



ENGINEERED AIR

INSTALLATION, OPERATION AND MAINTENANCE MANUAL

FOR

XE SERIES

INDOOR
INDIRECT GAS FIRED HEATING UNIT



UNIT MODEL NO. _____

UNIT SERIAL NO. _____

SERVICED BY: _____

TEL. NO: _____

**CANADIAN HEAD OFFICE
AND FACTORY**

1401 HASTINGS CRES. SE
CALGARY, ALBERTA
T2G 4C8

**CANADIAN
FACTORY**

6130-97 STREET
EDMONTON, ALBERTA
T6E 3J4

**CANADIAN
EASTERN FACTORY**

1175 TWINNEY DRIVE
NEWMARKET, ONTARIO
L3Y 5V7

**USA HEAD OFFICE
AND FACTORY**

32050 W. 83rd STREET
DESOTO, KANSAS
66018

SALES OFFICES ACROSS CANADA AND USA

Retain instructions with unit and maintain in a legible condition.
Please give model number and serial number when contacting
factory for information and/or parts.

**INSTALLATION, OPERATION
AND MAINTENANCE MANUAL**

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INTRODUCTION

The Engineered Air XE Series units are high quality products designed and manufactured to provide many years of trouble-free service. We recommend that this manual be read thoroughly to ensure ease of installation, efficient operation and proper maintenance of this equipment. The submittal record is considered to be part of the Installation, Operation and Maintenance Manual.

Warning: Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death. Read the installation, operating and maintenance instructions thoroughly before installing or servicing this equipment.

WARRANTY

ENGINEERED AIR will furnish without charge, F.O.B. factory, freight collect, replacement parts for, or repairs to products covered herein which prove defective in material or workmanship under normal and proper use within one year from the date of delivery, provided the customer gives *ENGINEERED AIR* written notice of such defects and provided that inspection by *ENGINEERED AIR* establishes the validity of the claim and all pertinent invoices have been paid in full.

The correction of such defects or replacement will be made only when the complete products or part claimed defective are returned to *ENGINEERED AIR*, transportation charges prepaid, if such return is requested by *ENGINEERED AIR*.

Repairs or replacements as provided by the foregoing paragraph shall constitute fulfilment of all *ENGINEERED AIR*'s obligations with respect to this warranty. The refrigerant charge is not included in any part of this warranty. *ENGINEERED AIR* shall not be liable to any damage to person or property, or loss of revenue, or expense incurred, irrespective of cause. This warranty does not apply to any products or parts thereof that have been subject to accident, misuse or unauthorized alterations, or where *ENGINEERED AIR*'s installation and service requirements have not been met. The foregoing warranty is in lieu of all other warranties, expressed or implied.

ENGINEERED AIR Warranty is void if:

1. The start- up & operation of the unit is not done in accordance with this manual.
2. The unit is operated in atmosphere containing flammable vapours, chlorinated or halogenated hydrocarbons, or other corrosive substances.
3. The unit is allowed to operate during building construction period.

FOR YOUR SAFETY

The use and storage of gasoline or other flammable vapours and liquids in open containers in the vicinity of this appliance is hazardous.

FOR YOUR SAFETY

If you smell gas:

1. Open windows.
2. Don't touch electrical switches.
3. Extinguish any open flame.
4. Immediately call your gas supplier

RECEIVING THE UNIT

Engineered Air units are usually pre-wired and assembled where possible. On receipt of unit, check electrical characteristics (see name plate) to make sure the unit voltage is compatible with that available for the unit. All separate parts are listed on the shipping order form. Carefully check shipping slip for all components and for damage to components before signing the freight bill. This unit was pretested at the factory immediately prior to shipping and was in good operating condition at that time.

INSTALLATION

CODES

In Canada

The installation of this unit must be made in accordance with:

- (a) The installation code for gas burning appliances and equipment, C.G.A. Std. CANI-B149.1 and .2, Provincial and Local Codes on units burning gas.
- (b) The Canadian Electrical Code, Part 1 - C.S.A. Standard C22.1, Provincial and Local Codes.

In USA

- (a) All gas piping must be installed in accordance with the National Fuel Gas Code ANSI/Z223.1 - latest edition. The local authority having jurisdiction should be consulted for local codes and requirements.
- (b) All power supply and control wiring to this unit must be installed in accordance with the latest edition of the National Electrical Code (ANSI/NFPA 70).

CLEARANCES TO COMBUSTIBLES IN INCHES (MM)

For Safety and Service, the following minimum clearances on the units shall be observed:

Heaters must be installed to meet at least the minimum clearances shown on the rating plate. The rating plate is located in the burner compartment. Be sure to allow enough clearance in front of the unit for removing the burners and above for removing fan motors and blades.

<u>MODEL</u>	<u>TOP</u>	<u>*FRONT</u>	<u>FLUE</u>	<u>LEFT & RIGHT SIDE</u>	<u>BACK</u>	<u>#FLOOR</u>
XE	1" (25)	6" (152)	6" (152)	0	0	C#

* - Service Clearance For Burner & Blower Access, 24" (610).

- Counterflow Units on combustible floor requires special base Part# CB(2,3,4,5,7,8, & 10).

ASSEMBLY OF TWO - PIECE UNITS

This procedure covers the required field assembly of XE units.

1. HB (HIGH BOY) UNITS

- a) Place heat section on top of fan section so the heat section is 1/2" (13) behind the fan section.
- b) Carefully slide the heat section forward until the back and sides of the heat and fan section are flush. This will lock the two pieces together at the back as the locking clip engages. Do not damage foam tape which acts as air seal between sections.
- c) Remove fan section door, then lift the front of the heat section and block the front open about 4" (102).
- d) Feed the motor wires through between the sections and allow the wire to hang in the fan compartment.
- e) Lower the heat section back onto the fan section. Check alignment of pieces then drive sheet metal screws up from the fan section into the heat section. Holes are provided in fan section at front sides for locating screws. Make sure the motor wires are not pinched between sections - but feed smoothly from one to other.
- f) The unit is now one piece locked together at the rear by a clip and at front by two sheet metal screws.
- g) Follow wiring diagram on the unit to connect motor wires to motor.
- h) Inspect and test electrical components and motor operation.

2. CF (COUNTER FLOW) UNITS

- a) Place fan section on top of heat section so the fan section is 1/2" (13) forward of heat section.
- b) Carefully slide the fan section back until the back and sides of the heat fan section are flush. This will lock the two pieces together at the back as the locking clip engages. Do not damage foam tape which acts as air seal between sections.
- c) Remove outer fan door, vent pipe, shipping cardboard and inner fan door. Drive sheet metal screws from fan section into heat section. Holes are provided in the front vestibule at sides for locating two sheet metal screws.
- d) The unit is now one piece locked together at back by clip and at front by two sheet metal screws.
- e) Motor wires and upper limit control wires are clipped at top of heat section. Feed both these wire pairs into the fan compartment, through the wire way hole provided. Wires should be neatly clipped in place and taut so they will not contact the hot draft hood parts.
- f) Connect motor wires to motor and upper limit control to limit as shown on wiring diagram.
- g) Install inner fan door.
- h) Connect vent pipe between heat section and top collar of fan section. The vent connector piece should be well tightened and located at the top of the fan section.
- i) Inspect and test electrical components and motor operation.

3. LB (LOW BOY) UNITS

- a) Place fan section at rear of heat section with fan directed into the heat section opening.
- b) Screw the two sections together with four sheet metal screws driven from inside the fan compartment into the heat section. Holes at top and bottom sides are provided to locate the screws.
- c) The unit is now one piece locked together by four sheet metal screws.
- d) Pull wires from the motor wire way tube into the fan compartment and connect these wires to motor according to wiring diagram.
- e) Inspect and test electrical components and motor operation.

COOLING COILS

Units with Cooling Coils installed on the upstream side of the heating unit must be equipped with a stainless steel heat exchanger to avoid corrosion of the heating element caused by condensation.

DRAIN TRAPS:

Each drain requires a separate drain trap supplied and installed by the contractor. For a trap to work properly it must always be primed. During freezing period the primed trap may need to be heat traced. Alternately drain and plug the trap when not in use. **Failure to properly trap each connection may result in drain pan flooding, standing water in unit, building damage, etc.** If a drain connection has a smaller drain/pipe inside, connect to the outer pipe only. Insure that the trap is of adequate depth to operate against a greater negative static that includes extra pressure drop for dirty filters.

Cooling coil drain pans may have multiple drain connections extending outside the unit casing. Multiple drain traps can be connected together into runs providing that each trap outlet is vented to atmosphere to avoid problems from traps in potentially different pressure zones. The drainpipe must be properly sized and sloped to keep unit drained

Size drain trap with the following minimum requirements for a 1 1/2" (38mm) diameter connection on:

a) Units with Draw Thru Drain Pans:

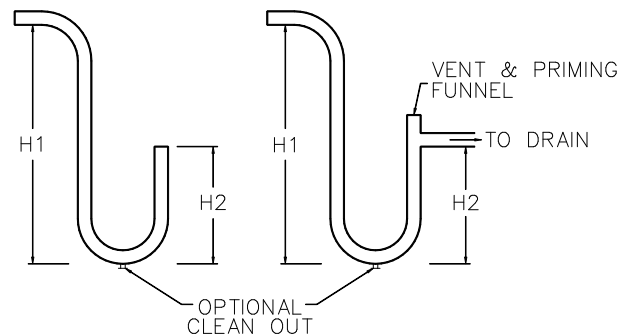
$$H1 = \text{Negative Static} \times 1.5 + 3.5"$$

$$H2 = \text{Negative Static} \times 0.75 + 2.5"$$

b) Units with Blow Thru Drain Pans:

$$H2 = \text{Maximum Positive Pressure} \times 1.5"$$

$$H1 = H2 + 0.5"$$



VENT

Use only approved gas "B" vent of sufficient size. Use **NAT MAX** Column from CGA B149 installation code table or approved vent table.

COMBUSTION AIR

All fuel burning equipment requires an adequate supply of air for combustion. A sufficient quantity of air must enter the heated space to replace that exhausted by the Heater. Modern buildings greatly reduce the amount of air entering the heated space through improved construction techniques. As well exhaust fans may create a negative pressure in the heated space. Follow CAN1-B149 Code, latest addition, and any local codes to provide enough air for combustion, ventilation and proper venting. Clearances must be maintained at all times from the louvred front panel openings.

GAS INSTALLATION

Installation must be made in accordance with the requirements of the authorities having jurisdiction.

- 1) Carefully check the unit name plate for the fuel type, supply pressure, input rating and temperature rise.
- 2) Gas supply pressure higher than the unit name plate requires an additional field supplied gas regulator. The standard unit name plate is 7" WC (1.75 kPa).
- 3) Gas lines should not be run in a manner which will interfere with unit access. The gas line connection at the heater shall have an approved drip leg with screwed cap.
- 4) The gas piping must be sized to allow for a maximum of 0.3" WC (75Pa) pressure drop from meter to unit.

ELECTRICAL INSTALLATION

All wiring shall be installed according to the requirements of the authorities having jurisdiction. Field wiring, internal wiring diagrams and unit operating functions are included in the control cabinet of the unit. The power requirements are indicated on the unit name plate. Where field wiring of the control circuit is required, take care to size the field wiring for a maximum 10% voltage drop. The VA rating of the transformer can be assumed to be the maximum load.

Standard Power of 115 volts, 1 ϕ , 60Hz power supply is required. If heater is wired for other than this power, look for special markings. DO NOT install any devices in a manner that interfere with access to the unit approval label or door opening.

Replacement wiring must be equivalent to original wire. See field wiring diagram for requirements for shielded or twisted pair wire for solid state devices.

START-UP CHECK LIST

The start-up and operation must be done in accordance with safe practices. State or Provincial regulations require that service mechanics who work on combustion equipment must be licensed. The unit should NOT be started or serviced by unqualified personnel.

- 1) Ensure that all shipping materials have been removed.
- 2) Set all electrical switches and main unit disconnect switch in "OFF" position.
- 3) Close all unit manual valves and field piping valves.
- 4) Remove tie-down bolts on blower vibration isolators (if supplied).
- 5) Check all bearings, drive and blower set screws for tightness.
- 6) Check drive alignment and belt tension. Refer to Maintenance, Page 8.
- 7) Purge all the air from the gas lines. Check all connections for leaks and fix. Ensure that the inlet pressure agrees with the name plate.
- 8) Inspect all electrical wiring, both field and factory installed, for loose connections.
- 9) Turn unit disconnect switch "ON" (control switch is still off) and check the supply voltage. Voltage must be within 10% of name plate rating. If not, consult the power company and have the voltage condition corrected before continuing unit start-up.
- 10) Check setting of fan - limit control(s). Adjust high limit to value indicated below unless wiring diagram shows a different value.

High Limit 180° (82°C)
Fan Switch "ON", 125° (52°C)
Fan Switch "OFF", 90° (32°)

Set all temperature controls to the temperature setting indicated on the wiring diagram.

- 11) Set thermostat or controller in the "off" position and turn unit control switch "on".
- 12) Check all fan motors for correct rotation. If incorrect, reverse rotation.
- 13) Check the amperage draw of each motor. Refer to name plate for full load amps.

- 14) Re-check voltage at unit disconnect switch with unit running. If the power is not within 10% of name plate, shut unit down and consult power company. Voltage should be within 2% on all phase to phase readings when compared to each other. A 2% voltage difference could cause as much as a 10% current imbalance.

OPERATION

CALL A QUALIFIED SERVICEMAN FOR SERVICE

OPERATIONAL CHECK

1. **PILOT ADJUSTMENT:** A pilot adjustment screw is provided on the gas valve. Adjust the pilot to a substantial, stable, blue flame.
2. **BTU INPUT:** All natural gas units are equipped with a Honeywell VR8200 or equivalent valve. The outlet pressure is factory set to 3.5" WC, (0.87Kpa). Should adjustment be required, the outlet pressure of the valve can be varied according to the following procedure. Refer also to valve manufacturer's instructions for additional details. This procedure applies only to natural gas fired units. Install and adjust units in accordance with local or provincial gas codes.
 - (1) Turn knob on gas valve to "pilot" or "off".
 - (2) Remove pressure tap plug in valve or pressure tap plug in manifold and install pressure tap fitting.
 - (3) Connect pressure gauge to pressure tap fitting. Preferred gauge is a U tube manometer.
 - (4) Turn valve to "on" and let burners come to full fire (approximately 15 seconds from initial opening of valve).
 - (5) Remove regulator cover screw and adjust manifold pressure by turning adjusting screw clockwise to increase pressure or counterclockwise to decrease pressure.
(**CAUTION:** Adjustment is sensitive. Turn screw very slowly.)
 - (6) Set manifold pressure to the rating plate value.

i.e. 4.0"WG(1kPa) for 0 - 2000 ft. (610m) rating
 3.5"WG(0.89kPa) for 0 - 4500 ft. (1372m) rating
 Allowable tolerance $\pm .05$ "WG(± 12.5 Pa)
 - (7) Check the gas input to the unit with the gas meter.
 - (8) When the pressure and input are set, turn knob on gas valve to "pilot" or "off". Remove pressure tap fittings, install pressure tap plugs and install regulator cover screw.
 - (9) Turn knob on control valve back to on position.
3. **AIR SHUTTER ADJUSTMENT:** - See instruction label in burner compartment.
4. **TEMPERATURE RISE:** Adjust the fan pulley to get the specified temperature rise through the unit (70°F[21EC] to 100°F[38EC] allowable). Thermometers may be used at the return and supply air outlets to determine temperature rise. Avoid having thermometers pick up radiant heat and giving false readings.
5. **THERMOSTAT:** Complete thermostat instructions are provided in the thermostat box. These should be adhered to, with the following exception: Thermostat heat anticipator should be set slightly higher (+0.16) than the control circuit current draw. Set the heat anticipator to 1.0 on units with X-TRAC or Maxitrol controls.

- 6. VENT SAFETY SWITCH:** This unit is equipped with a vent safety limit switch. The sensing element of this switch is located in the relief opening of the draft hood. The switch opens to shut down the main burners in the event of a blockage in the venting system. If a shut down occurs, refer to the information sticker adjacent to the switch.

OPERATING INSTRUCTIONS

1. Lighting, shut off and shut down instructions are provided on the rating plate located in the burner compartment.

MAINTENANCE

In order to provide a maintenance history, we recommend that the owner have a maintenance file on each unit. The following maintenance instructions are to be carried out each spring and fall or as otherwise indicated by a **qualified serviceman**.

SET SCREWS

Check set screws on blower wheel, blower bearings, blower and motor pulleys for looseness on the shaft. Tighten where required. Proper torque values are available from the bearing manufacturer. **IT IS IMPORTANT TO PERFORM THIS CHECK BEFORE INITIAL START-UP, AFTER A RUN-IN PERIOD OF 2 TO 4 WEEKS AND THEN ON A REGULAR BASIS OF 4 TO 6 MONTHS.**

XE shaft diameter = 3/4" (19mm): Set Screw Torque at 35 in.lb.. (4 NM).

- 1. FAN LUBRICATION:** No lubrication of the fan bearings is necessary. Both ball and sleeve fan bearings are permanently lubricated for their life.
- 2. MOTOR LUBRICATION:** Generally motor should be lubricated with a few drops of non-detergent SAE NO. 20 or SAE 30 oil once each year. **DO NOT** over-oil or use light-weight household oil.
- 3. PULLEYS AND BELTS:** Periodically check that the fan pulley and motor pulley are tight on their shafts. The fan pulley and motor pulley should be aligned, and the belt tightened only enough to prevent slipping. Replace a cracked or broken belt.
- 4. FILTERS - DISPOSABLE TYPE:** The air filter should be removed and cleaned about three times during the heating season. If unit is equipped with air-conditioning, never operate without a filter. Always install the filter with air-flow arrow in the proper direction.
- 5. FILTERS - PERMANENT TYPE:** If permanent, washable filters are installed, remove and vacuum or wash them to remove dust accumulation. When the filter becomes worn out from repeated cleanings replace it with a new filter of the same size and type. Reuse the metal filter clips on the new filter.
- 6. CONTROLS:**
 - A. Clean and recalibrate all controls.
 - B. Check controls for proper operation.
 - C. Repair or replace any controls found faulty.
 - D. Check all damper settings.
 - E. Replace blown fuses with equivalent size fuse. Failure to do so may result in damage to the unit.

7. **FURNACE INSPECTIONS and CLEANING:** Furnaces should be inspected once every four months during the heating season where the equipment is operating under normal conditions. If the furnace is located where unusual amounts of dust or soot or other impurities are contained in the air, more frequent inspection is recommended.
 - A. Follow the OPERATIONAL check as detailed on page 7.
 - B. It is good maintenance practice to thoroughly vacuum the fan compartment, fan and burner compartment at least once per year, to remove accumulated dust. The fan can be removed for cleaning.
8. **SUMMER OPERATION:** A "manual" continuous fan switch is provided on the fan control located in the burner compartment. Some summer cooling can be obtained by turning on the fan to provide air circulation. Easiest on-off control is by using the disconnect switch or fuse block switch to turn the fan "on" and "off" with the manual fan switch engaged.