INSTALLATION INSTRUCTIONS

MULTI-TEC®/th-TUNE Free Cooling Unit System

MULTI-TEC® Wall-Mount Air Conditioner

Models:

W18AAPA	W42AAPA	W72AAPA	W18LAPA	W48LAPA
W24AAPA	W42AAPB	W72AAPB	W24LAPA	W48LAPB
W24AAPB	W42AAPC	W72AAPC	W24LAPB	W48LAPC
W24AAPC	W48AAPA	W72AAPQ	W30LAPA	W48LAPQ
W30AAPA	W48AAPB		W30LAPB	W60LAPA
W30AAPB	W48AAPC		W30LAPC	W60LAPB
W30AAPC	W48AAPQ		W36LAPA	W60LAPC
W36AAPA	W60AAPA		W36LAPB	W60LAPQ
W36AAPB	W60AAPB		W36LAPC	W72LAPA
W36AAPC	W60AAPC		W42LAPA	W72LAPB
	W60AAPQ		W42LAPB	W72LAPC
			W42LAPC	W72LAPQ

th-Tune Single Unit Controller

NOTE: The th-Tune can be used as a replacement for the LC6000 controller for operation when a single W*AP* unit is used.***

Bard®
SINCE 1914
Climate Control Solutions

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

Manual: 2100-678
Supersedes: ***NEW***
Date: 9-20-17

CONTENTS

FIGURES AND TABLES

Free Cooling Unit System

This Bard Free Cooling Unit System is composed of MULTI-TEC wall-mounted air conditioners matched with an LC6000 lead/lag controller or Bard th-Tune single unit controller. If only one wall-mounted air conditioner is being used, it can be matched with either the LC6000 lead/lag controller or a th-Tune single unit controller. If more than one wall mount is installed, the LC6000 lead/lag controller must be matched with the air conditioning units. The wall mounts are specifically engineered for telecom/motor control center rooms.

NOTE: *The LC6000 lead/lag controller (or th-Tune single unit controller) and MULTI-TEC wall-mount units are designed specifically to work together. These controllers cannot run other Bard models or other brands of systems, nor can other controllers run the MULTI-TEC wall-mount units. They are a complete system, and must be used together.*

Wall-Mount Air Conditioner Units

The MULTI-TEC units operate on VAC power. The units will supply 100% of rated cooling airflow in free cooling mode with ability to exhaust the same amount through the unit itself without any additional relief openings in the shelter.

Each of these units are fully charged with refrigerant and may have optional auxiliary heat.

Controller

A th-Tune single unit controller (Bard P/N 8403-088) can be used in place of the LC6000 controller when only one MULTI-TEC wall-mount air conditioner is being controlled. If using a th-Tune stand-alone controller instead of the LC6000 controller, the alarm logging and remote communication capabilities of the LC6000 controller will not be available. **A TEC-EYE™ hand-held diagnostic tool is required to program the wall-mount unit for th-Tune single unit controller operation.** The th-Tune controller and TEC-EYE diagnostic tool are available as a kit (Bard P/N 8620-264).

General

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

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 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 **Additional Publications** below for information on codes and standards.

Sizing of systems for proposed installation should be based on heat loss and heat gain calculations made according to methods of Air Conditioning Contractors of America (ACCA). The supply flange 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.

Shipping Damage

Upon receipt of equipment, the cartons 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.

These units must remain in upright position at all times.

Additional Publications

These publications can help when installing the furnace. They can usually be found at the local library or purchased directly from the publisher. Be sure to consult the current edition of each standard.

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

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

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

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

For more information, contact these publishers:

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

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

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

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

ANSI Z535.5 Definitions:

DANGER: Indicate[s] a hazardous situation which, if not avoided, will result in death or serious injury. The signal word "DANGER" is to be limited to the most extreme situations. DANGER [signs] should not be used for property damage hazards unless personal injury risk appropriate to these levels is also involved.

WARNING: Indicate[s] a hazardous situation which, if not avoided, could result in death or serious injury. WARNING [signs] should not be used for property damage hazards unless personal injury risk appropriate to this level is also involved.

CAUTION: Indicate[s] a hazardous situation which, if not avoided, could result in minor or moderate injury. CAUTION [signs] without a safety alert symbol may be used to alert against unsafe practices that can result in property damage only.

NOTICE: [this header is] preferred to address practices not related to personal injury. The safety alert symbol shall not be used with this signal word. As an alternative to "NOTICE" the word "CAUTION" without the safety alert symbol may be used to indicate a message not related to personal injury.

⚠ WARNING

Electric shock hazard.

Have a properly trained individual perform these tasks.

Failure to do so could result in electric shock or death.

⚠ WARNING

Fire hazard.

Maintain minimum 1/4" clearance between the supply flange and combustible materials.

Failure to do so could result in fire causing damage, injury or death.

⚠ WARNING

Heavy item hazard.

Use more than one person to handle unit.

Failure to do so could result in unit damage or serious injury.

⚠ CAUTION

Cut hazard.

Wear gloves to avoid contact with sharp edges.

Failure to do so could result in personal injury.

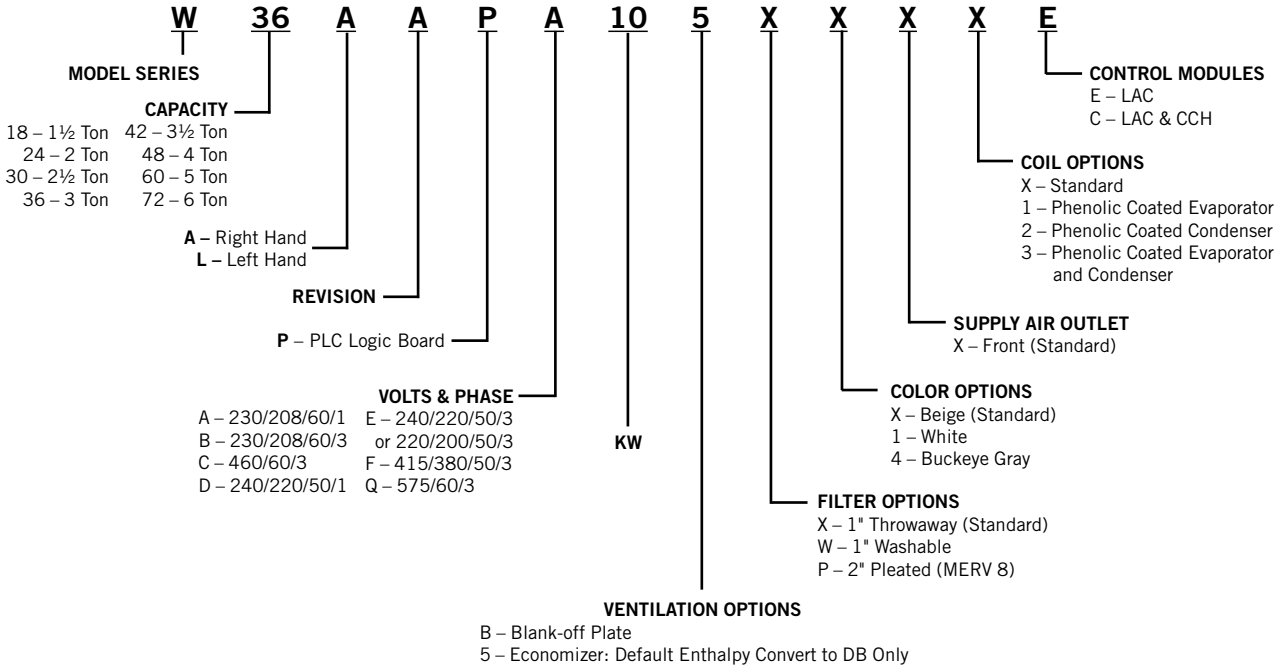
LIST OF NECESSARY MATERIALS/TOOLS

Additional hardware and miscellaneous supplies are needed for installation. These items are field supplied and must be sourced before installation. This list also includes tools needed for installation.

LIST OF MATERIALS/TOOLS

- Personal protective equipment/safety devices/anti-static wrist straps
- Supply and return grilles
- Field-fabricated sleeves (if necessary)
- Fasteners sufficient for mounting the units such as 5/16" diameter anchor/lag bolts
- 7/8" diameter washers
- Fasteners appropriate for the shelter wall construction to attach the controller to the wall
- Commercial grade outdoor silicone sealant
- Miscellaneous hand and power tools and jobsite or shop materials
- Lifting equipment with the necessary capacity and rigging to safely move/install the systems
- Electrical supplies
  - Various size circuit breakers for the shelter AC breaker box (see Tables 1 and 2 on pages 17 and 18)
  - High-voltage wire of various gauges (see Tables 1 and 2)
  - Communication wire: 3-wire, 20 gauge shielded cable
  - Miscellaneous electrical supplies including rigid/flexible conduit and fittings, junction boxes, wire connectors and supports

FIGURE 1
MULTI-TEC Wall-Mount Unit Model Nomenclature



WALL-MOUNT UNIT SITE PREPARATION

Model Identification

Identify the specific model using the model nomenclature information found in Figure 1 and the model/serial tag found on the unit on the opposite side of the control and access panels. See Figure 2 on page 8 for dimensions and critical installation requirements.

New Shelter Installation vs. Retrofit Installation

These installation instructions cover both new shelter installations and retrofit installations. Each installation is unique and may require special accomodations and modifications. Although Bard Manufacturing follows a long-established tradition of manufacturing equipment using industry standard dimensions for building penetration, it is occasionally necessary to move or enlarge supply and return openings when replacing non-standardized equipment in a retrofit application.

Minimum Clearance

Wall-mount air conditioners are available in both right-hand access models and left-hand access models. Right-hand access models have the heat strip access panel, external circuit breakers access panel and internal controls access panel on the right side of the unit. Left-hand access models are a mirror image of the right-hand access models, and allow two wall-mount units to be placed in relatively close proximity and yet still allow complete access for maintenance and repair.

On side-by-side installations, maintain a minimum of 20" clearance on control side to allow access to control panel and heat strips, and to allow proper airflow to the outdoor coil. For installations where units are installed with both control panels facing each other (inward), maintain a minimum of 36" clearance to allow access. Additional clearance may be required to meet local or national codes.

Care should be taken to ensure that the recirculation and obstruction of condenser discharge air does not occur. Recirculation of condenser discharge air can be from either a single unit or multiple units. Any object such as shrubbery, a building or a large object can cause obstructions to the condenser discharge air. Recirculation or reduced airflow caused by obstructions will result in reduced capacity, possible unit pressure safety lockouts and reduced unit service life.

For units with blow through condensers, such as these wall-mount units, it is recommended there be a minimum distance of 10' between the front of the unit and any barrier or 20' between the fronts of two opposing (facing) units.

Clearances Required for Service Access and Adequate Condenser Airflow

MODELS	LEFT SIDE	RIGHT SIDE	DISCHARGE SIDE
W18A, W24A, W30A, W36A	15"	20"	10'
W18L, W24L, W30L, W36L	20"	15"	10'
W42A, W48A, W60A, W72A	20"	20"	10'
W42L, W48L, W60L, W72L	20"	20"	10'

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

See Specifications Sheet S3532.

Clearance to Combustibles

⚠ WARNING

Fire hazard.

Maintain minimum 1/4" clearance between the supply air duct and combustible materials in the first 3' of ducting.

Failure to do so could result in fire causing damage, injury or death.

The unit itself is suitable for 0" clearance, but the supply air duct flange and the first 3' of supply air duct require a minimum of 1/4" clearance to combustible material. However, it is generally recommended that a 1" clearance is used for ease of installation and maintaining the required clearance to combustible material. See Figures 4A-D on pages 9-12 for details on opening sizes.

Minimum Clearances Required to Combustible Materials

MODELS	SUPPLY AIR DUCT FIRST 3'	CABINET
W18A, L W24A, L	0"	0"
W30A, L W36A, L	1/4"	0"
W42A, L W48A, L W60A, L W72A, L	1/4"	0"

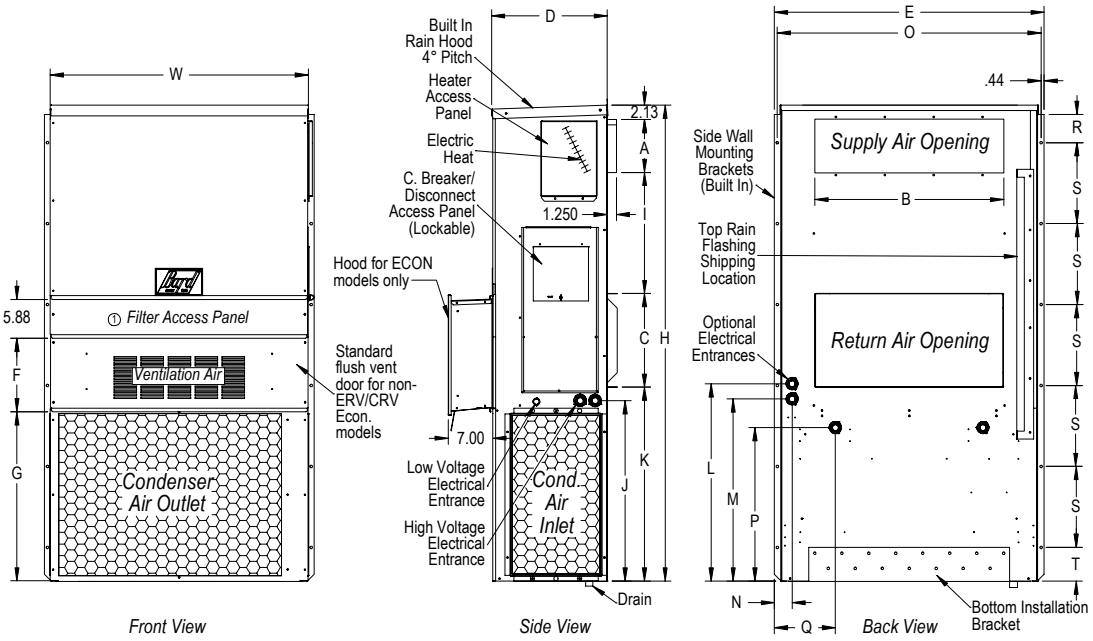
FIGURE 2

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
W18*A W24*A	33.300	17.125	74.563	7.88	19.88	11.88	19.88	35.00	10.88	29.75	20.56	30.75	32.06	33.25	31.00	2.63	34.13	26.06	10.55	4.19	12.00	9.00
W30*A W36*A	38.200	17.125	74.563	7.88	27.88	13.88	27.88	40.00	10.88	29.75	17.93	30.75	32.75	33.25	31.00	2.75	39.13	26.75	9.14	4.19	12.00	9.00
W42*A W48*A	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
W60*A W72*A	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.

WA RIGHT UNIT**



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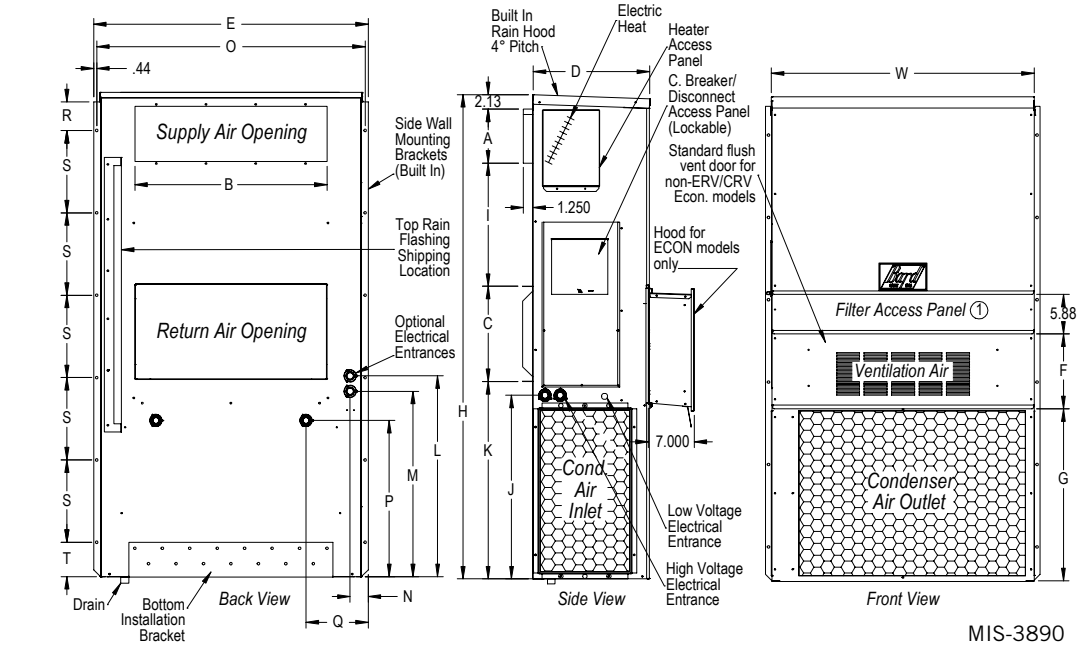
WL LEFT UNIT**



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WALL-MOUNT UNIT INSTALLATION

Mounting the Units

⚠ WARNING

Heavy item hazard.

Use more than one person to handle unit.

Failure to do so could result in unit damage or serious injury.

NOTE: *It may be best to spot some electrical knockouts (such as those located on the back of the wall-mount unit) before units are mounted and access is unavailable or limited (see Figure 2 to locate pre-punched knockouts).*

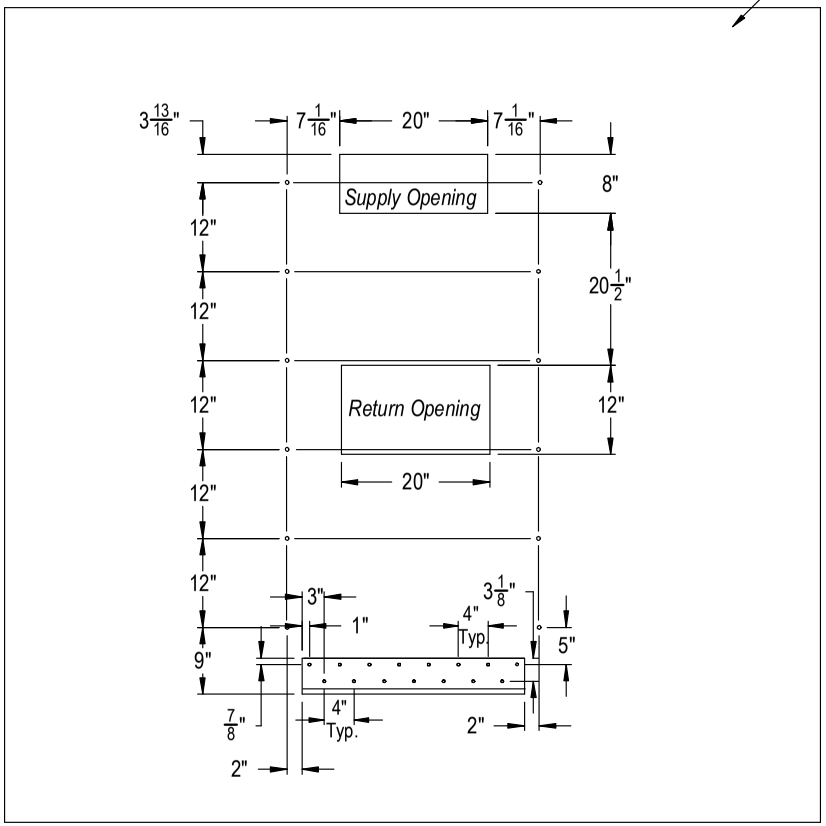
Two holes for the supply and return air openings must be cut through the wall as shown in Figures 4A-D on pages 9-12. On wood frame walls, the wall construction must be strong and rigid enough to carry the weight of the unit without transmitting any unit vibration. All walls must be thoroughly inspected to insure that they are capable of carrying the weight of the installed unit.

In retrofit (unit replacement) installations, the openings cut for the original equipment may not line up exactly with needs of this installation. Modifications may need to be made, such as increasing or decreasing the size of the wall cutouts. The existing bolt placement may not line up in which case the original bolts would need to be removed or cut away.

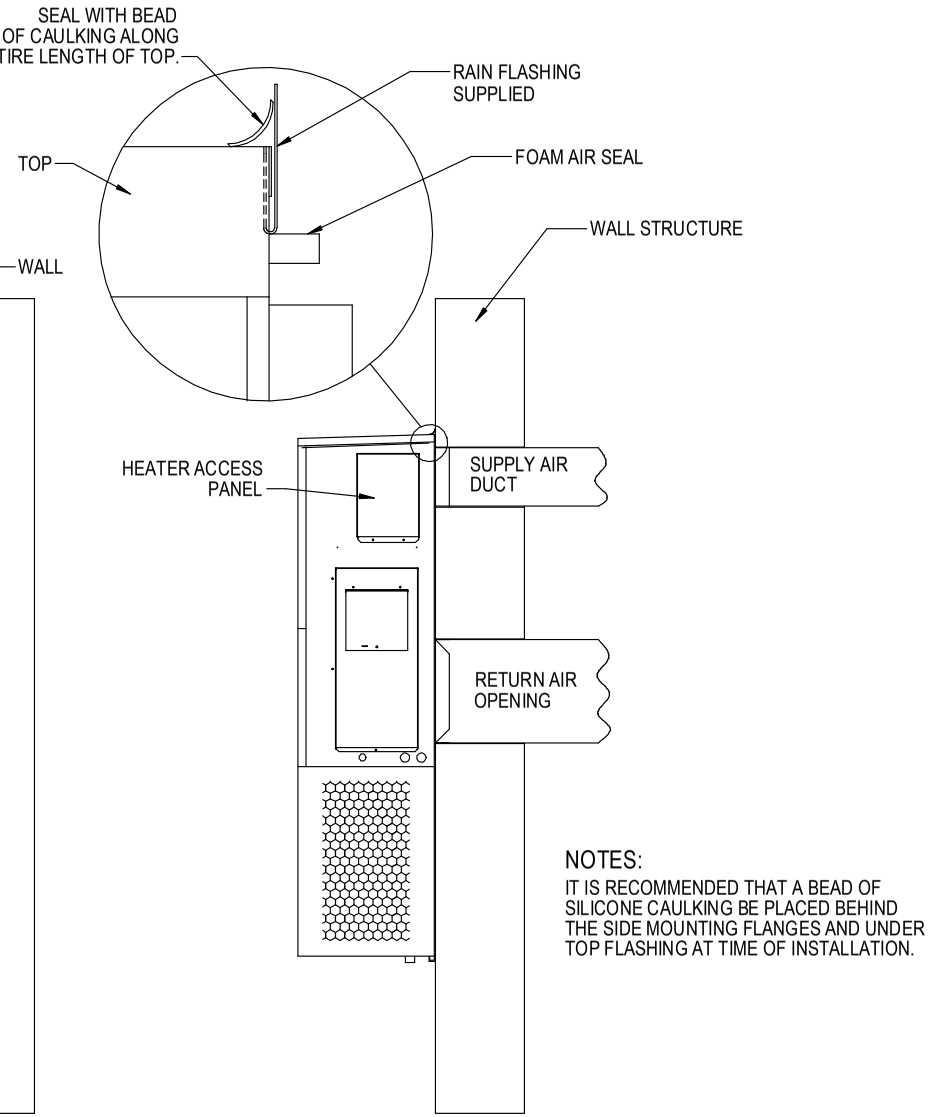
1. These units are secured by wall mounting flanges which secure the unit to the outside wall surface at both sides. A bottom mounting bracket, attached to skid for shipping, is provided for ease of installation, but is not required.
2. The unit itself is suitable for 0" clearance, but the supply air duct flange and the first 3' of supply air duct require a minimum of 1/4" clearance to combustible material. However, it is generally recommended that a 1" clearance is used for ease of installation and maintaining the required clearance to combustible material. See Figures 4A-D for details on opening sizes.
3. Locate and mark lag bolt locations and location for optional bottom mounting bracket, if desired (see Figures 4A-D).
4. Mount bottom mounting bracket (if used).
5. If desired, 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 fasteners sufficient for the application such as 5/16" lag/anchor/carriage bolts; use 7/8" diameter flat washers on the lag bolts. It is recommended that a bead of silicone caulking be placed behind the side mounting flanges.
7. Secure optional rain flashing to wall and caulk across entire length of top (see Figures 4A-D).
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. 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.
10. Install outdoor temperature/humidity sensor (see Figure 3). Remove grommet from base and sensor. Discard shipping bracket. Place sensor extension through hole in base under condenser fan and secure to base with screw.

FIGURE 3
Outdoor Sensor Installation

FIGURE 4A
W18A, W18L, W24A, W24L
Mounting Instructions



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.

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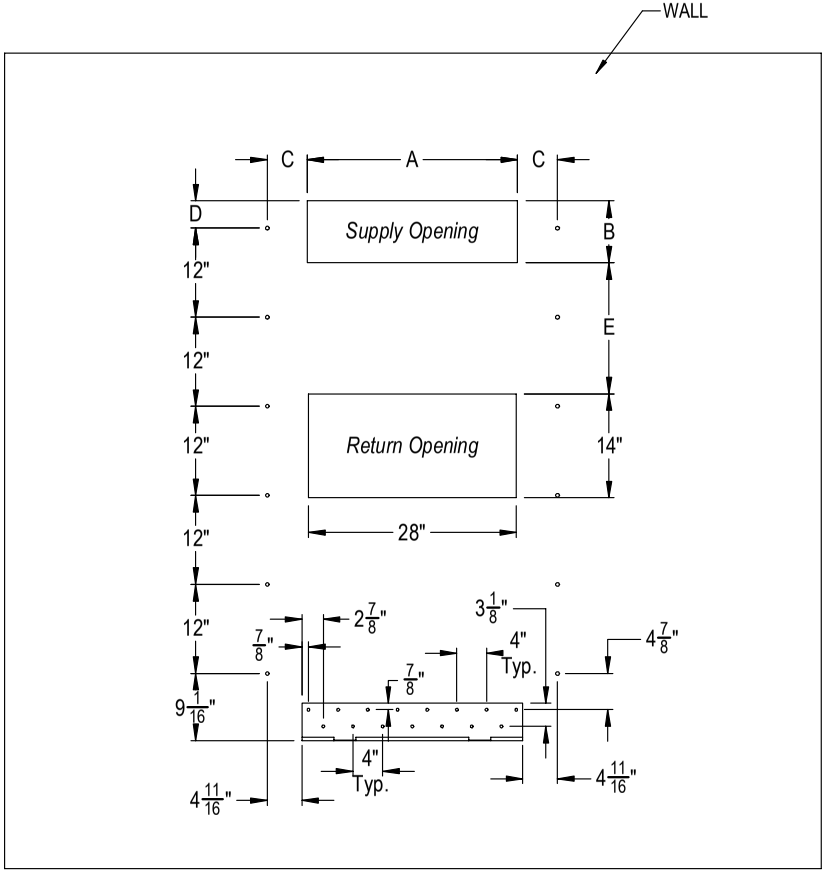
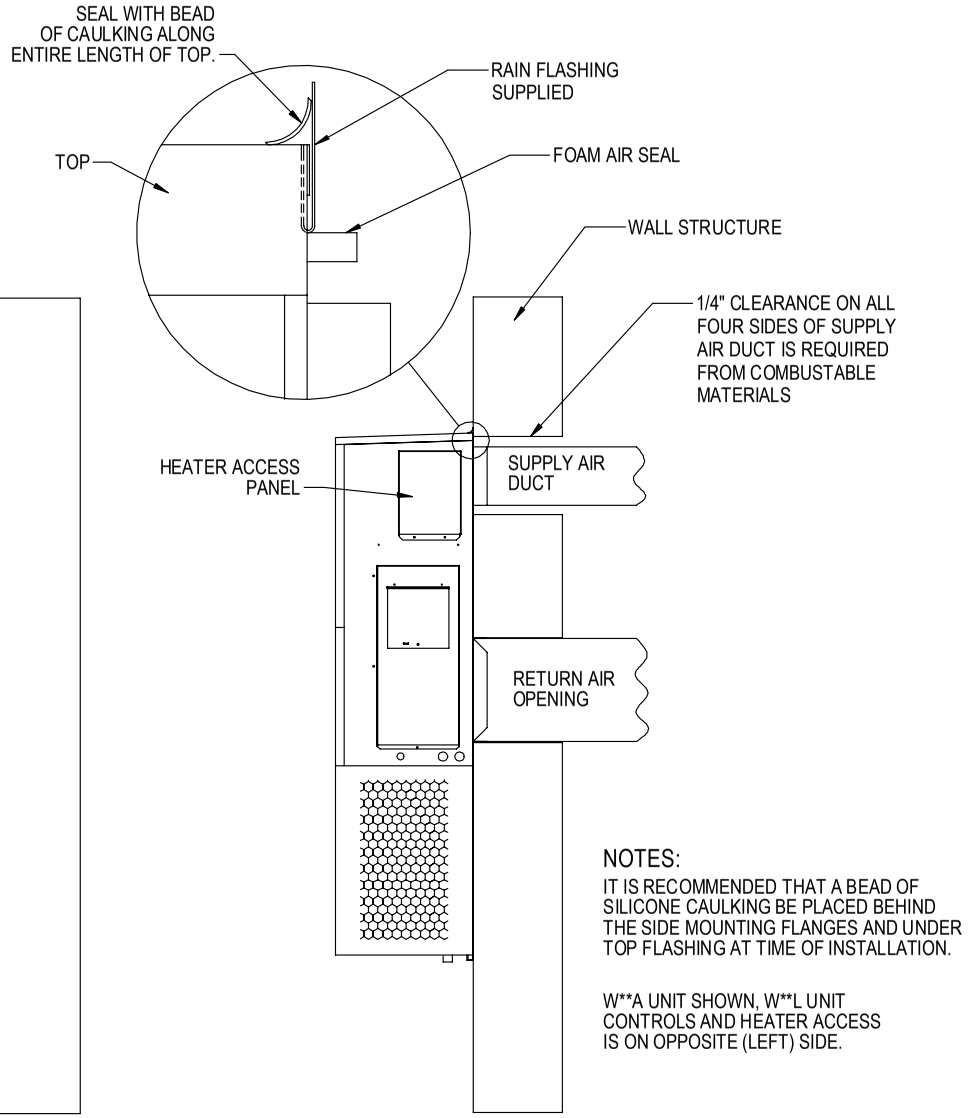
FIGURE 4B
W30A, W30L, W36A, W36L
Mounting Instructions

	A	B	C	D	E
REQUIRED DIMENSIONS TO MAINTAIN 1/4" MIN. CLEARANCE FROM COMBUSTIBLE MATERIALS	28 3/8	8 3/8	5 3/8	3 11/16	17 5/8
REQUIRED DIMENSIONS TO MAINTAIN RECOMMENDED 1" CLEARANCE FROM COMBUSTIBLE MATERIALS	29 7/8	9 7/8	4 5/8	4 7/16	16 7/8



Wall Opening and Hole Location View



Right Side View

NOTES:

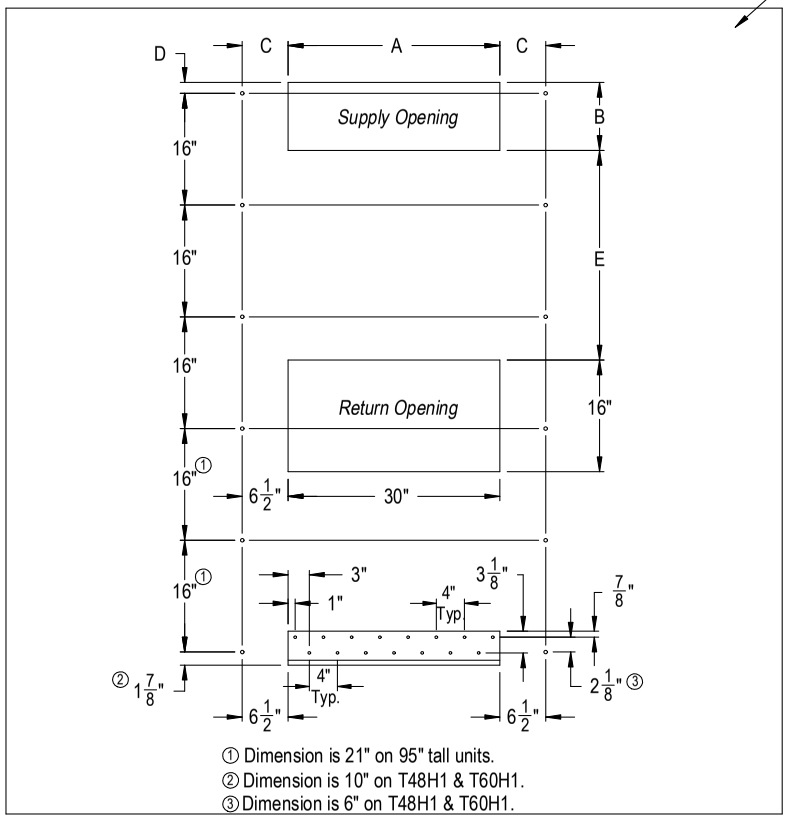
IT IS RECOMMENDED THAT A BEAD OF SILICONE CAULKING BE PLACED BEHIND THE SIDE MOUNTING FLANGES AND UNDER TOP FLASHING AT TIME OF INSTALLATION.

W**A UNIT SHOWN, W**L UNIT CONTROLS AND HEATER ACCESS IS ON OPPOSITE (LEFT) SIDE.

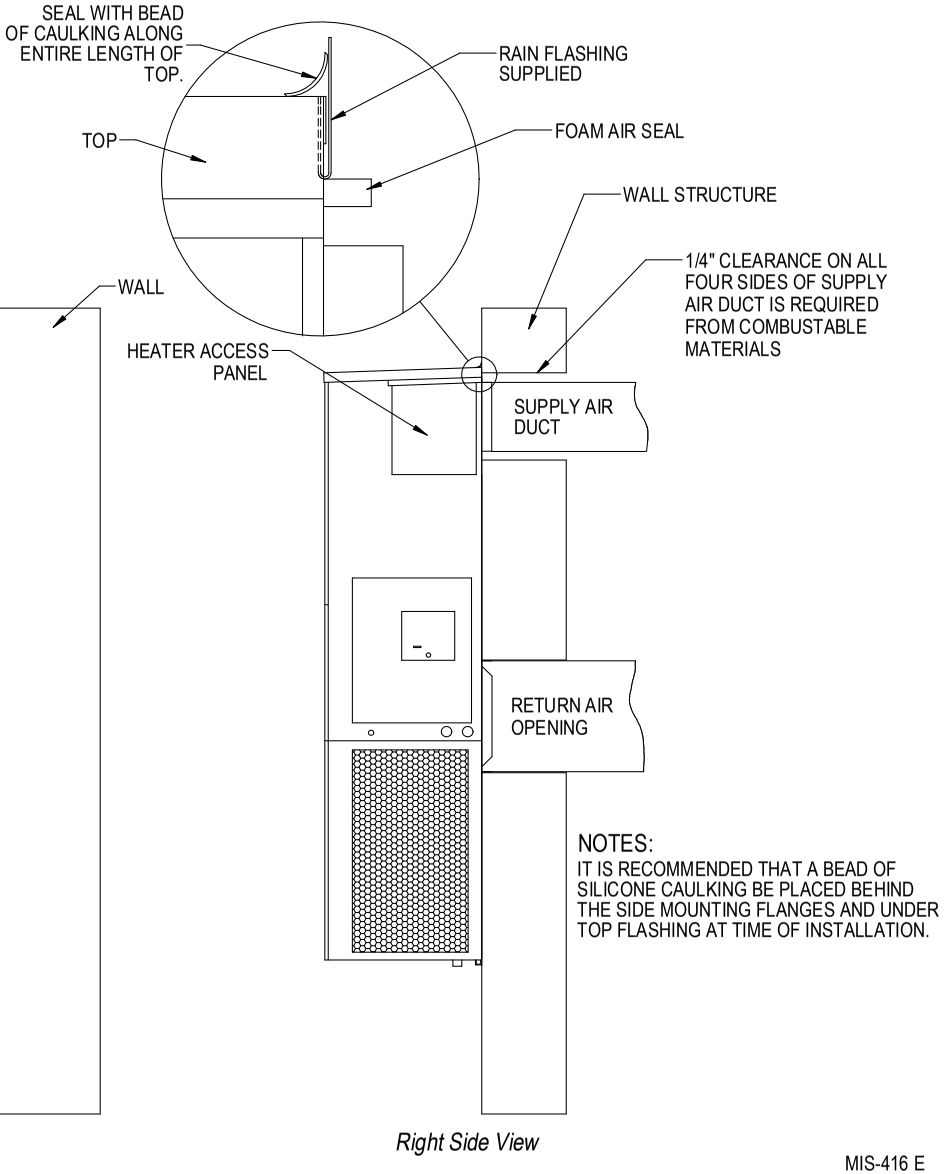
MIS-3820

FIGURE 4C
W42A, W42L, W48A, W48L
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

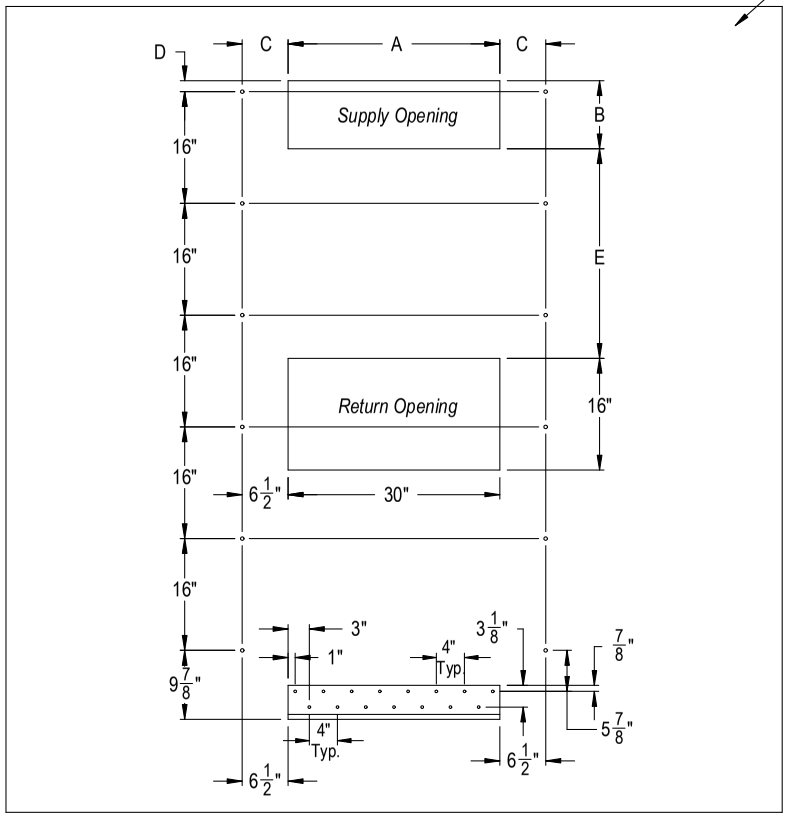


Right Side View

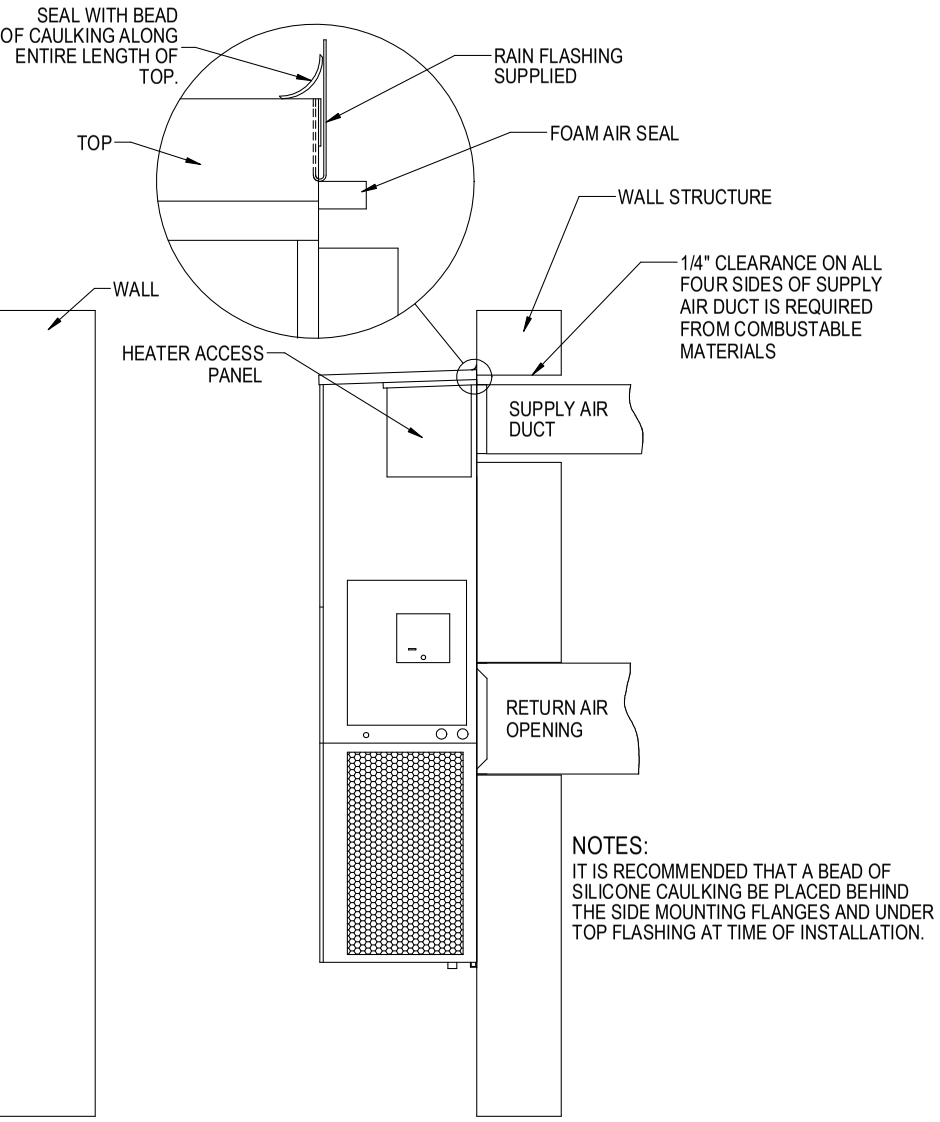
MIS-416 E

FIGURE 4D
W60A, W60L, W72A, W72L
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.

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FIGURE 5
Electric Heat Clearance

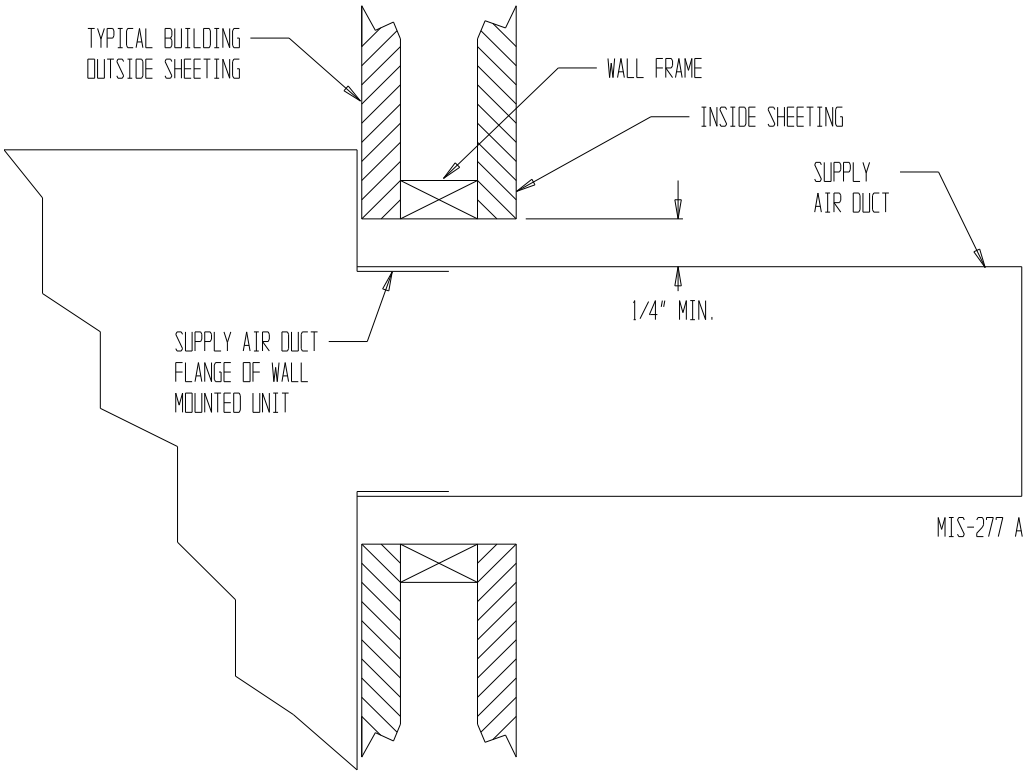
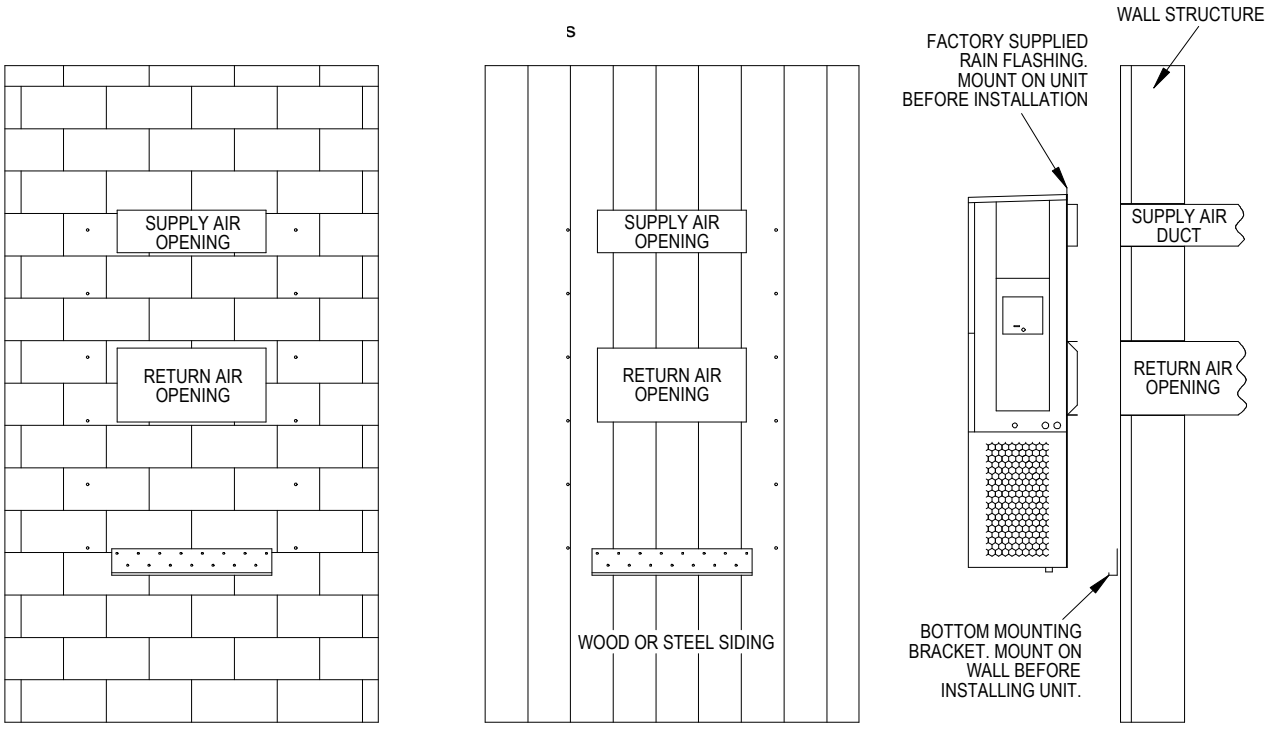


FIGURE 6
Wall Mounting Instructions



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

FIGURE 7
Wall Mounting Instructions

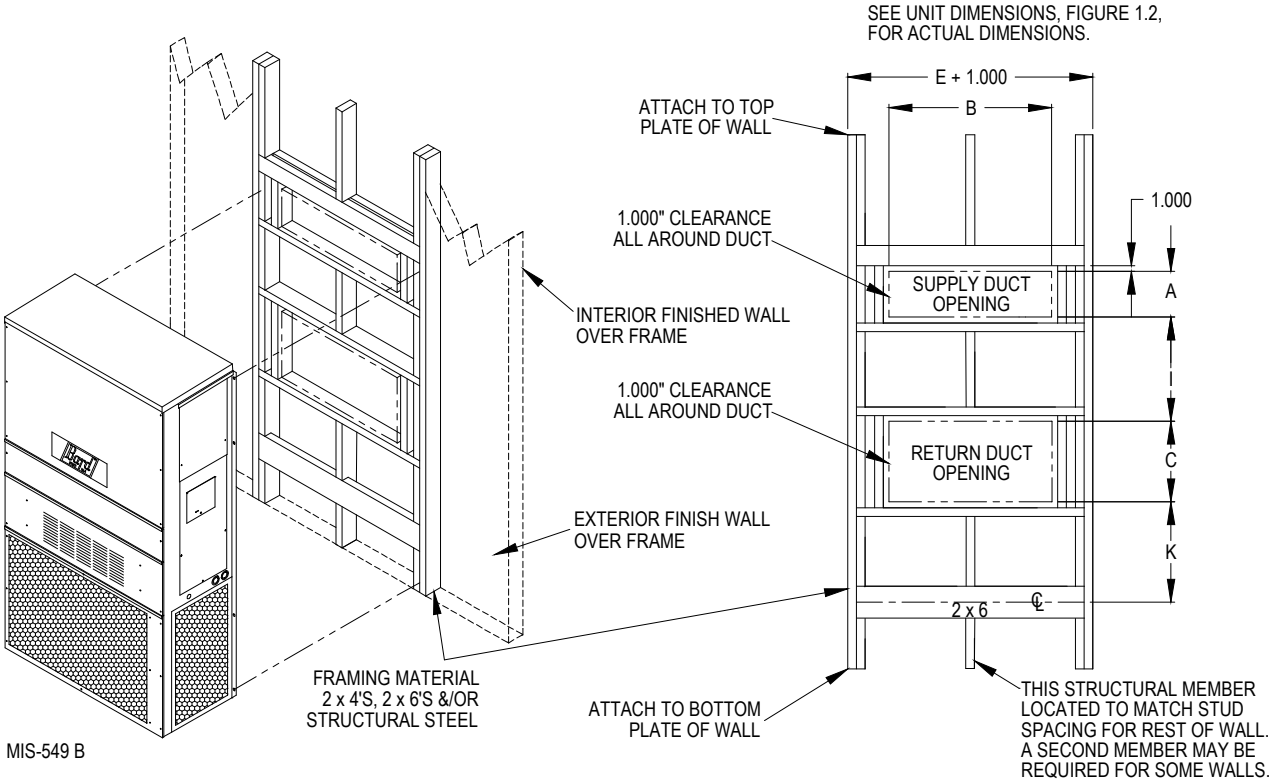
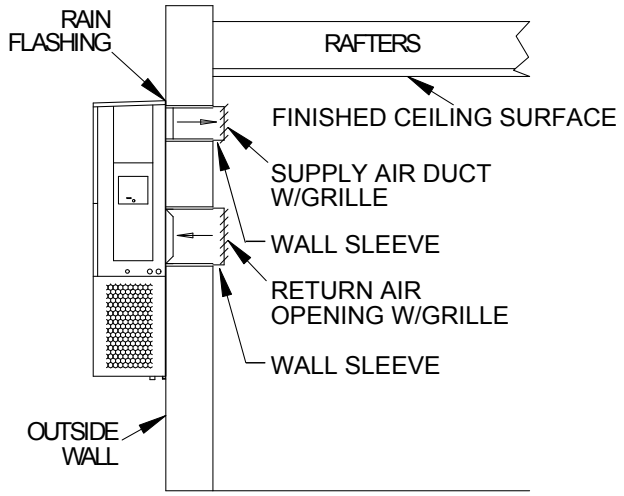
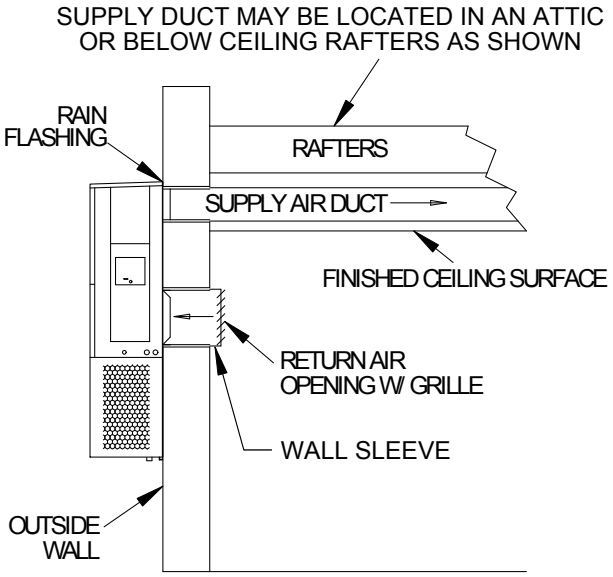


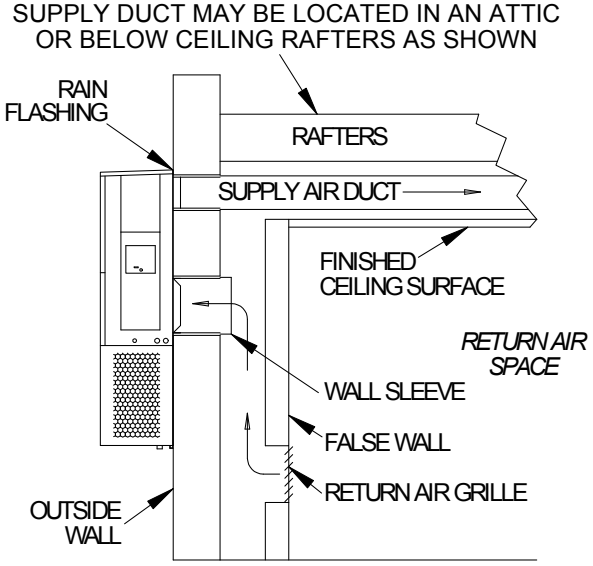
FIGURE 8
Common Wall Mounting Installations



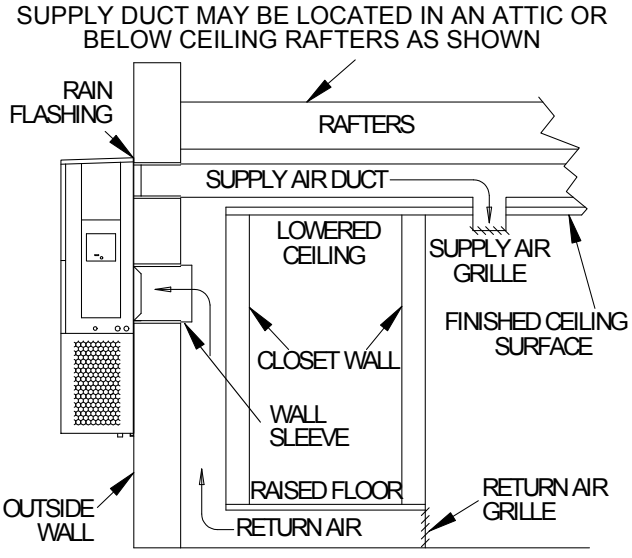
FREE AIR FLOW
NO DUCT



DUCTED SUPPLY
RETURN AT UNIT



FALSE WALL INSTALLATION



CLOSET INSTALLATION

MIS-550 C

WALL-MOUNT UNIT SUPPLY WIRING

⚠ WARNING

Electric shock hazard.

Have a properly trained individual perform these tasks.

Failure to do so could result in electric shock or death.

Main Power Wiring

Refer to the unit rating plate or Table 1 or Table 2 (page 18) for wire sizing information and maximum fuse or circuit breaker size. Each outdoor unit is marked with a "Minimum Circuit Ampacity". 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 or three field power circuits required. If this is the case, the unit rating 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 unit rating plate and Tables 1 and 2 list 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 circuit breaker or fuse 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.

Route all field wires to the right of the wire shield as shown in the circuit routing label found in Figure 9 (and also on the wall-mount units).

See Figure 10 to reference VAC landing points.

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.

FIGURE 9
Circuit Routing Label

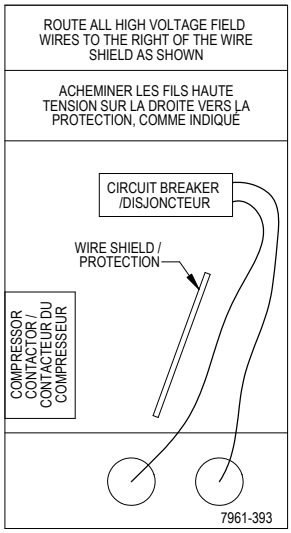
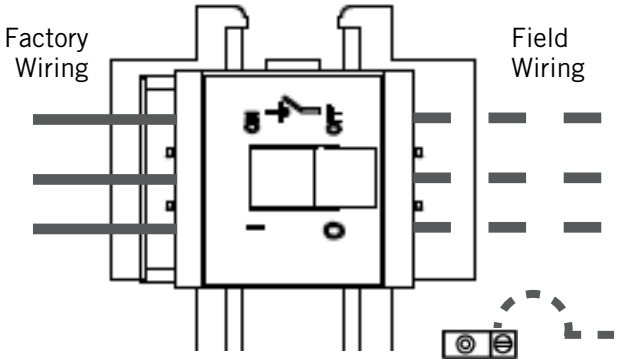


FIGURE 10
VAC Supply Wiring Landing Points



NOTE: Right-hand access model wiring landing points are shown here; left-hand access models will mirror this image.

Low Voltage Wiring

230/208V 1 phase and 3 phase equipment use dual primary voltage transformers. All equipment leaves the factory wired on 240V tap. **It is very important that the correct voltage tap is used.** For 208V operation, reconnect from 240V to 208V tap. The acceptable operating voltage range for the 240 and 208V taps are: 240V Tap (253 – 216) and 208 Tap (220 – 197).

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.*

For low voltage wiring, an 18 gauge copper, color-coded cable is recommended.

TABLE 1

*Electrical Specifications – W**AAP Series*

MODEL	Rated Volts & Phase	No. Field Power Circuits	Single Circuit				Multiple Circuit											
			③ Minimum Circuit Ampacity	① Maximum External Fuse or Ckt. Brkr.	② Field Power Wire Size	② Ground Wire	③ Minimum Circuit Ampacity			① Maximum External Fuse or Ckt. Breaker			② Field Power Wire Size			② Ground Wire Size		
							Ckt. A	Ckt. B	Ckt. C	Ckt. A	Ckt. B	Ckt. C	Ckt. A	Ckt. B	Ckt. C	Ckt. A	Ckt. B	Ckt. C
W18AAPA00, A0Z	230/208-1	1	16	20	12	12												
A05		1	30	30	10	10												
A08		1	46	50	8	10												
A10		1	56	60	6	10												
W24AAPA00, A0Z	230/208-1	1	21	30	10	10												
A04		1	25	30	10	10												
A05		1	30	30	10	10												
A08		1	46	50	8	10												
A10		1	56	60	6	10												
W24AAPB00, B0Z	230/208-3	1	15	20	12	12												
B06		1	22	25	10	10												
W24AAPC00, C0Z	460-3	1	9	15	14	14												
C06		1	11	15	14	14												
W30AAPA00, A0Z	230/208-1	1	26	35	8	10												
A05		1	32	35	8	10												
A08		1	47	50	8	10												
A10		1	58	60	6	10												
A15		1 or 2	84	90	4	8	58	26		60	30		6	10		10	10	
W30AAPB00, B0Z	230/208-3	1	19	20	12	12												
B06		1	24	25	10	10												
B09		1	33	35	8	10												
B15		1	51	60	6	10												
W30AAPC00, C0Z	460-3	1	9	15	14	14												
C06		1	12	15	14	14												
C09		1	17	20	12	12												
C12		1	21	25	10	10												
C15		1	26	30	10	10												
W36AAPA00, A0Z	230/208-1	1	29	35	8	10												
A05		1	32	35	8	10												
A08		1	47	50	8	10												
A10		1	58	60	6	10												
A15		1 or 2	84	90	4	8	58	26		60	30		6	10		10	10	
W36AAPB00, B0Z	230/208-3	1	23	30	10	10												
B06		1	24	30	10	10												
B09		1	33	35	8	10												
B15		1	51	60	6	10												
W36AAPC00, C0Z	460-3	1	11	15	14	14												
C06		1	12	15	14	14												
C09		1	17	20	12	12												
C12		1	21	25	10	10												
C15		1	26	30	10	10												
W42AAPA00, A0Z	230/208-1	1	32	50	8	10												
A05		1	32	50	8	10												
A10		1	58	60	6	10												
A15		1 or 2	84	90	4	8	58	26		60	30		6	10		10	10	
A20		1 or 2	110	125	2	6	58	52		60	60		6	6		10	10	
W42AAPB00, B0Z	230/208-3	1	25	35	8	10												
B06		1	25	35	8	10												
B09		1	33	35	8	10												
B15		1	51	60	6	10												
B18		1	60	60	6	10												
W42AAPC00, C0Z	460-3	1	12	15	14	14												
C09		1	17	20	12	12												
C15		1	26	30	10	10												
W48AAPA00, A0Z	230/208-1	1	34	50	8	10												
A05		1	34	50	8	10												
A10		1	58	60	6	10												
A15		1 or 2	84	90	4	8	58	26		60	30		6	10		10	10	
A20		1 or 2	110	125	2	6	58	52		60	60		6	6		10	10	
W48AAPB00, B0Z	230/208-3	1	26	35	8	10												
B06		1	26	35	8	10												
B09		1	33	35	8	10												
B15		1	51	60	6	10												
B18		1	60	60	6	10												
W48AAPC00, C0Z	460-3	1	12	15	14	14												
C09		1	17	20	12	12												
C15		1	26	30	10	10												
W48AAPQ00, Q0Z	575-3	1	12	15	14	14												
Q15		1	24	25	10	10												
W60AAPA00, A0Z	230/208-1	1	38	60	8	10												
A05		1	38	60	8	10												
A10		1	60	60	6	10												
A15		1 or 2	86	90	3	8	60	26		60	30		6	10		10	10	
A20		1 or 2	112	125	2	6	60	52		60	60		6	6		10	10	
W60AAPB00, B0Z	230/208-3	1	27	40	8	10												
B06		1	27	40	8	10												
B09		1	35	40	8	10												
B15		1	53	60	6	10												
B18		2	N/A	N/A	N/A	N/A	35	28		40	30		8	10		10	10	
W60AAPC00, C0Z	460-3	1	14	20	12	12												
C09		1	18	20	12	12												
C15		1	27	30	10	10												
W60AAPQ00, Q0Z	575-3	1	13	20	12	12												
Q15		1	24	25	12	12												
W72AAPA00, A0Z	230/208-1	1	58	60	6	10												
A05		1	58	60	6	10												
A10		1 or 2	62	70	6	8	58	26		60	30		6	10		10	10	
A15		1 or 2	88	90	3	8	58	52		60	60		6	6		10	10	
A20		1 or 3	114	125	2	6	58	52	52	60	60	60	6	6	6	10	10	10
W72AAPB00, B0Z	230/208-3	1	40	60	8	10												
B06		1	40	60	8	10												
B09		1	40	60	8	10												
B15		1	55	60	6	10												
B18		2	N/A	N/A	N/A	N/A	40	28		60	30		8	10		10	10	
W72AAPC00, C0Z	460-3	1	18	25	10	10												
C09		1	18	25	10	10												
C15		1	27	30	10	10												
W72AAPQ00, Q0Z	575-3	1	14	20	12	12												
Q15		1	24	25	10	10												

See footnotes under TABLE 1.2 on page 18

TABLE 2

*Electrical Specifications – W**LAP Series*

MODEL	Rated Volts & Phase	No. Field Power Circuits	Single Circuit				Dual Circuit							
			③ Minimum Circuit Ampacity	① Maximum External Fuse or Ckt. Brkr.	② Field Power Wire Size	② Ground Wire	③ Minimum Circuit Ampacity		① Maximum External Fuse or Ckt. Breaker		② Field Power Wire Size		② Ground Wire Size	
							Ckt. A	Ckt. B	Ckt. A	Ckt. B	Ckt. A	Ckt. B	Ckt. A	Ckt. B
W18LAPA00,A0Z	230/208-1	1	16	20	12	12								
A05		1	30	30	10	10								
A08		1	46	50	8	10								
A10		1	56	60	6	10								
W24LAPA00, A0Z	230/208-1	1	21	30	10	10								
A05		1	30	30	10	10								
A08		1	46	50	8	10								
A10		1	56	60	6	10								
W24LAPB00, B0Z	230/208-3	1	15	20	12	12								
B06		1	22	25	10	10								
W24LAPC00, C0Z	460-3	1	9	15	14	14								
C06		1	11	15	14	14								
W30LAPA00, A0Z	230/208-1	1	26	35	8	10								
A05		1	32	35	8	10								
A08		1	47	50	8	10								
A10		1	58	60	6	10								
A15		1 or 2	84	90	4	8	58	26	60	30	6	10	10	10
W30LAPB00, B0Z	230/208-3	1	19	20	12	12								
B09		1	33	35	8	10								
B15		1	51	60	6	10								
W30LAPC00, C0Z	460-3	1	9	15	14	14								
C09		1	17	20	12	12								
C15		1	26	30	10	10								
W36LAPA00, A0Z	230/208-1	1	29	35	8	10								
A05		1	32	35	8	10								
A10		1	58	60	6	10								
A15		1 or 2	84	90	4	8	58	26	60	30	6	10	10	10
W36LAPB00, B0Z	230/208-3	1	23	30	10	10								
B09		1	33	35	8	10								
B15		1	51	60	6	10								
W36LAPC00, C0Z	460-3	1	11	15	14	14								
C09		1	17	20	12	12								
C15		1	26	30	10	10								
W42LAPA00, A0Z	230/208-1	1	32	50	8	10								
A05		1	32	50	8	10								
A10		1	58	60	6	10								
A15		1 or 2	84	90	4	8	58	26	60	30	6	10	10	10
W42LAPB00, B0Z	230/208-3	1	25	35	8	10								
B06		1	25	35	8	10								
B09		1	33	35	8	10								
B15		1	51	60	6	10								
W42LAPC00, C0Z	460-3	1	12	15	14	14								
C09		1	17	20	12	12								
C15		1	26	30	10	10								
W48LAPA00, A0Z	230/208-1	1	34	50	8	10								
A05		1	34	50	8	10								
A10		1	58	60	6	10								
A15		1 or 2	84	90	4	8	58	26	60	30	6	10	10	10
W48LAPB00, B0Z	230/208-3	1	26	35	8	10								
B06		1	26	35	8	10								
B09		1	33	35	8	10								
B15		1	51	60	6	10								
W48LAPC00, C0Z	460-3	1	12	15	14	14								
C09		1	17	20	12	12								
C15		1	26	30	10	10								
W48LAPQ00, Q0Z	575-3	1	12	15	14	14								
Q15		1	24	25	10	10								
W60LAPA00, A0Z	230/208-1	1	38	60	8	10								
A05		1	38	60	8	10								
A10		1	60	60	6	10								
A15		1 or 2	86	90	3	8	60	26	60	30	6	10	10	10
W60LAPB00, B0Z	230/208-3	1	27	40	8	10								
B06		1	27	40	8	10								
B09		1	35	40	8	10								
B15		1	53	60	6	10								
W60LAPC00, C0Z	460-3	1	14	20	12	12								
C09		1	18	20	12	12								
C15		1	27	30	10	10								
W60LAPQ00, Q0Z	575-3	1	13	20	12	12								
Q15		1	24	25	12	12								
W72LAPA00, A0Z	230/208-1	1	58	60	6	10								
A05		1	58	60	6	10								
A10		1 or 2	62	70	6	8	58	26	60	30	6	10	10	10
A15		1 or 2	88	90	3	8	58	52	60	60	6	6	10	10
W72LAPB00, B0Z	230/208-3	1	40	60	8	10								
B06		1	40	60	8	10								
B09		1	40	60	8	10								
B15		1	55	60	6	10								
W72LAPC00, C0Z	460-3	1	18	25	10	10								
C09		1	18	25	10	10								
C15		1	27	30	10	10								
W72LAPQ00, Q0Z	575-3	1	14	20	12	12								
Q15		1	24	25	10	10								

① Maximum size of the time delay fuse or circuit breaker for protection of field wiring conductors.
② Based on 75°C copper wire. All wiring must conform to the National Electrical Code and all local codes.
③ These "Minimum Circuit Ampacity" values are to be used for sizing the field power conductors. Refer to the National Electrical code (latest version), Article 310 for power conductor sizing.

CAUTION: When more than one field power circuit is run through one conduit, the conductors must be derated. Pay special attention to Note 8 of Table 310 regarding Ampacity Adjustment Factors when more than three current carrying conductors are in a raceway.

IMPORTANT: While this electrical data is presented as a guide, it is important to electrically connect properly sized fuses and conductor wires in accordance with the National Electrical Code and all local codes.

Running in Stand Alone (Orphan) Mode

With the AC breakers turned on, each MULTI-TEC wall-mount unit has the capability to run without the LC6000 controller or th-Tune single unit controller attached—this feature is called stand alone or orphan mode. This keeps the shelter between 60°F and 77°F (factory default settings) by the use of the factory-installed return air sensor in each wall-mount unit. The blower runs continuously in stand alone mode.

The wall-mount unit can be turned on and off with the TEC-EYE hand-held diagnostic tool. When ON is chosen, the wall unit will heat or cool. The blower will continue to run when OFF is chosen. If the wall unit is turned OFF by the TEC-EYE while in stand alone mode and power is interrupted, when repowered the blower will not run until the wall unit is turned back ON by the TEC-EYE.

To turn the unit on or off with TEC-EYE:

1. Connect the TEC-EYE diagnostic tool to the control board located in the unit.
2. Press MENU key to go to the Main Menu screen.
3. Press UP or DOWN keys and ENTER key to enter USER password 2000.
4. Press UP or DOWN keys to scroll to **On/Off**; press ENTER key.
5. Press UP or DOWN keys to change value from On to Off or from Off to On.
6. Press ESCAPE key several times to return to Main Menu screen.

To ensure units will go into stand alone mode, disconnect the plug marked R-T-/R+T+/GND on the control board located in the wall-mount unit. Be sure to reconnect the plug before operating the wall-mount unit as part of the Bard Free Cooling Unit System.

Additionally, should the MULTI-TEC wall-mount unit lose communication with the th-Tune stand-alone controller (such as during maintenance), it will continue to serve the shelter's needs until a repair can be made.

TH-TUNE CONTROLLER INSTALLATION

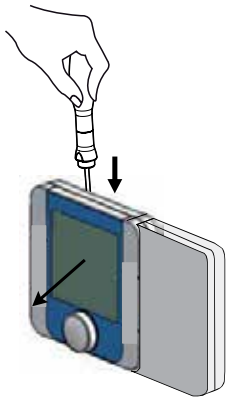
The Bard th-Tune single unit controller can be used in place of the LC-6000 controller when only one MULTI-TEC wall-mount air conditioner is being controlled. **If using a th-TUNE single unit controller instead of the PLC controller, the alarm logging and remote communications capabilities of the LC6000 controller will not be available.**

For optimum temperature sensor performance, the th-Tune controller should be mounted on an interior wall and away from any heat sources, sunlight, windows, air vents, air circulation obstructions and/or any other cause of erratic or false temperature sensing.

Mounting th-Tune Controller to Wall

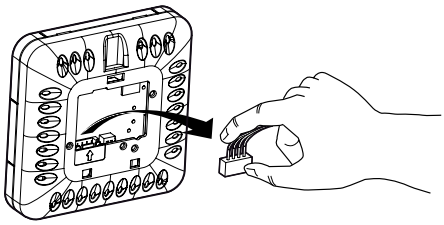
1. Before performing any operations on the controller, disconnect all power to the wall unit.
2. Separate the the front from the rear of the th-Tune using a screwdriver (see Figure 11).

FIGURE 11
Separate Front of th-Tune from Rear



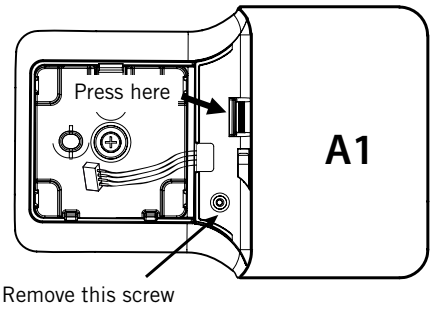
3. Disconnect the 4-pin connector from the front part as shown in Figure 12.

FIGURE 12
Disconnect 4-Pin Connector



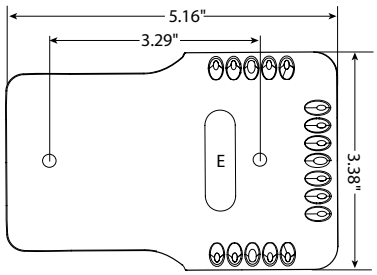
4. To remove cover A1 (Figure 13), unscrew screw, press the point of attachment and separate cover from base.

FIGURE 13
Remove Cover



5. Drill the mounting holes in the wall (see Figure 14), then insert the plugs and screws supplied, making sure that the electrical wires pass through hole in base. The th-Tune may also be installed on a 2 x 4 handi box to allow for wiring to be in conduit.

FIGURE 14
th-Tune Base Dimensions



Power and Communications Wiring

Power Wiring

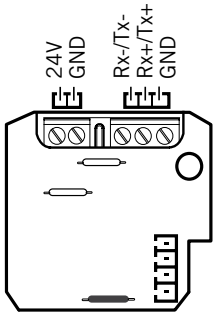
For the power wiring, use standard 18 gauge twisted pair wiring.

Power wires from the th-Tune connect to a special terminal block located next to the control board on the wall unit control panel. This terminal block will be labeled, “pAD Single Unit Controller” (see Figure 17).

When wiring power to the th-Tune from the wall unit, ensure that G0 from the wall unit terminal is wired to the GND terminal on the th-Tune power terminal block, and G from the wall unit terminal is wired to the 24V terminal on the th-Tune power terminal block. **Failure to wire these correctly will result in damage to the PLC and th-Tune controller.**

See Figures 15 and 16 for guidance with connecting the power and communications wires.

FIGURE 15
th-Tune Power and Communications Connections

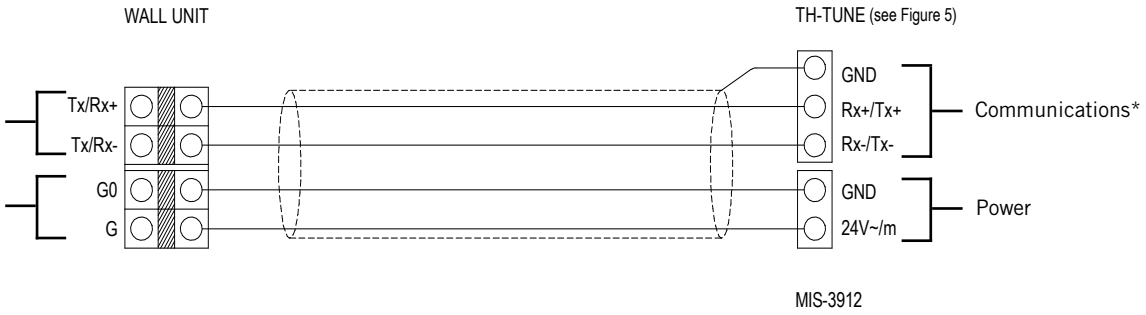


Communications Wiring

For the communications wiring, use 3-wire 20 gauge shielded cable.

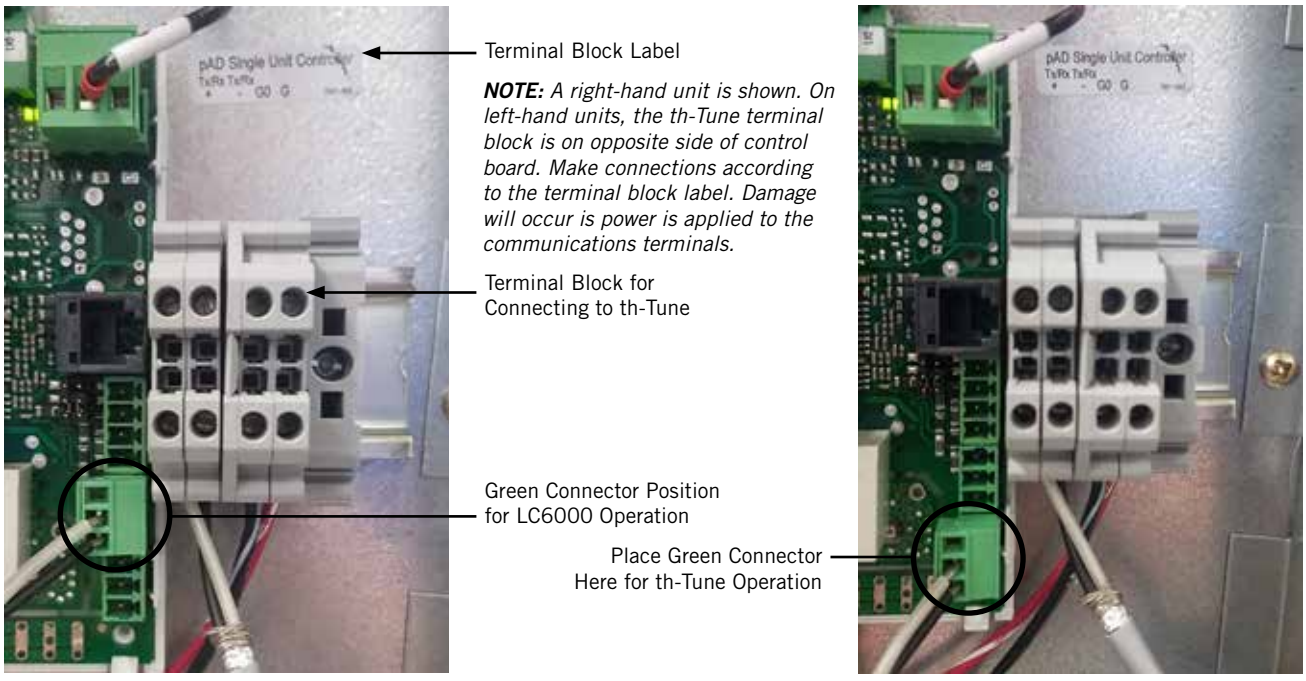
When wiring communication for the th-Tune, the green connecter plugged into the wall unit PLC board (with the jumper leads that connect from the communications terminal block as shown in Figure 17), will need to be moved from Fieldbus 2, to Fieldbus 1.

FIGURE 16
Wall Unit and th-Tune Power and Communications Connections



* If power is connected to these terminals, the th-Tune will be damaged.

FIGURE 17
Proper Communication Connector Placement



Operation

See Figures 22 and 23 on page 24 for overviews of th-Tune buttons and icons.

On/Off

Press and hold power button for 2 seconds to turn th-Tune on or off.

Heat/Cool Operation

Auto Mode

During Auto mode, the unit will start heating or cooling when room temperature falls below or rises above a user-defined deadband called the comfort range (see Figure 18). This can be changed using the TEC-EYE hand-held diagnostic tool—see ***Comfort Range*** on page 23. By default, this comfort range is 5°F. For example, when room temperature rises above the upper limit of the comfort range, a cooling call will be activated. This cooling call will remain active until the indoor temperature reaches a half degree below the setpoint. This operation works in the opposite direction for heating. If a room temperature reaches below the lower limit of the comfort range, a heating call will be activated. Once the indoor temperature rises a half degree above the setpoint, the heating call will be satisified and heating operations will stop.

Heat Mode

During Heat mode, the unit will only operate heating functions to maintain room temperature around the setpoint. The comfort range setting will still determine the on temperature and the off temperature will be a half degree above setpoint.

Cool Mode

During Cool mode, the unit will only operate cooling functions (including economizer) to maintain room temperature around the setpoint. The comfort range setting will still determine the on temperature and the off temperature will be a half degree below setpoint.

Staging of Free Cooling and Mechanical Cooling

When connected to the th-Tune, all mechanical cooling and free cooling operation (with the exception of staging) work as described in MULTI-TEC Service Instructions manual 2100-665. When a cooling call is first activated, the lowest form of available cooling will start. (If free cooling is available, the economizer will open and free cooling will begin. If free cooling is not available, the first stage of mechanical cooling will begin.) At this point, if the indoor temperature begins to drop, no additional cooling stages will be activated. If the indoor temperature continues to rise or stays constant, the next stage of cooling will be turned on. As an additional safety measure, if the indoor temperature rises 2°F above the comfort range, all available stages of cooling will become active to avoid overheating the room.

Changing the Setpoint

To change the setpoint, turn the knob (see Figure 19) on the front of the th-Tune until the desired setpoint is reached. Once this is complete, the th-Tune will load the new setpoint after the knob has stopped turning for 3 seconds.

Changing the Clock

To change the time or day of the week, press and hold the clock button for 5 seconds. Turn and press the knob to set the time and/or day of the week.

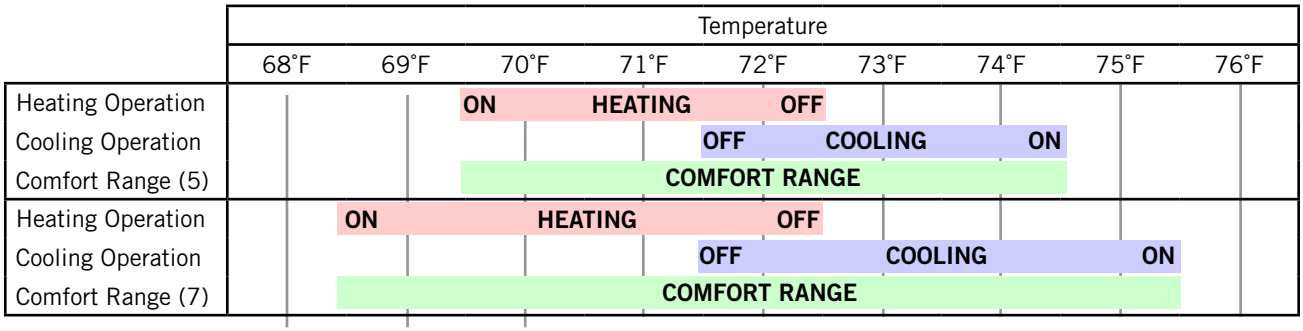
Changing to Celsius

Changing to Celsius must be done in the MULTI-TEC unit using the TEC-EYE.

Blower Operation

There are two modes of blower operation available while using the th-Tune. The first mode operates the blower during active heating and cooling calls. The second mode operates the blower continuously to continuously circulate the air.

FIGURE 18
Comfort Range
(Examples Shown: A setpoint of 72˚ with a 5˚ Range and a 7˚ Range)



NOTE: *The setpoint is the middle point of the comfort range*

FIGURE 19
Change Setpoint

th-Tune Setup Options Using the TEC-EYE

At this time, there is only one th-TUNE option, comfort range, that can be set up using the TEC-EYE hand-held diagnostic tool. For additional information about using the TEC-EYE, see the latest revision of MULTI-TEC Service Instructions manual 2100-665.

Comfort Range

This value sets the temperature range around the setpoint where the unit will not heat or cool.

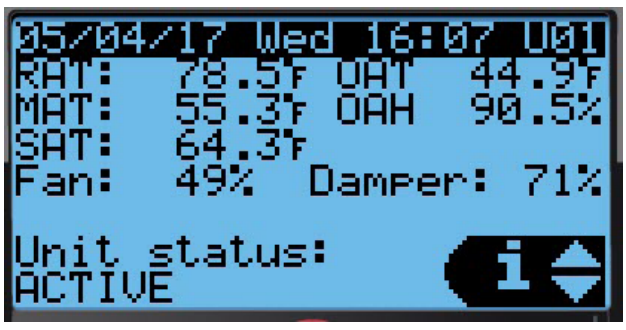
Example: If the comfort range is set to 5°F and the setpoint is set to 72°F, heating would occur when room temperature is below 68.5°F and cooling would occur when room temperature is above 75.5°F.

To adjust the comfort range using the TEC-EYE:

1. Connect the TEC-EYE diagnostic tool to the control board located in the wall unit. The TEC-EYE connects to the control board via an RJ11 modular phone connector.

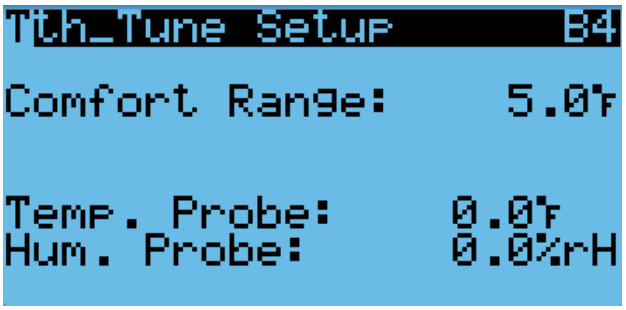
   The initial screen that will display on the TEC-EYE is the status screen for the MULTI-TEC wall unit. If the th-Tune has been properly connected to the wall unit, the status screen should look like Figure 20.

FIGURE 20
MULTI-TEC Status Screen



2. Press MENU key to go to the Main Menu screen.
3. Press UP or DOWN keys and ENTER key to enter TECHNICIAN password 1313.
4. Press UP or DOWN keys to scroll to **Adv System Config**; press ENTER key.
5. Press UP or DOWN keys to scroll to **th_Tune Setup (B4)**; press ENTER key.
6. Press ENTER key to scroll to **Comfort Range** (see Figure 21).
7. Press UP or DOWN keys to adjust value.
8. Press ENTER key to save.

FIGURE 21
Comfort Range Setup



Alarms and Troubleshooting

Alarms

If any alarm is triggered on the unit, the Bell icon will flash for 10 seconds accompanied by an audible tone alarm. After 10 seconds, the bell icon will stop flashing and become solid and the audible tone alarm will be silenced. If any alarm is present on the unit, the TEC-EYE display will need to be used to find out what the alarm is.

Troubleshooting

The th-Tune device is only a single unit controller. It provides a means to display basic information from the MULTI-TEC wall-mount unit and provides a temperature and humidity probe to better measure a room's climate. That means that all variables and unit operation is handled at the wall unit controller, and any troubleshooting beyond communication loss with the th-Tune will require the use of the TEC-EYE display. In the case of a loss of communication between th-Tune and the wall unit controller, a "Cn" will appear in the main display area. In that case, check the communications wiring.

FIGURE 22
th-Tune Buttons Overview

FIGURE 23
th-Tune Icons Overview

* **Rotating Display Area**

This area displays the following information in the following order and rotates through them every 5 seconds:

1. Clock/Day
2. Indoor Temperature Setpoint
3. Indoor Humidity
4. Outdoor Temperature
5. Outdoor Humidity