



MINI-SPLIT INSTALLATION AND MAINTENANCE MANUAL

**FOR MODELS
MSC49HP13115A
MSC412HP13115A**

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Installation and Maintenance Manual

Report all Shipping Damage to Carrier IMMEDIATELY, Check units and box exterior for damage

NOTE TO INSTALLER

This manual is to aid the qualified HVAC contractor in the Installation and Maintenance of this Mini Split system.

Please read and understand these instructions prior to installing the unit, failure to comply with these instructions may result in improper installation, operation and maintenance, possibly resulting in fire, electrical shock, property damage, personal injury or death.

Installers please retain this manual for future reference; please pass warranty registration to end user. If Technical Assistance is required during installation or start up, please call 704-504-8590 to speak to a Technical Service Engineer. Before calling please have the Model and Serial numbers available.

Safety Instructions

Read all the instructions, install and operate the system per those instructions.
Use the unit only in the manner described in this manual.

1. Check Rating Plate for correct system voltage before installing the unit installing and operating a unit with the incorrect voltage may result in malfunction or other issues and will void the warranty.
2. Units must be connected to a correctly grounded Electrical Supply.
3. Do not use the units if they have been dropped or otherwise damaged or installed incorrectly.

The manufacturer of the unit will not be liable for any damages caused by failure to comply with the installation and operating instructions in this manual.

The unit Rating Plate contains pertinent information to the unit operation; please refer to it as required.

Completely read all Instructions prior to assembling installing, operating, or working on these units. Inspect all parts for damage prior to installation and start up. Units must be installed by a Qualified HVAC Contractor.

Thermal Zone installation kit 2432-1412C is highly recommended for all installations.

Installer Supplied Items

The following Items are necessary for the installation of the unit. An Installation Kit can be purchased that includes these Items.

Refrigerant Line Set: Flare Connection only, suitable for R410A with both lines insulated, max length 45ft.

High Voltage Interconnect wiring: 14 AWG wiring from Outdoor unit to Indoor unit for Power and Control.

Condensate tubing: Per local codes to remove condensate from the indoor unit.

The following Items are necessary for installation but are **NOT** included in the Installation Kit.

Main System Breaker: Sized per unit requirements, to be mounted adjacent to Outdoor unit.

Refrigerant: R410A required for additional line set charge.

Mounting Hardware: Wall Anchors, Condenser Pad etc.

Items for Consideration

Application

Check the application of the unit prior to installation, certain applications require additional components or installation parameters.

Computer or Data Server Rooms

These require ballpark sizing of approximately 12,000 Btu/h Capacity per 250 Sq Ft of room size.

The units will be running 24/7, so a Low Ambient Head Pressure Controller (See accessories), a Crankcase Heater and possibly a Wind Baffle (Field Supplied for cooling below 32°F) **must** be installed.

Offices and Commercial Spaces, Churches etc

These require ballpark sizing of approximately 12,000 Btu/h Capacity per 400 Sq Ft of room size. The units could have the possibility of providing cooling with ambient temperatures below 65°F, so a Low Ambient Head Pressure Controller (See accessories) is required as is a Crankcase Heater (field supplied).

Residential, Bedrooms, Family Rooms etc

These require ballpark sizing of approximately 12,000 Btu/h capacity' per 600 Sq Ft of room size Low Ambient controllers typically are not needed, unless a home office application is required.

NOTICE:

Heat Pumps are a great application, however the units do not feature any back up resistance heat, so we do not recommend their use as a primary source of heat in areas where the winter temperatures fall below 30°F.

Installation

Determine the best location for mounting the Indoor unit. It must be located a minimum of 4 ft from the floor. Paying close attention to the air circulation in the room, 9,000 & 12,000 BTU units throw air approximately 15ft, 18,000 & 24,000 BTU units throw air approximately 25ft. Ensure no obstacles to airflow exist.

Locate the Indoor and Outdoor units as close together as possible, maximum line set run and in cannot BE EXCEEDED, then determine how the Interconnect piping, wiring and condensate hose is to be run.

LINESET INFORMATION

MODEL NUMBER	PART NUMBER	LINE SIZES
MSC49HP13115A	2432-1412C	¼" Liquid - ½" Suction
MSC412HP13115A	2432-1412C	¼" Liquid - ½" Suction

NOTE: All units have a Maximum Lineset Horizontal length of 45 ft and maximum vertical lift of 20 ft. Do not exceed these lengths.

Ensure that all panels can be removed for service as required

Certification

All Thermal Zone Ductless Mini Splits are certified by UL under UL standard 1995 Performance is certified by our certification under the ARI 210/240 Program.

Controls and Components

Units are supplied with a wireless remote controller, which communicates with the unit Microprocessor controller. The return air temperature sensor mounted on the unit then controls the unit operation.

Several modes of operation are available to the end user depending on the type of comfort required. All unit operating functions are controlled via the remote controller.

Optional Controls and Components

Low Ambient Controller: ICM 326H must be used in Data Room or Commercial applications

For a wiring diagram please follow general diagram supplied with ICM Controller. Probe must be located in the fin pack or on a return bend that measures approx 100°F during normal operation.

Condensate Pump: Field Installed Aspen brand of Condensate Pump (model ASP-MO-115)

Follow their wiring diagram recommendations. This pump is installed externally to the unit.

UNIT INSTALLATION

Follow Instructions, failure to follow instructions may cause possible malfunction and void any warranty.

Step 1

Remove Indoor and Outdoor units from the carton/box

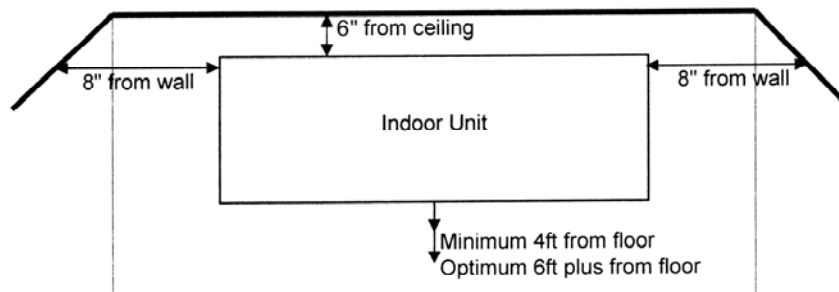
Indoor unit carton contains Remote Control and Batteries, ensure these are kept in a safe place during installation.

Step 2

Locate area to Install Indoor unit

Indoor unit must be located a minimum of 4ft. from the floor and 6" from the ceiling.

Choose an area where the wall is plumb and determine how to best to run the unit interconnects.



Ensure no obstacles to Airflow are directly in front of the unit, for a minimum of 12ft. for 9/12,000 Btu/h units and 16ft. for 18/24,000 Btu/h units. Do not install the Indoor unit units in areas exposed to high humidity (RH of 80% plus), direct sunlight and direct heat from stoves or other devices.

Step 3

Drill Hole for Line Set etc

Remove mounting bracket from the rear of the Indoor unit, use a Phillips head screwdriver to remove the unit pipe strap, and if unit is a heat pump the defrost sensor also must be undone from its retainer. If mounting the unit on an outside wall measure from the edges of the unit to the center of the line set stub 90° bend to locate the center of the wall penetration. Drill a 3" Diameter hole through the wall. Angle the wall penetration slightly down towards the outside to assist in draining the condensate away from the unit. If mounting the unit on an inside wall, use the knockouts provided on the Left and Right sides of the unit to route the piping and wiring connections.

Step 4

Install Mounting Bracket

Locate and secure the mounting bracket to the wall. The Indoor unit weighs a maximum of 30Lbs, use wall anchors and mount to a wall stud to ensure that the wall is capable of holding the weight of the unit. Use a level to ensure mounting bracket is leveled, so condensate can drain properly.

Step 5

Prepare Unit Line Set Connections

Rotate refrigerant line stubs set gently through 90° (if mounting on an outside wall). For other line set configurations align the stubs as required.

Tip: Use Duct tape to tape the Condensate hose (make sure it is below the Line set stubs) and the Defrost Sensor (Heat Pump only), this makes it easier to guide them through the hole drilled in the wall. Also If possible feed the 14 AWG Interconnect wiring between Indoor and Outdoor (Maximum # of wires required is 6) through the unit electrical connection (if required by local codes an electrical connector can be attached to the rear of the unit). Tape the loose wire to the line set stubs. These two tips save time and prevent damage to the stubs when mounting the Indoor unit.

Note:
Condensate hose is taped below line set stubs. Wrap Duct tape to the end of the condensate hose for easier installation.

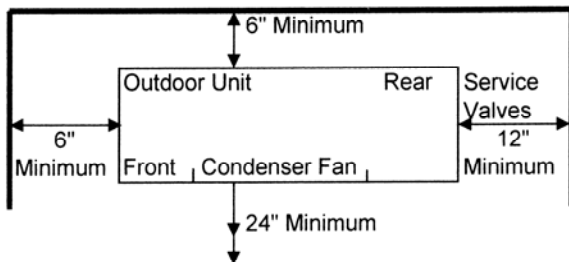
Step 6

Install unit on Mounting Bracket. Feed the line set stubs/condensate hose/wiring connections through the 3" hole, and then locate the unit key slots onto the tabs on top of the mounting bracket. Bottom of the unit then latches onto the mounting bracket. Indoor unit is now installed. It should be plumb, level and flush with the wall. If it is not check that the line set stubs are completely through the wall penetration, and also that the wall is plumb.

Step 7

Locate Outdoor unit

Clearances for the Outdoor unit are:



Install the Outdoor unit on a Condenser Pad or if a Heat Pump use feet to raise unit up approx 6" to allow for defrost to drain away

Install the Outdoor unit on a Condenser Pad or if a Heat Pump use feet to raise unit up approx 6" to allow for defrost to drain away. Do not install the Outdoor unit in a location exposed to high winds (field fabricated and installed wind baffle may be required).

Ensure location does not impede access around unit and pose a disturbance to neighboring areas.

Step 8

Refrigerant Line Set Piping

Interconnecting line set between the Outdoor unit and the Indoor unit must have both refrigerant lines insulated as condensing device is located in the Outdoor unit. Gently bend the line set stubs from the Indoor unit to the desired location. Using 2 x 10 -12" Crescent wrenches remove the flare nuts from the Indoor unit line stubs. Unit is filled with a dry gas, check for release of this to ensure that no leaks are present. Use a small amount of vacuum pump oil on the male flare threads to ease installation. Connect the line set to the stubs. Using the 2 wrenches, 1 on the male & 1 on the female, tighten the flare nuts.

DO NOT INSTALL A LIQUID LINE SIGHT GLASS OR FILTER DRIER IN THE SYSTEM

Run the line set to the Outdoor unit. Avoid tight bends and kinking the lines. It is not recommended to braze line sets together or to the unit connections. If line set length is in excess of that required, cut line set and re-flare or coil excess vertically to facilitate oil return to the compressor.

Step 9

Evacuation

Gauges can now be attached to the service ports - SERVICE PORTS HAVE a 5/16" CONNECTION TO GAUGES. Use caution to ensure that the proper size fittings are used when connecting. Once the gauges are attached the line set can be leak checked using Nitrogen at 300 Psig. Evacuate the unit down to a minimum of 200 Microns, break vacuum with Nitrogen to further leak check. Re-evacuate the system down to 200 Microns or lower. This is an R410A system; therefore it is essential that a deep vacuum be pulled on the system to remove all traces of moisture.

Step 10

MAIN POWER WIRING



DANGER

ELECTRICAL WIRING SHOULD BE DONE IN ACCORDANCE WITH NATIONAL AND LOCAL CODES

Electrical wiring should be done in accordance with all National Electrical Code (NEC) and local state/city building codes

- ◆ Tip: Small Electrical Screwdriver is required for unit terminals

Breaker size and wiring must be sized for the rating plate amperage. If a smaller than required breaker is used possibility of unit damage etc could occur. Use only 20 Amp HACR type breakers.

Each system installed must have a separate branch circuit with an individual breaker/fuse. A local disconnect should be installed adjacent to the Outdoor unit in accordance with National and Local Codes. The Outdoor unit provides power for the Indoor unit therefore, no disconnect is required between the Outdoor and Indoor units. Line voltage from the disconnect, should be wired to N – L – G (115V Unit) or L1 – L2 – G (208/230V Unit). Remove RHS Knockout on the terminal access panel for whip/wiring connection. Ground connection must be made to the terminal plate.

- ◆ Tip: For easier access to the Terminals in the Outdoor unit remove the lower access panel to install whip and sealtite connectors for conduit.

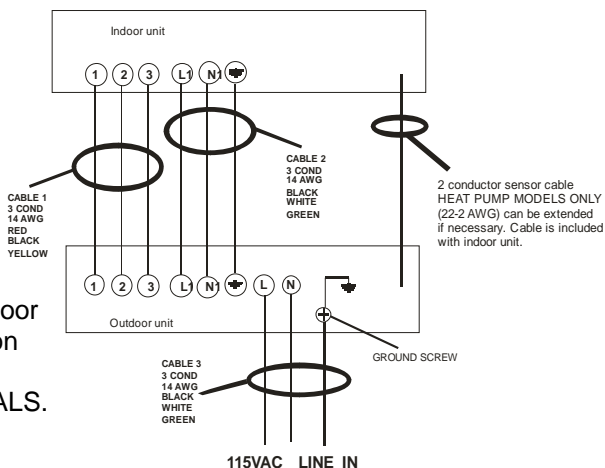
Step 11

Controls Wiring

**ALL CONTROL WIRING BETWEEN INDOOR AND OUTDOOR UNIT IS HIGH VOLTAGE
MINIMUM 14 AWG WIRE MUST BE USED**

Remove terminal covers from Indoor unit and wire to the terminals. A small electrical screwdriver required. Control wiring from the Outdoor Unit must be a point to point i.e. the terminal that the wire is attached to on the Outdoor unit must be the same terminal it is wired to in on the Indoor unit.

DO NOT CROSS WIRES BETWEEN TERMINALS.



OUTDOOR UNIT PIN #	CABLE/ COLOR	INDOOR UNIT PIN #
1	1-BLACK	1
2	1-RED	2
3	1-YELLOW	3
L1	2-BLACK	L1
N1	2-WHITE	N1
GND	2-GREEN	GND
L	3-BLACK	N/A
N	3-WHITE	N/A
GND TERM.	3-GREEN	N/A

This is extremely important: Switching the L1 - N1 wires over will allow the indoor unit to operate but it will not provide control signals for the Outdoor unit so that the compressor will not operate. Ground connection should be made to ground screw marked in Indoor unit.

If unit is a Heat Pump Defrost Sensor must be connected from the Indoor unit to the Outdoor unit. Standard lead length is 25ft. If a longer length is required then cut the lead and extend using thermostat wire.

Step 12

Condensate Hose

Unit is provided with approximately 18" of Condensate Hose. Hose connection is sized to accept a 3/4" OD or 5/8" ID Clear Plastic Hose to then extend to building drain. All condensate hose extensions should be in accordance with local building codes. Remember water only flows downhill to ensure positive draining from the unit, Check using water for a positive flow of Condensate.

The basic system installation is now complete (The unit is now ready for start up - use this time to ensure that worksite is tidy).

Unit Start Up

With the refrigerant system completely evacuated the system can now be opened to allow the refrigerant charge in the Outdoor unit to be released into the line set. The service valves require a 6mm and a 5mm allen wrench respectively to undo the valve stems. Remove the brass caps from the Service Valves.

Open the SUCTION line Valve first to prevent any possible oil clogged of the Capillary tube.

(This can occur if the liquid line valve is opened first with the rest of the system in a deep vacuum)

LIQUID or EXPANDED GAS line can then be opened.

Unscrew both valve stems until they come to a stop against the valve body, replace the brass Caps and then tighten the caps to prevent leaks.

Energize the breaker to power the system.

Start Indoor unit, Cooling mode is only allowed when the Outside Ambient Temperature is above 65°F to prevent damage to the compressor. Unit has a 3 minute time delay for the compressor start up operation.

NOTE: Unit is charged with enough R410A refrigerant for a line set of 25ft. length. For longer line set lengths additional charge must be WEIGHED in per the following table.

Lineset Length	per ft.	30 ft.	35 ft.	40 ft	45 ft.
Add this much:	.3 oz	1.5 oz.	3.0 oz.	4.5 oz.	6.0 oz.

DO NOT EXCEED THE 45 FT. MAXIMUM LINE LENGTH

Standard Operation of the unit – Cooling

Indoor Temperature Split 30°F

Suction Pressure 115 Psig, approx 37°F

Suction Line Temperature 45°F

PLEASE NOTE: Schrader connection on the "Liquid" line **DOES NOT READ HEAD PRESSURE** – it is an expanded gas pressure

MINI-SPLIT HEAT PUMP SPECIFICATIONS

Model	MSC49HP13115A	MSC412HP13115A	
Function	COOLING/HEATING	COOLING/HEATING	
Rated Voltage	115V AC	115V AC	
Rated Frequency	60Hz	60Hz	
Cooling/Heating Capacity (BTU)	9000/9000	12000/12000	
EER	13	13	
Cooling/Heating Power Input (W)	770/720	1010/1000	
Cooling/Heating Rated Input (W)	/	/	
Cooling/Heating Rated Current (A)	7.2/6.8	9.6/9.6	
Air Flow Volume (CFM)	347	382	
Dehumidifying Volume (pt/h)	1.7	2.8	
Auto Restart	Yes	Yes	
Breaker Size:	15 Amp	20 Amp	
Minimum Circuit Ampacity	10.6	13.91	
Indoor unit	Model of Indoor Unit	MSC49HP13115EA	MSC49HP13115EA
	Fan Motor Speed (r/min) (L/M/H)	950/1100/1250	950/1100/1250
	Output of Fan Motor (w)	16	16
	Input of Heater (w)	N/A	N/A
	Fan Motor Capacitor (uF)	4	4
	Fan Motor RLA(A)	0.35	0.35
	Fan Type-Piece	Cross flow fan	Cross flow fan
	Diameter-Length (in)	3.66"	3.74"
	Evaporator	Aluminum fin-copper tube	Aluminum fin-copper tube
	Pipe Diameter (in)	0.275	0.275
	Row-Fin Gap(in)	2-0.061"	2-0.061"
	Coil length (L) x height (H) x coil width (L)	26.3 X 15.75 X 1.57"	32 X 15.75 X 1.57"
	Swing Motor Model	TB-BDJ-A01	TB-BDJ-A01
	Output of Swing Motor (W)	1.2	1.2
	Fuse (A)	6.3	6.3
	Sound Pressure Level dB (A)(L/M/H)	32/39/44	32/39/44
	Sound Power Level dB (A)	42/49/54	42/49/54
	Dimension (W/D/H)(approx in)	31.1 x 7.1 x10.6 "	37x 7.1 x10.6 "
	Dimension of Package (W/D/H)(approx in)	34x14x10.5"	40x14x10.5"
	Net Weight /Gross Weight (LB)	20/25	22/27
Outdoor unit	Model of Outdoor Unit	MSC49HP13115CA	MSC412HP13115CA
	Compressor Model	EA82X1C-1FZDU1	EA108X1C-1FZDU1
	Compressor Type	Rotary	Rotary
	L.R.A. (A)	47	53
	Compressor RLA(A)	7.5	9.9
	Compressor Power Input(W)	810	1085
	Compressor overload protection:	Thermal (internal)	Thermal (internal)
	Throttling Method	Capillary throttling	Capillary throttling
	Compressor Start Capacitor:	45 ufd	45 ufd
	Outdoor Operating Range	23°F to 109°F	23°F to 109°F
	Condenser	Aluminum fin-copper tube	Aluminum fin-copper tube
	Pipe Diameter (in)	0.275	0.315
	Rows-Fin Gap(in)	2-.062	2-.062
	Coil length (l) x height (H) x coil width (L)	31.8 x 20 x 21.73"	33.1 x 20 x 21.73"
	Fan Motor Speed (rpm)	910	790
	Output of Fan Motor (W)	35	45
	Fan Motor RLA(A)	0.81	0.8
	Fan Motor Capacitor (uF)	8	11
	Air Flow Volume of Outdoor Unit	1265 cfm	1265 cfm
	Fan Type-Piece	Axial fan	Axial fan
	Fan Diameter (in)	15.8"	16.5"
	Defrosting Method	Auto defrost	Auto defrost
	Climate Type	T1	T1
	Isolation	I	I
	Moisture Protection	IP24	IP24
	Sound Pressure Level dB (A)	55	55
	Sound Power Level dB (A)	65	65
	Dimension (W/D/H)(approx in)	32"x10"x21"	33.5x11.6x23.8"
	Dimension of Package (W/D/H)(approx in)	36x13x23.5"	39x16x27"
	Net Weight /Gross Weight (lb)	73/84	86/93
Refrigerant Charge (lb)	R410A/2.12	R410A/2.65	
Design Length (ft)	24.6	19.2	
Design Pressure High / Low (PSIG)	465/252	495/252	
Extra Refrigerant Charge per feet above design length (oz./ft)	0.3	0.3	
Outer Diameter Liquid Pipe (in)	1/4"	1/4"	
Outer Diameter Gas Pipe (in)	1/2"	1/2"	
Max Distance Height (ft)	16.4	16.4	
Max Distance Length (ft)	32.8	32.8	
Connection Pipe	Installation Kit part Number	2432-1412C	2432-1412C

WARRANTY

THERMAL ZONE warrants the accompanying split air conditioner or heat pump system to be free of defects in material and workmanship for the applications specified in the operation manual and installation manual for a period of one (1) year on parts and five (5) years on compressor, valid from the date of original retail purchase in the United States or Canada. Labor is not covered under warranty.

If the unit exhibits a defect in normal use and is determined to be within the warranty period, THERMAL ZONE will, at its option, either repair or replace the unit free of charge within a reasonable time after the unit is returned.

This warranty DOES NOT cover:

- Damage, accidental or otherwise, to the unit while in possession of the consumer that is not a result of a defect in material in workmanship.
- Damage caused by consumer misuse, tampering, or failure to follow all care and maintenance instructions in the manuals.
- Damage to the finish of the case or other parts caused by water.
- Damage caused by repairs or alterations to the unit by anyone other than a qualified technician.
- Filter.
- Freight and Insurance cost for the warranty service.

Warranty Activation Card must be completed and sent in to activate the warranty for the accompanying unit.

TECHNICAL SUPPORT

If you need technical support please call (704)504-8590 M-F 7:30am to 4:00pm.