

SERVICE MANUAL

OIL—FIRED HUMIDAIRE UNIT

HU-60-1200

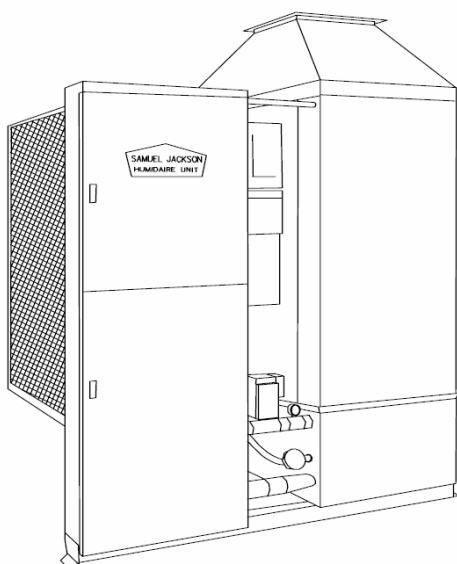
SAMUEL JACKSON
HUMIDAIRE UNIT

HU-60-1200 Humidaire Unit Specification

April 24, 2006

The specifications for several discontinued Humidaire models have been changed. This specification replaces all previous specification information.

Burner Input Capacity (maximum)	1.5 Million Btu/hr
Burner Input Capacity (normal operation)	800,000 Btu/hr
Kerosene Consumption (full throttle)	11.53 US Gallons/Hour
Kerosene Consumption (normal operation)	6.15 US Gallons/Hour
Heating efficiency (air and water)	1400 Btu/lb water at 2900 CFM
Evaporation (maximum)	2 US gallons/minute
Evaporation (normal operation)	1.13 gallons/minute
H2O Purge (fresh H2O at 15 grains/US gal)	.4 - .5 US gallons/minute (600 gal/24 hrs)
Recommended water supply	5 US gallons/min at 15 PSI – 30 PSI
Std Electrical Power	380/50, 415/50



The Samuel Jackson Humidaire Unit generates warm humid air which carries water vapor to cotton fibers in a form which is quickly and uniformly absorbed. Samuel Jackson Humidaire Units have been in extensive use since 1959.

Moist air from Humidaire Units is applied to seed cotton to preserve fiber properties in dry conditions. It is applied to lint cotton to improve bale press efficiency and to enjoy stable bale weights and bale opening characteristics.

Humidaire Units comes in various sizes, fuel types, and efficiencies. In choosing the model best suited for your need, we recommend first determining the method you wish to apply the moist air to the cotton with. Following this decision, heating fuel (gas or oil), air volume, and efficiency will narrow the choices to the one that best matches the need.

In reviewing the specifications, verify availability of power, fresh water supply, fuel type, and provision for water drainage. "Normal Operation", as noted in the specifications, refers to air temperature of 125 F and water temperature of 120 F with moist air volume of 2,900 CFM.

INSTRUCTION FOR PROPER USE OF THE ...

17041 DIGITAL CONTROL WITH THE HU-60-1200 HUMIDAIRE UNIT

OPERATION NOTES

This assembly incorporates two UDC-3000 digital temperature controllers. Please refer to "17040 DIGITAL CONTROL FOR HUMIDAIRE UNITS" for general operating guidelines.

There are some differences between the 17041 and 17040. The digital time delay relay referred to in the operating guidelines is not present with the HU-60-1200 as this function is accomplished in the programmable controller (PLC). In addition, the burner switch is momentary, NOT maintained.

To start the HU-60-1200, turn the burner switch to "1" and release it. It is not necessary to hold the switch until flame is established as on previous oil-fired Humidaire Units. For the next 15 seconds, the combustion controls will perform a series of tests and checks on the burner and its associated switches and valves. If it finds a problem it will reset the sequence and display a number on the numeric display in the Humidaire Unit's local panel (SP), located on the electrical panel inside the Humidaire Unit. See "ERRORS AND ALARMS EXPLANATION FOR HU-60-1200".

To stop the burner, turn the burner ON-OFF switch to the left ("0") momentarily and the burner will stop immediately if it has not yet reached the normal operating mode (indicated by the STATUS light OFF and the FLAME light ON). If the unit is in the normal operating step, turning the switch to the left momentarily will put the unit in the "POSTBURN" sequence. This involves a gradual throttle down, flame checks, and a cool down procedure. If an immediate shutdown is necessary, hold the switch to the left for 3 seconds (this is NOT recommended for use as a normal shutdown).

When the burner is first started, the STATUS light will come ON indicating that the burner is checking itself out prior to ignition. After flame is established, the STATUS light will remain ON for 90 seconds indicating that it is not permitting the water pump to turn ON until the system has warmed up. When the STATUS light goes OFF with the FLAME light remaining ON, the unit is in normal operating mode and is looking for a signal from the lint flue scanner to turn the water pump ON.

The water pump switch can be left in the ON position at all times if desired. The pump will only energize when the system has warmed up and the lint flue scanner sees cotton.

ALARMS AND ERRORS

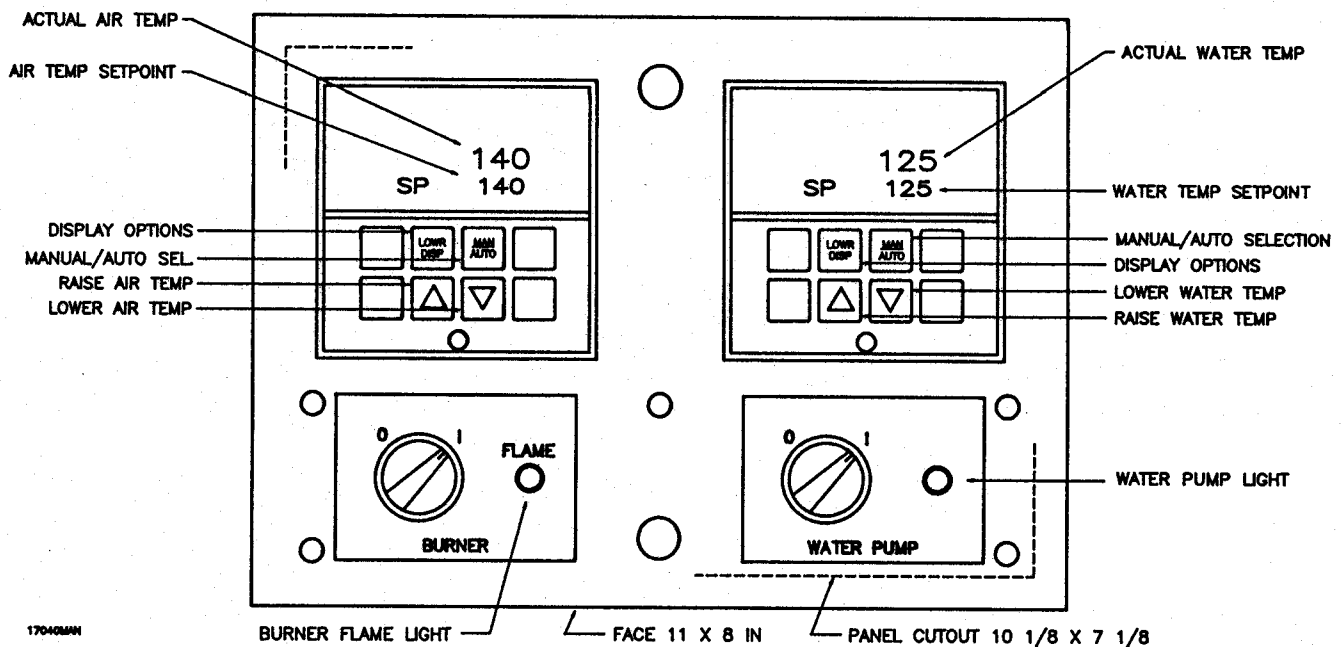
ALARMS -- Problems not serious enough to shut down operation.

ERRORS -- Problems which require that operations cease.

ALARM PROCEDURE -- During operation, the STATUS light will blink at the rate of one pulse every two seconds for 5 minutes then revert to ON. During the 5 minute interval, the ALARM light on the local panel will be ON. The counter will display the code number corresponding to the alarm problem, and will reset to zero at the end of the interval. If the Alarm is NUMBER 23 (Water Pump Rapid Cycle), the water pump will be turned off and locked out but the burner will continue to keep the system warm until the RESET button is pressed (releasing the lockout) and the problem is corrected at the lint flue scanner.

ERROR PROCEDURE -- The burner will shut down and cannot be restarted unless the RESET button on the local panel is pushed. The counter will display the appropriate code number and the ALARM light will be ON until the RESET button is pushed. The STATUS light will blink at the rate of one pulse per second for 5 minutes, then go OFF. If an attempt is made to start the burner before RESET, the STATUS light will blink for 10 seconds then go OFF.

17040 DIGITAL CONTROL FOR HUMIDAIRE UNITS



The 17040 Digital Control is used to control the HU-60-1106C Humidaire Unit. In some special cases, it will be used to control earlier models. This powerful control can be used on units installed at the lint slide, in conditioning hoppers or in drying systems.

LINT SLIDE, CONDENSER AND CONDITIONING HOPPER APPLICATION -- The controller allows the temperature of the air which is applied to the cotton and the water temperature in the Humidaire Unit to be controlled independently. This is especially helpful in lint slide or condenser applications to avoid condensation. The air temperature will normally be left constant at about 140 F (60 C). The water temperature set point will be increased for more humidification and reduced for less. The water temperature closely approximates the wet-bulb temperature of the air, so the closer the two temperatures come together, the higher the relative humidity will be. The constant temperature of the lint slide or condenser will help avoid condensing moisture on cold surfaces.

It will not be possible to raise the actual water temperature to more than about 3 deg F above the air temperature. If this does not produce enough humidification, or if moisture condenses, raise the air temp set point to 150 F (65 C). Always compare the actual temperatures with the setpoints. If the air temp will not reach the air temp setpoint, you may need a larger burner orifice. If the water temp will not come close to the air temp, the water nozzles may need cleaning to give a uniform spray pattern. Naturally, the amount of moisture addition will also depend on the way it is applied to the cotton (lint slide grid, condenser, etc.).

DRYING SYSTEM APPLICATION -- The comments above apply, except that the air temperature sensor should be installed after the air has been mixed with the seed cotton, but ahead of or in the top of any tower dryer. This will allow the burner to operate without the water pump as an ordinary drying system, or with the water pump it will humidify. In this application, it will be possible to raise the water temperature above the air temperature.

CAUTIONS -- The water pump and its controller will not energize until a digital time delay (normally set to 90 seconds) in the Humidaire cabinet has run its course. This preheats the system to avoid condensation when first started. The Lint Flue Scanner will also prevent operation of the water pump until cotton is flowing through the system. After the burner and water pump start, the setpoint of either controller can be changed by simply pressing its up-arrow or down-arrow.

Each controller shows the actual temperature as the upper display. To see the control output to either the burner or water valve, press the "LOWR DISP" button twice. To override the automatic control, press the "MAN/AUTO" button and use the arrow keys to position the valve between 0 and 100 percent open. This is strictly an emergency procedure. Only four buttons on each controller are visible. Do not remove the other button protectors and adjust the controller settings without consulting the factory.

ERRORS AND ALARMS --- HU-60-1200

<u>CODE</u>	<u>E/A</u>	<u>DESCRIPTION</u>
20	E	AIR FLOW SWITCH NOT OFF IN 12 HOURS
21	A	LOW AIR FLOW, INTERMITTENT
22	E	LOW AIR FLOW, > 3 SEC
23	A	WATER PUMP RAPID CYCLE
24	E	OIL HIGH PRESSURE
25	E	OIL LOW PRESSURE
26	E	OIL LOW PRESS SWITCH NOT WORKING
27	A	CONDUCTIVITY CONTROL ON FOR OVER 1 HOUR
28	E	LOW ATOMIZING AIR PRESSURE
29	E	ATOM AIR PRESSURE SWITCH NOT WORKING
30	E	MOD MOTOR FAILS TO GO TO LOW FIRE
31	E	MOD MOTOR FAILS TO OPEN
32	E	LOW COMBUSTION AIR PRESSURE
33	E	COMB AIR PR SWITCH NOT WORKING
34	E	HIGH TEMPERATURE CONDITION
35	E	EXCESSIVE FLAME FAILURES
36	A	FLAME WAS NOT ESTABLISHED
37	A	FLAME FAILED DURING OPERATION
38	E	FLAME SIGNAL BEFORE FUEL BEFORE SPARK
39	E	FLAME SIGNAL BEFORE FUEL DURING SPARK
40	E	FLAME STAYS TOO LONG AFTER SHUTDOWN
41	E	GAS LOW TEMPERATURE (DUAL FUEL ONLY)
42	E	GAS LOW PRESSURE (DUAL FUEL ONLY)

ERRORS AND ALARMS EXPLANATION

HU-60-1200

PRELIMINARIES -- As explained in the Operation Notes for the 17041 temperature control, **ERRORS** will cause the Humidaire Unit to shut down. **ALARMS** will permit the burner to continue operation, but will warn of conditions which may become serious. In each case, a number will be shown on the digital display inside the Humidaire Unit's control cabinet. This number will refer either to an **ALARM** or an **ERROR**. The number displayed will be the **FIRST** alarm or error to occur in a five minute time interval. This could mean that an **ALARM** code is displayed, yet the burner may have shut down due to an **ERROR**.

ERROR 20 -- AIR FLOW SWITCH NOT OFF IN 12 HOURS. The air flow switch must be operated periodically to test its proper operation. If the burner and fans have run continuously for over 12 hours, the burner will **NOT** shut down due to this **ERROR**. However, if the burner is turned off and an attempt is then made to restart it without turning off the fans, it will not start and will display **ERROR 20**. The **RESET** button will **NOT** allow restart. The fans must be turned off and then back on to allow the burner to start again.

ALARM 21 -- LOW AIR FLOW. This **ALARM** is an indication that a partial choke of the air flow is occurring. It is displayed when the air flow switch goes off and comes back on in less than 3 seconds. Can be caused by a pressure surge in the Humidaire Unit when the water pump is activated. The **RESET** button will clear this alarm.

ERROR 22 -- LOW AIR FLOW. The air flow was interrupted for more than 3 seconds. Verify proper air flow and that the door is in place on the spray chamber. Adjust switch if necessary.

ALARM 23 -- WATER PUMP RAPID CYCLE. The lint flue scanner is telling the water pump to turn on and off too frequently (OFF 3 times in under 2 minutes). This condition will ultimately result in the short life of an expensive pump and motor. This alarm has turned off the water pump but has left the burner on to keep the system warm. Press **RESET** to turn the pump back on and clear this alarm. Check the lint flue scanner for proper alignment in the flue. Check adjustment of the sensitivity on the lint flue scanner.

ERROR 24 -- OIL HIGH PRESSURE. It may be that the Fuel Pressure Relief Valve **FPR** has jammed shut or its discharge connection has been closed off. A shutdown due to this error is designed to prevent the Humidaire Unit's fuel line hoses from rupturing from this condition. If this is not the case, check to see if the Oil High Pressure Switch (**OHP**) has been adjusted to a pressure lower than the setting of the **FPR**.

ERROR 25 -- OIL LOW PRESSURE. See if fuel pump rotates when restart is attempted. If not, press white reset button on motor overload relay **MOL3**. If fuel pump runs, check the following: Check for empty oil supply tank. Look for a closed valve in supply pipe. Clean both of the oil filter screens (in the lower cabinet and on the burner). Check for oil leaks which could let air leak into supply pipe and cause pressure to fluctuate. Run the test program to adjust the oil pressure. Remember that the oil pressure determines the maximum heat output and that the oil pressure should be adjusted equal to the air pressure. Oil pressure higher than air pressure can result in smoky operation and difficulty in starting.

ERROR 26 -- OIL LOW PRESSURE SWITCH NOT WORKING. The oil low pressure switch **OLP** failed to turn off when the fuel pump was off. Check the **OLP** to see that its contacts have not been bridged and that it is adjusted properly. Run the test program to check its adjustment.

ALARM 27 -- CONDUCTIVITY CONTROL ON FOR OVER 1 HOUR. The conductivity control is set too low, or the purge valve is not operating properly. First, check to see if water is moving through the purge valve

when the conductivity control is activated. If the valve is operating properly, re-check the setting of the conductivity control.

ERROR 28 -- LOW ATOMIZING AIR PRESSURE. The atomizing air pressure fell below 30 psi. This may be caused by an inadequate air compressor, a closed valve in the supply line or an unusual usage of compressed air elsewhere in the plant. Dependable atomizing air pressure is essential for the proper operation of the burner. The pressure shown on the air pressure gauge on the burner head should be equal to the oil pressure, normally about 45 psi.

ERROR 29 -- ATOMIZING AIR PRESSURE SWITCH NOT WORKING. In Step 5, the atomizing air pressure switch AAP told the PLC that air pressure was present although the air valve had not been opened. Check for a leaking air valve, defective AAP, or a bridged circuit in the AAP.

ERROR 30 -- MODULATING MOTOR FAILS TO GO TO LOW FIRE. There is a limit switch indicating when the burner is in the low fire position. On older units, this switch is inside the motor. Now it is a separate limit switch. The PLC demands that this switch be ON in the low fire position and OFF as the valve opens. If burner throttle is in low fire position, check low fire switch adjustment. If low fire position is not attained, run the test program to Step 5 and test the operation of the modulating motor MM. Check for proper voltage on terminals L1 and L2 of MM.

ERROR 31 -- MODULATING MOTOR FAILS TO OPEN. This is similar to ERROR 30, and the same things should be checked.

ERROR 32 -- LOW COMBUSTION AIR PRESSURE. This error occurs when the combustion air pressure switch CAP sees insufficient combustion air pressure during certain steps of the operating program. Check for proper rotation of the combustion air fan motor M2, and make sure the overload relay MOL2 for this motor is not tripped. Reset it with the white push button. After verifying good combustion air pressure (through the tubes going to CAP), check for proper operation of CAP.

ERROR 33 -- COMBUSTION AIR PRESSURE SWITCH NOT WORKING. In Step 13, the combustion air fan is killed prior to trial for ignition. The pressure must fall to 1" (25 mm) and turn off combustion air pressure switch CAP within 15 seconds or this error will be activated. Look for wrong adjustment of CAP or bridging of its contacts.

ERROR 34 -- HIGH TEMPERATURE CONDITION. The PLC shut the Humidaira unit down because a high temperature condition occurred at the safety temperature sensor located above the burner.

ERROR 35 -- EXCESSIVE FLAME FAILURES. The burner was shut down because more than three flame failures (in ignition or operation) occurred after the burner was started. Normally, the burner will attempt to restart on a flame failure of any kind. If the last flame failure occurred less than five minutes before the shutdown, ALARM 37 or ALARM 38 may be displayed for this ERROR.

ALARM 36 -- FLAME WAS NOT ESTABLISHED. Step 15 reached the end of its maximum time, but flame was not established. The burner will try to restart automatically. If the burner fails to ignite after three attempts, it will shut down with error 35 (although ALARM 36 will still be displayed). Look for oil on the spark igniter or wrong adjustment of the spark igniter. See drawing of proper clamping position of igniter. Make sure that the oil purge in the test program was complete and that you see fuel rising in the flowmeter without air bubbles when ignition is attempted. Also verify that the small purge cock at the burner head is closed. If you see a flame in the viewing window of the burner, but the flame light does not come on, we can suspect a defective UV Flame Detector MP or a defective Flame Relay FLR. Unscrew MP and test it with a lighted match while watching input light 15 on the PLC.

ALARM 37 -- FLAME FAILED DURING OPERATION. Flame was established then failed. This can be caused by air or water in the oil line or atomizing air pressure higher than oil pressure. Burner will automatically attempt ignition again.

ERROR 38 -- FLAME SIGNAL BEFORE FUEL BEFORE SPARK. This error is usually caused by tampering with the Flame Relay FLR. Check to see that the contacts of FLR have not been bridged or jammed.

ERROR 39 -- FLAME SIGNAL BEFORE FUEL DURING SPARK. This error is caused by the UV Flame Scanner MP seeing the spark as a flame. Remove the scanner and verify that the small orifice disk is in front of the lens.

If the disk is there, the 3 mm hole may need to be smaller.

ERROR 40 -- FLAME STAYS TOO LONG AFTER SHUTDOWN. This error occurs when flame is still present at the end of Step 21, the tolerated afterburn period. Look at the flowmeter to see if the Fuel Oil Valve FOV in the lower cabinet is closing properly. See if oil pressure is within the recommended range (30 to 50 psi).

ERROR 41 -- GAS LOW TEMPERATURE (DUAL FUEL ONLY). This error occurs when liquid propane is detected in the line. Check for proper operation of vaporizer and high pressure regulator.

ERROR 42 -- GAS LOW PRESSURE (DUAL FUEL ONLY). Check for closed gas valve, or level of propane in tank.

TEST SEQUENCE EXPLANATION

HU-60-1200

PRELIMINARIES -- To test a new installation, first check that all necessary connections are made. Standard three-phase electrical power supplies are 380 V 50 HZ, 415 V 50 HZ and 480 V 60 HZ. The compressed air supply should be 80 psi (5.4 bars) minimum. The fuel supply may be kerosene. If you try to use a lower grade of oil, you will cause an acid buildup in the spray chamber which will decrease the life of the Humidaire Unit. Loosen the fuel filter assembly in the lower cabinet and carefully drain enough fuel to wash out any debris accumulated in the pipe.

Check the spray chamber for any debris or packing material which may have accumulated there. Close the 2 inch drain valve at the rear of the unit and verify that the small drain on the bottom of the water pump is closed. Begin filling the tank with water.

Press the water pump jog button and check motor rotation. Verify that the motor is turning in the proper direction (indicated by the arrow on the motor). If not, kill power and reverse two of the leads at the main disconnect switch.

The explanation below refers to the Test Sequence Outline. The factory has made the adjustments described before shipment. It will be advisable to repeat Step 4 after installation to purge air from the fuel line and make sure motors are running in proper direction.

The procedure can be used as a methodical way to correct problems.

TO ENTER TEST SEQUENCE -- Press RESET button while turning local selector switch to "0" (STOP). Hold both in for 5 seconds. Watch the STATUS light for seconds count. While still pressing RESET button, briefly operate START switch. This puts you in the test sequence. The STATUS light will confirm this by blinking once per second. The presence of various inputs can be verified by observing the numbered lights at the right end of the Humidaire Unit's PLC. INPUTS are at the bottom. OUTPUTS are at the top. The STEP NUMBER will be shown on the LCD digital display on the sequence panel SP.

STEP 0 -- After releasing RESET button, press it once to proceed.

STEP 1 -- Observe the condition of inputs outlined below. The operation of the remote and local start-stop switches and other inputs can be tested while observing the input LED's. While in this step only, pressing the WATER PUMP JOG BUTTON will check the STATUS light, remote FLAME light, and ALARM light for proper operation.

Press RESET to proceed.

CONDITION OF INPUTS AND TEST LIGHTS:

0002	RESET	OFF
0006	OIL LOW PRESS SWITCH	OFF
0007	OIL HIGH PRESS SWITCH	ON
0008	ATM AIR SWITCH	OFF
0009	AIR HI TEMP SWITCH	ON
0010	COMBUSTION AIR PRESS	OFF
0012	LOCAL STOP	ON (TEST BY TURNING)
0013	LOCAL START	OFF (TEST BY TURNING)
0015	FLAME	OFF
0200	LINT FLUE SCANNER	OFF (TEST)
0202	JOG BUTTON	OFF
0206	GAS TEMP SWITCH	ON (DUAL FUEL ONLY)
0207	GAS PRESSURE SWITCH	OFF (DUAL FUEL ONLY)

STEP 2 -- Test the water pump, valves, and conductivity control. It is a good idea to turn on the humid air fan during this step to help prevent water spray from wetting the burner head. To energize the water pump, press the WATER PUMP JOG BUTTON on panel SP. In this step only, pressing this button will toggle the pump on and off permitting you to make the necessary adjustments with both hands. In all other modes of operation, it is a momentary jog button only.

Turn the START-STOP selector switch to the right to open the modulating water valve. Center position will freeze its movement. Turn the switch to the left to close the valve. Valve position is indicated by the slot on the center shaft of the butterfly valve. When the slot is parallel to the pipe, the valve is fully open. Adjust the linkage accordingly and then freeze the valve halfway open.

The power light on the conductivity control should be on at this time. Verify that the switches on its face are set to OPERATE and ON. Turn the dial to the right all the way. Slowly turn it back to the left until the control light comes on. This indicates that the controller is opening the water purge valve. Remove the PVC cap on the flushing assembly at the rear of the unit and verify that water is being purged. The water should not be overflowing from the pipe with the cap off. If it is, turn the screw on top of the purge valve slowly to the right until the water flow decreases. After this is adjusted, add 1000 to the conductivity reading and turn the dial to this setting.

The digital temperature controller located on the right of the 17041 remote control should be on at this time. This controller has been pretuned by the factory for best operation with the HU-60-1200. If the tuning has been corrupted or changed and a return to the original factory setting is desired, use the following tuning parameters:

Prop Band	10.0
Rate	.10
Reset (min)	1.0 Min

The temperature indicated should correspond to the water temperature inside the water tank.

After checking for water leaks, press RESET to proceed to step 3.

STEP 3 -- This step tests the modulating motor on the fuel valve at the burner head. You may turn the humid air fan off at this step. In addition, it tests the electronic drive for the motor. Turning the local start-stop switch to the start position applies 20mA DC to the drive, which should open the valve to the full fire position. Releasing the switch will freeze its motion permitting adjustment to the linkage. Turning it to stop removes the DC current from the drive, which should bring it to the low fire position. As the valve approaches the low fire position, observe input light 11 (low fire switch) on the PLC to make sure that it turns on only at the low fire position. The operation of the low fire switch LFS is checked by the PLC during the preburn routine. As with the combustion air switch, the PLC will not permit the burner to start unless LFS operates properly. Adjust the switch by rotating its cam on the shaft.

The digital temperature controller located on the left of the 17041 remote control should be on at this time. This controller has been pretuned by the factory for best operation with the HU-60-1200. If the tuning has been corrupted or changed and a return to the original factory setting is desired, use the following tuning parameters:

Prop Band	17.0
Rate	0.45
Reset (min)	0.3 Min

Press RESET to proceed to Step 4.

STEP 4 -- The fuel pump and combustion air fan are started at this step. Verify that both motors are turning in the proper direction (indicated by the arrows on the motors). If not, kill power and reverse two of the

leads at the proper motor starter. Return to this step in the test program.

If this is a new installation, it will be necessary to purge the fuel line. Open the cock at the burner head and place a container beneath the clear plastic tube coming from the cock. Turn the start-stop selector switch at the burner control panel to the start position. This will open the fuel valve in the lower cabinet and begin opening the fuel valve at the burner head. Watch the fuel rise in the flowmeter, and spill into the container. When it becomes clear with no air bubbles, release the switch, then close the cock. The oil pressure should be steady.

Observe the oil pressure, which normally should be 45 psi. This pressure determines the maximum heat output of the burner. If necessary, adjust the pressure with the fuel pressure relief valve FPR in the lower cabinet. FPR has an adjusting screw under its cap.

The oil low pressure switch OLP (left) should turn OFF input light 6 on the PLC when the pressure falls below 30 psi (2 bars). Adjust OLP if necessary. The oil high pressure switch OHP (right) is factory set to turn OFF at about 80 psi (5.4 bars).

Press RESET to proceed to Step 5.

STEP 5 -- Step 5 opens the atomizing air valve. Adjust air pressure regulator APR so air pressure at the gauge on the burner head is equal to the fuel pressure. Now, slowly close the gate valve in the air supply pipe to reduce the air pressure. Atomizing air pressure switch AAP should turn OFF input light 8 on the PLC when the pressure falls below 30 psi (2 bars). Adjust AAP if necessary.

Press RESET to proceed to Step 6.

STEP 6 -- This step will enable the combustion air fan. Turn the START-STOP switch to "1" to turn it ON and "0" to turn it OFF in this step only. The combustion air pressure switch CAP has been adjusted to operate at a pressure of 1" (25 mm) pressure. Input 10 on the PLC should be ON when the combustion air fan is ON, and be OFF when combustion air pressure is not present. In the operation sequence, the PLC tests this switch for Error 33. If the switch is stuck closed, the burner will not start.

Press RESET to proceed to Step 7.

STEP 7 -- Turn on the pull fan for the Humidaire Unit. Verify that the spray chamber door is in place and that air is being drawn through the burner duct by removing the air inlet screen and placing your hand next to the burner head.

If the fan interlock relay has been wired correctly, INPUT 3 should be illuminated on the PLC. It should be off whenever the fan is turned off.

Adjust the air flow switch on the Humidaire Unit. Remove the aluminum cover of the air flow switch and note the adjustment screw on the right hand side. Turn this screw to the right until INPUT 5 is off. Now turn the screw back to the left just until it comes back on. Replace the cover.

Press RESET to proceed with step 8. (INPUTS 5 and 3 must be on) (Main fan must be ON)

STEP 8 -- This step is for units set up to burn both liquid and gaseous fuel (Dual Fuel Option). Press RESET if this is not applicable.

Turn the START-STOP selector switch to the right to open the safety shut off valve (SSOV) and charge the gas train with a small amount of gas. It will take approximately 10 seconds for the valve to fully open and approximately 1 second for it to close. Observe the gas pressure gauge. Gas pressure should be set for 1.4-1.6 psi. Remove the regulator cap and adjust if needed. Releasing the switch to the center position will close the SSOV.

Turn the switch to the left to open the Pilot Gas Valve. This will relieve the pressure in the gas cavity. The gas pressure switch should be set to open at approximately 0.7 psi. Observe INPUT 207 on the PLC to verify that it comes on when the switch is turned to the right and goes off when the switch is turned to the left.

Remove the cover of the gas low temperature switch (GLT). Verify that its setting is approximately 5 degrees F. The purpose of this switch is to check for liquid propane in the line. It may be necessary to make its setting lower for extremely cold climates and higher for warmer areas.

Before leaving step 8, charge the gas cavity by turning the switch to the right. Release the switch. Observe the gas pressure gauge closely and verify that the pressure is not falling. Falling pressure indicates a downstream gas valve is leaking. Now turn the switch to the left and evacuate the cavity. Release the switch. Observe the gauge and verify that pressure is not building up. This would indicate an upstream gas valve is leaking.

Press RESET to proceed with Step 9. (INPUT 5 and 3 must be on)

STEP 9 -- Turn the selector switch to the fuel desired (Dual Fuel Option Only).

Press RESET to confirm your fuel choice and continue. (INPUT 5 and 3 must be on)

STEP 10 -- This step will test the ignition transformer and the ignition light. Turn the start-stop selector switch to START to test the ignition transformer and light. The flame light must remain OFF with the spark ON or the PLC will, during the operating sequence, shut down the burner with Error 39. If the flame light is ON, the orifice disk in the UV Flame Scanner MP is missing or is too large.

Press RESET to proceed to step 11. (INPUT 5 and 3 must be on)

STEP 11 -- Steps 11 through 15 will be done automatically by the PLC. The combustion air fan is turned OFF in Step 10 if liquid fuel is being used. Input 10 on the PLC must go OFF for the sequence to proceed if oil was selected as the desired fuel.

STEP 12 -- The fuel oil valve is opened (or the pilot gas valve is opened) and ignition is started. There is a limit of 15 seconds permitted for this step.

STEP 13 -- Stabilization period for the flame (1.5 seconds).

STEP 14 -- The combustion air fan is restarted when flame is established (except in gas operation where the fan does not turn off). The burner will run for 90 seconds warming up all system components before humid air is generated.

STEP 15 -- The water pump will be energized (Lint Flue Scanner is defeated here in the test program) and will run for 10 minutes. Test may be terminated early by turning stop switch. Note that the remote water pump switch need NOT be in the ON position in order for the water pump to run in this portion of the test program. The modulating motors on the fuel valve and water valve are freed to respond to the 17041 Controller. Key in temperature set point of 58 degrees C (136 F) for the air and 54 degrees C (130 F) for the water. These are typical settings. Verify that each reading stabilizes and remains steady after a few minutes.

SETTING THE INTERNAL TIME DELAY RELAYS

(SOFTWARE VERSION 1.4)

DESCRIPTION -- Software version 1.4 offers two field-adjustable internal timers. One timer is an ON-DELAY timer providing an adjustable, mandatory warmup time prior to water pump operation. In previous software versions, this timer was preset to 90 seconds and was adjustable only at the factory. The second timer is an OFF-DELAY timer for water pump operation. This function had previously been provided by the internal timer in the photoscanner (lint slide installations) or had not been present (conditioning hopper installations).

Please note that software version 1.4 is not available for dual-fuel operation of the HU-60-1200.

It is recommended that a qualified technician perform the field adjustment of the two internal timers. Valid timing ranges for each timer are from 1 to 9,999 seconds (2.76 hours).

TO ACCESS ADJUSTMENT PROGRAM -- Turn off 120 VAC control power with the circuit breaker provided on the control panel. No lights will appear on the PLC. It will be necessary to make a temporary connection on the terminals of the PLC to access the internal timer adjustment program. Connect a test wire between input terminal 203 on the lower terminal strip of the PLC and the L1 (120 VAC) terminal on the upper terminal strip of the PLC. Turn the circuit breaker on and observe input light 203 on the lower face of the PLC. It should be on.

When power is applied to the PLC with the test lead in position, all normal operating and test programs are bypassed. The PLC is now in timer adjustment mode and is otherwise inoperable.

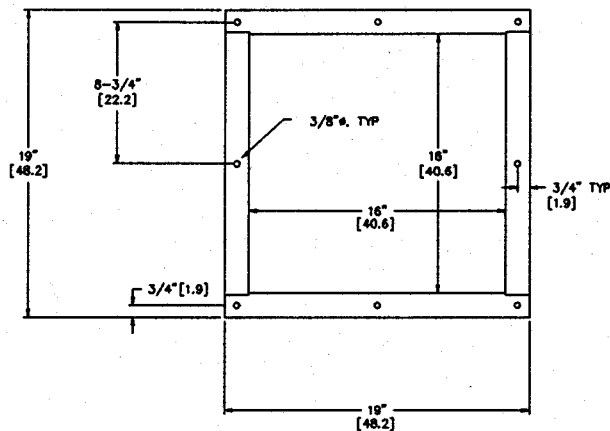
ADJUSTMENT OVERVIEW -- The local control panel of the HU-60-1200 acts as the adjustment mechanism for both time delays. The ALARM/ERROR display shows new time delay entry values in units of seconds, the RESET button clears the display in preparation for a new entry, the START/STOP selector switch advances (advances only, will not decrement) the display to the desired value, and the JOG WATER PUMP button will place the displayed value into the PLC memory.

ADJUSTING THE WARMUP TIME DELAY -- Turn the START/STOP selector switch to the right (START position). The ALARM/ERROR display advances rapidly (5 counts/second). The displayed units are seconds. For a five minute warmup delay, hold the switch in position for approximately 60 seconds (until the displayed value is about 300). If 300 is significantly overshot, press RESET to clear the value and try again from 0 value. When satisfied with the displayed value, press JOG WATER PUMP once to place the value into memory. The factory setting for this value is 90 seconds.

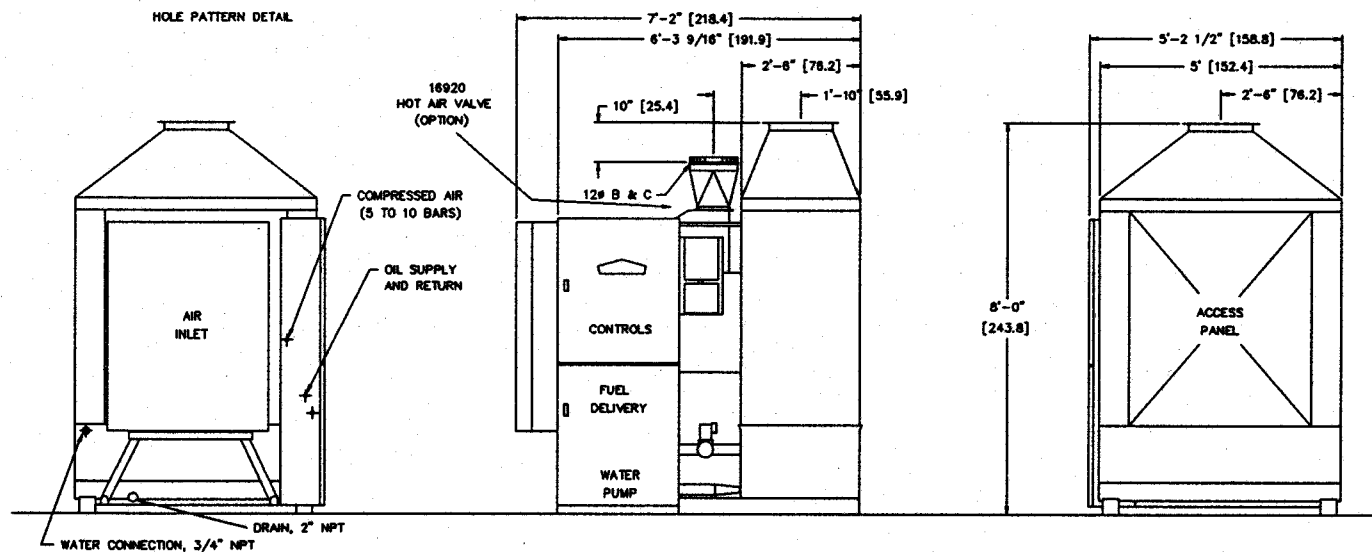
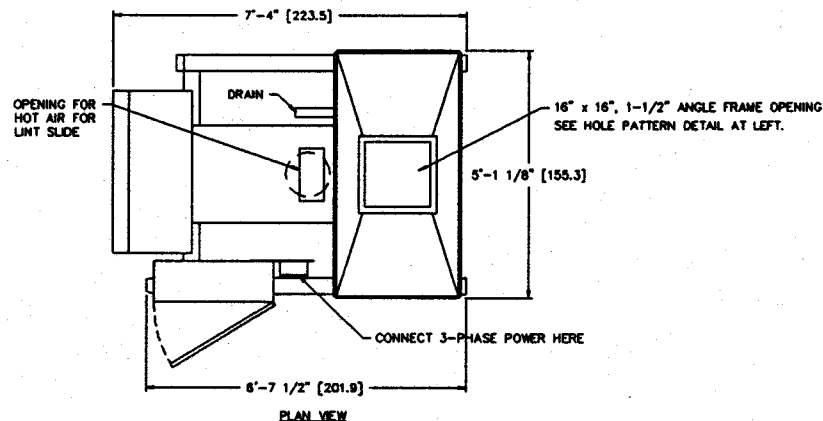
ADJUSTING THE WATER PUMP OFF DELAY -- Turn the START/STOP selector switch to the left (STOP position). The ALARM/ERROR display advances rapidly (5 counts/second). The displayed units are seconds. For a one minute off delay, hold the switch in position for approximately 12 seconds (until the displayed value is about 60). If 60 is significantly overshot, press RESET to clear the value and try again from 0 value. When satisfied with the displayed value, press JOG WATER PUMP once to place the value into memory. The factory setting for this value is 10 seconds.

SPECIAL NOTES -- The last START/STOP selector switch position (however brief) determines the memory location of the new timer value when JOG WATER PUMP is pressed. It will be necessary however, to make sure that the display is cleared to 0 when first starting the adjustment program so that synchronization with internal counters is assured.

COMPLETION -- Turn power off the PLC and remove the temporary connection to input 203. The adjustment is finished and normal operation can resume.



HOLE PATTERN DETAIL



1/48 SCALE 1/4" = 1' 0"
DIMENSIONS IN FT'- IN" [CENTIMETERS]

SAMUEL JACKSON MFG. CO.		
DIMENSION SHEET FOR		2410
HU-60-1200		
OIL-FIRED HUMIDAIRE		
UNIT		
		1-91

HU-60-1200 OIL-FIRED AND DUAL-FUEL HUMIDAIRE UNITS

STUB-UPS

<u>NO.</u>	<u>DESCRIPTION</u>	<u>ROUTING AND NOTES</u>
1	HUM UNIT 3-PHASE POWER	FROM ELECTRIC SERVICE TO HUM UNIT 3 WIRES 380 V 50 HZ OR 3 WIRES 415 V 50 HZ OR 3 WIRES 480 V 60 HZ 8 HP 6 KW MOTOR STARTERS AND 120 V CONTROL TRANSFORMER ARE IN BURNER CABINET
2	17040 HUM UNIT CONTROL A-C WIRES	HUM UNIT CABINET TO CONSOLE 7 - 16 GA WIRES
3	17040 HUM UNIT CONTROL SENSITIVE WIRES	HUM UNIT CABINET TO CONSOLE 4 - 16 GA WIRES AND 2 PAIRS TYPE-J T/C WIRES ONE OF WHICH CONTINUES OVERHEAD TO INLET TRANSITION OF HUM AIR TO LINT SL GRID.
4	HUM UNIT LINT FLUE SCANNER RUN OVERHEAD.	HUM UNIT CABINET TO SCANNER LOCATION IN LINT FLUE RISER. 3 - 16 GA WIRES. A-C WIRES. DO NOT SHARE CONDUIT WITH T/C WIRES.
5	HUM UNIT WATER SUPPLY	3/4" WATER LINE MIN PRESSURE 20 PSI, 1.4 BARS
6	WATER DRAINAGE FOR HUM UNIT	2 1/2" PVC DRAIN PIPE, 1000 GAL PER 24 HOURS TYPICAL
7	HUM UNIT FUEL OIL SUPPLY	1/2" PIPE KEROSENE OR NO. 2 DIESEL

FOR 80130 DUAL-FUEL VERSION ONLY:

8	HUM UNIT GAS SUPPLY	1" GAS SUPPLY LINE. NATURAL GAS OR PROPANE 5 TO 20 PSI, .3 TO 1.4 BARS DO NOT RUN PIPE IN FLOOR.
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INSTALLATION NOTES AND INSTRUCTIONS HU-60 HUMIDAIRE UNIT

HOISTING When using a forklift to lift the Humidaire Unit, it is important to verify that the right fork is inside the special bracket welded to the frame of the Humidaire Unit. The center of gravity is behind the base of the spray chamber, and the unit will tip over if the bracket is not around the fork. If hoisting is desired, a hoisting ring is welded to the base frame between the control cabinet and the spray chamber. The unit is shipped with a piece of plywood bolted to the top of the spray chamber. This plywood has a hole which is over the center of gravity. Pass a chain or cable down through this hole and hook it in the hoisting ring. The unit can now be lifted from above using a boom truck, fork lift, or chain hoist.

LOCATION If the location of the Humidaire Unit has not been specified on gin plans, it should be located in a clean place fairly close to the point of application of humid air. If the pipes are insulated (lagged), the humid air pipe can be run 80 to 100 feet (25 to 30 meters) without difficulty.

Outside the USA, some insurance companies or government authorities may require the Humidaire Unit to be located in a room separate from cotton processing operations.

AIR PIPES Connect air pipes in accordance with installation drawings. **IMPORTANT:** Even if not shown on drawings, make sure a slide valve is installed to regulate the flow of air through the Humidaire Unit. This is usually installed between the HU-60 and the fan. It may be located on the discharge side of the fan, especially where two valves are used to distribute humid air to two points of application.

Joints should be taped to prevent air leakage before draw bands are applied to joints. The pipe which conducts the humid air to the point of application is often insulated or lagged to prevent condensation. If the insulation has an outer covering which is impervious, then it should not be applied to the pipe joints. Otherwise, slight leaks of vapor through the pipe joints will fill the insulation with water vapor which will cause condensation. Interrupting the insulation at the pipe joints allows this vapor to escape.

The water screen is also shipped in the spray chamber. It goes in the bottom of the water tank, covering the pump intake pipe, but not the drain outlet as shown in figure 1. Remove the spacers provided which protect the float valve assembly during shipment.

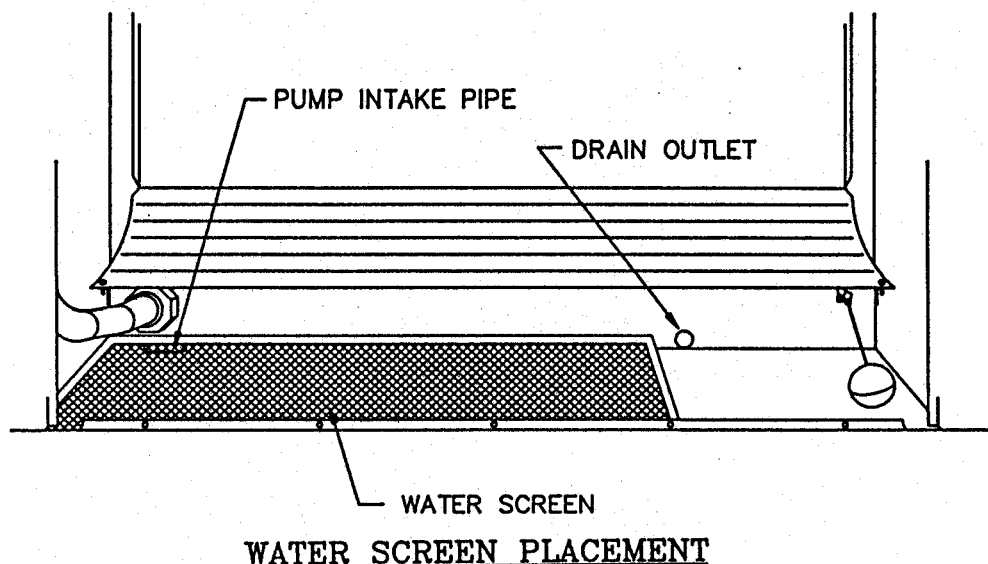


FIGURE 1

INSTALLATION NOTES AND INSTRUCTIONS HU-60-1200 HUMIDAIRE UNIT

ELECTRICAL Electrical connections and troubleshooting are covered in the electrical section of this manual. The electrical supply required for the HU-60 is 480/60 (10 Amperes) in the U.S. and 380/50 (12 Amperes) in other countries.

FUEL OIL Kerosene should be used whenever it is available because of its low sulphur content. If diesel fuel is used the sulphur will form concentrations of sulphuric acid in the tank which will eventually damage water train components on the Humidaire Unit. To prolong the life of the water train components, the conductivity control can be set to purge 250 units above its fresh water reading instead of 1000 as specified in its adjustment instructions. If this is done, a plentiful water supply and good drainage will be essential as the conductivity control will purge large amounts of water in an effort to reduce the acidity of the water. Connect the pipe supplying the fuel oil to the gate valve connection as indicated on the side of the control cabinet. Make sure that the pipe supplying the unit is free of debris and, after running the unit for several hours, check and clean the fuel oil filter on the oil train for any residual debris it may have collected.

FUEL GAS (DUAL FUEL OPTION ONLY) Connect the pipe supplying natural gas or LPG to the gas cock on the gas regulator assembly. Make sure gas supply pipe does not interfere with removing air inlet screen. The pipe used should be free of sand, metal chips and other debris. Even if it is, use the gas to flush the pipe by removing the pipe cap at the bottom of the gas regulator assembly and opening the gas cock until clean gas comes out.

DO NOT take gas supply from downstream side of low pressure regulator serving another burner. Go ahead of such regulators to get a pressure of 5 to 25 psi (.3 to 1.7 bars). Regulator installed in the HU-60 will lower this to the proper level (to be adjusted by serviceman at startup). Ordinarily, 1-inch pipe will be adequate, but if more than one HU-60 is served or long distances are involved, a larger pipe may be required.

Typical full-throttle fuel consumption at 2-million BTU/Hr is as follows: Natural gas --2,000 cubic ft/hour (57 cubic meters/hr); Propane -- 22 gal/hr (80 liters/hr or 47 Kg/hr).

For LPG (propane or butane) installation, some gins use a large storage tank without a vaporizer. In such cases, make sure that your gas man installs a 15-pound regulator at the tank. **DO NOT** run the high pressure gas underground ahead of the regulator. To do so will cause condensation of liquid LPG in your gas line. This will damage the HU-60 and other burners, and will create a dangerous condition. If the gas line in your building feels extremely cold during operation, you have liquid in your line, and you should correct the situation immediately.

Some local authorities may require piping the screened vent opening of the gas regulator to the outside of the building.

WATER SUPPLY Connect a 1/2-inch water supply pipe to the connection at the float valve in the water tank. We have provided a hydrant at this point for convenience in washing out the unit. Supply pressure should be at least 20 psi (1.4 bars).

Maximum water consumption at full throttle will be about 220 gal/hr (850 liters/hr) of which about 85 percent is evaporated and the remainder is bled off to the drain. Average water consumption will be much less than this, perhaps as little as 50 gal/hr when the unit supplies humid air only to the Lint Slide Grid.

Some users have installed water softeners to minimize scale deposits in the HU-60. Make sure the softener cannot recharge while the HU-60 is running. If it does, the salt it puts in the water will cause

INSTALLATION NOTES AND INSTRUCTIONS HU-60-1200 HUMIDAIRE UNIT

corrosion damage far more expensive than scale accumulation. We can supply our No. 14000 Powdered Acid Descaler in 50-pound pails. To remove scale, 10 pounds of the powder is added to the water in the tank while the unit continues to operate normally. The scale is usually removed within 24 hours. These practices will not eliminate the need for the conductivity control bleed off system. Please see the conductivity control instruction sheet in this manual for details on this.

WATER DRAINAGE FACILITY The HU-60 drains water through a 2-inch pipe located behind the water tank. Drainage is absolutely necessary for proper operation of the HU-60 because the water evaporated by the HU-60 is distilled water. All minerals are left behind in the machine. A conductivity control continuously monitors the amount of dissolved minerals in the remaining water and when this level reaches an undesirable level, a purge valve opens releasing this water to the drainage pipe. As this occurs, the float valve replaces the purged water with fresh water. The amount of water drained will vary with the settings of the purge valve and conductivity control system but as a general rule, the drainage pit should be capable of accepting about 1000 gallons per day.

1200INST.MAN 050891

ELECTRICAL INSTALLATION NOTES

THREE-PHASE SUPPLY TO HUMIDAIRE UNIT Run three-phase power to the Humidaire Unit from a 30-ampere fusible disconnect switch or circuit breaker which you will provide. A motor starter for the water pump motor is included in the Humidaire unit, as well as a stepdown transformer for 120-volt control power. Note that the programmable controller prevents the water pump from starting until the burner has operated for 90 seconds, but the water pump "Jog" push button will run the pump to check rotation. Look at the pump motor shaft to check proper rotation direction. If three phase voltage supplied does not correspond with that shown on the shipping tag of Humidaire Unit, the overload relay on the water pump motor starter and the connections on the control voltage transformer must be changed.

Wiring the 17041 automatic control to the Humidaire Unit is, for the most part, a wire by number operation. There are some things to note before connecting these. In addition, read the warnings below carefully.

The following rules need to be followed when wiring the thermocouple temperature sensors from the lint slide transition and the water tank to the 17041 automatic control.

- **Always** use thermocouple extension wire for the entire run from the thermocouple to the 17041 terminal block.
- **Never** run the thermocouple wires with power wiring (including 120 VAC control wires). You can run several T/C extension wires together in the same conduit with other wires marked sensitive on the external connection diagram.
- Observe the color code for thermocouple wire. Note that the red wire is negative and the white wire is positive.
- When wiring the thermocouples to the 17041 automatic control, it is absolutely critical to wire the water temperature thermocouple to terminals "T/CW" and the air temperature thermocouple to terminals "T/CA" on the 17041. **Verify** these connections before running the unit.

Please note that terminals 37, and 38 on the 17041 controls do not have matching numbers on the Humidaire Unit. These terminals are spares reserved for future use.

WARNING!

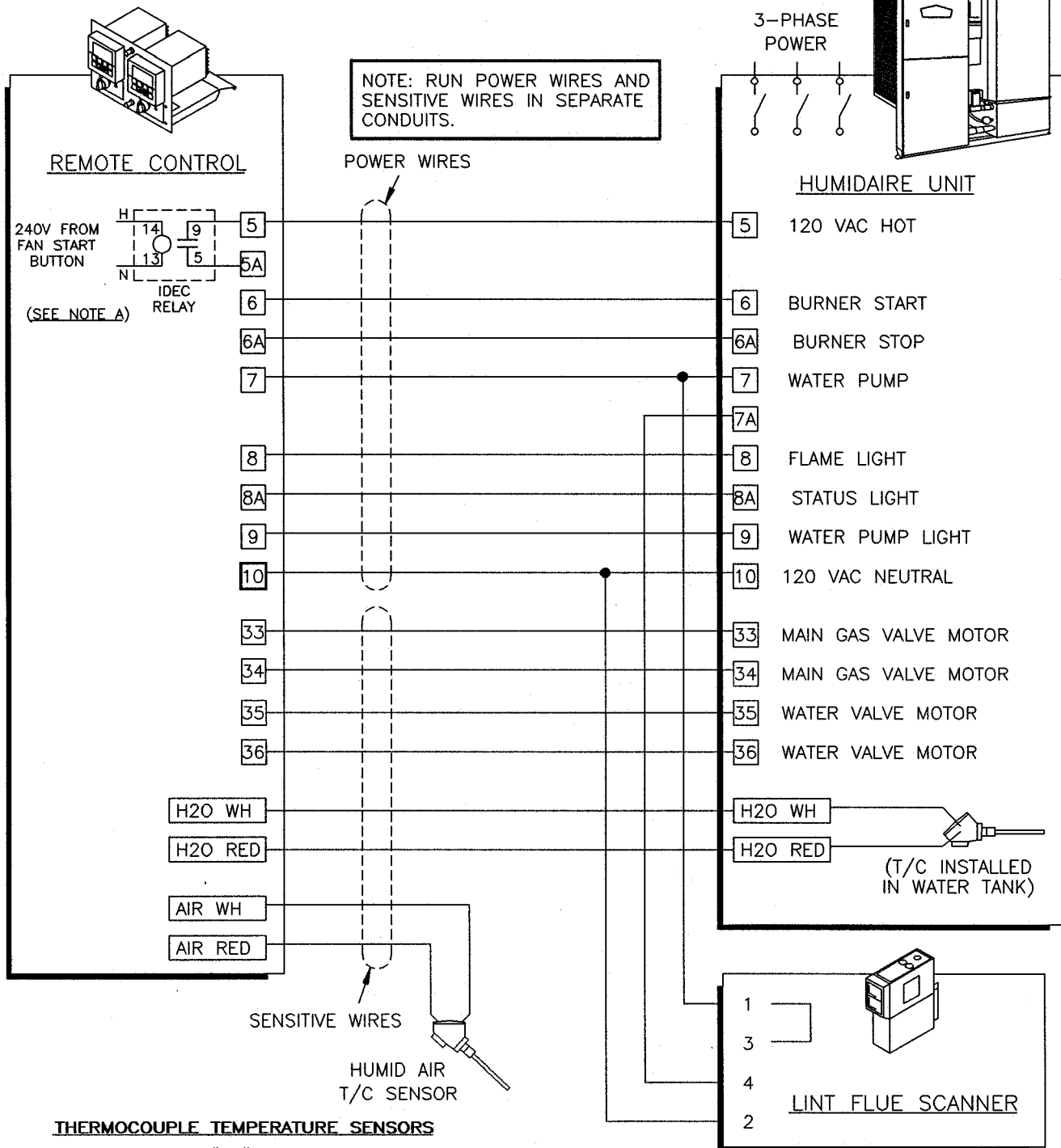
THERMOCOUPLE WIRING If the water temperature thermocouple in the water tank and the air temperature thermocouple at the lint slide are connected to the wrong terminals on the 17041 automatic control, there is a possibility for severe heat damage to the Humidaire Unit. Read the wiring instructions carefully and verify the connections before operating the Humidaire Unit burner.

WARNING!

FAN INTERLOCK The installing electrician must supply and connect a normally open interlock from the Humid air fan between terminals 5 and 5A on the 17041 controller. Although every Humidaire Unit has an air flow switch, this interlock is an extra safety device. It turns off the burner instantly when the fan motor stop button is touched. For the location of this interlock, see the External Electrical Connections sheet included in this manual.

EXTERNAL ELECTRICAL CONNECTIONS HU-60-1200 WITH 17041 AUTOMATIC CONTROL

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10-94



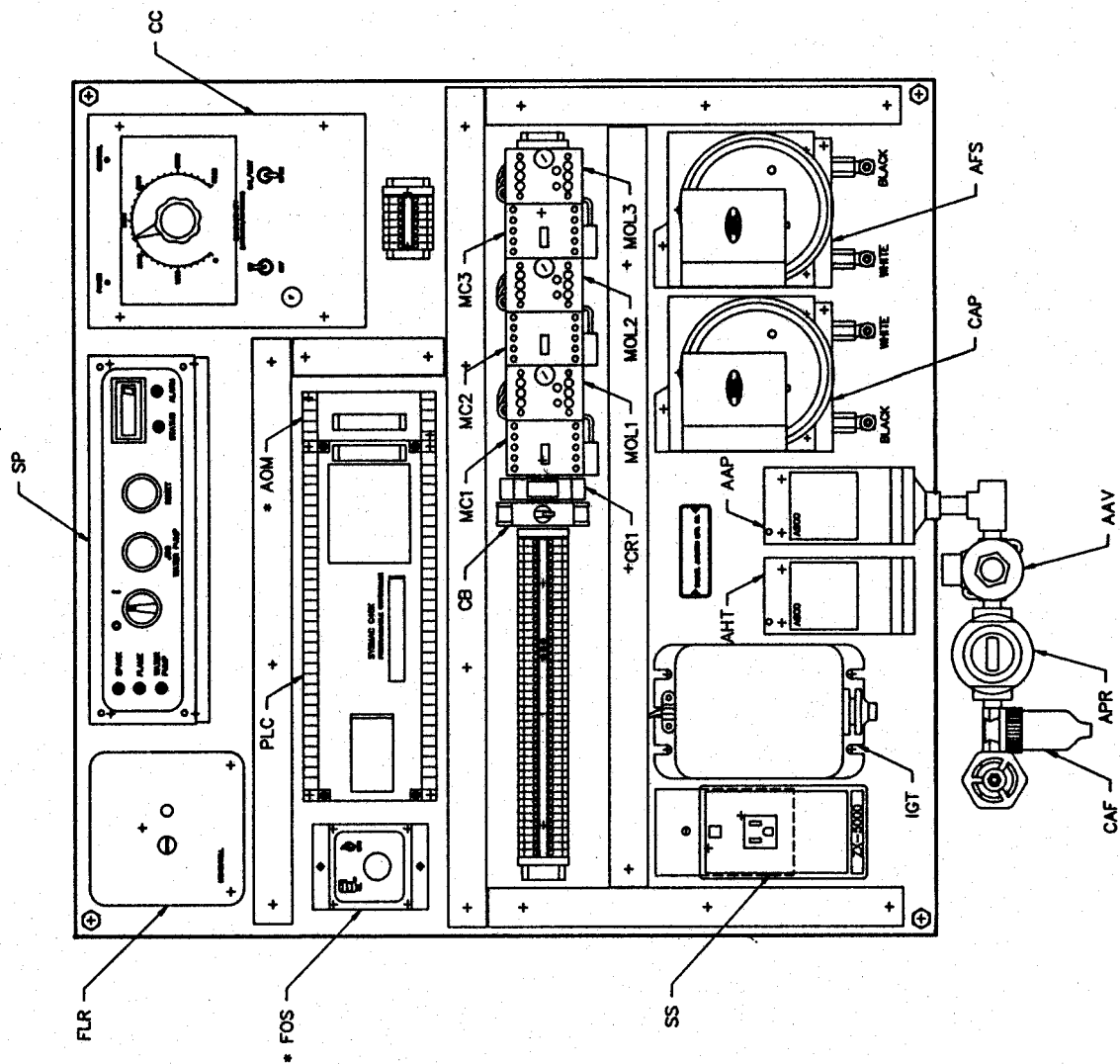
THERMOCOUPLE TEMPERATURE SENSORS

USE ONLY TYPE "J" THERMOCOUPLE EXTENSION WIRE FURNISHED WITH UNIT. OBSERVE THE COLOR CODE. RUN IN SEPARATE CONDUIT FROM POWER WIRES. SEVERAL T/C EXT. WIRES MAY BE RUN IN THE SAME CONDUIT.

NOTE A: INSTALLING ELECTRICIAN IS RESPONSIBLE FOR CONNECTION OF A NORMALLY OPEN **INTERLOCK** (FURNISHED) TO THE HUMID AIR FAN.

REMOTE CONTROL REQUIRES A RECTANGULAR MOUNTING CUTOUT 10 1/8 WIDE X 7 1/8 HIGH.

FOR **BLUE UDC-3000 CONTROLS** MAKE THE FOLLOWING TERMINAL SUBSTITUTIONS:
10 FOR 23, 11 FOR 24, 18 FOR 27, AND
1 FOR 3.



1/4 SCALE
• FOR DUAL FUEL ONLY

SAMUEL JACKSON MFG. CO.

ELECTRICAL CONTROL
PANEL

REF: 1200

DATE: 6-13-91

20-17230

COMPONENT LIST
HU-60-1200

<u>SYMBOL</u>	<u>NAME</u> <u>PART NUMBER, MFR'S TYPE</u>	<u>LOCATION</u>
AAP	ATOMIZING AIR PRESSURE SWITCH 14392 SWITCH UNIT PB-10A 14391 PRESSURE TRANSDUCER RF10A11	UPPER CABINET
AAV	ATOMIZING AIR VALVE 13598, 25005	UPPER CABINET
AFS	AIR FLOW SWITCH 16188, PC-301	UPPER CABINET
AHT	AIR HIGH TEMPERATURE SWITCH 14392 SWITCH UNIT PB-10A 14393 TEMPERATURE TRANSDUCER KJ-11A1	UPPER CABINET
APR	AIR PRESSURE REGULATOR 16830, R-16-02-000	UPPER CABINET
CAF	COMPRESSED AIR FILTER 16831, F-16-02-000	UPPER CABINET
CAP	COMBUSTION AIR PRESSURE SWITCH 16188, PC-301	UPPER CABINET
CB	CIRCUIT BREAKER 17427, NRS 1100 17413, SOCKET FOR BREAKER	UPPER CABINET
CC	CONDUCTIVITY CONTROL 14531, JA 153T	UPPER CABINET
CR1	CONTROL RELAY 17446, IDEC RH1B	UPPER CABINET
ED	ELECTRONIC DRIVE, 4-20 14845, CP-8391	BURNER, WATER TRAIN
FF	FUEL FLOW METER 13319, 2-20 GPH 26989	BURNER
FLR	FLAME RELAY 16236, R7023C1001	UPPER CABINET
FOV	FUEL OIL VALVE 16384, M8263B206V	LOWER CABINET
FP	FUEL PUMP 14753, 1300099	LOWER CABINET
FPR	FUEL PRESSURE RELIEF VALVE 12385, VJ-2W/WS	LOWER CABINET
IG	IGNITION ELECTRODE 14200, IP-19	BURNER
IGT	IGNITION TRANSFORMER 11172, 612-6A7	UPPER CABINET
LFS	LOW FIRE SWITCH 16848, BZE6-2RN80	BURNER

COMPONENT LIST - HU-60-1200
PAGE 2

M1	WATER PUMP MOTOR, 5HP 14975, JMM 3613T	LOWER CABINET
M2	FAN MOTOR, 2HP 14375, VM 3555T	BURNER
M3	FUEL PUMP MOTOR, 1/3HP 14735, M3458	LOWER CABINET
MC1	WATER PUMP MOTOR STARTER 16854, PD3.10E	UPPER CABINET
MC2	COMBUSTION FAN MOTOR STARTER 14854, PD2.10E	UPPER CABINET
MC3	FUEL PUMP MOTOR STARTER 14854, PD2.10E	UPPER CABINET
MM	MODULATING MOTOR FOR TCV 16614, MP5-2150 (50 HZ) 14824, MP-2150 (60 HZ)	BURNER, WATER TRAIN
MOL1	WATER PUMP OVERLOAD 14856, TR5.5	UPPER CABINET
MOL2	COMBUSTION FAN OVERLOAD 14736 TR2.8	UPPER CABINET
MOL3	FUEL PUMP OVERLOAD 14737, TR.55	UPPER CABINET
MP	MINIPEEPER, UV FLAME DETECTOR 12794, C7027A	BURNER
OHP	OIL HIGH PRESSURE SWITCH 16647, PB-11A TRANSDUCER FOR OHP 16668, RF10A42	LOWER CABINET
OLP	OIL LOW PRESSURE SWITCH 16647, PB-11A TRANSDUCER FOR OLP 16668, RF10A42	LOWER CABINET
ONoz	OIL NOZZLE SUBASSEMBLY 16511, 36546515SPEBC-3SP	BURNER
PLC	PROGRAMMABLE LOGIC CONTROLLER 17615, C40K	UPPER CABINET
SCR1	FUEL STRAINER SCREEN, 1/4 INCH 09992, 88-282-1	BURNER
SCR2	FUEL STRAINER SCREEN, 1/2 INCH 16383, 186-156-2B	LOWER CABINET
SP	SEQUENCE PANEL COMPLETE 17262, SJMC	UPPER CABINET
SS	SURGE SUPPRESSOR 16191, ZX-5000	UPPER CABINET
T/C	THERMOCOUPLE, UNGROUNDED 14660A, 2001-J-S	WATER TANK

COMPONENT LIST - HU-60-1200
PAGE 3

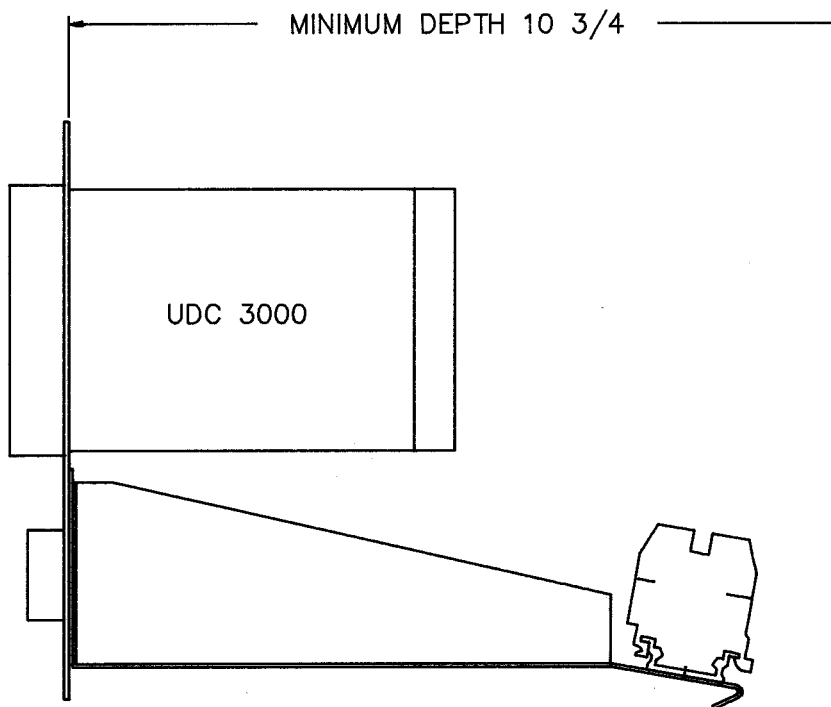
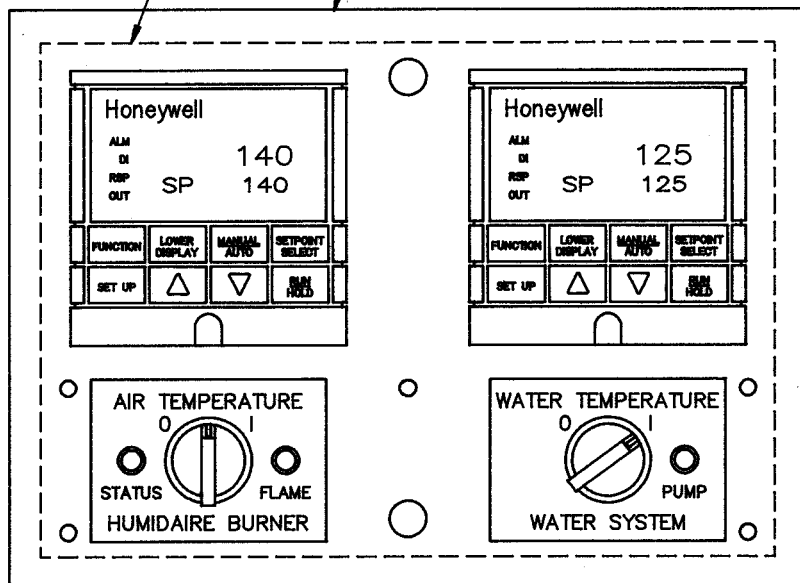
TRN	TRANSFORMER 380V, 480 TO 120 16480, 5802 SBE 320 VA	SIDE OF CABINET
WBV	WATER BUTTERFLY VALVE 14980A, SJMC	WATER TRAIN
WCS	WATER CONDUCTIVITY SENSOR 14532, E-1A	WATER TRAIN
WPG	WATER PRESSURE GAGE 11277B, 0-60 PSI	WATER TRAIN
WPV	WATER PURGE VALVE 14783, HR1-1	WATER TRAIN
WP50	WATER PUMP, 50 HZ 14973, 4BF50 SJM	LOWER CABINET

RECOMMENDED SPARE PARTS
HU-60-1200

<u>QTY</u>	<u>PART NUMBER</u>	<u>NAME</u>
1	14970	WATER PUMP WITH 5HP 60 HZ MOTOR
	14971	WATER PUMP WITH 5HP 50 HZ MOTOR
1	14974	SHAFT SEAL FOR WATER PUMP
1	14869	PUMP BODY O-RING
1	16188	AIR FLOW SWITCH PC-301
1	14392	PB-10A SWITCH ASSY
1	16647	PB-11A SWITCH ASSY
1	14391	RF10A11 TRANSDUCER
1	16668	RF10A42 TRANSDUCER
1	12385	FUEL PRESSURE RELIEF VALVE, VJ-2W/WS
1	14845	ELECTRONIC DRIVE 4-20 mA, CP-8391
1	16236	FLAME RELAY R7023C1001
2	12794	MINIPEEPER, C7027A1023
2	16383	STRAINER SCREENS FOR 16832 1/2" STRAINER
2	09992	STRAINER SCREENS FOR 09991 1/4" STRAINER
2	14200	IGNITION ELECTRODE, IP-19
1	11277B	WATER PRESSURE GAGE, 0-60 PSI
1	14745	WATER TANK SCREEN
1	12150D	MIST ELIMINATOR
3	14839	PILOT LIGHT, RED
1	14742	FLOAT VALVE
1	11069	FLOAT VALVE ROD
1	11068A	FLOAT BALL, S.S.
1	14660A	UNGROUNDING THERMOCOUPLE ASSY
1	16900A	EXPOSED TIP THERMOCOUPLE ASSY
1	15601	O-RING, 2-1/4" O.D. FOR WATER VALVE
1	15602	O-RING, 3/4" O.D. FOR WATER VALVE
3	15603	O-RING, 1/2" O.D. FOR WATER VALVE
2	16558	O-RING, 122 VITON FOR BURNER NOZZLE
1	16401	DIGITAL TEMPERATURE CONTROLLER

10 1/8 X 7 1/8 CUTOUT
REQUIRED FOR CONSOLE MOUNTING

FACE 11 WIDE X 8 HIGH



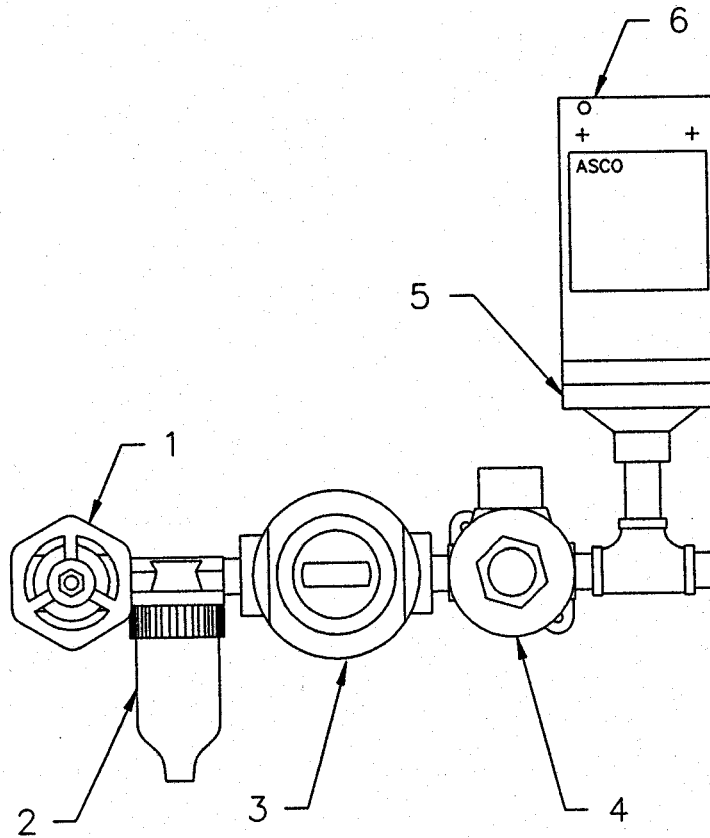
SAMUEL JACKSON, INC.

17041B HUMIDAIRE CONTROL
DIMENSION SHEET

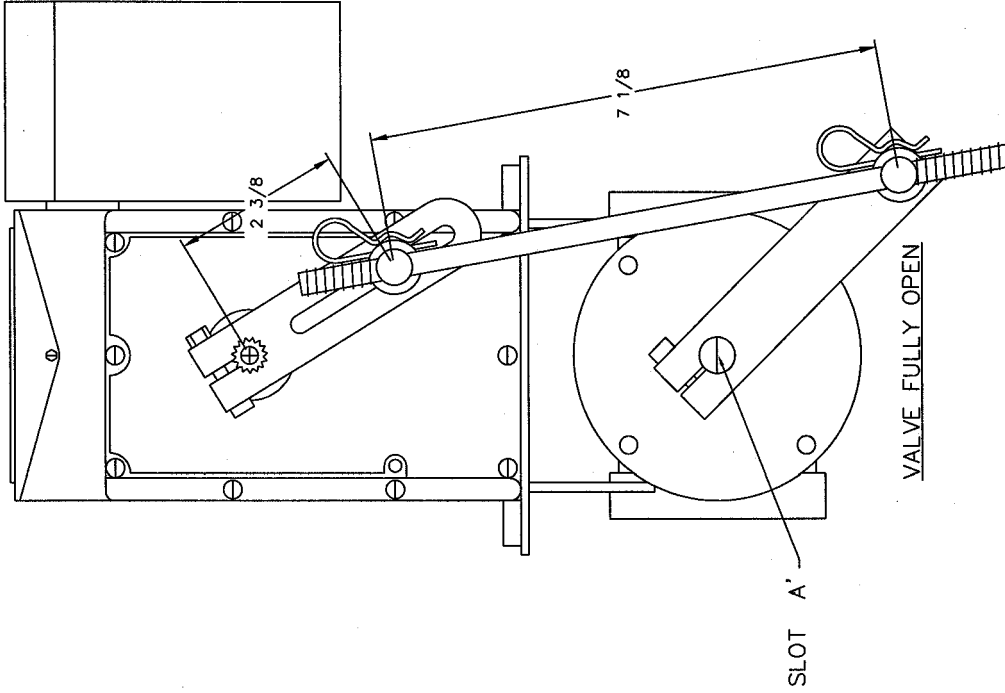
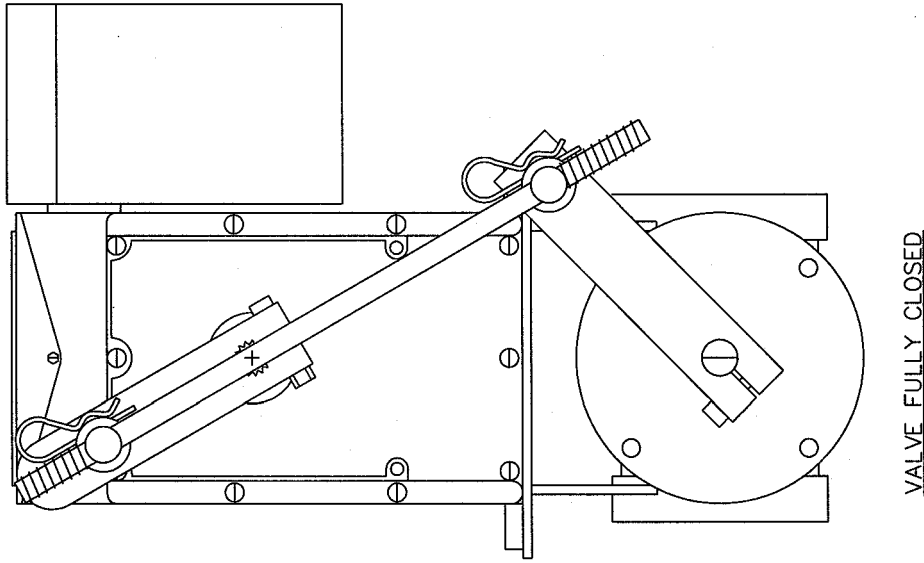
2370
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ATOMIZING AIR CONTROL ASSEMBLY

HU-60-1200 HUMIDAIRE UNIT



<u>REF</u>	<u>PART</u>	<u>QTY</u>	<u>DESCRIPTION</u>
1	13625	1	Gate Valve
2	16831	1	Compressed Air Filter
3	16830	1	Air Pressure Reg.
4	13598	1	Atomizing Air Valve
5	14391	1	Pressure Transducer
6	14392	1	Switch Unit



NOTE: POSITION OF SLOT A' DENOTES
THE POSITION OF THE DISC INSIDE
THE VALVE.

SAMUEL JACKSON, INC.

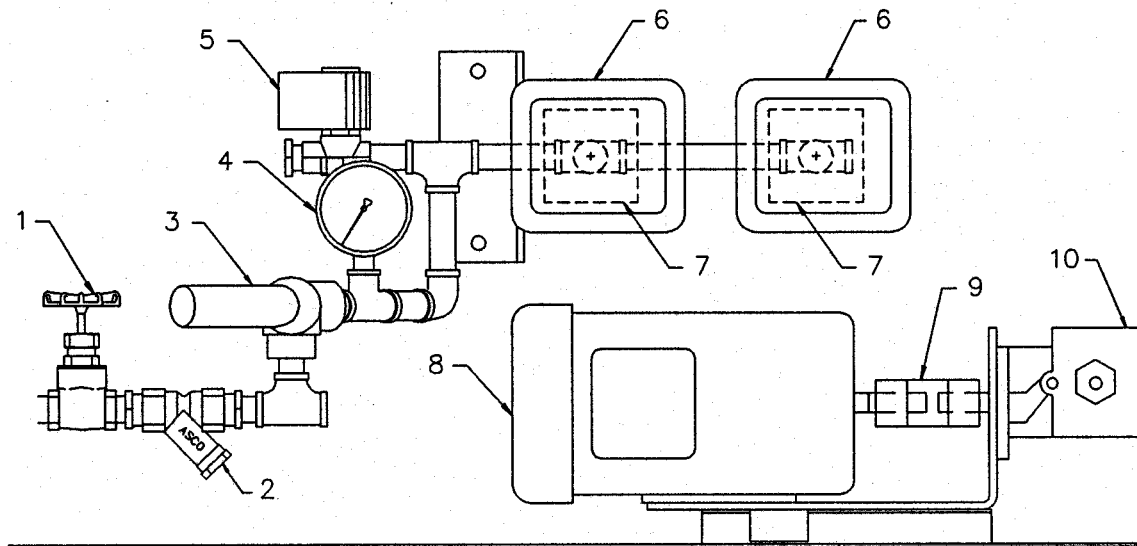
WATER VALVE
LINKAGE ADJUSTMENT

9-95

CAT2470

FUEL SUPPLY ASSEMBLY

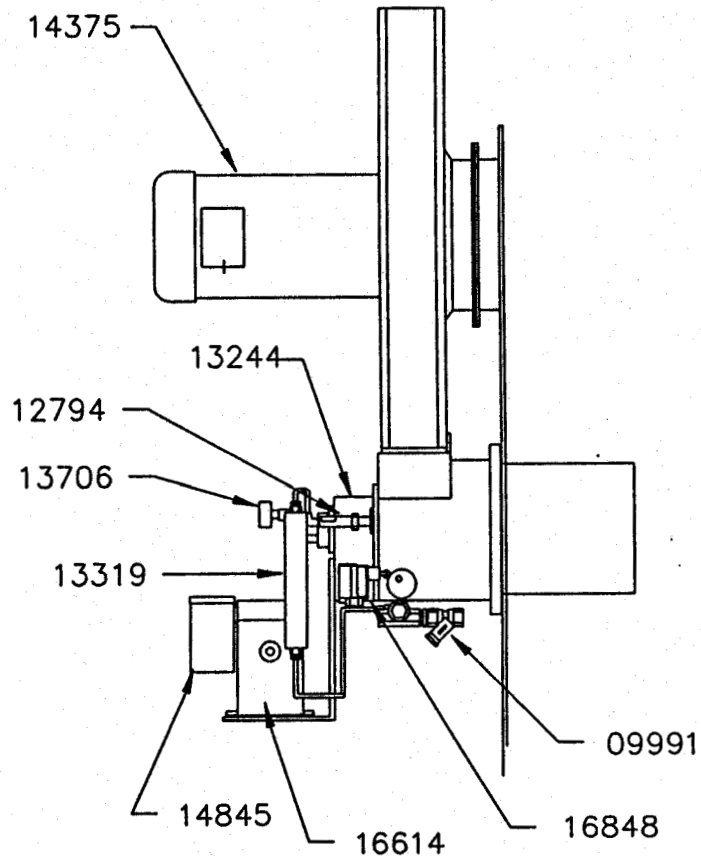
HU-60-1200 HUMIDAIRE UNIT



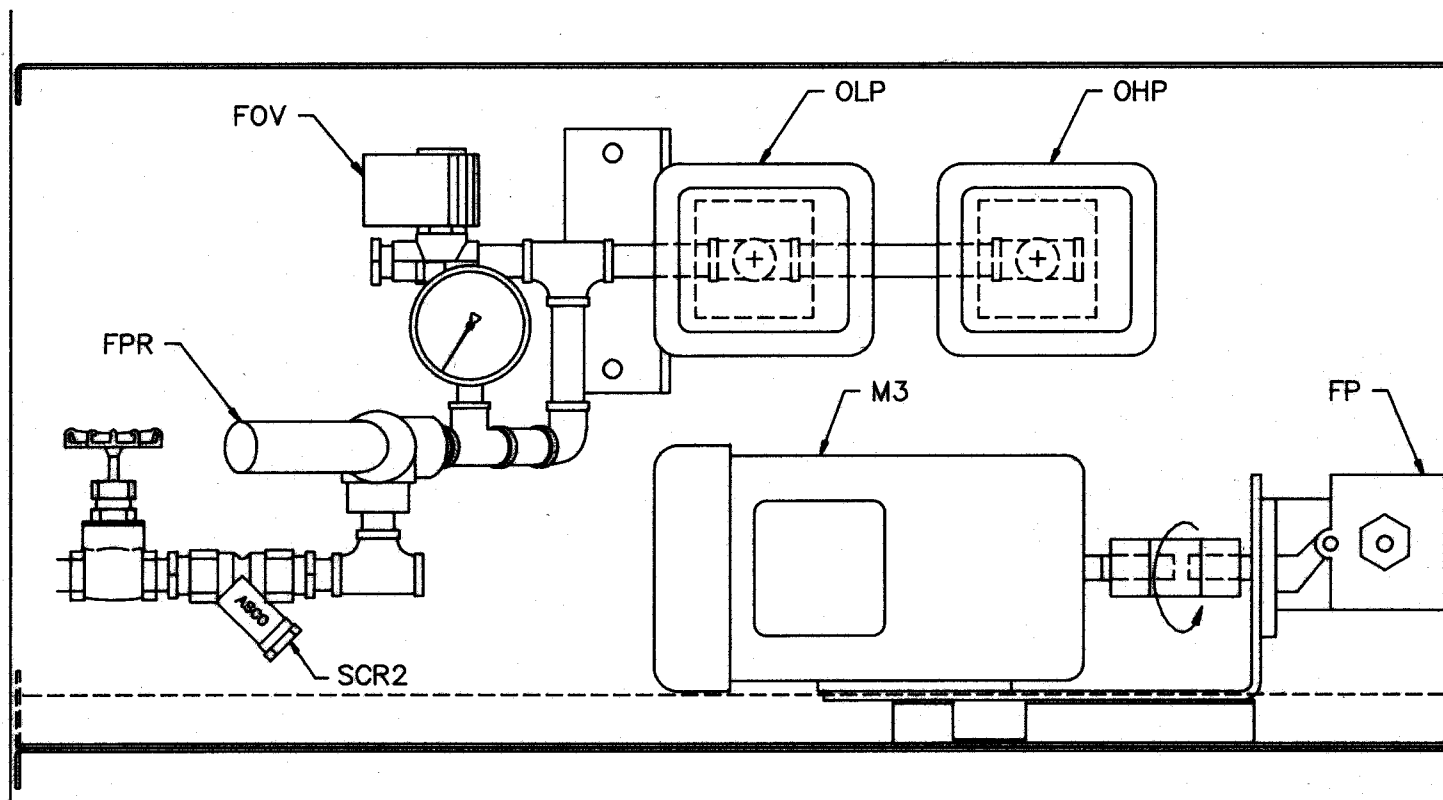
<u>REF</u>	<u>PART</u>	<u>QTY</u>	<u>DESCRIPTION</u>
1	13625	1	Gate Valve
2	16383	1	Fuel Strainer Screen
3	12385	1	Fuel Pressure Relief Valve
4	12313	1	Oil Pressure Gage
5	16384	1	Fuel Oil Valve
6	16647	2	Oil Pressure Switch
7	16668	2	Pressure Transducer
8	14735	1	Fuel Pump Motor
9	09838	1	Pump Shaft Coupling
10	14753	1	Fuel Pump

OIL BURNER ASSEMBLY

HU-60-1200 HUMIDAIRE UNIT

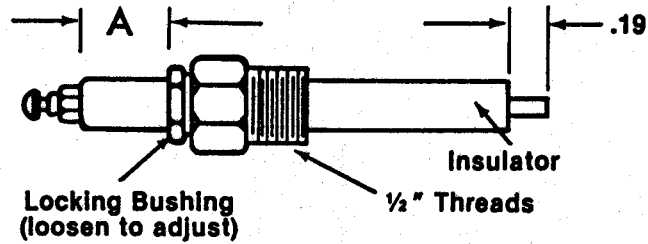


<u>PART NO.</u>	<u>QTY USED</u>	<u>DESCRIPTION</u>
14400	1	Burner Complete
14390	1	Burner Fan Impeller
14395	3	Impeller Belting, 50 HZ
14375	1	Fan Motor, 2 HP
13244	1	Fuel Nozzle Subassembly
13706	1	Air Pressure Gage
13319	1	Fuel Flow Meter, 2-20 GPH
12794	1	U-V Flame Scanner
16848	1	Low Fire Switch
16614	1	Fuel Modulator
14845	1	Electronic Drive
14200	1	Spark Igniter (Not Shown)
09991	1	Fuel Strainer
09992	1	Screen for 09991

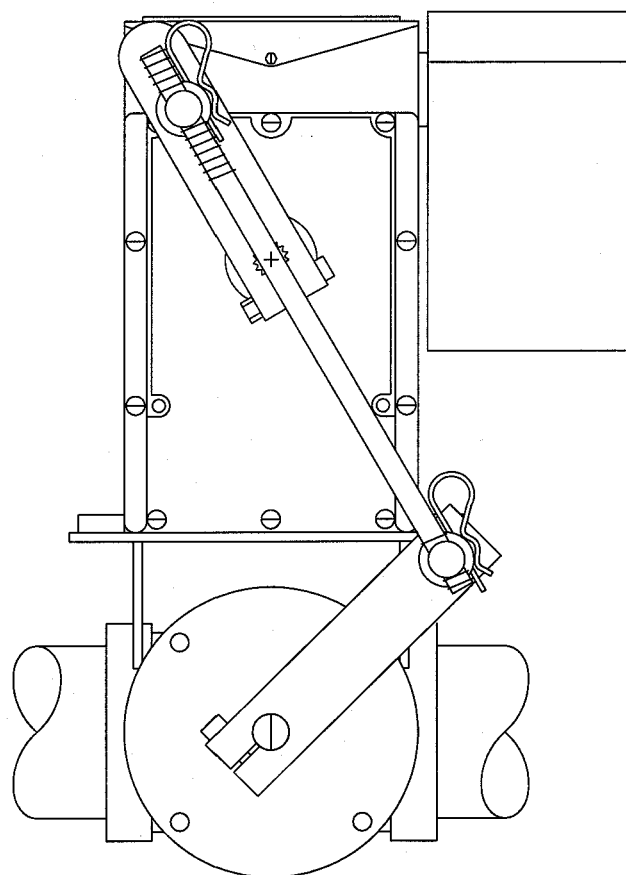


SAMUEL JACKSON MFG. CO.	
FUEL DELIVERY ASSEMBLY	
REF: 1200	
DWN. BY SK	DRAWING NO.
DATE 9-13-90	10-17627LB

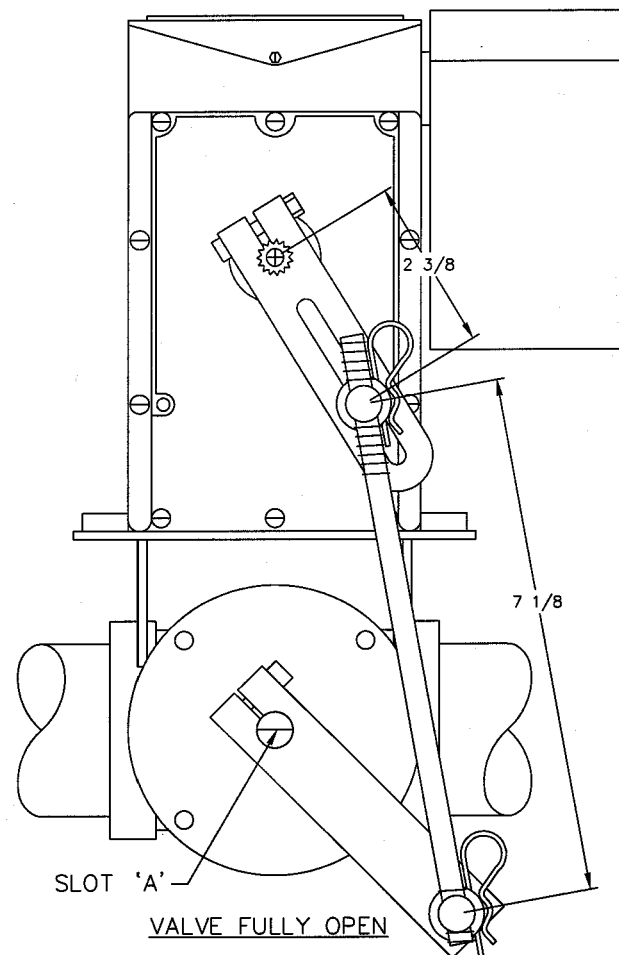
ADJUSTMENT OF
12796 AND 14200 SPARK IGNITORS
 (MAXON 25663)



<u>SJMC</u> <u>PART NO.</u>	<u>FOR SAMUEL</u> <u>JACKSON MACHINES</u>	<u>DIMENSION A</u>	
		<u>MM</u>	<u>INCHES</u>
12796	HU-60-1065	25	1.00
	HO- 7-1114		
14200	HU-60-1105	40	1.56
	HO- 4-1112		
	HO- 4-1118		
	HU-60-1200		



VALVE FULLY CLOSED



VALVE FULLY OPEN

NOTE: POSITION OF SLOT 'A' DENOTES
THE POSITION OF THE DISC INSIDE
THE VALVE.

SAMUEL JACKSON, INC.

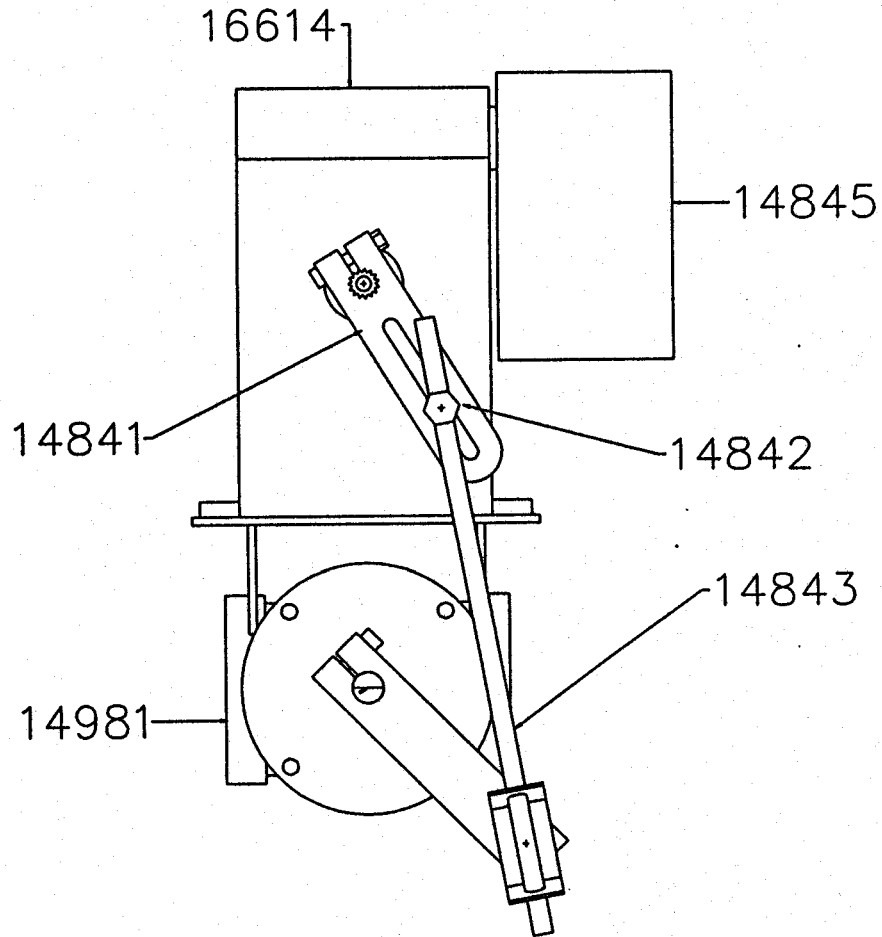
WATER VALVE
LINKAGE ADJUSTMENT

9-95

CAT2570

BUTTERFLY WATER VALVE ASSEMBLY

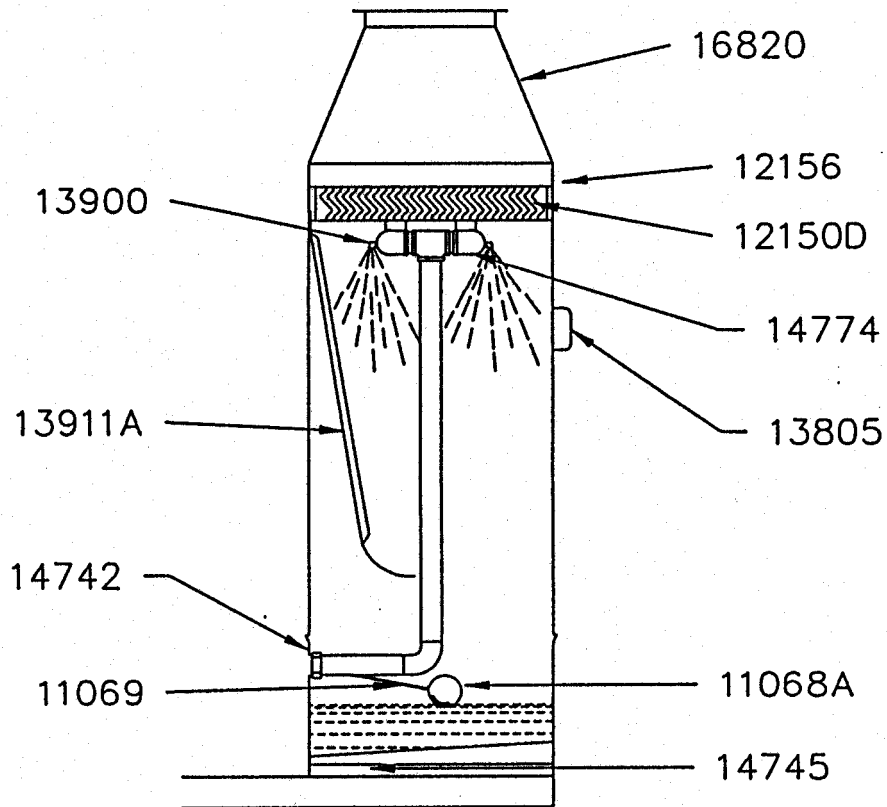
HU-60-1200 HUMIDAIRE UNIT



<u>PART NO.</u>	<u>QTY USED</u>	<u>DESCRIPTION</u>
14981	1	Valve Body Assembly
14980A	1	Valve Core Assembly
15601	1	Valve O-Ring, 2-1/4 ID
15602	1	Valve O-Ring, 3/4 ID
15603	3	Valve O-Ring, 1/2 ID
16614	1	Water Valve Actuator, 50 HZ
14845	1	Electronic Drive
14841	1	Crank Arm
14842	1	Straight Arm Fitting
14843	1	Rod
14952	1	Crank Arm

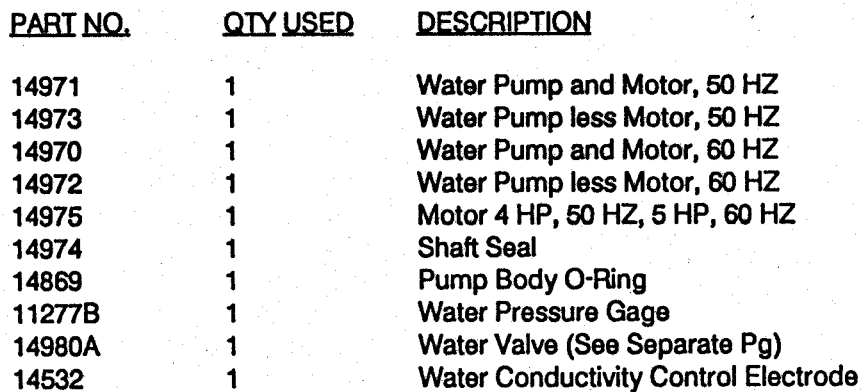
WATER SPRAY CHAMBER ASSEMBLY

HU-60-1200 HUMIDAIRE UNIT



<u>PART NO.</u>	<u>QTY USED</u>	<u>DESCRIPTION</u>
13460A	1	Spray Chamber, S.S.
16820	1	Air Discharge Hood
13805	2	Handle
13911A	1	Air Deflector Sheet
12156	2	Latch Assembly
12150D	1	Mist Eliminator Assembly
14745	1	Water Tank Screen
11068A	1	Float Ball, S.S.
11069	1	Brass Stem
14742	1	Water Float Valve, 3/4
13900	24	Water Spray Nozzles, S.S.
14774	2	Header Pipe, S.S.

HU-60-1200 HUMIDAIRE UNIT



WATER CONDUCTIVITY CONTROL SYSTEM

The Conductivity Control System measures the electrical conductivity of the recirculated water. This conductivity is a measure of the quantity of dissolved minerals, which will cause scale in the Humidaire Unit if not purged. On kerosene-fired Humidaire Units, sulphur in the fuel can cause the water to become acid and more conductive. In this case, the conductivity control prevents corrosion of the metal parts. The dial of the controller is numbered in micromhos (reciprocal megohms).

The Conductivity Control system comprises:

- 14530 Conductivity Controller. This is the instrument mounted in the electrical control cabinet.
- 14532 Sensor, installed in the intake pipe before the water pump. The mark on the electrode must be aligned with the mark on top of its fitting.
- 14783 Solenoid water valve which purges contaminated water from the Humidaire Unit. This is used on Humidaire Units with serial numbers higher than 4855. It is connected to the NO and N contacts of 14530. It replaces the following two items.
- *14465 Solenoid air valve, which controls the compressed air which closes the
- *14680 Air-operated water purge valve. (Part No. 14427 on Humidaire units with serial numbers below 4826.) This valve, when opened, bleeds contaminated water from the Humidaire Unit.
- 14700 Descaler Injector Kit (Optional). When available, this device will inject a small quantity of liquid descaler into the water tank each time water is purged.

OPERATION When the water conductivity reaches the value set on the 14530 Controller, it opens the water purge valve, allowing contaminated water to be pumped out. Clean water comes in through the float valve, lowers the conductivity to a satisfactory level and the controller closes the purge valve until another purge cycle is required.

INSTRUMENT SETTINGS

"ON/OFF" SWITCH. This turns controller on and off. No purge will occur in OFF position.

"CAL TEST/OPER" SWITCH. This switch is used to test the instrument independently of the sensor. Position the switches to ON and CAL TEST. The red "control" light should go on and remain on until the dial is turned to 6000 or close to it. Instrument calibration can be adjusted, if necessary, by means of a potentiometer on the printed circuit board inside the control. Return switches to ON and OPER for normal operation and for setting the control point.

SETTING CONTROL POINT. With fresh, clean water in the Humidaire Unit and the water pump operating, set to ON and OPER and allow instrument to warm up for about 3 minutes. Slowly turn the control pointer downscale until

*Obsolete. Superseded by 14783.

"control" light comes on. Note dial reading. This is the normal conductivity of your supply water. For operation, set the dial to a figure 400 to 1000 micromhos above the supply water conductivity. A smaller addition will bleed off more water and keep the water purer. A larger addition will bleed off less water, but increase the possibility of scale formation or acid corrosion. We recommend that you experiment to find the best setting.

If the optional descaler injector is used, a low setting will also inject descaler more often. If some scale does form during the operating season, remove it by applying Part No. 14000 Powdered Acid Descaler.

CLEANING: Periodically remove the 14532 sensor from the pipe and wipe its carbon buttons clean. If stubborn scale is present, a fine grain emery cloth may be used for cleaning. Take care not to disturb the temperature sensor, which is encased in a glass bead just below the surface level.

TROUBLE SHOOTING

PROBLEM

POSSIBLE CAUSES AND REMEDIES

Power light not on.

ON-OFF switch off.

Water pump not running.

Fuse blown. Replace with 10-amp fuse.

Fuse blows.

Short or ground in solenoid valve or wiring to it.

Control light stays on.

Switch in CAL TEST position. Move to OPER.

Drain line plugged or water purge valve not operating.

Control pointer set below conductivity of incoming water supply.

Sensor leads or sensor may be shorted. Unplug to test.

Scale builds up in Humidair unit or corrosion occurs in kerosene-fired unit.

ON-OFF switch off.

Control pointer set too high above conductivity of supply water.

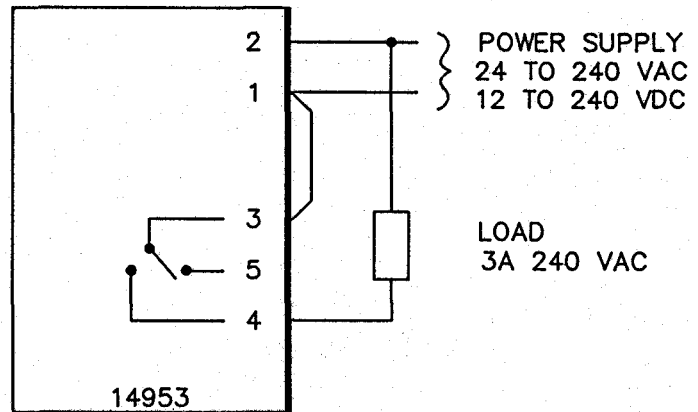
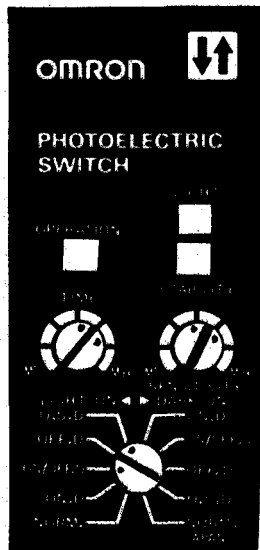
Sensor fouled or dirty. Clean it per instructions or replace it.

Drain line plugged or water purge valve not operating.

Special reminder:

Drain line must be installed and connected to Humidair Unit for this device to work.

LINT FLUE SCANNER SETTING AND WIRING



The diagram above shows the normal setting and wiring of the 14953 Photoelectric Switch, which is part of the 14900A Lint Flue Scanner.

The lower selector determines the operating mode for the scanner. The setting for the lint flue is LIGHT ON and OFF DELAY.

The SENSITIVITY adjustment is at right. Moving the pointer from MIN toward MAX will make the scanner respond to less cotton or cotton which is farther away. If the red "LIGHT" LED will not come on when cotton is present, increase the setting. If it will not go off when cotton is not present, decrease the setting. The green LED shows the stability of the detection.

The TIME adjustment is for the time delay which keeps the load relay ON when no cotton is in the scan range. This is shown by the yellow "OPERATION" LED. This delay keeps the water pump or solenoid valve from cycling ON and OFF. Adjust it to "Max."

The maximum load for the relay contacts in the scanner is 3 amperes at 240 volts AC. The circuits of Humidair Units and Lint Slide Sprayers are within this limit. If used for other applications with a load greater than this, interpose a contactor or relay between the scanner and the load. The voltage of the power supply for the load can be different from that supplied to the scanner on terminals 1 and 2.

14900A

LINT FLUE SCANNER INSTALLATION INSTRUCTIONS

APPLICATION: The 14900A control is used to determine when cotton is passing through a lint flue. It is used with the Samuel Jackson Humidaire Unit to operate its water pump only when cotton is being ginned. It can also be used with the Lint Slide Spray Unit.

The 14900A control has a special mount which allows the 14953 photoelectric infrared scanner to look through a tiny window at the oncoming flow of air and lint. When cotton is detected, the control closes its circuit, and turns the water pump on. A built-in time delay keeps the circuit closed even though the presence of lint is interrupted for a few seconds.

MOUNTING THE CONTROL: The 14900A Lint Flue Scanner should be mounted in a flat area of the lint flue, usually in the riser to the battery condenser. Avoid locations where elbows and offsets might divert lint away from the control. The 14775 mount fits into a 3 x 4 inch (75 x 100mm) rectangular hole in the wall of the flue. The stream of air and lint should blow against the small window.

ELECTRICAL WIRING: Be sure to follow the wiring drawing supplied with the Humidaire Unit or Lint Slide Sprayer. The 3 wires going to the 14900A control **MUST** be in a separate conduit from any power wires.

ADJUSTMENT: The 14900A Lint Flue Scanner has been adjusted at the factory, but may require further adjustment. If further adjustment is necessary:

1. Insure that 14900A has been wired into the system correctly. Apply power.
2. With the 14900A installed correctly in the lint flue and with cotton coming through the lint flue, the red "LIGHT" LED should be on. The yellow "operation" LED should be on and remain on until cotton is no longer present and the time delay has timed out. If the "LIGHT" LED fails to turn on with cotton in the system, turn the sensitivity adjustment clockwise until "LIGHT" comes on. This adjustment is located on top of the 14900A.
3. When no cotton is present in the lint flue, the "LIGHT" LED should be off. If the "LIGHT" LED fails to turn off, adjust sensitivity counterclockwise until it goes off.
4. Set the sensitivity pot midway between the two operating points determined in steps 3 and 4 for optimum operation. Make sure the green "STABILITY" light illuminates in both detecting and non-detecting states.
5. The off time delay is set to maximum (12 seconds) and should not need further adjustment. This prevents cycling the water pump.

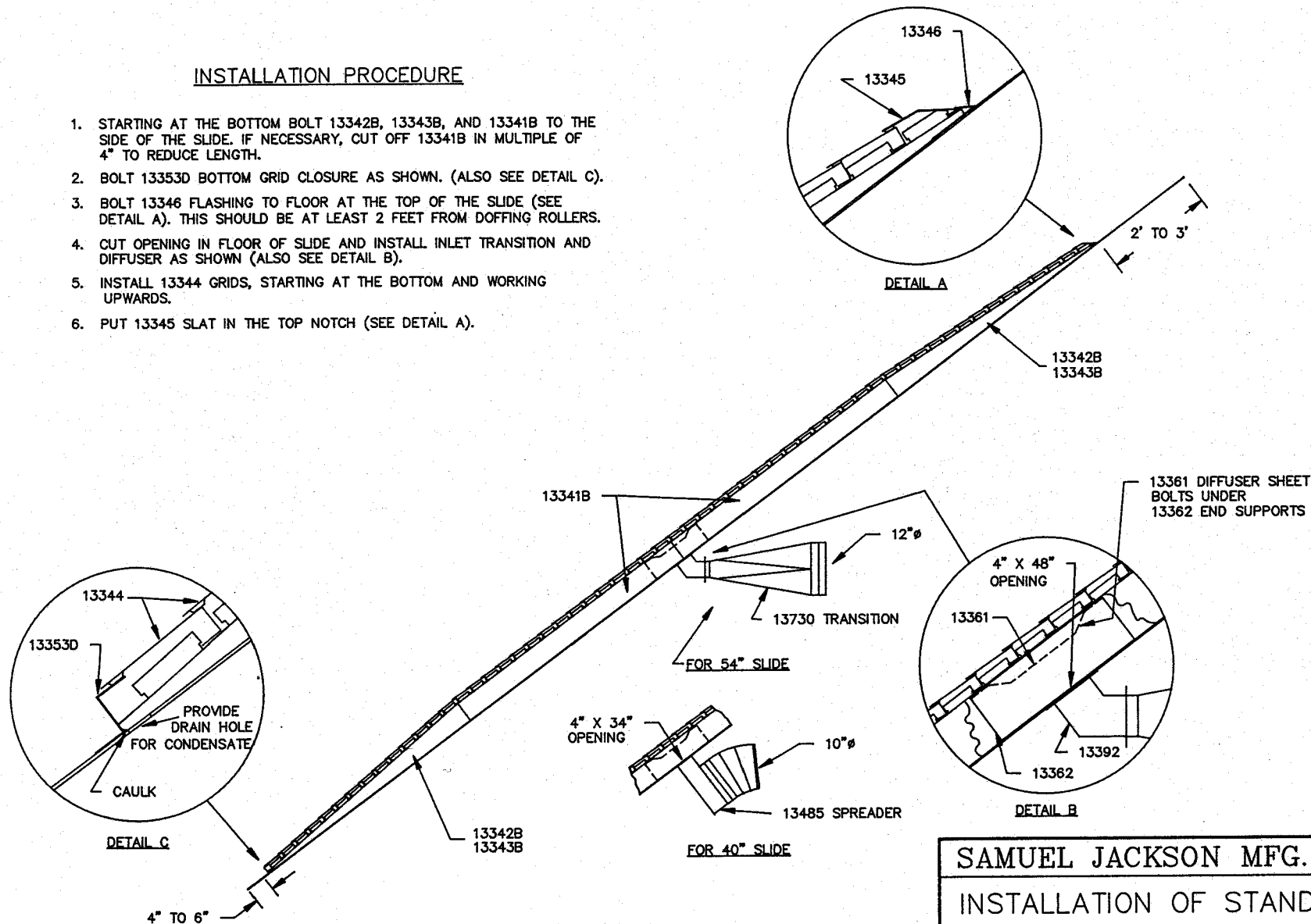
TROUBLESHOOTING: If the control does not operate properly, follow the steps below. An AC voltmeter is the only test equipment needed.

1. Remove the scanner from its mount. Look through the window and see if cotton can be seen going past the window. If not, the scanner and mount must be moved to a better location.
2. Make certain that window glass and lenses of the control are clean and dry. An accumulation of dust or lint on the window glass next to the control can affect its operation.
3. Check power to 14900A, by removing switch from mount, then remove top cover. Connect voltmeter across terminals 1 and 2. With the Humidaire Unit on and running, there should be 95 to 130 volts present. (For the Lint Slide Spray Unit this should be about 24 volts.) With the scanner seeing cotton, the same voltage should appear across terminals 4 and 2. If no voltage can be found, then trouble lies elsewhere in the circuit, not in this control.
4. If control does not respond to cotton properly, see Adjustment steps 2 to 4 above.
5. If, when the switch is tested, the yellow "OPERATION" LED comes on but the water pump stays off, check the pump wiring and overload.

If the unit is still inoperable, contact: SAMUEL JACKSON MFG. CO. Telephone 806-795-5218, Lubbock, Texas.

INSTALLATION PROCEDURE

1. STARTING AT THE BOTTOM BOLT 13342B, 13343B, AND 13341B TO THE SIDE OF THE SLIDE. IF NECESSARY, CUT OFF 13341B IN MULTIPLE OF 4" TO REDUCE LENGTH.
2. BOLT 13353D BOTTOM GRID CLOSURE AS SHOWN. (ALSO SEE DETAIL C).
3. BOLT 13346 FLASHING TO FLOOR AT THE TOP OF THE SLIDE (SEE DETAIL A). THIS SHOULD BE AT LEAST 2 FEET FROM DOFFING ROLLERS.
4. CUT OPENING IN FLOOR OF SLIDE AND INSTALL INLET TRANSITION AND DIFFUSER AS SHOWN (ALSO SEE DETAIL B).
5. INSTALL 13344 GRIDS, STARTING AT THE BOTTOM AND WORKING UPWARDS.
6. PUT 13345 SLAT IN THE TOP NOTCH (SEE DETAIL A).



THE LINT SLIDE GRID IS COVERED BY U.S. PATENT 4,103,397

SAMUEL JACKSON MFG. CO.

INSTALLATION OF STANDARD LINT SLIDE GRID ASSEMBLY

REF: LSG

DWN. SK
BY

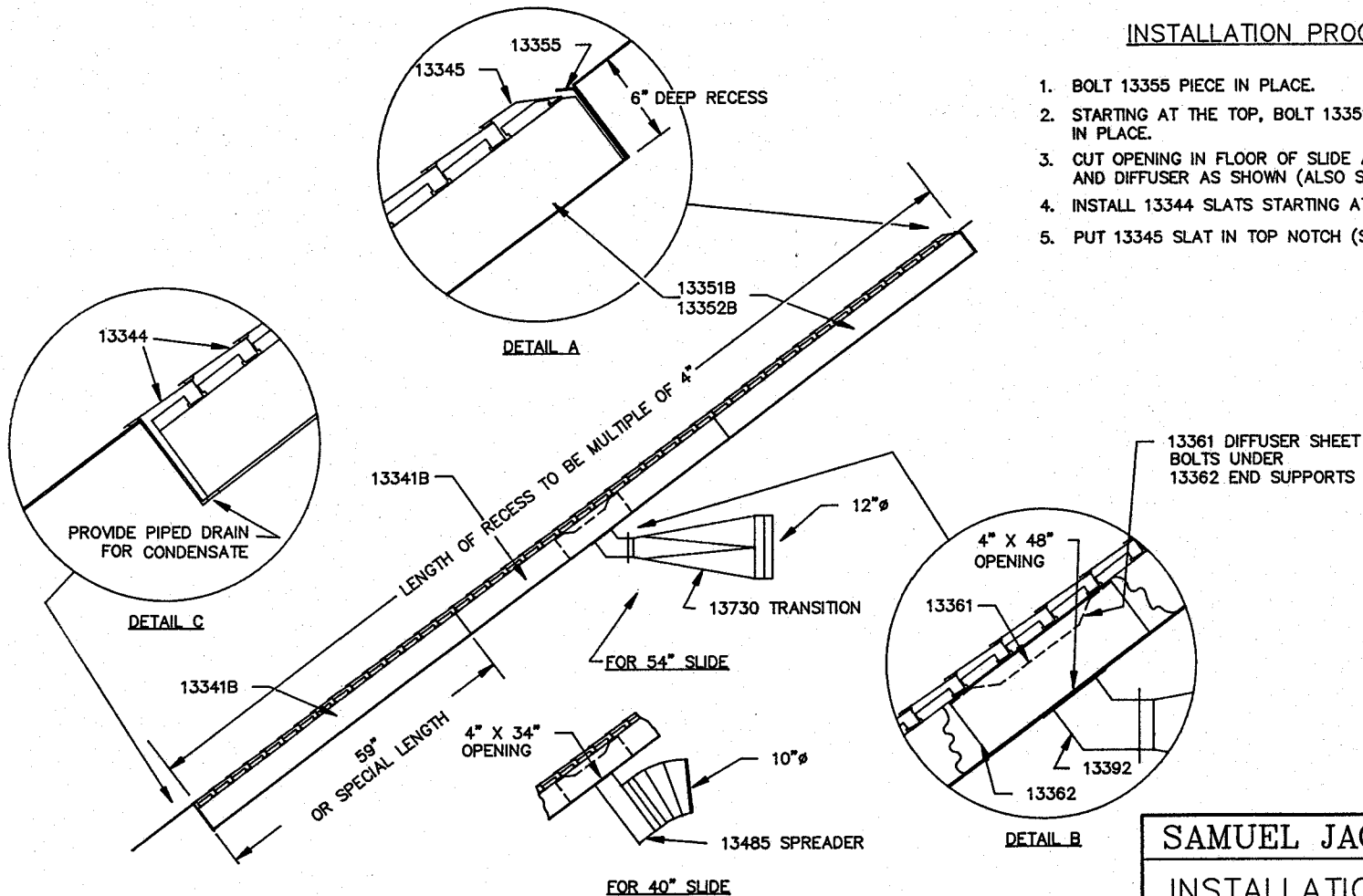
DATE 6-29-89

DRAWING NO.

14-2558

INSTALLATION PROCEDURE

1. BOLT 13355 PIECE IN PLACE.
2. STARTING AT THE TOP, BOLT 13351B, 13352B, AND 13341B PIECES IN PLACE.
3. CUT OPENING IN FLOOR OF SLIDE AND INSTALL INLET TRANSITION AND DIFFUSER AS SHOWN (ALSO SEE DETAIL B).
4. INSTALL 13344 SLATS STARTING AT THE BOTTOM. (SEE DETAIL C)
5. PUT 13345 SLAT IN TOP NOTCH (SEE DETAIL A).



THE LINT SLIDE GRID IS COVERED BY U.S. PATENT 4,103,397

SAMUEL JACKSON MFG. CO.

INSTALLATION OF RECESSED
LINT SLIDE GRID ASSEMBLY

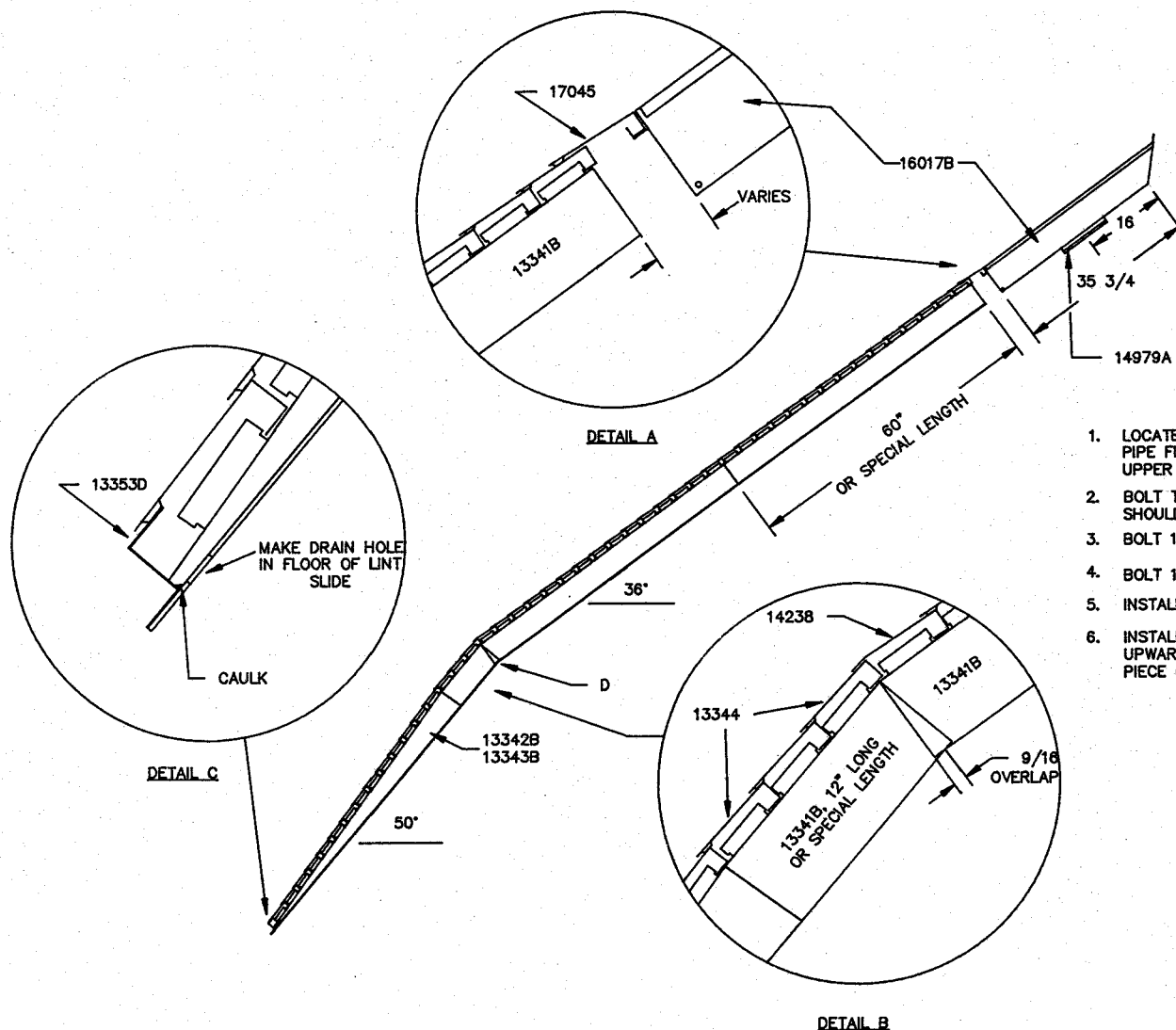
REF: LSG

DWN.
BY SK

DATE 6-28-89

DRAWING NO.

14-2557



INSTALLATION PROCEDURE

1. LOCATE AND CUT HOLE IN LINT SLIDE FLOOR FOR 14979A 12" DIA PIPE FLANGE. THIS HOLE SHOULD BE CENTERED ON THE SLIDE AT THE UPPER END, AS SHOWN. INSTALL THE 12" FLANGE.
2. BOLT TOP DIFFUSER SHEET (PART NO. 16017B) IN PLACE. THIS SHEET SHOULD CAULKED AT THE TOP.
3. BOLT 13341B PIECES IN PLACE, STARTING AT POINT D. SEE DETAIL B.
4. BOLT 13342B AND 13343B PIECES IN PLACE.
5. INSTALL 13353D BOTTOM GRID CLOSURE. SEE DETAIL C.
6. INSTALL 13344 GRIDS, STARTING NEAR THE BOTTOM AND WORKING UPWARDS, USING 14238 AT THE HUMP AND FINISHING WITH 17045 PIECE (SEE DETAIL A).

SAMUEL JACKSON MFG. CO.

INSTALLATION OF LUMMUS
LINT SLIDE GRID ASSEMBLY

REF: LSG

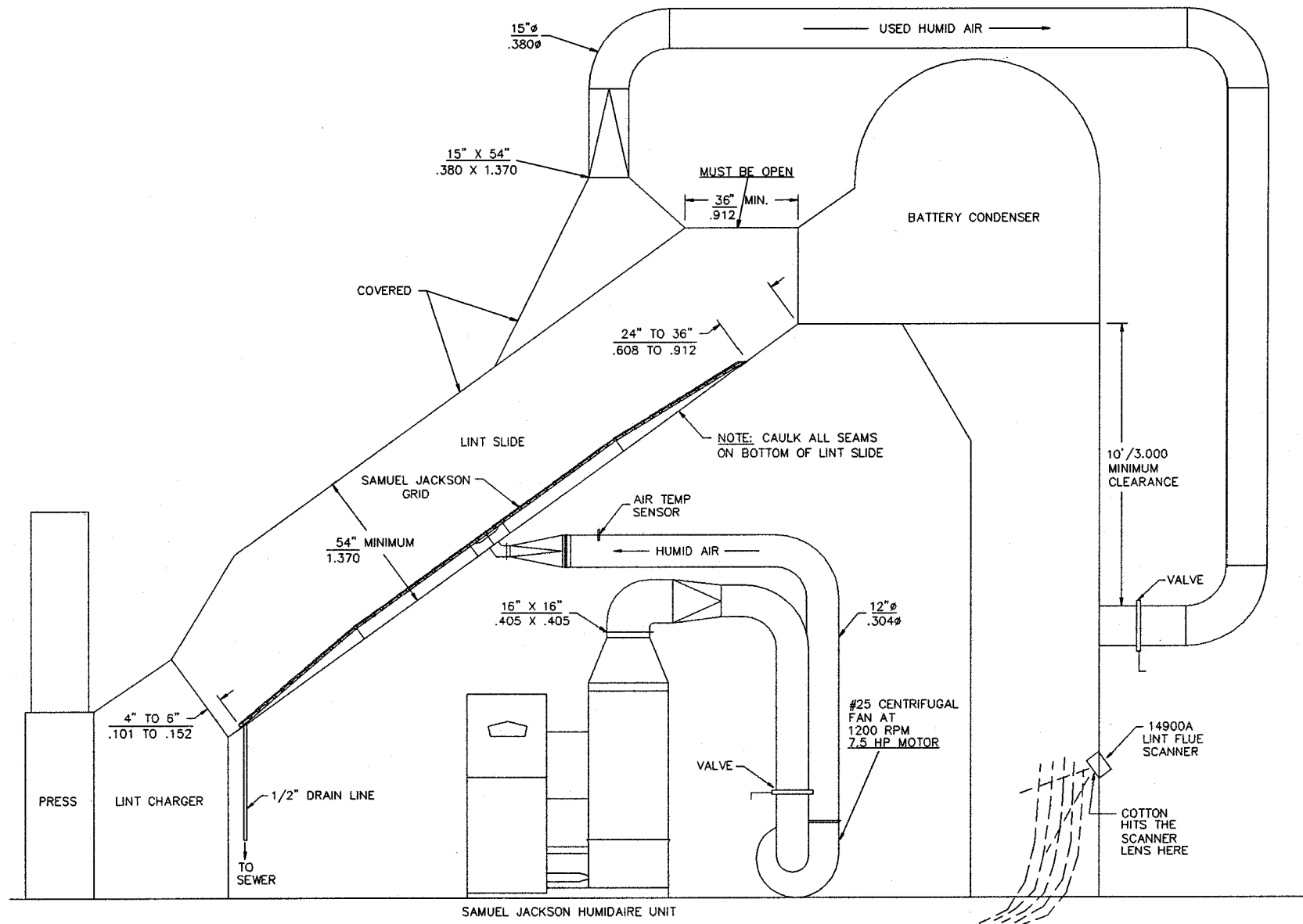
DWN.
BY SK

DATE 6-29-89

DRAWING NO.

14-2453

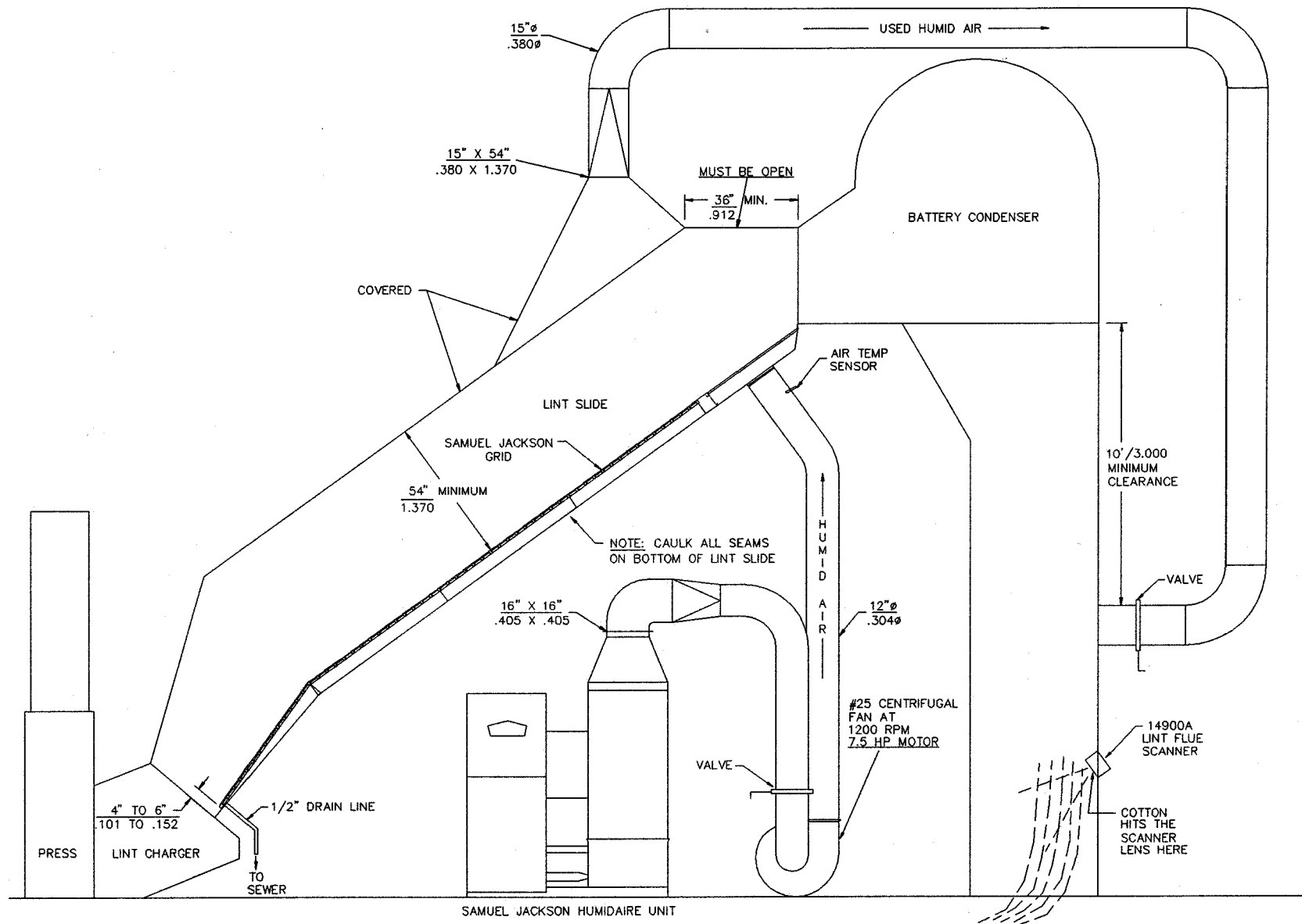
THE LINT SLIDE GRID IS COVERED BY U.S. PATENT 4,103,397



14-3230
11-93

STANDARD LINT SLIDE GRID INSTALLATION

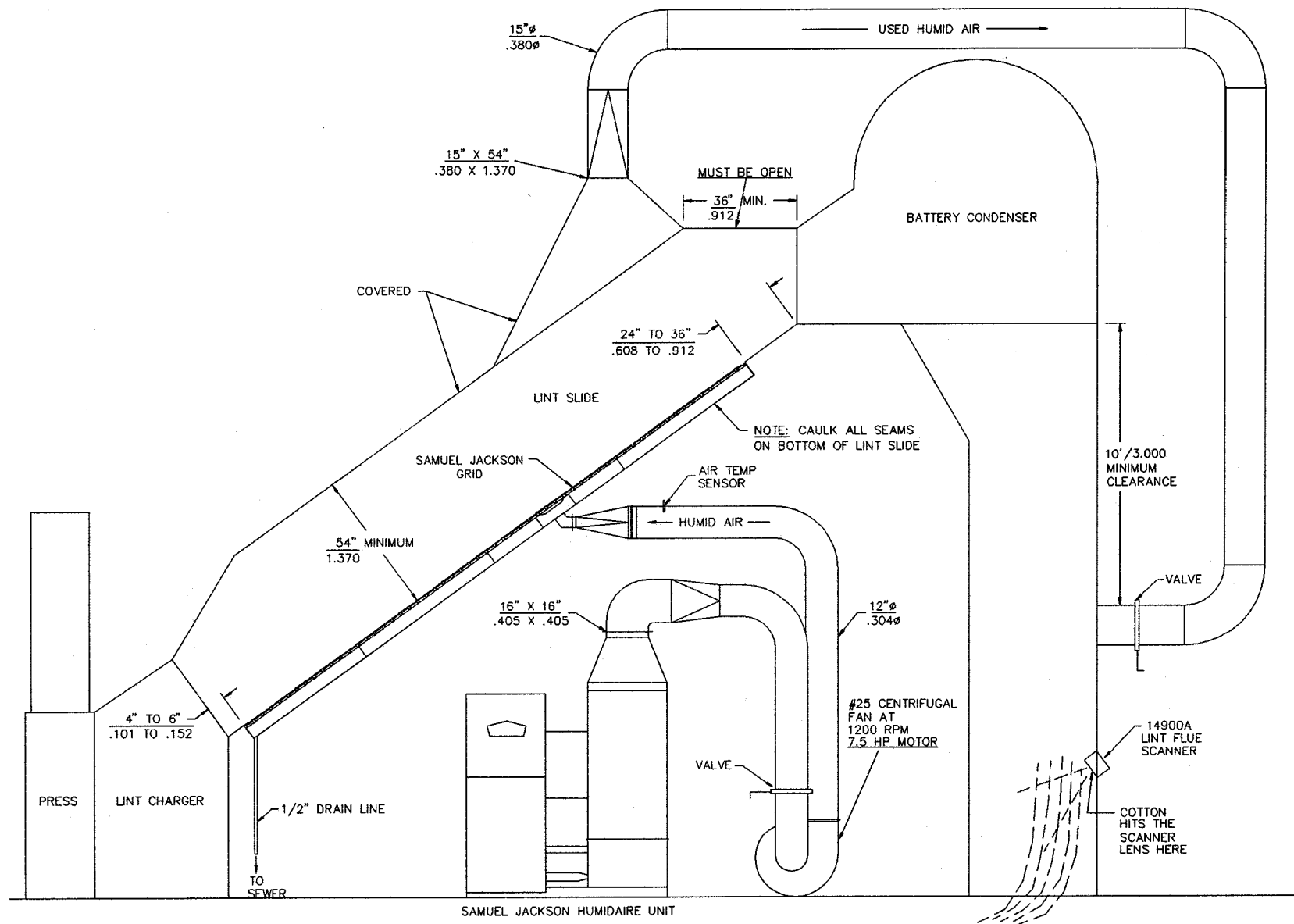
SAMUEL JACKSON, INC.
LUBBOCK, TEXAS



14-3231
11-93

LUMMUS LINT SLIDE GRID INSTALLATION

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LUBBOCK, TEXAS



14-3232
11-93

RECESSED LINT SLIDE GRID INSTALLATION

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LUBBOCK, TEXAS

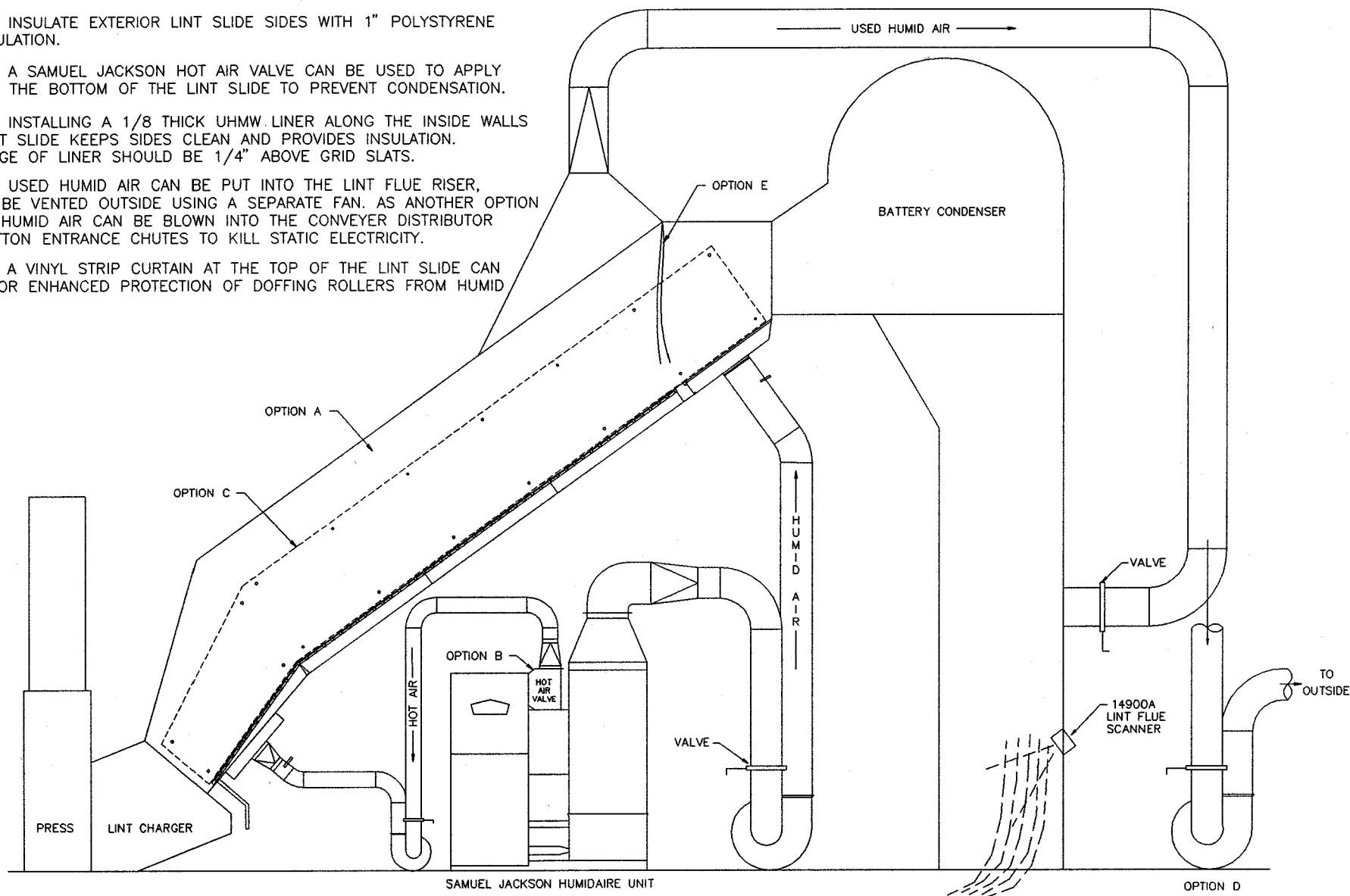
OPTION A. INSULATE EXTERIOR LINT SLIDE SIDES WITH 1" POLYSTYRENE BOARD INSULATION.

OPTION B. A SAMUEL JACKSON HOT AIR VALVE CAN BE USED TO APPLY HOT AIR TO THE BOTTOM OF THE LINT SLIDE TO PREVENT CONDENSATION.

OPTION C. INSTALLING A 1/8 THICK UHMW LINER ALONG THE INSIDE WALLS OF THE LINT SLIDE KEEPS SIDES CLEAN AND PROVIDES INSULATION. BOTTOM EDGE OF LINER SHOULD BE 1/4" ABOVE GRID SLATS.

OPTION D. USED HUMID AIR CAN BE PUT INTO THE LINT FLUE RISER, OR IT CAN BE VENTED OUTSIDE USING A SEPARATE FAN. AS ANOTHER OPTION THIS USED HUMID AIR CAN BE BLOWN INTO THE CONVEYER DISTRIBUTOR AT THE COTTON ENTRANCE CHUTES TO KILL STATIC ELECTRICITY.

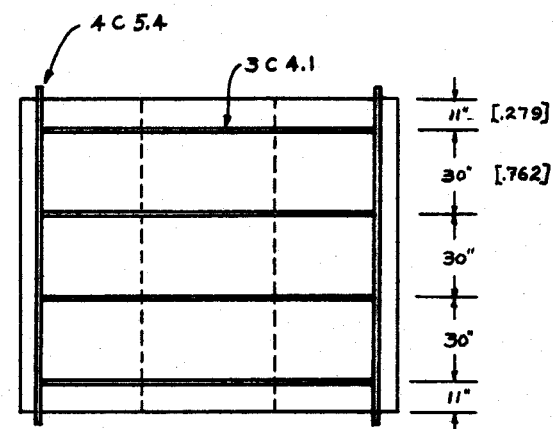
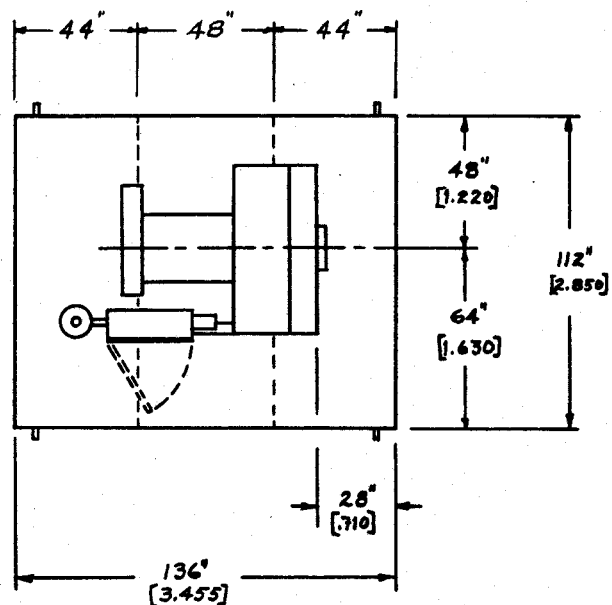
OPTION E. A VINYL STRIP CURTAIN AT THE TOP OF THE LINT SLIDE CAN BE USED FOR ENHANCED PROTECTION OF DOFFING ROLLERS FROM HUMID AIR.



14-3233
11-93

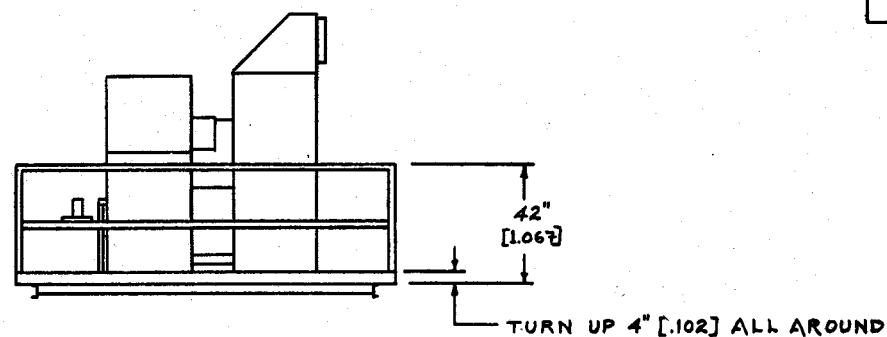
LINT SLIDE GRID OPTIONS AND ENHANCEMENTS

SAMUEL JACKSON, INC.
LUBBOCK, TEXAS



BOTTOM VIEW

QUAN.	MATERIAL	SIZE
3	1/8" FLOOR PLATE	4' X 10' [1.220 X 3.048]
2	4 C 5.4 CHANNEL	10'-0" [3.048]
4	3 C 4.1 CHANNEL	10'-0" [3.048]
100'	[30] ANGLE OR TUBE FOR HAND RAIL	



SAMUEL JACKSON MFG. CORP.

OVERHEAD PLATFORM
FOR
HU - 60
HUMIDAIRE UNIT

DWN.
BY SGJ
DATE 4-28-78

DRAWING NO.
14-2290