

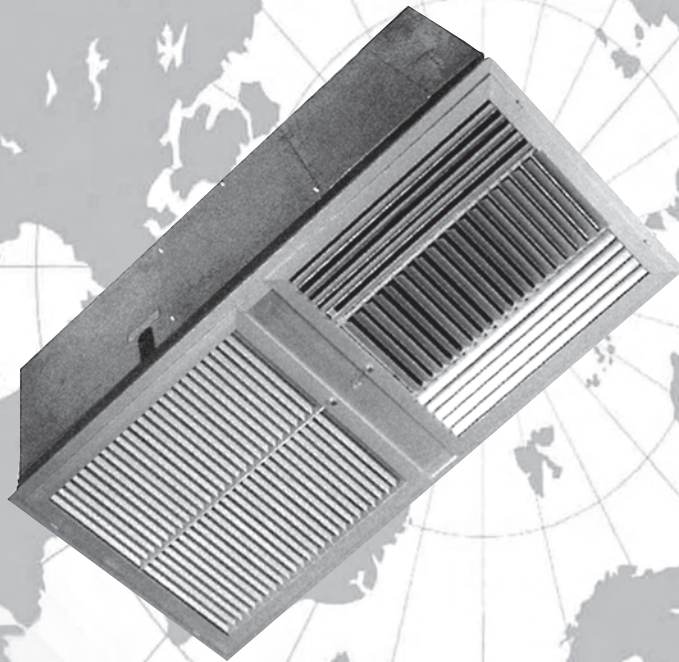
TBH 2 X 4 LAY-IN CEILING AIR HANDLER

COOLING ONLY/HEAT PUMP

Nominal Capacities:
9,000-12,000,
18,000 & 24,000 Btuh

EMI  *AmericaSeries*

Comfort Where It Counts.



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An  **ECR International Brand**
An ISO 9001-2000 Certified Company



P/N# 240-0662, Rev. 1.3 [11/04]

TBH COOLING ONLY/HEAT PUMP AIR HANDLER

INSTALLATION, OPERATION AND MAINTENANCE MANUAL

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Shipping Damage MUST be Reported to the Carrier IMMEDIATELY!!!
Examine the exterior. Remove cover and examine compressor and piping for signs of damage.

PRODUCT DESCRIPTION

This air handler opens room design possibilities while offering ideal placement of the source of conditioned air. TBH air handlers are designed to operate in either straight cool or heat pump mode, with no modification required. The chassis is suspended from the structural ceiling above the drop T-bar ceiling. The attractive intake/discharge grille replaces any two by four foot ceiling panel. Electric wiring and refrigerant tubing only are needed to connect the ceiling unit to the outside condensing unit.

In the executive suite, conference room or retail area where wall and floor space can not be sacrificed, the TBH is a practical, visually appealing and very high quality alternative. Outstanding performance is also part of the package, including super quiet air transfer and vibration isolation suspension of the unit.

The TBH models are fast and easy to install with 24V control circuits to the outside unit. Hanger brackets are standard on all models. This model may be installed with one of the several outdoor sections. Please refer to the following manual to complete the system installation:

EMI AmericaSeries Single-Zone & Multi-Zone Condensing Units, IOM #240-4514, for the SCC/SHC, MC2/MH2, and MC4/MH4.

All EMI products are subject to ongoing development programs. Design and specifications may change without notice.

CONTROLS/COMPONENTS

Controls and components installed at the factory or supplied included:

- Relays and connections for condensing unit and thermostat.
- Power Supply Terminal Block.
- Optional open wire type electric heaters used on all sizes (3KW and 4.8KW are available). They are equipped with automatic reset high temperature cut-out.
- Optional Condensate Pump
- Low Voltage Transformer

OPTIONAL EQUIPMENT

This manual pertains to a model with standard features; Straight cool or heat pump with or without electric heat. Check to be certain the included equipment is as ordered and that the voltage is correct for the power supply before attempting installation.

To obtain technical service or warranty assistance during or after the installation of an EMI unit, check our website @ www.enviromaster.com or call your installing contractor or distributor. Our technical service department may be contacted at 1-800-228-9364.

When calling for assistance, please have the following information ready:

- **Model Number** _____
- **Serial Number** _____
- **Date of Installation** _____



DANGER



Tampering with the EMI AmericaSeries air handlers is dangerous and may result in serious injury or death. Tampering voids all warranties. Do not attempt to modify or change this unit in any way.

INSTALLER SUPPLIED ITEMS

- Power Wiring
- Low Voltage Wiring
- Mounting Screws, fasteners, 3/8" threaded rods
- Refrigerant Piping (tube sets may be ordered separately from EMI)
- Condensate Piping
- Thermostat, suitable for HVAC applications (may be purchased separately from EMI)
- Electrical Fittings

ITEMS FOR CONSIDERATION

1. Check equipment for possible shipping damage prior to mounting.
2. Determine the best location for mounting the unit and room air circulation. Locate outdoor and indoor unit as close together as possible.
3. Determine routing of power supply wiring, interconnecting refrigerant piping, condensate drain and low voltage control interconnect wiring.
4. There are limitations as to the maximum allowable length and lift of interconnecting refrigerant lines. Refer to the condensing unit installation instructions or ask for the EMI Policy Bulletin.
5. Serviceability should be considered when locating the unit. All service can be performed through the removable panels.
6. A minimum of 19" above ceiling tile for mounting space. Unit height measures 18 3/4".

MOUNTING

Hanging the Unit:

1. Remove ceiling tile where unit is to be located and any adjacent tiles that would be helpful in handling the unit while positioning in the ceiling.
2. Secure suitable type materials (such as slotted angle) in place. The material should be capable of supporting the weight of the unit (approximately 160 lbs.). Now

attach all thread rods (3/8" field supplied) to angle. The rods should be double nutted. Check spacing of rods to make sure they will line up with hangers when unit is raised into ceiling.

3. Place supplied louver foam around the outer edge of the assembly by first peeling back the paper adhesive protectant. Eventual seal will be made with the perimeter edge of the chassis.
4. Now raise the unit into the ceiling. The use of a hydraulic jack is recommended. Once the unit is above the ceiling, attach all thread rods to hangers. Once all thread rods are attached to hangers, raise unit several inches above the ceiling to allow placement of grille into ceiling grid. After grille is in place, lower unit onto foam backing attached to grille. The unit should be lowered just far enough for the frame to form an airtight seal with the foam backing. Any further could create an air disturbance. Secure hangers from base.
5. To insure proper condensate removal, pitch the unit slightly towards chosen drain.
6. Proceed to run power wiring and refrigerant lines into unit.

CONDENSATE DRAIN

1. Units without condensate pumps are supplied with a 1/2" drain hose. A suitable trap should be installed on the condensate line close to the unit. Pitch the line 1" for 20' of run. A 5/8" drain connection exists as a secondary over flow protection.
2. The optional low profile condensate pump may be ordered factory installed or separately for field installation. The field installed condensate pump should be mounted adjacent to the side of the unit as low as possible. Connect to trap (field supplied). Kit number #550-104 should be specified when ordering a condensate pump to be field installed. Drawings and instructions are supplied. Consult the factory.
3. The dual connection drain pan is factory supplied with a safety float switch for prevention of condensate overflow.

ELECTRICAL WIRING

All wiring should be in accordance with the National Electric Code (NEC) and the local building codes.

1. Wiring entrances are located on the top of the unit, above the control box.
2. Inspect the existing wiring for any deficiencies such as cut or frayed wires. Replace such wiring if found.

3. Check the unit rating plate for circuit ampacity and breaker or fuse size. **Use only HACR type breakers.** Select the proper wire for the ampacity rating.
4. Each unit must have a separate branch circuit protected by a fuse or breaker. Refer to the unit rating plate for the proper wire and breaker or fuse size.
5. Connect the power according to the wiring diagram located inside the control box. Connect the ground wire to the ground lug lead at the same location in the control box.
6. Low voltage wiring must be run to the outdoor unit and thermostat. Refer to the unit wiring diagram on the unit for details. Be sure to use at least 18 AWG wire.
7. The TBH units require field installation of a low voltage thermostat that must be suitable for HVAC applications. Optional wall thermostats are available from EMI. Thermostats are 24 Volt and are to be wired to the TBH indoor unit and the outdoor condensing unit.

EMI OUTDOOR SECTIONS

Low voltage connectons will vary depending on the outdoor unit. Heat pumps require the operation of a reversing valve. EMI heat pumps energize the reversing valve (0) in cooling. Refer to the wiring diagram included with the condensing unit.

REFRIGERANT PIPING

The units are equipped with a piston type expansion device. Connections are sweat.

1. Be certain there are no burrs on the pipe connections.
2. The large line (suction) should be insulated with a closed cell foam type insulation. **Do not insulate the small liquid line.**

PIPING DO'S AND DON'T'S

- Use only refrigeration grade copper.
- Avoid piping on a rainy day.
- Cap ends of lines until ready to make final connections.
- Avoid unnecessary bending.
- Use a tube bender.

Connections to outdoor sections should be made according to the outdoor section installation instructions.

REFRIGERANT PROCESSING

Attention! It is illegal to discharge refrigerant into the atmosphere after July 1, 1992. Use proper reclaiming methods and equipment when installing or servicing this unit.

After making the connections to the outdoor section, you are ready to adjust the charge for the system. Follow the instructions in the outdoor manual for line evacuation, opening the service valves and final charge adjustments.

START UP

After checking the proper power and 24V connections between indoor and outdoor sections, you may run the system from the thermostat. Refer to the operating instructions supplied by the thermostat manufacturer.

Depending on room temperature, the unit may have to be run in the heat mode (if equipped) to warm the room. Run the unit in both heating and cooling modes before leaving this installation. Take a reading of the air discharge temperature. The cooling mode should produce a temperature 20° – 25°F below the room temperature. The heating mode should produce a rise in temperature of 20° – 25°F.

Make a final check of both units to determine if any refrigerant lines are touching, causing a vibration during operation. Be sure units are level and separate any lines that may be in contact.

OPERATION AND MAINTENANCE

Unit operation is a function of the wall mounted thermostat. Thermostat operation will vary depending on manufacturer and desired options. Review operating instructions supplied with the thermostat. Ensure that heat pumps are equipped with electric heat; utilize HVAC single-stage thermostat.

Typical operation is as follows:

- Heat – OFF – Cool switch
- Room temperature indicator
- Temperature selector side

Fan switch:

- ON - constant operation
- AUTO – automatic on/off with unit

COOLING MODE

Set system switch to “Cool”. Set temperature selector slide to desired level of comfort. If room temperature is warmer than desired temperature, unit will cycle on.

HEATING MODE

Set system switch to “Heat”. Set temperature selector slide to desired level of comfort. If room temperature is colder than desired temperature, unit will cycle on.

MAINTENANCE

Panels should remain on the unit at all times. Service should be performed by a QUALIFIED service agency. EMI units are designed and constructed for reliability and long life with minimal maintenance. To assure peak operating efficiency:

- Regular cleaning of air filters is required.
- The fiberglass filter may be cleaned with a vacuum cleaner. Allowing dust to collect on the filter will cause the unit to loose efficiency and eventually malfunction. Check filter at least once a month.
- Vacuum dust from the return air grille when cleaning the filter.
- Clean the exterior of the supply/discharge louver as desired. Use a mild household cleaner.
- This unit is equipped with a permanently lubricated motor. Although oiling is not necessary, adding a few drops of oil through oiling ports twice yearly will extend the life of the motor. Do not over oil.

SPECIFICATION CHANGES

All EMI products are subject to ongoing development programs and design and specifications may change without notice.

TROUBLESHOOTING

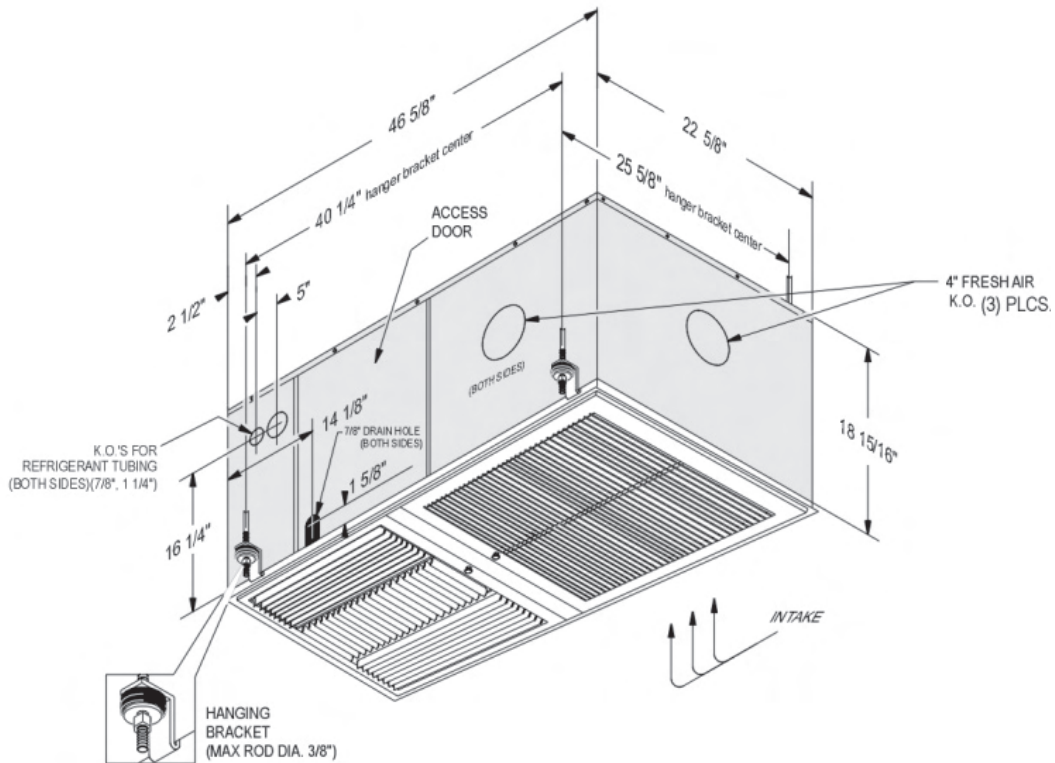
When trouble-shooting the indoor unit, please refer to the wiring diagram that is supplied with the equipment. It is located on the inside of the access panel. If you are unable to locate the wiring diagram please feel free to call the factory technical service line at (800) 228-9364 and one can be faxed or mailed. Please have the full model and serial number available prior to calling.

EMI **America Series** evaporators are designed to operate with EMI **America Series** condensers. The evaporator (indoor unit) and condenser (outdoor unit) are to be independently connected to the electrical service panel on separate breakers. (See the unit name plate for the correct breaker type and size). The indoor and outdoor units are also connected to each other via a 24V interconnect wiring. **A transformer located in the air handler** provides the low Volt power source for the controls. The number of low Volt interconnect conductors will be three or four depending on heating options. Cooling only units have three low Volt wires. Units with electric heat have four low Volt wires. Interconnect wire should be at least 18 AWG. Refer to the unit wiring diagram for the interconnect diagram that matches your system.

After starting the unit, complete the Test Unit Performance Data sheet on page 7. Save this information for future servicing. In the event there is a problem with the unit. Perform the test again (if possible) and have both sets of data ready when calling for assistance.

TBH DIMENSIONS AND SPECIFICATIONS

NOTE: Due to EMI's ongoing development programs, design and specifications data may change without notice.



Discharge Air Quantity	
Model No.	H.S. CFM
09, 12	350
18, 24	700

TBH Piping Specifications			
Model	Line Sizes		Shipping Weight
	Liquid	Suction	
09, 12	1/4"	1/2"	160 Lb.
18, 24	3/8"	3/4"	165 Lb.

TBH Electrical Specifications					
Model No.	Voltage/ Hertz	Fan		Min Ampacity ⁽¹⁾	Max Fuse ⁽¹⁾
		HP	FLA		
TBH 09D	208/230/60	.03	0.4	0.5	15
TBH 12D	208/230/60	.03	0.4	0.5	15
TBH 18D	208/230/60	.125	1.3	1.4	15
TBH 24D	208/230/60	.125	1.3	1.4	15

⁽¹⁾ If electric heaters are installed, use ampacity rating and max fuse from Heater Options Chart.

TBH Electric Heat Options						
Model No.	Voltage	KW	Htr Amps	Total Amps	Min Cir Amps	Max Fuse
09, 12	208/230	3.0	13.1	13.5	16.9	20
18, 24	208/230	4.8	20.9	21.9	27.4	30

START-UP, MAINTENANCE AND TROUBLESHOOTING PROCEDURE

The Test Unit Performance Data sheet below is provided for use by a qualified service professional. In order for our Technical Service Department to better serve you, please complete and have this information ready when calling.

Make sure to include the Model Number, Serial Number, Date of Installation.

Call our Technical Support Department
@ 1-800-228-9364.

Test Unit Performance Data	
	Date:
Model Number	Technician:
Serial Number	Mode: Cooling
Indoor Section	Notes
Evaporator Entering Air - DB	
Evaporator Entering Air - WB	
Evaporator Leaving Air - DB	
Evaporator Leaving Air - WB	
Outdoor Section	
Entering Air	
Leaving Air	
Temperature Split	
Operating Pressures	
Compressor Suction - PSIG	
Compressor Discharge - PSIG	
Power Input	
Compressor - Volts	
Compressor - Amps	
OD Fan Motor - Volts	
OD Fan Motor - Amps	
ID Fan Motor - Volts	
ID Fan Motor - Amps	
Total Volts	
Total Amps	
Temperatures - Degrees F°	
Compressor Suction	
Compressor Discharge	
Liquid Out Cond.	
Liquid before Expansion	
Suction out Evaporator	
Capacity Calculations	
DB - Temp Split at evap.	
Test Summary	
Compressor Superheat	
Sub Cooling	

ALL PRODUCT LIMITED WARRANTY

Enviromaster International LLC (EMI) warrants to the purchaser/owner that EMI products will be free from defects in material and workmanship under the normal use and maintenance for a period of twelve months for all components and sixty months on unit compressors from the date of original installation, or fifteen months for all components and sixty-three months on unit compressors from the date of manufacture, whichever comes first.

WHAT WE WILL COVER

EMI will replace any defective part returned to EMI's approved service organization with a new or rebuilt part at no charge. The replacement part assumes that unused portion of this warranty.

WHAT WE DON'T COVER

THIS WARRANTY DOES NOT INCLUDE LABOR or other costs incurred for repairing, removing, installing, shipping, servicing, or handling of either defective or replacement parts.

EMI IS NOT RESPONSIBLE FOR:

- Normal maintenance
- Damage or repairs required as a consequence of faulty installation or application by others.
- Failure to start due to voltage conditions, blown fuses, open circuit breakers, or other damages due to the inadequacy or interruption of electrical service.
- Damage or repairs needed as a consequence of any misapplication, abuse, improper servicing, unauthorized alteration, or improper operation.
- Damage as a result of floods, winds, fires, lightening, accidents, corrosive atmosphere, or other conditions beyond the control of EMI.
- Parts not supplied or designated by EMI.
- Products installed outside the United States or Canada.
- Any damages to person or property of whatever kind, direct or indirect, special or consequential, Whether resulting from use or loss of use of the product.

LIMITATION OF WARRANTIES

This warranty is exclusive and in lieu of any implied warranties of merchantability and fitness for a particular purpose and all other warranties express or implied. The remedies provided for in this warranty are exclusive and shall constitute the only liabilities on the part of EMI including any statements made by any individual which shall be of no effect.

FOR SERVICE OR REPAIR:

- (1) Contact the Installer
- (2) Call the nearest Distributor
- (3) Call or write:



5780 Success Dr., Rome, NY 13440
Phone: 1-800-228-9364
FAX: 1-800-232-9364
Email: emi@enviromaster.com