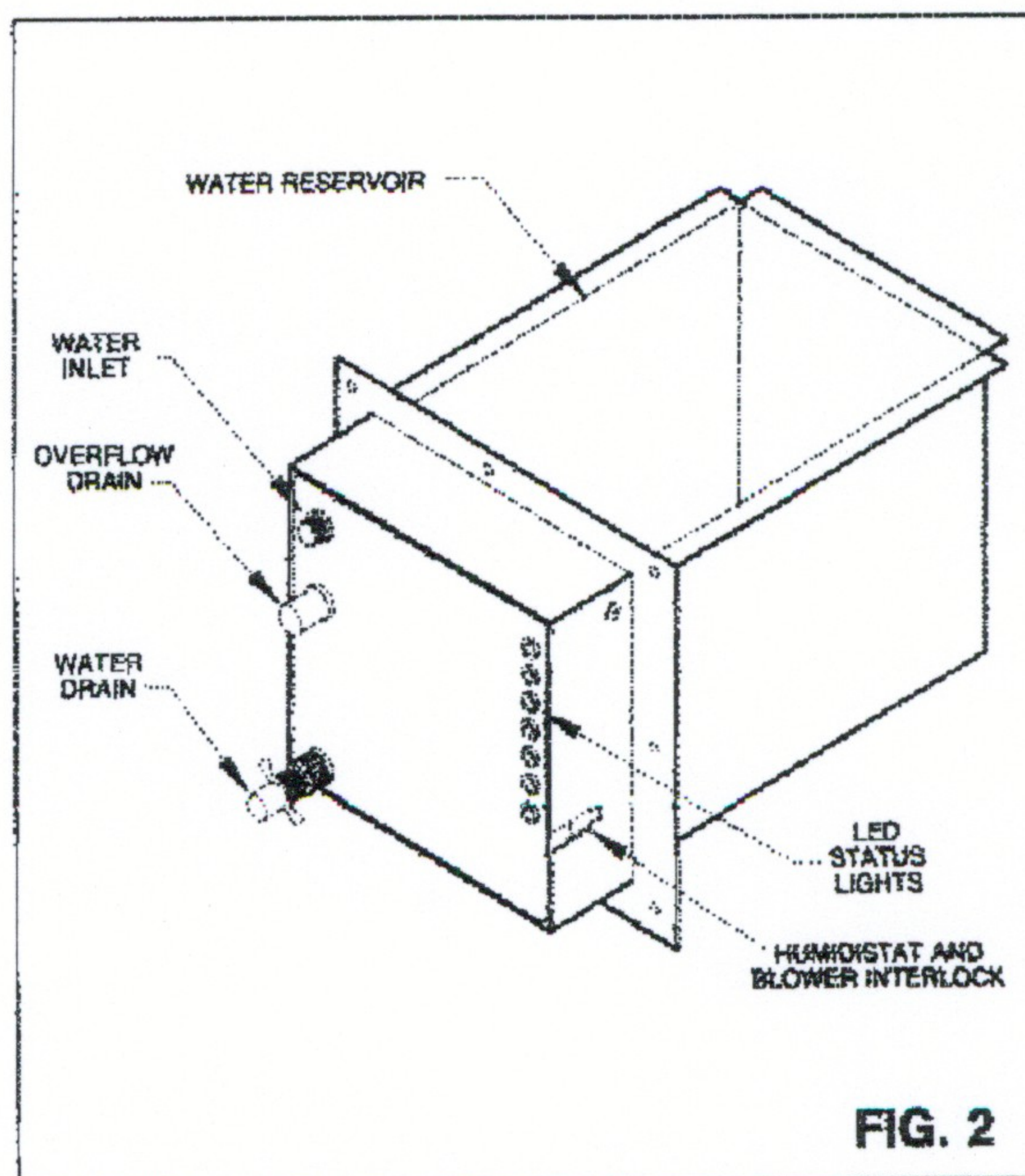
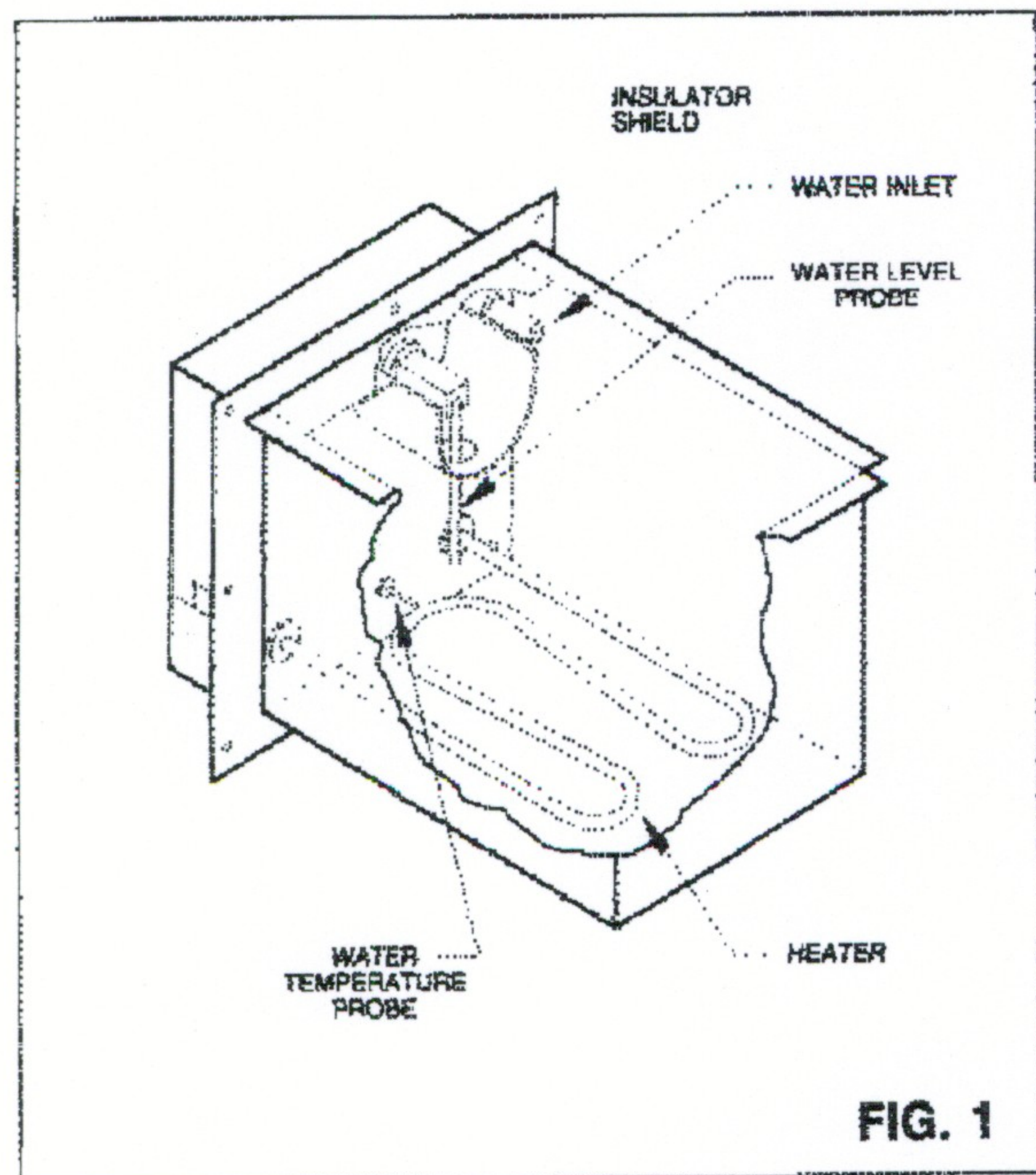
Installation Instructions & Owner's Manual

AUTOFLO ELECTRONIC STEAM UNIT - POWER HUMIDIFIER MODELS ESU-14 AND ESU-20

FOR GAS OR OIL FORCED AIR FURNACES, HEAT PUMPS AND ELECTRIC FURNACES

The AutoFlo Power Humidifier you have purchased has been designed to be simple to operate and maintain.

Familiarizing yourself with the items listed in Figures 1 and 2 will assist you in installing and maintaining your ESU Power Humidifier.



Parts included in the ESU Humidifier package are:

1. ESU Humidifier
2. Self Piercing Saddle Valve
3. Installation Instructions and Owners Manual
4. Mounting Template
5. Installation Hardware package

Additional parts recommended:

1. Overflow drain line — 5/8" automotive hose
2. One inch hose clamp
3. Humidistat — AutoFlo Models 052000 or 062000
4. Electrical wiring and connections
5. Relay, 24 VAC — AutoFlo Model 1549
6. Transformer, 24 VAC — AutoFlo Model 1524

SIMPLIFIED INSTALLATION INSTRUCTIONS

1. Select the mounting location and tape on the mounting template.
2. Punch or drill the (8) 1/8" mounting holes.
3. Cut out the humidifier opening in the duct.
4. Insert the humidifier into the opening and screw in place.
5. Connect the water line.
6. Connect an overflow drain line.
7. Make 24 VAC electrical connections to blower interlock.
8. Install and connect the humidistat.
9. Plug power cord into a grounded 120 VAC, 15 amp outlet for ESU-14 (240 VAC, 10 amp for ESU-20).

DETAILED INSTALLATION INSTRUCTIONS

1. LOCATION

The ESU humidifier can be installed in warm air supply ducts or the cold air return air ducts; however the preferred location would be in the warm air supply duct of the heating and air conditioning system. This humidifier does not require warm air to evaporate the water in order to provide humidity, but it will operate more efficiently in the warm air duct and less condensate is likely to form.

When selecting a location on the duct, be certain that there is enough room in the duct for the ESU water reservoir. There should be at least five (5) inches above the reservoir (see Figure 3) and the reservoir should not occupy more than about 25 percent of the duct space. If this criteria can not be met, you should order the ESU "Under Duct Adaptor," Model 402088, in order to properly install the humidifier under a horizontal duct or relocate the humidifier.

If the humidifier is installed on fiberglass duct, the installer must provide some structural support for the ESU mounting plate. The fiberglass duct will not provide a good material for the mounting screws.

NOTE: The ESU must be installed at a location so that the 120 VAC (240 VAC for ESU-20) power connections can be made without the use of an extension cord.

2. MOUNTING TEMPLATE

Tape the mounting template to the duct, as seen in Figure 3. The template must be leveled using the top of the cutout on the template. The template should be located so that the bottom of the reservoir cut-out is flush with the inside of the bottom of the duct for horizontal duct. Since most ducts are insulated this additional space, about one (1) inch, must be accounted for when determining the location for the bottom of the reservoir cut-out.

3. DRILL HOLES AND CUT OPENINGS

Use an electric drill, with grounded power cord, to drill eight (8) mounting holes, 1/8" diameter, in the duct. These can be drilled through the template at the locations indicated on the template.

A saber saw or tin snips can be used to cut out the water reservoir opening.

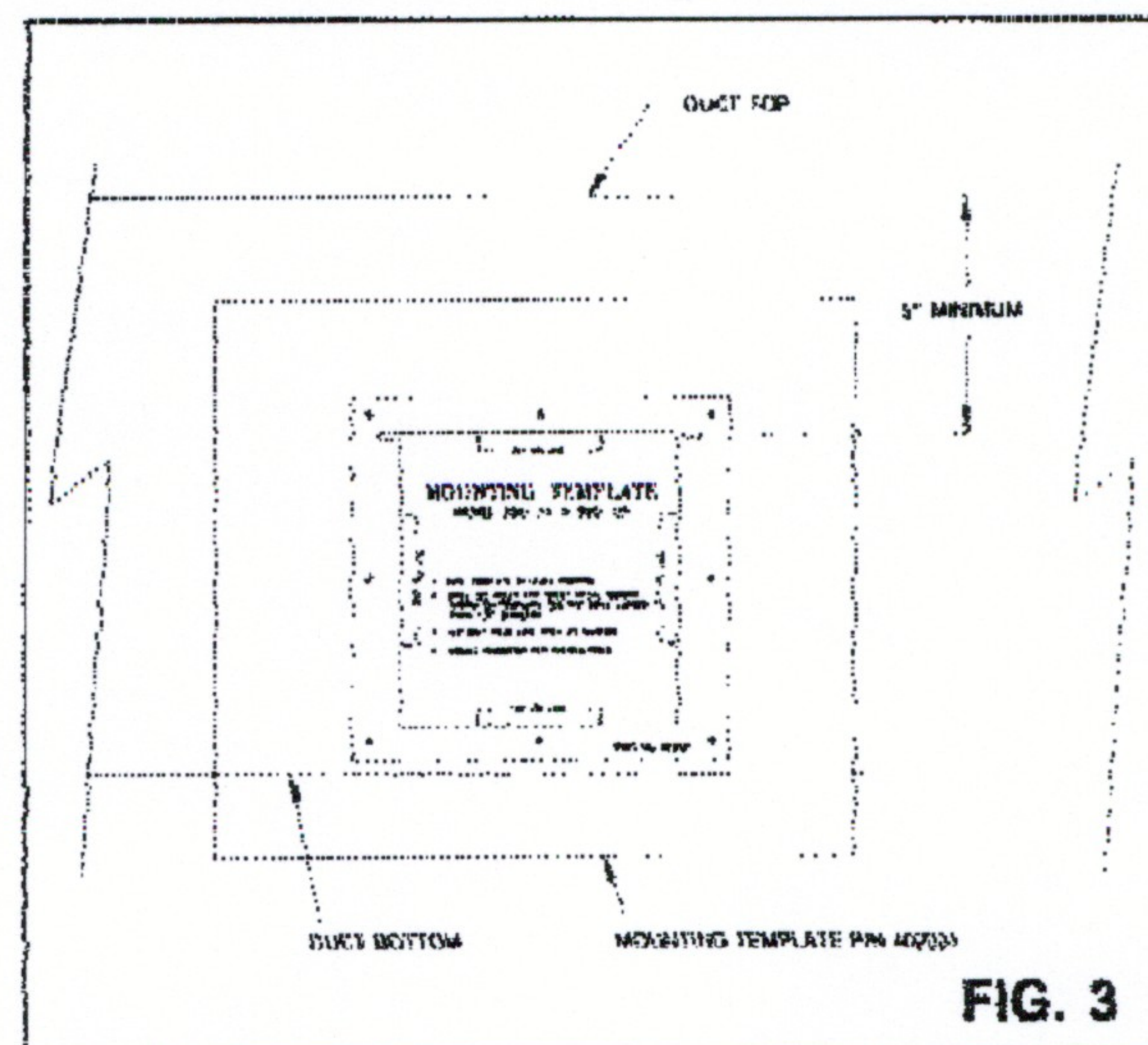


FIG. 3

4. WATER CONNECTIONS

A. WATER SUPPLY USING THE SADDLE VALVE FURNISHED WITH UNIT

Installation instructions for the saddle valve are printed on the plastic bag containing the saddle valve and its components.

NOTE: Never install the saddle valve on the bottom of the water pipe. Sediment in the water pipe may clog the saddle valve.

NOTE: Do not use any line connected to an air conditioning system. Lines connected to air conditioners generally carry refrigerant and are not water lines.

NOTE: Do not use any line which is served by a water softener. If home has a water softener, make the water connections to a water line upstream from the water softener. A water softener is not a demineralizer. It merely exchanges various hard ions for soft ions in the water. These soft ions, or minerals, will build up in the humidifier, causing the need for frequent servicing. The evaporation of softened water may also produce a white powder which may be

carried into the duct system and, ultimately, into your home.

The water line connecting the saddle valve to the ESU MUST be copper tubing. When tightening the hex compression nut, tighten only enough to assure there are no leaks.

B. OVERFLOW DRAIN

The use of an overflow drain is always required.

Use 5/8" ID high temperature rubber tubing, such as automotive heater or dishwasher drain hose. Slip the hose over the 5/8" drain fitting and use a hose clamp to secure.

Route the hose to a suitable drain. DO NOT route the hose above the bottom of the humidifier. Failure to install the overflow drain line will result in steam leaking out the overflow opening into the appliance room.

5. MOUNTING THE ESU HUMIDIFIER

Place the humidifier reservoir into the opening in the duct and secure with eight (8) sheet metal screws.

NOTE: If the ductwork will not support the unit in a level position with a water pan full of water the ductwork must be locally reinforced.

6. ESU OPERATING SEQUENCE

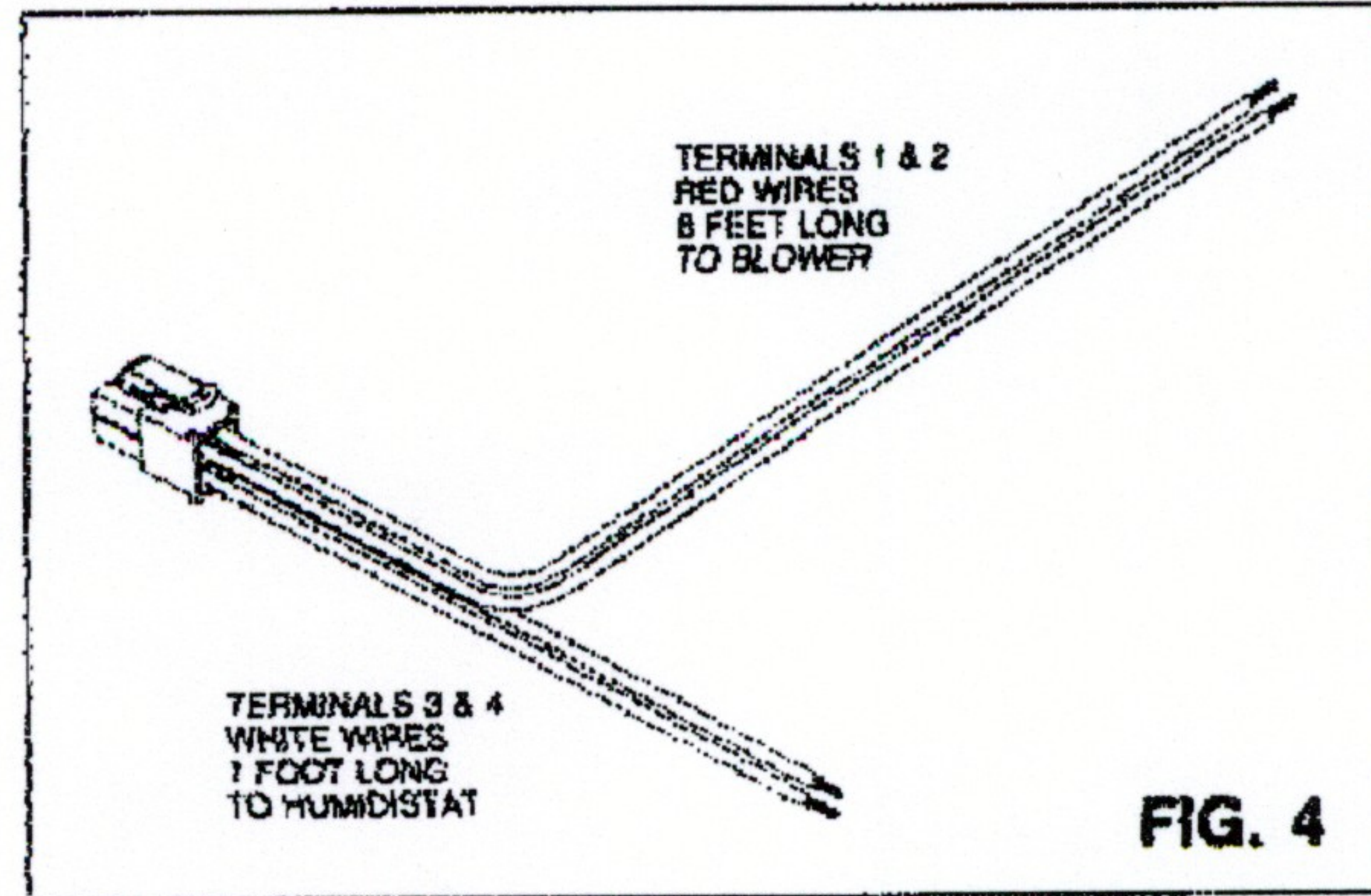
Because of the high output of the ESU, it must not be operated in ducts or plenums without the blower operating. The ESU humidifier is designed to be "Dominant" over the Heating-Air Conditioning System Blower. If necessary the "System" blower will be operated by the humidifier when humidity is required to meet the humidistat setting.

A temperature sensor is mounted on the ESU water reservoir to sense the water temperature. As the water temperature increases to about 170 degrees F, the ESU computer closes a set of blower relay contacts. When the water cools to about 160 degrees F, the ESU computer will open the relay contacts. The blower relay contacts are located on the low voltage interlock plug red wires terminals 1 & 2, Figure 4, and must be wired only with 24 VAC, NEC Class II power levels. The relay contacts must be used to interlock the system blower.

7. WIRING THE ESU HUMIDIFIER

A. INSTALLING AND WIRING THE HUMIDISTAT

A humidistat, such as the AutoFlo Models 052000 or 062000, is required to control the ESU Humidifier. The humidistat may be installed on the wall in the living space or on the return air duct. Instructions for installation are packaged with the humidistat.



IMPORTANT: If the humidistat, controlling the ESU, is installed on the return air plenum, it must be located at least three (3) feet upstream from the furnace or heat pump. If the humidifier is installed in the return air plenum the humidistat must be located at least three (3) feet upstream from the humidifier.

The humidistat has two (2) screw terminals which should be connected by wire to the low-voltage interlock plug white wires, terminals 3 & 4. (Figure 4). Use the crimp splices provided with the ESU to connect the unit white wires to the humidistat wires.

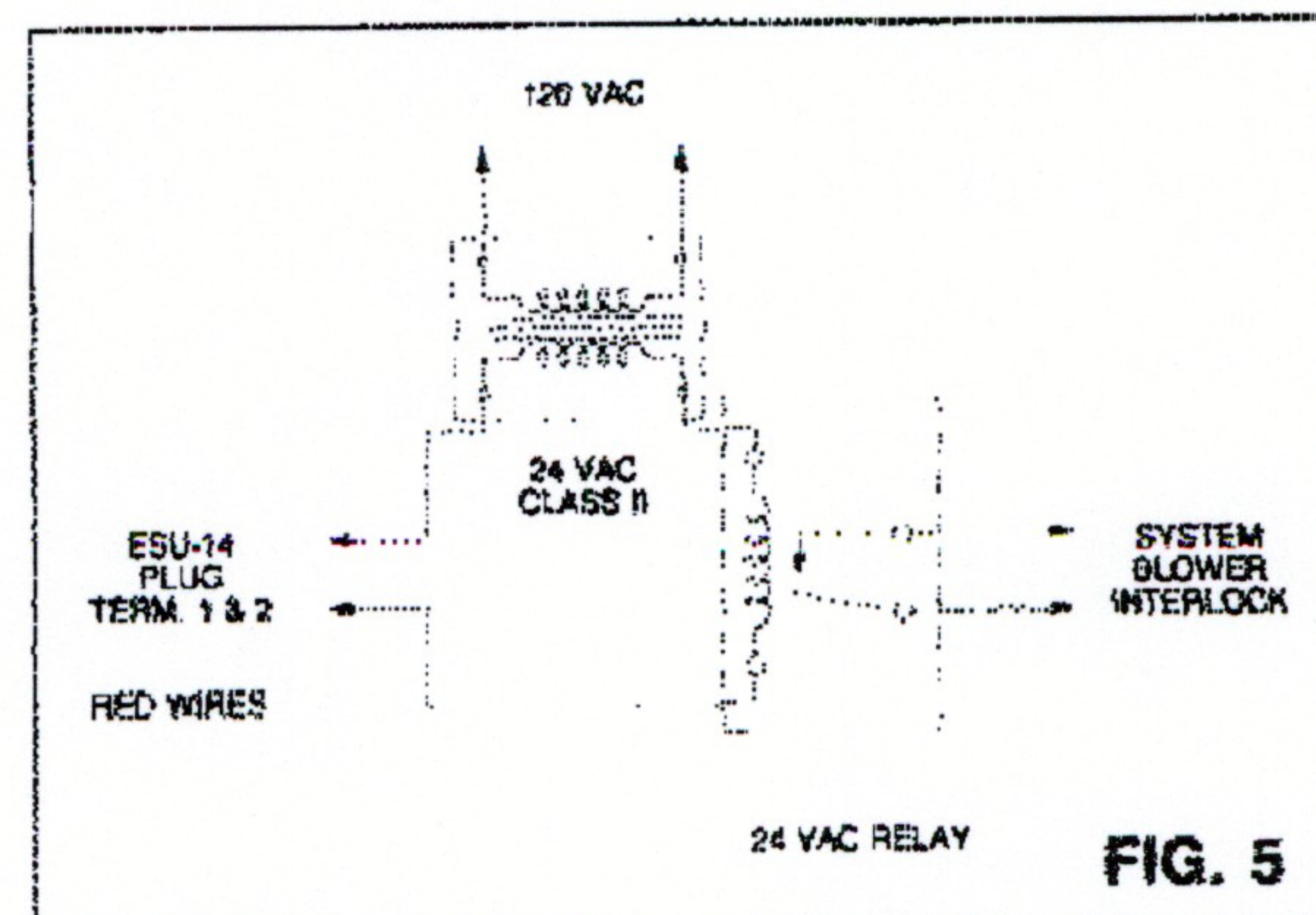
B. FIELD WIRING

All wiring must be made in accordance with local codes and ordinances.

Figure 5 describes a suggested interlock wiring arrangement for heating systems using only a furnace. If the interlock can be performed with a 24 VAC NEC Class II switch, the red wires terminals 1 and 2 can be used without the need for a relay.

A 24 VAC field relay AutoFlo Model 1548 may be required in order to connect the ESU-14 to the furnace fan switch, air conditioning or heat pump blower circuitry.

The "field" relay must be mounted inside the furnace and the transformer may be part of existing furnace controls.



(Page 4 of 7)

Connect field wiring as shown in Figure 5 to terminals 1 & 2, the red wires.

Interlocking may be performed on some heating systems that provide a 24 VAC NEC Class II terminal for blower control. In this case the ESU low voltage plug, terminals 1 & 2, may be used without field installed components.

Interlocking the ESU to systems employing air conditioning compressors or heat pumps must assure that the compressors are not energized by the humidifier. A field relay (other than the AutoFlo Model 1548) with a second set of contacts may be required to prevent energizing the compressor. On some heat pump systems two additional "lock-out" relays may also be required.

In the case of heat pumps, the compressor is energized by the system THERMOSTAT when requiring the addition of heat, in the winter, and cooling, in the summer. This may or may not occur at the same time that humidity is being added to the living space. Under these conditions, the interlock circuitry may require additional connections to prevent feedback between the compressor and the blower. The numerous heat pump and HVAC systems on the market today prevent a "standard" wiring approach to interlocking the ESU Humidifier. The installer must evaluate the interlock requirements for each

specific installation. The installer must also verify that the humidifier operation in both the summer and winter (heating and cooling) modes will be compatible with the ESU energizing the "System" blower without energizing the compressor.

8. SETTING THE HUMIDISTAT

It is recommended that humidistat settings of 30-40% not be exceeded. If condensation is noted, during very cold outside temperatures, the humidistat should be lowered.

The relative humidity for your home depends upon factors such as outdoor air temperature, type and placement of insulation, vapor barriers, effectiveness of weather stripping, type of windows and doors (including frames and jambs) and whether or not storm windows and doors are used. With all these variables it is nearly impossible to recommend a proper humidity setting. The best humidistat setting is one that you are comfortable with. Also, as the outdoor temperature fluctuates, it may be necessary to adjust the humidity level of your system a few times during the heating season.

Refer to the "Relative Humidity Chart" as a starting point for your proper humidistat setting. Generally, in a tighter and better insulated house, the humidistat may be set higher than in a drafty, un-insulated house.

RELATIVE HUMIDITY CHART

Outside Temperature	Outside Relative Humidity	Indoor Relative Humidity When Outside Air is Heated To 72 Degrees F	Maximum Safe Recommended Indoor Relative Humidity
-10 Deg. F	40%	1%	20%
	60%	2%	
	80%	2%	
0 Deg. F	40%	2%	25%
	60%	2%	
	80%	5%	
10 Deg. F	40%	4%	30%
	60%	5%	
	80%	7%	
20 Deg. F	40%	6%	35%
	60%	8%	
	80%	11%	
30 Deg. F	40%	8%	35%
	60%	13%	
	80%	17%	

(Page 5 of 7)

9. INITIAL START-UP

Once the ESU Humidifier has been installed and the water, humidistat and blower interlock connections completed, the humidifier may be initially started.

- A. Turn "ON" the water supply to the ESU Humidifier.
- B. Set the humidistat to a high or "on" position.
- C. Plug the ESU-14 Humidifier line cord into a 120 VAC, 15 amp source (240 VAC, 10 amp for ESU-20).
- D. The Green "POWER" LED should slowly flash and the "Water On" LED should be illuminated. Water should begin to fill the Water Pan.
- E. The initial "fill" cycle requires about three (3) times more water than the ESU allows for a normal operating cycle. This is because the ESU control circuitry does not allow the water to boil down below the heater element. During this initial "fill" cycle, the RED Service lamp may begin to flash with the GREEN Power lamp and the "filling" cycle will stop. If this occurs, unplug the ESU power cord, wait 15 seconds and plug the power cord back into the power source. This will reset the timing circuitry and resume filling.
- F. When the water level has reached the preset level the "Water On" lamp and fill valve will be turned off and the "Humidifying" lamp and heater will be turned on.
- G. If the above steps have been successfully completed the humidifier is operating properly.

10. DETAILED OPERATING DESCRIPTION (see Fig. 7)

The green "Power" lamp and four amber lamps indicate the various normal operational sequences described in this section. The two red lamps indicate that the humidifier has turned itself off due to an abnormal operational sequence or a need for service. Refer to section 12 "TROUBLE SHOOTING" for description of red lamp functions.

- A. A blinking green "Power" lamp indicates that power is being supplied to the humidifier and the internal computer circuitry is functioning correctly.
- B. When the humidistat calls for an increase in humidity, the ESU heater is energized and the amber "Humidifying" lamp is on. This initiates a "boil down cycle" that is controlled by computer timing. Each cycle takes about 10½ minutes allowing the water level to boil down approximately ¼ to ½ inch.
- C. When the water reservoir reaches a temperature of about 170 degrees F. the system blower and the amber "Blower ON" lamp will be energized.

- D. At the end of each boil down cycle the amber "Water On" lamp is on while the reservoir is being refilled. The water and lamp shut off when the water reaches the bottom of the water level probe.
- E. If the ESU heater has been on continuously (the humidistat has not turned it off) for twenty-four hours, computer timing will turn the heater off and the amber "Cycle Off" lamp on. This is a heater-cleaning cycle that lasts for one hour, allowing the water and heater to cool. Any mineral deposits attached to the heater will crack off the first time the heater turns back on after this cycle.
- F. When the indoor humidity reaches the humidistat setting the humidistat opens and the ESU heater and amber "Humidifying" lamp turn off. The amber "Water On" lamp is turned on while the reservoir refills to the water level probe. The system blower and the amber "Blower On" lamp will remain on until the water cools to about 160 degrees.

11. MAINTENANCE

Removal of mineral deposits is required on the ESU humidifier in order to optimize the performance and extend heater life. In areas of soft water conditions, this is normally required only once a year. However, in some areas with higher mineral content maintenance may be required more often. In areas of very heavy mineral content the unit should be checked after 6 weeks of initial operation and the amount of mineral buildup used to estimate future cleaning cycles.

Maintenance and inspection of the ESU requires removal of the humidifier from the duct. This can be done following these steps.

- A. Unplug the power cord from the 120 volt source for ESU-14 (240 volt for ESU-20) and allow the water to cool for at least 30 minutes prior to removal.
- B. Turn off the water supply at the saddle tapping valve.
- C. Remove the 4 wire plug from the side of the plastic control housing. Press in the locking tab on the rear of the plug and pull straight out.
- D. Drain the water with the drain valve. NOTE: The drain valve will be hot if the ESU has not been allowed to cool.
- E. Disconnect the water and drain lines. NOTE: Some water may drain out of the water line. Have a small container ready to catch the water.

NOTE: Although the water has been drained, some water may still remain in the humidifier reservoir along with sediment. Take care to not tip the ESU over when removing the screws in the following step.

(Page 6 of 7)

F. Remove the eight (8) screws around the front mounting plate.

G. Slide the humidifier out of the duct.

H. Remove the two (2) screws holding the probe insulator shield to the pan flange and remove the shield from the unit. Scrape all mineral deposits from the shield and wash shield off as described in step J.

I. Use a putty knife to scrape the minerals from the sides and bottom of the water reservoir. DO NOT scrape on the small temperature probe located between the heater legs in the water pan.

Carefully scrape the Water Level Probe and the heater element to remove mineral deposits.

J. Clean the Water Probe Insulator, inside the pan, with a cloth and vinegar and rinse with fresh water. Inspect for any mineral deposits on the plastic insulator. Repeat cleaning if necessary and thoroughly dry.

K. Rinse out the reservoir. Take care to keep water off of the wiring compartment or the outside of the humidifier.

L. Reposition the insulator shield around the probe insulator using care to center probe in round hole and the position rear of shield against water pan wall. Tighten two (2) screws.

M. Re-install the ESU in the duct and connect the water line, the drain line and the four wire plug.

N. Turn on the water supply. Inspect the water connections and drain fittings for leaks.

O. Plug-in the ESU-14 power cord to the 120 VAC (240 VAC for ESU-20) grounded outlet. DO NOT use an extension cord.

a. The green POWER light should blink slowly.

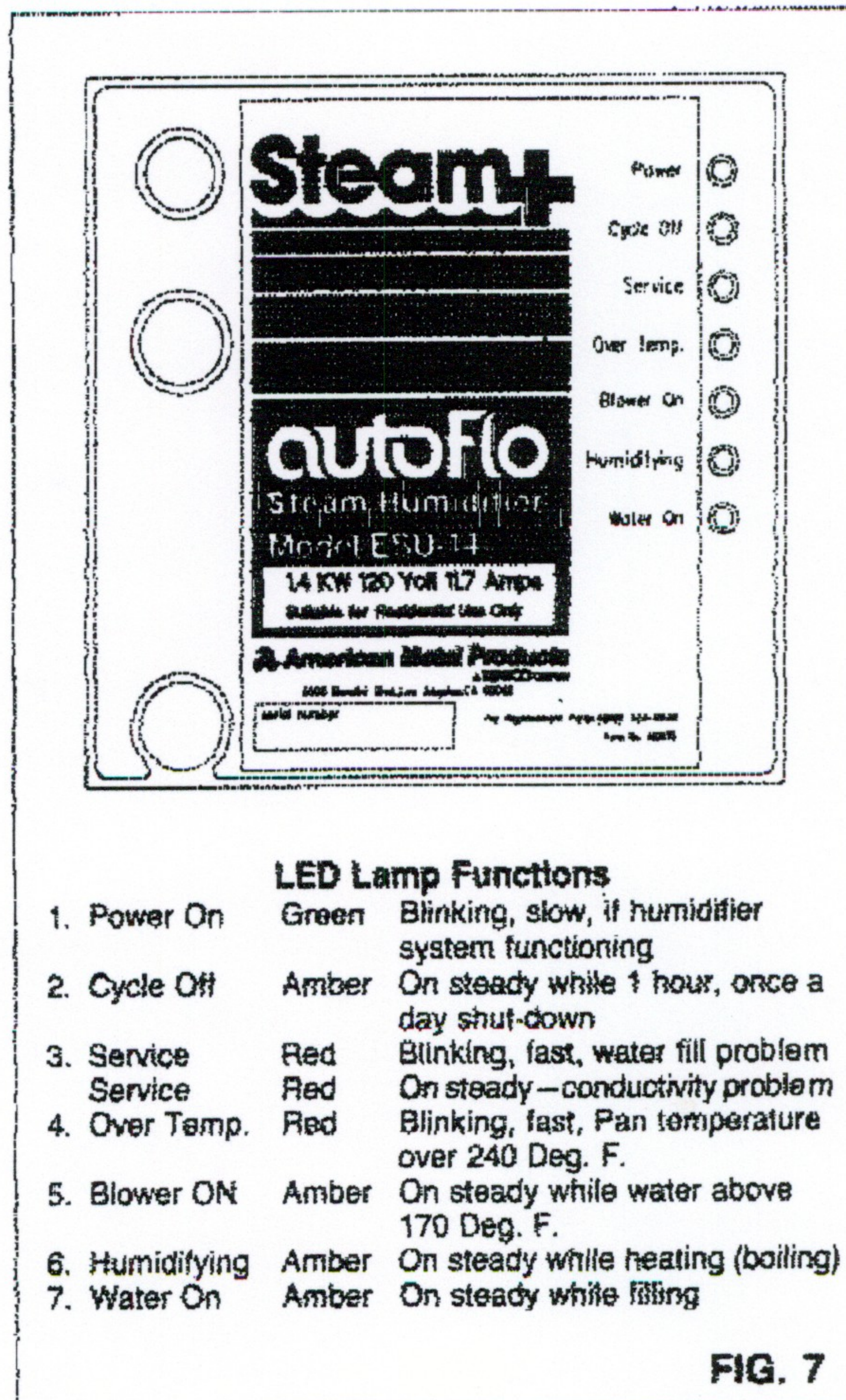
b. If the humidistat is calling for humidity the water valve will energize and the water pan will begin to fill.

c. The water should initially fill the reservoir for about 45 seconds. If the "Service" lamp begins to flash and the "Water On" lamp is off, unplug the ESU from its power source, wait about 15 seconds and reconnect the ESU power source. The ESU should resume filling to its correct operating point, as indicated when the "Water On" lamp shuts off and the "Humidifying" lamp becomes illuminated.

NOTE: On the initial fill after installation or any time the water pan is drained, the pan must fill with about three (3) times the amount of water as required in the normal cycle of refilling. The "Fill Timer" may time out before the water level reaches the water level probe, causing "Service" cycle to be started.

12. TROUBLE SHOOTING

Seven LED lamps provided on the front panel indicate the functional status of the ESU as seen in Figure 7 below.



A. The green "Power" light does not blink off and on.

1. The ESU-14 is not connected to an active 120 VAC 15 Amp power source. (ESU-20, 240 VAC, 10 amp)

2. The humidifier is defective, return to factory for service.

B. The "Humidifying" light does not illuminate. The humidistat is not closed calling for humidity or the humidistat is wired incorrectly. Or the unit is on its once a day shutdown.

C. The HVAC Blower will not operate, but the "Blower" light on the ESU is illuminated.

1. The blower "Field" wiring and/or interlock circuitry is incorrect.

2. The HVAC electric power is disconnected.