SUPREME AIR SYSTEMS LTD.

DIRECT FIRED MAKE-UP AIR HEATERS

SA-S, SA-D, SADR, SADVR SERIES

OPERATIONAL AND SERVICE INSTRUCTIONS
RETAIN THESE INSTRUCTIONS
MAINTAIN IN LEGIBLE CONDITION

SUPREME AIR SYSTEMS LTD.
6660 ORDAN DRIVE,UNIT D
MISSISSAUGA, ONTARIO
L5T 1J7

I N D E X

NOTICE:

SUPREME AIR SYSTEMS LTD.'S WARRANTY IS LIMITED TO THE CONDITIONS LISTED IN SUPREME'S BULLETIN

This equipment shall be installed in accordance with the Installation Code of Gas Burning Appliances and Equipment CAN.1-B.149.1 & 2 and applicable Provincial Regulations for the Class. Authorities having jurisdiction should be consulted before installations are made.

This equipment must maintain the following clearances from combustible materials (if other is not specified):

0" Clearance from bottom
48" Clearance top ("D" Model) and 2"("S" Model)
36" Clearance the control side and side opposite control panel

This equipment shall be so installed that the temperature of any adjacent combustible materials shall not exceed 90°F above an ambient temperature of 77°F, or as permitted by CAN.1-3.7.

This equipment shall be installed so that no source of flammable vapors, gases or dust shall be within 20 feet horizontally of any unit unless that source is separated from the unit by an enclosure of vapor resistive materials.

This equipment when suspended indoors shall be installed so that sufficient working clearance is provided below the unit or the unit must be adequately protected from damage.

This equipment shall be installed so that any fire dampers in the duct work are electrically interlocked with the Unit. (i.e. damper end switch contact between terminals 7 and 8, in series).

This equipment shall be adjusted as to maintain the toxic limits of the tempered air as set out in CAN.1-3.7.

2. INSTALLER

2.1 Receiving the Unit

All models are shipped in one piece. The inlet hoods for all machines are shipped separately.

Where a remote panel is shipped as a separate piece.

All separate pieces are listed on the shipping order form. Carefully check for all components and damage to any components before signing the freight bill.

2.2 Lifting the Unit

The make-up unit is designed with handling in mind. It is constructed on a heavy channel iron base frame. The frame is extended three inches beyond the entire length of the unit or section, and is pre-drilled for lifting lugs. Use spreader bars to keep the cable away from the unit cabinetry.

If the unit is lifted from the bottom (as with a fork lift) take care to lift on the channel iron base frame and not the cabinetry.

2.3 Assembly of Sections (See Assembly Detail)

The inlet hood is designed for field installation. Hook the hood on the support flange and attach with selftapping sheet metal screws.

2.4 Location of Unit

Refer to Clearances listed on page 1 of this form.

The purpose of a make-up air unit is to replace air which has been exhausted from a building. Air may be lost from the building by exhaust fans, chimneys, or combustion air fans.

The make-up air unit should be located minimum distance fram any axhaust to intake of air make in order to provide a maximum sweep of fresh air through the building. The unit's discharge should be located as high as possible in the space as directed into the least occupied areas. Avoid playing the unit discharge directly upon occupants.

2.5 Fresh Air Supply

The supply air to the make-up air unit must be 100% outside air. The fresh air inlet hood should be located to prevent the induction of flammable gases, toxic gases and other deterious materials. The fresh air inlet hood should be designed to prevent the induction of snow, rain, and other foreign materials.

On indoor units the F/A inlet duct shall run straight from the unit a distance at least 1 1/2 times greater than the unit height or 2 times greater than the unit width.

2.6 Exhaust Fan

The exhaust fan must be adequately sized to handle the volume of the make-up air unit. The exhaust fan should have a capacity of within 10% of the total make-up air volume. If the unit discharges directly into an spray booth, the exhaust fan must have a capacity at least equal to that of the make-up air unit.

2.7 External Damper Sections

The damper section is external on the unit's intake.

The make-up air unit is be electrically interlocked with the dampers in such a way as to prevent ignition, unless the dampers are fully open.

3. GAS FITTER

3.1 Gas Manifold Connections

Where under CAN B-149 any control device which requires a bleed or vent line that device must be bled to atmosphere. Regulators may use a common vent manifold, where a vent valve will require a separate vent line.

If the make-up air unit is equipped with vibration isolation, the gas supply line should be fitted with a flexible gas line connection.

3.2 Fuel

Carefully check the unit name plate for fuel type and supply pressure. Size the gas line for rated input while maintaining listed inlet pressures.

4. ELECTRICIAN

4.1 General

All wiring must be in accordance with the Canadian Electrical Code.

Both field wiring and internal wiring diagrams are included in the control cabinet of the unit. The power requirements are indicated on the unit name plate also found in the unit control panel.

When connecting the power supply take care that the wiring gives you the correct motor and blower rotation.

4.2 Exhaust Fan Interlocking

All direct fired make-up air units shall be interlocked with the exhaust fan so that the burner may not attempt ignition without a comparable exhaust system operating. As indicated on the field wiring diagram this contact (or contacts) is normally located between terminals seven and eight of the unit control terminal strip:

4.3 Damper Interlocking

Where dampers are installed in the make-up units ducting, an end switch shall be installed on the dampers to prove they are 100% open before the unit can attempt ignition. The end switch contacts should be wired in series with the exhaust interlock between terminals three and four of the unit control terminal strip.

5. START UP

5.1 Start Up

5.1.1 Check the following:

-The gas lines have been purged of air and are leak free.
-The circuit breakers for the control system and the blower motor are made.
-Check the automatic shut off valve for leaks, by watching for a build up in pressure between the closed manual firing valve and the safety shut off valve.

5.1.2

Push the flame safeguard reset on the flame relay in the unit control panel

5.1.3

Turn the manual switch on the remote control to the "unit on" position. Switch on the exhaust system to make the exhaust interlock. The damper should begin opening immediately. To fully open it takes 150 seconds or 2.5 minutes to open, the damper blade will make an end switch in "on" position which will pull in the blower motor line starter and start the blower. If the blower fails to start, check and adjust the damper end switch.
"Unit on" light on indicates that your blower section is now on.

5.1.4

To start the burner open the pilot manual firing valve put switch summer/winter in winter position. The pilot should then ignite or at least attempt ignition. If an attempt at ignition is made and lockout occurs, check the high limit setting to make sure that it is set at the temperature specified on the unit's name plate. If the air pressure switches are no made, lockout will also occur.

Refer to trouble shcoting guide. The difficulty may be an improper flame detection signal from the pilot flame rod.

5.1.5

After achieving a pilot that burns constantly while the blower is running, check the main gas valves for operation while the main manual firing valve is CLOSED. Switch off the burner. The pilot will then go out. Place a pressure gauge between the automatic valve and the manual firing valve. Switch on the burner. If the pilot comes on and proves properly, the main automatic valve should then open and the gauge should register pressure. If they do not open, check for a wiring error or a defective component.

5.1.6

Test for main flame ignition. Place a pressure gauge between the main firing valve and the burner. With the main automatic valve open, manually open the main firing valve at the rate of about 10 seconds from closed to open. Ignition should take place approximately one quarter of the turn from closed to open at which point the pressure gauge will indicate the flow of gas.

5.1.7

Do not adjust the main pressure regulator. The firing rate has been factory set and should not require any adjustment. The air temperature rise, should be a listed on the nameplate. If not, the air volume through the unit should be adjusted. This may be accomplished by adjusting the blower speed, by balancing dampers, or both. The air temperature rise should be measured, when the modulating valve is wide open.

The modulating valve can be made to stand wide open by turning the modulating temperature control up to its maximum setting and removing its sensing element from the air stream to expose it to room temperature. With proper airflow the flame should be approximately 12" to 16" long and tipped with yellow flame. If the flame is much longer and mostly yellow, or if the flame is much shorter and florescent blue only, check the trouble shooting guide for the necessary adjustments.

5.1.8

Perform a flame supervision check as follows: with the burner in full operation and firing, close the main manual firing valve and

the pilot firing valve. The flame safeguard relay should then lock out and the automatic valves close. To return to normal operation, reset the flame safeguard and general reset buttons and open the manual valves.

5.1.9

Check the low limit (optional) by adjusting the setting until the unit shuts down.

5.1.10

Give the low limit and temperature controller their proper settings (See control settings).

5.1.11

The blower motor and particularly, the belt, should be checked after the previous tests and adjustments have been completed. The belt has a tendency to get loose during the maximum firing adjustment. The amperage draw of the motor should be checked with an ammeter and should not exceed the rated amperage stated on the motor rating plate; otherwise, the heater relays on the motor line will lock out the motor.

5.1.12

See that the owners have copies of the "Wiring diagrams" and the "Installation and Service Manual", and suggest that these be stored near the unit or remote panel to facilitate operating and servicing. Instruct the owners regarding starting and stopping, looking after the filters, and seasonal adjustment of main temperature scale on the Temperature controller.

5.2 Control Settings

The controls have been factory set at good average setting at least for start up, but they will require further adjustment in the field. The controls and their settings are as follows:

5.2.1 Temperature Controller - Maximum allowable temperature setting "S" model 90°F, "D" model 160°F.

- Adjust the low fire (minimum burner flame) to be a straight line (small straight flame) when the temperature outside 60° F balance with the booth operating temperature at 60°F.

Install booth temperature set same as outside temps. and adjust flame to a straight line.

5.2.2 **High Limit** - Factory Set @ 200°F."D" Model & 150F "S" Model

5.2.3 **Electric Ignition** - Spark plug gap on the burner should be between 1/16" and 3/32".

6. OPERATING INSTRUCTINGS

6.1 Operating Instructions

6.1.1 To Switch On Blower

- Place the unit on/off switch in the "on" position. This switch will be on that panel and a light will indicated that the switch is on.

6.1.2 To Activate Spray Cycle

-Place the winter/summer switch in the "winter" position. If remote panel has been installed, and the light on the on this panel indicates that burner is on.

6.1.3 To Activate Bake Cycle "D" MODEL

- Set the time on the bake timer and press "Bake on" push button. Automatically, the unit will switch to bake cycle (ie: reduce volume to half and raise the discharge temperature).

NOTE:

The make-up air unit will not operate unless the associated exhaust system is in operation and the exhaust interlock is made. Consequently, the switches for the make-up air unit can be left in the "on" position, and this unit will automatically go into operation any time the exhaust system is switched on. If the machine is equipped with a manual low limit, a push button by-pass must be manually depressed for the first three minutes of operation. This allows the machine to fire and heat the discharge above the low limit setting (40°F).

6.2 Care and Maintenance

6.2.1 Filters

- It is extremely important that the filters be checked and cleaned regularly. Clogged filters will reduce air flow through the unit, and possibly cause nuisance shutdowns. The service interval for filters varies considerably from application to application, so it will be necessary to check the filters very regularly during the period immediately following installation of the unit, in order to determine the service interval for the filters. It is important that the filters be removed in winter to prevent clogging with frost. Nuisance shut downs may also result from a heavy frost build up on the intake screen. If the intake has been properly located the conditions which cause intake hood frosting should occur rarely if ever.

6.2.2 Lubrication

- At least once each year the blower motor, the blower and the damper motor should be oiled or greased. Do not use too much lubricant. Use only a lithieme base, high temperature grease such as alvania III, or equivalent.

6.2.3 Safety Check

- It is recommended that once each year the safety devices on the unit should be checked. The procedure is as outlined in paragraphs (5.1.8) and (5.1.9) in section 5 "Start Up".

6.2.4 Temperature Adjustment

- The installer should instruct the owner on how to alter the discharge temperature of the unit so that the owner can make minor adjustments himself.