



Weaver

CONSTRUCTION MANAGEMENT

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SUBMITTAL TRANSMITTAL

April 5, 2012

Submittal No: 15800-010

PROJECT: **Harold Thompson Regional WRF**
Birdsall Rd.
Fountain, CO 80817
Job No. 2908

ENGINEER: **GMS, Inc.**
611 No. Weber St., #300
Colorado Springs, CO 80903
719-475-2935 Roger Sams

OWNER: **Lower Fountain Metropolitan
Sewage Disposal District**
901 S. Santa Fe Ave.
Fountain, CO 80817
719-382-5303 James Heckman

CONTRACTOR: **Kuck Mechanical Contractors, LLC.**
395 West 67th Street
Loveland, CO 80593
970-461-3553 Melanie Peterson

SUBJECT: Preliminary O&M for HVAC @ the Headworks Building

SPEC SECTION: 15800 - Heating & Ventilating

PREVIOUS SUBMISSION DATES:

DEVIATIONS FROM SPEC: ___ YES X NO

CONTRACTOR'S STAMP: This submittal has been reviewed by Weaver Construction Management and, unless indicated otherwise, has been found to be in conformance with the intent of the contract documents.

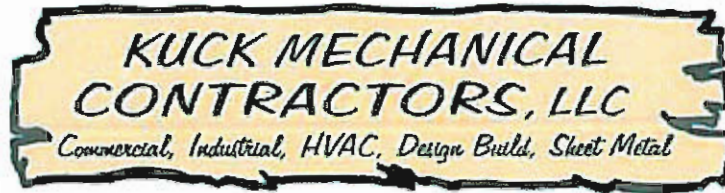
Contractor's Stamp:

Engineer's Stamp:

Date: 4/5/12

Reviewed by: Leslie Brown
(x) Reviewed Without Comments
() Reviewed With Comments

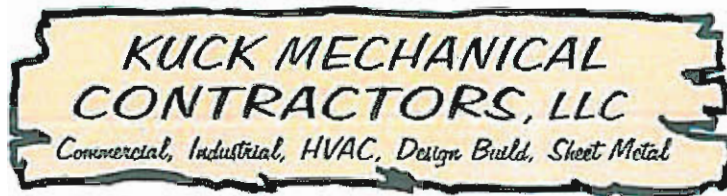
ENGINEER'S
COMMENTS:



Harold D. Thompson WRF Headworks Building

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Warranty



WARRANTY

Kuck Mechanical Contractors, LLC warrants all equipment provided by us free of defective materials and workmanship for a period of **(2)** two year from **Substantial Completion Date**. All equipment must be maintained as dictated in manufacturer's instructions.

**Project Name: Harlod D. Thompson WRF Headworks Building
Fountain, CO**

A handwritten signature in cursive script that reads "Tom Hammer".

Kuck Mechanical Contractors, LLC Authorized Signature

A handwritten date "3/28/12" written in cursive script.

Date: March 28, 2012



Ceiling Exhaust Fan

SF-1
Spec. 15800

Supplied by:

CFM
1440 So. Lipan St.
Denver, CO 80223
(970) 493-7293

Installation, Operation and Maintenance Manual

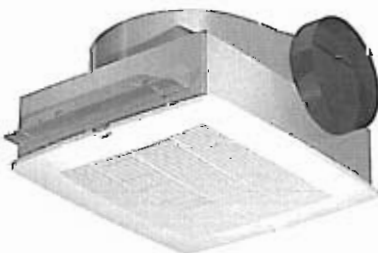
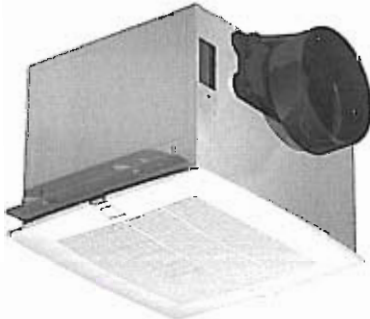
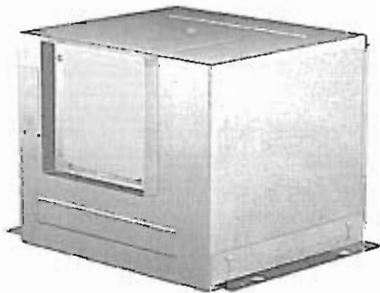
Please read and save these instructions. Read carefully before attempting to assemble, install, operate or maintain the product described. Protect yourself and others by observing all safety information. Failure to comply with instructions could result in personal injury and/or property damage! Retain instructions for future reference.

Model SP

Model SP is a direct drive ceiling exhaust fan designed for clean air applications where low sound levels are required. Many options and accessories are available such as lights, motion detectors, ceiling radiation dampers and speed controls. Capacities range from 25 to 1,600 cfm (42 to 2,718 m³/hr) and 1 in. wg (248 Pa). AMCA Licensed for Sound and Air Performance.



ENERGY STAR® Certified models include:
SP-A, 50, 70, 90, 200, 250, 290 and 410;
SP-B, 50, 70, 80 and 90.



Model CSP

Model CSP is a direct drive inline exhaust fan designed for clean air applications where low sound levels are required. Capacities range from 70 to 3,800 cfm (119 to 6,456 m³/hr) and 1 in. wg (248 Pa). AMCA Licensed for Air Performance.

WARNING!

To reduce the risk of fire, electric shock, or injury to persons, observe the following:

- Suitable for use with solid state speed controls.
- Use this unit only in the manner intended by the manufacturer. If you have questions, contact the manufacturer.
- Before servicing or cleaning unit, switch power off at service panel and lock service disconnecting means to prevent power from being switched on accidentally. When the service disconnecting means cannot be locked, securely fasten a prominent warning device, such as a tag, to the service panel.
- Installation work and electrical wiring must be done by qualified person(s) in accordance with all applicable codes and standards, including fire-rated construction.
- Sufficient air is needed for proper combustion and exhausting of gases through the flue (chimney) of fuel burning equipment to prevent back drafting. Follow the heating equipment manufacturer's guideline and safety standards such as those published by the National Fire Protection Association (NFPA), and the American Society for Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) and the local code authorities.
- When cutting or drilling into wall or ceiling, do not damage electrical wiring or other hidden utilities.
- Acceptable for use over a bathtub or shower when installed in a GFCI protected branch circuit. (Up through size SP-A390)
- Never place a switch where it can be reached from a tub or shower.
- Ducted fans must always be vented to the outdoors.
- These fans are not recommended for cooking exhaust applications. They are designed primarily for low temperature, clean air applications only. The diagram shows the minimum distance these fans should be placed in relation to cooking equipment.
- Fan/Light combination not to be installed in a ceiling thermally insulated to a value greater than R40.

CAUTION!

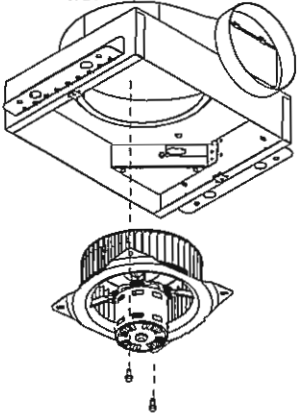
- For general ventilating use only. Do not use to exhaust hazardous or explosive materials and vapors.

Prepare the fan

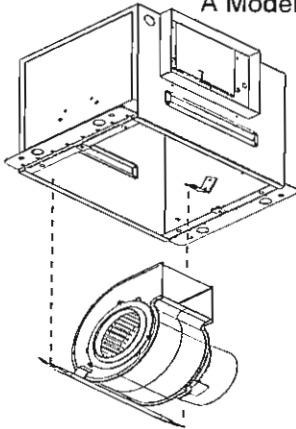
Power Assembly

If power assembly (motor, wheel, and scroll) is not installed in housing, insert the electrical plug into fan socket, then slide scroll end of power assembly into fan housing. Attach by using two sheet metal screws provided.

B Model

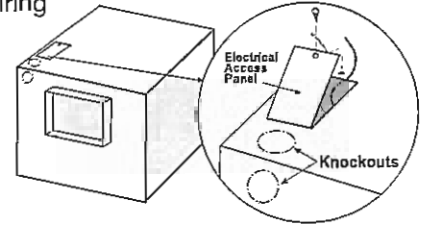


A Model



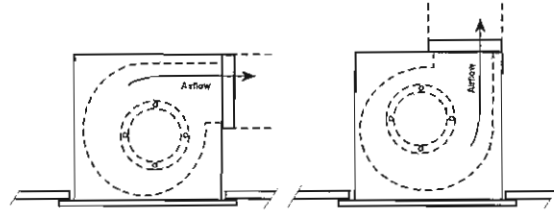
Remove Wiring Knockout

Remove either top or side wiring knockout, depending on wiring direction, by bending it back and forth to break tabs.



Ductwork

Check ductwork to see if the fan's discharge requires rotation from horizontal to vertical discharge.

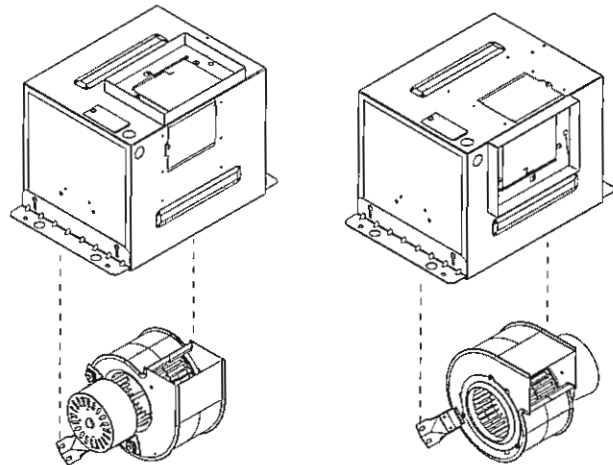


Fan Rotation

To rotate from horizontal to vertical discharge
A-Models Only

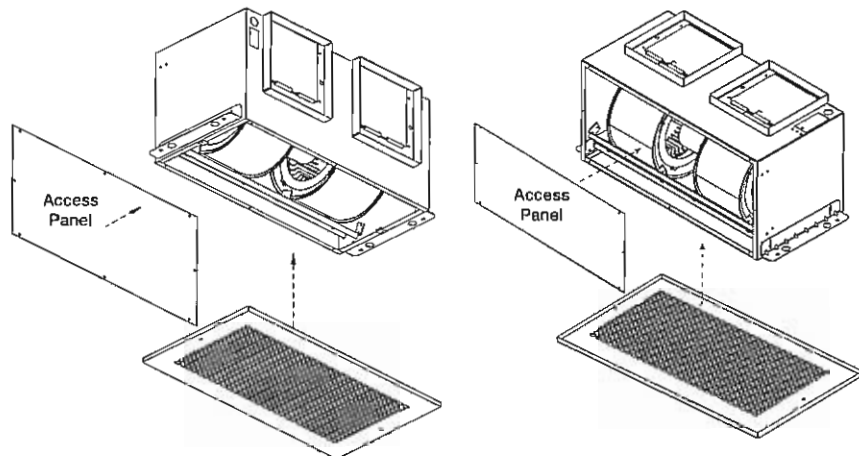
A-50-500, 710, 780 Models

Remove the two screws holding the power assembly in and pull power assembly out. Rotate power assembly 180 degrees and put back into fan. Use the same screws to reattach power assembly to fan housing. Flip fan over and remove the four screws holding the discharge duct and damper assembly. Exchange the assembly with plate mounted on top of fan, as shown in these illustrations.



A-700, 900-1500 Models

Remove the eight screws holding the access panel or collar as shown in picture. Rotate the fan housing so the discharge is facing up. Replace access panel or collar and screws.



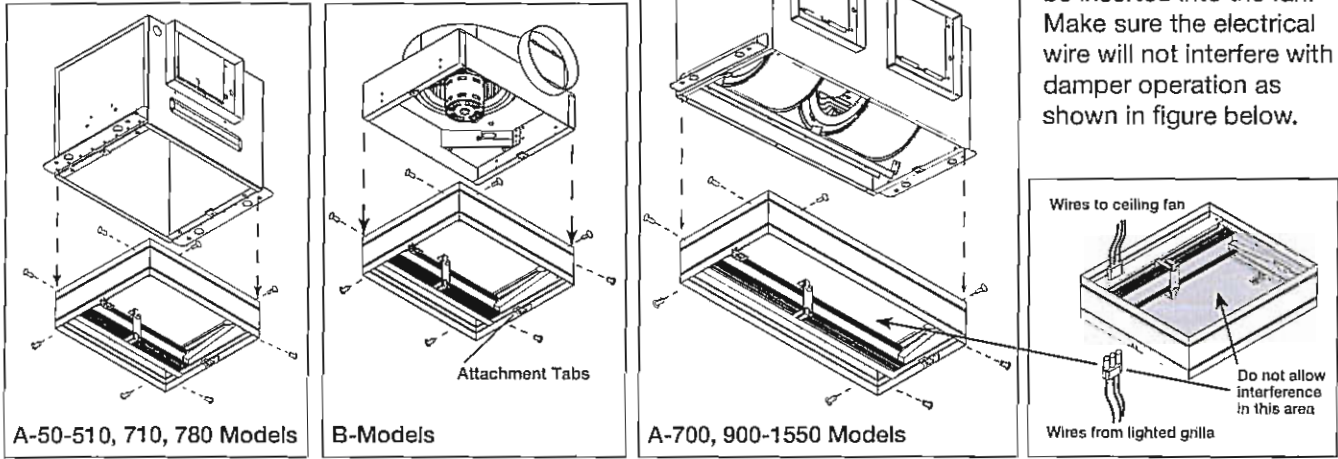
Ceiling Radiation Damper (CRD)

If fan is to be used in a fire resistive membrane ceiling, a ceiling radiation damper must be used.

If the ceiling radiation damper is already mounted to the fan from the factory, proceed to Install the Fan.

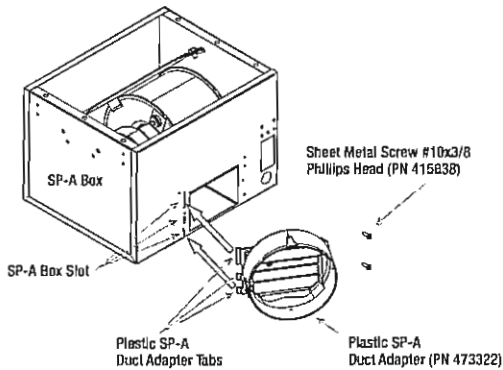
To mount the ceiling radiation damper to fan, make sure grille attachment tabs are facing down. Then place the inlet part of the fan into the ceiling radiation damper collar, and use self-tapping sheet metal screws (by others) to screw through the damper collar and into the fan housing. If the fan/light combination is being used, make sure ceiling

radiation damper has an electrical plug in it. The electrical plug must be inserted into the fan. Make sure the electrical wire will not interfere with damper operation as shown in figure below.

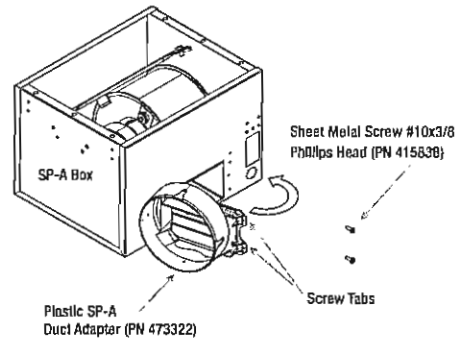


Discharge Installation SP-A 50-90 Models

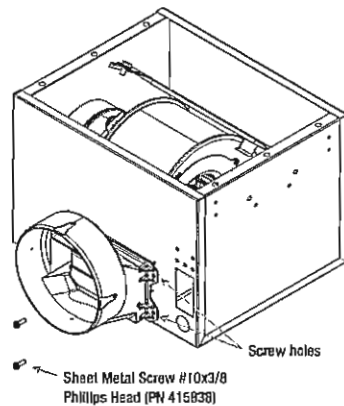
1 Insert plastic duct tab into SP-A box slots.



2 Rotate plastic SP-A duct adapter (PN 473322) until the screw tabs meet SP-A box.

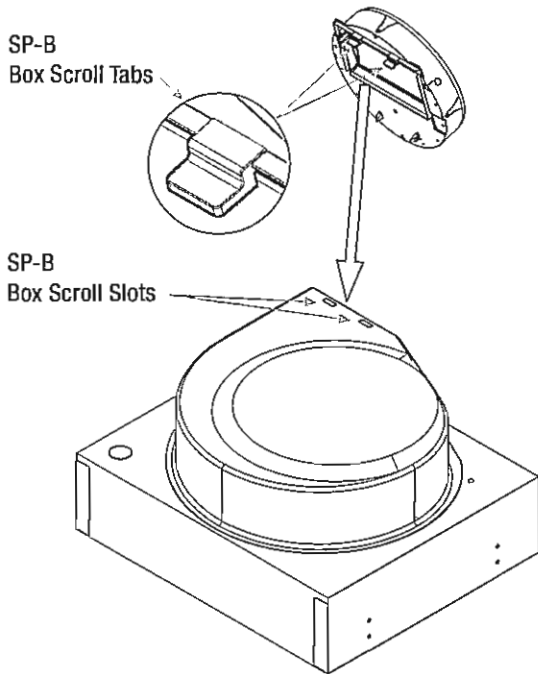


3 Install screws provided to secure discharge.

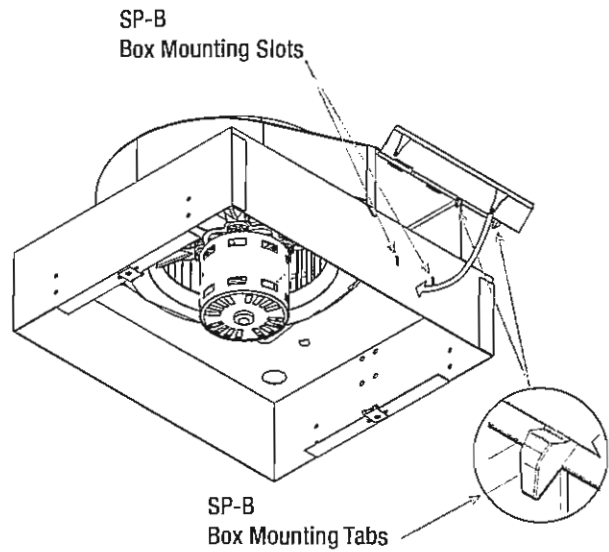


Discharge Installation SP/CSP-B 50-200 Models

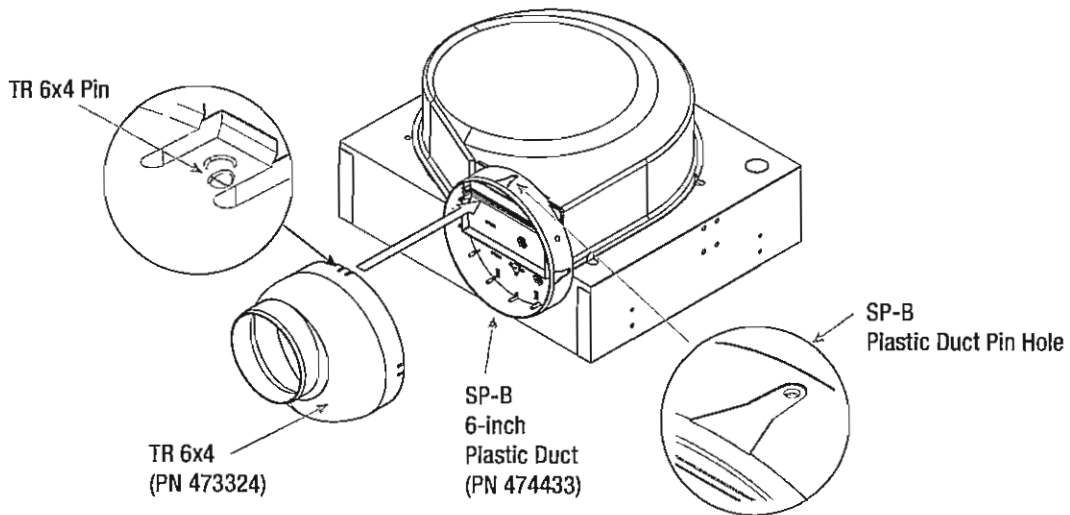
- 1** Insert SP-B box scroll tab into SP-B box scroll slots.



- 2** Rotate plastic SP-B duct adapter (PN 474433) until the two SP-B mounting tabs fully engage into the two SP-B box mounting slots.



- 3** **OPTIONAL**
Align the pins on the TR 6x4 adaptor to the duct pin hole on the SP-B 6-inch duct. Push until the adaptor snaps into place.



Install the Fan

- For best performance, choose a location with the shortest possible duct run and minimum number of elbows. Do not mount near cooking equipment, as shown in Fig. 1.
- Attach adjustable mounting brackets to fan, but leave the screws loose until proper height is determined, shown in Fig. 2. Cut hole to dimensions shown in table below:

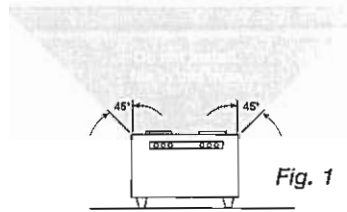


Fig. 1

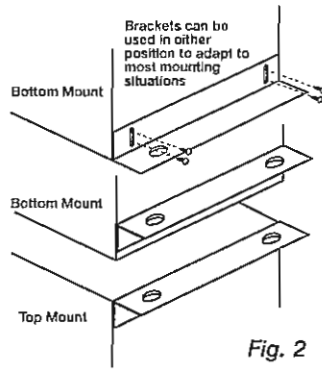


Fig. 2

Ceiling Openings		
Sizes	Fan or Fan/Light	Fan/CRD
SP-A50, A70, A90 SP-A110, A125, A190	10 $\frac{7}{8}$ x 13 $\frac{5}{8}$	11 $\frac{1}{8}$ x 13 $\frac{7}{16}$
SP-A200, A250, A290, A390	12 $\frac{1}{8}$ x 14 $\frac{1}{4}$	12 $\frac{1}{4}$ x 14 $\frac{3}{8}$
SP-A 700	23 $\frac{3}{4}$ x 11 $\frac{1}{4}$	24 $\frac{1}{8}$ x 12 $\frac{1}{4}$
SP-A410, A510, A710, A780	14 $\frac{3}{4}$ x 18 $\frac{5}{8}$	14 $\frac{3}{8}$ x 18 $\frac{1}{8}$
SP-A900, A1050, A1410, A1550	14 $\frac{3}{4}$ x 24	14 $\frac{7}{8}$ x 24 $\frac{1}{8}$
SP-B 50 - 200	14 $\frac{1}{8}$ x 11 $\frac{1}{4}$	14 $\frac{3}{8}$ x 12 $\frac{1}{4}$

NOTE

Model SP-A 50-90 are standard with a round duct. Should Model SP-A 110-190 require a round duct, Model RDC (Round Duct Connector) may be ordered from Greenheck for field installation.

For Frame Construction:

Position unit between joists. Position brackets such that bottom edge of housing will be flush with finished ceiling, and tighten the adjustable mounting brackets, shown in Fig. 3.

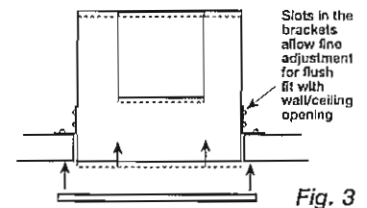


Fig. 3

For Hanging Installations:

Use Greenheck's optional vibration isolator kit Part Number VI Kit. Using the fan's standard adjustable mounting brackets and 10 by 32 threaded rod (by others), hang unit as shown in Fig. 4.

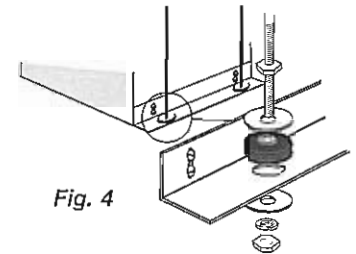
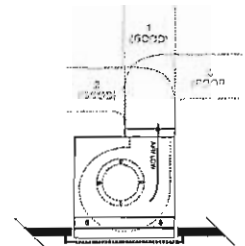


Fig. 4

- Installation of ductwork is critical to the performance of the fan, shown in Fig. 5. Straight ductwork (1) or ductwork that turns in the same direction as the wheel (2) is recommended. Ductwork turning opposite the wheel direction (3) will cause turbulence and back pressure resulting in poor performance.

Fig. 5



- Slide ductwork over the fan's discharge collar and securely attach it with sheet metal screws.

Make sure the screws do not interfere with damper operation. Check damper to make sure it opens freely.

Wire the Fan

- Remove wiring cover. If fan/light combination is being used, make sure the fan plug is connected to the fan receptacle and the light plug is connected to the light receptacle, shown in Fig. 6. Using proper wire connectors, wire the fan as shown in Fig. 7a. For wiring of light proceed to Fig. 7b.

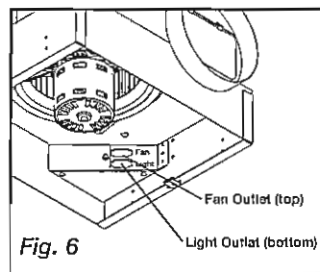


Fig. 6

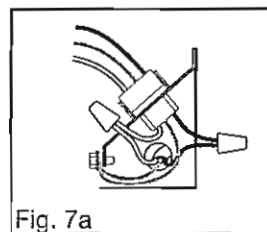


Fig. 7a

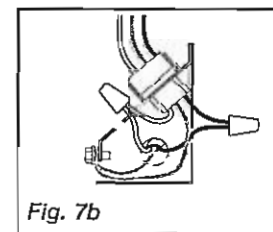


Fig. 7b

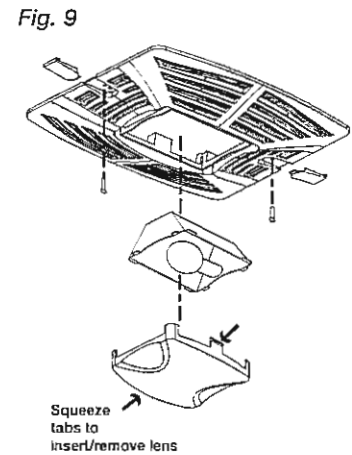
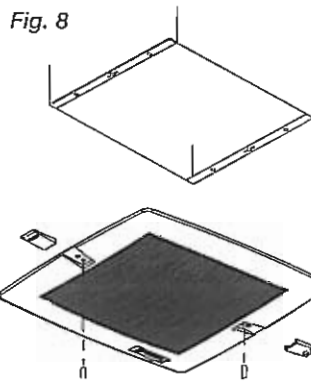
115 & 277 Volt
Black wire is "Hot"
White wire is "Neutral"
Green wire is "Ground"

220 - 240 Volt
Black wire is "Hot"
White wire is "Hot"
Green wire is "Neutral/Ground"

- Push all wiring into the unit's cover and replace wiring cover.

Attach the Grille

1. If lighted grille is being used, plug wire into fan socket.
If lighted grille and ceiling radiation damper are being used, plug wire from lighted grille into ceiling radiation damper socket. Do not plug wire directly into the fan socket. Make sure the wire does not interfere with the ceiling radiation damper operation.
2. Attach grille with two screws provided. Make sure not to over tighten; over tightening will damage grille.
3. Slide attachment screw covers over the attachment screws, shown in Figure 8 and 9.
4. If lighted grille is being used, install light bulb(s) into light socket(s). For incandescent lights, use maximum 100 watt bulb (by others). For fluorescent lights, use 27W GU24 bulbs. Greenheck has replacement 27W GU24 bulbs call 1-800-355-5354 to order.
5. If lighted grille is being used, snap lens into place, by pushing on the outside edges of lens, shown in Fig. 9. To remove lens, use small screw driver and pry on one side of lens.
6. Turn on power and check fan and light operation.



Converting from ceiling to cabinet design for Model SP fans

All SP convertible sizes will be shipped with grille and duct collar cover.

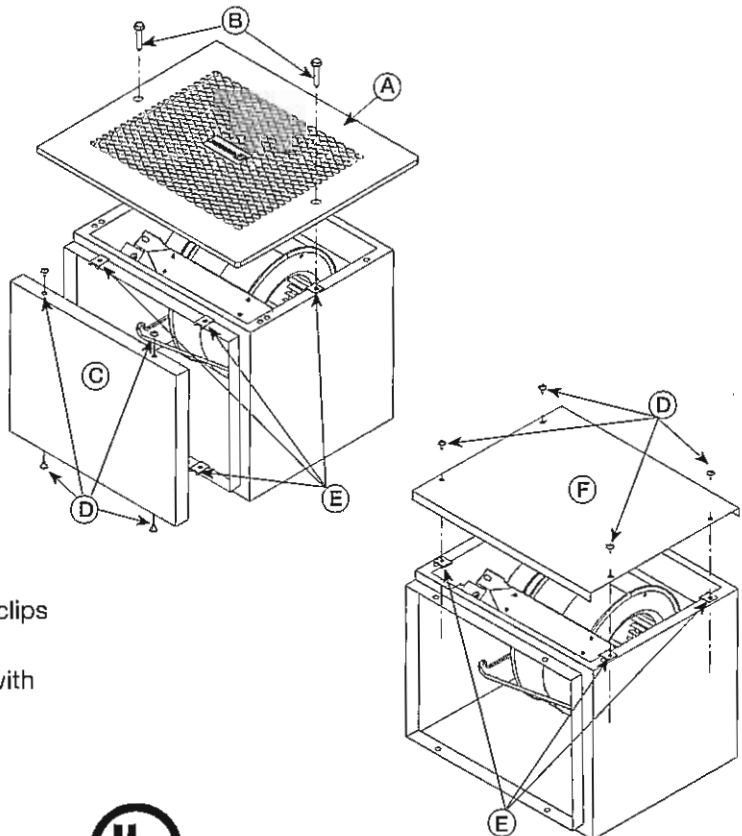
Conversion Kit Parts List

- Qty. of 1 Blower Box Cover

Tools Required

- Phillips Head Screwdriver

- Step 1: Remove grille (A) by removing the two grille screws (B).
- Step 2: Remove duct collar cover (C) by removing the four duct collar screws (D).
- Step 3: Discard grille (A), two grille screws (B), and duct collar cover (C).
- Step 4: Remove the six (6) tinnerman clips (E) by twisting them to one side and pulling straight out. Discard two of the six tinnerman clips.
- Step 5: Insert the remaining four tinnerman clips (E) on grille opening side.
- Step 6: Place blower box cover (F) over tinnerman clips (E), which were inserted in step 5.
- Step 7: Screw the blower box cover (F) into place with four blower box cover screws (D).



SP/CSP models shown are
UL and cUL listed E 33599

Other Installation Considerations

Ductwork and Noise

Fiberglass ductboard is a better choice than metal ductwork for reducing fan noise and is highly recommended for low sound applications. Where metal duct is used, sound transmission can be reduced with flexible duct connections between the fan and the duct.

Sound and Location

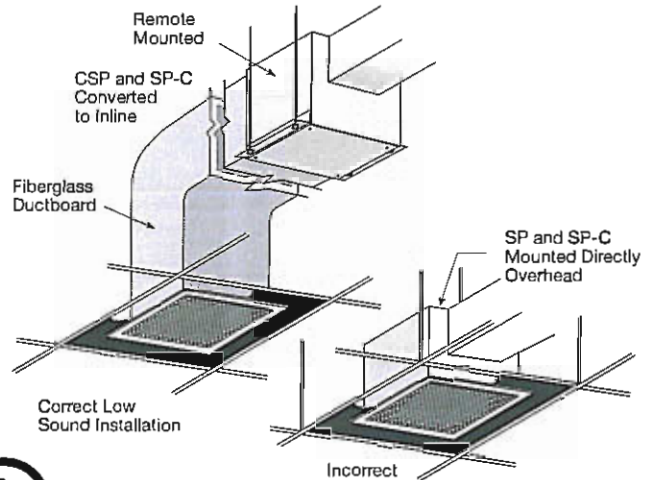
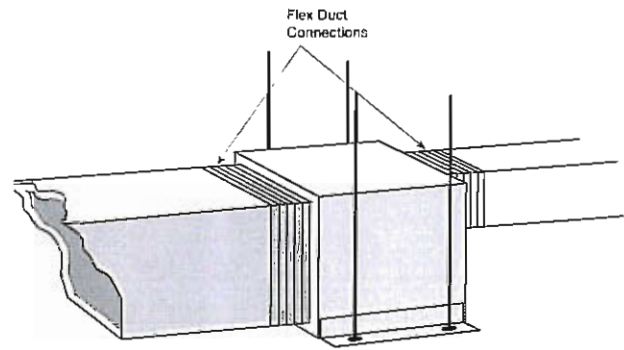
The location of these fans must be taken into consideration before installation. In critical sound installations, insulated ductwork, flexible duct connections or placing the fan in a remote section of ductwork are solutions to meeting the required fan sound levels.

Filters

The addition of an intake filter is highly recommended for these fans, even in clean air environments excess dirt can accumulate on wheels and motors causing reduced performance and imbalance.

Filters, once installed, should be checked and cleaned periodically to maintain performance.

Greenheck offers washable aluminum mesh filters specifically designed for these fans. Please consult our SP/CSP catalog for more information.



SP/CSP models shown are UL and cUL listed E 33599

General Maintenance Suggestions

Model SP/CSP ceiling exhaust fans require very little maintenance. But since small problems over time left unchecked could lead to loss of performance or early motor failure, we do recommend that the unit be inspected periodically (once or twice a year).

The fan motor and wheel should be checked for dust and dirt accumulations. Dirt buildup can lead to loss of performance and motor overheating. Cleaning can be accomplished by brushing off any dust that may have accumulated. Even filtered units can accumulate build-up and should be checked when cleaning filters.

The motor should be checked for lubrication at this time. Lubricate only those motors which have an oil hole provided. A few drops of all purpose oil (SAE 20) will be sufficient.

Warranty

Greenheck warrants this equipment to be free from defects in material and workmanship for a period of three years from the shipment date. Any units or parts which prove defective during the warranty period will be replaced at our option when returned to our factory, transportation prepaid. Motors are warranted by the motor manufacturer for a period of one year. Should motors furnished by Greenheck prove defective during this period, they should be returned to the nearest authorized motor service station. Greenheck will not be responsible for any removal or installation costs. All light bulbs are excluded under this limited warranty.

As a result of our commitment to continuous improvement, Greenheck reserves the right to change specifications without notice.

Greenheck Catalog SP/CSP provides additional information describing the equipment, fan performance, available accessories, and specification data.

AMCA Publication 410-96, Safety Practices for Users and Installers of Industrial and Commercial Fans, provides additional safety information. This publication can be obtained from AMCA International, Inc. at www.amca.org.



Phone: (715) 359-6171 • Fax: (715) 355-2399 • E-mail: gfcinfo@greenheck.com • Website: www.greenheck.com



Duct Heater

EDH-1
Spec. 15800

Supplied by:

CFM
1440 So. Lipan St.
Denver, CO 80223
(970) 493-7293



INSTALLATION, OPERATING AND MAINTENANCE INSTRUCTIONS FOR INDEECO ELECTRIC DUCT HEATERS

GENERAL

This document is to be used for all duct heater installations unless the heater is used in a piece of equipment where the testing and evaluation of the end use equipment supersedes this document. In that case, it is the responsibility of the end use equipment manufacturer to have performed testing for the end use application.

APPLICATION INFORMATION

1. Follow the procedure given on the reverse side of this sheet to find the minimum air velocity for safe operation. At least this minimum velocity must be provided at all points over the heater face area. Failure to meet this requirement may result in serious damage or nuisance thermal cutout tripping.
2. The maximum air inlet temperature for open coil heaters is 100° F, and for finned tubular heaters, 80° F.
3. The heater must be located at least 48" from any grills, registers, filters, abrupt duct size changes, humidifiers, air conditioning or air handling units, or any other change or obstructions in the duct which may result in nonuniform airflow. Duct elbows or turns must be located at least 4' from the inlet of the heater and 2' from the outlet of the heater. Sufficient working space must be provided per paragraph 110-26 of the NEC.
4. These duct heaters are not intended for installation in series in the airstream; the heaters are designed for use only as a single unit within a duct with the exception of Series ZUA, XUA, ZUBA, XUBA, TFXUA, TFXUA, XRA, XRBA, ZRA, ZRBA, TFXRA AND TFZRA which are designed for stacked installation for use as a single unit within a duct. (See Fig. No. 3)

MECHANICAL INSTALLATION

1. Heater terminal outlet box should not be enclosed. Heaters with ventilated terminal box covers must be installed in a position where air passing out of the terminal box does not enter into confined areas of the building structure (such as a space behind a false ceiling, a hollow space in a wall, etc.).
2. All heaters are suitable for installation with zero spacing between the duct and combustible surfaces.
3. The heater must be installed in the correct position as shown by the arrows marked on the terminal box.
4. Sufficient clearance for convection cooling must be allowed for all heaters with built-in SCR Power Controllers. Provide at least 5 inches of free air space above and below cooling fins extending from heater terminal box.
5. The air duct should be installed in accordance with the standards of the National Fire Protection Association for installation of air conditioning and ventilating systems of other than residence type (Pamphlet No. 90A) and residence type warm air heating and air conditioning systems (Pamphlet No. 90B).
6. For proper operation of heaters equipped with a built-in airflow switch, a minimum of .07" WC of static pressure is required in the duct system and the velocity pickup tube for the airflow switch must be pointed in the proper direction. When the heater is installed on the downstream or positive pressure side of the air moving fan, the arrow on the mounting flange of the pickup tube must point in the same direction as the airflow. When the heater is installed on the upstream or negative pressure side of the air moving fan, the arrow must point in the direction opposite to the airflow. If incorrectly installed, remove the two screws holding the pickup tube in place, rotate 180° and reinstall. See separate instruction sheet for installation of heaters supplied with a remote pickup tube.

FOR FLANGE TYPE HEATERS ONLY: (See Fig. No. 1)

7. Provide flanges on the duct to match the heater flanges, both on the entering and leaving air sides.

8. Attach the duct flanges to the heater flanges with bolts, sheet metal screws or slip and drive connectors when the heater has matching connectors for this purpose.

FOR SLIP-IN TYPE HEATERS ONLY: (See Fig. No. 2)

9. Cut a hole in the side of the duct to accommodate the body of the heater (excluding terminal box). This hole should be 1/8" larger than the heater frame.

10. Slip the heater into the duct and attach the back of the terminal box to the duct with sheet metal screws.

FOR STACKED TYPE HEATERS ONLY: (See Fig. No. 3)

11. The heaters with catalog prefix ZUA, ZUBA, XUBA XUA, TFZUA, TFXUA, XRA, XRBA, ZRA, ZRBA, TFXRA or TFZRA must be stacked as indicated in Fig. No. 3.

FOR HEATERS TO BE INSTALLED IN FIBER GLASS DUCTS:

12. Contact factory for special instructions. Note that the fiber glass duct material itself must be UL listed.

FOR HEATERS TO BE INSTALLED IN INTERIOR INSULATED DUCTS:

13. All slip-in type heaters are suitable for installation in ducts with up to 1" of interior insulation as long as they have been sized for the dimensions inside the insulation. The heaters are not suitable for insulation depths of greater than 1" unless a special construction has been ordered. Flange type heaters are only suitable for installation in insulated ducts if specially ordered for this application.

ELECTRICAL INSTALLATION

14. Follow the wiring diagram on the inside of the terminal box.

15. Supply connections must be made with copper wiring rated for 75° C minimum. Use aluminum wire only when specifically called for on accompanying wiring diagram.

16. If supply connections are for 250 volts or greater, all wiring must be insulated for 600 volts.

17. When making line connections to heater element terminals FOR FINNED TUBULAR DUCT HEATERS ONLY, apply a 1/4" wrench to flat section of terminal or nut immediately below threads. Otherwise damage to terminal may result.

18. Supply conductors for heaters rated less than 50 KW, must be sized at 125% of rated load. On heaters rated 50 KW and more, the supply conductors may be sized at 100% of rated load, if indicated on the wiring diagram. The line current for either a single or three phase load is calculated as follows:

$$\text{Single Phase Line Current} = \frac{\text{KW} \times 1000}{\text{Voltage}}$$

$$\text{Three Phase Line Current} = \frac{\text{KW} \times 1000}{\text{Voltage} \times 1.73}$$

19. The following table shows the maximum current for 75 °C. Copper wire with not more than 3 conductors in a raceway. It is based on the National Electrical Code Table 310-16. The amperages shown are for 125% and 100% wire sizing. If there are more than 3 conductors in a raceway, derate these amperages per Table 310-15(B)(2)(a).

AMPS		WIRE SIZE	AMPS		WIRE SIZE	AMPS		WIRE SIZE
125%	100%	AWG/MCM	125%	100%	AWG/MCM	125%	100%	AWG/MCM
12		14	80	100	3	184	230	4/0
16		12	92	115	2	204	255	250
24		10	104	130	1	228	285	300
40		8	120	150	0	248	310	350
52	65	6	140	175	2/0	268	335	400
68	85	4	160	200	3/0	304	380	500

20. When connecting heaters with more than one stage, wire stage No. 1 so that it is the first stage on and the last stage off. Heaters with built-in PE switches must follow this rule also. The stage number will be indicated on the front of each PE switch.

21. The heater must be wired so that it cannot operate unless air is flowing over it. This can be accomplished by using a built-in airflow switch, a built-in fan relay or any of several other methods. See the accompanying wiring diagram for the method used with this heater and provide appropriate interlock wiring as illustrated.

22. National Electrical Code and Underwriters Laboratories require the heater manufacturer to supply 1) over-current protection where heater total current exceeds 48 amperes and 2) any contactors required for proper functioning of temperature limiting controls. Where these devices are not included in the heater terminal box of a UL listed heater, they are supplied in a remote UL listed panel board shown on the wiring diagram.

23. If not supplied as part of this heater, install a line disconnect switch or main circuit breaker in accordance with the National Electrical Code. Depending upon the heater's location and accessibility, a built-in disconnect switch may meet this requirement.

24. All electrical connections in the heater, including both field and factory made connections, should be checked for tightness before operating the heater. In addition, after a short period of operation, all connections should again be checked for tightness.

25. If heater is wired to a heating-cooling thermostat, use a thermostat with isolating circuits to prevent possible interconnection of Class 2 outputs.

26a. If the area inside of the sheet metal directly surrounding the heating element section is more than 1" smaller in length and/or width than the duct in which the duct heater is installed, the KW per square foot of duct area should be calculated as the heater nameplate KW divided by the area inside the sheet metal enclosure directly around the heating elements.

26b. If the heating elements are divided into several sections with uncoiled resistance wire between two or more coiled sections, maximum KW per sq. ft. should be calculated as follows:

$$\frac{\text{Heater nameplate KW}}{\text{Number of heated sections} \times \text{area of one heated section}}$$

INSTALLATION DRAWINGS

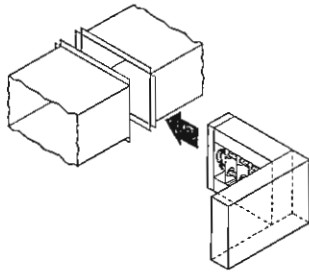


Fig. 1 - Installation drawing of flanged heater.

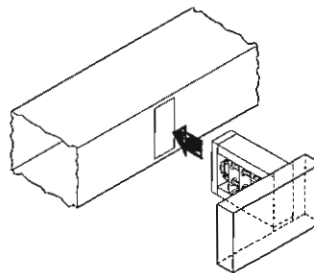


Fig. 2 - Installation drawing of slip-in heater.

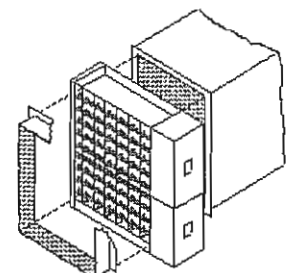


Fig. 3 - Installation drawing of two stacked sections in a duct.

AIR FLOW REQUIREMENTS

Calculate KW per square foot of duct area as: $\frac{\text{heater nameplate KW}}{\text{duct area (Sq.Ft.)}}$ (see #26)

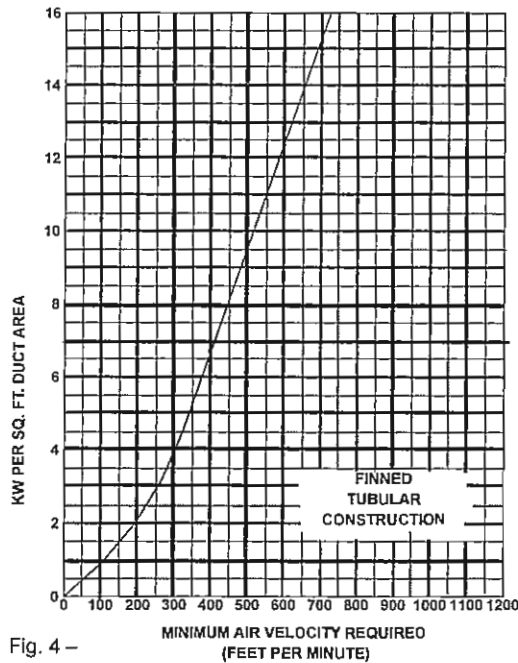


Fig. 4 -

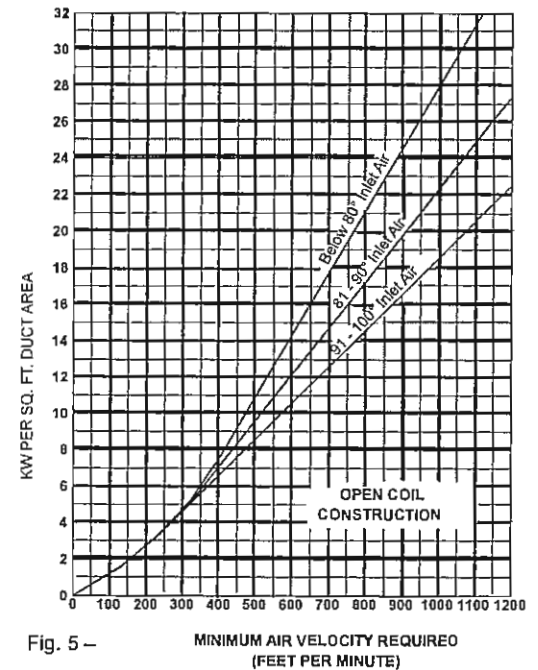


Fig. 5 -

OPERATION & MAINTENANCE NOTICE: ALL SOURCES OF SUPPLY MUST BE DISCONNECTED BEFORE WORKING ON THIS EQUIPMENT

To operate this heater make sure all associated control equipment is on, energize main supply disconnect and set controlling thermostat above ambient temperature. This heater is equipped with automatic and manual reset temperature limiting controls. If it fails to operate, make sure manual resets are operative by pushing reset buttons.

The only routine maintenance required is to check all electrical connections, including field and factory made connections, for tightness at least once each year or operating season. In addition, any filters in the airstream must be kept clean so that adequate airflow is maintained.



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LIMITED WARRANTY

Industrial Engineering and Equipment Company (INDEECO) new products are warranted against defects in workmanship, material, design, labeling and packaging. No other warranty, expressed or implied, written or oral, applies. No person other than an officer or the general manager of INDEECO is authorized to give any other warranty or assume any liability.

Warranty Period

This warranty is effective for eighteen months from the date of shipment of the product from INDEECO's factory, or for twelve months from the date the product is first placed into service, whichever period lapses first.

Conditions of Warranty

INDEECO products must be installed, operated, and maintained in accordance with INDEECO's instructions. INDEECO is not liable for damage or unsatisfactory performance of the product resulting from accident, negligence, alteration, unauthorized repair, improper application or installation of the product, improper specifications, or corrosion. **INDEECO IS NOT LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES.** Claims against carriers for damage in transit must be filed by the purchaser with the carrier.

Remedy

Contact INDEECO sales department at (314) 644-4300, for a Return Material Authorization Number (RMA#) and return instructions.

If after receipt of the product and the claim, INDEECO finds to its reasonable satisfaction that the product is defective in workmanship, material, design, labeling or packaging, the product will be repaired or replaced, or the purchase price refunded at INDEECO's option. There will be no charge to the purchaser for parts or labor. Removal and reinstallation of the product, and shipment of the product to INDEECO for repair or inspection, shall be at the purchaser's risk and expense.

THE REPAIR, REPLACEMENT, OR REFUND PROVIDED FOR IN THIS LIMITED WARRANTY IS THE EXCLUSIVE REMEDY OF THE PURCHASER. THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY OTHER, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE TERMS OF THIS LIMITED WARRANTY.



LIMITED WARRANTY

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Warranty Period

This warranty is effective for eighteen months from the date of shipment of the product from INDEECO's factory, or for twelve months from the date the product is first placed into service, whichever period lapses first.

Conditions of Warranty

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Indirect Fired Air Unit

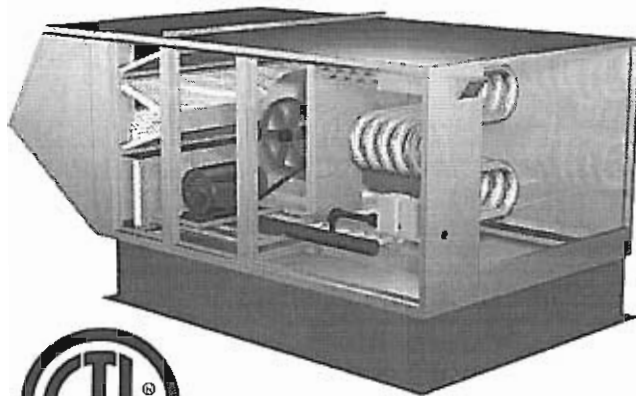
**MAU-1
Spec. 15800**

Supplied by:

**CFM
1440 So. Lipan St.
Denver, CO 80223
(970) 493-7293**

Installation, Operation and Maintenance Manual

Please read and save these instructions. Read carefully before attempting to assemble, install, operate or maintain the product described. Protect yourself and others by observing all safety information. Failure to comply with instructions could result in personal injury and/or property damage. Retain instructions for future reference.



2. The rotation of the wheel is critical. It must be free to rotate without striking or rubbing any stationary objects.
3. Motor must be securely and adequately grounded.
4. Do not spin fan wheel faster than the maximum cataloged fan rpm. Adjustments to fan speed significantly effects motor load. If the fan RPM is changed, the motor current should be checked to make sure it is not exceeding the motor nameplate amps.
5. Do not allow the power cable to kink or come in contact with oil, grease, hot surfaces or chemicals. Replace cord immediately if damaged.
6. Verify that the power source is compatible with the equipment.
7. Never open blower access doors while the fan is running.

General Safety Information

Only qualified personnel should install this unit. Personnel should have a clear understanding of these instructions and should be aware of general safety precautions. Improper installation can result in electric shock, possible injury due to coming in contact with moving parts, as well as other potential hazards. Other considerations may be required if high winds or seismic activity are present. If more information is needed, contact a licensed professional engineer before moving forward.

1. Follow all local electrical and safety codes, as well as the National Electrical Code (NEC), the National Fire Protection Agency (NFPA), where applicable. Follow the Canadian Electric Code (CEC) in Canada.

DANGER
Always disconnect power before working on or near a unit. Lock and tag the disconnect switch or breaker to prevent accidental power up.
CAUTION
When servicing the unit, motor may be hot enough to cause pain or injury. Allow motor to cool before servicing.

FOR YOUR SAFETY
If you smell gas:
<ol style="list-style-type: none"> 1. Open windows. 2. Do not touch electrical switches. 3. Extinguish any open flame. 4. Immediately call your gas supplier.
FOR YOUR SAFETY
The use and storage of gasoline or other flammable vapors and liquids in open containers in the vicinity of this appliance is hazardous.
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.

Receiving

Upon receiving the product check to make sure all items are accounted for by referencing the bill of lading to ensure all items were received. Inspect each crate for shipping damage before accepting delivery. Notify the carrier if any damage is noticed. The carrier will make notification on the delivery receipt acknowledging any damage to the product. All damage should be noted on all the copies of the bill of lading which is countersigned by the delivering carrier. A Carrier Inspection Report should be filled out by the carrier upon arrival and reported to the Traffic Department. If damaged upon arrival, file claim with carrier. Any physical damage to the unit after acceptance is not the responsibility of Greenheck Fan Corporation.

Unpacking

Verify that all required parts and the correct quantity of each item have been received. If any items are missing report shortages to your local representative to arrange for obtaining missing parts. Sometimes it is not possible that all items for the unit be shipped together due to availability of transportation and truck space. Confirmation of shipment(s) must be limited to only items on the bill of lading.

Handling

Units are to be rigged and moved by the lifting brackets provided or by the skid when a forklift is used. Location of brackets varies by model and size. Handle in such a manner as to keep from scratching or chipping the coating. Damaged finish may reduce ability of unit to resist corrosion.

Storage

Units are protected against damage during shipment. If the unit cannot be installed and operated immediately, precautions need to be taken to prevent deterioration of the unit during storage. The user assumes responsibility of the unit and accessories while in storage. The manufacturer will not be responsible for damage during storage. These suggestions are provided solely as a convenience to the user.

1. Plug all piping
2. Store belts flat to keep them from warping and stretching

INDOOR — The ideal environment for the storage of units and accessories is indoors, above grade, in a low humidity atmosphere which is sealed to prevent the entry of blowing dust, rain, or snow. Temperatures should be evenly maintained between 30°F (-1°C) and 110°F (43°C) (wide temperature swings may cause condensation and “sweating” of metal parts). All accessories must be stored indoors in a clean, dry atmosphere.

Remove any accumulations of dirt, water, ice, or snow and wipe dry before moving to indoor storage. To avoid “sweating” of metal parts allow cold parts to reach room temperature. To dry parts and packages

use a portable electric heater to get rid of any moisture build up. Leave coverings loose to permit air circulation and to allow for periodic inspection.

The unit should be stored at least 3½ in. (89 mm) off the floor on wooden blocks covered with moisture proof paper or polyethylene sheathing. Aisles between parts and along all walls should be provided to permit air circulation and space for inspection.

OUTDOOR — Units designed for outdoor applications may be stored outdoors, if absolutely necessary. Roads or aisles for portable cranes and hauling equipment are needed.

The fan should be placed on a level surface to prevent water from leaking into the unit. The unit should be elevated on an adequate number of wooden blocks so that it is above water and snow levels and has enough blocking to prevent it from settling into soft ground. Locate parts far enough apart to permit air circulation, sunlight, and space for periodic inspection. To minimize water accumulation, place all unit parts on blocking supports so that rain water will run off.

Do not cover parts with plastic film or tarps as these cause condensation of moisture from the air passing through heating and cooling cycles.

Inspection and Maintenance during Storage

While in storage, inspect fans once per month. Keep a record of inspection and maintenance performed.

If moisture or dirt accumulations are found on parts, the source should be located and eliminated. At each inspection, rotate the fan wheel by hand ten to fifteen revolutions to distribute lubricant on motor. Every three months, the fan motor should be energized. If paint deterioration begins, consideration should be given to touch-up or repainting. Fans with special coatings may require special techniques for touch-up or repair.

Machined parts coated with rust preventive should be restored to good condition promptly if signs of rust occur. Immediately remove the original rust preventive coating with petroleum solvent and clean with lint-free cloths. Polish any remaining rust from surface with crocus cloth or fine emery paper and oil. Do not destroy the continuity of the surfaces. Wipe thoroughly clean with Tectyl® 506 (Ashland Inc.) or the equivalent. For hard to reach internal surfaces or for occasional use, consider using Tectyl® 511M Rust Preventive or WD-40® or the equivalent.

REMOVING FROM STORAGE — As units are removed from storage to be installed in their final location, they should be protected and maintained in a similar fashion, until the equipment goes into operation.

Prior to installing the unit and system components, inspect the unit assembly to make sure it is in working order.

1. Check all fasteners, set screws on the fan, wheel, bearings, drive, motor base, and accessories for tightness.

2. Rotate the fan wheel(s) by hand and assure no parts are rubbing.
3. After storage period, purge grease before putting fan into service.

Indirect Gas Fired Unit Installations

Units are listed for installation in the United States and Canada

- Installation of gas fired duct furnaces must conform with local building codes. In the absence of local codes, installation must conform to the National Fuel Gas code, ANSI Z223.1 or in Canada, CAN/CGA-B149 installation codes.
- All electrical wiring must be in accordance with the regulation of the National Electric Code, ANSI/NFPA 70.
- Unit is approved for installation downstream from refrigeration units. In these conditions, condensate could form in the duct furnace and provision must be made to dispose of the condensate.

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Clearance to Combustibles / Service Clearances

	Floor	Top	Sides	Ends
Indirect Fired Units*	0 inches (0 mm)	0 inches (0 mm)	0 inches (0 mm)	0 inches (0 mm)

Clearance to combustibles is defined as the minimum distance required between the heater and adjacent combustible surfaces to ensure the adjacent surface's temperature does not exceed 90 degrees above the ambient temperature.

*Reference venting guidelines for combustion blower clearances

Recommended Minimum Service Clearances	
Housing 32 and less	42 inches (1067 mm) on the controls side of the unit

Clearances for component removal (such as evaporative cooler media) may be greater than the service clearances listed.

Installation of Indoor Unit

NOTE

To prevent premature heat exchanger failure, do not locate units where chlorinated, halogenated, or acid vapors are present.

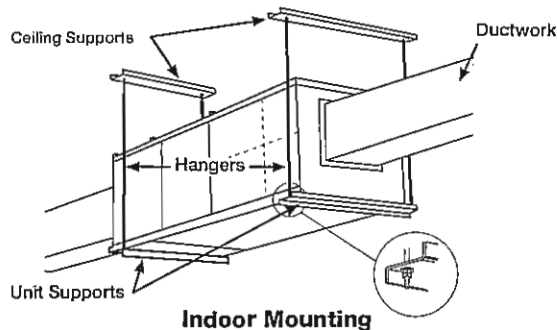
1. Install Hangers

Install threaded hangers from ceiling supports. When locating hangers, allow enough room to open access panel(s). Two nuts must be used on the end of each threaded hanger. Ceiling supports are supplied by others.

2. Install Unit

Raise the unit into place. Using two nuts per hanger, fasten the unit supports to hangers under the unit. Appropriate unit supports, such as the optional Greenheck hanging bracket kit or c-channel and angle iron (supplied by others) should be used.

Using self tapping screws, attach ductwork to unit. In order to prevent the unit from swinging and to provide a safe environment for service and maintenance, additional measures must be taken to secure the unit in all directions.



Indoor Mounting

NOTE

Two nuts must be used on each end of each threaded hanging rod for proper support.

WARNING

All factory provided lifting lugs must be used when lifting any unit. Failure to comply with this safety precaution could result in property damage, serious injury or death.

NOTE

Good duct practices should be followed for all ductwork. Ductwork should be installed in accordance with SMACNA and AMCA guidelines, NFPA 96 and any local codes. Reference the CAPS submittal for duct sizes.

3. Install Vent Piping

Refer to the Indoor Venting Instructions. Refer to your unit submittal to determine the correct venting option.

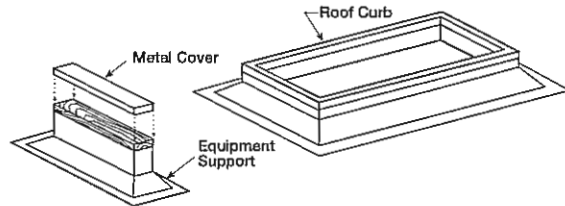
NOTE

Vent piping is supplied by others and not supplied by Greenheck.

Installation of Arrangement DB / HZ

1. Install Curb and/or Equipment Support(s)

Position curb/equipment support(s) on the roof (reference the CAPS submittal for placement of curb/equipment support(s) in relation to the unit). Verify that unit supports are level, shim if necessary. Attach curb to roof and flash into place. Attach the equipment support(s) to the roof, remove metal cover, flash to wooden nailer and reinstall cover.

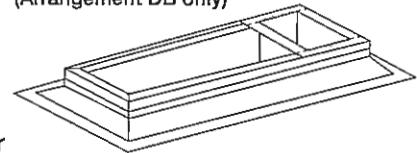


Roof Curb and Equipment Support

2. Install Ductwork

Good duct practices should be followed for all ductwork. All ductwork should be installed in accordance with SMACNA and AMCA guidelines, NFPA 96 and all local codes. Reference the CAPS submittal for ductwork sizes.

Supply Air Ductwork
(Arrangement DB only)



Ductwork

NOTE

The use of a duct adapter is recommended on a downblast (DB) arrangement to align the ductwork with the supply unit. The duct adapter is only a guide and is not to be used as support for the ductwork.

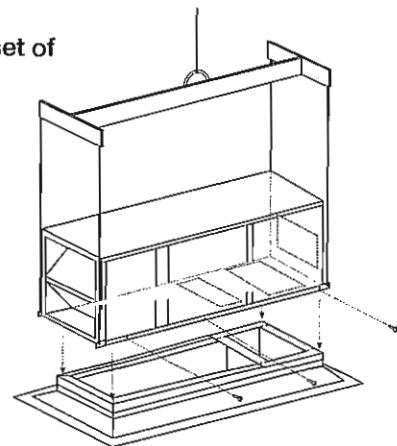
3. Apply Sealant

Apply an appropriate sealant around the perimeter of the curb and duct adapter(s) to isolate fan vibration and prevent water penetration.

4. Install Unit

Use a crane and a set of spreader bars hooked to the factory lifting lugs to lift and center the unit on the curb/equipment support(s).

Use self-tapping sheet metal screws to fasten the unit to the curb/equipment support(s).



Setting Unit

NOTE

The use of all lifting lugs and a set of spreader bars is mandatory when lifting the unit.

NOTE

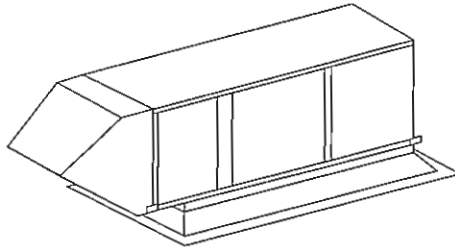
Some units come with the weatherhood attached and step 5 may not apply.

5. Assemble and Attach Weatherhood

The weatherhood can now be assembled and attached to the unit. Detailed assembly instructions can be found with the weatherhood. If the optional evaporative cooling module was selected, this step does not apply, refer to the installation instructions for the Optional Evaporative Cooling Module section, page 7.

6. Seal Weatherhood Seam

Using an appropriate sealant, seal the seam between the weatherhood and the unit.

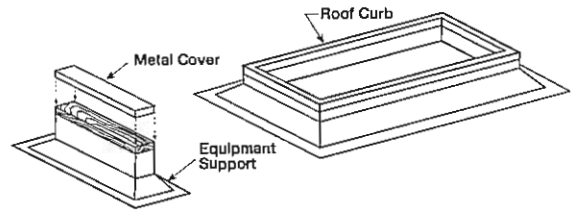


Complete Rooftop Installation

Installation of Roof Mounted Unit Arrangement DBC

1. Install Curb/Equipment Support(s)

Position curb/equipment support(s) on the roof (reference the CAPS submittal for placement of curb/equipment support(s) in relation to the unit). Verify that all unit supports are level, shim if necessary. Attach curb to roof and flash into place. Attach the equipment support(s) to the roof, remove metal cover, flash to wooden nailer and reinstall cover.



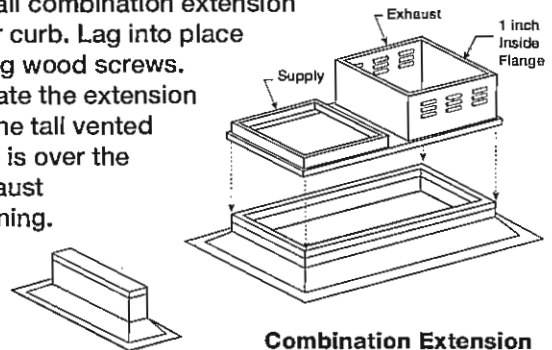
Roof Curb and Equipment Support

NOTE

Refer to Outdoor Venting instructions when locating the unit.

2. Install Combination Extension

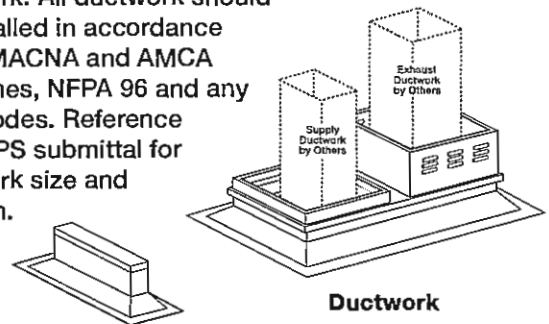
Install combination extension over curb. Lag into place using wood screws. Locate the extension so the tall vented side is over the exhaust opening.



Combination Extension

3. Install Ductwork

Good duct practices should be followed for all ductwork. All ductwork should be installed in accordance with SMACNA and AMCA guidelines, NFPA 96 and any local codes. Reference the CAPS submittal for ductwork size and location.



Ductwork

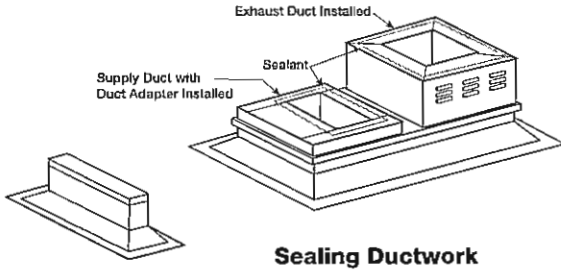
NOTE

The use of a duct adapter is recommended on a downblast (DBC) arrangement to align the ductwork with the supply unit. The duct adapter is only a guide and is not to be used as support for the ductwork.

Installation of Roof Mounted Unit Arrangement DBC, *continued*

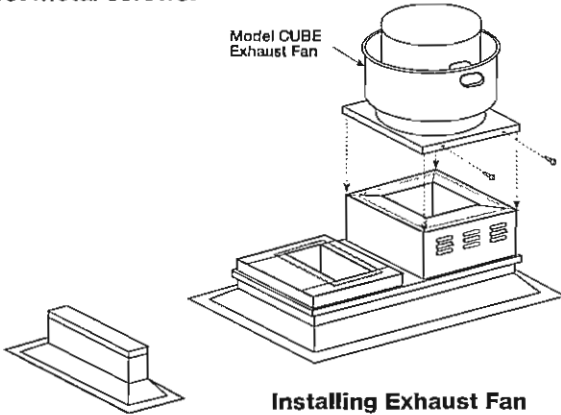
4. Apply Sealant

Apply an appropriate sealant around the perimeter of the curb and duct adapter(s) to isolate fan vibration and prevent water penetration.



5. Install Exhaust Fan

Fasten exhaust fan to curb extension with self-tapping sheet metal screws.



NOTE
Installing the exhaust fan prior to the supply unit will allow for easier installation of options.

6. Install Exhaust Options

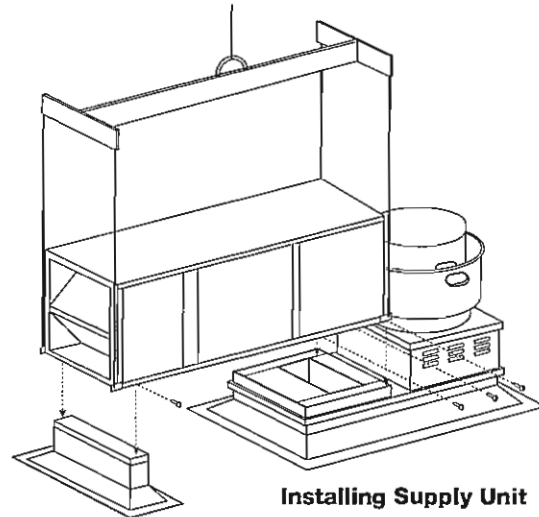
Install optional Greenheck hinge kit with restraining cables and grease trap with drain connection.

NOTE
NFPA 96 requires that the exhaust fan be hinged.

7. Install Supply Unit

Use a crane and a set of spreader bars hooked to the factory lifting lugs to lift and center the unit on the extension/equipment support(s).

Use self-tapping sheet metal screws to fasten the unit to the extension/equipment support(s).



NOTE
The use of all lifting lugs and a set of spreader bars is mandatory when lifting unit.

NOTE
Be sure to complete the outdoor venting installation instructions.

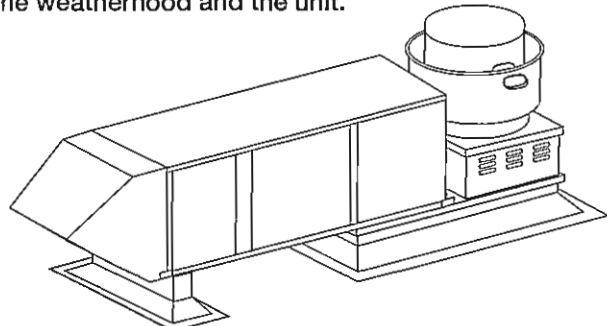
NOTE
Some units come with the weatherhood attached and step 8 may not apply.

8. Assemble and Attach Weatherhood

The weatherhood can now be assembled and/or attached to the unit. Detailed assembly instructions can be found with the weatherhood. If the optional evaporative cooling module was selected, this step does not apply, refer to the Installation Instructions for the Optional Evaporative Cooling Module section, page 7.

9. Seal Weatherhood Seam

Using an appropriate sealant, seal the seam between the weatherhood and the unit.



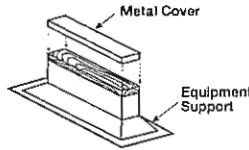
Installation of Evaporative Cooling Module (optional)

NOTE

Small evaporative coolers ship attached to the base unit and require no additional mounting.

1. Locate Equipment Support(s)

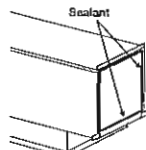
Position equipment support(s) on the roof (reference the CAPS submittal for placement of equipment support(s) in relation to the unit). Verify that all unit supports are level, shim if necessary. Attach equipment support to the roof, remove metal cover, flash to wooden nailer and reinstall cover.



Equipment Support

2. Apply Sealant

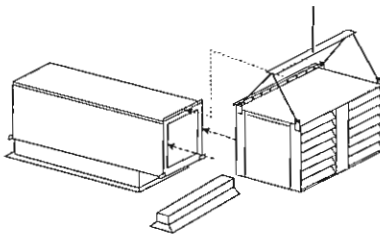
Apply an appropriate sealant around the airstream opening to create an air tight seal.



Sealant

3. Set Evaporative Cooling Module

Use a crane and a set of spreader bars hooked to the factory lifting lugs to lift and center the module on the equipment support(s). The flange on the evaporative cooler should overlap the flange on the unit.



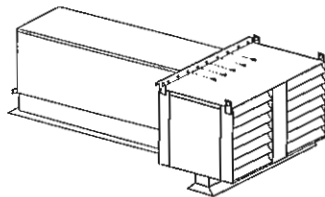
Placing Evaporative Module

NOTE

The use of all lifting lugs and a set of spreader bars is mandatory when lifting the evaporative cooling module.

4. Secure Cooling Module to Unit

Use self-tapping screws to fasten the cooling module to the base unit along the top and down both sides. Fasten at the top through the flanges. To fasten the sides, the media must be removed. To remove the media, first remove the access panel on the evaporative module and disconnect the evaporative pump(s). The media will now slide out. With the media removed, you can access the side fastening points inside the evaporative module. With all the screws in place, reinstall the media, reconnect the pumps and reinstall the access panel.



Securing Evaporative Module

NOTE

When mounting the evaporative cooler, it is important that it is level to ensure proper operation and water drainage.

Installation of Venting for Outdoor Units

1. Follow Guidelines

All of the following guidelines must be followed when installing the unit.

WARNING

Do not install units in locations where flue products can be drawn into adjacent building openings such as windows, fresh air intakes, etc. Distance from vent terminal to adjacent public walkways, adjacent buildings, operable windows, and building openings shall conform with the local codes. In the absence of local codes, installation shall conform with the National Fuel Gas Code, ANSI Z223.1, or the CAN/CGA B-149 Installation Codes.

WARNING

The following guidelines must be followed for all outdoor units:

1. Building materials that will be affected by flue gases should be protected.
2. Maintain minimum horizontal clearance of 4 feet from electric meters, gas meters, regulators, and relief equipment. In Canada, the minimum clearance is 6 feet.
3. The combustion blower discharge on outdoor units must be located a minimum of 42 inches from any combustible materials.
4. Do not modify or obstruct the combustion air inlet cover or the combustion blower weatherhood.
5. Do not add vents other than those supplied by the manufacturer.
6. During the winter, keep the unit clear of snow to prevent any blockage of the combustion venting.

2. Install Stack (Optional)

Clearance may require an exhaust stack. Install an exhaust stack as needed to the exhaust connection on the unit. Install a vent terminal on the exhaust pipe.

Installation of Venting for Indoor Units

WARNING

The following guidelines must be followed for all indoor units:

1. Installation of venting must conform with local building codes. In the absence of local codes, installation must conform with the National Fuel Gas Code, ANSI Z223.1 or in Canada, CAN/CGA-B149 installations codes.
2. For the exhaust pipe, use pipe approved for a category III appliance or single wall, 26 gauge or heavier galvanized vent pipe. The piping is required to be gas tight by ANSI.
3. For the combustion air pipe on separated combustion units, sealed single-wall galvanized air pipe is recommended.
4. The joints must be sealed with a metallic tape or Silastic™ suitable for temperatures up to 350°F.
5. A minimum of 12 inches of straight vent pipe is recommended after the exhaust connection and before any elbows.
6. Vertical combustion air pipes should be fitted with a tee, drip leg and clean-out cap to prevent any moisture in the combustion air pipe from entering the unit.
7. To reduce condensation, insulate any vent runs greater than 5 feet.
8. All vent pipe connections should be made with at least three corrosion resistant sheet metal screws.
9. Refer to the National Fuel Gas Code for additional piping guidelines.

NOTE

Vent piping is supplied by others and not supplied by Greenheck.

NOTE

The drip leg should be cleaned out periodically during the heating season.

NOTE

Clearances from combustible material for indoor units are determined by the National Fuel Gas Code and/or other local codes.

Venting Methods

There are three venting methods for indoor mounted units. For each method, the units can be vented horizontally through an exterior wall or vertically through the roof. Specific venting instructions are provided for each method and shown in the following pages. Construct the vent system as shown in these instructions. Refer to your unit specific submittal to determine the applicable venting option.

The venting method options are:

Standard Indoor Venting

- uses building air for combustion
- vents exhaust to outdoors
- one exterior roof or wall penetration

Separated Combustion Concentric Venting

- uses outside air for combustion
- vents exhaust to outdoors
- one exterior roof or wall penetration

Separated Combustion 2-Pipe Venting

- uses outside air for combustion
- vents exhaust to outdoors
- two exterior roof or wall penetrations

NOTE

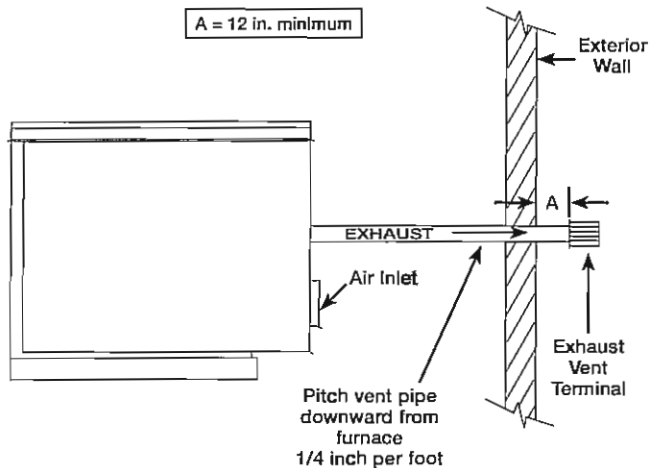
For each method, the units can be vented horizontally through an exterior wall or vertically through the roof. Refer to the specific venting instructions for your unit. Construct the vent system as shown in these instructions.

Installation of Standard Indoor Venting

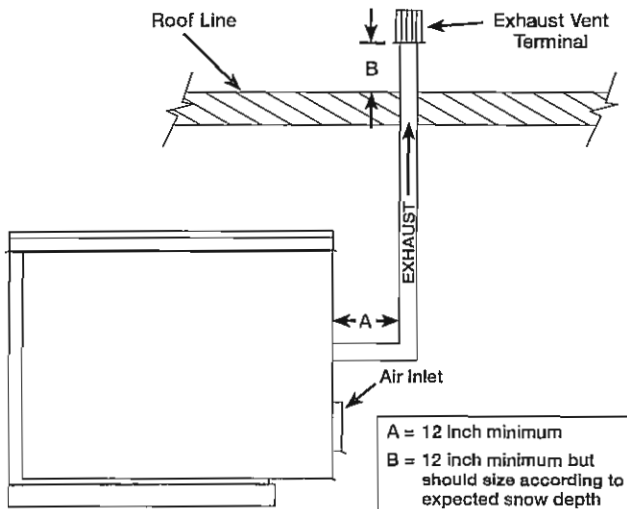
Standard Indoor Venting uses one penetration through an exterior wall or roof for venting the flue exhaust. The combustion air is supplied from the air inside the building. Units must not be installed in a potentially explosive, flammable, or corrosive atmosphere. To prevent premature heat exchanger failure, do not locate unit where chlorinated, halogenated or acid vapors are present.

When units are installed in tightly sealed buildings, provisions should be made to supply an adequate amount of infiltration air from the outside. The rule of thumb is that an opening of one square inch should be provided for every 1000 BTUs per hour of input rating.

Vent terminals must be used. Construct the vent system as shown in the drawings. Reference the Vent Pipe Diameter table and Exhaust Vent Pipe table for additional details.



Standard Indoor Venting - Horizontal



Standard Indoor Venting - Vertical

Vent Pipe Diameter

Select the vent pipe diameter. Use only the specified pipe diameter.

Furnace Size (MBH)	Exhaust Pipe Diameter (Inches)
75 - 175	4
200 - 400	6

Installing Exhaust Vent Pipe

Install the vent pipe with a minimum downward slope (from the unit) of 1/4-inch per foot (horizontal venting only). Securely suspend the pipe from overhead structures at points no greater than 3 feet apart. The minimum vent length is 5 feet for horizontal and 10 feet for vertical. The maximum vent length is 70 feet. The total equivalent vent length must include elbows. The equivalent length of a 4 inch elbow is 6 feet and the equivalent length of a 6 inch elbow is 10 feet. Attach the vent terminal to the end of the exhaust pipe.

Vent Length	Minimum (feet)	Maximum (feet)
Horizontal	5	70
Vertical	10	70

Installation of Concentric Venting (General)

Concentric venting allows the exhaust pipe and combustion air pipe to pass through a single hole in the roof or wall of the building. A concentric venting adapter (CVA) is required for concentric venting.

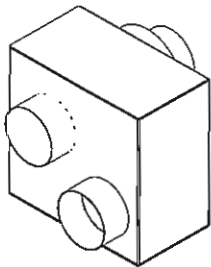
The concentric venting adapter is designed for indoor installations and should never be installed on the exterior of the building.

The exhaust pipe must terminate with the vent terminal. For horizontal venting, the combustion air pipe must terminate with the combustion air guard. For vertical venting, the combustion air pipe must terminate with the inlet terminal. Depending on what was ordered, one of these vent terminals will be provided in the optional venting kit along with the concentric venting adapter (CVA).

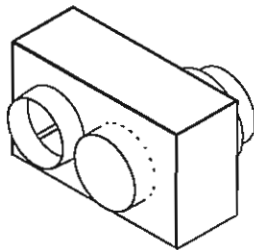
If venting vertically through the roof, refer to the vertical concentric venting instructions. If venting horizontally through the wall, refer to the horizontal concentric venting instructions.

NOTE

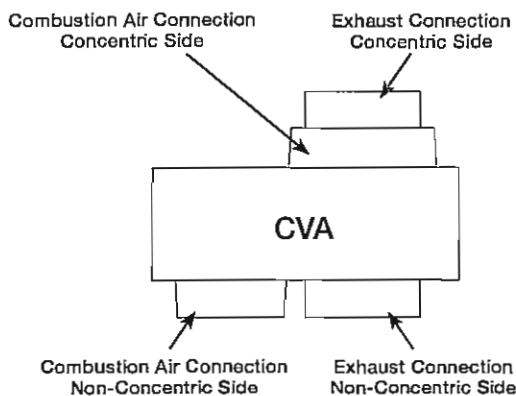
Vent piping is supplied by others and not supplied by Greenheck.



CVA-4
4-inch Concentric Venting Adapter



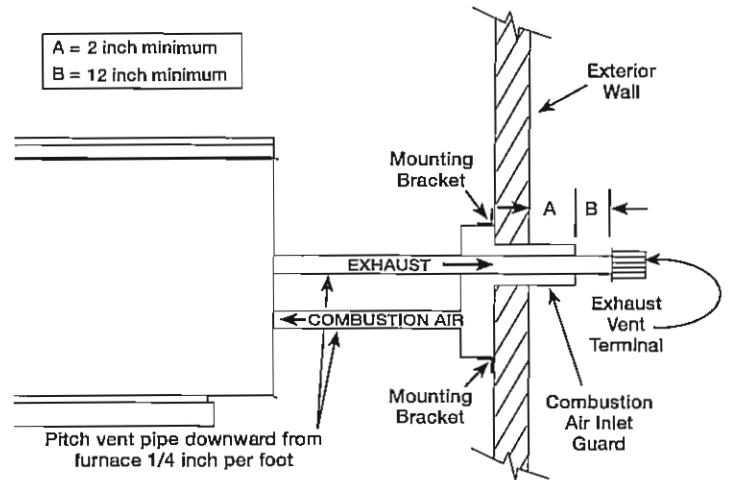
CVA-6
6-inch Concentric Venting Adapter



Top View

Concentric Venting – Horizontal

Refer to the diagram below for venting on horizontal concentric systems. Maintain at least 12 inches from the combustion air inlet guard to the exhaust vent terminal (Dim. B). To prevent water from running into the combustion air pipe and to allow for easy installation of the combustion air inlet guard, the combustion air pipe must terminate at least 2 inches from the exterior surface of the outside wall (Dim. A).



Vent Connection Diameter

Vent terminals must be used (one vent terminal included with each furnace). Construct the vent system as shown in the drawings and refer to the table for the correct vent connection diameters.

Furnace Size (MBH)	Non-Concentric Vent Connection Diameter		Concentric Vent Connection Diameter	
	Exhaust (inches)	Combustion Air (inches)	Exhaust (inches)	Combustion Air (inches)
75-175	4	4	4	6
200-400	6	6	6	8

Vent Length

Refer to table for minimum and maximum vent lengths. The total equivalent vent length must include elbows. The equivalent length of a 4 inch elbow is 6 feet and the equivalent length of a 6 inch elbow is 10 feet.

Vent Length	Minimum (feet)	Maximum (feet)
Horizontal	5	70

1. Determine Venting Location

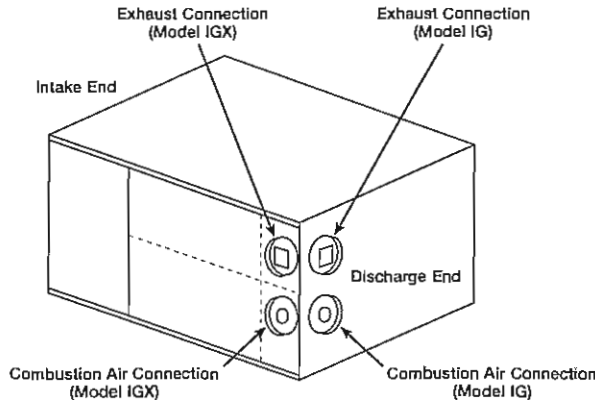
Determine the location of the concentric venting adapter (CVA) based on any clearances that must be maintained (follow all codes referenced in these instructions).

2. Attach Mounting Brackets

Attach field supplied, corrosion resistant, mounting brackets to the CVA using corrosion resistant sheet metal screws.

3. Install Exhaust Pipe

Slide the exhaust pipe through the CVA. Provide enough exhaust piping to pass through the wall (or floor) and provide the minimum clearance of 12 inches between the exhaust pipe termination and the combustion air intake. With all required clearances satisfied, attach the exhaust pipe to the CVA.



4. Install Combustion Air Pipe

Attach a field supplied combustion air pipe to the concentric side of the CVA.

Be sure to provide enough combustion air piping to pass through the wall and provide the minimum clearance of 2 inches between the combustion air intake and the exterior surface of the outside wall.

Be sure to maintain the minimum clearance of 12 inches between the exhaust pipe termination and the combustion air intake.

5. Install CVA Assembly

Place the CVA assembly through the wall and verify that all minimum clearance requirements as specified in these instructions are met. Secure the CVA assembly to the wall with corrosion resistant sheet metal screws through the mounting brackets.

6. Attach CVA Assembly to Unit

Attach the exhaust pipe to the unit's combustion exhaust. Using an additional combustion air pipe, connect the unit's combustion air supply intake to the combustion air connection on the CVA.

7. Install Combustion Air Inlet Guard and Exhaust Vent Terminal

Slide the combustion air inlet guard over the exhaust pipe and fasten it to the combustion air pipe. Attach the exhaust vent terminal to the discharge end of the exhaust piping on the outside of the building.

8. Seal Opening

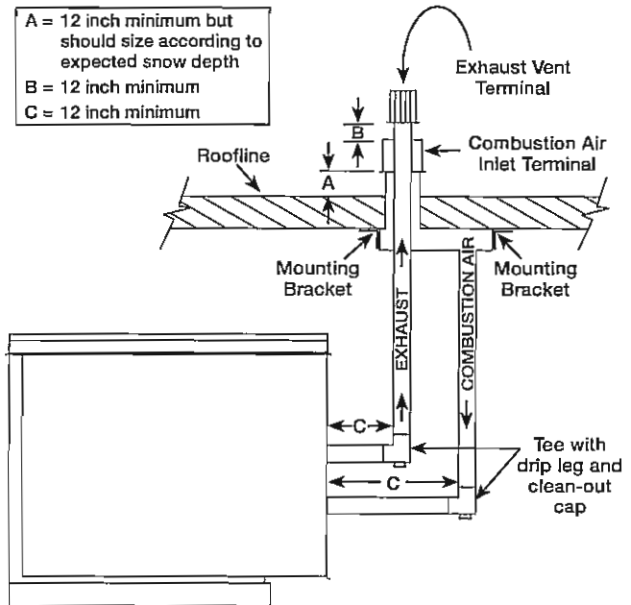
Seal the opening between the wall and the air intake pipe using an appropriate method.

Concentric Venting – Vertical

Refer to the diagram below for venting on vertical concentric systems. Maintain at least 12 inches between the top of the combustion air inlet terminals and the bottom of the exhaust terminal. (Dim. B).

The bottom of the combustion air intake pipe must terminate above the snow line or at least 12 inches above the roof, whichever is greater.

A tee with cleanout must be provided on the combustion air and exhaust pipe to prevent debris from entering the heat exchanger.



Vent Connection Diameter

Vent terminals must be used. Construct the vent system as shown in the drawings and refer to the table for the correct vent connection diameters.

Furnace Size (MBH)	Non-Concentric Vent Connection Diameter		Concentric Vent Connection Diameter	
	Exhaust (inches)	Combustion Air (inches)	Exhaust (inches)	Combustion Air (inches)
75-175	4	4	4	6
200-400	6	6	6	8

Vent Length

Refer to table for minimum and maximum vent lengths. The total equivalent vent length must include elbows. The equivalent length of a 4 inch elbow is 6 feet and the equivalent length of a 6 inch elbow is 10 feet.

Vent Length	Minimum (feet)	Maximum (feet)
Vertical	10	70

1. Determine Venting Location

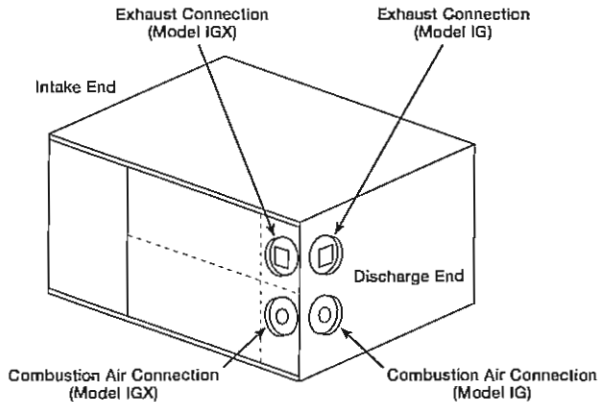
Determine the location of the concentric venting adapter (CVA) based on any clearances that must be maintained (follow all codes referenced in these instructions).

2. Attach Mounting Brackets

Attach field supplied, corrosion resistant, mounting brackets to the CVA using corrosion resistant sheet metal screws.

3. Install Exhaust Pipe

Slide the exhaust pipe through the CVA. Provide enough exhaust piping to pass through the roof and provide the minimum clearance of 12 inches between the exhaust pipe termination and the combustion air intake. With all required clearances satisfied, attach the exhaust pipe to the CVA.



4. Install Combustion Air Pipe

Attach a field supplied combustion air pipe to the concentric side of the CVA.

Be sure to provide enough combustion air piping to pass through the roof and provide the minimum clearance of 12 inches between the combustion air intake and the exterior surface of the roof. This clearance may need to be increased to allow for snow accumulation.

Be sure to maintain the minimum clearance of 12 inches between the exhaust pipe termination and the combustion air intake.

5. Install CVA Assembly

Place the CVA assembly through the roof and verify that all minimum clearance requirements as specified in these instructions are met. Secure the CVA assembly to the ceiling with corrosion resistant sheet metal screws through the mounting brackets.

6. Attach CVA Assembly to Unit

Attach the exhaust pipe to the unit's combustion exhaust. Using an additional combustion air pipe, connect the unit's combustion air supply intake to the combustion air connection on the CVA.

Be sure to include the required tee's with drip legs and clean-outs.

7. Install Combustion Air Inlet Guard and Exhaust Vent Terminal

Slide the combustion air terminal over the vent pipe and fasten it to the combustion air pipe. Attach the exhaust vent terminal to the discharge end of the exhaust piping.

8. Seal Opening

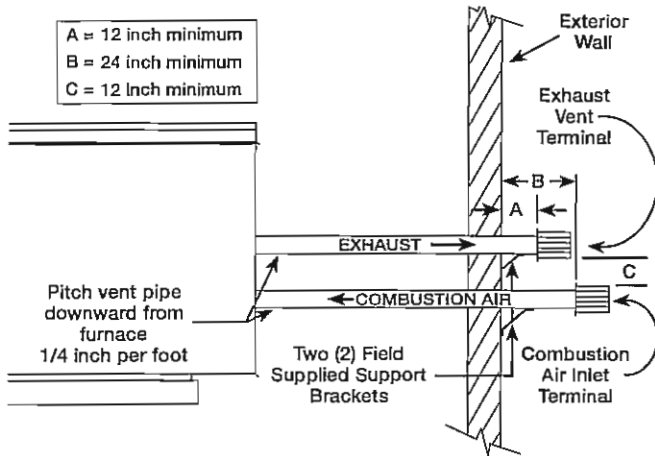
Seal the opening between the roofs and the air intake pipe using an appropriate method.

Installation of Two Pipe Venting – Horizontal

Refer to the diagram below for venting on horizontal concentric systems. Maintain at least 12 inches of clearance between the exhaust pipe termination and the exterior surface of the exterior wall (Dim. A).

The combustion air pipe must be a minimum of 12 inches from the exhaust pipe and 24 inches from the exterior surface of the outside wall (Dim. B).

A minimum of 1 inch and a maximum of 48 inches of building wall thickness is required for separated combustion vent pipe.



Vent Connection Diameter

Vent terminals must be used. The optional vent kit includes two terminals. Construct the vent system as shown in the drawings and refer to the table for the correct vent connection diameters.

Furnace Size (MBH)	Exhaust (inches)	Combustion (inches)
75 - 175	4	6
200 - 400	6	8

Vent Length

Refer to table for minimum and maximum vent lengths. The minimum vent length is 5 feet and the maximum vent length is 50 feet. The total equivalent vent length must include elbows. The equivalent length of a 4 inch elbow is 6 feet and the equivalent length of a 6 inch elbow is 10 feet.

Vent Length	Minimum (feet)	Maximum (feet)
Horizontal	5	50

1. Install Exhaust Pipe

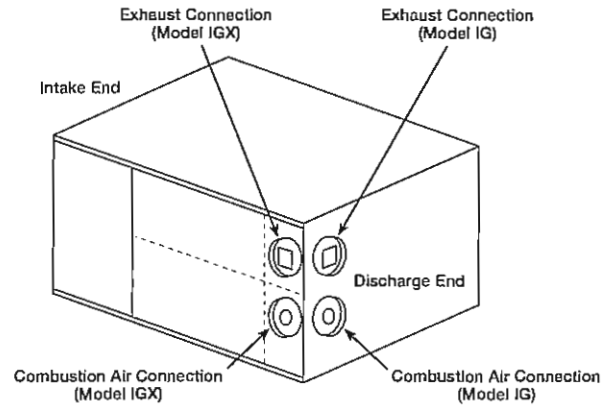
Run an exhaust pipe from the unit's combustion exhaust through the exterior wall to the outdoors. The exhaust pipe must terminate at least 12 inches from the outside surface of the outside wall. Attach exhaust vent terminal to the end of the exhaust pipe. Using field supplied mounting brackets, support the exhaust pipe as needed.

2. Install Combustion Air Pipe

Run a combustion air pipe from the unit's combustion air intake through the exterior wall to the outdoors. The combustion air pipe must terminate at least 12 inches from the combustion vent pipe and 24 inches from the exterior surface of the outside wall. Attach the combustion air inlet guard to the end of the combustion air pipe. Using field supplied mounting brackets, support the combustion air pipe as needed.

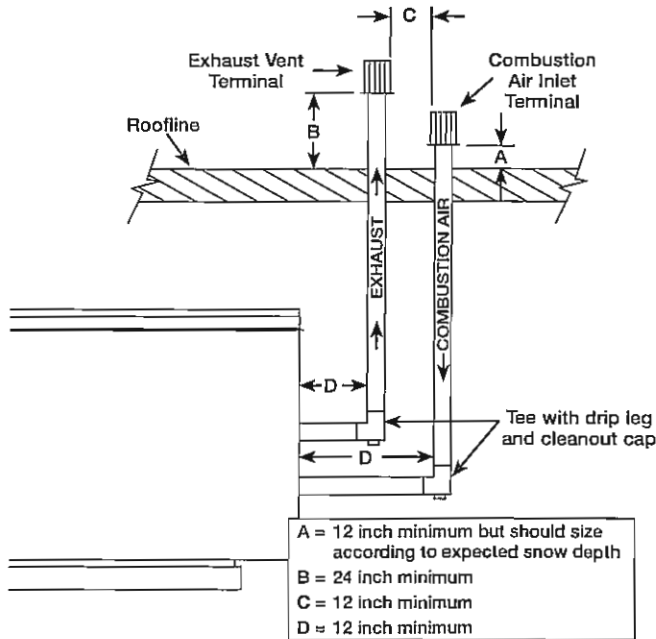
3. Seal Wall Openings

Using an appropriate method, seal the wall openings around the piping.



Installation of Two Pipe Venting – Vertical

Refer to the diagram below for venting on vertical concentric systems. The combustion air pipe must terminate at least 12 inches above the roof. This clearance may need to be increased to accommodate for snow accumulation. The exhaust must terminate at least 12 inches above and 12 inches horizontally from the combustion air inlet.



Vent Connection Diameter

Vent terminals must be used. Construct the vent system as shown in the drawings and refer to the table for the correct vent connection diameters.

Furnace Size (MBH)	Exhaust (inches)	Combustion (inches)
75 - 175	4	6
200 - 400	6	8

Vent Length

Refer to table for minimum and maximum vent lengths. The minimum vent length is 10 feet and the maximum vent length is 70 feet. The total equivalent vent length must include elbows. The equivalent length of a 4 inch elbow is 6 feet and the equivalent length of a 6 inch elbow is 10 feet.

Vent Length	Minimum (feet)	Maximum (feet)
Vertical	10	70

1. Install Exhaust Pipe

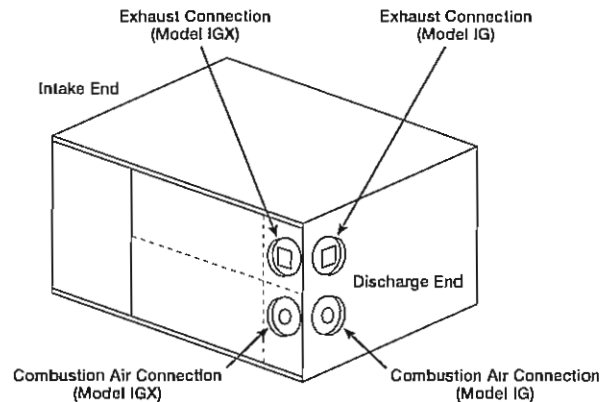
Run an exhaust pipe from the unit's combustion exhaust through the roof to the outdoors. The exhaust pipe must terminate at least 12 inches above the outside surface of the roof. This clearance may need to be increased to accommodate snow accumulation. Attach the exhaust vent terminal to the end of the exhaust pipe.

2. Install Combustion Air Pipe

Run a combustion air pipe from the unit's combustion air intake through the roof to the outdoors. The combustion air pipe must terminate at least 12 inches horizontally and vertically from the combustion exhaust pipe and at least 24 inches from the exterior surface of the roof. These clearances may need to be increased to accommodate for expected snow accumulation. Attach the combustion air terminal to the end of the combustion air pipe.

3. Seal Roof Penetration

Using an appropriate method, seal the roof openings around the vent pipes.



Installation - Electrical Wiring

IMPORTANT

Before connecting power to the unit, read and understand the following instructions and wiring diagrams. Complete wiring diagrams are attached on the inside of the control center door(s).

IMPORTANT

All wiring should be done in accordance with the latest edition of the National Electric Code ANSI/NFPA-70 and any local codes that may apply. In Canada, wiring should be done in accordance with the Canadian Electrical Code.

CAUTION

If replacement wire is required, it must have a temperature rating of at least 105°C, except for energy cut-off or sensor lead wire which must be rated to 150°C.

IMPORTANT

The equipment must be properly grounded. Any wiring running through the unit in the airstream must be protected by metal conduit, metal clad cable or raceways.

DANGER

High voltage electrical input is needed for this equipment. This work should be performed by a qualified electrician.

CAUTION

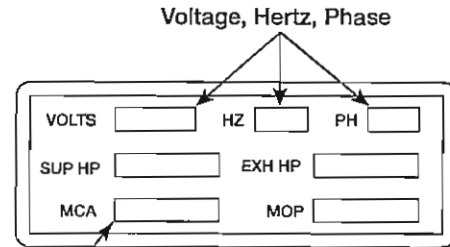
Any wiring deviations may result in personal injury or property damage. Greenheck is not responsible for any damage to, or failure of the unit caused by incorrect final wiring.

IMPORTANT

Greenheck's standard control voltage is 24 VAC. Control wire resistance should not exceed 0.75 ohms (approximately 285 feet total length for 14 gauge wire; 455 feet total length for 12 gauge wire). If the resistance exceeds 0.75 ohms an industrial-style, plug-in relay should be wired in place of the remote switch. The relay must be rated for at least 5 amps and have a 24 VAC coil. Failure to comply with these guidelines may cause motor starters to chatter or not pull in, resulting in contactor failures and/or motor failures.

1. Determine the Size of the Main Power Lines

The unit's nameplate states the voltage and the unit's total MCA. The main power lines to the unit should be sized accordingly. The nameplate is located on the outside of the unit on the control panel side.



Electrical Nameplate

2. Provide the Opening(s) for the Electrical Connections

Electrical openings vary by unit size and arrangement and are field supplied.

3. Connect the Main Power

Connect the main power lines to the disconnect switch and main grounding lug(s). Torque field connections to 20 in.-lbs.

4. Wire the Optional Convenience Outlet

The convenience outlet requires a separate 115V power supply circuit. The circuit must include short circuit protection which may need to be supplied by others.

5. Wire the Optional Accessories

Reference the ladder diagram on the inside of the control center door for correct wiring of the following accessories:

- Selectra Stat
- Room Override
- Blower Switch
- Heat Switch
- Indicating Lights
- Dirty Filter Indicator
- TSCP
- KSCP
- Economizer Activator
- Room Stat

NOTE

Wiring to the Selectra Stat or room override should be in separate conduit or run with shielded cable.

NOTE

The TSCP and KSCP remote panels have number-to-number wiring.

6. Wire the Evaporative Cooler (optional)

Reference the ladder diagram on the inside of the control center door for correct wiring of the pump and the optional water valves.

NOTE

Large evaporative coolers may require a separate power supply.

7. Install Economizer Sensors (optional)

All economizer options (EC) require an outdoor air temperature or enthalpy sensor to be field installed inside of the weatherhood and field wired to terminals *SO+* and *SO-* on the economizer.

Economizer options EC-3 and EC-4 require an outdoor air temperature or enthalpy sensor to be field installed in the return air duct and field wired to terminals *SR+* and *SR-* on the economizer.

The sensors are provided by the factory and ship with the unit.

8. Install Discharge Air Sensor (optional)

For units with 8:1, 16:1 or 24:1 staged turndown, install the discharge air sensor at least three duct diameters downstream of the heat exchanger. The discharge air sensor can be found in the unit's control center.

9. Install DDC Interface (Optional)

Some units may use an external signal from a building management system to control the dampers and/or discharge air temperature. Reference the unit ladder diagram for the correct wiring.

Installation of Gas Piping

IMPORTANT

All gas piping must be installed in accordance with the latest edition of the National Fuel Gas Code ANSI/Z223.1 and any local codes that may apply. In Canada, the equipment shall be installed in accordance with the Installation Code for Gas Burning Appliances and Equipment (CGA B149) and Provincial Regulations for the class. Authorities having jurisdiction should be consulted before installations are made.

IMPORTANT

All piping should be clean and free of any foreign material. Foreign material entering the gas train can cause damage.

WARNING

All components of this or any other gas fired heating unit must be leak tested prior to placing the unit into operation. A soap and water solution should be used to perform this test. NEVER test for gas leaks with an open flame.

IMPORTANT

Do NOT connect the unit to gas types other than what is specified and do NOT connect the unit to gas pressures that are outside of the pressure range shown on the label.

WARNING

When leak testing pressures equal to or less than 14 in. wc (3.5 kPa), first close the field-installed shutoff valve to isolate the unit from the gas supply line.

NOTE

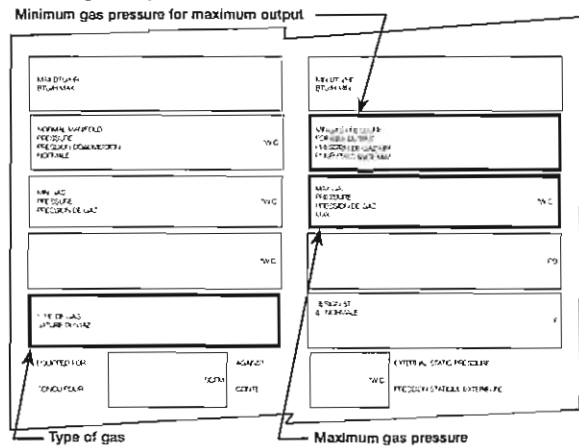
When connecting the gas supply, the length of the run must be considered in determining the pipe size to avoid excessive pressure drop. Refer to a Gas Engineer's Handbook for gas pipe capacities.

NOTE

Each furnace has a single 3/4-inch connection.

1. Determine the Supply Gas Requirements

The unit's nameplate states the requirements for the gas being supplied to the unit.



Indirect Gas Nameplate

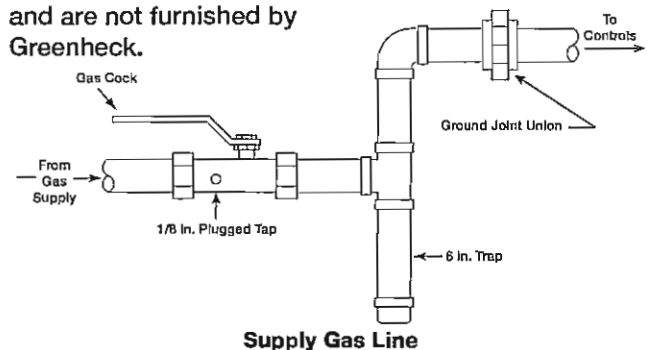
2. Install Additional Regulator if Required

When the supply gas pressure exceeds the maximum gas pressure shown on the unit's nameplate, an additional regulator (by others) is required to reduce the pressure. The regulator must have a listed leak limiting device or it must be vented to the outdoors.

	Supply Gas Pressure Range (inches wc)	
	Minimum	Maximum
Natural	6	14
LP	10	14

3. Connect the Supply Gas Line

A manual shut off valve (gas cock), 1/8 inch plugged test port and 6 inch drip leg must be installed prior to the gas train. The valve and the test port must be accessible for the connection of a test gauge. Supply gas connections must be made by a qualified installer and are not furnished by Greenheck.



Supply Gas Line

4. Test the System for Leaks

Check both the supply lines and the factory piping for leaks. Apply a soap and water solution to all piping and watch for bubbling which indicates a leak.

WARNING

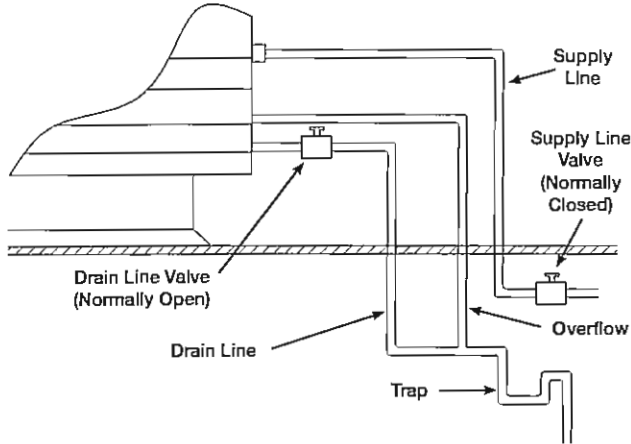
NEVER test for a gas leak with an open flame.

WARNING

The factory piping has been checked for leaks, but should be rechecked due to shipping and installation.

Installation - Evaporative Cooler Piping (optional)

Evaporative Cooling with Recirculating Pump



Recirculating Evaporative Piping

IMPORTANT

All supply solenoids, valves and all traps must be below the roofline or be otherwise protected from freezing.

IMPORTANT

The supply line should be of adequate size and pressure to resupply the amount of water lost due to bleed-off and evaporation. The drain line should be the same size or larger than the supply line.

CAUTION

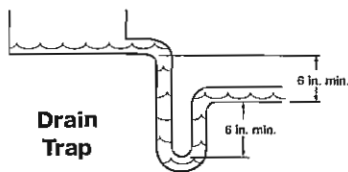
Provisions must be taken to prevent damage to the evaporative cooling section during freezing conditions. The sump, drain lines and supply lines must be drained prior to freezing conditions or an alternate method must be used to protect the lines and media.

1. Install the Water Supply Line

Supply line opening requirements vary by unit size and arrangement and are field supplied. Connect the water supply line to the float valve through the supply line opening in the evaporative cooling unit. Install a manual shutoff valve in the supply line.

2. Install the Drain Line

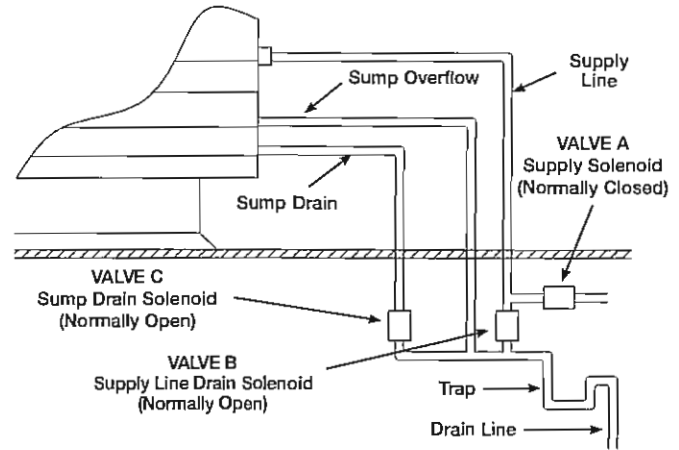
Connect an unobstructed drain line to the drain and overflow connections on the evaporative cooler. A manual shut off valve (by others) is required for the evaporative cooler drain line. A trap should be used to prevent sewer gas from being drawn into the unit. Refer to Drain Trap drawing.



3. Check/Adjust Water Level

Check the water level in the sump tank. The water level should be above the pump intake and below the overflow. Adjust the float as needed to achieve the proper water level.

Evaporative Cooling with Auto Drain and Fill



Auto Drain & Fill Evaporative Piping

IMPORTANT

The supply line should be of adequate size and pressure to resupply the amount of water lost due to bleed-off and evaporation. The drain line should be the same size or larger than the supply line.

CAUTION

All solenoids valves and traps must be installed below the roof to protect the supply water line from freezing. If they cannot be installed below the roof, an alternative method must be used to protect the lines from freezing.

IMPORTANT

The supply solenoid (Valve A) is NOT the same as the drain solenoids (Valve B and Valve C). Make sure to use the proper solenoid for each location. Check your local code requirements for proper installation of this type of system.

Auto Drain & Flush Valves (when provided by Greenheck)

Assembly Number	GFC Part Number	ASCO™ Part Number	Solenoid Type	De-Energized Position	Diameter	Qty.
852178	461262	8210G2	Supply	Closed	1/2 inch (12.7 mm)	1
	461263	8262G262	Supply Line Drain	Open	1/4 inch (6.35 mm)	1
	461264	8210G35	Sump Drain	Open	3/4 inch (19.05 mm)	1

Part numbers subject to change.

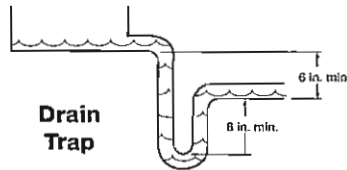
1. Install the Water Supply Line

Supply line opening requirements vary by unit size and arrangement and are field supplied. Connect the water supply line to the float valve through the supply line

opening in the evaporative cooling unit. Install the 1/2 inch normally closed solenoid (Valve A) in the supply line as shown above. Install the 1/4 inch normally open solenoid (Valve B) between the supply line and the drain line as shown above.

2. Install the Drain Line

Connect an unobstructed drain line to the sump drain overflow connection. Install the 3/4 in. normally open solenoid (Valve C) between the sump drain connection and the drain line. A trap should be used to prevent sewer gas from being drawn into the unit. Refer to Drain Trap drawing.



3. Check/Adjust Water Level

Check the water level in the sump tank. The water level should be above the pump intake and below the overflow. Adjust the float as needed to achieve the proper water level.

Installation of Water Wizard™ (optional)

Evaporative Cooling with the Water Wizard™

NOTE

The following instructions are provided for evaporative coolers equipped with the Water Wizard™ only. Additional instructions are provided for evaporative coolers equipped with the auto-drain and fill or bleed-off.

WARNING

Disconnect and lock-out all power and gas before performing any maintenance or service to the unit. Failure to do so could result in serious injury or death and damage to equipment.

Water Wizard™ Valves (when provided by Greenheck)

Unit Model	Assembly Number	GFC Part No.	ASCO™ Part No.	Solenoid Type	De-Energized Position	Diameter	Qty.
IGX - H12/H22 IGX - H32 (<9000 cfm)	852370	461262	8210G2	Supply	Closed	1/2 inch (12.7 mm)	1
		383086	8210G34	Supply Line Drain	Open	1/2 inch (12.7 mm)	1
IGX - H32 (≥9000 cfm)	852371	383088	8210G9	Supply	Closed	3/4 inch (19.05 mm)	1
		383086	8210G34	Supply Line Drain	Open	1/2 inch (12.7 mm)	1

Part numbers subject to change.

1. Install Normally Closed Supply Line/Solenoid

Connect the water supply line to the manual supply valve in the unit. Install the supply solenoid in the supply line, upstream of the manual supply valve and below the roofline.

2. Install Normally Open Drain Line/Solenoid

Connect the drain line to the supply line between the manual supply valve and the supply solenoid. Install a drain solenoid in the drain line, below the roof line. A trap should be installed in the drain line.

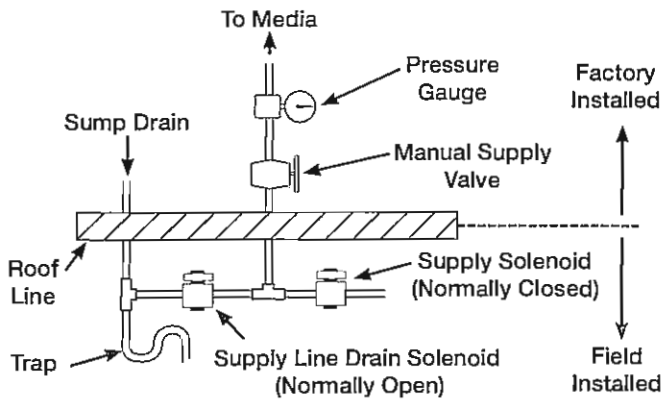
NOTE

Solenoid(s) may be provided by Greenheck (if ordered) or by others.

CAUTION

Any wiring deviations may result in personal injury or property damage. Greenheck is not responsible for any damage to, or failure of the unit caused by incorrect final wiring.

Installation of Water Wizard™, continued



Water Wizard™ Installation

3. Wire the Solenoid(s)

Wire the supply line solenoid and drain solenoid as shown on the unit's wiring diagram in the control center.

4. Wire the Temperature Sensor

If the evaporative cooler shipped separate from the unit, the temperature sensor must be wired. The sensor wire is bundled inside the discharge end of the evaporative cooler. Wire the sensor wire to terminals AI2 and AIC on the terminal strip in the unit's control center.

NOTE

The Water Wizard™ start-up must be completed for proper performance.

Installation - Direct Expansion (DX) Coil Piping (optional)

IMPORTANT

Guidelines for the installation of direct expansion cooling coils have been provided to insure proper performance and longevity of the coils. These are general guidelines that may have to be tailored to meet the specific requirements of any one job. As always, a qualified party or individual should perform the installation and maintenance of any coil. Protective equipment such as safety glasses, steel toe boots and gloves are recommended during the installation and maintenance of the coil.

IMPORTANT

All field brazing and welding should be performed using high quality materials and an inert gas purge (such as nitrogen) to reduce oxidation of the internal surface of the coil.

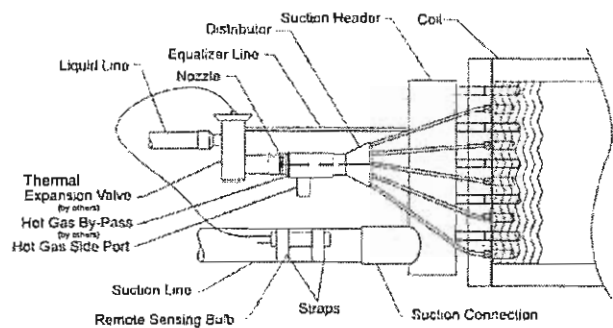
IMPORTANT

All field piping must be self-supporting and flexible enough to allow for the thermal expansion of the coil.

1. Locate the Distributor(s) by Removing the Distributor Access Panel



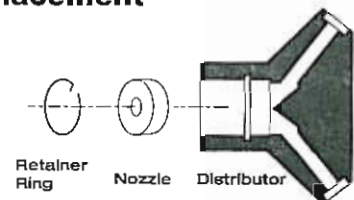
Distributor Access Panel



Installation with Hot Gas Bypass

2. Verify Nozzle Placement

Inspect the refrigerant distributor and verify that the nozzle is in place. The nozzle is generally held in place by a retaining ring or is an integral part of the distributor itself.



Nozzle Placement

NOTE

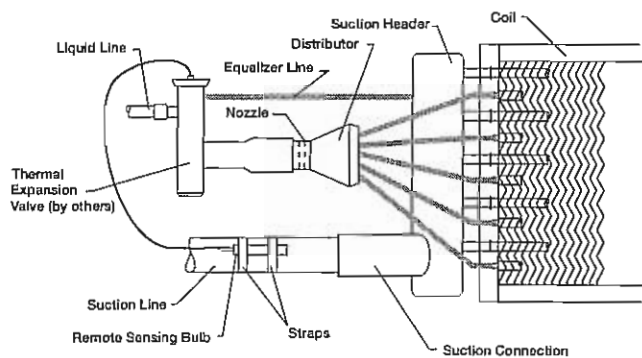
If a hot gas bypass kit was provided by others, refer to the manufacturer's instructions.

3. Install Suction Line

Install suction line(s) from the compressor to the suction connection(s) which are stubbed through the side of the cabinet.

4. Install the Liquid Line and Thermal Expansion Valve (TEV) (By Others)

Liquid line openings vary by coil size and circuiting and are field supplied. Follow the TEV recommendations for installation to avoid damaging the valve. If the valve is externally equalized, use a tubing cutter to cut off the plugged end of the factory installed equalizer line. Use a de-burring tool to remove any loose metal from the equalizer line and attach it to the TEV. If the valve is internally equalized, the factory installed equalizer line can be left as is.



General Installation

5. Mount the Remote Sensing Bulb (By Others)

The expansion valve's remote sensing bulb should be securely strapped to the horizontal run of the suction line at the 3 or 9 o'clock position and insulated.

6. Check Coil Piping for Leaks

Pressurize the coil to 100 psig with dry nitrogen or other suitable gas. The coil should be left pressurized for a minimum of 10 minutes. If the coil holds the pressure, the hook-up can be considered leak free. If the pressure drops by 5 psig or less, re-pressurize the coil and wait another 10 minutes. If the pressure drops again there is likely one or more small leaks which should be located and repaired. Pressure losses greater than 5 psig indicate a large leak that should be isolated and repaired.

7. Evacuate and Charge the Coil

Use a vacuum pump to evacuate the coil and any interconnecting piping that has been open to the atmosphere. Measure the vacuum in the piping using a micron gauge located as far from the pump as possible. Evacuate the coil to 500 microns or less and then close the valve between the pump and the system. If the vacuum holds to 500 microns or less

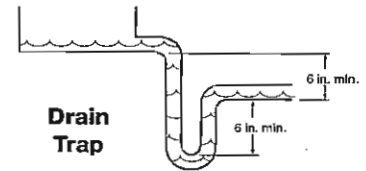
for one minute, the system is ready to be charged or refrigerant in another portion of the system can be opened to the coil. A steady rise in microns would indicate that moisture is still present and that the coil should be further vacuumed until the moisture has been removed.

NOTE

Failure to obtain a high vacuum indicates a great deal of moisture or a small leak. Break the vacuum with a charge of dry nitrogen or other suitable gas and recheck for leaks. If no leaks are found, continue vacuuming the coil until the desired vacuum is reached.

8. Install the Drain Line

Connect an unobstructed drain line to the drain pan. A trap should be used to prevent sewer gas from being drawn into the unit.



IMPORTANT

All traps must be installed below the roof line or be otherwise protected from freezing.

Installation of Chilled Water Coil Piping (optional)

IMPORTANT

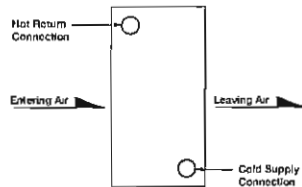
Guidelines for the installation of the cooling coil have been provided to insure proper performance of the coils and their longevity. These are general guidelines that may have to be tailored to meet the specific requirements of any one job. As always, a qualified party or individual should perform the installation and maintenance of the coil. Protective equipment such as safety glasses, steel toe boots and gloves are recommended during the installation and maintenance of the coil.

When installing couplings, do not apply undue stress to the connection. Use a backup pipe wrench to avoid breaking the weld between the coil connection and the header.

All field piping must be self-supporting. System piping should be flexible enough to allow for the thermal expansion and contraction of the coil.

1. Verify Coil Hand Designation

Check the coil hand designation to ensure that it matches the system. Coils are generally plumbed with the supply connection located on the bottom of the leaving air-side of the coil and the return connection at the top of the entering air-side of the coil. This arrangement provides a counter flow heat exchanger and positive coil drainage.



2. Check the Coil for Leaks

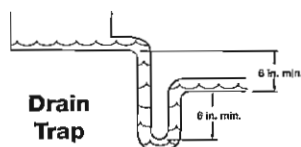
Pressurize the coil to 100 psig with dry nitrogen or other suitable gas. The coil should be left pressurized for a minimum of 10 minutes. If the coil holds the pressure, the hook-up can be considered leak free. If the pressure drops by 5 psig or less, re-pressurize the coil and wait another 10 minutes. If the pressure drops again there is likely one or more small leaks which should be located and repaired. Pressure losses greater than 5 psig indicate a large leak that should be isolated and repaired.

3. Connect the Supply & Return Lines

Connect the supply and return lines as shown above.

4. Install the Drain Line

Connect an unobstructed drain line to the drain pan. A trap should be installed to prevent sewer gas from being drawn into the unit.



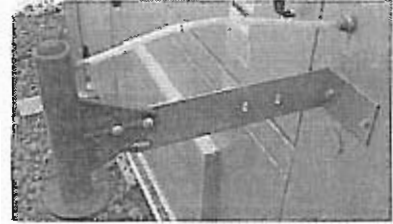
IMPORTANT

All traps must be installed below the roof line or be otherwise protected from freezing.

Installation of Building Pressure Control (optional)

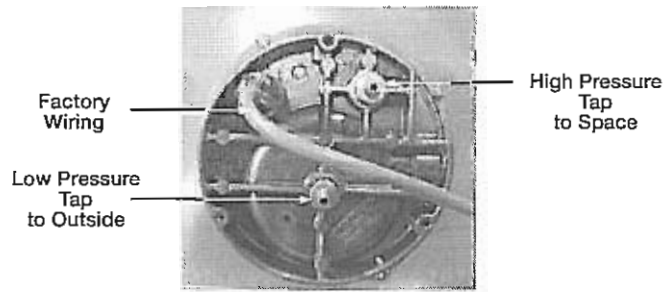
1. Mount Pressure Tap

Using the factory provided bracket, mount the pressure tap to the outside of the unit. Choose a location out of the prevailing winds and away from supply or exhaust fans to assure accurate readings.



2. Run Pressure Tap Lines

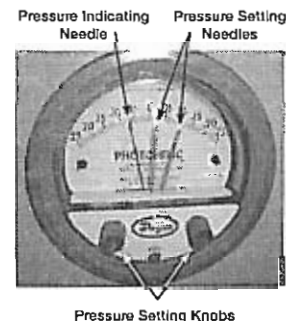
Run a pressure tap line from the pressure tap on the outside of the unit to the low pressure tap on the back of the photohelic gauge. Run a second pressure tap line from the high pressure tap on the back of the photohelic gauge to the space. Fifty feet of tubing is supplied with the unit.



Connections for Photohelic Gauge

3. Set the Building Pressure

The pressure gauge is used to set the desired building pressure. The pressure is set by adjusting the knobs for the upper and lower pressure limits. Typical settings are 0.0 inch wc for the lower and 0.10 inch wc for the upper pressure setting.



Typical Photohelic Gauge Settings

Start-Up - Blower

Refer to the Start-Up Checklist in the Reference Section Before Proceeding Further!

Pre Start-Up Check

Rotate the fan wheel by hand and make sure no parts are rubbing. Check the V-belt drive for proper alignment and tension (a guide for proper belt tension and alignment is provided in the Belt Maintenance section). Check fasteners, set screws, and locking collars on the fan, bearings, drive, motor base, and accessories for tightness.

WARNING

Disconnect and lock-out all power and gas before performing any maintenance or service to the unit. Failure to do so could result in serious injury or death and damage to equipment.

SPECIAL EQUIPMENT REQUIRED

Required and recommended tools. Equivalent products may be used.

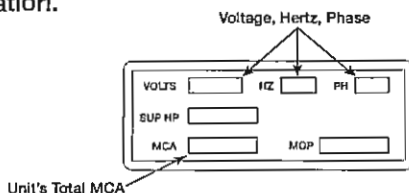
Voltage & Amperage Meter	Manufacturer: Fluke Model: 177 Phone: 1-800-44-FLUKE www.fluke.com
Thermometer	Manufacturer: Fluke Model: 50 Phone: 1-800-44-FLUKE www.fluke.com
Micro Amp Meter	Manufacturer: Fluke Model: 116 Phone: 1-800-44-FLUKE www.fluke.com
U-Tube Manometer	Manufacturer: Dwyer Model: Slack Tube Phone: 1-219-897-8000 www.dwyer-inst.com
Tachometer	Manufacturer: Monarch Model: Pocket Tach 100 Phone: 1-800-999-3390 www.monarchinstrument.com

WARNING

Check the housing, blower, and ductwork for any foreign objects before running the blower.

1. Check the Voltage

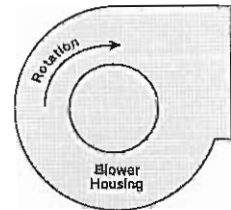
Before starting the unit, compare the supplied voltage, hertz, and phase with the unit and motor's nameplate information.



Electrical Nameplate

2. Check the Blower Rotation

Open the blower access door and run the blower momentarily to determine the rotation. Arrows are placed on the blower scroll to indicate the proper direction or reference the example shown to the right.



Blower Rotation

NOTE

To reverse the rotation on three phase units, disconnect and lock-out the power, then interchange any two power leads.

NOTE

To reverse the rotation on single phase units, disconnect and lock-out the power, then rewire the motor per the manufacturer's instructions.

IMPORTANT

If the blower is rotating in the wrong direction, the unit will move some air, but will not perform as designed. Be sure to perform a visual inspection to guarantee the correct blower rotation.

3. Check for Vibration

Check for unusual noise, vibration or overheating of the bearings. Reference the Troubleshooting section for corrective actions.

IMPORTANT

Excessive vibration may be experienced during the initial start-up. Left unchecked, it can cause a multitude of problems including structural and/or component failure.

IMPORTANT

Generally, fan vibration and noise is transmitted to other parts of the building by the ductwork. To minimize this undesirable effect, the use of heavy canvas duct connectors is recommended.

4. Motor Check

Measure the motor's voltage, amps and RPM. Compare to the specifications. Motor amps can be reduced by lowering the motor RPM or increasing system static pressure.

IMPORTANT

Additional starters and overloads may be provided in the make-up air control center for optional exhaust blowers. Any additional overloads must be checked for proper voltage, amps and RPMs.

5. Air Volume Measurement & Check

Measure the unit's air volume (CFM) and compare it with its rated air volume. If the measured air volume is off, adjust the fan's RPM by changing/adjusting the drive.

NOTE

The most accurate way to measure the air volume is by using a pitot traverse method downstream of the blower. Other methods can be used but should be proven and accurate.

IMPORTANT

Changing the air volume can significantly increase the motor's amps. If the air volume is changed, the motor's amps must be checked to prevent overloading the motor.

NOTE

To ensure accuracy, the dampers are to be open when measuring the air volume.

6. Set-up Optional Components

Adjust the settings on the optional components. See the Control Center Layout in the Reference section for location of optional components.

- Heating Inlet Air Sensor (typical setting: 60-70°F / 15-21°C)
- Cooling Inlet Air Sensor (typical setting: 75°F / 24°C)
- Building Freeze Protection (typical setting: 5 minutes at 45°F / 7°C)
- Dirty Filter Gauge (typical setting: settings vary greatly for each unit). (see Reference section for adjusting information)

NOTE

If your unit is equipped with a 4:1 modulation or 8:1 staged control, the inlet air sensor and building freeze protection may be included in the furnace controller. If this is the case, instructions for setting the inlet air sensor and building freeze protection are included in the Furnace Start-Up.

Start-Up - Furnaces (all units)

IMPORTANT

For the unit to function properly, all stage or modulation valves must be set for high and low fire.

NOTE

There are five furnace control options available. Be sure to refer to the specific instructions for your control type.

IMPORTANT

Multi furnace units may use a combination of the available control options. Each furnace must be set-up per the specific instructions for its control type.

IMPORTANT

Multi furnace units will use one stage or electronic modulation controller per unit and one or two ignition controller(s) per furnace. Each furnace will have its own gas valve(s). Each valve must be set for high and low fire.

NOTE

To force the unit to light for set-up purposes, the heat switch must be closed or jumpered out. See the Ladder Diagram on the inside of the control center door for proper terminals to jumper out.

NOTE

If the unit is equipped with an independent inlet air sensor (not incorporated into the stage or modulation controller), the unit will not light unless the outside air temperature is less than the inlet air sensor setting. If the outside air is greater than the inlet air sensor setting, turn the setting to its maximum position. When set-up is complete, reset the inlet air sensor to the proper temperature. If the unit is equipped with a stage or electronic modulation controller that includes an inlet air sensor function, the inlet air sensor will be overridden when the unit is forced to high fire.

Available Control Options

Single Furnace Units

1:1 Staged	one 1-stage furnace
2:1 Staged	one 2-stage furnace
8:1 Staged	one 8-stage furnace
2:1 Electronic Modulation	one 2:1 modulating furnace
4:1 Electronic Modulation	one 4:1 modulating furnace

Two Furnace Units

1:1 Staged	two independent 1-stage furnaces
2:1 Staged	two independent 1-stage furnaces
4:1 Staged	two independent 2-stage furnaces
16:1 Staged	one 8-stage and one 1-stage furnace
8:1 Electronic Modulation	one 4:1 modulating and one 2-stage furnace

Three Furnace Units

1:1 Staged	three independent 1-stage furnaces
3:1 Staged	three independent 1-stage furnaces
6:1 Staged	three independent 2-stage furnaces
24:1 Staged	one 8-stage and two 1-stage furnaces
12:1 Electronic Modulation	one 4:1 modulating, one 2-stage and one 1-stage furnace

Start-Up - Single Stage Control

1. Send Unit to High Fire

Send the unit to high fire by setting the temperature selector to its maximum setting.

Temperature Selector



2. Check the High Fire Manifold Pressure

Using a manometer, measure the burner manifold pressure at the manifold pressure test port. Refer to the Gas Train Layout in the Reference section for the test port location.

The pressure on high fire should be 3-1/2 inches wc for natural gas and 10 inches wc for LP gas.

	Single Stage Manifold Pressure (inches wc)	
	Natural Gas	LP
High Fire	3-1/2	10

If needed, use the high fire adjustment screw on the staged gas valve to adjust the high fire manifold pressure. Counterclockwise rotation will decrease the gas pressure and clockwise rotation will increase the gas pressure.



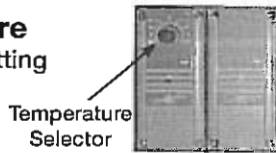
3. Reset the Temperature Setting

Reset the temperature setting on the temperature selector to the desired setting.

Start-Up - 2:1 Staged Control

1. Send Unit to High Fire

Send the unit to high fire by setting the temperature selector to its maximum setting.

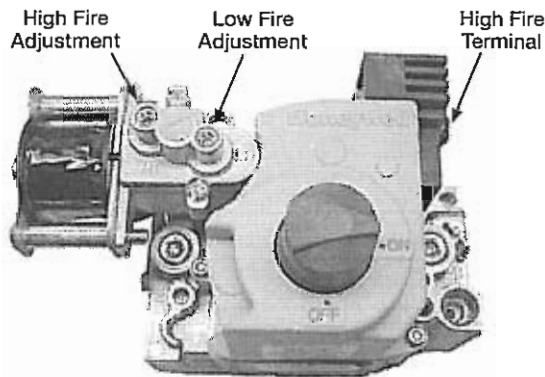


2. Check the High Fire Manifold Pressure

Using a manometer, measure the burner manifold pressure at the manifold pressure test port. Refer to the Gas Train Layout in the Reference section for the test port location.

The pressure on high fire should be 3-1/2 inches wc for natural gas and 10 inches wc for LP gas.

If needed, use the high fire adjustment screw on the combination gas valve to adjust the high fire manifold pressure. Counterclockwise rotation will decrease the gas pressure and clockwise rotation will increase the gas pressure.



3. Send Unit to Low Fire

Remove and isolate the wire from the high fire terminal on the combination gas valve to send the unit to low fire.

4. Check the Low Fire Manifold Pressure

Using a manometer, measure the burner manifold pressure at the manifold pressure test port. Refer to the Gas Train Layout in the Reference section for the test port location.

The pressure on low fire should be 7/8 inches wc for natural gas and 2-1/2 inches wc for LP gas.

	Two Stage Manifold Pressure (inches wc)	
	Natural Gas	LP
Low Fire	7/8	2-1/2
High Fire	3-1/2	10

If needed use the low fire adjustment screw on the combination gas valve to adjust the low fire manifold pressure. Counterclockwise rotation will decrease the gas pressure and clockwise rotation will increase the gas pressure. Once the low fire manifold pressure is set, reattach the high fire wire to the high fire terminal.

5. Reset the Temperature Setting

Reset the temperature setting on the temperature selector to the desired setting.

Start-Up - 8:1 Staged Control

IMPORTANT

8:1 staged furnaces use two manifolds and two staged gas valves per furnace. The high and low fire manifold pressure must be checked and properly set on each manifold.

IMPORTANT

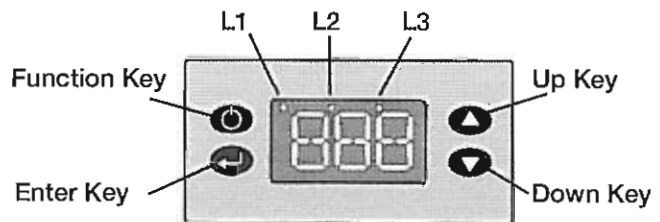
Confirm that the discharge air sensor is installed in the duct, at least three duct diameters downstream of the furnace

1. Send the Unit to High Fire

For the furnace to light, the heat switch must be closed or jumpered out. Reference the unit ladder diagram for proper terminals to jumper.

To send the unit to high fire, press and hold the up, down and enter keys. The middle LED light, L2, will flash on the screen when the unit is forced to high fire.

The unit will remain at high fire until the escape key is pressed (middle LED light, L2, will stop flashing).



WARNING

Once the unit is forced to high fire, it will remain at high fire until the escape key is pressed.

NOTE

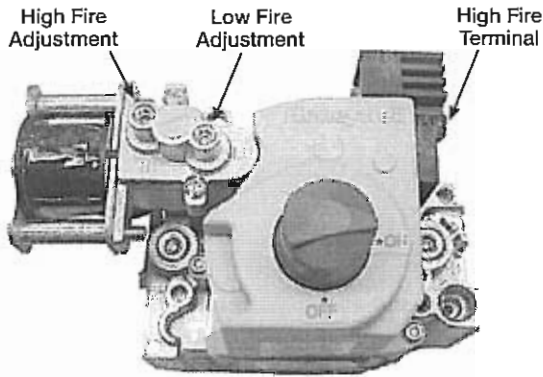
Forcing the unit to high fire during warm or hot weather conditions may cause the high limit switch to trip. If the switch trips, it will reset once the discharge air temperature has reached a safe level.

2. Check the High Fire Manifold Pressure

Using a manometer, measure the high fire burner manifold pressure for each furnace at the pressure test port. Refer to the Gas Train Layout in the Reference section for the test port location.

The recommended high fire manifold pressure is 3-1/2 inches wc for natural gas and 10 inches wc for LP gas.

If needed, adjust the high fire screws on each staged gas valve to set both high fire manifold pressures. Counterclockwise rotation will decrease the gas pressure and clockwise rotation will increase the gas pressure.



3. Send the Unit to Low Fire

Disconnect and isolate the wire from the high fire terminal to send the unit to low fire.

4. Check the Low Fire Manifold Pressure

Measure each valve's low fire manifold pressure.

The recommended low fire manifold pressure is 7/8 inch wc for natural gas and 2-1/2 inches wc for LP.

If needed, use the low fire adjustment screw on each staged gas valve to properly set both low manifold settings. Counterclockwise rotation will decrease the gas pressure and clockwise rotation will increase the gas pressure.

When the low fire manifold pressure is properly set, reattach the disconnected wire to the high fire terminal, allow the heat switch to close or remove the jumper (see #1).

	Eight Stage Manifold Pressure (inches wc)	
	Natural Gas	LP
Low Fire	7/8	2-1/2
High Fire	3-1/2	10

WARNING

Once the high and low fire have been set, be sure the press the escape key to end high fire mode. The middle LED light, L2, will stop flashing when high fire mode is off.

NOTE

Step 5-7 are for adjusting the discharge air setting. The discharge air temperature setting is factory set to the recommended 70°F. Only adjust the setting if needed.

NOTE

After modifying a setting, the enter key must be pressed to save the change. If the enter key is not pressed the display will return to the setpoints menu without saving the change.

5. Access the Setpoints Menu

Press and hold the Escape key for three seconds to access the Setpoints Menu. The display will read "SET."



6. Access the Discharge Air Temperature Setting

Using the Up or Down key, scroll through the Setpoints Menu until the display reads "dtS", then press the Enter key. The display will change to the discharge air temperature setting.



7. Edit the Setting

Use the Up or Down key to change the discharge air temperature setting. When the correct setting is displayed, press the Enter key to save the setting and return to the Setpoints Menu.

NOTE

Steps 8 - 9 are provided for adjusting the inlet air set point. The inlet air sensor is preset to the factory recommended 65°F, only adjust if needed.

NOTE

The inlet air sensor monitors the temperature of the inlet air. If the inlet air is above the sensor's set point, the inlet air sensor shuts off the furnace and continues to supply the warm outside air.

8. Access the Inlet Air Sensor Setting

From the Setpoints Menu, use the Up or Down key to navigate through the menu options until the display reads "iAS". Once the display reads "iAS", press the Enter key. The display will change to the inlet air sensor setting.



9. Edit the Setting

Use the Up or Down key to change the inlet air setting. When the correct setting is displayed, press the Enter key to save the setting and return to the Setpoints Menu.

NOTE

After modifying a setting, the Enter key must be pressed to save the change. If the Enter key is not pressed, the display will return to the Setpoints Menu without saving the change.

NOTE

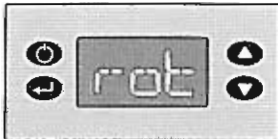
Steps 10 - 11 are provided for adjusting the room override setting. Only adjust the setting if the room override function is desired.

NOTE

The room override function temporarily changes the discharge air temperature to the room override setting if the room thermostat is not satisfied.

10. Access the Room Override Setting

From the Setpoints Menu, use the Up or Down key to navigate through the menu options until the display reads "rot." Once the display reads "rot," press the Enter key. The display will change to the room override setting.



NOTE

The room override function requires a field supplied thermostat to be installed in the space and to be wired between terminal 31 and 32 in the unit's control center. Reference the unit ladder diagram.

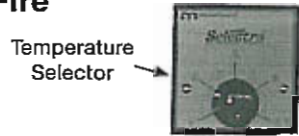
11. Edit the Setting

Use the Up or Down key to change the room override setting. When the correct setting is displayed, press the Enter key to save the setting and return to the Setpoints Menu.

Start-Up - 2:1 Electronic Modulation

1. Send Unit to High Fire

Turn the temperature selector to its maximum setting to send the unit to high fire.

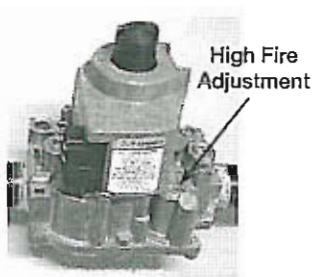


2. Check the High Fire Manifold Pressure

With the unit at high fire, use a manometer to measure the burner manifold pressure at the manifold pressure test port. See the Gas Train Layout in the Reference section for the manifold pressure test port location.

The recommended high fire manifold pressure is 3-1/2 inches wc for natural gas and 10 inches wc for LP gas.

If needed, use the high fire adjustment screw on the shut-off gas valve to adjust the high fire manifold pressure. Counterclockwise rotation will decrease the gas pressure and clockwise rotation will increase the gas pressure.



3. Send Unit to Low Fire

Remove and isolate one wire from the modulating gas valve terminal to send the unit to low fire.

4. Check the Low Fire Manifold Pressure

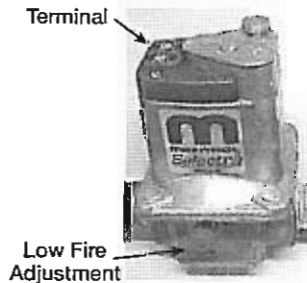
With the unit at low fire, use a manometer to measure the burner manifold pressure at the manifold pressure test port. See the Gas Train Layout in the Reference section for the manifold pressure test port location.

The recommended low fire manifold pressure is 7/8 inch wc for natural gas and 2-1/2 inches wc for LP gas.

	2:1 Manifold Pressure (inches wc)	
	Natural Gas	LP
Low Fire	7/8	2-1/2
High Fire	3-1/2	10

If needed use the low fire adjustment screw on the modulating gas valve to adjust the low fire manifold pressure. Counterclockwise rotation will decrease the gas pressure and clockwise rotation will increase the gas pressure.

Once the low fire is set, reattach the disconnected wire to the modulating gas valve and reset the temperature selector.



NOTE

The low fire manifold pressure should always be rechecked after adjusting the high fire.

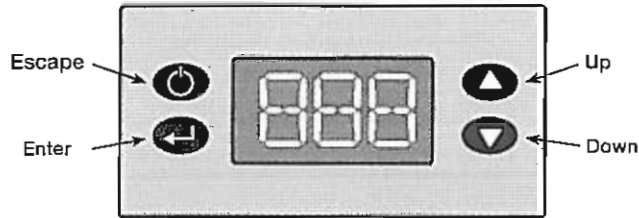
NOTE

Once the high and low fire manifold pressures are properly set, reset the discharge air temperature to the desired setting.

Start-Up - 4:1 Electronic Modulation

1. Send the Unit to High Fire

To send the unit to high fire, press and hold the Up, Down and Enter keys. The unit will remain at high fire until the Escape key is pressed.



WARNING

If the unit is forced to high fire, it will remain at high fire until the escape key is pressed.

NOTE

After modifying a setting, the Enter key must be pressed to save the change. If the Enter key is not pressed the display will return to the Program Menu without saving the change.

NOTE

Forcing the unit to high fire in mild weather conditions may cause the high limit switch to trip. If the switch trips, it will reset once the discharge air temperature is at a safe level.

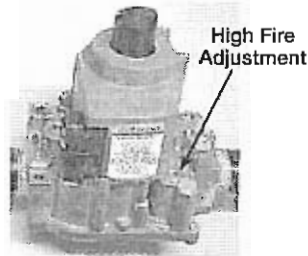
2. Check the High Fire Manifold Pressure

Before setting high fire on the EXA valve, turn the regulator screw on the combination valve all the way in (increase pressure).

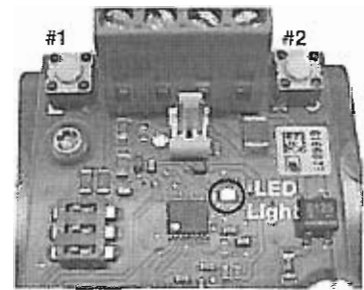
Using a manometer, measure the high fire manifold pressure at the pressure test port. Refer to the Gas Train Layout in the Reference section for the test port location.

The recommended high fire manifold pressure is 3-1/2 inches wc for natural gas and 10 inches wc for LP gas.

If needed, adjust the high fire screw on the shut-off valve to set the high fire manifold pressure. Counterclockwise rotation will decrease the gas pressure and clockwise rotation will increase the gas pressure.



To enter the high fire setting mode, press and hold button #1 until the LED lights solid red. Release. The valve is now in the high fire setting mode.



Press or hold button #2 to decrease gas flow. Each button press equates to the minimum available step size and will decrease flow slowly. Holding the button down auto-steps and eliminates the need to continuously press the button. Use this feature to rapidly decrease the flow.

Press or hold button #1 to increase gas flow. Each button press equates to the minimum available step size and will increase flow slowly. Holding the button down auto-steps and eliminates the need to continuously press the button. Use this feature to rapidly decrease the flow.

High fire setting should be 3.5 inches wc for natural gas and 10.0 inches wc for LP gas.

To save high fire setting, simultaneously hold button #1 and #2 until the LED turns off.

NOTE

Controls left in the high fire setting mode will default to the current setting after 5 minutes of inactivity.

3. Exit High Fire Mode

Press the Escape key to exit high fire mode.

4. Send Unit to Low Fire

Remove the cover on the modulating gas valve. Press and hold button #2 until the LED light blinks red; release. The unit is now in low fire.

5. Check the Low Fire Manifold Pressures

With the unit at low fire use a manometer to check the manifold pressure. Refer to the Gas Train Layout in the Reference section for the test port location.

The recommended low fire manifold pressure is 1/3 inches wc for natural gas and 1.0 inches wc for LP gas.

To adjust the low fire gas pressure, use button #1 and #2 on the gas valve. Button #1 will increase the gas pressure, while button #2 will decrease the gas pressure. Each time the button is pressed, it corresponds to the minimum available step size and will slowly change the gas pressure. Holding the button down will rapidly change the gas pressure.

To save the low fire setting, simultaneously hold buttons 1 and 2 until the LED turns off.

	4:1 Modulation Manifold Pressure (inches wc)	
	Natural Gas	LP
Low Fire	1/3	1
High Fire	3-1/2	10

Note: If the valve remains in the low fire setting mode for more than five (5) minutes, it will revert back to its previous setting.

NOTE
The following steps are for adjusting the discharge air setting. The discharge air temperature setting is factory set to the recommended 70°F. Only adjust the setting if needed.

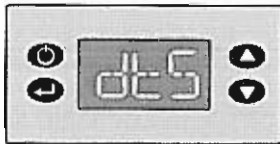
6. Access the Setpoints Menu

Press and hold the Escape key for three seconds to access the Setpoints Menu. The display will read "SET" when Setpoints Mode is active.



7. Access the Discharge Air Temperature Setting

Use the Up and Down key to scroll through the Setpoints Menu options until the display reads "dtS" then press the Enter key. The display will change to the discharge air temperature setting.



8. Edit the Setting

Use the Up or Down keys to change the discharge air temperature setting. When the correct setting is displayed, press the Enter key to save the setting and return to the Setpoints Menu.

NOTE
After modifying a setting, the Enter key must be pressed to save the change. If the Enter key is not pressed the display will return to the Setpoints Menu without saving the change.

NOTE
Steps 8 thru 10 are provided for adjusting the inlet air set point. The inlet air sensor is preset to the factory recommended 60°F, only adjust if needed.

NOTE
The inlet air sensor monitors the temperature of the inlet air. If the inlet air is above the sensor's set point, the inlet air sensor shuts off the furnace and continues to supply the warm outside air.

9. Access the Inlet Air Sensor Setting

From the Setpoints Menu, use the Up or Down key to navigate through the menu options until the display reads "iAS." Once the display reads "iAS", press the Enter key. The display will change to the inlet air sensor setting.



10. Edit the Setting

Use the Up or Down key to edit the inlet air setting. When the correct setting is displayed, press the Enter key to save the setting and return to the Setpoints menu.

NOTE
Steps 11 and 12 are provided for adjusting the room override setting. Only adjust the setting if the room override function is desired.

NOTE
The room override function temporarily changes the discharge air temperature to the room override setting if a room thermostat is not satisfied.

11. Access the Room Override Setting

From the Setpoints Menu, use the Up or Down key to navigate through the menu options until the display reads "rot." Once the display reads "rot," press the Enter key. The display will change to the room override setting.



NOTE
The room override function requires a field supplied thermostat to be installed in the space and to be wired between terminal 31 and 32 in the unit's control center.

12. Edit the Setting

Use the Up or Down key to change the room override setting. When the correct setting is displayed, press the Enter key to save the setting and return to the Setpoints menu.

NOTE
After modifying a setting, the Enter key must be pressed to save the change. If the Enter key is not pressed the display will return to the Setpoints Menu without saving the change.

Start-Up - Economizer (optional)

NOTE

To prevent premature heat exchanger failure, do not locate units where chlorinated, halogenated, or acid vapors are present.

NOTE

Units with an economizer are designed for either 0-30% outside air (HV-1), 31-75% outside air (HV-2) or 100% return air (HV-3). Refer to the CAPS submittal for the unit's ventilation type.

NOTE

HV-1 and HV-2 use economizer controls (EC) or (MB).

NOTE

Economizer control may use outside air temperature reference (EC-1), outside enthalpy reference (EC-2), differential temperature reference (EC-3) or differential temperature reference (EC-4).

NOTE

Economizer control may use a potentiometer (MB-1), 2-10 VDC signal (MB-2), 4-20mA signal (MB-3) or a manual quadrant (MB-4).

1. Verify Sensor Installation

All economizer options (EC) require an outdoor air temperature or enthalpy sensor to be field installed inside of the weatherhood and field wired to terminals SO+ and SO- on the economizer.

Economizer options EC-3 and EC-4 require an outdoor air temperature or enthalpy sensor to be field installed in the return air duct and field wired to terminals SR+ and SR- on the economizer.

Verify that all economizer sensors needed for your application are properly installed and wired.

2. Set Minimum Outside Air

Set the minimum outside air position. HV-1 is designed for 0-30% outside air and HV-2 is designed for 31-75% outside air.

All economizer options (EC-1, EC-2, EC-3 and EC-4) and option MB-1 use a potentiometer to set the minimum outside air damper position. The potentiometer is located on the economizer for options EC-1, EC-2, EC-3 and EC-4. The potentiometer may be factory mounted in the unit control center or field mounted in the space for option MB-1.

MB-2 and MB-3 use an external signal from a building management system to position the dampers.

MB-4 uses a manual quadrant located on the inlet damper to position the dampers.

IMPORTANT

The outside air volume must be measured and compared to the total air volume when setting the minimum outside air. The minimum outside air should never be set based on the inlet damper or potentiometer position.

3. Set the Enthalpy Changeover Set Point (optional)

If using an economizer, the enthalpy changeover setting must be set. If differential temperature or differential enthalpy control is used, set the enthalpy changeover set point to *D*. If outside air temperature or enthalpy reference is used, set the enthalpy changeover set point to the desired setting from the following table.

Enthalpy Changeover Setting	
Setting	Changeover Temperature* (°F)
A	73
B	70
C	67
D	63

*Temperature at 50% relative humidity, see the Honeywell W7212 Economizer instructions for set points at other humidities

NOTE

For options EC-3 and EC-4 the enthalpy changeover set point is the temperature at which the economizer will send the dampers to the minimum outside air position.

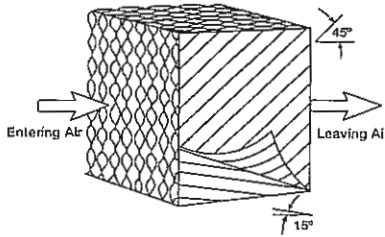
4. Program Optional Room Stat

Program the optional room stat. Separate detailed instructions for programming the room stat ship with the optional room stat.

Start-Up - Evaporative Cooling (optional)

1. Check the Installation

The media may have been removed during installation, so its orientation should be double checked. The media should be installed with the steeper flute angle sloping down towards the entering air side.



Verify that the stainless steel caps and distribution headers are in place. The headers should be located over the media towards the entering air side. The caps should be placed over the headers.

2. Check the Pump Filter

Check that the pump filter is around the pump inlet.

3. Fill the Sump and Adjust the Float

Turn on the water supply and allow the sump tank to fill. Adjust the float valve to shut-off the water supply when the sump is filled to within 1 in. of the bottom of the overflow.

4. Break-in the Media

Open the bleed-off valve completely and saturate the media with the blower(s) off for no less than 20 minutes.

NOTE

A jumper will need to be installed in the control center to power the evaporative pumps with the blower(s) off. Reference the unit's ladder diagram to determine proper terminals.

5. Check the Flow Rate

The pumps should provide enough water to saturate the media in 45 to 60 seconds. Consult the factory, if adequate flow is not achieved.

6. Adjust the Water Bleed-Off Rate

The water bleed-off rate is dependent on the water's mineral content. The bleed-off should be adjusted based on the media's mineral deposits after two weeks of service.

7. Set the Optional Auto Drain and Fill

Set the auto drain, fill timer and temperature settings.

Timer settings are: t1: 1.0, 10min
t2: 0.4, 60h

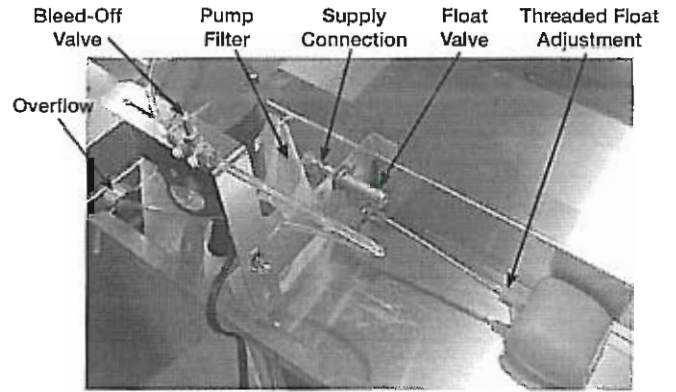
Temperature is typically set to 45°F / 7°C

8. Put the Unit into Service

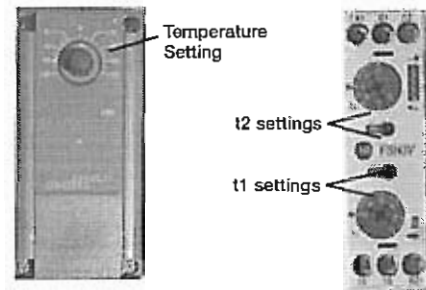
Remove the jumper, and energize the blower(s). Verify proper operation.

IMPORTANT

Check the media for minerals after two weeks of service and adjust the bleed-off rate accordingly.



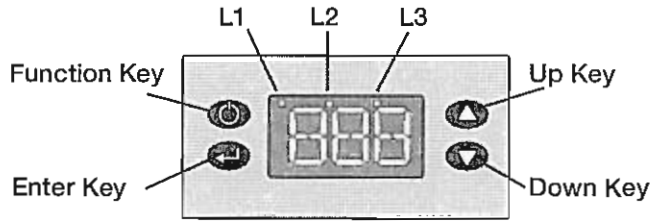
Evaporative Cooler Set-Up



Evaporative Freeze Protection

Evaporative Timer

Start-Up - Water Wizard™ (optional)



Water Wizard™ User Interface
Key Function Description

1. Open the Solenoid

Confirm that the manual water supply valve is closed. Press and hold the Function key for one second. L3 (refer to Water Wizard™ Operation in the Reference section) will begin blinking (short on, long off), indicating that flow test mode is active and the supply solenoid is open.

WARNING

Opening the manual supply valve will allow water to pass to the media. Be sure the sump is safely draining before opening the manual supply valve.

NOTE

The manual supply valve ships closed and must be adjusted for proper performance.

2. Set the Water Pressure

With the solenoid open, set the supply water pressure to the correct setting from the following tables. Use the manual supply valve to adjust the supply pressure. A pressure gauge is provided between the manual supply valve and the media.

NOTE

The recommended water pressure for the model IGX is set based on media width, model IG is set based on air volume. A table is provided for each. Be sure to refer to the correct table.

IGX Housing	Media Width (inches)	Water Pressure (inches wc)
12	30	20
	43-3/4	36
22	48	42
	60	61
	66	72
32	96*	42

*Multiple media sections. Value represents total media width.

Model IG CFM Range	Water Pressure (inches wc)
800 – 3500	50
3501 – 7000	74

3. Break-in Media

Leave the supply solenoid open to saturate and break-in the media for 20 minutes with the blower off.

4. Close Solenoid

With the pressure set, press the Function key for one second to deactivate flow test mode and allow the supply solenoid to close.

5. Check Media

Start the cooling cycle and check the media after one hour of operation. If the media is continuously dry or if too much water is draining from the sump tank, refer to Troubleshooting Water Wizard™.

NOTE

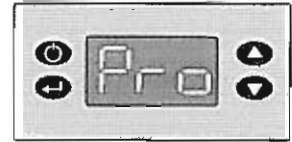
Steps 6 through 8 are provided to adjust the minimum cooling temperature. The minimum cooling temperature is preset to the factory recommended 75°F (24°C). Only adjust if needed.

NOTE

The inlet air sensor function overrides and shuts down the evaporative cooler if the outside temperature falls below the minimum cooling temperature.

6. Enter Program Mode

Press and hold the Enter key for three seconds. The display will read "Pro" when Program Mode is active.



7. Adjust the Minimum Cooling Temperature

While in the Program menu, use the Up and Down key to navigate the menu options until "toF" is displayed.



Press the Enter key to access the selected menu option setting. Use the Up and Down key to adjust the minimum cooling temperature as needed. Press the Enter key to save the new minimum cooling temperature setting and return to the Program Menu.

IMPORTANT

The enter key must be pressed to save the new minimum cooling temperature.

8. Exit Program Mode

After 15 seconds of idle time, the controller will exit Program Mode.


NOTE

Steps 9-11 are provided to adjust the freeze temperature setting. The freeze temperature is preset to the factory recommended 45°F (7°C). Only adjust if needed.

NOTE


The freeze temperature is the temperature at which the supply solenoid closes and the drain solenoid opens to drain the supply line, preventing possible freeze damage. A drain solenoid is required for this option.

9. Enter Program Mode

 Press and hold the Enter key for three seconds. The display will read "Pro" when Program Mode is active.



10. Adjust the Freeze Temperature

 While in Program Mode, use the Up and Down key to navigate through the menu options until "Frt" is displayed. Press the Enter key to access the selected menu option setting. Use the Up and Down key to adjust the freeze temperature setting as needed. Press the Enter key to set the freeze temperature and return to the Program Menu.



IMPORTANT

The enter key must be pressed to save the new freeze temperature.

11. Exit Program Mode

After fifteen seconds of idle time, the controller will exit Program Mode.

Check Operation - VAV Units (optional)

NOTE

Blower Start-Up, Steps 1-5 should be performed before the blower is run.

NOTE

For maintenance issues associated with variable frequency drives, consult the drive's manual supplied with the unit. The drives are programmed at the factory and should not need any adjustment during installation and start-up. For kitchen applications, the drive may be located in the kitchen or in the unit.

Variable Volume Operation

The variable volume option is recommended when a building's exhaust volume may vary. This option enables the make-up air volume to track with the exhaust volume, providing only the amount of make-up air required. Control strategies include 2-speed and modulating blowers. Before the unit is left in service, the variable volume control system should be tested.

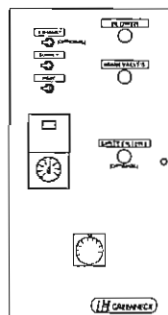
2-Speed

A variable frequency drive (VFD) is used to control air volumes. The VFD can be switched to low or high speed from a remote control panel. Turn the fan speed switch on the remote control panel to each position and confirm that the fan speed adjusts accordingly.

Modulating

Potentiometer Control — a variable frequency drive is controlled by input from a remote speed selector (potentiometer). This unit allows easy manual adjustment of make-up air volumes. To test potentiometer operation, turn the potentiometer to the two extremes. With variable volume, make sure the fan goes to maximum and minimum speed.

When the potentiometer is at 0, the fan speed will be at its minimum. When the potentiometer is at 100, the fan will be at its maximum speed.



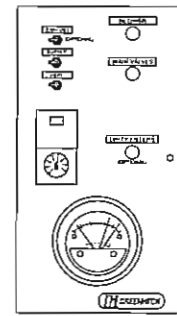
Potentiometer Control

Building Pressure Control — a variable frequency drive is controlled according to input from a pressure sensing device.

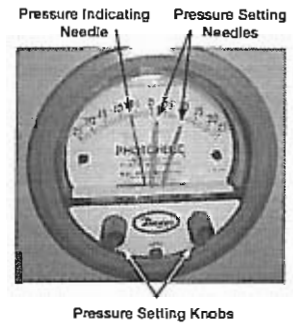
Turn both knobs to the upper most pressure setting. You may have to remove the outdoor pressure tap tubing. VAV systems should go to maximum speed. Set both knobs at the lowest setting and the VAV systems should go to minimum speed.

Reset the correct pressure limits before starting the unit.

This picture depicts a typical photohelic setting. Typical settings are 0.0 inch wc for the lower pressure setting and 0.10 inch wc for the upper pressure setting. The needle indicates a negative building pressure. During correct operation, the indicating needle will remain between or near the setting needles.



Building Pressure Control



Photohelic Gauge

External Signal — a variable frequency drive is controlled according to input from an external 2-10 VDC or 4-20 mA signal (by others).

A 2 VDC or 4 mA signal will send the blower to low speed. The blower will go to maximum speed with a 10 VDC or 20 mA signal.

Variable Kitchen Control — A variable frequency drive is controlled by input from a remote speed control. This unit allows automatic adjustment of make-up air volumes based on varying cooking loads.

Check Operation - Recirculating Units (optional)

NOTE

Blower Start-Up, steps 1-5 should be performed before the blower is run.

Recirculation Operation

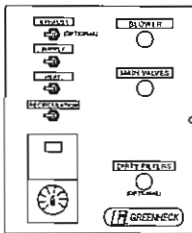
The recirculation operation option is recommended when the ventilation equipment provides the primary source of heating for the space. Recirculation can vary from 100% return air to 100% outside air. Control strategies include 2-position and modulating dampers.

Before the unit is left in service, the recirculation control system should be tested.

2-Position Damper

A 2-position spring return actuator is used to control the return air amounts. The damper moves from open to closed. If power is cut to the unit, the outdoor air damper will fail to close.

Turn the recirculating switch on the remote control panel to each position and confirm that the return air damper adjusts accordingly. The damper actuator may take a few minutes to open or close.

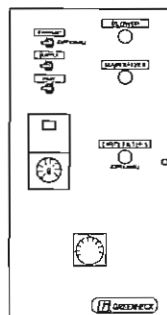


2-Position Damper Control

Modulating

Potentiometer Control — a modulating spring return actuator is used to control the return air amounts. The return air damper modulates from fully open to fully closed based on a signal from a remote potentiometer.

To test potentiometer operation, turn the potentiometer to the two extremes. Confirm that the return air damper fully opens and fully closes. When the potentiometer is at 0, the return air damper will open. When the potentiometer is at 100, the return air damper will close. The damper actuator may take a few minutes to open or close.



Potentiometer Control

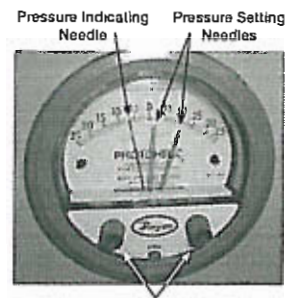
Building Pressure Control — a modulating spring return actuator is used to control the return air amounts. The return air damper modulates from fully open to fully closed based on a signal from a remote pressure sensing device.

Turn both knobs to the upper most pressure setting. You may have to remove the outdoor pressure tap tubing. The return air damper should close.

Set both knobs at the lowest setting and the damper should open. It may take one to two minutes for the damper to reach the desired position.

Reset the correct pressure limits before starting the unit.

This picture shows a typical photohelic setting. Typical settings are 0.0 inch wc for the lower and 0.10 inch wc for the upper pressure setting. The needle in this photo indicates a negative building pressure. During correct operation, the indicating needle will remain between or near the setting needles.



Pressure Setting Knobs
Photohelic Gauge

External Signal — a modulating spring return actuator is used to control the return air amounts. Return air damper modulates from fully open to fully closed based on an external 2-10 VDC or 4-20 mA signal (by others).

The return air damper will close with a 10 VDC or 20 mA signal. The return air damper should open with a 2 VDC or 4mA signal. The damper actuator may take a few minutes to open or close.

Sequence of Operation

2:1 Staged Sequence

1. Exhaust Fan Contact (S1) Manually Closed (optional)

- Power passes through N.C. contact on exhaust fan overload (ST2 OL), which is closed if exhaust fan (M2) has not overloaded
- Power passes to exhaust fan starter (ST2)
- N.O. contact on exhaust fan starter (ST2) is energized and closed
- Power passes to and energizes exhaust fan (M2)

2. Supply Fan Contact (S2) Manually Closed

- Power passes through N.C. field supplied fire contact (FSC)
- Power passes through optional N.O. contact on exhaust fan starter (ST2), which is closed when the optional exhaust starter (ST2) is activated
- Power passes through N.C. contact on supply starter overload (ST1 OL), which is closed if the supply fan has not overloaded
- Power passes through N.C. contact on optional freeze protection timer (RT4), which is closed if the temperature has remained above the set point
- Power passes to and energizes optional inlet damper (D1), which opens
- Power passes through optional damper limit switch (DL1), which is energized and closed if the optional inlet damper is open. It may take several minutes for the damper to fully open and for the damper limit switch to close
- Power passes to and energizes fan relay (RF)
- Power passes through N.O. contact on fan relay (RF), which is closed once the fan relay (RF) is activated
- Power passes to and energizes starter relay (ST1)
- N.O. contact on supply fan starter (ST1) is energized and closed
- Supply fan (M1) starts

3. Heat Contact (S4) Manually Closed

- Power passes through N.O. fan relay (RF), which is energized and closed if the supply fan (M1) is on
- Power passes through N.C. contact on optional inlet air sensor (TS4), which is closed if inlet air temperature is below the set point
- Power passes to and energizes the heat relay (RH)
- N.O. contact on heat relay (RH) closes
- 24 VAC is supplied to stage controller (SC1)
- If the discharge temperature is less than the set point on the discharge air sensor (TS2) and the high temperature limit control (HLC1) has not been tripped, the N.O. contact for furnace stage controller will close
- Power will be supplied to the ignition controller (IC1), which will begin its sequence of operation

4. Ignition Controller (IC1) Sequence of Operation

- The N.O. contact on air proving switch (PS2) is open
- The ignition controller (IC1) energizes the combustion blower relay (CR)
- N.O. contact on combustion blower relay (CR) closes
- Power passes to and energizes the combustion blower (CM)
- The N.O. contact on air proving switch (PS2) closes
- The ignition controller (IC1) begins a 15 second pre-purge
- The high fire relay (RT3) is energized and the N.O. contact on high fire relay (RT3) closes
- The main gas valve (MV) fully opens (100%)
- Igniter begins sparking
- 10 second trial for ignition begins
- The furnace will light at high fire (100%)
- When the flame is detected, the igniter stops sparking
- The furnace will remain at high fire (100%) for at least 10 seconds
- High fire contact (RT3) will open
- Furnace stages to maintain the discharge air temperature set point (SC1)

5. High Fire – Low Fire Sequence of Operation

- The furnace lights at high fire (100%) and remains at high fire for 10 seconds
- If the discharge temperature is above the discharge air sensor (TS2) set point, the N.O. furnace stage 2 controller contact (SC2), will open and the furnace will go to low fire (50%)
- If the furnace is at low fire (50%) and the discharge temperature is above the discharge air sensor (TS2) set point, the furnace stage 1 contact (SC1) will open and the furnace will shut down
- If the furnace is at low fire (50%) and the discharge temperature is below the discharge air sensor (TS2) set point, the furnace stage 2 contact (SC2) will close and the furnace will go to high fire

6. Optional Evaporative Cooling Contact (S4) Closed*

- N.O. contact on fan relay (RF) is energized and closed
- Power passes through N.O. contact on optional inlet air sensor (TS4), which is energized and closed if the inlet air temperature is above the set point
- Power passes to and energizes cool relay (RC)
- N.O. contact on cool relay (RC) is energized and closed
- Power passes to evaporative cooling pump (P1)

*If DX or chilled water coils are used rather than an evaporative cooler, the cooling sequence of operation will depend on the coil controls. Cooling coil controls are supplied by others.

Sequence of Operation

2:1 Modulation Sequence

1. Exhaust Fan Contact (S1) Manually Closed (optional)

- Power passes through N.C. contact on exhaust fan overload (ST2 OL), which is closed if exhaust fan (M2) has not overloaded
- Power passes to exhaust fan starter (ST2)
- N.O. contact on exhaust fan starter (ST2) is energized and closed
- Power passes to and energizes exhaust fan (M2)

2. Supply Fan Contact (S2) Manually Closed

- Power passes through N.C. field supplied fire contact (FSC)
- Power passes through optional N.O. contact on exhaust fan starter (ST2), which is closed when the optional exhaust starter (ST2) is activated
- Power passes through N.C. contact on supply starter overload (ST1 OL), which is closed if the supply fan has not overloaded
- Power passes through N.C. contact on optional freeze protection timer (RT4), which is closed if the temperature has remained above the set point
- Power passes to and energizes optional inlet damper (D1), which opens
- Power passes through optional damper limit switch (DL1), which is energized and closed if the optional inlet damper is open. It may take several minutes for the damper to fully open and for the damper limit switch to close
- Power passes to and energizes fan relay (RF)
- Power passes through N.O. contact on fan relay (RF), which is closed once the fan relay (RF) is activated
- Power passes to and energizes starter relay (ST1)
- N.O. contact on supply fan starter (ST1) is energized and closed
- Supply fan (M1) starts

3. Heat Contact (S4) Manually Closed

- Power passes through N.O. contact on fan relay (RF), which is energized and closed if the supply fan (M1) is on
- Power passes through the N.C. contact on optional inlet air sensor (TS4), which is closed if inlet air temperature is below set point
- Power passes to and energizes the heat relay (RH)
- Power passes to N.C. contact on high temperature limit control (HLC1), which remains closed if it has not been tripped
- N.O. contact on heat relay (RH) closes
- 24 VAC is supplied to ignition controller (IC1) and amplifier (AMP)
- If the discharge air sensor (TS2) reading is less than the temperature selector (TS3) setting, the

amplifier (AMP) sends a call for heating to the ignition controller (IC1)

4. Ignition Controller (IC1) Sequence of Operation

- The N.O. contact on air proving switch (PS2) is open
- The ignition controller (IC1) energizes the combustion blower relay (CR)
- N.O. contact on combustion blower relay (CR) closes
- Power passes to and energizes the combustion blower (CM)
- The N.O. contact on air proving switch (PS2) closes
- The ignition controller (IC1) begins a 15 second pre-purge
- The high fire relay (RT3) is energized and the N.O. contact on high fire relay (RT3) closes
- The main gas valve (MV) fully opens (100%) and the modulating gas valve (MOD) opens to high fire
- Igniter begins sparking
- 10 second trial for ignition begins
- The furnace will light at high fire (100%)
- When the flame is detected, the igniter stops sparking
- The furnace will remain at high fire (100%) for at least 10 seconds
- High fire contact (RT3) will open
- Furnace modulates to maintain the temperature selector (TS3) set point

5. High Fire – Low Fire Sequence of Operation

- The furnace lights at and remains at high fire (100%) for 10 seconds
- If the discharge temperature sensor (TS2) reading is above the temperature selector (TS3) set point, and furnace is not at low fire, the amplifier will adjust the modulating gas valve (MOD) down until the discharge temperature sensor (TS2) reading equals the temperature selector (TS3) setting
- If the discharge temperature sensor (TS2) reading is below the temperature selector (TS3) set point, and the furnace is not at high fire, the amplifier will adjust the modulating gas valve (MOD) up until the discharge temperature sensor (TS2) reading equals the temperature selector (TS3) setting
- If the furnace is at low fire and the discharge temperature sensor (TS2) reading is above the temperature selector (TS3) set point, the amplifier will end the call for heat and the ignition controller (IC1) will shut down the furnace

6. Optional Evaporative Cooling Contact (S4) Closed*

- N.O. contact on fan relay (RF) is energized and closed
- Power passes through N.O. contact on optional inlet air sensor (TS4), which is energized and closed if the Inlet air temperature is above the set point
- Power passes to and energizes cool relay (RC)

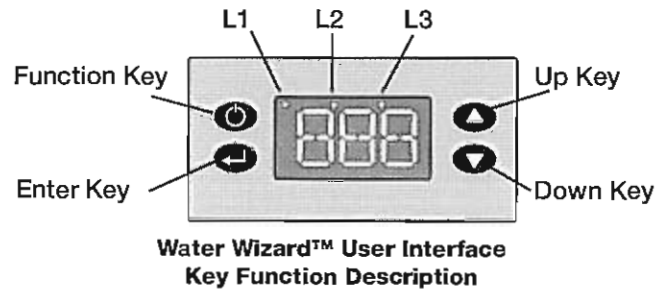
Sequence of Operation

2:1 Modulation Sequence, *continued*

- N.O. contact on cool relay (RC) is energized and closed
 - Power passes to evaporative cooling pump (P1)
- *If DX or chilled water coils are used rather than an evaporative cooler, the cooling sequence of operation will depend on the coil controls. Cooling coil controls are supplied by others.

Operation

4:1 Modulation and 8:1 Staged Controller



Program Mode

Program Mode allows the user to view the Program Menu and edit the factory default settings. To access Program Mode and view the Setpoints Menu, press and hold the Escape key for three seconds. While viewing the Setpoints Menu, press the Up or Down key to scroll through the menu options. To view the setting of the selected menu option, press the Enter key. To edit the setting, press the Up or Down key while viewing the setting. To save the setting and return to the Setpoints Menu press the Enter key. To return to the Setpoints Menu without saving the change, wait 15 seconds. To exit Program Mode from the Setpoints Menu, wait 15 seconds.

WARNING

Changing the default settings will significantly affect performance. Only change a setting after reading and understanding this entire manual.

NOTE

The Enter key must be pressed to save any changes made to a setting.

Inlet Air Sensor (iAS)

The inlet air sensor monitors the temperature of the inlet air. If the inlet air is above the sensor's set point, the inlet air sensor shuts off the furnace and continues to supply the warm outside air. The inlet air sensor is preset to the factory recommended 65°F for 8:1 and 60°F for 4:1.

Discharge Air Temperature (dtS)

The discharge air temperature setting is the temperature that the unit will discharge. The discharge air temperature is preset to the factory recommended 70°F. The actual discharge air temperature is the default display.

Outside Air Temperature (OAt)

To temporarily display the outside air temperature, use the Up or Down key until the display reads "OAt," then press the Enter key.

Program Revision Number

To access the program revision number from the default display, press the Up or Down key until the display reads *F##*, *J##* or *I##*. The two numbers following the letter indicate the revision number. For example, *F12* indicates program *F*, revision twelve.

Optional Room Override (ROT)

When the room override function is triggered, the discharge air temperature (70°F default) is temporarily changed to the room override setting (90°F default). When the room override function is released the discharge air temperature returns to the default temperature.

Indicating Lights

Three indicating lights are located across the top of the display to indicate the status of the furnace.

4:1 Electronic Modulation			
Light	On	Off	Blinking
L1	Call for Heat	No call for heat	High fire
L2	Call for heat sent to ignition controller	No call for heat sent to ignition controller	High fire
L3	Combustion fan high speed	Combustion fan low speed	High fire
8:1 Staged Control (Single Furnace Units)			
Light	On	Off	Blinking
L1	Call for heat	No call for heat	N/A
L2	n/a	n/a	High fire
L3	Burner interlock	n/a	n/a
8:1 Staged Control (Multi Furnace Units)			
Light	On	Off	Blinking
L1	n/a	n/a	n/a
L2	n/a	n/a	Alarm
L3	Program Mode	n/a	Saving new setting

Sequence of Operation

4:1 Electronic Modulation

1. Exhaust Fan Contact (S1) Manually Closed (optional)

- Power passes through N.C. contact on exhaust fan overload (ST2 OL), which is closed if exhaust fan (M2) has not overloaded
- Power passes to exhaust fan starter (ST2)
- N.O. contact on exhaust fan starter (ST2) is energized and closed
- Power passes to and energizes exhaust fan (M2)

2. Supply Fan Contact (S2) Manually Closed

- Power passes through N.C. field supplied fire contact (FSC)
- Power passes through optional N.O. contact on exhaust fan starter (ST2), which is closed when the optional exhaust starter (ST2) is activated
- Power passes through N.C. contact on supply starter overload (ST1 OL), which is closed if the supply fan has not overloaded
- Power passes through N.C. contact on optional freeze protection timer (RT4), which is closed if the temperature has remained above the set point
- Power passes to and energizes optional inlet damper (D1), which opens
- Power passes through optional damper limit switch (DL1), which is energized and closed if the optional inlet damper is open. It may take several minutes for the damper to fully open and for the damper limit switch to close
- Power passes to and energizes fan relay (RF)
- Power passes through N.O. contact on fan relay (RF), which is closed once the fan relay (RF) is activated
- Power passes to and energizes starter relay (ST1)
- N.O. contact on supply fan starter (ST1) is energized and closed
- Supply fan (M1) starts

3. Heat Contact (S4) Manually Closed

- Power passes through N.O. contact on fan relay (RF), which is energized and closed if the supply fan (M1) is on
- Power passes to and energizes the heat relay (RH)
- N.O. contact on heat relay (RH) closes
- Power passes to N.C. contact on high temperature limit control (HLC1), which remains closed if it has not been tripped
- 24 VAC is supplied to ignition controller (IC1)
- The modulating controller (SC1) compares the inlet air temperature to the inlet air set point (iAS, FX Program Menu). If the inlet air temperature is below the set point, the modulating controller (SC1) closes N.O. contact (FUR 1) and sends a call for heat to the ignition controller (IC1)

Sequence of Operation

4:1 Electronic Modulation, *continued*

4. Ignition Controller (IC1) Sequence of Operation

- The N.O. contact on air proving switch (PS2) is open
- The ignition controller (IC1) energizes the induction relay (IR)
- N.O. contact on induction relay (IR) closes
- Power passes to and energizes the combustion blower (CM), sending it to high speed
- The N.O. contact on air proving switch (PS2) and high pressure switch (PS5) closes
- The ignition controller (IC1) begins a 15 second pre-purge
- The main gas valve (MV) fully opens (100%) and the modulating gas valve (MOD) opens to high fire
- Igniter begins sparking
- 10 second trial for ignition begins
- The furnace will light at high fire (100%)
- When the flame is detected, the igniter stops sparking
- The furnace will remain at high fire (100%) for 30 seconds
- The modulation controller (SC1) will adjust the modulating gas valve (MOD) and the combustion blower (CM) as needed between low and high fire
- The modulating controller (SC1) will monitor the high pressure switch (PS5) and run the furnace at low fire if the high pressure switch is not satisfied

5. High Fire – Low Fire Sequence of Operation

- The furnace lights at and remains at high fire (100%) for 30 seconds
- If the discharge temperature sensor (TS2) reading is above the discharge temperature setting (dtS, FX Program Menu), and the furnace is not at low fire, the modulating controller (SC1) will adjust the modulating gas valve (MOD) down until the discharge temperature sensor (TS2) reading equals the discharge temperature setting (dtS, FX Program Menu)
- If the discharge temperature sensor (TS2) reading is below the discharge temperature setting (dtS, FX Program Menu), and the furnace is not at high fire, the modulating controller (SC1) will adjust the modulating gas valve (MOD) up until the discharge temperature sensor (TS2) reading equals the discharge temperature setting (dtS, FX Program Menu)

6. Optional Evaporative Cooling Contact (S4) Closed*

- N.O. contact on fan relay (RF) is energized and closed
- Power passes through N.O. contact on inlet air sensor (TS4), which is energized and closed if the inlet air temperature is above the set point

- Power passes to and energizes cool relay (RC)
- N.O. contact on cool relay (RC) is energized and closed
- Power passes to evaporative cooling pump (P1)

*If DX or chilled water coils are used rather than an evaporative cooler, the cooling sequence of operation will depend on the coil controls. Cooling coil controls are supplied by others.

Sequence of Operation

8:1 Staged Control

1. Exhaust Fan Contact (S1) Manually Closed (optional)

- Power passes through N.C. contact on exhaust fan overload (ST2 OL), which is closed if exhaust fan (M2) has not overloaded
- Power passes to exhaust fan starter (ST2)
- N.O. contact on exhaust fan starter (ST2) is energized and closed
- Power passes to and energizes exhaust fan (M2)

2. Supply Fan Contact (S2) Manually Closed

- Power passes through N.C. field supplied fire contact (FSC)
- Power passes through optional N.O. contact on exhaust fan starter (ST2), which is closed when the optional exhaust starter (ST2) is activated
- Power passes through N.C. contact on supply starter overload (ST1 OL), which is closed if the supply fan has not overloaded
- Power passes through N.C. contact on optional freeze protection timer (RT4), which is closed if the temperature has remained above the set point
- Power passes to and energizes optional inlet damper (D1), which opens
- Power passes through optional damper limit switch (DL1), which is energized and closed if the optional inlet damper is open. It may take several minutes for the damper to fully open and for the damper limit switch to close
- Power passes to and energizes fan relay (RF)
- Power passes through N.O. contact on fan relay (RF), which is closed once the fan relay (RF) is activated
- Power passes to and energizes starter relay (ST1)
- N.O. contact on supply fan starter (ST1) is energized and closed
- Supply fan (M1) starts

3. Heat Contact (S4) Manually Closed

- Power passes through N.O. contact on fan relay (RF), which is energized and closed if the supply fan (M1) is on
- Power passes to and energizes the heat relay (RH)
- N.O. contact on heat relay (RH) closes
- The stage controller (SC1) compares the inlet air temperature to the inlet air set point (IAS, FX Program Menu). If the inlet air temperature is below the discharge air setting (dtS, FX Program Menu), the stage controller sends a call for heat to the ignition controller (IC1)

4. Ignition Controller (IC1) Sequence of Operation

- The N.O. contact on air proving switch (PS2) is open
- The stage controller (SC1) energizes the combustion blower relay (CR)

- N.O. contact on combustion blower relay (CR) closes
- Power passes to and energizes the combustion blower (CM)
- The N.O. contact on air proving switch (PS2) closes
- Power passes to and energizes air proving switch relay (R9)
- N.O. contacts on air proving switch (R9) closes
- The ignition controller (IC) completes a 30 second pre-purge
- The main gas valve (MV) fully opens (100%)
- Igniter begins sparking
- 10 second trial for ignition begins
- The furnace will light
- The stage controller (SC1) will choose which stage to light the furnace at based on the discharge air temperature setting (dtS, FX Program Menu) and the outside air temperature (TS1)
- When the flame is detected, the igniter stops sparking
- The furnace will remain at high fire (100%) for 20 seconds
- The stage controller (SC1) will stage the main gas valves (MV#) as needed between low fire, high fire and off
- If the furnace is at low fire and the discharge temperature sensor (TS2) reading remains above the discharge air temperature setting (dtS, FX Program Menu) for more than six minutes, the furnace will shut down

5. Staging Control Sequence of Operation

- If the discharge temperature (TS2) is below the discharge air temperature set point (dtS, FX Program Menu), the furnace will stage up
- If the discharge temperature (TS2) is above the discharge air temperature set point (dtS, FX Program Menu), the furnace will stage down
- If the discharge temperature (TS2) is above the discharge air temperature set point (dtS, FX Program Menu) and the furnace is at low fire, the furnace will shut off
- If the furnace is at high fire and the discharge air temperature setting (dtS, FX Program Menu) is not satisfied, the furnace will remain at high fire
- If the furnace is at low fire and the discharge air temperature setting (dtS, FX Program Menu) is satisfied, the furnace will shut off

6. Optional Evaporative Cooling Contact (S4) Closed*

- N.O. contact on fan relay (RF) is energized and closed
- Power passes through N.O. contact on optional inlet air sensor (TS4), which is energized and closed if the inlet air temperature is above the set point
- Power passes to and energizes cool relay (RC)

Sequence of Operation

8:1 Staged Control, *continued*

- N.O. contact on cool relay (RC) is energized and closed
- Power passes to evaporative cooling pump (P1)

*If DX or chilled water coils are used rather than an evaporative cooler, the cooling sequence of operation will depend on the coil controls. Cooling coil controls are supplied by others.

Operation - Economizer

NOTE

Only models IG-HV and IGX-HV with options EC-1, 2, 3 or 4 use an economizer.

Option EC-1 (Outside Air Temperature Reference)

This option uses one dry bulb temperature sensor, field installed in the inlet of the unit. A second dry bulb temperature sensor is factory installed in the discharge of the unit.

After a call for cooling, the outside air temperature is compared to the economizer set point. If the outside air temperature is above the economizer set point, the economizer sends the dampers to the minimum outside air position and calls for mechanical cooling. If the outside air temperature is between the economizer set point and 55°F, the economizer sends the dampers to the 100% outside air position. If the outside air is less than 55°F, the economizer modulates the dampers to achieve a 55°F mixed air temperature.

Option EC-2 (Outside Air Enthalpy Reference)

This option uses one enthalpy sensor field installed in the inlet of the unit. A dry bulb temperature sensor is installed in the discharge of the unit.

After a call for cooling, the outside air enthalpy is compared to the field adjustable enthalpy changeover set point. If the outside air enthalpy is less than the set point, the dampers will modulate to provide a 55°F mixed air temperature. If the outside air enthalpy is greater than the set point, the economizer sends the damper to the minimum outside air position and sends a call for mechanical cooling.

Option EC-3 (Differential Temperature Control)

This option uses one dry bulb temperature sensor, field installed in the inlet of the unit. A second dry bulb temperature sensor is field installed in the return air duct. A third dry bulb temperature sensor is factory installed in the discharge of the unit.

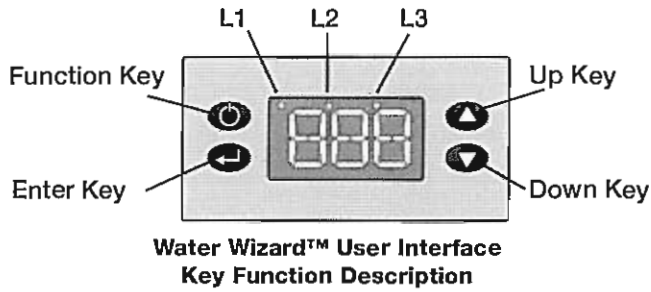
After a call for cooling the economizer compares the outdoor and return air temperatures. If the outdoor air temperature is greater than the return air dry bulb temperature, the economizer sends the dampers to the minimum outside air position and sends a call for mechanical cooling. If the outside air temperature is less than the return air temperature, the economizer will modulate the dampers to achieve a 55°F mixed air temperature. If the outside air temperature is less than the return air temperature, but a 55°F mixed air temperature cannot be achieved, the programmable room thermostat may call for mechanical cooling.

Option EC-4 (Differential Enthalpy Control)

This option uses one enthalpy sensor, field installed in the inlet of the unit. A second enthalpy sensor is field installed in the return air duct. A dry bulb temperature sensor is factory installed in the discharge of the unit.

After a call for cooling the economizer compares the outdoor and return air enthalpies. If the outdoor air enthalpy is greater than the return air enthalpy, the economizer sends the dampers to the minimum outside air position and sends a call for mechanical cooling. If the outside enthalpy is less than the return air enthalpy, the economizer will modulate the dampers to achieve a 55°F mixed air temperature. If the outside enthalpy is less than the return air temperature, but a 55°F mixed air temperature cannot be achieved, the programmable room thermostat may call for mechanical cooling.

Operation - Water Wizard™ (optional)



Drain Mode

Drain Mode locks open the drain solenoid and drains the supply line between the supply solenoid and the media. To activate Drain Mode simultaneously, press the Function and Enter Keys (L2 will light). To deactivate Drain Mode and unlock the drain solenoid, simultaneously press the Function and Enter Keys again.

Flow Test Mode

Activating Flow Test Mode opens the supply solenoid and allows water to pass to the manual supply valve. To activate Flow Test Mode, press and hold the Function Key for one second (L3 will flash). To deactivate Flow Test Mode and allow the supply solenoid to close, press and hold the Function Key again for one second.

CAUTION

The sump drain line must be clear and draining to a safe location before using Flow Test Mode.

CAUTION

Be aware of the water level in the sump tank at all times when using the Flow Test Mode.

Program Mode

Program Mode allows the user to view the Program Menu and edit the factory default settings. To access Program Mode and view the Program Menu press and hold the Enter Key for three seconds. While viewing the Program Menu press the Up and Down Keys to scroll through the Menu Options. To view the setting of the selected Menu Option, press the Enter Key. To edit the setting, press the Up or Down Key while viewing the setting. To save the setting and return to the Program Menu, press the Enter Key. To return to the Program Menu without saving the change, wait 15 seconds. To exit Program Mode from the Program Menu, wait 15 seconds.

WARNING

Changing the default settings will significantly affect performance. Only change a setting after reading and understanding this entire manual.

WARNING

The Enter key must be pressed to save any changes made to a setting.

Dry Bulb Temperature

The dry bulb temperature is visible on the home screen. If it is not visible, wait 15 seconds to return to the home screen, then use the Up and Down Keys until a number is displayed.

Wet Bulb Temperature

To view the Wet Bulb Temperature, simultaneously press and hold the Up and Down Keys.

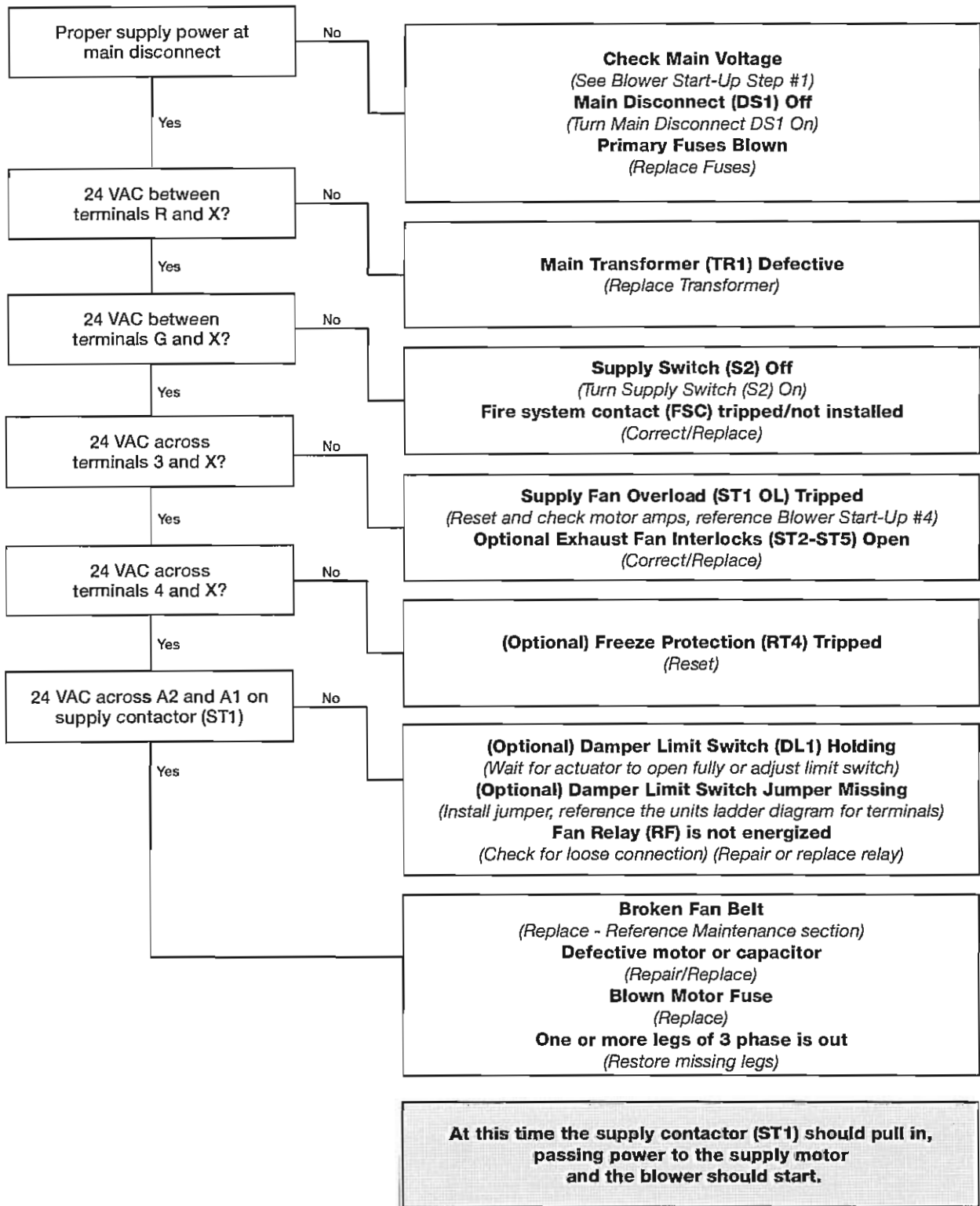
Indicating Lights

Three indicating lights are located across the top of the display to indicate the status of the Water Wizard™.

Light Status				
Indicating Light	On	Off	Blinking (Long on, Short Off)	Blinking (Short on, Long Off)
L1	Call for cooling	No call for cooling	Call for cooling. Outdoor temperature lockout.	N/A
L2	Drain solenoid open	Drain solenoid closed	N/A	Supply solenoid open. (Drain solenoid closed).
L3	Cooling on	Cooling off	Supply solenoid locked closed	Flow test mode active

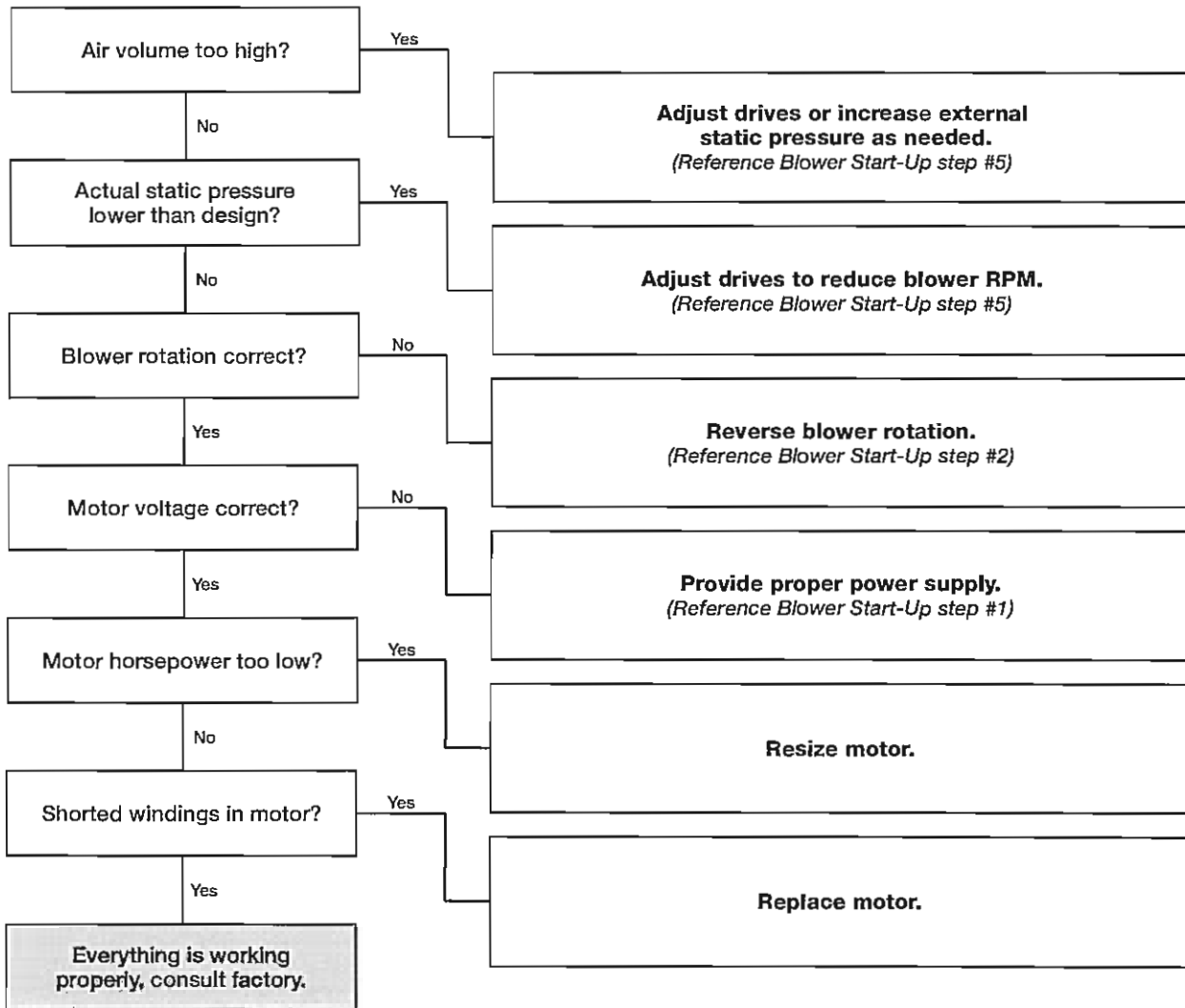
Troubleshooting

Blower Does Not Operate



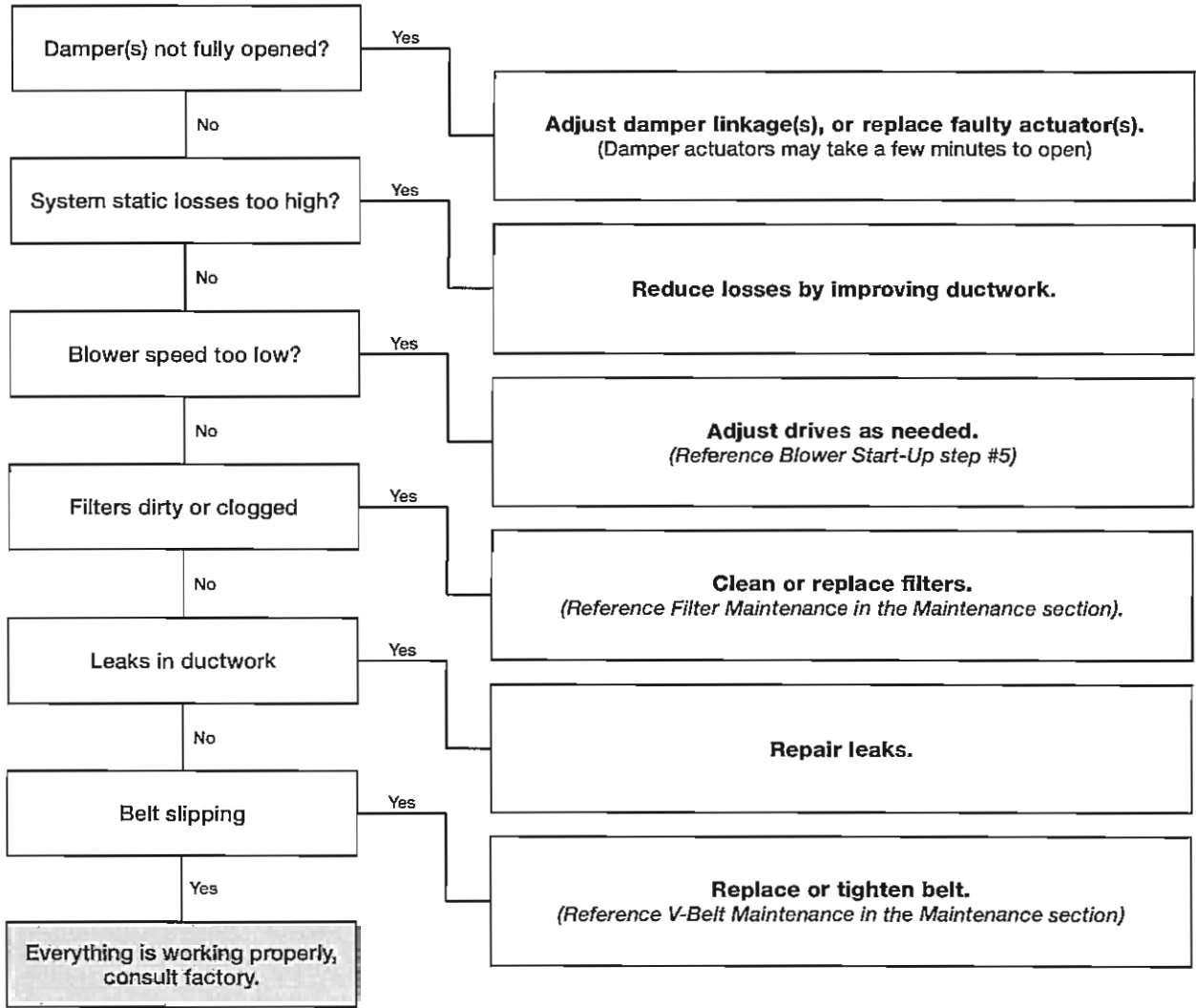
Troubleshooting

Motor Over Amps

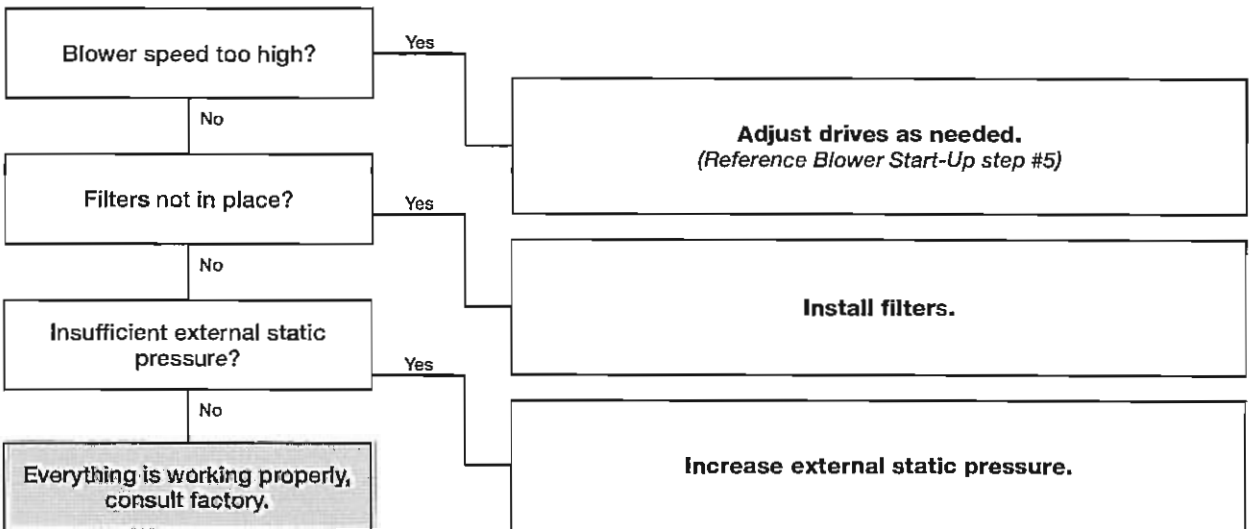


Troubleshooting

Insufficient Airflow

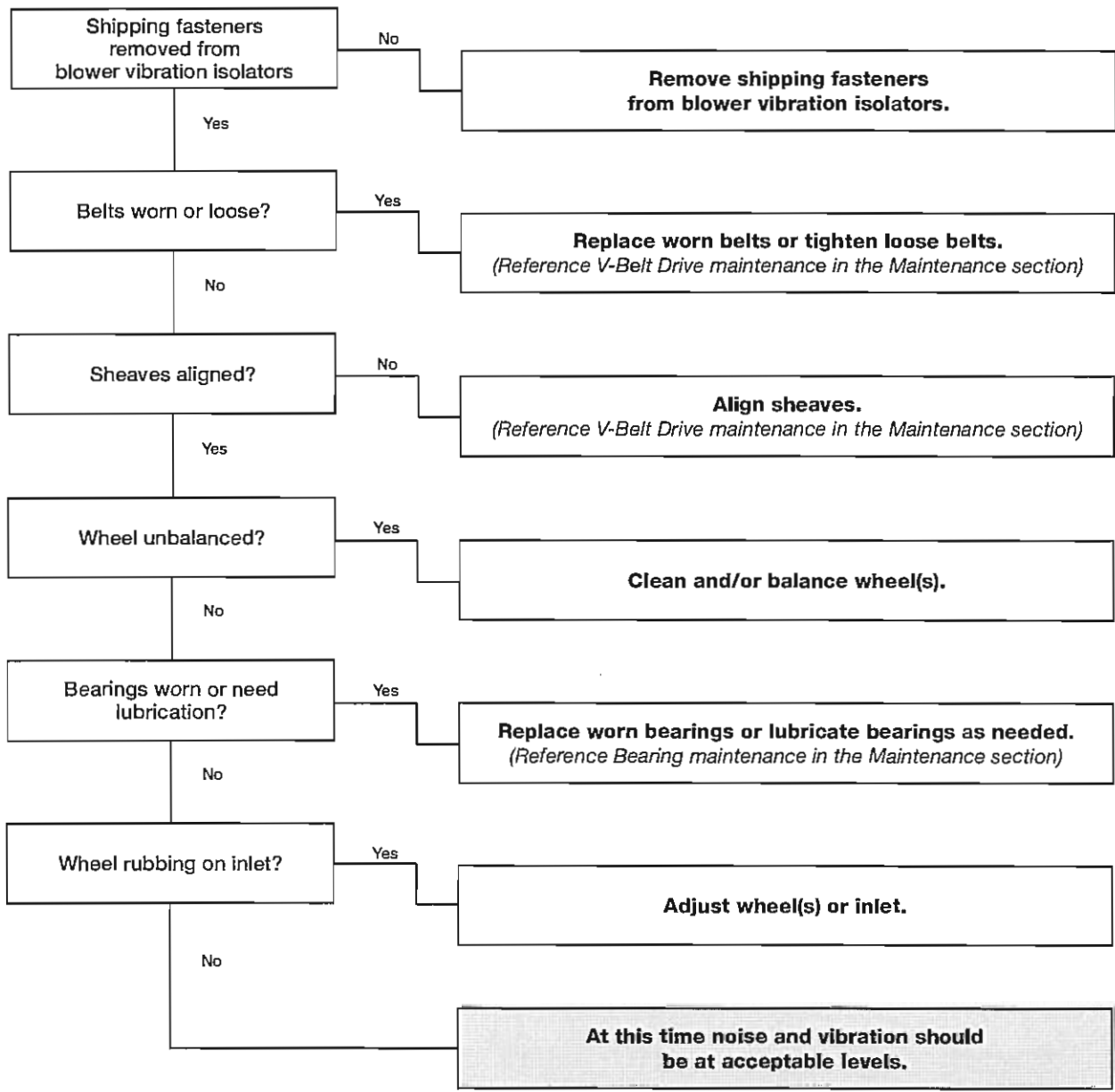


Too Much Airflow



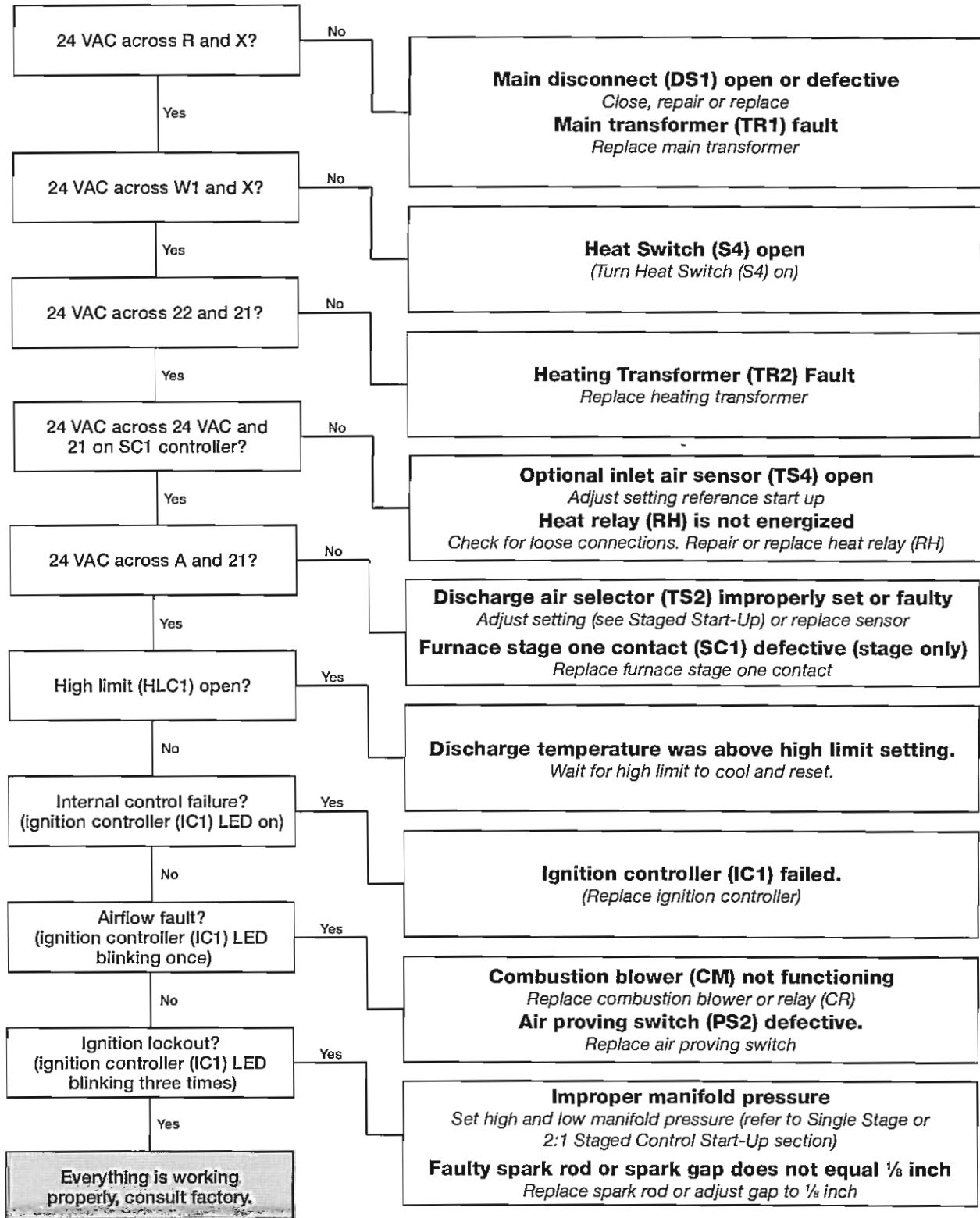
Troubleshooting

Excessive Noise or Vibration



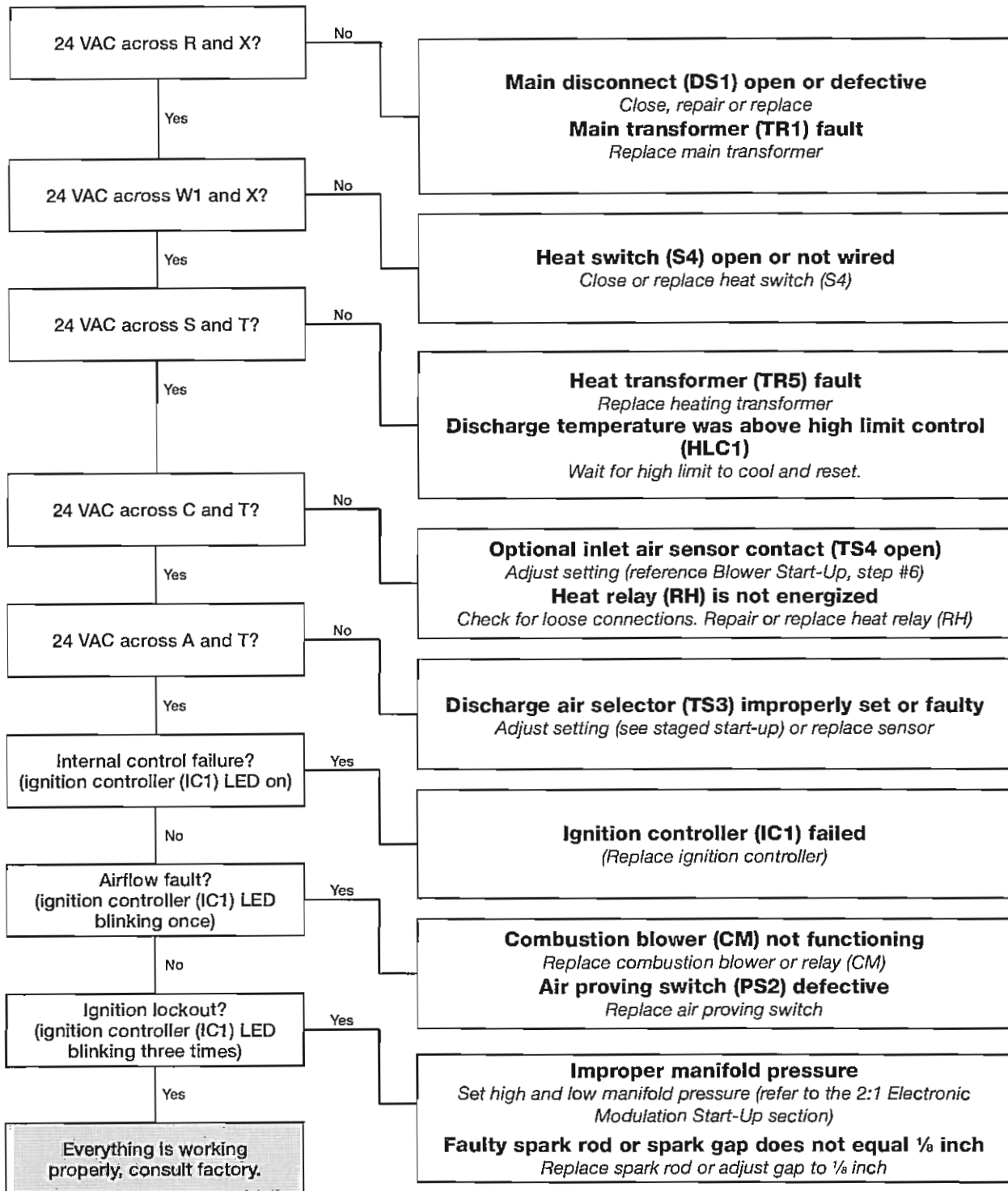
Troubleshooting

Single or 2:1 Stage Furnace Will Not Light



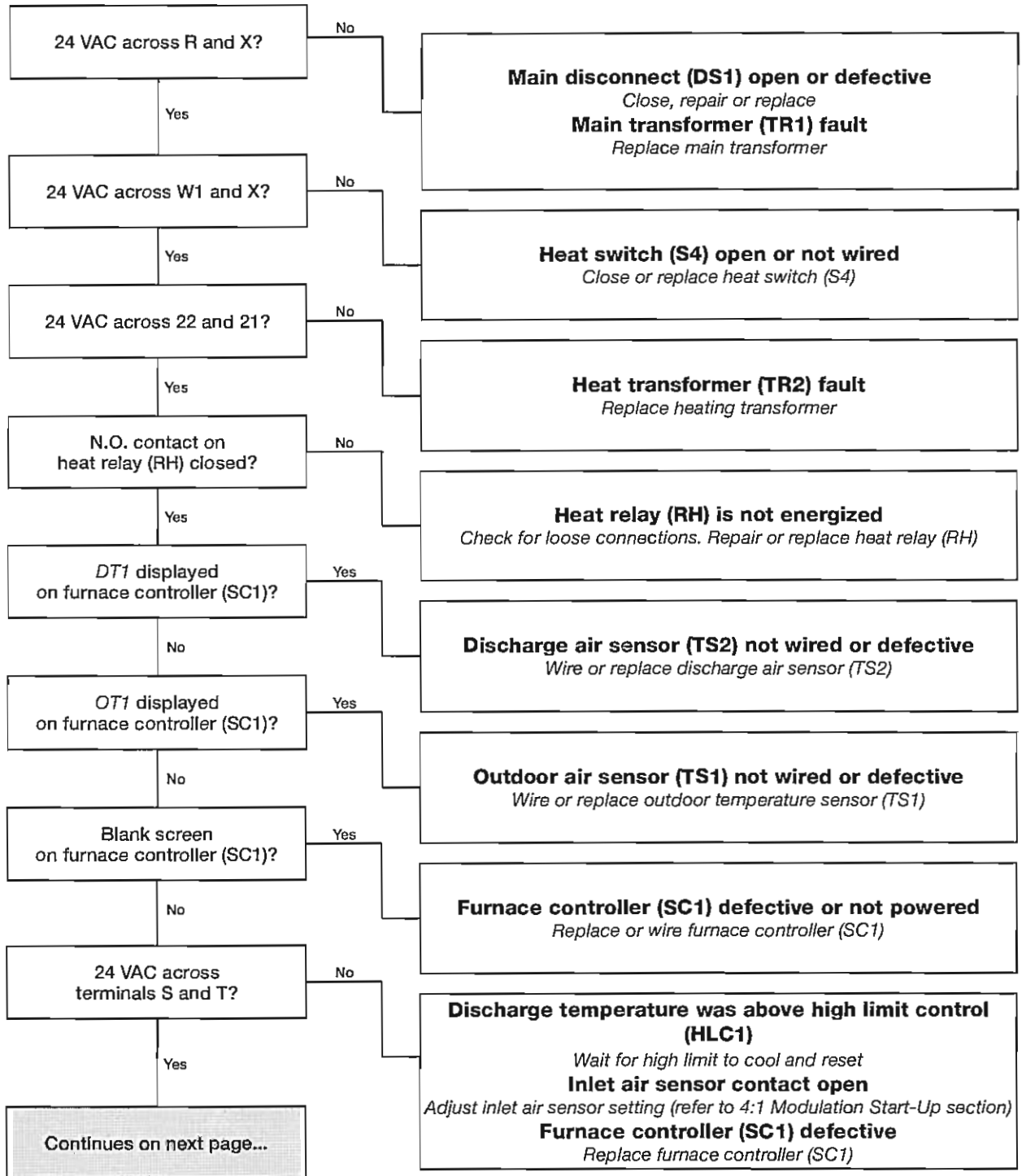
Troubleshooting

2:1 Modulating Furnace Will Not Light



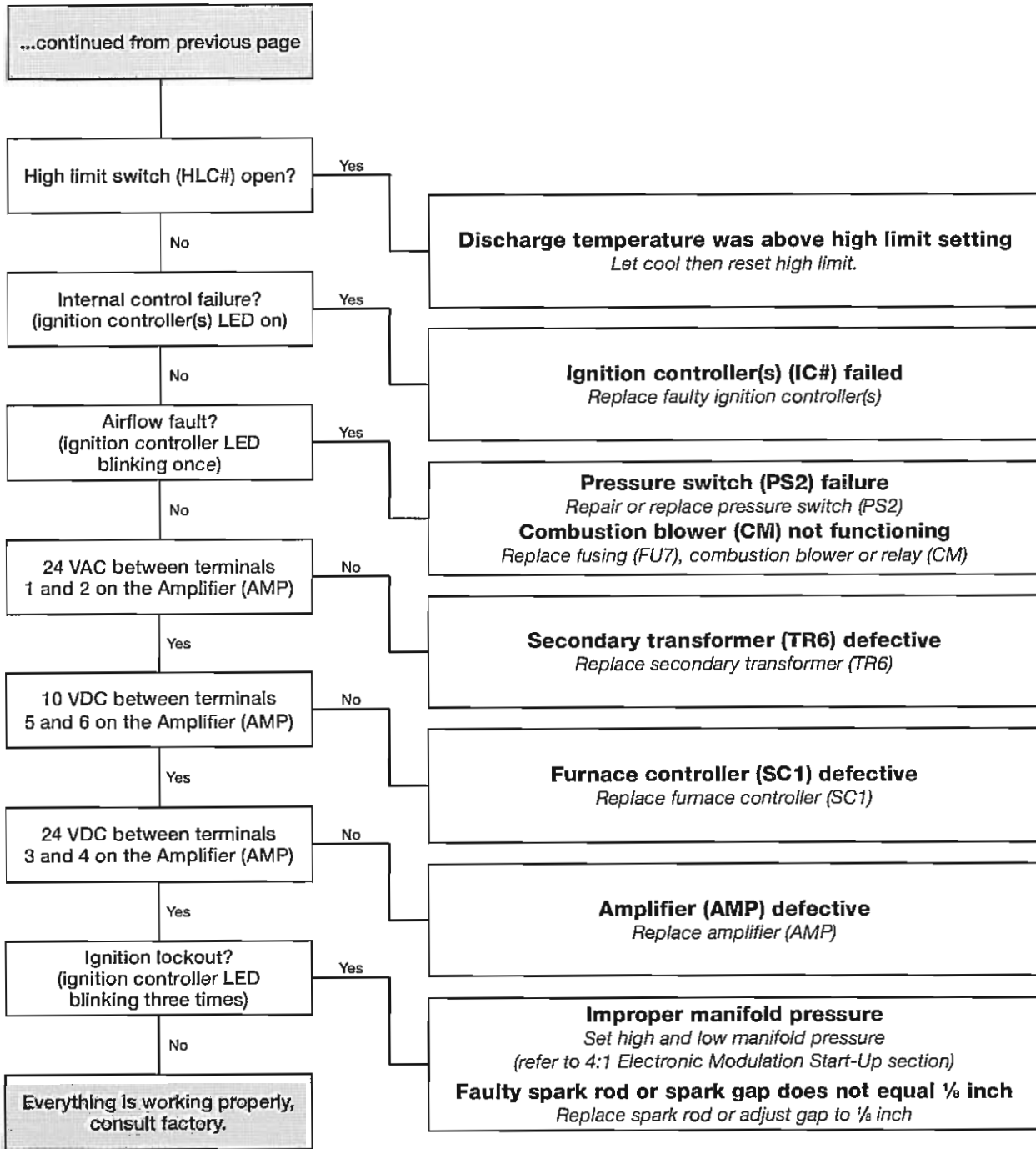
Troubleshooting

4:1 Modulating Furnace Will Not Light



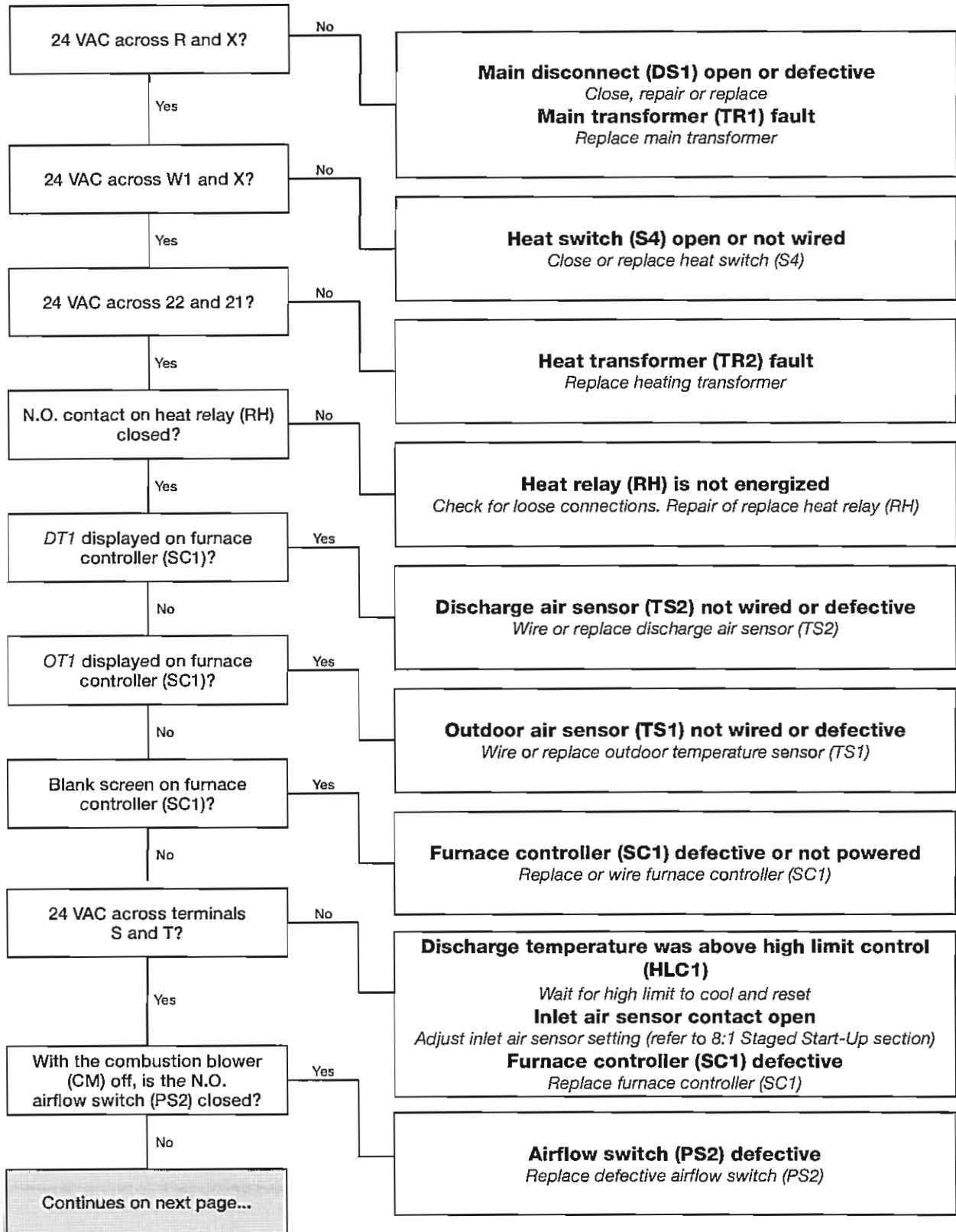
Troubleshooting

4:1 Modulating Furnace Will Not Light



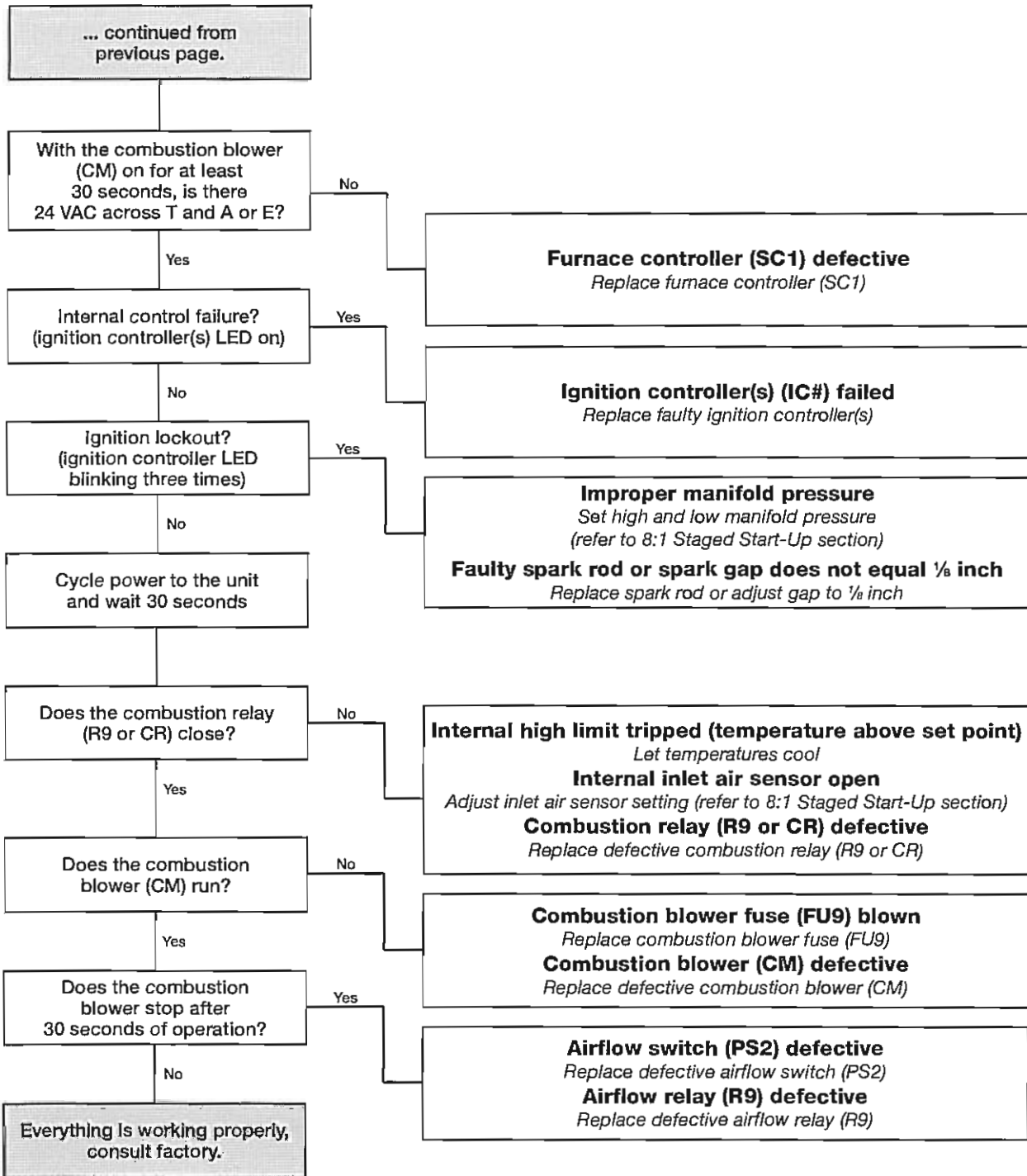
Troubleshooting

8:1 Staged Furnace Will Not Light



Troubleshooting

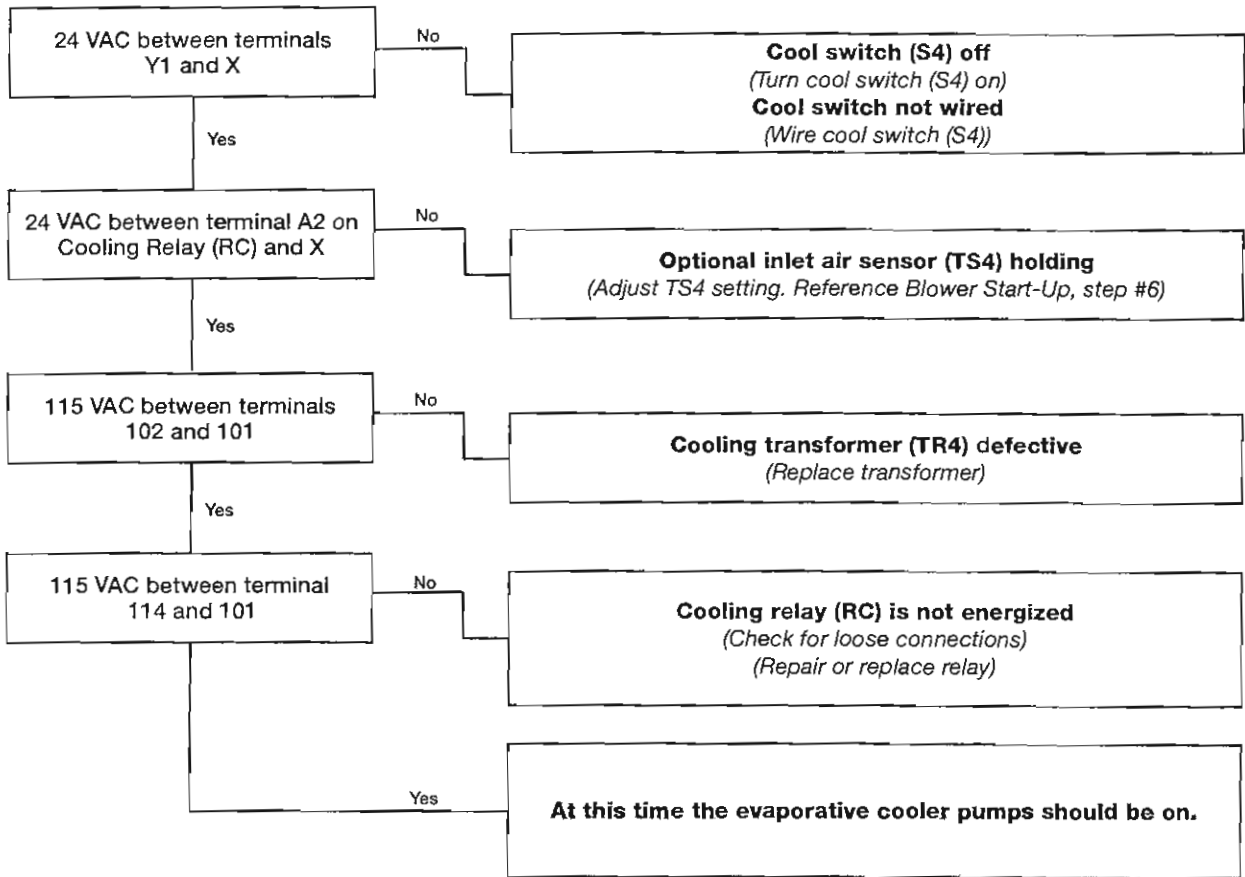
8:1 Staged Furnace Will Not Light



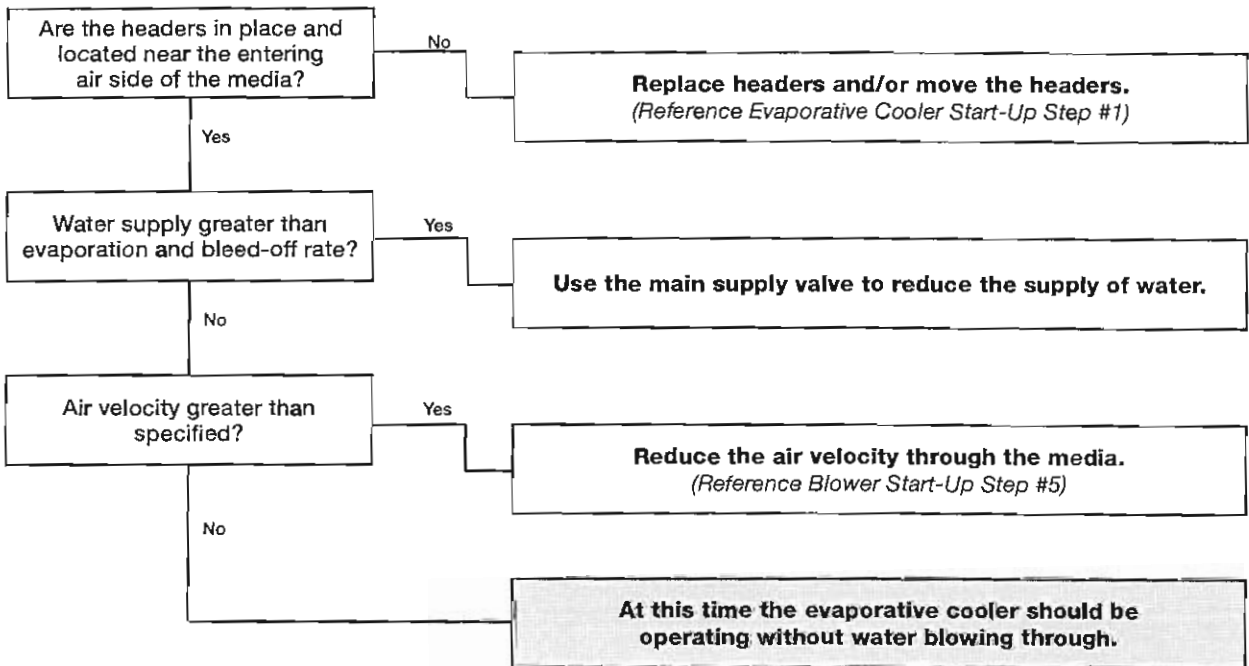
Troubleshooting

Evaporative Cooler does not Operate (Recirculating pump)

Supply fan must be on for cooler to operate



Water Blows through Evaporative Cooler



Troubleshooting

Water Wizard™ – Improper Water Supply

NOTE

If the water supply is too low, the media will continuously appear dry.

NOTE

If the water supply is too high, the media will be saturated and excessive water will be draining from the sump tank.

NOTE

Some water drainage is desired to keep the media flushed, but it should be minimized to utilize the Water Wizard™.

NOTE

Changing the On Time Factor by (1) will change the water supply by approximately 3%.

IMPORTANT

The Enter key must be pressed to save the new On Time Factor.

1. Adjust the Manual Supply Valve

Adjust the manual supply valve (refer to Start-Up, Water Wizard™). If the recommended water pressure does not provide enough water, increase the pressure until the desired water supply is achieved. If the recommended water pressure provides too much water, decrease the water pressure until the desired water supply is achieved.

CAUTION

Only proceed to Steps 2 and 3 if Step 1 does not correct the problem.

2. Enter Program Mode

Press and hold the Enter key for three seconds to enter Program Mode. The display will read "Pro" when Program Mode is active.



3. Adjust the On Time Factor

While in the Program Menu, use the Up and Down keys to navigate through the menu options until "ont" is displayed.



With "ont" displayed, press the Enter key to access the setting.

With the setting displayed, use the Up and Down keys to adjust the setting as needed.

Increase the factor to increase the water supply or decrease the factor to decrease the water supply.

Press the Enter key to save the new On Time Factor and return to the Program Menu.

4. Exit Program Mode

After 15 seconds of idle time the controller will automatically exit Program Mode

Maintenance - Routine

CAUTION

Lock-out the gas and the electrical power to the unit before performing any maintenance or service operations to this unit.

V-Belt Drives

V-belt drives must be checked on a regular basis for wear, tension, alignment, and dirt accumulation.

Check the tension by measuring the deflection in the belt as shown below.

Check the alignment by using a straight edge across both sheaves as shown below.

IMPORTANT

Premature or frequent belt failures can be caused by improper belt tension, or misaligned sheaves.

- Abnormally high belt tension or drive misalignment will cause excessive bearing loads and may result in failure of the fan and/or motor bearings.
- Abnormally low belt tension will cause squealing on start-up, excessive belt flutter, slippage, and overheated sheaves.

IMPORTANT

Do not pry belts on or off the sheave. Loosen belt tension until belts can be removed by simply lifting the belts off the sheaves.

IMPORTANT

When replacing V-belts on multiple groove drives, all belts should be changed to provide uniform drive loading.

IMPORTANT

Do not install new belts on worn sheaves. If the sheaves have grooves worn in them, they must be replaced before new belts are installed.

Snow Accumulation

Clear snow away from roof mounted units. Keep the snow clear of the intake and access doors.

Motors

Motor maintenance is generally limited to cleaning and lubrication (where applicable).

Cleaning should be limited to exterior surfaces only. Removing dust and grease build-up on the motor assures proper motor cooling.

Motors supplied with grease fittings should be greased in accordance with the manufacturer's recommendations.

IMPORTANT

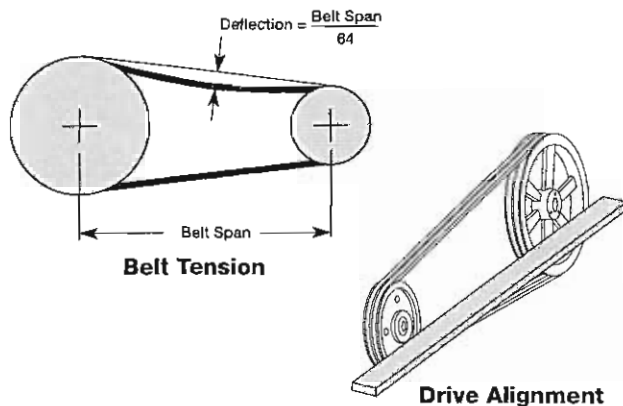
Do not allow water or solvents to enter the motor or bearings. Motors and bearings should never be sprayed with steam, water or solvents.

IMPORTANT

Greasing motors is only intended when fittings are provided. Many motors are permanently lubricated, requiring no additional lubrication.

Wheels

Wheels require little attention when moving clean air. Occasionally oil and dust may accumulate on the wheel causing imbalance. When this occurs the wheel and housing should be cleaned to assure proper operation.



Maintenance - Routine *continued*

Bearings

The bearings for Greenheck fans are carefully selected to match the maximum load and operating conditions of the specific class, arrangement and fan size. The instructions provided in this manual and those provided by the bearing manufacturer will minimize any bearing problems.

IMPORTANT

Lubricate bearings prior to periods of extended shutdowns or storage and rotate shaft monthly to aid in corrosion prevention. If the fan is stored more than three months, purge the bearings with new grease prior to start-up.

Recommended Bearing Lubrication Schedule (in Months*)					
Fan RPM	Bearing Bore Size (inches)				
	1/2 - 1	1 1/8 - 1 1/2	1 5/8 - 1 7/8	1 15/16 - 2 3/16	2 1/16 - 3
250	6	6	6	6	6
500	6	6	6	5	4
750	6	5	4	3	3
1000	5	3	2	1	1
1250	5	3	2	1	1
1500	5	2	1	1	0.5
2000	5	1	1	0.5	0.25

*Suggested initial greasing interval is based on 12 hour per day operation and 150°F maximum housing temperature. For continuous (24 hour) operation, decrease greasing interval by 50%

- If extended grease lines are present, relubricate while in operation, only without endangering personnel.
- For ball bearings (operating) relubricate until clean grease is seen purging at the seals. Be sure not to unseat the seal by over lubricating.
- For ball bearings (idle) add 1-2 shots of grease up to 2 inch bore size, and 4-5 shots above 2 inch bore sizes with a hand grease gun.
- For roller bearings add 4 shots of grease up to 2 inch bore size, and 8 shots for 2-5 inch bore size with a hand grease gun.
- Adjust relubrication frequency based on condition of purged grease.
- A high quality lithium based grease conforming to NLGI Grade 2 consistency, such as those listed here:

Mobil 532	Texaco Multifak #2	B Shell Alvania #2
Mobilux #2	Texaco Premium #2	Exxon Unirex #2

Filters

Filter maintenance is generally limited to cleaning and replacement.

If aluminum mesh filters are installed, they can be washed in warm soapy water.

An adhesive spray can be added to aluminum mesh filters to increase their efficiency.

If disposable filters are installed, they can be checked by holding up to a light source. If light cannot pass through the filter, it should be replaced.

IMPORTANT

When reinstalling filters, be sure to install them with the airflow in the correct direction. An airflow direction arrow is located on the side of the filters.

IMPORTANT

Replacement filters should be from the same manufacturer and the same size as the original filters provided with the unit.

Evaporative Coolers

The media should be periodically brushed lightly with a soft bristle brush in an up and down motion while flushing with water. This aids in reducing the amount of mineral build-up.

For large amounts of mineral build-up, clean or replace the media and increase the water bleed-off or flush rate.

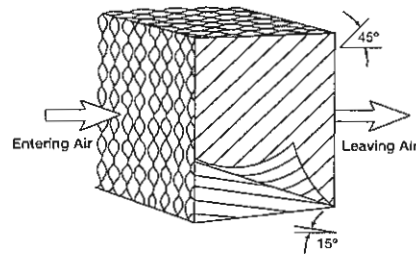
The cooling media has a useful life of 3 to 5 years depending on the water quality and the bleed-off or flush rate.

IMPORTANT

When reinstalling the evaporative media, make sure that it is installed correctly. Reference the drawing shown below.

IMPORTANT

Replacement media should be from the same manufacturer and be the same size as the original media provided with the unit.



Media Orientation

Maintenance - Routine *continued*

Cooling Coils

WARNING

Repair and replacement of the coil and the connecting piping, valves, etc., should be performed by a qualified individual.

Inspect the coil for signs of corrosion and/or leaks. Repair any leaks as required.

Inspect the coil's surface for foreign material. If the coil surface needs cleaning, clean the coil from the leaving air-side so that foreign material will be washed out of the coil rather than pushed farther in.

Inspect and clean the drain pan to prevent the growth of algae and other organisms.

IMPORTANT

Be sure to read and follow the manufacturer's recommendations before using any cleaning fluid.

CAUTION

Caution should be used to avoid injury when venting the coil. High pressure and/or high temperature fluids can cause serious injuries.

Chilled Water Coils

Test the circulating fluid for sediment, corrosive products and biological contaminants. Make the necessary corrective measures.

Maintain adequate fluid velocities and proper filtering of the fluid.

If automatic air vents are not utilized, periodic venting of the coil is recommended to remove accumulated air.

Maintenance - Fall

High Limit

The high limit switch may have tripped over the summer; it should be checked and reset if necessary.

CAUTION

Lock-out the gas and the electrical power to the unit before performing any maintenance or service operations to this unit.

Gas Line

Remove the drip leg and clean any liquid or debris that may have accumulated. Once the drip leg is cleaned, reattach it.

Gas Train

The gas connections, joints and valves should be checked annually for tightness. Apply a soap and water solution to all piping; watch for bubbling which indicates a leak. Other leak testing methods can be used.

Vent Piping

Remove any debris from the drip legs on the combustion air and exhaust pipes.

Burners and Orifices

Before each heating season, examine the burners and gas orifices to make sure they are clear of any debris such as spider webs, etc. Clean burner as follows:

- Turn off both electrical and gas supplies to the unit.
- Disconnect union between manifold and gas valve.
- Remove manifold and burner assembly.
- Inspect and clean orifices and burners as necessary. Avoid using any hard or sharp instruments which could cause damage to the orifices or burners.
 - Remove any soot deposits from the burner with a wire brush.
 - Clean the ports with an aerosol degreaser or compressed air.
 - Wipe the inside of the burner clean. Cleaning the burner with a degreaser will slow the future build-up of dirt.
- Before reinstalling the burner assembly, look down the heat exchanger tubes to make sure they are clear of any debris.
- Reinstall manifold and burner assembly, reconnect wire leads and gas supply piping.
- Turn on the electrical power and gas supply.
- Follow the start-up procedure to light the burners and verify proper operation.

Heat Exchanger

The heat exchanger should be checked annually for cracks. If a crack is detected, the heat exchanger should be replaced before the unit is put back into operation. Also, airflow across the heat exchanger should be checked to make sure the blower is operating properly.

Flue Collector Box

The flue passageway and flue collector box should be inspected prior to each heating season and cleared of any debris.

Electrical Wiring

The electrical wiring should be checked annually for loose connections or deterioration.

Replacement Parts

When ordering replacement parts, include the complete unit model number and serial number listed on the unit nameplate.

Evaporative Coolers

The water should be shut off and all the lines drained when the outside temperature drops below 45°F.

Remove drain plugs for the winter.

Clean all interior parts of any mineral deposits or foreign materials that may have built-up during the cooling season.

Replace any worn or non-functioning parts.

Winterizing Chilled Water Coils

During the winter, chilled water coils need to be protected against freezing. Greenheck recommends protecting the coils by either blowing-out the coils or by flushing the coils.

Blowing-Out Coils

1. Close valves on the supply and return lines.
2. Open drain valves and/or drain plug. Remove vent plug to allow coil to drain faster.
3. After coil is fully drained, connect a blower to the caps. Do not connect the blower to the air vent or drain plug.
4. Close the vent plug on the header that the blower is connected to. Open the drain valve or cap on the other header.
5. Turn on blower for 30 minutes. Place mirror at discharge. If the mirror fogs up, repeat procedure until no fog appears on the mirror.
6. After drying the coil, wait a few minutes then repeat Step #5.
7. Leave drains open and do not install plugs until beginning of cooling season.

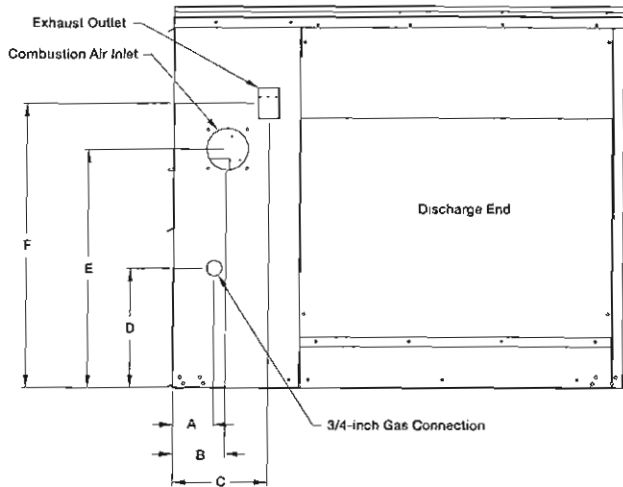
Flushing Coils

Greenheck recommends the use of inhibited glycol (such as propylene or ethylene) to flush water coils to protect against freezing. Additionally, the use of inhibited glycol provides corrosion protection.

The table below indicate the percentage of glycol required to prevent freezing in a coil at a given outdoor air freeze point. Completely fill coil with solution. Drain coil. Residual glycol fluid per these concentrations can be left in the coil without concern of freezing. Recovered fluid can be used to flush other coils.

Percent of Ethylene Glycol by Volume	Freeze Point		Percent of Propylene Glycol by Volume	Freeze Point	
	°F	°C		°F	°C
0	32	0	0	32	0
10	25	-4	10	26	-3
20	16	-9	20	19	-7
30	3	-16	30	8	-13
40	-13	-25	40	-7	-22
50	-34	-37	50	-28	-33
60	-55	-48	60	-60	-51

Reference - Model IG Venting Connection Location



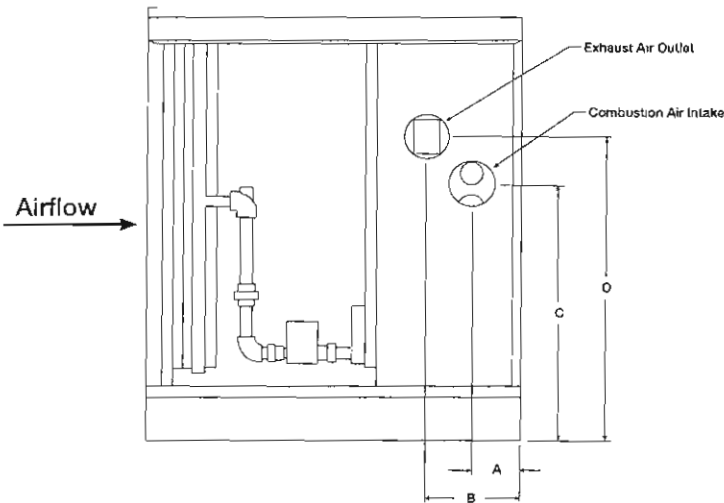
Venting Location Dimensions						
IG Housing	A	B	C	D	E	G
10	3.89	5.12	9.12	11.59	23.11	27.58
20	3.91	3.89	7.89	11.62	25.34	32.27
30	3.91	3.89	7.89	11.62	25.34	32.27

Dimensions are in inches.

Dimensions B and E are not needed for standard venting. A round adapter should be used for the exhaust connection.

Flue Connection Size (diameter in inches)					
IG Housing	Standard	Non-Concentric		Concentric	
	Exhaust	Exhaust	Intake	Exhaust	Intake
10	4.0	4.0	4.0	4.0	6.0
20	6.0	6.0	6.0	6.0	8.0
30	6.0	6.0	6.0	6.0	8.0

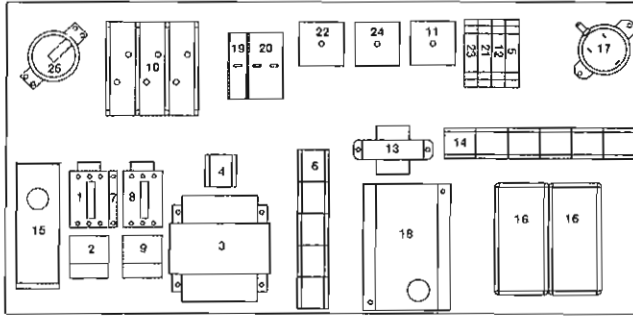
Reference - Model IGX Venting Connection Location



IGX Housing	Furnace Size (MBH)	A	B	C	D	Flue Connection Size (diameter in inches)				
						Standard	Non-Concentric		Concentric	
						Exhaust	Exhaust	Intake	Exhaust	Intake
12	100	4.45	8.45	23.43	27.90	4.0	4.0	4.0	4.0	6.0
	150	4.45	8.45	23.43	27.90	4.0	4.0	4.0	4.0	6.0
	200	5.64	9.64	23.97	30.90	6.0	6.0	6.0	6.0	8.0
	250	5.64	9.64	23.97	30.90	6.0	6.0	6.0	6.0	8.0
22	150	4.45	8.45	29.38	33.85	4.0	4.0	4.0	4.0	6.0
	200	5.67	9.67	24.97	31.90	6.0	6.0	6.0	6.0	8.0
	250	5.67	9.67	24.97	31.90	6.0	6.0	6.0	6.0	8.0
	300	5.67	9.67	24.97	31.90	6.0	6.0	6.0	6.0	8.0
	350	5.67	9.67	19.01	25.94	6.0	6.0	6.0	6.0	8.0
	400	5.67	9.67	19.01	25.94	6.0	6.0	6.0	6.0	8.0
	500	5.67	9.67	24.97	31.90	6.0	6.0	6.0	6.0	8.0
	600	5.67	9.67	24.97	31.90	6.0	6.0	6.0	6.0	8.0
32	350	5.96	9.71	28.31	35.24	6.0	6.0	6.0	6.0	8.0
	400	5.96	9.71	28.31	35.24	6.0	6.0	6.0	6.0	8.0
	500	5.96	9.71	28.31	35.24	6.0	6.0	6.0	6.0	8.0
	600	5.96	9.71	28.31	35.24	6.0	6.0	6.0	6.0	8.0
	700	5.96	9.71	28.31	35.24	6.0	6.0	6.0	6.0	8.0
	800	5.96	9.71	28.31	35.24	6.0	6.0	6.0	6.0	8.0
	1050	5.96	9.71	28.31	35.24	6.0	6.0	6.0	6.0	8.0
1200	5.96	9.71	28.31	35.24	6.0	6.0	6.0	6.0	8.0	

Dimensions are in inches. Dimensions A and C are not needed for standard venting.

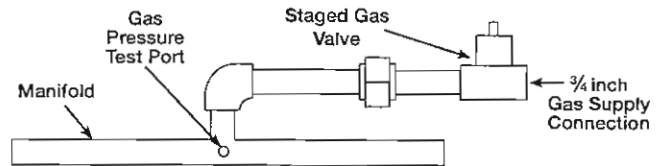
Reference - Model IG (Single or 2 Stage)



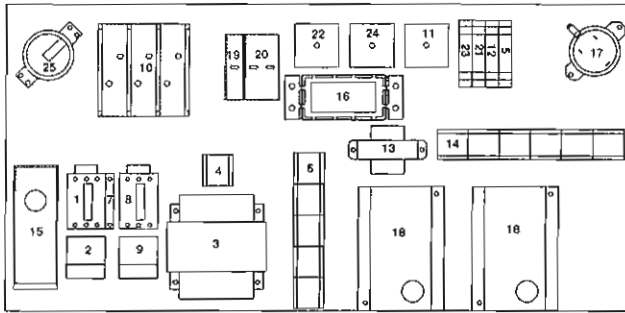
NOTE

This is a typical blower control center, the control center in your unit may be different. Reference the ladder diagram on the inside of the control center door for a unit specific wiring diagram.

1. **Supply Motor Starter** - 24 volt magnetic contacts for starting supply motor.
2. **Supply Overload** - Provides electronic overload protection to supply motor.
3. **Low Voltage Transformer** - Provides low voltage to fan/heat/cooling enable controls, staged furnace controls and optional evaporative cooling controls.
4. **Control Terminal Block** - Provides wiring access to controls.
5. **Fan Relay** - Allows power to pass to energize motor starter.
6. **Control Terminal Block** - Provides wiring access to fan/heat/cooling enable controls.
7. **Auxiliary Contact (Optional)** - Provides one normally closed and one normally open contact for other equipment.
8. **Exhaust Motor Starter (Optional)** - 24 volt magnetic contacts for starting exhaust motor.
9. **Exhaust Overload (Optional)** - Provides electronic overload protection to exhaust motor.
10. **Exhaust Fuses (Optional)** - Provides proper fusing for exhaust fan motor(s).
11. **Building Freeze Protection Timer (Optional)** - Prevents the discharge of cold air into the building.
12. **Heat Relay** - Allows power to pass to heating controls.
13. **Low Voltage Transformer** - Provides low voltage to the ignition controller.
14. **Heating Terminal Block** - Provides wiring access to heating controls.
15. **Inlet Air Sensor (Optional)** - Outdoor air stat that automatically controls the heating and/or cooling based on outdoor air temperature.
16. **Stage Controller** - Provides single or two stage control of the furnace.
17. **Airflow Switch** - Monitors the airflow inside the heat exchanger.
18. **Ignition Controller** - Controls the ignition of the furnace. Maintains safe operation of the furnace.
19. **Evaporative Cooling Fuses (Optional)** - Provides proper fusing to evaporative cooling pump and controls.
20. **Transformer Fuse (Optional)** - Provides proper fusing for evaporative cooling transformer.
21. **Cooling Relay (Optional)** - Allows power to pass to cooling controls.
22. **Reset Timer (Optional)** - Resets cooling system to run a time interval.
23. **Auto Drain Relay (Optional)** - Assures supply pump does not operate during drain interval. Allows pump to operate in cooling mode.
24. **Cooling Timer (Optional)** - Allows for automatic draining of the evaporative cooling system based on time schedule.
25. **Dirty Filter Switch (Optional)** - Monitors filter pressure drop. Turns on indicating light when pressure drop is above field adjustable set point.



Reference - Model IG (8:1 Staged)

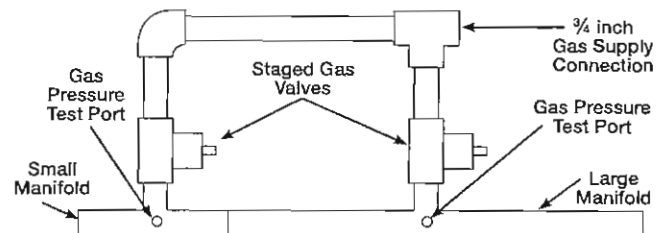


NOTE

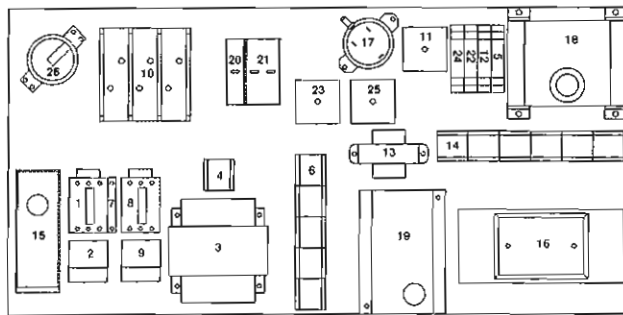
This is a typical blower control center, the control center in your unit may be different. Reference the ladder diagram on the inside of the control center door for a unit specific wiring diagram.

1. **Supply Motor Starter** - 24 volt magnetic contacts for starting supply motor.
2. **Supply Overload** - Provides electronic overload protection to supply motor.
3. **Low Voltage Transformer** - Provides low voltage to fan/heat/cooling enable controls, staged furnace controls and optional evaporative cooling controls.
4. **Control Terminal Block** - Provides wiring access to controls.
5. **Fan Relay** - Allows power to pass to energize motor starter.
6. **Control Terminal Block** - Provides wiring access to fan/heat/cooling enable controls.
7. **Auxiliary Contact (Optional)** - Provides one normally closed and one normally open contact for other equipment.
8. **Exhaust Motor Starter (Optional)** - 24 volt magnetic contacts for starting exhaust motor.
9. **Exhaust Overload (Optional)** - Provides electronic overload protection to exhaust motor.
10. **Exhaust Fuses (Optional)** - Provides proper fusing for exhaust fan motor(s).
11. **Building Freeze Protection Timer (Optional)** - Prevents the discharge of cold air into the building.
12. **Heat Relay** - Allows power to pass to heating controls.
13. **Low Voltage Transformer** - Provides low voltage to the ignition controller.
14. **Heating Terminal Block** - Provides wiring access to heating controls.
15. **Inlet Air Sensor (Optional)** - Outdoor air stat that automatically controls the heating and/or cooling based on outdoor air temperature.

16. **Stage Controller** - Provides 8 stage control of the furnace.
17. **Airflow Switch** - Monitors the airflow inside the heat exchanger.
18. **Ignition Controller** - Controls the ignition of the furnace. Maintains safe operation of the furnace.
19. **Evaporative Cooling Fuses (Optional)** - Provides proper fusing to evaporative cooling pump and controls.
20. **Transformer Fuse (Optional)** - Provides proper fusing for evaporative cooling transformer.
21. **Cooling Relay (Optional)** - Allows power to pass to cooling controls.
22. **Reset Timer (Optional)** - Resets cooling system to run a time interval.
23. **Auto Drain Relay (Optional)** - Assures supply pump does not operate during drain interval. Allows pump to operate in cooling mode.
24. **Cooling Timer (Optional)** - Allows for automatic draining of the evaporative cooling system based on time schedule.
25. **Dirty Filter Switch (Optional)** - Monitors filter pressure drop. Turns on indicating light when pressure drop is above field adjustable set point.



Reference - Model IG (2:1 Modulation)

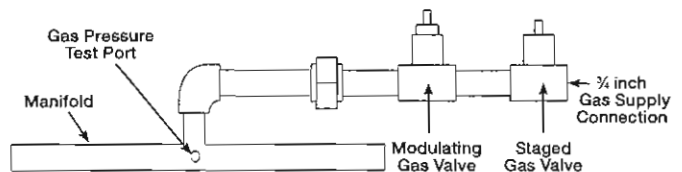


NOTE

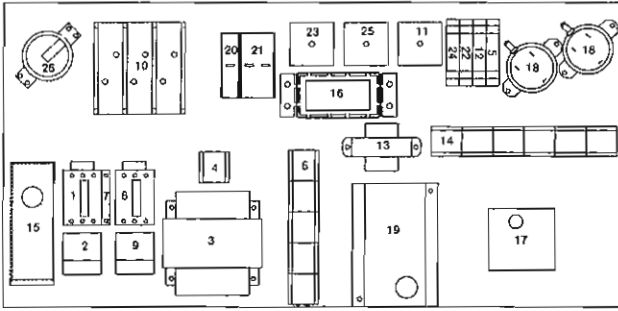
This is a typical blower control center, the control center in your unit may be different. Reference the ladder diagram on the inside of the control center door for a unit specific wiring diagram.

1. **Supply Motor Starter** - 24 volt magnetic contacts for starting supply motor.
2. **Supply Overload** - Provides electronic overload protection to supply motor.
3. **Low Voltage Transformer** - Provides low voltage to fan/heat/cooling enable controls, modulating furnace controls and optional evaporative cooling controls.
4. **Control Terminal Block** - Provides wiring access to controls.
5. **Fan Relay** - Allows power to pass to energize motor starter.
6. **Control Terminal Block** - Provides wiring access to fan/heat/cooling enable controls.
7. **Auxiliary Contact (Optional)** - Provides one normally closed and one normally open contact for other equipment.
8. **Exhaust Motor Starter (Optional)** - 24 volt magnetic contacts for starting exhaust motor.
9. **Exhaust Overload (Optional)** - Provides electronic overload protection to exhaust motor.
10. **Exhaust Fuses (Optional)** - Provides proper fusing for exhaust fan motor(s).
11. **Building Freeze Protection Timer (Optional)** - Prevents the discharge of cold air into the building.
12. **Heat Relay** - Allows power to pass to heating controls.
13. **Low Voltage Transformer** - Provides low voltage to the ignition controller.
14. **Heating Terminal Block** - Provides wiring access to heating controls.
15. **Inlet Air Sensor (Optional)** - Outdoor air stat that automatically controls the heating and/or cooling based on outdoor air temperature.

16. **Amplifier** - Controls the modulating valve based on the input from the temperature selector and the discharge air sensor.
17. **Airflow Switch** - Monitors the airflow inside the heat exchanger.
18. **Temperature Selector** - Allows the user to adjust discharge air temperature.
19. **Ignition Controller** - Controls the ignition of the furnace. Maintains safe operation of the furnace.
20. **Evaporative Cooling Fuses (Optional)** - Provides proper fusing to evaporative cooling pump and controls.
21. **Transformer Fuse (Optional)** - Provides proper fusing for evaporative cooling transformer.
22. **Cooling Relay (Optional)** - Allows power to pass to cooling controls.
23. **Reset Timer (Optional)** - Resets cooling system to run a time interval.
24. **Auto Drain Relay (Optional)** - Assures supply pump does not operate during drain interval. Allows pump to operate in cooling mode.
25. **Cooling Timer (Optional)** - Allows for automatic draining of the evaporative cooling system based on time schedule.
26. **Dirty Filter Switch (Optional)** - Monitors filter pressure drop. Turns on indicating light when pressure drop is above field adjustable set point.



Reference - Model IG (4:1 Modulation)

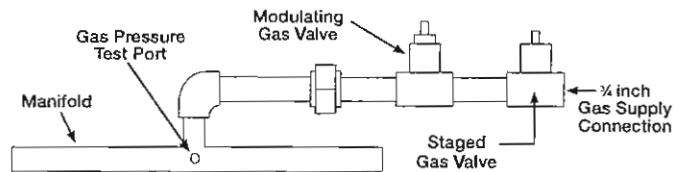


NOTE

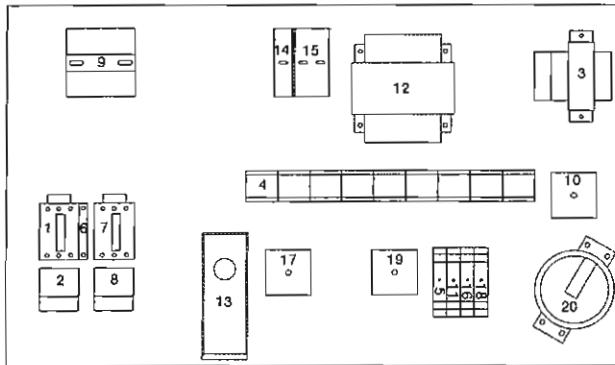
This is a typical blower control center, the control center in your unit may be different. Reference the ladder diagram on the inside of the control center door for a unit specific wiring diagram.

1. **Supply Motor Starter** - 24 volt magnetic contacts for starting supply motor.
2. **Supply Overload** - Provides electronic overload protection to supply motor.
3. **Low Voltage Transformer** - Provides low voltage to fan/heat/cooling enable controls, modulating furnace controls and optional evaporative cooling controls.
4. **Control Terminal Block** - Provides wiring access to controls.
5. **Fan Relay** - Allows power to pass to energize motor starter.
6. **Control Terminal Block** - Provides wiring access to fan/heat/cooling enable controls.
7. **Auxiliary Contact (Optional)** - Provides one normally closed and one normally open contact for other equipment.
8. **Exhaust Motor Starter (Optional)** - 24 volt magnetic contacts for starting exhaust motor.
9. **Exhaust Overload (Optional)** - Provides electronic overload protection to exhaust motor.
10. **Exhaust Fuses (Optional)** - Provides proper fusing for exhaust fan motor(s).
11. **Building Freeze Protection Timer (Optional)** - Prevents the discharge of cold air into the building.
12. **Heat Relay** - Allows power to pass to heating controls.
13. **Low Voltage Transformer** - Provides low voltage to the ignition controller.
14. **Heating Terminal Block** - Provides wiring access to heating controls.
15. **Inlet Air Sensor (Optional)** - Outdoor air stat that automatically controls the heating and/or cooling based on outdoor air temperature.

16. **Modulation Controller** - Provides 4:1 modulating turndown control of the furnace.
17. **Amplifier** - Controls the modulating valve based on the input from the modulation controller settings and the discharge air sensor.
18. **Airflow Switch** - Monitors the airflow inside the heat exchanger.
19. **Ignition Controller** - Controls the ignition of the furnace. Maintains safe operation of the furnace.
20. **Modulation Controller (Optional)** - Provides proper fusing to modulation controller.
21. **Transformer Fuse (Optional)** - Provides proper fusing to low voltage transformer.
22. **Cooling Relay (Optional)** - Allows power to pass to cooling controls.
23. **Reset Timer (Optional)** - Resets cooling system to run a time interval.
24. **Auto Drain Relay (Optional)** - Assures supply pump does not operate during drain interval. Allows pump to operate in cooling mode.
25. **Cooling Timer (Optional)** - Allows for automatic draining of the evaporative cooling system based on time schedule.
26. **Dirty Filter Switch (Optional)** - Monitors filter pressure drop. Turns on indicating light when pressure drop is above field adjustable set point.



Reference - Model IGX (Blower Control Center)

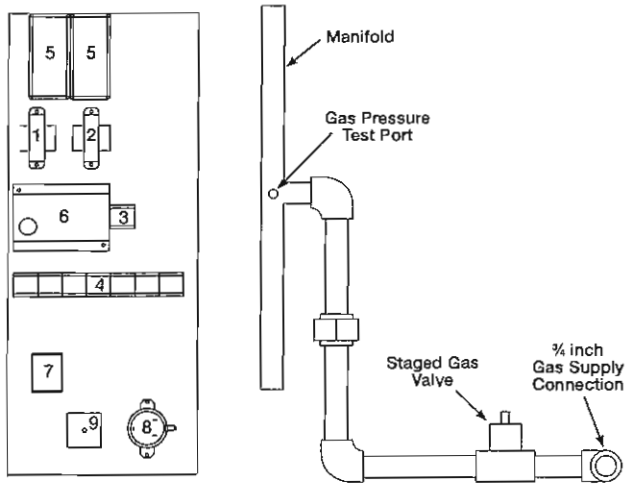


NOTE

This is a typical blower control center, the control center in your unit may be different. Reference the ladder diagram on the inside of the control center door for a unit specific wiring diagram.

1. **Supply Motor Starter** - 24 volt magnetic contacts for starting supply motor.
2. **Supply Overload** - Provides electronic overload protection to supply motor.
3. **Low Voltage Transformer** - Provides low voltage to fan/heat/cooling enable controls.
4. **Control Terminal Block** - Provides wiring access to controls.
5. **Fan Relay** - Allows power to pass to energize motor starter.
6. **Auxiliary Contact (Optional)** - Provides one normally closed and one normally open contact for other equipment.
7. **Exhaust Motor Starter (Optional)** - 24 volt magnetic contacts for starting exhaust motor.
8. **Exhaust Overload (Optional)** - Provides electronic overload protection to exhaust motor.
9. **Exhaust Fuses (Optional)** - Provides proper fusing for exhaust fan motor(s).
10. **Building Freeze Protection Timer (Optional)** - Prevents the discharge of cold air into the building.
11. **Heat Relay** - Allows power to pass to heating controls.
12. **Low Voltage Transformer** - Provides low voltage to the optional evaporative cooling controls.
13. **Inlet Air Sensor (Optional)** - Outdoor air stat that automatically controls the heating and/or cooling based on outdoor air temperature.
14. **Evaporative Cooling Fuses (Optional)** - Provides proper fusing to evaporative cooling pump and controls.
15. **Transformer Fuse (Optional)** - Provides proper fusing for evaporative cooling transformer.
16. **Cooling Relay (Optional)** - Allows power to pass to cooling controls.
17. **Reset Timer (Optional)** - Resets cooling system to run a time interval.
18. **Auto Drain Relay (Optional)** - Assures supply pump does not operate during drain interval. Allows pump to operate in cooling mode.
19. **Cooling Timer (Optional)** - Allows for automatic draining of the evaporative cooling system based on time schedule.
20. **Dirty Filter Switch (Optional)** - Monitors filter pressure drop. Turns on indicating light when pressure drop is above field adjustable set point.

Reference - Model IGX (Single or 2 Stage)

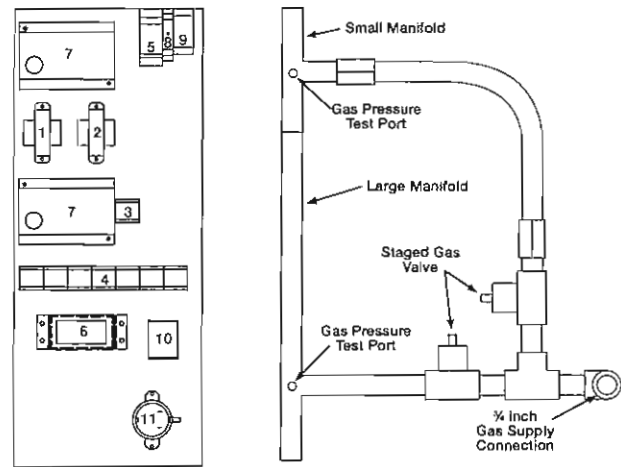


NOTE

This is a typical furnace control center, the control center in your unit may be different. Reference the ladder diagram on the inside of the control center door for a unit specific wiring diagram.

1. **Low Voltage Transformer** - Provides low voltage to the ignition controller.
2. **Low Voltage Transformer** - Provides low voltage to the ignition stage controller.
3. **Control Terminal Block** - Provides wiring access to heat controls.
4. **Control Terminal Block** - Provides wiring access to heat/combustion blower controls.
5. **Stage Controller** - Provides single or two stages of furnace control based on discharge air temperature set point.
6. **Ignition Controller** - Controls the ignition of the furnace. Maintains safe operation of the furnace.
7. **Combustion Blower Contact** - Passes power to the combustion blower.
8. **Airflow Switch** - Monitors the airflow inside the heat exchanger to ensure proper combustion airflow.
9. **High Fire Relay** - Allows furnace to ignite on high-fire.

Reference - Model IGX (8:1 Staged)

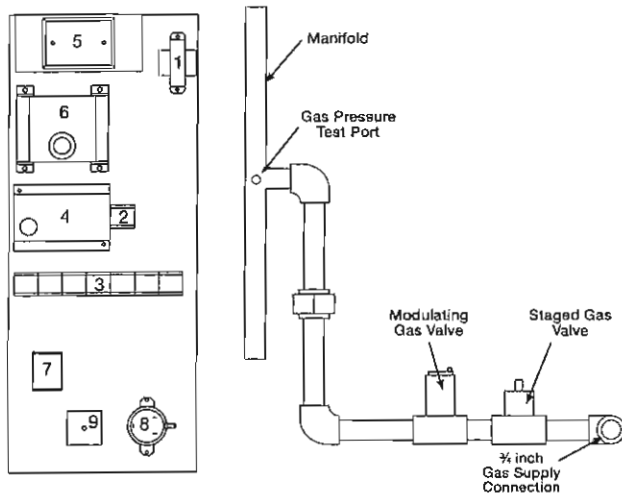


NOTE

This is a typical furnace control center, the control center in your unit may be different. Reference the ladder diagram on the inside of the control center door for a unit specific wiring diagram.

1. **Low Voltage Transformer** - Provides low voltage to the staged controller.
2. **Low Voltage Transformer** - Provides low voltage to the ignition controllers.
3. **Control Terminal Block** - Provides wiring access to controls.
4. **Control Terminal Block** - Provides wiring access to controls.
5. **Input Converter** - Receives and converts signal from Building Management Systems (BMS).
6. **Stage Controller** - Provides eight stages of control based on discharge temperature set point.
7. **Ignition Controllers** - Controls the ignition of the furnace. Maintains safe operation of the furnace.
8. **Contacting Relay** - Allows power to pass to the combustion blower contact.
9. **Air Proving Switch Relay** - Functions as a relay for the pressure switch.
10. **Combustion Blower Contact** - Passes power to the combustion blower.
11. **Airflow Switch** - Monitors the airflow inside the heat exchanger.

Reference - Model IGX (2:1 Modulation)

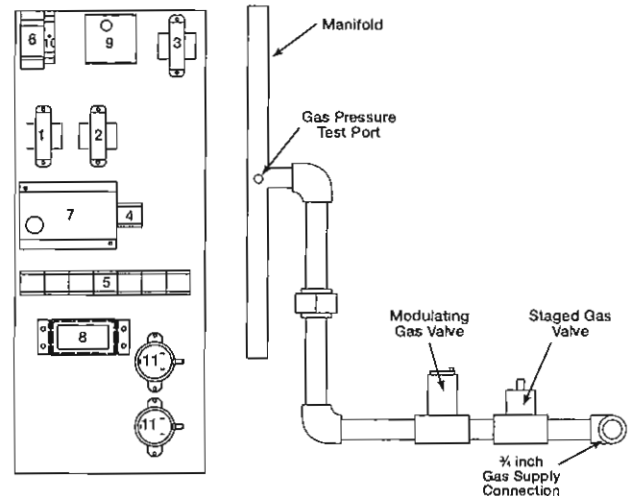


NOTE

This is a typical furnace control center, the control center in your unit may be different. Reference the ladder diagram on the inside of the control center door for a unit specific wiring diagram.

1. **Low Voltage Transformer** - Provides low voltage to the ignition controller and amplifier.
2. **Control Terminal Block** - Provides wiring access to heat controls.
3. **Control Terminal Block** - Provides wiring access to heat controls.
4. **Ignition Controller** - Controls the ignition of the furnace. Maintains safe operation of the furnace.
5. **Amplifier** - Controls the modulating valve based on the input from the temperature selector and the discharge air sensor.
6. **Temperature Selector** - Allows the user to adjust discharge air temperature.
7. **Combustion Blower Contact** - Passes power to the combustion blower.
8. **Airflow Switch** - Monitors the airflow inside the heat exchanger to ensure proper combustion airflow.
9. **High Fire Relay** - Allows furnace to ignite on high-fire.

Reference - Model IGX (4:1 Modulation)



NOTE

This is a typical furnace control center, the control center in your unit may be different. Reference the ladder diagram on the inside of the control center door for a unit specific wiring diagram.

1. **Low Voltage Transformer** - Provides low voltage to the ignition controller.
2. **Low Voltage Transformer** - Provides low voltage to the 4:1 electronic modulation controller.
3. **Low Voltage Transformer** - Provides low voltage to the amplifier.
4. **Control Terminal Block** - Provides wiring access to controls.
5. **Control Terminal Block** - Provides wiring access to controls.
6. **Input Converter** - Receives and converts signal from Building Management System (BMS).
7. **Ignition Controllers** - Controls the ignition of the furnace. Maintains safe operation of the furnace.
8. **Modulation Controller** - Provides 4:1 modulation turndown control of furnace based on the discharge air temperature.
9. **Amplifier** - Controls the modulating valve based on the input from the modulation controller settings and discharge air temperature sensor reading.
10. **Combustion Blower Relay** - Passes power to the variable speed combustion blower.
11. **Airflow Switches** - Monitors the airflow inside the heat exchanger to ensure proper combustion airflow.

Reference - Performance Table

Performance Table

The following table gives the air volume in cubic feet per minute that is required to provide the desired temperature rise for a given heating input. Model IG has a maximum 7,000 CFM capacity.

Input (MBH)	Output (MBH)	Temperature Rise (°F)															
		25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
100	80	2963	2469	2116	1852	1646	1481	1347	1235	1140	1058	988	926	871	823	780	741
150	120	4444	3704	3175	2778	2469	2222	2020	1852	1709	1587	1481	1389	1307	1235	1170	1111
200	160	5926	4938	4233	3704	3292	2963	2694	2469	2279	2116	1975	1852	1743	1646	1559	1481
250	200	7407	6173	5291	4630	4115	3704	3367	3086	2849	2646	2469	2315	2179	2058	1949	1852
300	240	8889	7407	6349	5556	4938	4444	4040	3704	3419	3175	2963	2778	2614	2469	2339	2222
350	280	10370	8642	7407	6481	5761	5185	4714	4321	3989	3704	3457	3241	3050	2881	2729	2593
400	320	11852	9877	8466	7407	6584	5926	5387	4938	4558	4233	3951	3704	3486	3292	3119	2963
500	400	14815	12346	10582	9259	8230	7407	6734	6173	5698	5291	4938	4630	4357	4115	3899	3704
600	480	NA	14815	12698	11111	9877	8889	8081	7407	6838	6349	5926	5556	5229	4938	4678	4444
700	560	NA	NA	14815	12963	11523	10370	9428	8642	7977	7407	6914	6481	6100	5761	5458	5185
800	640	NA	NA	NA	14815	13169	11852	10774	9877	9117	8466	7901	7407	6972	6584	6238	5926
1050	840	NA	NA	NA	NA	NA	NA	14141	12963	11966	11111	10370	9722	9150	8642	8187	7778
1200	960	NA	NA	NA	NA	NA	NA	NA	14815	13675	12698	11852	11111	10458	9877	9357	8889

Start-Up Checklist

Start-Up Checklist

Unit Model Number _____ (e.g. IGX-120-H32-DB)
 Unit Serial Number _____ (e.g. 10111000)
 Start-up date _____ (MM/DD/YYYY)
 Start-up Personnel Name _____
 Start-up Company _____
 Phone Number _____

Pre Start-Up Checklist - check boxes as items are completed

- Check tightness of all factory wiring connections
- Verify control wiring wire gauge
- Hand-rotate blower to verify free rotation
- Verify supply voltage to the main disconnect
- Verify the supply gas pressure
- Verify remote controls wiring

Start-Up Blower Checklist - refer to Blower Start-Up section for further detail

- Check line voltage L1-L2 _____ L2-L3 _____ L1-L3 _____
- Check blower rotation
- Check for vibration
- Supply fan RPM _____ RPM
- Motor nameplate amps _____ Amps
- Actual motor amps _____ Amps
- Actual CFM delivered _____ CFM

Optional Accessories - refer to Blower Start-Up section, step #6 for further detail

- Heating inlet air sensor _____ Actual Setting (Typical Setting 60-70°F)
- Cooling inlet air sensor _____ Actual Setting (Typical Setting 75°F)
- Building freeze protection _____ Actual Setting (Typical Setting 5 min; 45°F)
- Dirty filter gauge _____ Actual Setting (Typical Setting varies)

Start-Up Indirect Gas - refer to Furnace Start-Up section for further detail

Furnace 1

- Determine furnace control type _____ 1 Stage - 2 Stage - 8 Stage - 2:1 Mod. - 4:1 Mod.
- Check supply gas pressure _____ Maximum _____ Minimum _____ Actual
- Set the High Manifold pressure _____ inches wc
- Set the Low Manifold pressure _____ inches wc
- Set the unit's operating temperature _____ degrees F

Furnace 2 (Optional)

- Determine furnace control type _____ 1 Stage - 2 Stage - 8 Stage - 2:1 Mod. - 4:1 Mod.
- Check supply gas pressure _____ Maximum _____ Minimum _____ Actual
- Set the High Manifold pressure _____ inches wc
- Set the Low Manifold pressure _____ inches wc

Furnace 3 (Optional)

- Determine furnace control type _____ 1 Stage - 2 Stage - 8 Stage - 2:1 Mod. - 4:1 Mod.
- Check supply gas pressure _____ Maximum _____ Minimum _____ Actual
- Set the High Manifold pressure _____ inches wc
- Set the Low Manifold pressure _____ inches wc

Maintenance Log

Date _____ Time _____ AM/PM

Notes: _____

Date _____ Time _____ AM/PM

Notes: _____

Date _____ Time _____ AM/PM

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Date _____ Time _____ AM/PM

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Date _____ Time _____ AM/PM

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Date _____ Time _____ AM/PM

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Warranty

Greenheck warrants this equipment to be free from defects in material and workmanship for a period of one year from the shipment date. Any units or parts which prove defective during the warranty period will be replaced at our option when returned to our factory, transportation prepaid. Motors are warranted by the motor manufacturer for a period of one year. Should motors furnished by Greenheck prove defective during this period, they should be returned to the nearest authorized motor service station. Greenheck will not be responsible for any removal or installation costs.

As a result of our commitment to continuous improvement, Greenheck reserves the right to change specifications without notice.

Greenheck Catalogs IG, IGX, IG-HV and IGX-HV provide additional information describing the equipment, fan performance, available accessories, and specification data.

AMCA Publication 410-96, Safety Practices for Users and Installers of Industrial and Commercial Fans, provides additional safety information. This publication can be obtained from AMCA International, Inc. at: www.amca.org.



Phone: (715) 359-6171 • Fax: (715) 355-2399 • E-mail: gfcinfo@greenheck.com • Web site: www.greenheck.com



Low Leakage Damper

**No Tag
Spec. 15800**

Supplied by:

**CFM
1440 So. Lipan St.
Denver, CO 80223
(970) 493-7293**



Part #463384
VCD, FBH & FBV MODELS

Vertical and Horizontal Mount

Installation, Operation, and Maintenance Instructions

This manual is the property of the owner, and is required for future maintenance. Please leave it with the owner when the job is complete.



RECEIVING AND HANDLING

Upon receiving dampers, check for both obvious and hidden damage. If damage is found, record all necessary information on the bill of lading and file a claim with the final carrier. Check to be sure that all parts of the shipment, including accessories, are accounted for.

Dampers must be kept dry and clean. Indoor storage and protection from dirt, dust and the weather is highly recommended. Do not store at temperatures in excess of 100°F (37°C).

SAFETY WARNING:

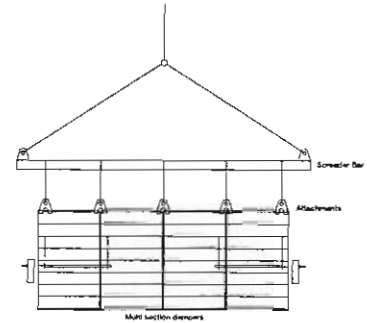
Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death. Read the installation, operating, and maintenance instructions thoroughly before installing or servicing this equipment.

Due to continuing research, Greenheck reserves the right to change specifications without notice.

Pre-Installation Guidelines

The basic intent of a proper installation is to secure the volume control damper into the opening in such a manner as to prevent distortion and disruption of damper operation. The following items will aid in completing the damper installation in a timely and effective manner.

- 1) Check the schedules for proper damper locations within the building. Visually inspect the damper for damage.
- 2) Lift or handle damper using sleeve or frame. Do not lift damper using blades, linkage, actuators, or jackshaftering. When handling multiple sections assemblies, use sufficient support to evenly lift at each section mullion (see drawing). Do not drag, step on, apply excessive bending, twisting, or racking.
- 3) Do not install screws in damper frame that will interfere with unexposed blade linkage and prevent damper blades from opening and/or closing.
- 4) Damper must be installed into duct or opening square and free of twist or other misalignment. Damper must not be squeezed or stretched into duct or opening. Out of square, racked, twisted or misaligned installations can cause excessive leakage and/or torque requirements to exceed damper/actuator design.
- 5) Damper and actuator must be kept clean, dry and protected from dirt, dust and other foreign materials prior to and after installation. Examples of such foreign materials include but are not limited to:
 - a) Mortar dust
 - b) Drywall dust
 - c) Firesafing materials
 - d) Wall texture
 - e) Paint overspray
- 6) Damper should be sufficiently covered as to prevent overspray if wall texturing or spray painting will be performed within 5 feet (1.50m) of the damper. Excessive dirt or foreign material deposits on damper can cause excessive leakage and/or torque requirements to exceed damper/actuator design.
- 7) ACCESS: Suitable access (actuators maintenance, etc.) must be provided for damper inspection and servicing. Where it is not possible to achieve sufficient size access, it will be necessary to install a removable section of duct.



Electrical Guidelines

Electrical and/or pneumatic connections to damper actuators should be made in accordance with wiring and piping diagrams developed in compliance with applicable codes, ordinances and regulations.

SAFETY CAUTION !

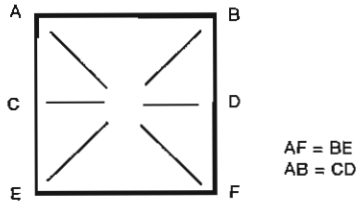
Verify power requirements before wiring actuator. Greenheck is not responsible for any damage to, or failure of the unit caused by incorrect field wiring.

SAFETY DANGER !

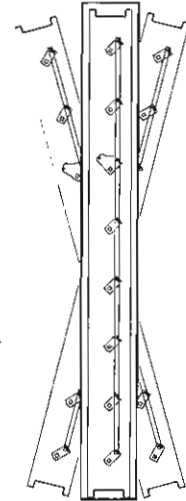
Electrical input may be needed for this equipment. This work should be performed by a qualified electrician.

Installation - Failure to follow instructions will void all warranties

1. Duct opening or opening square should measure ¼ inch (6mm) larger than damper dimension and should be straight and level.



Do not twist or bow. Mount damper plumb in the opening.



2. If more than two sections wide, unit ships as a multiple section assembly and a single section together. The single section is joined to the side of the multiple section where the jackshaft extends past the frame 4 inches (see Figure 1 & 2).
3. A damper assembly is not restricted to a maximum number of sections, but must not exceed the section sizes and overall sizes shown at the right.
4. The damper sections must be attached together with #10 x ¾ in. (19mm) max. sheet metal screws, ¼ in. (6mm) diameter nuts and bolts, tack or spot welds, or 3/16 in. (4mm) diameter steel pop rivets. Attachments must be spaced a maximum of 6 in. (152mm) on centers and a maximum of 2 in. (50mm) from corners. Attachments must be made on front face and back face (air entering and air exiting side) of damper sections.
5. Two section high dampers require reinforcement using a 14 gauge (2mm), 5 in. (127mm) wide mullion or two individually sleeved units stacked vertically. When using two individually sleeved units, the sleeve acts as the mullion, therefore no mullion is required (Mullions are not provided by Greenheck).

Damper Model	Maximum Single Section Size W x H in. (mm)	Maximum Overall Size for Multi-Section Dampers
VCD-15, VCD-18	48 x 60 (1219 x 1524)	84 in. W x 60 in. H (2133mm x 1524mm)
VCD-20, VCD-23	48 x 74 (1219 x 1880)	Unlimited
VCD-33, VCD-34, VCD-40, VCD-42, VCD-43	60 x 74 (1524 x 1880)	Unlimited
VCD-20V, VCD-23V	74 x 48 (1879 x 1219)	NA
VCD-33V, VCD-42V, VCD-43V	74 x 60 (1879 x 1524)	NA
FBH-43	Face: 60 x 74 (1524 x 1880) Bypass: 60 x 74 (1524 x 1880)	Face: 96 x 74 (2438 x 1880)
FBV-43	Face: 60 x 74 (1524 x 1880) Bypass: 60 x 74 (1524 x 1880)	Face: 96 x 74 (2438 x 1880) Bypass: 96 x 74 (2438 x 1880)

Installation (continued)

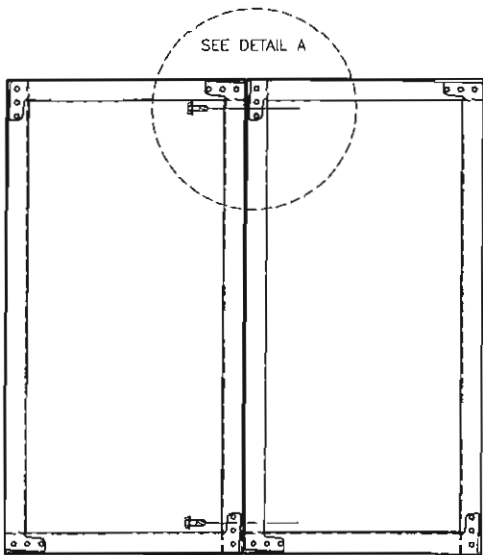


Figure 1

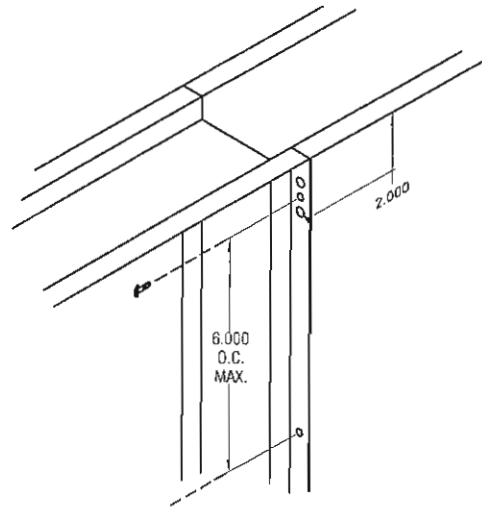


Figure 2

- When the height of a Face & Bypass vertical style (FBV) is greater than 84 in. (2134mm), the damper sections are shipped separate and field assembly is required. Before fastening damper sections together, the non-actuated damper section will need to be flipped upside down so that the linkage is on the same side as the actuated damper. After damper sections are fastened together, attach interconnecting angle as shown in **Figure 3**. (Interconnecting angle is shipped with actuated damper section.)

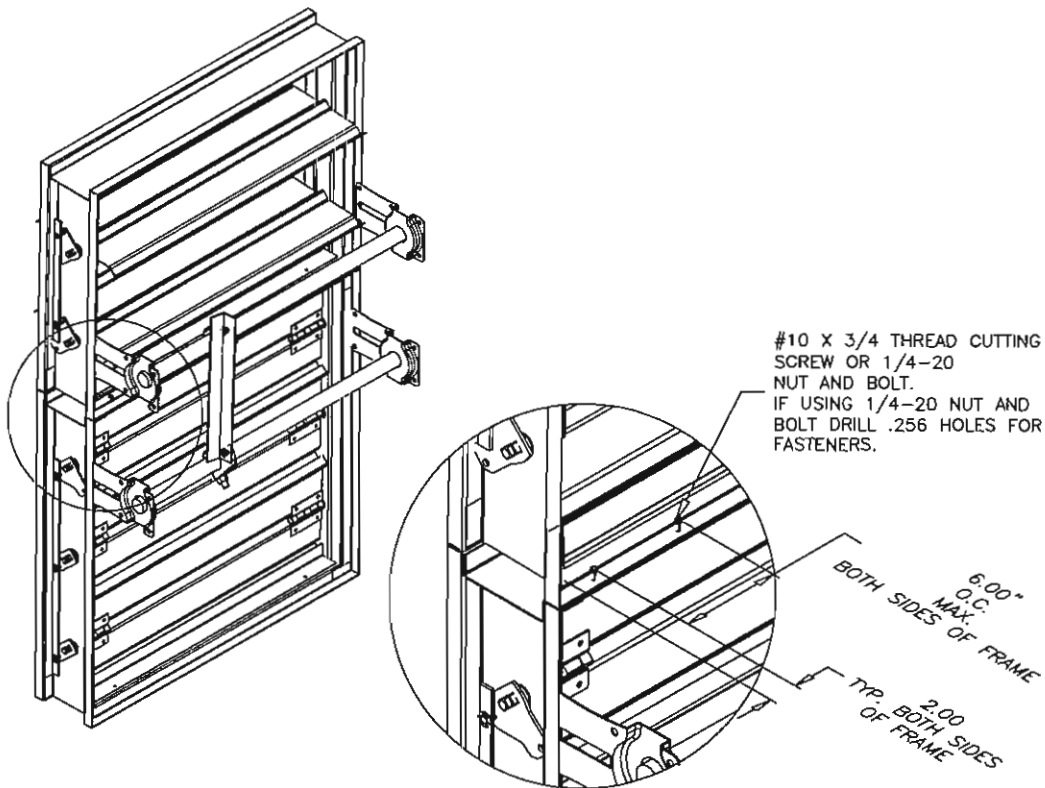


Figure 3

Installation (continued)

7. If no holes are present in frame, drill ¼ inch (6mm) diameter holes at 6 inch (52mm) centers and fasten frames together with ¼ inch (6mm) #20 (.03mm) bolts and nuts (see Figure 1 & 2).
8. Use shims between damper frame and duct opening or opening space to prevent distortion of frame by fasteners holding it in place. Brace at every horizontal mullion and vertically brace at every 8 feet (2.4m) of damper width for strength. Dampers in high velocity (2000 fpm [610m per second]) may require more bracing. Note: Greenheck dampers are specifically designed and engineered for structural integrity based on model and conditions. Attachment, framing, mating flanges, and anchoring of damper assemblies into openings, ductwork, or walls is the responsibility of the installer. Design calculations for these retaining and supporting members should be determined by field engineers for that particular installation.
9. If damper actuator is to be mounted out of the airstream, the extension pin should extend approximately 6 inches (152mm) beyond the frame. On jackshafted units, the jackshaft should extend through the jackshaft bearing assembly and approximately, 6 inches (152mm) beyond the frame.
10. Individual damper sections, as well as entire multiple section assemblies must be completely square and free from racking, twisting, or bending. Measure diagonally from upper corners to opposite lower corners of each section.
11. Damper blades, axles, and linkage must operate without binding. Before system operation, cycle dampers after installation to assure proper operation. On multiple section assemblies, all sections should open and close simultaneously.

Note: When you have a vertical damper installation, blades must be horizontal. When blades need to be vertical, you need a vertical blade damper (example: VCD-23V). These dampers are built so they don't crush the jamb seal.

Damper Maintenance

Greenheck's dampers are designed to be trouble free and hassle free under normal operation. Dampers are to be installed square and straight so as to prevent binding during operation. The following annual damper maintenance suggestions will help to insure proper damper operation and increase the life expectancy of the damper.

Foreign Matter	Over the course of time, dirt and grime may collect on damper surfaces. The damper surfaces should be cleaned to prevent hindrance to airflow.
Moving Parts	Make sure that parts such as linkage, bearings, blades, etc. that are intended to move freely, can do so. Lubricating these components can prevent possible rusting and unnecessary friction increase. Use only a moli-spray oil or similar graphite based oil as regular lubricating oil will attract dirt. <i>Bearings.</i> Synthetic, oil impregnated, and ball bearings (without grease fittings) do not require lubrication. Ball bearings with grease fittings require only minimal grease.
Closure	Remove foreign materials that may be interfering with blade closure or effective sealing of the blades with each other or with the frame.
Operation	While operating the damper through its full cycle, check to see that the blades open and close properly. If there is a problem, check for loose linkage, especially at the actuator. Tighten the linkage where required.

Damper Trouble Shooting

The following is a cause and correction list for common concerns with the dampers.

Symptom	Possible Cause	Corrective Action
Damper does not fully open and/or fully close	Frame is 'racked' causing blades to bind on jamb seals	Adjust frame such that it is square and plumb
	Actuator linkage loose	Close damper, disconnect power, adjust and tighten linkage
	Defective motor	Replace
	Screws in damper linkage	Locate screws and remove
	Actuator linkage hitting wall or floor	Damper installed too far into wall. Move out to line designated on damper label
	Contaminants on damper	Clean with a non oil-based solvent (see Damper Maintenance)
Actuator runs hot or makes a humming noise	Actuator type is MP-3754 or MP-3756 (stall type actuator)	None required since this normal for stall type actuators
	Actuator prohibited from reaching end of stroke	Disconnect linkage from jackshaft, open damper, power actuator to end of spring, tighten linkage. Verify amp draw.

WARRANTY

Greenheck warrants this equipment to be free from defects in material and workmanship for a period of one year from the shipping date. Any units or parts which prove to be defective during the warranty period will be repaired or replaced at our option. Greenheck shall not be liable for damages resulting from misapplication or misuse of its products. Greenheck will not be responsible for any installation or removal costs. Greenheck will not be responsible for any service work or backcharges without prior written authorization.



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463384 VCD IOM Rev. 8 February 2012

P.O. Box 410 • Schofield, WI 54478-0410 • 715.359.6171 • greenheck.com



Split System

**DSFC-1
Spec. 15800**

Supplied by:

**Trane
445 Bryant Street, Unit 5
Denver, CO 80204
(303) 228-2855**

Model names are indicated in 1-3.
When installing multi units, refer to the installation manual of the multi unit for outdoor unit installation.

Required Tools for Installation

Phillips screwdriver	5/32 in. (4 mm) hexagonal wrench
Level	Flare tool for R410A
Scale	Gauge manifold for R410A
Utility knife or scissors	Vacuum pump for R410A
2-9/16 in. (65 mm) hole saw	Charge hose for R410A
Torque wrench	Pipe cutter with reamer
Wrench (or spanner)	

1. BEFORE INSTALLATION**1-1. THE FOLLOWING SHOULD ALWAYS BE OBSERVED FOR SAFETY**

- Be sure to read "THE FOLLOWING SHOULD ALWAYS BE OBSERVED FOR SAFETY" before installing the air conditioner.
- Be sure to observe the warnings and cautions specified here as they include important items related to safety.
- After reading this manual, be sure to keep it together with the OPERATING INSTRUCTIONS for future reference.
- Please report to your supply authority or obtain their consent before connecting this equipment to the power supply system.

⚠ WARNING (Could lead to death, serious injury, etc.)

- **Do not install the unit by yourself (user).**
Incomplete installation could cause fire or electric shock, injury due to the unit falling, or leakage of water. Consult the dealer from whom you purchased the unit or a qualified installer.
- **Perform the installation securely referring to the installation manual.**
Incomplete installation could cause fire or electric shock, injury due to the unit falling, or leakage of water.
- **Install the unit securely in a place which can bear the weight of the unit.**
If the installation location cannot bear the weight of the unit, the unit could fall causing injury.
- **Perform electrical work according to the installation manual and be sure to use an exclusive circuit. Do not connect other electrical appliances to the circuit.**
If the capacity of the power circuit is insufficient or there is incomplete electrical work, it could result in a fire or an electric shock.
- **Ground the unit correctly.**
Do not connect the ground to a gas pipe, water pipe, lightning rod or telephone ground. Defective grounding could cause electric shock.
- **Do not damage the wires by applying excessive pressure with parts or screws.**
Damaged wires could cause fire.
- **Be sure to cut off the main power in case of setting up the indoor P.C. board or wiring works.**
Failure to do so could cause electric shock.
- **Use the specified wires to connect the Indoor and outdoor units securely and attach the wires firmly to the terminal block connecting sections so the stress of the wires is not applied to the sections.**
Incomplete connecting and securing could cause fire.
- **Do not install the unit in a place where inflammable gas may leak.**
If gas leaks and accumulates in the area around the unit, it could cause an explosion.
- **Do not use intermediate connection of the power cord or the extension cord and do not connect many devices to one AC outlet.**
It could cause a fire or an electric shock due to defective contact, defective insulation, exceeding the permissible current, etc.
- **Be sure to use the parts provided or specified parts for the installation work.**
The use of defective parts could cause an injury or leakage of water due to a fire, an electric shock, the unit falling, etc.
- **When plugging the power supply plug into the outlet, make sure that there is no dust, clogging, or loose parts in both the outlet and the plug. Make sure that the power supply plug is pushed completely into the outlet.**
If there is dust, clogging, or loose parts on the power supply plug or the outlet, it could cause electric shock or fire. If loose parts are found on the power supply plug, replace it.
- **Attach the electrical cover to the indoor unit and the service panel to the outdoor unit securely.**
If the electrical cover of the indoor unit and/or the service panel of the outdoor unit are not attached securely, it could result in a fire or an electric shock due to dust, water, etc.
- **When installing or relocating the unit, make sure that no substance other than the specified refrigerant (R410A) enters the refrigerant circuit.**
Any presence of foreign substance such as air can cause abnormal pressure rise or an explosion.
- **Do not discharge the refrigerant into the atmosphere. If refrigerant leaks during installation, ventilate the room.**
If refrigerant comes in contact with a fire, harmful gas could be generated.
- **Check that the refrigerant gas does not leak after installation has been completed.**
If refrigerant gas leaks indoors, and comes into contact with the flame of a fan heater, space heater, stove, etc., harmful substances will be generated.
- **Use appropriate tools and piping materials for installation.**
The pressure of R410A is 1.6 times more than R22. Not using appropriate tools or materials and incomplete installation could cause the pipes to burst or injury.
- **When pumping down the refrigerant, stop the compressor before disconnecting the refrigerant pipes.**
If the refrigerant pipes are disconnected while the compressor is running and the stop valve is open, air could be drawn in and the pressure in the refrigeration cycle could become abnormally high. This could cause the pipes to burst or injury.
- **When installing the unit, securely connect the refrigerant pipes before starting the compressor.**
If the compressor is started before the refrigerant pipes are connected and when the stop valve is open, air could be drawn in and the pressure in the refrigeration cycle could become abnormally high. This could cause the pipes to burst or injury.
- **Fasten a flare nut with a torque wrench as specified in this manual.**
If fastened too tight, a flare nut may break after a long period and cause refrigerant leakage.
- **The unit shall be installed in accordance with national wiring regulations.**

⚠ CAUTION (Could lead to serious injury in particular environments when operated incorrectly)

- **Install a Ground Fault Interrupt (GFI) circuit breaker depending on the installation place.**
If the Ground Fault Interrupt (GFI) circuit breaker is not installed, it could cause electric shock.
- **Perform the drainage/piping work securely according to the installation manual.**
If there is defect in the drainage/piping work, water could drop from the unit, soaking and damaging household goods.
- **Do not touch the air inlet or the aluminum fins of the outdoor unit.**
This could cause injury.
- **Do not install the outdoor unit where small animals may live.**
If small animals enter and touch the electric parts inside the unit, it could cause a malfunction, smoke emission, or fire. Also, advise user to keep the area around the unit clean.

1-2. SELECTING THE INSTALLATION LOCATION

INDOOR UNIT

- Where airflow is not blocked.
- Where cool air spreads over the entire room.
- Rigid wall without vibration.
- Where it is not exposed to direct sunshine.
- Where easily drained.
- At a distance 3 ft. (1 m) or more away from your TV and radio. Operation of the air conditioner may interfere with radio or TV reception. An amplifier may be required for the affected device.
- In a place as far away as possible from fluorescent and incandescent lights (so the infrared remote control can operate the air conditioner normally).
- Where the air filter can be removed and replaced easily.

Note:

Install indoor unit at a high position on the wall where air can distribute over the entire room.

REMOTE CONTROLLER

- Where it is easy to operate and easily visible.
- Where children cannot touch it.
- Select a position about 4 ft. (1.2 m) above the floor and check that signals from the remote controller are surely received by the indoor unit from that position ('beep' or 'beep beep' receiving tone sounds). After that, attach remote controller holder to a pillar or wall and install wireless remote controller.

Note:

In rooms where inverter type fluorescent lamps are used, the signal from the wireless remote controller may not be received.

OUTDOOR UNIT

- Where it is not exposed to strong wind.
- Where airflow is good and dustless.
- Where neighbours are not annoyed by operation sound or hot air.
- Where rigid wall or support is available to prevent the increase of operation sound or vibration.
- Where there is no risk of combustible gas leakage.
- When installing the unit at a high level, be sure to secure the unit legs.
- Where it is at least 10 ft. (3 m) away from the antenna of TV set or radio. Operation of the air conditioner may interfere with radio or TV reception in areas where reception is weak. An amplifier may be required for the affected device.
- Install the unit horizontally.
- Please install it in an area not affected by snowfall or blowing snow. In areas with heavy snow, please install a canopy, a pedestal and/or some baffle boards.

Note:

- It is advisable to make a piping loop near outdoor unit so as to reduce vibration transmitted from there.
- For increased efficiency, install the outdoor unit in a location where continuous direct sunlight or excessive water can be avoided as much as possible.

Note:

When operating the air conditioner in low outside temperature, be sure to follow the instructions described below.

- Never install the outdoor unit in a place where its air inlet/outlet side may be exposed directly to wind.
- To prevent exposure to wind, install the outdoor unit with its air inlet side facing the wall.
- To prevent exposure to wind, it is recommended to install a baffle board on the air outlet side of the outdoor unit.

Avoid the following places for installation where air conditioner trouble is liable to occur.

- Where flammable gas could leak.
- Where there is much machine oil.
- Salty places such as the seaside.
- Where sulfide gas is generated such as a hot spring.
- Where there is high-frequency or wireless equipment.

1-3. SPECIFICATIONS

1-3-1. POWER SUPPLY AND INDOOR/OUTDOOR WIRE CONNECTION

- Power should be taken from an exclusive branched circuit.
- Wiring work should be based on applicable technical standards.
- Wiring connections should be made following the diagram.
- Screws should be tightened so they will not loosen.

Connecting wires and connecting ground wire

- Use solid conductor AWG14 or stranded conductor AWG14.
- Use double insulated copper wire with 500V insulation.
- Use copper conductors only.
- Follow local electrical code.

Power supply cable and ground wire

- Use solid or stranded conductor AWG14.
- Use copper conductors only.
- Follow local electrical code.

Note:

When the indoor unit is powered from the outdoor unit, a disconnect switch needs to be installed to power supply circuit (between indoor and outdoor unit) depending on local code.

1-3-2. REFRIGERANT PIPES

- Ensure that the 2 refrigerant pipes are insulated to prevent condensation.
- Refrigerant pipe bending radius must be 4 in. (100 mm) or more.

CAUTION

Be sure to use the insulation of specified thickness. Excessive thickness may cause incorrect installation of the indoor unit and lack of thickness may cause dew dripage.

- This unit has flared connections on both indoor and outdoor sides.
- Remove the outdoor units valve cover, then connect the pipe.
- Refrigerant pipes are used to connect the indoor and outdoor units.
- Be careful not to crush or bend the pipe in pipe bending.

- Refrigerant adjustment... If pipe length exceeds 25 ft. (7m), additional refrigerant (R410A) charge is required.

(The outdoor unit is charged with refrigerant for pipe length up to 25 ft. (7 m))

Electrical specifications

MODEL	MSZ-A09/12NA	MSZ-A15/17NA MSY-A15/17NA	MS-A09WA	MS-A12WA
INDOOR UNIT				
Power supply (V, PHASE, Hz)	208/230, 1, 60		115, 1, 60	
Min. Circuit Ampacity	1.0	1.0	1.2	1.2
Fan motor (F.L.A.)	0.76		0.95	
OUTDOOR UNIT				
Power supply (V, PHASE, Hz)	208/230, 1, 60		115, 1, 60	
Max. Fuse size (time delay) (A)	15	15	15	20
Min. Circuit Ampacity	12	14	14	16
Fan motor (F.L.A.)	0.52	0.52	0.63	0.926
Compressor	(R.L.A.)	7.8	10.1	9.30
	(L.R.A.)	9.2	12	47
Control voltage	Indoor unit - Remote controller: (Wireless) Indoor unit - Outdoor unit: DC12-24V (Polar)		Indoor unit - Remote controller: (Wireless) Indoor unit - Outdoor unit: AC115V	

Pipe	Outside diameter	Minimum wall thickness	Insulation thickness	Insulation material	
					inch (mm)
For liquid	1/4 (6.35)	0.0315 (0.8)	5/16 (8)	Heat resisting foam plastic 0.045 Specific gravity	
For gas	MSZ-A09/12NA MS-A09WA	3/8 (9.52)	0.0315 (0.8)		5/16 (8)
	MSZ-A15/17NA MSY-A15/17NA MS-A12WA	1/2 (12.7)	0.0315 (0.8)		5/16 (8)

Limits	MSZ-A09/12/15/17NA MSY-A15/17NA	MS-A09/12WA
Pipe length	65ft. (20 m) max.	65ft. (20 m) max.
Height difference	40 ft. (12 m) max.	35 ft. (10 m) max.
No. of bends	10 max.	10 max.

Pipe length	Up to 25 ft. (7m)	No additional charge is required.
	Exceeding 25 ft. (7m)	Additional charge is required. (Refer to the table below.)
Refrigerant to be added	MSZ-A09/12/15/17NA MSY-A15/17NA	1.62 oz each 5 ft. (30g/m)
	MS-A09/12WA	1.08 oz. each 5 ft. (20g/m)

1-4. INSTALLATION DIAGRAM

ACCESSORIES

Check the following parts before installation.
<Indoor unit>

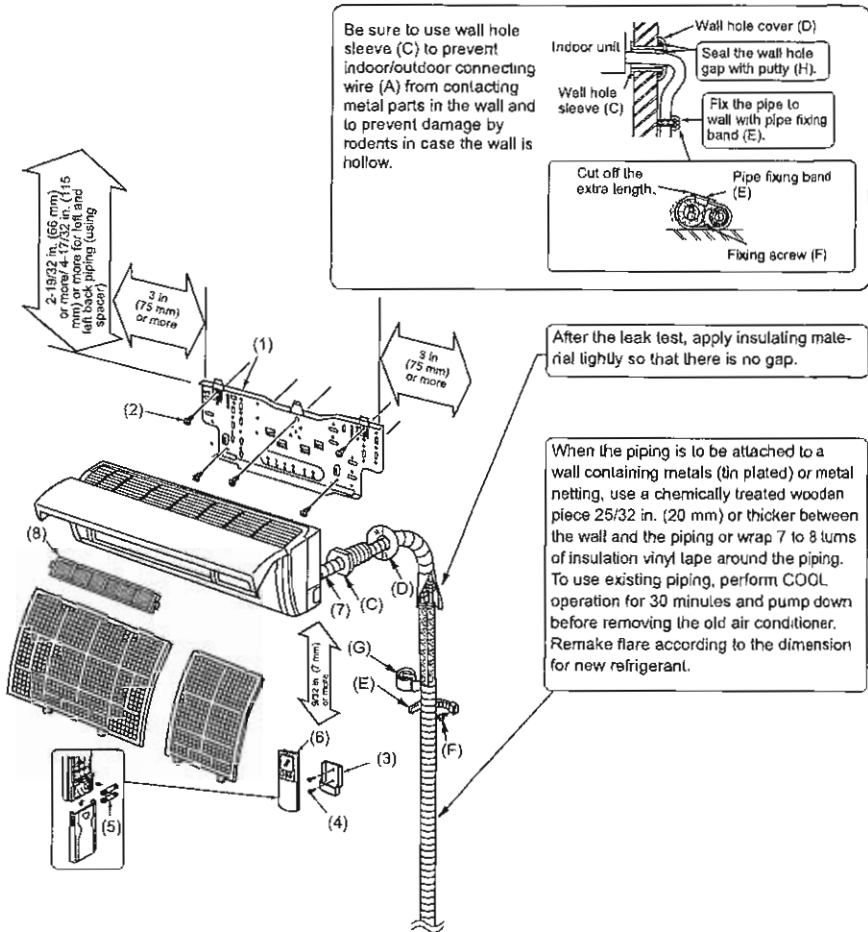
(1)	Installation plate	1
(2)	Installation plate fixing screw 4 x 25 mm	5
(3)	Remote controller holder	1
(4)	Fixing screw for (3) 3.5 x 16 mm (Black)	2
(5)	Battery (AAA) for (6)	2
(6)	Wireless remote controller	1
(7)	Felt tape (For left or left-rear piping)	1
(8)	Air cleaning filter	1

PARTS TO BE PROVIDED AT YOUR SITE

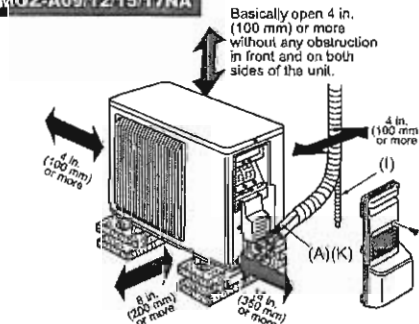
(A)	Indoor/outdoor unit connecting wire*	1
(B)	Extension pipe	1
(C)	Wall hole sleeve	1
(D)	Wall hole cover	1
(E)	Pipe fixing band	2 to 5
(F)	Fixing screw for (E) 4 x 20 mm	2 to 5
(G)	Piping tape	1
(H)	Putty	1
(I)	Drain hose (or soft PVC hose, 19/32 in. [15 mm] inner dia. or hard PVC pipe VP16)	2 to 5
(J)	Refrigeration oil	1
(K)	Power supply cord	1

* Note:

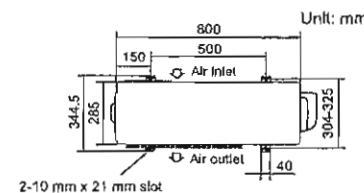
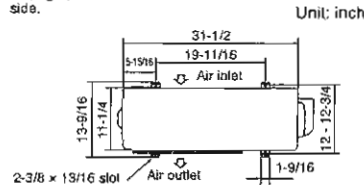
Place indoor/outdoor unit connecting wire (A) and power supply cord (K) at least 3 ft. (1 m) away from the TV antenna wire.



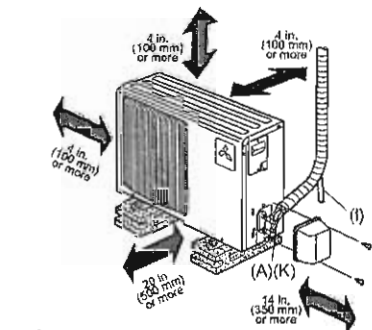
MU-A09WA
MU-Y-A15/17NA
MUZ-A09/12/15/17NA



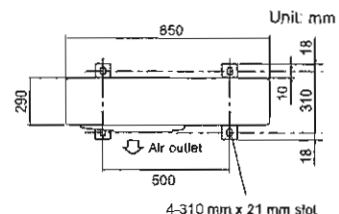
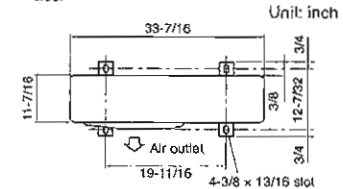
Open two sides of left, right, or rear side.



MU-A12WA



Open two sides of left, right, or rear side.



Units should be installed by licensed contractor according to local code requirements.

2. INDOOR UNIT INSTALLATION

2-1. FIXING OF INSTALLATION PLATE

- Find a structural material (such as a stud) in the wall and fix installation plate (1) horizontally with fixing screws (2).
- To prevent installation plate (1) from vibrating, be sure to install the fixing screws in the holes indicated in the illustration. For added support, fixing screws may also be installed in other holes.
- When bolts recessed in the concrete wall are to be utilized, secure installation plate (1) using 7/16 in. x 13/16 in. x 7/16 in. x 1 in. (11 mm x 26 mm x 11 mm x 26 mm) oval hole (17-3/4 in. [450 mm] pitch).
- If the recessed bolt is too long, change it for a shorter one available in the market.

2-2. WALL HOLE DRILLING

- Determine the wall hole position.
- Drill a dia. 2-9/16 in. (65 mm) hole. The outdoor side should be 6/32 to 9/32 in. (5 to 7 mm) lower than the indoor side.
- Insert wall hole sleeve (C).

2-3. CONNECTING WIRES FOR INDOOR UNIT

Note:

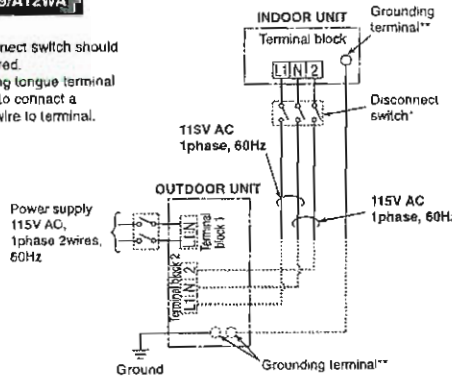
When the indoor unit is powered from the outdoor unit, a disconnect switch needs to be installed to power supply circuit (between indoor and outdoor unit) depending on local code.

- Remove the front panel. (Refer to 5-1.)
- Hook the upper part of the indoor unit on the installation plate.
- Remove corner box and conduit cover.
- Fix conduit pipe (for rear piping) / elbow joint (for right, left, or downward piping) to conduit cover with lock nut. The thread part of installed conduit pipe / elbow joint appearing inside should be less than 3/8 in. (10 mm). (Fig. 1) Elbow joint should appear less than 1-3/16 in. (30 mm) outside. (Fig. 2)
- Process the end of ground wire (Fig. 3). Connect it to the ground terminal of electrical parts box.
- Process the end of indoor/outdoor unit connecting wire (A) (Fig. 3). Fix it to terminal block. Be careful not to make mis-wiring. Fix the wire to the terminal block securely so that no part of its core is appeared, and no external force is conveyed to the connecting section of the terminal block.
- Firmly tighten the terminal screws to prevent them from loosening. After tightening, pull the wires lightly to confirm that they do not move.
- Secure indoor/outdoor unit connecting wire (A) and the ground wire with conduit cover. Never fail to hook the claw of the conduit cover to the electrical box. Attach the conduit cover securely. (Fig. 4)
- According to the piping direction, cut off the shaded part of the left side of box (Fig. 5) or corner box (Fig. 6). Reinstall corner box and front panel.

MS-A09/A12WA

Remark:

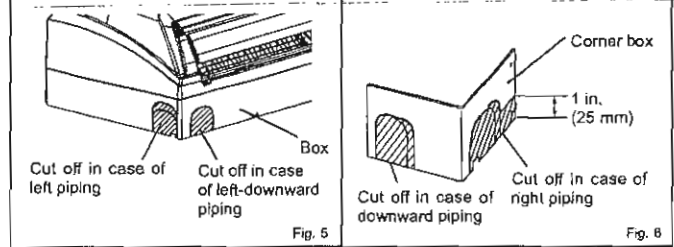
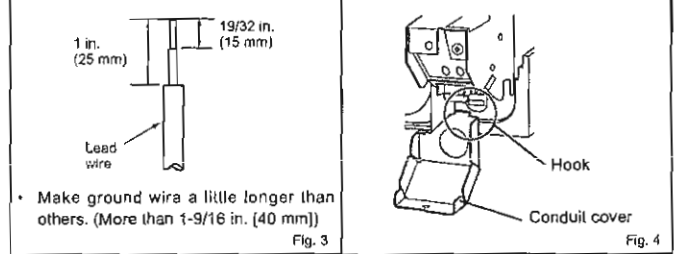
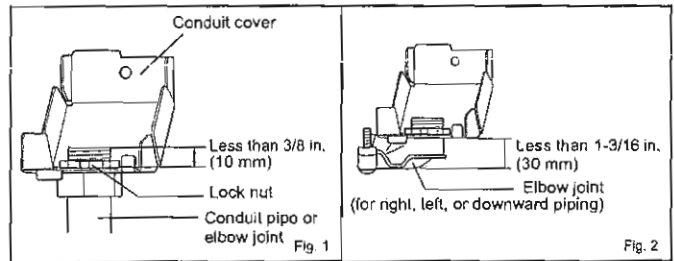
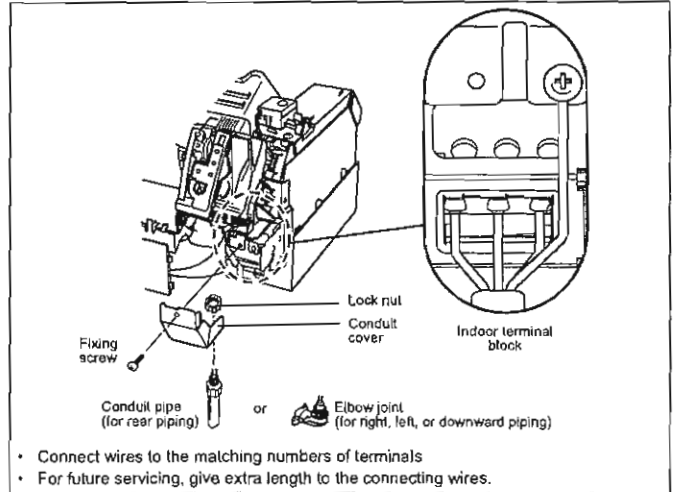
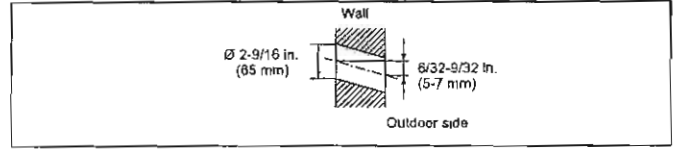
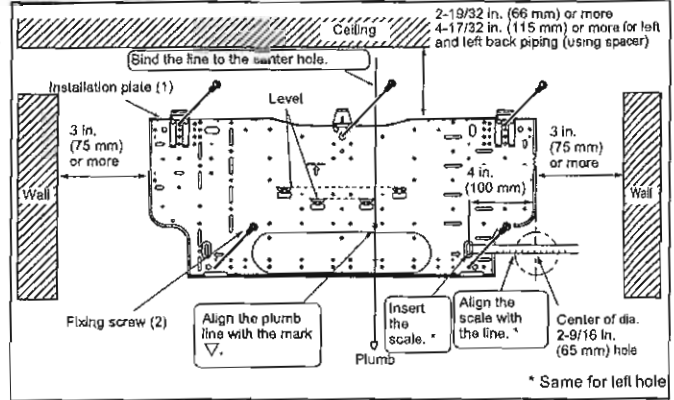
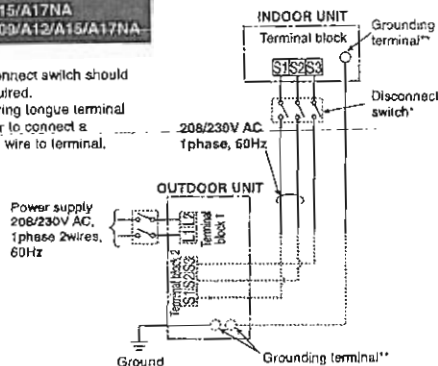
- A disconnect switch should be required.
- Use a ring tongue terminal in order to connect a ground wire to terminal.



MSY-A15/A17NA MSZ-A09/A12/A15/A17NA

Remark:

- A disconnect switch should be required.
- Use a ring tongue terminal in order to connect a ground wire to terminal.



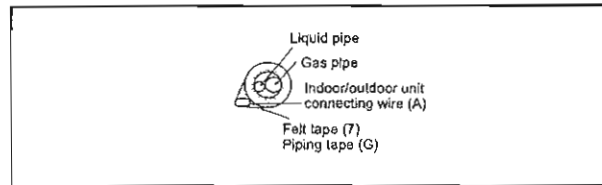
2-4. PIPE FORMING AND DRAIN PIPING

2-4-1. PIPE FORMING

- Place the drain hose below the refrigerant piping.
- Make sure that the drain hose is not heaved or snaked.
- Do not pull the hose when applying the tape.
- When the drain hose passes the room, be sure to wrap insulation material (obtainable at a store) around it.

Note:

Screws may damage the cover of refrigerant pipe during left piping. Make sure not to damage the cover of refrigerant pipe.

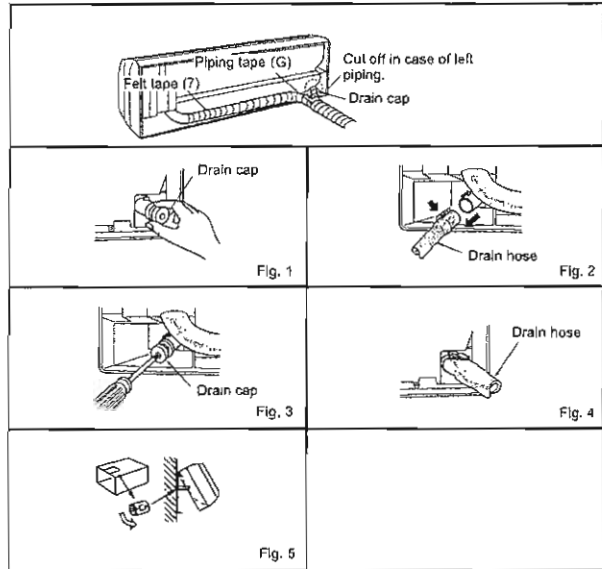


Left or left-rear piping

Note:

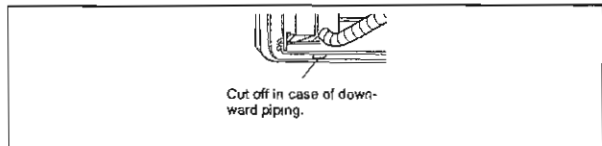
Be sure to reattach the drain hose and the drain cap in case of left or left-rear piping. Otherwise, it could cause drops of water to drip down from the drain hose.

- Put the refrigerant piping and the drain hose together, then firmly apply felt tape (7) from the end. Felt tape (7) overlap width should be 1/3 the tape width. Use a bandage stopper at the end of felt tape (7).
- Pull out the drain cap at the rear right of the indoor unit. (Fig. 1)
 - Hold the convex section at the end and pull the drain cap.
- Pull out the drain hose at the rear left of the indoor unit. (Fig. 2)
 - Hold the claw marked by the arrows and pull out the drain hose forward.
- Put the drain cap into the section to which the drain hose is to be attached at the rear of the indoor unit. (Fig. 3)
 - Insert not sharp-edged tools such as screwdrivers into the hole at the end of the cap and insert the cap fully into the drain pan.
- Insert the drain hose fully into the drain pan at the rear right of the indoor unit. (Fig. 4)
 - Check if the hose is hooked securely to the projection of its inserting part at the drain pan.
- Insert the drain hose into wall hole sleeve (C), and hook the upper part of indoor unit on installation plate (1). Then, move the indoor unit completely to the left in order to make placing the piping in the back space of the unit easier.
- Cut out a piece of cardboard from the shipping box, roll it up, hook it onto the back rib, and use it as a spacer to lift the indoor unit. (Fig. 5)
- Connect the refrigerant piping with the extension pipe (B).
- Thrust the lower part of the indoor unit into the installation plate (1).



Rear or downward piping

- Put the refrigerant piping and the drain hose together, then firmly apply piping tape (G) from the end.
- Insert the piping and the drain hose into the wall hole sleeve (C), and hook the upper part of the indoor unit on the installation plate (1).
- Check if the indoor unit is hooked securely on the installation plate (1) by moving the unit to left and right.
- Thrust the lower part of the indoor unit into the installation plate (1).

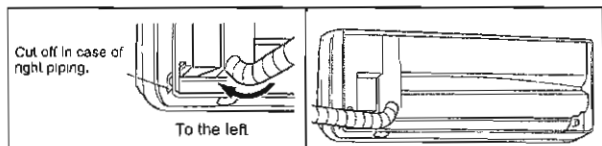


Right piping

Note:

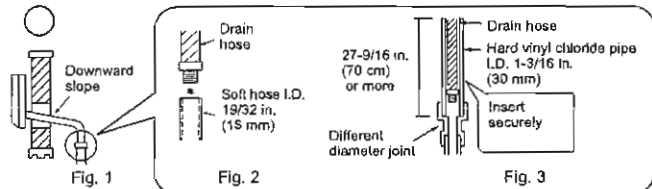
Before performing the following, make sure that wiring is completed, and the conduit cover is installed. (Refer to 2-3.)

- Put the refrigerant piping and the drain hose together, position them to left side, and then firmly apply piping tape (G) from the end.
- Insert the piping and the drain hose into the wall hole sleeve (C), and hook the upper part of the indoor unit on the installation plate (1).
- Check if the indoor unit is hooked securely on the installation plate (1) by moving the unit to left and right.
- Thrust the lower part of the indoor unit into the installation plate (1).

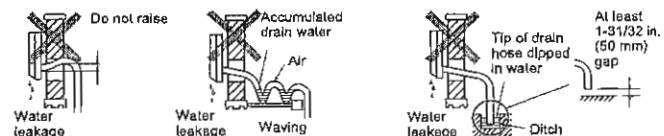


2-4-2. DRAIN PIPING

- If the extension drain hose has to pass through a room, be sure to wrap it with commercially sold insulation.
- The drain hose should point downward for easy drain flow. (Fig. 1)
- If the drain hose provided with the indoor unit is too short, connect it with drain hose (I) that should be provided at your site. (Fig. 2)
- When connecting the drain hose to the hard vinyl chloride pipe, be sure to insert it securely into the pipe. (Fig. 3)



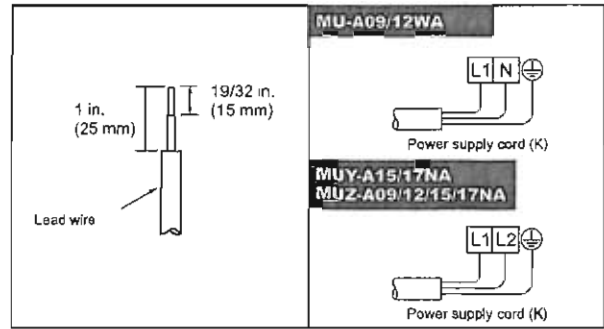
Do not make drain piping as shown below.



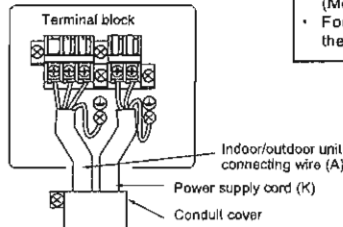
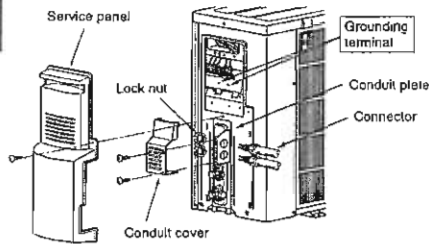
3. OUTDOOR UNIT INSTALLATION

3-1. CONNECTING WIRES FOR OUTDOOR UNIT

- 1) Remove the service panel.
- 2) Remove the conduit cover.
- 3) Fix the conduit connector to conduit plate (A models)/conduit cover (B models) with lock nut then secure it against unit with screws.
- 4) Loosen terminal screw, and connect indoor/outdoor unit connecting wire (A) from the indoor unit correctly on the terminal block. Be careful not to make mis-wiring. Fix the wire to the terminal block securely so that no part of its core is appeared, and no external force is conveyed to the connecting section of the terminal block.
- 5) Firmly tighten the terminal screws to prevent them from loosening. After tightening, pull the wires lightly to confirm that they do not move.
- 6) Connect power supply cord (K).
- 7) Connect ground wires of indoor/outdoor unit connecting wire (A) and power supply cord (K) to the TB support.
- 8) Install the conduit cover.
- 9) Install the service panel securely.

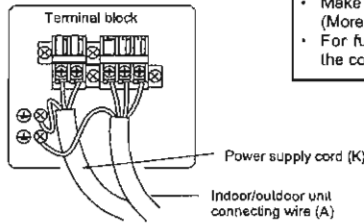
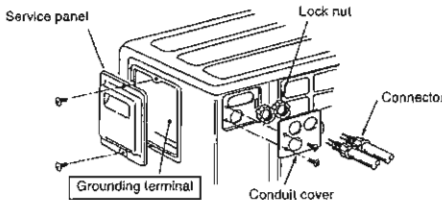


A MU-A09WA MUY-A15/17NA MUZ-A09/12/15/17NA



- Make earth wire a little longer than others. (More than 1-12/32 in. 35 mm)
- For future servicing, give extra length to the connecting wires.

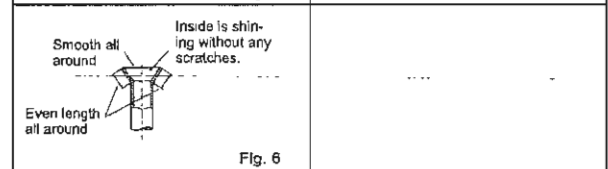
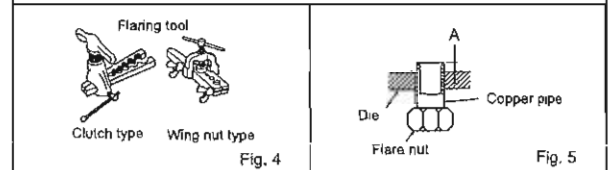
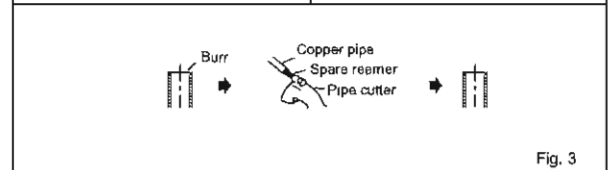
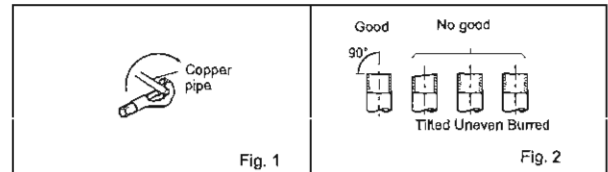
B MU-A12WA



- Make earth wire a little longer than others. (More than 1-12/32 in. 35 mm)
- For future servicing, give extra length to the connecting wires.

3-2. FLARING WORK

- 1) Cut the copper pipe correctly with pipe cutter. (Fig. 1, 2)
- 2) Completely remove all burrs from the cut cross section of pipe. (Fig. 3)
 - Put the end of the copper pipe to downward direction as you remove burrs in order to avoid to let burrs drop in the piping.
- 3) Remove flare nuts attached to indoor and outdoor units, then put them on pipe having completed burr removal. (Not possible to put them on after flaring work.)
- 4) Flaring work (Fig. 4, 5). Firmly hold copper pipe in the dimension shown in the table. Select A mm from the table according to the tool you use.
- 5) Check
 - Compare the flared work with Fig. 6.
 - If flare is noted to be defective, cut off the flared section and do flaring work again.



Pipe diameter inch (mm)	Nut inch (mm)	A inch (mm)			Tightening torque	
		Clutch type tool for R410A	Clutch type tool for R22	Wing nut type tool for R22	N·m	ft·lb (kgf·cm)
ø 1/4 (6.35)	1/4 (17)	0 to 0.02 (0 to 0.5)	0.04 to 0.06 (1.0 to 1.5)	0.06 to 0.08 (1.5 to 2.0)	13.7 to 17.7	10 to 13 (140 to 180)
ø 3/8 (9.52)	3/8 (22)			0.08 to 0.10 (2.0 to 2.5)	34.3 to 41.2	25 to 30 (350 to 420)
ø 1/2 (12.7)	1/2 (26)			49.0 to 56.4	36 to 42 (500 to 575)	
ø 5/8 (15.88)	5/8 (29)			73.5 to 78.4	54 to 58 (750 to 800)	

3-3. PIPE CONNECTION

- Fasten flare nut with a torque wrench as specified in the table.
- When fastened too tight, flare nut may brake after a long period and cause refrigerant leakage.

Indoor unit connection

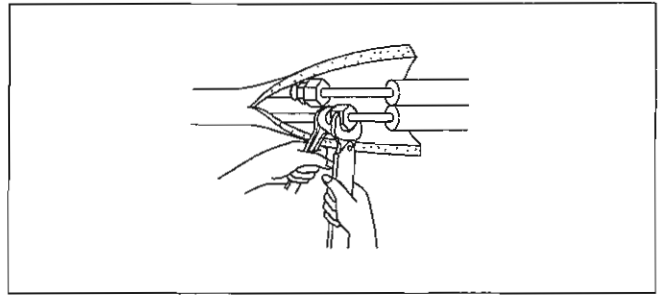
Connect both liquid and gas pipings to indoor unit.

- Apply a thin coat of refrigeration oil (J) on the seat surface of pipe.
- For connection, first align the center, then tighten the first 3 to 4 turns of flare nut.
- Use tightening torque table below as a guideline for indoor unit side union joint section, and tighten using two wrenches. Excessive tightening damages the flare section.

Outdoor unit connection

Connect pipes to stop valve pipe joint of the outdoor unit in the same manner applied for indoor unit.

- For tightening, use a torque wrench or spanner and use the same tightening torque applied for indoor unit.



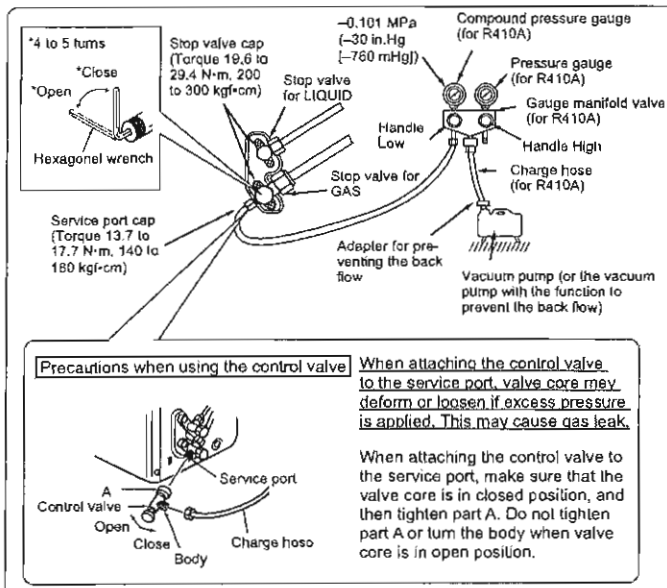
3-4. INSULATION AND TAPING

- 1) Cover piping joints with pipe cover.
- 2) For outdoor unit side, surely insulate every piping including valves.
- 3) Using piping tapa (G), apply taping starting from the entry of outdoor unit.
 - Stop the end of piping lape (G) with lape (with adhesive agent attached).
 - When piping have to be arranged through above ceiling, closet or where the temperature and humidity are high, wind additional commercially sold insulation to prevent condensation.

4. PURGING PROCEDURES, LEAK TEST, AND TEST RUN

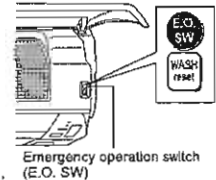
4-1. PURGING PROCEDURES AND LEAK TEST

- 1) Remove service port cap of stop valve on the side of the outdoor unit gas pipe. (The stop valve will not work in its initial state fresh out of the factory, totally closed with cap on.)
- 2) Connect gauge manifold valve and vacuum pump to service port of stop valve on the gas pipe side of the outdoor unit.



4-2. TEST RUN

- 1) Insert power supply plug into the power outlet and/or turn on the breaker. Check that all LED lamps are not lit. If they are blinking, check that the horizontal vane is installed correctly. Refer to operating instructions for details.
- 2) Press the E.O. SW. Test run will be performed for 30 minutes. If the left side lamp of the operation indicator blinks every 0.5 seconds, inspect the indoor/outdoor unit connecting wire (A) for mis-wiring. After the test run, emergency COOL mode (75°F [24°C] COOL) will start.
- 3) To stop operation, press the E.O. SW several times until all LED lamps turn off. Refer to operating instructions for details.



Checking the remote (infrared) signal reception

Press the ON/OFF button on the remote controller and check that an electronic sound is heard from the indoor unit. Press the ON/OFF button again to turn the air conditioner off.

- Once the compressor stops, the restart preventive device operates so the compressor will not operate for 3 minutes to protect the air conditioner.

4-3. AUTO RESTART FUNCTION

This product is equipped with an auto restart function. When the power supply is stopped during operation, such as during blackouts, the function automatically starts operation in the previous setting once the power supply is resumed. (Refer to the operating instructions for details.)

Caution:

- After test run or remote signal reception check, turn off the unit with the E.O. SW or the remote controller before turning off the power supply. Not doing so will cause the unit to start operation automatically when power supply is resumed.

To the user

- After installing the unit, make sure to explain the user about auto restart function.
- If auto restart function is unnecessary, it can be deactivated. Consult the service representative to deactivate the function. Refer to the service manual for details.

- 3) Run the vacuum pump. (Vacuumize for more than 15 minutes.)
- 4) Check the vacuum with gauge manifold valve, then close gauge manifold valve, and stop the vacuum pump.
- 5) Leave as it is for one or two minutes. Make sure pointer gauge manifold valve remains in the same position. Confirm that pressure gauge shows -0.101 Mpa [Gauge] (-30 in.Hg [-760 mmHg]).
- 6) Remove gauge manifold valve quickly from service port of stop valve.
- 7) After refrigerant pipes are connected and evacuated, fully open all stop valves on both sides of gas pipe and liquid pipe. Operating without fully opening lowers the performance and this causes trouble.
- 8) Refer to 1-3., and charge the prescribed amount of refrigerant if needed. Be sure to charge slowly with liquid refrigerant. Otherwise, composition of the refrigerant in the system may be changed and affect performance of the air conditioner.
- 9) Tighten cap of service port to obtain the initial status.
- 10) Leak test

4-4. EXPLANATION TO THE USER

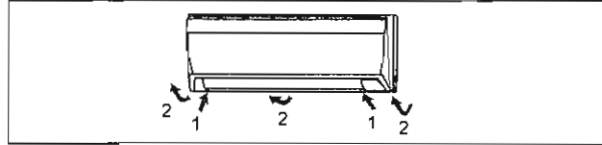
- Using the OPERATING INSTRUCTIONS, explain to the user how to use the air conditioner (how to use the remote controller, how to remove the air filters, how to remove or put the remote controller in the remote controller holder, how to clean, precautions for operation, etc.)
- Recommend the user to read the OPERATING INSTRUCTIONS carefully.

5. RELOCATION AND MAINTENANCE

5-1. REMOVING AND INSTALLING THE PANEL ASSEMBLY

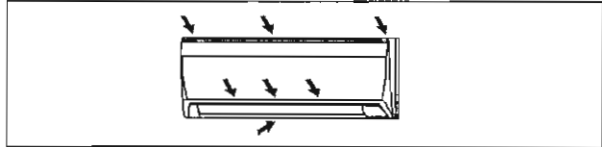
Removal procedure

- 1) Remove the 2 screws which fix the panel assembly.
- 2) Remove the panel assembly. Be sure to remove its bottom end first.



Installation procedure

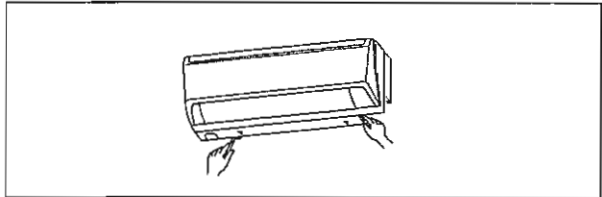
- 1) Install the panel assembly following the removal procedure in reverse.
- 2) Be sure to press the positions as indicated by the arrows in order to attach the assembly completely to the unit.



5-2. REMOVING THE INDOOR UNIT

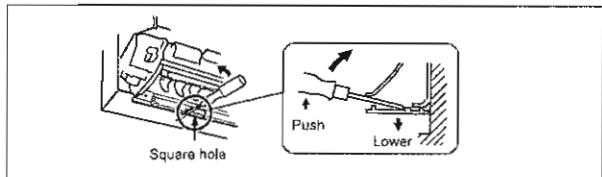
Remove the bottom of the indoor unit from the installation plate.

When releasing the corner part, release both left and right bottom corner part of indoor unit and pull it downward and forward as shown in the figure on the right.



If the above method cannot be used

Remove the front panel. Then, insert hexagonal wrenches into the square holes on the left and right sides of the unit and push them up as shown in the following figure. The bottom of the indoor unit lowers and releases the hooks.



5-3. PUMPING DOWN

When relocating or disposing of the air conditioner, pump down the system following the procedure below so that no refrigerant is released into the atmosphere.

- 1) Connect the gauge manifold valve to the service port of the stop valve on the gas pipe side of the outdoor unit.
- 2) Fully close the stop valve on the liquid pipe side of the outdoor unit.
- 3) Close the stop valve on the gas pipe side of the outdoor unit almost completely so that it can be easily closed fully when the pressure gauge shows 0 MPa [Gauge] (0 lb/in^2 [0 kgf/cm^2]).
- 4) Start the emergency COOL operation.
To start the emergency operation in COOL mode, disconnect the power supply plug and/or turn off the breaker. After 15 seconds, connect the power supply plug and/or turn on the breaker, and then press the E.O. SW once. (The emergency COOL operation can be performed continuously for up to 30 minutes.)
- 5) Fully close the stop valve on the gas pipe side of the outdoor unit when the pressure gauge shows 0.05 to 0 MPa [Gauge] (approx. 7.25 to 0 lb/in^2 [0.5 to 0 kgf/cm^2]).
- 6) Stop the emergency COOL operation.
Press the E.O. SW twice to stop the operation.

SPLIT-TYPE AIR CONDITIONERS

INDOOR UNIT

**MSZ-GE06NA MSZ-GE09NA MSZ-GE12NA
MSZ-GE15NA MSZ-GE18NA**



OPERATING INSTRUCTIONS

- To use this unit correctly and safely, be sure to read these operating instructions before use.

For user

MANUAL DE INSTRUCCIONES

- Para utilizar esta unidad de forma correcta y segura, lea previamente estas instrucciones de funcionamiento.

Para los clientes

NOTICE D'UTILISATION

- Pour avoir la certitude d'utiliser cet appareil correctement et en toute sécurité, veuillez lire cette notice d'instructions avant de mettre le climatiseur sous tension.




A l'attention des clients



English


Español

Français






SAFETY PRECAUTIONS

 CAUTION	
	<p>Do not step on an unstable bench to operate or clean the unit.</p> <ul style="list-style-type: none"> This may cause injury if you fall down.
	<p>Do not pull the power cord.</p> <ul style="list-style-type: none"> This may cause a portion of the core wire to break, which may cause overheating or fire.
	<p>Do not charge or disassemble the batteries, and do not throw them into a fire.</p> <ul style="list-style-type: none"> This may cause the batteries to leak, or cause a fire or explosion.
	<p>Do not operate the unit for more than 4 hours at high humidity (80% RH or more) and/or with windows or outside door left open.</p> <ul style="list-style-type: none"> This may cause the water condensation in the air conditioner, which may drip down, wetting or damaging the furniture. The water condensation in the air conditioner may contribute to growth of fungi, such as mold.
	<p>Do not use the unit for special purposes, such as storing food, raising animals, growing plants, or preserving precision devices or art objects.</p> <ul style="list-style-type: none"> This may cause deterioration of quality, or harm to animals and plants.
	<p>Do not expose combustion appliances to direct airflow.</p> <ul style="list-style-type: none"> This may cause incomplete combustion.
	<p>Before cleaning the unit, switch it OFF and disconnect the power plug or turn the breaker OFF.</p> <ul style="list-style-type: none"> This may cause injury, since the fan inside rotates at high speeds during operation.
	<p>When the unit will be unused for a long time, disconnect the power plug or turn the breaker OFF.</p> <ul style="list-style-type: none"> The unit may accumulate dirt, which may cause overheating or fire.
	<p>Replace all batteries of the remote controller with new ones of the same type.</p> <ul style="list-style-type: none"> Using an old battery together with a new one may cause overheating, leakage, or explosion.
	<p>If the battery fluid comes in contact with your skin or clothes, wash them thoroughly with clean water.</p> <ul style="list-style-type: none"> If the battery fluid comes in contact with your eyes, wash them thoroughly with clean water and immediately seek medical attention.
	<p>Ensure that the area is well-ventilated when the unit is operated together with a combustion appliance.</p> <ul style="list-style-type: none"> Inadequate ventilation may cause oxygen starvation.
	<p>Turn the breaker OFF when you hear thunder and there is a possibility of a lightning strike.</p> <ul style="list-style-type: none"> The unit may be damaged if lightning strikes.
	<p>After the air conditioner is used for several seasons, perform inspection and maintenance in addition to normal cleaning.</p> <ul style="list-style-type: none"> Dirt or dust in the unit may create an unpleasant odor, contribute to growth of fungi, such as mold, or clog the drain passage, and cause water to leak from the indoor unit. Consult your dealer for inspection and maintenance, which require specialized knowledge and skills.

	<p>Do not operate switches with wet hands.</p> <ul style="list-style-type: none"> This may cause electric shock.
	<p>Do not clean the air conditioner with water or place an object that contains water, such as a flower vase, on it.</p> <ul style="list-style-type: none"> This may cause fire or electric shock.
	<p>Do not step on or place any object on the outdoor unit.</p> <ul style="list-style-type: none"> This may cause injury if you or the object falls down.

 IMPORTANT	
<p>Dirty filters cause condensation in the air conditioner which will contribute to the growth of fungi such as mold. It is therefore recommended to clean air filters every 2 weeks.</p>	

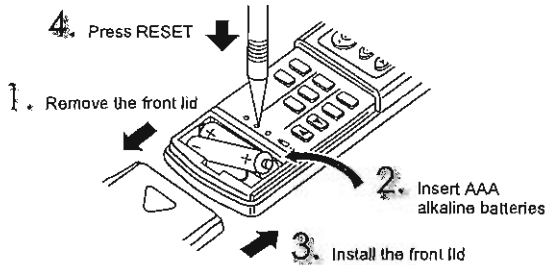
For installation

 WARNING	
	<p>Consult your dealer for installing the air conditioner.</p> <ul style="list-style-type: none"> It should not be installed by the user since installation requires specialized knowledge and skills. An improperly installed air conditioner may cause water leakage, fire, or electric shock.
	<p>Provide a dedicated power supply for the air conditioner.</p> <ul style="list-style-type: none"> A non-dedicated power supply may cause overheating or fire.
	<p>Do not install the unit where flammable gas could leak.</p> <ul style="list-style-type: none"> If gas leaks and accumulates around the unit, it may cause an explosion.
	<p>Ground the unit correctly.</p> <ul style="list-style-type: none"> Do not connect the ground wire to a gas pipe, water pipe, lightning rod, or a telephone ground wire. Improper grounding may cause electric shock.
 CAUTION	
	<p>Install a Ground Fault Interrupt (GFI) circuit breaker depending on the installation location of the air conditioner (such as highly humid areas).</p> <ul style="list-style-type: none"> If the Ground Fault Interrupt (GFI) breaker is not installed, it may cause electric shock.
	<p>Ensure that the drain water is properly drained.</p> <ul style="list-style-type: none"> If the drain passage is improper, water may drip down from the indoor/outdoor unit, wetting and damaging the furniture.
<p>In case of an abnormal condition Immediately stop operating the air conditioner and consult your dealer.</p>	

PREPARATION BEFORE OPERATION

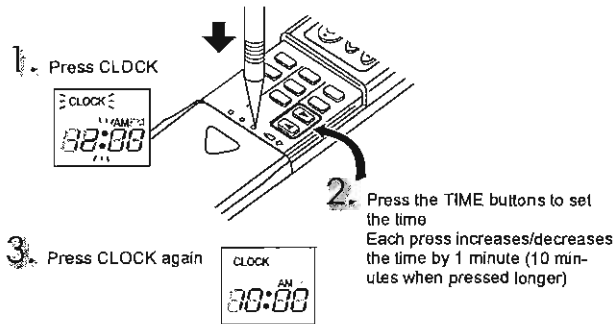
Before operation: Insert the power supply plug into the power outlet and/or turn the breaker on.

Installing the remote controller batteries

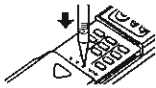


- Make sure the polarity of the batteries is correct.
- Do not use manganese batteries. The remote controller could malfunction.
- Do not use rechargeable batteries.
- Replace all batteries with new ones of the same type.
- Batteries can be used for approximately 1 year. However, batteries with expired shelf lives last shorter.
- Press RESET gently using a thin instrument.
If the RESET button is not pressed, the remote controller may not operate correctly.

Setting current time

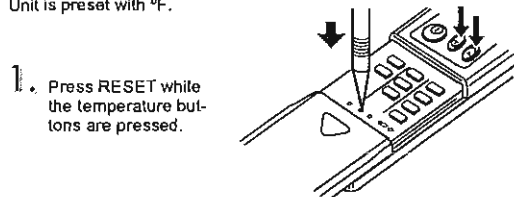


- Press CLOCK gently using a thin instrument.



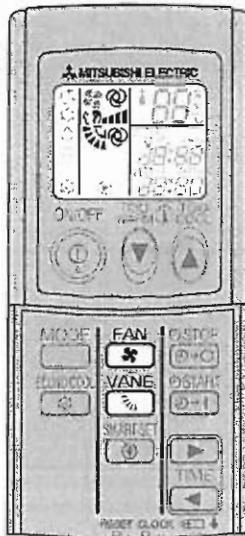
Changing temperature units (°F→°C)

Unit is preset with °F.

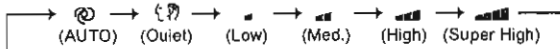


- Press RESET gently using a thin instrument.
- To change temperature unit from °C to °F, press RESET.

FAN SPEED AND AIRFLOW DIRECTION ADJUSTMENT



Press **FAN** to select fan speed. Each press changes fan speed in the following order:



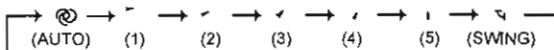
- Two short beeps are heard from the indoor unit when set to AUTO.
- Use higher fan speed to cool/heat the room quicker. It is recommended to lower the fan speed once the room is cool/warm.
- Use lower fan speed for quiet operation.

Note:

Multi system operation

When several indoor units are operated simultaneously for heating operation, the temperature of the airflow may be low. In this case, it is recommended to set the fan speed to AUTO.

Press **VANE** to select airflow direction. Each press changes airflow direction in the following order:



- Two short beeps are heard from the indoor unit when set to AUTO.

Airflow direction

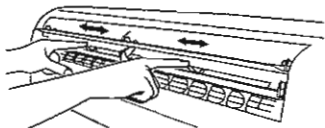
(AUTO).....The vane is set to the most efficient airflow direction. COOL/DRY:horizontal position. HEAT:position (5).

(Manual).....For efficient air conditioning, select the upper position for COOL/DRY, and the lower position for HEAT. If the position (4) or (5) is selected during COOL/DRY, the vane automatically moves to the horizontal position after 0.5 to 1 hour to prevent any condensation from dripping.

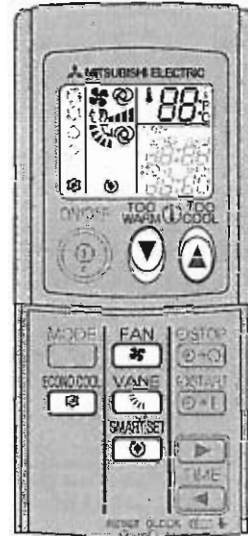
(Swing).....The vane moves up and down intermittently.

To change the horizontal airflow direction.

Move the vertical vane manually before starting operation.



SMART SET OPERATION



1 Press **SMART SET** during COOL, ECONO COOL, or HEAT mode to select SMART SET mode.

2 Set the temperature, fan speed, and airflow direction.

- The same setting is selected from the next time by simply pressing **SMART SET**.
- Two settings can be saved. (One for COOL/ECONO COOL, one for HEAT)
- Select the appropriate temperature, fan speed, and airflow direction according to your room.
- Normally, the minimum temperature setting in HEAT mode is 59°F (16°C). However, during SMART SET operation only, the minimum temperature setting is 50°F (10°C).

Press **SMART SET** again to cancel SMART SET operation.

- SMART SET operation also is canceled when the MODE button is pressed.

SMART SET operation

A simplified set back function enables to recall the preferred (preset) setting with a single push of the **SMART SET** button. Press the button again and you can go back to the previous setting in an instance.

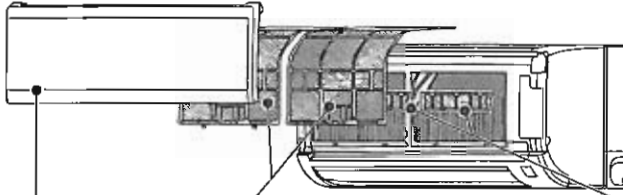
Example of use:

1. Low energy mode
Set the temperature 4°F (2°C) to 6°F (3°C) warmer in COOL and cooler in HEAT mode. This setting is suitable for unoccupied room, and while you are sleeping.
2. Saving frequently used settings
Save your preferred setting for COOL/ECONO COOL and HEAT. This enables you to select your preferred setting with a single push of the button.

CLEANING

Instructions:

- Switch off the power supply or turn off the breaker before cleaning.
- Be careful not to touch the metal parts with your hands.
- Do not use benzine, thinner, polishing powder, or insecticide.
- Use only diluted mild detergents.
- Do not expose parts to direct sunlight, heat, or fire to dry.
- Do not use water hotter than 120°F (50°C).



Air filter (Catechin air filter)

- **Clean every 2 weeks**
- Remove dirt by a vacuum cleaner, or rinse with water.
- After washing with water, dry it well in shade.

What is "Catechin air filter" ?

Catechin is a bioflavonoid that is found in green tea that has both antiviral and antioxidant qualities. In addition to these benefits, Catechin also offers excellent deodorizing characteristics. Catechin air filter uses this compound to not only improve air quality but also prevent the spread of bacteria and viruses in the room.

Air cleaning filter (Anti-Allergy Enzyme Filter)

Back side of air filter

Every 3 months:

- Remove dirt by a vacuum cleaner.

When dirt cannot be removed by vacuum cleaning:

- Soak the filter and its frame in lukewarm water before rinsing it.
- After washing, dry it well in shade.

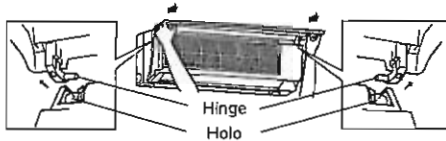
Every year:

- Replace it with a new air cleaning filter for best performance.
- Parts Number **MAC-408FT-E**

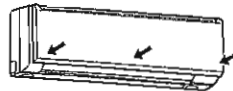


Pull to remove from the air filter

Front panel




1. Lift the front panel until a "click" is heard.
2. Hold the hinges and pull to remove as shown in the illustration above.
 - Wipe with a soft dry cloth or rinse it with water.
 - Do not soak it in water for more than two hours.
 - Dry it well in shade.
3. Install the panel by following the removal procedure in reverse. Close the front panel securely and press the positions indicated by the arrows.



Important

- Clean the filters regularly for best performance and to reduce power consumption.
- Dirty filters cause condensation in the air conditioner which will contribute to the growth of fungi such as mold. It is therefore recommended to clean air filters every 2 weeks.

WHEN THE AIR CONDITIONER IS NOT GOING TO BE USED FOR A LONG TIME

- 1 Set to the highest temperature in manual COOL mode, and operate for 3 to 4 hours. **Page 5**
 - This dries the inside of the unit.
 - Moisture in the air conditioner contributes to favorable conditions for growth of fungi, such as mold.
- 2 Press  to stop the operation.
- 3 Turn off the breaker and/or disconnect the power supply plug.
- 4 Remove all batteries from the remote controller.

When using the air conditioner again:

- 1 Clean the air filter. **Page 8**
- 2 Check that the air inlet and outlet of the indoor and outdoor units are not blocked.
- 3 Check that the ground wire is connected correctly.
- 4 Refer to the "PREPARATION BEFORE OPERATION", and follow the instructions. **Page 4**

SPECIFICATIONS

Guaranteed operating range

		Indoor	Outdoor
Cooling	Upper limit	90°F (32.2°C) DB 73°F (22.8°C) WB	115°F (46.1°C) DB —
	Lower limit	67°F (19.4°C) DB 57°F (13.9°C) WB	14°F (-10°C) DB —
Heating	Upper limit	80°F (26.7°C) DB —	75°F (23.9°C) DB 65°F (18.3°C) WB
	Lower limit	70°F (21.1°C) DB —	-4°F (-20°C) DB -5°F (-21.1°C) WB

DB : Dry Bulb
WB : Wet Bulb

Note:

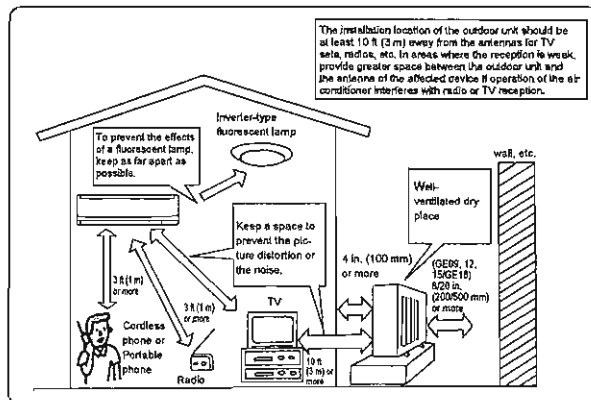
If the outdoor temperature is below the lower limit of guaranteed operating range, the outdoor unit may stop operation until the outdoor temperature exceeds the lower limit.

INSTALLATION PLACE AND ELECTRICAL WORK

Installation place

Avoid installing the air conditioner in the following places.

- Where there is much machine oil.
- Salty places such as the seaside.
- Where sulfide gas is generated such as a hot spring.
- Where oil is splashed or where the area is filled with oily smoke.
- Where there is high-frequency or wireless equipment.
- Where the air from the outdoor unit air outlet is blocked.
- Where the operation sound or air from the outdoor unit does not bother the house next door.








Electrical work

- Provide an exclusive circuit for the power supply of the air conditioner.
- Be sure to observe the breaker capacity.

If you have any questions, consult your dealer.




MEDIDAS DE SEGURIDAD



 CUIDADO	
	<p>Mientras limpia o hace funcionar la unidad, no tenga los pies en una superficie inestable.</p> <ul style="list-style-type: none"> • Si se cayera, podría hacerse daño.
	<p>No tire del cable de alimentación.</p> <ul style="list-style-type: none"> • Podría hacer que se rompa parte del núcleo del cable, lo que puede causar sobrecalentamiento o fuego.
	<p>No cargue ni desarme las pilas y no las arroje al fuego.</p> <ul style="list-style-type: none"> • Podría provocar fugas en las pilas, o causar fuego o una explosión.
	<p>La unidad no debe estar en funcionamiento más de 4 horas en condiciones de humedad elevada (80% de humedad relativa o superior) y/o con la puerta de entrada o las ventanas abiertas.</p> <ul style="list-style-type: none"> • Esto podría causar un descenso en la condensación de agua en el acondicionador de aire que podría humedecer o dañar el mobiliario. • La condensación de agua en el acondicionador de aire podría contribuir a la formación de hongos, como el moho.
	<p>No use la unidad para fines especiales, como para almacenar alimentos, criar animales, cultivar plantas o guardar dispositivos de precisión u objetos de arte.</p> <ul style="list-style-type: none"> • Podría deteriorar la calidad o causar daños a los animales y plantas.
	<p>Evite la exposición directa de aparatos de combustión al flujo de aire.</p> <ul style="list-style-type: none"> • Podría interrumpir la combustión.
	<p>Antes de limpiar la unidad, apáguela y desconecte el cable de alimentación o coloque el disyuntor en OFF.</p> <ul style="list-style-type: none"> • Podría causar daños, puesto que el ventilador del interior gira a alta velocidad durante el funcionamiento.
	<p>Si la unidad va a dejar de usarse un tiempo prolongado, desconecte el cable de alimentación o coloque el disyuntor en OFF.</p> <ul style="list-style-type: none"> • La unidad puede acumular polvo y provocar sobrecalentamiento o fuego.
	<p>Sustituya las 2 pilas viejas del controlador remoto por otras nuevas de la misma clase.</p> <ul style="list-style-type: none"> • La utilización de una pila usada junto con una nueva puede causar sobrecalentamiento, provocar una fuga o producir una explosión.
	<p>Si el líquido de la pila entra en contacto con la piel o la ropa, lávelas a fondo con agua limpia.</p> <ul style="list-style-type: none"> • Si el líquido de la pila entra en contacto con los ojos, lévelos a fondo con agua limpia y acuda a un médico de inmediato.
	<p>Asegúrese de que la zona está bien ventilada cuando la unidad esté en funcionamiento junto con un aparato de combustión.</p> <ul style="list-style-type: none"> • Una ventilación inadecuada puede originar falta de oxígeno.
	<p>Coloque el disyuntor en OFF si oye truenos y hay posibilidad de que caigan rayos.</p> <ul style="list-style-type: none"> • La unidad puede resultar dañada si cae algún rayo.
	<p>Tras varias estaciones con el acondicionador de aire en funcionamiento, efectúe una inspección y el mantenimiento además de la limpieza habitual.</p> <ul style="list-style-type: none"> • Si hay polvo o suciedad en la unidad se puede producir un olor desagradable, contribuir al crecimiento de hongos, como el moho, o bien bloquear el conducto de drenaje, lo que hace que gotee agua de la unidad interior. Consulte con su distribuidor sobre la inspección y el mantenimiento, puesto que exigen conocimientos y capacidades especializadas.

	<p>No utilice los mandos con las manos mojadas.</p> <ul style="list-style-type: none"> • Podría producirse una descarga eléctrica.
	<p>No limpie el acondicionador de aire con agua ni coloque sobre él un objeto que contenga agua, como un florero.</p> <ul style="list-style-type: none"> • Podría causar fuego o una descarga eléctrica.
	<p>No se suba a la unidad exterior ni coloque ningún objeto encima.</p> <ul style="list-style-type: none"> • Si se cayera usted o el objeto, podría haber daños.

 IMPORTANTE	
<p>Los filtros sucios pueden provocar condensación en el acondicionador de aire que contribuye a la formación de hongos, como el moho. Por lo tanto, es recomendable limpiar los filtros cada 2 semanas.</p>	

Para la instalación

 ATENCIÓN	
	<p>Pida a su distribuidor que instale el aire acondicionado.</p> <ul style="list-style-type: none"> • No debe instalarlo el usuario, puesto que requiere conocimientos y capacidades especializadas. Si no se instala correctamente, puede provocar fugas, fuego o descargas eléctricas.
	<p>Dedique una toma de alimentación en exclusiva al acondicionador de aire.</p> <ul style="list-style-type: none"> • Si no se utiliza una toma de alimentación en exclusiva, pueden producirse sobrecalentamiento o fuego.
	<p>No instale la unidad donde puede haber fugas de gas inflamable.</p> <ul style="list-style-type: none"> • Si hay una fuga de gas y éste se acumula cerca de la unidad, podría producirse una explosión.
	<p>Conecte la unidad a una toma a tierra.</p> <ul style="list-style-type: none"> • No conecte el cable de tierra a una tubería de gas, tubería de agua, pararrayos o cable de tierra de un teléfono. Si no, podría producirse una descarga eléctrica.

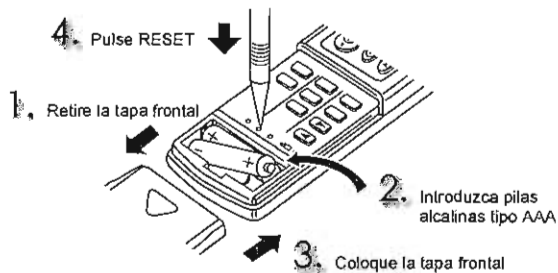
 CUIDADO	
	<p>Instale un disyuntor de pérdidas de tierra en función del lugar de instalación del aire acondicionado (por ejemplo, áreas muy húmedas).</p> <ul style="list-style-type: none"> • Si no instala el disyuntor de pérdidas de tierra, podrían producirse descargas eléctricas.
	<p>Asegúrese de que se drene correctamente el agua de drenaje.</p> <ul style="list-style-type: none"> • Si el conducto de drenaje no es correcto, el agua podría caer desde la unidad interior/exterior, causando humedad y daños en el mobiliario.

<p>Si se produce una condición anómala Pare de inmediato el acondicionador de aire y consulte a su distribuidor.</p>	
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PREPARACIÓN ANTES DE LA PUESTA EN MARCHA

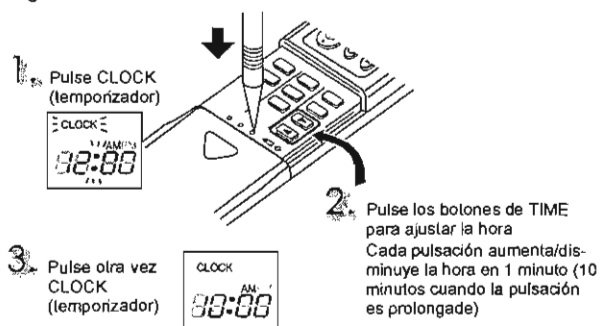
Antes de la puesta en marcha: inserte el enchufe de alimentación en la toma de corriente y/o encienda el disyuntor.

Instalación de las pilas del controlador remoto



- Asegúrese de que la polaridad de las pilas es la correcta.
- No utilice pilas de manganeso. El controlador remoto podría funcionar inadecuadamente.
- No utilice pilas recargables.
- Sustituya todas las pilas por otras nuevas de la misma clase.
- Las pilas pueden durar 1 año aproximadamente. Ahora bien, las pilas caducadas pueden durar menos.
- Pulse RESET (reiniciar) suavemente utilizando un objeto en punta. Si no se pulsa el botón de reinicialización (RESET), el controlador remoto no funcionará correctamente.

Ajuste de la hora actual



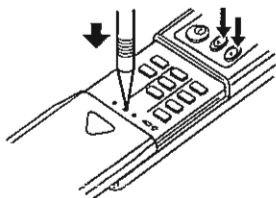
- Pulse CLOCK (temporizador) suavemente utilizando un objeto en punta.



Cambio de unidades de temperatura (°F→°C)

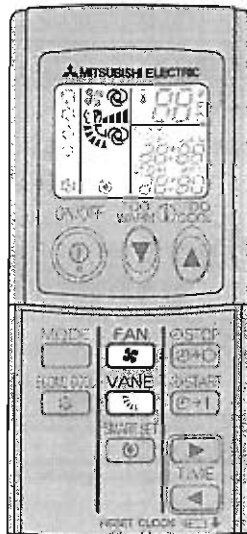
La unidad esta configurada por defecto con °F.

1. Pulse RESET (reiniciar) con los botones de temperatura pulsados.

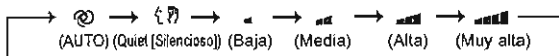


- Pulse RESET (reiniciar) suavemente utilizando un objeto en punta.
- Para cambiar la unidad de temperatura de °C a °F, pulse RESET.

VELOCIDAD DEL VENTILADOR Y AJUSTE DE LA DIRECCIÓN DEL AIRE



Pulse **FAN** para seleccionar la velocidad del ventilador. La velocidad del ventilador cambia con cada pulsación en el orden siguiente:



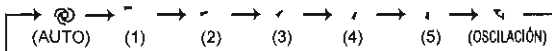
- Al configurar la unidad interior en AUTO, se escuchan dos pitidos cortos.
- Utilice una velocidad de ventilador superior para calentar o enfriar la habitación más rápidamente. Se recomienda reducir la velocidad del ventilador una vez que la sala se ha enfriado/calentado.
- Utilice una velocidad de ventilador inferior para un funcionamiento silencioso.

Nota:

Funcionamiento multisistema

Cuando se ponen en funcionamiento simultáneamente varias unidades interiores para una función de calefacción, la temperatura del flujo de aire puede ser baja. En este caso, se recomienda ajustar la velocidad del ventilador en modo AUTO (cambio automático).

Pulse **VANE** para seleccionar la dirección del aire. La dirección del aire cambia con cada pulsación en el orden siguiente:



- Al configurar la unidad interior en AUTO, se escuchan dos pitidos cortos.

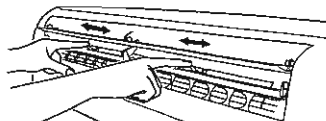
Dirección del flujo de aire

(AUTO).....El deflector se ajusta en la dirección de flujo de aire que ofrece un mayor rendimiento. REFRIGERACIÓN/DESHUMIDIFICACIÓN: posición horizontal. CALEFACCIÓN: posición (5).

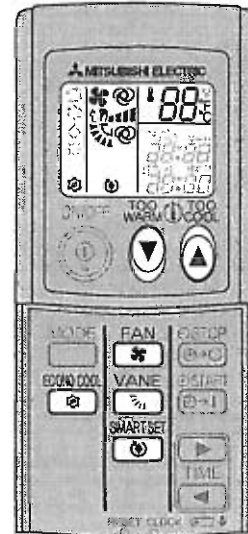
(Manual).....Para un mejor rendimiento del acondicionador de aire, seleccione la posición superior para REFRIGERACIÓN/DESHUMIDIFICACIÓN, y la posición inferior para CALEFACCIÓN. Si se selecciona la posición (4) o (5) durante el modo de REFRIGERACIÓN/DESHUMIDIFICACIÓN, el deflector se desliza automáticamente a la posición horizontal pasado un periodo de 30 minutos a 1 hora para evitar que gotee el agua de condensación.

(Oscilación).....El deflector se desliza hacia arriba y hacia abajo de forma intermitente.

■ Para cambiar la dirección del flujo de aire. Desplace el deflector vertical manual antes de que empiece a funcionar el acondicionador.



FUNCIONAMIENTO SMART SET (SELECCIÓN INTELIGENTE)



1 Pulse **SMART SET** durante el modo de REFRIGERACIÓN, DESCONEXIÓN AUTOMÁTICA (ECONO COOL) o CALEFACCIÓN para seleccionar el modo SMART SET (SELECCIÓN INTELIGENTE).

2 Establezca la temperatura, la velocidad del ventilador y la dirección del flujo de aire.

- La próxima vez que lo enciende, podrá seleccionar esta misma configuración sólo con pulsar **SMART SET**.
- Pueden guardarse dos grupos de configuración. (Uno para REFRIGERACIÓN/DESCONEXIÓN AUTOMÁTICA, otro para CALEFACCIÓN)
- Seleccione la temperatura, la velocidad del ventilador y la dirección del flujo de aire adecuadas para la habitación.
- Normalmente, la configuración de temperatura mínima en el modo CALEFACCIÓN es 59°F (16°C). Tenga en cuenta que durante el funcionamiento en modo SMART SET (SELECCIÓN INTELIGENTE) la temperatura mínima es de 50°F (10°C).

Vuelva a pulsar **SMART SET** para cancelar el funcionamiento SMART SET (SELECCIÓN INTELIGENTE).

- El funcionamiento SMART SET (SELECCIÓN INTELIGENTE) también se cancela al pulsar el botón MODE (MOOO).

Funcionamiento SMART SET (SELECCIÓN INTELIGENTE)

Mediante una sencilla función de selección previa se puede recordar la configuración preferida (preestablecida) con sólo pulsar el botón **SMART SET**. Para volver a la configuración anterior, vuelva a pulsar el botón.

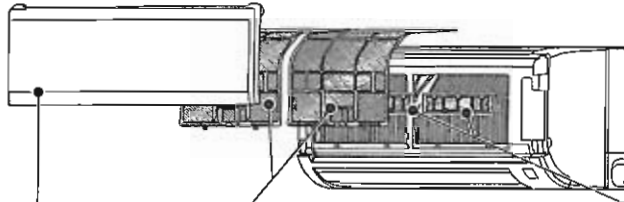
Ejemplo de uso:

1. Modo de bajo consumo
Ajuste la temperatura de 4°F (2°C) a 6°F (3°C) más caliente en el modo REFRIGERACIÓN y más frío en el modo CALEFACCIÓN. Puede usar esta configuración para una habitación desocupada o mientras duerme.
2. Guardar las configuraciones más frecuentes
Guarde su configuración preferida para REFRIGERACIÓN/DESCONEXIÓN AUTOMÁTICA y CALEFACCIÓN. De esta forma, podrá seleccionar su configuración preferida con solo pulsar un botón.

LIMPIEZA

Instrucciones:

- Durante la limpieza, apague el disyuntor o desenchúfelo de la toma de corriente.
- Tenga cuidado de no tocar las partes metálicas con las manos.
- No utilice bencina, polvo de pulimentación ni insecticida.
- Usa sólo detergentes suaves diluidos.
- No exponga directamente al sol, al calor o a las llamas ninguna pieza con el fin de secarla.
- No use agua con temperatura superior a 120°F (50°C).



Filtro de limpieza de aire (Filtro de enzimas antialérgico)

Filtro de aire (filtro de aire de taninos)

- **Límpielo cada 2 semanas**
- Elimine la suciedad con un aspirador o acébrelo con agua.
- Después de limpiarlo con agua, déjelo secar completamente a la sombra.

¿Qué es el "filtro de aire de taninos"?

Los taninos son bioflavonoides que se encuentran en el té verde y que tienen propiedades tanto antivirales como antioxidantes. Además de estas ventajas, los taninos ofrecen también excelentes características como desodorante. Este filtro de aire utiliza los taninos no sólo para mejorar la calidad del aire, sino también para evitar la diseminación de bacterias y virus por la habitación.

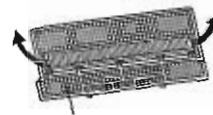
Parte posterior del filtro de aire

Cada 3 meses:

- Elimine la suciedad con un aspirador.
- **Si la suciedad no se puede eliminar con un aspirador:**
- Sumerja el filtro y su carcasa en agua emplada antes de enjuagarlos.
- Tras el lavado, séquelo bien a la sombra.

Cada año:

- Cambie el filtro de aire por uno nuevo para un mejor rendimiento.
- Número de las piezas **MAC-403PTE**



Tire para desacoplar del filtro de aire.

Panel frontal




1. Suba el panel frontal hasta que oiga un "clic".
2. Sujete los goznes y tire de él para extraerlo, como se muestra en la ilustración anterior.
 - Pásele un paño suave seco o acébrelo con agua.
 - No lo empape en agua más de dos horas.
 - Séquelo bien en la sombra.
3. Instale el panel siguiendo las instrucciones de extracción en orden inverso. Cierre el panel frontal de forma segura y pulse las posiciones que indican las flechas.



Importante

- **Limpie los filtros con regularidad para un mejor rendimiento y para reducir el consumo de electricidad.**
- **Los filtros sucios pueden provocar condensación en el acondicionador de aire que contribuye a la formación de hongos, como el moho. Por lo tanto, es recomendable limpiar los filtros cada 2 semanas.**

CUANDO EL ACONDICIONADOR DE AIRE NO SE VAYA A UTILIZAR DURANTE MUCHO TIEMPO

- 1 Ajuste a la máxima temperatura en el modo manual de REFRIGERACIÓN, y déjelo en funcionamiento durante 3 a 4 horas. **Página 5**
 - Esto hace que se seque el interior de la unidad.
 - La humedad condensada en el aparato de aire acondicionado puede contribuir a la formación y expansión de hongos, como el moho.
- 2 Pulse  para que se detenga.
- 3 Desconecte el disyuntor o desconecte el enchufe de la alimentación.
- 4 Quite todas las pilas del controlador remoto.

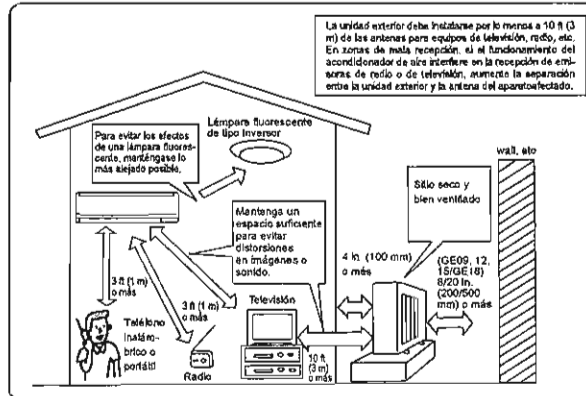
Al volver a usar el acondicionador de aire:

- 1 Limpie el filtro del aire. **Página 8**
- 2 Compruebe que no estén bloqueadas las entradas y salidas de aire de las unidades interior/externa.
- 3 Compruebe que el cable de tierra esté conectado correctamente.
- 4 Consulte la sección "PREPARACIÓN ANTES DE LA PUESTA EN MARCHA" y siga las instrucciones. **Página 4**

LUGAR DE INSTALACIÓN Y TRABAJO ELÉCTRICO

Lugar de instalación

- Procure no instalar el acondicionador de aire en los siguientes lugares.
- Donde haya demasiado aceite para maquinaria.
 - En ambientes salobres, como las zonas costeras.
 - Donde haya gas sulfúrico, como en zonas de baños termales.
 - Donde se haya derramado aceite o haya mucho humo aceitoso en el ambiente.
 - Donde existe equipo inalámbrico o de alta frecuencia.
 - Donde el aire de la salida de aire de la unidad exterior esté bloqueado.
 - Donde el sonido del funcionamiento o el del aire de la unidad exterior no moleste a los vecinos.



Instalación eléctrica

- Procure que el acondicionador de aire disponga de un circuito de alimentación exclusivo.
- Procure que la capacidad del disyuntor sea la adecuada.

Si tiene alguna pregunta, consulte a su distribuidor.

ESPECIFICACIONES

Intervalo garantizado de funcionamiento




		Interior	Exterior
Refrigeración	Margen superior	90°F (32,2°C) DB	115°F (46,1°C) DB
		73°F (22,8°C) WB	—
	Margen inferior	67°F (19,4°C) DB	14°F (-10°C) DB
		57°F (13,9°C) WB	—
Calefacción	Margen superior	80°F (26,7°C) DB	75°F (23,9°C) DB
		—	65°F (18,3°C) WB
	Margen inferior	70°F (21,1°C) DB	-4°F (-20°C) WB
		—	-5°F (-21,1°C) WB



DB : Temperatura seca
WB : Temperatura húmeda

Nota:

Si la temperatura exterior se encuentra por debajo del margen inferior del intervalo garantizado de funcionamiento, es posible que la unidad exterior detenga el funcionamiento hasta que la temperatura exterior supere el margen inferior.

CONSIGNES DE SECURITE






 PRECAUTION	
	<p>Veiller à ne pas monter sur une surface instable pour allumer ou nettoyer le climatiseur.</p> <ul style="list-style-type: none"> • Risque de chute et de blessures.
	<p>Ne jamais tirer sur le cordon d'alimentation.</p> <ul style="list-style-type: none"> • Le fil central du cordon d'alimentation pourrait se rompre et provoquer un incendie.
	<p>Ne jamais recharger ou tenter d'ouvrir les piles et ne pas les jeter au feu.</p> <ul style="list-style-type: none"> • Les piles pourraient fuir et présenter un risque d'incendie ou d'explosion.
	<p>Ne pas faire fonctionner le climatiseur pendant plus de 4 heures avec un taux d'humidité important (80% HR ou plus), et/ou lorsqu'une porte ou une fenêtre est ouverte.</p> <ul style="list-style-type: none"> • Ceci peut provoquer de la condensation à l'intérieur du climatiseur, qui risque de s'écouler et de mouiller ou d'endommager le mobilier. • La présence d'humidité dans la climatisation peut contribuer à la croissance de certains champignons tels que la moisissure.
	<p>Ne pas utiliser le climatiseur pour conserver des aliments, élever des animaux, faire pousser des plantes, ranger des outils de précision ou des objets d'art.</p> <ul style="list-style-type: none"> • Leur qualité pourrait s'en ressentir, et le bien-être des animaux et des plantes pourrait en être affecté.
	<p>Ne pas exposer des appareils à combustion directement sous la sortie d'air pulsé.</p> <ul style="list-style-type: none"> • Une combustion imparfaite pourrait en résulter.
	<p>Avant de procéder au nettoyage du climatiseur, le mettre hors tension et débrancher la fiche d'alimentation électrique ou couper le disjoncteur.</p> <ul style="list-style-type: none"> • La vitesse de rotation extrêmement rapide du ventilateur pendant le fonctionnement du climatiseur pourrait provoquer un accident.
	<p>Si le climatiseur doit rester inutilisé pendant une période prolongée, débrancher la fiche d'alimentation électrique ou couper le disjoncteur.</p> <ul style="list-style-type: none"> • Il pourrait s'encrasser et présenter un risque d'incendie ou d'électrocution.
	<p>Remplacer les piles de la télécommande par des piles neuves du même type.</p> <ul style="list-style-type: none"> • Ne jamais mélanger piles usagées et piles neuves; ceci pourrait provoquer une surchauffe, une fuite ou une explosion.
	<p>Si du liquide provenant des piles entre en contact avec la peau ou les vêtements, les rincer abondamment à l'eau claire.</p> <ul style="list-style-type: none"> • Si du liquide alcalin entre en contact avec les yeux, les rincer abondamment à l'eau claire et contacter d'urgence un médecin.
	<p>Si le climatiseur est utilisé conjointement avec un appareil à combustion, veiller à ce que la pièce soit parfaitement ventilée.</p> <ul style="list-style-type: none"> • Une ventilation insuffisante pourrait provoquer un manque d'oxygène dans la pièce.
	<p>Couper le disjoncteur par temps d'orage.</p> <ul style="list-style-type: none"> • La foudre pourrait endommager le climatiseur.
	<p>Si le climatiseur a été utilisé pendant plusieurs saisons consécutives, procéder à une inspection et à un entretien rigoureux en plus du nettoyage normal.</p> <ul style="list-style-type: none"> • Une accumulation de saletés ou de poussière à l'intérieur du climatiseur peut être à l'origine d'une odeur désagréable, contribuer au développement de moisissures ou bloquer l'écoulement des condensats et provoquer une fuite d'eau de l'unité interne. Consulter un revendeur agréé pour procéder à une inspection et des travaux d'entretien nécessitant l'intervention de personnel qualifié et compétent.

	<p>Ne pas actionner les commandes du climatiseur avec les mains mouillées.</p> <ul style="list-style-type: none"> • Risque d'électrocution !
	<p>Ne pas nettoyer le climatiseur avec de l'eau et ne placer ni vase ni verre d'eau dessus.</p> <ul style="list-style-type: none"> • Ceci pourrait provoquer un risque d'incendie ou d'électrocution.
	<p>Ne jamais marcher sur l'unité externe et ne rien poser dessus.</p> <ul style="list-style-type: none"> • Risque de chute et de blessures.

IMPORTANT

Des filtres encrassés peuvent provoquer de la condensation dans le climatiseur, ce qui contribuera à la croissance de certains champignons tels que la moisissure. Il est donc recommandé de nettoyer les filtres à air toutes les 2 semaines.

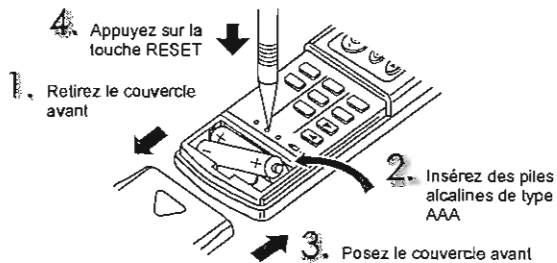
A propos de l'installation

 AVERTISSEMENT	
	<p>Consulter un revendeur agréé pour qu'il procède à l'installation du climatiseur.</p> <ul style="list-style-type: none"> • L'utilisateur ne doit en aucun cas tenter d'installer le climatiseur lui-même ; seul du personnel qualifié et compétent est en mesure de le faire. Toute installation incorrecte du climatiseur pourrait être à l'origine de fuites d'eau et provoquer un risque d'incendie ou d'électrocution.
	<p>Prévoir un circuit réservé à l'alimentation du climatiseur.</p> <ul style="list-style-type: none"> • Dans le cas contraire, un risque de surchauffe ou d'incendie n'est pas à exclure.
	<p>Ne pas installer l'appareil dans un endroit susceptible d'être exposé à des fuites de gaz inflammable.</p> <ul style="list-style-type: none"> • L'accumulation de gaz autour de l'appareil entraîne des risques d'explosion.
	<p>Raccorder correctement le climatiseur à la terre.</p> <ul style="list-style-type: none"> • Ne jamais raccorder le câble de terre à un tuyau de gaz, une évacuation d'eau, un paratonnerre ou un câble téléphonique de mise à la terre. Une mise à la terre incorrecte pourrait provoquer un risque d'électrocution.
 PRECAUTION	
	<p>Installer un disjoncteur de fuites à la terre selon l'endroit où le climatiseur sera monté (pièce humide par ex.).</p> <ul style="list-style-type: none"> • L'absence de disjoncteur de fuites à la terre peut entraîner un risque d'électrocution.
	<p>Veiller à ce que l'eau de vidange s'écoule correctement.</p> <ul style="list-style-type: none"> • Si l'écoulement des condensats est bouché, l'eau de vidange risque de s'écouler de l'unité interne/externe et d'endommager le mobilier.
<p>En présence d'une situation anormale Arrêter immédiatement le climatiseur et consulter un revendeur agréé.</p>	

PREPARATIF D'UTILISATION

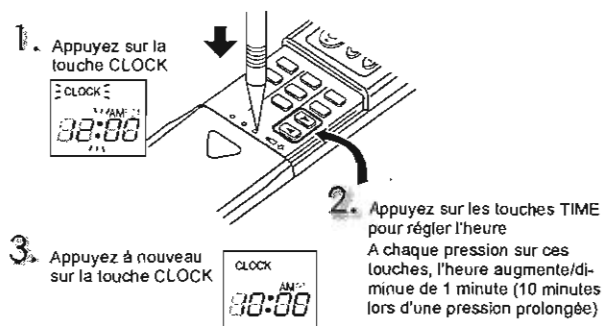
Avant la mise en marche : insérez la fiche d'alimentation électrique dans la prise secteur et/ou endenchez le disjoncteur.

Insertion des piles dans la télécommande



- Veillez à respecter la polarité des piles.
- N'utilisez pas de piles au manganèse. Elles pourraient provoquer un dysfonctionnement de la télécommande.
- N'utilisez pas de piles rechargeables.
- Remplacez toutes les piles par des piles de même type.
- La durée de vie des piles est de 1 an environ. Cependant, les piles dont la date d'utilisation est dépassée durent moins longtemps.
- Appuyez doucement sur RESET à l'aide d'un instrument fin. Si la touche RESET n'est pas enfoncée, la télécommande risque de ne pas fonctionner correctement.

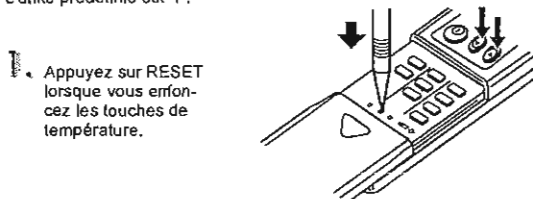
Réglage de l'heure



- Appuyez doucement sur CLOCK à l'aide d'un instrument fin.

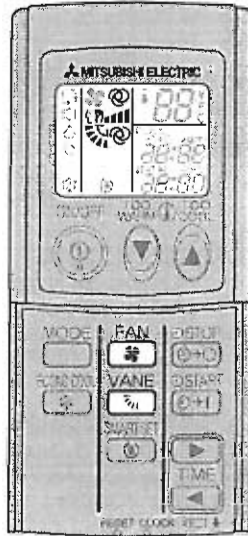
Changement des unités de température (°F → °C)

L'unité prédéfinie est °F.

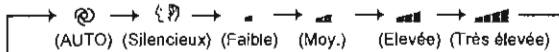


- Appuyez doucement sur RESET à l'aide d'un instrument fin.
- Pour changer l'unité de la température entre degrés Celsius (°C) et degrés Fahrenheit (°F), appuyez sur la touche RESET.

REGLAGE DE LA VITESSE DU VENTILATEUR ET DE LA DIRECTION DU FLUX D'AIR



Appuyez sur la touche **FAN** pour sélectionner la vitesse du ventilateur. Chaque nouvelle pression sur cette touche vous permet de modifier la vitesse du ventilateur dans l'ordre suivant :



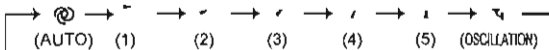
- L'unité interne émet deux bips courts lorsqu'elle est réglée en mode AUTO.
- Augmentez la vitesse du ventilateur pour refroidir/chauffer la pièce plus rapidement. Il est recommandé de réduire la vitesse du ventilateur dès que la pièce est fraîche/chaude.
- Diminuez la vitesse du ventilateur pour un fonctionnement silencieux.

Remarque :

Fonctionnement multi-système

Lorsque plusieurs unités internes fonctionnent simultanément en mode de chauffage, il se peut que la température du flux d'air soit basse. Dans ce cas, il est recommandé de régler la vitesse du ventilateur sur AUTO.

Appuyez sur la touche **VANE** pour sélectionner la direction du flux d'air. Chaque nouvelle pression sur cette touche vous permet de modifier la direction du flux d'air dans l'ordre suivant :



- L'unité interne émet deux bips courts lorsqu'elle est réglée en mode AUTO.

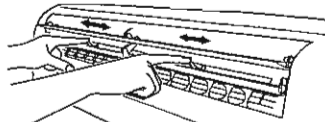
Direction du flux d'air

(AUTO)..... L'ailette est réglée pour fournir la direction de flux d'air la plus efficace. REFROIDISSEMENT/DESHUMIDIFICATION : position horizontale. CHAUFFAGE : position (5).

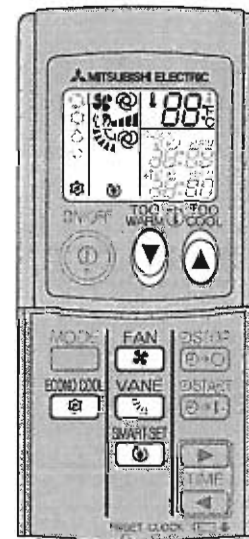
(Manuel)..... Pour obtenir une climatisation efficace, l'ailette doit être dirigée vers le haut en mode de REFROIDISSEMENT/DESHUMIDIFICATION, et vers le bas en mode de CHAUFFAGE. Si la position (4) ou (5), est sélectionnée en mode de REFROIDISSEMENT/DESHUMIDIFICATION, l'ailette se place automatiquement en position horizontale au bout de 0,5 à 1 heure pour éviter la formation de gouttes de condensation.

(Oscillation)..... L'ailette se déplace de haut en bas par intermittence.

- Pour modifier la direction horizontale du flux d'air. Déplacez manuellement l'ailette verticale avant de faire fonctionner le climatiseur.



MODE SMART SET (REGLAGE INTELLIGENT)



1 Appuyez sur **SMART SET** en mode REFROIDISSEMENT, ECONO COOL ou CHAUFFAGE pour sélectionner le mode SMART SET (REGLAGE INTELLIGENT).

2 Réglez la température, la vitesse du ventilateur et la direction du flux d'air.

- Pour sélectionner les mêmes réglages par la suite, il vous suffira d'appuyer sur **SMART SET**.
- Il est possible d'enregistrer deux groupes de réglages. (Un pour REFROIDISSEMENT/ECONO COOL, un pour CHAUFFAGE)
- Sélectionnez la température, la vitesse du ventilateur et la direction du flux d'air appropriées pour votre local.
- Normalement, le réglage de température minimum en mode CHAUFFAGE est de 59°F (16°C). Cependant, en mode SMART SET (REGLAGE INTELLIGENT) seul, le réglage de température minimum est de 50°F (10°C).

Appuyez une nouvelle fois sur **SMART SET** pour annuler le mode SMART SET (REGLAGE INTELLIGENT).

- Une pression sur la touche MODE permet également d'annuler le mode SMART SET (REGLAGE INTELLIGENT).

MODE SMART SET (REGLAGE INTELLIGENT)

Une fonction programmable simplifiée permet de rappeler le réglage favori (préprogrammé) à l'aide d'une simple pression sur la touche **SMART SET**. Une seconde pression sur la touche permet de revenir instantanément au réglage précédent.

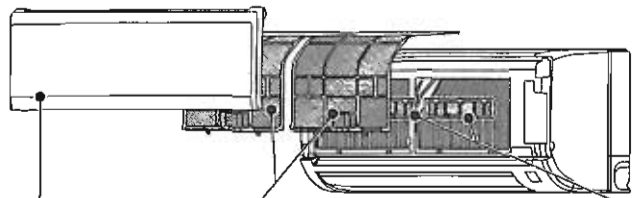
Exemple d'utilisation:

1. Mode économis d'énergie
Réglez la température à 4°F (2°C) ou 6°F (3°C) de plus en mode REFROIDISSEMENT, et de moins en mode CHAUFFAGE. Ce réglage convient pour les pièces inoccupées ou pendant la nuit.
2. Enregistrement des paramètres fréquemment utilisés
Enregistrez vos réglages favoris pour les modes REFROIDISSEMENT/ECONO COOL et CHAUFFAGE. Il vous suffira ensuite d'une simple pression sur la touche pour rappeler votre réglage favori.

NETTOYAGE

Instructions :

- Coupez l'alimentation ou le disjoncteur avant de procéder au nettoyage du climatiseur.
- Veillez à ne pas toucher les parties métalliques avec les mains.
- N'utilisez ni benzine, ni diluant, ni poudre abrasive, ni insecticide.
- Utilisez uniquement un détergent doux dilué avec de l'eau.
- N'exposez pas les pièces aux rayons directs du soleil, à la chaleur ou à une flamme pour les faire sécher.
- N'utilisez pas d'eau dont la température est supérieure à 120°F (50°C).



Filtre à air (filtre à air catéchine)

- **A nettoyer toutes les 2 semaines**
- Éliminez la saleté avec un aspirateur ou lavez le filtre à l'eau.
- Après lavage, laissez bien sécher à l'ombre.

Qu'est-ce qu'un "filtre à air catéchine" ?

La catéchine est un bioflavonoïde que l'on trouve dans le thé vert et dont les propriétés sont à la fois antivirales et antioxydantes. En plus de ces qualités, la catéchine possède également d'excellentes propriétés désodorisantes. Les filtres à air qui utilisent cette substance permettent non seulement d'améliorer la qualité de l'air mais également d'éviter la prolifération des bactéries et des virus dans la pièce.

Filtre d'épuration d'air (filtre antiallergique à enzymes)

Envers du filtre à air

Tous les 3 mois :

- Enlever la saleté à l'aide d'un aspirateur.

Lorsque cela ne suffit pas :

- Faites tremper le filtre et son cadre dans de l'eau tiède avant de les nettoyer.
- Lorsqu'ils sont propres, faites-les sécher correctement à l'ombre.

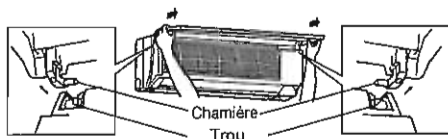
Tous les ans :

- Pour des performances optimales, remplacer le filtre d'épuration d'air.
- Référence **MAC-408FT-E**



Tirez sur le panneau frontal pour le retirer du filtre à air.

Panneau frontal



1. Soulevez le panneau frontal jusqu'à ce que vous entendiez un déclic.
2. Maintenez les charnières et tirez sur le panneau pour le retirer comme indiqué sur l'illustration ci-dessus.
 - Essuyez-le avec un chiffon doux et sec ou lavez-le à l'eau.
 - Ne le faites pas tremper dans l'eau pendant plus de deux heures.
 - Faites-le sécher correctement à l'ombre.
3. Reposez le panneau en suivant la procédure de dépose en sens inverse. Refermez correctement le panneau frontal et appuyez sur les repères indiqués par les flèches.



Important


- **Nettoyez régulièrement les filtres pour obtenir des performances optimales et réduire votre consommation d'électricité.**
- **Des filtres encrassés peuvent provoquer de la condensation dans le climatiseur, ce qui contribuera à la croissance de certains champignons tels que la moisissure. Il est donc recommandé de nettoyer les filtres à air toutes les 2 semaines.**

SI LE CLIMATISEUR DOIT RESTER LONGTEMPS INUTILISÉ

- 1 Sélectionnez manuellement le mode de REFROIDISSEMENT et réglez la température la plus élevée ; faites fonctionner le climatiseur entre 3 et 4 heures.

Page 5

- Cette opération permet de sécher l'intérieur du climatiseur.
- La présence d'humidité dans la climatisation contribue à créer un terrain favorable à la croissance de certains champignons tels que la moisissure.

- 2 Appuyez sur  pour arrêter le fonctionnement du climatiseur.

- 3 Débranchez la fiche d'alimentation électrique et/ou coupez le disjoncteur.

- 4 Retirez toutes les piles de la télécommande.

Lorsque le climatiseur doit être remis en service :

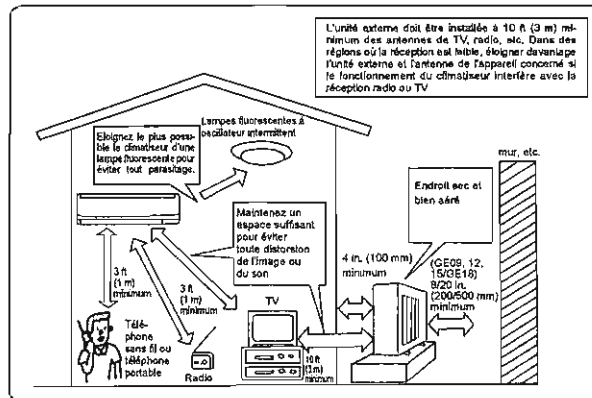
- 1 Nettoyez le filtre à air. **Page 8**
- 2 Veillez à ce que l'entrée et la sortie d'air des unités interne et externe ne soient pas obstruées.
- 3 Veillez à raccorder correctement le câble de mise à la terre.
- 4 Reportez-vous à la section "PRÉPARATIF D'UTILISATION" et suivez les instructions. **Page 4**

LIEU D'INSTALLATION ET TRAVAUX ÉLECTRIQUES

Lieu d'installation

Évitez d'installer le climatiseur dans les endroits suivants.

- En présence d'une grande quantité d'huile de machine.
- Dans les régions où l'air est très salin, comme en bord de mer.
- En présence de gaz sulfurique, comme dans les stations thermales.
- Dans des endroits exposés à des projections d'huile ou dont l'atmosphère est chargée d'huile.
- En présence d'équipements haute fréquence ou sans fil.
- Dans un endroit où la sortie d'air de l'unité externe est susceptible d'être obstruée.
- Dans un endroit où le bruit de fonctionnement ou la pulsation d'air chaud risquent de représenter une nuisance pour le voisinage.



Travaux électriques

- Veuillez prévoir un circuit réservé à l'alimentation du climatiseur.
- Veuillez respecter la puissance électrique du disjoncteur.

Dans le doute, veuillez consulter votre revendeur.

FICHE TECHNIQUE

Gamme opérationnelle garantie

		Interne	Externe
Refroidissement	Limite supérieure	90°F (32,2°C) DB 73°F (22,8°C) WB	115°F (46,1°C) DB —
	Limite inférieure	67°F (19,4°C) DB 57°F (13,9°C) WB	14°F (-10°C) DB —
Chauffage	Limite supérieure	80°F (26,7°C) DB —	75°F (23,9°C) WB 65°F (18,3°C) WB
	Limite inférieure	70°F (21,1°C) DB —	-4°F (-20°C) WB -5°F (-21,1°C) WB

DB : Bulbe sec
WB : Bulbe humide

Remarque :

Si la température extérieure est en-dessous de la limite inférieure de la gamme opérationnelle garantie, il se peut que l'unité externe s'arrête jusqu'à ce que la température extérieure dépasse la limite inférieure.

Revised July 2009



Mitsubishi Electric Mr. Slim® Split Air-conditioner and Heat-pump Systems LIMITED WARRANTY

MEUS warrants as follows to the original owner of this Mr. Slim product that, if purchased from and installed by a contractor licensed for HVAC installation under applicable local and state laws within the continental United States, Alaska and Hawaii, should it prove defective by reason of defects arising from improper workmanship and/or material:

A. FIVE YEAR ON PARTS. The parts are warranted for a period of five (5) years to the original end-user of this System. If it should prove defective due to improper workmanship and/or material for a period of five (5) years from the date of installation, MEUS will replace any defective part without charge for the part. Replacement parts are warranted for the remainder of the original 5-year warranty period. Parts used for replacement may be of like kind and quality and may be new or remanufactured. Defective parts must be made available to MEUS in exchange for the replacement part and become the property of MEUS.

B. ADDITIONAL TWO-YEAR COMPRESSOR WARRANTY. The compressor is warranted for a total period of seven (7) years to the original end-user of this System. If it should prove defective due to improper workmanship and/or material for a period of seven (7) years from the date of installation, MEUS will replace any defective compressor without charge for the compressor. Replacement compressors are warranted for the remainder of this warranty period. Compressors used for replacement may be of like kind and quality and may be new or remanufactured. Defective compressors must be made available to MEUS in exchange for the replacement compressor and become the property of MEUS.

C. NO LABOR. THESE LIMITED WARRANTIES DO NOT INCLUDE LABOR or any other costs incurred for service, maintenance, repair, removing, replacing, installing, complying with local building and electric codes, shipping or handling, or replacement of the System, compressors or any other parts. For items that are designed to be maintained or replaced by the owner, the owner is solely responsible for all labor and other costs of maintaining, installing, replacing, disconnecting or dismantling the System and parts (such as filters or belts) in connection with owner-required maintenance. Air filter cleaning and/or replacement for each applicable indoor unit are owner-required maintenance, and labor for this procedure is not covered under warranty. Please consult the applicable technical documentation for air filter cleaning and other maintenance procedures.

D. Proper Installation. This Limited Warranty applies only to Systems that are installed by contractors who are licensed for HVAC installation under applicable local and state law, and who install the Systems in accordance with (i) all applicable building codes and permits; (ii) MEUS's installation and operation instructions; and (iii) good trade practices.

BEFORE REQUESTING SERVICE, please review the applicable technical documentation to insure proper installation and correct customer control adjustment for the System. If the problem persists, please arrange for warranty service.

1. TO OBTAIN WARRANTY PARTS SERVICE:

(a) Contact the licensed contractor who installed the System or the nearest licensed contractor, dealer or distributor (whose name and address may be obtained on our website at www.mehvac.com) of any defect within the applicable warranty time period.

(b) Proof of the installation date by a licensed contractor is required when requesting warranty service. Present the sales receipt, building permit or other document which establishes proof and date of installation. Otherwise, this Limited Warranty shall be deemed to begin one hundred twenty (120) days after the date of manufacture stamped on the System. **THE RETURN OF THE OWNER REGISTRATION CARD IS NOT A CONDITION OF COVERAGE UNDER THIS LIMITED WARRANTY.** However, please return the Owner Registration Card so that MEUS can contact you if a question of safety arises.

(c) This Limited Warranty applies only while the System remains at the site of the original installation and only to locations within the continental United States, Alaska and Hawaii.

2. THIS LIMITED WARRANTY DOES NOT COVER: property damages, malfunction or failure of the System, or personal injury caused by or resulting from: (a) accident, abuse, negligence or misuse; (b) operating the System in a corrosive or wet environment containing chlorine, fluorine or any other hazardous chemicals; (c) installation, alteration, repair or service by anyone other than a licensed contractor or other than pursuant to the manufacturer's instructions; (d) improper matching of System components; (e) improper sizing of the System; (f) improper or deferred maintenance contrary to the manufacturer's instructions; (g) physical abuse to or misuse of the System (including failure to perform any maintenance as described in the Operation Manual such as air filter cleaning, or any System damaged by excessive physical or electrical stress); (h) Systems that have had a serial number or any part thereof altered, defaced or removed; (i) System used in any manner contrary to the

Revised July 2009

Operation Manual; (j) freight damage; or (k) damage caused by force majeure or other factors such as power surge damage caused by lightning and fluctuations in or interruptions of electrical power.

3. **THIS LIMITED WARRANTY ALSO EXCLUDES:** (a) SERVICE CALLS WHERE NO DEFECT IN THE SYSTEM COVERED UNDER THIS WARRANTY IS FOUND; (b) System installation or set-ups; (c) adjustments of user controls; or (d) Systems purchased or installed outside the continental United States, Alaska and Hawaii. Consult the operating instructions for information regarding user controls.

4. This Limited Warranty shall not be enlarged, extended or affected by, and no obligation or liability shall arise or grow out of, MEUS providing, directly or indirectly, any technical advice, information and/or service to Owner in connection with the System.

5. **EXCEPT AS OTHERWISE PROVIDED IN THIS LIMITED WARRANTY, MEUS MAKES NO OTHER WARRANTIES OF ANY KIND WHATSOEVER REGARDING THE SYSTEM. MEUS DISCLAIMS AND EXCLUDES ALL WARRANTIES NOT EXPRESSLY PROVIDED HEREIN AND ALL REMEDIES WHICH, BUT FOR THIS PROVISION, MIGHT ARISE BY IMPLICATION OR OPERATION OF LAW, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND OF FITNESS FOR ANY PARTICULAR PURPOSE. NO ONE IS AUTHORIZED TO CHANGE THIS LIMITED WARRANTY IN ANY RESPECT OR TO CREATE ANY OTHER OBLIGATION OR LIABILITY FOR MEUS IN CONNECTION WITH THE SYSTEM. MEUS DISCLAIMS ALL LIABILITY FOR THE ACTS, OMISSIONS AND CONDUCT OF ALL THIRD PARTIES (including, without limitation, the installing contractor) IN CONNECTION WITH OR RELATED TO THE SYSTEM.**

6. **UNDER NO CIRCUMSTANCES SHALL MEUS BE LIABLE FOR ANY INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES INCLUDING, WITHOUT LIMITATION, LOST GOODWILL, LOST REVENUES OR PROFITS, WORK STOPPAGE, SYSTEM FAILURE, IMPAIRMENT OF OTHER GOODS, COSTS OF REMOVAL AND REINSTALLATION OF THE SYSTEM, LOSS OF USE, INJURY TO PERSONS OR PROPERTY ARISING OUT OR RELATED TO THE SYSTEM WHETHER BASED ON BREACH OF WARRANTY, BREACH OF CONTRACT, TORT OR OTHERWISE, EVEN IF MEUS HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGE. IN NO EVENT SHALL MEUS'S LIABILITY EXCEED THE ACTUAL PURCHASE PRICE OF THE SYSTEM WITH RESPECT TO WHICH ANY CLAIM IS MADE.**

7. Some states do not allow limitations on warranties or exclusions or limitation of damages, so the above limitations or exclusions may not apply.

8. This Limited Warranty gives the owner specific legal rights and the owner may also have other rights that vary from state to state.

9. This Limited Warranty is valid only in the continental United States, Alaska and Hawaii, and it is not transferable.

MITSUBISHI ELECTRIC & ELECTRONICS USA, INC.
HVAC Advanced Products Division
3400 Lawrenceville-Suwanee Road
Suwanee, GA 30024-9928

Revised July 2009



Steel Manual Damper

MBD-15
Spec. 15820

Supplied by:

CFM
1440 So. Lipan St.
Denver, CO 80223
(970) 493-7293

FIELD INSTALLATION INSTRUCTIONS

Kit Part Number

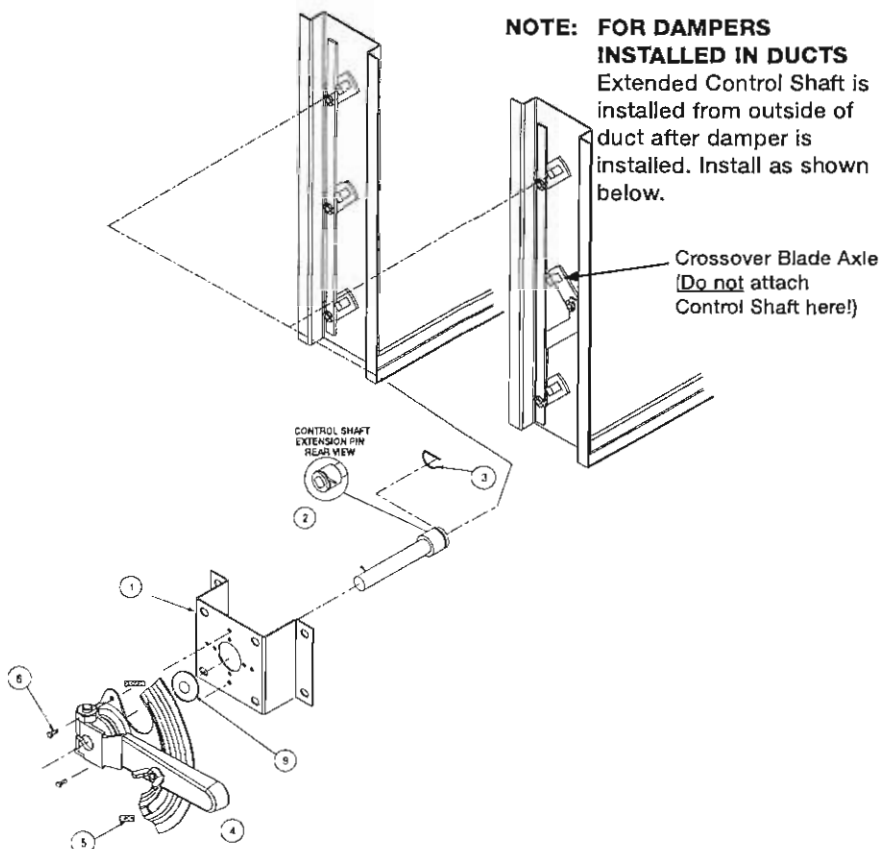
1/2 in. Extension Pin Kit & Manual Quadrant Kit	Part #828599
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TOOLS REQUIRED:

- 5/16 in. Hex Nut Driver
- 3/8 in. Electric Drill
- 1/2 in. Open End Wrench

1/2 in. Extension Pin Kit Part Numbers

No.	Qty.	Description
1	1	Stand off bracket Part #651812
2	1	Extension pin Part #463676
3	1	Retaining clip Part #451738
4	1	1/2 in. (13mm) manual quadrant Part #455648
5	1	Open and close labels
6	2	Tek screws
9	1	Washer Part #416338)



Before Installing Damper in the Duct

1. If damper has more than one blade, determine which blade axle will be driven by the extended control shaft. Always attach extended control shaft to a blade axle which is directly connected to the main linkage tiebar. DO NOT attach extended control shaft to a crossover blade axle.
2. Cut hole approximately 1 in. in diameter in the duct where damper drive blade axle will be located. Hole must provide clearance for enlarged portion of extended control shaft.

After Damper Is Installed in Duct

1. Push extended control shaft through hole in the duct and onto drive blade axle. Retainer clip should "click" into groove on drive blade axle and hold shaft into place. Standard Control Shaft location is the third blade from the bottom on dampers with three or more blades. Control Shaft location is the first blade from the bottom on dampers with one or two blades.
2. Install the stand off bracket with washer over the extended control shaft and screw bracket to duct. Make sure screws do not interfere with damper linkage or blade movement. Assemble Manual Quadrant to extension bracket assembly (screws provided).
3. With damper either fully open or closed, lock manual quadrant to extended control shaft so manual quadrant can move damper between open and closed. Note: Tighten down bolt on manual quadrant to 250 in. lb. of torque. Apply "OPEN" and "CLOSED" labels if damper movement is opposite to that engraved in the manual quadrant.
4. Set damper to desired position and tighten wing nut on manual quadrant to hold damper in place.

Caution

Stand off bracket with washer is needed to support the extended control shaft. If not installed as directed, the extended control shaft may not operate the damper correctly.

Warranty

Greenheck warrants this equipment to be free from defects in material and workmanship for a period of three years from the shipment date. Any units or parts which prove defective during the warranty period will be replaced at our option when returned to our factory, transportation prepaid. Motors are warranted by the motor manufacturer for a period of one year. Should motors furnished by Greenheck prove defective during this period, they should be returned to the nearest authorized motor service station. Greenheck will not be responsible for any removal or installation costs. All light bulbs are excluded under this limited warranty.

As a result of our commitment to continuous improvement, Greenheck reserves the right to change specifications without notice.

Greenheck Catalog SP/CSP provides additional information describing the equipment, fan performance, available accessories, and specification data.

AMCA Publication 410-98, Safety Practices for Users and Installers of Industrial and Commercial Fans, provides additional safety information. This publication can be obtained from AMCA International, Inc. at www.amca.org.



Phone: (715) 359-6171 • Fax: (715) 355-2399 • E-mail: gfoinfo@greenheck.com • Website: www.greenheck.com



Louver

**LVR-1
Spec. 15800**

Supplied by:

**CFM
1440 So. Lipan St.
Denver, CO 80223
(970) 493-7293**

Warranty

Greenheck warrants this equipment to be free from defects in material and workmanship for a period of three years from the shipment date. Any units or parts which prove defective during the warranty period will be replaced at our option when returned to our factory, transportation prepaid. Motors are warranted by the motor manufacturer for a period of one year. Should motors furnished by Greenheck prove defective during this period, they should be returned to the nearest authorized motor service station. Greenheck will not be responsible for any removal or installation costs. All light bulbs are excluded under this limited warranty.

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Phone: (715) 359-6171 • Fax: (715) 355-2399 • E-mail: gfcinfo@greenheck.com • Website: www.greenheck.com



Low Leakage Damper

**No Tag
Spec. 15800**

Supplied by:

**CFM
1440 So. Lipan St.
Denver, CO 80223
(970) 493-7293**



Part #463384
VCD, FBH & FBV MODELS

Vertical and Horizontal Mount

Installation, Operation, and Maintenance Instructions

This manual is the property of the owner, and is required for future maintenance. Please leave it with the owner when the job is complete.



RECEIVING AND HANDLING

Upon receiving dampers, check for both obvious and hidden damage. If damage is found, record all necessary information on the bill of lading and file a claim with the final carrier. Check to be sure that all parts of the shipment, including accessories, are accounted for.

Dampers must be kept dry and clean. Indoor storage and protection from dirt, dust and the weather is highly recommended. Do not store at temperatures in excess of 100°F (37°C).

SAFETY WARNING:

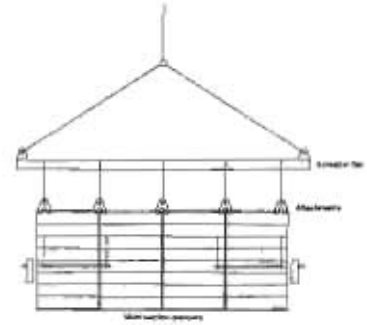
Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death. Read the installation, operating, and maintenance instructions thoroughly before installing or servicing this equipment.

Due to continuing research, Greenheck reserves the right to change specifications without notice.

Pre-Installation Guidelines

The basic intent of a proper installation is to secure the volume control damper into the opening in such a manner as to prevent distortion and disruption of damper operation. The following items will aid in completing the damper installation in a timely and effective manner.

- 1) Check the schedules for proper damper locations within the building. Visually inspect the damper for damage.
- 2) Lift or handle damper using sleeve or frame. Do not lift damper using blades, linkage, actuators, or jackshafting. When handling multiple sections assemblies, use sufficient support to evenly lift at each section mullion (see drawing). Do not drag, step on, apply excessive bending, twisting, or racking.
- 3) Do not install screws in damper frame that will interfere with unexposed blade linkage and prevent damper blades from opening and/or closing.
- 4) Damper must be installed into duct or opening square and free of twist or other misalignment. Damper must not be squeezed or stretched into duct or opening. Out of square, racked, twisted or misaligned installations can cause excessive leakage and/or torque requirements to exceed damper/actuator design.
- 5) Damper and actuator must be kept clean, dry and protected from dirt, dust and other foreign materials prior to and after installation. Examples of such foreign materials include but are not limited to:
 - a) Mortar dust
 - b) Drywall dust
 - c) Firesafing materials
 - d) Wall texture
 - e) Paint overspray
- 6) Damper should be sufficiently covered as to prevent overspray if wall texturing or spray painting will be performed within 5 feet (1.50m) of the damper. Excessive dirt or foreign material deposits on damper can cause excessive leakage and/or torque requirements to exceed damper/actuator design.
- 7) ACCESS: Suitable access (actuators maintenance, etc.) must be provided for damper inspection and servicing. Where it is not possible to achieve sufficient size access, it will be necessary to install a removable section of duct.



Electrical Guidelines

Electrical and/or pneumatic connections to damper actuators should be made in accordance with wiring and piping diagrams developed in compliance with applicable codes, ordinances and regulations.

SAFETY CAUTION !

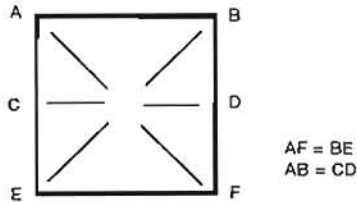
Verify power requirements before wiring actuator. Greenheck is not responsible for any damage to, or failure of the unit caused by incorrect field wiring.

SAFETY DANGER !

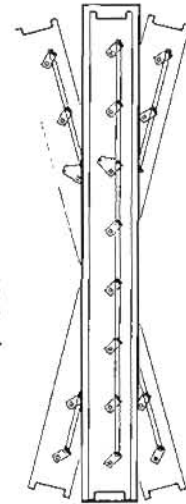
Electrical input may be needed for this equipment. This work should be performed by a qualified electrician.

Installation - Failure to follow instructions will void all warranties

1. Duct opening or opening square should measure ¼ inch (6mm) larger than damper dimension and should be straight and level.



Do not twist or bow. Mount damper plumb in the opening.



2. If more than two sections wide, unit ships as a multiple section assembly and a single section together. The single section is joined to the side of the multiple section where the jackshaft extends past the frame 4 inches (see Figure 1 & 2).
3. A damper assembly is not restricted to a maximum number of sections, but must not exceed the section sizes and overall sizes shown at the right.
4. The damper sections must be attached together with #10 x ¾ in. (19mm) max. sheet metal screws, ¼ in. (6mm) diameter nuts and bolts, tack or spot welds, or 3/16 in. (4mm) diameter steel pop rivets. Attachments must be spaced a maximum of 6 in. (152mm) on centers and a maximum of 2 in. (50mm) from corners. Attachments must be made on front face and back face (air entering and air exiting side) of damper sections.
5. Two section high dampers require reinforcement using a 14 gauge (2mm), 5 in. (127mm) wide mullion or two individually sleeved units stacked vertically. When using two individually sleeved units, the sleeve acts as the mullion, therefore no mullion is required (Mullions are not provided by Greenheck).

Damper Model	Maximum Single Section Size W x H in. (mm)	Maximum Overall Size for Multi-Section Dampers
VCD-15, VCD-18	48 x 60 (1219 x 1524)	84 in. W x 60 in. H (2133mm x 1524mm)
VCD-20, VCD-23	48 x 74 (1219 x 1880)	Unlimited
VCD-33, VCD-34, VCD-40, VCD-42, VCD-43	60 x 74 (1524 x 1880)	Unlimited
VCD-20V, VCD-23V	74 x 48 (1879 x 1219)	NA
VCD-33V, VCD-42V, VCD-43V	74 x 60 (1879 x 1524)	NA
FBH-43	Face: 60 x 74 (1524 x 1880) Bypass: 60 x 74 (1524 x 1880)	Face: 96 x 74 (2438 x 1880)
FBV-43	Face: 60 x 74 (1524 x 1880) Bypass: 60 x 74 (1524 x 1880)	Face: 96 x 74 (2438 x 1880) Bypass: 96 x 74 (2438 x 1880)

Installation (continued)

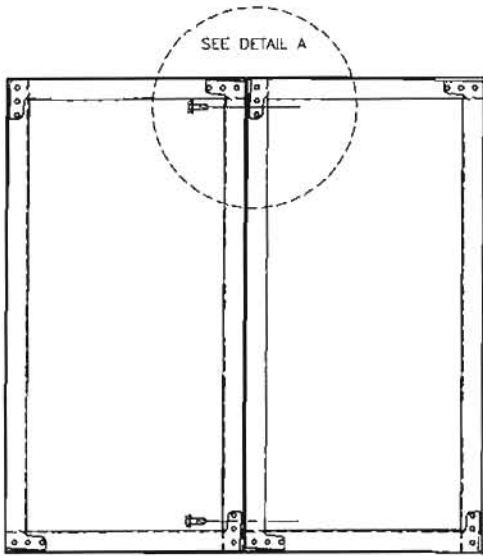


Figure 1

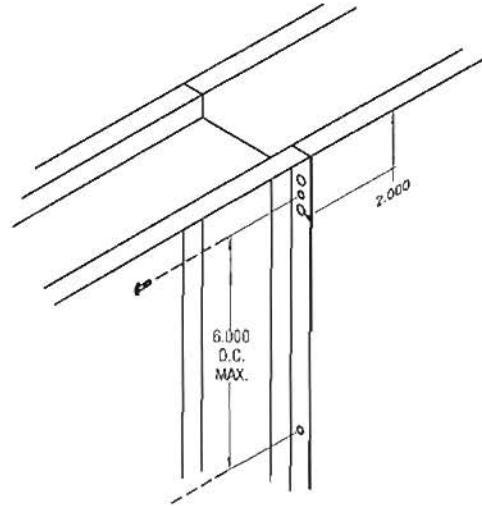


Figure 2

6. When the height of a Face & Bypass vertical style (FBV) is greater than 84 in. (2134mm), the damper sections are shipped separate and field assembly is required. Before fastening damper sections together, the non-actuated damper section will need to be flipped upside down so that the linkage is on the same side as the actuated damper. After damper sections are fastened together, attach interconnecting angle as shown in **Figure 3**. (Interconnecting angle is shipped with actuated damper section.)

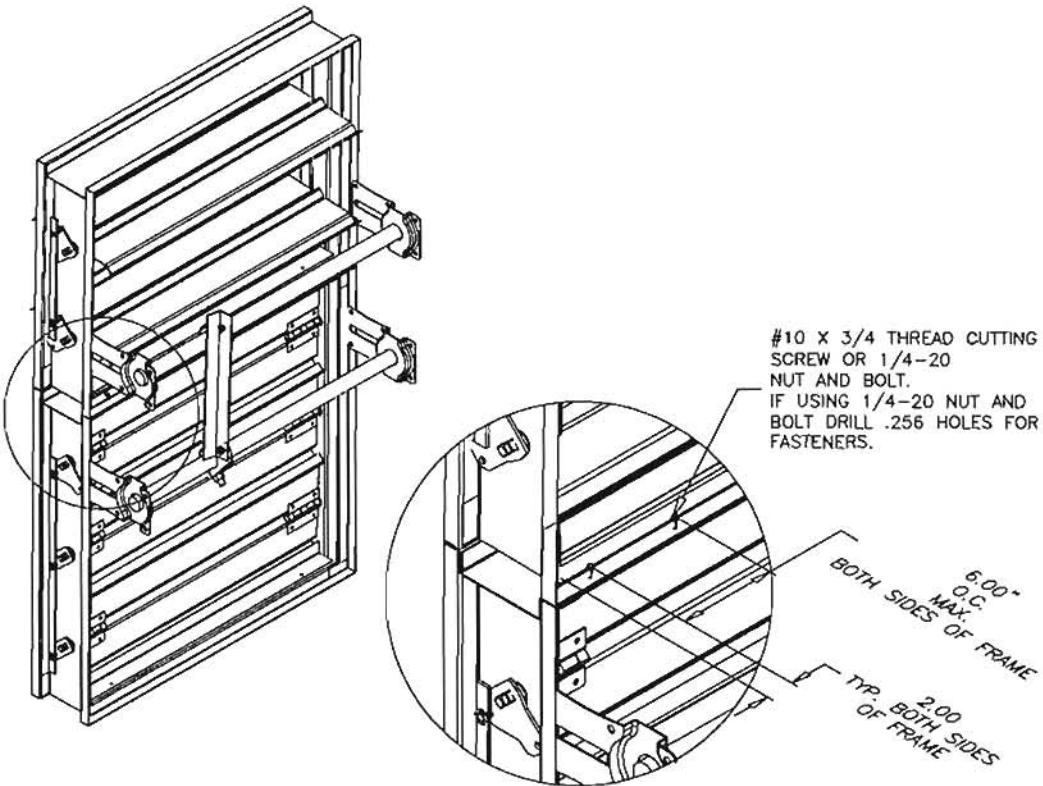


Figure 3

Installation (continued)

7. If no holes are present in frame, drill ¼ inch (6mm) diameter holes at 6 inch (52mm) centers and fasten frames together with ¼ inch (6mm) #20 (.03mm) bolts and nuts (see Figure 1 & 2).
8. Use shims between damper frame and duct opening or opening space to prevent distortion of frame by fasteners holding it in place. Brace at every horizontal mullion and vertically brace at every 8 feet (2.4m) of damper width for strength. Dampers in high velocity (2000 fpm [610m per second]) may require more bracing. Note: Greenheck dampers are specifically designed and engineered for structural integrity based on model and conditions. Attachment, framing, mating flanges, and anchoring of damper assemblies into openings, ductwork, or walls is the responsibility of the installer. Design calculations for these retaining and supporting members should be determined by field engineers for that particular installation.
9. If damper actuator is to be mounted out of the airstream, the extension pin should extend approximately 6 inches (152mm) beyond the frame. On jackshafted units, the jackshaft should extend through the jackshaft bearing assembly and approximately, 6 inches (152mm) beyond the frame.
10. Individual damper sections, as well as entire multiple section assemblies must be completely square and free from racking, twisting, or bending. Measure diagonally from upper corners to opposite lower corners of each section.
11. Damper blades, axles, and linkage must operate without binding. Before system operation, cycle dampers after installation to assure proper operation. On multiple section assemblies, all sections should open and close simultaneously.

Note: When you have a vertical damper installation, blades must be horizontal. When blades need to be vertical, you need a vertical blade damper (example: VCD-23V). These dampers are built so they don't crush the jamb seal.

Damper Maintenance

Greenheck's dampers are designed to be trouble free and hassle free under normal operation. Dampers are to be installed square and straight so as to prevent binding during operation. The following annual damper maintenance suggestions will help to insure proper damper operation and increase the life expectancy of the damper.

Foreign Matter	Over the course of time, dirt and grime may collect on damper surfaces. The damper surfaces should be cleaned to prevent hindrance to airflow.
Moving Parts	Make sure that parts such as linkage, bearings, blades, etc. that are intended to move freely, can do so. Lubricating these components can prevent possible rusting and unnecessary friction increase. Use only a moli-spray oil or similar graphite based oil as regular lubricating oil will attract dirt. <i>Bearings.</i> Synthetic, oil impregnated, and ball bearings (without grease fittings) do not require lubrication. Ball bearings with grease fittings require only minimal grease.
Closure	Remove foreign materials that may be interfering with blade closure or effective sealing of the blades with each other or with the frame.
Operation	While operating the damper through its full cycle, check to see that the blades open and close properly. If there is a problem, check for loose linkage, especially at the actuator. Tighten the linkage where required.

Damper Trouble Shooting

The following is a cause and correction list for common concerns with the dampers.

Symptom	Possible Cause	Corrective Action
Damper does not fully open and/or fully close	Frame is 'racked' causing blades to bind on jamb seals	Adjust frame such that it is square and plumb
	Actuator linkage loose	Close damper, disconnect power, adjust and tighten linkage
	Defective motor	Replace
	Screws in damper linkage	Locate screws and remove
	Actuator linkage hitting wall or floor	Damper installed too far into wall. Move out to line designated on damper label
	Contaminants on damper	Clean with a non oil-based solvent (see Damper Maintenance)
Actuator runs hot or makes a humming noise	Actuator type is MP-3754 or MP-3756 (stall type actuator)	None required since this normal for stall type actuators
	Actuator prohibited from reaching end of stroke	Disconnect linkage from jackshaft, open damper, power actuator to end of spring, tighten linkage. Verify amp draw.

WARRANTY

Greenheck warrants this equipment to be free from defects in material and workmanship for a period of one year from the shipping date. Any units or parts which prove to be defective during the warranty period will be repaired or replaced at our option. Greenheck shall not be liable for damages resulting from misapplication or misuse of its products. Greenheck will not be responsible for any installation or removal costs. Greenheck will not be responsible for any service work or backcharges without prior written authorization.



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463384 VCD IOM Rev. 8 February 2012

P.O. Box 410 • Escanaba, WI 54476-0410 • 715.359.6171 • greenheck.com



Split System

**DSFC-1
Spec. 15800**

Supplied by:

**Trane
445 Bryant Street, Unit 5
Denver, CO 80204
(303) 228-2855**

Model names are indicated in 1-3.
When installing multi units, refer to
the installation manual of the multi
unit for outdoor unit installation.

Required Tools for Installation

Phillips screwdriver	5/32 in. (4 mm) hexagonal wrench
Level	Flare tool for R410A
Scale	Gauge manifold for R410A
Utility knife or scissors	Vacuum pump for R410A
2-9/16 in. (65 mm) hole saw	Charge hose for R410A
Torque wrench	Pipe outer with reamer
Wrench (or spanner)	

1. BEFORE INSTALLATION

1-1. THE FOLLOWING SHOULD ALWAYS BE OBSERVED FOR SAFETY

- Be sure to read "THE FOLLOWING SHOULD ALWAYS BE OBSERVED FOR SAFETY" before installing the air conditioner.
- Be sure to observe the warnings and cautions specified here as they include important items related to safety.
- After reading this manual, be sure to keep it together with the OPERATING INSTRUCTIONS for future reference.
- Please report to your supply authority or obtain their consent before connecting this equipment to the power supply system.

⚠ WARNING (Could lead to death, serious injury, etc.)

- Do not install the unit by yourself (user).
Incomplete installation could cause fire or electric shock, injury due to the unit falling, or leakage of water. Consult the dealer from whom you purchased the unit or a qualified installer.
- Perform the installation securely referring to the Installation manual.
Incomplete installation could cause fire or electric shock, injury due to the unit falling, or leakage of water.
- Install the unit securely in a place which can bear the weight of the unit.
If the installation location cannot bear the weight of the unit, the unit could fall causing injury.
- Perform electrical work according to the installation manual and be sure to use an exclusive circuit. Do not connect other electrical appliances to the circuit.
If the capacity of the power circuit is insufficient or there is incomplete electrical work, it could result in a fire or an electric shock.
- Ground the unit correctly.
Do not connect the ground to a gas pipe, water pipe, lightning rod or telephone ground. Defective grounding could cause electric shock.
- Do not damage the wires by applying excessive pressure with parts or screws.
Damaged wires could cause fire.
- Be sure to cut off the main power in case of setting up the indoor P.C. board or wiring works.
Failure to do so could cause electric shock.
- Use the specified wires to connect the indoor and outdoor units securely and attach the wires firmly to the terminal block connecting sections so the stress of the wires is not applied to the sections.
Incomplete connecting and securing could cause fire.
- Do not install the unit in a place where inflammable gas may leak.
If gas leaks and accumulates in the area around the unit, it could cause an explosion.
- Do not use intermediate connection of the power cord or the extension cord and do not connect many devices to one AC outlet.
It could cause a fire or an electric shock due to defective contact, defective insulation, exceeding the permissible current, etc.
- Be sure to use the parts provided or specified parts for the installation work.
The use of defective parts could cause an injury or leakage of water due to a fire, an electric shock, the unit falling, etc.
- When plugging the power supply plug into the outlet, make sure that there is no dust, clogging, or loose parts in both the outlet and the plug. Make sure that the power supply plug is pushed completely into the outlet.
If there is dust, clogging, or loose parts on the power supply plug or the outlet, it could cause electric shock or fire. If loose parts are found on the power supply plug, replace it.
- Attach the electrical cover to the indoor unit and the service panel to the outdoor unit securely.
If the electrical cover of the indoor unit and/or the service panel of the outdoor unit are not attached securely, it could result in a fire or an electric shock due to dust, water, etc.
- When installing or relocating the unit, make sure that no substance other than the specified refrigerant (R410A) enters the refrigerant circuit.
Any presence of foreign substance such as air can cause abnormal pressure rise or an explosion.
- Do not discharge the refrigerant into the atmosphere. If refrigerant leaks during installation, ventilate the room.
If refrigerant comes in contact with a fire, harmful gas could be generated.
- Check that the refrigerant gas does not leak after installation has been completed.
If refrigerant gas leaks indoors, and comes into contact with the flame of a fan heater, space heater, stove, etc., harmful substances will be generated.
- Use appropriate tools and piping materials for installation.
The pressure of R410A is 1.6 times more than R22. Not using appropriate tools or materials and incomplete installation could cause the pipes to burst or injury.
- When pumping down the refrigerant, stop the compressor before disconnecting the refrigerant pipes.
If the refrigerant pipes are disconnected while the compressor is running and the stop valve is open, air could be drawn in and the pressure in the refrigeration cycle could become abnormally high. This could cause the pipes to burst or injury.
- When installing the unit, securely connect the refrigerant pipes before starting the compressor.
If the compressor is started before the refrigerant pipes are connected and when the stop valve is open, air could be drawn in and the pressure in the refrigeration cycle could become abnormally high. This could cause the pipes to burst or injury.
- Fasten a flare nut with a torque wrench as specified in this manual.
If fastened too tight, a flare nut may break after a long period and cause refrigerant leakage.
- The unit shall be installed in accordance with national wiring regulations.

⚠ CAUTION (Could lead to serious injury in particular environments when operated incorrectly)

- Install a Ground Fault Interrupt (GFI) circuit breaker depending on the installation place.
If the Ground Fault Interrupt (GFI) circuit breaker is not installed, it could cause electric shock.
- Perform the drainage/piping work securely according to the installation manual.
If there is defect in the drainage/piping work, water could drop from the unit, soaking and damaging household goods.
- Do not touch the air inlet or the aluminum fins of the outdoor unit.
This could cause injury.
- Do not install the outdoor unit where small animals may live.
If small animals enter and touch the electric parts inside the unit, it could cause a malfunction, smoke emission, or fire. Also, advise user to keep the area around the unit clean.

1-2. SELECTING THE INSTALLATION LOCATION

INDOOR UNIT

- Where airflow is not blocked.
- Where cool air spreads over the entire room.
- Rigid wall without vibration.
- Where it is not exposed to direct sunshine.
- Where easily drained.
- At a distance 3 ft. (1 m) or more away from your TV and radio. Operation of the air conditioner may interfere with radio or TV reception. An amplifier may be required for the affected device.
- In a place as far away as possible from fluorescent and incandescent lights (so the infrared remote control can operate the air conditioner normally).
- Where the air filter can be removed and replaced easily.

Note:

Install indoor unit at a high position on the wall where air can distribute over the entire room.

REMOTE CONTROLLER

- Where it is easy to operate and easily visible.
- Where children cannot touch it.
- Select a position about 4 ft. (1.2 m) above the floor and check that signals from the remote controller are surely received by the indoor unit from that position ('beep' or 'beep beep' receiving tone sounds). After that, attach remote controller holder to a pillar or wall and install wireless remote controller.

Note:

In rooms where inverter type fluorescent lamps are used, the signal from the wireless remote controller may not be received.

OUTDOOR UNIT

- Where it is not exposed to strong wind.
- Where airflow is good and dustless.
- Where neighbours are not annoyed by operation sound or hot air.
- Where rigid wall or support is available to prevent the increase of operation sound or vibration.
- Where there is no risk of combustible gas leakage.
- When installing the unit at a high level, be sure to secure the unit legs.
- Where it is at least 10 ft. (3 m) away from the antenna of TV set or radio. Operation of the air conditioner may interfere with radio or TV reception in areas where reception is weak. An amplifier may be required for the affected device.
- Install the unit horizontally.
- Please install it in an area not affected by snowfall or blowing snow. In areas with heavy snow, please install a canopy, a pedestal and/or some baffle boards.

Note:

- It is advisable to make a piping loop near outdoor unit so as to reduce vibration transmitted from there.
- For increased efficiency, install the outdoor unit in a location where continuous direct sunlight or excessive water can be avoided as much as possible.

Note:

When operating the air conditioner in low outside temperature, be sure to follow the instructions described below.

- Never install the outdoor unit in a place where its air inlet/outlet side may be exposed directly to wind.
- To prevent exposure to wind, install the outdoor unit with its air inlet side facing the wall.
- To prevent exposure to wind, it is recommended to install a baffle board on the air outlet side of the outdoor unit.

Avoid the following places for installation where air conditioner trouble is liable to occur.

- Where flammable gas could leak.
- Where there is much machine oil.
- Salty places such as the seaside.
- Where sulfide gas is generated such as a hot spring.
- Where there is high-frequency or wireless equipment.

1-3. SPECIFICATIONS

1-3-1. POWER SUPPLY AND INDOOR/OUTDOOR WIRE CONNECTION

- Power should be taken from an exclusive branched circuit.
- Wiring work should be based on applicable technical standards.
- Wiring connections should be made following the diagram.
- Screws should be tightened so they will not loosen.

Connecting wires and connecting ground wire

- Use solid conductor AWG14 or stranded conductor AWG14.
- Use double insulated copper wire with 500V insulation.
- Use copper conductors only.
- Follow local electrical code.

Power supply cable and ground wire

- Use solid or stranded conductor AWG14.
- Use copper conductors only.
- Follow local electrical code.

Note:

When the indoor unit is powered from the outdoor unit, a disconnect switch needs to be installed to power supply circuit (between indoor and outdoor unit) depending on local code.

1-3-2. REFRIGERANT PIPES

- Ensure that the 2 refrigerant pipes are insulated to prevent condensation.
- Refrigerant pipe bending radius must be 4 in. (100 mm) or more.

CAUTION

Be sure to use the insulation of specified thickness. Excessive thickness may cause incorrect installation of the indoor unit and lack of thickness may cause dew dripage.

- This unit has flared connections on both indoor and outdoor sides.
- Remove the outdoor units valve cover, then connect the pipe.
- Refrigerant pipes are used to connect the indoor and outdoor units.
- Be careful not to crush or bend the pipe in pipe bending.

- Refrigerant adjustment... If pipe length exceeds 25 ft. (7m), additional refrigerant (R410A) charge is required.

(The outdoor unit is charged with refrigerant for pipe length up to 25 ft. (7 m))

Electrical specifications

MODEL	MSZ-A09/12NA	MSZ-A15/17NA MSY-A15/17NA	MS-A09WA	MS-A12WA
INDOOR UNIT				
Power supply (V, PHASE, Hz)	208/230, 1, 60		115, 1, 60	
Min. Circuit Ampacity	1.0	1.0	1.2	1.2
Fan motor (F.L.A.)	0.76		0.95	
OUTDOOR UNIT				
Power supply (V, PHASE, Hz)	208/230, 1, 60		115, 1, 60	
Max. Fuse size (time delay) (A)	15	15	15	20
Min. Circuit Ampacity	12	14	14	16
Fan motor (F.L.A.)	0.52	0.52	0.63	0.926
Compressor	(R.L.A.)	7.8	10.1	9.30
	(L.R.A.)	9.2	12	47
Control voltage	Indoor unit - Remote controller: (Wireless) Indoor unit - Outdoor unit: DC12-24V (Polar)		Indoor unit - Remote controller: (Wireless) Indoor unit - Outdoor unit: AC115V	

Pipe	Outside diameter	Minimum wall thickness	Insulation thickness	Insulation material
For liquid	1/4 (6.35)	0.0315 (0.8)	5/16 (8)	Heat resisting foam plastic 0.045 Specific gravity
For gas	MSZ-A09/12NA MS-A09WA	3/8 (9.52)	0.0315 (0.8)	
	MSZ-A15/17NA MSY-A15/17NA MS-A12WA	1/2 (12.7)	0.0315 (0.8)	

Limits	MSZ-A09/12/15/17NA MSY-A15/17NA	MS-A09/12WA
Pipe length	65ft. (20 m) max.	65ft. (20 m) max.
Height difference	40 ft. (12 m) max.	35 ft. (10 m) max.
No. of bends	10 max.	10 max.

Pipe length	Up to 25 ft. (7m)	No additional charge is required.
	Exceeding 25 ft. (7m)	Additional charge is required. (Refer to the table below.)
Refrigerant to be added	MSZ-A09/12/15/17NA MSY-A15/17NA	1.62 oz. each 5 ft. (30g/m)
	MS-A09/12WA	1.08 oz. each 5 ft. (20g/m)

1-4. INSTALLATION DIAGRAM

ACCESSORIES

Check the following parts before installation.
(Indoor unit)

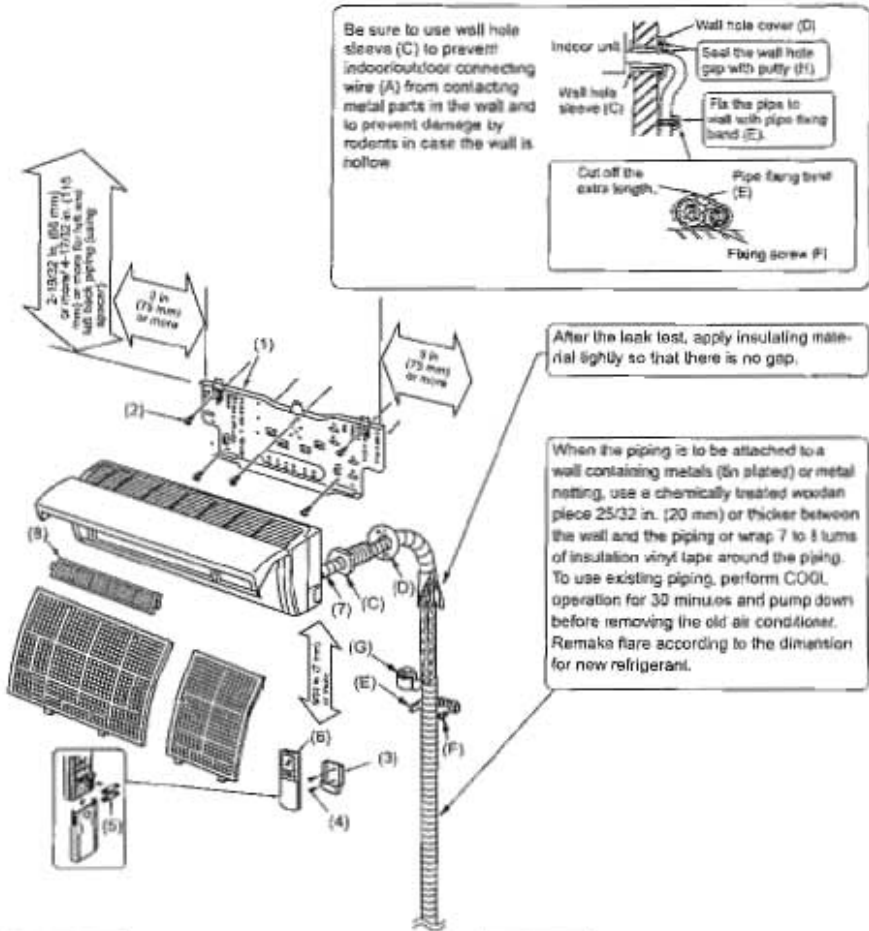
(1)	Installation plate	1
(2)	Installation plate fixing screw 4 × 25 mm	8
(3)	Remote controller holder	1
(4)	Fixing screw for (3) 3.5 × 16 mm (Black)	2
(5)	Battery (AAA) for (6)	2
(6)	Wireless remote controller	1
(7)	Foil tape (For left or left-rear piping)	1
(8)	Air cleaning filter	1

PARTS TO BE PROVIDED AT YOUR SITE

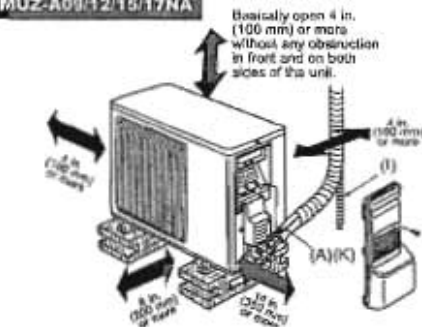
(A)	Indoor/outdoor unit connecting wire*	1
(B)	Extension pipe	1
(C)	Wall hole sleeve	1
(D)	Wall hole cover	1
(E)	Pipe fixing band	2 to 5
(F)	Fixing screw for (E) 4 × 20 mm	2 to 5
(G)	Piping tape	1
(H)	Putty	1
(I)	Drain hose (or soft PVC hose, 1/2 in. [12.7 mm] inner dia. or hard PVC pipe VP16)	2 to 5
(J)	Refrigeration oil	1
(K)	Power supply cord	1

* Note:

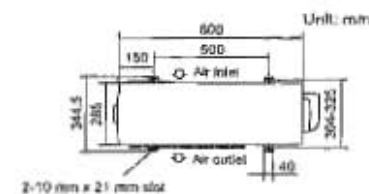
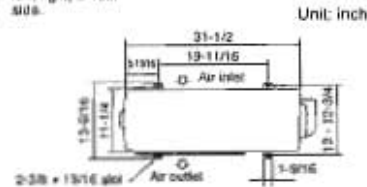
Place indoor/outdoor unit connecting wire (A) and power supply cord (K) at least 3 ft. (1 m) away from the TV antenna wire.



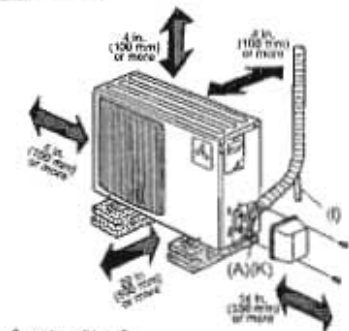
MU-A09WA MUY-A15/17NA MUZ-A09/12/15/17NA



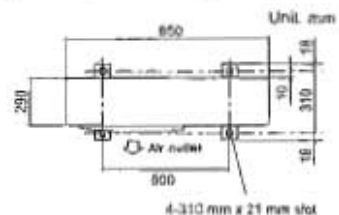
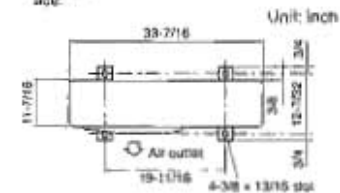
Open two sides of left, right, or rear side.



MU-A12WA



Open two sides of left, right, or rear side.

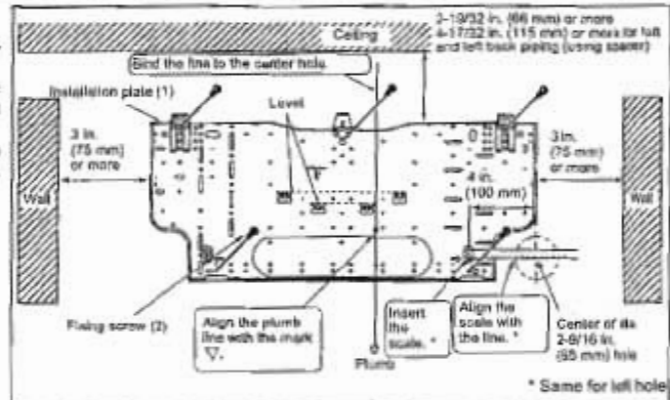


Units should be installed by licensed contractor according to local code requirements.

2. INDOOR UNIT INSTALLATION

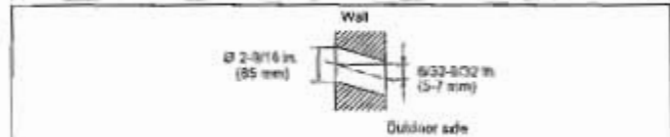
2-1. FIXING OF INSTALLATION PLATE

- Find a structural material (such as a stud) in the wall and fix installation plate (1) horizontally with fixing screws (2).
- To prevent installation plate (1) from vibrating, be sure to install the fixing screws in the holes indicated in the illustration. For added support, fixing screws may also be installed in other holes.
- When bolts recessed in the concrete wall are to be utilized, secure installation plate (1) using 7/16 in. x 13/16 in. x 7/16 in. x 1 in. (11 mm x 20 mm x 11 mm x 26 mm) oval hole (17-3/4 in. (450 mm) pitch).
- If the recessed bolt is too long, change it for a shorter one available in the market.



2-2. WALL HOLE DRILLING

- Determine the wall hole position.
- Drill a dia. 2-9/16 in. (65 mm) hole. The outdoor side should be 6/32 to 9/32 in. (5 to 7 mm) lower than the indoor side.
- Insert wall hole sleeve (C).

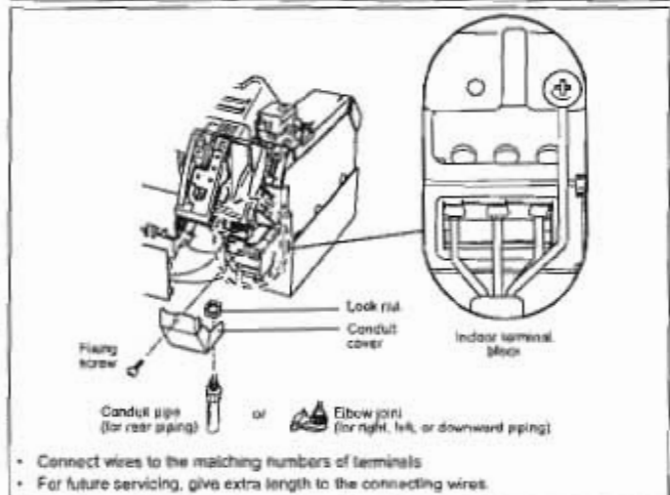


2-3. CONNECTING WIRES FOR INDOOR UNIT

Note:

When the indoor unit is powered from the outdoor unit, a disconnect switch needs to be installed to power supply circuit (between indoor and outdoor unit) depending on local code.

- Remove the front panel. (Refer to 5-1.)
- Hook the upper part of the indoor unit on the installation plate.
- Remove corner box and conduit cover.
- Fix conduit pipe (for rear piping) / elbow joint (for right, left, or downward piping) to conduit cover with lock nut. The thread part of installed conduit pipe / elbow joint appearing inside should be less than 3/8 in. (10 mm). (Fig. 1) Elbow joint should appear less than 1-3/16 in. (30 mm) outside. (Fig. 2)
- Process the end of ground wire (Fig. 3). Connect it to the ground terminal of electrical parts box.
- Process the end of indoor/outdoor unit connecting wire (A) (Fig. 3). Fix it to terminal block. Be careful not to make mis-wiring. Fix the wire to the terminal block securely so that no part of its core is appeared, and no external force is conveyed to the connecting section of the terminal block.
- Firmly tighten the terminal screws to prevent them from loosening. After tightening, pull the wires lightly to confirm that they do not move.
- Secure indoor/outdoor unit connecting wire (A) and the ground wire with conduit cover. Never fail to hook the claw of the conduit cover to the electrical box. Attach the conduit cover securely. (Fig. 4)
- According to the piping direction, cut off the shaded part of the left side of box (Fig. 5) or corner box (Fig. 6). Reinstall corner box and front panel.

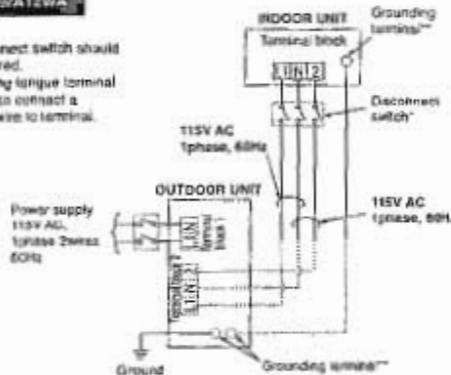


- Connect wires to the matching numbers of terminals
- For future servicing, give extra length to the connecting wires.

MS-A09/A12WA

Remark:

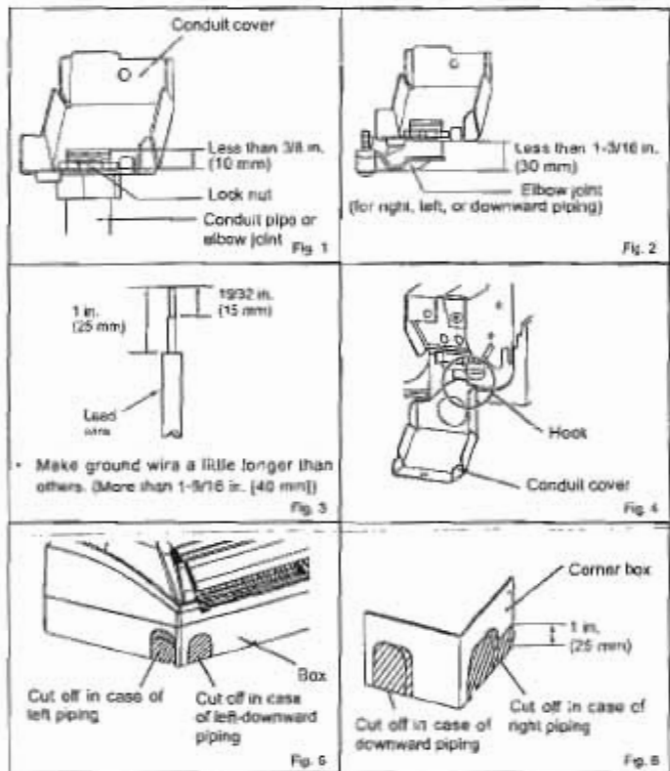
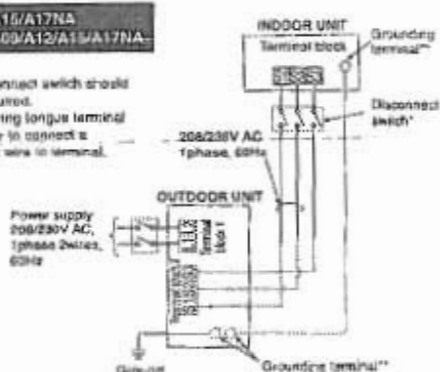
- A disconnect switch should be required.
- Use a ring tongue terminal in order to extract a ground wire to terminal.



MSV-A16/A17NA MSZ-A09/A12/A16/A17NA

Remark:

- A disconnect switch should be required.
- Use a ring tongue terminal in order to connect a ground wire to terminal.



2-4. PIPE FORMING AND DRAIN PIPING

2-4-1. PIPE FORMING

- Place the drain hose below the refrigerant piping.
- Make sure that the drain hose is not heaved or snaked.
- Do not pull the hose when applying the tape.
- When the drain hose passes the room, be sure to wrap insulation material (obtainable at a store) around it.

Note:

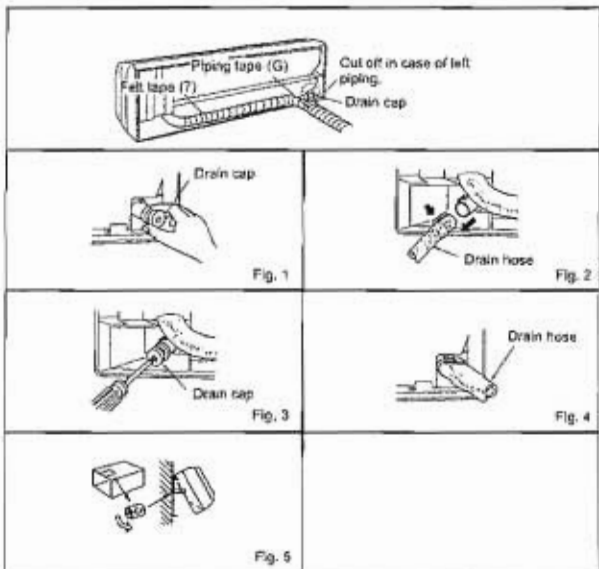
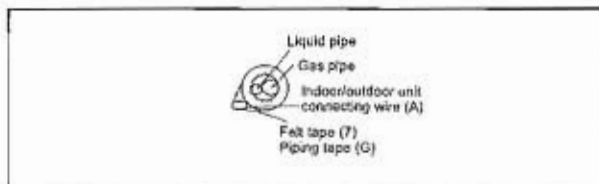
Screws may damage the cover of refrigerant pipe during left piping. Make sure not to damage the cover of refrigerant pipe.

Left or left-rear piping

Note:

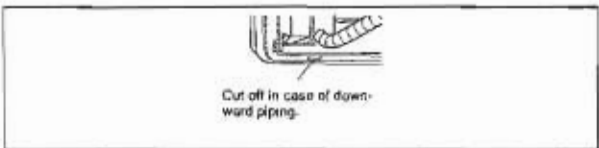
Be sure to reattach the drain hose and the drain cap in case of left or left-rear piping. Otherwise, it could cause drops of water to drip down from the drain hose.

- Put the refrigerant piping and the drain hose together, then firmly apply felt tape (7) from the end.
 - Felt tape (7) overlap width should be 1/3 the tape width. Use a bandage stopper at the end of felt tape (7).
- Pull out the drain cap at the rear right of the indoor unit. (Fig. 1)
 - Hold the convex section at the end and pull the drain cap.
- Pull out the drain hose at the rear left of the indoor unit. (Fig. 2)
 - Hold the claw marked by the arrows and pull out the drain hose forward.
- Put the drain cap into the section to which the drain hose is to be attached at the rear of the indoor unit. (Fig. 3)
 - Insert not sharp-edged tools such as screwdrivers into the hole at the end of the cap and insert the cap fully into the drain pan.
- Insert the drain hose fully into the drain pan at the rear right of the indoor unit. (Fig. 4)
 - Check if the hose is hooked securely to the projection of its inserting part of the drain pan.
- Insert the drain hose into wall hole sleeve (C), and hook the upper part of indoor unit on installation plate (1). Then, move the indoor unit completely to the left in order to make placing the piping in the back space of the unit easier.
- Cut out a piece of cardboard from the shipping box, roll it up, hook it onto the back rib, and use it as a spacer to lift the indoor unit. (Fig. 5)
- Connect the refrigerant piping with the extension pipe (B).
- Thrust the lower part of the indoor unit into the installation plate (1).



Rear or downward piping

- Put the refrigerant piping and the drain hose together, then firmly apply piping tape (G) from the end.
- Insert the piping and the drain hose into the wall hole sleeve (C), and hook the upper part of the indoor unit on the installation plate (1).
- Check if the indoor unit is hooked securely on the installation plate (1) by moving the unit to left and right.
- Thrust the lower part of the indoor unit into the installation plate (1).

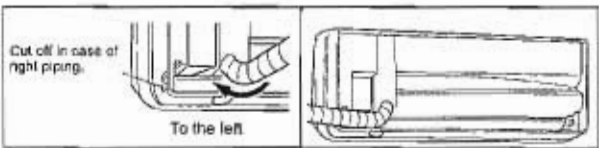


Right piping

Note:

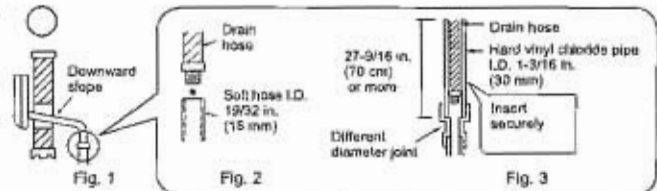
Before performing the following, make sure that wiring is completed, and the conduit cover is installed. (Refer to 2-3.)

- Put the refrigerant piping and the drain hose together, position them to left side, and then firmly apply piping tape (G) from the end.
- Insert the piping and the drain hose into the wall hole sleeve (C), and hook the upper part of the indoor unit on the installation plate (1).
- Check if the indoor unit is hooked securely on the installation plate (1) by moving the unit to left and right.
- Thrust the lower part of the indoor unit into the installation plate (1).

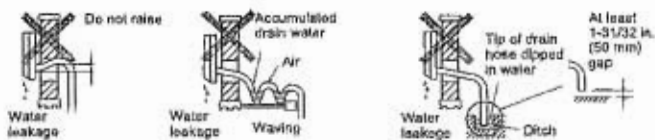


2-4-2. DRAIN PIPING

- If the extension drain hose has to pass through a room, be sure to wrap it with commercially sold insulation.
- The drain hose should point downward for easy drain flow. (Fig. 1)
- If the drain hose provided with the indoor unit is too short, connect it with drain hose (I) that should be provided at your site. (Fig. 2)
- When connecting the drain hose to the hard vinyl chloride pipe, be sure to insert it securely into the pipe. (Fig. 3)



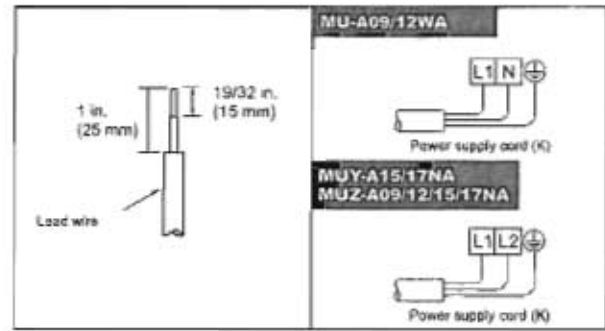
Do not make drain piping as shown below.



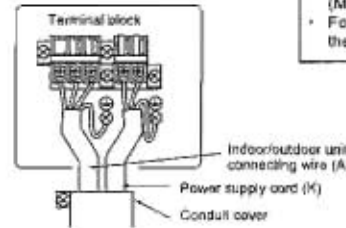
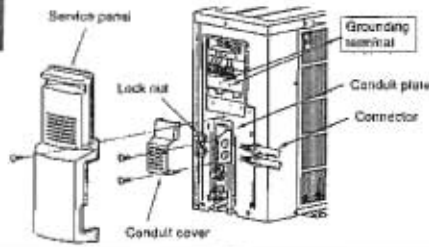
3. OUTDOOR UNIT INSTALLATION

3-1. CONNECTING WIRES FOR OUTDOOR UNIT

- 1) Remove the service panel.
- 2) Remove the conduit cover.
- 3) Fix the conduit connector to conduit plate (A models)/conduit cover (B models) with lock nut, then secure it against unit with screws.
- 4) Loosen terminal screw, and connect indoor/outdoor unit connecting wire (A) from the indoor unit correctly on the terminal block. Be careful not to make mis-wiring. Fix the wire to the terminal block securely so that no part of its core is appeared, and no external force is conveyed to the connecting section of the terminal block.
- 5) Firmly tighten the terminal screws to prevent them from loosening. After tightening, pull the wires lightly to confirm that they do not move.
- 6) Connect power supply cord (K).
- 7) Connect ground wires of indoor/outdoor unit connecting wire (A) and power supply cord (K) to the TB support.
- 8) Install the conduit cover.
- 9) Install the service panel securely.

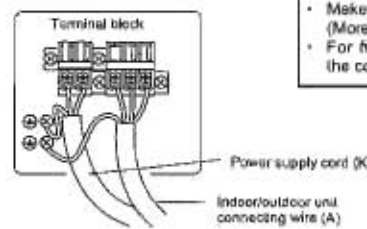
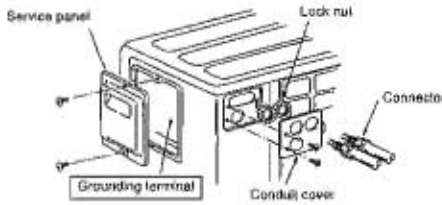


A MU-A09WA MU-Y-A15/17NA MUZ-A09/12/15/17NA



- Make earth wire a little longer than others. (More than 1-12/32 in. 35 mm)
- For future servicing, give extra length to the connecting wires.

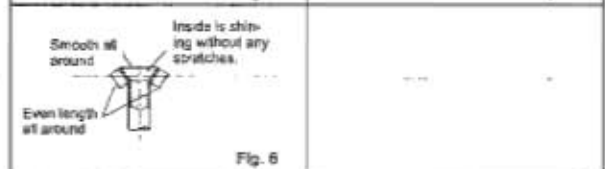
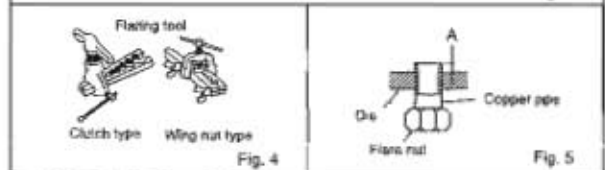
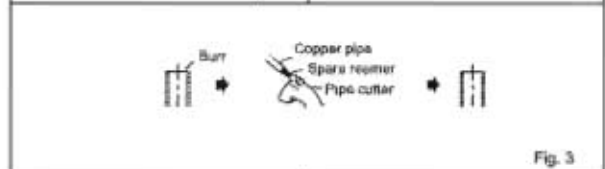
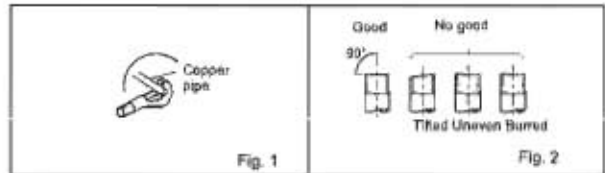
B MU-A12WA



- Make earth wire a little longer than others. (More than 1-12/32 in. 35 mm)
- For future servicing, give extra length to the connecting wires.

3-2. FLARING WORK

- 1) Cut the copper pipe correctly with pipe cutter. (Fig. 1, 2)
- 2) Completely remove all burrs from the cut cross section of pipe. (Fig. 3)
 - Put the end of the copper pipe to downward direction as you remove burrs in order to avoid to let burrs drop in the piping.
- 3) Remove flare nuts attached to indoor and outdoor units, then put them on pipe having completed burr removal. (Not possible to put them on after flaring work.)
- 4) Flaring work (Fig. 4, 5). Firmly hold copper pipe in the dimension shown in the table. Select A mm from the table according to the tool you use.
- 5) Check
 - Compare the flared work with Fig. 6.
 - If flare is noted to be defective, cut off the flared section and do flaring work again.



Pipe diameter inch (mm)	Nut inch (mm)	A inch (mm)			Tightening torque	
		Clutch type tool for R410A	Clutch type tool for R22	Wing nut type tool for R22	N·m	ft·lb (kgf·cm)
ø 1/4 (6.35)	1/4 (17)	0 to 0.02 (0 to 0.5)	0.04 to 0.06 (1.0 to 1.5)	0.06 to 0.08 (1.5 to 2.0)	13.7 to 17.7	10 to 13 (140 to 180)
ø 3/8 (9.52)	3/8 (22)			0.08 to 0.10 (2.0 to 2.5)	34.3 to 41.2	25 to 30 (350 to 420)
ø 1/2 (12.7)	1/2 (26)			49.0 to 56.4	36 to 42 (500 to 575)	
ø 5/8 (15.88)	5/8 (29)			73.5 to 78.4	54 to 58 (750 to 800)	

3-3. PIPE CONNECTION

- Fasten flare nut with a torque wrench as specified in the table.
- When fastened too tight, flare nut may break after a long period and cause refrigerant leakage.

Indoor unit connection

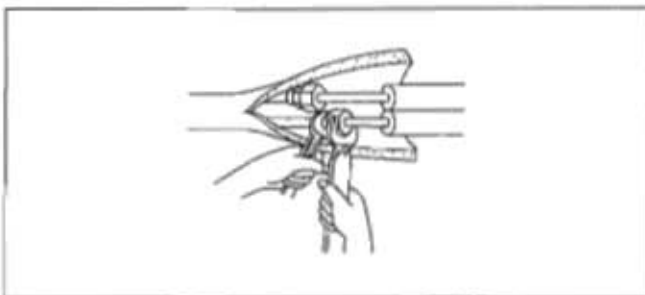
Connect both liquid and gas pipings to indoor unit.

- Apply a thin coat of refrigeration oil (μ) on the seat surface of pipe.
- For connection, first align the center, then tighten the first 3 to 4 turns of flare nut.
- Use tightening torque table below as a guideline for indoor unit side union joint section, and tighten using two wrenches. Excessive tightening damages the flare section.

Outdoor unit connection

Connect pipes to stop valve pipe joint of the outdoor unit in the same manner applied for indoor unit.

- For tightening, use a torque wrench or spanner and use the same tightening torque applied for indoor unit.



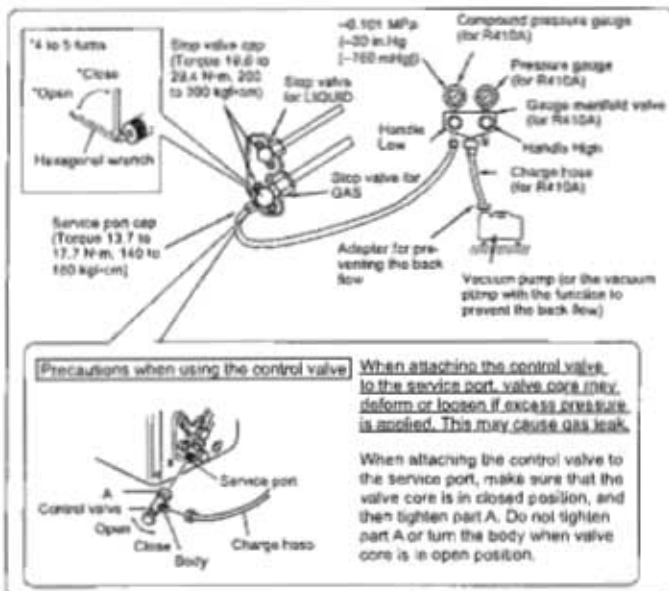
3-4. INSULATION AND TAPING

- Cover piping joints with pipe cover.
- For outdoor unit side, surely insulate every piping including valves.
- Using piping tape (G), apply taping starting from the entry of outdoor unit.
 - Stop the end of piping tape (G) with tape (with adhesive agent attached).
 - When piping have to be arranged through above ceiling, closet or where the temperature and humidity are high, wind additional commercially sold insulation to prevent condensation.

4. PURGING PROCEDURES, LEAK TEST, AND TEST RUN

4-1. PURGING PROCEDURES AND LEAK TEST

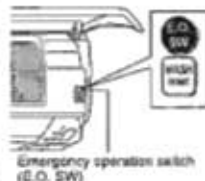
- Remove service port cap of stop valve on the side of the outdoor unit gas pipe. (The stop valve will not work in its initial state fresh out of the factory, totally closed with cap on.)
- Connect gauge manifold valve and vacuum pump to service port of stop valve on the gas pipe side of the outdoor unit.



- Run the vacuum pump. (Vacuumize for more than 15 minutes.)
- Check the vacuum with gauge manifold valve, then close gauge manifold valve, and stop the vacuum pump.
- Leave as it is for one or two minutes. Make sure pointer gauge manifold valve remains in the same position. Confirm that pressure gauge shows -0.101 Mpa [Gauge] [-30 in.Hg [-780 mmHg]].
- Remove gauge manifold valve quickly from service port of stop valve.
- After refrigerant pipes are connected and evacuated, fully open all stop valves on both sides of gas pipe and liquid pipe. Operating without fully opening lowers the performance and this causes trouble.
- Refer to 1-3., and charge the prescribed amount of refrigerant if needed. Be sure to charge slowly with liquid refrigerant. Otherwise, composition of the refrigerant in the system may be changed and affect performance of the air conditioner.
- Tighten cap of service port to obtain the initial status.
- Leak test

4-2. TEST RUN

- Insert power supply plug into the power outlet and/or turn on the breaker. Check that all LED lamps are not lit. If they are blinking, check that the horizontal wire is installed correctly. Refer to operating instructions for details.
- Press the E.O. SW. Test run will be performed for 30 minutes. If the left side lamp of the operation indicator blinks every 0.5 seconds, inspect the indoor/outdoor unit connecting wire (A) for mis-wiring. After the test run, emergency COOL mode (75°F [24°C] COOL) will start.
- To stop operation, press the E.O. SW several times until all LED lamps turn off. Refer to operating instructions for details.



Checking the remote (infrared) signal reception

Press the ON/OFF button on the remote controller and check that an electronic sound is heard from the indoor unit. Press the ON/OFF button again to turn the air conditioner off.

- Once the compressor stops, the restart preventive device operates so the compressor will not operate for 3 minutes to protect the air conditioner.

4-3. AUTO RESTART FUNCTION

This product is equipped with an auto restart function. When the power supply is stopped during operation, such as during blackout, the function automatically starts operation in the previous setting once the power supply is resumed. (Refer to the operating instructions for details.)

Caution:

- After test run or remote signal reception check, turn off the unit with the E.O. SW or the remote controller before turning off the power supply. Not doing so will cause the unit to start operation automatically when power supply is resumed.

To the user

- After installing the unit, make sure to explain the user about auto restart function.
- If auto restart function is unnecessary, it can be deactivated. Consult the service representative to deactivate the function. Refer to the service manual for details.

4-4. EXPLANATION TO THE USER

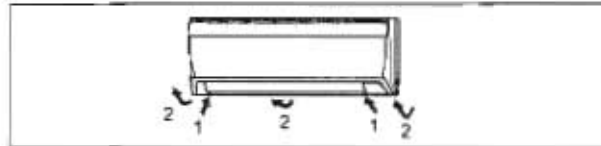
- Using the OPERATING INSTRUCTIONS, explain to the user how to use the air conditioner (how to use the remote controller, how to remove the air filters, how to remove or put the remote controller in the remote controller holder, how to clean, precautions for operation, etc.)
- Recommend the user to read the OPERATING INSTRUCTIONS carefully.

5. RELOCATION AND MAINTENANCE

5-1. REMOVING AND INSTALLING THE PANEL ASSEMBLY

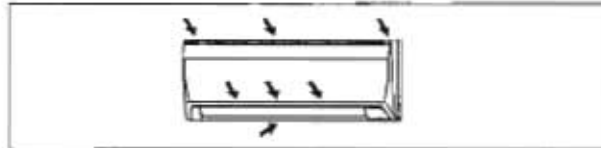
Removal procedure

- 1) Remove the 2 screws which fix the panel assembly.
- 2) Remove the panel assembly. Be sure to remove its bottom end first.



Installation procedure

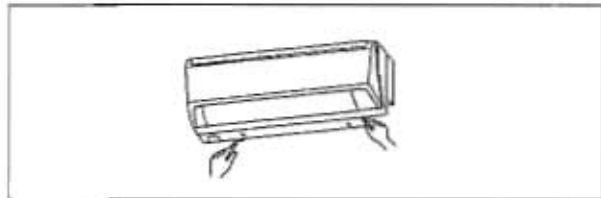
- 1) Install the panel assembly following the removal procedure in reverse.
- 2) Be sure to press the positions as indicated by the arrows in order to attach the assembly completely to the unit.



5-2. REMOVING THE INDOOR UNIT

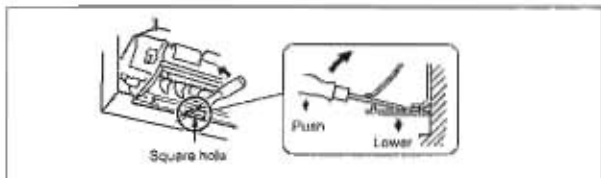
Remove the bottom of the indoor unit from the installation plate.

When releasing the corner part, release both left and right bottom corner part of indoor unit and pull it downward and forward as shown in the figure on the right.



If the above method cannot be used

Remove the front panel. Then, insert hexagonal wrenches into the square holes on the left and right sides of the unit and push them up as shown in the following figure. The bottom of the indoor unit lowers and releases the hooks.



5-3. PUMPING DOWN

When relocating or disposing of the air conditioner, pump down the system following the procedure below so that no refrigerant is released into the atmosphere.

- 1) Connect the gauge manifold valve to the service port of the stop valve on the gas pipe side of the outdoor unit.
- 2) Fully close the stop valve on the liquid pipe side of the outdoor unit.
- 3) Close the stop valve on the gas pipe side of the outdoor unit almost completely so that it can be easily closed fully when the pressure gauge shows 0 MPa (Gauge) (0 lb/in.² [0 kgf/cm²]).
- 4) Start the emergency COOL operation.
To start the emergency operation in COOL mode, disconnect the power supply plug and/or turn off the breaker. After 15 seconds, connect the power supply plug and/or turn on the breaker, and then press the E.O. SW once. (The emergency COOL operation can be performed continuously for up to 30 minutes.)
- 5) Fully close the stop valve on the gas pipe side of the outdoor unit when the pressure gauge shows 0.05 to 0 MPa (Gauge) (approx. 7.25 to 0 lb/in.² [0.5 to 0 kgf/cm²]).
- 6) Stop the emergency COOL operation.
Press the E.O. SW twice to stop the operation.

SPLIT-TYPE AIR CONDITIONERS

INDOOR UNIT

**MSZ-GE06NA MSZ-GE09NA MSZ-GE12NA
MSZ-GE15NA MSZ-GE18NA**

OPERATING INSTRUCTIONS

- To use this unit correctly and safely, be sure to read these operating instructions before use.

For user

MANUAL DE INSTRUCCIONES

- Para utilizar esta unidad de forma correcta y segura, lea previamente estas instrucciones de funcionamiento.

Para los clientes

NOTICE D'UTILISATION

- Pour avoir la certitude d'utiliser cet appareil correctement et en toute sécurité, veuillez lire cette notice d'instructions avant de mettre le climatiseur sous tension.

A l'attention des clients

English

Español

Français



CONTENTS

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■ NAME OF EACH PART	3
■ PREPARATION BEFORE OPERATION	4
■ SELECTING OPERATION MODES	5
■ FAN SPEED AND AIRFLOW DIRECTION ADJUSTMENT	6
■ SMART SET OPERATION	6
■ ECONO COOL OPERATION	7
■ TIMER OPERATION (ON/OFF TIMER)	7
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SAFETY PRECAUTIONS





- Since rotating parts and parts which could cause an electric shock are used in this product, be sure to read these "Safety Precautions" before use.
- Since the cautionary items shown here are important for safety, be sure to observe them.
- After reading this manual, keep it together with the installation manual in a handy place for easy reference.
- Be sure to receive a guarantee card from your dealer and check that the purchased date and shop name, etc. are entered correctly.






Marks and their meanings

-  **WARNING:** Incorrect handling could cause serious hazard, such as death, serious injury, etc. with a high probability.
-  **CAUTION:** Incorrect handling could cause serious hazard depending on the conditions.




Meanings of symbols used in this manual



-  : Be sure not to do.
-  : Be sure to follow the instruction.
-  : Never insert your finger or stick, etc.
-  : Never step onto the indoor/outdoor unit and do not put anything on them.
-  : Danger of electric shock. Be careful.
-  : Be sure to disconnect the power supply plug from the power outlet.
-  : Be sure to shut off the power.


 WARNING	
	<p>Do not connect the power cord to an intermediate point, use an extension cord, or connect multiple devices to a single AC outlet.</p> <ul style="list-style-type: none"> • This may cause overheating, fire, or electric shock. <p>Make sure the power plug is free of dirt and insert it securely into the outlet.</p> <ul style="list-style-type: none"> • A dirty plug may cause fire or electric shock. <p>Do not bundle, pull, or modify the power cord, and do not apply heat or place heavy objects on it.</p> <ul style="list-style-type: none"> • This may cause fire or electric shock. <p>Do not turn the breaker OFF/ON or disconnect/connect the power plug during operation.</p> <ul style="list-style-type: none"> • This may create sparks, which can cause fire. • After the indoor unit is switched OFF with the remote controller, make sure to turn the breaker OFF or disconnect the power plug. <p>Do not expose your body directly to cool air for a prolonged length of time.</p> <ul style="list-style-type: none"> • This could be detrimental to your health. <p>The unit should not be installed, relocated, or repaired by the user.</p> <ul style="list-style-type: none"> • An improperly handled air conditioner may cause fire or electric shock.
 	<p>Do not insert your finger, a stick, or other objects into the air inlet or outlet.</p> <ul style="list-style-type: none"> • This may cause injury, since the fan inside rotates at high speeds during operation.

 	<p>In case of an abnormal condition (such as a burning smell), stop the air conditioner and disconnect the power plug or turn the breaker OFF.</p> <ul style="list-style-type: none"> • A continued operation in the abnormal state may cause a malfunction, fire, or electric shock. In this case, consult your dealer.
	<p>When the air conditioner does not cool or heat, there is a possibility of refrigerant leakage. In this case, consult your dealer. If a repair involves recharging the unit with refrigerant, ask the service technician for details.</p> <ul style="list-style-type: none"> • The refrigerant used in the air conditioner is safe. Normally, it does not leak. However, if refrigerant leaks and comes in contact with a heat source such as a fan heater, kerosene heater, or cooking stove, it will create a harmful gas.
 CAUTION	
	<p>Do not touch the air inlet or the aluminum fins of the indoor/outdoor unit.</p> <ul style="list-style-type: none"> • This may cause injury. <p>Do not use insecticides or flammable sprays on the unit.</p> <ul style="list-style-type: none"> • This may cause a fire or deformation of the unit. <p>Do not expose pets or houseplants to direct airflow.</p> <ul style="list-style-type: none"> • This may cause injury to the pets or plants. <p>Do not place other electric appliances or furniture under the indoor/outdoor unit.</p> <ul style="list-style-type: none"> • Water may drip down from the unit, which may cause damage or malfunction. <p>Do not leave the unit on a damaged installation stand.</p> <ul style="list-style-type: none"> • The unit may fall and cause injury.






SAFETY PRECAUTIONS

 CAUTION	
	<p>Do not step on an unstable bench to operate or clean the unit.</p> <ul style="list-style-type: none"> This may cause injury if you fall down.
	<p>Do not pull the power cord.</p> <ul style="list-style-type: none"> This may cause a portion of the core wire to break, which may cause overheating or fire.
	<p>Do not charge or disassemble the batteries, and do not throw them into a fire.</p> <ul style="list-style-type: none"> This may cause the batteries to leak, or cause a fire or explosion.
	<p>Do not operate the unit for more than 4 hours at high humidity (80% RH or more) and/or with windows or outside door left open.</p> <ul style="list-style-type: none"> This may cause the water condensation in the air conditioner, which may drip down, wetting or damaging the furniture. The water condensation in the air conditioner may contribute to growth of fungi, such as mold.
	<p>Do not use the unit for special purposes, such as storing food, raising animals, growing plants, or preserving precision devices or art objects.</p> <ul style="list-style-type: none"> This may cause deterioration of quality, or harm to animals and plants.
	<p>Do not expose combustion appliances to direct airflow.</p> <ul style="list-style-type: none"> This may cause incomplete combustion.
	<p>Before cleaning the unit, switch it OFF and disconnect the power plug or turn the breaker OFF.</p> <ul style="list-style-type: none"> This may cause injury, since the fan inside rotates at high speeds during operation.
	<p>When the unit will be unused for a long time, disconnect the power plug or turn the breaker OFF.</p> <ul style="list-style-type: none"> The unit may accumulate dirt, which may cause overheating or fire.
	<p>Replace all batteries of the remote controller with new ones of the same type.</p> <ul style="list-style-type: none"> Using an old battery together with a new one may cause overheating, leakage, or explosion.
	<p>If the battery fluid comes in contact with your skin or clothes, wash them thoroughly with clean water.</p> <ul style="list-style-type: none"> If the battery fluid comes in contact with your eyes, wash them thoroughly with clean water and immediately seek medical attention.
	<p>Ensure that the area is well-ventilated when the unit is operated together with a combustion appliance.</p> <ul style="list-style-type: none"> Inadequate ventilation may cause oxygen starvation.
	<p>Turn the breaker OFF when you hear thunder and there is a possibility of a lightning strike.</p> <ul style="list-style-type: none"> The unit may be damaged if lightning strikes.
	<p>After the air conditioner is used for several seasons, perform inspection and maintenance in addition to normal cleaning.</p> <ul style="list-style-type: none"> Dirt or dust in the unit may create an unpleasant odor, contribute to growth of fungi, such as mold, or clog the drain passage, and cause water to leak from the indoor unit. Consult your dealer for inspection and maintenance, which require specialized knowledge and skills.

	<p>Do not operate switches with wet hands.</p> <ul style="list-style-type: none"> This may cause electric shock.
	<p>Do not clean the air conditioner with water or place an object that contains water, such as a flower vase, on it.</p> <ul style="list-style-type: none"> This may cause fire or electric shock.
	<p>Do not step on or place any object on the outdoor unit.</p> <ul style="list-style-type: none"> This may cause injury if you or the object falls down.

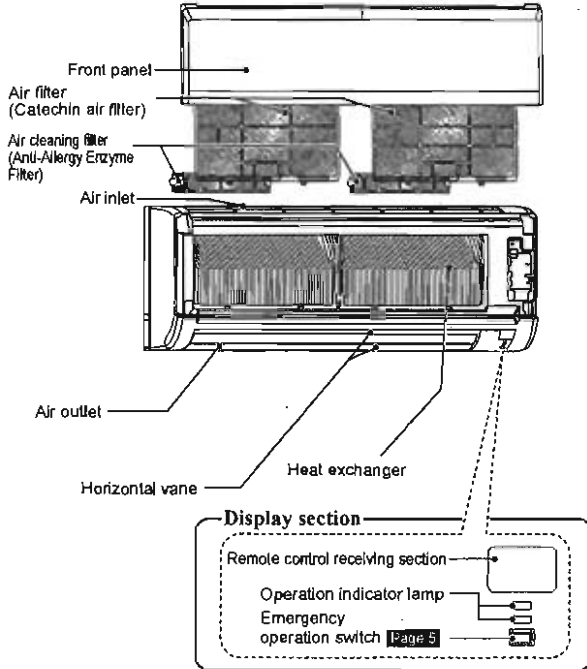
 IMPORTANT	
<p>Dirty filters cause condensation in the air conditioner which will contribute to the growth of fungi such as mold. It is therefore recommended to clean air filters every 2 weeks.</p>	

For installation

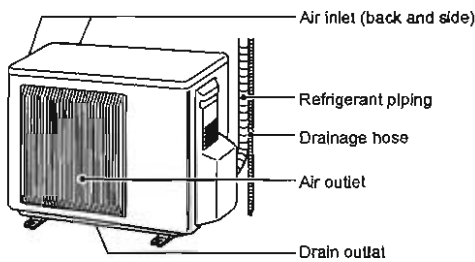
 WARNING	
	<p>Consult your dealer for installing the air conditioner.</p> <ul style="list-style-type: none"> It should not be installed by the user since installation requires specialized knowledge and skills. An improperly installed air conditioner may cause water leakage, fire, or electric shock.
	<p>Provide a dedicated power supply for the air conditioner.</p> <ul style="list-style-type: none"> A non-dedicated power supply may cause overheating or fire.
	<p>Do not install the unit where flammable gas could leak.</p> <ul style="list-style-type: none"> If gas leaks and accumulates around the unit, it may cause an explosion.
	<p>Ground the unit correctly.</p> <ul style="list-style-type: none"> Do not connect the ground wire to a gas pipe, water pipe, lightning rod, or a telephone ground wire. Improper grounding may cause electric shock.
 CAUTION	
	<p>Install a Ground Fault Interrupt (GFI) circuit breaker depending on the installation location of the air conditioner (such as highly humid areas).</p> <ul style="list-style-type: none"> If the Ground Fault Interrupt (GFI) breaker is not installed, it may cause electric shock.
	<p>Ensure that the drain water is properly drained.</p> <ul style="list-style-type: none"> If the drain passage is improper, water may drip down from the indoor/outdoor unit, wetting and damaging the furniture.
<p>In case of an abnormal condition Immediately stop operating the air conditioner and consult your dealer.</p>	

NAME OF EACH PART

Indoor unit

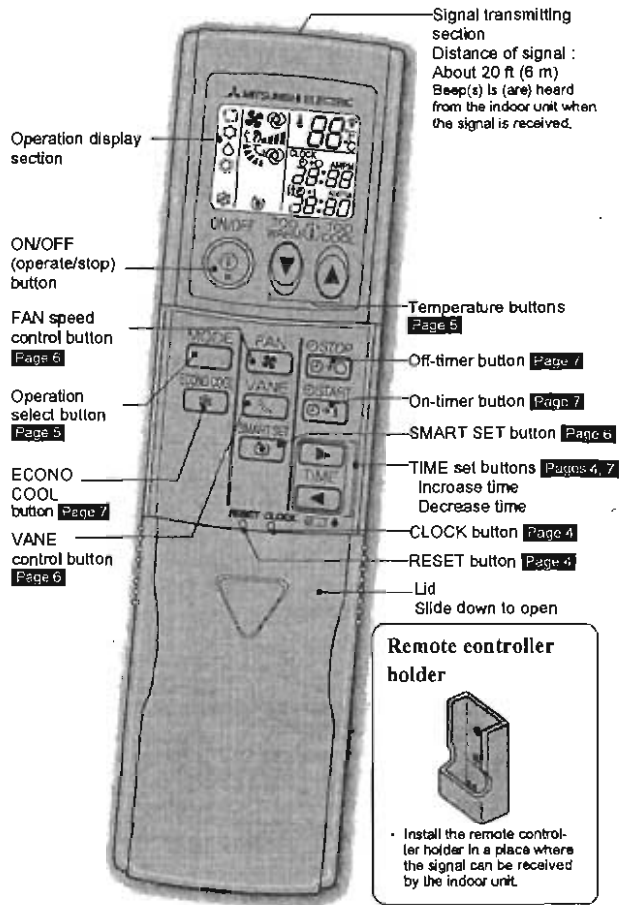


Outdoor unit



Outdoor units may be different in appearances.

Remote controller



Remote controller holder

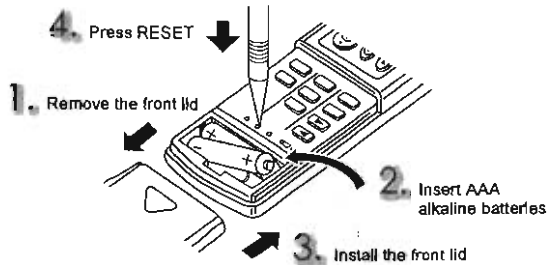
• Install the remote controller holder in a place where the signal can be received by the indoor unit.

Only use the remote controller provided with the unit.
Do not use other remote controllers.

PREPARATION BEFORE OPERATION

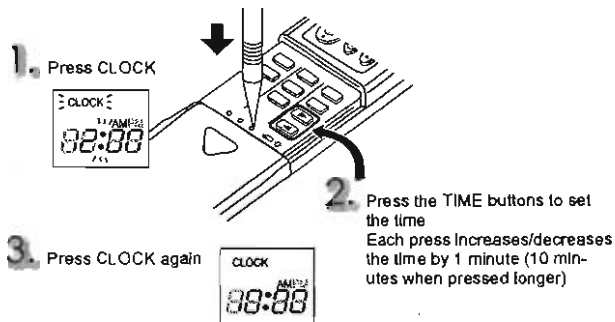
Before operation: Insert the power supply plug into the power outlet and/or turn the breaker on.

Installing the remote controller batteries



- Make sure the polarity of the batteries is correct.
 - Do not use manganese batteries. The remote controller could malfunction.
 - Do not use rechargeable batteries.
 - Replace all batteries with new ones of the same type.
 - Batteries can be used for approximately 1 year. However, batteries with expired shelf lives last shorter.
 - Press RESET gently using a thin instrument.
- If the RESET button is not pressed, the remote controller may not operate correctly.

Setting current time

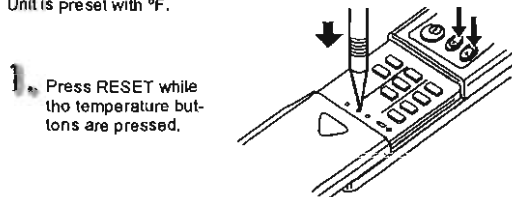


- Press CLOCK gently using a thin instrument.



Changing temperature units (°F → °C)

Unit is preset with °F.



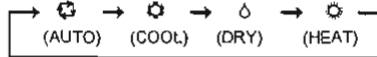
- Press RESET gently using a thin instrument.
- To change temperature unit from °C to °F, press RESET.

SELECTING OPERATION MODES



1 Press to start the operation.

2 Press to select operation mode. Each press changes mode in the following order:



3 Press to set the temperature. Each press raises or lowers the temperature by 1°F (1°C).

Press to stop the operation.
 • The same setting is selected the next time by simply pressing .

Operation indicator lamp

The operation indicator lamp shows the operation state of the unit.

Indication	Operation state	Room temperature
	The unit is operating to reach the set temperature	About 4°F (2°C) or more away from set temperature
	The room temperature is approaching the set temperature	About 2 to 4°F (1 to 2°C) from set temperature
	Standby mode (only during multi system operation)	—

Lighted Blinking Not lighted

Multi system operation

Two or more indoor units can be operated by one outdoor unit. When several indoor units are operated simultaneously, cooling and heating operations cannot be done at the same time. When COOL is selected with one unit and HEAT with another or vice versa, the unit selected last goes into standby mode. The power lamp blinks (display section).

AUTO mode (Auto change over)

The unit selects the operation mode according to the difference between the room temperature and the set temperature. During AUTO mode, the unit changes mode (COOL→HEAT) when the room temperature is 4°F (2°C) away from the set temperature for more than 15 minutes.

Note:

- Auto Mode is not recommended if this indoor unit is connected to a MXZ type outdoor unit.
- Two or more indoor units can be operated by one outdoor unit. When several indoor units are operated simultaneously, the unit may not be able to switch operation mode between COOL and HEAT. In this case, the indoor unit becomes standby mode.

COOL mode

Enjoy cool air at your desired temperature.

Note:

Do not operate COOL mode at very low outside temperatures (less than 14°F [-10°C]). Water condensed in the unit may drip and wet or damage furniture, etc.

DRY mode

Dehumidify your room. The room may be cooled slightly. Temperature cannot be set during DRY mode.

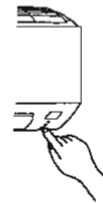
HEAT mode

Enjoy warm air at your desired temperature.

Emergency operation

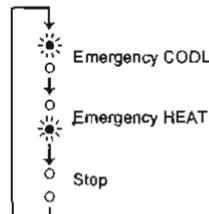
When the remote controller cannot be used...

Emergency operation can be activated by pressing the emergency operation switch (E.O.SW) on the indoor unit.



Each time the E.O.SW is pressed, the operation changes in the following order:

Operation Indicator lamp



Set temperature : 75°F (24°C)
 Fan speed : Medium
 Horizontal vane : Auto

Note:

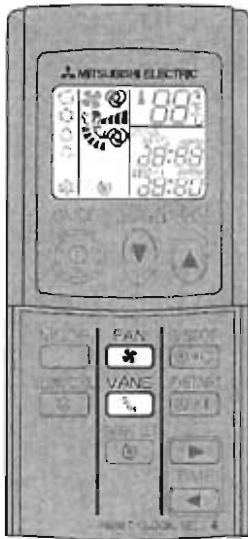
The first 30 minutes of operation is test run. Temperature control does not work, and fan speed is set to High.


Auto restart function

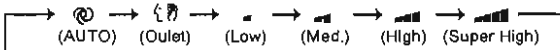
If a power failure occurs or the main power is turned off during operation, "Auto restart function" automatically starts operation in the same mode as the one set with the remote controller just before the shutoff of the main power. When timer is set, timer setting is cancelled and the unit starts operation when power is resumed.

If you do not want to use this function, please consult the service representative because the setting of the unit needs to be changed.

FAN SPEED AND AIRFLOW DIRECTION ADJUSTMENT



Press  to select fan speed. Each press changes fan speed in the following order:




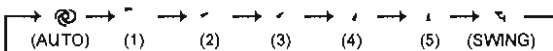
- Two short beeps are heard from the Indoor unit when set to AUTO.
- Use higher fan speed to cool/heat the room quicker. It is recommended to lower the fan speed once the room is cool/warm.
- Use lower fan speed for quiet operation.

Note:

Multi system operation


When several Indoor units are operated simultaneously for heating operation, the temperature of the airflow may be low. In this case, it is recommended to set the fan speed to AUTO.


Press  to select airflow direction. Each press changes airflow direction in the following order:



- Two short beeps are heard from the Indoor unit when set to AUTO.

Airflow direction

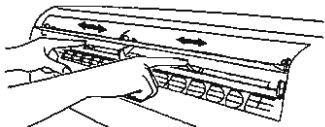
 (AUTO).....The vane is set to the most efficient airflow direction. COOL/ DRY:horizontal position. HEAT:position (5).

 (Manual).....For efficient air conditioning, select the upper position for COOL/DRY, and the lower position for HEAT. If the position (4) or (5) is selected during COOL/DRY, the vane automatically moves to the horizontal position after 0.5 to 1 hour to prevent any condensation from dripping.

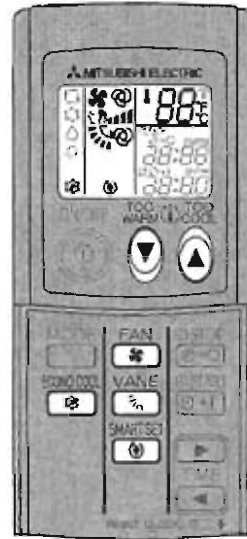
 (Swing).....The vane moves up and down Intermittently.


■ To change the horizontal airflow direction:

Move the vertical vane manually before starting operation.




SMART SET OPERATION



1 Press  during COOL, ECONO COOL, or HEAT mode to select SMART SET mode.


2 Set the temperature, fan speed, and airflow direction.

- The same setting is selected from the next time by simply pressing .
- Two settings can be saved. (One for COOL/ECONO COOL, one for HEAT)
- Select the appropriate temperature, fan speed, and airflow direction according to your room.
- Normally, the minimum temperature setting in HEAT mode is 59°F (16°C). However, during SMART SET operation only, the minimum temperature setting is 50°F (10°C).

Press  again to cancel SMART SET operation.

- SMART SET operation also is canceled when the MODE button is pressed.

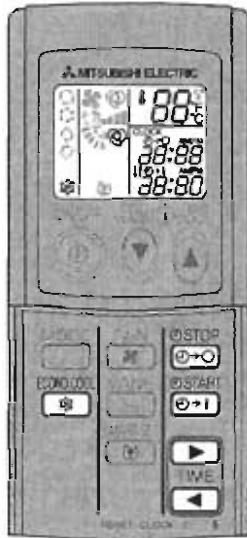
SMART SET operation

A simplified set back function enables to recall the preferred (preset) setting with a single push of the  button. Press the button again and you can go back to the previous setting in an instance.


Example of use:

1. Low energy mode
 - Set the temperature 4°F (2°C) to 6°F (3°C) warmer in COOL and cooler in HEAT mode. This setting is suitable for unoccupied room, and while you are sleeping.
2. Saving frequently used settings
 - Save your preferred setting for COOL/ECONO COOL and HEAT. This enables you to select your preferred setting with a single push of the button.

ECONO COOL OPERATION



ECONO COOL

Press  during COOL mode [page 5](#) to start ECONO COOL operation.

The unit performs swing operation vertically in various cycles according to the temperature of airflow. Set temperature is set 4°F (2°C) higher automatically.

ECONO COOL

Press  again to cancel ECONO COOL operation.


• ECONO COOL operation is also canceled when the VANE button is pressed.


What is "ECONO COOL"?

Swing airflow (change of airflow) makes you feel cooler than stationary airflow. So, even though the set temperature is automatically set at 4°F (2°C) higher, it is possible to perform cooling operation with keeping comfort. As a result, energy can be saved.



TIMER OPERATION (ON/OFF TIMER)



1 Press  or  during operation to set the timer.



 (ON timer): The unit turns ON at the set time.

 (OFF timer): The unit turns OFF at the set time.

-  or  blinks.
- Make sure that the current time is set correctly. [Page 4](#)

2 Press  (Increase) and  (Decrease) to set the time of timer.

- Each press increases or decreases the set time by 10 minutes.
- Set the timer while  or  is blinking.

3 Press  or  again to cancel timer.

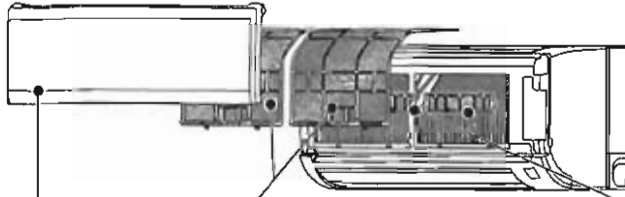
Note:

- ON and OFF timers can be set together. ↓↑ mark indicates the order of timer operations.
- If power failure occurs while ON/OFF timer is set, see [page 5](#) "Auto restart function".

CLEANING

Instructions:

- Switch off the power supply or turn off the breaker before cleaning.
- Be careful not to touch the metal parts with your hands.
- Do not use benzine, thinner, polishing powder, or insecticide.
- Use only diluted mild detergents.
- Do not expose parts to direct sunlight, heat, or fire to dry.
- Do not use water hotter than 120°F (50°C).



Air filter (Catechin air filter)

- **Clean every 2 weeks**
- Remove dirt by a vacuum cleaner, or rinse with water.
- After washing with water, dry it well in shade.

What is "Catechin air filter" ?

Catechin is a bioflavonoid that is found in green tea that has both anti-viral and antioxidant qualities. In addition to these benefits, Catechin also offers excellent deodorizing characteristics. Catechin air filter uses this compound to not only improve air quality but also prevent the spread of bacteria and viruses in the room.

Air cleaning filter (Anti-Allergy Enzyme Filter)

Back side of air filter

Every 3 months:

- Remove dirt by a vacuum cleaner.

When dirt cannot be removed by vacuum cleaning:

- Soak the filter and its frame in lukewarm water before rinsing it.
- After washing, dry it well in shade.

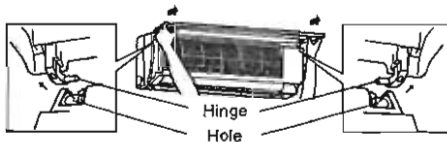
Every year:

- Replace it with a new air cleaning filter for best performance.
- Parts Number **MAC-408FT-E**



Pull to remove from the air filter

Front panel



1. Lift the front panel until a "click" is heard.
2. Hold the hinges and pull to remove as shown in the illustration above.
 - Wipe with a soft dry cloth or rinse it with water.
 - Do not soak it in water for more than two hours.
 - Dry it well in shade.
3. Install the panel by following the removal procedure in reverse. Close the front panel securely and press the positions indicated by the arrows.



Important

- Clean the filters regularly for best performance and to reduce power consumption.
- Dirty filters cause condensation in the air conditioner which will contribute to the growth of fungi such as mold. It is therefore recommended to clean air filters every 2 weeks.

WHEN YOU THINK THAT TROUBLE HAS OCCURRED

Even if these items are checked, when the unit does not recover from the trouble, stop using the air conditioner and consult your dealer.


Symptom	Explanation & Check points
Indoor Unit	
The unit cannot be operated.	<ul style="list-style-type: none"> Is the breaker turned on? Is the power supply plug connected? Is the ON timer set? Page 7
All LED lamps on the indoor unit are blinking.	<ul style="list-style-type: none"> Are the horizontal vanes installed correctly? Page 8
The horizontal vane does not move.	<ul style="list-style-type: none"> Are the horizontal vanes installed correctly? Page 8 Is the fan guard deformed?
The unit cannot be operated for about 3 minutes when restarted.	<ul style="list-style-type: none"> This protects the unit according to instructions from the microprocessor. Please wait.
Mist is discharged from the air outlet of the indoor unit.	<ul style="list-style-type: none"> The cool air from the unit rapidly cools moisture in the air inside the room, and it turns into mist.
The swing operation of the HORIZONTAL VANE is suspended for a while, then restarted.	<ul style="list-style-type: none"> This is for the swing operation of the HORIZONTAL VANE to be performed normally.
The airflow direction changes during operation. The direction of the horizontal vane cannot be adjusted with the remote controller.	<ul style="list-style-type: none"> When the unit is operated in COOL or DRY mode, if the operation continues with air blowing down for 0.5 to 1 hour, the direction of the airflow is automatically set to horizontal position to prevent water from condensing and dripping. In the heating operation, if the airflow temperature is too low or when defrosting is being done, the horizontal vane is automatically set to horizontal position.
The operation stops for about 10 minutes in the heating operation.	<ul style="list-style-type: none"> Outdoor unit is in defrost. Since this is completed in max.10 minutes, please wait. (When the outside temperature is too low and humidity is too high, frost is formed.)
The unit starts operation by itself when the main power is turned on, but hasn't received sign from the remote controller.	<ul style="list-style-type: none"> These models are equipped with an auto restart function. When the main power is turned off without stopping the unit with the remote controller and is turned on again, the unit starts operation automatically in the same mode as the one set with the remote controller just before the shutoff of the main power. Refer to "Auto restart function" page 5.
Multi system	
The indoor unit which is not operating becomes warm and a sound, similar to water flowing, is heard from the unit.	<ul style="list-style-type: none"> A small amount of refrigerant continues to flow into the indoor unit even though it is not operating.
When heating operation is selected, operation does not start right away.	<ul style="list-style-type: none"> When operation is started during defrosting of outdoor unit is done, it takes a few minutes (max. 10 minutes) to blow out warm air.
Outdoor Unit	
The fan of the outdoor unit does not rotate even though the compressor is running. Even if the fan starts to rotate, it stops soon.	<ul style="list-style-type: none"> When the outside temperature is low during cooling operation, the fan operates intermittently to maintain sufficient cooling capacity.
Water leaks from the outdoor unit.	<ul style="list-style-type: none"> During COOL and DRY operations, pipe or pipe connecting sections are cooled and this causes water to condense. In the heating operation, water condensed on the heat exchanger drips down. In the heating operation, the defrosting operation makes ice forming on the outdoor unit melt and drip down.
White smoke is discharged from the outdoor unit.	<ul style="list-style-type: none"> In the heating operation, vapor generated by the defrosting operation looks like white smoke.

Symptom	Explanation & Check points
Remote controller	
The display on the remote controller does not appear or it is dim. The indoor unit does not respond to the remote control signal.	<ul style="list-style-type: none"> Are the batteries exhausted? Page 4 Is the polarity (+, -) of the batteries correct? Page 4 Are any buttons on the remote controller of other electric appliances being pressed?
Does not cool or heat	
The room cannot be cooled or heated sufficiently.	<ul style="list-style-type: none"> Is the temperature setting appropriate? Page 5 Is the fan setting appropriate? Please change fan speed to higher setting. Page 6 Are the filters clean? Page 8 Is the fan or heat exchanger of the indoor unit clean? Are there any obstacles blocking the air inlet or outlet of the indoor or outdoor unit? Is a window or door open?
The room cannot be cooled sufficiently.	<ul style="list-style-type: none"> When a ventilation fan or a gas cooker is used in a room, the cooling load increases, resulting in an insufficient cooling effect. When the outside temperature is high, the cooling effect may not be sufficient.
The room cannot be heated sufficiently.	<ul style="list-style-type: none"> When the outside temperature is low, the heating effect may not be sufficient.
Air does not blow out soon in the heating operation.	<ul style="list-style-type: none"> Please wait as the unit is preparing to blow out warm air.
Airflow	
The air from the indoor unit smells strange.	<ul style="list-style-type: none"> Are the filters clean? Page 8 Is the fan or heat exchanger of the indoor unit clean? The unit may suck in an odor adhering to the wall, carpet, furniture, cloth, etc. and blow it out with the air.
Sound	
Cracking sound is heard.	<ul style="list-style-type: none"> This sound is generated by the expansion/contraction of the front panel, etc. due to change in temperature.
"Bubbling" sound is heard.	<ul style="list-style-type: none"> This sound is heard when the outside air is absorbed from the drain hose by turning on the range hood or the ventilation fan, making water flowing in the drain hose to spout out. This sound is also heard when the outside air blows into the drain hose in case the outside wind is strong.
Mechanical sound is heard from the indoor unit.	<ul style="list-style-type: none"> This is the switching sound in turning on/off the fan or the compressor.
The sound of water flowing is heard.	<ul style="list-style-type: none"> This is the sound of refrigerant or condensed water flowing in the unit.
Hissing sound is sometimes heard.	<ul style="list-style-type: none"> This is the sound when the flow of refrigerant inside the unit is changed.

In the following cases, stop using the air conditioner and consult your dealer.

- When water leaks or drips from the indoor unit.
- When the upper operation indicator lamp blinks.
- When the breaker trips frequently.
- The remote control signal is not received in a room where an electronic ON/OFF type fluorescent lamp (inverter-type fluorescent lamp, etc.) is used.
- Operation of the air conditioner interferes with radio or TV reception. An amplifier may be required for the affected device.
- When an abnormal sound is heard.

WHEN THE AIR CONDITIONER IS NOT GOING TO BE USED FOR A LONG TIME

- 1 Set to the highest temperature in manual COOL mode, and operate for 3 to 4 hours. **Page 5**
 - This dries the inside of the unit.
 - Moisture in the air conditioner contributes to favorable conditions for growth of fungi, such as mold.
- 2 Press  to stop the operation.
- 3 Turn off the breaker and/or disconnect the power supply plug.
- 4 Remove all batteries from the remote controller.

When using the air conditioner again:

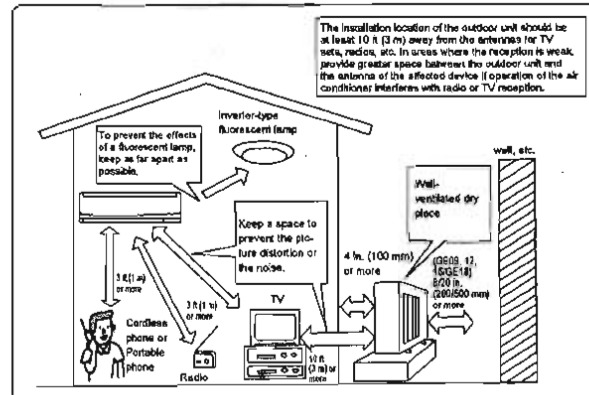
- 1 Clean the air filter. **Page 8**
- 2 Check that the air inlet and outlet of the indoor and outdoor units are not blocked.
- 3 Check that the ground wire is connected correctly.
- 4 Refer to the "PREPARATION BEFORE OPERATION", and follow the instructions. **Page 4**

INSTALLATION PLACE AND ELECTRICAL WORK

Installation place

Avoid installing the air conditioner in the following places.

- Where there is much machine oil.
- Salty places such as the seaside.
- Where sulfide gas is generated such as a hot spring.
- Where oil is splashed or where the area is filled with city smoke.
- Where there is high-frequency or wireless equipment.
- Where the air from the outdoor unit air outlet is blocked.
- Where the operation sound or air from the outdoor unit does not bother the house next door.



Electrical work

- Provide an exclusive circuit for the power supply of the air conditioner.
- Be sure to observe the breaker capacity.

If you have any questions, consult your dealer.

SPECIFICATIONS

Guaranteed operating range

		Indoor	Outdoor
Cooling	Upper limit	80°F (32.2°C) DB 73°F (22.8°C) WB	115°F (46.1°C) DB —
	Lower limit	67°F (19.4°C) DB 57°F (13.9°C) WB	14°F (-10°C) DB —
Heating	Upper limit	80°F (26.7°C) DB —	75°F (23.9°C) DB 65°F (18.3°C) WB
	Lower limit	70°F (21.1°C) DB —	-4°F (-20°C) DB -5°F (-21.1°C) WB

DB : Dry Bulb
WB : Wet Bulb

Note:

If the outdoor temperature is below the lower limit of guaranteed operating range, the outdoor unit may stop operation until the outdoor temperature exceeds the lower limit.

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MEDIDAS DE SEGURIDAD





- Puesto que este producto tiene piezas rotatorias y piezas que pueden provocar descargas eléctricas, lea atentamente las "Medidas de seguridad" antes de usarlo.
- Tome las precauciones aconsejadas en este manual, ya que son importantes para una utilización segura del producto.
- Después de leer este manual, guárdelo a mano junto con el manual de instalación para poder recurrir a él con facilidad.
- Asegúrese de recibir la garantía de su distribuidor y comprobar que contiene la fecha de compra, el nombre del establecimiento, etc. correctos.






Indicaciones y sus significados

- ⚠ ATENCIÓN:** Una manipulación incorrecta podría conllevar con toda probabilidad un peligro grave, por ejemplo, de muerte o de heridas graves.
- ⚠ CUIDADO:** Una manipulación incorrecta podría conllevar, según las condiciones, un peligro grave.

Símbolos utilizados en este manual y su significado

-  : Asegúrese de no hacerlo.
-  : Siga las instrucciones estrictamente.
-  : No introduzca nunca los dedos ni objetos, etc.
-  : No se suba a la unidad interior/exterior ni ponga nada encima.
-  : Peligro de descarga eléctrica. Tenga cuidado.
-  : Asegúrese de desconectar el enchufe de alimentación de la toma de corriente.
-  : Asegúrese de desconectar la corriente.

 ATENCIÓN	
	No conecte el cable de alimentación a un punto intermedio; utilice una alargadera o conecte varios dispositivos a una sola toma de CA. • Podría causar sobrecalentamiento, fuego o descarga eléctrica.
	Asegúrese que el enchufe no tiene polvo e insértele de forma segura en la toma de corriente. • Si el enchufe está sucio puede provocar fuego o una descarga eléctrica.
	No enrolle ni cambie ni tire del cable de alimentación, y no aplique calor ni coloque objetos pesados sobre el mismo. • Podría causar fuego o una descarga eléctrica.
	No accione el disyuntor OFF/ON ni desconecte/conecte el enchufe de alimentación durante el funcionamiento. • Podría generar chispas y originar un fuego. • Una vez que la se apega la unidad interior con el controlador remoto, asegúrese de que coloca el disyuntor en OFF o que desconecta el enchufe de alimentación.
	Evite la exposición directa de la piel al aire frío durante un periodo de tiempo prolongado. • Puede ser perjudicial para la salud.
	El usuario no debe instalar, cambiar de sitio ni reparar la unidad. • Si no se maneja correctamente, el acondicionador de aire puede causar fuego o descarga eléctrica.
 	No introduzca los dedos, palos, etc. en las entradas/salidas de aire. • Podría causar daños, puesto que el ventilador del interior gira a alta velocidad durante el funcionamiento.

 	En caso de que se produzca una condición anómala (como olor a quemado), pare el aparato y desconecte el enchufe de alimentación o coloque el disyuntor en OFF. • Si se prolonga el funcionamiento en la condición anómala puede producirse un fallo, fuego o una descarga eléctrica. En tal caso, consulte a su distribuidor.
	Cuando el acondicionador de aire no enfría o no calienta, es posible que haya una fuga del refrigerante. En tal caso, consulte a su distribuidor. Si una reparación exige la recarga de la unidad con refrigerante, solicite más información al técnico de servicio. • El refrigerante que se usa en el acondicionador de aire es seguro. Normalmente no tiene fugas. Ahora bien, si hay fuga de refrigerante y éste entra en contacto con una fuente de calor como un calentador de ventilador, un calentador de parafina o un horno de cocina, generará gases perjudiciales.
 CUIDADO	
	No toque la entrada de aire ni la aleta de aluminio de la unidad interior/exterior. • Podría hacerse daño.
	No eche insecticidas ni pulverizadores inflamables sobre la unidad. • Podrían provocar incendios o deformaciones de la unidad.
	Evite la exposición directa de animales domésticos o plantas al flujo de aire. • Puede causar daños a los animales y las plantas.
	No coloque otros electrodomésticos o muebles debajo de la unidad interior/exterior. • Podría gotear agua desde la unidad, que podría causar daños o hacer que funcionara mal.
	No instale la unidad en un soporte roto. • La unidad podría caer y causar daños.

MEDIDAS DE SEGURIDAD

⚠ CUIDADO

⊘	<p>Mientras limpia o hace funcionar la unidad, no tenga los pies en una superficie inestable.</p> <ul style="list-style-type: none"> • Si se cayera, podría hacerse daño. <p>No tire del cable de alimentación.</p> <ul style="list-style-type: none"> • Podría hacer que se rompa parte del núcleo del cable, lo que puede causar sobrecalentamiento o fuego. <p>No cargue ni desarme las pilas y no las arroje al fuego.</p> <ul style="list-style-type: none"> • Podría provocar fugas en las pilas, o causar fuego o una explosión. <p>La unidad no deba estar en funcionamiento más de 4 horas en condiciones de humedad elevada (80% de humedad relativa o superior) y/o con la puerta de entrada o las ventanas abiertas.</p> <ul style="list-style-type: none"> • Esto podría causar un descenso en la condensación de agua en el acondicionador de aire que podría humedecer o dañar el mobiliario. • La condensación de agua en el acondicionador de aire podría contribuir a la formación de hongos, como el moho. <p>No use la unidad para fines especiales, como para almacenar alimentos, criar animales, cultivar plantas o guardar dispositivos de precisión u objetos de arte.</p> <ul style="list-style-type: none"> • Podría deteriorar la calidad o causar daños a los animales y plantas. <p>Evite la exposición directa de aparatos de combustión al flujo de aire.</p> <ul style="list-style-type: none"> • Podría interrumpir la combustión.
!	<p>Antes de limpiar la unidad, apáguela y desconecte al cable de alimentación o coloque el disyuntor en OFF.</p> <ul style="list-style-type: none"> • Podría causar daños, puesto que el ventilador del interior gira a alta velocidad durante el funcionamiento. <p>Si la unidad va a dejar de usarse un tiempo prolongado, desconecte el cable de alimentación o coloque el disyuntor en OFF.</p> <ul style="list-style-type: none"> • La unidad puede acumular polvo y provocar sobrecalentamiento o fuego. <p>Sustituya las 2 pilas viejas del controlador remoto por otras nuevas de la misma clase.</p> <ul style="list-style-type: none"> • La utilización de una pila usada junto con una nueva puede causar sobrecalentamiento, provocar una fuga o producir una explosión. <p>Si el líquido de la pila entra en contacto con la piel o la ropa, lávelas a fondo con agua limpia.</p> <ul style="list-style-type: none"> • Si el líquido de la pila entra en contacto con los ojos, lávelos a fondo con agua limpia y acuda a un médico de inmediato. <p>Asegúrese de que la zona está bien ventilada cuando la unidad esté en funcionamiento junto con un aparato de combustión.</p> <ul style="list-style-type: none"> • Una ventilación inadecuada puede originar falta de oxígeno. <p>Coloque el disyuntor en OFF si oye truenos y hay posibilidad de que caigan rayos.</p> <ul style="list-style-type: none"> • La unidad puede resultar dañada si cae algún rayo. <p>Tras varias estaciones con el acondicionador de aire en funcionamiento, afecte una inspección y el mantenimiento además de la limpieza habitual.</p> <ul style="list-style-type: none"> • Si hay polvo o suciedad en la unidad se puede producir un olor desagradable, contribuir al crecimiento de hongos, como el moho, o bien bloquear el conducto de drenaje, lo que hace que gotee agua de la unidad interior. Consulte con su distribuidor sobre la inspección y el mantenimiento, puesto que exigen conocimientos y capacidades especializadas.



No utilice los mandos con las manos mojadas.

- Podría producirse una descarga eléctrica.

No limpie el acondicionador de aire con agua ni coloque sobre él un objeto que contenga agua, como un florero.

- Podría causar fuego o una descarga eléctrica.



No se suba a la unidad exterior ni coloque ningún objeto encima.

- Si se cayera usted o el objeto, podría haber daños.

! IMPORTANTE

Los filtros sucios pueden provocar condensación en el acondicionador de aire que contribuye a la formación de hongos, como el moho. Por lo tanto, es recomendable limpiar los filtros cada 2 semanas.

Para la instalación

⚠ ATENCIÓN



Pida a su distribuidor que instale el aire acondicionado.

- No debe instalarlo al usarlo, puesto que requiere conocimientos y capacidades especializadas. Si no se instala correctamente, puede provocar fugas, fuego o descargas eléctricas.

Dedique una toma de alimentación en exclusiva al acondicionador de aire.

- Si no se utiliza una toma de alimentación en exclusiva, pueden producirse sobrecalentamiento o fuego.

No instale la unidad donde pueda haber fugas de gas inflamable.

- Si hay una fuga de gas y éste se acumula cerca de la unidad, podría producirse una explosión.



Conecte la unidad a una toma a tierra.

- No conecte el cable de tierra a una tubería de gas, tubería de agua, pararrayos o cable de tierra de un teléfono. Si no, podría producirse una descarga eléctrica.

⚠ CUIDADO



Instale un disyuntor de pérdidas de tierra en función del lugar de instalación del aire acondicionado (por ejemplo, áreas muy húmedas).

- Si no instala el disyuntor de pérdidas de tierra, podrían producirse descargas eléctricas.

Asegúrese de que se drene correctamente el agua de drenaje.

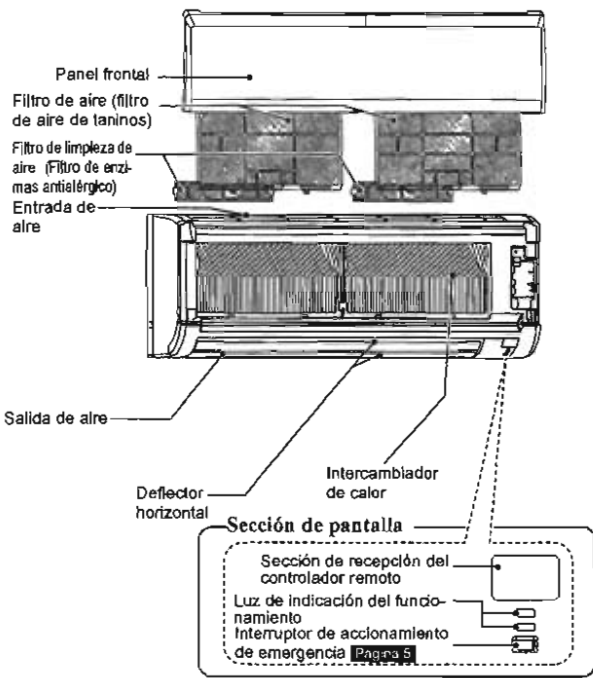
- Si el conducto de drenaje no es correcto, el agua podría caer desde la unidad interior/exterior, causando humedad y daños en el mobiliario.

Si se produce una condición anómala

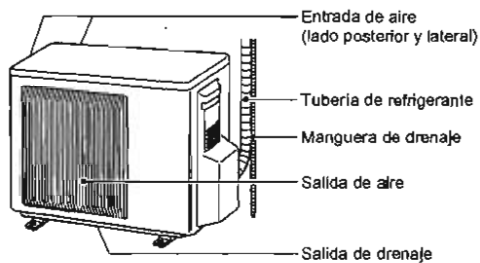
pare de inmediato el acondicionador de aire y consulte a su distribuidor.

NOMBRE DE LAS PARTES

Unidad interior

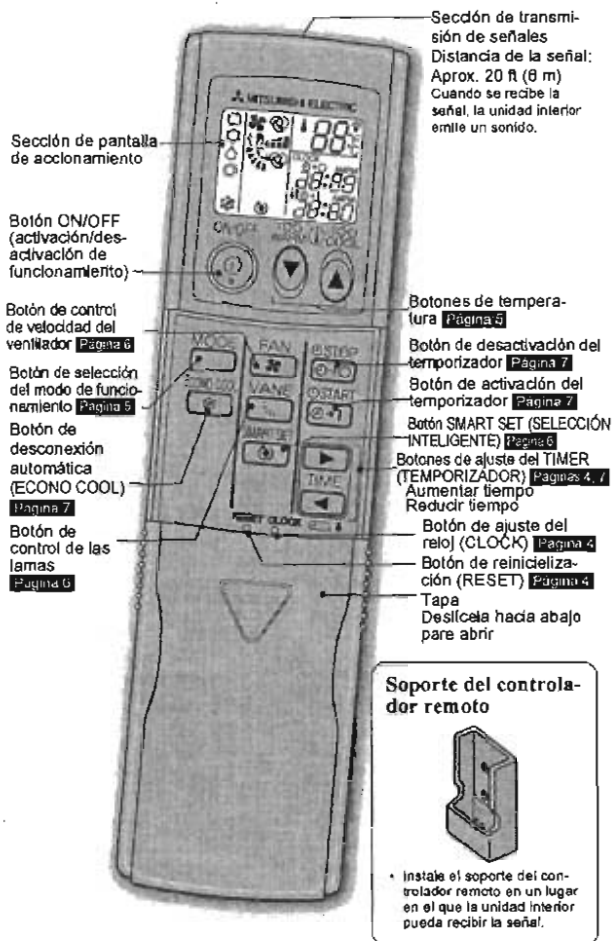


Unidad exterior



La apariencia de las unidades exteriores puede ser diferente.

Controlador remoto

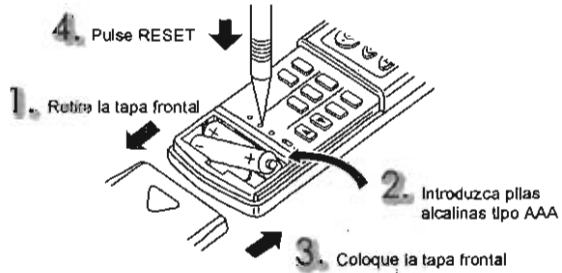


Use únicamente el controlador remoto suministrado con la unidad.
No use otro controlador remoto.

PREPARACIÓN ANTES DE LA PUESTA EN MARCHA

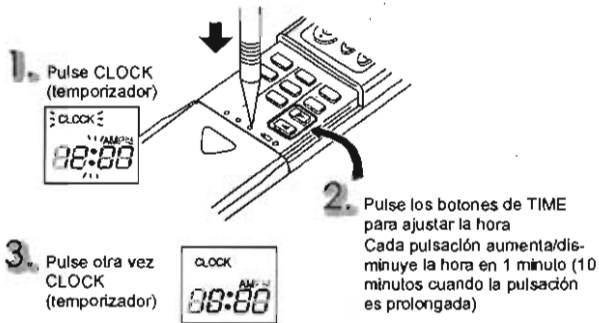
Antes de la puesta en marcha: inserte el enchufe de alimentación en la toma de corriente y/o encienda el disyuntor.

Instalación de las pilas del controlador remoto



- Asegúrese de que la polaridad de las pilas es la correcta.
- No utilice pilas de manganeso. El controlador remoto podría funcionar inadecuadamente.
- No utilice pilas recargables.
- Sustituya todas las pilas por otras nuevas de la misma clase.
- Las pilas pueden durar 1 año aproximadamente. Ahora bien, las pilas caducadas pueden durar menos.
- Pulse RESET (reiniciar) suavemente utilizando un objeto en punta. Si no se pulsa el botón de reinicialización (RESET), el controlador remoto no funcionará correctamente.

Ajuste de la hora actual

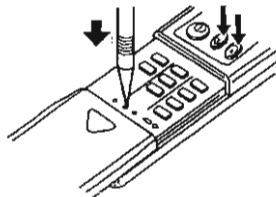


- Pulse CLOCK (temporizador) suavemente utilizando un objeto en punta.

Cambio de unidades de temperatura (°F→°C)

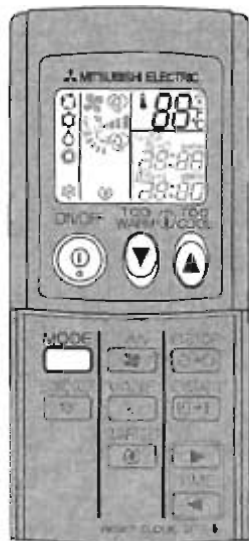
La unidad está configurada por defecto con °F.

1. Pulse RESET (reiniciar) con los botones de temperatura pulsados.



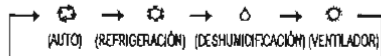
- Pulse RESET (reiniciar) suavemente utilizando un objeto en punta.
- Para cambiar la unidad de temperatura de °C a °F, pulse RESET.

SELECCIÓN DE MODOS DE FUNCIONAMIENTO



1 Pulse **ON/OFF** para que se ponga en funcionamiento.

2 Pulse **MODE** para seleccionar el modo de funcionamiento. El modo cambia con cada pulsación de la manera siguiente:



3 Pulse **▲** o **▼** para ajustar la temperatura. Cada pulsación eleva o disminuye la temperatura en 1°F (1°C).

Pulse **ON/OFF** para apagarlo.
 • Cuando vuelva a encenderlo, se activará la misma configuración seleccionada si pulsa **ON/OFF**.

Luz de indicación de funcionamiento

La luz de indicación de funcionamiento muestra el estado de funcionamiento de la unidad.

Indicación	Estado de funcionamiento	Temperatura ambiente
☀	La unidad está en funcionamiento para alcanzar la temperatura fijada	Aproximadamente 4°F (2°C) o más de diferencia con la temperatura fijada
☀ ○	La temperatura ambiente se acerca a la temperatura fijada	Aproximadamente de 2 a 4°F (1 a 2°C) de diferencia con la temperatura fijada
☀ ☀	Modo en espera (sólo durante el funcionamiento multisistema)	—

☀ Luz encendida ✨ Luz parpadeante ○ Luz apagada

Funcionamiento multisistema

Dos o más unidades interiores pueden funcionar con una unidad exterior. Si se activan varias unidades interiores al mismo tiempo, las operaciones de refrigeración y calefacción no pueden realizarse simultáneamente. Cuando se selecciona REFRIGERACIÓN en una unidad y CALEFACCIÓN en otra o viceversa, la última unidad seleccionada entra en modo de espera. La luz de funcionamiento parpadea (sección de pantalla).

Modo de AUTO (Cambio automático)

La unidad selecciona el modo de funcionamiento de acuerdo con la diferencia que haya entre la temperatura ambiente y la temperatura establecida. Durante el modo de AUTO, la unidad cambia el modo (REFRIGERACIÓN → CALEFACCIÓN) cuando la temperatura ambiente difiere en 4°F (2°C) de la temperatura establecida durante más de 15 minutos.

Nota:

- No se recomienda utilizar el modo de Auto si esta unidad interior está conectada a una unidad exterior de tipo MXZ.
- Dos o más unidades interiores pueden funcionar con una unidad exterior. Cuando se ponen en funcionamiento simultáneamente varias unidades interiores, puede que la unidad no altere el modo de funcionamiento entre el de REFRIGERACIÓN y el de CALEFACCIÓN. En tal caso, la unidad interior se coloca en el modo de espera.

Modo de REFRIGERACIÓN

Disfrute de aire frío a la temperatura que desee.

Nota:

No ponga en funcionamiento el modo de REFRIGERACIÓN con temperaturas muy bajas en el exterior (inferior a 14°F (-10°C)). El agua condensada en la unidad puede gotear y humedecer o dañar el mobiliario, etc.

Modo de DESHUMIDIFICACIÓN

Deshumedezca su habitación. Puede refrigerarla ligeramente. La temperatura no se puede ajustar mientras el aparato está en el modo de DESHUMIDIFICACIÓN.

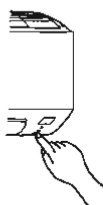
Modo de CALEFACCIÓN

Disfrute de aire cálido a la temperatura que desee.

Funcionamiento de emergencia

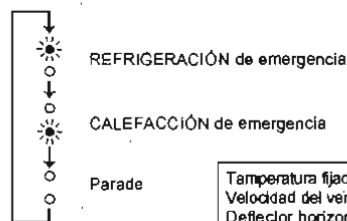
Si no se puede utilizar el controlador remoto...

Se puede activar el funcionamiento de emergencia pulsando el Interruptor de accionamiento de emergencia (E.D.SW) en la unidad interior.



Cada vez que se pulsa el Interruptor de accionamiento de emergencia (E.O.SW), el funcionamiento cambia en el orden siguiente:

Luz de indicación de funcionamiento



Temperatura fijada: 75°F (24°C)
 Velocidad del ventilador: media
 Deflector horizontal: auto

Nota:

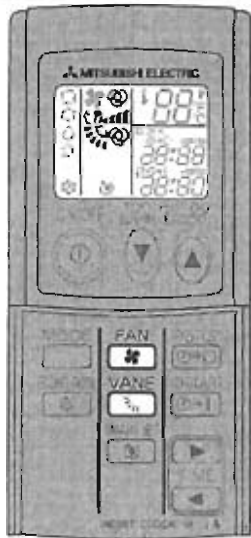
Los primeros 30 minutos de funcionamiento son de prueba. El control de temperatura no funciona y la velocidad del ventilador está fijada en "Alta".

Función de reinicio automático

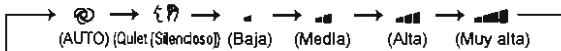
En caso de que se produzca un corte en el suministro eléctrico o se apague la unidad mientras esté funcionando, la "Función de reinicio automático" se activará automáticamente en el mismo modo seleccionado con el controlador remoto antes de que se interrumpiese el funcionamiento. Cuando está configurado el temporizador, los ajustes se anulan y la unidad empieza a funcionar al volver a encenderla.

Si no desea utilizar esta función, póngase en contacto con el servicio técnico ya que tendrá que modificar los ajustes de la unidad.

VELOCIDAD DEL VENTILADOR Y AJUSTE DE LA DIRECCIÓN DEL AIRE



Pulse **FAN** para seleccionar la velocidad del ventilador. La velocidad del ventilador cambia con cada pulsación en el orden siguiente:



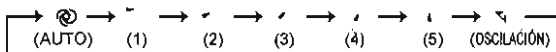
- Al configurar la unidad Interior en AUTO, se escuchan dos pitidos cortos.
- Utilice una velocidad de ventilador superior para calentar o enfriar la habitación más rápidamente. Se recomienda reducir la velocidad del ventilador una vez que la sala se ha enfriado/caentado.
- Utilice una velocidad de ventilador inferior para un funcionamiento silencioso.

Nota:

Funcionamiento multisistema

Cuando se ponen en funcionamiento simultáneamente varias unidades interiores para una función de calefacción, la temperatura del flujo de aire puede ser baja. En este caso, se recomienda ajustar la velocidad del ventilador en modo AUTO (cambio automático).

Pulse **VANE** para seleccionar la dirección del aire. La dirección del aire cambia con cada pulsación en el orden siguiente:



- Al configurar la unidad Interior en AUTO, se escuchan dos pitidos cortos.

Dirección del flujo de aire

(AUTO).....El deflector se ajusta en la dirección de flujo de aire que ofrece un mayor rendimiento. REFRIGERACIÓN/DESHUMIDIFICACIÓN: posición horizontal. CALEFACCIÓN: posición (5).

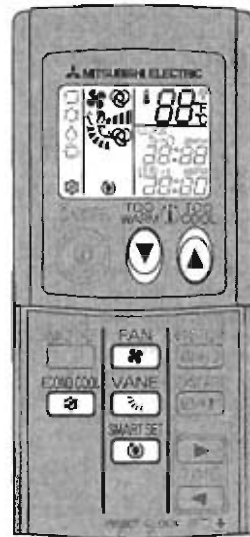
(Manual).....Para un mejor rendimiento del acondicionador de aire, seleccione la posición superior para REFRIGERACIÓN/DESHUMIDIFICACIÓN, y la posición inferior para CALEFACCIÓN. Si se selecciona la posición (4) o (5) durante el modo de REFRIGERACIÓN/DESHUMIDIFICACIÓN, el deflector se desplaza automáticamente a la posición horizontal pasado un periodo de 30 minutos a 1 hora para evitar que gotee el agua de condensación.

(Oscilación).....El deflector se desplaza hacia arriba y hacia abajo de forma intermitente.

- Para cambiar la dirección del flujo de aire. Desplace el deflector vertical manual antes de que empiece a funcionar el acondicionador.



FUNCIONAMIENTO SMART SET (SELECCIÓN INTELIGENTE)



1 Pulse **SMART SET** durante el modo de REFRIGERACIÓN, DESCONEXIÓN AUTOMÁTICA (ECONO COOL) o CALEFACCIÓN para seleccionar el modo SMART SET (SELECCIÓN INTELIGENTE).

2 Establezca la temperatura, la velocidad del ventilador y la dirección del flujo de aire.

- La próxima vez que lo encienda, podrá seleccionar esta misma configuración sólo con pulsar **SMART SET**.
- Pueden guardarse dos grupos de configuración. (Uno para REFRIGERACIÓN/DESCONEXIÓN AUTOMÁTICA, otro para CALEFACCIÓN)
- Seleccione la temperatura, la velocidad del ventilador y la dirección del flujo de aire adecuadas para la habitación.
- Normalmente, la configuración de temperatura mínima en el modo CALEFACCIÓN es 59°F (16°C). Tenga en cuenta que durante el funcionamiento en modo SMART SET (SELECCIÓN INTELIGENTE) la temperatura mínima es de 50°F (10°C).

Vuelva a pulsar **SMART SET** para cancelar el funcionamiento SMART SET (SELECCIÓN INTELIGENTE).

- El funcionamiento SMART SET (SELECCIÓN INTELIGENTE) también se cancela al pulsar el botón MODE (MODO).

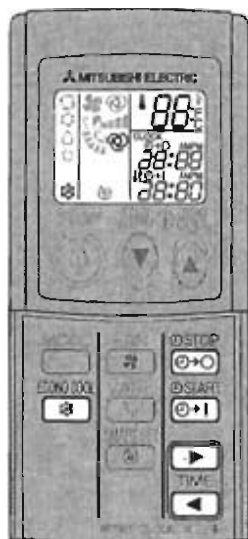
Funcionamiento SMART SET (SELECCIÓN INTELIGENTE)

Mediante una sencilla función de selección previa se puede recordar la configuración preferida (preestablecida) con sólo pulsar el botón **SMART SET**. Para volver a la configuración anterior, vuelva a pulsar el botón.


Ejemplo de uso:

1. Modo de bajo consumo
Ajuste la temperatura de 4°F (2°C) a 6°F (3°C) más caliente en el modo REFRIGERACIÓN y más frío en el modo CALEFACCIÓN. Puede usar esta configuración para una habitación desocupada o mientras duerme.
2. Guardar las configuraciones más frecuentes
Guarde su configuración preferida para REFRIGERACIÓN/DESCONEXIÓN AUTOMÁTICA y CALEFACCIÓN. De esta forma, podrá seleccionar su configuración preferida con sólo pulsar un botón.

FUNCIONAMIENTO DE LA DESCONEXIÓN AUTOMÁTICA (ECONO COOL)









ECONO COOL
 Pulse  durante el modo de REFRIGERACIÓN **Página 5** para iniciar el funcionamiento de desconexión automática (ECONO COOL).
 La unidad realiza la operación de oscilación verticalmente en varios ciclos según la temperatura del flujo de aire. La temperatura fijada sube automáticamente 4°F (2°C).





ECONO COOL
 Pulse  otra vez para cancelar la operación ECONO COOL.
 • El funcionamiento de DESCONEXIÓN AUTOMÁTICA (ECONO COOL) también se puede cancelar pulsando el botón de DEFLECTOR (VANE).



¿En qué consiste la función de "desconexión automática (ECONO COOL)"?

Si la dirección del aire cambia cada cierto tiempo (válvula del aire), el ambiente se refresca más que si la dirección se mantiene siempre fija. Así pues, aunque la temperatura establecida aumente automáticamente en 4°F (2°C), puede utilizar esta función cuando el aparato esté en modo de refrigeración y así sentirse cómodo. Además, podrá ahorrar energía.

FUNCIONAMIENTO DEL TEMPORIZADOR (ACTIVACIÓN/DESACTIVACIÓN DEL TEMPORIZADOR)

1 Pulse  o  durante el funcionamiento para ajustar el temporizador.
 (ACTIVACIÓN del temporizador):
 La unidad se encenderá a la hora establecida.
 (DESACTIVACIÓN del temporizador):
 La unidad se apagará a la hora establecida.
 •  o  parpadea.
 • Asegúrese de que la hora actual es la correcta. **Página 4**

2 Pulse  (Aumentar) y  (Disminuir) para ajustar la hora del temporizador.
 Con cada pulsación la hora establecida aumenta o disminuye en 10 minutos.
 • Ajuste el temporizador mientras  o  parpadean.

3 Pulse  o  de nuevo para cancelar el temporizador.

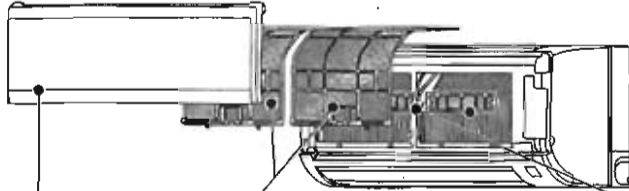
Nota:

- Los temporizadores de ON (encendido) y OFF (apagado) se pueden configurar a la vez. La marca "↑" muestra el orden en el que se activarán los temporizadores.
- Si se produce un corte en el suministro eléctrico mientras está configurado el temporizador en ACTIVACIÓN/DESACTIVACIÓN, consulte la **Página 5** "Función de reinicio automático".

LIMPIEZA

Instrucciones:

- Durante la limpieza, apague el disyuntor o desenchúfelo de la toma de corriente.
- Tenga cuidado de no tocar las partes metálicas con las manos.
- No utilice bencina, polvo de pulimentación ni insecticida.
- Use sólo detergentes suaves diluidos.
- No exponga directamente al sol, al calor o a las llamas ninguna pieza con el fin de secarla.
- No use agua con temperatura superior a 120°F (50°C).



Filtro de aire (filtro de aire de taninos)

- **Límpielo cada 2 semanas**
- Elimine la suciedad con un aspirador o aclárelo con agua.
- Después de limpiarlo con agua, déjelo secar completamente a la sombra.

¿Qué es el "filtro de aire de taninos"?

Los taninos son bioflavonoides que se encuentran en el té verde y que tienen propiedades tanto antivirales como antioxidantes. Además de estas ventajas, los taninos ofrecen también excelentes características como desodorante. Este filtro de aire utiliza los taninos no sólo para mejorar la calidad del aire, sino también para evitar la diseminación de bacterias y virus por la habitación.

Filtro de limpieza de aire (Filtro de enzimas antialérgico)

Parte posterior del filtro de aire

Cada 3 meses:

- Elimine la suciedad con un aspirador.

Si la suciedad no se puede eliminar con un aspirador:

- Sumerja el filtro y su carcasa en agua empuada antes de enjuagarlos.
- Tras el lavado, séquelo bien a la sombra.

Cada año:

- Cambie el filtro de aire por uno nuevo para un mejor rendimiento.
- Número de las piezas **MAC 403F1-E**



Tire para desacoplar del filtro de aire.

Panel frontal



1. Suba el panel frontal hasta que oiga un "click".
2. Sujete los goznes y tire de él para extraerlo, como se muestra en la ilustración anterior.
 - Pásele un paño suave seco o aclárelo con agua.
 - No lo empape en agua más de dos horas.
 - Séquelo bien en la sombra.
3. Instale el panel siguiendo las instrucciones de extracción en orden inverso. Cierre el panel frontal de forma segura y pulse las posiciones que indican las flechas.



Importante

- Limpie los filtros con regularidad para un mejor rendimiento y para reducir el consumo de electricidad.
- Los filtros sucios pueden provocar condensación en el acondicionador de aire que contribuye a la formación de hongos, como el moho. Por lo tanto, es recomendable limpiar los filtros cada 2 semanas.

SI CREE QUE HA OCURRIDO ALGÚN PROBLEMA

Si después de comprobar estas cuestiones el acondicionador de aire sigue sin funcionar bien, póngase en contacto con su distribuidor.


Sintoma	Explicación y puntos de comprobación
Unidad interior	
La unidad no puede ponerse en funcionamiento.	<ul style="list-style-type: none"> ¿Está activado el disyuntor? ¿Está puesto el enchufe de la alimentación? ¿Está configurada la activación del temporizador? Página 7
Todas las luces de los indicadores de la unidad interior parpadean.	<ul style="list-style-type: none"> ¿Los deflectores horizontales están instalados correctamente? Página 8
El deflector horizontal no se mueve.	<ul style="list-style-type: none"> ¿Está correctamente instalado el deflector horizontal? Página 8 ¿Está deformado el protector del ventilador?
Cuando se vuelve a poner en marcha, la unidad tarda unos 3 minutos en funcionar.	<ul style="list-style-type: none"> Se trata de una instrucción del microprocesador para proteger la unidad. Espere.
El vapor se descarga a través de la salida de aire de la unidad interior.	<ul style="list-style-type: none"> El aire refrigerado de la unidad enfría rápidamente la humedad del interior de la habitación y la convierte en vapor.
La operación de oscilación del DEFLECTOR HORIZONTAL se suspende durante un tiempo y, a continuación, se reanuda.	<ul style="list-style-type: none"> Es para que la operación de oscilación del DEFLECTOR HORIZONTAL se realice con normalidad.
La dirección del flujo de aire cambia en pleno funcionamiento. La dirección del deflector horizontal no puede ajustarse con el controlador remoto.	<ul style="list-style-type: none"> Cuando el aire acondicionado sigue funcionando en el modo de REFRIGERACIÓN o de DESHUMIDIFICACIÓN, después de llevar entre 30 minutos y 1 hora expulsando el aire hacia abajo, la dirección del flujo de aire se ajusta automáticamente en la posición horizontal para evitar que el agua condensada gotee. En el modo de calefacción, si la temperatura de la corriente de aire es demasiado baja o se está eliminando la escarcha, el deflector horizontal se ajusta automáticamente en la posición horizontal.
El funcionamiento se detiene durante unos 10 minutos en modo calefacción.	<ul style="list-style-type: none"> Se está desescarchando la unidad exterior. Espere hasta que acabe el proceso, que dura unos 10 minutos. (La escarcha se forma cuando la temperatura exterior es demasiado baja y la humedad demasiado alta.)
La unidad se pone en marcha por sí misma al conectar la alimentación principal, aunque no haya recibido la señal del controlador remoto.	<ul style="list-style-type: none"> Estos modelos están equipados con la función de reinicio automático. Cuando se desconecta la alimentación principal sin detener la unidad mediante el controlador remoto y se vuelve a encender, la unidad se pone en marcha automáticamente en el mismo modo seleccionado con el controlador remoto justo antes de que se desconectara la alimentación principal. Consulte "Función de reinicio automático" Página 5.
Multisistema	
La unidad interior que no está en funcionamiento se calienta y emite un sonido parecido al agua que corre.	<ul style="list-style-type: none"> En la unidad interior, continúa circulando una pequeña cantidad de líquido refrigerante aunque esta unidad no esté en funcionamiento.
Cuando se selecciona la operación de calefacción, no se pone en marcha de forma inmediata.	<ul style="list-style-type: none"> Cuando se inicia la operación durante el desescarchado de la unidad exterior, la expulsión del aire caliente lleva unos minutos (máximo 10).
Unidad exterior	
El ventilador de la unidad exterior no gira aunque el compresor está funcionando. Aunque el ventilador empieza a girar, se para en seguida.	<ul style="list-style-type: none"> Cuando la temperatura exterior es baja durante la operación de refrigeración, el ventilador funciona intermitentemente para mantener suficiente capacidad de enfriamiento.
En la unidad exterior hay una fuga de agua.	<ul style="list-style-type: none"> Durante la REFRIGERACIÓN o la DESHUMIDIFICACIÓN, el enfriamiento de los tubos y de las conexiones de los tubos hace que se condense el agua. En el modo de calefacción, el agua se condensa en el intercambiador de calor y empieza a gotear. En el modo de calefacción, la función de desescarchado detiene el hielo adherido a la unidad exterior y el agua empieza a gotear.

Sintoma	Explicación y puntos de comprobación
Unidad exterior	
Sale humo blanco de la unidad exterior.	<ul style="list-style-type: none"> En el modo de calefacción, el vapor que se genera debido al funcionamiento de desescarchado tiene el aspecto de humo blanco.
Controlador remoto	
La pantalla del controlador remoto no aparece o se oscurece. La unidad interior no responde a la señal del controlador remoto.	<ul style="list-style-type: none"> ¿Están agotadas las pilas? Página 4 ¿Es correcta la polaridad (+, -) de las pilas? Página 4 ¿Se ha pulsado algún botón del controlador remoto de otros aparatos eléctricos?
No refrigera	
La habitación no se refrigera lo suficiente.	<ul style="list-style-type: none"> ¿Es correcto el ajuste de la temperatura? Página 9 ¿Es adecuado el ajuste del ventilador? Cambie la velocidad del ventilador a un valor mayor. Página 6 ¿Están limpios los filtros? Página 8 ¿Están limpios el ventilador o el intercambiador de calor de la unidad interior? ¿Hay algún obstáculo que bloquee la entrada o salida de aire de las unidades interior o exterior? ¿Se ha abierto una ventana o puerta?
La habitación no se refrigera lo suficiente.	<ul style="list-style-type: none"> Cuando se utiliza un ventilador de aire o una cocina de gas en la habitación, aumenta la carga de refrigeración, con lo cual el efecto de refrigeración resulta insuficiente. Cuando la temperatura del aire exterior es alta, el efecto de refrigeración puede resultar insuficiente.
La habitación no se calienta lo suficiente.	<ul style="list-style-type: none"> Cuando la temperatura de aire exterior es baja, el efecto de calentamiento puede resultar insuficiente.
Durante el funcionamiento en modo de calefacción, el aire no circula rápidamente.	<ul style="list-style-type: none"> Espere hasta que la unidad esté lista para expulsar aire caliente.
Flujo de aire	
El aire de la unidad interior tiene un olor raro.	<ul style="list-style-type: none"> ¿Están limpios los filtros? Página 8 ¿Están limpios el ventilador o el intercambiador de calor de la unidad interior? La unidad puede absorber el olor adherido a las paredes, alfombras, muebles, prendas, etc. y expulsarlo junto con el aire.
Sonido	
Se oye un ruido de rotura.	<ul style="list-style-type: none"> Se trata de un sonido provocado por la dilatación/contracción del panel frontal, etc. a causa de los cambios de temperatura.
Se oye un ruido de "burbujeo".	<ul style="list-style-type: none"> Este ruido se oye cuando, al encenderse la campana o el ventilador, la manguera de drenaje absorbe aire del exterior y el agua que fluye por la manguera sale expulsada. Este ruido también se oye cuando hace mucho viento y entra aire en la manguera de drenaje.
Se escucha un sonido mecánico en la unidad interior.	<ul style="list-style-type: none"> Corresponde al sonido de encendido/apagado del ventilador o del compresor.
Se oye correr agua.	<ul style="list-style-type: none"> Se trata del ruido del refrigerante o del agua condensada que fluye por la unidad.
A veces se oye un silbido.	<ul style="list-style-type: none"> Se trata del ruido que hace el refrigerante al cambiar la dirección de la circulación en el interior de la unidad.

En los casos siguientes pare el equipo y póngase en contacto con su distribuidor.

- Cuando cae o gotea agua de la unidad interior.
- Cuando la luz de indicación de funcionamiento superior parpadea.
- Cuando el disyuntor se desconecta con frecuencia.
- Es posible que la señal del controlador remoto no se reciba en habitaciones en las que se utilicen fluorescentes de accionamiento electrónico (de tipo Inversor, etc.).
- El funcionamiento del acondicionador de aire interfiere con la capacidad de recepción del televisor o la radio. Puede ser necesario conectar el receptor afectado a un amplificador.
- Si se oye un ruido anómalo.

CUANDO EL ACONDICIONADOR DE AIRE NO SE VAYA A UTILIZAR DURANTE MUCHO TIEMPO

- 1 Ajuste a la máxima temperatura en el modo manual de REFRIGERACIÓN, y déjelo en funcionamiento durante 3 a 4 horas. **Página 5**
 - Esto hace que se seque el interior de la unidad.
 - La humedad condensada en el aparato de aire acondicionado puede contribuir a la formación y expansión de hongos, como el moho.
- 2 Pulse  para que se detenga.
- 3 Desconecte el disyuntor o desconecte el enchufe de la alimentación.
- 4 Quite todas las pilas del controlador remoto.

Al volver a usar el acondicionador de aire:

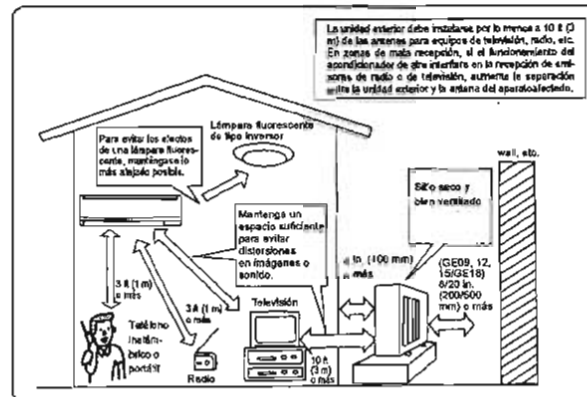
- 1 Limpie el filtro del aire. **Página 8**
- 2 Compruebe que no estén bloqueadas las entradas y salidas de aire de las unidades interior/externa.
- 3 Compruebe que el cable de tierra esté conectado correctamente.
- 4 Consulte la sección "PREPARACIÓN ANTES DE LA PUESTA EN MARCHA" y siga las instrucciones. **Página 4**

LUGAR DE INSTALACIÓN Y TRABAJO ELÉCTRICO

Lugar de instalación

Procure no instalar el acondicionador de aire en los siguientes lugares.

- Donde haya demasiado aceite para maquinalear.
- En ambientes salobres, como las zonas costeras.
- Donde haya gas sulfúrico, como en zonas de baños termales.
- Donde se haya derramado aceite o haya mucho humo aceitoso en el ambiente.
- Donde existe equipo inalámbrico o de alta frecuencia.
- Donde el aire de la salida de aire de la unidad exterior esté bloqueado.
- Donde el sonido del funcionamiento o el del aire de la unidad exterior no moleste a los vecinos.



Instalación eléctrica

- Procure que el acondicionador de aire disponga de un circuito de alimentación exclusivo.
- Procure que la capacidad del disyuntor sea la adecuada.

Si tiene alguna pregunta, consulte a su distribuidor.

ESPECIFICACIONES

Intervalo garantizado de funcionamiento

		Interior	Exterior
Refrigeración	Margen superior	90°F (32,2°C) DB	115°F (46,1°C) DB
		73°F (22,8°C) WB	—
	Margen inferior	67°F (19,4°C) DB	14°F (-10°C) DB
		57°F (13,9°C) WB	—
Calefacción	Margen superior	80°F (26,7°C) DB	75°F (23,9°C) DB
		—	65°F (18,3°C) WB
	Margen inferior	70°F (21,1°C) DB	-4°F (-20°C) WB
		—	-5°F (-21,1°C) WB

DB : Temperatura seca
WB : Temperatura húmeda

Nota:

Si la temperatura exterior se encuentra por debajo del margen inferior del intervalo garantizado de funcionamiento, es posible que la unidad exterior detenga el funcionamiento hasta que la temperatura exterior supere el margen inferior.



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CONSIGNES DE SECURITE








- Avant toute utilisation, veuillez lire les "Consignes de sécurité" car cet appareil contient des pièces rotatives ou autres pouvant entraîner des risques d'électrocution.
- Les consignes contenues dans cette section sont importantes pour la sécurité et doivent donc impérativement être respectées.
- Après avoir lu cette notice, conservez-la avec le manuel d'installation à portée de main pour pouvoir la consulter aisément.
- Veuillez à recevoir une carte de garantie de votre revendeur et vérifiez que la date d'achat et le nom du magasin, etc. sont saisis correctement.






Symboles et leur signification

-  **AVERTISSEMENT:** toute manipulation incorrecte peut avoir des conséquences graves, provoquer des blessures corporelles voire la mort de l'utilisateur.
-  **PRECAUTION:** toute manipulation incorrecte peut avoir des conséquences graves selon les circonstances.




 AVERTISSEMENT	
	<p>Ne pas utiliser de raccord intermédiaire ou de rallonge pour brancher le cordon d'alimentation et ne pas brancher plusieurs appareils à une même prise secteur.</p> <ul style="list-style-type: none"> • Ceci pourrait provoquer une surchauffe de l'appareil, un incendie ou un risque d'électrocution.
	<p>Nettoyer la fiche d'alimentation électrique et l'insérer prudemment dans la prise secteur.</p> <ul style="list-style-type: none"> • Une fiche d'alimentation électrique encrassée peut entraîner un risque d'incendie ou d'électrocution.
	<p>Ne pas enrouler, tordre de façon excessive, modifier ou chauffer le cordon d'alimentation, et ne rien poser dessus.</p> <ul style="list-style-type: none"> • Ceci pourrait provoquer un risque d'incendie ou d'électrocution.
	<p>Ne pas enclencher/couper le disjoncteur ou débrancher/brancher le fiche d'alimentation électrique pendant le fonctionnement de l'appareil.</p> <ul style="list-style-type: none"> • Des étincelles pourraient se produire et provoquer un risque d'incendie. • Toujours couper le disjoncteur ou débrancher la fiche d'alimentation électrique suite à l'arrêt de l'unité interne avec la télécommande.
	<p>Il est déconseillé à toute personne de s'exposer au flux d'air froid pendant une période prolongée.</p> <ul style="list-style-type: none"> • Ceci pourrait entraîner des problèmes de santé.
	<p>L'utilisateur ne doit en aucun cas installer, déplacer ou tenter de réparer le climatiseur.</p> <ul style="list-style-type: none"> • Toute manipulation incorrecte du climatiseur pourrait provoquer un risque d'incendie ou d'électrocution.
 	<p>Ne jamais insérer le doigt ou tout autre objet dans les entrées ou sorties d'air.</p> <ul style="list-style-type: none"> • La vitesse de rotation extrêmement rapide du ventilateur pendant le fonctionnement du climatiseur pourrait provoquer un accident.



Signification des symboles utilisés dans ce manuel

-  : à éviter absolument.
-  : suivre rigoureusement les instructions.
-  : ne jamais insérer le doigt ou un objet long, etc.
-  : ne jamais monter sur l'unité interne/externe et ne rien poser dessus.
-  : risque d'électrocution ! Attention !
-  : veiller à débrancher la fiche d'alimentation électrique de la prise secteur.
-  : couper l'alimentation au préalable.

 	<p>En cas d'anomalie (odeur de brûlé, etc.), arrêter le climatiseur et débrancher la fiche d'alimentation électrique ou couper le disjoncteur.</p> <ul style="list-style-type: none"> • Si le climatiseur continue à fonctionner en présence d'une anomalie, une défaillance technique, un risque d'incendie ou d'électrocution ne sont pas à exclure. Dans ce cas, consulter un revendeur agréé.
	<p>Si la fonction de refroidissement ou de chauffage du climatiseur est inopérante, cela peut indiquer la présence d'une fuite de réfrigérant. Dans ce cas, consulter un revendeur agréé. Si la réparation consiste à recharger l'appareil en réfrigérant, demander conseil auprès d'un technicien responsable de l'entretien.</p> <ul style="list-style-type: none"> • Le réfrigérant contenu dans le climatiseur ne pose aucun problème de sécurité. En règle générale, aucune fuite ne doit se produire. Cependant, si le réfrigérant fuit et entre en contact avec la partie chauffante d'un appareil de chauffage à ventilation, d'un chauffage d'appoint, d'une cuisinière, etc., des substances toxiques se produiront.
 PRECAUTION	
	<p>Ne pas toucher à l'entrée d'air ou aux ailettes en aluminium de l'unité interne/externe.</p> <ul style="list-style-type: none"> • Risque de blessures.
	<p>Ne vaporiser ni insecticide ni substance inflammable sur l'appareil.</p> <ul style="list-style-type: none"> • Ceci pourrait provoquer un incendie ou une déformation de l'appareil.
	<p>Ne pas exposer un animal domestique ou une plante d'intérieur directement sous le courant d'air pulsé.</p> <ul style="list-style-type: none"> • Le bien-être des animaux et des plantes pourrait en être affecté.
	<p>Ne placer ni appareil électrique ni meuble sous l'unité interne/externe.</p> <ul style="list-style-type: none"> • De l'eau pourrait s'écouler de l'appareil et les endommager ou provoquer une panne de leur système.
	<p>Ne jamais laisser le climatiseur posé sur un support endommagé.</p> <ul style="list-style-type: none"> • Il pourrait tomber et provoquer un accident.

CONSIGNES DE SECURITE






 PRECAUTION	
	<p>Veiller à ne pas monter sur une surface instable pour allumer ou nettoyer le climatiseur.</p> <ul style="list-style-type: none"> • Risque de chute et de blessures.
	<p>Ne jamais tirer sur le cordon d'alimentation.</p> <ul style="list-style-type: none"> • Le fil central du cordon d'alimentation pourrait se rompre et provoquer un incendie.
	<p>Ne jamais recharger ou tenter d'ouvrir les piles et ne pas les jeter au feu.</p> <ul style="list-style-type: none"> • Les piles pourraient fuir et présenter un risque d'incendie ou d'explosion.
	<p>Ne pas faire fonctionner le climatiseur pendant plus de 4 heures avec un taux d'humidité important (80% HR ou plus), et/ou lorsqu'une porte ou une fenêtre est ouverte.</p> <ul style="list-style-type: none"> • Ceci peut provoquer de la condensation à l'intérieur du climatiseur, qui risque de s'écouler et de mouiller ou d'endommager le mobilier. • La présence d'humidité dans la climatisation peut contribuer à la croissance de certains champignons tels que la moisissure.
	<p>Ne pas utiliser le climatiseur pour conserver des aliments, élever des animaux, faire pousser des plantes, ranger des outils de précision ou des objets d'art.</p> <ul style="list-style-type: none"> • Leur qualité pourrait s'en ressentir, et le bien-être des animaux et des plantes pourrait en être affecté.
	<p>Ne pas exposer des appareils à combustion directement sous la sortie d'air pulsé.</p> <ul style="list-style-type: none"> • Une combustion imparfaite pourrait en résulter.
	<p>Avant de procéder au nettoyage du climatiseur, le mettre hors tension et débrancher la fiche d'alimentation électrique ou couper le disjoncteur.</p> <ul style="list-style-type: none"> • La vitesse de rotation extrêmement rapide du ventilateur pendant le fonctionnement du climatiseur pourrait provoquer un accident.
	<p>Si le climatiseur doit rester inutilisé pendant une période prolongée, débrancher la fiche d'alimentation électrique ou couper le disjoncteur.</p> <ul style="list-style-type: none"> • Il pourrait s'encrasser et présenter un risque d'incendie ou d'électrocution.
	<p>Remplacer les piles de la télécommande par des piles neuves du même type.</p> <ul style="list-style-type: none"> • Ne jamais mélanger piles usagées et piles neuves; ceci pourrait provoquer une surchauffe, une fuite ou une explosion.
	<p>Si du liquide provenant des piles entre en contact avec la peau ou les vêtements, les rincer abondamment à l'eau claire.</p> <ul style="list-style-type: none"> • Si du liquide alcalin entre en contact avec les yeux, les rincer abondamment à l'eau claire et contacter d'urgence un médecin.
	<p>Si le climatiseur est utilisé conjointement avec un appareil à combustion, veiller à ce que la pièce soit parfaitement ventilée.</p> <ul style="list-style-type: none"> • Une ventilation insuffisante pourrait provoquer un manque d'oxygène dans la pièce.
	<p>Couper le disjoncteur par temps d'orage.</p> <ul style="list-style-type: none"> • La foudre pourrait endommager le climatiseur.
	<p>Si le climatiseur a été utilisé pendant plusieurs saisons consécutives, procéder à une inspection et à un entretien rigoureux en plus du nettoyage normal.</p> <ul style="list-style-type: none"> • Une accumulation de saletés ou de poussière à l'intérieur du climatiseur peut être à l'origine d'une odeur désagréable, contribuer au développement de moisissures ou bloquer l'écoulement des condensats et provoquer une fuite d'eau de l'unité interne. Consulter un revendeur agréé pour procéder à une inspection et des travaux d'entretien nécessitant l'intervention de personnel qualifié et compétent.

	<p>Ne pas actionner les commandes du climatiseur avec les mains mouillées.</p> <ul style="list-style-type: none"> • Risque d'électrocution !
	<p>Ne pas nettoyer le climatiseur avec de l'eau et ne placer ni vase ni verre d'eau dessus.</p> <ul style="list-style-type: none"> • Ceci pourrait provoquer un risque d'incendie ou d'électrocution.
	<p>Ne jamais marcher sur l'unité externe et ne rien poser dessus.</p> <ul style="list-style-type: none"> • Risque de chute et de blessures.

IMPORTANT

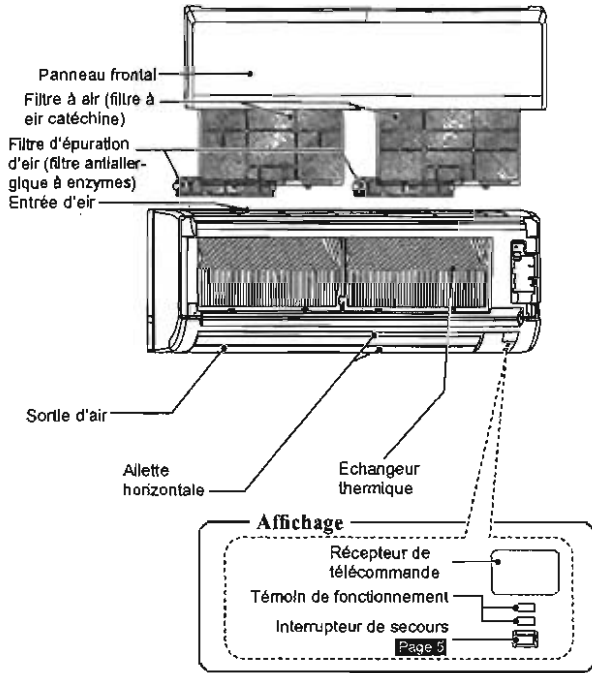
Des filtres encrassés peuvent provoquer de la condensation dans le climatiseur, ce qui contribuera à la croissance de certains champignons tels que la moisissure. Il est donc recommandé de nettoyer les filtres à air toutes les 2 semaines.

A propos de l'installation

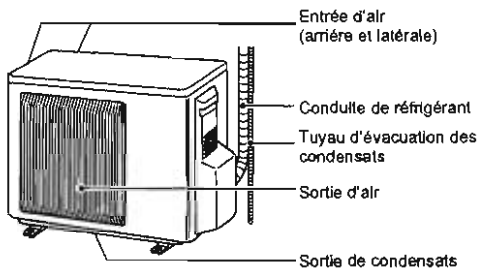
 AVERTISSEMENT	
	<p>Consulter un revendeur agréé pour qu'il procède à l'installation du climatiseur.</p> <ul style="list-style-type: none"> • L'utilisateur ne doit en aucun cas tenter d'installer le climatiseur lui-même; seul du personnel qualifié et compétent est en mesure de le faire. Toute installation incorrecte du climatiseur pourrait être à l'origine de fuites d'eau et provoquer un risque d'incendie ou d'électrocution.
	<p>Prévoir un circuit réservé à l'alimentation du climatiseur.</p> <ul style="list-style-type: none"> • Dans le cas contraire, un risque de surchauffe ou d'incendie n'est pas à exclure.
	<p>Ne pas installer l'appareil dans un endroit susceptible d'être exposé à des fuites de gaz inflammable.</p> <ul style="list-style-type: none"> • L'accumulation de gaz autour de l'appareil entraîne des risques d'explosion.
	<p>Raccorder correctement le climatiseur à la terre.</p> <ul style="list-style-type: none"> • Ne jamais raccorder le câble de terre à un tuyau de gaz, une évacuation d'eau, un paratonnerre ou un câble téléphonique de mise à la terre. Une mise à la terre incorrecte pourrait provoquer un risque d'électrocution.
 PRECAUTION	
	<p>Installer un disjoncteur de fuites à la terre selon l'endroit où le climatiseur sera monté (placé humide par ex.).</p> <ul style="list-style-type: none"> • L'absence de disjoncteur de fuites à la terre peut entraîner un risque d'électrocution.
	<p>Veiller à ce que l'eau de vidange s'écoule correctement.</p> <ul style="list-style-type: none"> • Si l'écoulement des condensats est bouché, l'eau de vidange risque de s'écouler de l'unité interne/externe et d'endommager le mobilier.
<p>En présence d'une situation anormale Arrêter immédiatement le climatiseur et consulter un revendeur agréé.</p>	

NOMENCLATURE

Unité interne

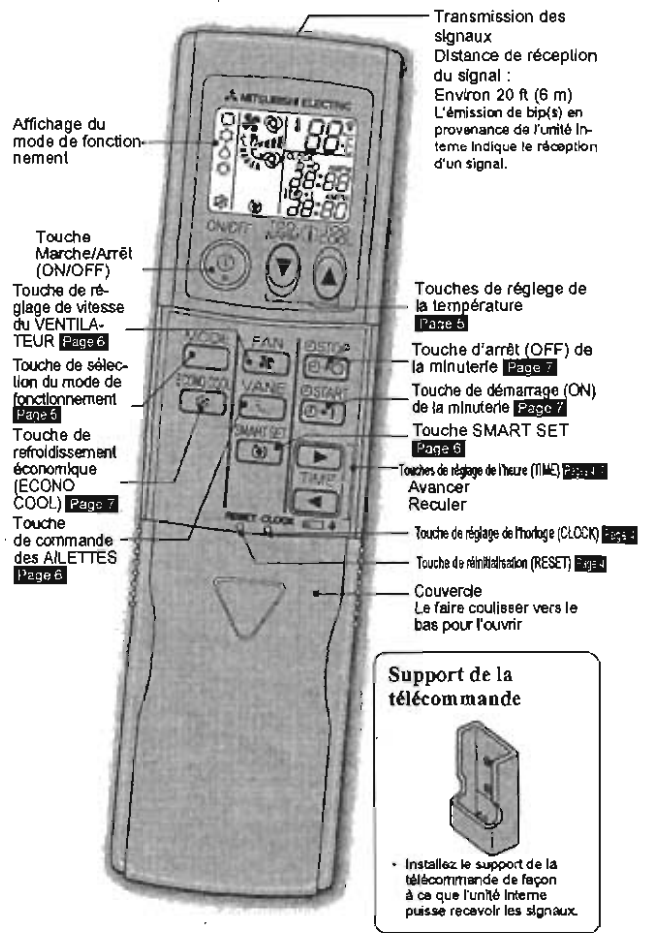


Unité externe



L'apparence des unités externes peut varier d'un modèle à l'autre.

Télécommande

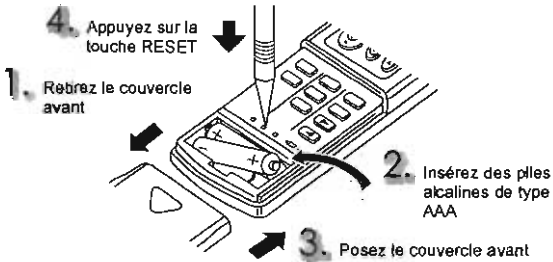


Utilisez uniquement la télécommande fournie avec le climatiseur. N'en utilisez pas d'autres.

PREPARATIF D'UTILISATION

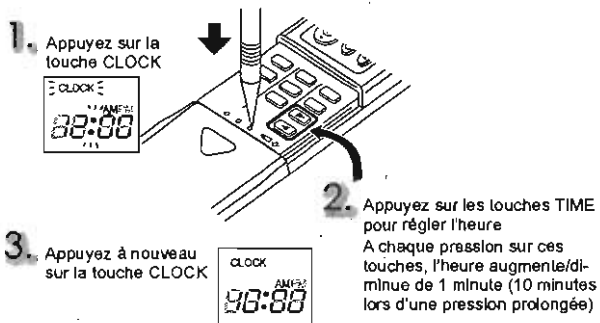
Avant la mise en marche : Insérez la fiche d'alimentation électrique dans la prise secteur et/ou enclenchez le disjoncteur.

Insertion des piles dans la télécommande



- Veillez à respecter la polarité des piles.
- N'utilisez pas de piles au manganèse. Elles pourraient provoquer un dysfonctionnement de la télécommande.
- N'utilisez pas de piles rechargeables.
- Remplacez toutes les piles par des piles de même type.
- La durée de vie des piles est de 1 an environ. Cependant, les piles dont la date d'utilisation est dépassée durent moins longtemps.
- Appuyez doucement sur RESET à l'aide d'un instrument fin. Si la touche RESET n'est pas enfoncée, la télécommande risque de ne pas fonctionner correctement.

Réglage de l'heure

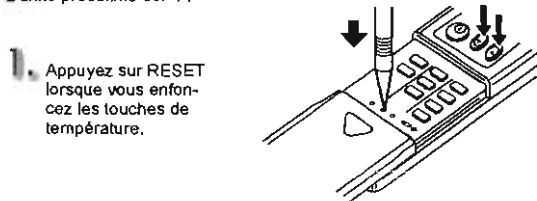


- Appuyez doucement sur CLOCK à l'aide d'un instrument fin.



Changement des unités de température (°F → °C)

L'unité prédéfinie est °F.



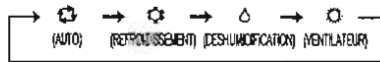
- Appuyez doucement sur RESET à l'aide d'un instrument fin.
- Pour changer l'unité de la température entre degrés Celsius (°C) et degrés Fahrenheit (°F), appuyez sur la touche RESET.

SELECTION DES MODES DE FONCTIONNEMENT



1 Appuyez sur la touche pour lancer le fonctionnement du climatiseur.

2 Appuyez sur la touche pour sélectionner le mode de fonctionnement. Chaque nouvelle pression sur cette touche vous permet de passer d'un mode à l'autre dans l'ordre suivant :



3 Appuyez sur les touches pour régler la température. Chaque nouvelle pression sur ces touches vous permet d'augmenter ou de diminuer la température de 1°F (1°C).

Appuyez sur la touche pour arrêter le fonctionnement du climatiseur.
 • Vous avez la possibilité de recouvrer les mêmes réglages lors de la prochaine utilisation du climatiseur en appuyant simplement sur .

Témoin de fonctionnement

Le témoin de fonctionnement indique l'état de fonctionnement du climatiseur.

Témoin	Etat de fonctionnement	Température de la pièce
	Le climatiseur fonctionne de façon à atteindre la température programmée	Environ 4°F (2°C) d'écart minimum avec la température programmée
	Le température de la pièce se rapproche de la température programmée	Environ 2 à 4°F (1 à 2°C) d'écart avec la température programmée
	Mode de veille (uniquement en fonctionnement multi-système)	—

Allumé Clignotant Eteint

Fonctionnement multi-système

Une unité externe peut fonctionner avec deux unités internes ou davantage. Lorsque plusieurs unités internes fonctionnent simultanément, les modes de refroidissement et de chauffage ne peuvent pas fonctionner en même temps. Lorsque le mode de REFROIDISSEMENT est sélectionné pour une unité et le mode CHAUFFAGE sur une autre, ou inversement, la dernière unité sélectionnée passe en mode de veille. Le témoin d'alimentation clignote (affichage).

Mode AUTO (permutation automatique)

Le climatiseur sélectionne le mode de fonctionnement selon la différence qui existe entre la température de la pièce et la température programmée. En mode AUTO, le climatiseur passe d'un mode à l'autre (REFROIDISSEMENT → CHAUFFAGE) lorsque la température de la pièce est inférieure de 4°F (2°C) à la température programmée pendant plus de 15 minutes.

Remarque :

- Le mode Auto est déconseillé si cette unité interne est connectée à une unité externe de type MXZ.
- Une unité externe peut fonctionner avec deux unités internes ou davantage. Si plusieurs unités internes fonctionnent simultanément, le climatiseur risque de ne pas pouvoir alterner entre les modes de REFROIDISSEMENT et de CHAUFFAGE. Dans ce cas, l'unité interne passe en mode de veille.

Mode de REFROIDISSEMENT

Le confort de l'air frais à votre température.

Remarque :

Ne faites pas fonctionner le climatiseur en mode de REFROIDISSEMENT lorsque les températures extérieures sont extrêmement basses. (inférieure à 14°F [-10°C]). L'eau de condensation présente à l'intérieur du climatiseur risque de s'écouler et d'endommager le mobilier, etc.

Mode de DESHUMIDIFICATION

Éliminez l'humidité de votre pièce. Il se peut que la pièce refroidisse légèrement.

Il n'est pas possible de régler la température en mode de DESHUMIDIFICATION.

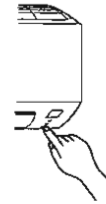
Mode de CHAUFFAGE

Le confort de l'air ambiant à votre température.

Fonctionnement d'urgence

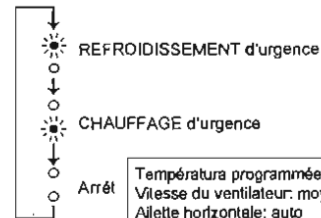
Lorsqu'il est impossible d'utiliser la télécommande...

Vous pouvez lancer le fonctionnement d'urgence en appuyant sur l'interrupteur de secours (E.O.S.W) de l'unité interne.



A chaque fois que vous appuyez sur l'interrupteur de secours (E.O.S.W), le fonctionnement du climatiseur change dans l'ordre suivant :

Témoin de fonctionnement



Température programmée: 75°F (24°C)
 Vitesse du ventilateur: moyenne
 Ailette horizontale: auto

Remarque :

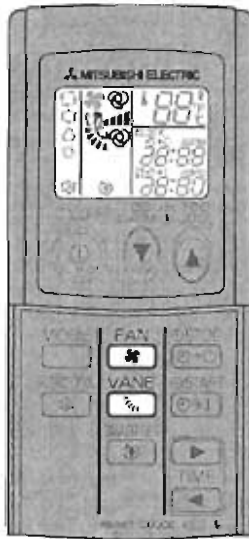
Les premières 30 minutes de fonctionnement constitue un essai de fonctionnement. La commande de température ne fonctionne pas, et la vitesse du ventilateur est réglée sur Rapide.

Fonction de redémarrage automatique

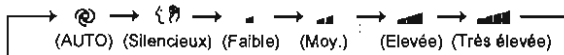
En cas de coupure d'électricité ou d'interruption de l'alimentation principale pendant le fonctionnement du climatiseur, la fonction de redémarrage automatique prend automatiquement le relais et permet de remettre le climatiseur en marche en respectant le mode sélectionné à l'aide la télécommande juste avant le coupure de l'alimentation. Si vous avez recours au fonctionnement manuel de la minuterie, le réglage de la minuterie sera annulé et le climatiseur redémarrera au retour de l'alimentation.

Si vous ne voulez pas utiliser cette fonction, veuillez vous adresser au représentant du service technique afin qu'il modifie le réglage du climatiseur.

REGLAGE DE LA VITESSE DU VENTILATEUR ET DE LA DIRECTION DU FLUX D'AIR



Appuyez sur la touche **FAN** pour sélectionner la vitesse du ventilateur. Chaque nouvelle pression sur cette touche vous permet de modifier la vitesse du ventilateur dans l'ordre suivant :



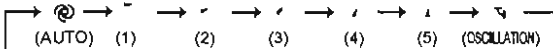
- L'unité interne émet deux bips courts lorsqu'elle est réglée en mode AUTO.
- Augmentez la vitesse du ventilateur pour refroidir/chauffer la pièce plus rapidement. Il est recommandé de réduire la vitesse du ventilateur dès que la pièce est fraîche/chaude.
- Diminuez la vitesse du ventilateur pour un fonctionnement silencieux.

Remarque :

Fonctionnement multi-système

Lorsque plusieurs unités internes fonctionnent simultanément en mode de chauffage, il se peut que la température du flux d'air soit basse. Dans ce cas, il est recommandé de régler la vitesse du ventilateur sur AUTO.

Appuyez sur la touche **VANE** pour sélectionner la direction du flux d'air. Chaque nouvelle pression sur cette touche vous permet de modifier la direction du flux d'air dans l'ordre suivant :



- L'unité interne émet deux bips courts lorsqu'elle est réglée en mode AUTO.

Direction du flux d'air

(AUTO).....L'ailette est réglée pour fournir la direction de flux d'air la plus efficace. REFROIDISSEMENT/DESHUMIDIFICATION : position horizontale. CHAUFFAGE : position (5).

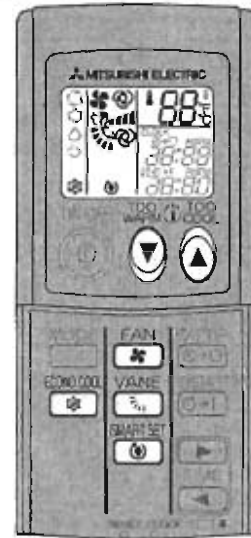
(Manuel).....Pour obtenir une climatisation efficace, l'ailette doit être dirigée vers le haut en mode de REFROIDISSEMENT/DESHUMIDIFICATION, et vers le bas en mode de CHAUFFAGE. Si la position (4) ou (5), est sélectionnée en mode de REFROIDISSEMENT/DESHUMIDIFICATION, l'ailette se place automatiquement en position horizontale au bout de 0,5 à 1 heure pour éviter la formation de gouttes de condensation.

(Oscillation)...L'ailette se déplace de haut en bas par intermittence.

■ Pour modifier la direction horizontale du flux d'air, Déplacez manuellement l'ailette verticale avant de faire fonctionner le climatiseur.



MODE SMART SET (REGLAGE INTELLIGENT)



1 Appuyez sur **SMART SET** en mode REFROIDISSEMENT, ECONO COOL ou CHAUFFAGE pour sélectionner le mode SMART SET (REGLAGE INTELLIGENT).

2 Réglez la température, la vitesse du ventilateur et la direction du flux d'air.

- Pour sélectionner les mêmes réglages par la suite, il vous suffira d'appuyer sur **SMART SET**.
- Il est possible d'enregistrer deux groupes de réglages. (Un pour REFROIDISSEMENT/ECONO COOL, un pour CHAUFFAGE)
- Sélectionnez la température, la vitesse du ventilateur et la direction du flux d'air appropriées pour votre local.
- Normalement, le réglage de température minimum en mode CHAUFFAGE est de 59°F (16°C). Cependant, en mode SMART SET (REGLAGE INTELLIGENT) seul, le réglage de température minimum est de 50°F (10°C).

Appuyez une nouvelle fois sur **SMART SET** pour annuler le mode SMART SET (REGLAGE INTELLIGENT).

- Une pression sur la touche MODE permet également d'annuler le mode SMART SET (REGLAGE INTELLIGENT).

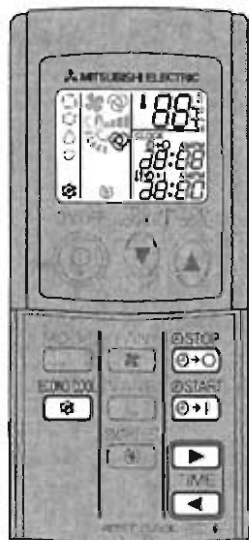
MODE SMART SET (REGLAGE INTELLIGENT)

Une fonction programmable simplifiée permet de rappeler le réglage favori (préprogrammé) à l'aide d'une simple pression sur la touche **SMART SET**. Une seconde pression sur la touche permet de revenir instantanément au réglage précédent.

Exemple d'utilisation:

1. Mode économie d'énergie
Réglez la température à 4°F (2°C) ou 6°F (3°C) de plus en mode REFROIDISSEMENT, et de moins en mode CHAUFFAGE. Ce réglage convient pour les pièces inoccupées ou pendant la nuit.
2. Enregistrement des paramètres fréquemment utilisés
Enregistrez vos réglages favoris pour les modes REFROIDISSEMENT/ECONO COOL et CHAUFFAGE. Il vous suffira ensuite d'une simple pression sur la touche pour rappeler votre réglage favori.

FONCTIONNEMENT EN MODE ECONO COOL



Appuyez sur la touche **ECONO COOL** en mode de REFROIDISSEMENT **Page 5** pour lancer le fonctionnement ECONO COOL.

L'unité effectue un balayage oscillant vertical en différents cycles en fonction de la température du flux d'air, la température programmée est automatiquement réglée à 4°F (2°C) au-dessus de la température normale.

Appuyez à nouveau sur la touche **ECONO COOL** pour annuler le fonctionnement en mode ECONO COOL.

• La touche VANE permet également d'annuler le fonctionnement en mode ECONO COOL.

Qu'est-ce que le mode de REFROIDISSEMENT ECONOMIQUE "ECONO COOL" ?

L'oscillation de l'air pulsé (changement de direction) permet de rafraîchir davantage une pièce qu'un flux d'air constant. Ainsi, même si la température programmée est automatiquement réglée 4°F (2°C) au-dessus de la température normale, il est possible d'utiliser le mode de refroidissement tout en conservant un certain niveau de confort. De plus, vous économisez de l'énergie.

FONCTIONNEMENT DE LA MINUTERIE (MARCHE/ARRET)

1 Appuyez sur les touches **START** ou **STOP** pendant le fonctionnement du climatiseur pour régler la minuterie.

START (Départ de la minuterie [ON]) :
Le climatiseur démarrera (ON) à l'heure programmée.

STOP (Arrêt de la minuterie [OFF]) :
Le climatiseur s'arrêtera (OFF) à l'heure programmée.

• **START** ou **STOP** clignote.

• La minuterie doit être réglée à l'heure juste. **Page 4**

2 Appuyez sur les touches **▶** (Augmenter) et **◀** (Diminuer) pour régler l'heure de la minuterie.

Chaque pression sur ces touches vous permet de faire avancer ou reculer l'heure programmée de 10 minutes.

• Réglez la minuterie lorsque **START** ou **STOP** clignote.

3 Appuyez à nouveau sur les touches **START** ou **STOP** pour annuler le fonctionnement de la minuterie.

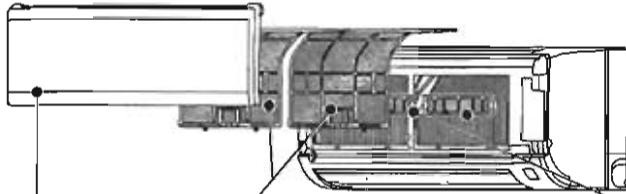
Remarque :

- Les fonctions de démarrage (ON) et d'arrêt (OFF) de la minuterie peuvent être réglées conjointement. Le symbole **↑** indique l'ordre d'application des modes de fonctionnement de la minuterie.
- En cas de coupure d'électricité survenant après le réglage de la minuterie (MARCHE/ARRET), voir **Page 3** "Fonction de redémarrage automatique".

NETTOYAGE

Instructions :

- Coupez l'alimentation ou le disjoncteur avant de procéder au nettoyage du climatiseur.
- Veillez à ne pas toucher les parties métalliques avec les mains.
- N'utilisez ni benzine, ni diluant, ni poudre abrasive, ni insecticide.
- Utilisez uniquement un détergent doux dilué avec de l'eau.
- N'exposez pas les pièces aux rayons directs du soleil, à la chaleur ou à une flamme pour les faire sécher.
- N'utilisez pas d'eau dont la température est supérieure à 120°F (50°C).



Filter à air (filtre à air catéchine)

- **A nettoyer toutes les 2 semaines**
- Éliminez la saleté avec un aspirateur ou lavez le filtre à l'eau.
- Après lavage, laissez bien sécher à l'ombre.

Qu'est-ce qu'un "filtre à air catéchine" ?

La catéchine est un bioflavonoïde que l'on trouve dans le thé vert et dont les propriétés sont à la fois antivirales et antioxydantes. En plus de ces qualités, la catéchine possède également d'excellentes propriétés désodorisantes. Les filtres à air qui utilisent cette substance permettent non seulement d'améliorer la qualité de l'air mais également d'éviter la prolifération des bactéries et des virus dans la pièce.

Filter d'épuration d'air (filtre antiallergique à enzymes)

Envers du filtre à air

Tous les 3 mois :

- Enlever la saleté à l'aide d'un aspirateur.

Lorsque cela ne suffit pas :

- Faites tremper le filtre et son cadre dans de l'eau tiède avant de les nettoyer.
- Lorsqu'ils sont propres, faites-les sécher correctement à l'ombre.

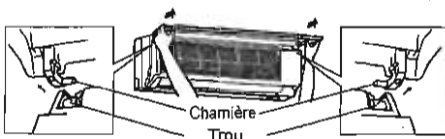
Tous les ans :

- Pour des performances optimales, remplacer le filtre d'épuration d'air.
- Référence **MAC-403FT-E**



Tirez sur le panneau frontal pour le retirer du filtre à air.

Panneau frontal



1. Soulevez le panneau frontal jusqu'à ce que vous entendiez un dé clic.
2. Maintenez les charnières et tirez sur le panneau pour le retirer comme indiqué sur l'illustration ci-dessus.
 - Essuyez-le avec un chiffon doux et sec ou lavez-le à l'eau.
 - Ne le faites pas tremper dans l'eau pendant plus de deux heures.
 - Faites-le sécher correctement à l'ombre.
3. Reposez le panneau en suivant la procédure de dépose en sens inverse. Refermez correctement le panneau frontal et appuyez sur les repères indiqués par les flèches.



! Important

- **Nettoyez régulièrement les filtres pour obtenir des performances optimales et réduire votre consommation d'électricité.**
- **Des filtres encrassés peuvent provoquer de la condensation dans le climatiseur, ce qui contribuera à la croissance de certains champignons tels que la moisissure. Il est donc recommandé de nettoyer les filtres à air toutes les 2 semaines.**

EN PRESENCE D'UNE PANNE POTENTIELLE

Suite à la vérification de ces points, si le climatiseur ne fonctionne toujours pas correctement, ne vous en servez plus et consultez votre revendeur.

Symptôme	Explication & points à vérifier
Unité interne	
L'unité ne fonctionne pas.	<ul style="list-style-type: none"> Le disjoncteur est-il enclenché ? La fiche d'alimentation est-elle branchée ? La minuterie de mise en marche (ON) est-elle programmée ? Page 7
Tous les voyants DEL de l'unité interne clignotent.	<ul style="list-style-type: none"> Les ailettes horizontales sont-elles posées correctement ? Page 8
L'ailette horizontale ne bouge pas.	<ul style="list-style-type: none"> Les ailettes horizontales sont-elles installées correctement ? Page 8 La grille de protection du ventilateur est-elle déformée ?
L'unité ne peut pas être remise en marche dans les 3 minutes qui suivent sa mise hors tension.	<ul style="list-style-type: none"> Cette disposition a été prise pour protéger le climatiseur conformément aux instructions du microprocesseur. Veuillez patienter.
De la buée s'échappe de la sortie d'air de l'unité interne.	<ul style="list-style-type: none"> L'air frais pulsé par le climatiseur refroidit rapidement l'humidité présente dans la pièce, et la transforme en buée.
L'oscillation de l'AILETTE HORIZONTALE est suspendue un certain temps, puis restaurée.	<ul style="list-style-type: none"> Cela permet l'oscillation correcte de l'AILETTE HORIZONTALE.
La direction de l'air pulsé varie pendant le fonctionnement de l'unité. La télécommande ne permet pas de régler la direction de l'ailette horizontale.	<ul style="list-style-type: none"> Lorsque le climatiseur est en mode de REFROIDISSEMENT ou de DESHUMIDIFICATION, s'il fonctionne en continu entre 0,5 et 1 heure avec le flux d'air orienté vers le bas, la direction de l'air pulsé est automatiquement placée en position horizontale afin d'empêcher l'eau de condensation de s'écouler. En mode de chauffage, si la température de l'air pulsé est trop basse ou si le dégivrage est en cours, l'ailette horizontale se place automatiquement en position horizontale.
Le fonctionnement s'arrête pendant 10 minutes environ en mode de chauffage.	<ul style="list-style-type: none"> L'unité extérieure est en cours de dégivrage. Cette opération prend 10 minutes environ, veuillez patienter. (Une température extérieure trop basse et un taux d'humidité trop élevé provoquent une formation de givre.)
L'unité démarre automatiquement lors de la mise sous tension, sans avoir reçu aucun signal de la télécommande.	<ul style="list-style-type: none"> Ces modèles sont équipés d'une fonction de redémarrage automatique. Si vous coupez l'alimentation principale sans arrêter le climatiseur avec la télécommande puis remettez sous tension, le climatiseur démarre automatiquement dans le même mode que celui qui avait préalablement été sélectionné à l'aide de la télécommande avant la mise hors tension. Consultez la section "Fonction de redémarrage automatique" Page 51.
Multi-système	
L'unité interne qui ne fonctionne pas chauffe et émet un bruit similaire au bruit de l'eau qui s'écoule.	<ul style="list-style-type: none"> Une petite quantité de réfrigérant continue à circuler dans l'unité interne même lorsque celle-ci ne fonctionne pas.
Lorsque le mode de chauffage est sélectionné, le climatiseur ne démarre pas immédiatement.	<ul style="list-style-type: none"> Lorsque le climatiseur se met en marche alors que le dégivrage de l'unité externe est en cours, il faut attendre quelques minutes (10 minutes maxi.) pour que l'air pulsé se réchauffe.
Unité externe	
Le ventilateur de l'unité externe ne tourne pas alors que le compresseur fonctionne correctement. Même s'il se met à tourner, le ventilateur s'arrête aussitôt.	<ul style="list-style-type: none"> Lorsque la température extérieure est basse, le ventilateur fonctionne de façon intermittente en mode de refroidissement pour maintenir une capacité de refroidissement suffisante.
De l'eau s'écoule de l'unité externe.	<ul style="list-style-type: none"> En mode de REFROIDISSEMENT et de DESHUMIDIFICATION, la tuyauterie et les raccords de tuyauterie sont refroidis et un certain degré de condensation peut se produire. En mode de chauffage, l'eau de condensation présente sur l'échangeur thermique peut goutter. En mode de chauffage, l'opération de dégivrage fait fondre la glace présente sur l'unité externe et celle-ci se met à goutter.

Symptôme	Explication & points à vérifier
Unité externe	
De la fumée blanche sort de l'unité externe.	<ul style="list-style-type: none"> En mode de chauffage, la vapeur générée par l'opération de dégivrage peut ressembler à de la fumée blanche.
Télécommande	
Aucun affichage sur la télécommande ou affichage indistinct. L'unité interne ne répond pas au signal de la télécommande.	<ul style="list-style-type: none"> Les piles sont-elles déchargées ? Page 4 La polarité (+, -) des piles est-elle correcte ? Page 4 Avez-vous appuyé sur les touches de télécommandes d'autres appareils électriques ?
Le climatiseur ne refroidit pas correctement	
Impossible de refroidir suffisamment la pièce.	<ul style="list-style-type: none"> Le réglage de la température est-il adapté ? Page 5 Le réglage du ventilateur est-il adapté ? Veuillez régler le ventilateur sur une vitesse plus rapide. Page 6 Les filtres sont-ils propres ? Page 8 Le ventilateur ou l'échangeur thermique de l'unité interne sont-ils propres ? L'entrée ou la sortie d'air des unités interne et externe sont-elles obstruées ? Y a-t-il une fenêtre ou une porte ouvertes ?
Le refroidissement de la pièce n'est pas satisfaisant.	<ul style="list-style-type: none"> Si vous utilisez un ventilateur ou une gazinière dans la pièce, la charge de refroidissement augmente, et le refroidissement ne peut se faire de manière satisfaisante. Lorsque la température extérieure est élevée, il se peut que le refroidissement ne se fasse pas de manière satisfaisante.
Le réchauffement de la pièce n'est pas satisfaisant.	<ul style="list-style-type: none"> Lorsque la température extérieure est basse, le climatiseur peut ne pas fonctionner de manière satisfaisante pour réchauffer la pièce.
L'air pulsé tarde à sortir du climatiseur en mode de chauffage.	<ul style="list-style-type: none"> Veuillez patienter car le climatiseur se prépare à souffler de l'air chaud.
Flux d'air	
L'air qui sort de l'unité interne a une odeur étrange.	<ul style="list-style-type: none"> Les filtres sont-ils propres ? Page 8 Le ventilateur ou l'échangeur thermique de l'unité interne sont-ils propres ? Le climatiseur peut être imprégné de l'odeur d'un mur, d'un tapis, d'un meuble, de vêtements, etc. et la rejeter avec l'air pulsé.
Bruit	
Des craquements se produisent.	<ul style="list-style-type: none"> Ce phénomène provient de l'expansion/la contraction du panneau frontal, etc. en raison des variations de température.
Un "murmure" est perceptible.	<ul style="list-style-type: none"> Ce bruit est perceptible lorsque de l'air frais pénètre dans le tuyau d'écoulement ; il provient de l'évacuation de l'eau présente dans le tuyau lors de l'ouverture du bouchon ou de la rotation du ventilateur. Ce bruit est également perceptible lorsque de l'air frais pénètre dans le tuyau d'écoulement par vents violents.
Un bruit mécanique provient de l'unité interne.	<ul style="list-style-type: none"> Il s'agit du bruit de mise en marche/arrêt du ventilateur ou du compresseur.
Un bruit d'écoulement d'eau se produit.	<ul style="list-style-type: none"> Ce bruit peut provenir de la circulation du réfrigérant ou de l'eau de condensation dans le climatiseur.
Un sifflement est parfois perceptible.	<ul style="list-style-type: none"> Il s'agit du bruit que fait le réfrigérant à l'intérieur du climatiseur lorsqu'il change de sens.

Dans les cas suivants, arrêtez le climatiseur et consultez votre revendeur.


- Si de l'eau s'écoule ou goutte de l'unité interne.
- Si le témoin de fonctionnement supérieur clignote.
- Si le disjoncteur saute régulièrement.
- L'unité interne peut ne pas recevoir les signaux de la télécommande dans une pièce dont le système d'éclairage est à lampes fluorescentes (à oscillateur intermittent, etc.).
- Le fonctionnement du climatiseur interfère avec la réception radio ou TV. Il peut s'avérer nécessaire de brancher un amplificateur sur l'appareil concerné.
- Si l'unité émet un bruit anormal.

SI LE CLIMATISEUR DOIT RESTER LONGTEMPS INUTILISÉ

1 Sélectionnez manuellement le mode de REFROIDISSEMENT et réglez la température la plus élevée ; faites fonctionner le climatiseur entre 3 et 4 heures.

Page 5

- Cette opération permet de sécher l'intérieur du climatiseur.
- La présence d'humidité dans la climatisation contribue à créer un terrain favorable à la croissance de certains champignons tels que la moisissure.

2 Appuyez sur  pour arrêter le fonctionnement du climatiseur.

3 Débranchez la fiche d'alimentation électrique et/ou coupez le disjoncteur.

4 Retirez toutes les piles de la télécommande.

Lorsque le climatiseur doit être remis en service :

1 Nettoyez le filtre à air. **Page 8**

2 Veillez à ce que l'entrée et la sortie d'air des unités interne et externe ne soient pas obstruées.

3 Veillez à raccorder correctement le câble de mise à la terre.

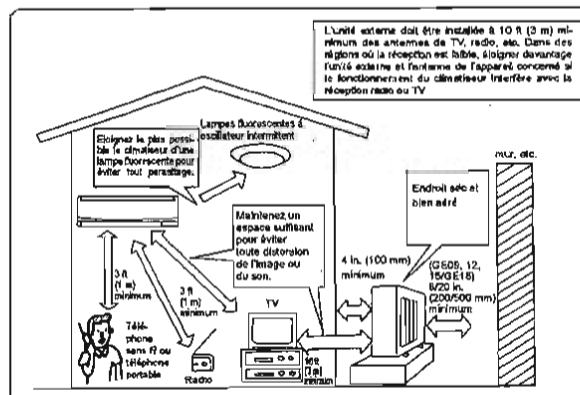
4 Reportez-vous à la section "PRÉPARATIF D'UTILISATION" et suivez les instructions. **Page 4**

LIEU D'INSTALLATION ET TRAVAUX ÉLECTRIQUES

Lieu d'installation

Évitez d'installer le climatiseur dans les endroits suivants.

- En présence d'une grande quantité d'huile de machine.
- Dans les régions où l'air est très salin, comme en bord de mer.
- En présence de gaz sulfurique, comme dans les stations thermales.
- Dans des endroits exposés à des projections d'huile ou dont l'atmosphère est chargée d'huile.
- En présence d'équipements haute fréquence ou sans fil.
- Dans un endroit où la sortie d'air de l'unité externe est susceptible d'être obstruée.
- Dans un endroit où le bruit de fonctionnement ou la pulsation d'air chaud risquent de représenter une nuisance pour le voisinage.



Travaux électriques

- Veuillez prévoir un circuit réservé à l'alimentation du climatiseur.
- Veuillez respecter la puissance électrique du disjoncteur.

Dans le doute, veuillez consulter votre revendeur.

FICHE TECHNIQUE

Gamme opérationnelle garantie

		Intérieur	Extérieur
Refré- disse- ment	Limite supérieure	90°F (32,2°C) DB	115°F (46,1°C) DB
		73°F (22,8°C) WB	—
	Limite inférieure	67°F (19,4°C) DB	14°F (-10°C) DB
		57°F (13,9°C) WB	—
Chauf- fage	Limite supérieure	80°F (26,7°C) DB	75°F (23,9°C) WB
		—	65°F (18,3°C) WB
	Limite inférieure	70°F (21,1°C) DB	-4°F (-20°C) WB
		—	-5°F (-21,1°C) WB

DB : Bulbe sec
WB : Bulbe humide

Remarque :

Si la température extérieure est en-dessous de la limite inférieure de la gamme opérationnelle garantie, il se peut que l'unité externe s'arrête jusqu'à ce que la température extérieure dépasse la limite inférieure.

 **MITSUBISHI ELECTRIC CORPORATION**

HEAD OFFICE: TOKYO BLDG., 2-7-3, MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN

SG79F365H01

Revised July 2009



Mitsubishi Electric Mr. Slim® Split Air-conditioner and Heat-pump Systems LIMITED WARRANTY

MEUS warrants as follows to the original owner of this Mr. Slim product that, if purchased from and installed by a contractor licensed for HVAC installation under applicable local and state laws within the continental United States, Alaska and Hawaii, should it prove defective by reason of defects arising from improper workmanship and/or material:

A. FIVE YEAR ON PARTS. The parts are warranted for a period of five (5) years to the original end-user of this System. If it should prove defective due to improper workmanship and/or material for a period of five (5) years from the date of installation, MEUS will replace any defective part without charge for the part. Replacement parts are warranted for the remainder of the original 5-year warranty period. Parts used for replacement may be of like kind and quality and may be new or remanufactured. Defective parts must be made available to MEUS in exchange for the replacement part and become the property of MEUS.

B. ADDITIONAL TWO-YEAR COMPRESSOR WARRANTY. The compressor is warranted for a total period of seven (7) years to the original end-user of this System. If it should prove defective due to improper workmanship and/or material for a period of seven (7) years from the date of installation, MEUS will replace any defective compressor without charge for the compressor. Replacement compressors are warranted for the remainder of this warranty period. Compressors used for replacement may be of like kind and quality and may be new or remanufactured. Defective compressors must be made available to MEUS in exchange for the replacement compressor and become the property of MEUS.

C. NO LABOR. THESE LIMITED WARRANTIES DO NOT INCLUDE LABOR or any other costs incurred for service, maintenance, repair, removing, replacing, installing, complying with local building and electric codes, shipping or handling, or replacement of the System, compressors or any other parts. For items that are designed to be maintained or replaced by the owner, the owner is solely responsible for all labor and other costs of maintaining, installing, replacing, disconnecting or dismantling the System and parts (such as filters or belts) in connection with owner-required maintenance. Air filter cleaning and/or replacement for each applicable indoor unit are owner-required maintenance, and labor for this procedure is not covered under warranty. Please consult the applicable technical documentation for air filter cleaning and other maintenance procedures.

D. Proper Installation. This Limited Warranty applies only to Systems that are installed by contractors who are licensed for HVAC installation under applicable local and state law, and who install the Systems in accordance with (i) all applicable building codes and permits; (ii) MEUS's installation and operation instructions; and (iii) good trade practices.

BEFORE REQUESTING SERVICE, please review the applicable technical documentation to insure proper installation and correct customer control adjustment for the System. If the problem persists, please arrange for warranty service.

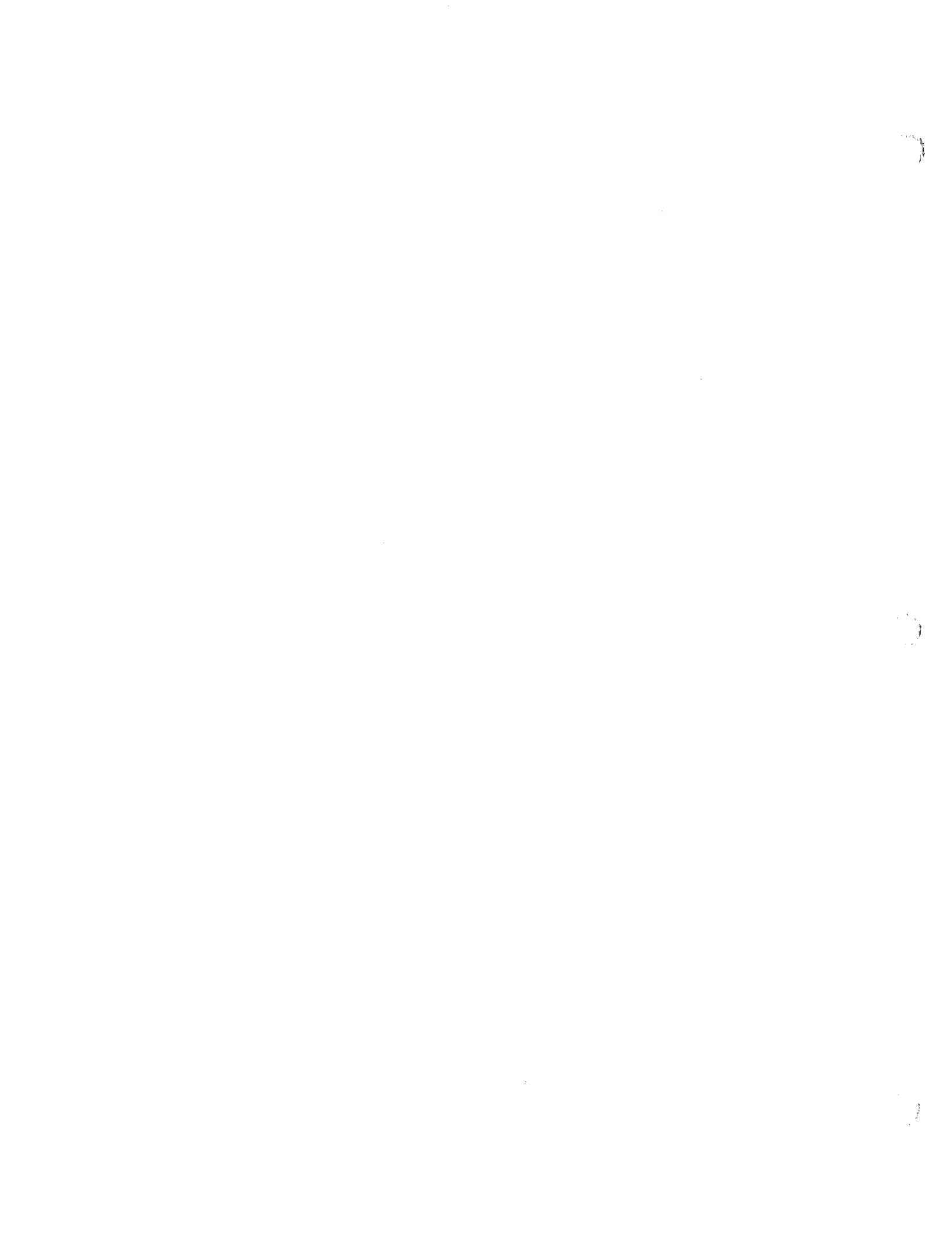
1. TO OBTAIN WARRANTY PARTS SERVICE:

(a) Contact the licensed contractor who installed the System or the nearest licensed contractor, dealer or distributor (whose name and address may be obtained on our website at www.mehvac.com) of any defect within the applicable warranty time period.

(b) Proof of the installation date by a licensed contractor is required when requesting warranty service. Present the sales receipt, building permit or other document which establishes proof and date of installation. Otherwise, this Limited Warranty shall be deemed to begin one hundred twenty (120) days after the date of manufacture stamped on the System. **THE RETURN OF THE OWNER REGISTRATION CARD IS NOT A CONDITION OF COVERAGE UNDER THIS LIMITED WARRANTY.** However, please return the Owner Registration Card so that MEUS can contact you if a question of safety arises.

(c) This Limited Warranty applies only while the System remains at the site of the original installation and only to locations within the continental United States, Alaska and Hawaii.

2. THIS LIMITED WARRANTY DOES NOT COVER: property damages, malfunction or failure of the System, or personal injury caused by or resulting from: (a) accident, abuse, negligence or misuse; (b) operating the System in a corrosive or wet environment containing chlorine, fluorine or any other hazardous chemicals; (c) installation, alteration, repair or service by anyone other than a licensed contractor or other than pursuant to the manufacturer's instructions; (d) improper matching of System components; (e) improper sizing of the System; (f) improper or deferred maintenance contrary to the manufacturer's instructions; (g) physical abuse to or misuse of the System (including failure to perform any maintenance as described in the Operation Manual such as air filter cleaning, or any System damaged by excessive physical or electrical stress); (h) Systems that have had a serial number or any part thereof altered, defaced or removed; (i) System used in any manner contrary to the



Revised July 2009

Operation Manual; (j) freight damage; or (k) damage caused by force majeure or other factors such as power surge damage caused by lightning and fluctuations in or interruptions of electrical power.

3. THIS LIMITED WARRANTY ALSO EXCLUDES: (a) SERVICE CALLS WHERE NO DEFECT IN THE SYSTEM COVERED UNDER THIS WARRANTY IS FOUND; (b) System installation or set-ups; (c) adjustments of user controls; or (d) Systems purchased or installed outside the continental United States, Alaska and Hawaii. Consult the operating instructions for information regarding user controls.

4. This Limited Warranty shall not be enlarged, extended or affected by, and no obligation or liability shall arise or grow out of, MEUS providing, directly or indirectly, any technical advice, information and/or service to Owner in connection with the System.

5. EXCEPT AS OTHERWISE PROVIDED IN THIS LIMITED WARRANTY, MEUS MAKES NO OTHER WARRANTIES OF ANY KIND WHATSOEVER REGARDING THE SYSTEM. MEUS DISCLAIMS AND EXCLUDES ALL WARRANTIES NOT EXPRESSLY PROVIDED HEREIN AND ALL REMEDIES WHICH, BUT FOR THIS PROVISION, MIGHT ARISE BY IMPLICATION OR OPERATION OF LAW, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND OF FITNESS FOR ANY PARTICULAR PURPOSE. NO ONE IS AUTHORIZED TO CHANGE THIS LIMITED WARRANTY IN ANY RESPECT OR TO CREATE ANY OTHER OBLIGATION OR LIABILITY FOR MEUS IN CONNECTION WITH THE SYSTEM. MEUS DISCLAIMS ALL LIABILITY FOR THE ACTS, OMISSIONS AND CONDUCT OF ALL THIRD PARTIES (including, without limitation, the installing contractor) IN CONNECTION WITH OR RELATED TO THE SYSTEM.

6. UNDER NO CIRCUMSTANCES SHALL MEUS BE LIABLE FOR ANY INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES INCLUDING, WITHOUT LIMITATION, LOST GOODWILL, LOST REVENUES OR PROFITS, WORK STOPPAGE, SYSTEM FAILURE, IMPAIRMENT OF OTHER GOODS, COSTS OF REMOVAL AND REINSTALLATION OF THE SYSTEM, LOSS OF USE, INJURY TO PERSONS OR PROPERTY ARISING OUT OR RELATED TO THE SYSTEM WHETHER BASED ON BREACH OF WARRANTY, BREACH OF CONTRACT, TORT OR OTHERWISE, EVEN IF MEUS HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGE. IN NO EVENT SHALL MEUS'S LIABILITY EXCEED THE ACTUAL PURCHASE PRICE OF THE SYSTEM WITH RESPECT TO WHICH ANY CLAIM IS MADE.

7. Some states do not allow limitations on warranties or exclusions or limitation of damages, so the above limitations or exclusions may not apply.

8. This Limited Warranty gives the owner specific legal rights and the owner may also have other rights that vary from state to state.

9. This Limited Warranty is valid only in the continental United States, Alaska and Hawaii, and it is not transferable.

MITSUBISHI ELECTRIC & ELECTRONICS USA, INC.
HVAC Advanced Products Division
3400 Lawrenceville-Suwanee Road
Suwanee, GA 30024-9928

Revised July 2009



Steel Manual Damper

MBD-15
Spec. 15820

Supplied by:

CFM
1440 So. Lipan St.
Denver, CO 80223
(970) 493-7293

**GREENHECK****Part #464599**
Extension Pin Kit & Manual Quadrant
Operators on MBD-15**FIELD INSTALLATION INSTRUCTIONS****Kit Part Number**

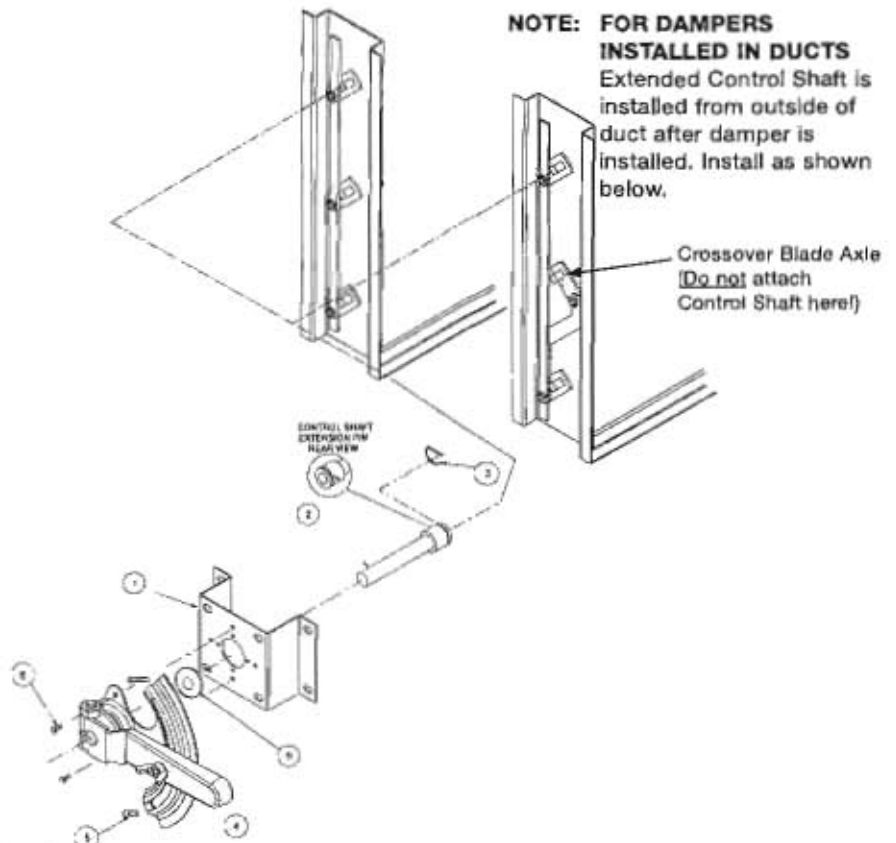
1/2 in. Extension Pin Kit & Manual Quadrant Kit	Part #828599
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TOOLS REQUIRED:

- 5/16 in. Hex Nut Driver
- 3/8 in. Electric Drill
- 1/2 in. Open End Wrench

1/2 in. Extension Pin Kit Part Numbers

No.	Qty.	Description
1	1	Stand off bracket Part #651812
2	1	Extension pin Part #463676
3	1	Retaining clip Part #451738
4	1	1/2 in. (13mm) manual quadrant Part #455648
5	1	Open and close labels
6	2	Tek screws
9	1	Washer Part #416338)

**Before Installing Damper in the Duct**

1. If damper has more than one blade, determine which blade axle will be driven by the extended control shaft. Always attach extended control shaft to a blade axle which is directly connected to the main linkage tiebar. DO NOT attach extended control shaft to a crossover blade axle.
2. Cut hole approximately 1 in. in diameter in the duct where damper drive blade axle will be located. Hole must provide clearance for enlarged portion of extended control shaft.

After Damper Is Installed in Duct

1. Push extended control shaft through hole in the duct and onto drive blade axle. Retainer clip should "click" into groove on drive blade axle and hold shaft into place. Standard Control Shaft location is the third blade from the bottom on dampers with three or more blades. Control Shaft location is the first blade from the bottom on dampers with one or two blades.
2. Install the stand off bracket with washer over the extended control shaft and screw bracket to duct. Make sure screws do not interfere with damper linkage or blade movement. Assemble Manual Quadrant to extension bracket assembly (screws provided).
3. With damper either fully open or closed, lock manual quadrant to extended control shaft so manual quadrant can move damper between open and closed. Note: Tighten down bolt on manual quadrant to 250 in. lb. of torque. Apply "OPEN" and "CLOSED" labels if damper movement is opposite to that engraved in the manual quadrant.
4. Set damper to desired position and tighten wing nut on manual quadrant to hold damper in place.

Caution

Stand off bracket with washer is needed to support the extended control shaft. If not installed as directed, the extended control shaft may not operate the damper correctly.



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IDM #464599 MBD-15 Rev. 2, May 2005

Warranty

Greenheck warrants this equipment to be free from defects in material and workmanship for a period of three years from the shipment date. Any units or parts which prove defective during the warranty period will be replaced at our option when returned to our factory, transportation prepaid. Motors are warranted by the motor manufacturer for a period of one year. Should motors furnished by Greenheck prove defective during this period, they should be returned to the nearest authorized motor service station. Greenheck will not be responsible for any removal or installation costs. All light bulbs are excluded under this limited warranty.

As a result of our commitment to continuous improvement, Greenheck reserves the right to change specifications without notice.

Greenheck Catalog SP/CSP provides additional information describing the equipment, fan performance, available accessories, and specification data.

AMCA Publication 410-96, Safety Practices for Users and Installers of Industrial and Commercial Fans, provides additional safety information. This publication can be obtained from AMCA International, Inc. at www.amca.org.



Phone: (715) 359-8171 • Fax: (715) 355-2399 • E-mail: gfcinfo@greenheck.com • Website: www.greenheck.com



Louver

LVR-1
Spec. 15800

Supplied by:

CFM
1440 So. Lipan St.
Denver, CO 80223
(970) 493-7293

Warranty

Greenheck warrants this equipment to be free from defects in material and workmanship for a period of three years from the shipment date. Any units or parts which prove defective during the warranty period will be replaced at our option when returned to our factory, transportation prepaid. Motors are warranted by the motor manufacturer for a period of one year. Should motors furnished by Greenheck prove defective during this period, they should be returned to the nearest authorized motor service station. Greenheck will not be responsible for any removal or installation costs. All light bulbs are excluded under this limited warranty.

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