

# Haier

## Central Air Conditioning

# SERVICE MANUAL

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### Models

HW1800VD1V22(-P)	HW3000VD1V22(-P)
HW1805VD1V22(-P)	HW3005VD1V22(-P)
HW1808VD1V22(-P)	HW3008VD1V22(-P)
HW1810VD1V22(-P)	HW3010VD1V22(-P)
HW2400VD1V22(-P)	
HW2405VD1V22(-P)	
HW2408VD1V22(-P)	
HW2410VD1V22(-P)	

Part Number:  
AC-8888-177

### ● Features

- High efficiency design
- Auxiliary electric heating function (optional)
- Time-Delay function
- Small and large chassis front return only
- Convenient for installation and maintenance
- Vertical wall-mount electric heat air handler designed to be wall hung or stud mounted

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# 1. DESCRIPTION OF PRODUCTS & FEATURES

## 1.1 Air conditioning

This manual discusses ‘split’ central air conditioning and indoor coils. “Split” central air condition system refers to the physical location of major air conditioning components. The split system air conditioning are manufactured to standards of quality and performance.They are 13 SEER(Seasonal Engery Efficiency Ratio) which meet or exceed the standards imposed by efficiency legislated and therefore represent both good value today and for years to come. The current air conditioning system use scroll and reciprocating compressors. This gives the air conditioning a durable compressor which needs less external protection, while increasing the unit efficiency in cooling mode.

## 1.2 Nomenclature for model number

### Example

H	W	24	08	V	A	1	M	20	P
Haier	Blower unit	Nominal capacity in (1000) Btu/h	Electric heater	Electric Designation	Coil code	Design series	Airflow configuration	Unit Width(in.)	Continuation
Brand symbol	B:Blower unit C:Evaporator W:Wall moun- ted unit	24: 24000BTU/h 30: 30000BTU/h	00: No; 05: 5KW; 08: 8KW; 10:10KW	Y:575V-3Ph-60Hz; V:208/230V-1Ph- 60Hz; C:208/230V-3Ph- 60Hz; D:460V-3Ph- 60Hz; A:115V,1 Ph,60Hz	A:10 SEER A/C coil D:13 SEER A/C coil E:14 SEER A/C coil	1: 1st Generation; 2: 2nd Generation;	M:Multi- direction V:Vertical H:Horizontal	17:17"[432] 20:20"[497] 22:22"[559] 25:25"[625]	P: Powder paint E: EC motor

Table 1-1





### 3.SAFETY PRECAUTIONS

**CAUTION:** To ensure proper installation and operation, completely read all instructions prior to attempting to assemble ,install ,operate, maintain or repair the product.

**WARNING:**THE MANUFACTURER’S WARRANTY DOES NOT COVER ANY DAMAGE OR DEFECT TO THE AIR CONDITIONER CAUSED BY THE ATTACHMENT OR USE OF ANY COMPONENTS, ACCESSORIES OR DEVICES (OTHER THAN THOSE AUTHORIZED BY THE MANUFACTURER) INTO, ONTO OR IN CONJUNCTION WITH THE HEAT PUMP. BE AWARE THAT THE USE OF UNAUTHORIZED COMPONENTS, ACCESSORIES OR DEVICES MAY ENDANGER LIFE AND PROPERTY. THE MANUFACTURER DISCLAIMS ANY RESPONSIBILITY FOR SUCH LOSS OR INJURY RESULTING FROM THE USE OF SUCH UNAUTHORIZED COMPONENTS, ACCESSORIES OR DEVICES.

- Always use good industry-recognized service practices in the maintenance, adjustment and repair of the products covered in this manual to protect the technician and the customer.
- Always wear safety glasses when handling refrigerant and brazing materials.
- Follow the manufacturer’s instructions when making repairs, installing replacement parts and assembling.
- Use only authorized factory parts.

### 4.ELECTRICAL CONTROL DEVICES

#### THERMOSTATS

Thermostats are the most obvious control in the air conditioning system because these controls are accessible by the consumer. Contact your local distributor for information on part numbers of various manual changeover, auto changeover and set-back thermostats or see the thermostat and subbase selection information found in the wiring diagram booklet.

In the cooling mode, the thermostat calls for cooling by energizing the compressor contactor and the indoor blower control. The indoor blower can operate continuously by setting the thermostat subbase fan switch to the “ON” position.

#### RELAYS

Relays provide control switching .The voltages controlled may be either low(24VAC)or line voltage. It is usually 24 volts. Contact voltage may be either low or line voltage.

#### HEATER CONTACTOR

The coil uses 24 volts but the contacts carry line voltage .The heater contactor is a large relay, which controls the heater.

### 5. APPLICATION

Before specifying any air conditioning equipment, a survey of the structure and a heat gain calculation must be made. A heat gain calculation involves identifying all surfaces and openings that gain heat from the surrounding air and quantifying that heat gain. The heat calculation also calculates the extra heaty load caused by sunlight and by humidity removal. These factors must be considered before selection an air conditioning system to provide year round comfort. The Air Conditioning Contractors of AMerica (ACCA) J Manual method of load calculation is one recognized procedure for determining the cooling load.

The cooling load calculation determines the unit size. There are two capacities that enable the equipment to provide comfort. The first is sensible capacity. How much sensible heat can the unit remove? Sensible heat is the heat energy measured on the dry bulb thermometer.

The second form of heat is called latent or hidden heat. This is heat held in the humidity in the air. Removing this heat does not affect a thermometer. However, removing the heat held in the moisture in the air greatly increase comfort. A properly sized unit removes both forms of heat, producing a comfortable living space. An oversized system cycles on and off too quickly and does not properly remove humidify , producing an uncomfortable living space. Select the indoor and outdoor equipment combination based on the manufacturer’s engineering data.

After the proper equipment combination has been selected, satisfying both sensible and latent conditioning requirements, the system must be properly installed. Only then can the unit provide the comfort the manufacturer built into it.

There are several factors that installers must consider.

- Outdoor unit location
- Proper equipment evacuation
- Outdoor unit refrigerant charge
- Indoor unit air flow
- Indoor unit blower speed
- Supply and return air duct design and sizing
- System air balancing
- Diffuser and return air grille location and sizing

The air distribution system has the greatest effect. The duct system is totally in the control of the contractor. The industry can only recommend the correct procedure.

The correct air quantity is critical on air conditioning system. Proper operation, efficiency, compressor life and humidity control depend on the correct balance between indoor load and outdoor unit capacity. High indoor air flow increases the possibility of high humidity problems in cooling. Low indoor air flow reduces total capacity, and causes coil icing. Serious harm can be done to the compressor in either condition.

Air conditioning requires a specified air flow. Each ton of air conditioning requires 400 cubic feet of air per minute (**400CFM/TON**).

Duct design and construction should be carefully done. System performance can be lowered dramatically through bad planning or workmanship. In cooling, a hot attic can cause a temperature gain of 3° in the return duct and 4° in the supply duct. This can reduce the cooling capacity of an air conditioning system by as much as 30%. This means a loss of almost one ton of cooling capacity from a three ton system.

Air leakage of only 3% in a return duct can cause a 5% loss in system capacity. 3% leakage on a three ton system is only 30 CFM. Two or three unsealed joints can cause this leak. Sealing the return and supply ducts pays dividends in increased system capacity and lower operating costs.

Effective duct insulation is essential to prevent loss of capacity and sweating ducts in the cooling mode. Duct systems installed in the conditioned space can be left uninsulated, but a dense 1/2" fiberglass duct liner reduces blower and air noises, and prevents sweating ducts when humidity levels are high.

Supply and return duct systems in attics and crawl spaces require a minimum 1" of dense duct liner or 2" fiberglass wrap with a sealed vapor barrier. A leaky vapor barrier results in duct sweating, causing wet insulation.

Wet insulation does not insulate. Heat transfer through poorly insulated systems can result in over 50% loss in operating capacity. Sweating ducts also promote rusting ducts resulting in premature duct failure. Other duct materials have been successfully used. Carefully follow the duct manufacturers' installation instructions. The duct system is only as good as the planners and installers construct.

Air supply diffusers must be selected and located carefully. They must be sized and positioned to deliver treated air along the perimeter of the space. If they are too small for their intended air flow they become noisy. If they are not located properly they cause drafts on the occupants in the rooms. Return air grilles must be properly sized to carry air back to the blower. If they are too small they also cause noise. The installers should balance the air distribution system to ensure proper air flow to all rooms in the home. This ensures a comfortable living space.

## 6. INSTALLATION INSTRUCTIONS

### **! WARNING**

These instructions are intended as an aid to qualified, licensed service personnel for proper installation, adjustment and operation of this unit. Read these instructions thoroughly before attempting installation or operation. **Failure to follow these instructions may result in improper installation, adjustment, service or maintenance possibly resulting in fire, electrical shock, property damage, personal**

**injury or death.**

This product is designed and manufactured to permit installation in accordance with National Codes. **It is the installer's responsibility to install the product in accordance with National Codes and/or prevailing local codes and regulations.** The manufacturer assumes no responsibility for equipment installed in violation of any codes or regulations.

**The United States Environmental Protection Agency (EPA) has issued various regulations regarding the introduction and disposal of refrigerants in this unit.** Failure to follow these regulations may harm the environment and can lead to the imposition of substantial fines. Because these regulations may vary due to the passage of new laws we suggest that any work on this unit be done by a certified technician. Should you have any questions please contact the local EPA office.

The manufacturer's warranty does not cover any damage or defect to the air conditioner caused by the attachment or use of any components, accessories or devices (other than those authorized by the manufacturer) into, onto, or in conjunction with the air conditioner. **You should be aware that the use of unauthorized components, accessories or devices may adversely affect the operation of the air conditioner and may also endanger life and property.** The manufacturer disclaims any responsibility for such loss or injury resulting from the use of such unauthorized components, accessories or devices.

These instructions are intended as an aid to qualified, licensed service personnel for proper installation, adjustment and operation of this unit. Read these instructions thoroughly before attempting installation or operation. **Failure to follow these instructions may result in improper installation, adjustment, service or maintenance possibly resulting in fire, electrical shock, property damage, personal injury or death.**

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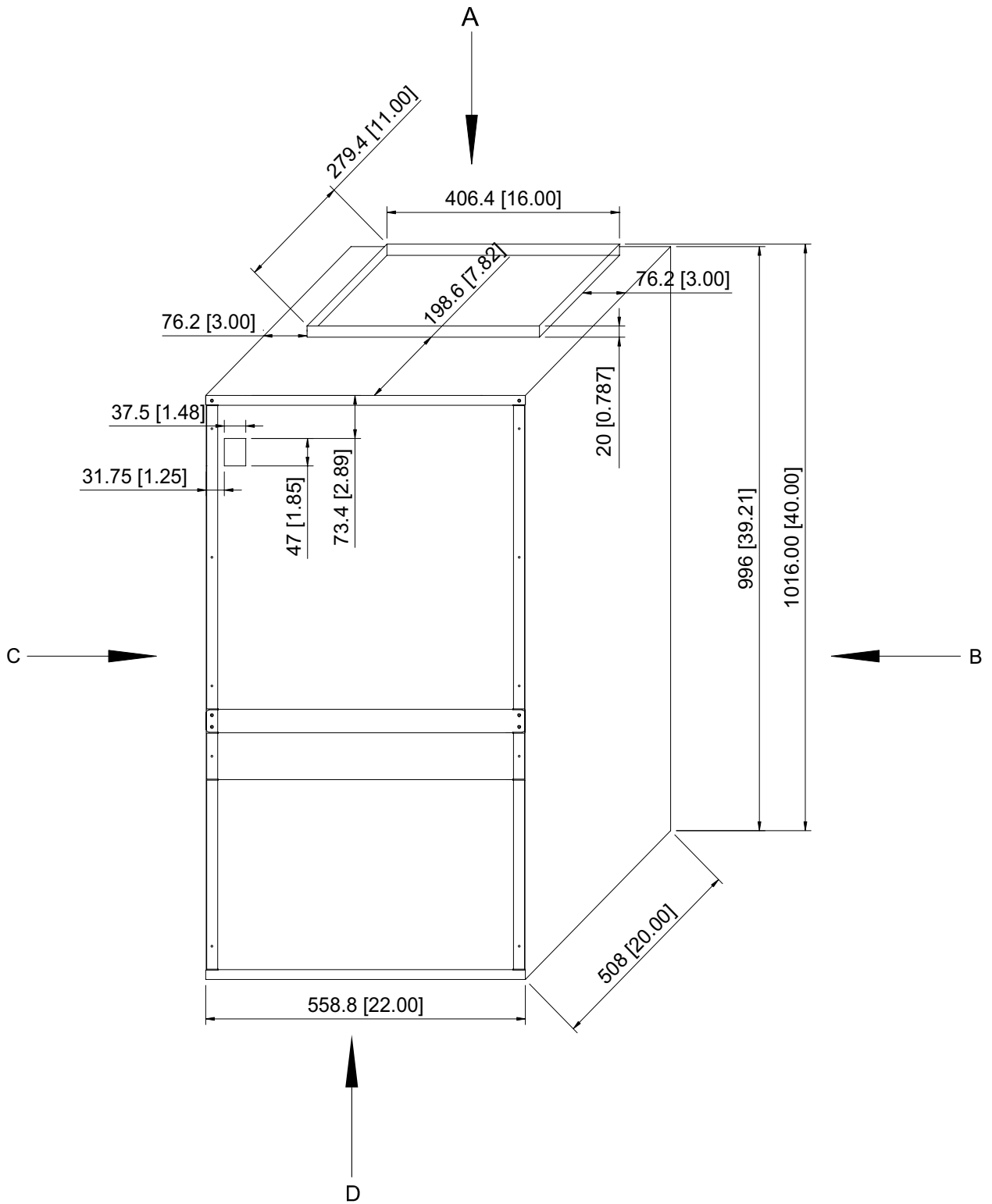
Units are designed to be installed either recessed into a wall or hanging in a vertical "upflow" position. If units are recessed in a wall, holes to attach units to the framing studs are provided along the inside of the front flange.

Airhandlers are provided with an offset hanging bracket attached to the rear of the cabinet for hanging applications. Units are front return only. Installed in a front return application, front access panel with insulation should be removed and discarded. A filter rack with filter is provided. Inspect and clean or replace filter monthly. Units are equipped with bottom primary and secondary drains and both drains must be trapped. Failure to install a trap could result in condensation overflowing the drain pan which will result in substantial water damage to the nearby area.

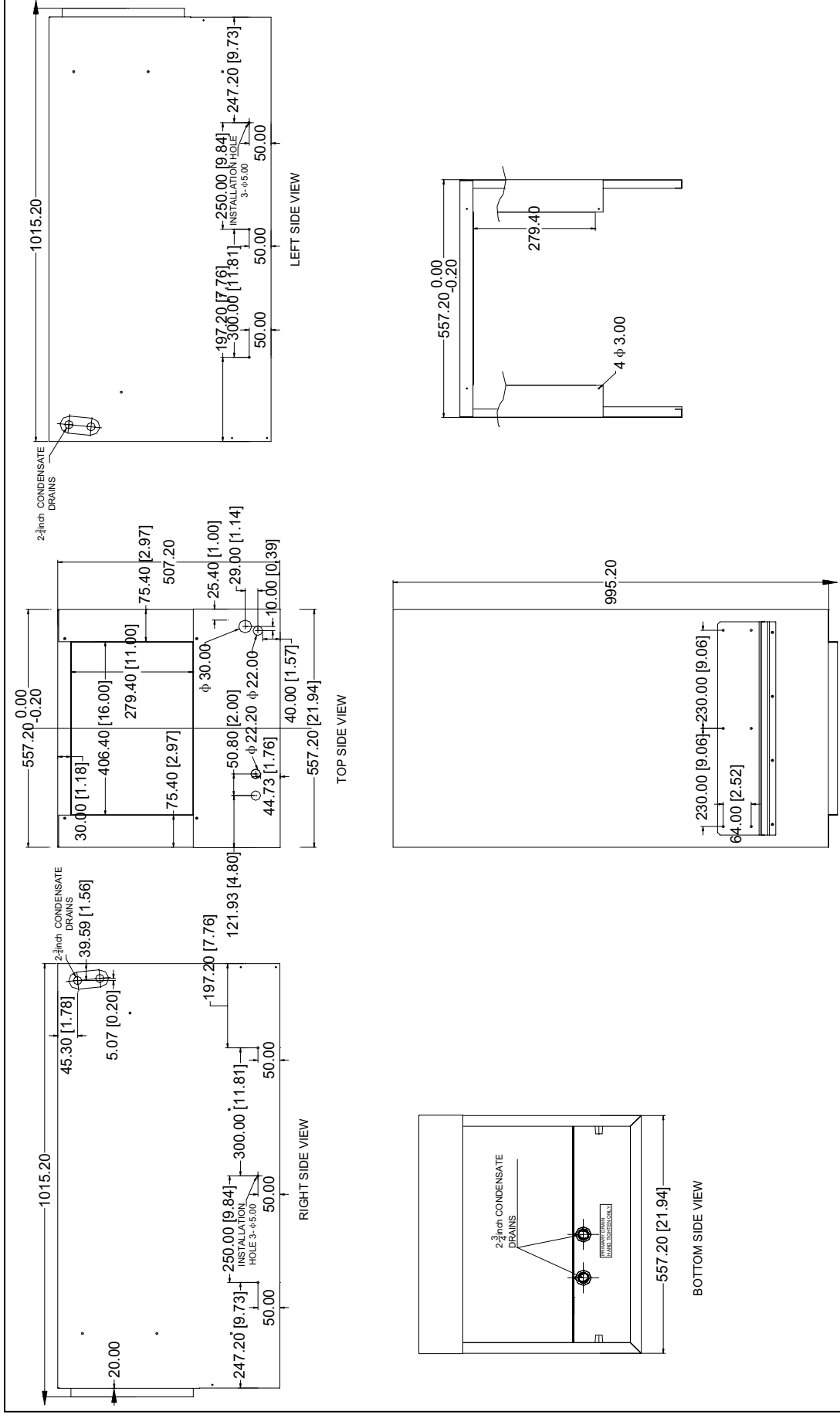
**NOTE:** If you intend to install this unit with a "Word" door it must be mounted flush or behind front edge of stud.



### UNIT DIMENSIONS



Note: 1. unit: mm [inch]  
 2. the dimensions is exclude screw and mounting plate



Before installing this appliance insure that it is properly sized and adequate power is available.

This product is designed for zero inch (0") clearance; however, adequate access for service or replacement must be considered without removing permanent structure. This unit can be installed on a platform when deemed necessary.

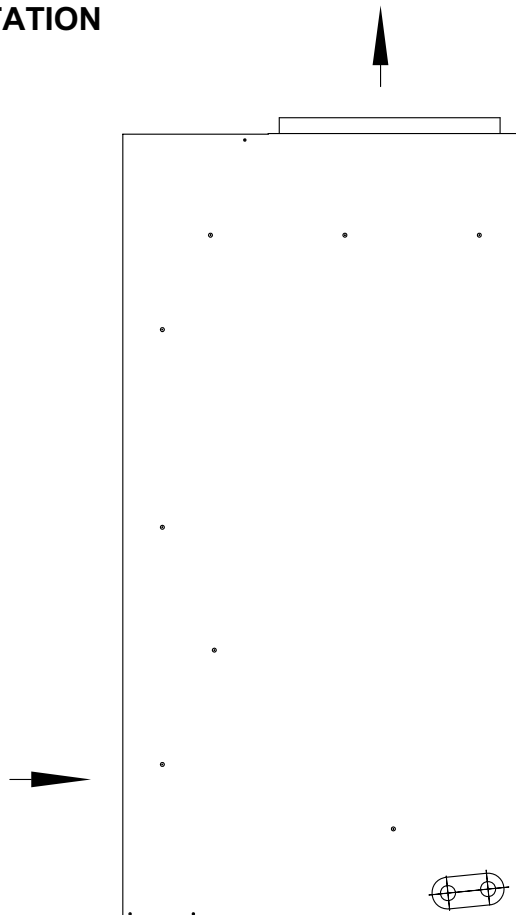
In an attic installation a secondary drain pan must be provided by the installer and placed under the entire unit with a separate drain line properly sloped and terminated in an area visible to the owner. This secondary drain pan is required in the event that there is a leak or main drain blockage. Closed cell insulation should be applied to the drain lines in unconditioned spaces where sweating may occur.

Appliances installed in garages, warehouses or any other areas where they may be subjected to mechanical damage must be suitably guarded against such damage by installing behind protective barriers, elevated or located out of the normal path of vehicles. When installed on a base, the base must also be protected by similar means.

Heating and cooling equipment located in garages, which may generate a glow, spark or flame capable of igniting flammable vapors, must be installed with the ignition source at least 18" above the floor level.

**When more than one appliance is installed in a building, permanently identify the unit as to the area or space serviced by that appliance.**

### AIRFLOW ORIENTATION



## REFRIGERANT TUBING

Refrigerant tubing should be installed as to avoid undue stress. They must be supported or routed to avoid strain or vibration. To avoid damage that can be caused by condensate, insulate the suction tube with a closed cell insulation with the seams sealed. The insulation should terminate at the tubing entrance to the air handler. Do not reduce the recommended tubing size.

## CONDENSATE REMOVAL

**THIS APPLIANCE EMPLOYS A DRAW-THROUGH COIL, THEREFORE A TRAP MUST BE INSTALLED IN THE DRAIN LINE(S) TO ALLOW FOR PROPER CONDENSATE DISPOSAL.**

The condensate trap must not be the "running" type, or "R" type. A "P" trap is required.

The total workable height of this trap, in inches, must exceed the total negative pressure, in inches of water, as measured in the return duct.

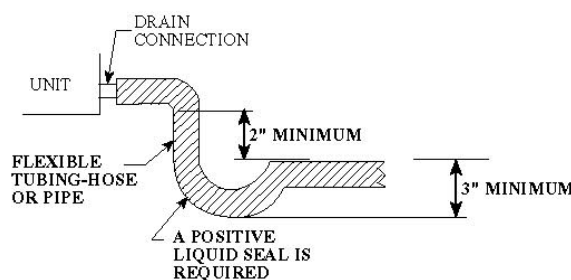


Fig.6-2

The condensate drain line must be at least 3/4 NPT, for each unit. Precautions must be used not to over tighten the adapter at the drain pan connection, this precaution will prevent damage to the plastic drain pan. A joint compound should be used to prevent leakage and act as a lubricant.

When using copper tubing as a condensate line adequate caution must be taken to prevent damage to the plastic drain pan during the soldering process. All condensate drain lines and drain traps should be adequately insulated.

Note: The unit and the auxiliary drain pan must be adequately elevated to insure proper drainage.

Use of a condensate removal pump is permitted when necessary. This condensate pump should have provisions for shutting off the control voltage should a blocked drain occur. A trap must be installed between the unit and the condensate pump. **Important:** The evaporator coil is coated with oils that will dissolve Styrofoam and certain types of plastics. Therefore a removal pump or float switch must not contain any of these materials.

**NOTE: AFTER INSTALLATION AND POSITIONING THE UNIT , THE DRAIN PAN BEING USED SHOULD BE TESTED BY FILLING IT WITH WATER TO ENSURE PROPER DRAINAGE AND CHECK FOR LEAKS.**

## ELECTRICAL CONNECTIONS

The required electrical power supply information is located on the series and rating plate on the exterior of the unit. Wiring selection must be in accordance with local codes, or in absence of local code, the National Electrical Code. A disconnect means should be installed within sight of the unit, when required by code.

Copper wire is recommended for all electrical connections.

When an optional heat kit is installed refer to the electrical requirements in that kit.

The wiring diagram included in the heat kit must be placed over the wiring diagram on the air handler.

All pertinent information, such as the rating plate, included in the optional heat kit must be applied to the Air Handler as indicated.

The use of copper connections are recommended inside the control box (see UL 1995, section 37.9).

Model	MAX OVER CURRENT	FAN MOTOR CAPACITOR(μF)	Blower Motor FLA	Blower Motor HP
HW1800VD1V22	5	8	0.9	1/8
HW1805VD1V22	30	8	0.9	1/8
HW1808VD1V22	60	8	0.9	1/8
HW1810VD1V22	60	8	0.9	1/8
HW2400VD1V22	5	8	0.9	1/8
HW2405VD1V22	30	8	0.9	1/8
HW2408VD1V22	60	8	0.9	1/8
HW2410VD1V22	60	8	0.9	1/8
HW3000VD1V22	5	8	1.4	1/5
HW3005VD1V22	30	8	1.4	1/5
HW3008VD1V22	60	8	1.4	1/5
HW3010VD1V22	60	8	1.4	1/5

Table 6-1 Electrical parameter

A MEANS OF STRAIN RELIEF MUST BE INSTALLED TO THIS APPLIANCE AT THE ELECTRICAL SERVICE ENTRANCE.

## **SYSTEM STARTUP**

1. Turn thermostat to "OFF", turn on power supply at disconnect switch.
  2. Turn temperature setting as high as it will go.
  3. Turn fan switch to "ON". Indoor blower should run. Be sure it is running in the right direction.
  4. Turn fan switch to "AUTO". Turn system switch to "COOL" and turn temperature setting below room temperature. Unit should run in cooling mode.
  5. Turn fan switch to "AUTO". Turn system switch to "HEAT" and turn temperature setting above room temperature. Unit should run in heating mode.
  6. Check to see if compressor and outdoor fan and heating are running correctly ?
  6. Check the refrigerant charge (see Instructions under "Charging the System").
  7. Replace service port caps. Service port cores are for system access only and will leak if not tightly capped.
  8. Check unit for tubing and sheet metal rattles.
  9. Instruct the owner on operation and maintenance.
- Leave this "Installation and Operating Manual" and the "Use and Care Manual" with owner.

## **OPERATION**

### **SEQUENCE OF OPERATION**

In order to service and troubleshoot a air conditioning system a service technician must understand the

unit's sequence of operation. This is the order of events the system undergoes to cycle itself on and off. Knowing how the units operate properly aids in determining where to start troubleshooting when the unit doesn't operate properly. Where the system varies from its normal sequence is a major clue to any problems.

**COOLING CYCLE**

**Mechanical.** The operation sequence as follows:

1. The compressor pumps out high pressure, superheated refrigerant vapor.
2. The vapor leaves the compressor and passes through the reversing valve.
3. It flows through the outdoor vapor line to the finned outdoor coil. Air from the outdoor fan removes heat from the refrigerant vapor. When enough heat is removed, the vapor condenses into a high pressure liquid. The liquid temperature is slightly warmer than ambient air temperature.
4. This warm, high pressure liquid leaves the outdoor coil, and flows through the small copper refrigerant liquid line.
5. At the end of the liquid line the refrigerant passes through the a flowcheck device, reducing a pressure and temperature.
6. As the cool liquid, under reduced pressure, enters the indoor coil surface it expands and absorbs heat from the indoor air passing over the finned surface.. Heat from the indoor air, causes the low pressure liquid to evaporate and cools the indoor air. The refrigerant is now a cool vapor.
7. The cool refrigerant vapor travels through the larger, insulated vapor line to the accumulator.
8. The accumulator separator separates any liquid refrigerant and holds it. Only vapor refrigerant and refrigerant oil leave the accumulator. The oil is drawn out through a special port inside the accumulator.
9. Refrigerant vapor flows through the suction line to the intake of the compressor. The cycle then repeats.

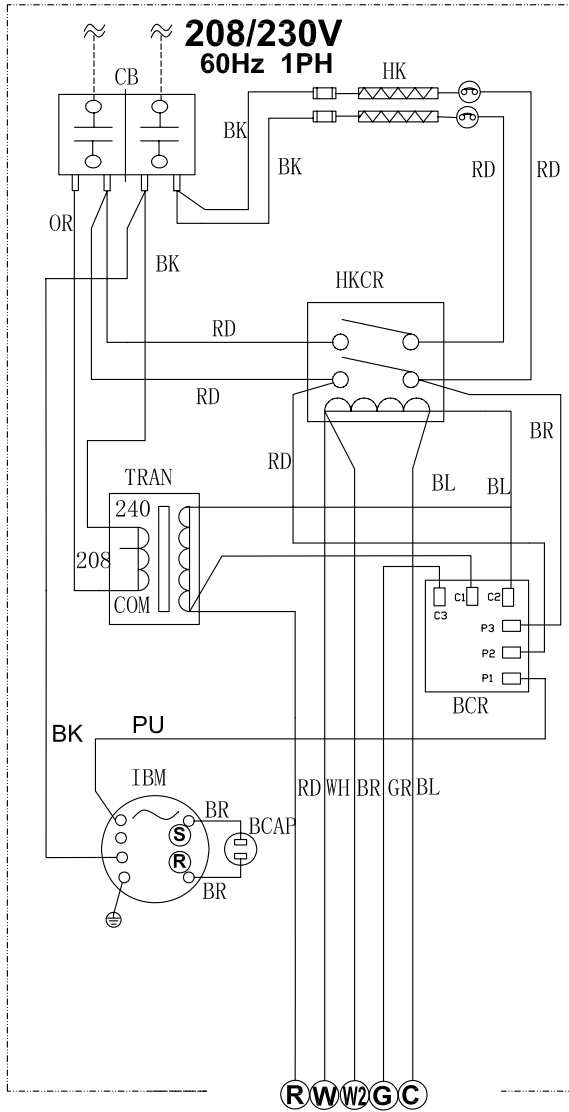
**Electrical .** The operation cycle as follows:

1. The thermostat calls for cooling
2. This sends a 24 voltage signal through the "Y" terminal to the compressor start kit, after 3 minutes the compressor contactor in the outdoor unit are closed. The compressor and outdoor fan start.
3. At the same time, a 24 Voltage signal flows through the "G" Terminal to the indoor blower relay.. The indoor blower starts.
4. The cooling system is now in operation.
5. The thermostat satisfies and ends the call for cooling.
6. This ends the 24 Voltage signal to the compressor start kit and the outdoor unit stops.
7. This ends the 24 voltage signal to the indoor blower relay and this indoor blower strips
8. The system is now off.

**7. WIRING DIAGRAM**

**Air Handler Wiring Diagram**

0010577601



**LINE VOLTAGE**  
**FACTORY STANDARD** \_\_\_\_\_  
**FIELD INSTALLED** - - - - -  
**OPTIONAL** - - - - -  
**LOW VOLTAGE**  
**FACTORY STANDARD** \_\_\_\_\_  
**FIELD INSTALLED** - - - - -  
**OPTIONAL** - - - - -

**USE COPPER CONDUCTORS ONLY**  
**WARNING CABINET MUST BE**  
**PERMANENTLY GROUNDED AND ALL**  
**WIRING TO CONFORM TO I.E.C.,N.E.C.,C.E.C.**  
**C.L.C. AND LOCAL CODES AS APPLICABLE.**  
**REPLACEMENT WIRE MUST BE THE SAME**  
**GAGE AND INSULATION TYPE AS ORIGINAL**  
**WIRE.**

**COMPONENT CODES**  
**CB - CIRCUIT BREAKER**  
**HK - HEATING KIT**  
**BCR - BLOWER CONTROL RELAY**  
**BCAP - RUN CAPACITOR**  
**IBM - INDOOR BLOWER MOTOR**  
**TRAN - TRANSFORMER**  
**HKCR - HEATING KIT CONTROL RELAY**  
**230/208 SELECTABLE**

**COLOR CODES**  
**BK - BLACK WH - WHITE RD - RED**  
**PU - PURPLE BL - BLUE OR - ORANGE**  
**BR - BROWN GR - GREEN**

- 1) Confirm system selection. Optional components may be field or factory installed.
- 2) For proper system operation, consult indoor unit and outdoor unit installation instructions to confirm system match up and blower speed selection.
- 3) For different machine, the indoor fan motor may use medium or low speed.