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# 84093 INDOOR COMBUSTION AIR KIT 84093

Model Numbers: Lx500-800

Version Date: 2011-04-04



**Filter Maintenance - The MERV 7 filter must be replaced when dirty or air flow will be restricted resulting in ignition failure.**

## Installer Responsibilities

As the installing technician, it is your responsibility to ensure the installation is performed in accordance with the NTI Kit #84093 Installation Instructions and any applicable local or National ventilation and/or installation codes. Verify Kit contents before commencing installation.

### Kit Contents (P/N 84093)

- Indoor Combustion Air Box, stainless steel, 12”x 12”
- #84305 - MERV 7, pleated filter, 11-1/2”x11-1/2”x2”
- #84011 - Air Intake Gasket, 3/16”, EPDM (square)
- #11801 - 4 Flat washers, 3/16”

### Combustion Air Intake Contamination

Be careful not to locate the appliance’s air-intake in an area where contaminants can be drawn in and used for combustion. Combustion air containing dust, debris or air-borne contaminants will drastically increase the required maintenance and may cause a corrosive reaction in the Heat Exchanger which could result in premature failure, fire, serious injury, or death. See Table 1-1 for sources to avoid when installing the combustion air box:

Table 1-1 Corrosive Products and Contaminant Sources

Products to Avoid	Contaminated Sources to Avoid
Antistatic fabric softeners, bleaches, detergents, cleaners	Laundry facilities
Perchloroethylene (PCE), hydrocarbon based cleaners	Dry cleaning facilities
Chemical fertilizer, herbicides/pesticides, dust, methane gas	Farms or areas with livestock and manure
Paint or varnish removers, cements or glues, sawdust	Wood working or furniture refinishing shops
Water chlorination chemicals (chloride, fluoride)	Swimming pools, hot tubs
Solvents, cutting oils, fiberglass, cleaning solvents	Auto body or metal working shops
Refrigerant charge with CFC or HCFC	Refrigerant repair shops
Permanent wave solutions	Hair Salons
Fixer, hydrochloric acid (muriatic acid), bromide, iodine	Photo labs, chemical / plastics processing plants
Cement powder, crack fill dust, cellulose, fiber based insulation	Concrete plant or construction site



**Flammable Vapours** - Do not store or use gasoline or flammable vapours/liquids in the vicinity of this appliance. Failure to comply may result in serious injury or death.

### Mechanical Room Installations (Commercial)

The Trinity Lx500-800 is certified for use with this Indoor Combustion Air Box where flue gas piping is connected directly to the appliance, but combustion air is drawn directly from the room. Room supplied combustion air systems are subject to additional code requirements such as pre-ignition interlocks with motorized dampers or auxiliary proving circuits when operating in rooms with mechanical exhaust fans. Refer to section on “Combustion Air Requirements”.



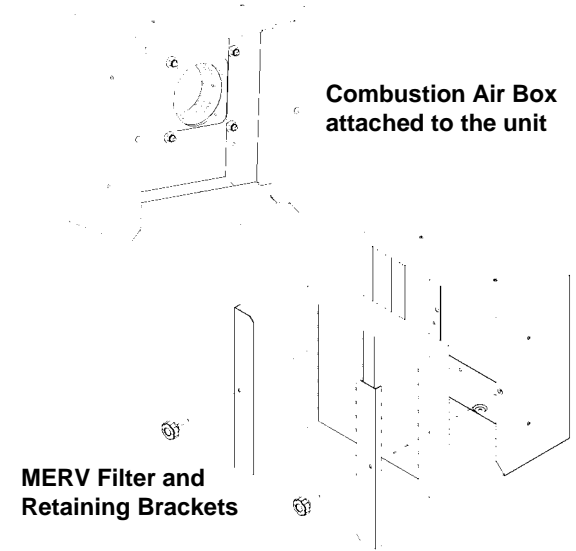
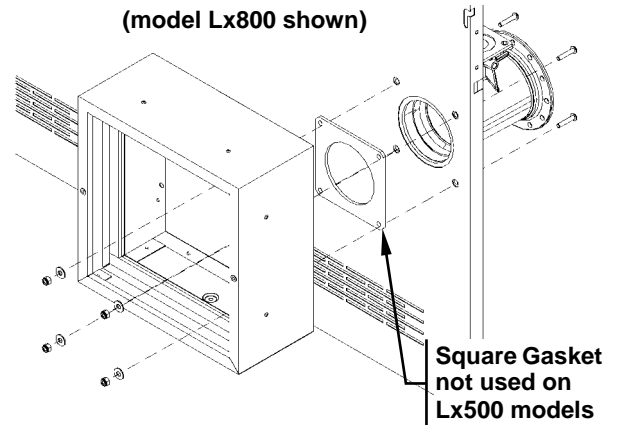
**Auxiliary Proof** - Interlocks are required between motorized dampers and burner ignition controls to ensure combustion air is adequate to sustain burner operation at high fire.



**MERV Filter** - The Indoor Combustion Air Kit comes with a 2” MERV 7 filter which is mandatory for appliance operation. Do not operate the unit using indoor combustion air without the filter installed. Failure to comply may result in property damage, serious injury or death.

**Installation Procedure**

1. **Power Down** - To turn off power: a) locate the Manual Gas Shutoff Valve outside the unit and upstream of the Gas Valve, b) turn the valve off, and c) shut off electrical power to the appliance. Refer to section on “Lighting/Shutting Down the Appliance”.
2. **Air Intake Adapter** - To remove the air intake adapter: a) remove the appliance’s front cover, b) on the venturi, remove the nuts and the four bolts attaching it to the air intake adapter, c) remove the external square air intake gasket, if applicable (none on Lx500), and d) retain the original mounting hardware (i.e. bolts and locknuts) for installation of combustion air box in Step 3. New external gasket provided in kit.
3. **Combustion Air Box** \* - To prepare the combustion air box for installation: a) remove the knobs securing the retaining brackets, b) remove the retaining brackets and filter, c) slide bolts, retained from Step 2, through holes in the venturi flange and internal gasket, d) feed bolts through washers and interior cabinet wall until they protrude, e) align new external square air intake gasket (see kit) with air intake opening, f) slide the gasket over the bolts until it rests against the outside of the cabinet, g) slip the combustion air box over the bolts, h) secure air box in place using flat washers / locknuts retained from Step 2. [\*Lx500 models - skip steps c), e) and f).]
4. **MERV Filter** - To install pleated filter: a) place filter against the inside flange, and b) secure filter in place with retaining brackets and tighten the knobs. Filter must be replaced when dirty or air flow will be restricted resulting in burner ignition failure. See kit contents above for replacement filter part number.
5. **Drain** - Do not plug the drain hole in the bottom of the combustion air box. It is common for moisture to accumulate when cold or humid inlet air condenses in the venturi or combustion air box. For this reason, the drain port must be kept unobstructed to allow residual water vapour to drain out and/or evaporate.
6. **Auxiliary Proof** - To connect interlock : a) remove the jumper on the Trinity’s Low Voltage barrier strip labeled Aux. Proof (T2-7,8), and b) replace with field supplied end switch incorporated with motorized damper and/or louver controls.
7. **Power Up** - To turn on power: a) turn on electrical power to the appliance, and b) turn the Manual Gas Shutoff Valve outside the unit to the on position. Refer to section “Lighting/Shutting Down the Appliance”.
8. **Settings** - If using the Indoor Combustion Air Kit (Lx500-800 only) in lieu of Direct Vent piping for the air inlet, refer to Table 1-2 for a list of parameters that need to be adjusted before putting the unit into operation.



**Table 1-2 Indoor Combustion Air Settings Quick Reference Table**

Configuration Group	Setting Considerations	Reference
Modulation Configuration	Set the Minimum Modulation rate to 2500 RPM.	See Figure 4-11 and Table 4-10 (page 17) Trinity Lx manual, Appendix A - Controller and Touchscreen Display.
Burner Control Ignition	Set the Lightoff rate to a minimum of 3000 RPM.	See Figure 4-21 and Table 4-20 (page 23) Trinity Lx manual, Appendix A - Controller and Touchscreen Display.



**Settings** - Failure to adjust controller settings may cause ignition failure or erratic burner operation resulting in property damage, serious injury or death.



**Prohibited Applications** - The Indoor Combustion Air option is not to be used in conjunction with closet or alcove installations. Failure to comply with these instructions may result in property damage, serious injury or death.

## Combustion Air Requirements

**Air Competition** - Drawing combustion air from the room can result in competition for combustion air with other fuel burning appliances, ventilation air systems or exhaust sources. See Table 1-3 (identical to Table 4-5 in the Lx I&O manual) for a list of design considerations and installation guidelines. Check with applicable codes and authorities regarding specific application requirements.

**Mandatory Interlocks** - Required between motorized dampers and burner ignition controls to ensure adequate supply or make-up air is provided. The Lx500-800 come equipped with auxiliary proving capability. Simply remove the jumper on the Low Voltage barrier labeled Aux. Proof (T2-7,8) and replace with field supplied end switch incorporated with motorized damper and/or louver controls.

**Wall Openings** - Outdoor opening for louvers/grilles must be sized so that the minimum unobstructed area will provide adequate air flow at high fire, known as the FREE AREA and is expressed in square inches/Btuh. Free Area (FA) is determined by taking the area of the wall opening less any obstructions. Common louver free areas range from 35% to 60% of the wall opening, meaning 65% to 40% is obstructed by the frame and blades.

**Table 1-3 Indoor Combustion Air Guidelines**

Parameters	Method / Type	Requirements	NFPA 54 Part 9.3 / CSA B149 Part 8.0	Comments
Supply Air <sup>1</sup>	Ventilation	applicable codes	locate combustion air openings lower than ventilation air openings	see "Combustion Air Methods"; see "Air Competition"
	Combustion Air	five methods (below)		
Combustion Air Methods	Indoor Air	by volume	infiltration or air changes/hour	see "Air Competition"
	Outdoor Air	by opening area	1 or 2 permanent openings	see "Outdoor Opening"
	Combo. Indoor/Outdoor	see indoor/outdoor air	calculate each method separately	see "Indoor Air" / "Outdoor Air"
	Engineered Air	adequate air	approved engineered design	subject to approval by authority having jurisdiction
Mechanical Air	outdoor air supplied @ 0.35cfm/1000Btuh	interlocks mandatory		
Air Competition	Exhaust Fans	provide make-up air	supply = exhaust + combustion air	fuel burning appliances must not share combustion air with other appliances or compete for air with exhaust sources
	Other Appliances <sup>2</sup>	adequate air for all	supply = collective combustion air	
	Building Ventilation	additional air	supply = ventilation + combustion air	
Interlocks	Damper interlock <sup>3</sup>	on driven member	combustion air must be proven prior to igniting appliance burner	interlocks required by ASME CSD-1, Part CG-260
	Fan interlock <sup>4</sup>	with appliance burner		
Louvers, Grilles, & Dampers	Fixed	fully open position	opening must be sized to provide the Required Free Area	see "Outdoor Opening"
	Automatically adjustable	interlocks required		
	Manually adjustable	not permitted		
Outdoor Opening	Opening Free Area <sup>5</sup>	unrestricted flow	Opening FA must be $\geq$ Required FA for Combustion Air.	see "Free Area, Required"
	Opening Nominal	gross dimensions		
Free Area, <sup>6</sup> Required	Calculate Required FA for Combustion Air	1 sq. in./4000 Btuh	Required FA for Lx800 = $(1/4000) \times 750,000$ Btuh = <b>188 sq. in.</b>	see "Free Area, Opening Size" and/or "Free Area, Duct Area"
Nominal, Opening Size	Known FA, specified	Opening FA	Nominal larger than Opening FA.	select louver/grille/damper with Opening FA = Required FA
	Unknown FA, assumed	wood 25%; metal 75%	Nominal=Required FA/Assumed FA N = <b>188 sq. in.</b> / 75% = 250 sq. in.	
Free Area, Duct Area	Vertical ducts	1/4000	vertical duct area = FA	combustion air ducts, minimum dimension = 3"
	Horizontal ducts	1/2000	horizontal duct area = FA / 2	

**Notes:**

<sup>1</sup> Placing ventilation and combustion air openings too close to each other may result in short circuiting of air flow.

<sup>2</sup> Combustion air for each appliance must be calculated separately. The outdoor opening size can be a single opening large enough for the collective total of each appliance in the room or a separate opening for each appliance.

<sup>3</sup> Louvers/dampers must be fixed open or interlocked with fuel burning equipment to prove air flow during operation.

<sup>4</sup> Screens/grilles over air openings create air flow resistance decreasing the effective area of unrestricted flow. "Free Area" (FA) is the minimum unobstructed area needed for adequate air flow at high fire expressed in square inches/Btuh.

<sup>5</sup> Each appliance must be interlocked with the mechanical air supply system in the boiler room to prevent burner operation when the fan is not operating.

<sup>6</sup> Required FA by heating capacity (I&O manual, Table 2-2): Lx500=120 sq. in.; Lx600=142 sq. in.; Lx700 = 164 sq. in.

 Lighting / Shutting Down the Appliance**WARNING**

**Read Before Proceeding** - If you do not follow these instructions exactly, a fire or explosion may result causing property damage, serious injury or death.

**FOR YOUR SAFETY, READ BEFORE OPERATING**

- A) This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.
- B) BEFORE OPERATING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.  
**WHAT TO DO IF YOU SMELL GAS:**
  - Do not try to light any appliance.
  - Do not touch any electric switch.
  - Do not use any phone in your building.
  - Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
  - If you cannot reach your gas supplier, call the fire department.
- C) Use only your hand to push in or turn the gas control knob. Never use tools. If the knob will not push in or turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.
- D) Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

**OPERATING INSTRUCTIONS**

1. STOP! Read the safety information above very carefully.
2. Set the thermostat to lowest setting. Turn off all electric power to the appliance.
3. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.
4. Turn the manual gas valve to the OFF position. Remove front access panel.
5. Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you smell gas, STOP! Follow "B" in the safety information above. If you don't smell gas, go to the next step.
6. Turn the manual gas valve ON. Wait an additional five (5) minutes smelling for gas.
7. Replace the front access panel.
8. Set thermostat to highest setting. Turn on all electric power to the appliance.
9. Ignition sequence is automatic. Combustion will occur after a brief fan purge.
10. If ignition does not occur, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas supplier.

**TO TURN OFF GAS TO THE APPLIANCE**

1. STOP! Read the safety information above very carefully.
2. Turn off all electric power to the appliance.
3. Turn the manual gas valve to the OFF position.