INSTALLATION INSTRUCTIONS

WALL-MOUNTED PACKAGED AIR CONDITIONER

Models:

K36A2-A K42A2-A K48A2-A K60A2-A
K36A2-N K42A2-N K48A2-N K60A2-N

K36L2-A K42L2-A K48L2-A K60L2-A
K36L2-N K42L2-N K48L2-N K60L2-N

Bard Manufacturing Company, Inc.
Bryan, Ohio 43506
www.bardhvac.com

Manual: 2100-628
Supersedes: ***NEW***
Date: 12-1-14

Contents

Figures

Tables

GETTING OTHER INFORMATION AND PUBLICATIONS

These publications can help you install the air conditioner or heat pump. You can usually find these at your local library or purchase them directly from the publisher. Be sure to consult current edition of each standard.

National Electrical Code.....ANSI/NFPA 70

Standard for the Installation .....ANSI/NFPA 90A of Air Conditioning and Ventilating Systems

Standard for Warm Air.....ANSI/NFPA 90B Heating and Air Conditioning Systems

Load Calculation for ..... ACCA Manual J Residential Winter and Summer Air Conditioning

Duct Design for Residential ..... ACCA Manual D Winter and Summer Air Conditioning and Equipment Selection

FOR MORE INFORMATION, CONTACT THESE PUBLISHERS:

ACCA **Air Conditioning Contractors of America**
1712 New Hampshire Ave. N.W.
Washington, DC 20009
Telephone: (202) 483-9370
Fax: (202) 234-4721

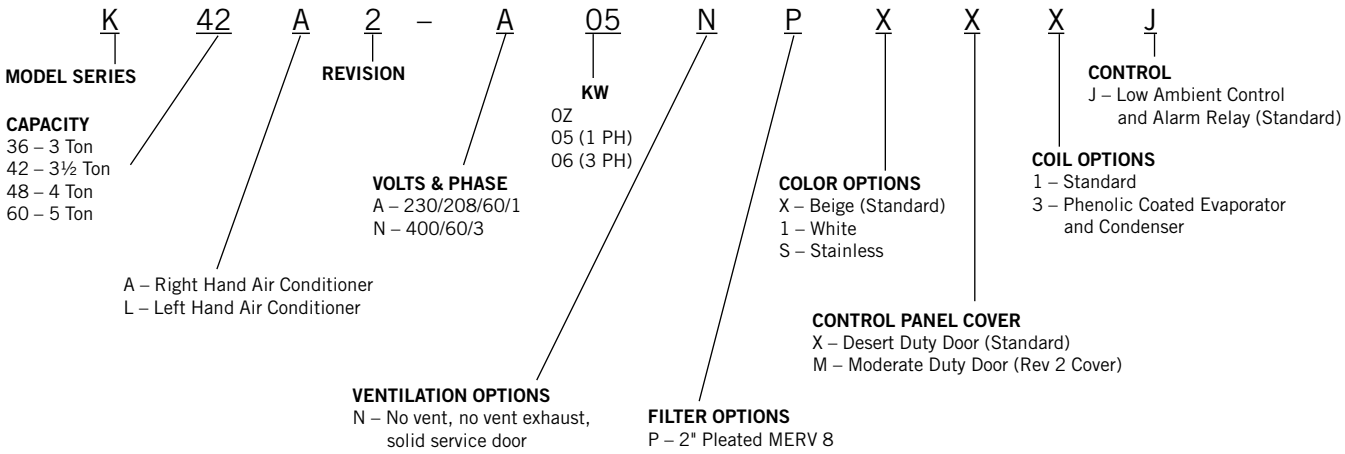
ANSI **American National Standards Institute**
11 West Street, 13th Floor
New York, NY 10036
Telephone: (212) 642-4900
Fax: (212) 302-1286

ASHRAE **American Society of Heating, Refrigeration and Air Conditioning Engineers, Inc.**
1791 Tullie Circle, N.E.
Atlanta, GA 30329-2305
Telephone: (404) 636-8400
Fax: (404) 321-5478

NFPA **National Fire Protection Association**
Batterymarch Park
P.O. Box 9101
Quincy, MA 02269-9901
Telephone: (800) 344-3555
Fax: (617) 984-7057

WALL-MOUNT GENERAL INFORMATION

AIR CONDITIONER WALL-MOUNT MODEL NOMENCLATURE



SHIPPING DAMAGE

Upon receipt of equipment, the carton should be checked for external signs of shipping damage. If damage is found, the receiving party must contact the last carrier immediately, preferably in writing, requesting inspection by the carrier's agent.

GENERAL

The equipment covered in this manual is to be installed by trained, experienced service and installation technicians.

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.

Children should be supervised to ensure that they do not play with the appliance.

The refrigerant system is completely assembled and charged. All internal wiring is complete.

The unit is designed for use with or without duct work. Flanges are provided for attaching the supply and return ducts.

These instructions explain the recommended method to install the air cooled self-contained unit and the electrical wiring connections to the unit.

These instructions and any instructions packaged with any separate equipment required to make up the entire air conditioning system should be carefully read before beginning the installation. Note particularly "Starting Procedure" and any tags and/or labels attached to the equipment.

While these instructions are intended as a general recommended guide, they do not supersede any national and/or local codes in any way. Authorities having jurisdiction should be consulted before the installation is made. See Page 3 for information on codes and standards.

Size of unit for a proposed installation should be based on heat loss calculation made according to methods of Air Conditioning Contractors of America (ACCA). The air duct should be installed in accordance with the Standards of the National Fire Protection Association for the Installation of Air Conditioning and Ventilating Systems of Other Than Residence Type, NFPA No. 90A, and Residence Type Warm Air Heating and Air Conditioning Systems, NFPA No. 90B. Where local regulations are at a variance with instructions, installer should adhere to local codes.

DUCT WORK

All duct work, supply and return, must be properly sized for the design airflow requirement of the equipment. Air Conditioning Contractors of America (ACCA) is an excellent guide to proper sizing. All duct work or portions thereof not in the conditioned space should be properly insulated in order to both conserve energy and prevent condensation or moisture damage.

Refer to Table 9 Maximum ESP of Operation – Electric Heat Only on page 24.

Design the duct work according to methods given by the Air Conditioning Contractors of America (ACCA). When duct runs through unheated spaces, it should be insulated with a minimum of one inch of insulation. Use insulation with a vapor barrier on the outside of the insulation. Flexible joints should be used to connect the duct work to the equipment in order to keep the noise transmission to a minimum.

All models covered by this installation instructions require a 1/4 inch clearance to combustible material for the first three feet of duct attached to the outlet air frame is required. See Wall Mounting Instructions and Figures 2 and 3 on pages 8 and 9 for further details.

Ducts through the walls must be insulated and all joints taped or sealed to prevent air or moisture entering the wall cavity.

Some installations may not require any return air duct. A metallic return air grille is required with installations not requiring a return air duct. The spacing between louvers on the grille shall not be larger than 5/8 inch.

Any grille that meets with 5/8 inch louver criteria may be used. It is recommended that Bard Return Air Grille Kit RG5 or RFG5 be installed when no return duct is used. Contact distributor or factory for ordering information. If using a return air filter grille, filters must be of sufficient size to allow a maximum velocity of 400 fpm.

NOTE: If no return air duct is used, applicable installation codes may limit this cabinet to installation only in a single story structure.

FILTERS

A 2-inch pleated filter is standard with each unit. The filter slides into position making it easy to service. This filter can be serviced from the outside by removing the filter access panel.

CONDENSATE DRAIN

A plastic drain hose extends from the drain pan at the top of the unit down to the unit base. There are openings in the unit base for the drain hose to pass through. In the event the drain hose is connected to a drain system of some type, it must be an open or vented type system to assure proper drainage.

WALL MOUNTING INFORMATION

1. Two holes for the supply and return air openings must be cut through the wall as shown in Figure 2 on page 8.
2. On wood frame walls, the wall construction must be strong and rigid enough to carry the weight of the unit without transmitting any unit vibration.
3. Concrete block walls must be thoroughly inspected to insure that they are capable of carrying the weight of the installed unit.

⚠ WARNING

Failure to provide the 1/4 inch clearance between the supply duct and a combustible surface for the first 3 feet of duct can result in fire causing damage, injury or death.

MOUNTING THE UNIT

1. These units are secured by wall mounting brackets which secure the unit to the outside wall surface at both sides. A bottom mounting bracket, attached to skid for shipping, is provided for ease of installation, but is not required.
2. The unit itself is suitable for 0 inch clearance, but the supply air duct flange and the first 3 feet of supply air duct require a minimum of 1/4 inch clearance to combustible material. However, it is generally recommended that a 1 inch clearance is used for ease of installation and maintaining the required clearance to combustible material. See Figure 2 on page 8 for details on opening sizes.
3. Locate and mark lag bolt locations and bottom mounting bracket location. See Figure 2.
4. Mount bottom mounting bracket.
5. Hook top rain flashing, attached to front-right of supply flange for shipping, under back bend of top.
6. Position unit in opening and secure with 5/16 lag bolts; use 7/8 inch diameter flat washers on the lag bolts.
7. Secure rain flashing to wall and caulk across entire length of top. See Figure 2.
8. For additional mounting rigidity, the return air and supply air frames or collars can be drilled and screwed or welded to the structural wall itself (depending upon wall construction). Be sure to observe required clearance if combustible wall.
9. On side-by-side installations, maintain a minimum of 20 inches clearance on right side to allow access to control panel and heat strips, and to allow proper airflow to the outdoor coil. Additional clearance may be required to meet local or national codes.

Clearances Required for Service Access and Adequate Condenser Airflow

MODELS	LEFT SIDE	RIGHT SIDE	DISCHARGE SIDE
K36A, K42A, K48A, K60A	20"	20"	10'
K36L, K42L, K48L, K60L	20"	20"	10'

NOTE: For side by side installation of two (2) K**A models there must be 20" between units. This can be reduced to 15" by using a K**L model (left side compressor and controls) for the left unit and K**A (right side compressor and controls) for right unit.

See specification S3498.

Minimum Clearances Required to Combustible Materials

MODELS	SUPPLY AIR DUCT FIRST THREE FEET	CABINET
K36A, L/K42A, L K48A, L/K60A, L	1/4"	0"

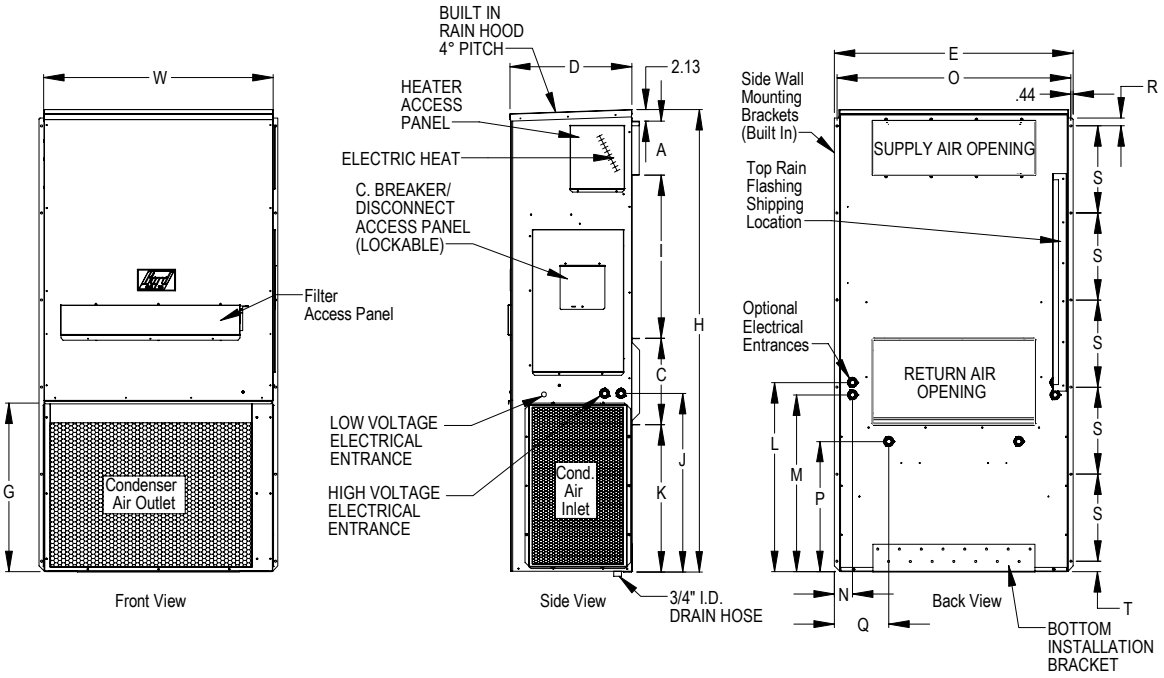
FIGURE 1

Dimensions of Basic Unit for Architectural and Installation Requirements (Nominal)

Model	Width (W)	Depth (D)	Height (H)	Supply		Return																
				A	B	C	B	E	F	G	I	J	K	L	M	N	O	P	Q	R	S	T
K36A/L K42A/L	42.075	22.432	84.875	9.88	29.88	15.88	29.88	43.88	13.56	31.66	30.00	32.68	26.94	34.69	32.43	3.37	43.00	23.88	10.00	1.44	16.00	1.88
K48A/L K60A/L	42.075	22.432	93.000	9.88	29.88	15.88	29.88	43.88	13.56	37.00	30.00	40.81	35.06	42.81	40.56	3.37	43.00	31.00	10.00	1.44	16.00	10.00

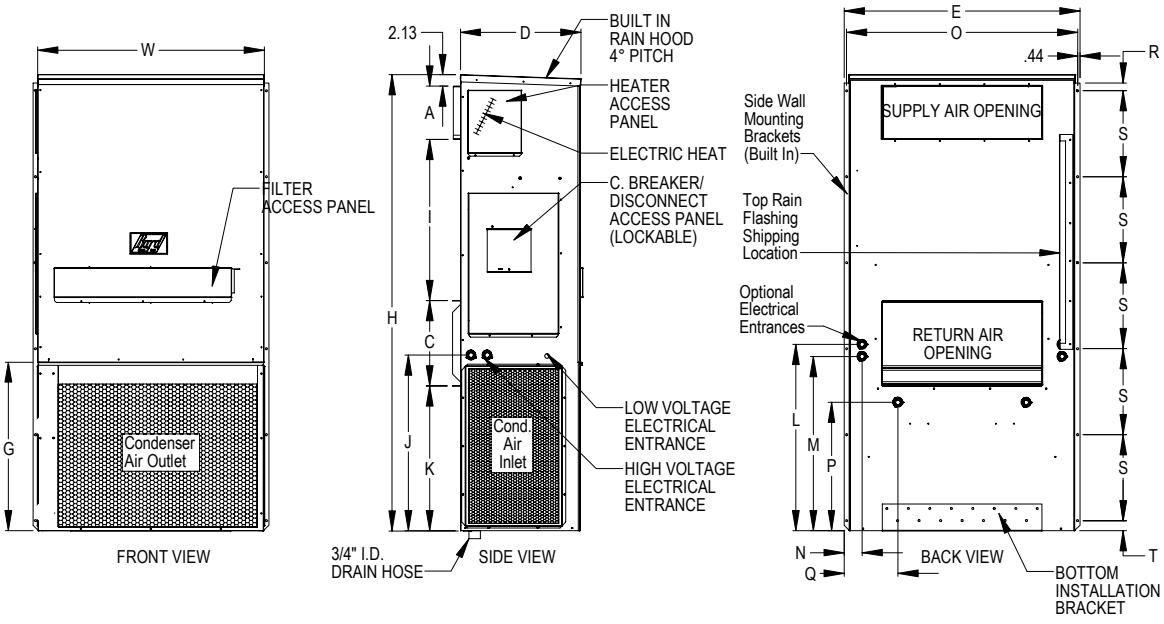
All dimensions are in inches. Dimensional drawings are not to scale.

KA RIGHT HAND UNIT**



MIS-3666 A

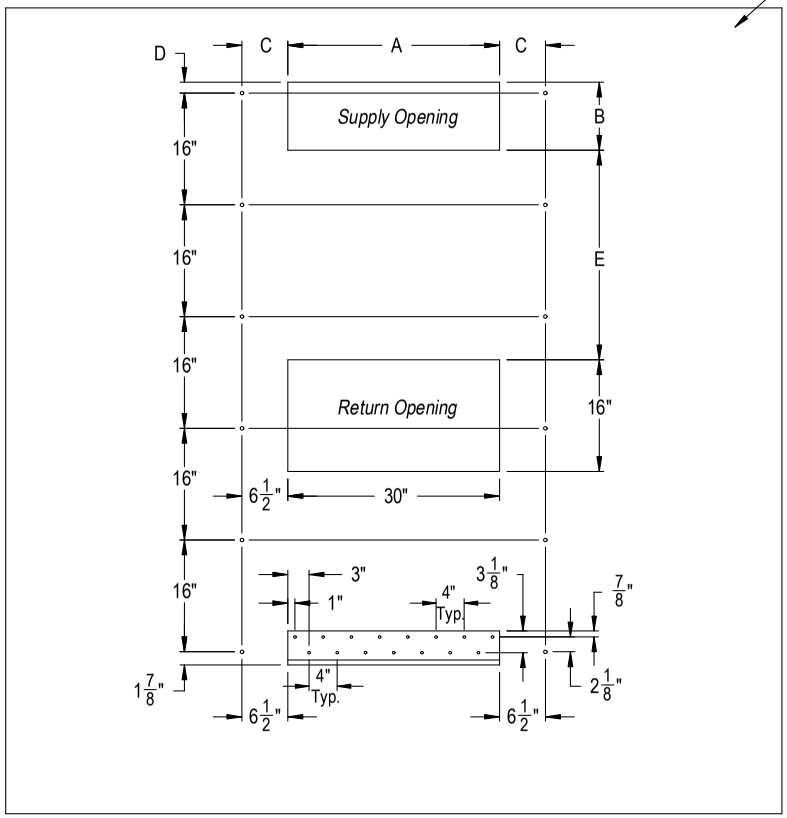
KL LEFT HAND UNIT**



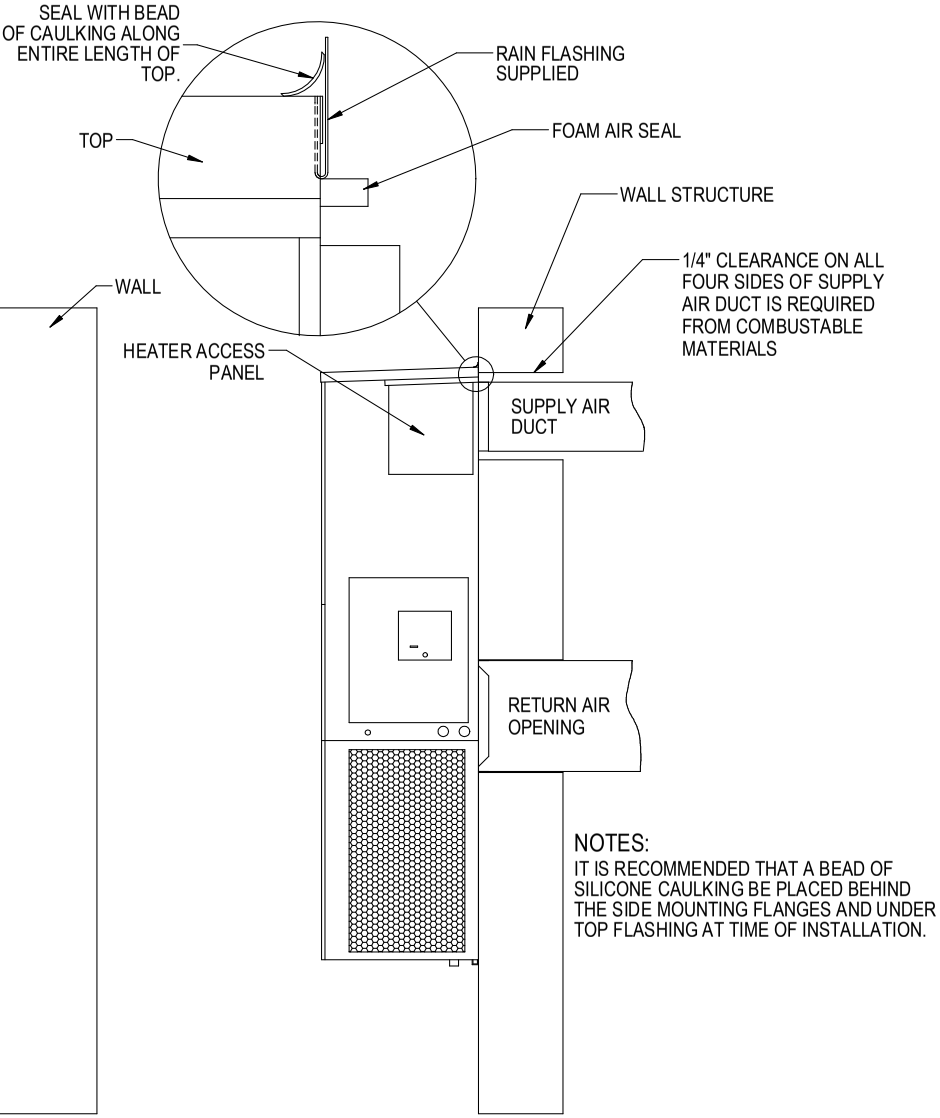
MIS-3665 A

FIGURE 2
K36A2, K36L2, K42A2, K42L2, K48A2, K48L2, K60A2, K60L2
MOUNTING INSTRUCTIONS

	A	B	C	D	E
REQUIRED DIMENSIONS TO MAINTAIN 1/4" MIN. CLEARANCE FROM COMBUSTIBLE MATERIALS	30 1/2	10 1/2	6 1/4	1 1/4	29 3/4
REQUIRED DIMENSIONS TO MAINTAIN RECOMMENDED 1" CLEARANCE FROM COMBUSTIBLE MATERIALS	32	12	5 1/2	2	29



Wall Opening and Hole Location View

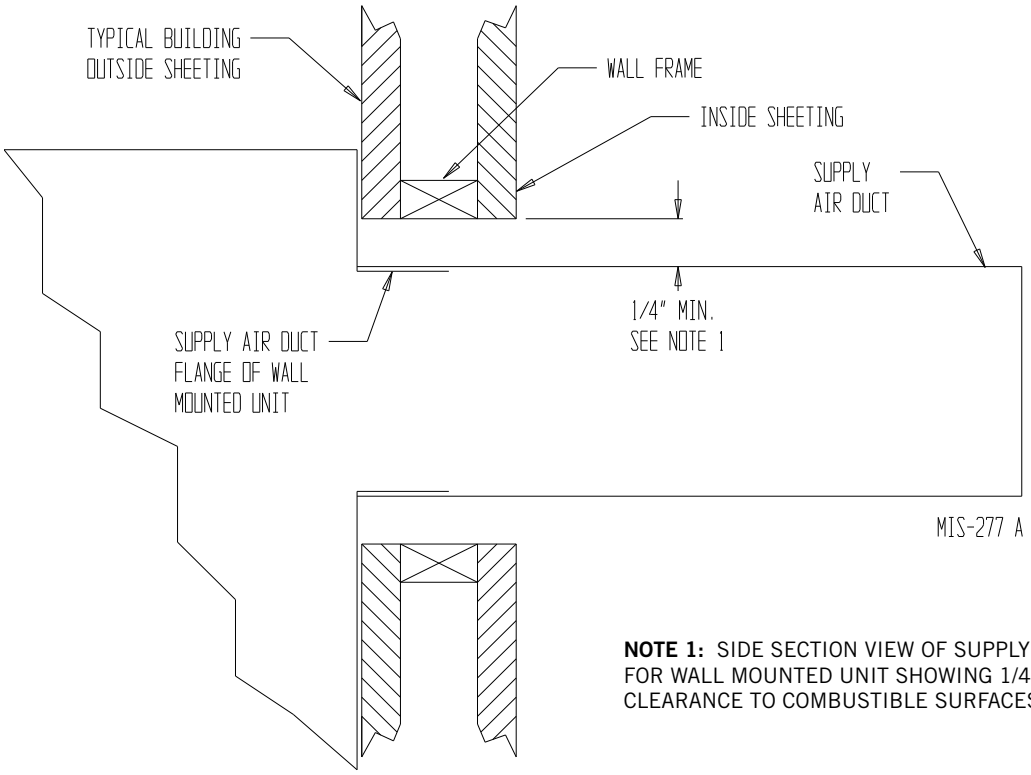


Right Side View

NOTES:
IT IS RECOMMENDED THAT A BEAD OF SILICONE CAULKING BE PLACED BEHIND THE SIDE MOUNTING FLANGES AND UNDER TOP FLASHING AT TIME OF INSTALLATION.

MIS-416 E

FIGURE 3
ELECTRIC HEAT CLEARANCE
K36A2, K36L2, K42A2, K42L2, K48A2, K48L2, K60A2, K60L2



NOTE 1: SIDE SECTION VIEW OF SUPPLY AIR DUCT FOR WALL MOUNTED UNIT SHOWING 1/4 INCH CLEARANCE TO COMBUSTIBLE SURFACES.

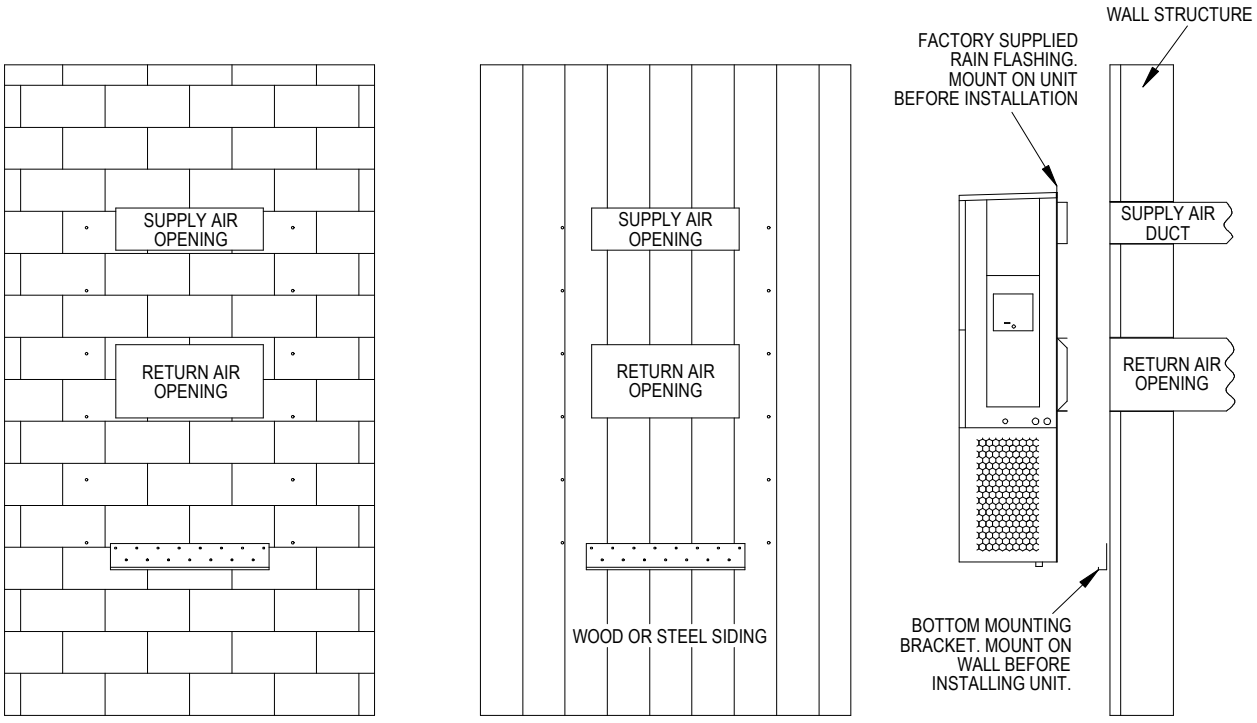
⚠ WARNING

A ***minimum*** of 1/4 inch clearance must be maintained between the supply air duct and combustible materials. This is required for the first 3 feet of ducting.

It is important to insure that the 1/4 inch minimum spacing is maintained at all points.

Failure to do this could result in overheating the combustible material and may result in a fire causing damage, injury or death.

FIGURE 4
WALL MOUNTING INSTRUCTIONS



CONCRETE BLOCK WALL INSTALLATION *WOOD FRAME WALL INSTALLATION* *SIDE VIEW* MIS-548 A

FIGURE 5
WALL MOUNTING INSTRUCTIONS

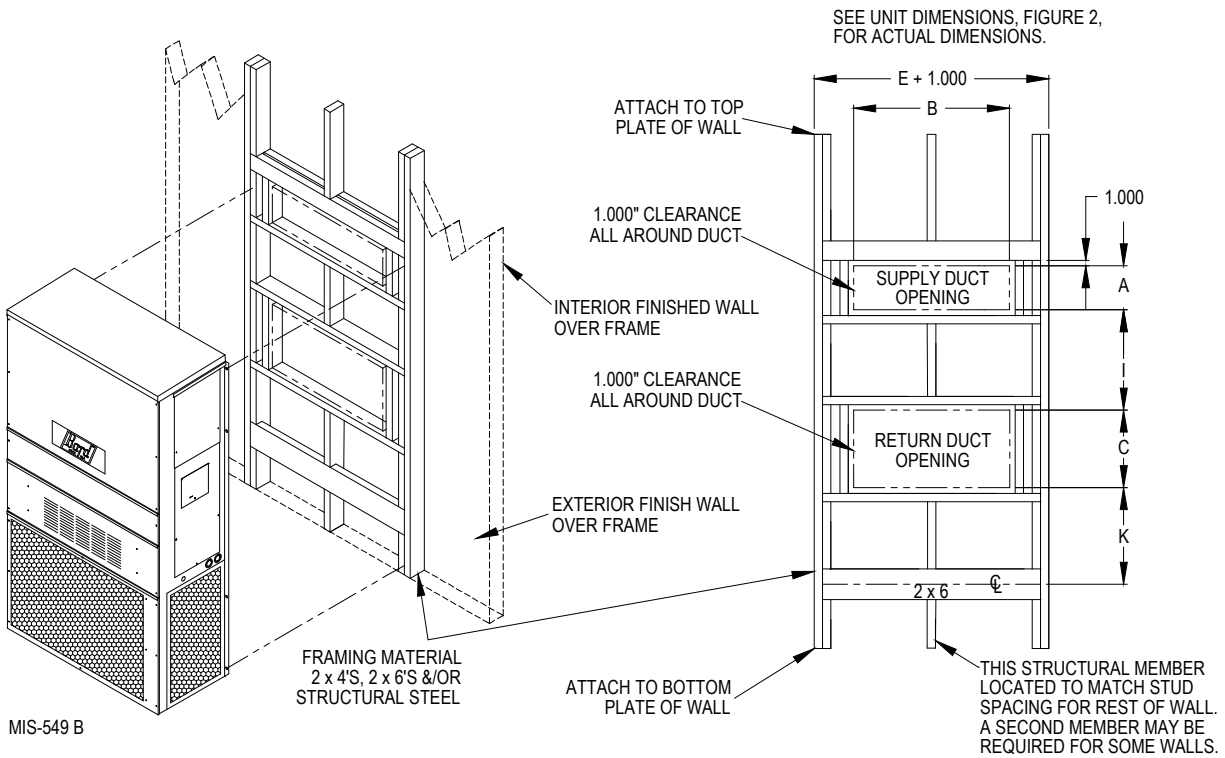
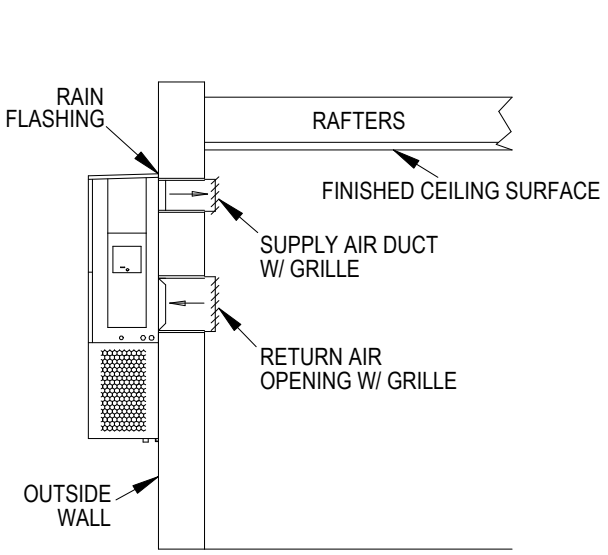
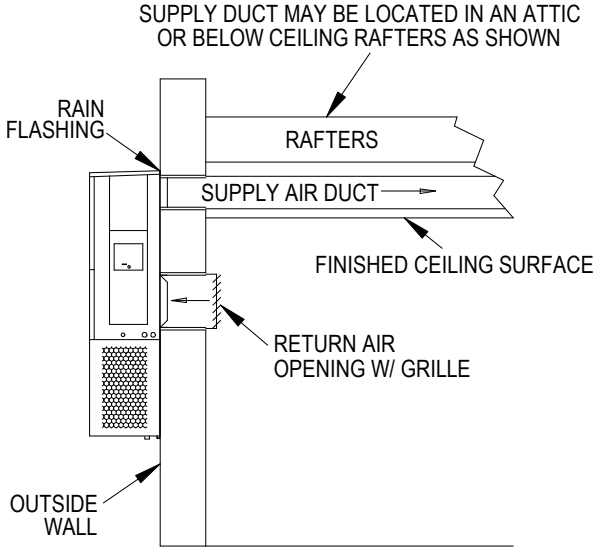


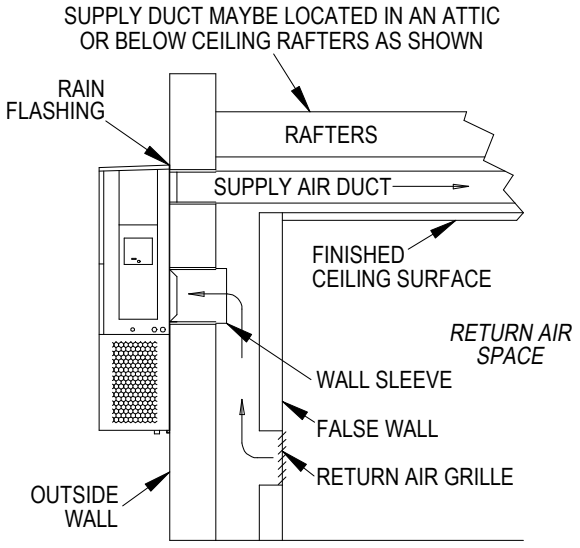
FIGURE 6
COMMON WALL MOUNTING INSTALLATIONS



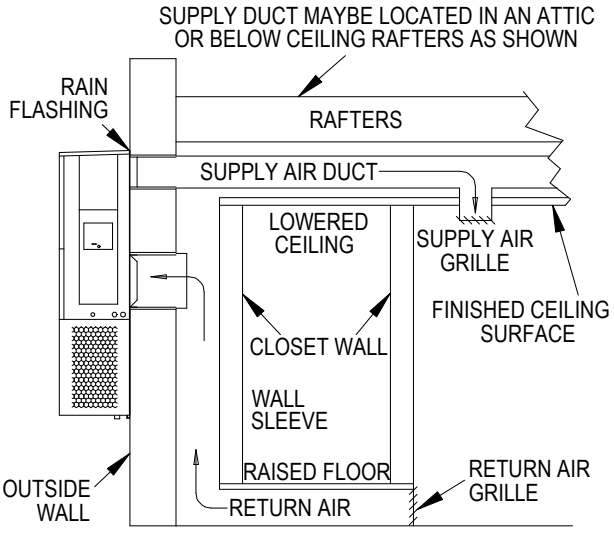
FREE AIR FLOW
NO DUCT



DUCTED SUPPLY
RETURN AT UNIT



FALSE WALL INSTALLATION



CLOSET INSTALLATION

MIS-550 B

WIRING – MAIN POWER

Refer to the unit rating plate for wire sizing information and maximum fuse or circuit breaker size. Each outdoor unit is marked with a "Minimum Circuit Ampacity". This means that the field wiring used must be sized to carry that amount of current. Depending on the installed KW of electric heat, there may be two field power circuits required. If this is the case, the unit serial plate will so indicate. All models are suitable only for connection with copper wire. Each unit and/or wiring diagram will be marked "Use Copper Conductors Only". These instructions ***must be*** adhered to. Refer to the National Electrical Code (NEC) for complete current carrying capacity data on the various insulation grades of wiring material. All wiring must conform to NEC and all local codes.

The electrical data lists fuse and wire sizes (75° C copper) for all models including the most commonly used heater sizes. Also shown are the number of field power circuits required for the various models with heaters.

The unit rating plate lists a "Maximum Time Delay Relay Fuse" or circuit breaker that is to be used with the equipment. The correct size must be used for proper circuit protection and also to assure that there will be no nuisance tripping due to the momentary high starting current of the compressor motor.

The disconnect access door on this unit may be locked to prevent unauthorized access to the disconnect. To convert for the locking capability, bend the tab located in the bottom left-hand corner of the disconnect opening under the disconnect access panel straight out. This tab will now line up with the slot in the door. When shut, a padlock may be placed through the hole in the tab preventing entry.

See "Start Up" section (page 17) for important information on three phase scroll compressor start ups.

See Table 6 on page 23 for Electrical Specifications.

WIRING – LOW VOLTAGE WIRING

All 230/208V 1 phase equipment has dual primary voltage transformers. All equipment leaves the factory wired on 240V tap. For 208V operation, reconnect from 240V to 208V tap. The acceptable operating voltage range for the 240 and 208V taps are:

TAP	RANGE
240	253 – 216
208	220 – 187

NOTE: The voltage should be measured at the field power connection point in the unit and while the unit is operating at full load (maximum amperage operating condition).

18 guage copper, color-coded thermostat cable is recommended. See Figure 7 on page 14 for thermostat connections.

Low Voltage Connection

These units use a 24-volt AC low voltage circuit. The "*RT*" terminal is the 24V transformer output, and the "*R*" terminal is the 24VAC *hot* terminal for the operation of the equipment. "*RT*" and "*R*" are connected with brass jumper bar which can be removed and "*RT*" and "*R*" connected to external NC (normally closed) contact such as a fire/smoke detector that will cause immediate shutdown of the equipment upon activation.

"*C*" terminal is *grounded*.
"*G*" terminal is the *fan input*.
"*Y*" terminal is the *compressor input for cooling*
"*W1*" terminal is the *1st stage electric heat*.

TABLE 1
LOW VOLTAGE CONNECTIONS FOR DDC CONTROL

Fan Only	Energize G
Cooling Mode	Energize Y, G
Heating Mode	Energize W1, G

TABLE 2
WALL THERMOSTAT

Part Number	Predominate Features
8403-057 (TH3110D1040)	1 stage Cool, 1 stage Heat Electronic Non-Programmable Auto or Manual changeover
8403-058 (TH5220D1151)	2 stage Cool, 2 stage Heat Electronic Non-Programmable HP or Conventional (Default: HP) Auto or Manual changeover
8403-059 (TH5220D1219/U)	2 stage Cool, 2 stage Heat Electronic Non-Programmable HP or Conventional (Default: AC) Auto or Manual changeover
8403-060 (1120-445)	3 stage Cool; 3 stage Heat Programmable/Non-Programmable Electronic HP or Conventional Auto or Manual changeover Dehumidification Output

TABLE 3
THERMOSTAT WIRE SIZE

Transformer VA	FLA	Wire Gauge	Maximum Distance (Feet)
55	2.3	20 gauge 18 gauge 16 gauge 14 gauge 12 gauge	45 60 100 160 250

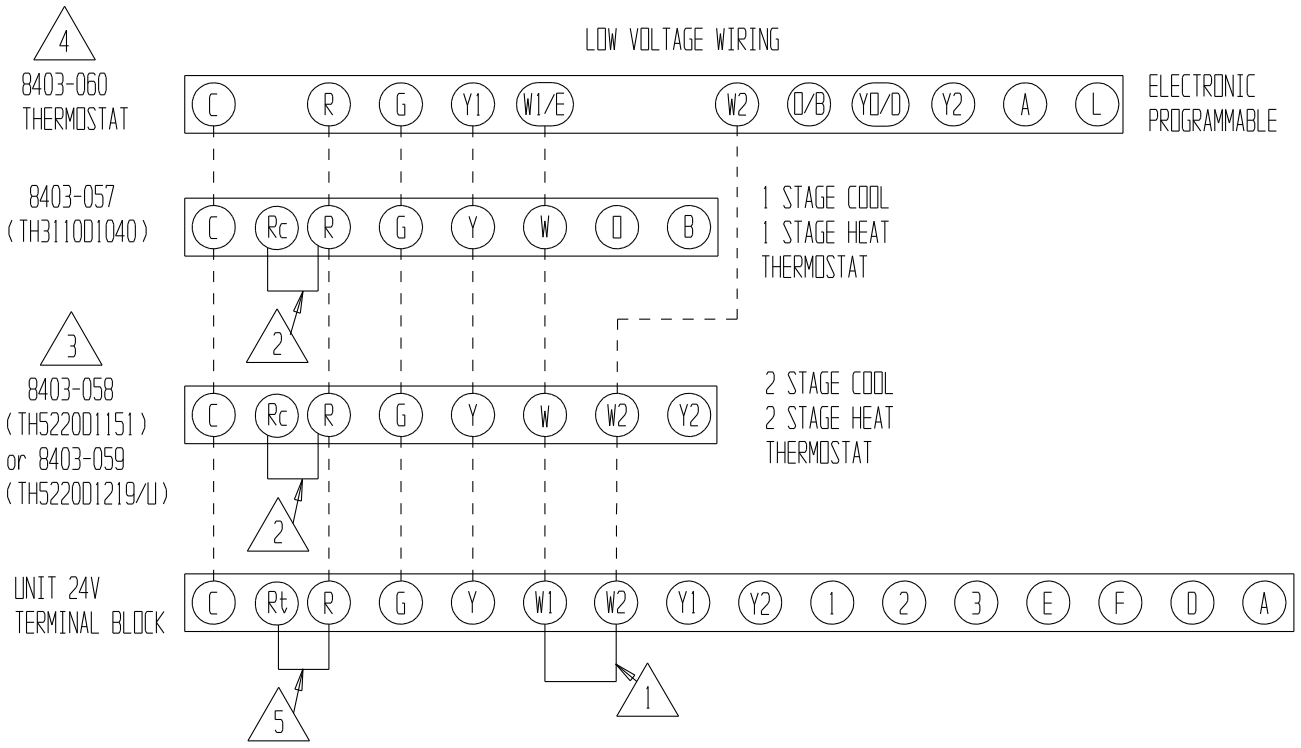
HUMIDITY CONTROL OPTION

When two units are controlled and connected with the MV4001K-B, they can be adapted to perform dehumidification with the addition of a simple humidity controller that closes-on-rise, and is connected to terminals "H1" and "H2" on the main controller board (see Figure 8 on page 15). Recommended is Bard Part # 8403-038 (H600A 1014). ***NOTE: Both HVAC units must be equipped with electric resistance heat for this sequence to work properly.***

1. Temperature control always has priority over dehumidification. If there is any stage of cooling demand active, the dehumidification sequence is locked out.
2. If all stages of cooling are satisfied, and relative humidity is above the set point of the humidity controller.
    a. The Green "Dehumid Operation Light" will come on, and the lag unit compresser and blower will operate until the set point of humidty controller is satisfied (or cancelled by a call for cooling).
    b. If the space temperature drops to 19.4°C, the electric heater of the lead unit will cycle to help maintain building temperature. It will cycle off at 20.6°C.
    c. If the space temperature drops to 17.8°C, the "Stage 2 Heating Light" will come on, and the lag unit compressor operation for dehumidification mode will terminate until the building temperature rises above18.3°C from the 1st Stage heat and building load. The Green "Dehumidification Light" will stay on during this sequence, and when 2nd Stage Heating light is "OFF", the compressor is "ON". The electric resistance heater in the lag unit is locked out in dehumidification mode.

Lag Unit outputs G, Y1, and Y2 are all switched one during dumidification sequence. This is true for both alternating and non-alternating controller configurations.

FIGURE 7
THERMOSTAT CONNECTIONS



1 REMOVE JUMPER FOR 2 STAGE ELECTRIC HEAT ON UNITS WITH 15 OR MORE KW

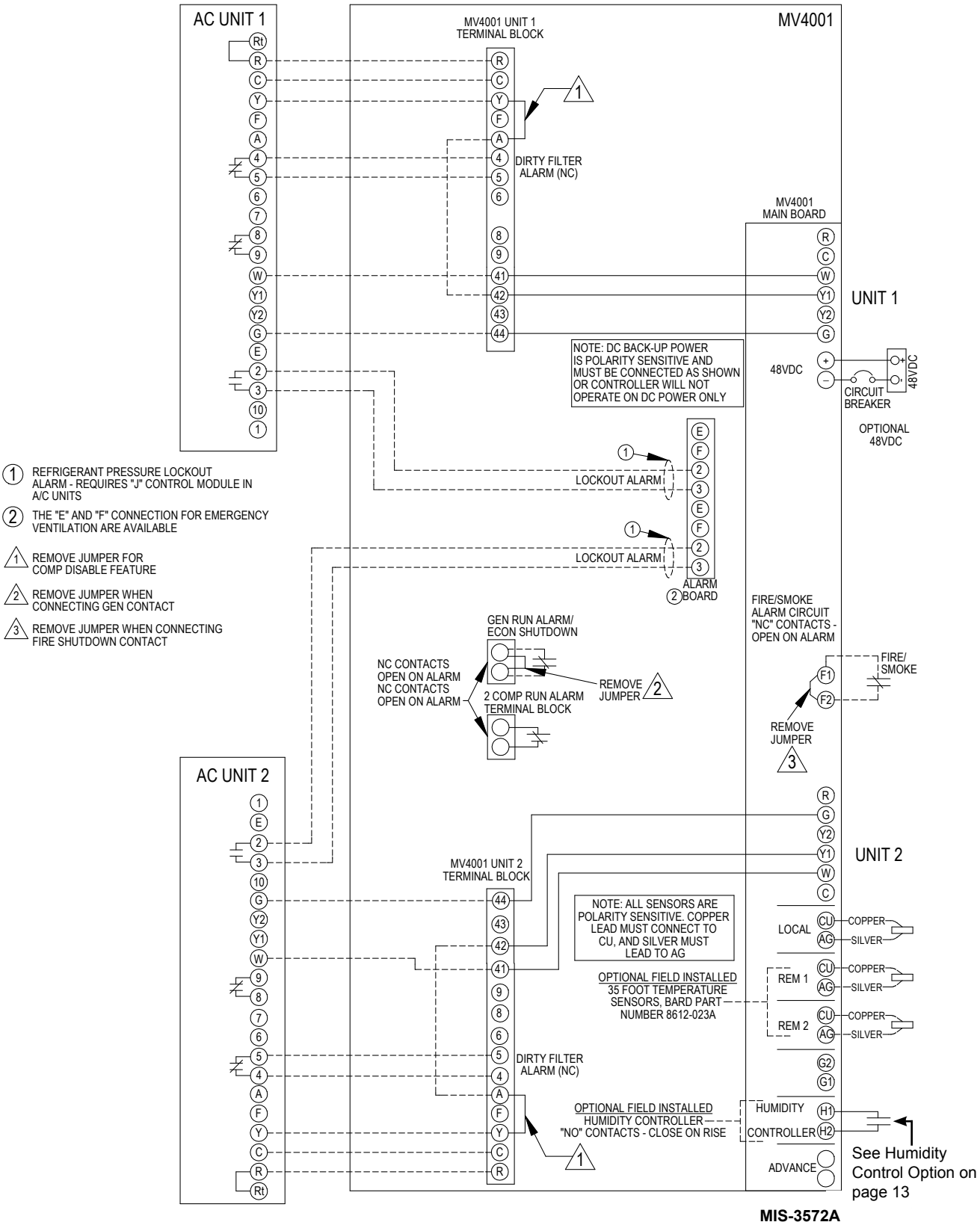
2 FACTORY INSTALLED JUMPER

3 FOR 8403-058, CHANGE "SYSTEM TYPE", SET UP FUNCTION 1, FROM 5 (2 HEAT/ 1 COOL HEAT PUMP) TO 6 (2 HEAT/ 2 COOL CONVENTIONAL). FOR 8403-059, NO CHANGE REQUIRED

4 CHANGE MODEL CONFIGURATION FROM HEAT PUMP TO HEAT/COOL.

5 FACTORY INSTALLED JUMPER. FOR IMMEDIATE EMERGENCY SHUTDOWN OF ALL HVAC OPERATION, REMOVE JUMPER AND CONNECT NORMALLY CLOSED (NC) CONTACT TO R AND Rt TERMINALS. MIS-3138 A

FIGURE 8
MV4001K-B CONTROLLER CONNECTIONS
1-STAGE (KA/K**L SERIES) AIR CONDITIONERS – NO ECONOMIZER**



MIS-3572A

THESE UNITS REQUIRE R-410A REFRIGERANT AND POLYOL ESTER OIL.

GENERAL

1. Use separate service equipment to avoid cross contamination of oil and refrigerants.
2. Use recovery equipment rated for R-410A refrigerant.
3. Use manifold gauges rated for R-410A (800 psi/250 psi low).
4. R-410A is a binary blend of HFC-32 and HFC-125.
5. R-410A is nearly azeotropic - similar to R-22 and R-12. Although nearly azeotropic, charge with liquid refrigerant.
6. R-410A operates at 40-70% higher pressure than R-22, and systems designed for R-22 cannot withstand this higher pressure.
7. R-410A has an ozone depletion potential of zero, but must be reclaimed due to its global warming potential.
8. R-410A compressors use polyolester oil.
9. Polyol Ester oil is hygroscopic; it will rapidly absorb moisture and strongly hold this moisture in the oil.
10. A liquid line dryer must be used - even a deep vacuum will not separate moisture from the oil.
11. Limit atmospheric exposure to 15 minutes.
12. If compressor removal is necessary, always plug compressor immediately after removal. Purge with small amount of nitrogen when inserting plugs.

TOPPING OFF SYSTEM CHARGE

If a leak has occurred in the system, Bard Manufacturing recommends reclaiming, evacuating (see criteria above), and charging to the nameplate charge. If done correctly, topping off the system charge can be done without problems.

With R-410A, there are no significant changes in the refrigerant composition during multiple leaks and recharges. R-410A refrigerant is close to being an azeotropic blend (it behaves like a pure compound or single component refrigerant). The remaining refrigerant charge, in the system, may be used after leaks have occurred and then "top-off" the charge by utilizing the pressure charts on the inner control panel cover as a guideline.

REMEMBER: When adding R-410A refrigerant, it must come out of the charging cylinder/tank as a liquid to avoid any fractionation, and to ensure optimal system performance. Refer to instructions for the cylinder that is being utilized for proper method of liquid extraction.

⚠ WARNING

Failure to conform to these practices could lead to damage, injury or death.

SAFETY PRACTICES

1. Never mix R-410A with other refrigerants.
2. Use gloves and safety glasses, Polyol Ester oils can be irritating to the skin, and liquid refrigerant will freeze the skin.
3. Never use air and R-410A to leak check; the mixture may become flammable.
4. Do not inhale R-410A. The vapor attacks the nervous system, creating dizziness, loss of coordination and slurred speech. Cardiac irregularities, unconsciousness and ultimate death can result from breathing this concentration.
5. Do not burn R-410A. This decomposition produces hazardous vapors. Evacuate the area if exposed.
6. Use only cylinders rated DOT4BA/4BW 400.
7. Never fill cylinders over 80% of total capacity.
8. Store cylinders in a cool area, out of direct sunlight.
9. Never heat cylinders above 125°F.
10. Never trap liquid R-410A in manifold sets, gauge lines or cylinders. R-410A expands significantly at warmer temperatures. Once a cylinder or line is full of liquid, any further rise in temperature will cause it to burst.

IMPORTANT INSTALLER NOTE

For improved start up performance wash the indoor coil with a dish washing detergent.

HIGH PRESSURE SWITCH

All K**A/K**L wall mounted air conditioner series models are supplied with a remote reset for the high and low pressure switch. If tripped, this pressure switch may be reset by turning the thermostat off then back on again.

THREE PHASE SCROLL COMPRESSOR START UP INFORMATION

Scroll compressors, like several other types of compressors, will only compress in one rotational direction. Direction of rotation is not an issue with single phase compressors since they will always start and run in the proper direction.

However, three phase compressors will rotate in either direction depending upon phasing of the power. Since there is a 50-50 chance of connecting power in such a way as to cause rotation in the reverse direction, verification of proper rotation must be made. Verification of proper rotation direction is made by observing that suction pressure drops and discharge pressure rises when the compressor is energized. Reverse rotation also results in an elevated sound level over that with correct rotation, as well as substantially reduced current draw compared to tabulated values.

Verification of ***proper rotation*** must be made at the time the equipment is put into service. If improper rotation is corrected at this time, there will be no negative impact on the durability of the compressor. However, reverse operation for over one hour may have a negative impact on the bearing due to oil pump out.

NOTE: If compressor is allowed to run in reverse rotation for an extended period of time, the compressor's internal protector will trip.

All three phase compressors are wired identically internally. As a result, once the correct phasing is determined for a specific system or installation, connecting properly phased power leads to the same Fusite terminal should maintain proper rotation direction.

The direction of rotation of the compressor may be changed by reversing any two line connections to the unit.

PHASE MONITOR

All units with three phase scroll compressors are equipped with a 3 phase line monitor to prevent compressor damage due to phase reversal.

The phase monitor in this unit is equipped with two LEDs. If the Y signal is present at the phase monitor and phases are correct the green LED will light.

If phases are reversed, the red fault LED will be lit and compressor operation is inhibited.

If a fault condition occurs, reverse two of the supply leads to the unit. ***Do not reverse any of the unit factory wires as damage may occur.***

CONDENSER FAN OPERATION

NOTE: *All models covered by this manual are equipped with a low ambient control (LAC); on start up, the condenser fan motor will have delayed start until system refrigerant operating pressure builds up. After starting, the fan motor may or may not cycle depending upon ambient conditions. This is normal operation.*

SERVICE HINTS

1. Caution owner/operator to maintain clean air filters at all times. Also, not to needlessly close off supply and return air registers. This reduces airflow through the system, which shortens equipment service life as well as increasing operating costs.
2. Check all power fuses or circuit breakers to be sure they are the correct rating.
3. Periodic cleaning of the outdoor coil to permit full and unrestricted airflow circulation is essential.

SEQUENCE OF OPERATION

COOLING – Circuit R-Y makes at thermostat pulling in compressor contactor, starting the compressor and outdoor motor. (See **NOTE** on previous page under Condenser Fan Operation if equipped with Low Ambient Control.) The G (indoor motor) circuit is automatically completed by the thermostat on any call for cooling operation or can be energized by manual fan switch on subbase for constant air circulation. On a call for heating, circuit R-W1 make at the thermostat pulling in heat contactor for the strip heat and blower operation. On a call for second stage heat, R-W2 makes bringing on second heat contactor, if so equipped.

COMPRESSOR CONTROL MODULE

The compressor control module is standard on all models covered by this manual. The compressor control module is an anti-short cycle/lockout timer with high and low pressure switch monitoring and alarm relay output.

Adjustable Delay On Make And Break Timer

On initial power up or anytime power is interrupted to the unit, the *delay on make* period begins, which will be 2 minutes plus 10% of the *delay on break* setting. When the delay on make is complete and the high pressure switch and low pressure switch is closed, the compressor contactor is energized. Upon shutdown, the delay on break timer starts and prevents restart until the delay on break and delay on make periods have expired.

During routine operation of the unit with no power interruptions, the compressor will operate on demand with no delay.

High Pressure Switch and Lockout Sequence

If the high pressure switch opens, the compressor contactor will de-energize immediately. The lockout timer will go into a *soft lockout* and stay in soft lockout until the high pressure switch closes and the delay on break time has expired. If the high pressure switch opens again in this same operating cycle, the unit will go into *manual lockout* condition and the alarm relay circuit will energize. Recycling the wall thermostat resets the manual lockout.

Low Pressure Switch, Bypass, and Lockout Sequence

If the low pressure switch opens for more than 120 seconds, the compressor contactor will de-energize and go into a soft lockout. Regardless the state of the low pressure switch, the contactor will reenergize after the delay on make time delay has expired. If the low pressure switch remains open, or opens again for longer than 120 seconds, the unit will go into manual lockout condition and the alarm relay circuit will energize. Recycling the wall thermostat resets the manual lockout.

Alarm Relay Output

Alarm terminal is output connection for applications where alarm relay is employed. This terminal is powered whenever the compressor is locked out due to HPC or LPC sequences as described.

NOTE: Both high and low pressure switch controls are inherently automatic reset devices. The high pressure switch and low pressure switch cut out and cut in settings are fixed by specific air conditioner unit model. The lockout features, both soft and manual, are a function of the Compressor Control Module.

ADJUSTMENTS

Adjustable Delay on Make and Delay on Break Timer

The potentiometer is used to select Delay on Break time from 30 seconds to 5 minutes. Delay on Make (DOM) timing on power-up and after power interruptions is equal to 2 minutes plus 10% of Delay on Break (DOB) setting:

0.5 minute (30 seconds) DOB = 123 second DOM
1.0 minute (60 seconds) DOB = 126 second DOM
2.0 minute (120 seconds) DOB = 132 second DOM
3.0 minute (180 seconds) DOB = 138 second DOM
4.0 minute (240 seconds) DOB = 144 second DOM
5.0 minute (300 seconds) DOB = 150 second DOM

During routine operation of the unit with no power interruptions, the compressor will operate on demand with no delay.

Typical Settings for Dual Unit Installation:

Unit 1: DOB set at 2 minutes; DOM is 132 seconds

Unit 2: DOB set at 4 minutes; DOM is 144 seconds

PRESSURE SERVICE PORTS

High and low pressure service ports are installed on all units so that the system operating pressures can be observed. A cooling pressure table can be found on page 22.

FAN BLADE SETTING DIMENSIONS

Shown in Figure 9 is the correct fan blade setting for proper air delivery across the outdoor coil. Refer to Table 4 for unit specific dimension.

Any service work requiring removal or adjustment in the fan and/or motor area will require that the dimensions below be checked and blade adjusted in or out on the motor shaft accordingly.

FIGURE 9
FAN BLADE SETTING

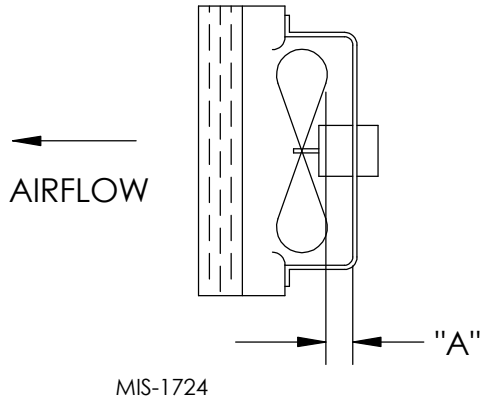


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TABLE 4
FAN BLADE DIMENSION

Model	Dimension A
K36A2/K36L2 K42A2/K42L2 K48A2/K48L2 K60A2/K60L2	1.75"

R-410A REFRIGERANT CHARGE

This unit was charged at the factory with the quantity of refrigerant listed on the serial plate. AHRI capacity and efficiency ratings were determined by testing with this refrigerant charge quantity.

The pressure table on page 22 shows nominal pressures for the units. Since many installation specific situations can affect the pressure readings, this information should only be used by certified technicians as a guide for evaluating proper system performance. They shall not be used to adjust charge. If charge is in doubt, reclaim, evacuate and recharge the unit to the serial plate charge.

REMOVAL OF FAN SHROUD

1. Disconnect all power to the unit.
2. Remove the screws holding both grilles, one on each side of unit, and remove grilles.
3. Remove screws holding fan shroud to condenser and bottom. Nine (9) screws.
4. Unwire condenser fan motor.
5. Slide complete motor, fan blade, and shroud assembly out the left side of the unit.
6. Service motor/fan as needed.
7. Reverse steps to reinstall.

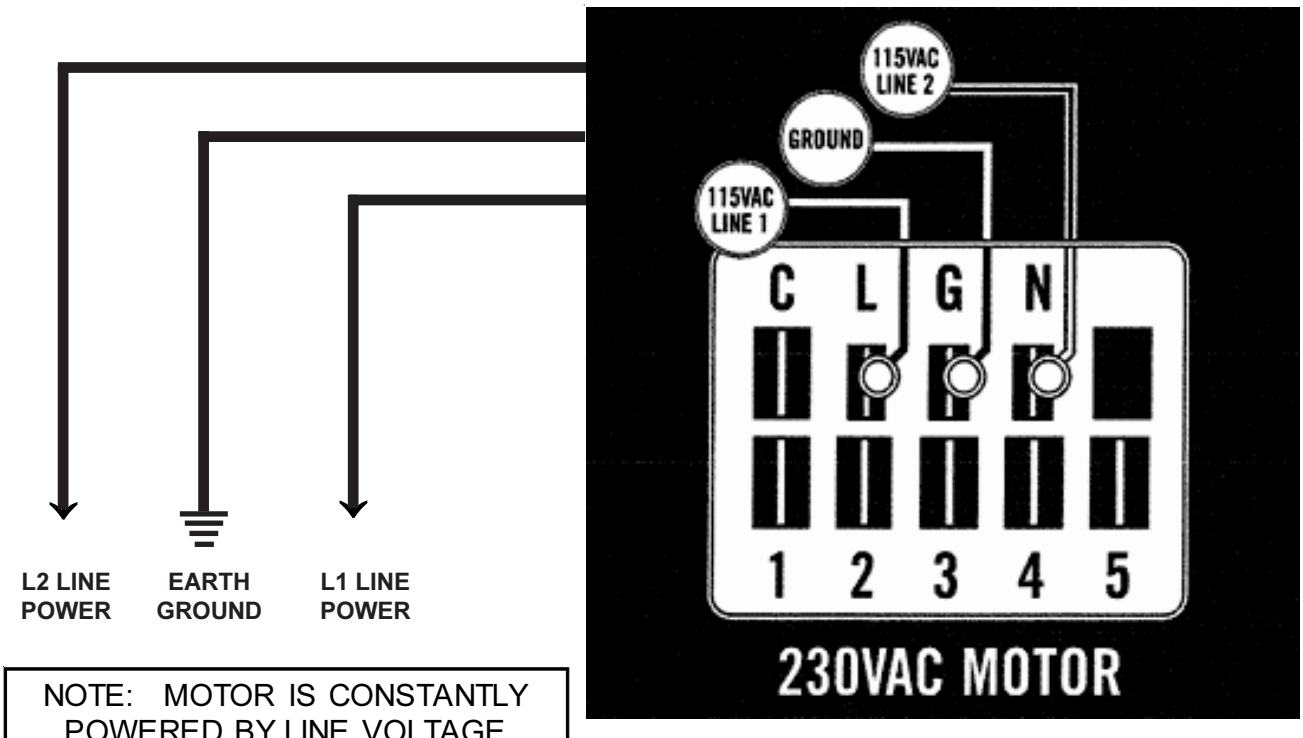
IF THE MOTOR IS RUNNING

1. It is normal for the motor to rock back and forth on start up. Do not replace the motor if this is the only problem identified.
2. If the system is excessively noisy, does not appear to change speeds in response to a demand (Heat, Cool, Other) or is having symptoms during the cycle such as tripping limit or freezing coil, check the following:
   a. Wait for programmed delays to time out.
   b. Confirm that the motors control inputs are wired per the factory supplied wiring diagram to ensure motor is getting proper control signals and sequencing.
   c. Remove the filter and check that all dampers, registers and grilles are open and free flowing. If removing the filters corrects the problem, clean or replace with a less restrictive filter. Also check and clean the blower wheel or coil as necessary.
   d. Check the external static pressure (total of both supply and return) to ensure that you are within the ranges as listed on the unit serial plate. If higher than allowed, additional duct work is needed.
   e. If the motor does not shut off at the end of the cycle, wait for any programmed delays to time out (no more than 90 seconds). Also make sure that there is no call for "Continuous Fan" on the "G" terminal.
   f. If the above diagnostics do not solve the problem, confirm the voltage checks in the next section below, then continue with the "Communication Diagnostics" on the following page.

IF THE MOTOR IS NOT RUNNING

1. Check for proper high voltage and ground at the (L/L1) (G) (N/L2) connections at the motor (see Figure 10). Correct any voltage issues before proceeding to the next step. The motor is voltage specific. Only the correct voltage should be applied to the proper motor. Input voltage within plus or minus 10% of the nominal 230 VAC is acceptable.
2. If the motor has proper high voltage and ground at the (L/L1) (G) (N/L2) connections, then continue with the "Communication Diagnostics" on the following page.

FIGURE 10
MOTOR HIGH VOLTAGE CONNECTIONS



NOTE: MOTOR IS CONSTANTLY POWERED BY LINE VOLTAGE

COMMUNICATION DIAGNOSTICS

The motor is communicated through 24 VAC low voltage (Thermostat Control Circuit Wiring).

1. Start with unit wiring diagram to confirm proper connections and voltage (see Figure 11).
2. Initiate a demand from the thermostat and check the voltage between the common and the appropriate motor terminal (1-5). ("G" input is typically on terminal #1, but refer to wiring diagram.)
   a. If the low voltage communication is not present, check the demand from the thermostat. Also check the output terminal and wire(s) from the terminal strip or control relay(s) to the motor.
   b. If the motor has proper high voltage as identified above (Motor not Running #1) and proper low voltage to a programmed terminal yet is not operating, the motor is failed and will require replacement.

FIGURE 11
MOTOR LOW VOLTAGE CONNECTIONS

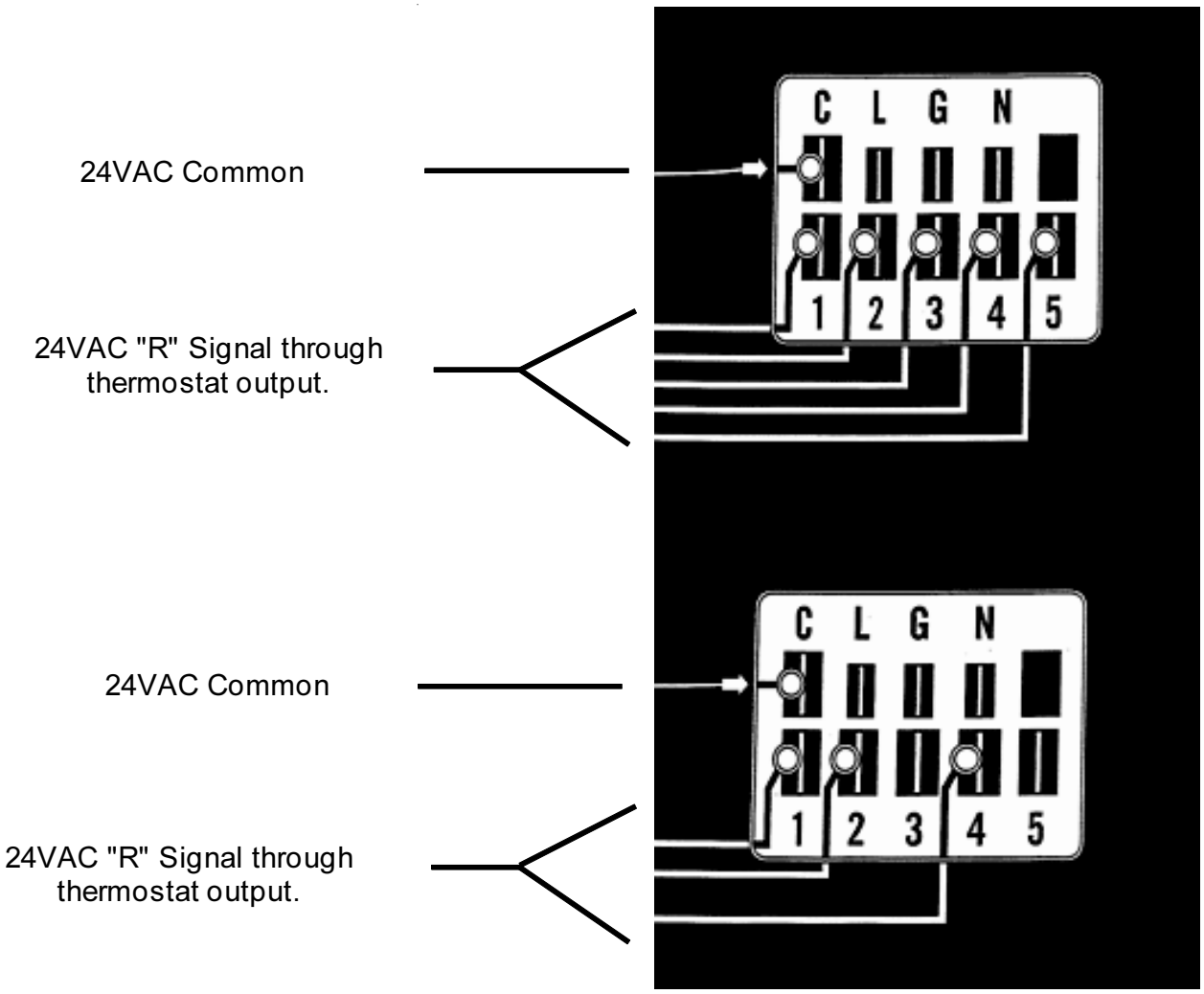


TABLE 5
COOLING PRESSURE TABLE

OUTDOOR AMBIENT TEMPERATURE °C

Model	Return Air Temperature °C	Pressure	35	37	39	41	43	45	47	49	51	53	55
K36*2	27° DB 19° WB	Low Side	143	145	147	148	150	152	154	156	158	160	162
		High Side	368	388	408	429	449	470	489	509	528	547	566
	27° DB 19° WB	Low Side	143	145	147	149	151	153	155	158	160	162	164
		High Side	368	389	409	430	451	472	492	511	530	549	568
K42*2	27° DB 19° WB	Low Side											
		High Side											
	27° DB 19° WB	Low Side											
		High Side											
K48*2	27° DB 19° WB	Low Side	149	149	149	149	149	149	150	153	156	159	162
		High Side	377	396	415	435	454	473	494	517	539	562	585
	27° DB 19° WB	Low Side	151	152	152	153	154	154	156	159	162	165	168
		High Side	378	397	416	436	455	474	495	519	542	565	589
K60*2	27° DB 19° WB	Low Side											
		High Side											
	27° DB 19° WB	Low Side											
		High Side											

Low side pressure ± 4 PSIG
High side pressure ± 10 PSIG

Tables are based upon rated CFM (airflow) across the evaporator coil. If there is any doubt as to correct operating charge being in the system, the charge should be removed and the system evacuated and recharged to serial plate charge weight.

NOTE: Pressure table based on high speed condenser fan operation. If condensing pressures appear elevated, check condenser fan wiring. See "Condenser Fan Operation" (page 17).

TABLE 6
ELECTRICAL SPECIFICATIONS

Model	Rated Volts, Hertz & Phase	No. Field Power Circuits	Single Circuit			
			③ Minimum Circuit Ampacity	① Maximum External Fuse or Ckt. Brkr.	② Field Power Wire Size	② Ground Wire
K36A2-A0Z	208/230-60-1	1				
-A05		1				
K36A2-N0Z	400-60-3	1	8.2	10	14	14
-N05		1	9.8	15	14	14
K42A2-A0Z	208/230-60-1	1				
-A05		1				
K42A2-N0Z	400-60-3	1				
-N05		1				
K48A2-A0Z	208/230-60-1	1				
-A05		1				
K48A2-N0Z	400-60-3	1	12.7	15	14	14
-N05		1	12.7	15	14	14
K60A2-A0Z	208/230-60-1	1				
-A05		1				
K60A2-N0Z	400-60-3	1	14.1	20	12	12
-N05		1	14.1	20	12	12

Model	Rated Volts, Hertz & Phase	No. Field Power Circuits	Single Circuit			
			③ Minimum Circuit Ampacity	① Maximum External Fuse or Ckt. Brkr.	② Field Power Wire Size	② Ground Wire
K36L2-A0Z	208/230-60-1	1				
-A05		1				
K36L2-N0Z	400-60-3	1	8.2	10	14	14
-N05		1	9.8	15	14	14
K42L2-A0Z	208/230-60-1	1				
-A05		1				
K42L2-N0Z	400-60-3	1				
-N05		1				
K48L2-A0Z	208/230-60-1	1				
-A05		1				
K48L2-N0Z	400-60-3	1	12.7	15	14	14
-N05		1	12.7	15	14	14
K60L2-A0Z	208/230-60-1	1				
-A05		1				
K60L2-N0Z	400-60-3	1	14.1	20	12	12
-N05		1	14.1	20	12	12

① These "Minimum Circuit Ampacity" values are to be used for sizing the field power conductors. Refer to the National Electric Code (latest version), Article 310 for power conductor sizing.

② Maximum Size of the time delay fuse or circuit breaker for protection of field wiring conductors.

③ Based on 75°C copper wire. All wiring must conform to the National Electric Code and all local codes.

TABLE 7
RECOMMENDED AIRFLOW

Model	Nominal Rated CFM *	Nominal Rated ESP *	Recommended Airflow Range
K36A, K36L	1100	.15	930 - 1350
K42A, K42L	1300	.20	1485 - 1070
K48A, K48L	1550	.20	1750 - 1285
K60A, K60L	1600	.20	1890 - 1335

* Rated CFM and ESP on factory speed connection.

TABLE 8
INDOOR BLOWER PERFORMANCE

Model	K36	K42	K48	K60
ESP (Inch H_2O)				
0.1	1100	1300	1550	1650
0.2	1068	1257	1485	1587
0.3	1030	1208	1413	1518
0.4	983	1149	1313	1440
0.5	924	1079	1240	1350

NOTE: Application of required supply and return grilles will result in approximately 0.10" ESP restriction.

TABLE 9
MAXIMUM ESP OF OPERATION
ELECTRIC HEAT ONLY

Model	K36A/L, K42A/L, K48A/L, K60A/L	
Outlet	FRONT	
Speed	High	Low
-A0Z -A05	.50 .50	.50 .50
-N0Z -N06	.50 .50	.50 .50

Values shown are for units equipped with standard 1-inch throwaway filter or 1-inch washable filter.

Derate ESP by .15 for 2-inch pleated filters.

TABLE 10
ELECTRIC HEAT

KW	240V-1		208V-1		400V-3	
	Amps	BTUH	Amps	BTUH	Amps	BTUH
5	20.8	17,065	18.1	12,800	--	--
6	--	--	--	--	9.0	21,330