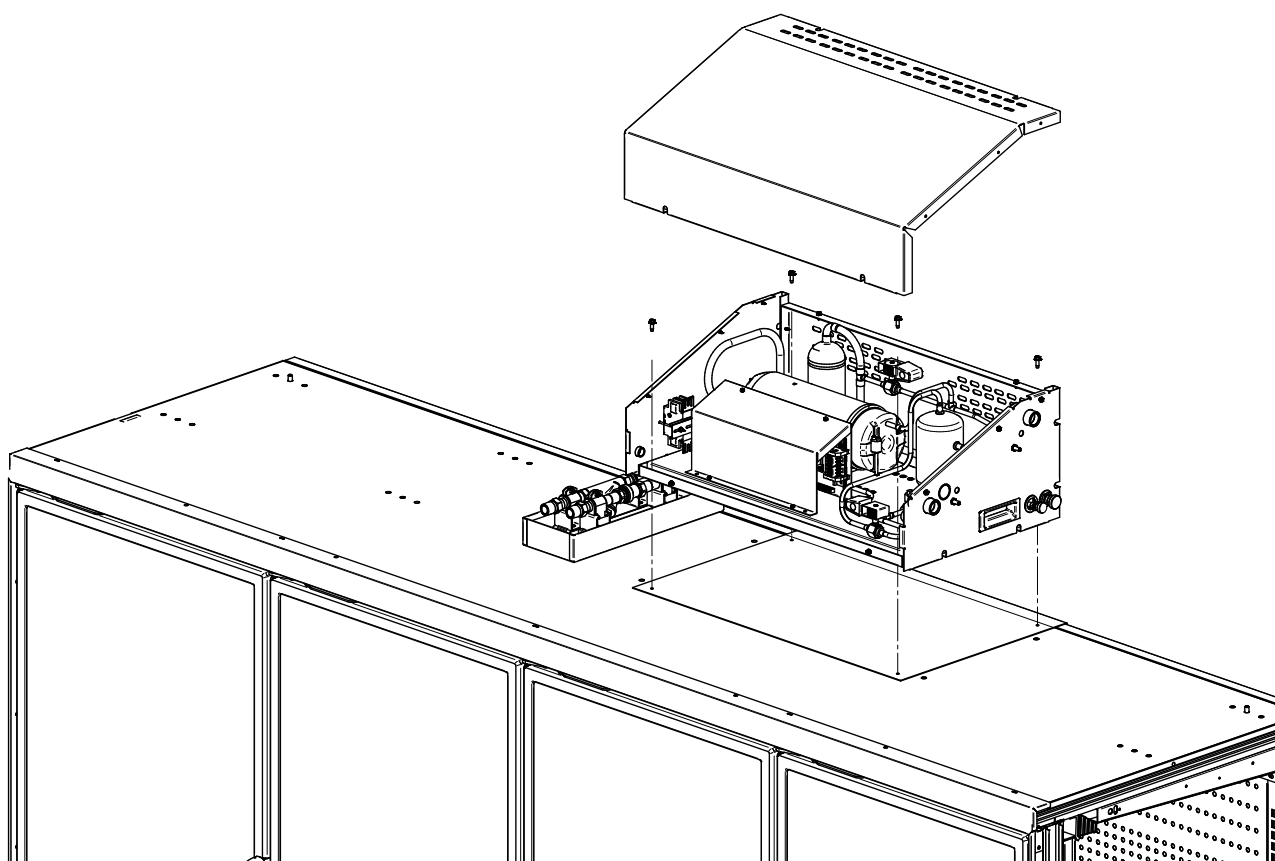


HMDSLMT

Water-Cooled Condensing Unit



IMPORTANT

Keep in store for
future reference!

Installation & Operation Manual

P/N 3082681_D
November 2019

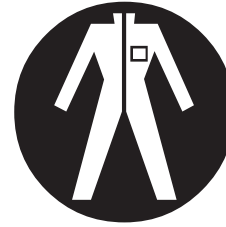
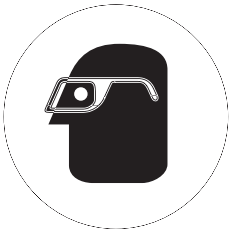


BEFORE YOU BEGIN
Read these instructions completely and carefully.



PERSONAL PROTECTION EQUIPMENT (PPE)

Personal Protection Equipment (PPE) is required whenever installing or servicing this equipment. Always have safety glasses, gloves, protective boots or shoes, long pants, and a long-sleeve shirt.



WARNING

Only qualified personal must install and service the equipment. The installation, start-up and maintenance of the condensing unit can be dangerous, for this reason it requires specific technical knowledge and adequate training for its intervention. Improperly installed product, by a voluntary or involuntary manipulation by untrained persons could result in death or serious injury.



WARNING

Personal protective equipment required! The installation, starting and maintenance of the condensing unit can face mechanical, electrical and chemical hazards. Before carrying out any manipulation of this unit, qualified personnel should have the recommended protective equipment for the work to be carried out. Refer to the MSDS and OSHA standards for adequate protective equipment recommendations.

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REVISION HISTORY

REVISION D – Updated unit wiring diagrams

REVISION C – Updated compliance standard

REVISION B – Updated refrigerant types

REVISION A – Original issue

ANSI Z535.5 DEFINITIONS



• **DANGER** – Indicate[s] a hazardous situation which, if not avoided, will result in death or serious injury.



• **WARNING** – Indicate[s] a hazardous situation which, if not avoided, could result in death or serious injury.



• **CAUTION** – Indicate[s] a hazardous situation which, if not avoided, could result in minor or moderate injury.

• **NOTICE** – Not related to personal injury – Indicates[s] situations, which if not avoided, could result in damage to equipment.

FOR CALIFORNIA INSTALLATIONS ONLY:



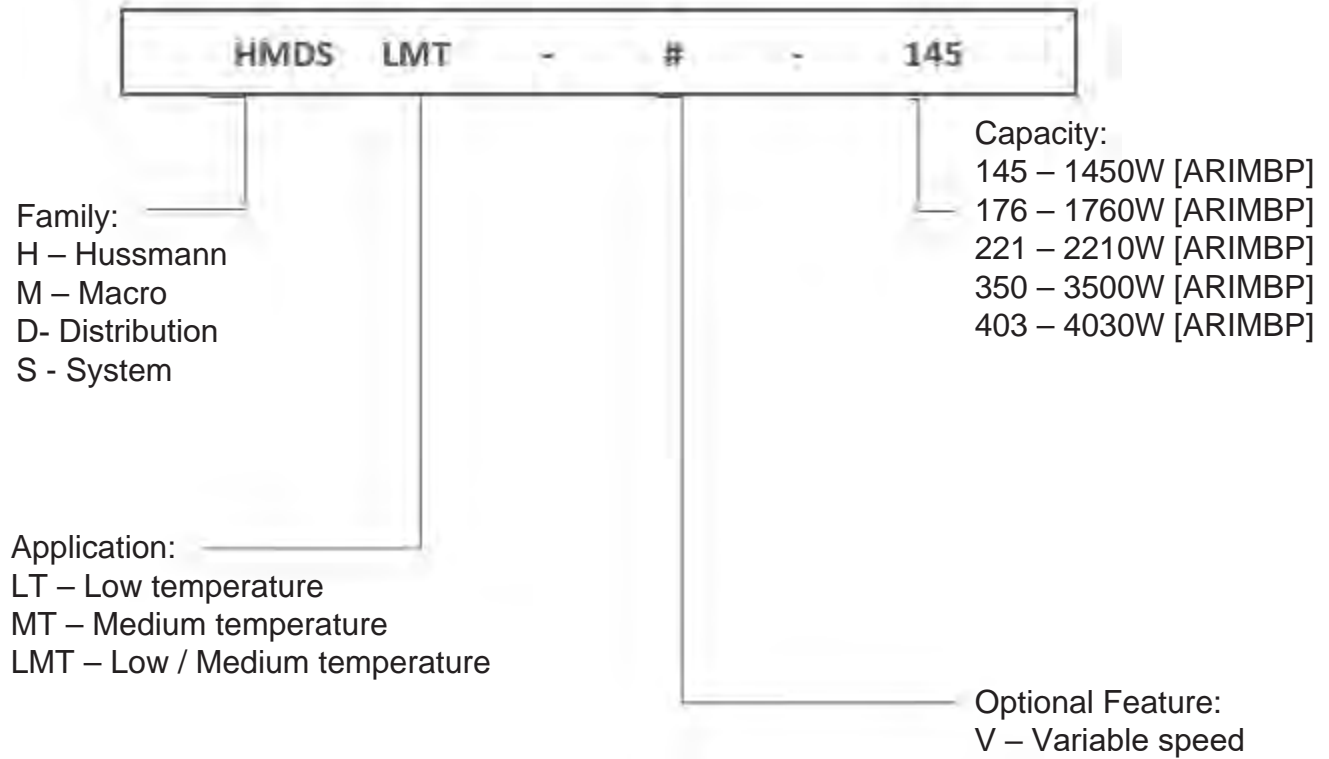
WARNING:

Cancer and Reproductive Harm
www.P65Warnings.ca.gov

3069575

This warning does not mean that Hussmann products will cause cancer or reproductive harm, or is in violation of any product-safety standards or requirements. As clarified by the California State government, Proposition 65 can be considered more of a 'right to know' law than a pure product safety law. When used as designed, Hussmann believes that our products are not harmful. We provide the Proposition 65 warning to stay in compliance with California State law. It is your responsibility to provide accurate Proposition 65 warning labels to your customers when necessary. For more information on Proposition 65, please visit the California State Government Website.

I. MODEL NUMBERING SYSTEM



II. GENERAL

A. UL Listing

These units are manufactured to meet UL/ 1995 standard requirements for safety. Proper installation is required to maintain the listing.

B. Federal / State Regulation

These units, at the time they are manufactured, meet all federal and state/ provincial regulations. Proper installation is required to ensure these standards are maintained.

These condensing units are designed for indoor installation on a case top. Every unit is completely piped and wired at the factory and is shipped ready for immediate installation. Only the liquid and suction lines to the evaporator coil, water inlet and outlet, the thermostat and the main power wiring are required to complete the installation. Each unit is evacuated, leak tested and pre-charge with refrigerant R-448a / R-449a.

HMDSLMT water cooled condensing unit are designed to work in stores where temperature is maintained at or below the ANSI/NSF-7 specified level and relative humidity is maintained at or below 55%. Any other condition may alter the energy consumption values.

The unit is cooled by water, and it is designed to operate with an inlet water temperature range of 50°F to 115 °F.

All the units HMDSLMT are tested electrically before shipping to ensure the final user safety and an adequate operation during its useful life; they are pre-charge with refrigerant in order to avoid the entrance of humidity and possible leaks. Quantity of refrigerant gas depends on the model and application of the condensing unit.

These units are designed to be ready for top-mounted on Low and Medium Temperature cases. They are intended to be controlled by an electronic control. The case temperature is controlled by cycling the compressor based on the discharge air temperature input.



TABLE 1. UNIT DIMENSIONS AND WEIGHT

Model	H x D x W (in)	Weight (lb)
HMDSLMT145	11.89 x 18.86 x 33.62	100.3
HMDSLMT176	11.89 x 18.86 x 33.62	100.3
HMDSLMT221	11.89 x 18.86 x 33.62	100.3
HMDSLMT350	11.89 x 18.86 x 33.62	121.3
HMDSLMT403	11.89 x 18.86 x 33.62	121.3

C. Components

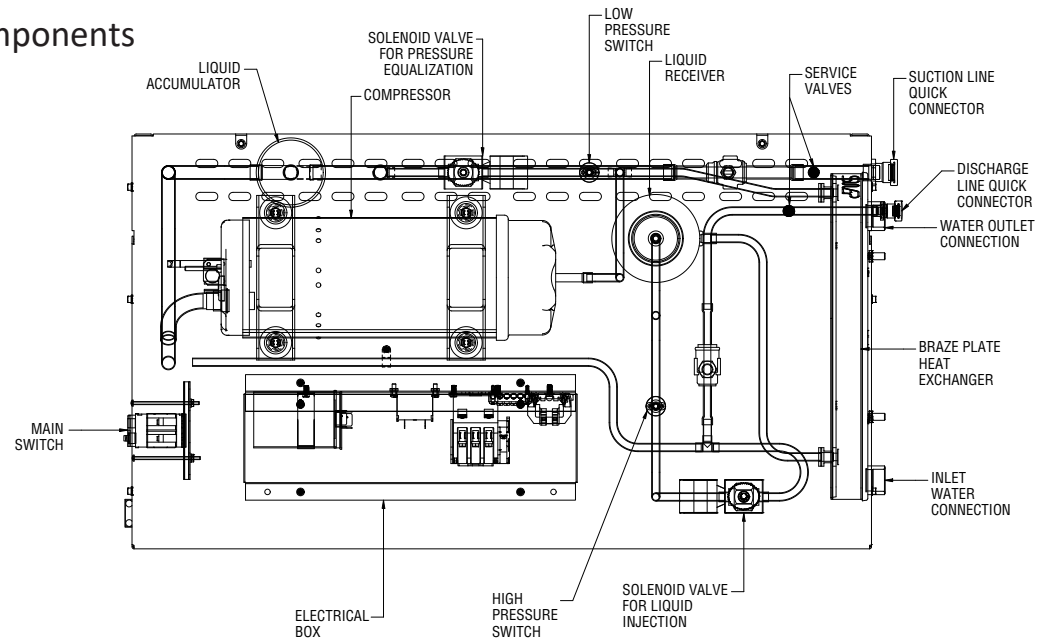
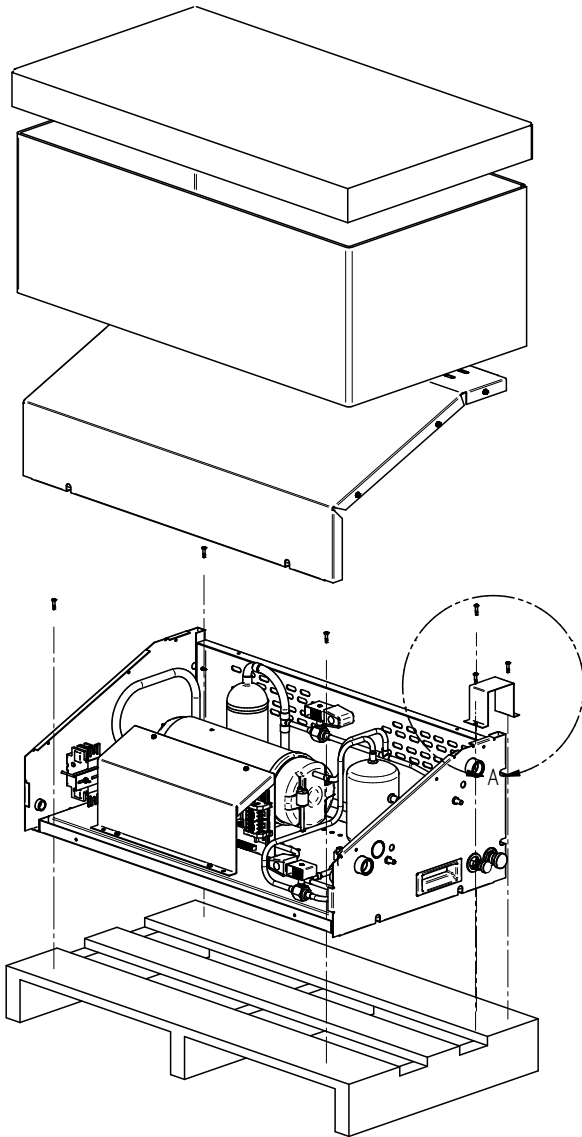


TABLE 2. UNIT COMPONENTS

Component	HMDSLMT
Scroll compressor	✓
Capillary tube liquid injection for compressor cooling	✓
Liquid accumulation	✓
Liquid line service valve	✓
Discharge line service valve	✓
Liquid line quick connector	✓
Discharge line quick connector	✓
Braze plate heat exchanger	✓
Solenoid valve for liquid injection	✓
Solenoid valve for equalizing pressures	✓
High pressure switch	✓
Low pressure switch	✓
Liquid receiver	✓

1. All the units are made with painted galvanized steel, which makes them durable and corrosion resistant. These units are designed for easy access to electrical components for serviceability.
2. The units have a discrete and pleasant look, and are designed to be placed on top of the case for space optimization.
3. All the electrical components (including compressor electrical components and contactors) are placed in a designated housing inside the unit. For safety, the unit includes a high pressure switch and a low pressure switch that activate when the set pressure values are reached. The high pressure switch setting is 26 ± 1 bar; the low pressure switch is set to 0.5 ± 0.4 bar.
4. A liquid receiver is included, in order to maintain a uniform flow for optimum performance at the full range of water temperatures.

III. INSTALLATION INSTRUCTIONS



A. Shipping Damage

All equipment should be thoroughly examined for shipping damage before and while unloading. This equipment has been carefully inspected at our factory and the carrier has assumed responsibility for safe arrival. If damaged, either apparent or concealed, claim must be made to the carrier.

1. Apparent Loss or Damage

If there is an obvious loss or damage, it must be noted on the freight bill or express receipt and signed by the carrier's agent, otherwise, carrier may refuse claim. The carrier will supply the necessary claim forms.

2. Concealed Loss or Damage

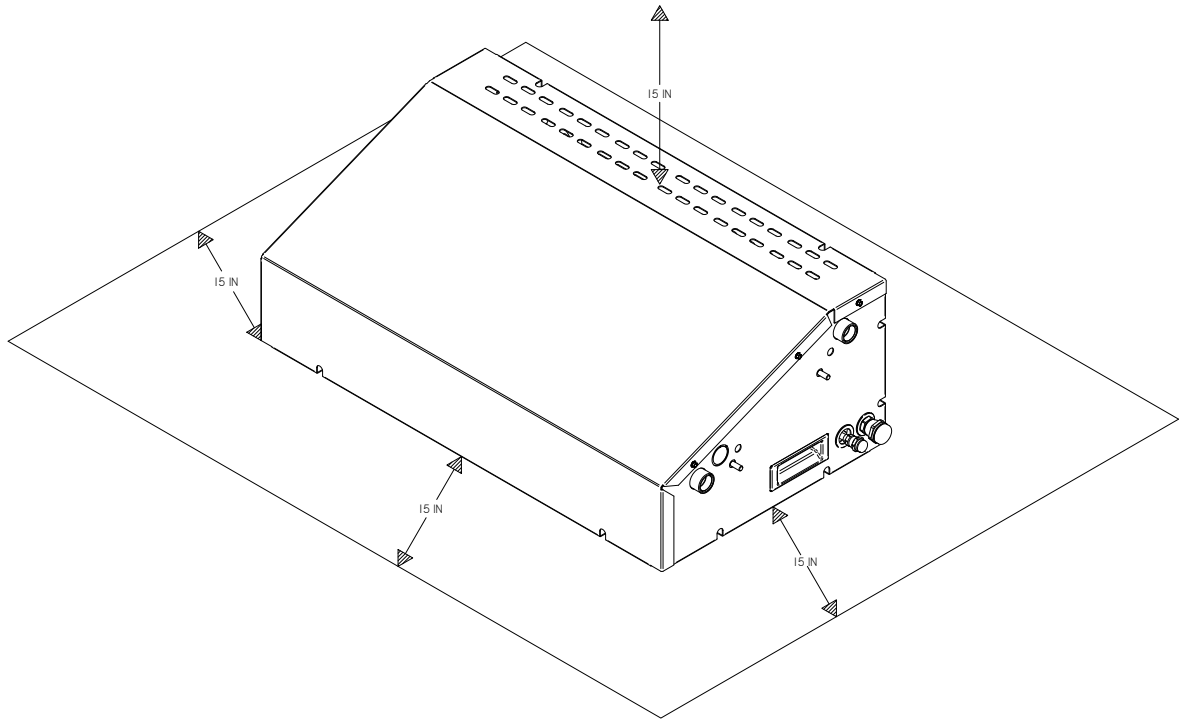
When loss or damage is not apparent until after equipment is uncrated, a claim for concealed damage is made. Upon discovering damage, make request in writing to carrier for inspection within 15 days and retain all packing. The carrier will supply inspection report and required claim forms.

B. Rigging and Lifting

The unit must be moved using a lift truck. When unpacked, use the lateral handles to pull the unit.

C. Unit Placement

When setting the unit, some minimum distances are listed in order to ensure the adequate free space for serviceability and performance.



It is recommended to place the unit at least 15 inches away from any wall on the laterals and front sides. In order to remove the upper cover for maintenance, some screws on the lateral, upper and front sides must be removed, for these, the minimum allowable distance is 15 inches.

D. Refrigerant

The correct type of refrigerant will be stamped on each condensing unit's serial plate, which is located on the back side of the housing.

The condensing units are pre-charge with refrigerant R-448a / R-449a. Use the quick connectors provided with the case and condensing unit to properly connect the suction and discharge lines.

TABLE 3. REFRIGERANT CHARGE PER UNIT

Condensing unit	Amount of pre-charge refrigerant [lb]
HMDSLMT145	2.2
HMDSLMT176	2.2
HMDSLMT221	2.2
HMDSLMT350	3.3
HMDSLMT403	3.3

WARNING

Refrigeration lines are under pressure. Depressurize and recover refrigerant before attempting any connection or repair.

Refrigerant vapor is hazardous to your health and can cause death. Avoid breathing refrigerant and lubrication vapor or mist. Exposure may irritate eyes, nose and throat. If accidental system discharge occurs, ventilate work area before resuming service.

Always wear safety goggles and protective gloves when working with refrigerants. Contact with refrigerant may cause injury. Disconnect hoses with extreme caution! All hoses may contain liquid refrigerant under pressure.

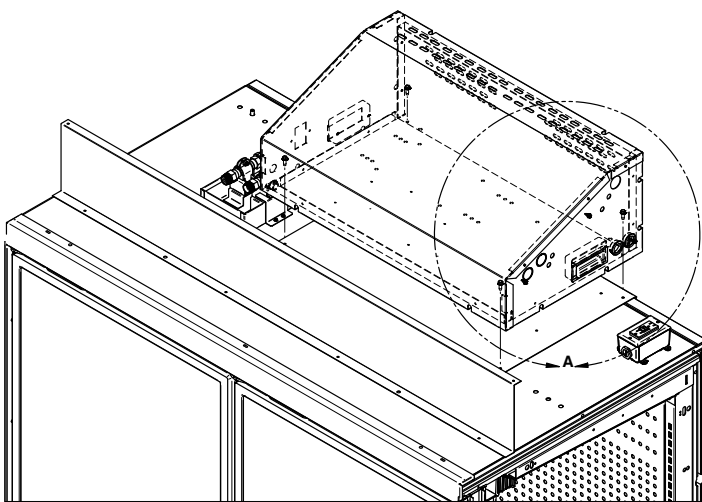
Be sure that any room where you are working is thoroughly ventilated, especially if a leak is suspected. Read all safety information regarding the safe handling of refrigerant and refrigerant oil, including the Material Safety Data Sheet. MSDS sheets can be obtained from your refrigerant supplier.

E. Field Installation

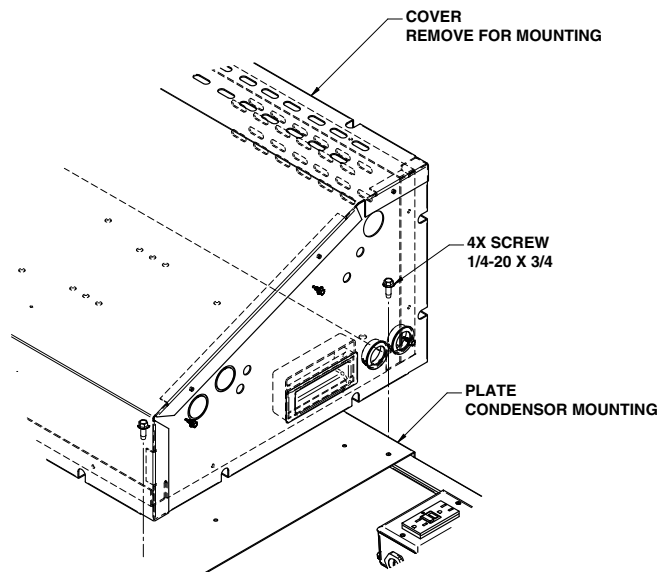
1. Mounting

A mounting plate is provided on top of the case with pilot holes that provide specific attachment points for the condensing unit base.

HMDSLMT CONDENSING UNIT MOUNTING



EXPLODED VIEW
PARTS HIDDEN FOR CLARITY
CONDENSING UNIT SHOWN IN HIDDEN LINES FOR CLARITY



DETAIL A

2. Connect Lines

Quick Connect fittings are provided on both the case inlet and outlet lines, and on Hussmann's Freedom Line condensing units.

The case and condensing unit are pre-charged with the correct amount of refrigerant, and the lines are sealed.

Step 1:

Apply refrigerant oil to the entire surface of diaphragm, o-ring and threaded area of male coupling assembly. The amount of lubricant used must cover all designated surfaces sufficiently. Ideal application is a small applicator brush saturated with lubricant and applied liberally.

Step 2:

Ensure that the coupling halves are held in proper alignment with each other prior to starting the threads of the female coupling nut onto the male half. The coupling end faces should be parallel with each other and visually in line with each other, this allows the female coupling nut to easily be threaded on by hand for the initial 2-3 rotations of the union nut. These initial rotations will bring the diaphragm in contact and a sharp increase in torque will be felt when they come into contact and start to pierce the diaphragms on each coupling half. If the nut will not start by hand, adjust the position of the line set to ensure proper coupling alignment and eliminate/minimize all side load force on the coupling during assembly.

Step 3:

Using appropriate size wrenches, reference table below for the female coupling body and female union nut, tighten the female union nut, according to the torque specs below, while preventing rotation of the female body with respect to the male half. The nut should be tightened until a definite increase in resistance, metal to metal contact occurs, is felt (at this point, the nut will have covered most of the threads on the male body). It is important to ensure the male and female coupling bodies DO NOT ROTATE during any portion of the wrench installation.

TABLE 4. HEX WRENCH SIZE PER COUPLING

Coupling	Hex Wrench Size
3/8 in. Male	3/4 in.
3/8 in. Female	13/16 in.
5/8 in. Male 1	1/16 in.
5/8 in. Female	15/16 in.
Coupling Size	Foot Pounds (Ft. Lbs.)
3/8 in.	10-12
5/8 in.	35-45

Step 4:

Using a permanent marker or scribe, mark a line lengthwise from the female coupling union nut to either the bulkhead or female coupling body. Then tighten an additional one (1) wrench flat (60°); refer to the marking on the union nut to confirm the rotation has occurred. The final rotation is necessary to ensure the formation of the leak-proof seal, between the male and female couplings.

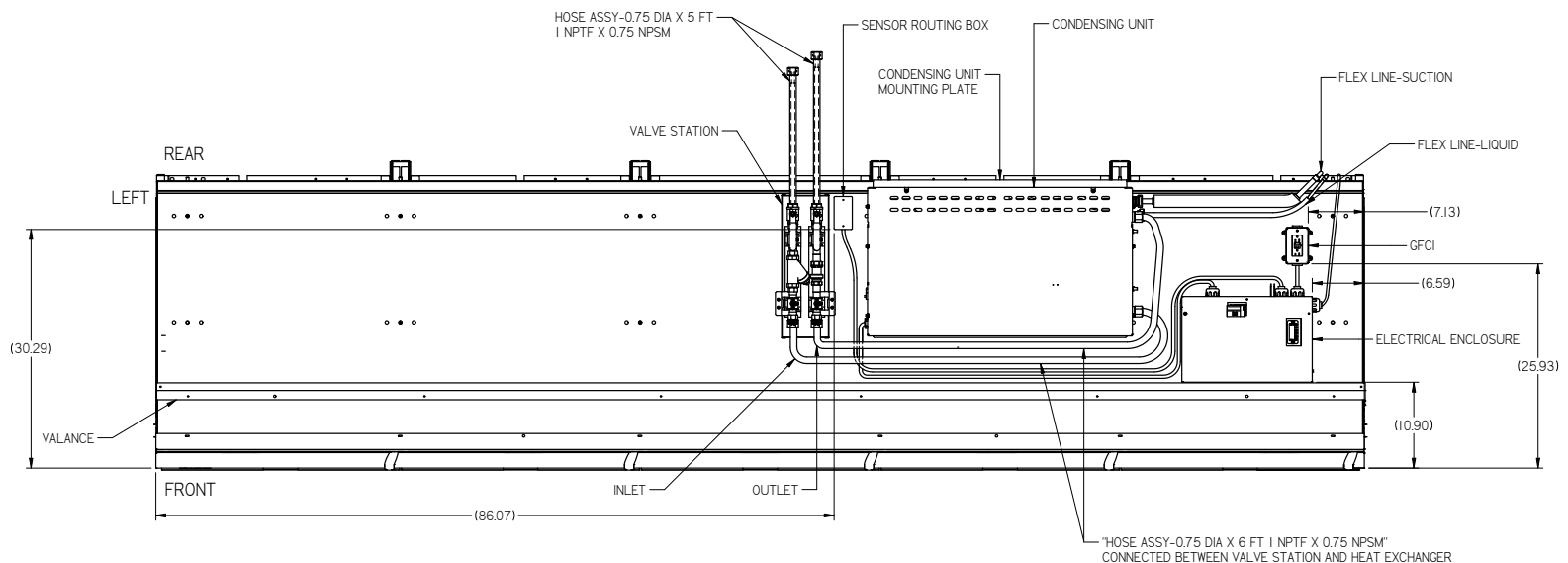
The swivel nut end contains one diaphragm in the center post. The male fitting contains the knife blades and its own diaphragm.

1. Insulate refrigerant lines

Suction lines are insulated to prevent condensation; extra insulation is provided to cover the field connected tubing sections. Check that all suction lines are adequately covered with insulation from case penetration to compressor; including suction service valves as some insulation may have been dislodged during shipping and installation.

2. Installation of water lines

$\frac{3}{4}$ " male National Pipe Thread (NPT) connections are provided at the top of the case for water line connections. Hoses are marked with inlet and outlet. Optional flow control valves may be supplied. Refer to Document 0525699 for propylene glycol guidelines. Refer to Table 3. Application information for flow rates.

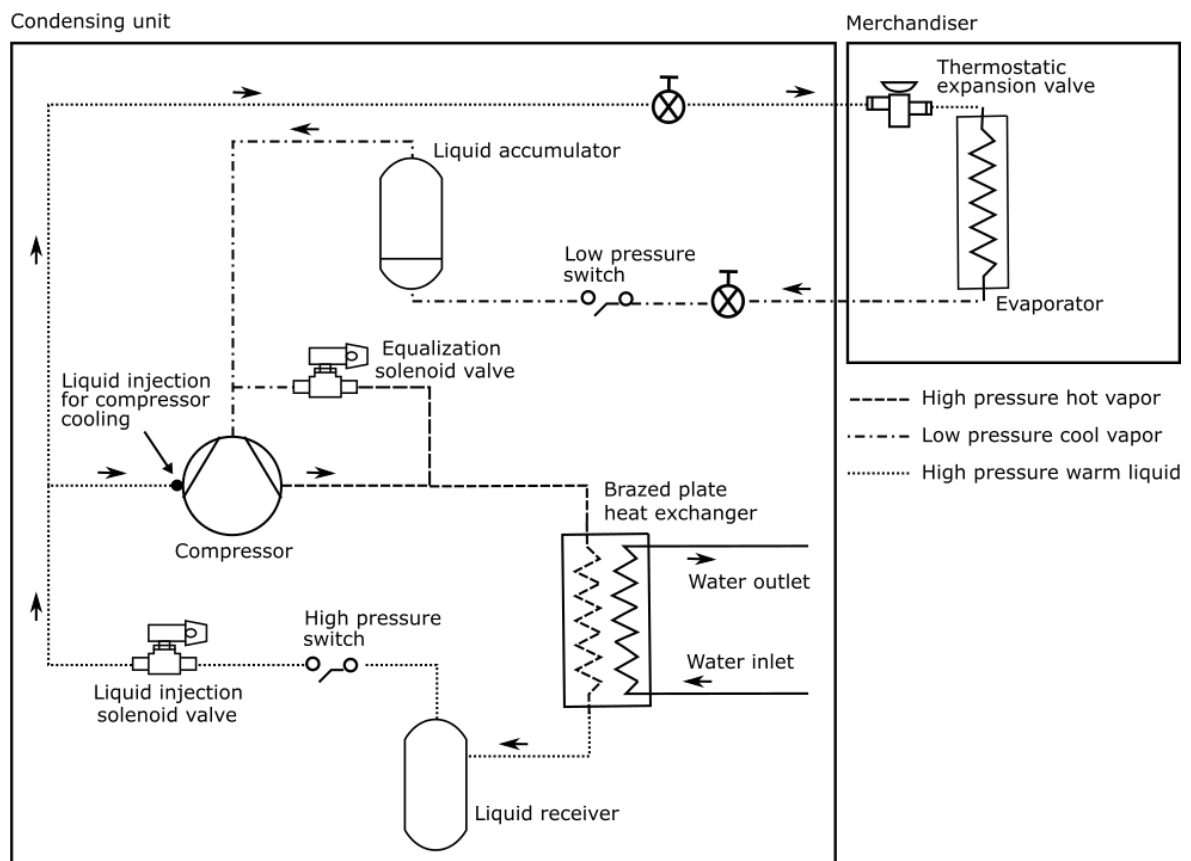


IV. REFRIGERATION PROCESS

Beginning with the compressor, refrigerant vapor is compressed and flows to the brazed plate heat exchanger, which rejects the heat that must be removed from refrigerant to cause it to condense. The receiver is a holding vessel for liquid refrigerant that compensates for fluctuations in liquid requirements due to charging load, defrost and weather. The solenoid valve is open when the compressor is on, supplying refrigerant through a capillary tube for cooling the compressor head through refrigerant expansion.

The thermostatic expansion valve (TEV), located in the merchandiser, meters liquid refrigerant through its orifice to the low pressure side of the system where it absorbs heat from the coil causing the liquid to evaporate. The accumulator catches liquid refrigerant in the suction line before it reaches the compressor.

At critical locations along the refrigerant path, service vales or ball valves allow isolation of components.



V. ELECTRICAL

A. Overview

Condensing Unit components are wired as completely as possible at the factory with all work completed in accordance with UL. All deviations required by governing electrical codes will be the responsibility of the installer.

B. Field Wiring

1. Main Switch

When installing the unit, the main current for energizing the condensing unit, must be connected to the terminals marked as 3 and 5, on the terminal block.

The current needed for the rest of the components is delivered from the terminal block.

2. Liquid Injection and Equalization Solenoid Valves

Both solenoid valves are connected to a relay which switches between both valves. The liquid injection valve is wired to be closed when the compressor is off, in order to avoid liquid flooding the compressor.

The equalization valve remains opened when the compressor is off. This allows the pressure from the high and low side to equalized during off time, to reduce start-up torque.

3. Compressor Electrical Components

Compressor wiring includes starting and running capacitors and a relay. Condensing unit electrical values are shown here. Refer to the technical literature provided for the case and/or controller kits for electrical values when applied to the specific case model and controller.

TABLE 5. ELECTRICAL DATA - INTERIOR UNIT

Condensing unit model	Compressor			
	Power Supply	RLA	LRA	MCA
HMDSLMT145	208-230V-1-60	4.7	29	5.9
HMDSLMT176	208-230V-1-60	5.7	34	7.1
HMDSLMT221	208-230V-1-60	7.4	40	9.3
HMDSLMT350	208-230V-1-60	9.5	60	11.9
HMDSLMT403	208-230V-1-60	10.2	68	12.8

4. High and Pressure Switches

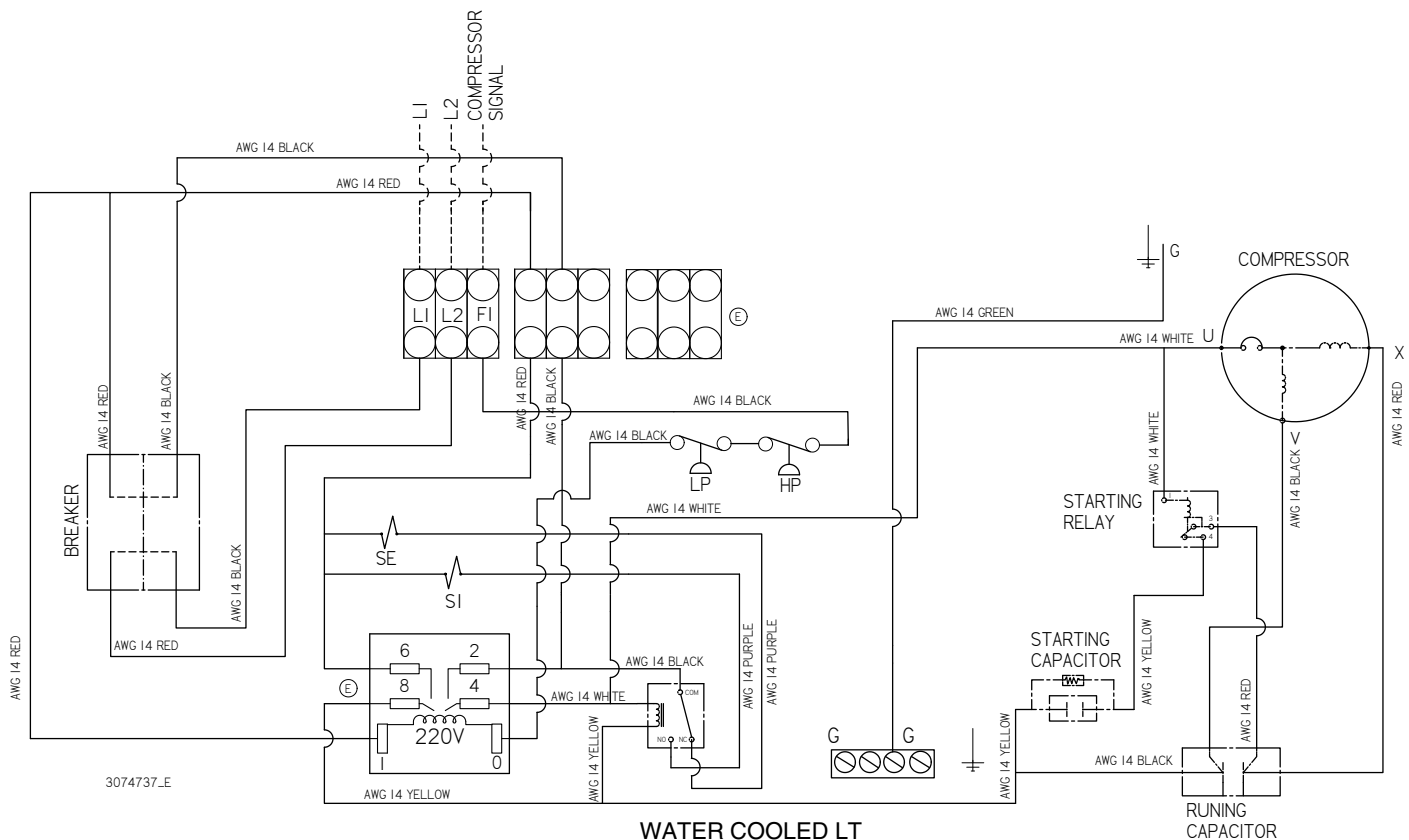
The condensing unit includes a high and low pressure switch for protection of the compressor. The high pressure switch shuts off the compressor when the high side pressure increases up to 405 ± 14 psi (28 ± 1 bar). The switch closes again when the pressure decreases to 305 ± 22 psi (21 ± 1.5 bar).

The low pressure switch opens when the low side pressure decreases to 7 ± 6 psi (0.5 ± 0.4 bar), and allows the compressor to start again when the pressure reaches 22 ± 4 psi (1.5 ± 0.5 bar).

5. Control Wiring

The water cooled HMDSLMT condensing units include a terminal block for connection of power and control wiring. Line 1 and 2 (208V 60 Hz single phase) are connected to terminals 3 and 5, and supply power to the compressor, and the liquid injection and equalization solenoid valves. The compressor relay input is connected to terminal F1 for compressor cycling to control case temperature. See Figure C for the condensing unit wiring diagram. Refer to the case wiring diagram and data sheet for specific wiring instructions.

C. Electrical Diagram





WARNING

Know whether a circuit is open at the power supply or not. Remove all power before opening control panels. Note: Some equipment may have more than one power supply. Always use a pressure regulator with a nitrogen tank. Do not exceed 2 pounds of pressure and vent lines when brazing. Do not exceed 350 pounds of pressure for leak testing high side. Do not exceed 150 pounds of pressure for leak testing low side. Always follow current EPA regulations and guidelines



WARNING

Disconnect all power before servicing. Multiple power sources may be present. Failure to do so may cause property damage, personal injury or death due to electric shock.

VI. START-UP

Verify that water flow valves are open and water is flowing before starting up case.

Verify that no air is trapped in water lines. Purge valves must be located at the highest location to allow for purging of trapped air.

Verify that water connections are tight and not leaking while water system is flowing.

Once the case is considered ready for start up, move the main switch on the electrical box to the “on” position. This switch is located on the front of the electrical box, on the top of the case. This toggle switch turns on the power to the condensing unit, and all case electrical components, including anti-sweat heaters, lights and fans. Remember to turn the switch of the condensing units also, this switch is located on the left side of the condensing unit.

Check the reading on the display; it should be displaying the case temperature. The display is located in the center of the front of the facade above the doors. The displayed temperature will show the merchandiser’s discharge air temperature.

Listen for any unusual sounds or events. For example: compressor trip on overload, or high head due to excessive ambient temperature, circuit breaker trip, etc.

After 12hrs running, check the water outlet temperature from each condensing unit. Water outlet temperature should be less than 10° above water inlet temperature.

VII. USAGE AND SAFETY RECOMMENDATIONS

- Check connections, pipes, valves and hoses for refrigerant leaks. For this, use an electronic leak detector.
- Once the unit is switched on, it is important to check that the refrigerant charge is adequate by checking the superheat and subcooling. It may be necessary to check the discharge and suction pressures. Also check the discharge air temperature of the refrigerated equipment to ensure that the control setpoint is reached according to the desired application.
- The condensing unit is equipped with a brazed plate heat exchanger, its optimal performance is based on the installation conditions and maintenance.
- The water used can have different qualities. In urban grid systems, normally the water used has not been treated, they are demineralized, partially demineralized or softened. Water quality is an important factor, since the concentrations of certain substances can change with the quality of the water. It is important to understand all the qualities of the water in the system, in circulation up to the water of added replenishment.
- It is recommended to carry out periodic tests in the water, it helps to keep the state of the water under control and reduces the risk of corrosion and the formation of particles.
- The exchangers used in this unit use 316 stainless steel plates, which provides a good tolerance to corrosion, however, at certain chloride levels the corrosion process can be initiated, which most commonly occurs as pitting which are difficult to detect if not until the leak appears, hence the importance of periodic analysis of the water in the system.
- The exchangers used in the unit use copper as a welding material because they present a good resistance to corrosion in most water qualities, however, under certain circumstances the copper could be diluted with water in the presence of certain chemicals. As oxygen that its presence should be less than 0.02mg / l, we can also see this effect in the presence of ammonia and sulfur. Ammonia is commonly used to regulate the PH, other chemicals should be considered for this purpose such as Sodium Hydroxide.
- Due to the degree of turbulence, normally very high, in the exchangers there is a self-cleaning effect on the channels. However, in some applications the tendency to clog can be very high, for example, when using extremely hard water at high temperatures. In those cases, it is always possible to clean the exchanger by circulating a cleaning liquid (CIP - Cleaning In Place).

Use a tank with a weak acid at 5% phosphoric acid or, if the exchanger is cleaned often, 5% oxalic acid. Pump the cleaning fluid through the exchanger.

- When cleaning, pump the cleaning solution through the exchanger from the lower connection to vent the air. For optimal cleaning, the flow rate should be at least 1.5 times the normal flow rate, preferably in reverse circulation mode. If possible, change the flow direction every 30 minutes. After use, do not forget to carefully rinse the heat exchanger with clean water. A 1-2% solution of sodium hydroxide (NaOH) or sodium bicarbonate (NaHCO₃) before the last rinse will ensure that all the acid has been neutralized. Clean at regular intervals.



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Please include the model and
serial number of the product.**