HUSSMANN®

HE H-SERIES CONDENSING UNIT WITH DIGITAL COMPRESSORS

IMPORTANT

Keep in store for future reference!

PLEASE NOTE:

New store installations with refrigerated systems for CA beginning 1/1/2022 must not exceed 50 lbs of charge and use a refrigerant below 2,200 GWP. Systems greater than 50 lbs charge require refrigerants below 150 GWP. Existing store compliance for CA requires a weighted average GWP of refrigerants used to be less than 1,400 GWP for the fleet by 2030 or a 55% reduction of overall GHGp (charge not relevant).

Installation & Operation Manual

P/N 3178531_A
July 2023

MANUAL - IO H-SERIES CONDENSING UNITS
WITH DIGITAL COMPRESSORS

BEFORE YOU BEGIN

Read the safety information completely and carefully.

The precautions and use of the procedures described herein are intended to use the product correctly and safely. Comply with the precautions below to protect yourself and others from injuries. Relative to its potential danger, the relevant information is divided into four parts as defined by ANSI Z535.5 below.

ANSI Z535.5 Definitions

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE is used to address practices not related to personal injury.

SAFETY INSTRUCTIONS (or equivalent) signs indicate specific safety-related instructions or procedures.

⚠WARNING

» **Contractors shall strictly adhere to specifications provided by the Engineer of Record (EOR), as well as US Environmental Protection Agency regulations, OSHA regulations, and all other federal, state and local codes. This work should only be done by qualified, licensed contractors.**

» **There are numerous hazards, not limited to, but including: burns due to high temperatures, high pressures, toxic substances, electrical arcs and shocks, very heavy equipment with specific lift points and structural constraints, food and product damage or contamination, public safety, noise, and possible environmental damage.**

» **Never leave operating compressors unattended during the manual soft-start process. Always power rocker switches off when unattended.**

⚠WARNING

» **PERSONAL PROTECTION EQUIPMENT (PPE)**

» **Only qualified personnel should install and service this equipment. Personal Protection Equipment (PPE) is required whenever servicing this equipment. Wear safety glasses, gloves, protective boots or shoes, long pants, and a long-sleeve shirt as required when working with this equipment. Observe all precautions on tags, stickers, labels and literature attached to this equipment.**

⚠WARNING

» **Proper Field Wiring and Grounding Required!**

» **Failure to follow code could result in death or serious injury. All field wiring MUST be performed by qualified personnel. Improperly installed and grounded field wiring poses FIRE and ELECTROCUTION hazards. To avoid these hazards, you MUST follow requirements for field wiring installation and grounding as described in NEC and your local/state electrical codes.**

ENVIRONMENTAL CONCERNS

Hussmann recommends responsible handling of refrigerants that contain Chlorine, Fluorine and Carbon (CFCs) and those that contain Hydrogen, Chlorine, Fluorine, and Carbon (HCFCs). Only certified technicians may handle these refrigerants. All technicians must be aware and follow the requirements set forth by the Federal Clean Air Act (Section 608) for any service procedure being performed on this equipment that involves refrigerant. Additionally, some states have other requirements that must be adhered to for responsible management of refrigerants.

⚠WARNING

— LOCK OUT / TAG OUT —

» **To avoid serious injury or death from electrical shock, always disconnect the electrical power at the main disconnect when servicing or replacing any electrical component. This includes, but is not limited to, such items as controllers, electrical panels, condensers, lights, fans, and heaters.**

⚠CAUTION

» **This manual was written in accordance with originally prescribed equipment that is subject to change. Hussmann reserves the right to change all or part of the equipment for future stores such as, but not limited to, controllers, valves and electrical specifications. It is the installers responsibility to reference the refrigeration drawings supplied for each installation, as directed by the Engineer of Record.**

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.

⚠WARNING

» **This equipment is prohibited from use in California with any refrigerants on the "List of Prohibited Substances" for that specific end-use, per California Code of Regulations, Title 17, Section 95374.**

» **Use in other locations is limited to refrigerants permitted by country, state, or local laws and is the responsibility of the installer/end-user to ensure only permitted refrigerants are used.**

» **This disclosure statement has been reviewed and approved by Hussmann and Hussmann attests, under penalty of perjury, that these statements are true and accurate.**

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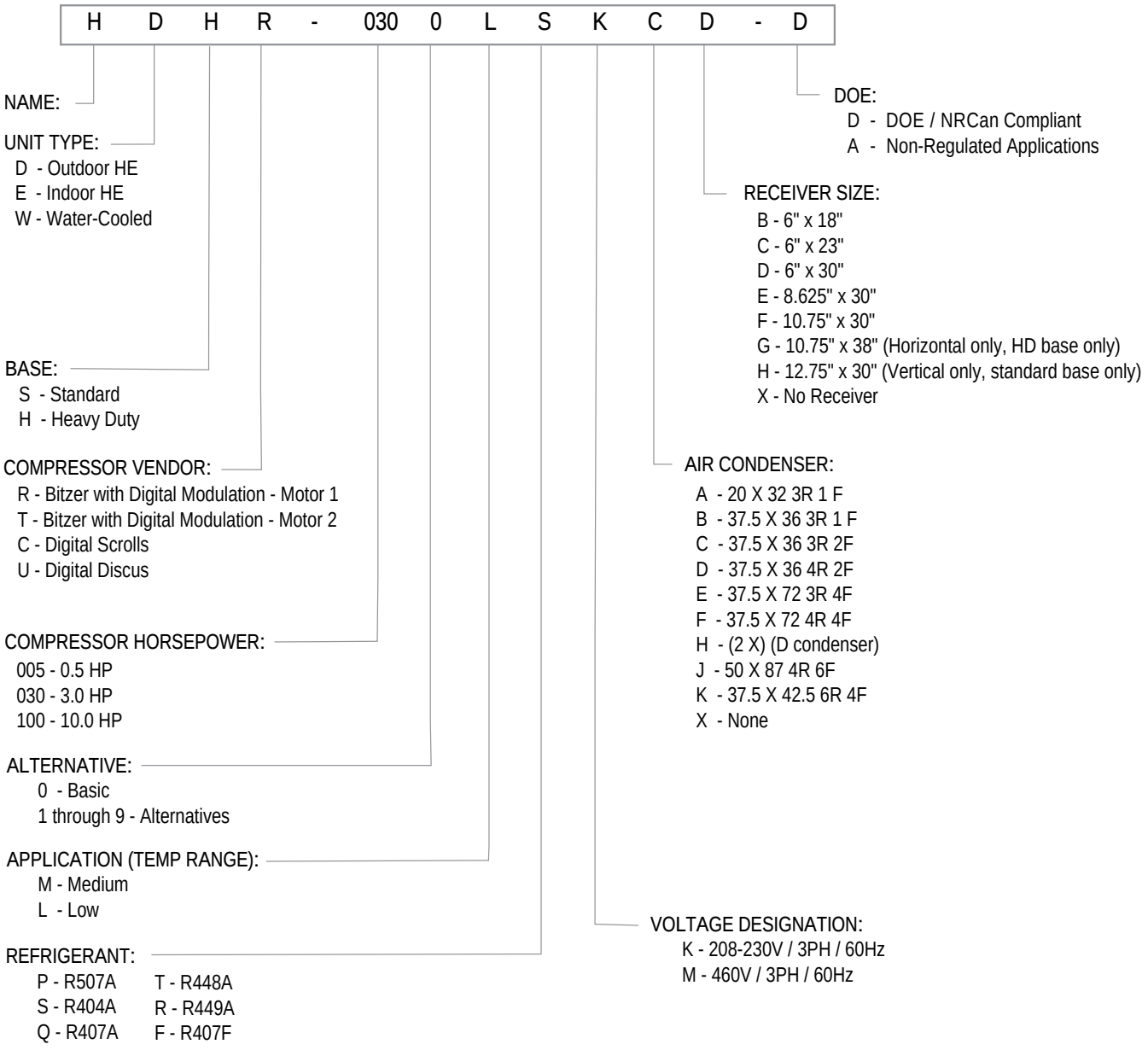
MODEL NUMBERING SYSTEM

HE H-Series Digital Compressor Nomenclature



NOTE:
Units are ordered refrigerant specific (i.e. "S" for R-404A) and will include other refrigerants that can also be used on the data plate.

INSTALLATION INSTRUCTIONS

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.

APPARENT LOSS OR DAMAGE

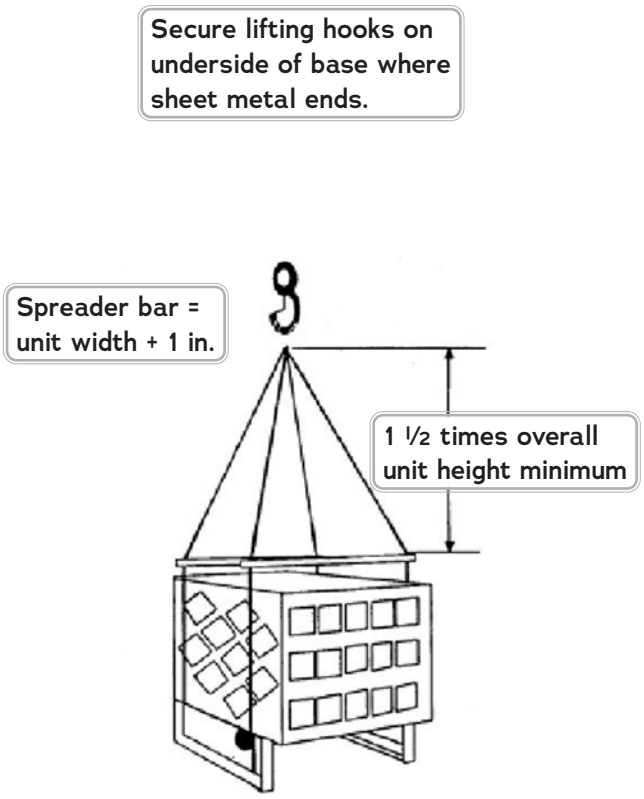
If there is an obvious loss or damage, it must be noted on the freight bill or express receipt and signed by the carrier's agent, otherwise, carrier may refuse claim. The carrier will supply the necessary claim forms.

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.

RIGGING & LIFTING

Under no circumstances should the manifolds, piping return blends, or control panel be used for lifting or moving the unit. Use lifting eyes provided on two-tier units. On single-tier units, secure lifting hooks to the underside of the base or use the holes provided in the base. The installer is responsible for seeing that equipment used to move the unit is operated within its limits.



Rigging and Lifting

MACHINE ROOM REQUIREMENTS

The equipment room floor must solidly support the compressor unit as a live load. Ground-level installation seldom presents problems, but a mezzanine installation must be carefully engineered. Equipment must be located in the machine room to provide enough working space for service personnel and to meet electrical codes.

When a remote condenser, satellite, or water-cooled condensing unit is installed, the ventilation should be 100 CFM per compressor unit horsepower. The air inlet should be sized for a maximum of 600 FPM velocity (0.5 ft^2 of air intake per compressor unit horsepower).

The indoor condensing unit ventilation should be 750 to 1,000 CFM with 2 to 2.5 ft^2 of air intake per compressor unit horsepower. The ventilation fans should cycle by thermostatic control. All machine room ventilation equipment must be field supplied. Check local codes for variances. Proper ventilation provides airflow across the compressors. Ductwork may be necessary.

Provide a floor drain for disposal of condensate that may form on the compressor unit or header defrost assembly.

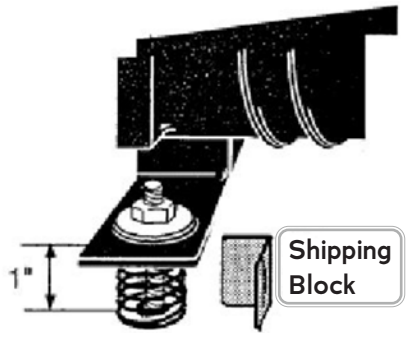
Consult the NEC National Fire Handbook, particularly "Installation of Switch Boards" and "Working Space Requirements." Refer to local codes for each installation. Reference individual drawings shown in the Appendix.

SHIPPING BLOCK REMOVAL

Hard mounting is standard on all units. All piping is carefully designed to absorb the vibration generated by the compressor and fan motors.

When the spring mounting kit (optional) is installed, the unit is shipped with blocks under each compressor foot to prevent transit damage.

Loosen the mounting spring nuts at least one full turn and remove the blocks. Adjust the torque on the mounting spring nuts so the compressor feet are one inch above the unit's base.



Shipping Block Removal

UNIT PLACEMENT

When setting the units, plan in relation to the rest of the equipment to be installed and existing structures. Some minimum and maximum distances are listed.

NOTE:
Piping equivalent is not the same as linear distance.

MINIMUM ALLOWABLE CLEARANCES

- Between **1** outdoor condensing unit and any vertical structure (except open chain link fence) the minimum allowable distance is **4 feet**.
- Between **1** outdoor condensing unit exhaust and another condensing unit intake the minimum allowable distance is **15 feet**.
- Between the sides of **two** outdoor condensing units, the minimum allowable distance is **5 feet**.
- On indoor, satellite, remote, and water-cooled condensing units, the minimum allowable distance between the control panel and the wall is **42 inches**.
- On indoor, satellite, remote, and water-cooled condensing units, the minimum distance between the control panel and another live panel is **4 feet.**
- On indoor condensing units, the minimum distance between the condenser air intake and a louvered wall is **30 inches.**

RECEIVER CAPACITY

The receiver capacity is listed in the table below.

PRESSURE RELIEFS

It is standard that a fusible plug is installed on all receivers. The connection size for piping from the fusible plug to outside is 3/8" NPT.

It is also available as an option with a relief valve, which replaces the fusible plug, (same connection size) for piping (3/8" NPT).

WATER-COOLED CONDENSER

Flush the water lines before connecting them to the water-cooled condenser.

Consult with your Hussmann representative for specific information on pressure drop, recommended inlet water temperature, and water flow through the condenser.

	HE H-Series Receiver Capacity - 90%			
HE H-series Receivers	R404A/R507A (lbs)	R448A/R449A (lbs)	R407A (lbs)	R407F (lbs)
6x12	11.1	11.7	12.2	11.9
6x18	16.7	17.6	18.4	18.0
6x23	21.4	22.5	23.6	23.0
6x30	27.9	29.3	30.7	30.0
8-5/8x30	53.9	56.6	59.4	57.9
10-3/4x30	82.3	86.5	90.7	88.5
10-3/4x38	106.2	111.6	117.0	114.2
12-3/4x30	100.1	105.2	110.3	107.6
5x12	7.9	8.3	8.7	8.5
6x15	14.6	15.3	16.1	15.7
6x12	11.4	12.0	12.6	12.3
6x36	36.1	37.9	39.8	38.8

SYSTEM COMPONENT OVERVIEW

REFRIGERATION PROCESS

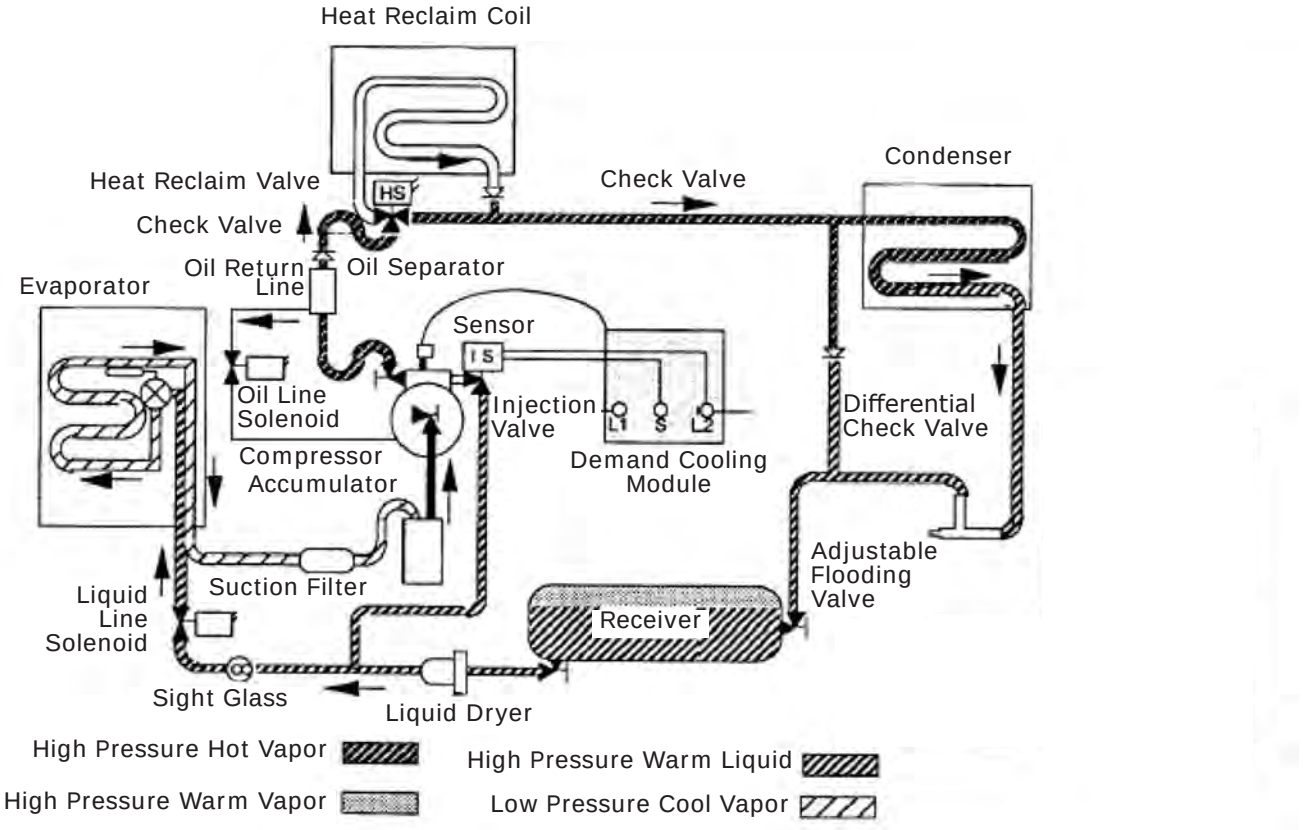
This diagram below details the refrigeration process by tracking the refrigerant flow through the system components. Heat Reclaim, Demand Cooling, Oil separation and Return is explained.

Typically, refrigeration falls into low or medium temperature ranges. An average low temperature condensing unit maintains a suction temperature of -20°F with a low-temp satellite operating at -33°F. A common medium temperature condensing unit operates at +25°F with a low-temperature satellite operating at +7°F.

In the diagram, refrigerant flow direction is generally clockwise and indicated by directional arrows.

Electric solenoid valves carry the same initial abbreviations as in the electric schematics.

Refrigeration lines not actually in the cycle being discussed are shown closed or removed. Pressure in oil lines will also retain a fixed pattern.



Refrigeration Cycle

DIGITAL COMPRESSOR CONDENSING UNIT

High Efficiency (HE) H-Series units are available with Capacity Modulation (CM) utilizing digital compressors. These units are available in 208V/3/60 or 460V/3/60 main power connections with the following digital compressor solutions available:

- Emerson Scroll (MT Only)- ZFD21KCE to ZBD76K5E (3-15HP)
- Bitzer Recip W/CMRC Module (4-16HP medium and low temp)
- Emerson Discus W/IDCM Module (7.5-15HP medium temp; 6-22HP low temp)

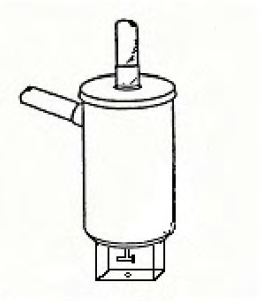
HE H-Series units with CM come standard with variable EC fan motors for air-cooled condensers. These units will require an on- board controller with following options:

1. Hussmann Corelink™
2. Dixell XCM-25D (scroll compressors only)
3. KE2 Compressor & Condenser Controller

Details of these controllers along with wiring schematics are included in the general sequence of operations later in this manual.

REFRIGERATION CYCLE

Beginning with the compressor, refrigerant vapor is compressed and flows to the oil separator, which separates the oil from the discharge gas by centrifugal force and screen baffles. The oil is stored in the bottom of the oil separator and returned to the compressors through the oil return line.



Oil Separator

When an oil separator is installed the following components are required:

- Check valve on the discharge line (after the oil separator) to prevent refrigerant migration during low ambient temperatures from the condenser to the oil separator, and then to the compressor.

- Oil line solenoid on the oil return line, to prevent oil returning from the compressor when not running. The excessive oil in the carter when the compressor starts could cause damage to the compressor such as a broken valve plate or piston, etc.

CONDENSER

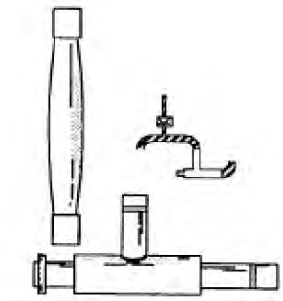
The condenser rejects heat that must be removed from refrigerant to condense.

FLOODING VALVE

The flooding valve maintains head pressure in low ambient conditions by restricting liquid refrigerant flow from the condenser. This causes liquid refrigerant to remain in the condenser, thus reducing available surface heat transfer and causing the discharge pressure to increase.

Fan cycling or flooding valves are required in low ambient conditions. These valves may be fixed or adjustable. The adjustable flooding valve works in parallel with a 20-pound differential check valve.

Outdoor HE units are equipped with adjustable ORI flooding valves for winter control and ORD differential valves for receiver pressure regulation. Outdoor multi-fan HE (standard) units are also equipped with a temperature control to cycle off half the fans in low-ambient conditions (standard).



Adjustable Flooding Valve and Differential Check Valve

RECEIVER

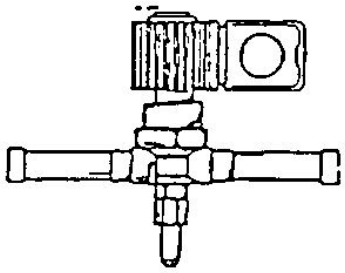
The receiver is a holding vessel for liquid refrigerant that compensates for fluctuations in liquid requirements due to changing load, defrost, and weather.

LIQUID LINE DRIER

A liquid line drier removes moisture and contaminants from the refrigerant. The sight glass allows service personnel to view refrigerant flow inside the liquid line.

LIQUID LINE SOLENOID VALVE

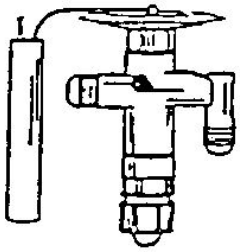
The liquid line solenoid valve closes off refrigerant supply to the evaporator.



Liquid Line Solenoid Valve

THERMOSTATIC EXPANSION VALVE (TEV)

is located in the merchandiser. It 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.



Thermostatic Expansion Valve

ACCUMULATOR

The accumulator catches liquid refrigerant in the suction line and provides a means for it to boil off before it reaches the compressor.

SUCTION FILTER

A suction filter is placed upstream from the compressor to remove system contaminants from the refrigerant vapor.

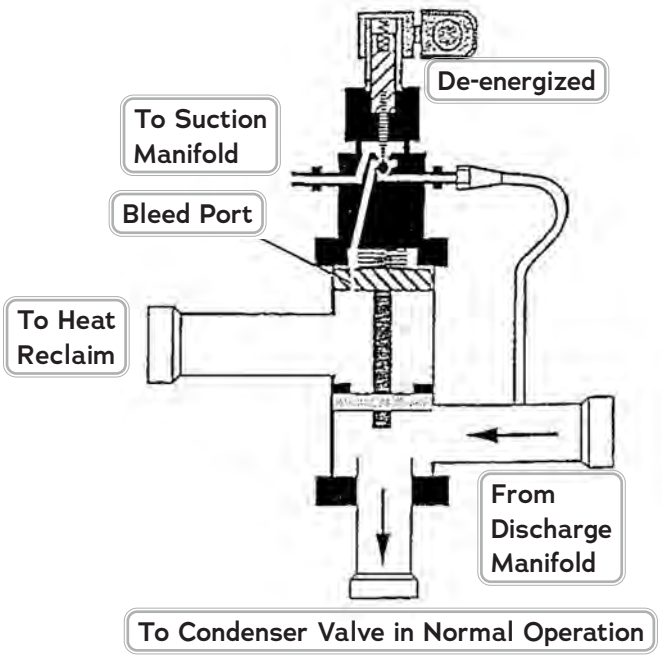
At critical locations along the refrigerant path, service valves or ball valves allow isolation of components.

HEAT RECLAIM VALVE

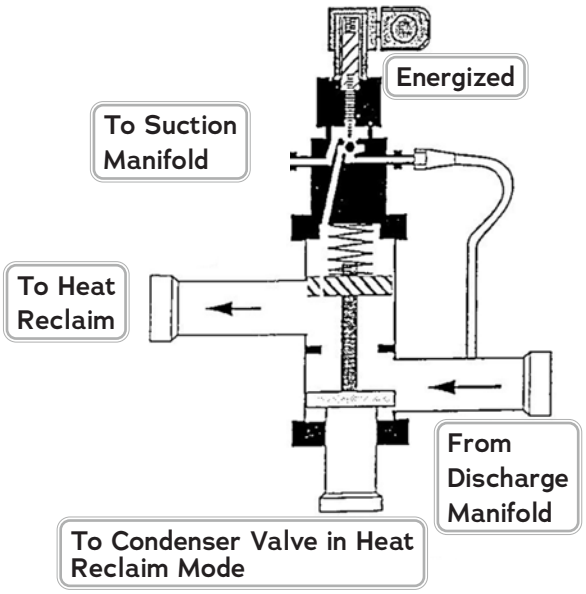
A 3-way heat reclaim valve directs the refrigerant to either the condenser or a heat reclaim coil. When the solenoid is de-energized, the valve directs the refrigerant to the condenser.

When the solenoid is de-energized, the high-pressure inlet is stopped and the passage between the suction and the valve chamber is open. When the solenoid is energized, the suction outlet is stopped and the passage between high pressure and the valve chamber is open.

"B" version of the valve has a bleed port through the drive piston to the suction manifold. The bleed port provides a vent for fluids trapped in the heat reclaim circuits during normal operation.



Heat Reclaim Valve Normal Operation



Heat Reclaim Valve / Heat Reclaim Mode

DEMAND COOLING

The demand cooling system is designed to inject saturated refrigerant into the suction cavity when the compressor internal head temperature exceeds 292°F. Injection continues until the temperature is reduced to 282°F. If the temperature remains above 310°F for one minute, the control shuts down the compressor. After correcting the cause of shutdown, a manual reset is required.

SYSTEM PARTS

- **Temperature Sensor**
- **Control Module**
- **Injection Valve**

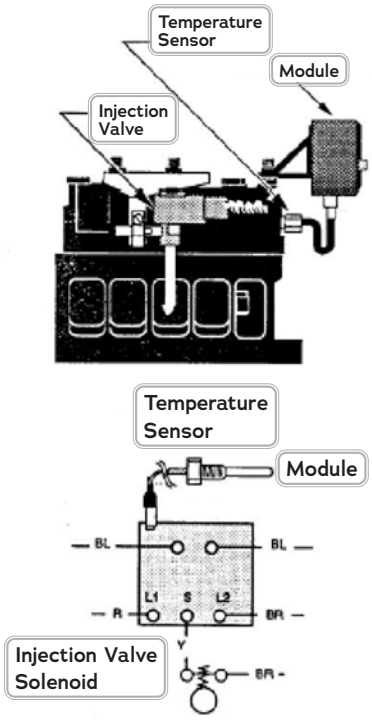
The temperature sensor uses a Negative Temperature Coefficient (NTC) thermistor to provide signals to the control module. The NTC resistance drops on temperature rise.

Temperature (°F)	Approximate Ohm Reading
77	90,000
282	2,400
292	2,100
310	1,700

The control module responds to the temperature sensor input by energizing the injection valve solenoid when 292°F is exceeded. Too high or too low a resistance from the thermistor circuit will cause the module to shut down the compressor after one minute.

The injection valve meters saturated refrigerant into the suction cavity of the compressor. The valve orifice is carefully sized to meet the requirements of a specific compressor. Valve sizes correspond to the four compressor bodies- 2D, 3D, and 4D.

Probe test readings between 100,000 Ohms and 1,600 Ohms usually indicate an operating probe.



Demand Cooling Components

COMPONENT TESTING

1. Remove power to the system. Unplug the temperature sensor from the module. The sensor should "ohm out" between 1,600 and 100,000 Ohms.

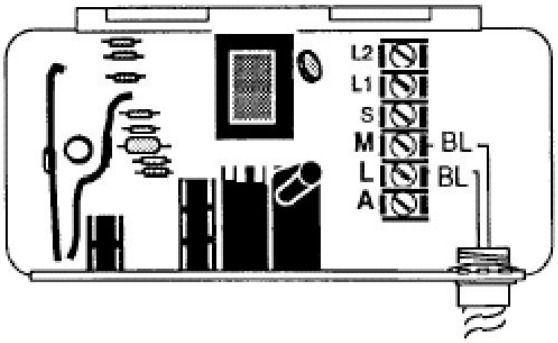
2. Leave the sensor unplugged and restart the system. There should be no voltage between terminals "S" and "L2" on the module. The inlet and outlet sides of the injection valve should feel the same temperature. After one minute, the alarm relay should trip. Remove power to the system. Press the manual reset on the module.

3. Using a small piece of wire, jump the Sensor circuit at the female plug in the module. Restart the system. There should be voltage between terminals "S" and "L2" on the module. The outlet side of the injection valve should feel colder than the inlet side. After one minute, the alarm relay should trip.

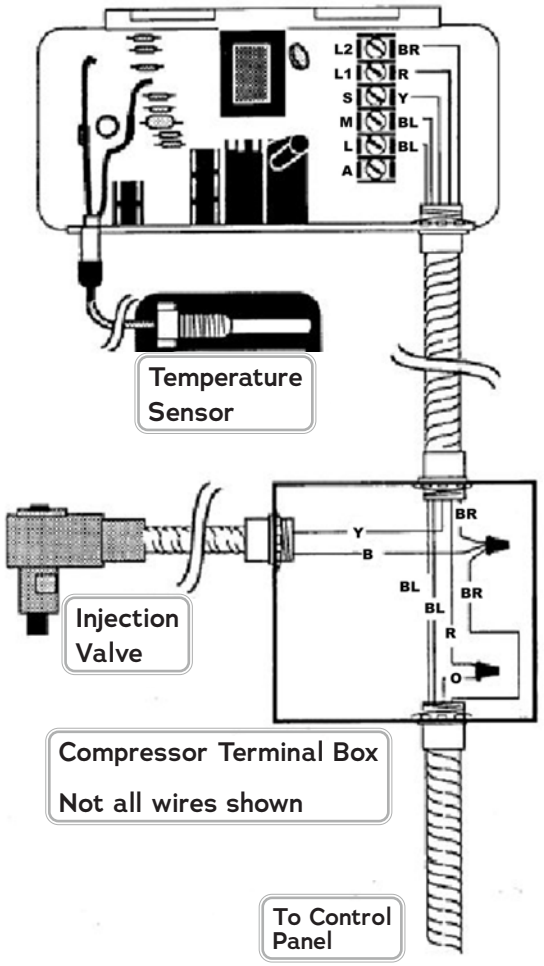
4. Remove power to the system. Press the manual reset on the module.

5. Remove the jumper wire and plug in the temperature sensor.

6. Restart the system.



Demand Cooling Alarm Connections



Demand Cooling Wiring

ALARM CIRCUIT

The alarm circuit has three terminals in the control module:

-
- **"L"** – Common
- **"M"** – Normally Closed
- **"A"** – Normally Open
- **"L" and "M"** are wired into the compressor control circuit, so an alarm condition removes the compressor from the line and power to the module. A manual reset is required to call attention the alarm condition.

ALARM RELAY

The alarm relay is activated after a one minute delay under the following three conditions:

- **Compressor discharge temperature exceeds 310°F**
- **A shorted circuit or very low thermistor resistance**
- **An open circuit or very high thermistor resistance**

OPERATIONAL NOTES

Demand cooling does NOT replace head cooling fans, which may be required on low temperature applications.

For indoor and outdoor condensing units, the condenser fans replace the head cooling fan.

When fan cycling is applied, at least one condenser fan MUST always be ON with the compressor, so head cooling fan will be not necessary.

Temperature sensor cables must not touch any hot surfaces or the cable will be damaged.

COMPONENT PIPING

OVERVIEW

This section deals with the information necessary for installing the refrigeration lines for a condensing unit. The components are piped as completely as practical at the factory.

Use only clean, dehydrated, sealed refrigeration grade copper tubing. Use dry nitrogen in the tubing during brazing to prevent the formation of copper oxide. All joints should be made with silver alloy brazing material and use 45% silver solder for dissimilar metals.

⚠WARNING

» **Always use a Pressure Regulator on the nitrogen tanks. Nitrogen is odorless and can displace oxygen from ambient air within an enclosed space leading to a dangerous build-up of the inert gas. Depending on the concentration of nitrogen a person is exposed to, signs and symptoms from sudden unconsciousness to death due to asphyxiation could occur.**

PIPING CONNECTIONS

The unit has the suction line sized to minimize friction losses based on maximum capacity under design conditions and also operate at lower capacities. When modulating system capacity, special considerations should be given for sizing suction piping and suction risers to ensure proper compressor oil return under all operating conditions.

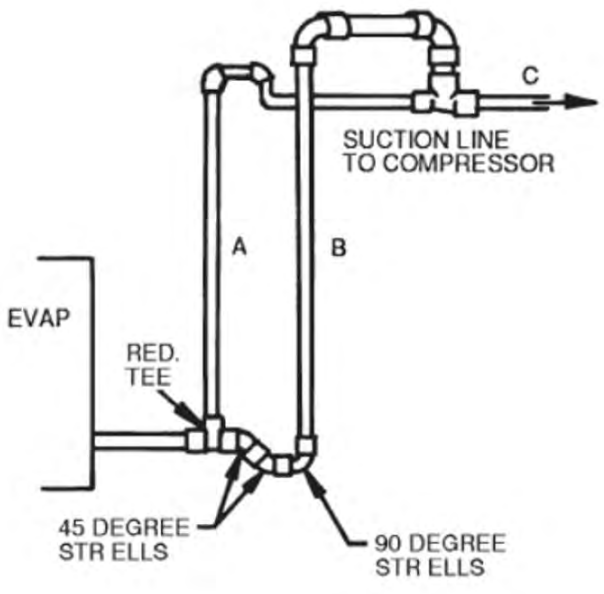
- When piping a suction riser, the maximum vertical distance between p-traps is 20 feet.
- When piping from a remote condenser unit to a condenser, the maximum allowable equivalent is 100 feet.

HE H-Series units with capacity modulation come standard with:

- An oil separator and oil regulator
- Non-adjustable low-pressure safety switch

LEGEND

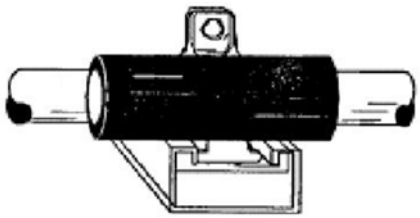
A — Pipe A, Suction Riser, without Trap
B — Pipe B, Suction Riser with Trap
C — Suction Line to Condensing Unit

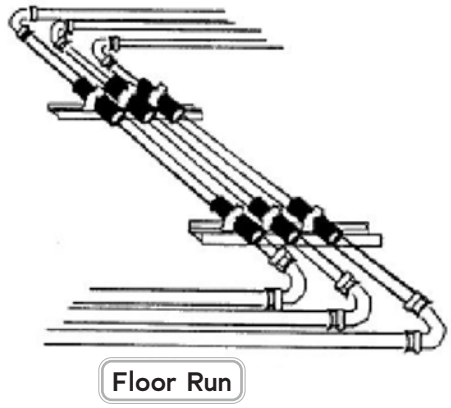


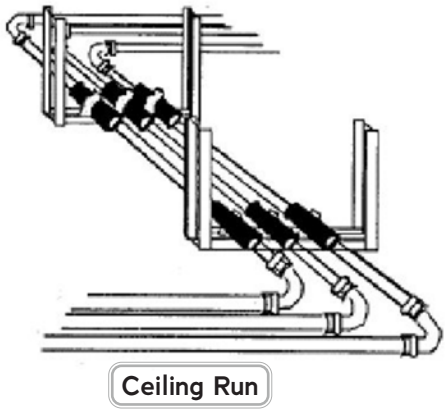
REFRIGERANT LINE RUNS

Liquid and suction lines must be free to expand and contract independently of each other. Do not clamp or solder together. Run supports must allow tubing to expand and contract freely. Do not exceed 100 feet without a change of direction and / or offset. Plan proper pitching, expansion allowance and P-traps at the base of all suction risers. Use long radius elbows to reduce line resistance and breakage.

Avoid the use of 45-degree elbows altogether. Install service valves at several locations to ease maintenance and reduce service costs. These valves must be UL approved for 410 psig minimum working pressure.



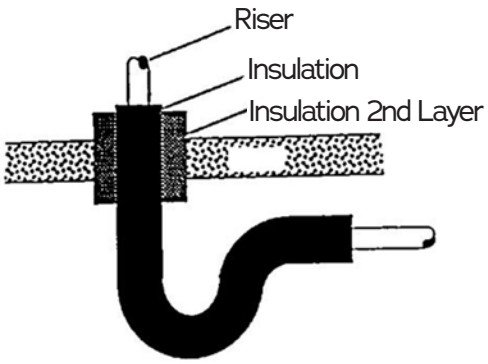




Supporting Refrigeration Lines

THROUGH WALLS OR FLOORS

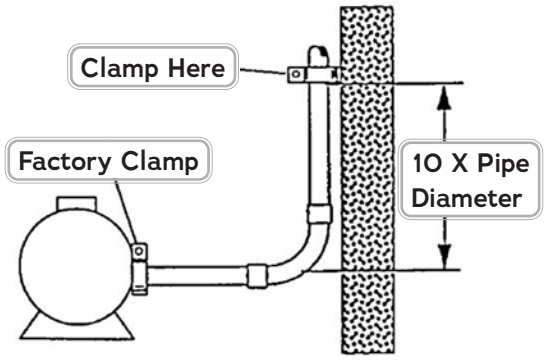
Refrigeration lines run through walls or floors must be properly insulated. Avoid running lines through refrigeration cases. When this is done, the lines must be adequately insulated.



Insulating a Riser

FROM MACHINE TO SOLID OBJECT

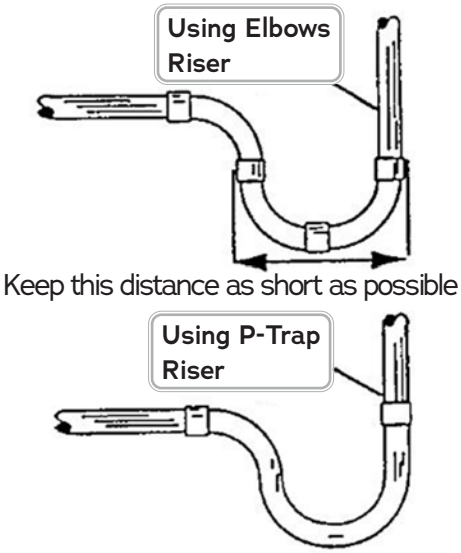
When mounting lines from machinery to a solid object allow line freedom for vibration to prevent metal fatigue.



Vibration Allowance

P-TRAP CONSTRUCTION

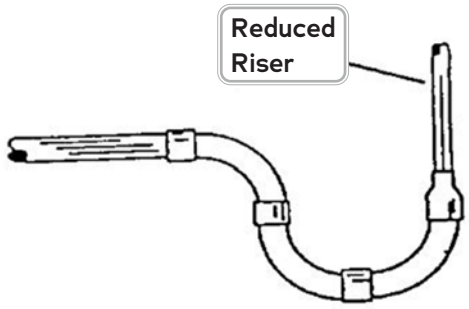
A P-Trap must be installed at the bottom of all suction risers to return oil to the compressors.



P-Trap Construction

REDUCED RISER

When a reduced riser is necessary, place the reduction coupling downstream of the P-Trap.



Reduced Riser

FACTORY SUPPLIED STUBS

Stub sizes provided do not automatically correspond to the line sizes necessary. It is the installer's responsibility to supply reduction couplings.

PROTECTING VALVES AND CLAMPS

When brazing near factory installed clamps or valves ensure to protect with a wet rag to avoid overheating.

CONNECTING A REMOTE CONDENSER

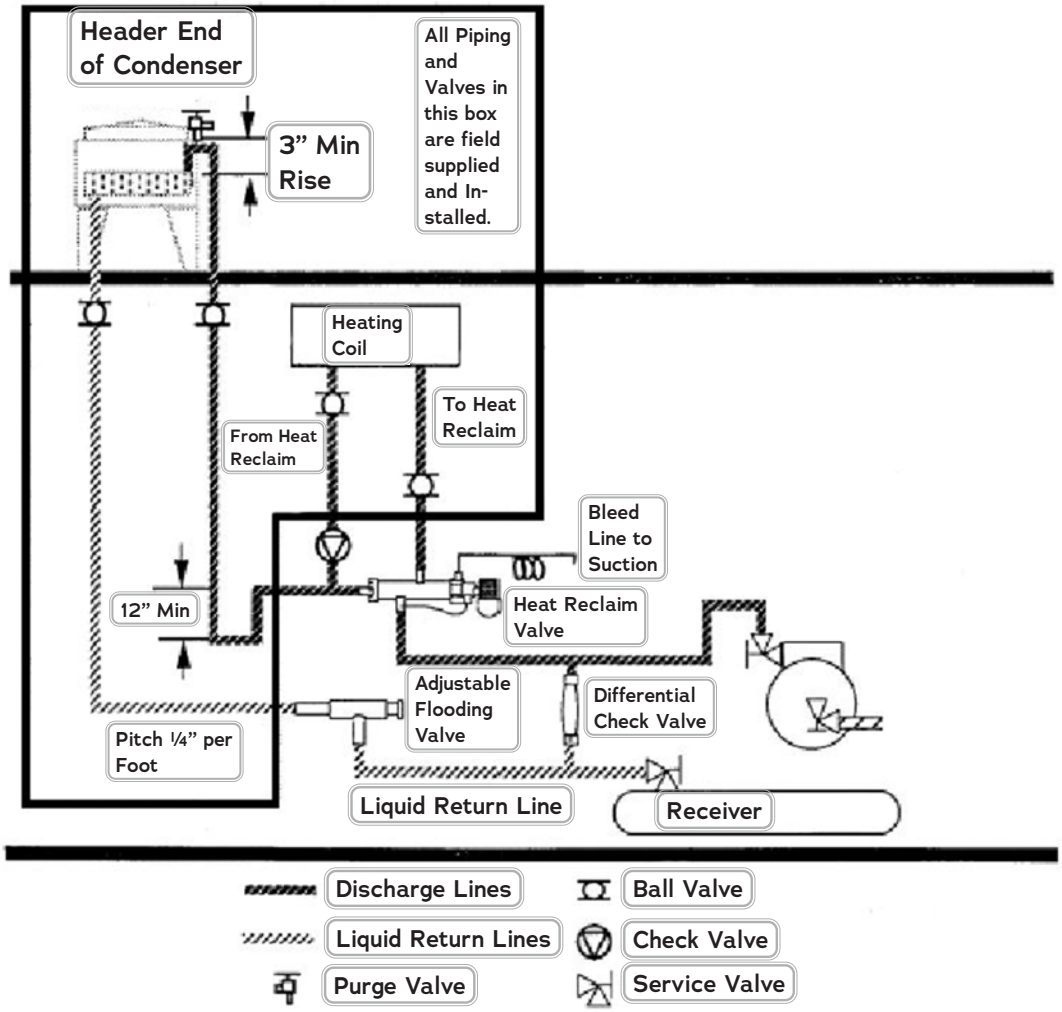
- Discharge line will be routed directly to the condenser inlet stub with a purge valve at the highest point.
- Liquid return line will be pitched downstream and provide trap less drainage to the receiver.

PURGE VALVE LOCATION

The purge valve will be installed at the highest point of an inverted P-Trap, with at least a 6" rise. (Use with approved recovery vessel.)

⚠WARNING

» **Always vent the receiver safety relief device properly.**



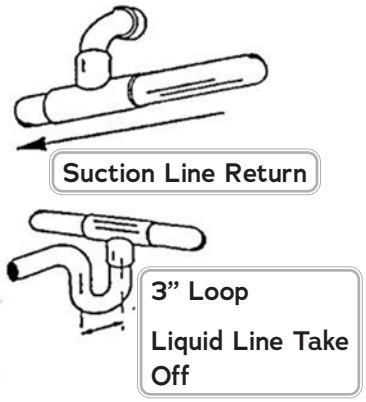
Remote Condensing Unit Piping

NOTE:
The heat reclaim valve could be factory or field installed based on customer specifications.

MERCHANDISER PIPING

Suction Line

- Pitch in direction of flow.
- May be reduced by one size at one third of run load and again after the second third. Do not reduce below evaporator connection size.
- Suction returns from evaporators enter at the top of the branch line.



Line Piping Inside Merchandisers

LIQUID LINE – OFF TIME AND ELECTRIC DEFROST

- May be reduced by one size after one half of the case load run. Do not reduce below evaporator connection size.
- Take-offs to evaporators exit the bottom of the liquid line. Provide an expansion loop for each evaporator take-off (minimum 3-inch diameter).

FIELD CONNECTIONS FOR HEAT RECLAIM

Each circuit of the heat reclaim coil is tagged to correspond with a specific condensing unit and must be connected only to that unit.

The supply and return lines are to be installed as shown in the diagram on Page 19.

Notice that heat reclaim could be factory or field installed, and depends on customer order.

SPECIAL PIPING FOR OPEN ROOMS

An open preparation room allows heat infiltration from the rest of the store at a rate which may jeopardize total refrigeration performance. To protect the rest of the refrigeration system, open preparation evaporators must be piped with a Crankcase Pressure Regulating Valve (CPR).

The CPR is field installed in the suction line(s) from the evaporator(s). The installer is responsible for proper adjustment of the valve. (See: Control Valve Section for adjustment procedures.)

RUN LENGTHS AND EQUIVALENTS

When figuring run lengths, angle valves and 90 degrees elbows are figured as additional straight pipe. The chart below gives equivalent lengths for these components.

Tubing Size	Angle Valve	Long Radius Elbow 90°
1/2	6	0.9
5/8	7	1.0
7/8	9	1.4
1 1/8	12	1.7
1 3/8	15	2.3
1 5/8	18	2.6
2 1/8	24	3.3
2 5/8	29	4.1
3 1/8	35	5.0
3 5/8	41	5.9
4 1/8	47	6.7

Equivalent Feet for Angle Valve and Elbow 90°
(ASHARE 1994 Refrigeration Handbook)

INSULATION

Additional insulation for the balance of the liquid and suction lines is recommended whenever condensation drippage is objectionable or the lines are exposed to ambient conditions.

REFRIGERANT LINE SIZING

General Information

This document supersedes all previously published line sizing data – including planning data, installation instructions, or other stand-alone documents.

Refer to ASHARE standards for line sizing. The installer is responsible for sizing the piping for each application.

REFRIGERATION LINE STUB OUT

Stub sizes do not match line sizes. Reduction fittings are field supplied and installed. These are general guidelines. The installer is responsible to account for any factors which may affect the system.

CONDENSER LINE SIZING

A Condenser line sizing chart is established for an equivalent pipe run of 100 feet. For longer runs use the following formula:

Table Capacity * √100 / Longer Length = Longer Line Capacity

NOTE:
This formula applies only to remote condenser lines, and only to longer runs of these lines. A 25 foot run does not necessarily have double the capacity of a 100 foot run.

ELECTRICAL

OVERVIEW

The scope of this section is limited to main field wiring connections and to the control panel.

The digital compressor condensing unit is available wired for 208V-230V/3/60 or 460V/3/60 compressors (note that some compressors may be available in all voltages). In either case, the control circuit is 208V-230V.

The digital compressor 460V condensing unit requires two single point connections, one for the compressor (460V) and one for the control and defrost circuits (208V-230V).

When a single point connection is specified for 460V condensing units, the factory will install a transformer to supply 208V-230V for just the control circuit.

Refer to the serial plate located on the control panel to determine wire size (MCA) and over-current protection (MOPD).

GUIDELINES FOR FIELD WIRING

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

The main lugs in the compressor control panel are sized for copper wire only with 75°C insulation. All wiring must be in compliance with governing electrical codes.

- **For 208-230/3/60 Condensing Units:**
  To each condensing unit provide; one 208-230/3/60 branch circuit,
- **For 460/3/60 Condensing Units:**
  To each condensing unit provide;
  one 460/3/60 branch circuit,
  one 208/3/60 circuit – see Note 1

NOTE 1:
Omit when single point connection kit is used.

UNIT COOLER FAN WIRING

- **Off Time Defrost: the unit cooler fan should be wired from the condensing unit panel or an outside panel.**
- **Electric Defrost: the unit cooler fan should be wired from the condensing unit panel.**

EVAPORATOR MOUNTED LIQUID LINE SOLENOID

Power for a liquid line solenoid can be picked up from the fan circuit (if defrost is controlled from condensing unit).

COOLER DOOR SWITCH WIRING

The switch must be mounted to the cooler door frame, and must be wired to control the field installed liquid line solenoid and evaporator fans. Door switches are wired in series.

SIZING WIRE AND OVERCURRENT PROTECTORS

Check the serial plate for Minimum Circuit Ampacity (MCA) and Maximum Overcurrent Protective Devices (MOPD), follow NEC guidelines.

OTHER CONTROLS

When other controls are used for defrost / case controls, refer to the manual included with that control.

GENERAL SEQUENCE OF OPERATION

ELECTRICAL

NOTE:

The electrical diagrams in this section show circuit logic. They are not intended for troubleshooting or design work. For unit cooler fan power, electric defrost sub circuit balance, and other location specific circuits refer to the schematics provided with each unit.

Digital HE H-Series units will come standard with variable EC fan motors for air-cooled condensers. These units will need an on-board controller. Below are the controller options available:

1. Hussmann CoreLink™
2. Dixell XCM-25D Controller (scroll compressors only)
3. KE2 Compressor & Condenser Controller

1) GENERAL SEQUENCE OF OPERATION FOR DIGITAL COMPRESSOR UNITS

A. System Inputs & Control

The On-board controller monitors system inputs, controls system outputs, and provides alarm functionality. The unit shall be configurable for R404A, R407A, R407F, R448A, and R449A refrigerants.

B. Compressors

Capacity modulation through the compressors shall be achieved thru a control point (e.g., suction pressure set point) located in the corresponding return suction line. The compressor operates under the direction of the unit controller with outputs wired in series with the compressor's safety devices. This includes a compressor high-pressure switch for high discharge pressure protection, low pressure safety, and other electronic safeties for individual compressor oil differential pressure and/or oil-level monitoring. The compressor safety devices provide emergency compressor shutdown and/or backup to the unit controller.

C. Condenser

Condenser operation can be configured based on the following options:

1. Based on a discharge pressure control strategy. The system controller operates the condenser fans and will modulate the fans (ramp up/down) to maintain set head pressure.
2. Condenser fan modulation based on TD strategy. Controller maintains 10F TD between drop leg and ambient temperature readings. Also, there are minimum and maximum pressure set point limitations.

2) COMPRESSOR SAFETIES

A. Oil Level Failures

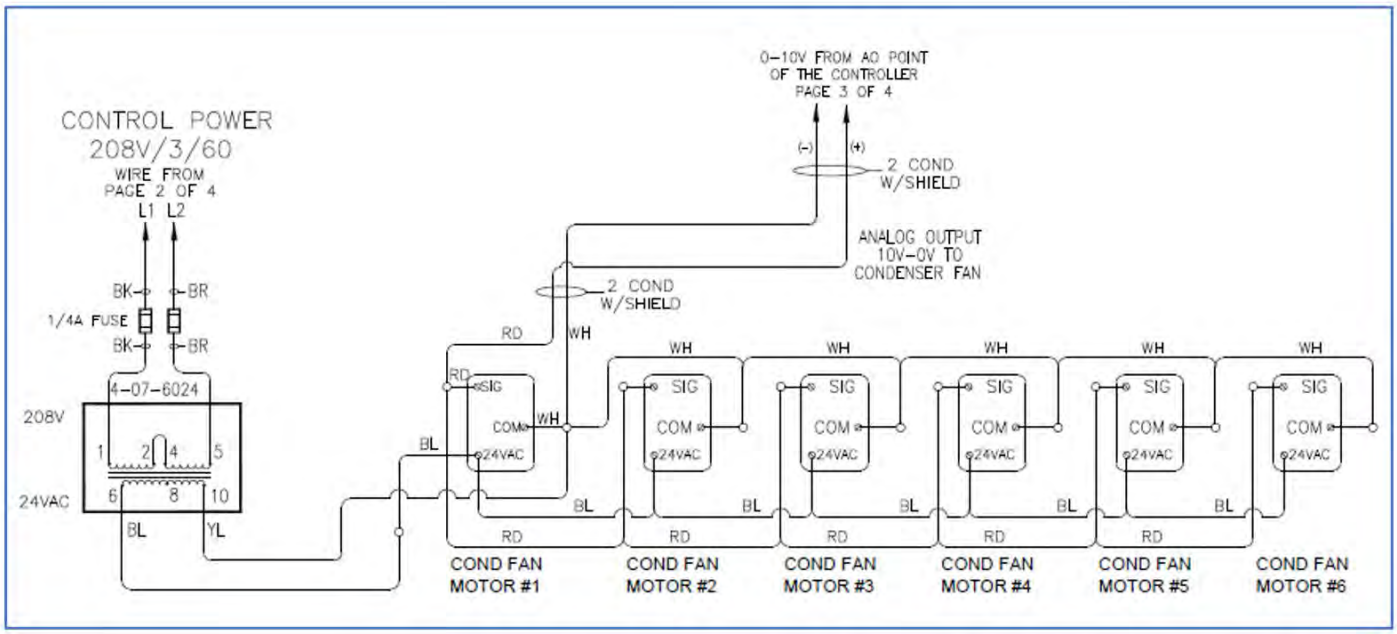
Digital compressors with capacity modulation feature an OMC optical oil level control which monitors and maintains proper oil level at the compressor. In the event of low oil level conditions, following a two-minute internal delay, the oil control shall signal an oil failure condition, and de-energize the compressor control circuit. For Bitzer Recip compressors, oil regulation is through OMC, and oil safety is via OLCK-1.

B. High Pressure Lockout Switch

Each compressor includes an automatic reset high pressure switch. In the event of an overpressure event at the individual compressor, this switch will disable the compressor control circuit. The high-pressure switch will automatically reset when the pressure has dropped below the switch differential (cut-in) setpoint.

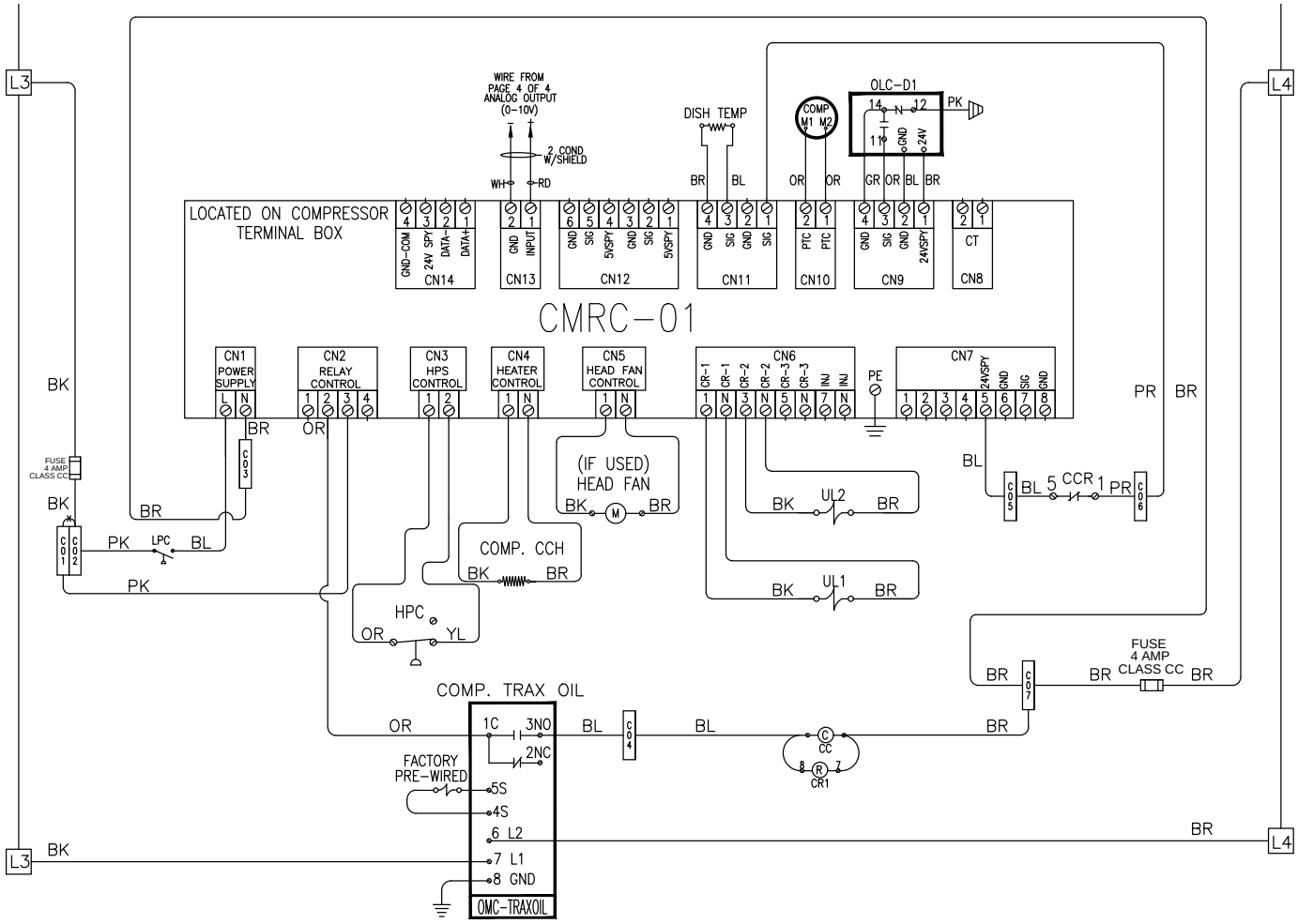
CONDENSER FAN CONTROL

- All motors are variable speed EC.
- 10V is low speed and 0V is full speed.
- Condenser fans modulate based on the condenser control strategy.



BITZER RECIP COMPRESSORS WITH CMRC

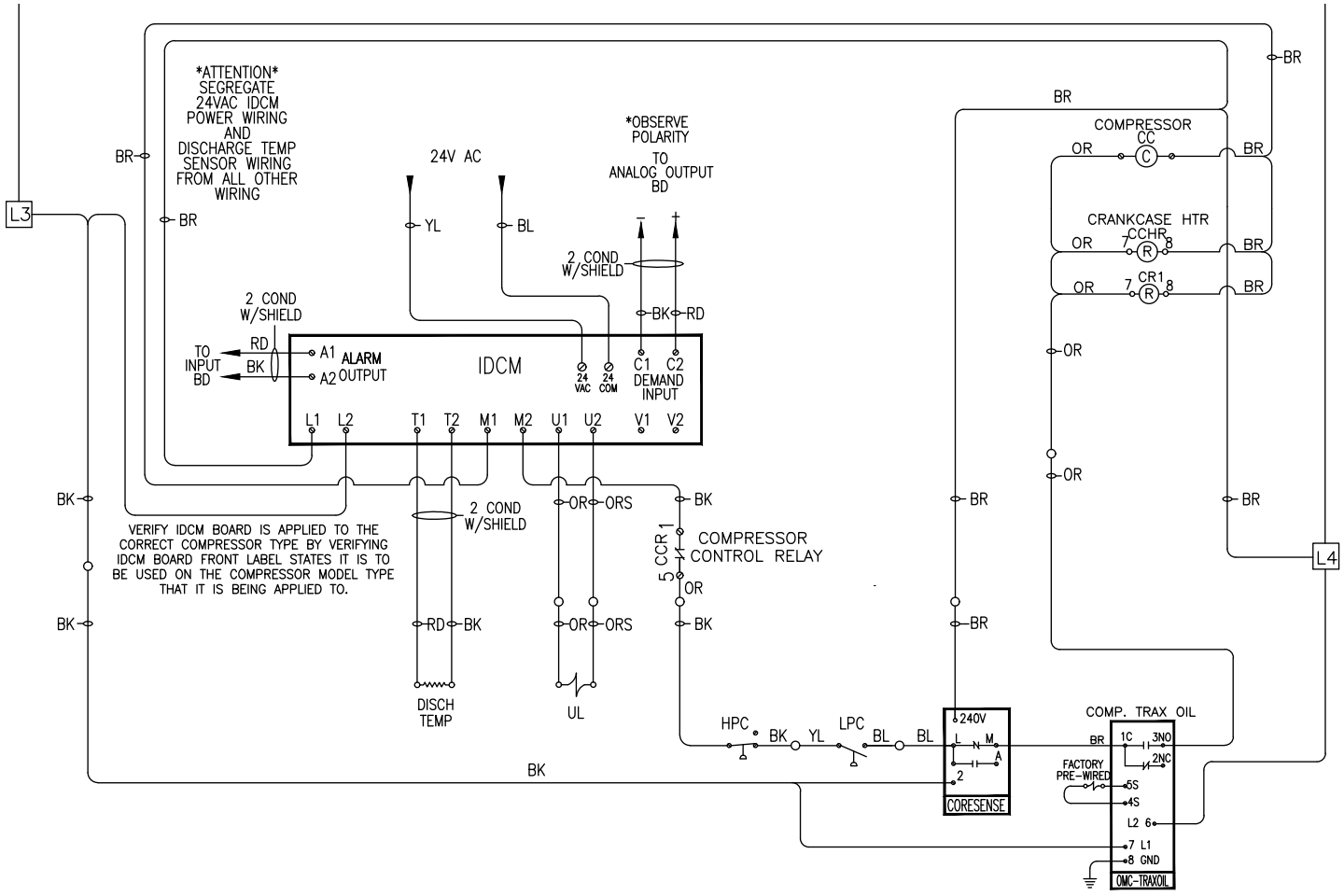
For more information on the Bitzer CMRC Module, refer to the link below (Bitzer technical document KT-230). https://www.bitzer.de/us/us/products/electronical-components/iq-module/
Refer to CMRC wiring schematic below:



TRAXOIL POWERING

COPELAND DIGITAL DISCUS

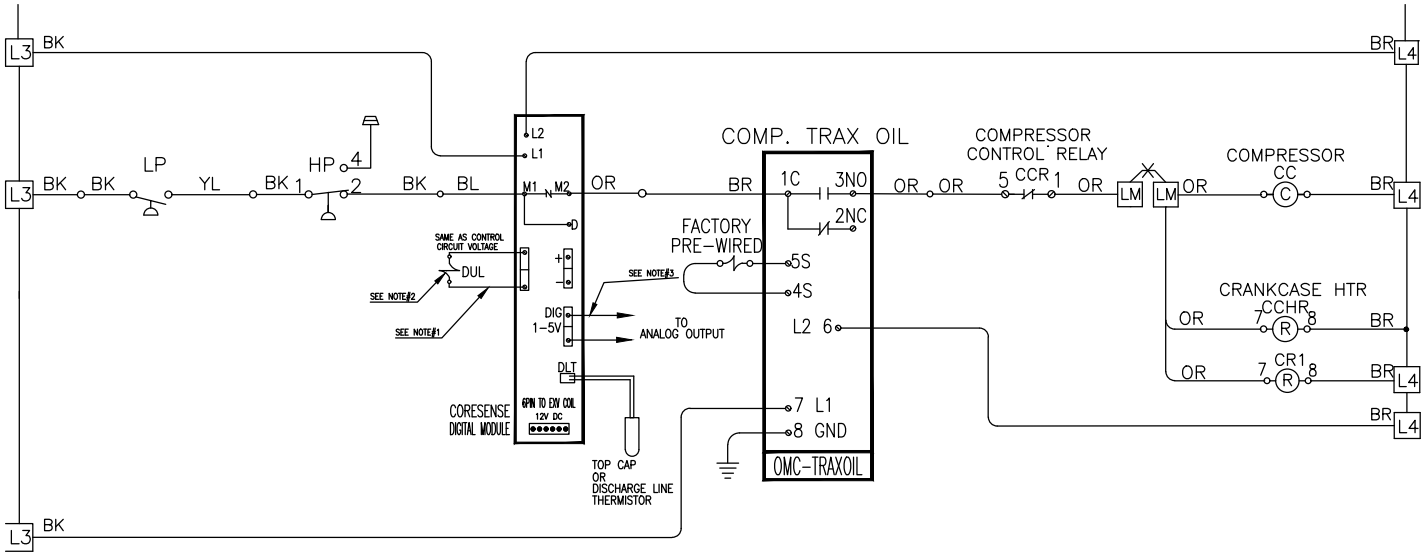
See below for IDCM wiring schematic. Digital discus and scrolls (Non-K5E) will require an IDCM Module with certain controllers.



COPELAND DIGITAL SCROLL (K5E)

Digital Scroll with K5E and CoreSense Diagnostics Module Wiring Schematic

The digital K5E compressor has a CoreSense diagnostic module. The unit controller sends a 1-5V signal to the CoreSense Module for capacity modulation. The wiring schematic below shows the CoreSense wiring details.



NOTE: 1. TO WIRE FROM DIGITAL SOLENOID COIL TO CORESENCE DIAGNOSTIC MODULE USE WIRE KIT# 998-0342-00 (HUSS PART#2H09438001)
2. DIGITAL UNLOADER SOLENOID COIL FOR 208V - 998-0060-09 (HUSS PART#2H09436001)
3. TO WIRE 1-5V ANALOG SIGNAL FROM CORESENSE MODULE TO ANALOG OUTPUT BOARD IN RACK PANEL USE WIRE KIT# 998-0341-00 (2H09437001)

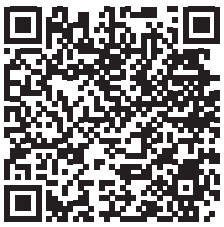
CORELINK CONTROLLER

Below are the controller and related components supplied with the CoreLink™ control option:

- CoreLink™ Controller - Hussmann Part# 3053539
- Suction Pressure Transducer (0-200 PSI) - Hussmann Part# 0701514
- Discharge Pressure Transducer (0-500 PSI) - Hussmann Part# 07011515
- Discharge Temperature Sensor - Hussmann Part# 0005232
- Ambient Temp Sensor- Hussmann Part# 2H06679001
- Suction Temp Sensor- Hussmann Part# 2H06679001
- Drop Leg Temp Sensor- Hussmann Part# 2H06679001
- 56VA XFMR for 24VAC Power Supply for CoreLink™ Controller- Hussmann Part# 0427513
- 30VA (24VAC) Transformer for CoreLink™ DI inputs- Hussmann Part# 0704584
- Corelink™ Display - Hussmann Part# 3088264

For detailed information on controllers, specifications & parameters refer to below manual (PN 3182246).

CoreLink™ Controller Manual:



START UP

⚠WARNING

» **Know whether a circuit is open at the power supply or not. Remove all power before opening control panels. Note: Some equipment has 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.**

CHECK:

- **Leak Testing -** Visually inspect all lines and joints for proper piping practices
- **Isolate - Compressors –** Front Seat Service Valves on Suction and Discharge
- **Pressure Transducers -** Close Angle Valves
- **Open - Valves –** to condenser, heat reclaim and receiver
- **Liquid Line Solenoid Valve -** Solenoid should be energized
- **Disconnect -** Defrost Time Clock – Disconnect power to the clock
- **Verify -** Refrigerant requirements for system, compressors, and TEVs in merchandisers and coolers. Electrical supply and component requirements.

⚠WARNING

» **Always recapture test charge in approved recovery vessel for recycling.**

OIL LEVELS

Check oil levels for the compressor: Compressor sight glass 1/8 to 1/2 full.

Check the oil sticker on the condensing unit before adding oil.

TEST CHARGE

Using properly regulated dry nitrogen and R22 pressurize the system with vapor only. Add dry nitrogen to bring the system pressure up to 150 psig. Using an electronic leak detector inspect all connections. If a leak is found, isolate, repair, and retest. Be sure system is at 150 psig and all valves closed to isolate the leak are opened. After the last leak is repaired and retested, the system must stand unaltered for 12 hours with no pressure drop from 150 psig.

Compressors with Pre-Charged Oil as Standard	Compressors Shipped Dry
HE H-Series Condensing Units Krack C-Series Condensing Units	*HE H-Series Condensing Units with Bitzer Compressors

***NOTE:**
Any HE H-Series condensing units selected with Bitzer compressors will not have oil pre-charged or included as a standard offering. It may be ordered as a ship loose option.

NITROGEN EVACUATION

Nitrogen and moisture will remain in the system unless proper evacuation procedures are followed. Nitrogen left in the system may cause head pressure problems. Moisture causes TEV ice blockage, wax build up, acid oil, and sludge formation.

Do not simply purge the system – this procedure is expensive, harmful to the environment, and may leave moisture and nitrogen behind.

Do not run the compressors to evacuate – this procedure introduces moisture into the compressor's crankcase oil and does not produce adequate vacuum to remove moisture from the rest of the system at normal temperatures.

EVACUATION SETUP

Using all copper lines and pack less valves, connect an 8 CFM or larger vacuum pump to suction or liquid line. Connect one-micron vacuum gauge at the pump. Plan procedures so breaking the vacuum with refrigerant will not introduce contaminates into the system. The vacuum pump must be in good condition filled with fresh oil to achieve desired results.

EVACUATION PROCEDURE

1. Pull a vacuum to 1500 microns. If the vacuum fails to hold, determine the cause and correct. Begin again with the first of the three required evacuations.
2. Break the vacuum with refrigerant vapor to a pressure of about 2 psig. Do not exceed the micron gauge transducer's maximum pressure limit. Liquid refrigerant may cause damage to components through thermal shock or a pressure surge to the transducer of the micron gauge.
3. Repeat first two steps.
4. Install the suction and liquid drier cores, if applicable.
5. Pull a vacuum to 500 microns. Close vacuum header valves and allow system to stand for a minimum of 12 hours.

If the 500-micron vacuum holds, charging may begin. If not the cause must be determined and corrected. Repeat the entire evacuation procedure from the first step.

⚠WARNING

» **Never trap liquid refrigerant between closed valves. A hydraulic explosion may occur, which could result in death or serious personal injury.**

PRE-CHARGE CHECK LIST

While the system is being evacuated preparation for charging can begin. During any of the pull downs:

Check controller:

- Program, if applicable.
- Merchandisers:
- Electrical requirements and power supply
- Electrical connections are tight and clean
- Proper fan operation
- Thermostat setting.

Check walk-in coolers and freezers:

- Electrical requirements and power supply
- Electrical connections tight and clean
- Proper fan operation
- Thermostat setting.

Check condensing unit:

- Electrical requirements and power supply
- Electrical connections are tight and clean
- Proper fan operation
- Pressure settings
- Defrost settings
- Adjust head pressure valve

To obtain maximum energy efficiency, the ORI flooding valve should be field-adjusted to allow the minimum condensing temperature permitted for the application in question, based on the compressor operating envelope.

Due to variations in equipment designs and installations, the ORI flooding valve may need to be adjusted to a slightly higher pressure setting to achieve proper operation of the refrigeration system.

The temperature control set points should be field-adjusted to cycle off half the fans at ambient temperatures below 40°F.

Check Air-Cooled Condenser

- Electrical requirements and power supply
- Electrical connections are tight and clean
- Proper fan operation
- Thermostat or pressure settings
- Damper operation, if equipped

Check Water-Cooled Condenser

- Flush water lines before connecting them to water-cooled condenser

Check Heat Reclaim and other systems

- Electrical requirements and power supply
- Electrical connections are tight and clean
- Component operation.

NOTE:
Remember to reinstate control to unit components jumpered to make test.

Set all mechanical pressure controls. Compressor should still be isolated from the rest of the system.

During the last evacuation look up and make a list of the required control settings for the system. High and low pressure, heat reclaim lockout, winter control settings, and other controls on the system should be noted.

CHARGING

Use standard procedures for charging while watching for possible problems.

CHECK:

- **Suction and discharge pressure oil level**
- **Voltage differential and balance**
- **Ampere draw and balance**

Shut down the unit at first indication of unusual operation, locate and correct cause.

Leak testing, evacuation and initial charging are now completed.

NOTE:
With non-azeotropic refrigerants, it is best to charge the entire contents of the cylinder to prevent fractionalization of the refrigerant when charging vapor.

WINTER CHARGE

When charging the condensing unit that is equipped with a winter head pressure control valve, additional refrigerant is required for winter operation. See table below:

Condenser Size	Summer Charge (lbs)	Winter Charge (lbs)
a	1	6
b	3	13
c	3	13
d	4	17
e	6	26
f	8	34
j	13	56
k	7	30

*Charges Based on R407A

COMPRESSOR MOTOR ROTATION (SCROLL)

To check compressor rotation, use the following procedure:

1. Install gauges on suction and discharge side of compressor. A momentary compressor run should cause a drop in suction header and a rise in discharge header pressure.
2. With main disconnect OFF, switch OFF all breakers or fuses in the control panel.
3. Turn ON main disconnect. Look for the light on the single-phase protector. If not illuminated, turn OFF the main disconnect. Have the field connections to the main breaker of the unit corrected so the phase protector indicates phase alignment (light illuminated).
4. Turn ON the main disconnect.
5. Momentarily turn ON the compressor and verify correct pumping direction. If the compressor is rotating backwards, change two legs on the load side of the compressor contactor.

NOTE:
DO NOT run compressors for more than 10 seconds during test.

FINAL CHECKS
Once the system is operating, it is the installer's responsibility to ensure all fine adjustments are made so that the condensing unit delivers maximum temperature performance and efficiency for the customer. These include:

1. Confirm ORI flooding valve setpoint (when applied).
2. Confirm fan-cycling temperature-control setpoint (outdoor HE H-Series units).
3. Confirm factory-installed scroll compressor terminal rain cover (when supplied) is properly re-installed on outdoor units after service. The black ABS cover is secured to the compressor shell with heat-resistant webbing and a squeeze-release buckle.
4. Defrost scheduling and timing condenser controls
5. Winter controls
6. TEV superheat adjustment
7. High and low pressure controls
8. Thermostat settings
9. Adjustments to electronic controls
10. Inlet / Outlet water temperature (water-cooled units only)
11. Reinstall the wire grille on the front side of the unit enclosure.
12. Make sure electrical enclosure is properly grounded and reinstall panel door after service.
13. Thoroughly inspect all field piping while the equipment is running and add supports where line vibration occurs. Be sure additional supports do not conflict with pipe expansion and contraction.
14. When condition space is completely stocked, check the operation of the system again.
15. At **48** hours of operation, replace the liquid drier and suction filter cores (if applicable).
16. At **90** days, recheck the entire system, including all field wiring.

MAINTENANCE

This procedure is not designed to cover system changeover to a different refrigerant.

COMPRESSOR REPLACEMENT

Since each machine room tends to be unique, plan carefully as how to move the compressor without harming personnel, equipment, or the building. Before beginning removal of an old compressor, make replacement unit ready for installation. Have compressor in an easily accessible position, uncrated, and unbolted from shipping pallets.

Verify:

- Replacement compressor
- Electrical requirements
- Refrigerant application
- Capacity
- Piping hookup location and design
- Suction and discharge gaskets
- Mounting requirements

Disconnect Electrical Supply:

1. Turn off motor and control panel power that supplies to the condensing unit.
2. Turn off control circuit and open all compressor circuit breakers or fuses.
3. Tag and remove electrical wires and conduit from the compressor.

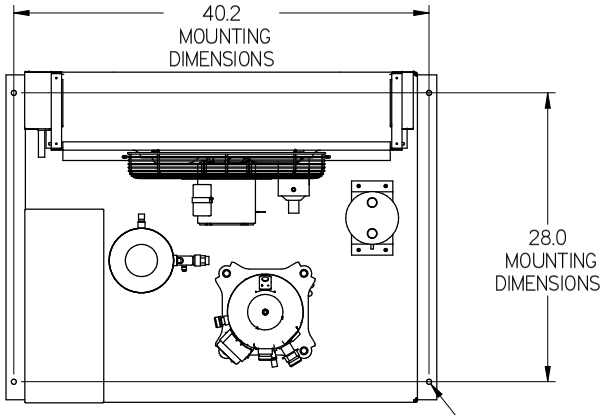
Isolate Compressor:

1. Front seat suction and discharge service valves. Close oil supply and equalizing lines.
2. Bleed compressor pressure through both discharge and suction access ports into an approved recovery vessel.
3. Remove externally mounted components which will be re-used on the replacement compressor.
4. Plug holes to compressor manufacturer's specifications.
5. Remove bolts from suction and discharge service valves.
6. Remove mounting bolts.
7. When moving the compressor, use a come-along, hoist or hydraulic lift to carry the weight.
8. Do not use the piping or panel to support a hoist or come-along.
9. Do not use ceiling trusses to support a hoist or come-along.
10. The rear support channel on the rack or a properly constructed ceiling rail may be used to support a hoist or come-along.
11. To make hookup and lifting easier, an eyebolt may be installed in the rear top of the compressor head.
12. If a compressor removal table is used, slide the compressor fully on to the table, then roll table to overhead hoist or hydraulic lift area.
13. When the old compressor has been removed, clean the suction and discharge service valve gasket surfaces to shiny metal. Clean the gasket surfaces on the new compressor to shiny metal. Be careful not to groove or round the surfaces. Gasket surfaces must be clean to prevent leaking.
14. Install the new compressor in reverse order of removal. Do not open the new compressor to the system until after it has been leak tested and triple evacuated.

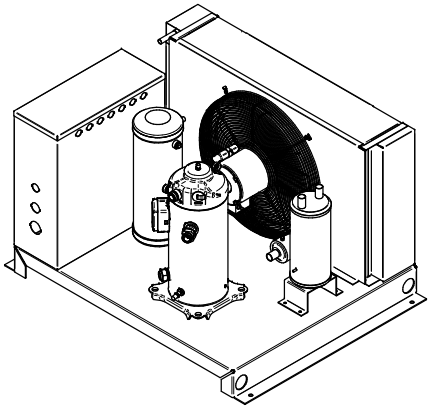
REPLACING DRIER AND FILTER CORES

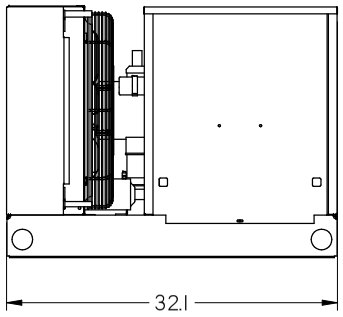
- Shut down the system.
- Isolate the core to be replaced and bleed off pressure into an approved recovery vessel.
- Open housing, replace core and close up. Pressurize, leak test and bring back into line.

HIGH EFFICIENCY H-SERIES SMALL SIZE INDOOR UNIT STANDARD BASE "HxSx-xxxxxxx-xx-x" WEIGHT: 400 LBS

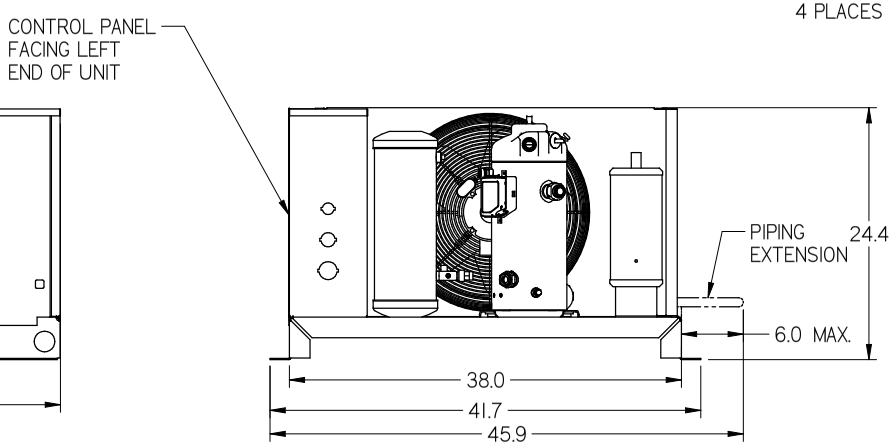


TOP VIEW

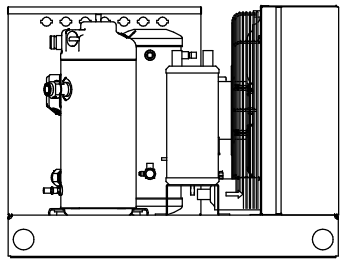




LEFT SIDE VIEW



FRONT VIEW

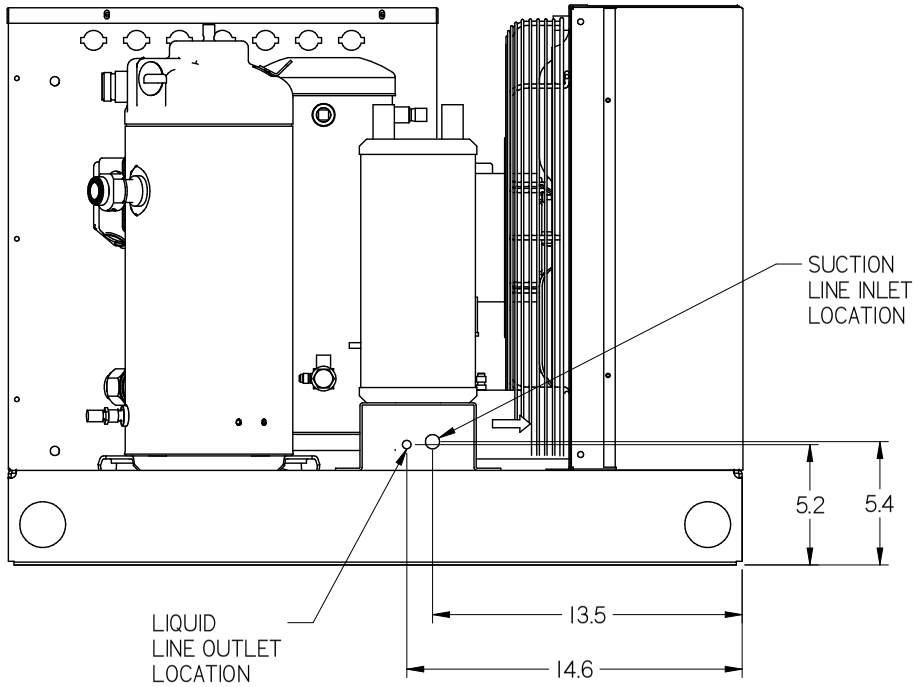


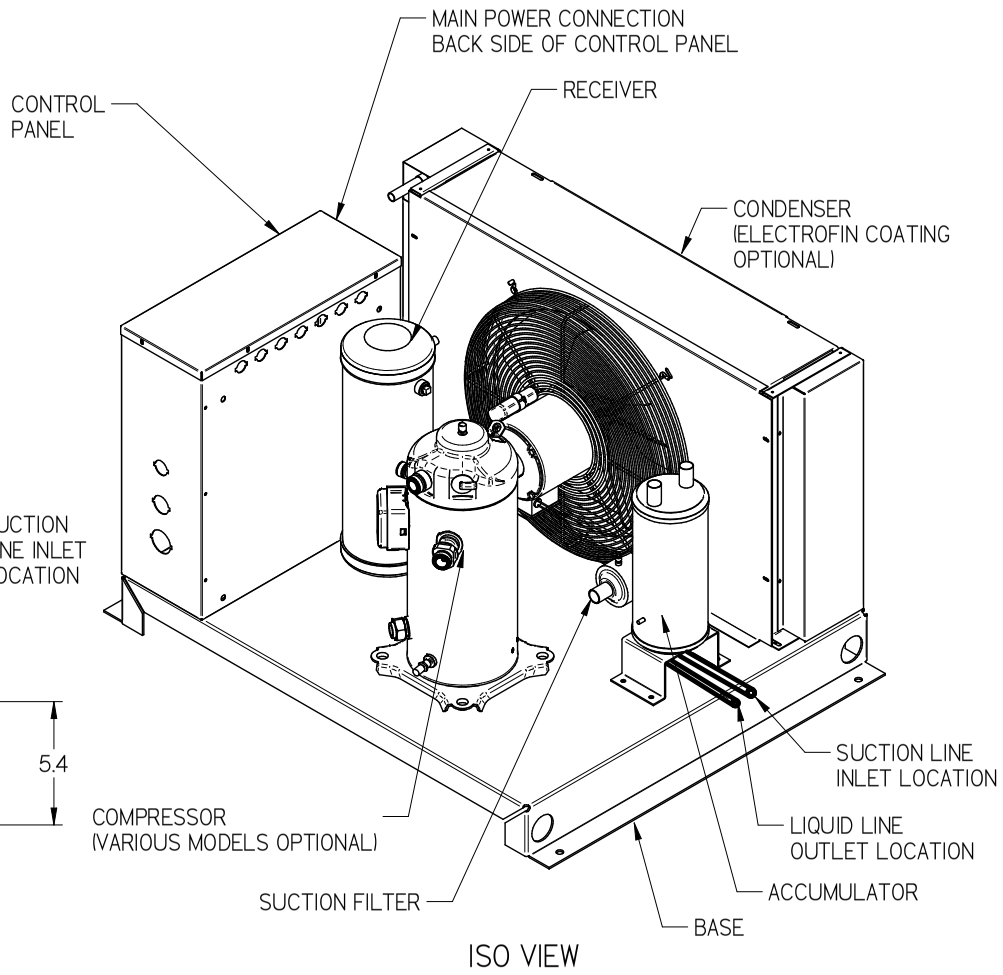
RIGHT SIDE VIEW

NOTES:
1. IT IS THE RESPONSIBILITY OF THE INSTALLING CONTRACTOR TO ENSURE THAT THE FINAL EQUIPMENT INSTALLATION MEETS ALL APPLICABLE CODE REQUIREMENTS.
2. ILLUSTRATION SHOWN IS FOR GENERAL REPRESENTATION ONLY. ACTUAL PRODUCT WILL VARY DEPENDENT UPON APPLICATION.
3. OVERALL DIMENSIONS: 45.9 L X 32.1 W X 24.4 H.

INFORMATION SUBJECT TO CHANGE

DIMENSIONS ARE IN INCHES	HUSSMANN®
DRAWN: DEC 2019	HIGH EFFICIENCY H-SERIES SMALL INDOOR STD BASE
THIRD ANGLE PROJECTION	DOC PD-000000004 REV E
SHEET 1 OF 3	SWN 1.0 SUBMITTAL SHEET SIZE D





ISO VIEW

PIPING CONNECTION LOCATION
OUT RIGHT SIDE OF UNIT

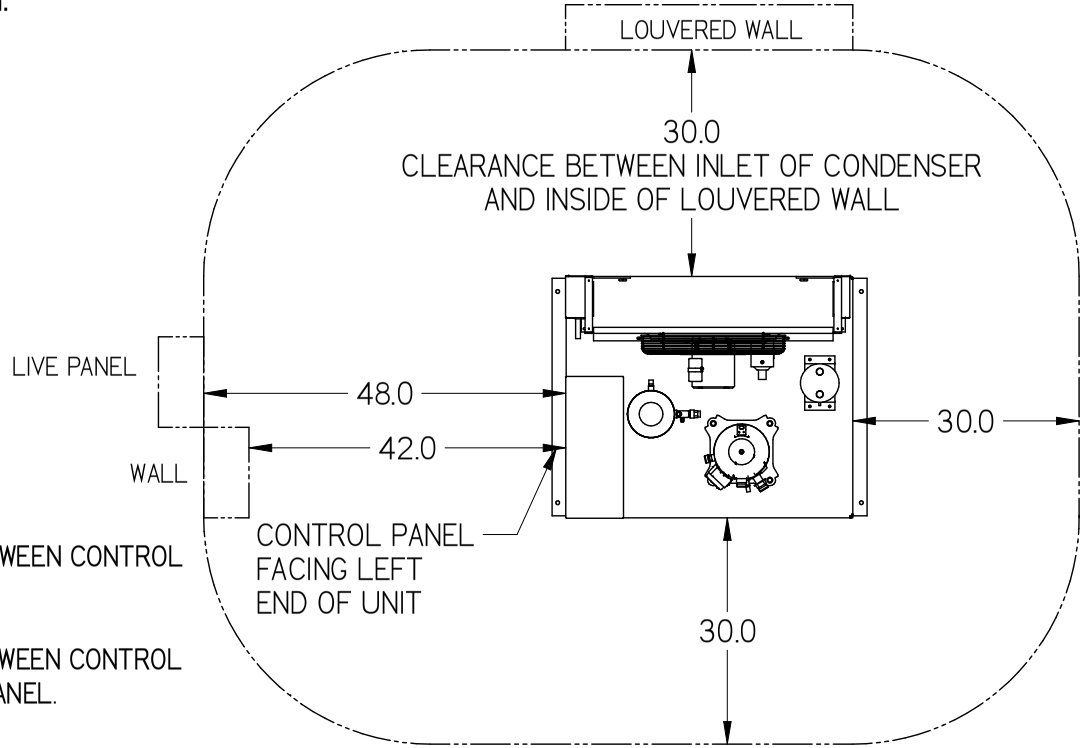
NOTES:
1. IT IS THE RESPONSIBILITY OF THE INSTALLING CONTRACTOR TO ENSURE THAT THE FINAL EQUIPMENT INSTALLATION MEETS ALL APPLICABLE CODE REQUIREMENTS.
2. ILLUSTRATION SHOWN IS FOR GENERAL REPRESENTATION ONLY. ACTUAL PRODUCT WILL VARY DEPENDENT UPON APPLICATION.
3. OVERALL DIMENSIONS: 45.9 L X 32.1 W X 24.4 H.

DIMENSIONS ARE IN INCHES
DRAWN: DEC 2019
THIRD ANGLE PROJECTION
INFORMATION SUBJECT TO CHANGE
SHEET 2 OF 3

HUSSMANN®
HIGH EFFICIENCY
H-SERIES SMALL
INDOOR STD BASE
DOC PD-000000004 REV E
SWN 1.0 SUBMITTAL SHEET SIZE D

MINIMUM CLEARANCE REQUIREMENTS:

ACTUAL CLEARANCE REQUIREMENTS ARE DEPENDENT UPON AUTHORITY HAVING JURISDICTION, AND MAY EXCEED DIMENSIONS SHOWN.



42" CLEARANCE BETWEEN CONTROL PANEL & ANY WALL.

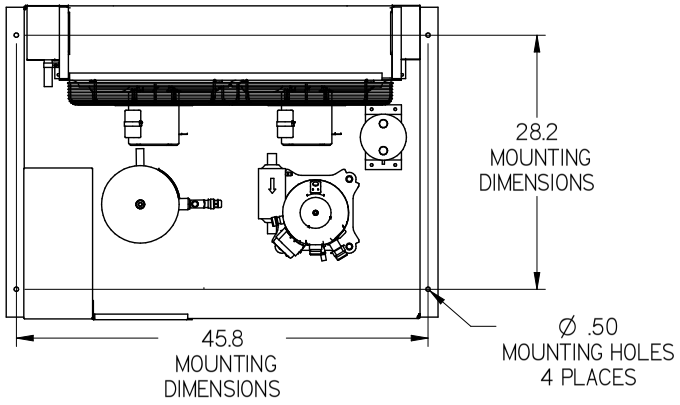
48" CLEARANCE BETWEEN CONTROL PANEL & ANY LIVE PANEL.

NOTES:
1. IT IS THE RESPONSIBILITY OF THE INSTALLING CONTRACTOR TO ENSURE THAT THE FINAL EQUIPMENT INSTALLATION MEETS ALL APPLICABLE CODE REQUIREMENTS.
2. ILLUSTRATION SHOWN IS FOR GENERAL REPRESENTATION ONLY. ACTUAL PRODUCT WILL VARY DEPENDENT UPON APPLICATION.
3. OVERALL DIMENSIONS: 45.9 L X 32.1 W X 24.4 H.

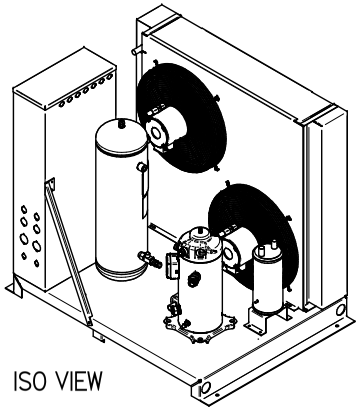
DIMENSIONS ARE IN INCHES
DRAWN: DEC 2019
THIRD ANGLE PROJECTION
INFORMATION SUBJECT TO CHANGE
SHEET 3 OF 3

HUSSMANN®
HIGH EFFICIENCY H-SERIES SMALL INDOOR STD BASE
DOC PD-000000004 REV E
SWN 1.0 SUBMITTAL SHEET SIZE D

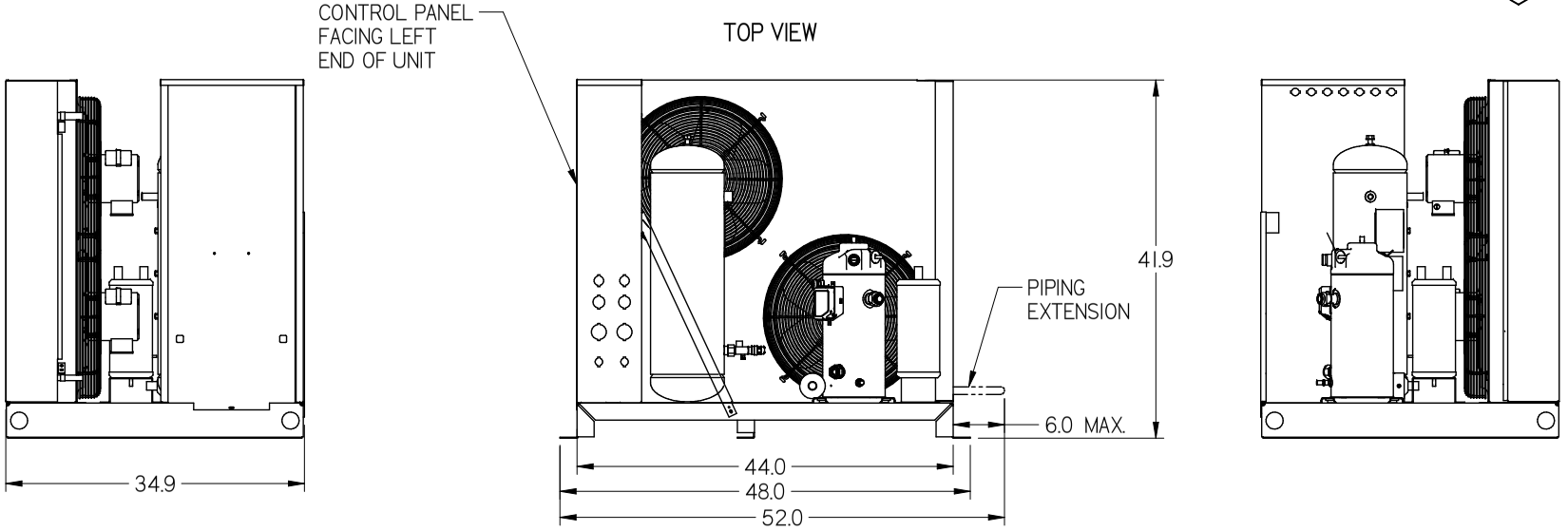
HIGH EFFICIENCY H-SERIES MEDIUM SIZE INDOOR UNIT STANDARD BASE "HxSx-xxxxxxx-xx-x" WEIGHT: 650 LBS.



TOP VIEW



ISO VIEW



LEFT SIDE VIEW

FRONT VIEW

RIGHT SIDE VIEW

NOTES:
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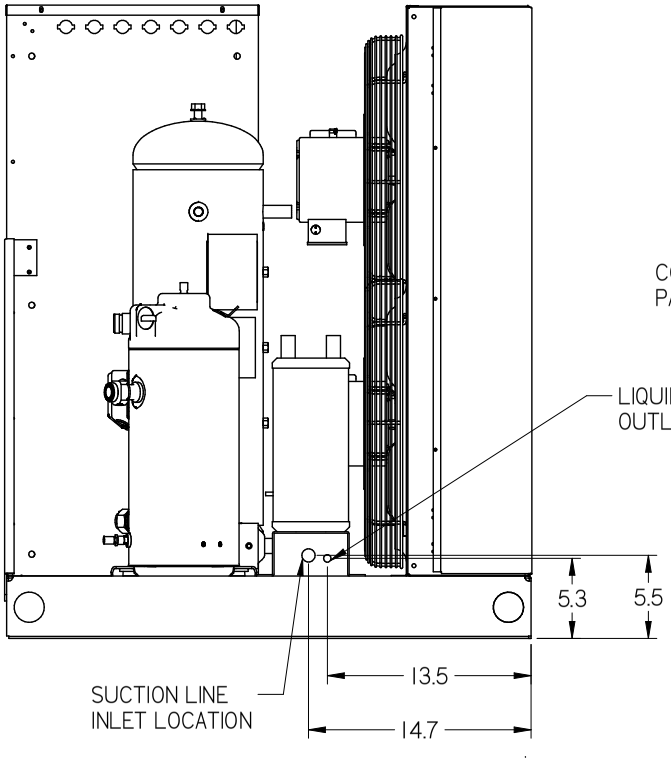
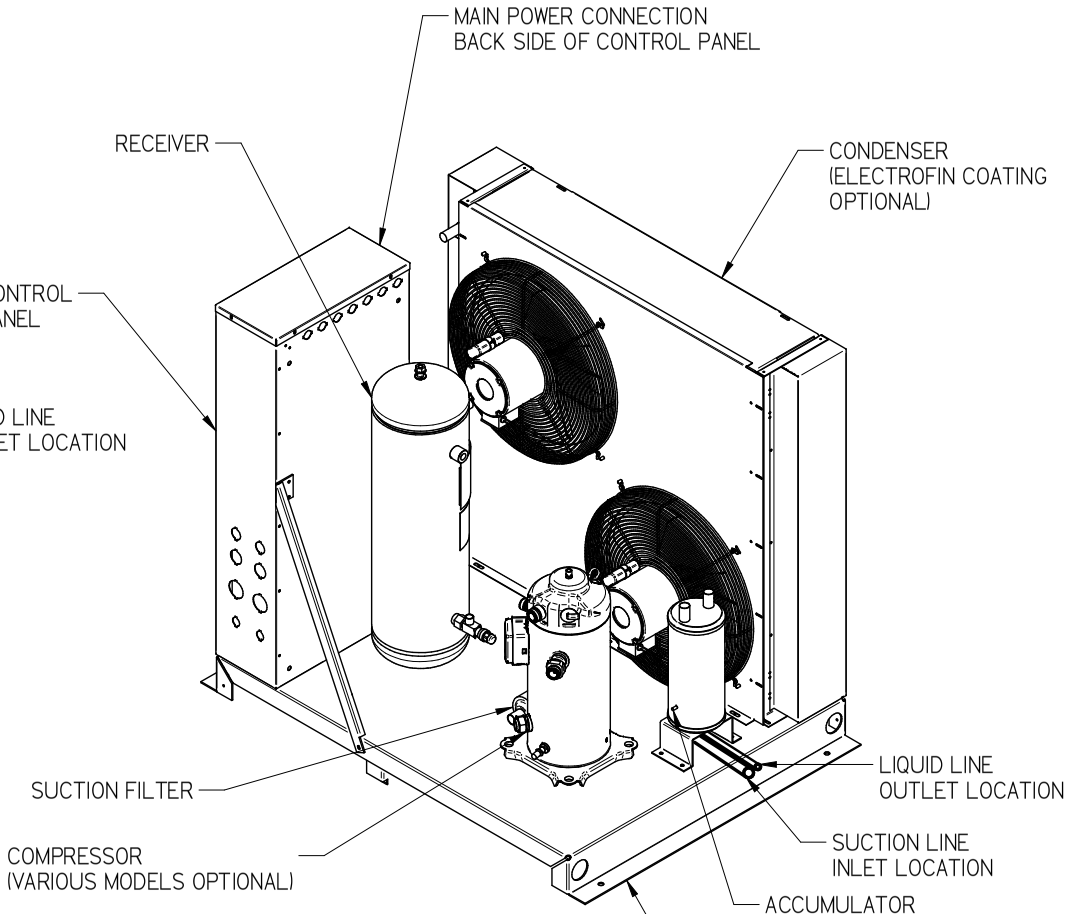
2. ILLUSTRATION SHOWN IS FOR GENERAL REPRESENTATION ONLY. ACTUAL PRODUCT WILL VARY DEPENDENT UPON APPLICATION.
3. OVERALL DIMENSIONS: 52.0 L X 34.9 W X 41.9 H.

INFORMATION SUBJECT TO CHANGE

DIMENSIONS ARE IN INCHES	HUSSMANN®
DRAWN: DEC 2019	HIGH EFFICIENCY H-SERIES MEDIUM INDOOR STD BASE
THIRD ANGLE PROJECTION	DOC PD-000000005 REV E
SHEET 1 OF 3	SWN 1.0 SUBMITTAL SHEET SIZE D



PIPING CONNECTION LOCATION OUT RIGHT SIDE OF UNIT



ISO VIEW

NOTES:
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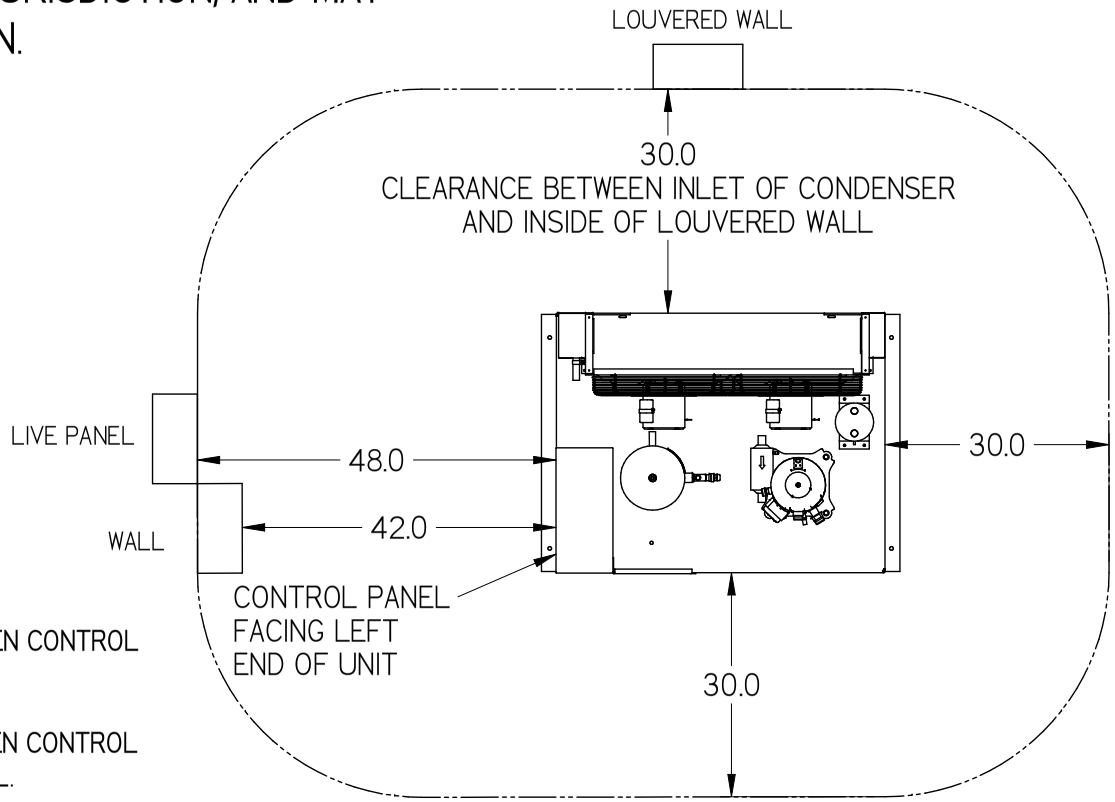
3. OVERALL DIMENSIONS: 52.0 L X 34.9 W X 41.9 H.

DIMENSIONS ARE IN INCHES	HUSSMANN®
DRAWN: DEC 2019	HIGH EFFICIENCY H-SERIES MEDIUM INDOOR STD BASE
THIRD ANGLE PROJECTION	DOC PD-000000005 REV E
INFORMATION SUBJECT TO CHANGE	SHEET 2 OF 3

SWIN I.O SUBMITTAL SHEET SIZE D

MINIMUM CLEARANCE REQUIREMENTS:

ACTUAL CLEARANCE REQUIREMENTS ARE DEPENDENT UPON AUTHORITY HAVING JURISDICTION, AND MAY EXCEED DIMENSIONS SHOWN.



42" CLEARANCE BETWEEN CONTROL PANEL & ANY WALL.

48" CLEARANCE BETWEEN CONTROL PANEL & ANY LIVE PANEL.

NOTES:
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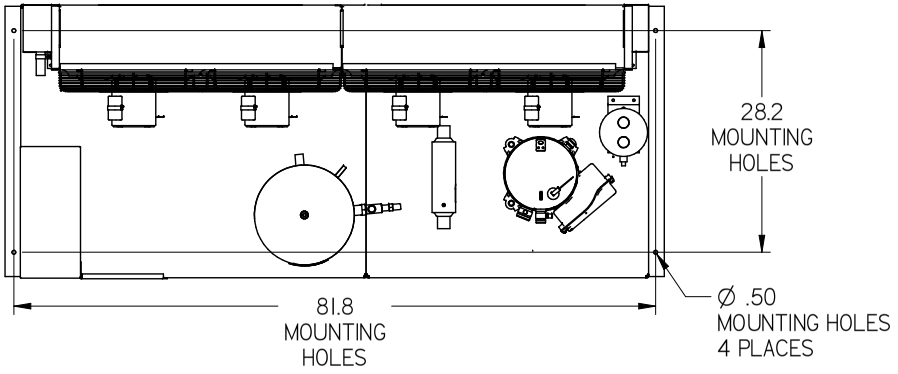
3. OVERALL DIMENSIONS: 52.0 L X 34.9 W X 41.9 H.

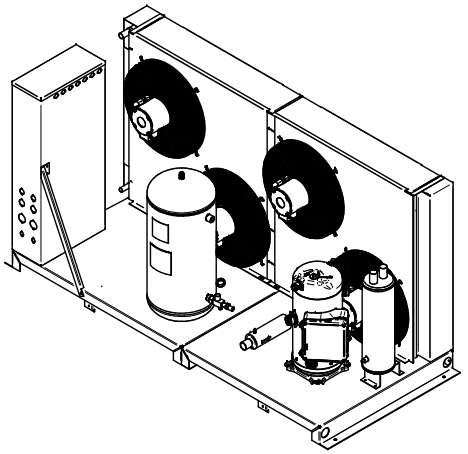
INFORMATION SUBJECT TO CHANGE

DIMENSIONS ARE IN INCHES	HUSSMANN®
DRAWN: DEC 2019	HIGH EFFICIENCY H-SERIES MEDIUM INDOOR STD BASE
THIRD ANGLE PROJECTION	DOC PD-000000005 REV E
SHEET 3 OF 3	SMN 1.0 SUBMITTAL SHEET SIZE D

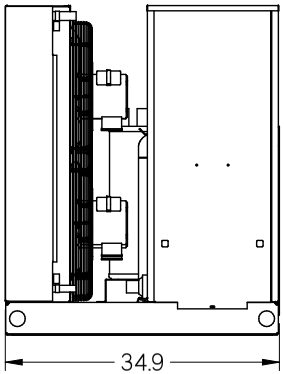
HIGH EFFICIENCY H-SERIES LARGE SIZE INDOOR UNIT STANDARD BASE "HxSx-xxxxxxx-xx-x" WEIGHT: 1,250 LBS.



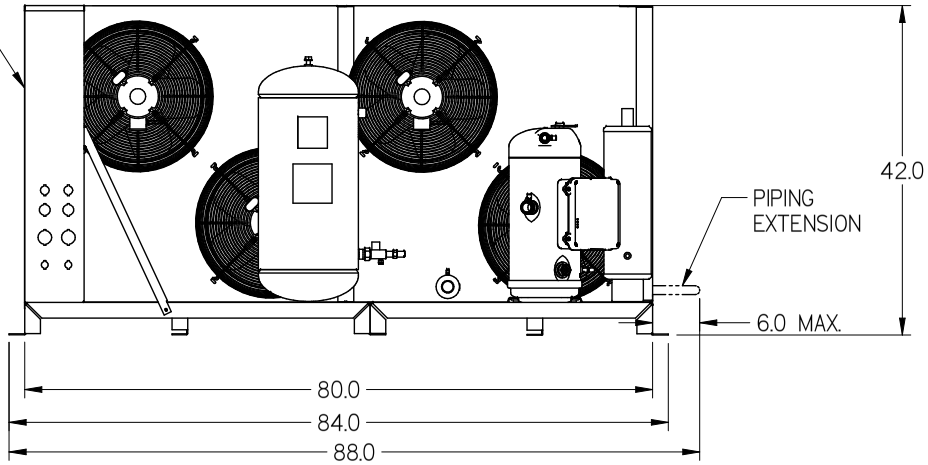
TOP VIEW



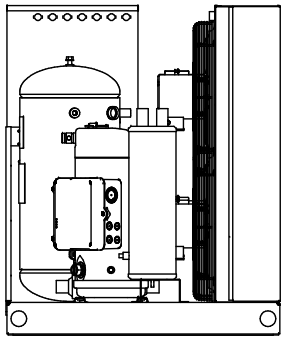
CONTROL PANEL
FACING LEFT
END OF UNIT



LEFT SIDE VIEW



FRONT VIEW



RIGHT SIDE VIEW

NOTES:
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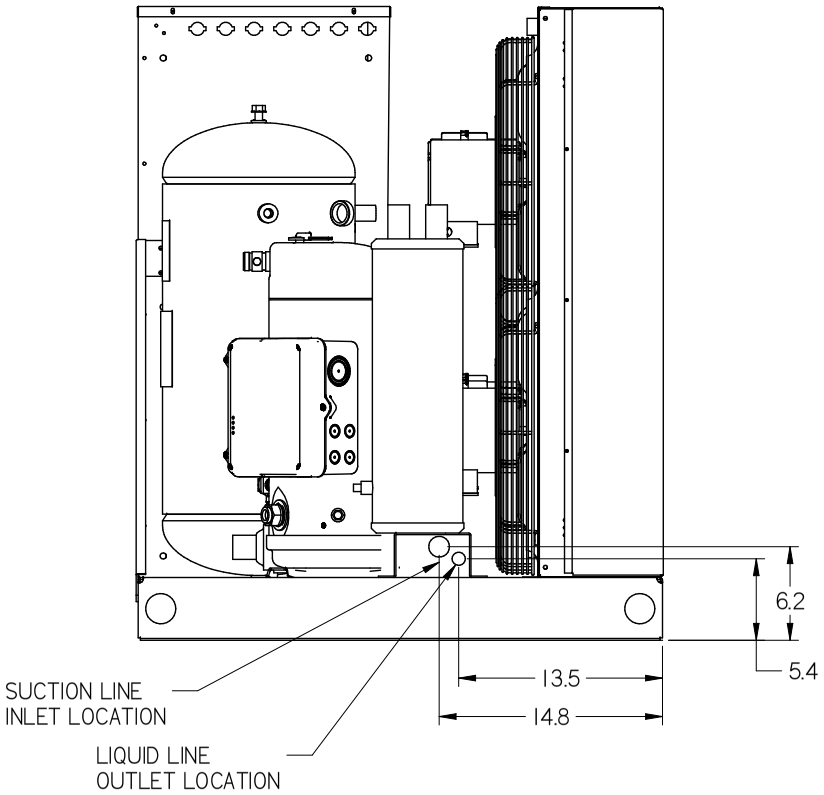
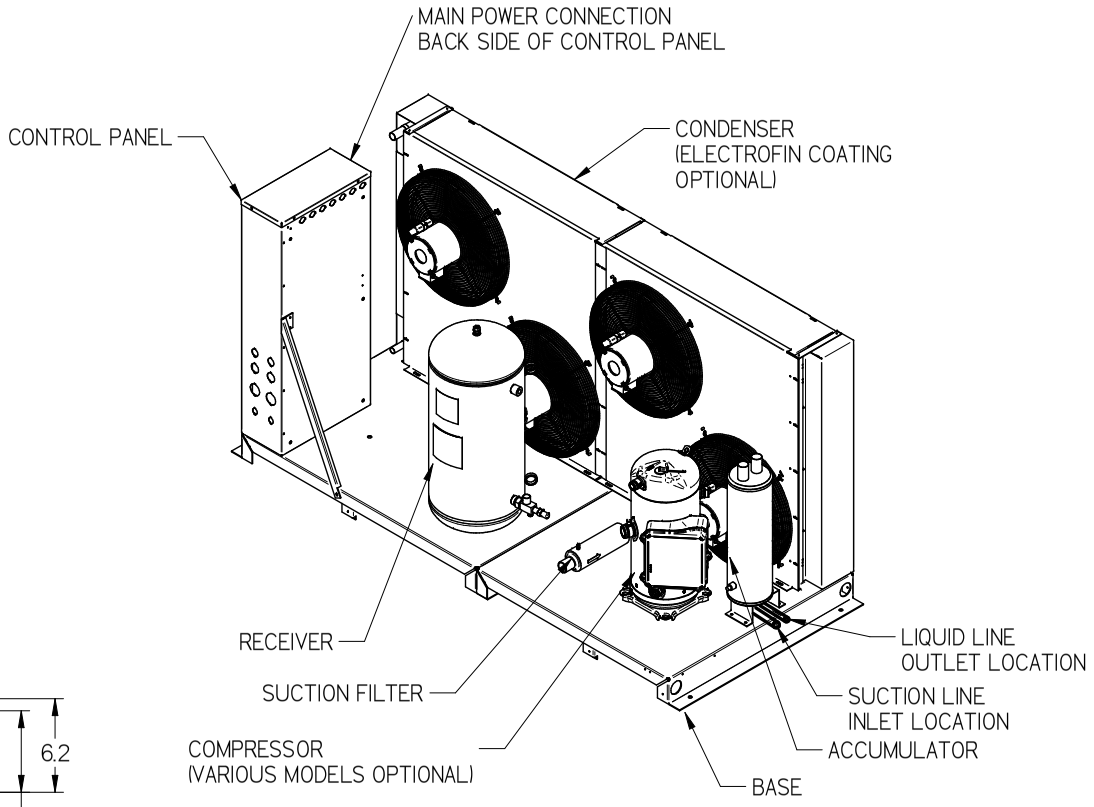
3. OVERALL DIMENSIONS: 88.0 L X 34.9 W X 42.0 H.

INFORMATION SUBJECT TO CHANGE

DIMENSIONS ARE IN INCHES	HUSSMANN®
DRAWN: DEC 2019	HIGH EFFICIENCY H-SERIES LARGE INDOOR STD BASE
THIRD ANGLE PROJECTION	DOC PD-000000006 REV D
SHEET 1 OF 3	SWN.1.0 SUBMITTAL SHEET SIZE D



PIPING CONNECTION LOCATION
OUT RIGHT SIDE OF UNIT



ISO VIEW

NOTES:
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2. ILLUSTRATION SHOWN IS FOR GENERAL REPRESENTATION ONLY. ACTUAL PRODUCT WILL VARY DEPENDENT UPON APPLICATION.
3. OVERALL DIMENSIONS: 88.0 L X 34.9 W X 42.0 H.

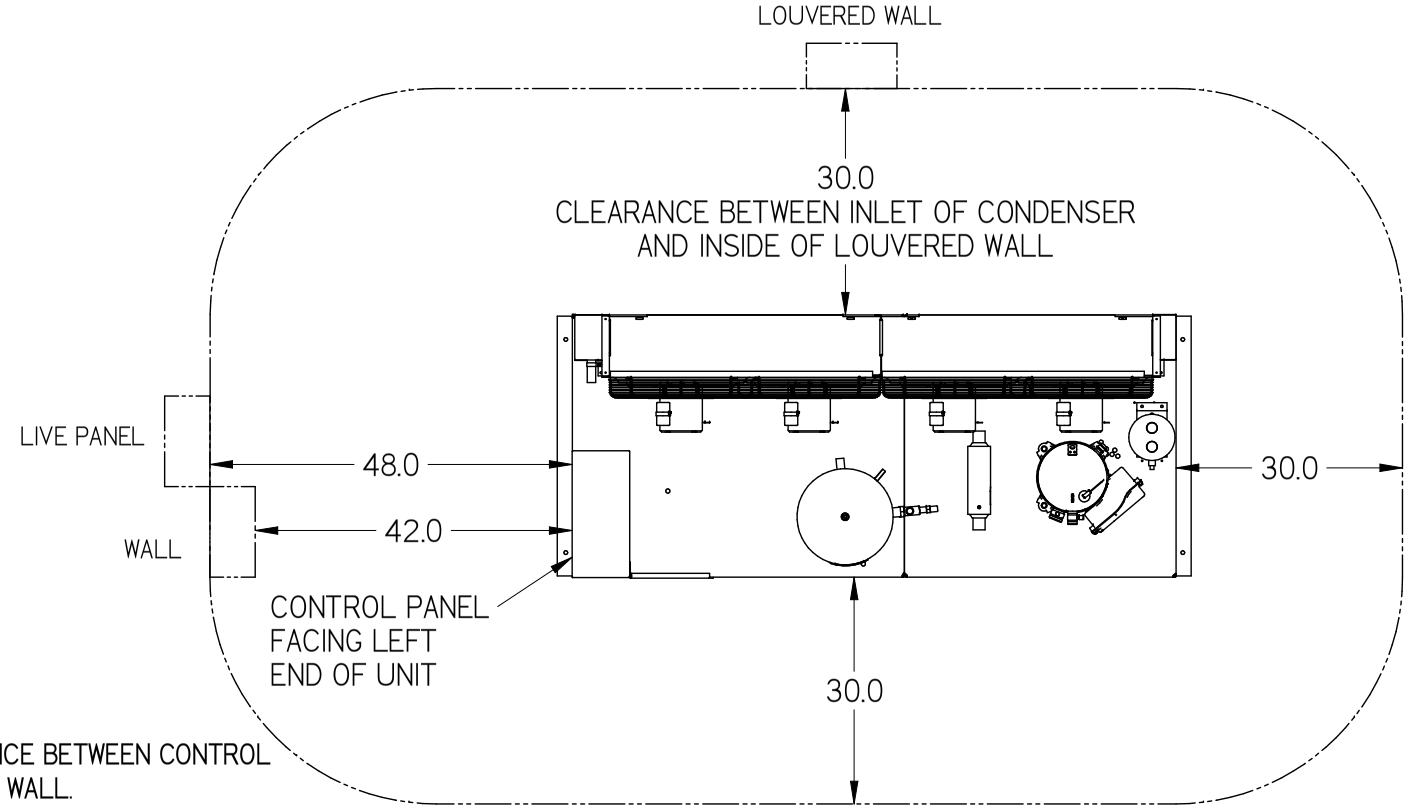
DIMENSIONS ARE IN INCHES
DRAWN: DEC 2019
THIRD ANGLE PROJECTION
INFORMATION SUBJECT TO CHANGE
SHEET 2 OF 3

HUSSMANN®
HIGH EFFICIENCY
H-SERIES LARGE
INDOOR STD BASE
DOC PD-000000006 REV D

SWN 1.0 SUBMITTAL SHEET SIZE D

MINIMUM CLEARANCE REQUIREMENTS:

ACTUAL CLEARANCE REQUIREMENTS ARE DEPENDENT UPON AUTHORITY HAVING JURISDICTION, AND MAY EXCEED DIMENSIONS SHOWN.



42" CLEARANCE BETWEEN CONTROL PANEL & ANY WALL.

48" CLEARANCE BETWEEN CONTROL PANEL & ANY LIVE PANEL.

NOTES:
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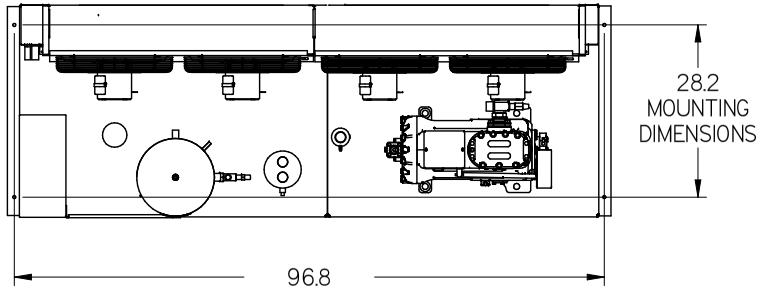
3. OVERALL DIMENSIONS: 88.0 L X 34.9 W X 42.0 H.

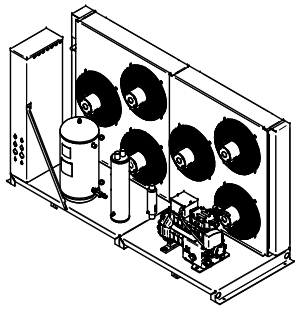
INFORMATION SUBJECT TO CHANGE

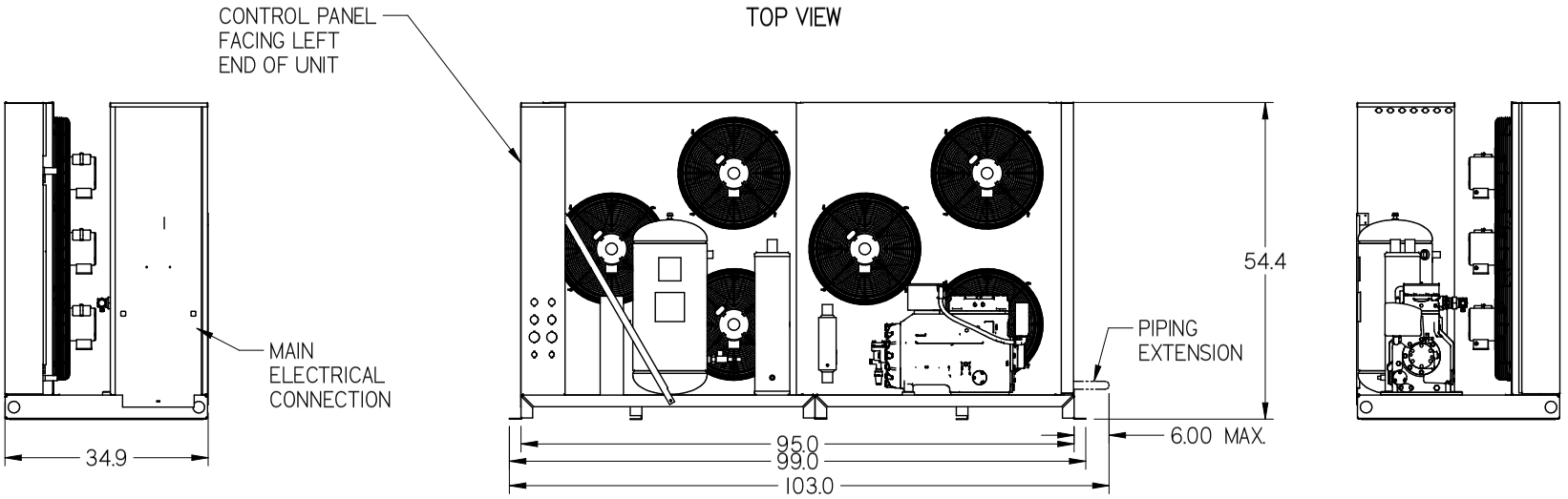
DIMENSIONS ARE IN INCHES	HUSSMANN®
DRAWN: DEC 2019	HIGH EFFICIENCY H-SERIES LARGE INDOOR STD BASE
THIRD ANGLE PROJECTION	DOC PD-000000006 REV D
SHEET 3 OF 3	SWN I.O. SUBMITTAL SHEET SIZE D

HIGH EFFICIENCY
H-SERIES
EXTRA LARGE SIZE
INDOOR UNIT
STANDARD BASE
"HxSx-xxxxxxx-xx-x"
WEIGHT: 1,575 LBS.



TOP VIEW





LEFT HAND VIEW

FRONT VIEW

RIGHT SIDE VIEW

NOTES:
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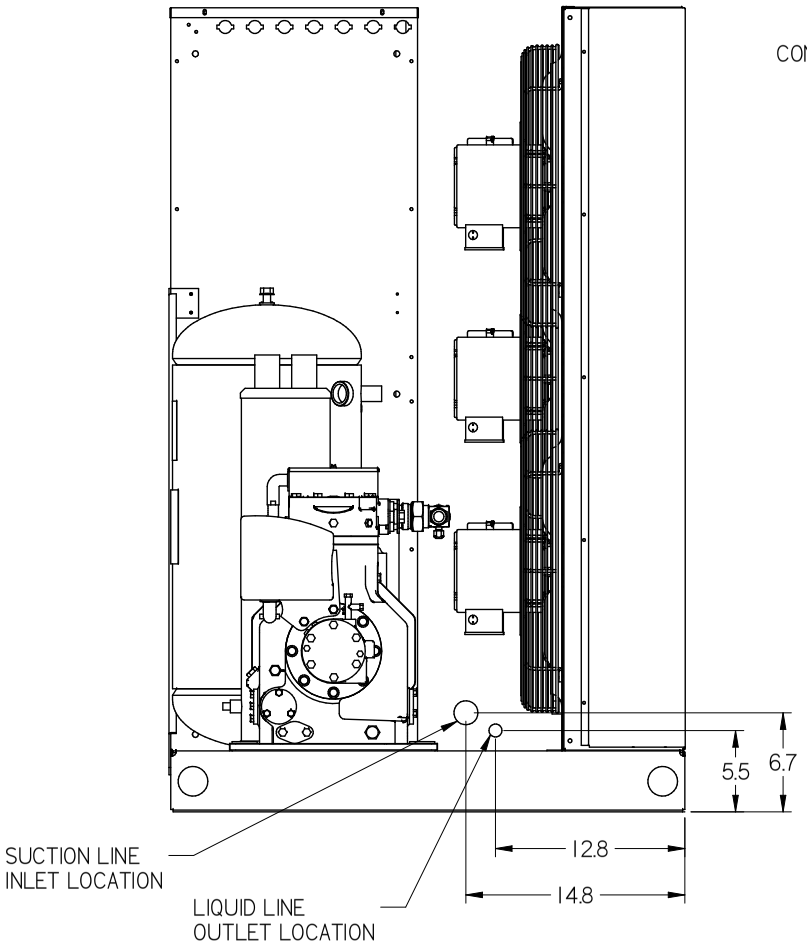
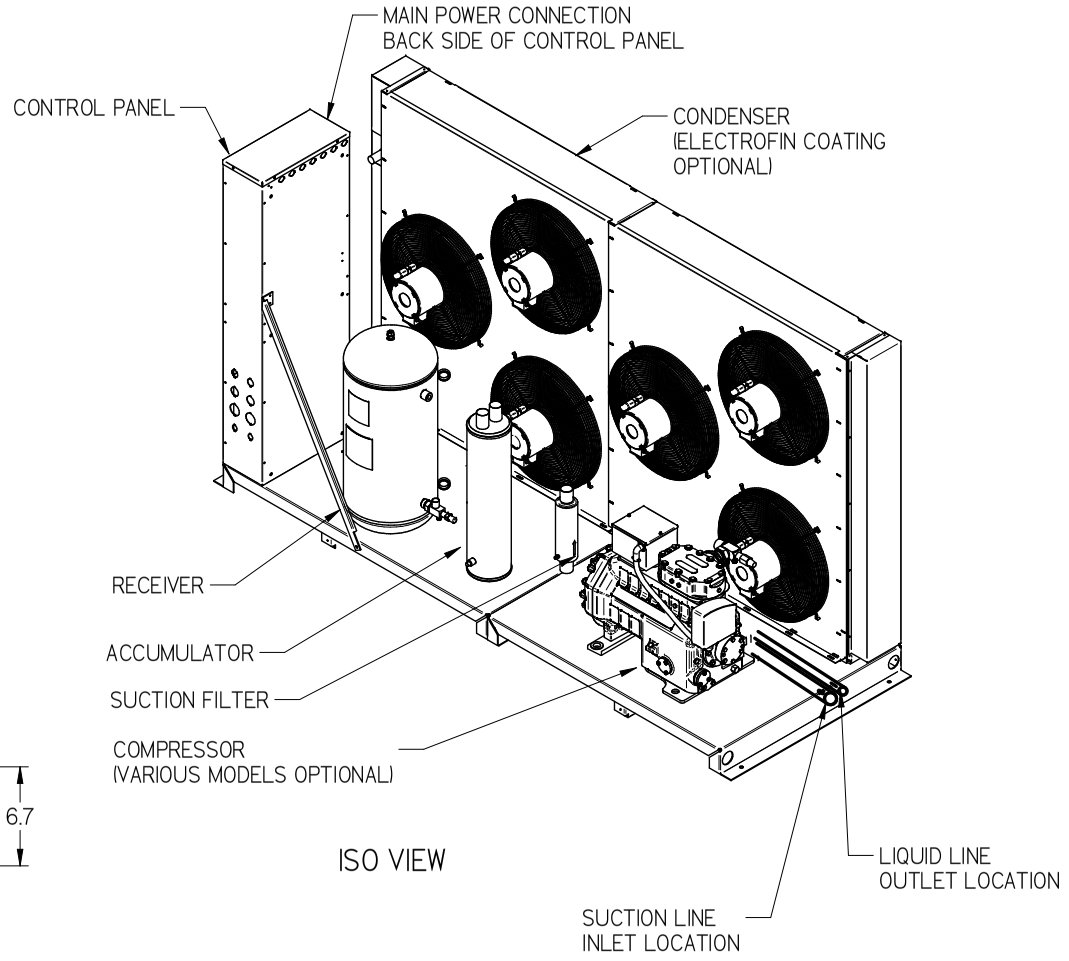
3. OVERALL DIMENSIONS: 103.0 L X 34.9 W X 54.4 H.

DIMENSIONS ARE IN INCHES	HUSSMANN®
DRAWN: DEC 2019	HIGH EFFICIENCY H-SERIES EXTRA LARGE INDOOR STD BASE
THIRD ANGLE PROJECTION	DOC PD-000000007 REV D
INFORMATION SUBJECT TO CHANGE	SHEET 1 OF 3

SWN 1.0 SUBMITTAL SHEET SIZE D





PIPING CONNECTION LOCATION
OUT RIGHT SIDE OF UNIT

NOTES:
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DIMENSIONS ARE IN INCHES	HUSSMANN®	
DRAWN: DEC 2019	HIGH EFFICIENCY H-SERIES EXTRA LARGE INDOOR STD BASE	
THIRD ANGLE PROJECTION	DOC PD-000000007	REV D
INFORMATION SUBJECT TO CHANGE	SHEET 2 OF 3	

SMN 1.0 SUBMITTAL SHEET SIZE D

MINIMUM CLEARANCE REQUIREMENTS:

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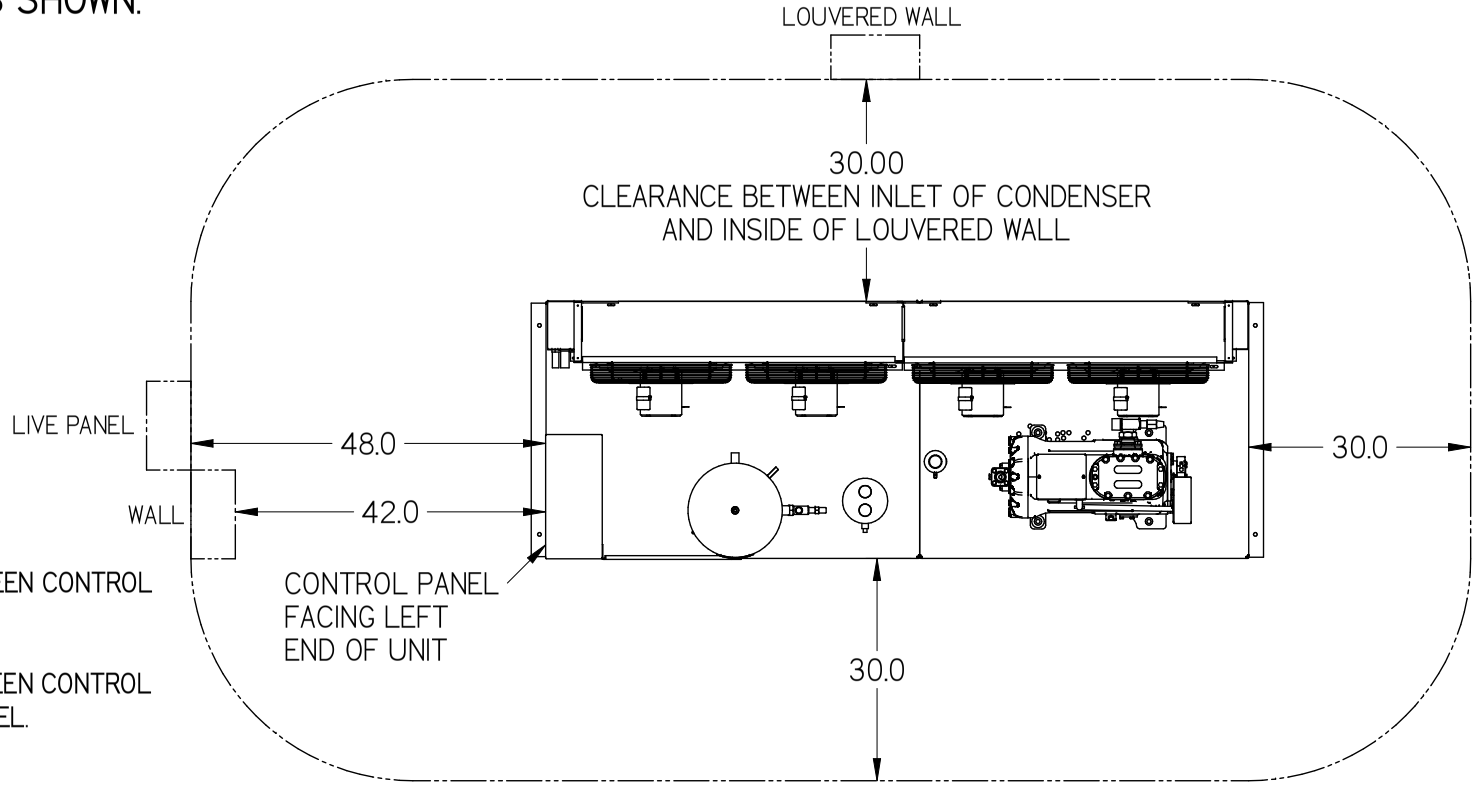

42" CLEARANCE BETWEEN CONTROL PANEL & ANY WALL.

48" CLEARANCE BETWEEN CONTROL PANEL & ANY LIVE PANEL.

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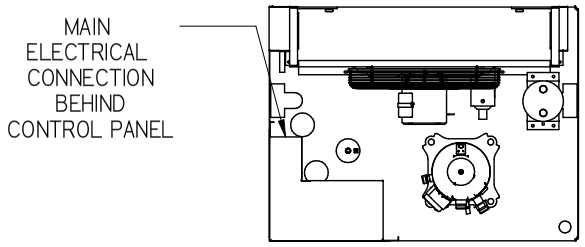
DIMENSIONS ARE IN INCHES	HUSSMANN®
DRAWN: DEC 2019	HIGH EFFICIENCY H-SERIES EXTRA LARGE INDOOR STD BASE
THIRD ANGLE PROJECTION	DOC PD-000000007 REV D
INFORMATION SUBJECT TO CHANGE	SHEET 3 OF 3

SMN 10 SUBMITTAL SHEET SIZE D

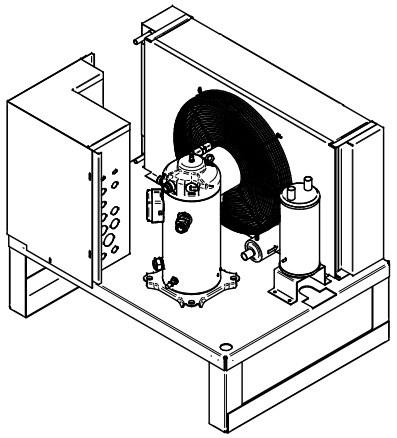
HIGH EFFICIENCY H-SERIES SMALL SIZE INDOOR UNIT HEAVY DUTY BASE

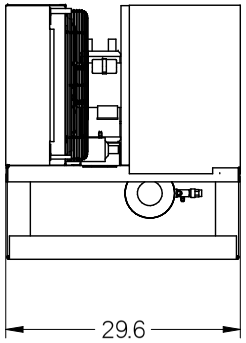
"HxHx-xxxxxxx-xx-x"

WEIGHT: 400 LBS.

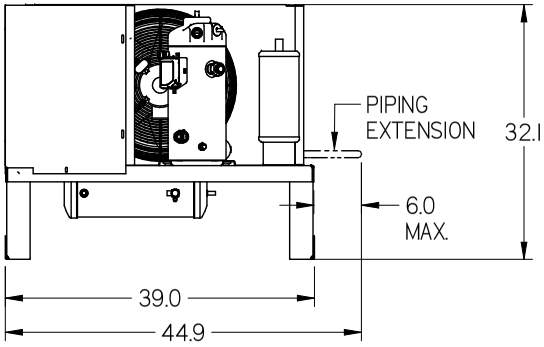


TOP VIEW

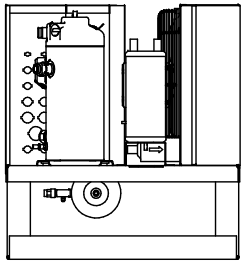




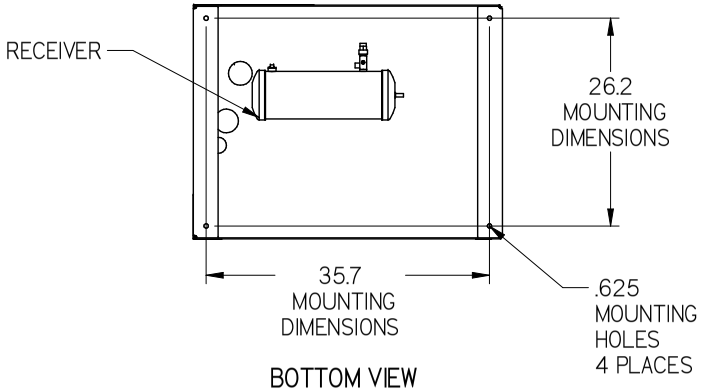
LEFT SIDE VIEW



FRONT VIEW



RIGHT SIDE VEW



BOTTOM VIEW

NOTES:
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3. OVERALL DIMENSIONS: 44.9 L X 29.6 W X 32.1 H.

INFORMATION SUBJECT TO CHANGE

DIMENSIONS ARE IN INCHES

DRAWN: DEC 2019

THIRD ANGLE PROJECTION

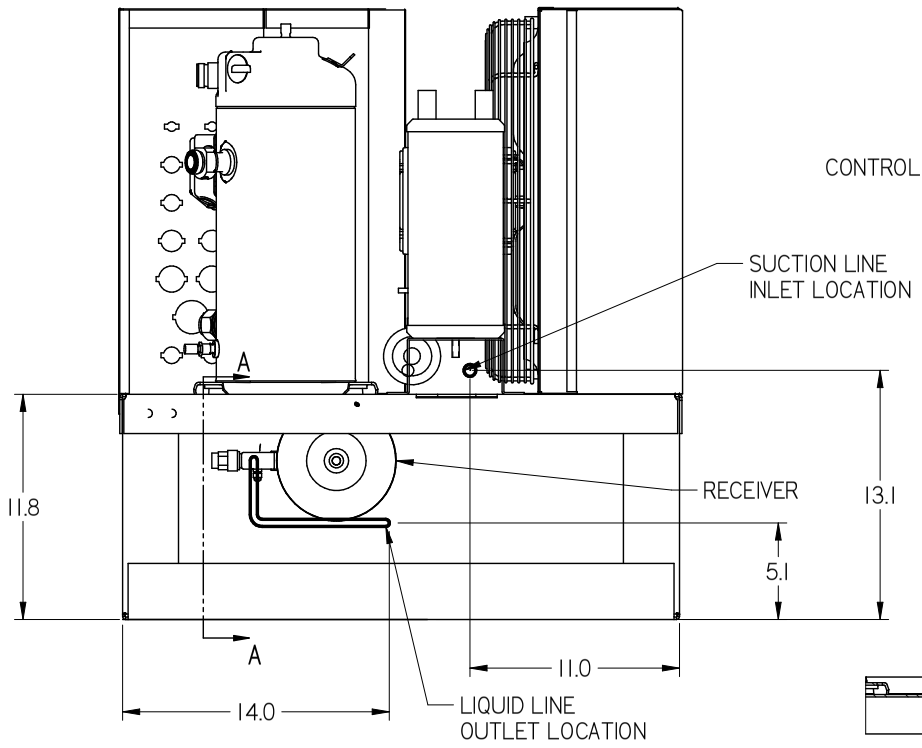
SHEET 1 OF 3

HUSSMANN®

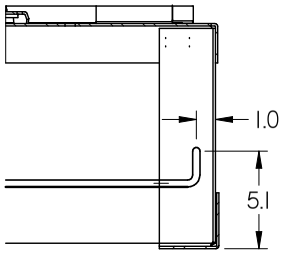
HIGH EFFICIENCY H-SERIES SMALL INDOOR HD BASE

DOC PD-000000009 REV D

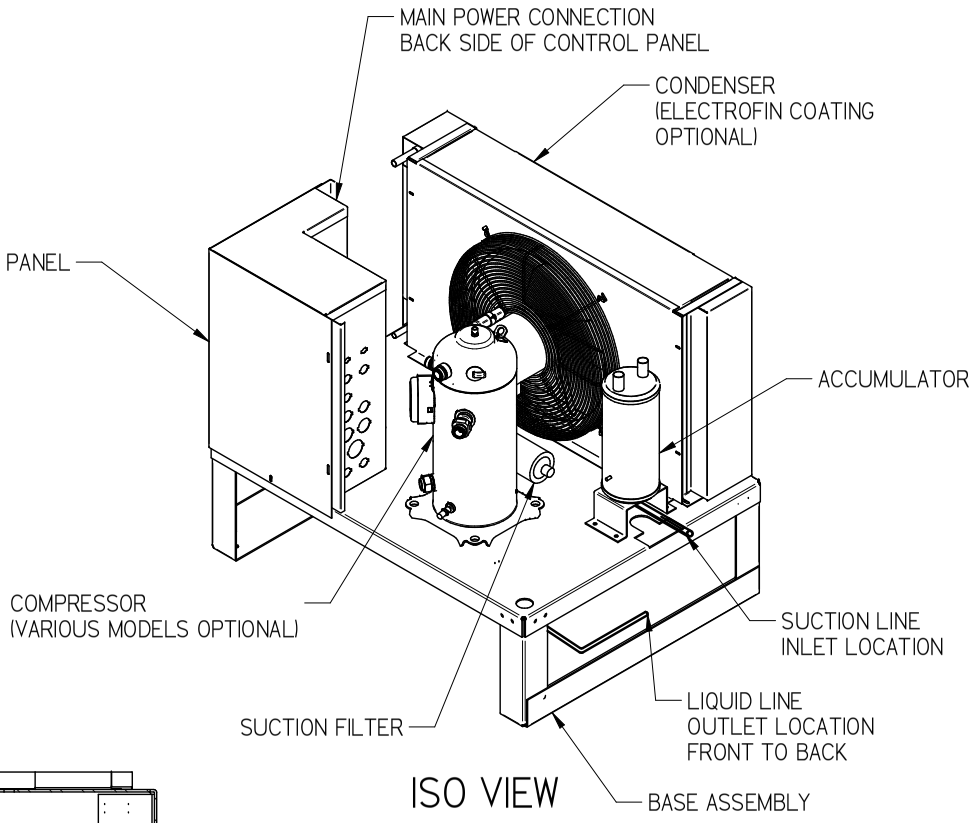
SWN I.O SUBMITTAL SHEET SIZE D



PIPING CONNECTION LOCATION
OUT RIGHT SIDE OF UNIT



SECTION A-A



ISO VIEW

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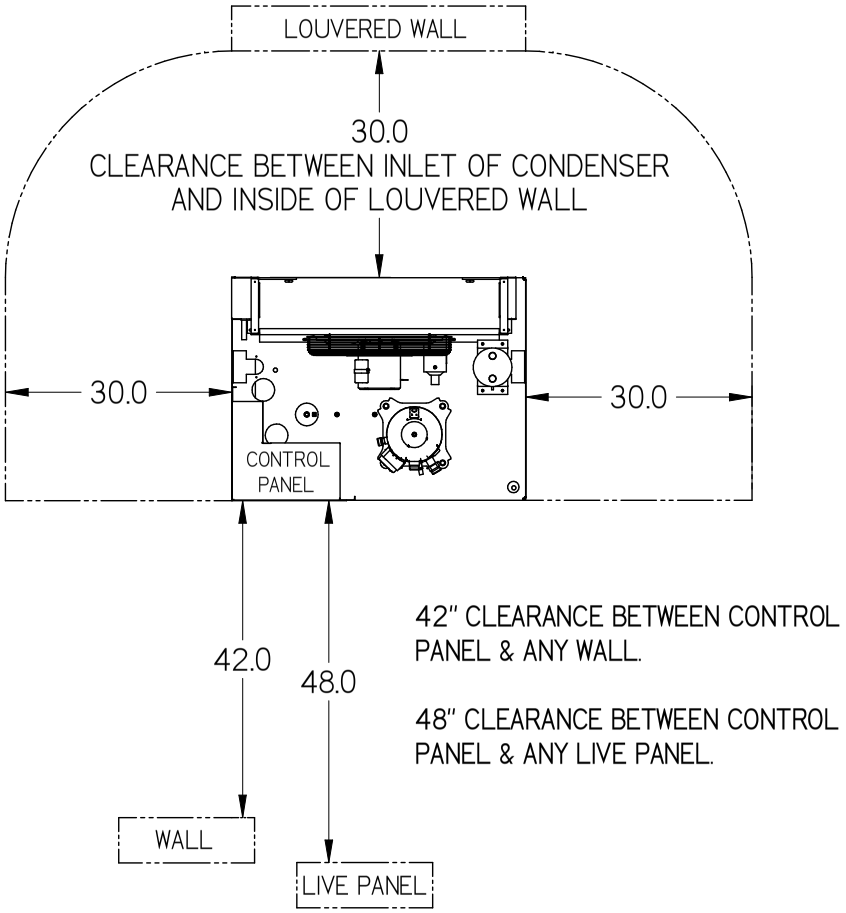
DIMENSIONS ARE IN INCHES	HUSSMANN®
DRAWN: DEC 2019	HIGH EFFICIENCY H-SERIES SMALL INDOOR HD BASE
THIRD ANGLE PROJECTION	DOC PD-000000009 REV D
INFORMATION SUBJECT TO CHANGE	SHEET 2 OF 3

SWK I.D. SUBMITTAL SHEET SIZE D

MINIMUM CLEARANCE REQUIREMENTS:

ACTUAL CLEARANCE REQUIREMENTS ARE DEPENDENT UPON AUTHORITY HAVING JURISDICTION, AND MAY EXCEED DIMENSIONS SHOWN.



42" CLEARANCE BETWEEN CONTROL PANEL & ANY WALL.

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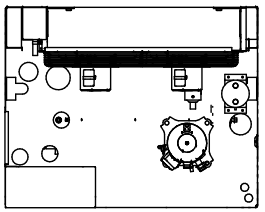
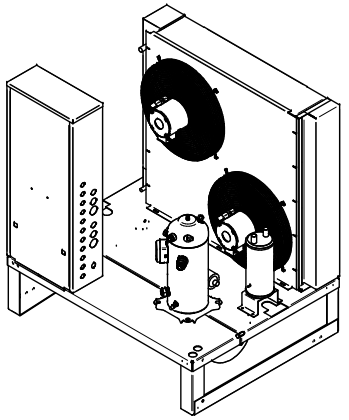
INFORMATION SUBJECT TO CHANGE

DIMENSIONS ARE IN INCHES	HUSSMANN®
DRAWN: DEC 2019	HIGH EFFICIENCY H-SERIES SMALL INDOOR HD BASE
THIRD ANGLE PROJECTION	DOC PD-000000009 REV D
SHEET 3 OF 3	SWN_1.0_SUBMITTAL_SHEET_SIZE_D

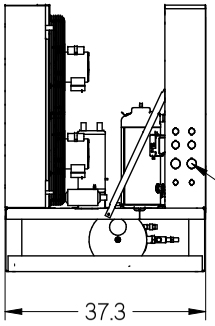
HIGH EFFICIENCY
H-SERIES
MEDIUM SIZE
INDOOR UNIT
HEAVY DUTY BASE
"HxHx-xxxxxxx-xx-x"
WEIGHT: 650 LBS.



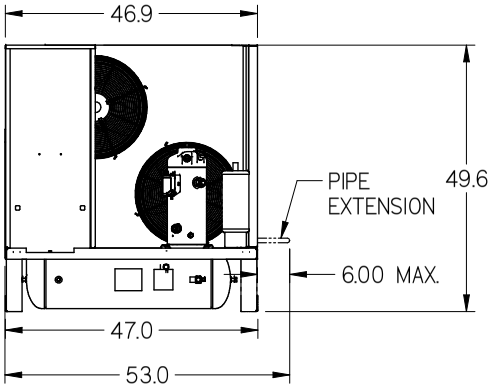
TOP VIEW



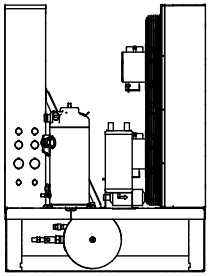
ISO VIEW



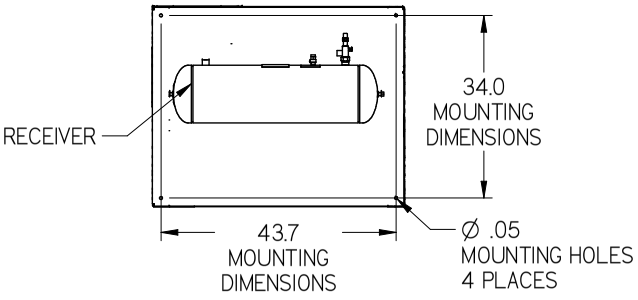
LEFT SIDE VIEW



FRONT VIEW



RIGHT SIDE VIEW

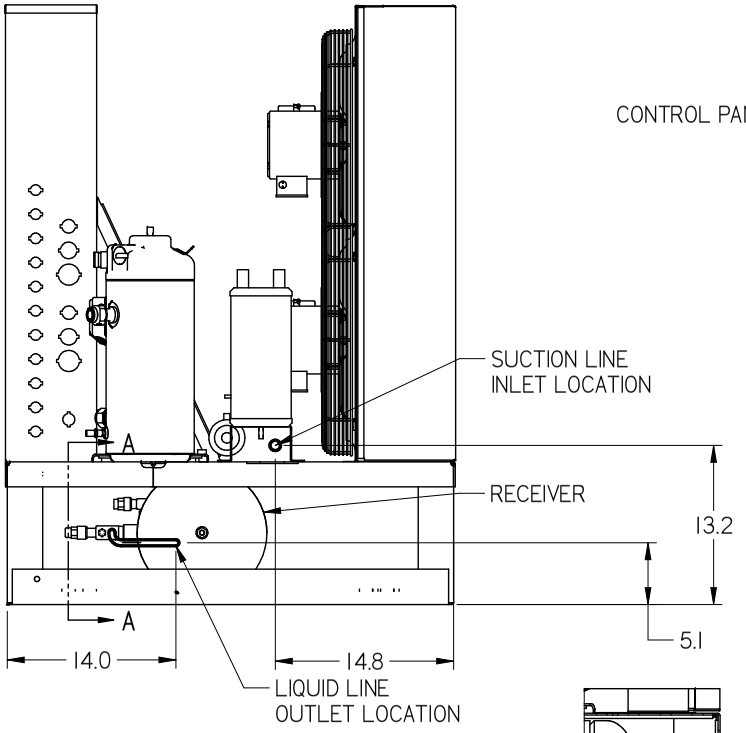


BOTTOM VIEW

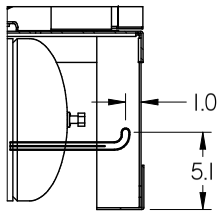
NOTES:
1. IT IS THE RESPONSIBILITY OF THE INSTALLING CONTRACTOR TO ENSURE THAT THE FINAL EQUIPMENT INSTALLATION MEETS ALL APPLICABLE CODE REQUIREMENTS.
2. ILLUSTRATION SHOWN IS FOR GENERAL REPRESENTATION ONLY. ACTUAL PRODUCT WILL VARY DEPENDENT UPON APPLICATION.
3. OVERALL DIMENSIONS: 53.0 L X 37.3 W X 49.6 H.

INFORMATION SUBJECT TO CHANGE

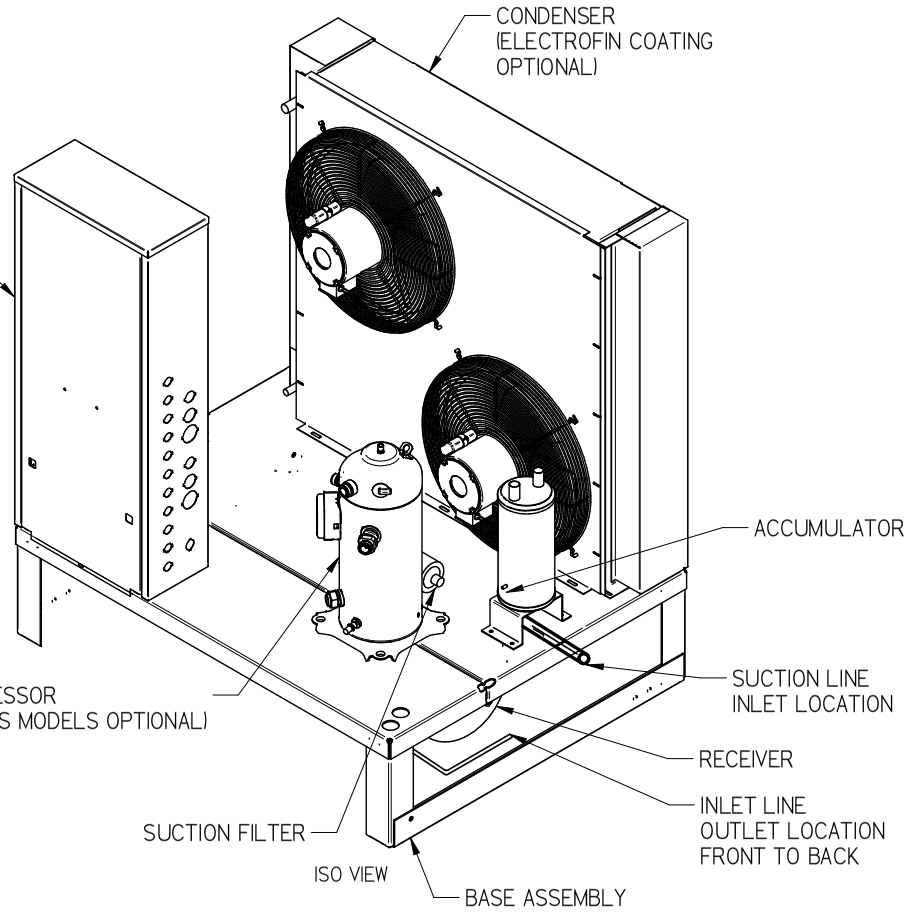
DIMENSIONS ARE IN INCHES	HUSSMANN®
DRAWN: DEC 2019	HIGH EFFICIENCY H-SERIES MEDIUM INDOOR HD BASE
THIRD ANGLE PROJECTION	DOC PD-000000010 REV D
SHEET 1 OF 3	SWN1.10 SUBMITTAL SHEET SIZE D



PIPING CONNECTION LOCATION
OUT RIGHT SIDE OF UNIT



SECTION A-A



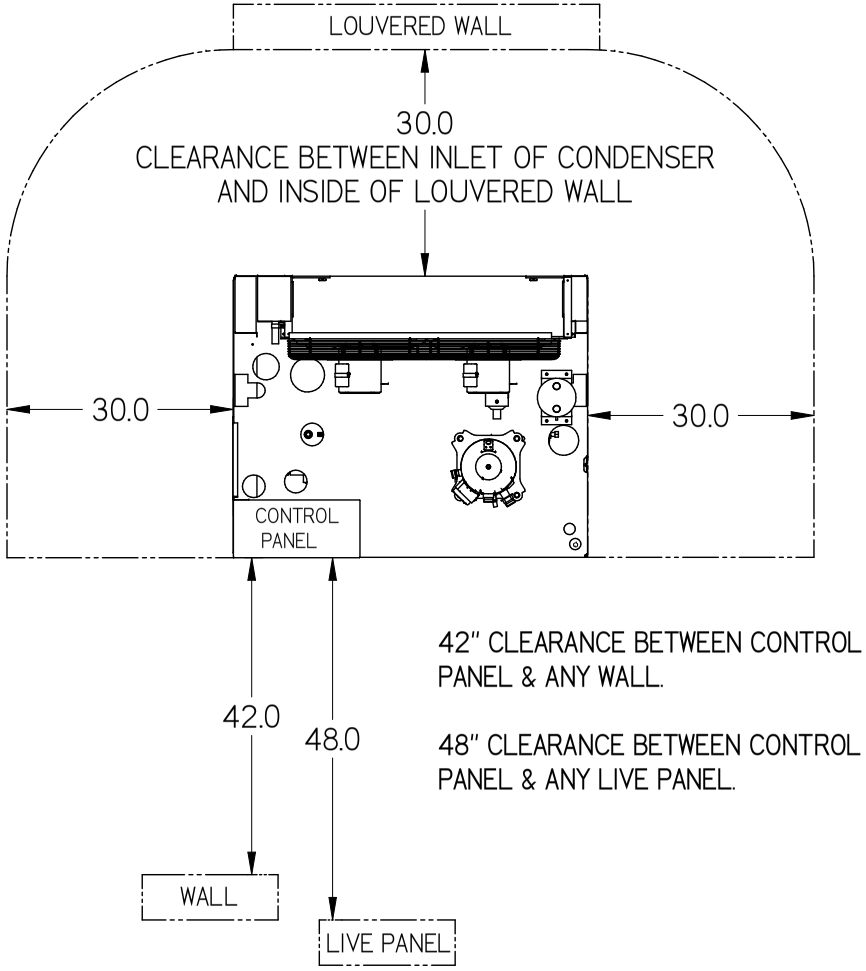
NOTES:
1. IT IS THE RESPONSIBILITY OF THE INSTALLING CONTRACTOR TO ENSURE THAT THE FINAL EQUIPMENT INSTALLATION MEETS ALL APPLICABLE CODE REQUIREMENTS.
2. ILLUSTRATION SHOWN IS FOR GENERAL REPRESENTATION ONLY. ACTUAL PRODUCT WILL VARY DEPENDENT UPON APPLICATION.
3. OVERALL DIMENSIONS: 53.0 L X 37.3 W X 49.6 H.

INFORMATION SUBJECT TO CHANGE

DIMENSIONS ARE IN INCHES	HUSSMANN®
DRAWN: DEC 2019	HIGH EFFICIENCY H-SERIES MEDIUM INDOOR HD BASE
THIRD ANGLE PROJECTION	DOC PD-000000010 REV D
SHEET 2 OF 3	SWN 1.0 SUBMITTAL SHEET SIZE D

MINIMUM CLEARANCE REQUIREMENTS:

ACTUAL CLEARANCE REQUIREMENTS ARE DEPENDENT UPON AUTHORITY HAVING JURISDICTION, AND MAY EXCEED DIMENSIONS SHOWN.



42" CLEARANCE BETWEEN CONTROL PANEL & ANY WALL.

48" CLEARANCE BETWEEN CONTROL PANEL & ANY LIVE PANEL.

NOTES:
1. IT IS THE RESPONSIBILITY OF THE INSTALLING CONTRACTOR TO ENSURE THAT THE FINAL EQUIPMENT INSTALLATION MEETS ALL APPLICABLE CODE REQUIREMENTS.
2. ILLUSTRATION SHOWN IS FOR GENERAL REPRESENTATION ONLY. ACTUAL PRODUCT WILL VARY DEPENDENT UPON APPLICATION.
3. OVERALL DIMENSIONS: 53.0 L X 37.3 W X 49.6 H.

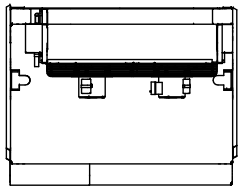
INFORMATION SUBJECT TO CHANGE

DIMENSIONS ARE IN INCHES
DRAWN: DEC 2019
THIRD ANGLE PROJECTION
SHEET 3 OF 3

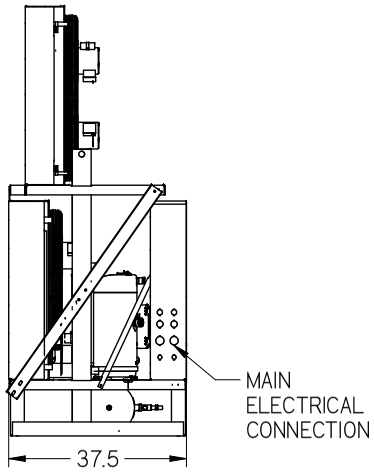
HUSSMANN®
HIGH EFFICIENCY H-SERIES MEDIUM INDOOR HD BASE
DOC PD-000000010 REV D

SMN 1.0 SUBMITTAL SHEET SIZE D

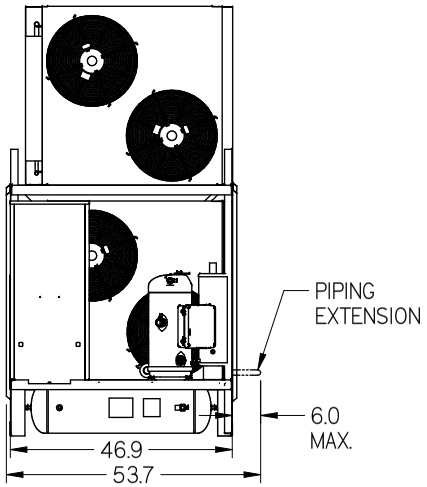
HIGH EFFICIENCY
H-SERIES
LARGE SIZE
INDOOR UNIT
HEAVY DUTY BASE
"HxHx-xxxxxxx-xx-x"
WEIGHT: 1,250 LBS.



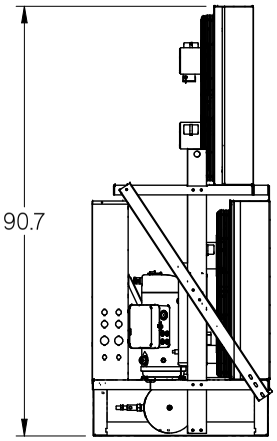
TOP VIEW



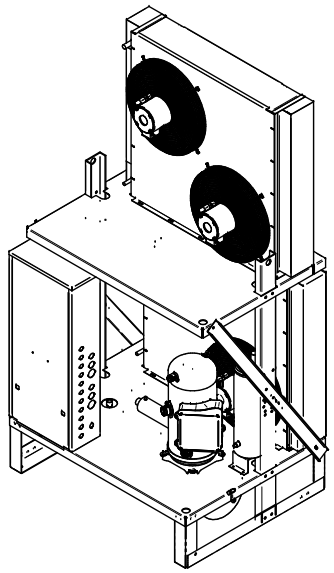
LEFT SIDE VIEW



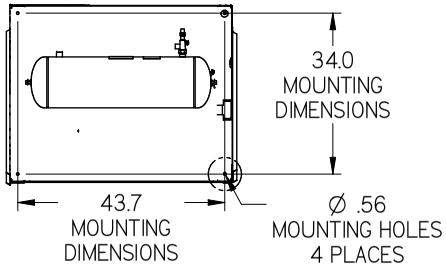
FRONT VIEW



RIGHT SIDE VIEW



ISO VIEW



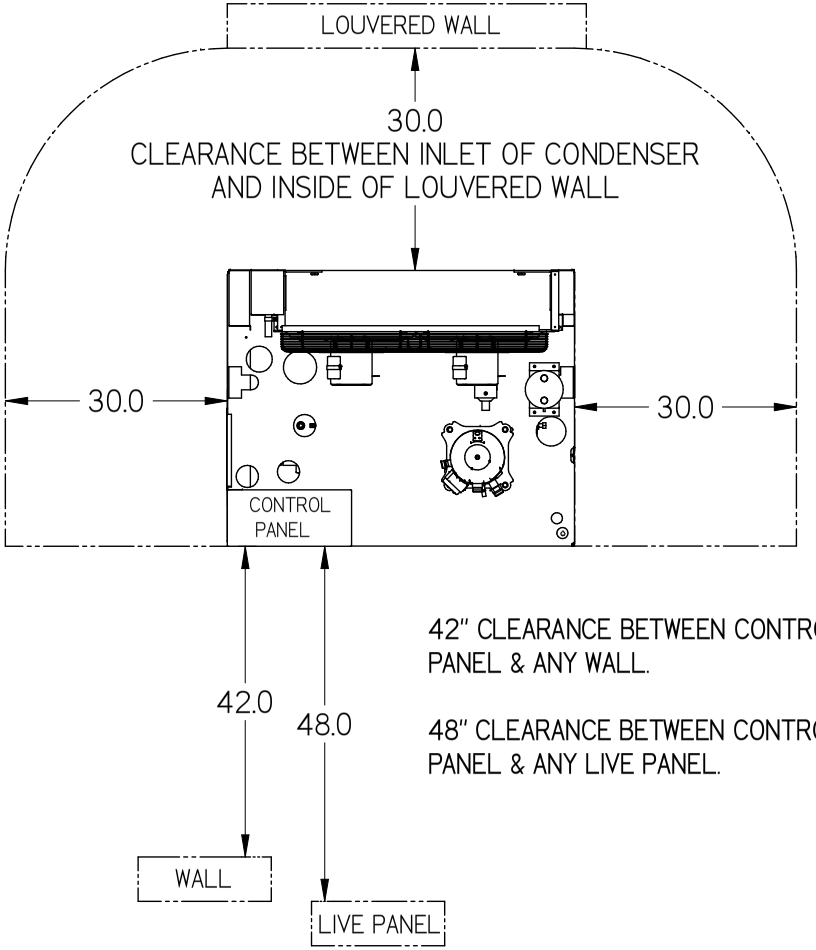
NOTES:
1. IT IS THE RESPONSIBILITY OF THE INSTALLING CONTRACTOR TO ENSURE THAT THE FINAL EQUIPMENT INSTALLATION MEETS ALL APPLICABLE CODE REQUIREMENTS.
2. ILLUSTRATION SHOWN IS FOR GENERAL REPRESENTATION ONLY. ACTUAL PRODUCT WILL VARY DEPENDENT UPON APPLICATION.
3. OVERALL DIMENSIONS: 53.7 L X 37.5 W X 90.7 H.

INFORMATION SUBJECT TO CHANGE

DIMENSIONS ARE IN INCHES	HUSSMANN®
DRAWN: DEC 2019	HIGH EFFICIENCY H-SERIES LARGE INDOOR HD BASE
THIRD ANGLE PROJECTION	DOC PD-000000011 REV D
SHEET 1 OF 2	SWN: I.O SUBMITTAL SHEET SIZE: D

MINIMUM CLEARANCE REQUIREMENTS:

ACTUAL CLEARANCE REQUIREMENTS ARE DEPENDENT UPON AUTHORITY HAVING JURISDICTION, AND MAY EXCEED DIMENSIONS SHOWN.



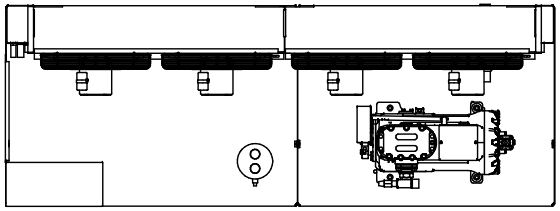
42" CLEARANCE BETWEEN CONTROL PANEL & ANY WALL.

48" CLEARANCE BETWEEN CONTROL PANEL & ANY LIVE PANEL.

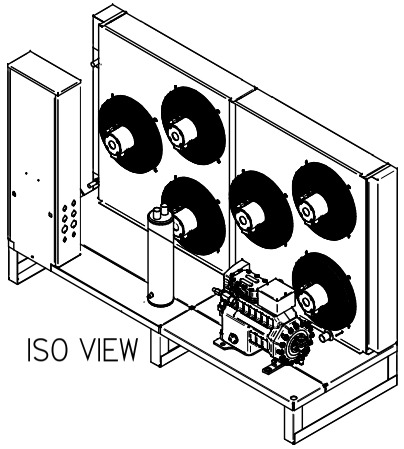
NOTES:
1. IT IS THE RESPONSIBILITY OF THE INSTALLING CONTRACTOR TO ENSURE THAT THE FINAL EQUIPMENT INSTALLATION MEETS ALL APPLICABLE CODE REQUIREMENTS.
2. ILLUSTRATION SHOWN IS FOR GENERAL REPRESENTATION ONLY. ACTUAL PRODUCT WILL VARY DEPENDENT UPON APPLICATION.
3. OVERALL DIMENSIONS: 53.7 L X 37.5 W X 90.7 H.

DIMENSIONS ARE IN INCHES	HUSSMANN®	
DRAWN: DEC 2019	HIGH EFFICIENCY H-SERIES LARGE INDOOR HD BASE	
THIRD ANGLE PROJECTION	DOC PD-000000011	REV D
INFORMATION SUBJECT TO CHANGE	SHEET 2 OF 2	SWN 10 SUBMITTAL SHEET SIZE D

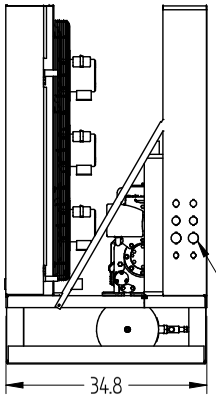
HIGH EFFICIENCY H-SERIES EXTRA LARGE SIZE INDOOR UNIT HEAVY DUTY BASE "HxHx-xxxxxxx-xx-x" WEIGHT: 1,575 LBS.



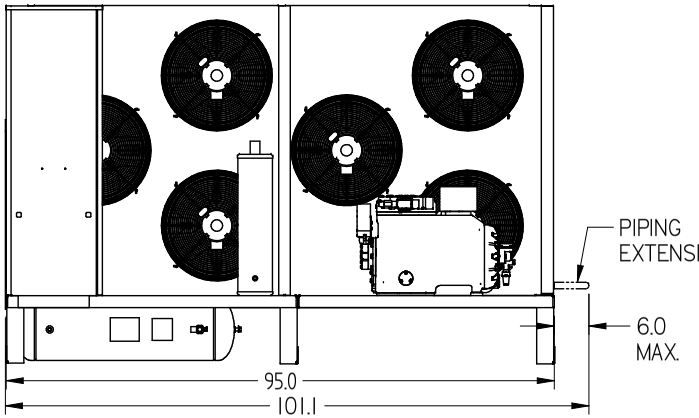
TOP VIEW



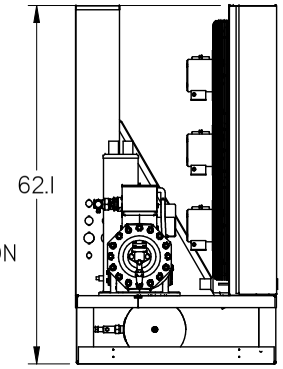
ISO VIEW



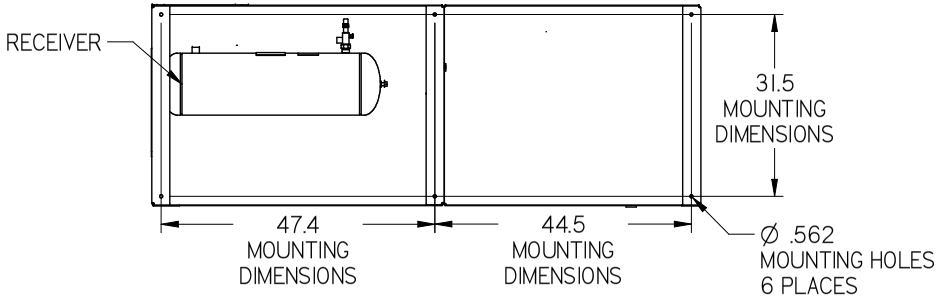
LEFT SIDE VIEW



FRONT VIEW



RIGHT SIDE VIEW



BOTTOM VIEW

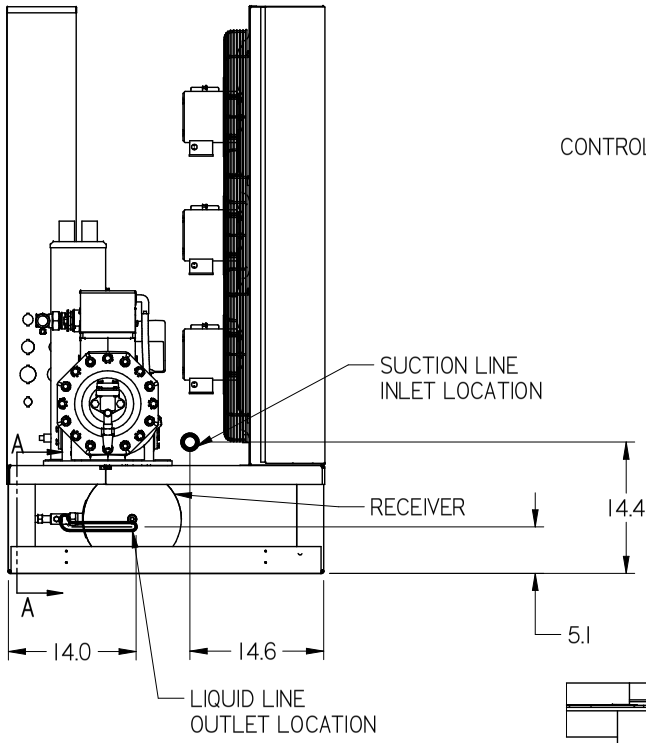
NOTES:
1. IT IS THE RESPONSIBILITY OF THE INSTALLING CONTRACTOR TO ENSURE THAT THE FINAL EQUIPMENT INSTALLATION MEETS ALL APPLICABLE CODE REQUIREMENTS.
2. ILLUSTRATION SHOWN IS FOR GENERAL REPRESENTATION ONLY. ACTUAL PRODUCT WILL VARY DEPENDENT UPON APPLICATION.
3. OVERALL DIMENSIONS: 101.1 L X 34.8 W X 62.1 H.

INFORMATION SUBJECT TO CHANGE

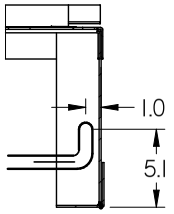
DIMENSIONS ARE IN INCHES
DRAWN: DEC 2019
THIRD ANGLE PROJECTION
SHEET 1 OF 3

HUSSMANN®
HIGH EFFICIENCY H-SERIES EXTRA LARGE INDOOR HD BASE
DOC PD-000000012 REV D

SWN I.O SUBMITTAL SHEET SIZE D



PIPING CONNECTION LOCATION
OUT RIGHT SIDE OF UNIT



SECTION A-A

ISO VIEW

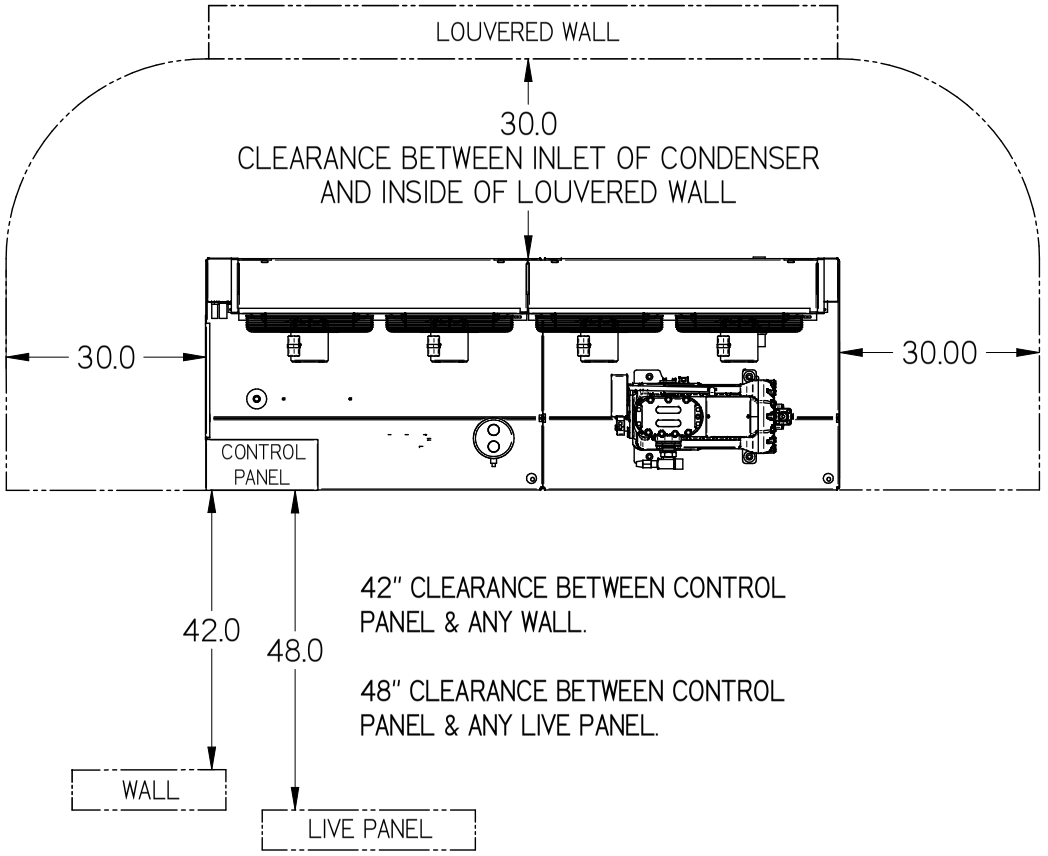
NOTES:
1. IT IS THE RESPONSIBILITY OF THE INSTALLING CONTRACTOR TO ENSURE THAT THE FINAL EQUIPMENT INSTALLATION MEETS ALL APPLICABLE CODE REQUIREMENTS.
2. ILLUSTRATION SHOWN IS FOR GENERAL REPRESENTATION ONLY. ACTUAL PRODUCT WILL VARY DEPENDENT UPON APPLICATION.
3. OVERALL DIMENSIONS: 101.1 L X 34.8 W X 62.1 H.

DIMENSIONS ARE IN INCHES	HUSSMANN®
DRAWN: DEC 2019	HIGH EFFICIENCY H-SERIES EXTRA LARGE INDOOR HD BASE
THIRD ANGLE PROJECTION	DOC PD-000000012 REV D
SHEET 2 OF 3	SMN 1.0 SUBMITTAL SHEET SIZE D

INFORMATION SUBJECT TO CHANGE

MINIMUM CLEARANCE REQUIREMENTS:

ACTUAL CLEARANCE REQUIREMENTS ARE DEPENDENT UPON AUTHORITY HAVING JURISDICTION, AND MAY EXCEED DIMENSIONS SHOWN.



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2. ILLUSTRATION SHOWN IS FOR GENERAL REPRESENTATION ONLY. ACTUAL PRODUCT WILL VARY DEPENDENT UPON APPLICATION.
3. OVERALL DIMENSIONS: 101.1 L X 34.8 W X 62.1 H.

INFORMATION SUBJECT TO CHANGE

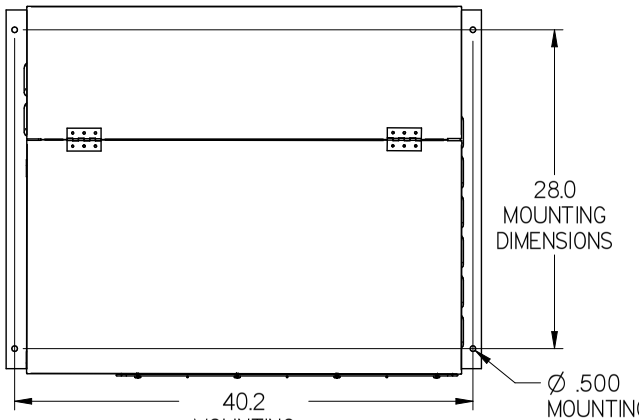
DIMENSIONS ARE IN INCHES
DRAWN: DEC 2019
THIRD ANGLE PROJECTION
SHEET 3 OF 3

HUSSMANN®
HIGH EFFICIENCY H-SERIES EXTRA LARGE INDOOR HD BASE
DOC PD-000000012 REV D

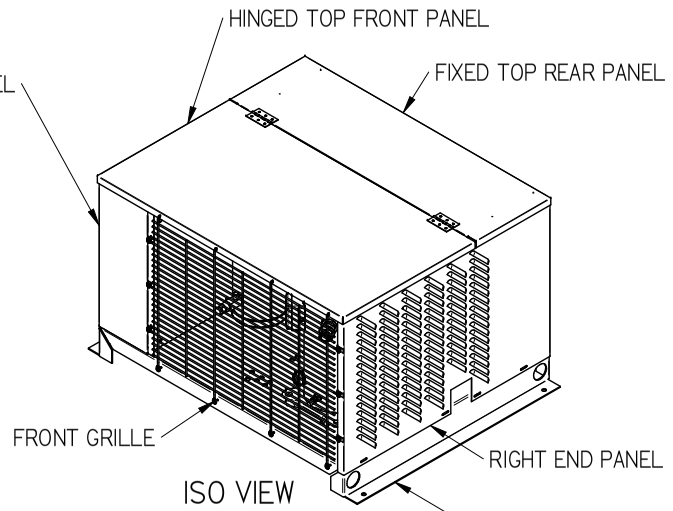
SWN I.O SUBMITTAL SHEET SIZE D

HIGH EFFICIENCY H-SERIES SMALL SIZE OUTDOOR UNIT STANDARD BASE "HxSx-xxxxxxx-xx-x"

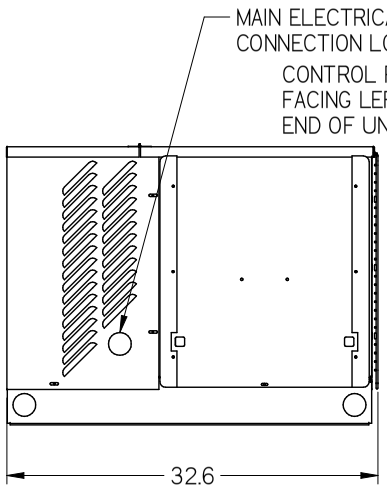
WEIGHT: 400 LBS.



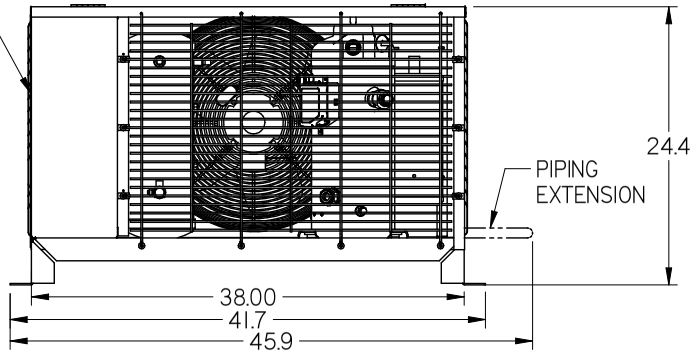
TOP VIEW



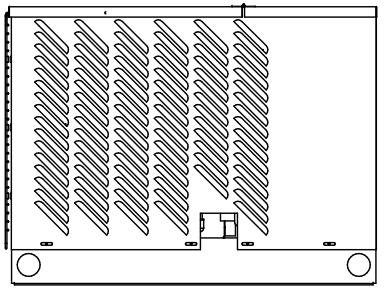
ISO VIEW



LEFT SIDE VIEW



FRONT VIEW



RIGHT SIDE VIEW

NOTES:
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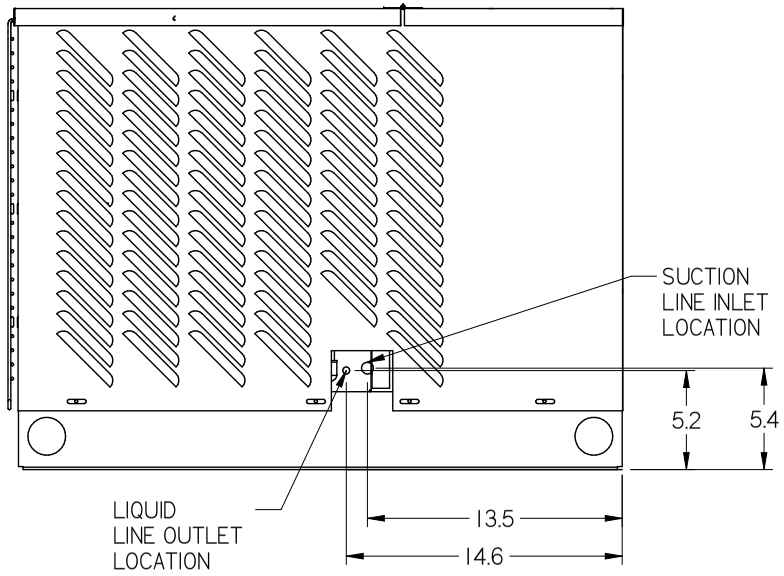
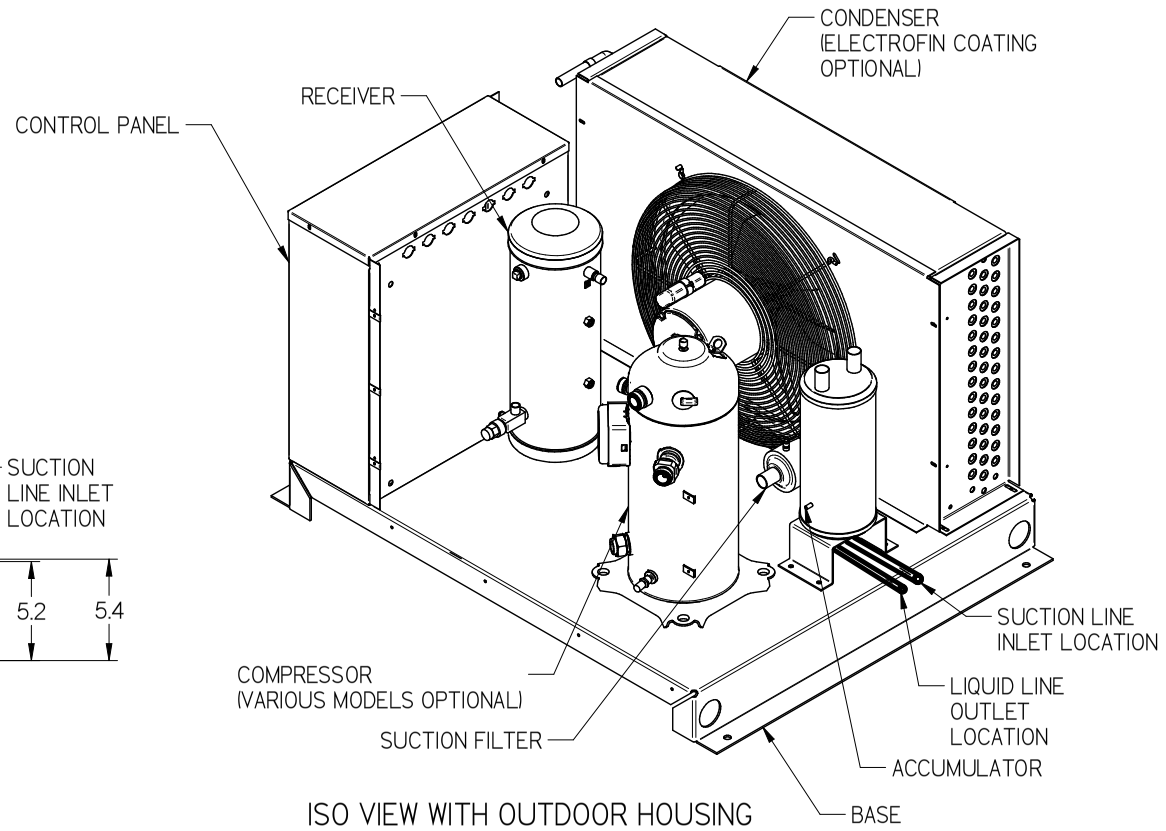
2. ILLUSTRATION SHOWN IS FOR GENERAL REPRESENTATION ONLY. ACTUAL PRODUCT WILL VARY DEPENDENT UPON APPLICATION.
3. OVERALL DIMENSIONS: 45.9 L X 32.6 W X 24.4 H.

DIMENSIONS ARE IN INCHES	HUSSMANN®
DRAWN: DEC 2019	HIGH EFFICIENCY H-SERIES SMALL OUTDOOR STD BASE
THIRD ANGLE PROJECTION	DOC PD-000000013 REV D
INFORMATION SUBJECT TO CHANGE	SHEET 1 OF 3

SWN 1.0 SUBMITTAL SHEET SIZE D



PIPING CONNECTION LOCATION
OUT RIGHT SIDE OF UNIT



ISO VIEW WITH OUTDOOR HOUSING
REMOVED FOR CLARITY

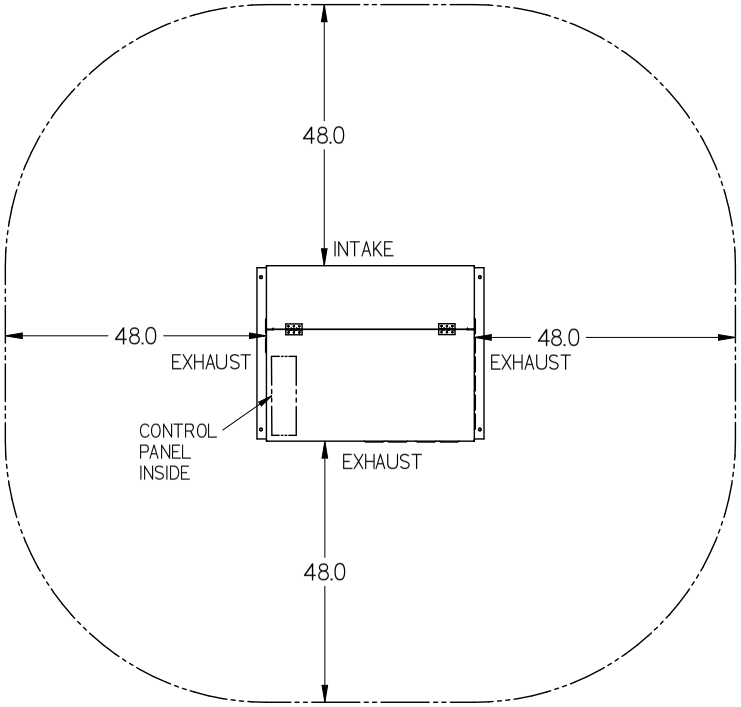
NOTES:
1. IT IS THE RESPONSIBILITY OF THE INSTALLING CONTRACTOR TO ENSURE THAT THE FINAL EQUIPMENT INSTALLATION MEETS ALL APPLICABLE CODE REQUIREMENTS.
2. ILLUSTRATION SHOWN IS FOR GENERAL REPRESENTATION ONLY. ACTUAL PRODUCT WILL VARY DEPENDENT UPON APPLICATION.
3. OVERALL DIMENSIONS: 45.9 L X 32.6 W X 24.4 H.

DIMENSIONS ARE IN INCHES	HUSSMANN®
DRAWN: DEC 2019	HIGH EFFICIENCY H-SERIES SMALL OUTDOOR STD BASE
THIRD ANGLE PROJECTION	DOC PD-000000013 REV D
INFORMATION SUBJECT TO CHANGE	SHEET 2 OF 3

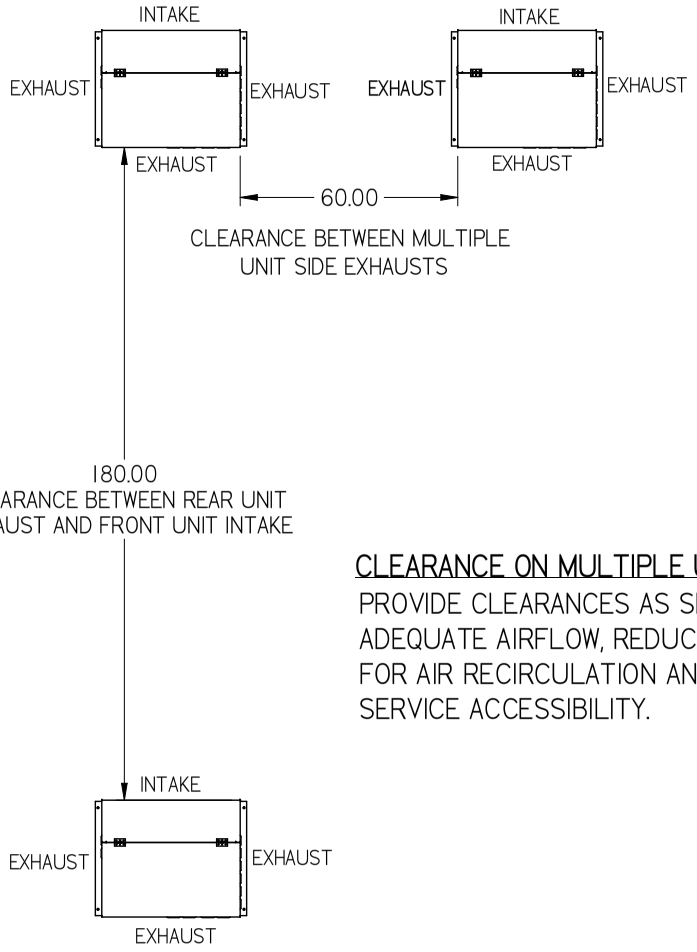
SWM 1.0 SUBMITTAL SHEET SIZE D

MINIMUM CLEARANCE REQUIREMENTS:

ACTUAL CLEARANCE REQUIREMENTS ARE DEPENDENT UPON AUTHORITY HAVING JURISDICTION, AND MAY EXCEED DIMENSIONS SHOWN.



CLEARANCE ON A SINGLE UNIT APPLICATION



CLEARANCE ON MULTIPLE UNIT APPLICATION

PROVIDE CLEARANCES AS SHOWN TO ENSURE ADEQUATE AIRFLOW, REDUCE THE POTENTIAL FOR AIR RECIRCULATION AND FACILITATE SERVICE ACCESSIBILITY.

NOTES:
1. IT IS THE RESPONSIBILITY OF THE INSTALLING CONTRACTOR TO ENSURE THAT THE FINAL EQUIPMENT INSTALLATION MEETS ALL APPLICABLE CODE REQUIREMENTS.
2. ILLUSTRATION SHOWN IS FOR GENERAL REPRESENTATION ONLY. ACTUAL PRODUCT WILL VARY DEPENDENT UPON APPLICATION.
3. OVERALL DIMENSIONS: 45.9 L X 32.6 W X 24.4 H.

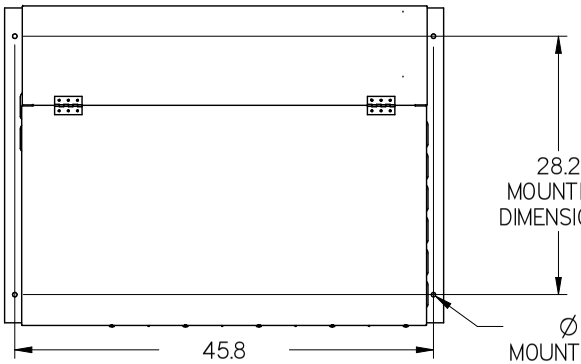
INFORMATION SUBJECT TO CHANGE

DIMENSIONS ARE IN INCHES
DRAWN: DEC 2019
THIRD ANGLE PROJECTION
SHEET 3 OF 3

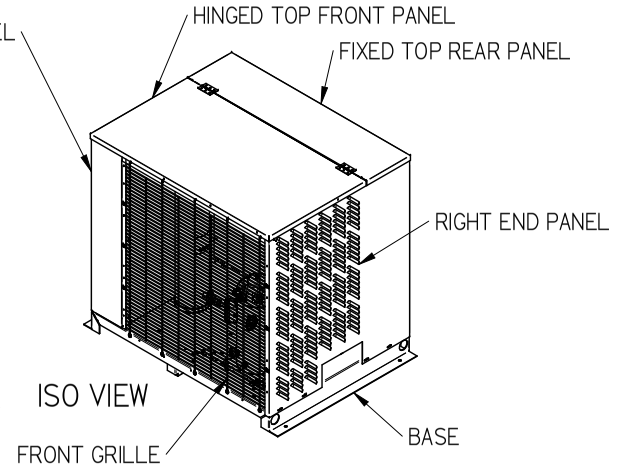
HUSSMANN®
HIGH EFFICIENCY H-SERIES SMALL OUTDOOR STD BASE
DOC PD-000000013 REV D

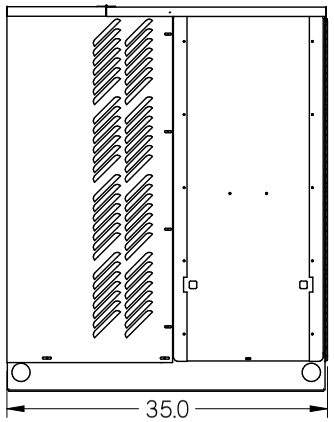
SWN I.D SUBMITTAL SHEET SIZE D

HIGH EFFICIENCY H-SERIES MEDIUM SIZE OUTDOOR UNIT STANDARD BASE "HxSx-xxxxxxx-xx-x" WEIGHT: 650 LBS.

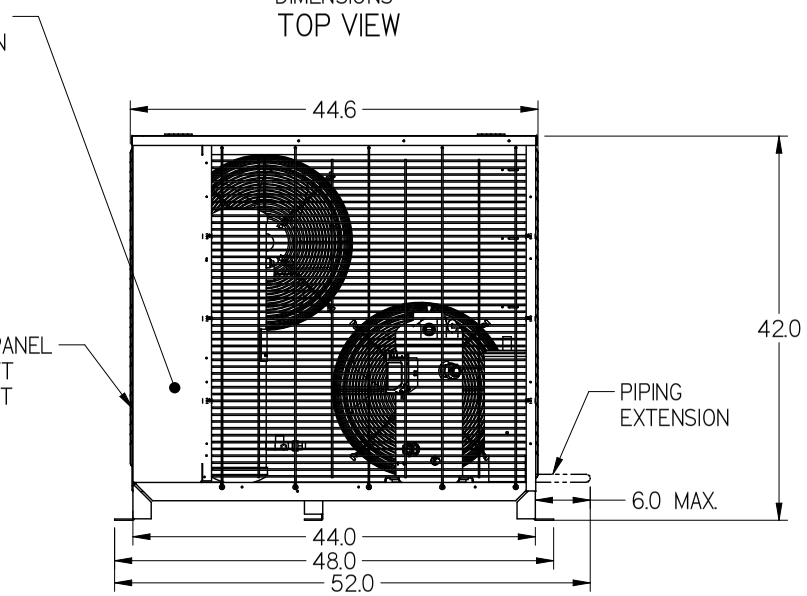


TOP VIEW

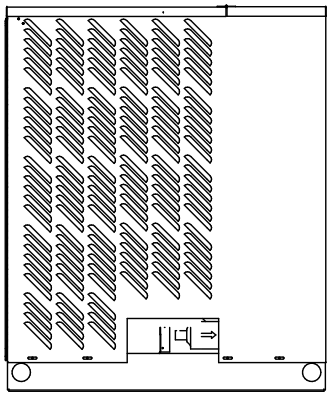




LEFT SIDE VIEW



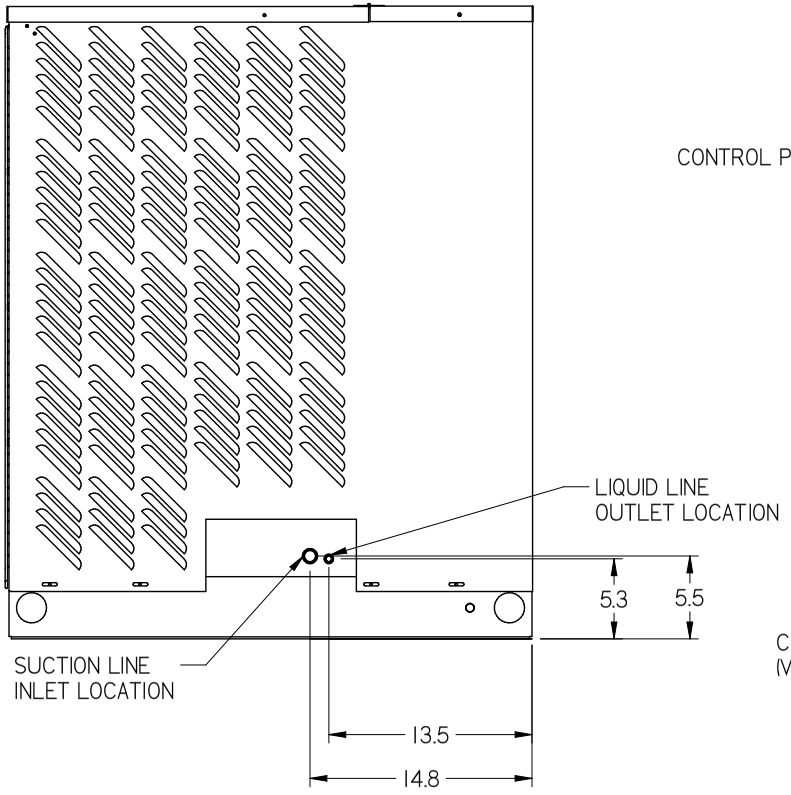
FRONT VIEW


RIGHT SIDE VIEW

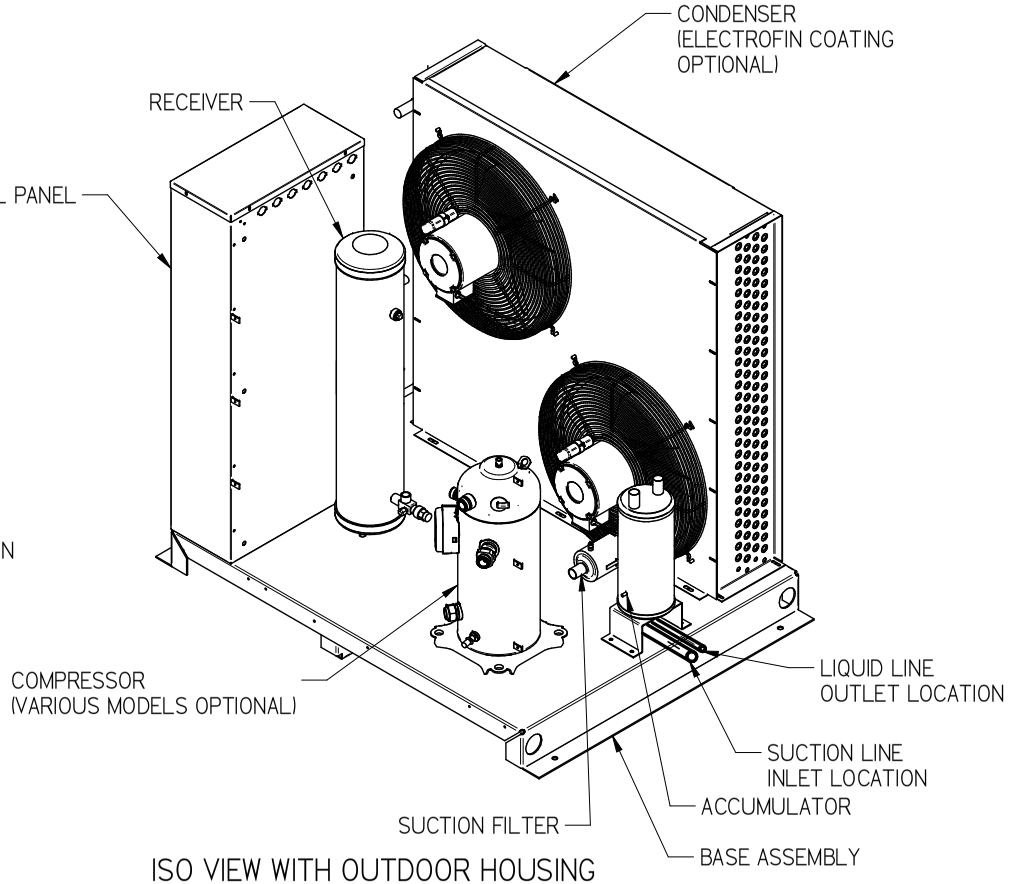
NOTES:
1. IT IS THE RESPONSIBILITY OF THE INSTALLING CONTRACTOR TO ENSURE THAT THE FINAL EQUIPMENT INSTALLATION MEETS ALL APPLICABLE CODE REQUIREMENTS.
2. ILLUSTRATION SHOWN IS FOR GENERAL REPRESENTATION ONLY. ACTUAL PRODUCT WILL VARY DEPENDENT UPON APPLICATION.
3. OVERALL DIMENSIONS: 52.0 L X 35.0 W X 42.0 H.

DIMENSIONS ARE IN INCHES
DRAWN: DEC 2019
THIRD ANGLE PROJECTION
INFORMATION SUBJECT TO CHANGE
SHEET 1 OF 3

HUSSMANN®
HIGH EFFICIENCY H-SERIES MEDIUM OUTDOOR STD BASE
DOC PD-000000014 REV E
SWN I.O SUBMITTAL SHEET SIZE D



PIPING CONNECTION LOCATION
OUT RIGHT SIDE OF UNIT



ISO VIEW WITH OUTDOOR HOUSING
REMOVED FOR CLARITY

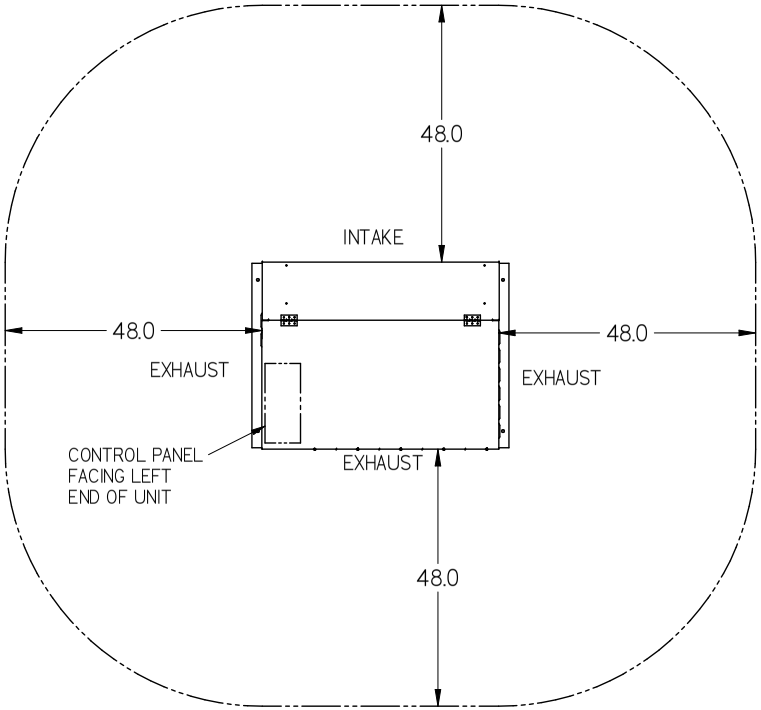
NOTES:
1. IT IS THE RESPONSIBILITY OF THE INSTALLING CONTRACTOR TO ENSURE THAT THE FINAL EQUIPMENT INSTALLATION MEETS ALL APPLICABLE CODE REQUIREMENTS.
2. ILLUSTRATION SHOWN IS FOR GENERAL REPRESENTATION ONLY. ACTUAL PRODUCT WILL VARY DEPENDENT UPON APPLICATION.
3. OVERALL DIMENSIONS: 52.0 L X 35.0 W X 42.0 H.

INFORMATION SUBJECT TO CHANGE

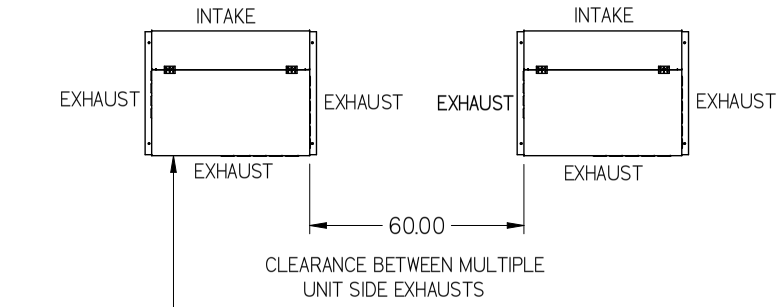
DIMENSIONS ARE IN INCHES	HUSSMANN®
DRAWN: DEC 2019	HIGH EFFICIENCY H-SERIES MEDIUM OUTDOOR STD BASE
THIRD ANGLE PROJECTION	DOC PD-000000014 REV E
SHEET 2 OF 3	SMN 1.0 SUBMITTAL SHEET SIZE D

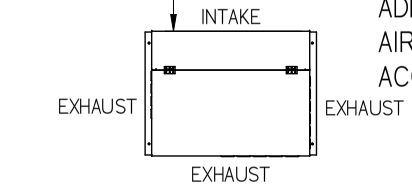
MINIMUM CLEARANCE REQUIREMENTS:

ACTUAL CLEARANCE REQUIREMENTS ARE DEPENDENT UPON AUTHORITY HAVING JURISDICTION, AND MAY EXCEED DIMENSIONS SHOWN.



CLEARANCE ON A SINGLE UNIT APPLICATION





CLEARANCE ON MULTIPLE UNIT APPLICATION

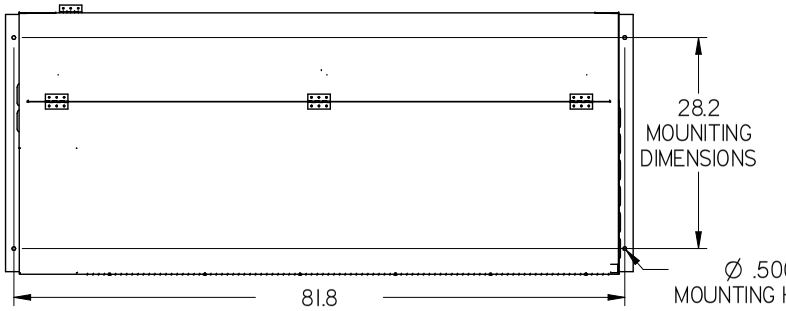
PROVIDE CLEARANCES AS SHOWN TO ENSURE ADEQUATE AIRFLOW, REDUCE THE POTENTIAL FOR AIR RECIRCULATION AND FACILITATE SERVICE ACCESSIBILITY.

NOTES:
1. IT IS THE RESPONSIBILITY OF THE INSTALLING CONTRACTOR TO ENSURE THAT THE FINAL EQUIPMENT INSTALLATION MEETS ALL APPLICABLE CODE REQUIREMENTS.
2. ILLUSTRATION SHOWN IS FOR GENERAL REPRESENTATION ONLY. ACTUAL PRODUCT WILL VARY DEPENDENT UPON APPLICATION.
3. OVERALL DIMENSIONS: 52.0 L X 35.0 W X 42.0 H.

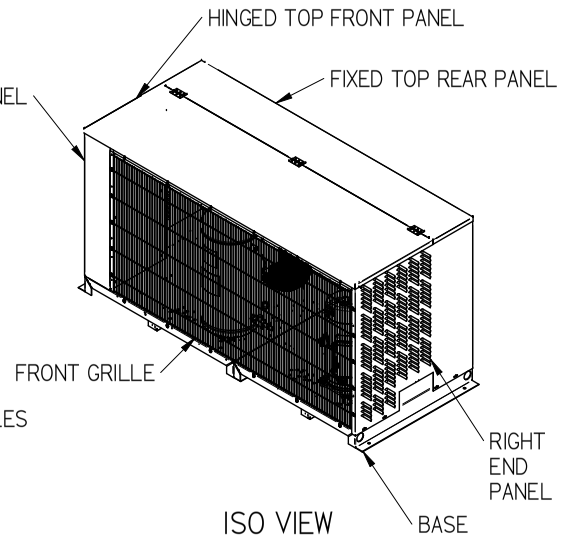
DIMENSIONS ARE IN INCHES	HUSSMANN®
DRAWN DEC 2019	HIGH EFFICIENCY H-SERIES MEDIUM OUTDOOR STD BASE
THIRD ANGLE PROJECTION	DOC PD-000000014 REV E
INFORMATION SUBJECT TO CHANGE	SHEET 3 OF 3

SMN I.D. SUBMITTAL SHEET SIZE D

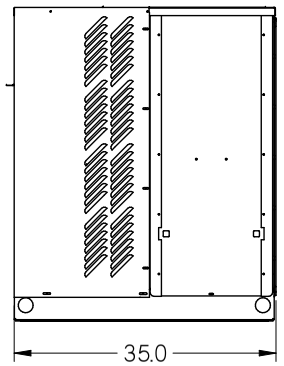
HIGH EFFICIENCY H-SERIES LARGE SIZE OUTDOOR UNIT STANDARD BASE "HxSx-xxxxxxx-xx-x" WEIGHT: 1,250 LBS



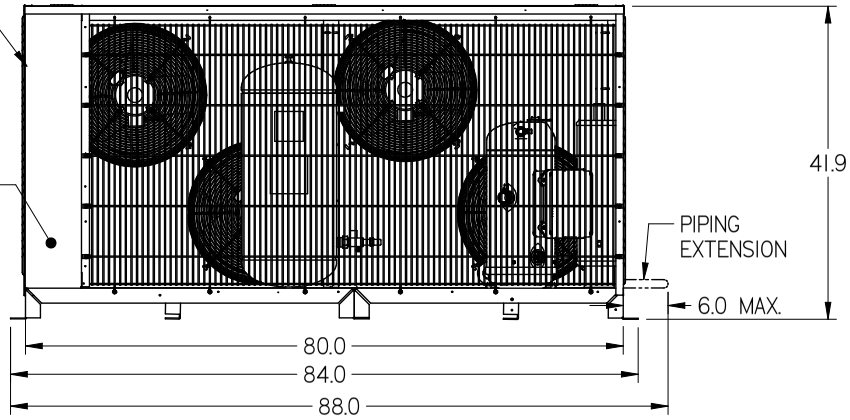
TOP VIEW



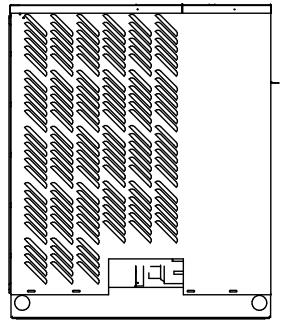
ISO VIEW



LEFT SIDE VIEW



FRONT VIEW

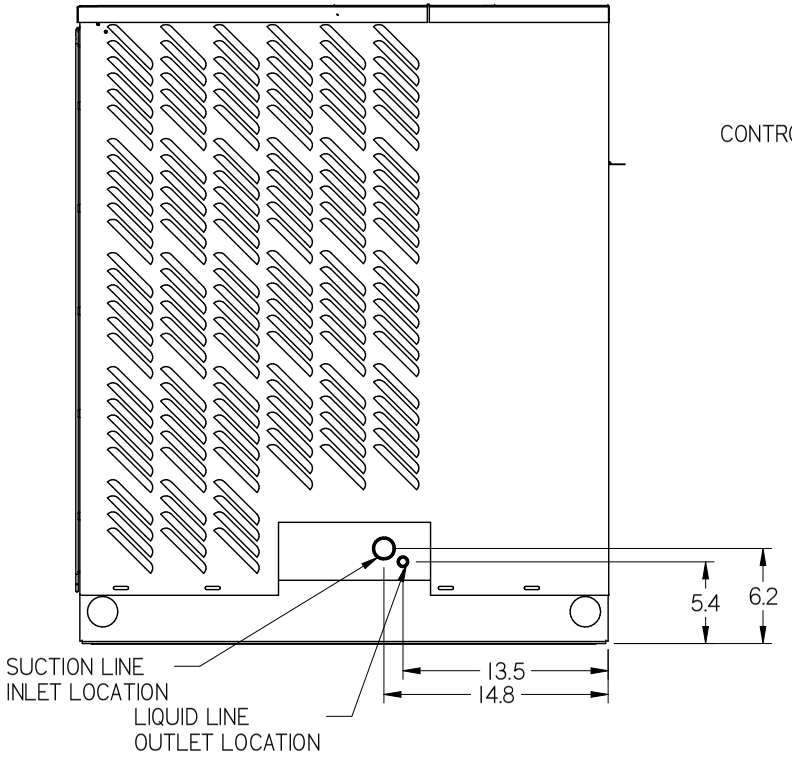


RIGHT SIDE VIEW

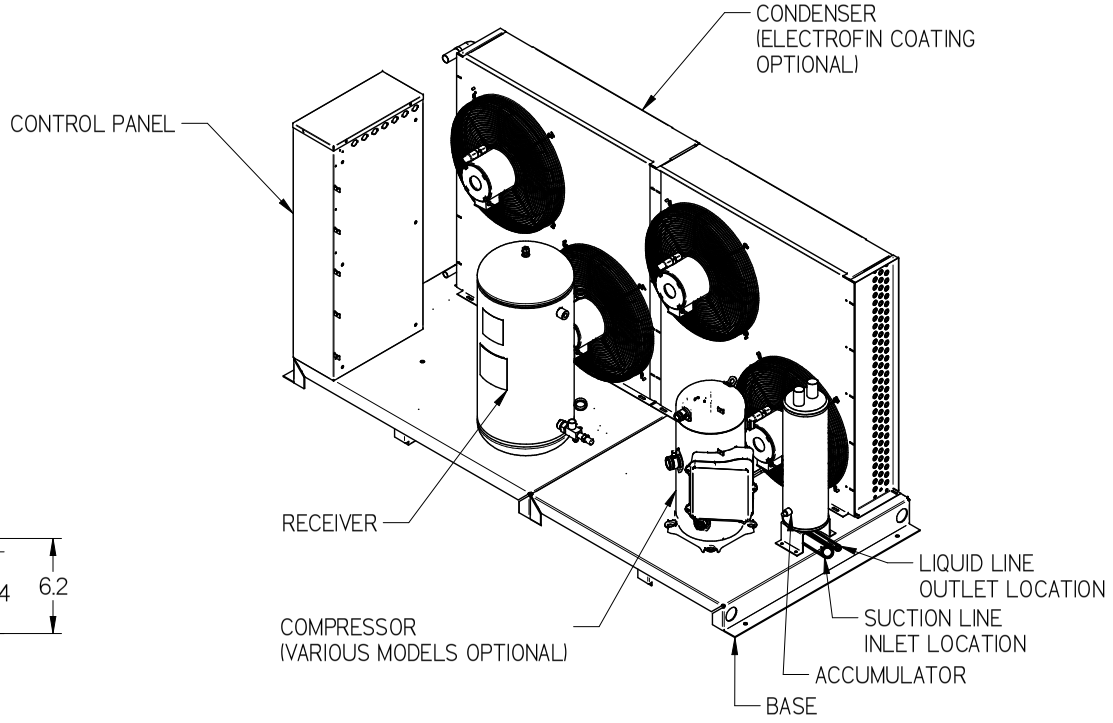
NOTES:
1. IT IS THE RESPONSIBILITY OF THE INSTALLING CONTRACTOR TO ENSURE THAT THE FINAL EQUIPMENT INSTALLATION MEETS ALL APPLICABLE CODE REQUIREMENTS.
2. ILLUSTRATION SHOWN IS FOR GENERAL REPRESENTATION ONLY. ACTUAL PRODUCT WILL VARY DEPENDENT UPON APPLICATION.
3. OVERALL DIMENSIONS: 88.0 L X 35.0 W X 41.9 H.

INFORMATION SUBJECT TO CHANGE

DIMENSIONS ARE IN INCHES	HUSSMANN®
DRAWN DEC 2019	HIGH EFFICIENCY H-SERIES LARGE OUTDOOR STD BASE
THIRD ANGLE PROJECTION	DOC PD-000000015 REV D
SHEET 1 OF 3	SMN I.O SUBMITTAL SHEET SIZE D



PIPING CONNECTION LOCATION
OUT RIGHT SIDE OF UNIT



ISO VIEW WITH OUTDOOR HOUSING
REMOVED FOR CLARITY

NOTES:
1. IT IS THE RESPONSIBILITY OF THE INSTALLING CONTRACTOR TO ENSURE THAT THE FINAL EQUIPMENT INSTALLATION MEETS ALL APPLICABLE CODE REQUIREMENTS.
2. ILLUSTRATION SHOWN IS FOR GENERAL REPRESENTATION ONLY. ACTUAL PRODUCT WILL VARY DEPENDENT UPON APPLICATION.
3. OVERALL DIMENSIONS: 88.0 L X 35.0 W X 41.9 H.

INFORMATION SUBJECT TO CHANGE

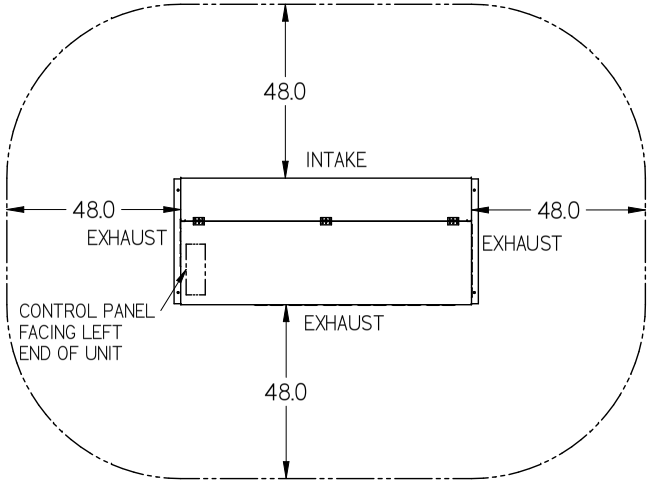
DIMENSIONS ARE IN INCHES
DRAWN: DEC 2019
THIRD ANGLE PROJECTION
SHEET 2 OF 3

HUSSMANN®
HIGH EFFICIENCY
H-SERIES LARGE
OUTDOOR STD BASE
DOC PD-000000015 REV D

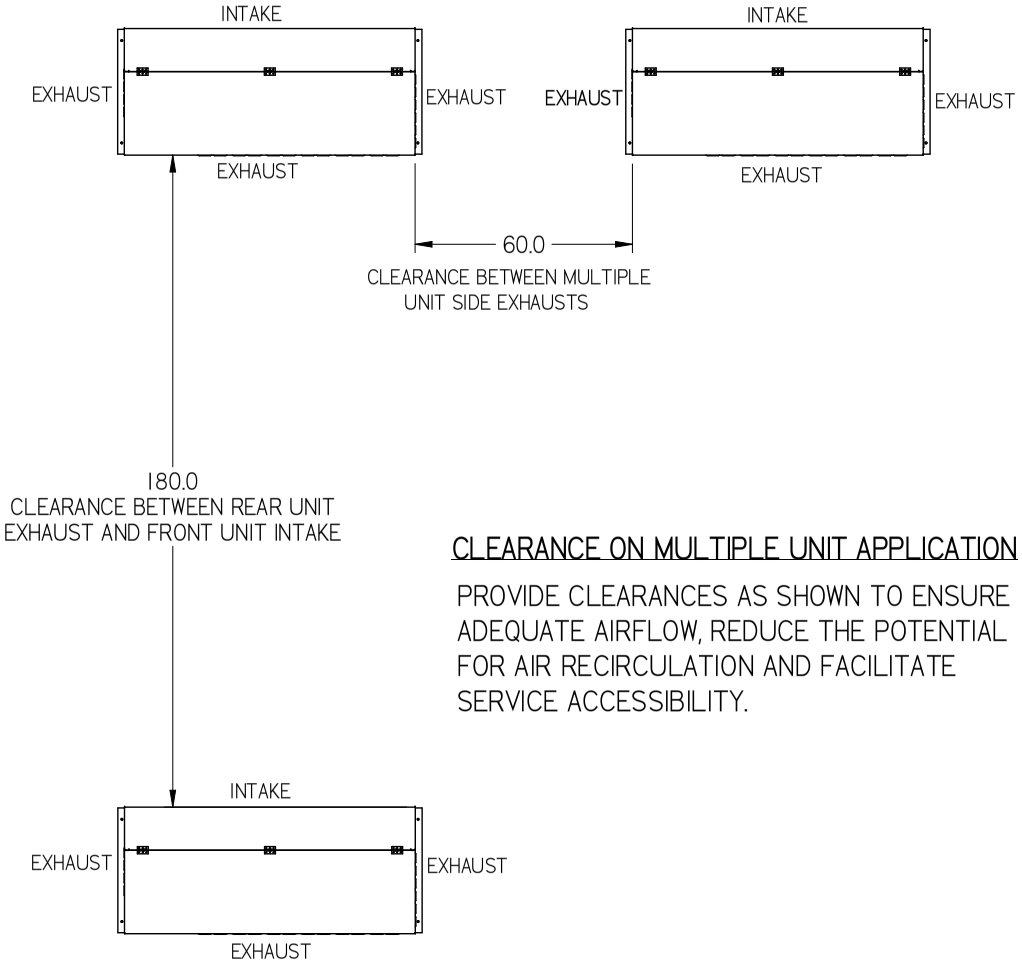
SWN 1.0 SUBMITTAL SHEET SIZE D

MINIMUM CLEARANCE REQUIREMENTS:

ACTUAL CLEARANCE REQUIREMENTS ARE DEPENDENT UPON AUTHORITY HAVING JURISDICTION, AND MAY EXCEED DIMENSIONS SHOWN.



CLEARANCE ON A SINGLE UNIT APPLICATION



CLEARANCE ON MULTIPLE UNIT APPLICATION

PROVIDE CLEARANCES AS SHOWN TO ENSURE ADEQUATE AIRFLOW, REDUCE THE POTENTIAL FOR AIR RECIRCULATION AND FACILITATE SERVICE ACCESSIBILITY.

NOTES:
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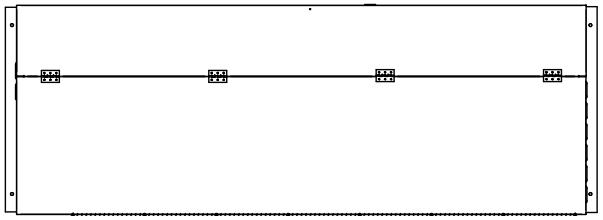
2. ILLUSTRATION SHOWN IS FOR GENERAL REPRESENTATION ONLY. ACTUAL PRODUCT WILL VARY DEPENDENT UPON APPLICATION.
3. OVERALL DIMENSIONS: 88.0 L X 35.0 W X 41.9 H.

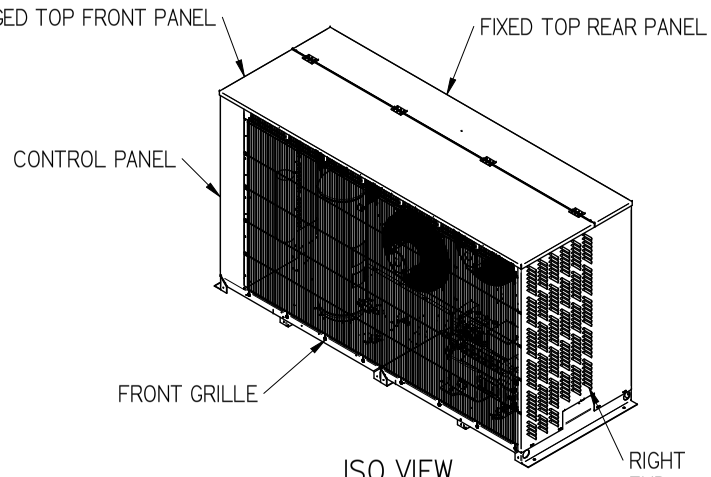
DIMENSIONS ARE IN INCHES	HUSSMANN®
DRAWN: DEC 2019	HIGH EFFICIENCY H-SERIES LARGE OUTDOOR STD BASE
THIRD ANGLE PROJECTION	DOC PD-000000015 REV D
INFORMATION SUBJECT TO CHANGE	SHEET 3 OF 3

SWN I.O SUBMITTAL SHEET SIZE D

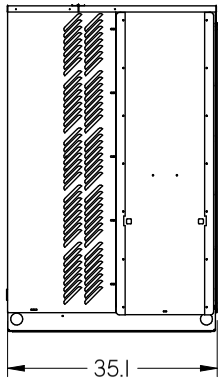
HIGH EFFICIENCY H-SERIES EXTRA LARGE SIZE OUTDOOR UNIT STANDARD BASE "HxSx-xxxxxxx-xx-x" WEIGHT: 1,575 LBS.



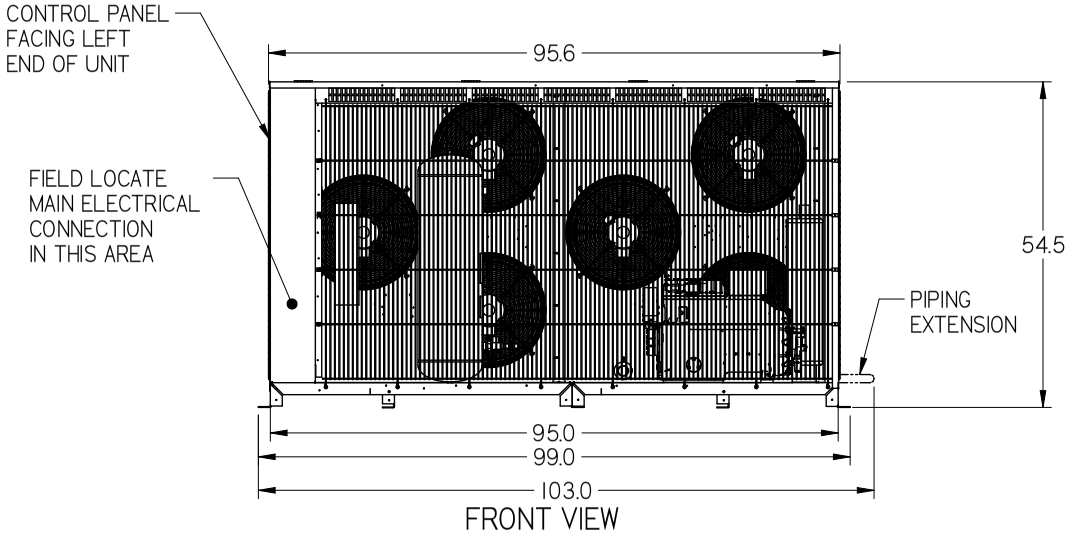
TOP VIEW



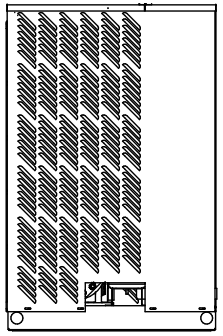
ISO VIEW



LEFT SIDE VIEW



FRONT VIEW



RIGHT SIDE VIEW

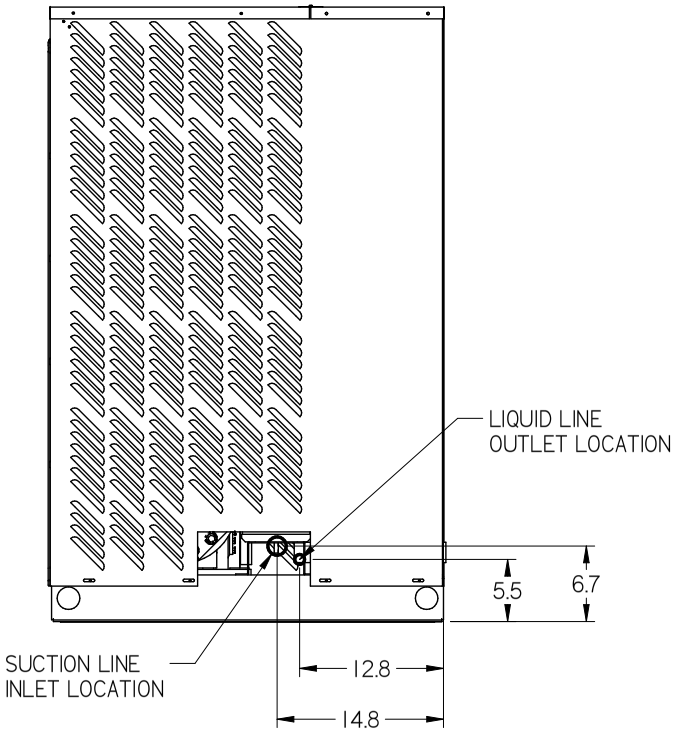
NOTES:
1. IT IS THE RESPONSIBILITY OF THE INSTALLING CONTRACTOR TO ENSURE THAT THE FINAL EQUIPMENT INSTALLATION MEETS ALL APPLICABLE CODE REQUIREMENTS.
2. ILLUSTRATION SHOWN IS FOR GENERAL REPRESENTATION ONLY. ACTUAL PRODUCT WILL VARY DEPENDENT UPON APPLICATION.
3. OVERALL DIMENSIONS: 103.0 L X 35.1 W X 54.5 H.

INFORMATION SUBJECT TO CHANGE

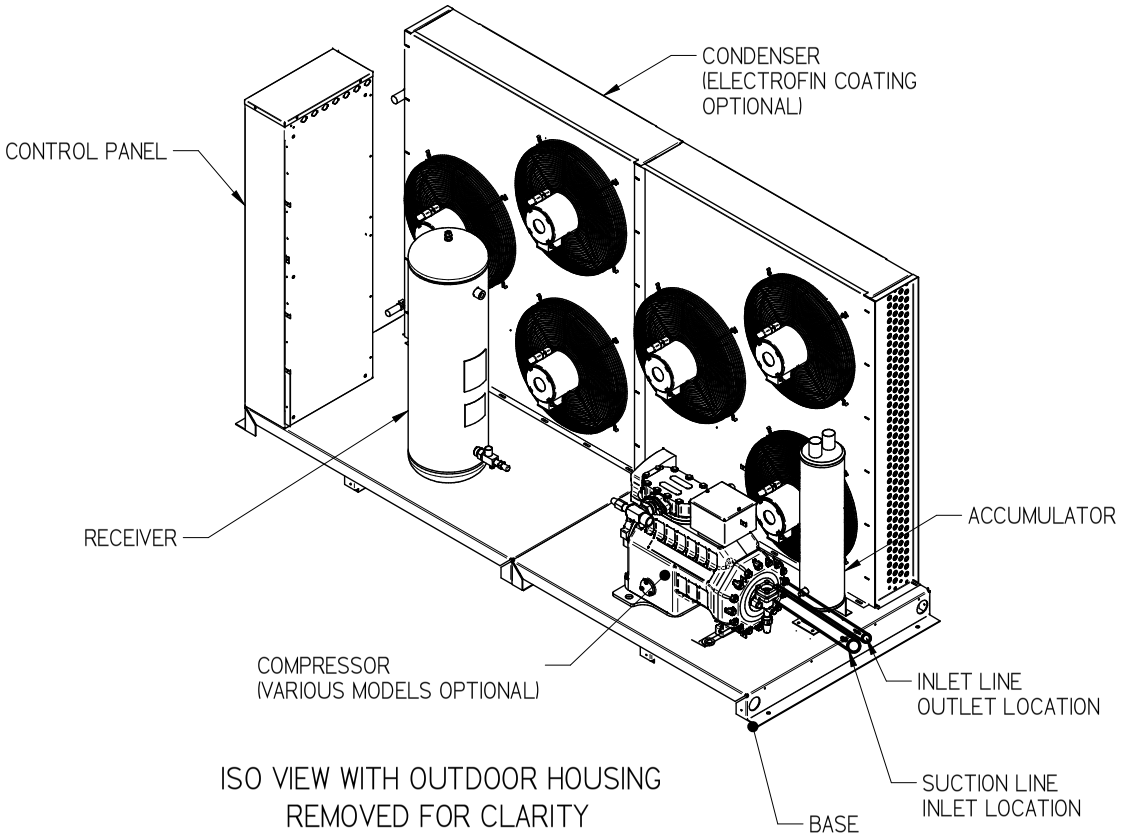
DIMENSIONS ARE IN INCHES
DRAWN: DEC 2019
THIRD ANGLE PROJECTION
SHEET 1 OF 3

HUSSMANN®
HIGH EFFICIENCY H-SERIES EXTRA LARGE OUTDOOR STD BASE
DOC PD-000000016 REV D

SWN 1.0 SUBMITTAL SHEET SIZE D



PIPING CONNECTION LOCATION
OUT RIGHT SIDE OF UNIT



ISO VIEW WITH OUTDOOR HOUSING
REMOVED FOR CLARITY

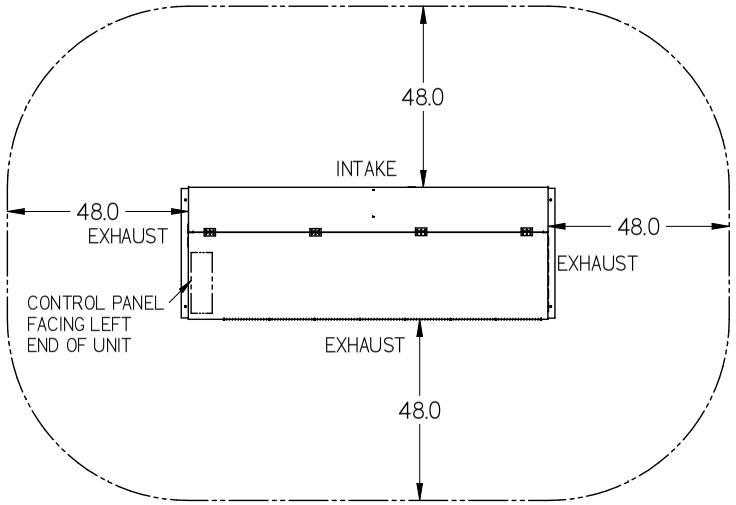
NOTES:
1. IT IS THE RESPONSIBILITY OF THE INSTALLING CONTRACTOR TO ENSURE THAT THE FINAL EQUIPMENT INSTALLATION MEETS ALL APPLICABLE CODE REQUIREMENTS.
2. ILLUSTRATION SHOWN IS FOR GENERAL REPRESENTATION ONLY. ACTUAL PRODUCT WILL VARY DEPENDENT UPON APPLICATION.
3. OVERALL DIMENSIONS: 103.0 L X 35.1 W X 54.5 H.

DIMENSIONS ARE IN INCHES	HUSSMANN®
DRAWN: DEC 2019	HIGH EFFICIENCY H-SERIES EXTRA LARGE OUTDOOR STD BASE
THIRD ANGLE PROJECTION	DOC PD-000000016 REV D
INFORMATION SUBJECT TO CHANGE	SHEET 2 OF 3

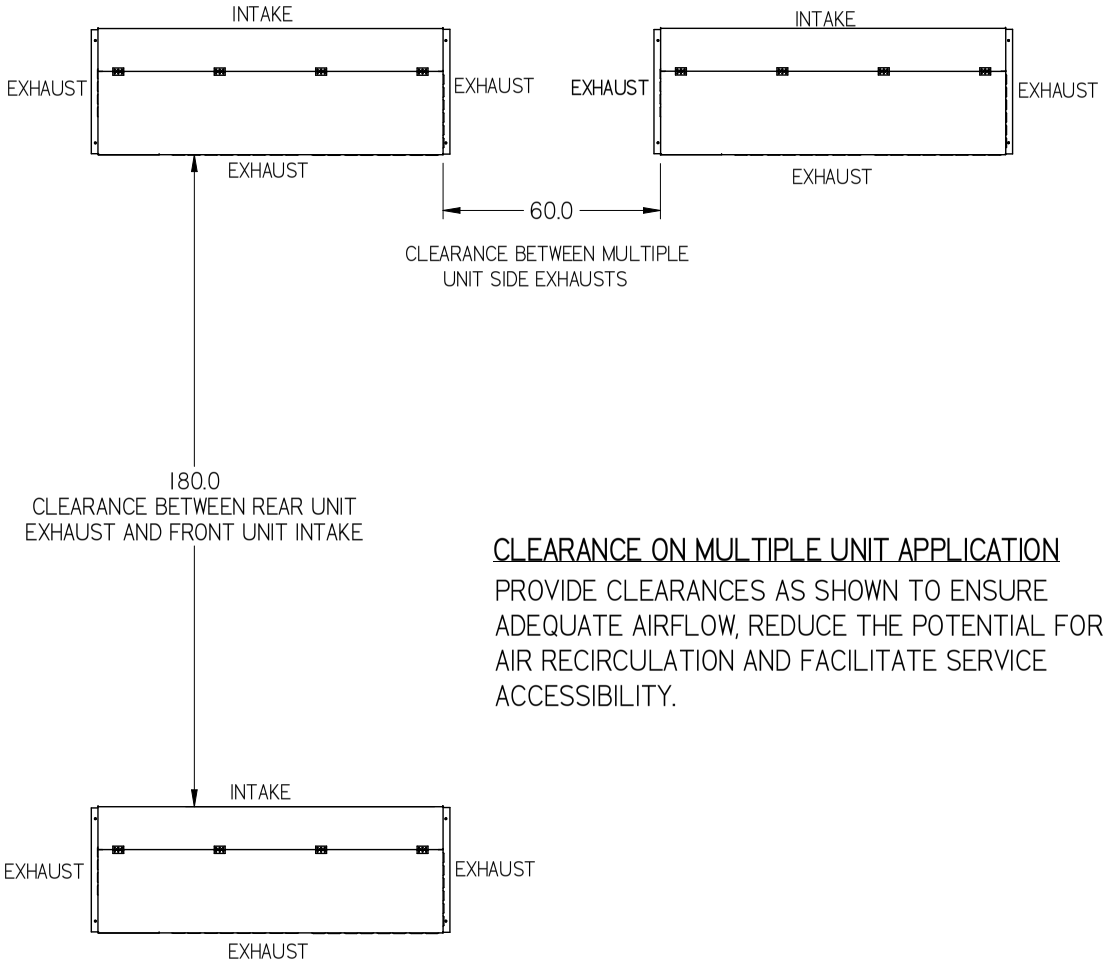
SWN 1.0 SUBMITTAL SHEET SIZE D

MINIMUM CLEARANCE REQUIREMENTS:

ACTUAL CLEARANCE REQUIREMENTS ARE DEPENDENT UPON AUTHORITY HAVING JURISDICTION, AND MAY EXCEED DIMENSIONS SHOWN.



CLEARANCE ON A SINGLE UNIT APPLICATION



CLEARANCE ON MULTIPLE UNIT APPLICATION

PROVIDE CLEARANCES AS SHOWN TO ENSURE ADEQUATE AIRFLOW, REDUCE THE POTENTIAL FOR AIR RECIRCULATION AND FACILITATE SERVICE ACCESSIBILITY.

NOTES:
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2. ILLUSTRATION SHOWN IS FOR GENERAL REPRESENTATION ONLY. ACTUAL PRODUCT WILL VARY DEPENDENT UPON APPLICATION.
3. OVERALL DIMENSIONS: 103.0 L X 35.1 W X 54.5 H.

INFORMATION SUBJECT TO CHANGE

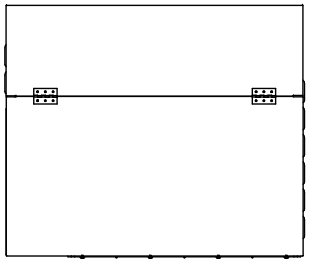
DIMENSIONS ARE IN INCHES
DRAWN: DEC 2019
THIRD ANGLE PROJECTION
SHEET 3 OF 3

HUSSMANN®
HIGH EFFICIENCY
H-SERIES EXTRA LARGE
OUTDOOR STD BASE
DOC PD-000000016 REV D

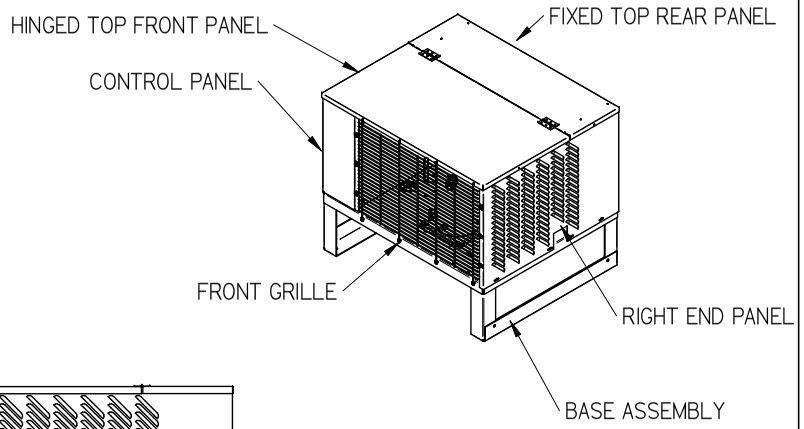
SWN.1.0 SUBMITTAL SHEET SIZE D

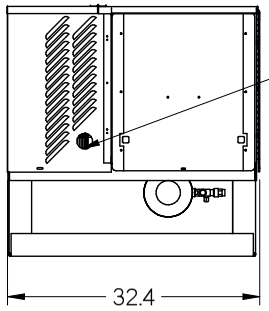
HIGH EFFICIENCY H-SERIES SMALL SIZE OUTDOOR UNIT HEAVY DUTY BASE "HxHx-xxxxxxx-xx-x"

WEIGHT: 400 LBS

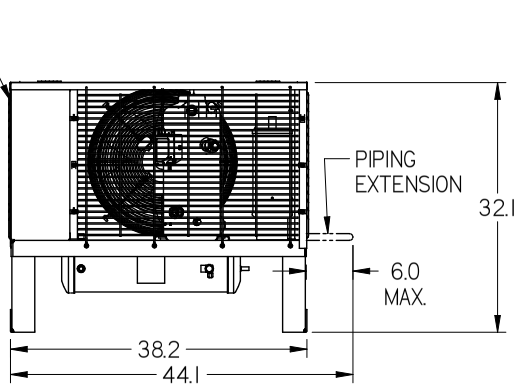


TOP VIEW

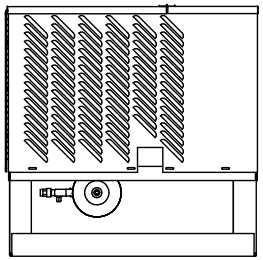




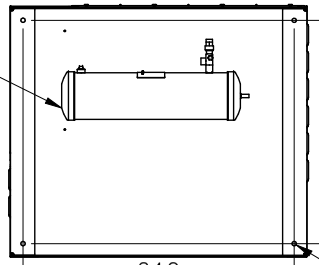
LEFT SIDE VIEW



FRONT VIEW



RIGHT SIDE VIEW

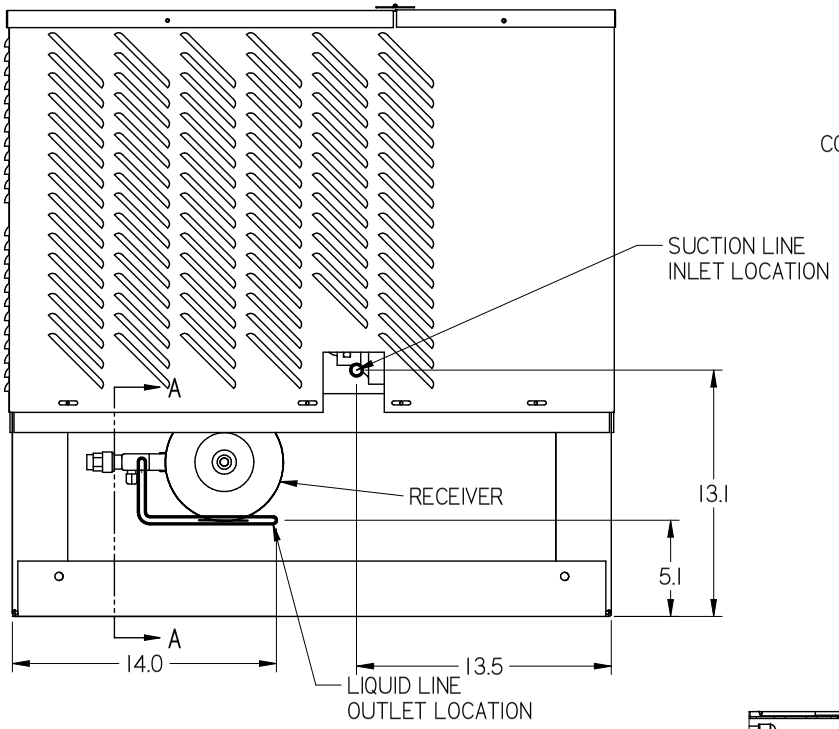


BOTTOM VIEW

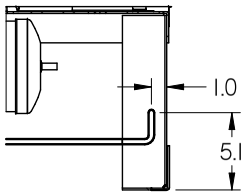
NOTES:
1. IT IS THE RESPONSIBILITY OF THE INSTALLING CONTRACTOR TO ENSURE THAT THE FINAL EQUIPMENT INSTALLATION MEETS ALL APPLICABLE CODE REQUIREMENTS.
2. ILLUSTRATION SHOWN IS FOR GENERAL REPRESENTATION ONLY. ACTUAL PRODUCT WILL VARY DEPENDENT UPON APPLICATION.
3. OVERALL DIMENSIONS: 44.1 L X 32.4 W X 32.1 H.

INFORMATION SUBJECT TO CHANGE

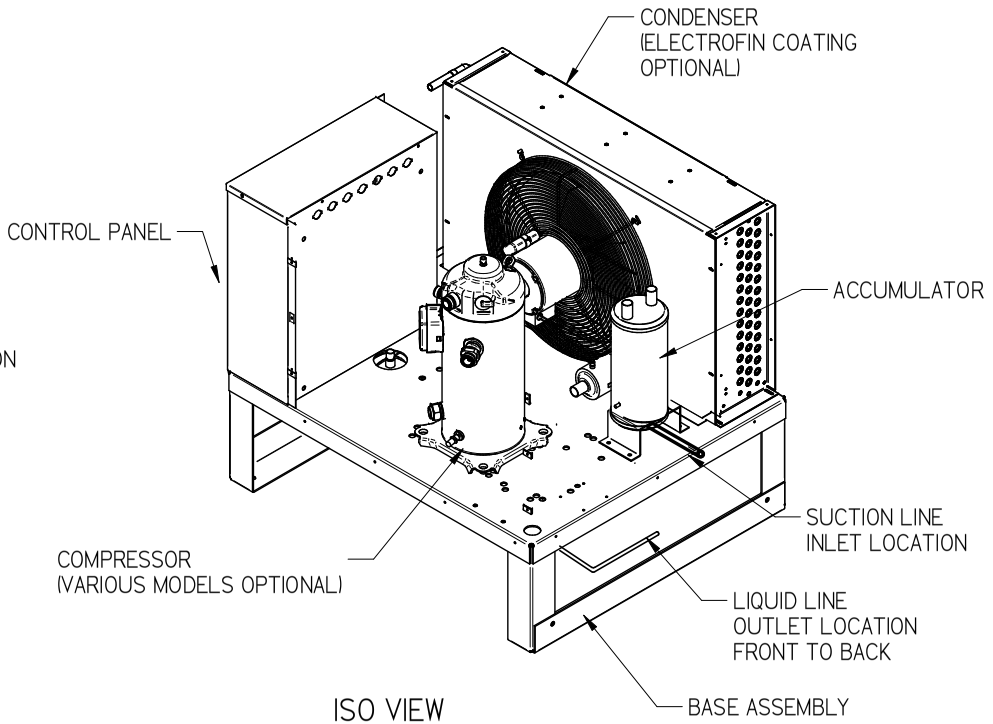
DIMENSIONS ARE IN INCHES	HUSSMANN®
DRAWN: DEC 2019	HIGH EFFICIENCY H-SERIES SMALL OUTDOOR HD BASE
THIRD ANGLE PROJECTION	DOC PD-000000017 REV D
SHEET 1 OF 3	SWN 1.0 SUBMITTAL SHEET SIZE D



PIPING CONNECTION LOCATION
OUT RIGHT SIDE OF UNIT



SECTION A-A



ISO VIEW
OUTDOOR HOUSING
REMOVED FOR CLARITY

NOTES:
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3. OVERALL DIMENSIONS: 44.1 L X 32.4 W X 32.1 H.

INFORMATION SUBJECT TO CHANGE

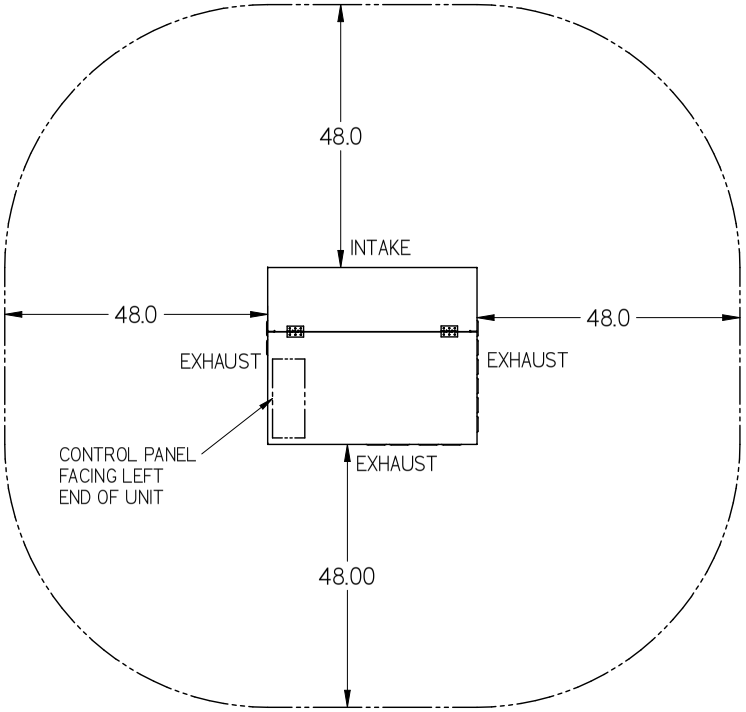
DIMENSIONS ARE IN INCHES
DRAWN: DEC 2019
THIRD ANGLE PROJECTION
SHEET 2 OF 3

HUSSMANN®
HIGH EFFICIENCY
H-SERIES SMALL
OUTDOOR HD BASE
DOC PD-000000017 REV D

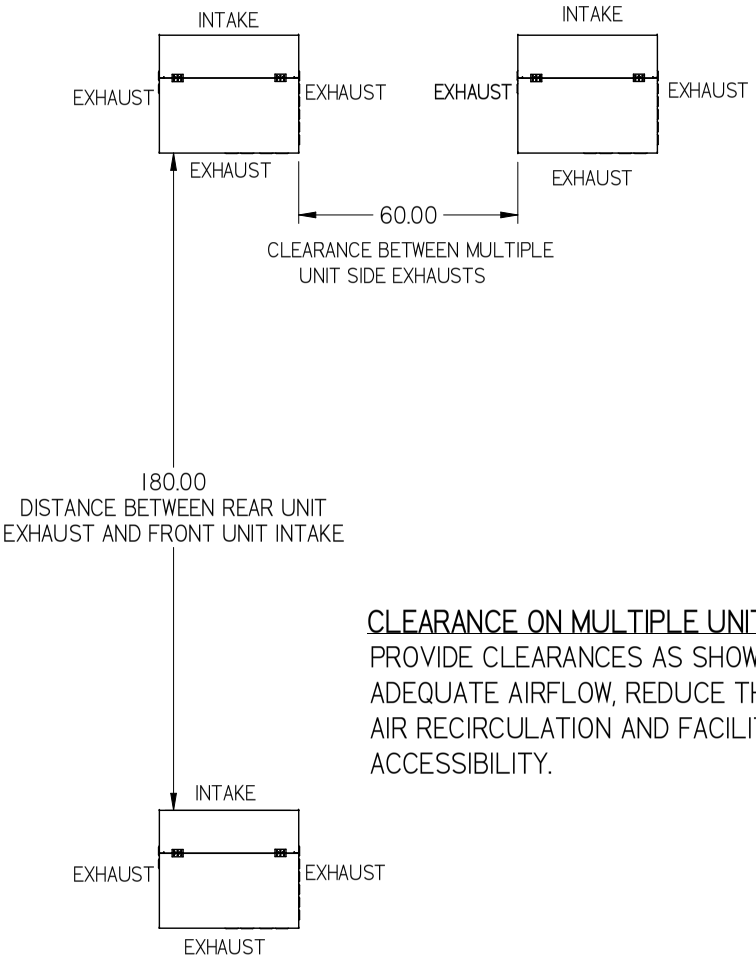
SMN 1.0 SUBMITTAL SHEET SIZE D

MINIMUM CLEARANCE REQUIREMENTS:

ACTUAL CLEARANCE REQUIREMENTS ARE DEPENDENT UPON AUTHORITY HAVING JURISDICTION, AND MAY EXCEED DIMENSIONS SHOWN.



CLEARANCE ON A SINGLE UNIT APPLICATION



CLEARANCE ON MULTIPLE UNIT APPLICATION

PROVIDE CLEARANCES AS SHOWN TO ENSURE ADEQUATE AIRFLOW, REDUCE THE POTENTIAL FOR AIR RECIRCULATION AND FACILITATE SERVICE ACCESSIBILITY.

NOTES:
1. IT IS THE RESPONSIBILITY OF THE INSTALLING CONTRACTOR TO ENSURE THAT THE FINAL EQUIPMENT INSTALLATION MEETS ALL APPLICABLE CODE REQUIREMENTS.
2. ILLUSTRATION SHOWN IS FOR GENERAL REPRESENTATION ONLY. ACTUAL PRODUCT WILL VARY DEPENDENT UPON APPLICATION.
3. OVERALL DIMENSIONS: 44.1 L X 32.4 W X 32.1 H.

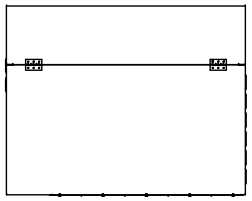
INFORMATION SUBJECT TO CHANGE

DIMENSIONS ARE IN INCHES
DRAWN: DEC 2019
THIRD ANGLE PROJECTION
SHEET 3 OF 3

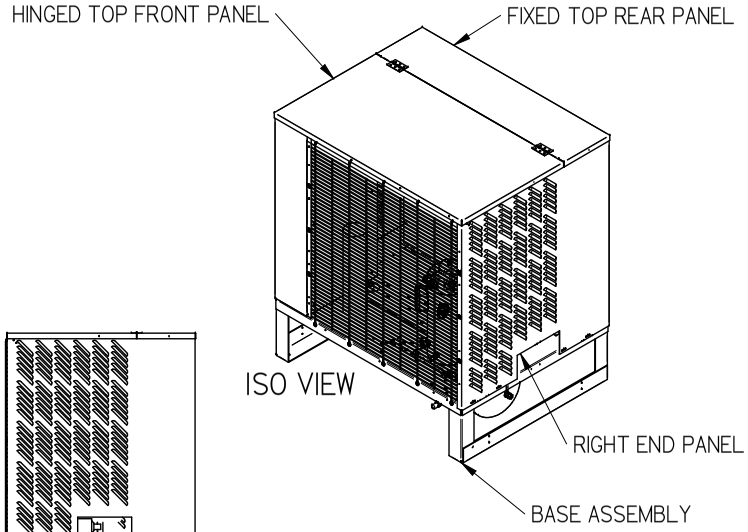
HUSSMANN®
HIGH EFFICIENCY H-SERIES SMALL OUTDOOR HD BASE
DOC PD-000000017 REV D

SMN 1.0 SUBMITTAL SHEET SIZE D

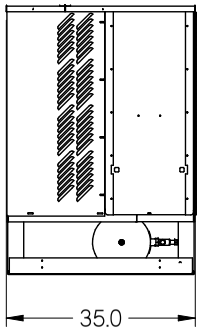
HIGH EFFICIENCY
H-SERIES
MEDIUM SIZE
OUTDOOR UNIT
HEAVY DUTY BASE
"HxHx-xxxxxxx-xx-x"
WEIGHT: 650 LBS.



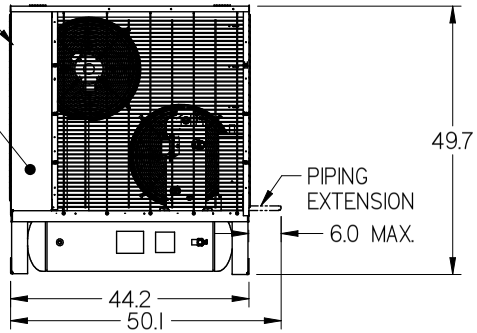
TOP VIEW



ISO VIEW

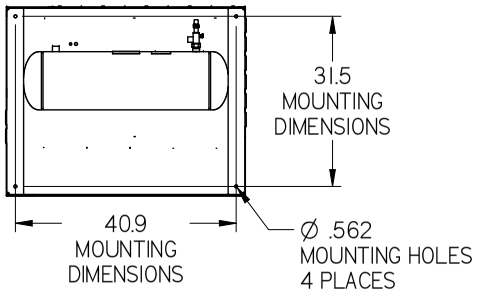


LEFT SIDE VIEW



FRONT VIEW

RIGHT SIDE VIEW



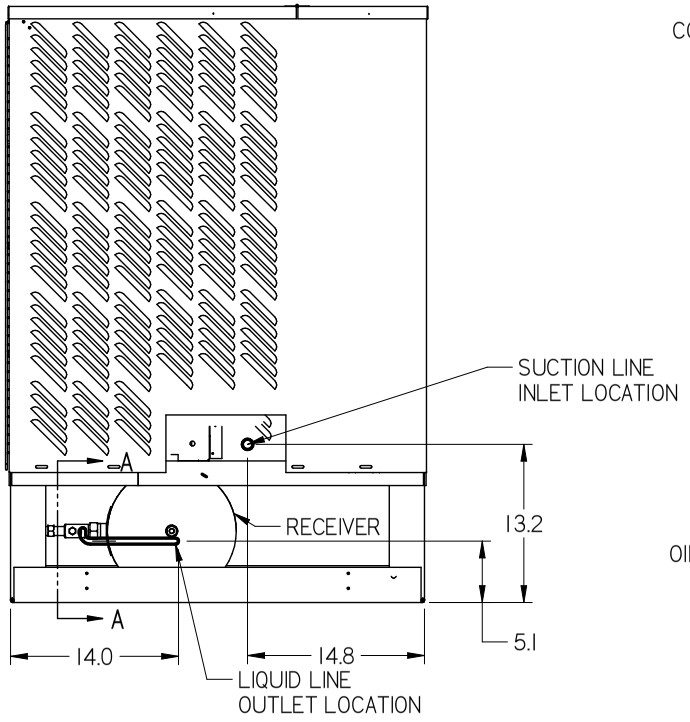
BOTTOM VIEW

NOTES:
1. IT IS THE RESPONSIBILITY OF THE INSTALLING CONTRACTOR TO ENSURE THAT THE FINAL EQUIPMENT INSTALLATION MEETS ALL APPLICABLE CODE REQUIREMENTS.
2. ILLUSTRATION SHOWN IS FOR GENERAL REPRESENTATION ONLY. ACTUAL PRODUCT WILL VARY DEPENDENT UPON APPLICATION.
3. OVERALL DIMENSIONS: 50.1 L X 35.0 W X 49.7 H.

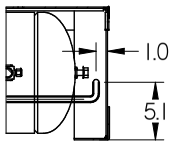
INFORMATION SUBJECT TO CHANGE

DIMENSIONS ARE IN INCHES	HUSSMANN®
DRAWN: DEC 2019	HIGH EFFICIENCY H-SERIES MEDIUM OUTDOOR HD BASE
THIRD ANGLE PROJECTION	DOC PD-000000018 REV E
SHEET 1 OF 3	

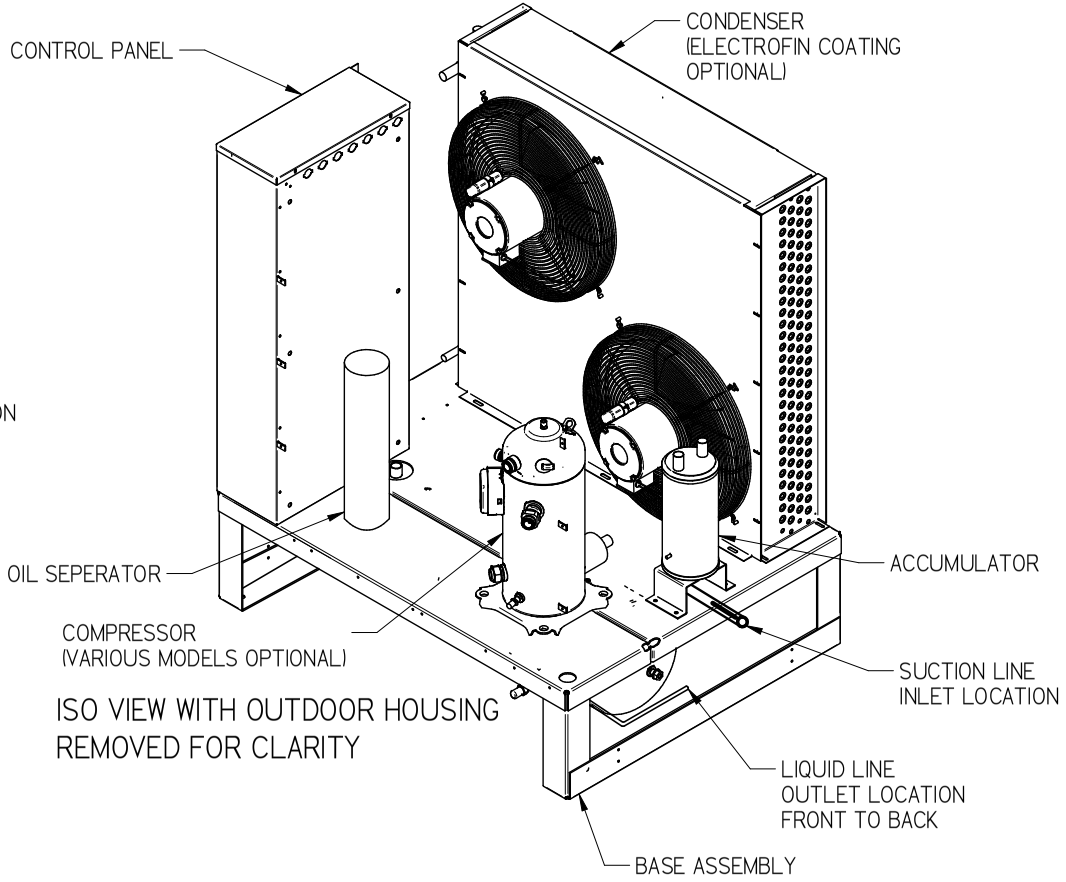
SWK I.D. SUBMITTAL SHEET SIZE D



PIPING CONNECTION LOCATION
OUT RIGHT SIDE OF UNIT



SECTION A-A



ISO VIEW WITH OUTDOOR HOUSING
REMOVED FOR CLARITY

NOTES:
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INFORMATION SUBJECT TO CHANGE

DIMENSIONS ARE IN INCHES	HUSSMANN®
DRAWN: DEC 2019	HIGH EFFICIENCY H-SERIES MEDIUM OUTDOOR HD BASE
THIRD ANGLE PROJECTION	DOC PD-000000018 REV E
SHEET 2 OF 3	

SWN I.D. SUBMITTAL SHEET SIZE D

MINIMUM CLEARANCE REQUIREMENTS:

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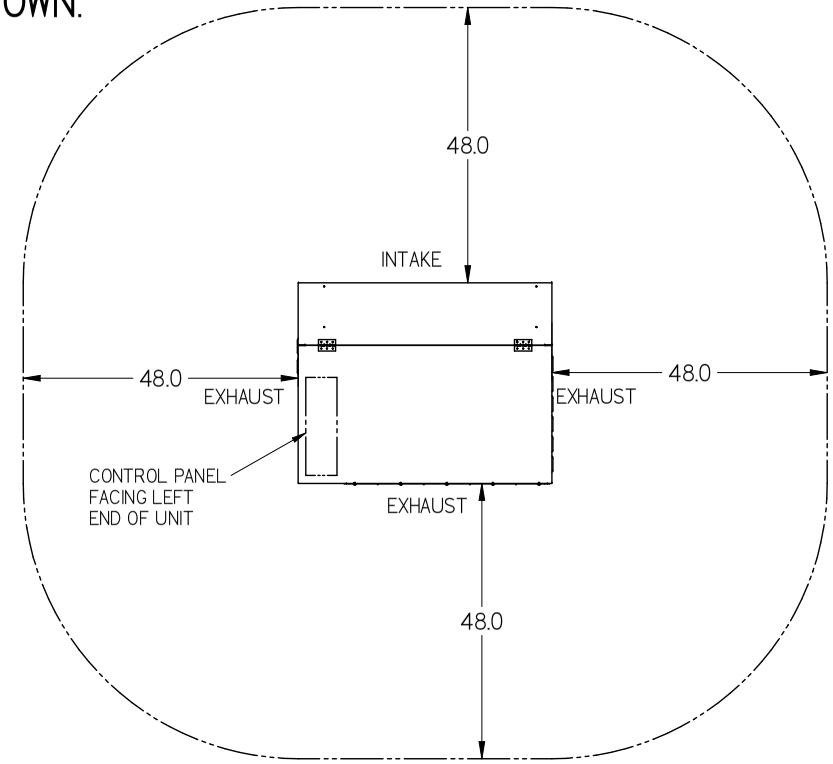
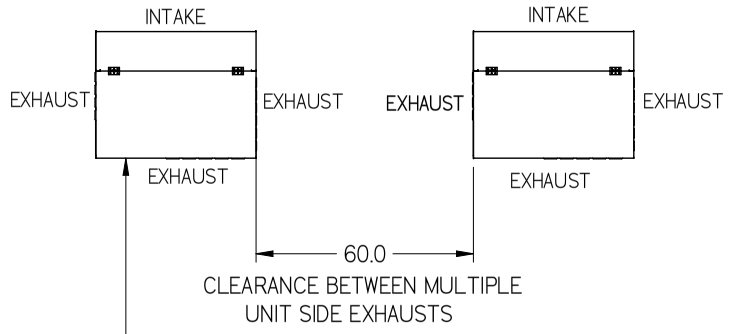
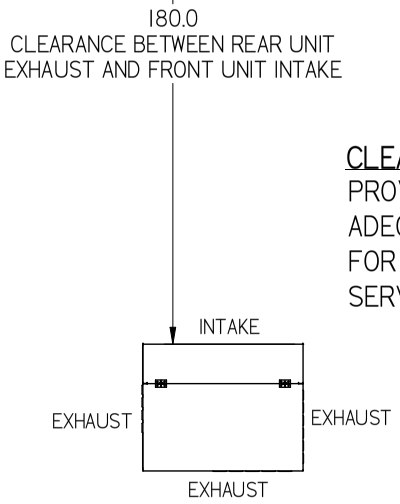


CLEARANCE ON A SINGLE UNIT APPLICATION





CLEARANCE ON MULTIPLE UNIT APPLICATION

PROVIDE CLEARANCES AS SHOWN TO ENSURE ADEQUATE AIRFLOW, REDUCE THE POTENTIAL FOR AIR RECIRCULATION AND FACILITATE SERVICE ACCESSIBILITY.

NOTES:
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2. ILLUSTRATION SHOWN IS FOR GENERAL REPRESENTATION ONLY. ACTUAL PRODUCT WILL VARY DEPENDENT UPON APPLICATION.
3. OVERALL DIMENSIONS: 50.1 L X 35.0 W X 49.7 H.

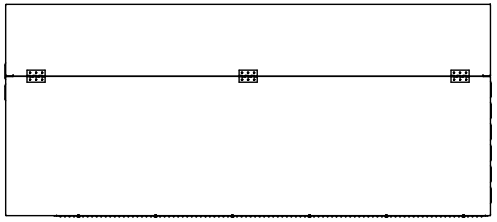
DIMENSIONS ARE IN INCHES
DRAWN: DEC 2019
THIRD ANGLE PROJECTION
INFORMATION SUBJECT TO CHANGE
SHEET 3 OF 3

HUSSMANN®
HIGH EFFICIENCY H-SERIES MEDIUM OUTDOOR HD BASE
DOC PD-000000018 REV E
SWN | 0 SUBMITTAL SHEET SIZE D

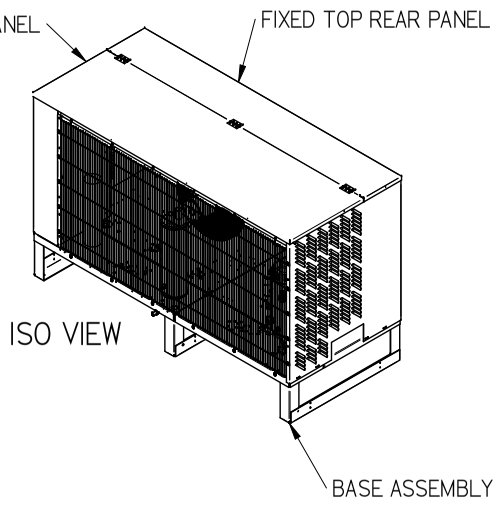
HIGH EFFICIENCY H-SERIES LARGE SIZE OUTDOOR UNIT HEAVY DUTY BASE

"HxHx-xxxxxxx-xx-x"

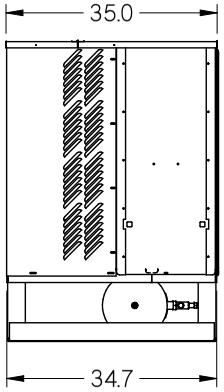
WEIGHT: 1,250 LBS.



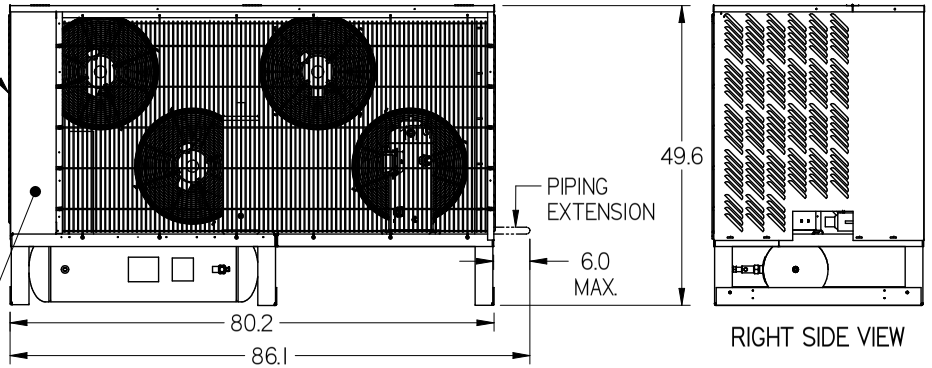
TOP VIEW



ISO VIEW



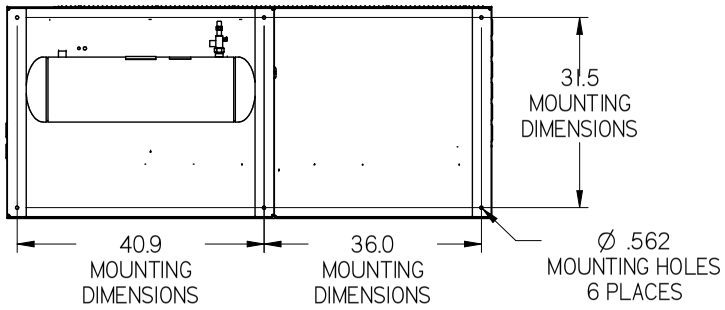
LEFT SIDE VIEW



FRONT VIEW

RIGHT SIDE VIEW

FIELD LOCATE MAIN POWER CONNECTION IN THIS AREA.



BOTTOM VIEW

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3. OVERALL DIMENSIONS: 86.1 L X 35.0 W X 49.6 H.

INFORMATION SUBJECT TO CHANGE

DIMENSIONS ARE IN INCHES

DRAWN: DEC 2019

THIRD ANGLE PROJECTION

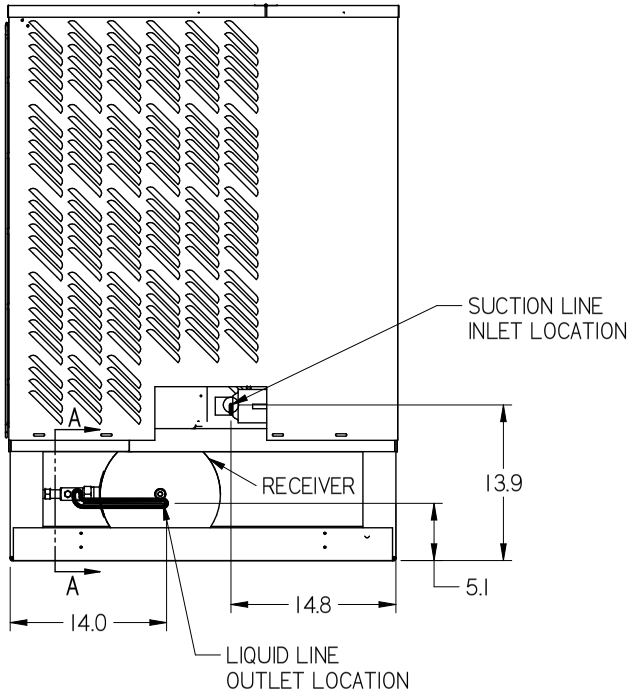
SHEET 1 OF 3

HUSSMANN®

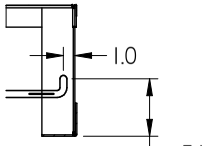
HIGH EFFICIENCY H-SERIES LARGE OUTDOOR HD BASE

DOC PD-000000019 REV D

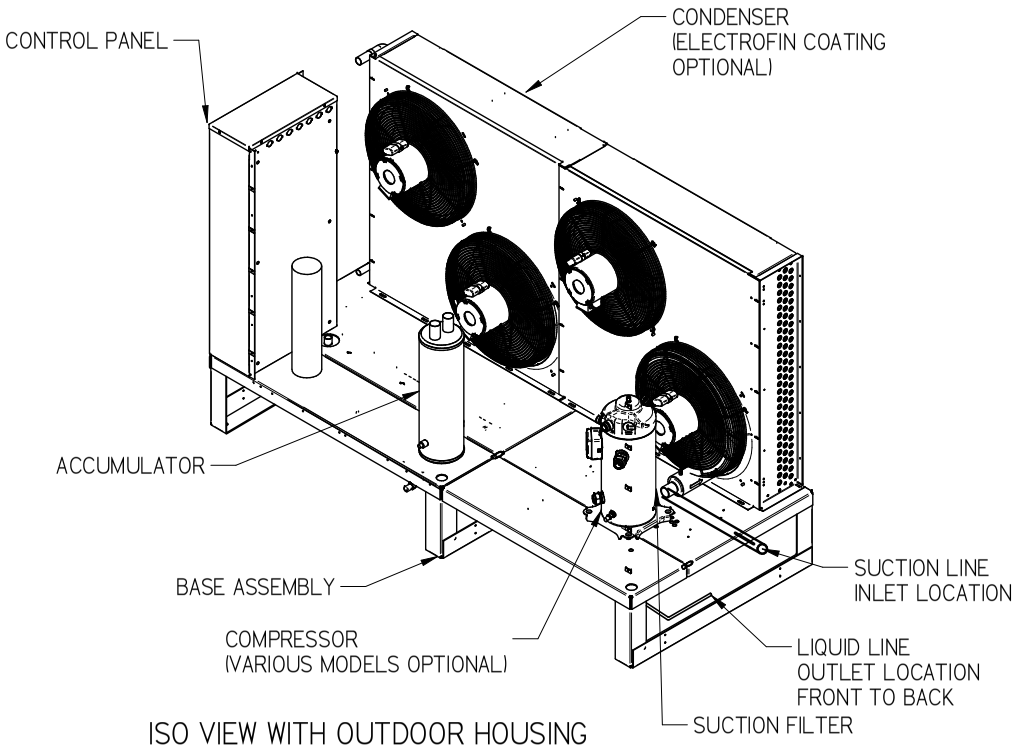
SWN 1.0 SUBMITTAL SHEET SIZE D



PIPING CONNECTION LOCATION
OUT RIGHT SIDE OF UNIT



SECTION A-A



ISO VIEW WITH OUTDOOR HOUSING
REMOVED FOR CLARITY

NOTES:
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DIMENSIONS ARE IN INCHES	HUSSMANN®
DRAWN: DEC 2019	HIGH EFFICIENCY H-SERIES LARGE OUTDOOR HD BASE
THIRD ANGLE PROJECTION	DOC PD-000000019 REV D
INFORMATION SUBJECT TO CHANGE	SHEET 2 OF 3

SWN 1.0 SUBMITTAL SHEET SIZE D

MINIMUM CLEARANCE REQUIREMENTS:

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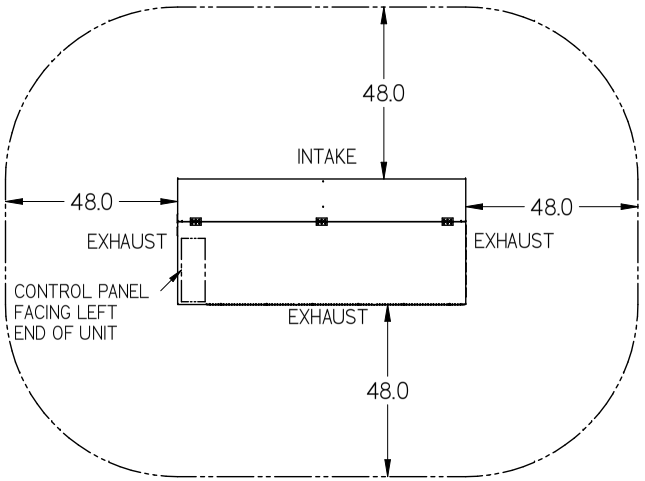
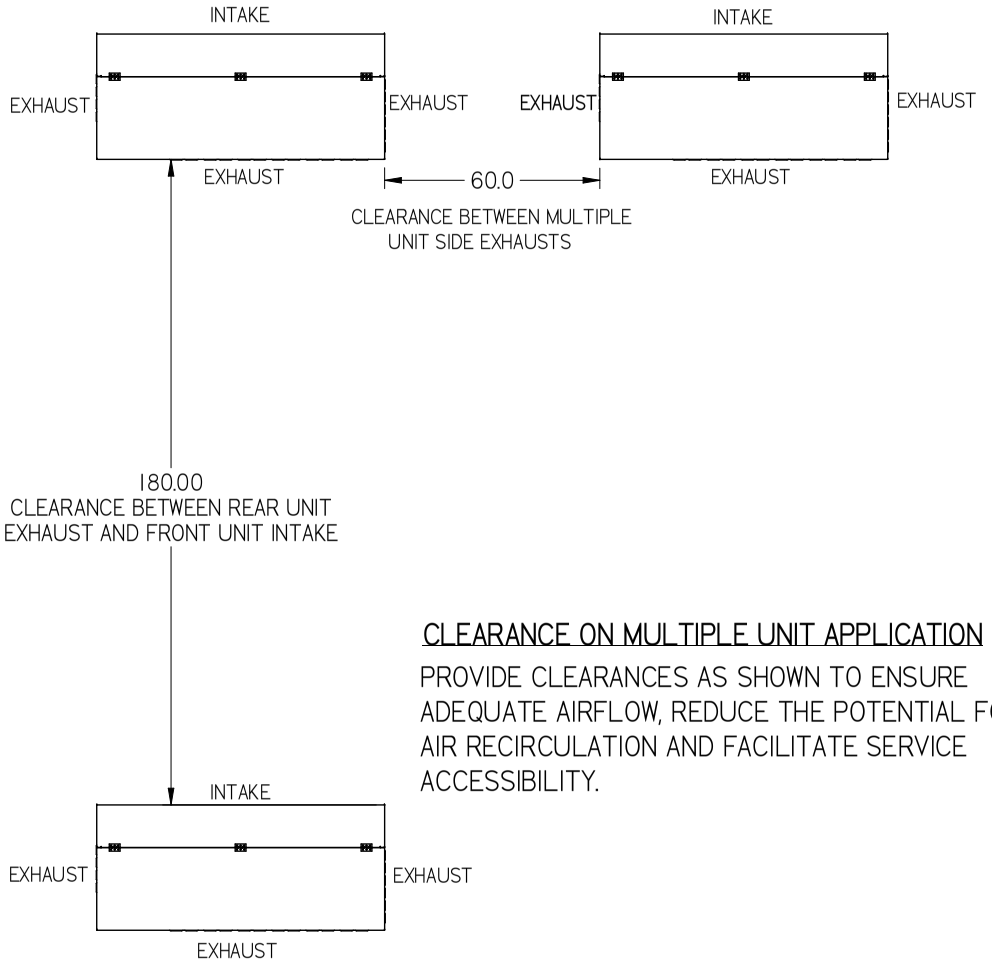


CLEARANCE ON A SINGLE UNIT APPLICATION



CLEARANCE ON MULTIPLE UNIT APPLICATION

PROVIDE CLEARANCES AS SHOWN TO ENSURE ADEQUATE AIRFLOW, REDUCE THE POTENTIAL FOR AIR RECIRCULATION AND FACILITATE SERVICE ACCESSIBILITY.

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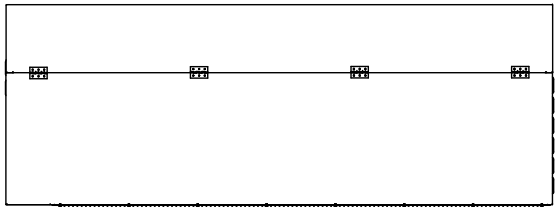
INFORMATION SUBJECT TO CHANGE

DIMENSIONS ARE IN INCHES
DRAWN: DEC 2019
THIRD ANGLE PROJECTION
SHEET 3 OF 3

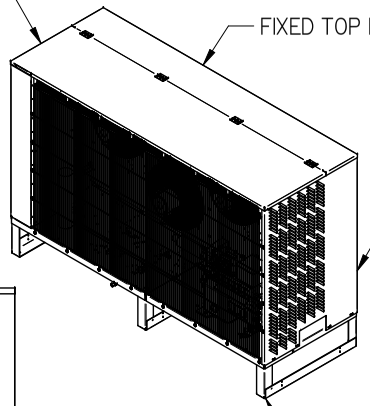
HUSSMANN®
HIGH EFFICIENCY H-SERIES LARGE OUTDOOR HD BASE
DOC PD-000000019 REV D

SWN I.D. SUBMITTAL SHEET SIZE D

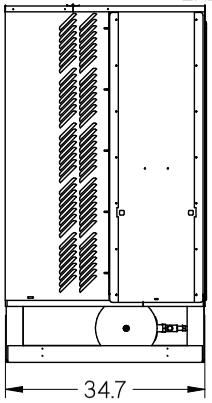
HIGH EFFICIENCY
H-SERIES
EXTRA LARGE SIZE
OUTDOOR UNIT
HEAVY DUTY BASE
"HxHx-xxxxxxx-xx-x"
WEIGHT: 1,575 LBS.



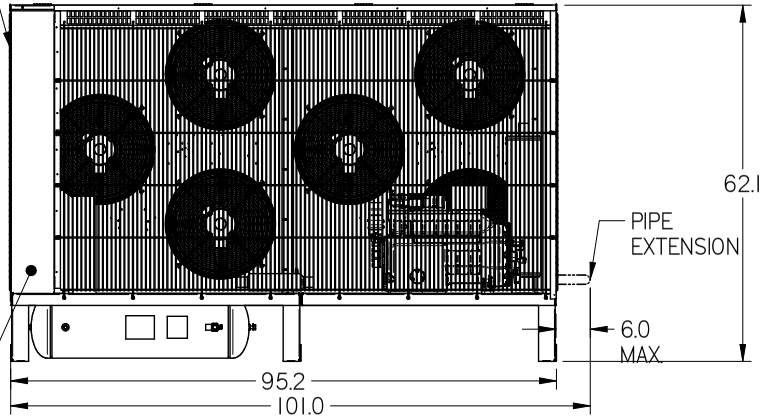
TOP VIEW



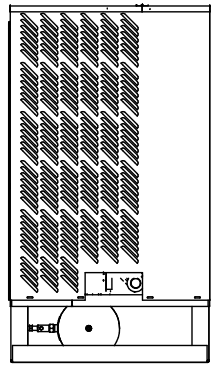
ISO VIEW



LEFT SIDE VIEW

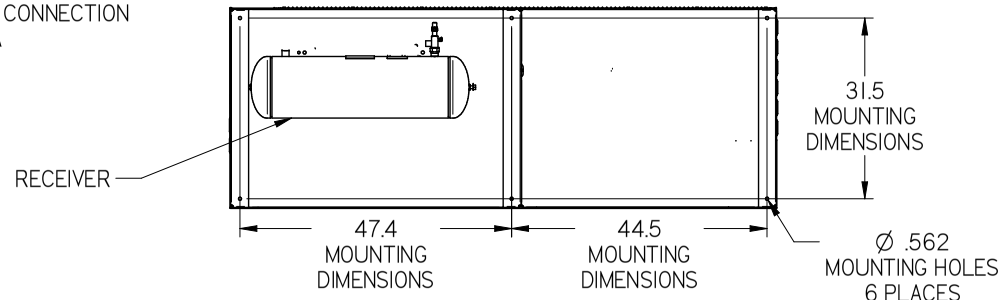


FRONT VIEW



RIGHT SIDE VIEW

FIELD LOCATE MAIN
ELECTRICAL CONNECTION
IN THIS AREA



BOTTOM VIEW

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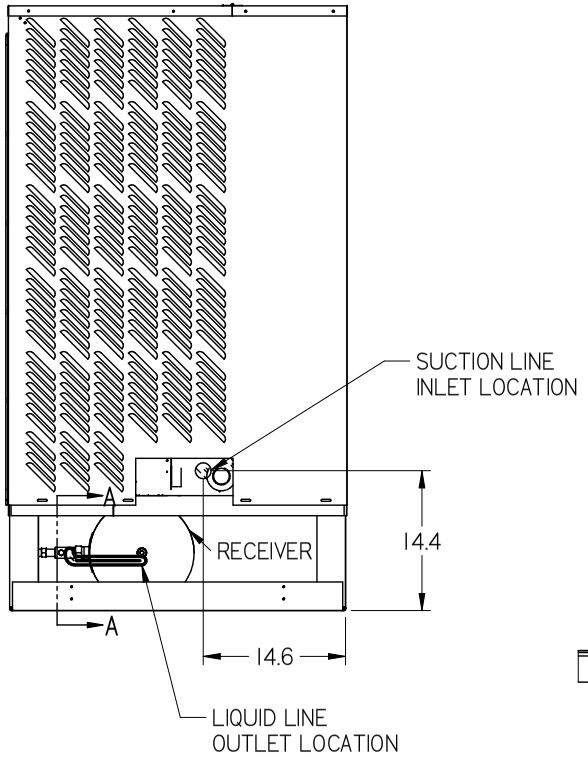
3. OVERALL DIMENSIONS: 101.0 L X 34.7 W X 62.1 H.

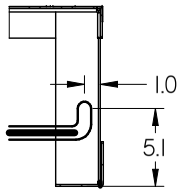
INFORMATION SUBJECT TO CHANGE

DIMENSIONS ARE IN INCHES
DRAWN: DEC 2019
THIRD ANGLE PROJECTION
SHEET 1 OF 3

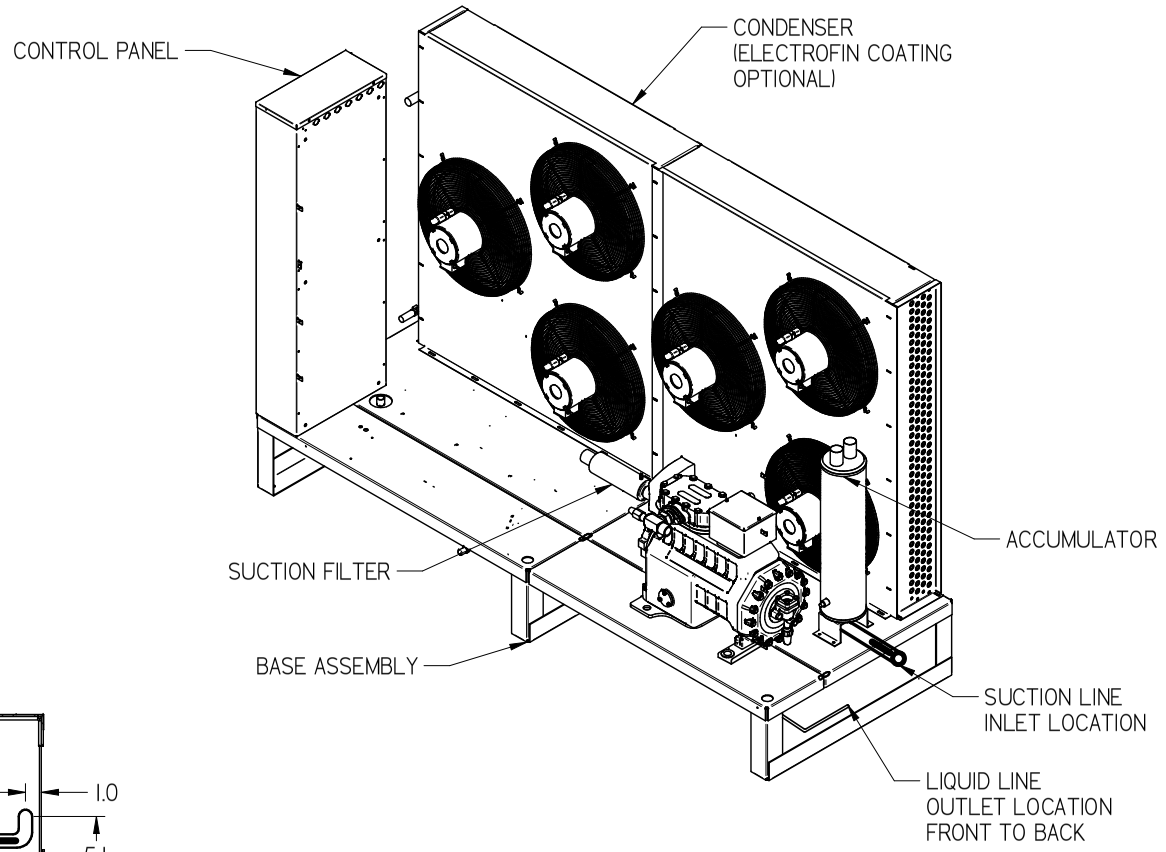
HUSSMANN®
HIGH EFFICIENCY
H-SERIES EXTRA LARGE
OUTDOOR HD BASE
DOC PD-000000020 REV D
SWN 1.0 SUBMITTAL SHEET SIZE D



PIPING CONNECTION LOCATION
OUT RIGHT SIDE OF UNIT



SECTION A-A



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DIMENSIONS ARE IN INCHES	HUSSMANN®
DRAWN: DEC 2019	HIGH EFFICIENCY H-SERIES EXTRA LARGE OUTDOOR HD BASE
THIRD ANGLE PROJECTION	DOC PD-000000020 REV D
SHEET 2 OF 3	SMN 1.0 SUBMITTAL SHEET SIZE D

INFORMATION SUBJECT TO CHANGE

MINIMUM CLEARANCE REQUIREMENTS:

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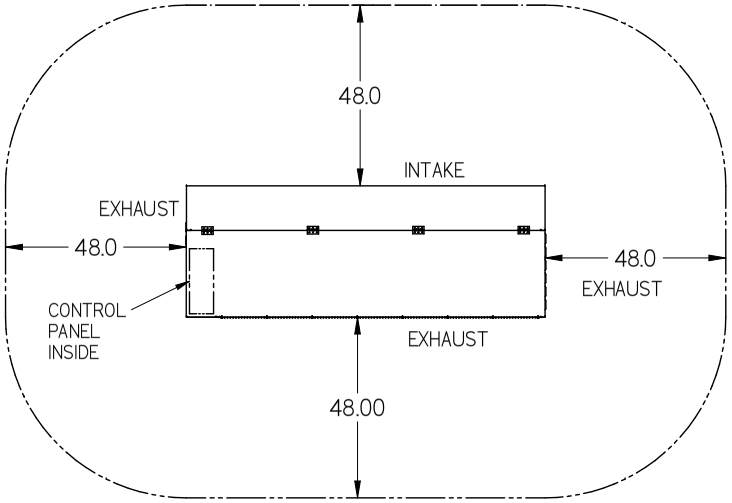
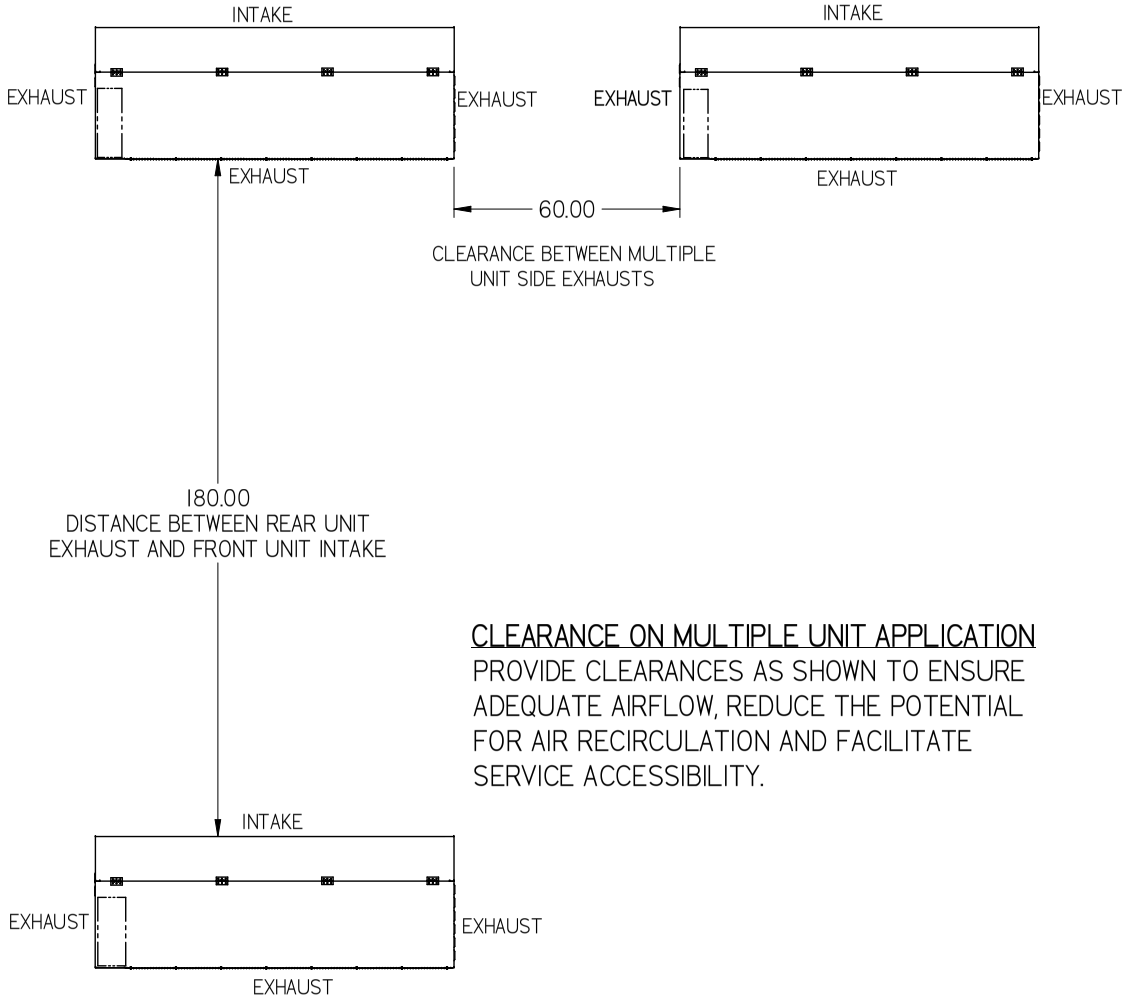


CLEARANCE ON A SINGLE UNIT APPLICATION



CLEARANCE ON MULTIPLE UNIT APPLICATION

PROVIDE CLEARANCES AS SHOWN TO ENSURE ADEQUATE AIRFLOW, REDUCE THE POTENTIAL FOR AIR RECIRCULATION AND FACILITATE SERVICE ACCESSIBILITY.

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DIMENSIONS ARE IN INCHES	HUSSMANN®
DRAWN: DEC 2019	HIGH EFFICIENCY H-SERIES EXTRA LARGE OUTDOOR HD BASE
THIRD ANGLE PROJECTION	DOC PD-000000020 REV D
INFORMATION SUBJECT TO CHANGE	SHEET 3 OF 3

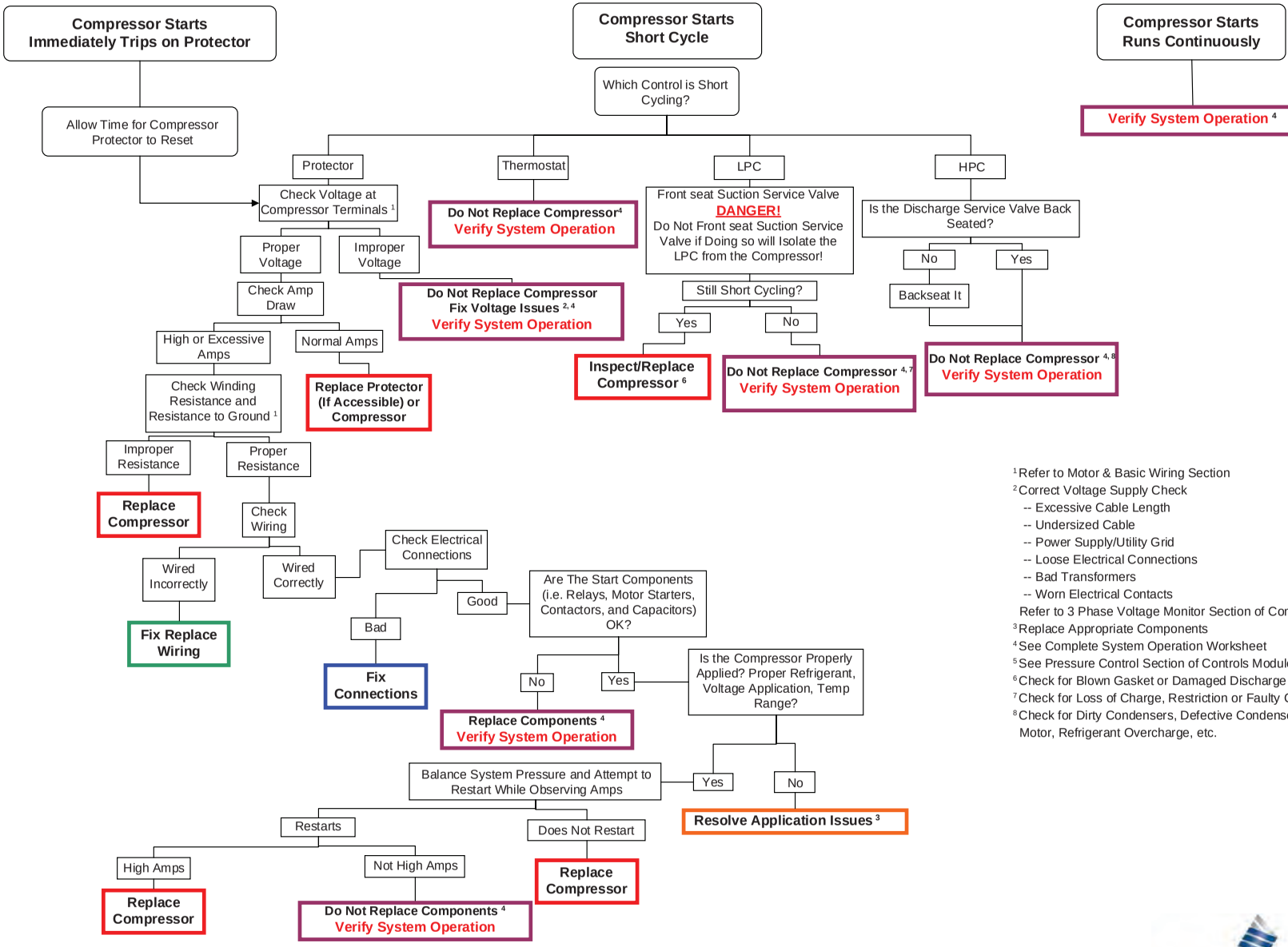
SWM I.D SUBMITTAL SHEET SIZE D

TROUBLESHOOTING INFORMATION

SPORLAN
https://www.sporlanonline.com

EMERSON Mobile Apps including the Fault Finder App
https://climate.emerson.com/en-us/tools-resources/mobile-apps

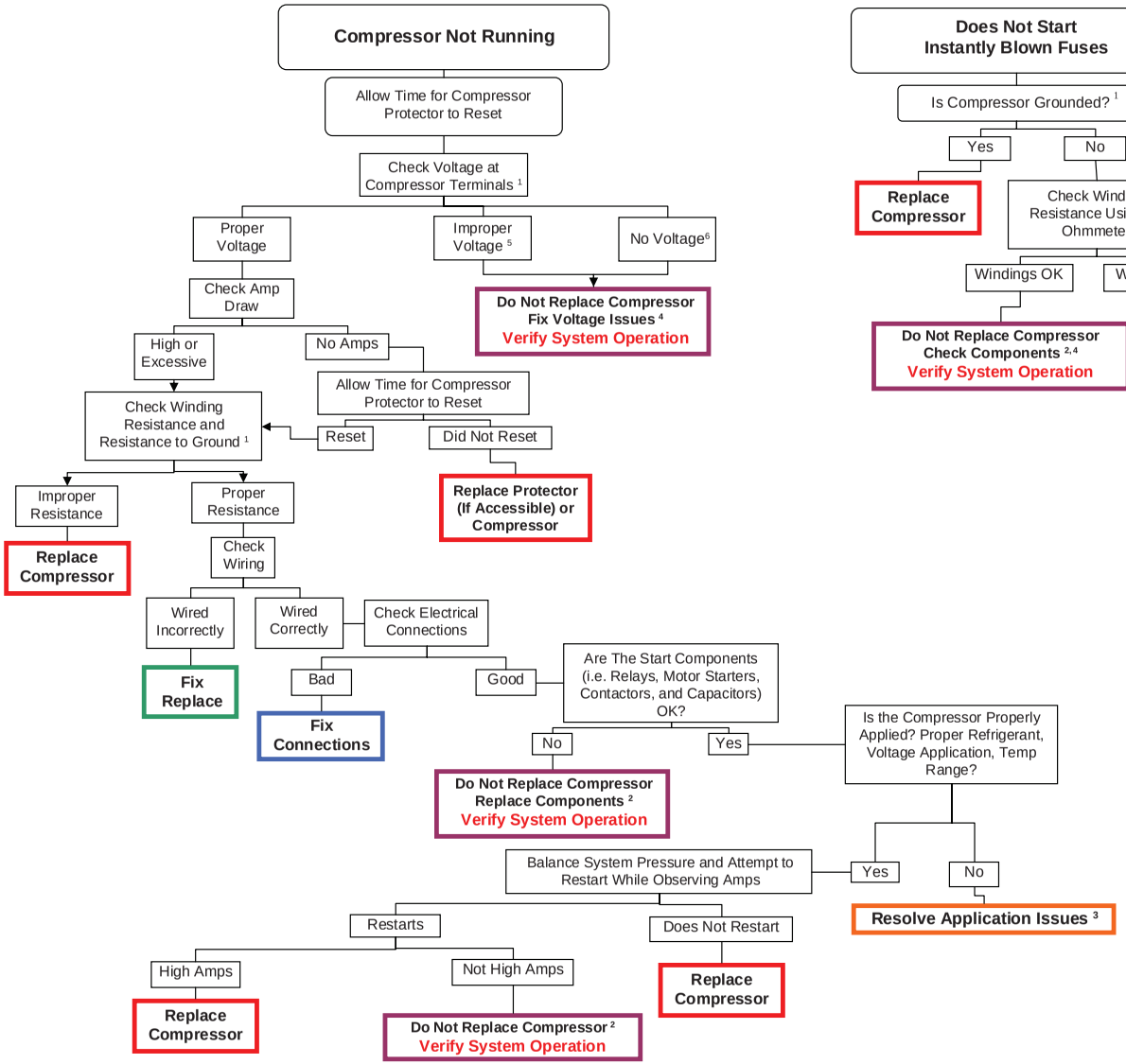
SQUARED HOTLINE
888-SQUARED (888-778-2733)
Tech Support Line. Level One provides product initial Tech Support and can connect the Caller to Level 2, if required.



[1] Refer to Motor & Basic Wiring Section
[2] Correct Voltage Supply Check
-- Excessive Cable Length
-- Undersized Cable
-- Power Supply/Utility Grid
-- Loose Electrical Connections
-- Bad Transformers
-- Worn Electrical Contacts
Refer to 3 Phase Voltage Monitor Section of Controls Module
[3] Replace Appropriate Components
[4] See Complete System Operation Worksheet
[5] See Pressure Control Section of Controls Module
[6] Check for Blown Gasket or Damaged Discharge Reeds
[7] Check for Loss of Charge, Restriction or Faulty Control
[8] Check for Dirty Condensers, Defective Condenser, Fan & Motor, Refrigerant Overcharge, etc.

Troubleshooting Guide

Form No. 2004CC-126



[1] Refer to Motor & Basic Wiring Module
[2] See Complete System Operation Worksheet
[3] Replace Appropriate Components
[4] Check External Wiring
[5] Correct Voltage Supply Check
-- Excessive Cable Length
-- Undersized Cable
-- Power Supply/Utility Grid
-- Loose Electrical Connections
-- Bad Transformers
-- Worn Electrical Contacts
Refer to 3 Phase Voltage Monitor Section of Controls Module
[6] Check Fuses, Circuit Breakers, Control Circuit/Safety Controls Thermostat, Contactors, etc.

Troubleshooting Guide

Form No. 2004CC-126

WARRANTY INFORMATION

HUSSMANN®

To obtain warranty information or other support, contact your Hussmann representative or visit:
https://www.hussmann.com/services/warranty

Please include the model and serial number of the product.

For questions about your equipment please contact our Technical Support Team 866-785-8499

For General Support or Service Calls contact our Customer Support Call Center 800-922-1919

For ordering Aftermarket Warranty Parts 1-855-Huss-Prt (1-855-487-7778)
Hussmann_part_warranty@hussmann.com

HUSSMANN®

Table of Contents

1.0 KE2 Compressor Sequencer Part Numbers and Programming Instructions

Controller Types:

CONTROLLER	DESCRIPTION	LINK TO WEBPAGE
KE2 COMPRESSOR SEQUENCER OEM	Manual	https://ke2therm.com/literature/ke2-compressor-sequencer/
KE2Condenser Fan Controller	Manual	https://ke2therm.com/wp-content/uploads/2019/07/Q-2-51-KE2-Condenser-Fan-July-2019-sm.pdf

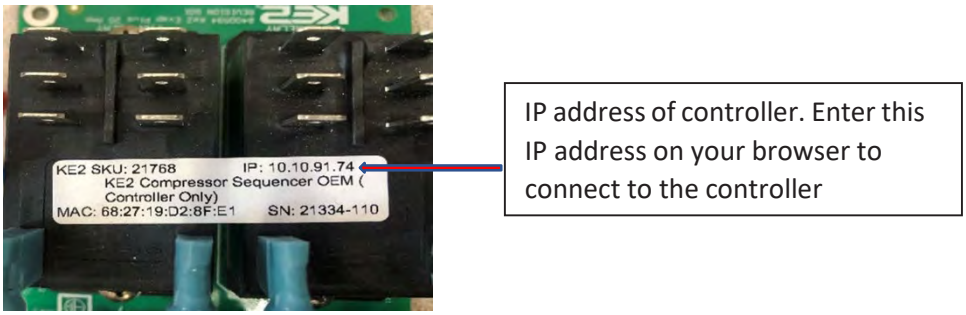
1.1 Part numbers for KE2 Comp Controllers, Sensors, and Transducers.

Item	Description	Hussmann Part No.	Manufacture's Part No.
1	KE2 Compressor control board	3158352	21768
2	KE2 condenser Fan Control board	3158353	21543
3	KE2 transducer 0-150psi 10ft	3158354	20201
4	KE2 transducer 0-500psi 10ft	3158355	20202
5	KE2 standard Temp sensor for all other temp input black 10ft	3158356	20199
6	KE2 standard Temp sensor for all other temp input black 40ft	3083470	20200
7	KE2 High Discharge Temp sensor 10ft	3170905	31230

1.2 Initial Setup:

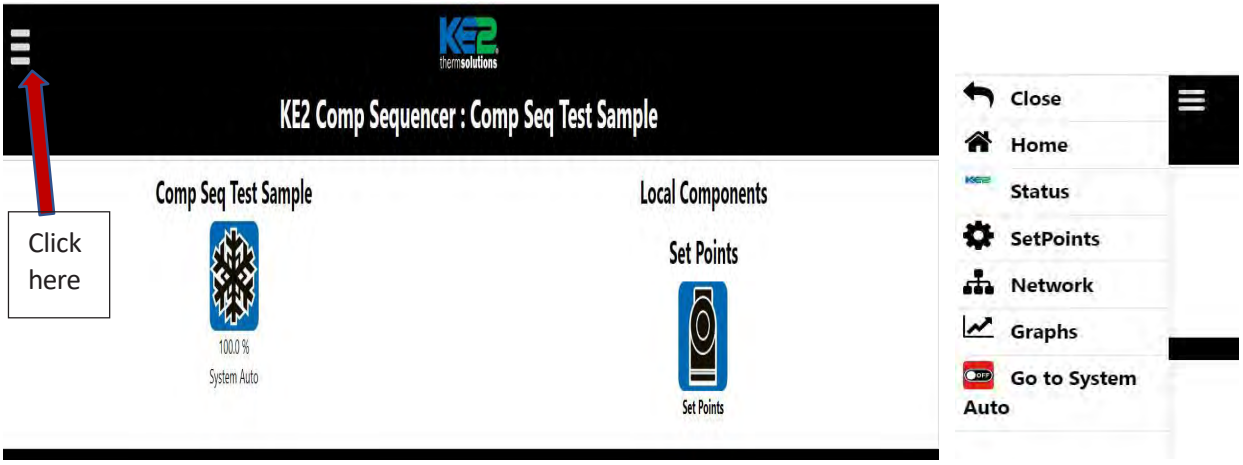
Initial setup is required in order for the controller to work. Log into the controller using the IP address on the controller with a laptop and an internet cable.

Once connected to the controller via the IP address provided on the controller, a webpage of the controller will open. The IP address for compressor sequencer controller is 10.10.91.74.



When a connection is established between the controller and the laptop, the image below will appear.

Click on the three horizontal bars in the top left of the screen to open the navigation menu. Click on the Set Points to load the set point page for the controller (image on right):



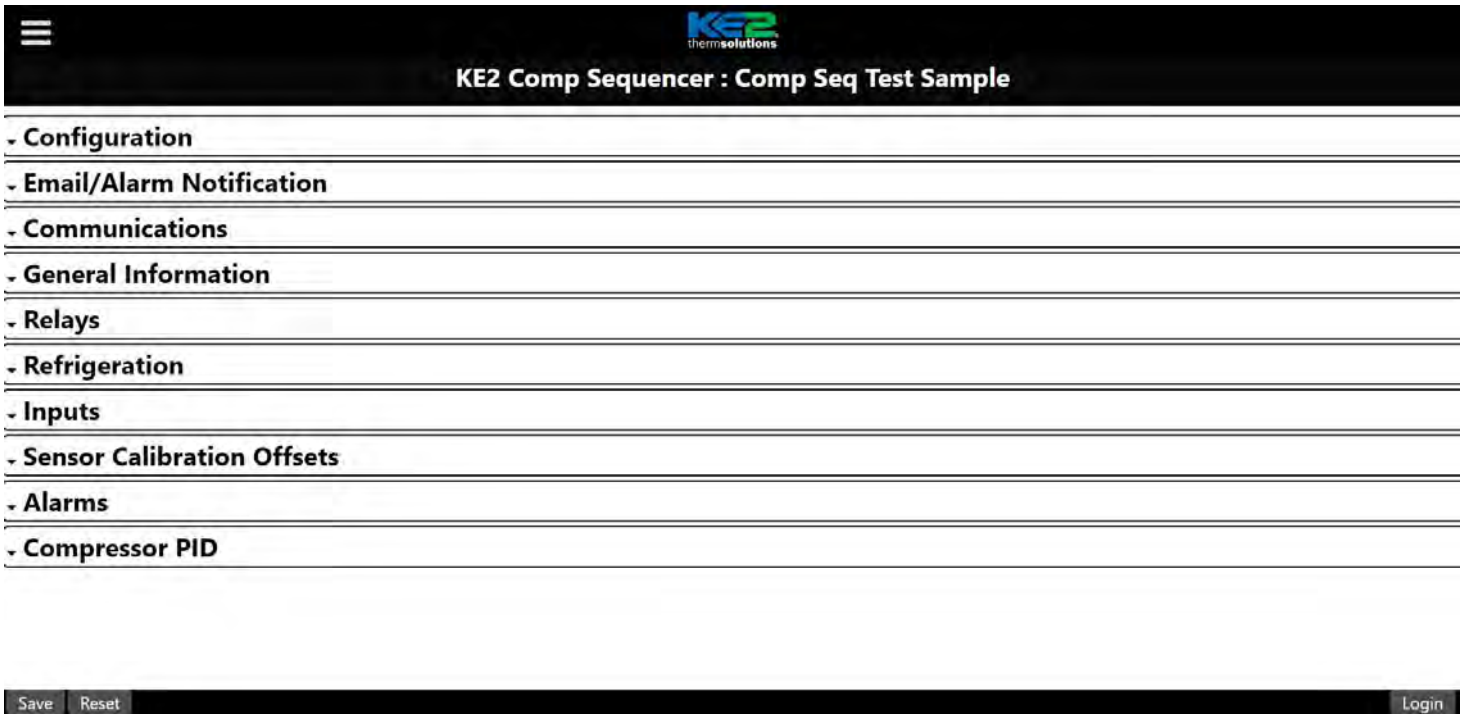
The controller comes with a default login username and password:

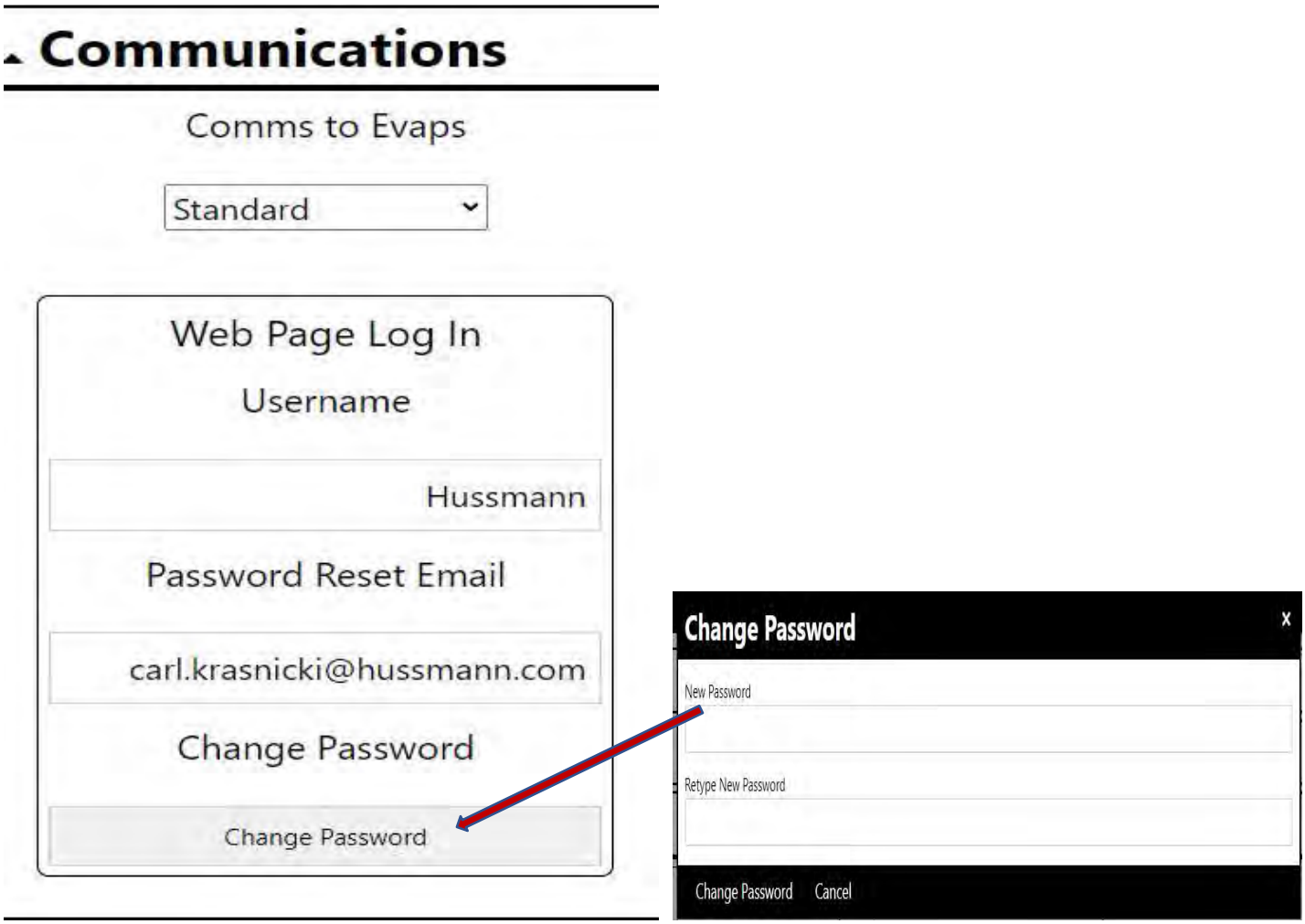
Default username = Ke2admin

Default password = Ke2admin

Look for Login on the bottom right of the controller page, image below, and log into the controller using the default username and password.

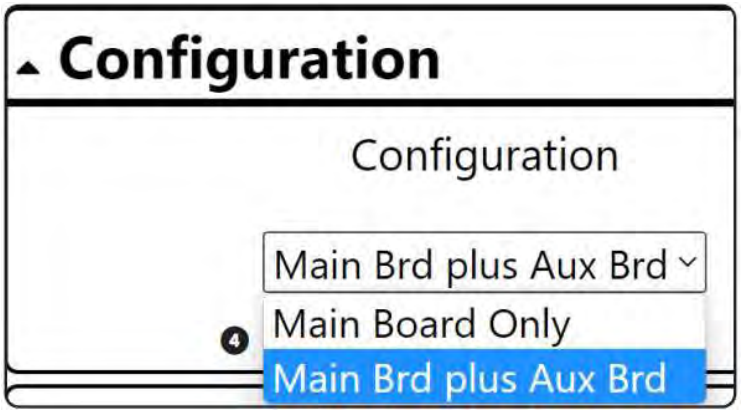
For security reasons, change the username to Hussmann and password as either 12345678 or Hussmann. To change the password, click on **Communication** in the navigation menu (image below)**.** In the box containing the username, click in the box to change the username. To change the password, click inside the box containing the password, then follow the instruction to change the password. You must enter an email address which will enable you to remotely reset the password and to login into the controller using the new password.


KE2 Comp Sequencer : Comp Seq Test Sample
Configuration
Email/Alarm Notification
Communications
General Information
Relays
Refrigeration
Inputs
Sensor Calibration Offsets
Alarms
Compressor PID
Save
Reset
Login


Communications
Comms to Evaps
Standard
Web Page Log In
Username
Hussmann
Password Reset Email
carl.krasnicki@hussmann.com
Change Password
Change Password
Change Password
New Password
Retype New Password
Change Password
Cancel

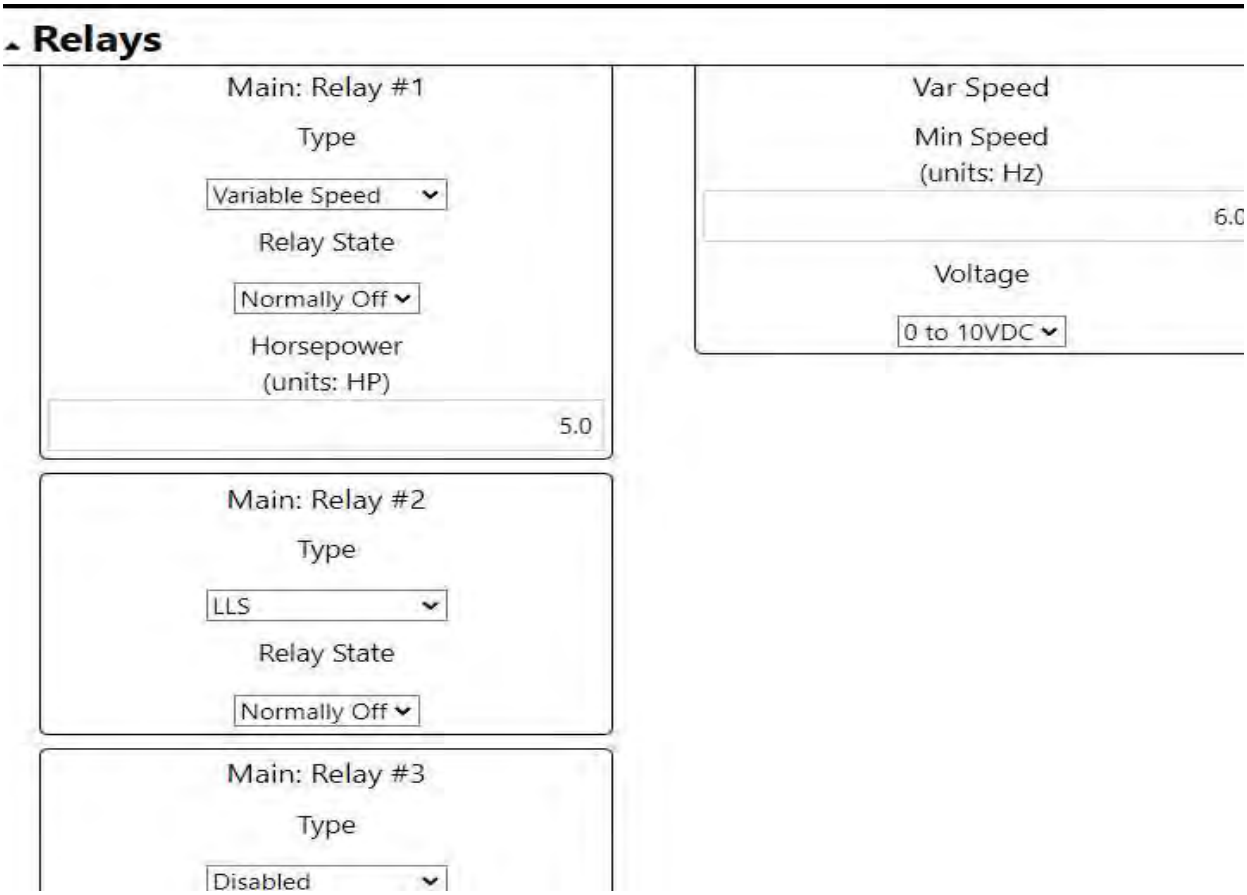
2.0 Controller Configuration:

To assign the correct function of relays on the board, click setpoint, click on configuration, and select Main board only from the drop down then click save in the left corner of the screen. Please note, any changes made to the controller must be saved by clicking the SAVE button.



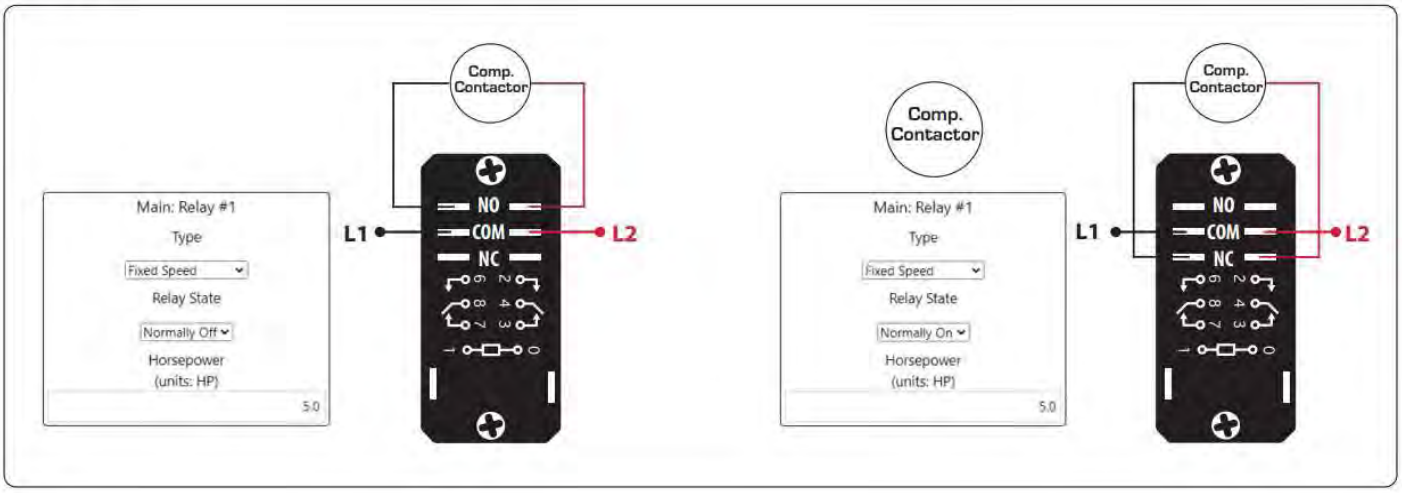
2.1 Relays:

Next click on Relay in the navigation menu to allow configuration of the controller relays. Select the correct function for each relay, then click save. Any relays not used should be disabled (see example below).



Depending on how the contactor coil is wired to the relays (i.e.,, for normally open or normally close), set the relay as shown below in Figure 1:

Figure 1



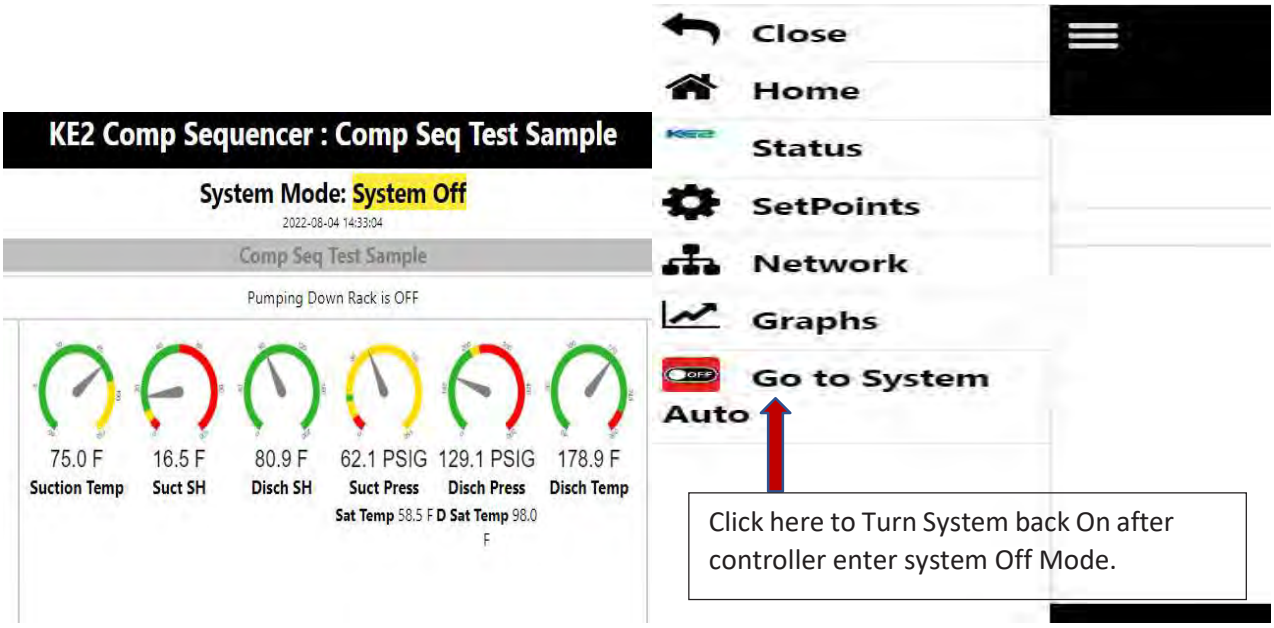
2.2 Compressor Basic Set Points:

In the Navigation menu, Select Refrigeration and set the following parameters:

1) Refrigerant---------- click in the box to select the appropriate refrigerant
2) Suction Pressure Differential----- Pressure above or below suction pressure set point
3) Cut Out Pressure ----- Pressure at which the controller will shut the comp off after one minute
4) Temp Units ------ Select Fahrenheit as the unit measurement for temperature.
5) 2nd Suction Pressure -- When 2nd press digital input is active, this value becomes the new Target Suction pressure
6) Max Pump Out Time (in mins) ----- Time set for controller to shut down the system
7) Fixed / Float Suction -------- Select whether target suction pressure should float based on room temperature
8) Min Time Between Stages--------- Min time set for staging compressor when more than one comp is used
9) Room Temp --------Room temperature set point for suction float when room sensor is connected to the controller Suction Pressure ------- Target suction pressure to maintain
10) 2nd Room Temp--------When 2nd Temp Digital input is active, this value becomes the new room temperature set point for suction float.
11) Minimum Comp Runtime------- Minimum time compressor must run before turning Off
12) Minimum Comp Off time------- Minimum time compressor must before turning On.

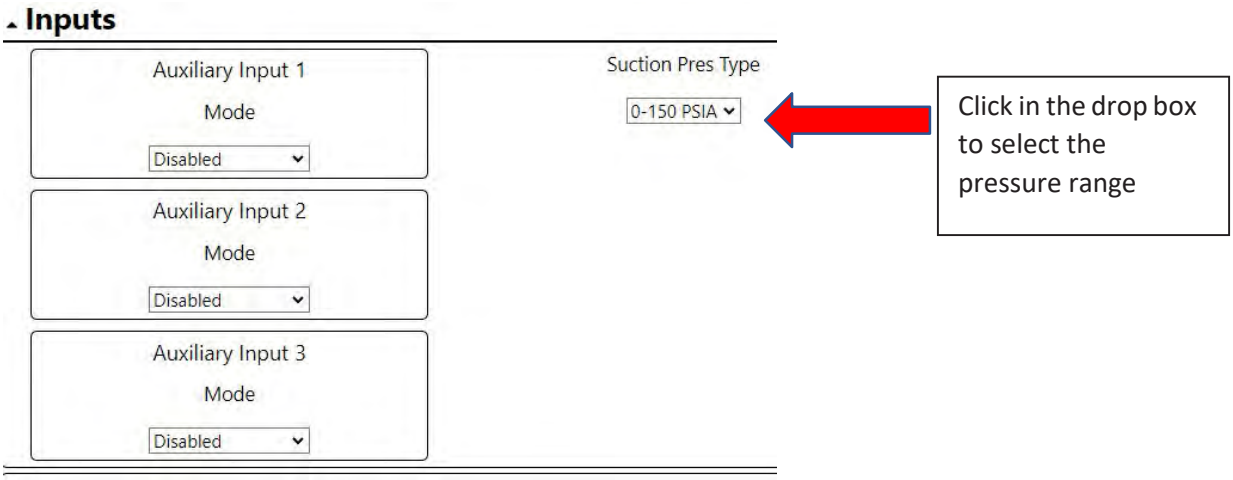
Please click on SAVE to save all changes made to the controller.

Please Note: anytime a critical set point of the controller is changed, the controller will enter System Off mode. This means the system will not operate and requires it to be manually turned on (System On) by clicking on the three horizontal bar icon at top of the screen. Select Go to System and click on Auto to turn the system back on.



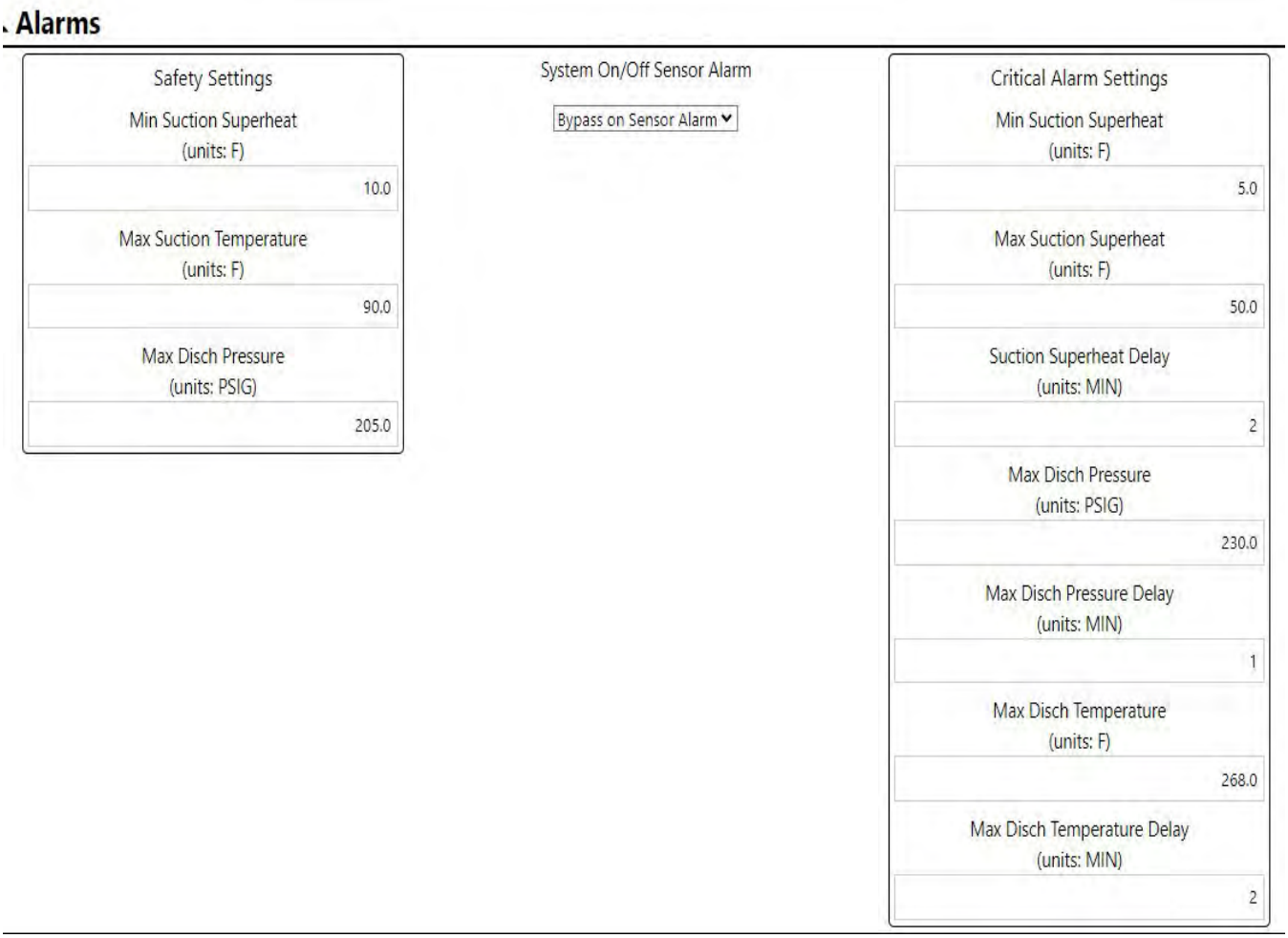
2.3 Input:

Select input from the navigation menu to set the suction pressure range. Disable all auxiliary inputs if not used.



2.4 Alarms Setting:

Select Alarms from the Navigation Menu to set alarm range for the following as shown in the page below:



3.0 Basic Display- Set Point Menu:

To navigate through the set point Menu press and Hold the ENTER key until PSP is shown. Press the UP and DOWN arrow to go through the set point abbreviations. Press the ENTER key to view the current set point value. Pressing the ENTER key will blink the next value to be change. Press the UP and DOWN to change the set point. Press and hold ENTER to SAVE. For numerical set points pressing ENTER once will change the digit that is being modified. Press the BACK key to return to the previous screen. After viewing a set point press the BACK key to return the previous screen without saving.

Abbr	Full Name	Default	Description
PSP	Target Suction Pressure	25.0 psi	Suction pressure the controller will work to maintain
LPt	Max Pump out time	2 min	Sets maximum time to reach cut-out pressure
rFG	Refrigerant		Refrigerant used in the system
SPd	Suction Pressure Diff	2.0 psi	Suction pressure differential used for control
CLA	Clear Alarms		Press and hold ENTER to clear all active
PAS	Web Password Reset		Press and hold ENTER to reset the web username and password to factory default.
FAC	Factory Reset		Press and hold ENTER to reset to factory default.
SA	KE2 Smart Access		Turn KE2 smart Access on or Off EnA to enable / diS to disable
dHC	DHCP Mode		Turn DHCP mode on or off: EnA to enable / diS to disable DHCP
SyS	System ON/OFF		Allow rack to run or put into system off: on to run / oFF to pump down rack and put and into system off. Press and hold ENTER key for 3sec to change state.

3.1 Remote Display Abbreviation:

The table below shows the abbreviation / short form of the system information that will be displayed on the Remote Display screen when connected to the controller. To view the values, press on the Enter Key on the Remote Display to reveal the value / reading. Use the UP or DOWN arrows to scroll through the pages.

When the controller is not in alarm mode, system off, or system bypass, the controller always display the Suction Pressure reading.

Item	Abbreviations	Full Name	Description
1	SoF	System Off	The controller is in System off mode
2	bYP	System Bypass	The controller is in bypass (system On) all stages will be loaded
3	Pr5	Suction Pressure	Suction Pressure as read by the controller
4	Sut	Suction Temperature	Suction Temperature as read by the controller
5	SAt	Saturation Temperature	Saturated Suction Temperature as calculated by the controller
6	SHt	Superheat	Suction Superheat As calculated by the controller
7	dpr	Discharge Pressure	Discharge pressure as read by the controller
8	dst	Discharge Temperature	Discharge Temperature as read by the controller
9	dsA	Discharge Saturation Temperature	Discharge saturation temperature as calculated by the controller
10	dSH	Discharge Superheat	Discharge Superheat as calculated by the controller
11	iP1	IP octet 1	First three digits of the IP address
12	iP2	IP octet 2	Second three digits of the IP address
13	iP3	IP octet 3	Third three digits of the IP address
14	iP4	IP octet 4	Fourth three digits of the IP address
15	PnH	Firmware Part Number 1	First three digits of firmware PN
16	PnL	Firmware Part Number 2	Last three digits of firmware PN
17	Fir	Firmware Version	Current firmware version on the controller

3.2 Alarms:

There are three LED lights in front of the Remote Display attached to the controller with three different color lights.

RED: Critical alarm (most critical alarms will shut the system down)

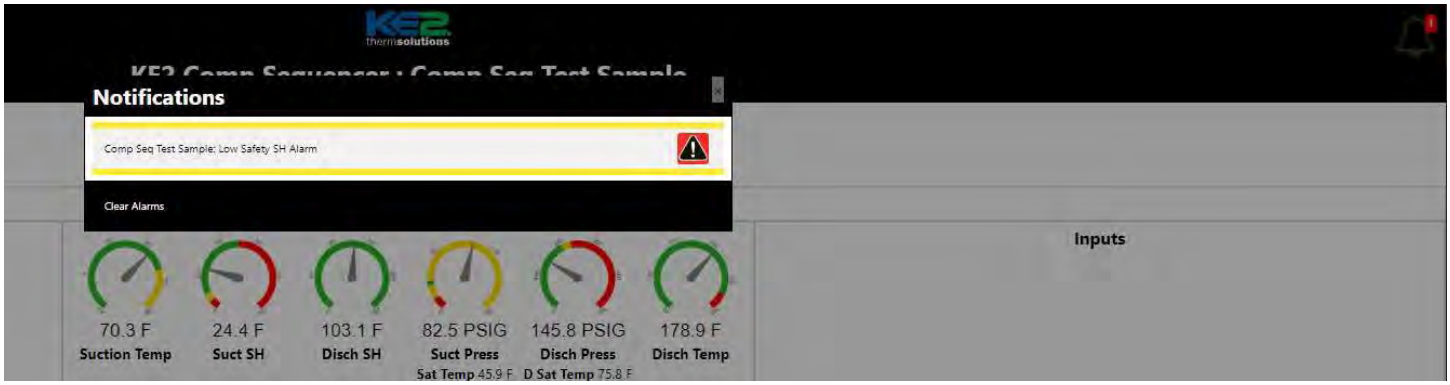
YELLOW: Cautionary alarm (the controller will continue to function but the error needs to be resolved)

GREEN: System is OK, and there is no alarm. The controller will generate an alarm in the form of Abbreviation and display it on the Remote Display.

Item	Alarm Abbr	Alarm	Description
1	A01	Suction Pressure Sensor	Suction Pressure Sensor is shorted, open or pressure is out of range
2	A02	Discharge Pres Sensor	Discharge Pressure Sensor is shorted, open or pressure is out of range
3	A03	Suction Temp Sensor	Suction Temp Sensor is shorted or open
4	A04	Discharge Temp Sensor	Discharge Temp Sensor is shorted or open
5	A05	High Superheat	Suction Superheat is higher than the Max Suction SH for longer than Suction superheat Delay
6	A06	Low Superheat	Suction superheat is lower than the Min Suction SH for longer than Suction superheat Delay
7	A07	High Discharge temp	Discharge temperature is higher than the Max Disch Temp for longer than Max Disch Temperature Delay
8	A08	High in Comp Temp	Digital Compressor internal Temp is high. Comp will turn off until temp lowers.
9	A09	High Disch Pressure	Discharge pressure is higher than Max Disch Pressure for longer than Max Disch Pressure Delay.
10	A24	Alarm Watchdog	Contact KE2 Therm
11	A25	Email Failure	Email alert was not confirmed
12	A26	SNTP	Controller cannot communicate with external time of day server

13	A27	Evap Comm Alarm	Cannot communicate with one or more evaporator controllers for site view
14	S01	Low Safety SH Alarm	Suction Superheat is below Min Suction Superheat for more than 5 minutes
15	S02	High Safety Suction Temp Alarm	Suction Temperature is above Max Suction Temperature for more than 5 minutes
16	S03	High Safety Disch Pressure Alarm	Discharge Pressure is above Max Discharge. Controller will attempt to unload stages and not load anymore stages until pressure is well below Max Disch Pressure

To clear any alarm, click on the bell icon in the top right corner of the controller page. Click on clear to clear the alarm. If the root cause of the alarm is not resolved, the alarm will resurface again.



You can clear the alarm using the Remote display option as well. Press and hold the ENTER key till PSP is shown. Use the UP and DOWN till CLR is shown. Press on the ENTER key to clear alarm.

For more information on the settings and alarms, visit the website (link below) to learn more:

https://ke2therm.com/literature/ke2-compressor-sequencer/

4.0 Condenser Fan Controller

The KE2 condenser fan can be set to control the following fans motors:

1) Fixed speed EC (Electronically Commutated) motors
2) Fixed speed PSC (Permanent Split Capacitor) that runs at constant speed
3) Variable Speed EC motors

The controller has an onboard 0-10 Vdc output that can be used to control ECM fan speed, and standard VFD for three-phase fan motors.

The condenser controller can also be set to five different control modes:

1) Fixed Head Pressure
2) Subcooling
3) Saturation temp to ambient air temp diff
4) Condenser liquid temp to ambient air temp diff, or
5) Condenser inlet temp to condenser outlet temp diff

The condenser controller has a remote display that can be accessed to set parameters or adjust set points.

4.1 Initial Setup for Condenser:

When the controller is powered up for the first time, the display will read Cdr, for 3 seconds. If there are no alarms, the controller will read the head pressure.

The controller must be logged into to make changes to parameters.

Web Login: the condenser controller IP address is 10.10.221.157.

Connect to the controller using an internet cable to a laptop, open a browser and type in the IP address. When connection is successful, the page below will open. Enter the default username and password to login.

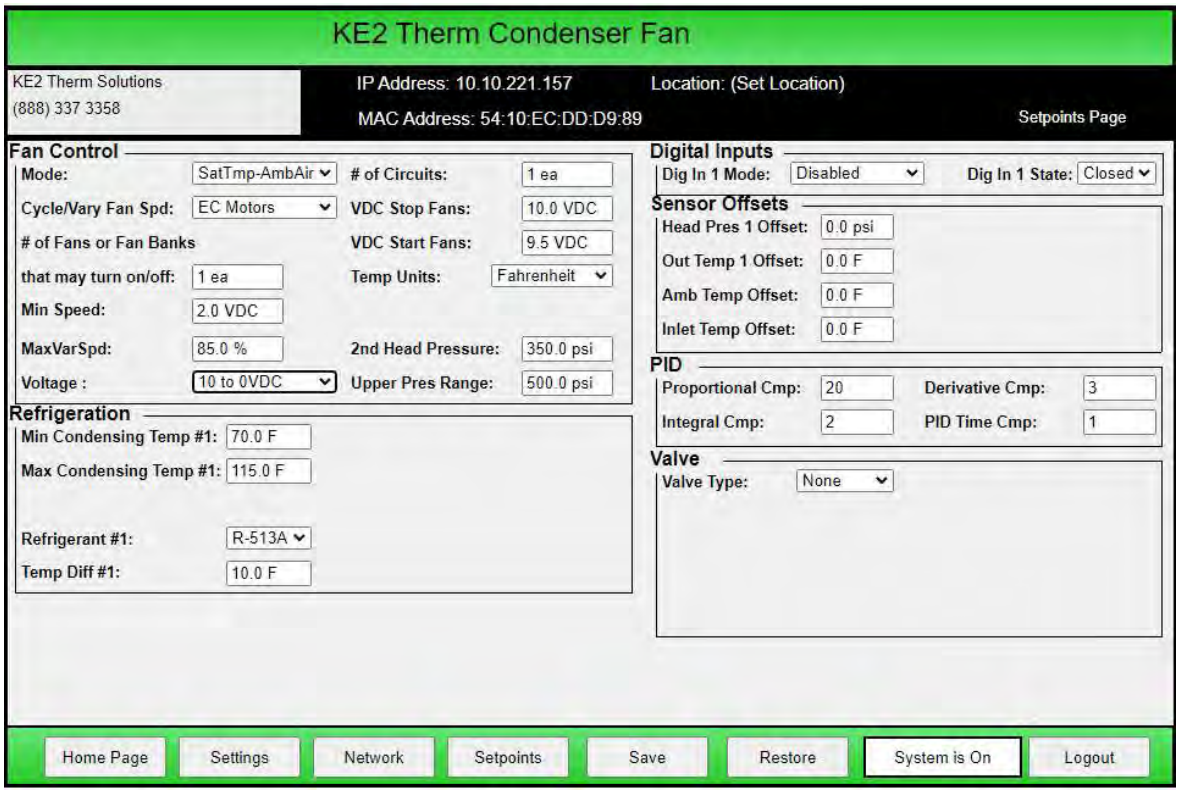
Default username: ke2admin and password: ke2admin - Enter username and password then submit.

For security reasons, password must be changed:

To change the username and password, type new username and password under Web Page Log In as shown in the figure below. Click on save to update the new username and password.

4.2 Basic Parameter Setups:

Click on set points on the control web page and the below page will open. Click inside the drop boxes in the page display to change the following parameters:



4.3 Fan Control Mode:

Click in the drop box to select from the following options based on the sensor used to control the condenser fans:

1) Fixed Head Pressure
2) Subcooling
3) Saturation temp to ambient air temp diff
4) Condenser liquid temp to ambient air temp diff, or
5) Condenser inlet temp to condenser outlet temp diff

Cycle/Vary Fan speed: this is based on what type of device is controlling the fans.

1) VFD
2) ECM
3) ECM with Fix Speed
4) Cycle ON/OFF

Continue the setup by setting the ff:

a) No. of Fans install: enter the number of fans installed
b) Select temperature units from the drop box
c) Enter the discharge pressure at which the condenser fan should run irrespective of the outdoor temperature
d) Voltage: Select 10 – 0 Vdc for ECM
e) Min Condensing Temp #1: Enter the temperature values at which the fans should start
f) Max Condensing Temp #2: Enter the max condensing temperature
g) Refrigerant #1: Select the refrigerant type
h) Temp Diff #1: enter the temp differential at which the fans turn On and Off

When all the settings are done click on Save to save the new parameter.

The set points can also be set using the remote display interface attached to the controller.

Press and Hold the ENTER key on the remote display to enter the set point menu. Press ENTER key to toggle between set point and value.

Use the Up and Down arrows to scroll through the various set point pages and set the parameters accordingly. To save the set point value press and hold the ENTER key for 3 seconds to save.

To exist without saving, press the BACK key to return to the previous menu. Pressing the BACK key several times will return the controller to the default view.

4.4 Condenser Abbreviation:

Below are the short form abbreviations that you will see on the Remote Display, use the UP and DOWN arrows to scroll through the pages. Use the ENTER key to enter and set or change the parameters.

Items	Abbr	Full Name	Description
1	cnd	Control Mode	Select PSP for fixed pressure: ACn for condenser temp: SbC for subcool; AdF for Out-Amb temp; iod for in-out temp (select AdF for outdoor temp)
2	FAn	Number of Fans	Number of fans being controlled
3	Cir	Number of Refrigeration Circuits	Number of refrigeration circuits in condenser being controlled. Only one circuit available in iod in-out mode or if split condenser is enabled
4	rG1	Refrigeration 1	Type of refrigerant used in circuit 1
5	rG2	Refrigeration 2	Type of refrigerant used in circuit 2
6	UrA	Voltage Range Output	0t1 for 0-10 vdc; 0t5 for 0-5 vdc; 1t0 for 10-0 vdc; 5t0 for 5-0 vdc
7	CLt	Control Type	Type of control: Ecn for EC motor control; ECF for control of fixed speed EC motor; UFd for VFD control; FSP for cycling fans on-off
8	Upr	Upper Pressure Range	Upper range of pressure being used
9	PP1	Fixed Pressure 1	Setpoint when controlling to fixed pressure setpoint on circuit 1
10	Pd1	Pressure differential	Pressure differential when controlling fixed pressure on circuit 1
11	td1	Temp Differential	Temp differential setpoint when controlling, ACn, AdF, or iod on circuit 1
12	SP1	Subcooling Setpoint 1	Setpoint when controlling subcooling in circuit 1
13	nC1	Minimum Condenser Temp 1	First minimum condenser Temp used to control for ACn
14	AC1	Maximum Condenser Temp 1	First maximum condenser Temp used to control for ACn.
15	nP1	Minimum Pressure 1	First Minimum Pressure used to control for SbC, AdF, iod
16	oP1	Maximum Pressure 1	First Maximum pressure used to control for SbC, AdF, iod

17	Stt	Min Switch Time	Minimum time between switching fans on or off
18	2nd	2nd Fixed Pressure Setpoint	2nd pressure setpoint used when digital input is active
19	FSd	Minimum Fan Speed	Used when controlling VFD or EC motors
20	LFn	Maximum Load Fan	Used when controlling VFD or EC motors
21	Str	VDC start Fans	Minimum voltage required to start the EC motors
22	StP	VDC stop Fans	Voltage at which the EC motors stop.

For more information on the display, go to the condenser link page.
https://ke2therm.com/wp-content/uploads/2019/07/Q-2-51-KE2-Condenser-Fan-July-2019-sm.pdf

4.5 Condenser Alarms:

Control Mode selected and applicable alarms based on the control mode chosen. Under the set point menu, the alarm notifications applicable are as follows:

Abbr	Full Name	Possible Alarm
ACn	Condenser Temp	ASA, PA1, PA2, CCN, EFL
AdF	Out Ambient Temp	ASA, oA1, oA2, PA1, PA2, CCN, EFL
iod	In-Out Ambient Temp	iSA, oA1, oA2, PA1, PA2, CCN, EFL
PSP	Fixed Pressure	PA1, PA2, CCN, EFL
SbC	Subcool	oA1, oA2, PA1, PA2, CCN, EFL
Alarm Description		
PA1	Pressure sensor 1 alarm	1st Head Pressure Sensor Alarm

oA1	Outlet sensor 1 alarm	1st outlet temp sensor (also as drop leg temp alarm
ASA	Air sensor alarm	Ambient air sensor alarm
iSA	Inlet sensor alarm	Inlet temp sensor alarm
PA2	Pressure sensor 2 alarm	2nd head pressure alarm
oA2	Outlet sensor 2alarm	2nd outlet temp sensor (also as drop leg temp alarm
EAL	External Alarm	Auxiliary input is active when external alarm is selected
CCn	Comm alarm with Comp Seq	No communication with compressor sequencer board
EFL	E-mail Failure Alarm	E-mail was not confirmed by email server after seven consecutive tries.

When all set points are completed, click on the Home page to view the status of all sensors connected to the controller.

HUSSMANN®

Table of Contents

1.0 CM25D Controller:

The Dixell XCM25D Controller is designed to be installed in a condensing unit where all parameters can be set exactly as needed.

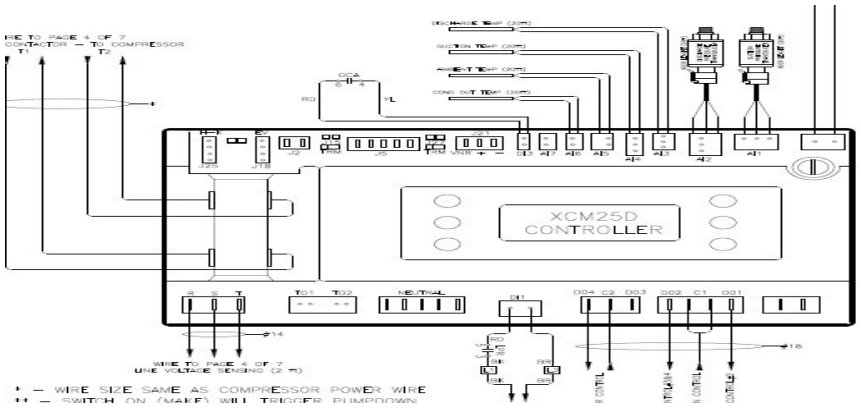
The controller must be configured/mapped to function based on the drawing and the I/O points provided by the design engineer to function at maximum efficiency.

Example of I/O list:

Items	I/O Points	Amps/Volts	I/O Points
1	DO1	16A	Evap Fans
2	DO2	16A	Defrost Heater
3	DO3	8A	Compressor
4	DO4	5A	Crank Case Heater
5	DO5	5A	Alarm Output
6	AI1	0 - 5V	Suction Pressure
7	AI2	0 - 5V	Condensing Temperature (General Purpose)
8	AI3	0 - 5V	Discharge Line Temperature
9	AI4	0 - 5V	Ambient Temperature
10	AI5	0 - 5V	Vapor Inlet
11	AI6	0 - 5V	Vapor Outlet
12	AI7	0 - 5V	Liquid Line Temperature
13	DI1		Defrost Termination Thermostat
14	DI2		Internal, Fixed HP
15	DI3		AI8, not use in production, may be used as case temp in the field
16	TO1		Condenser Fan Motor
17	TO2		Not used

Table 1

A table such as this will not be provided, however, the sensors displayed on the controller will be shown as in this diagram.



1.1 Using the Controller Front Panel Keypads:

The controller can be configured using the front panel keypads or Wismate software installed on a computer (Fig. a)

Fig. a

1.2 Keypad Commands:

SET Keypad	To display target set point; in programming mode its use for selecting a parameter or to confirm an operation
START Keypad	(RESET) Hold for 5 seconds to reset any lockouts if the current state of the controller allows for it to be reset. This is to be done on the first push of 3 seconds.
UP KEY	The Up key is used to scroll through the parameters and to increase a value
DOWN KEY	The DOWN key is used scroll through parameters and to decrease a value
BOOK/SERVICE KEY	The SERVICE key is used to enter the alarm menu
SNOW/DEFROST KEY	Hold for 3 seconds to start a manual defrost or terminate an active defrost
UP+DOWN KEY	Press and hold for about 3 seconds to lock (Pon) or unlock (PoF) the keyboard
SET+UP	Pressed together to exit from programming mode or from menu; on submenus rtC and EEV combination allows returning to previous level
SET+DOWN	Pressed together for 3 seconds, this would allow access to first level programming mode

Table 2

The controller provides two levels of programing when using the keypads: level Pr1 and level Pr2 (protected with a password and intended for experts).

Access to Pr1	SET + DOWN KEY	Press and hold for three seconds for access to first level programming level Pr1 (can only change one or two parameters)
Select item	UP or DOWN KEY	Select the parameter or submenu using the arrows
Show Value	SET	Press the SET button
Modify	UP or DOWN	Use the arrow to modify the values
Confirm & Store	SET	Press the SET key - the value will blink for 3 seconds and then the display will show the next parameter
Exit	SET+UP key	Instantaneous exit from the programming mode (also can wait for the controller to exit the programming mode)

Table 3

To access level Pr2, press and hold the “SET+DOWN” keys for 3 seconds, the parameter label “Par” will show. Press the “SET” keypad and press the DOWN keypad once “PAS” will show. Press the SET key to enter the passcode.

The controller will start blinking PAS and after a few seconds “0”. Use the UP and DOWN key to enter 321 as the passcode and confirm the passcode by pressing the SET key.

1.3 Fast Access Menu:

The fast menu contains a list of probes and values automatically loaded by the controller such as the superheat and percentage of valve opening. When the controller displays **nP or noP,** it means the probe is not available or present. **Err** is an error message indicating the value is out of range.

To go through the controller menu, use the UP key to scroll:

Enter the quick menu access by pressing the UP key	If the UP arrow is not pressed for about 3 minutes, the controller will exit the quick menu. The values that would be displayed depends on the configuration of the board
Use the UP or DOWN arrows to select an entry. Press the SET key to see the value	✓ PIP: Pressure value of the P1 probe. ✓ P2t: Temperature value of the P2 probe. ✓ P2P: Pressure value of the P2 probe (if wired) ✓ P3t: Temperature values of the P3 probe (if wired) ✓ P4t: Temperature values of the P4 probe (if wired) ✓ P5t: Temperature values of the P5 probe (if wired) ✓ P6t: Temperature values of the P6 probe (if wired) ✓ P7t: Temperature values of the P7 probe (if wired) ✓ SH: Value of superheat. NA = not available ✓ oPP: Percentage of step valve opening ✓ LInJ: Status of Liquid Line Solenoid (OFF-OFF) this information is available only if one relay is set as LLS ✓ SEtd: Value of the Dynamic Set Point (Condenser fan SET) only available if the Dynamic set function is enabled ✓ Aoo: Percentage of the analog output (0-10V) this information is available only if the 0-10V or TRIAC PWM mod is enabled ✓ DStO: Percentage of the PWM output driving the valve of the Digital Scroll compressor ✓ L°t: Minimum room temperature ✓ H°t: Maximum room temperature ✓ tU1: Voltage reading V1 ✓ tU2: Voltage reading V2 ✓ tU3: Voltage reading V3 ✓ tA1: Current reading I1 ✓ tA2: Current reading I2 ✓ HM: Menu

Table 4

To exit, press the SET and UP key together. If the keypad is LOCKED with the display POF, press the UP and DOWN key for about 3 seconds to unlock the keypad, Pon will display on the controller indicating the controller is unlocked.

1.4 HOT KEY:

The Hotkey can be used to Upload and Download the program from the controller. After using the front panel to program the controller, Insert the HOTKEY into J25 terminal on the controller to Upload the program to the HOTKEY.

1.5 To Upload:

1) Turn the controller ON
2) Insert the HotKey into the terminal mark “HK or J25”
3) Press the UP key till you see **uPL** message on the controller *(Fig.b)*

Fig. b

Fig. c

4) The controller will start uploading the program. In a few seconds the controller will Flash the word “END” indicating the Upload is complete (*Fig.c).*
5) Press or push the SET button. The “END” will stop flashing.
6) Turn OFF the controller and remove the HotKey.
7) Turn ON the controller, the controller will go through a few menu items and begin to work, however, if the message Err displays, it means the Upload is not successful. Start the process again and if Err appears again, replace the HotKey and start the process again.

1.6 Downloading a program to the controller:

1) Turn the controller OFF
2) Insert a pre-programmed “HotKey” into the terminal mark HK or J25
3) Turn the controller ON
4) The controller will display “doL” (fig. d) for a few seconds, followed by the word “END” (fig. e) indicating the download is complete.

Fig. d

Fig. e

Remove the HotKey from the controller, the controller will display a few set points and start working.

For more on parameter lists and settings, please visit the Emerson website for the latest revisions and instructions on programming:

https://climate.emerson.com/documents/copeland-eazycool-zx-condensing-units-xcm25d-controller-parameter-list-technical-information-en-gb-6406414.pdf

XCM 25D Technical Manual V1_3.pdf

1.7 Programming The XCM25D controller with the Front Panel:

To access level Pr2 to start programming, press and hold the “SET+DOWN” keys for 3 seconds. The parameter label “Par “will be shown. Press the “SET” keypad and Press the DOWN keypad once, the word “PAS” will show up. Press the SET key to enter the passcode.

The controller will start blinking PAS, and after a few seconds, “0”. Use the UP and DOWN key to enter 321as the passcode and confirm the passcode by pressing the SET key.

The below parameter SET points in the controller need to be set for the first time for the controller to run the unit. Follow the instructions on how to use the front panel key and set the parameters.

Code Label	Description	Parameter range
Cin/C01	Compressor Cut in Pressure Set Point	0 – 135 psi
CoU/C02	Compressor Cut out Pressure Set Point	0 – 15 psi
LS/C03	Minimum Set Point for Suction pressure/temperature	
US/C04	Maximum set point for Suction pressure/temperature	
LAO/C10	Pressure/temperature operation for ambient differential	
StC/16	Digital compressor set point	
Pbd/C17	Proportional band for compressor regulation	
rS/C18	Band offset for compressor regulation	
ESC/P18	Compressor set point hysteresis in energy saving mode	
tdG/C21	Cycle time for digital compressor	10 to 40 seconds
PMi/C24	Minimum Capacity for Digital Compressor	0 to 100
PMA/C25	Maximum Capacity for Digital Compressor	0 to 100
rEF/C07	Refrigeration Selection	R404(0-404)-R507(1-507)-R134(2-134)-R22(3-R22)-R407C(4-07C)-R407A(5-07A)-R407F(6-07F)-N40(7N40)-DR33(8-R33)-R410A (9-410)

Spo/C08	Set Point offset	NV(0-NU)- small offset, medium offset(2-MOF)- Large offset(3-LOF) _LAO(4-FOF)
MCS/E41	Minimum Condenser Set Point	-40F to 230F
FSM/E38	Fan Set Point Modulation Enable	0: no. 1: yes
FSP/E39	Condenser Set Point when fan set point modulation is disabled	-40F to 230F
LAI/C09	Ambient temperature operation set point	-40F to 230F
LT1/E02	Low set point for condenser fan motor fan map, 1(for R404, R507)	Condenser
LP1/E03	Lower suction pressure points for condenser	
HT1/E04	High Set Point for condenser fan	
HP1/E05	High suction pressure points for condenser fan map 1 (For R404A, R507A)	

Table 5

1.8 Hussmann Configuration Points:

Input Points:

- AI1 = Suction Pressure
- AI2 = Discharge Pressure
- AI3 = Discharge Temperature
- AI4 = Suction Temperature
- AI5 = Ambient Temperature
- AI6 = Condenser Outdoor Temperature
- DI3 = General Compressor Alarm

Output Points:

- DO1 (16A) = Compressor Control
- DO2 (16A) = Backup Control
- DI1 = 208VAC connect to DI1
- TO1 = Condenser Fan Control
- TO2 = Digital Unloader Solenoid ON/OFF Controls (Output points)
- DO1 (16A) = Condenser Fan Control #2
- DO2 (16A) = Condenser Fan Control #3 & #4
- DO3 (8A) = not used
- DO4 (5A) = Compressor Control
- TO1 = not used
- TO2 = not used

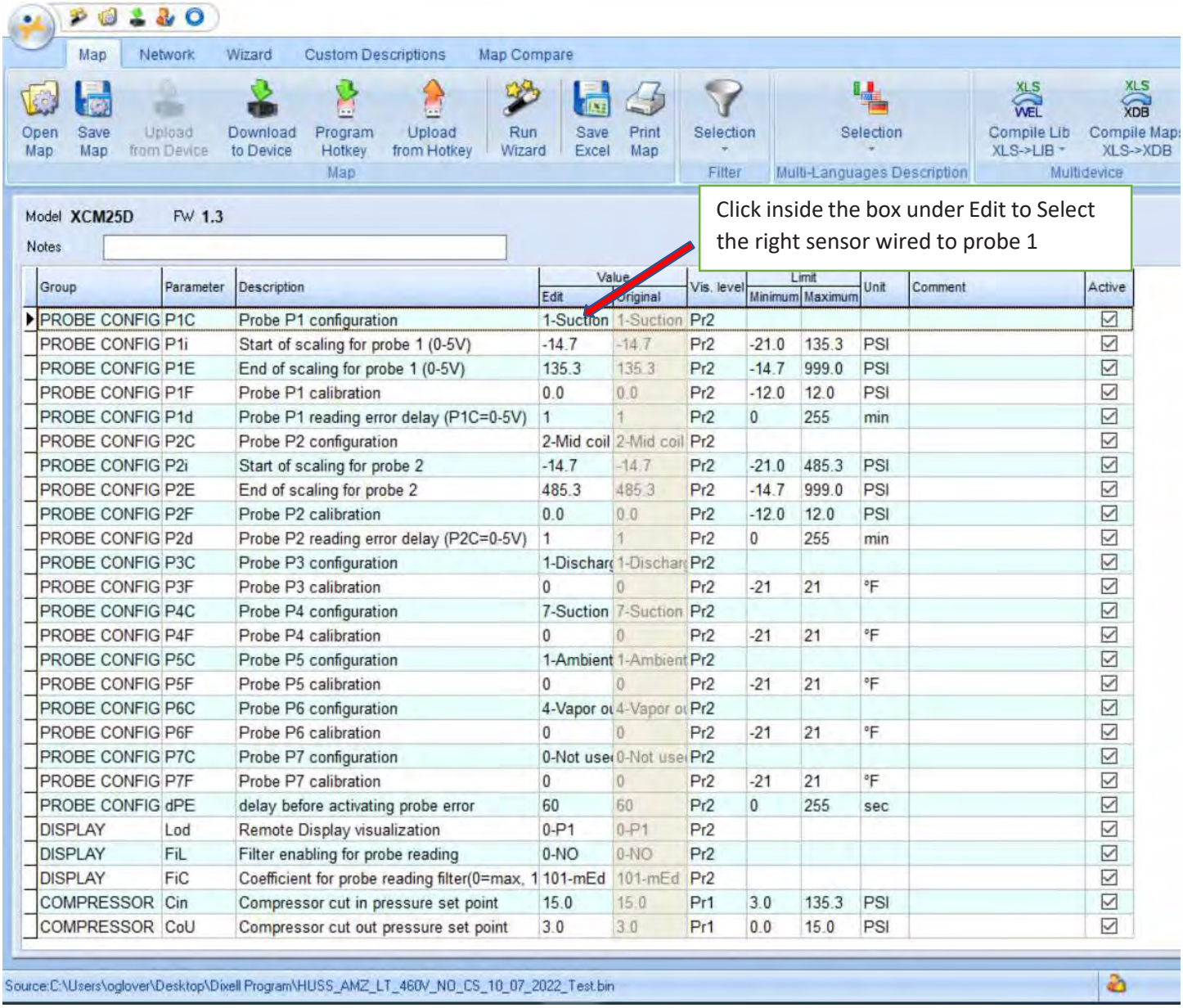
For all probe configurations, select the right sensor in the program assigned to the point. For example, if probe “AI1” has the suction pressure wired to it, in the program, select (2-mid coil pressure 0-5V).

1.9 Wizmate:

The controller can be programed with Wizmate software installed. Have the Wizmate software installed to a computer by IT personnel or follow the instructions in the pdf file below to install:

Wizmate instruction.pdf

After the installation of the Wizmate software, click on the Wizmate icon. Look for security and click on login to login as an Administrator. The username is Administrator, and the password is admin. The controller page will open and look like the picture shown below.



Group	Parameter	Description	Value Edit	Value Original	Vis. level	Limit Minimum	Limit Maximum	Unit	Comment	Active
PROBE CONFIG	P1C	Probe P1 configuration	1-Suction	1-Suction	Pr2					☑
PROBE CONFIG	P1i	Start of scaling for probe 1 (0-5V)	-14.7	-14.7	Pr2	-21.0	135.3	PSI		☑
PROBE CONFIG	P1E	End of scaling for probe 1 (0-5V)	135.3	135.3	Pr2	-14.7	999.0	PSI		☑
PROBE CONFIG	P1F	Probe P1 calibration	0.0	0.0	Pr2	-12.0	12.0	PSI		☑
PROBE CONFIG	P1d	Probe P1 reading error delay (P1C=0-5V)	1	1	Pr2	0	255	min		☑
PROBE CONFIG	P2C	Probe P2 configuration	2-Mid coil	2-Mid coil	Pr2					☑
PROBE CONFIG	P2i	Start of scaling for probe 2	-14.7	-14.7	Pr2	-21.0	485.3	PSI		☑
PROBE CONFIG	P2E	End of scaling for probe 2	485.3	485.3	Pr2	-14.7	999.0	PSI		☑
PROBE CONFIG	P2F	Probe P2 calibration	0.0	0.0	Pr2	-12.0	12.0	PSI		☑
PROBE CONFIG	P2d	Probe P2 reading error delay (P2C=0-5V)	1	1	Pr2	0	255	min		☑
PROBE CONFIG	P3C	Probe P3 configuration	1-Dischar	1-Dischar	Pr2					☑
PROBE CONFIG	P3F	Probe P3 calibration	0	0	Pr2	-21	21	°F		☑
PROBE CONFIG	P4C	Probe P4 configuration	7-Suction	7-Suction	Pr2					☑
PROBE CONFIG	P4F	Probe P4 calibration	0	0	Pr2	-21	21	°F		☑
PROBE CONFIG	P5C	Probe P5 configuration	1-Ambient	1-Ambient	Pr2					☑
PROBE CONFIG	P5F	Probe P5 calibration	0	0	Pr2	-21	21	°F		☑
PROBE CONFIG	P6C	Probe P6 configuration	4-Vapor ou	4-Vapor ou	Pr2					☑
PROBE CONFIG	P6F	Probe P6 calibration	0	0	Pr2	-21	21	°F		☑
PROBE CONFIG	P7C	Probe P7 configuration	0-Not use	0-Not use	Pr2					☑
PROBE CONFIG	P7F	Probe P7 calibration	0	0	Pr2	-21	21	°F		☑
PROBE CONFIG	dPE	delay before activating probe error	60	60	Pr2	0	255	sec		☑
DISPLAY	Lod	Remote Display visualization	0-P1	0-P1	Pr2					☑
DISPLAY	FiL	Filter enabling for probe reading	0-NO	0-NO	Pr2					☑
DISPLAY	FiC	Coefficient for probe reading filter(0=max, 1	101-mEd	101-mEd	Pr2					☑
COMPRESSOR	Cin	Compressor cut in pressure set point	15.0	15.0	Pr1	3.0	135.3	PSI		☑
COMPRESSOR	CoU	Compressor cut out pressure set point	3.0	3.0	Pr1	0.0	15.0	PSI		☑

Fig. f

All configurations or settings are done under “edit” in the controller page. To change the setting, click inside the box. A dialogue box will open to select the right option for the configuration. For example, to change any configuration under probes, select the probe with the word “Probe P1 configuration,” “Probe P2 configuration,” Etc. as shown in *Fig.f* above. The controller has a list of configuration points that must be set. Scroll through the various configuration points in the controller to configure the controller based on all the input and output points wired to the controller.

The controller page has been partitioned or grouped in the following sequence in the Wizmate software:

- PROBE CONFIGURATIONS
- DISPLAY (THIS OPTION IS SELECTED WHEN AN EXTERNAL DISPLAY IS ATTACHED TO THE CONTROLLER)
- COMPRESSOR
- COMPRESSOR SAFETY
- CONDENSER FAN
- COMPRESSOR PROTECTION
- CRANKCASE HEATER
- RTC (CONTROLLER INTERNAL TIME SETTING)
- DIGITAL INPUT
- OUTPUT AND
- OTHERS

Based on the drawing and the I/O list provided, scroll through all the set points in the controller and set the appropriate Input/output points.

Please Note: Most of the default set points are provided in the controller which does not require any change. Unless otherwise stated, there is no need to change the default settings.

When all parameters are set, click on SAVE MAP and create a folder to save the program on a desktop.

1.10 LOADING PROGRAM TO HOTKEY:

To load the program to the Hotkey, the “Emerson Prog Tool” is required.

2 PROG TOOL

The PROG TOOL unit may be utilized to:

a. Program a HOT KEY either from another HOT KEY or from a PC
b. Program controller from a PC directly

The PROG TOOL is equipped with 3 LEDs:

1	Power LED	GREEN indicates power supply is ON
2	Tx LED	YELLOW blinking indicates communication between PC and PROG TOOL
3	Copy LED	YELLOW indicates HOT KEY programming RED indicates HOT KEY programming error GREEN indicates HOT KEY programming successful

Table 6

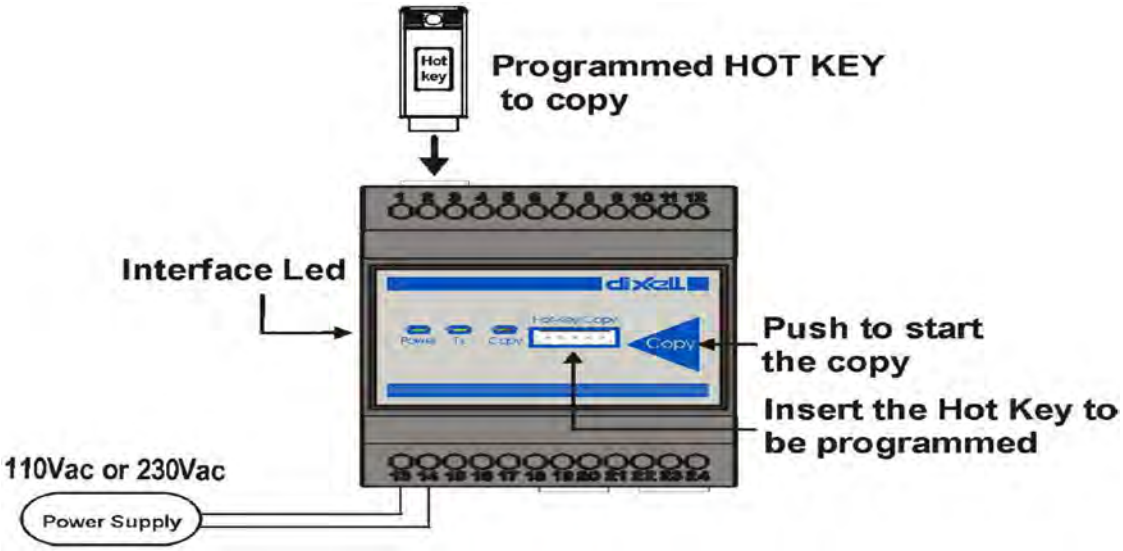


FIGURE 1: PROGRAM FROM HOT KEY TO HOT KEY

2.1 Program from HOT KEY to HOT KEY

PROG TOOL allows to create copies of any HOT KEY already programmed.

The following steps instruct how to copy the parameter map from one HOT KEY to another HOT KEY:

1. Insert a pre-programmed HOT KEY into the side of the Pro-Tool connector.
2. Insert the HOTKEY to be programmed into the **Copy** connector on top of the PROG TOOL.
3. Push the **Copy** button to initiate the transfer. The Copy LED blinks during the transfer operation.
4. After a few seconds, the Copy LED will stop blinking indicating the operation was successful. The following blinking shows the status of the programmed being copy:
    - RED indicates the operation failed.
    - Orange indicates the program is being copied.
    - GREEN indicates the operation is successful.
5. Remove the HOT KEYs.

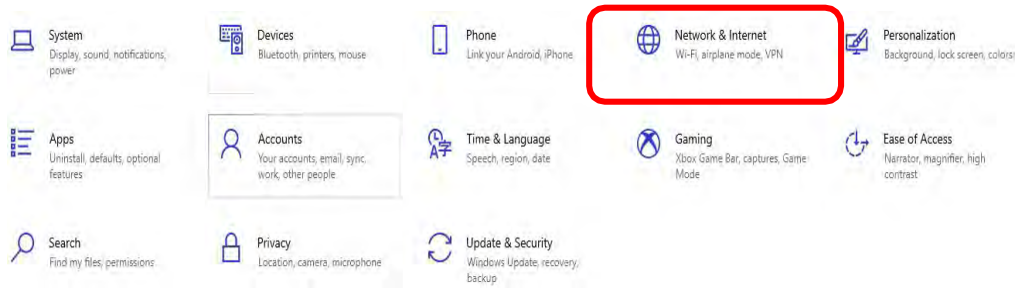
2.2 Program from PC to HOT KEY

The WIZMATE software on a PC may be utilized to copy a parameter map to a HOT KEY through the PROG TOOL. The following steps instruct on how to program a HOT KEY using the PROG TOOL:

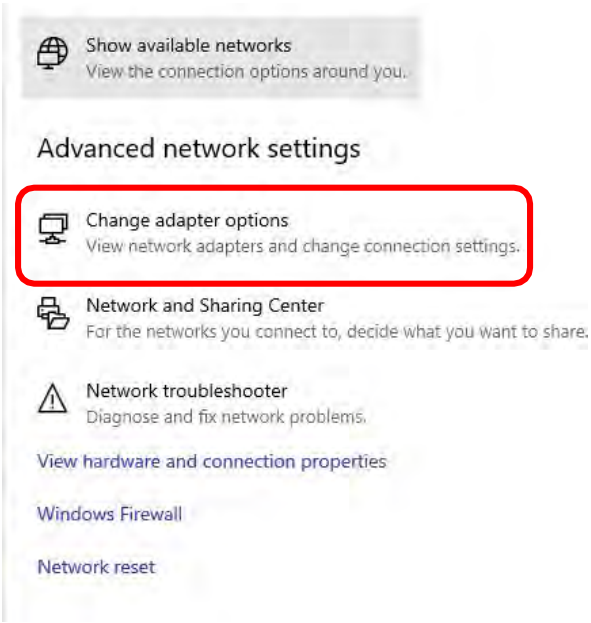
Please ensure to setup a PC to reflect the IP address.

2.2.1 How to setup up a laptop.

Go to settings on a laptop and click on Network & Internet.

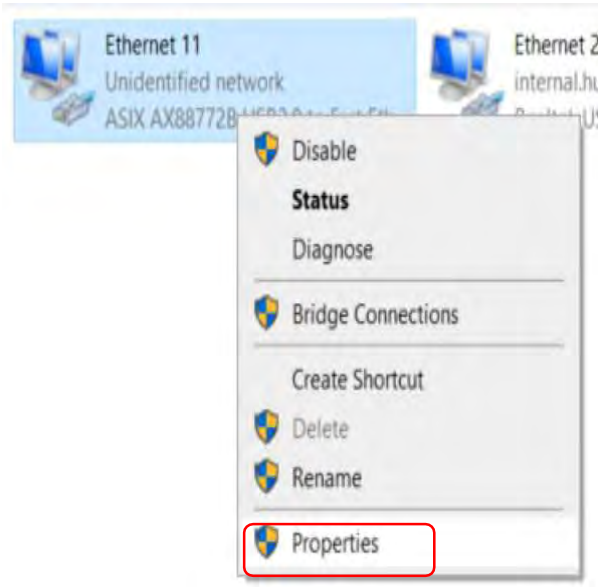


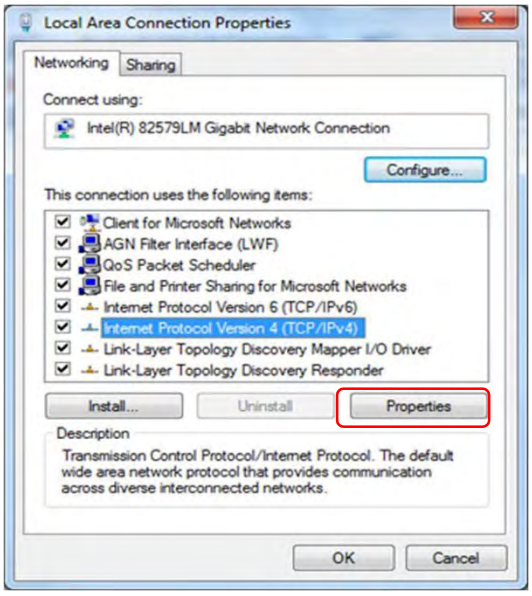
Click on “Change adapter options”



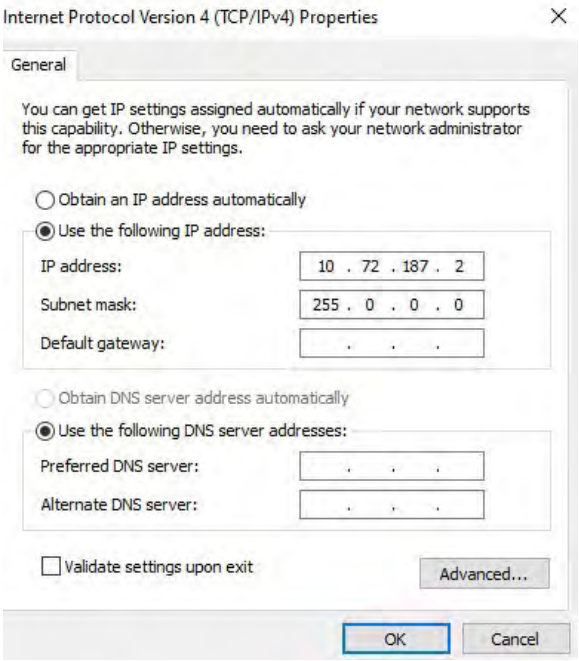
The network page will open. Select Ethernet and “right click on the Ethernet with the mouse.” Click on properties. See the image below.

Select the Internet Protocol Version 4 (TCP/IPv4) and click on Properties.





Select “Use the following IP address” and enter the IP address shown below. Click on ‘OK’ to save the IP address: 10.72.187.2.



Connect the PROG TOOL to the PC using an RS232 serial cable.

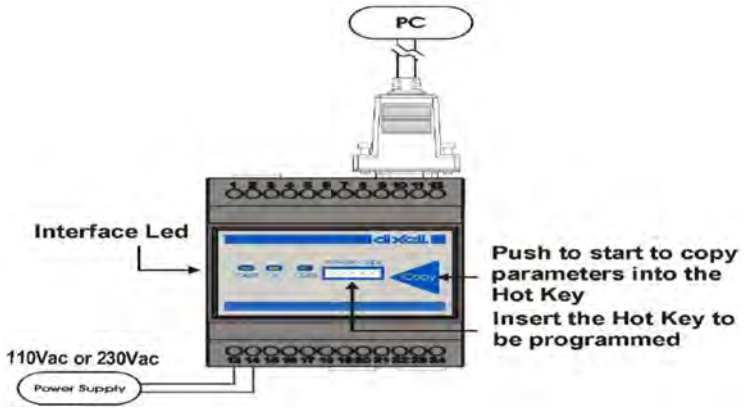


FIGURE 2: PROGRAM PC TO HOT KEY

Open WIZMATE software on PC. Click on the Wizmate icon located at top left corner ( ) and select Modbus Configuration as illustrated in the following picture:

FIGURE 3: WIZMATE - MODBUS CONFIGURATION

1. As illustrated in the following picture, select the appropriate **Com Port** through the drop-down box and click the **OK** button:

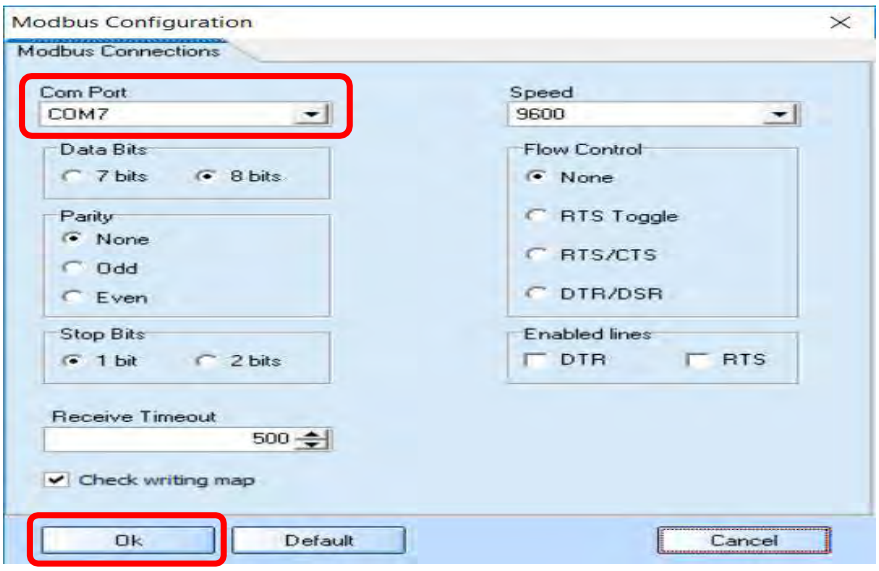


FIGURE 4: WIZMATE - MODBUS SETTINGS

2. As illustrated in the following picture, select the Network tab and click on Scan Network ( ) button to detect Prog Tool:

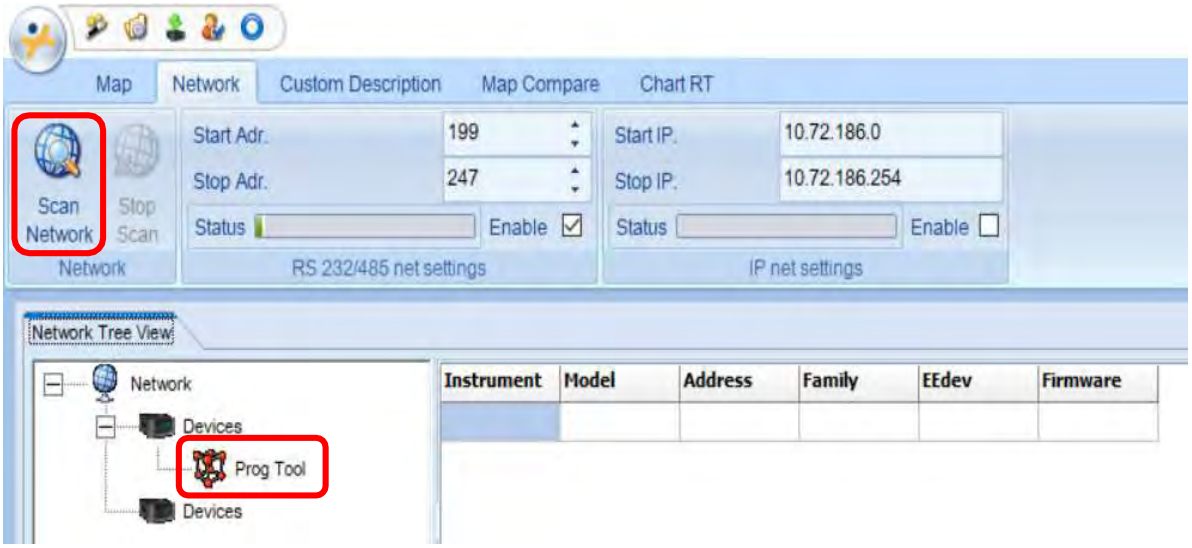


FIGURE 5: WIZMATE - SCAN NETWORK

3. Either create a parameter map or open an existing parameter map and copy it into the PROG TOOL by selecting Download Hotkey ( ) button.
4. Plug the HOT KEY to be programmed into Hot-Key Copy connector located on top of the PROG TOOL.
5. Click on "Program Hotkey" and wait until this message appears: "Send Complete."

6. Push the **Copy** button on the "Prog Tool" to initiate copy of the program to the Hotkey. Copy led blinks during the transfer operation. The LED will be solid when transfer is complete then goes off.
7. After a few seconds, the Copy LED indicates the operation status as follows: RED indicates operation failed.
   GREEN indicates operation is successful.
8. Remove the HOT KEY.

2.3 Program from PC to controller

The controller can be interfaced to a PC through a PROG TOOL and programmed directly.

The following steps instruct how to program a controller using the PROG TOOL:

1. Using a 2-wire cable, connect the controller RS485 to the RS485 terminals of the PROG TOOL taking care to respect the + and – polarity.
2. Supply power to the controller using a 24 VAC transformer.
3. Connect the PROG TOOL to the PC using an RS232 serial cable.
4. Using WIZMATE software on a PC, create a parameter map and copy it into controller by selecting **Download Device** ( ) button.

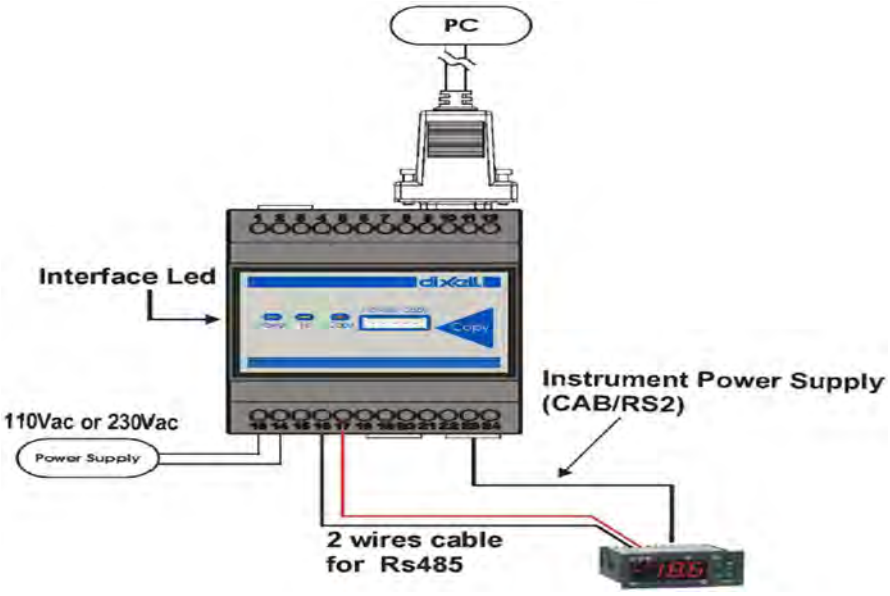


FIGURE 6: PROGRAM FROM PC TO CONTROLLER

3 USB to RS485 CONVERTER

The controller can be interfaced to PC through an USB to RS485 converter and programmed directly.
The following steps instruct how to program a controller using WIZMATE:

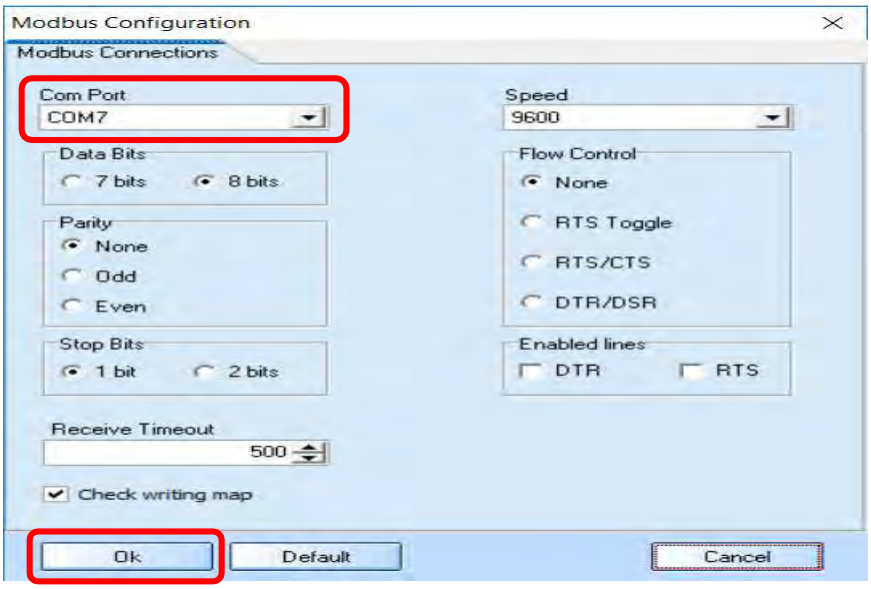
1. Supply power to the controller using 24VAC transformer.
2. Plug in the USB to RS485 converter into PC.
3. Using a 2-wire cable, connect the controller RS485 to RS485 terminals of the USB to the RS485 Converter taking care to respect the + and – polarity.

FIGURE 7: SERIAL CONVERTER

4. Open the WIZMATE software on a PC click on Wizmate icon located at top left corner ( ) and select Modbus Configuration as illustrated in the following picture:

Figure 8 WIZMATE - MODBUS CONFIGURATION

5. As illustrated in the following picture, select the appropriate **Com Port** through the drop-down box and click **OK.**



***button*FIGURE 9: WIZMATE - MODBUS SETTINGS**

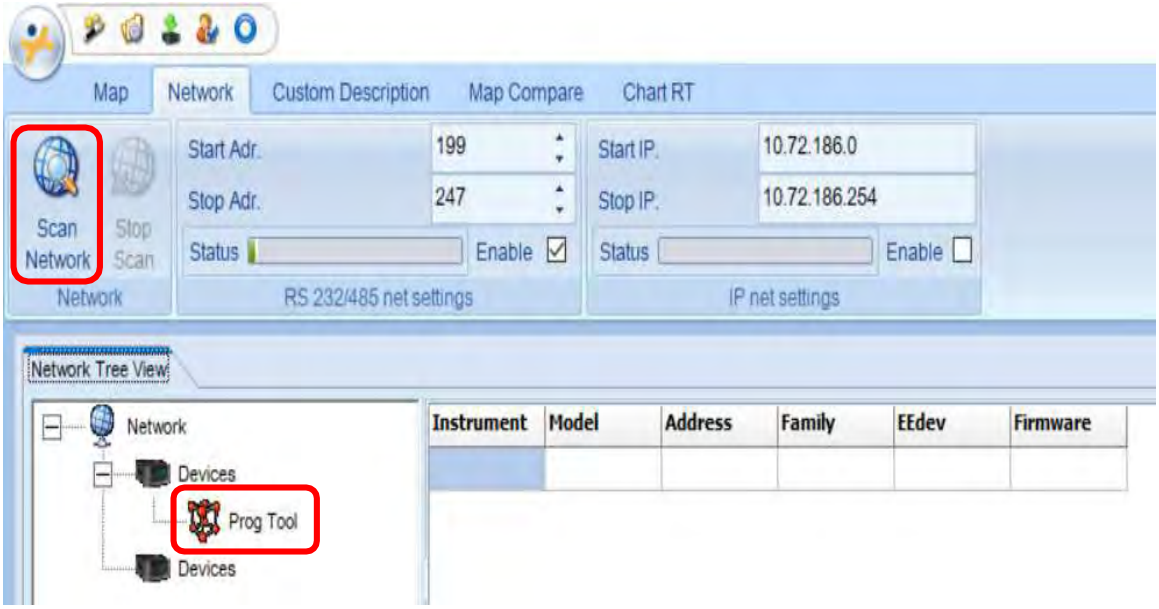


FIGURE 10 WIZMATE - SCAN NETWORK

6. As illustrated in the following picture, select the **Network** tab, and click on **Scan Network** ( ) button to detect Prog Tool:
7. Go the Map tap in the software and select download to device to send program to the controller
8. Log into the controller using the front panel keypad on the controller to verify that the program has been loaded to the controller.

4.0 ERROR CODES:

The following are error codes may show up:

ERROR CODE	DESCRIPTION	ALARM STATUS	ALARM TYPE	POSSIBLE CAUSE
E01	AI1 ERROR	Alarm	Hardware Error	Check SUCTION PRESSURE sensor for Possible Damage or out of range reading.
E02	AI2	Alarm	Hardware Error	Check Sensor for Possible Damage or Not Wrong Sensor (sensor maybe out of range)
E03	AI3	Alarm	Hardware Error	Check Sensor for Possible Damage or Not Wrong Sensor (sensor maybe out of range)
E04	AI4	Alarm	Hardware Error	Check Sensor for Possible Damage or Not Wrong Sensor (sensor maybe out of range)
E05	AI5	Alarm	Hardware Error	Check Sensor for Possible Damage or Not Wrong Sensor (sensor maybe out of range)
E06	AI6	Alarm	Hardware Error	Check Sensor for Possible Damage or Wrong Sensor (sensor maybe out of range)
E07	AI7	Alarm	hardware Error	Check Sensor for Possible Damage or Wrong Sensor (sensor maybe out of range)
E08	Battery error	Alarm	Hardware Error	Check the internal back up battery and replaced it.
E09	Current sensor 1 error	Alarm	Hardware Error	Check Current Sensor, Check program if this is enabled or disabled. check sensor range
E10	Current sensor 2 error	Alarm	Hardware Error	Check Current Sensor, Check program if this is enabled or disabled. check sensor range
E11	Voltage Sensor error 1	Alarm	Hardware Error	Check incoming Voltage with multimeter on RST or Check Program to see if this is Enabled or disabled
E12	Voltage Sensor error 2	Alarm	Hardware Error	Check incoming Voltage with multimeter on RST or Check Program to see if this is Enabled or disabled
E13	Voltage Sensor error 3	Alarm	Hardware Error	Check incoming Voltage with multimeter on RST or Check Program to see if this is Enabled or disabled
E14-E19	Reserved		Hardware Error	

ERROR CODE	DESCRIPTION	ALARM STATUS	ALARM TYPE	POSSIBLE CAUSE
E20	Lost Phase Error	Alarm	Electrical Error	Check all phase Voltages
L20	Lost Phase Error	Lockout	Electrical Error	Check Power Supply to the unit
E21	Phase Sequence Error	Alarm	Electrical Error	Check the phase sequence power supply to the controller and swap two hot line.
L21	Phase Sequence lockout	Lockout	Electrical Error	Turn power off and check the phase sequence
E22	Phase Imbalance current	Lockout	Electrical Error	Check current on each phase
E23	Over Current	Alarm	Electrical Error	Reset power to the controller
L22	Imbalance Current	Lockout	Electrical Error	Check current flow on each line
L23	Over current lockout	Lockout	Electrical Error	Check current flow on each line and reset controller
E24	Open run circuit error	Alarm	Electrical Error	Motor running winding open (single phase) Compressor will trip. Check compressor and if everything is ok reset the controller
L24	Open run circuit lockout	Lockout	Electrical Error	Motor running winding open (single phase) Compressor will trip, if fault exist for a long-time compressor will lockout. Check compressor and if everything is ok reset the controller
E26	Under Voltage Alarm	Alarm	Electrical Error	Check Supply Voltage and make sure the right voltage programmed is loaded into the controller.
L26	Under Voltage lockout	Lockout	Electrical Error	If under voltage is kept for a long-time compressor will lock out
E27	Over Voltage	Alarm	Electrical Error	Check Voltage Supply to ensure the supply voltage is within range
L27	Over Voltage-lockout	lockout	Electrical Error	Check incoming Voltage supply to ensure voltage supply is within range and restart the controller
E28	Compressor build-in protection trip	Warning	Electrical Error	Compressor build-in thermal trip. Check compressor.
E30	Main power lost	Alarm	Electrical Error	Check main power supply
E40	High Pressure switch	Alarm	High pressure switch open	Check high pressure switch
L40	High pressure switch lockout	Lockout	High pressure switch	Check high pressure switch
E41	Low pressure switch	Alarm	Low pressure switch	Check low pressure switch.
E43	Low pressure Alarm	Operating errors		Check low pressure
E44	Discharge line temperature alarm	Operating error	Discharge Sensor	Check Sensor
L44	Discharge line temperature lockout	Lockout	Discharge line sensor overheat	Compressor will lockout, Check Sensor temperature reading, check program to see sensor range setting

ERROR CODE	DESCRIPTION	ALARM STATUS	ALARM TYPE	POSSIBLE CAUSE
E45	High condenser pressure alarm	Alarm	Operating Error	Error will clear when pressure falls below set point
E46	High condenser temperature	Alarm	Operating error	Error will clear when the temperature falls below the max setpoint
E47	EXV full open in EVI	Warning	Operating error	Error will clear as soon as EXV is not at maximum step
E48	Refrigerant shortage error in EVI	Warning	Operating error	Error will clear as soon as superheat is lower than the set point
E49	Pump down Alarm	Warning	Warning only	
E50	High side flood back alarm	Warning	Warning only	
E80	RTC warning, date is not correct	Warning	F	You can disable the RTC or problem with board
E81	RTC warning communication error	Warning	Misc. alarm	Problem with the board
E82	Probe configuration error	Alarm	Misc. alarm	Correct the wrong configuration and reset the board
E83	DI configuration	Alarm	Same Digital input configuration present in DI	Correct the wrong configuration