HEATCRAFT™ Refrigeration Products

Installation and Operations Manual

H-IM-UC-A2L **May 2026** **Part No. 25012201(Rev. D)**

A2L Unit Coolers

(Internal CVT)



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A2L Unit Coolers

A2L unit coolers function in much the same way as standard A1 unit coolers with some exceptions. This manual describes recommendations and requirements unique to A2L unit coolers. For general unit cooler installation and operations, see manual H-IM-UC, part number 25008201.

Symbols

Listed below are the warning symbols and their meanings used on the A2L unit coolers

Heatcraft approved Refrigerant Detection System (RDS) is required in the unit cooler to comply with regulatory requirement for leak detection and mitigation.

The Refrigerant Detection System provided by Heatcraft must be factory or field installed before using A2L refrigerants, including R-454A, R-454C or R-455A.



WARNING:
Risk of fire/flammable materials



[symbol ISO 7000-1701 (2004-01)] pressure



[symbol IEC 60417-6412 (2019-03)]

WARNING: ***Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.***
The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater.
Do not pierce or burn.
Be aware that refrigerants may not contain an odour.

In Canada, the French translation is

***MISE EN GARDE*:**
Ne pas utiliser de moyens autres que ceux recommandés par le fabricant pour accélérer le processus de dégivrage ou pour nettoyer l'appareil.
L'appareil doit être entreposé dans un local ne contenant pas de sources d'inflammation permanentes (flammes nues, appareil à gaz ou dispositif de chauffage électrique en fonctionnement, par exemple).
Ne pas percer ou brûler.
Attention, les fluides frigorigènes peuvent ne pas dégager d'odeur.

General Information

a) information for spaces where refrigerant pipes are allowed

i) piping material, pipe routing, and installation shall include protection from physical damage in operation and service, and be in compliance with national and local codes and standards, such as ANSI/ASHRAE 15, IAPMO Uniform Mechanical Code, ICC International Mechanical Code, or CSA B52. All field joints shall be accessible for inspection prior to being covered or enclosed;

ii) the installation of pipe-work shall be kept to a minimum;

iii) pipe-work in the case of flammable refrigerants shall not be installed in an unventilated space, if that space is smaller than Amin in Annex 101.DVU of UL 60335-2-89, except for A2L refrigerants where the installed pipes comply with Clause 22.115DV. In case of field charge, the effect on refrigerant charge caused by the different pipe length shall be quantified;

iv) mechanical connections made in accordance with Clause 22.115DV shall be accessible for maintenance purposes;

v) provision shall be made for expansion and contraction of long runs of piping;

vi) protection devices, piping, and fittings shall be protected as far as possible against adverse environmental effects, for example, the danger of water collecting and freezing in relief pipes or the accumulation of dirt and debris;

vii) piping in refrigeration systems shall be so designed and installed to minimize the likelihood of hydraulic shock damaging the system;

viii) steel pipes and components shall be protected against corrosion with a rustproof coating before applying any insulation;

ix) flexible pipe elements shall be protected against mechanical damage, excessive stress by torsion, or other forces, and that they should be checked for mechanical damage annually;

x) precautions shall be taken to avoid excessive vibration or pulsation;

xi) for appliances containing flammable refrigerants, the minimum floor area of the room shall be mentioned in the form of a table or a single figure without reference to a formula;

xii) after completion of field piping for split systems, the field pipework shall be pressure tested with an inert gas and then vacuum tested prior to refrigerant charging, according to the following requirements:

1) The minimum test pressure for the low side of the system shall be the low side design pressure and the minimum test pressure for the high side of the system shall be the high side design pressure, unless the high side of the system cannot be isolated from the low side of the system in which case the entire system shall be pressure tested to the low side design pressure.
2) The test pressure after removal of pressure source shall be maintained for at least one hour with no decrease of pressure indicated by the test gauge, with test gauge resolution not exceeding 5 % of the test pressure.
3) During the evacuation test, after achieving a vacuum level specified in the manual or less, the refrigeration system shall be isolated from the vacuum pump and the pressure shall not rise above 1500 microns within 10 minutes. The vacuum pressure level shall be specified in the manual, and shall be the lessor of 500 microns or the value required for compliance with national and local codes and standards, which may vary between residential, commercial, and industrial buildings.

xiii) field-made refrigerant joints indoors shall be tightness tested according to the following requirements: The test method shall have a sensitivity of 5 grams per year of refrigerant or better. The test pressure should be at least the maximum working pressure of the unit times 0.25. As example, if the maximum working pressure of the unit is 400psi, then the test pressure would be at least 100psi. No leak shall be detected.

b) See the refrigerant charging instruction section in the condensing unit IO manual H-IM-CU to determine the REFRIGERANT CHARGE needed and how to complete the REFRIGERANT CHARGE on the label to note the resulting total refrigerant charge for each refrigerating system per clause. This label is located on the Condensing unit.

c) If ventilation airflow is required the minimum rated airflow shall be
Q = 30(mc- mmax) / LFL, not to exceed Qmin - 486 / LFL

Where:

Qmin is the minimum mechanical ventilation in m3/h;
mc is the refrigerant system charge in kg;
mmax Is the maximum charge as determined in Clause 101. DVU.1.6;
LFL is the lower flammability limit in kg/m3;
30 is a constant

Where mechanical ventilation is required, circulation airflow for the purpose of mixing the air in the room is also required. This is provided by the unit cooler fans which are turned on if a leak is detected by the refrigerant detection system.

d) Red tags are provided on schrader ports and TXVs. If these are removed they must be reapplied.

e) See **Correct Working Procedures Pg. 14** section for information on handling, installation, cleaning, servicing and disposal of refrigerant;

f) For A2L unit coolers using FLAMMABLE REFRIGERANTS, see the tables at the end of the A2L unit cooler section for the max releasable REFRIGERANT CHARGE mc and minimum room area of the space Amin

g) Warning to keep any required ventilation openings clear of obstruction;

h) Notice that servicing shall be performed only as recommended by Heatcraft

i) Warning that ducts connected to an appliance shall not contain a potential ignition source;

j) for appliances that require external ventilation, refer to the wiring diagram on the unit cooler for wiring external ventilation to the refrigerant detection system

k) Refrigerant leak sensors are installed on the unit cooler and should not be installed remotely

l) for appliances using A2L REFRIGERANTS, connected via an air duct system to one or more rooms, the supply and return air shall be directly ducted to the space. Open areas such as false ceilings shall not be used as a return air duct;

m) the following information requirements apply for connecting piping in field erected systems:

i) Equipment piping in the occupied space shall be installed in such a way to protect against accidental damage in operation UL 60335-2-89 2nd edition.

n) Safety shut-off valves shall be located outside such that leaks upstream of the safety shut off valve shall not enter the internal volume of the partial unit. Safety shut off valves shall be positioned to enable access for maintenance by an authorized person. See diagram on pages 8 and 9.

Refrigerant Detection System (RDS)

The Refrigerant Detect System (RDS) is an A2L refrigerant sensing system which responds to pre-set concentrations of A2L refrigerants in the environment. When an A2L refrigerant leak is detected by the refrigerant sensors mounted in the unit cooler, mitigation actions are taken.

The RDS must be approved by Heatcraft for use in Heatcraft unit coolers. The RDS consists of these major components.

a) A2L Controller (1)

b) A2L Sensors (1 or 2)

c) Safety Shut Off Valve (1)

d) Safety Check Valve (1)

The A2L controller and A2L sensors can be factory installed or field installed in the unit cooler. The Safety Shut Off Valve and the Safety Check Valve must be field installed outside of the refrigerated space.

a) The Safety Shut Off Valve is field installed on the liquid line outside of the refrigerated space.

b) The Safety Check Valve is field installed on the suction line outside of the refrigerated space.

A separate 24v uninterrupted power supply is required for the RDS A2L Controller. Power supplied to the evaporator fans and heaters is cycled on and off during defrost and cannot be used to power the A2L Controller.

Listed below are the operation and required servicing measures for the RDS.

a) When the RDS is first powered up, it initializes the A2L Sensors for refrigerant leak detection. This process takes 5 minutes. A flashing green LED on the A2L controller indicates this process. After initialization, the LED turns solid green indicates normal operation.

b) When a refrigerant leak is detected by the refrigerant sensors mounted in the unit cooler and the refrigerant concentration reaches the predefined early warning level, the A2L Controller initiates early warning actions. The status LED will be blinking alternating yellow and white. An Early Warning output is provided for Building Automation System (BAS) to provide advanced alert of a refrigerant leak. This allows the user to fix the leak before it reaches the higher mitigation level that stops refrigeration. The early warning output is the blue terminal on the A2L controller board labeled Alert. The Early Warning Alert Terminals consist a Normally Open (NO), a Normally Close (NC) and a Common (COM) terminal for field wiring. The relay output to the terminals is rated for 1A at 125VAC, SPDT.

c) When a refrigerant leak is detected and the refrigerant concentration reaches the Lower Flammability Limit defined by regulation, the A2L Controller initiates mitigation actions. The status LED will be blinking red and white. The Mitigation Alarm output takes the following actions:

   i. Close the Safety Shut Off Valve to stop the refrigerant flow entering the unit cooler and the refrigerated space.
   ii. Turn on unit cooler fans to provide air circulation.
   iii. Terminate defrost if the unit cooler is in defrost mode.
   iv. Turn on ventilation fan if it is required by the system's Mitigation Zone requirement.

d) When the RDS is in Mitigation mode, a service technician is required to fix the refrigerant leak and then manually reset the A2L controller by depressing the "Reset/Test" button on the control board for longer than 3 seconds.

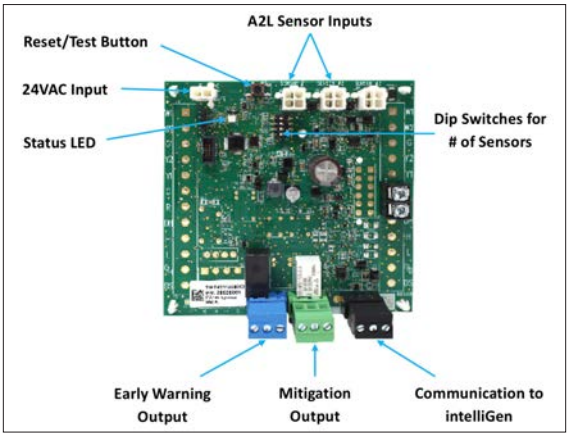
e) The RDS has expected life of 15 years. Service parts are available via Heatcraft's Interlink Service Parts. The replacement parts (A2L sensors, A2L controller, safety shut off valve and check valve) must be specified by Heatcraft. A2L sensors must be mounted using the correct predrilled holes and angled on the mounting brackets. Maximum torque specification for mounting the screws to attach the A2L sensor is 30lb-in.

f) To test the RDS for actuation of the mitigation actions.

   i. Depress the "Reset/Test" button for >1 second. The test feature will trigger the controller to simulate a leak condition for verification of mitigation actions.
   ii. The user test will last for 2 minutes. The mitigation relay will be deenergized..
   iii. After completion of the 2-minute test, the controller will return to normal operation.
   iv. The user can exit test feature before the 2-minute has elapsed by depressing the "Reset/Test" button for longer than 3 seconds.

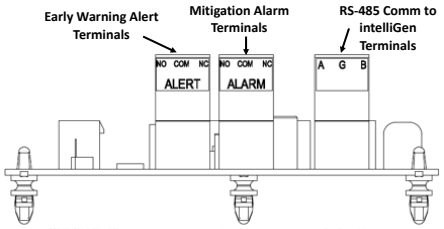
g) The RDS has communication capability to Heatcraft's intelliGen Refrigeration Controller via RS485 communication. The black terminal on the A2L Controller board labeled A G B can be connected to the RDS Com terminals on the intelliGen Controller board. intelliGen will provide mitigation alarm and early warning alert, and status reporting. The intelliGen controller has to be configured to use the A2L refrigerants (R-454A, R-454C or R-455A). See the intelliGen Instructions and Operation manual for more details.

h) A field installed Refrigerant Detection System kit is available from Heatcraft's Interlink Service Parts for each unit cooler product family. See the field installation instructions that comes with the kit for details.



Dip Switch Settings for Number of Sensors Connected

Configuration	Switch 1	Switch 2	Switch 3	Switch 4
One (1) sensor connected to Connector 1	OFF	ON	ON	N/A
Two (2) sensors connected to Connector 1 and 2	OFF	OFF	ON	N/A
Three (3) sensors connected to Connector 1, 2 and 3	OFF	OFF	OFF	N/A



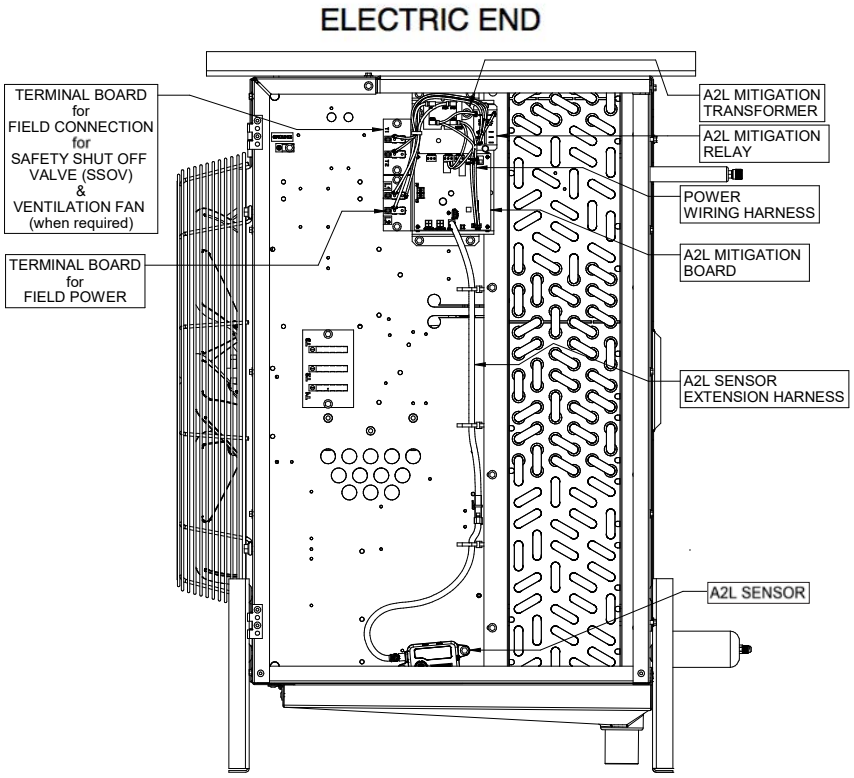
LED Pattern:	Status:
Flashing Green	Controller Initializing
Solid Green	Normal. Monitoring
Alternating Yellow and White*	Early Leak Warning
Alternating Red and White*	Mitigation Mode - Leak Detected
Alternating Red and Blue*	Service Mode - Sensor Fault
Solid Yellow	User Test

*White/Blue flash count indicates sensor # that is triggering the abnormal condition (e.g. red followed by two white flashes indicates that sensor #2 has sensed a leak; if multiple sensors are triggering the same condition then there will be 4 count flashes to indicate more than 1 sensor has the offending condition)

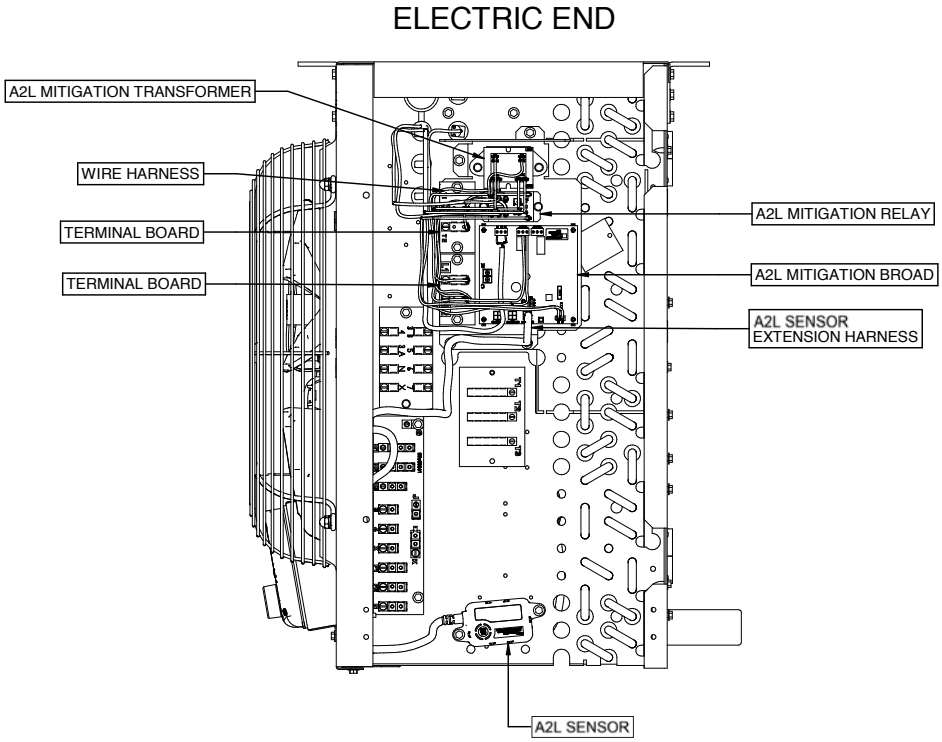
Notes:
1) While in Normal/Monitoring mode, pressing the push-button for >1 second will initiate "User Test" mode for two minutes so that mitigation outputs can be verified.
2) While in Mitigation or Service mode, pressing the push-button for >3 seconds will trigger a controller reset where the system will re-initialize and then enter "Normal/Monitoring" mode if they Mitigation and/or Service conditions have been resolved.

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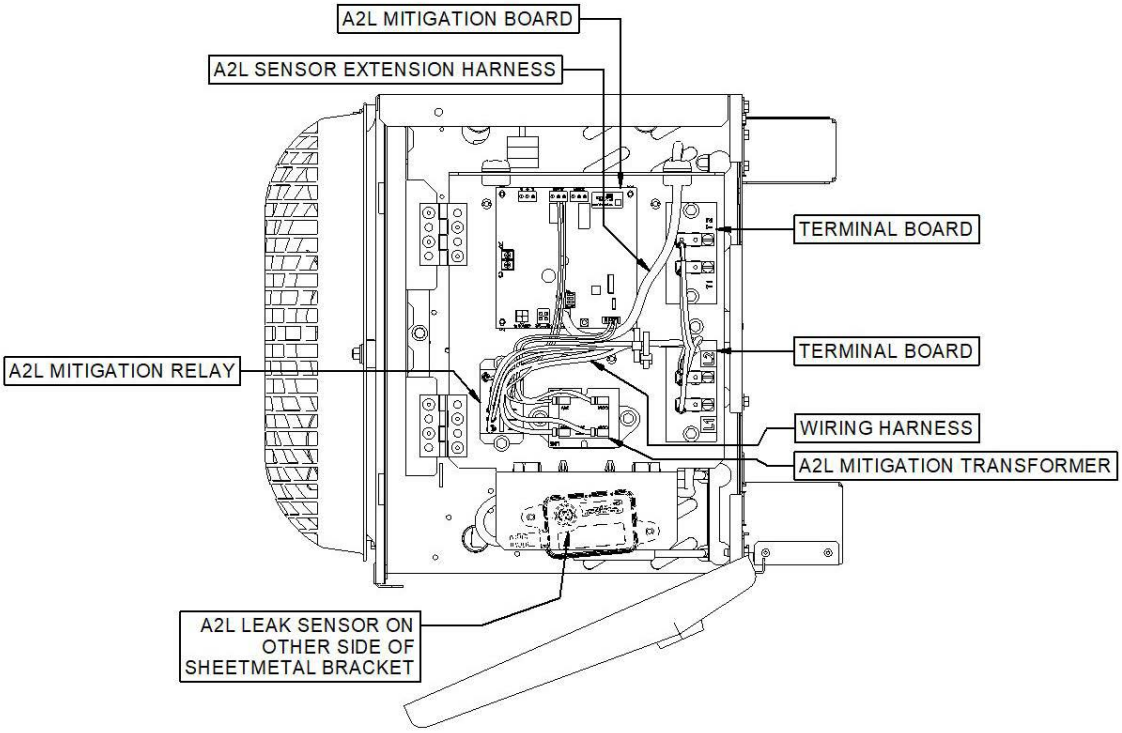
Large Unit Coolers



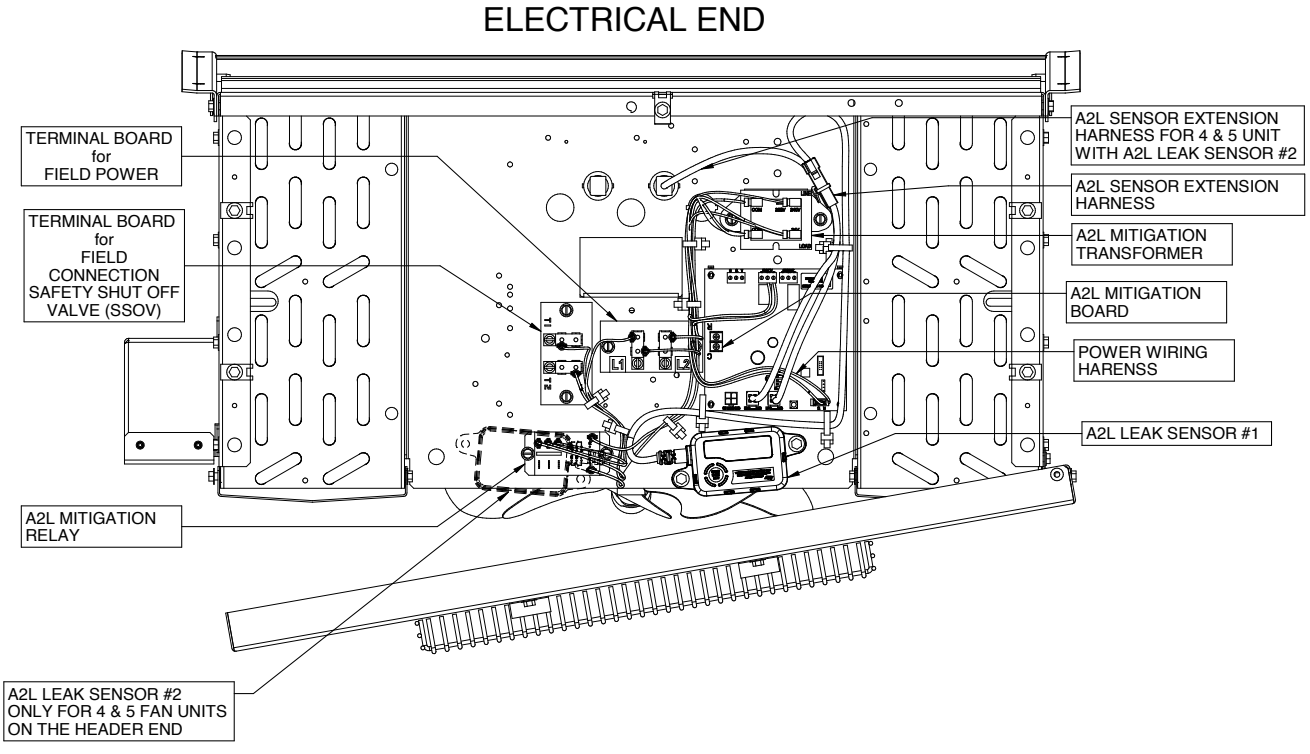
Medium Profile Unit Coolers



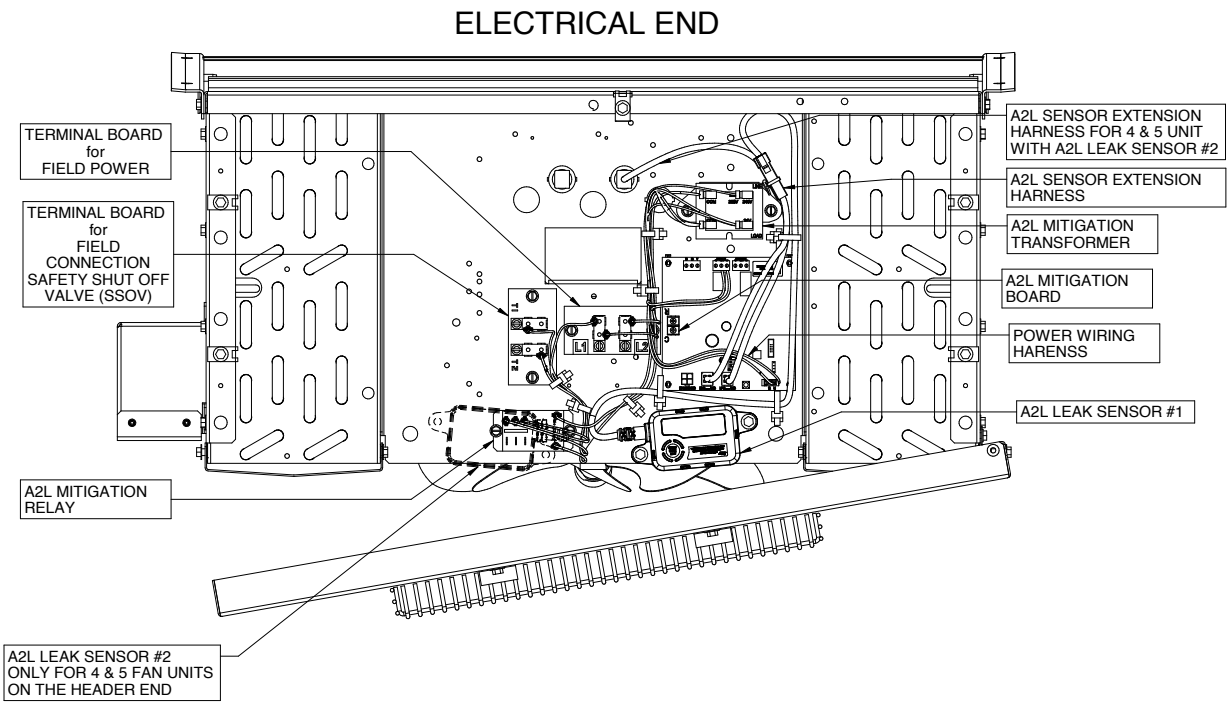
Low Profile Unit Coolers



Center Mount Unit Coolers



Low Velocity Center Mount Unit Coolers

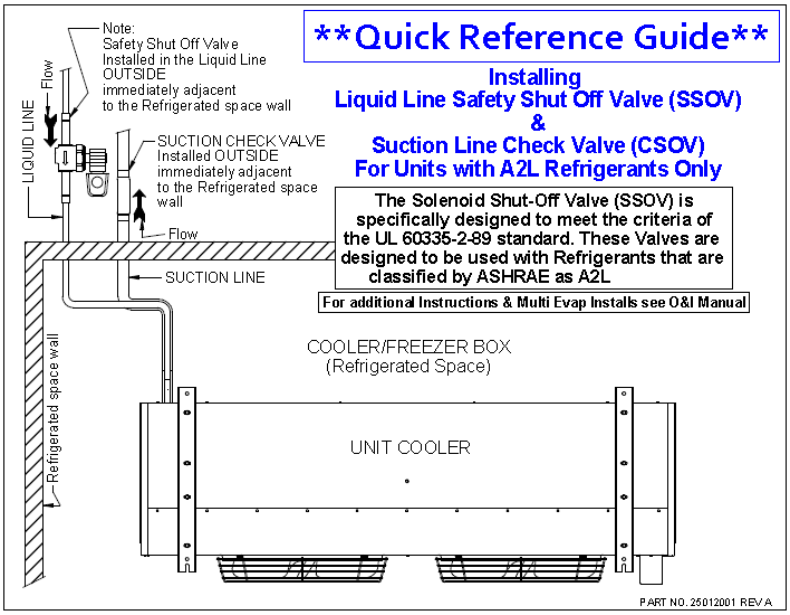


Safety Shut Off Valve and Check Valves

As a part of the Refrigerant Detection System (RDS), a Heatcraft approved Safety Shut Off Valve is required to field install on the liquid line and a Heatcraft approved Safety Check Valve is required to field install on the suction line, outside of the refrigerated space, immediately adjacent to the Refrigerated Space Wall. See **Piping Diagram 1** for a single A2L unit cooler system installation. In the event of the RDS is in mitigation mode, the A2L controller will close the Safety Shut Off Valve and Check Valve to stop the refrigerant flow into the unit cooler and the refrigerated space.

For Heatcraft's standard equipment selection, the Safety Shut Off Valve and the Check Valve are configured based on the individual unit cooler model size, one Safety Shut Off Valve and one Check Valve for each unit cooler.

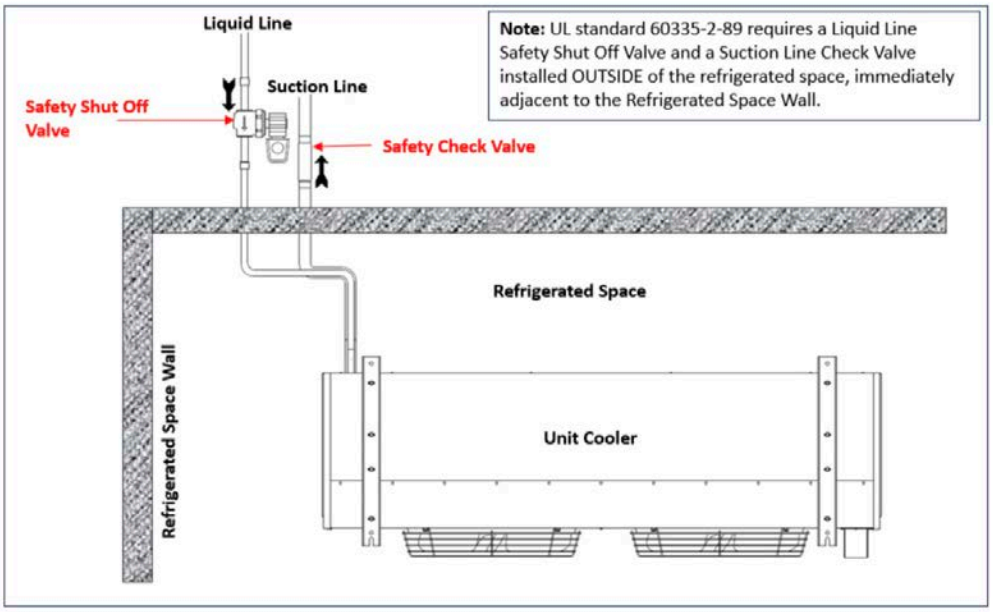
Warning: The standard Sporlan brand of Liquid Line Solenoid Valve (has blue tag) cannot be used in place of the Safety Shut Off Valve for the Refrigerant Detection System. The standard Liquid Line Solenoid Valve may not perform proper mitigation actions. A specified Safety Shut Off Valve (has yellow tag) is required.



Safety Shut Off Valve and Check Valves (cont.)

Piping Diagram 1 applies to systems equipped with a single unit cooler, including Large Unit Cooler models that contain dual refrigerant circuits.

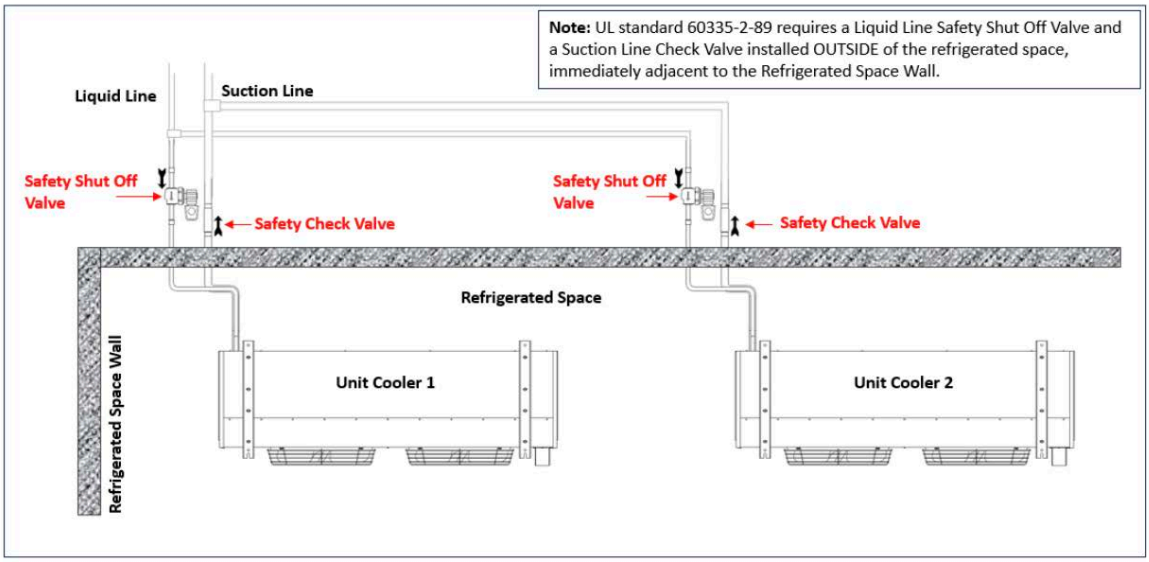
Piping Diagram 1: Single Unit Cooler System



For multiple unit coolers to one condensing unit systems, the standard Heatcraft design is one Safety Shut Off Valve and one Safety Check Valve for each unit cooler and field installed outside of the refrigerated space, immediately adjacent to the Refrigerated Space Wall.
See **Piping Diagram 2** as installation example.

For the scenario shown in **Piping Diagram 2**, the A2L refrigerant Releasable Charge Limit and the Minimum Room Area of each individual unit cooler determines the UL required mitigation zone.

Piping Diagram 2: Multiple Unit Coolers System, One Safety Shut Off Valve and One Check Valve Per Each Unit Cooler

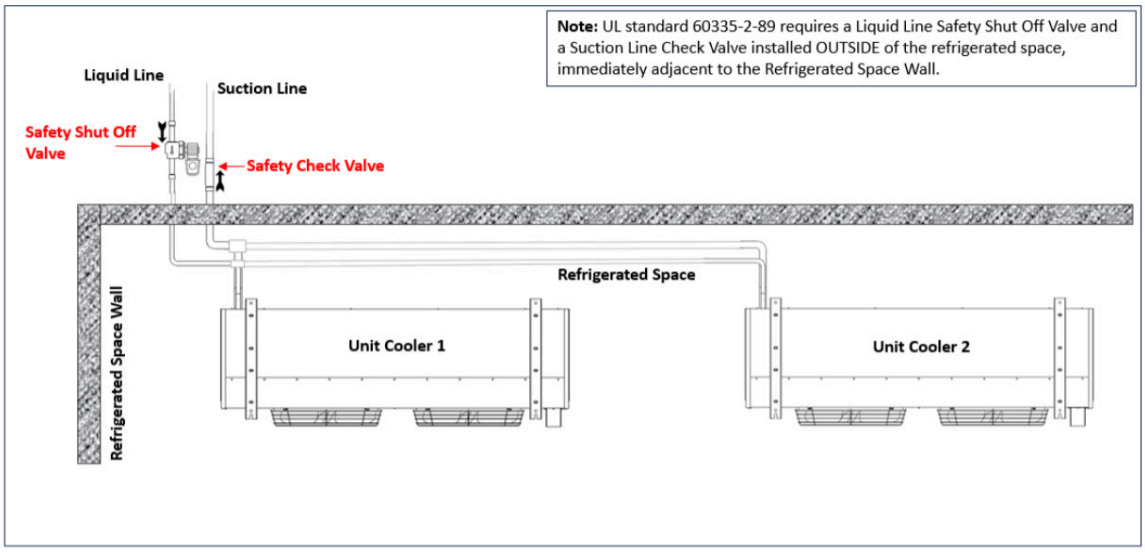


Safety Shut Off Valve and Check Valves (cont.)

For multiple unit coolers to one condensing unit systems, if the field piping scheme is different from the individual unit cooler isolation piping scheme, the Safety Shut Off Valve and the Check Valve needs to be checked and resized. See **Piping Diagram 3** as example. The total A2L refrigerant Releasable Charge amount includes all connected unit coolers and piping.

The Minimum Room Area requirement must be calculated combining all connected unit coolers and piping. The total Releasable Charge amount and the new Minimum Room Area determine the proper mitigation zone. Contact a Heatcraft representative for assistance to determine the proper UL mitigation requirement for the installation.

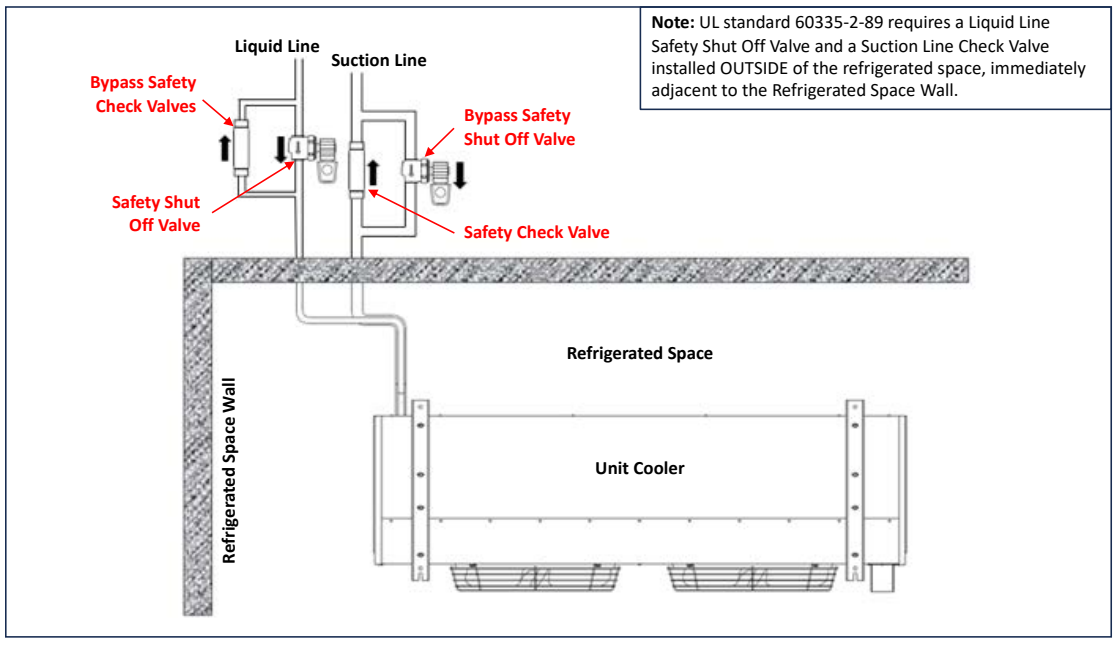
Piping Diagram 3: Multiple Unit Coolers System, One Safety Shut Off Valve and One Check Valve for All Unit Coolers



For A2L Mohave and Hot Gas Reverse Cycle Systems, one set of Safety Shutoff Valve (SSOV) and Check Valve (CSOV), a second set of Bypass SSOV and CSOV, two Check Valves and external piping must be field installed outside of the refrigerated space. The Bypass SSOV is sized for discharge application and the Bypass CSOV is sized based on the liquid line size.

Refer to **Piping Diagram 4** on this page and the related diagrams on page 10 as references. Detailed refrigeration operation diagrams are provided on pages 52-59 of the Mohave I&O Manual (H-IM-HGD-MOHAVE).

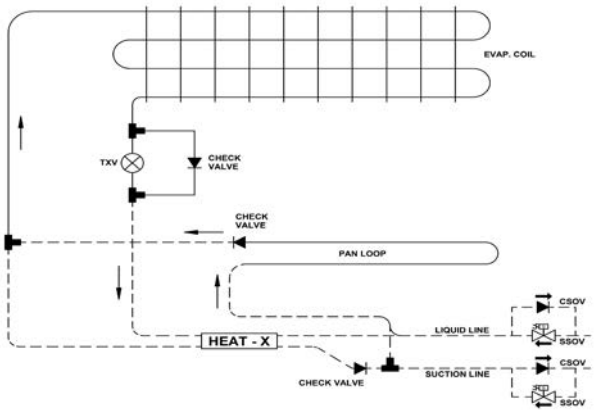
Piping Diagram 4: Mohave & Hot Gas Reverse Cycle Single Unit Cooler System, Two Sets of Safety Shut Off Valves and Check Valves



Hot Gas Reverse Cycle and Mohave Defrost Systems

a) For hot gas reverse cycle defrost systems, one set of safety shut off valve and safety check valve and a second set of bypass safety shut off valve and bypass check valve are needed. The bypass valves allow refrigerant to flow in the reverse direction when in defrost mode. See REVERSE CYCLE DEFROST PIPING diagram. The SSOVs, CSOV, and the piping showing as dash lines in the diagram are field installed outside of the refrigerated space.

REVERSE CYCLE DEFROST PIPING



Note: The Bypass SSOV is sized for discharge application and the Bypass CSOV is sized based on the liquid line size.

b) Piping that is exterior to the cabinet is field installed for A2L hot gas reverse cycle and Mohave unit coolers like shown in figures on the right, Mohave Field Installed Piping Diagrams

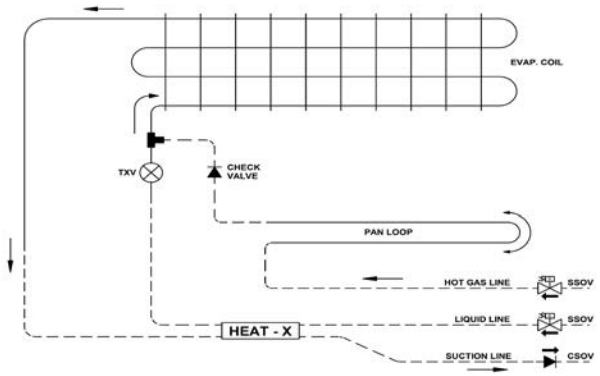
c) Valves, tees and elbows needed will be shipped loose to the field. The install contractor will provide the straight lengths of tubing needed and cut to fit in the field.

d) For Mohave systems, refer to the Mohave Hot Gas Defrost I&O manual for additional information.

Hot Gas Three-pipe Defrost System

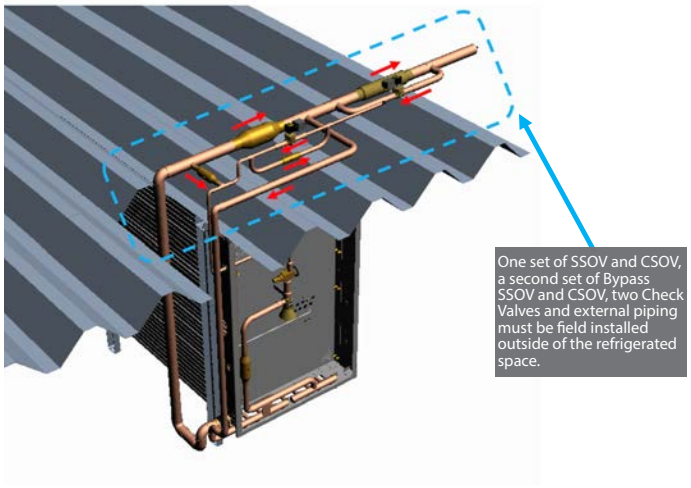
For hot gas three-pipe defrost systems, two safety shut off valves (one for the liquid line and one for the hot gas line) and one safety check valve (for the suction line) are needed. See THREE-PIPE DEFROST PIPING diagram. The SSOVs, CSOV, and the piping showing as dash lines in the diagram are field installed outside of the refrigerated space.

THREE-PIPE DEFROST PIPING

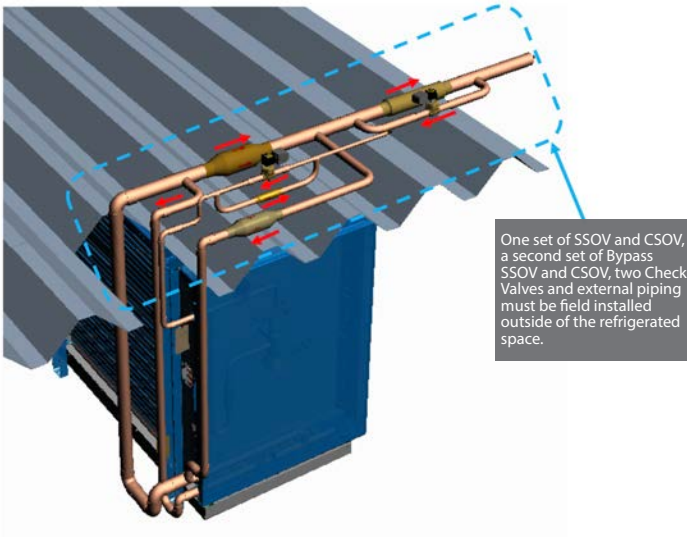


Note:
Hot Gas Line SSOV is sized for discharge application.

A2L Mohave Field Installed SSOVs, CSOVs, Check Valves and External Piping



A2L Hot Gas Reverse Cycle Kit Field Installed SSOVs, CSOVs, Check Valves and External Piping

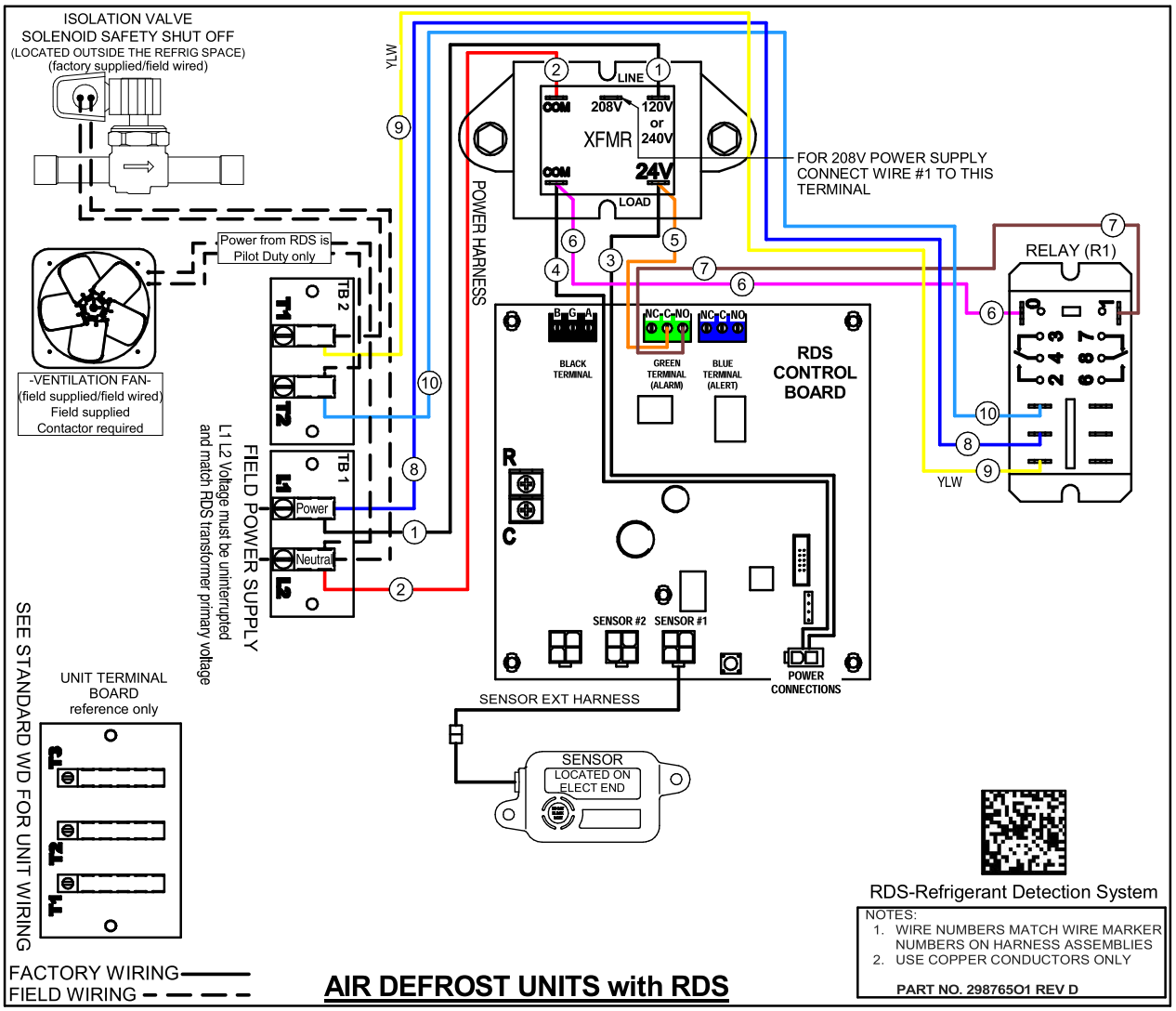


Circulation and Ventilation Mitigation Zones

For the systems that are in the Circulation mitigation zone, the circulation fans on the units coolers are required to turn on when the Refrigerant Detection System (RDS) is in mitigation mode. The unit cooler is wired to turn on the circulation fans. See the wiring diagram in the unit cooler for reference.

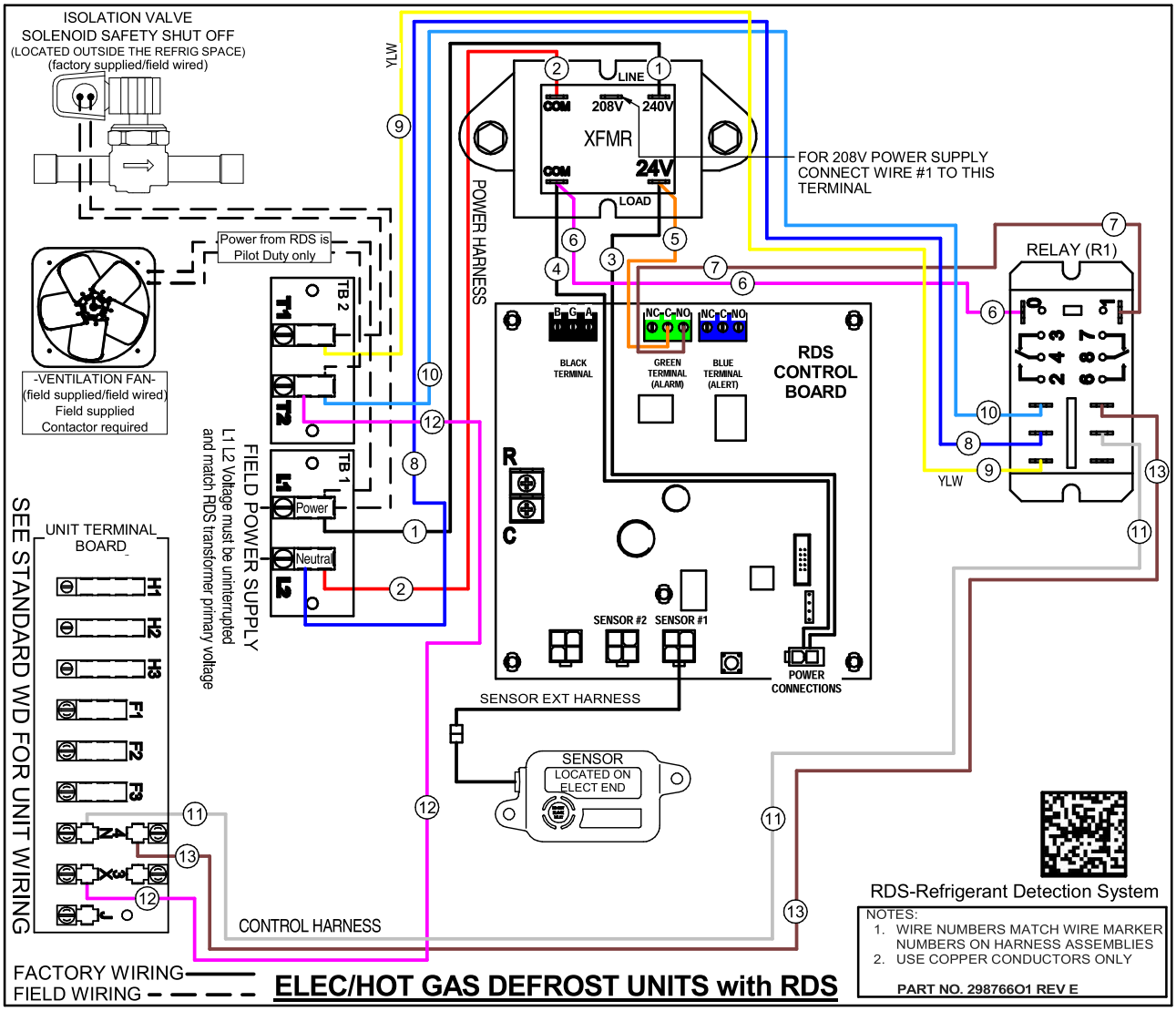
For the systems that are in the Ventilation mitigation zone, a ventilation fan is required to exhaust the inside air to outside when the RDS is in mitigation mode. The power from the RDS is pilot duty for ventilation fan control only. The installer is responsible for field supply of the proper ventilation fan, contactor, field wires and power for installation. See the wiring diagram in the unit cooler for reference to field connect the ventilation fan to the RDS system.

A2L RDS Wiring Diagram Example for Mechanical Air Defrost Unit Cooler



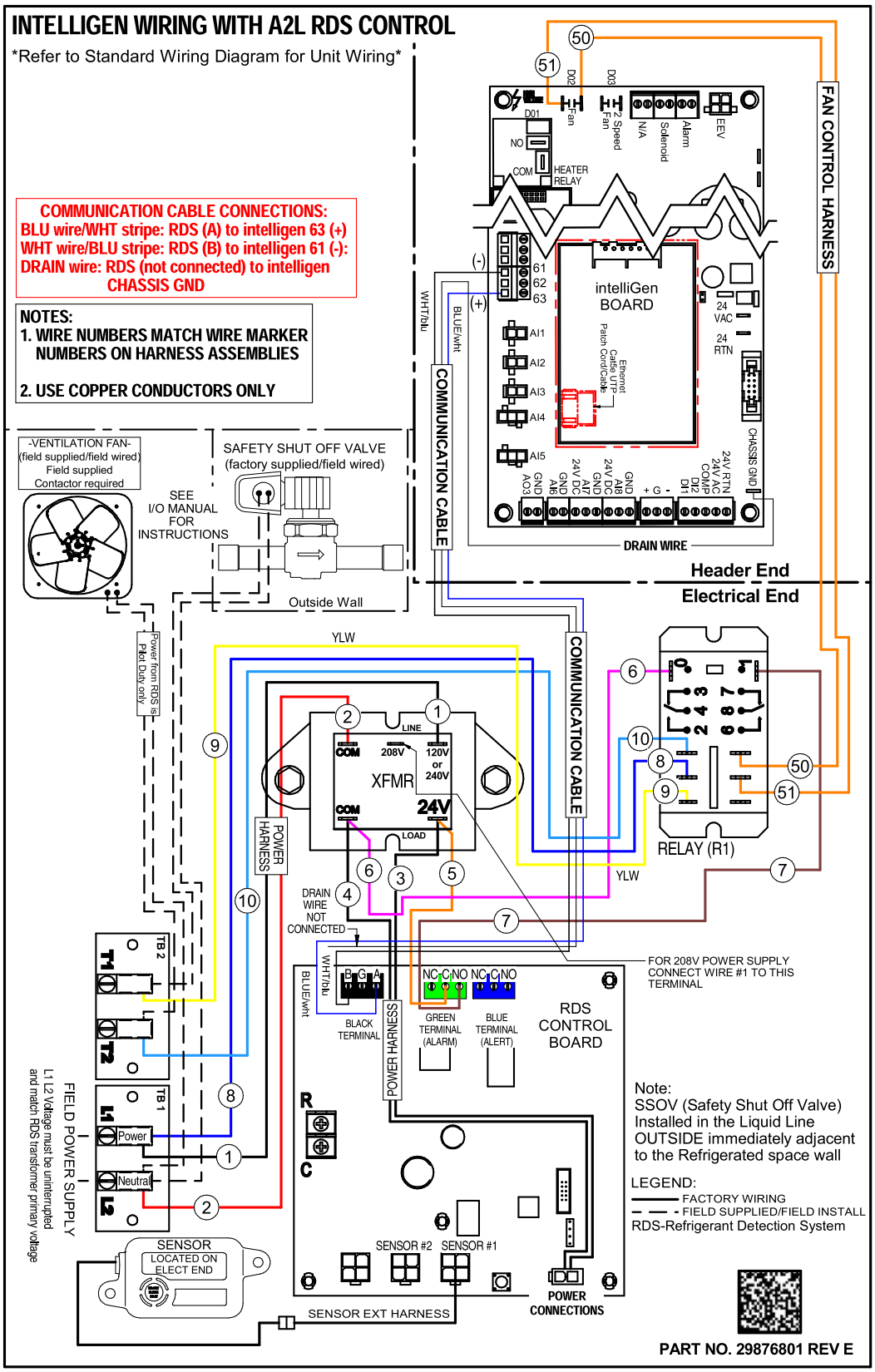
Note:
This wiring diagram is an example for reference only. See the wiring diagram attached in the unit for actual wiring.

A2L RDS Wiring Diagram Example for Mechanical Electric/Hot Gas Defrost Unit Cooler



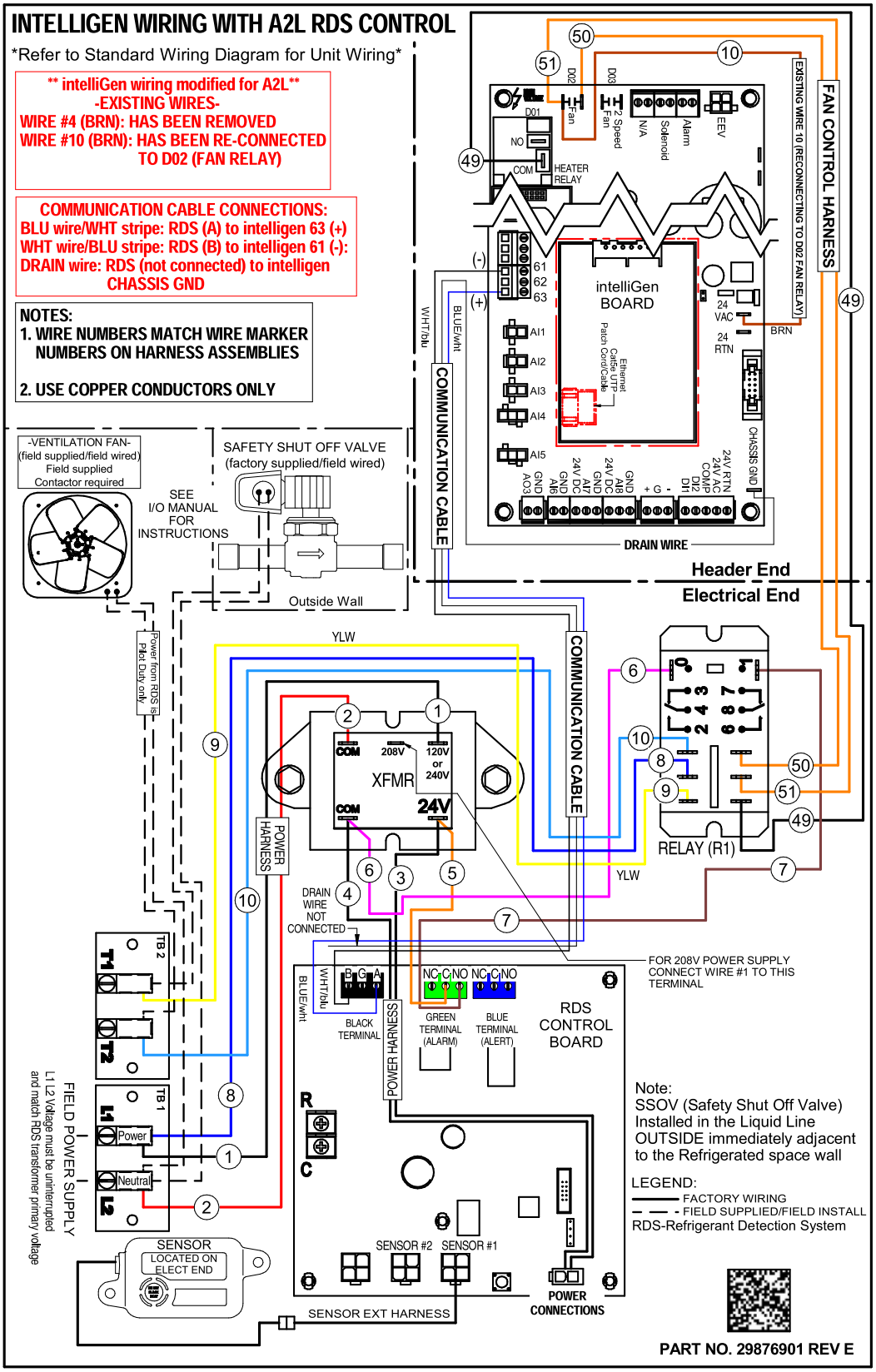
Note:
This wiring diagram is an example for reference only. See the wiring diagram attached in the unit for actual wiring.

A2L RDS Wiring Diagram Example for Air Defrost Unit Cooler with intelliGen Control



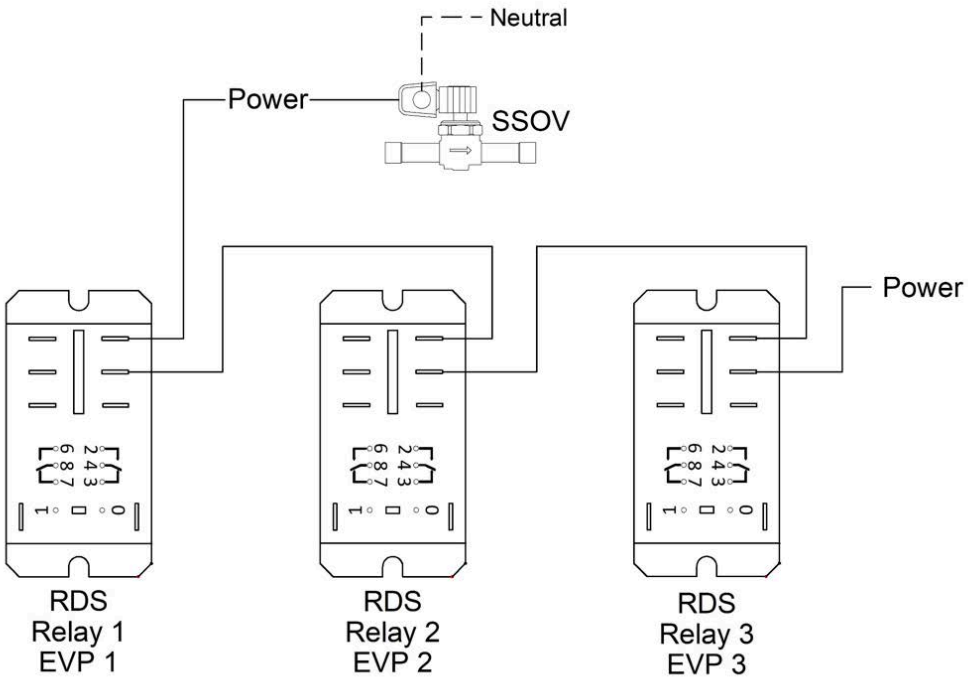
Note:
This wiring diagram is an example for reference only. See the wiring diagram attached in the unit for actual wiring.

A2L RDS Wiring Diagram Example for Electric Defrost Unit Cooler with intelliGen Control



Note:
This wiring diagram is an example for reference only. See the wiring diagram attached in the unit for actual wiring.

Wiring Diagram Example for Multiple Unit Coolers To One SSOV



Note:
This wiring diagram is an example for reference only. See the wiring diagram attached in the unit for actual wiring.

Unventilated areas

See the below warnings for appliances in an unventilated area containing more than m1 for any refrigerating circuit

a) **Warning:** the non-FIXED APPLIANCE shall be stored in an area where the room size corresponds to the room area as specified for operation;
b) **Warning:** the non-FIXED APPLIANCE shall be stored in a room without continuously operating open flames (for example an operating gas appliance) or other potential ignition sources (for example an operating electric heater, hot surfaces).

Qualification of workers

Working personnel for maintenance, service, and repair operations should be trained and qualified to work on A2L refrigeration systems. Personnel should have the appropriate technical training and experience necessary to be aware of hazards to which he or she is exposed in performing a task and of measures necessary to minimize the danger to themselves or other persons. Every working procedure that affects safety means shall only be carried out by competent persons according to Annex 101.DVT in UL 60335-2-89

Examples for such working procedures are

a) breaking into the refrigerating circuit;
b) opening of sealed components;
c) opening of ventilated enclosures.

General Information for Service Personnel

The below sections contain specific information for service personnel

Checks to the area

Prior to beginning work on systems containing FLAMMABLE REFRIGERANTS, safety checks are necessary to ensure that the risk of ignition is minimized. For repair to the REFRIGERATING SYSTEM, Sections listed below for service personnel shall be completed prior to conducting work on the system.

Work procedure

Work shall be undertaken under a controlled procedure so as to minimize the risk of a flammable gas or vapour being present while the work is being performed.

General work area

All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided.

Presence of fire extinguisher

If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available on hand. A dry chemical or CO2 fire extinguisher should be adjacent to the charging area.

No ignition sources

No person carrying out work in relation to a REFRIGERATING SYSTEM which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space. Cell phones are to be turned off. Prior to work taking place, the area around the equipment shall be surveyed to make sure that there are no flammable hazards or ignition risks. "No Smoking" signs shall be displayed.

Ventilated area

Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

Checks to the refrigerating equipment

Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times, the maintenance and service guidelines shall be followed. If in doubt, consult Heatcraft's technical department for assistance.

The following checks shall be applied to installations using FLAMMABLE REFRIGERANTS:

a) the actual REFRIGERANT CHARGE is in accordance with the room size within which the refrigerant containing parts are installed;
b) the ventilation machinery and outlets are operating adequately and are not obstructed;
c) if an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant;
d) marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected;
e) refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

Checks to electrical devices

Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment, so all parties are advised.

Initial safety checks shall include:

a) that capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking;
b) that no live electrical components and wiring are exposed while charging, recovering or purging the system;
c) that there is continuity of earth bonding.

Repairs to sealed components

During repairs to sealed components, all electrical supplies shall be disconnected from the equipment being worked upon prior to any removal of sealed covers, etc. If it is absolutely necessary to have an electrical supply to equipment during servicing, then a permanently operating form of leak detection shall be located at the most critical point to warn of a potentially hazardous situation.

Particular attention shall be paid to the following to ensure that by working on electrical components, the casing is not altered in such a way that the level of protection is affected. This shall include damage to cables, excessive number of connections, terminals not made to original specification, damage to seals, incorrect fitting of glands, etc.

Ensure that the apparatus is mounted securely.

Ensure that seals or sealing materials have not degraded to the point that they no longer serve the purpose of preventing the ingress of flammable atmospheres. Replacement parts shall be in accordance with Heatcraft's specifications.

Repair to intrinsically safe components

Do not apply any permanent inductive or capacitance loads to the circuit without ensuring that this will not exceed the permissible voltage and current permitted for the equipment in use.

Intrinsically safe components are the only types that can be worked on while live in the presence of a flammable atmosphere. The test apparatus shall be at the correct rating.

Replace components only with parts specified by Heatcraft. Other parts can result in the ignition of refrigerant in the atmosphere from a leak.

NOTE: *The use of silicon sealant can inhibit the effectiveness of some types of leak detection equipment. Intrinsically safe components do not have to be isolated prior to working on them.*

Cabling

Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges, or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.

Detection of flammable refrigerants

Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.

The following leak detection methods are deemed acceptable for all refrigerant systems. Electronic leak detectors may be used to detect refrigerant leaks but, in the case of FLAMMABLE REFRIGERANTS, the sensitivity might not be adequate, or might need re- calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25 % maximum) is confirmed.

Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine can react with the refrigerant and corrode the copper pipe-work.

NOTE: *Examples of leak detection fluids are*
- Bubble Method
- Fluorescent Method Agents

If a leak is suspected, all naked flames shall be removed/extinguished. If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak. Removal of refrigerant shall be according to instructions under Removal and Evacuation.

Removal and evacuation

When breaking into the refrigerant circuit to make repairs – or for any other purpose – conventional procedures shall be used. However, for flammable refrigerants it is important that best practice be followed, since flammability is a consideration. The following procedure shall be adhered to:

a) safely remove refrigerant following local and national regulations;
b) purge the circuit with inert gas;
c) evacuate (optional for A2L);
d) purge with inert gas (optional for A2L);
e) open the circuit by cutting or brazing.

The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems.

For appliances containing flammable refrigerants, refrigerants purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum (optional for A2L). This process shall be repeated until no refrigerant is within the system (optional for A2L). When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place.

Ensure that the outlet for the vacuum pump is not close to any potential ignition sources and that ventilation is available.

Charging procedures

In addition to conventional charging procedures, the following requirements shall be followed.

a) Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.
b) Cylinders shall be kept in an appropriate position according to the instructions.
c) Ensure that the REFRIGERATING SYSTEM is earthed prior to charging the system with refrigerant.
d) Label the system when charging is complete (if not already).
e) Extreme care shall be taken not to overfill the REFRIGERATING SYSTEM.

Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. The system shall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

Charging procedures (cont.)

In addition to conventional charging procedures, the following requirements shall be followed.

a) Only the following A2L refrigerants R454A, R454C and R455A can be used in these unit coolers. The following A1 refrigerants R404A, R507A, R407A/C/F, R448A and R449A can also be used in these unit coolers.

b) A Heatcraft approved refrigerant detection system must be installed if an A2L refrigerant is used.

c) The condensing unit must be labeled with the refrigerant that the system is charged with.

d) The unit cooler can only be connected to an appliance that is suitable for the same refrigerant

e) The maximum operating pressure must be considered when connecting to any condenser, condensing, or compressor unit.

Decommissioning

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of recovered refrigerant. It is essential that electrical power is available before the task is commenced.

a) Become familiar with the equipment and its operation.

b) Isolate the system electrically.

c) Before attempting the procedure, ensure that:

   i) mechanical handling equipment is available, if required, for handling refrigerant cylinders;

   ii) all personal protective equipment is available and being used correctly;

   iii) the recovery process is supervised at all times by a competent person;

   iv) recovery equipment and cylinders conform to the appropriate standards.

d) Pump down refrigerant system, if possible.

e) If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.

f) Make sure that cylinder is situated on the scales before recovery takes place.

g) Start the recovery machine and operate in accordance with instructions.

h) Do not overfill cylinders (no more than 80 % volume liquid charge).

i) Do not exceed the maximum working pressure of the cylinder, even temporarily.

j) When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.

k) Recovered refrigerant shall not be charged into another REFRIGERATING SYSTEM unless it has been cleaned and checked.

Labeling

Equipment shall be labelled stating that it has been de-commissioned and emptied of refrigerant. The label shall be dated and signed. For appliances containing FLAMMABLE REFRIGERANTS, ensure that there are labels on the equipment stating the equipment contains FLAMMABLE REFRIGERANT.

Recovery

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.

When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e., special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of all appropriate refrigerants including, when applicable, FLAMMABLE REFRIGERANTS. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult Heatcraft if in doubt.

The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.

If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that FLAMMABLE REFRIGERANT does not remain within the lubricant. The evacuation process shall be carried out prior to returning the compressor to the suppliers. Only electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.

l) Pump down refrigerant system, if possible.

m) If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.

n) Make sure that cylinder is situated on the scales before recovery takes place.

o) Start the recovery machine and operate in accordance with instructions.

p) Do not overfill cylinders (no more than 80 % volume liquid charge).

q) Do not exceed the maximum working pressure of the cylinder, even temporarily.

r) When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.

s) Recovered refrigerant shall not be charged into another REFRIGERATING SYSTEM unless it has been cleaned and checked.

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b) Isolate the system electrically.
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q) Do not exceed the maximum working pressure of the cylinder, even temporarily.
r) When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.
s) Recovered refrigerant shall not be charged into another REFRIGERATING SYSTEM unless it has been cleaned and checked.

Correct working procedures:

Commissioning

i) Ensure that the floor area is sufficient for the REFRIGERANT CHARGE or that the ventilation duct is assembled in a correct manner.
ii) Connect the pipes and carry out a leak test before charging with refrigerant.
iii) Check safety equipment before putting into service.

Maintenance

i) Portable equipment is to be repaired outside or in a workshop specially equipped for servicing units with FLAMMABLE REFRIGERANTS.
ii) Ensure sufficient ventilation at the repair place.
iii) Be aware that malfunction of the equipment can be caused by refrigerant loss and a refrigerant leak is possible.
iv) Discharge capacitors in a way that won't cause any spark. The standard procedure to short circuit the capacitor terminals usually creates sparks.
v) Reassemble sealed enclosures accurately. If seals are worn, replace them.
vi) Check safety equipment before putting into service.

Maximum Releasable Charge and Minimum Room Area Tables

Minimum Room Areas are calculated base on a maximum room height of 7.2 feet defined by regulatory requirement. For room height that is less than 7.2ft, the minimum room area needs to be recalculated with formula (7.2ft / room height ft) X 37sq.ft. = Amin____sq.ft.

Large Unit Coolers (LUC)

LUC Model	R-455A			R-454C			R-454A		
	Min. Room Area (sq ft)	Min. Room Area (sq m)	Max Releasable Charge (lb)	Min. Room Area (sq ft)	Min. Room Area (sq m)	Max Releasable Charge (lb)	Min. Room Area (sq ft)	Min. Room Area (sq m)	Max Releasable Charge (lb)
*EH0570	173	16.1	16.7	N/A	N/A	16.8	265	24.6	16.7
*EH0700	173	16.1	16.7	N/A	N/A	16.8	265	24.6	16.7
*EH0755	208	19.3	20.1	N/A	N/A	20.1	318	29.5	20.1
*EH0900	221	20.5	21.4	N/A	N/A	21.4	338	31.4	21.4
*EH1080	221	20.5	21.4	N/A	N/A	21.4	338	31.4	21.4
*EH1245	260	24.1	25.2	N/A	N/A	25.2	398	36.9	25.2
*EH1445	279	25.9	27.0	N/A	N/A	27.1	427	39.7	27.0
*EH1655	331	30.7	32.0	N/A	N/A	32.1	506	47.0	32.0
*EH0620	126	11.7	12.2	187	17.3	12.2	193	17.9	12.2
EH0730**6	209	19.4	20.2	309	28.7	20.3	319	29.6	20.2
*EH0840	209	19.4	20.2	309	28.7	20.3	319	29.6	20.2
*EH1250	221	20.4	21.3	327	30.3	21.4	337	31.3	21.3
*EH1470	380	35.2	36.7	562$^{\Delta}$	52.2$^{\Delta}$	36.8	581$^{\Delta}$	53.9$^{\Delta}$	36.7
*EH1870	338	31.3	32.7	500	46.4	32.8	517$^{\Delta}$	48.0$^{\Delta}$	32.7
*EH2200	573$^{\Delta}$	53.2$^{\Delta}$	55.5	849$^{\Delta}$	78.8$^{\Delta}$	55.6	877$^{\Delta}$	81.4$^{\Delta}$	55.5
*EH0540	168	15.6	16.2	249	23.1	16.3	257	23.8	16.2
*EH0630	205	19.0	19.8	304	28.2	19.9	313	29.1	19.8
*EH0805	218	20.2	21.1	323	30.0	21.2	334	31.0	21.1
*EH0925	257	23.9	24.9	381	35.4	25.0	393	36.5	24.9
*EH1125	281	26.0	27.1	416	38.6	27.2	429	39.8	27.1
*EH1210	315	29.2	30.5	467	43.3	30.6	482	44.7	30.5
*EH0480	168	15.6	16.3	249	23.1	16.3	257	23.8	16.2
*EH0565	205	19.0	19.8	304	28.2	19.9	313	29.1	19.8
*EH0730**4	218	20.2	21.1	323	30.0	21.2	334	31.0	21.1
*EH0845	257	23.9	24.9	381	35.4	25.0	393	36.5	24.9
*EH1010	281	26.0	27.1	416	38.6	27.2	429	39.8	27.1
*EH1085	315	29.2	30.5	467	43.3	30.6	482	44.7	30.5
*EH1340	276	25.6	26.7	408	37.9	26.7	422	39.1	26.7
*EH1560	332	30.8	32.1	492	45.6	32.2	507	47.1	32.1
*EH1820***E	569$^{\Delta}$	52.8$^{\Delta}$	55.1	843$^{\Delta}$	78.2$^{\Delta}$	55.2	870$^{\Delta}$	80.8$^{\Delta}$	55.0
*EH1820***H	622$^{\Delta}$	57.8$^{\Delta}$	60.2	922$^{\Delta}$	85.6$^{\Delta}$	60.4	951$^{\Delta}$	88.3$^{\Delta}$	60.2
*EH2330***E	761$^{\Delta}$	70.7$^{\Delta}$	73.7	1128$^{\Delta}$	104.7$^{\Delta}$	73.9	1164$^{\Delta}$	108.1$^{\Delta}$	73.6
*EH2330***H	845$^{\Delta}$	78.4$^{\Delta}$	81.8	1252$^{\Delta}$	116.3$^{\Delta}$	82.1	1291$^{\Delta}$	119.8$^{\Delta}$	81.7
*EH0540 w/ HG DP	222	20.6	21.5	329	30.5	21.5	339	31.5	21.4

Large Unit Coolers (LUC)

LUC Model	R-455A			R-454C			R-454A		
	Min. Room Area (sq ft)	Min. Room Area (sq m)	Max Releasable Charge (lb)	Min. Room Area (sq ft)	Min. Room Area (sq m)	Max Releasable Charge (lb)	Min. Room Area (sq ft)	Min. Room Area (sq m)	Max Releasable Charge (lb)
*EH0630 w/ HG DP	259	24.0	25.0	383	35.5	25.1	396	36.7	25.0
*EH0805 w/ HG DP	279	25.9	27.0	414	38.4	27.1	427	39.7	27.0
*EH0925 w/ HG DP	319	29.5	30.8	472	43.8	30.9	487	45.2	30.8
*EH1125 w/ HG DP	349	32.4	33.8	517Δ	48.0Δ	33.9	534Δ	49.6Δ	33.8
*EH1210 w/ HG DP	384	35.6	37.1	569Δ	52.8Δ	37.2	587Δ	54.5Δ	37.1
*EH0480 w/ HG DP	222	20.6	21.5	329	30.5	21.5	339	31.5	21.4
*EH0565 w/ HG DP	259	24.0	25.0	383	35.5	25.1	396	36.7	25.0
*EH0730 w/ HG DP	279	25.9	27.0	414	38.4	27.1	427	39.7	27.0
*EH0845 w/ HG DP	319	29.5	30.8	472	43.8	30.9	487	45.2	30.8
*EH1010 w/ HG DP	349	32.4	33.8	517Δ	48.0Δ	33.9	534Δ	49.6Δ	33.8
*EH1085 w/ HG DP	384	35.6	37.1	569Δ	52.8Δ	37.2	587Δ	54.5Δ	37.1
*EH1340 w/ HG DP	365	33.8	35.3	540Δ	50.1Δ	35.4	558Δ	51.8Δ	35.3
*EH1560 w/ HG DP and MHV	429	39.8	41.5	635Δ	58.9Δ	41.6	655Δ	60.8Δ	41.5
*EH1820 w/ HG DP and MHV	716Δ	66.5Δ	69.3	1061Δ	98.6Δ	69.5	1095Δ	101.7Δ	69.3
*EH2330 w/ HG DP and MHV	947Δ	87.9Δ	91.7	1404Δ	130.4Δ	92.0	1447Δ	134.4Δ	91.6
*EH1560 w/ HG DP and Rev Cyc Dual Ckt	450	41.8	43.6	667Δ	61.9Δ	43.7	688Δ	63.9Δ	43.5
*EH1820 w/ HG DP and Rev Cyc Dual Ckt	738Δ	68.6Δ	71.5	1094Δ	101.6Δ	71.7	1129Δ	104.8Δ	71.4
*EH2330 w/ HG DP and Rev Cyc Dual Ckt	975Δ	90.5Δ	94.4	1445Δ	134.2Δ	94.7	1489Δ	138.3Δ	94.3
EH0553	119	11.0	11.4	176	16.3	11.5	181	16.8	11.4
EH0723	146	13.5	14.1	216	20.0	14.1	223	20.7	14.1
EH0743	152	14.1	14.7	225	20.8	14.7	232	21.5	14.7
EH0933	188	17.4	18.2	278	25.8	18.2	287	26.7	18.2
EH1053	280	25.9	27.0	414	38.4	27.1	428	39.7	27.1
EH1313	331	30.7	32.0	490	45.5	32.1	506	47.0	32.0
EH1333	278	25.8	26.9	411	38.2	26.9	425	39.4	26.9
EH1623	279	25.8	27.0	413	38.3	27.0	426	39.6	27.0
EH1873	373	34.6	36.1	553Δ	51.3Δ	36.2	569Δ	52.8Δ	36.0
EH2203	569Δ	52.8Δ	55.0	842Δ	78.2Δ	55.2	869Δ	80.7Δ	55.0
EH2553	645Δ	59.9Δ	62.5	956Δ	88.8Δ	62.6	987Δ	91.6Δ	62.5
EH2883	763Δ	70.8Δ	73.9	1130Δ	105.0Δ	74.1	1166Δ	108.3Δ	73.8
*EH2513	570Δ	52.9Δ	55.1	844Δ	78.3Δ	55.3	871Δ	80.9Δ	55.1
*EH2953	681Δ	63.3Δ	66.0	1010Δ	93.7Δ	66.2	1042Δ	96.8Δ	66.0
*EH3283	764Δ	71.0Δ	74.0	1133Δ	105.2Δ	74.2	1169Δ	108.6Δ	74.0
EH0423	117	10.8	11.3	173	16.0	11.3	178	16.5	11.3
*EH0513**6	145	13.4	14.0	215	19.9	14.1	222	20.6	14.0
EH0573	149	13.8	14.4	221	20.4	14.4	228	21.1	14.4
EH0713	185	17.1	17.9	274	25.4	17.9	283	26.2	17.9

Large Unit Coolers (LUC)

LUC Model	R-455A			R-454C			R-454A		
	Min. Room Area (sq ft)	Min. Room Area (sq m)	Max Releasable Charge (lb)	Min. Room Area (sq ft)	Min. Room Area (sq m)	Max Releasable Charge (lb)	Min. Room Area (sq ft)	Min. Room Area (sq m)	Max Releasable Charge (lb)
EH0763	280	26.0	27.1	414	38.5	27.1	428	39.7	27.1
EH0963	314	29.1	30.4	465	43.2	30.5	480	44.6	30.4
EH0373	117	10.8	11.3	173	16.0	11.3	178	16.5	11.3
EH0473	145	13.4	14.0	215	19.9	14.1	222	20.6	14.0
*EH0513**4	149	13.8	14.4	221	20.4	14.4	228	21.1	14.4
EH0653	185	17.1	17.9	274	25.4	17.9	283	26.2	17.9
EH0693	280	26.0	27.1	414	38.5	27.1	428	39.7	27.1
EH0883	314	29.1	30.4	465	43.2	30.5	480	44.6	30.4
EH1123	275	25.5	26.6	407	37.8	26.7	420	39.0	26.6
*EH1343**6	276	25.6	26.7	408	37.9	26.7	422	39.1	26.7
EH1563	333	30.9	32.2	493	45.8	32.3	509[Δ]	47.3[Δ]	32.2
*EH1823***E	569[Δ]	52.8[Δ]	55.1	843[Δ]	78.2[Δ]	55.2	870[Δ]	80.8[Δ]	55.0
*EH1823***H	621[Δ]	57.7[Δ]	60.1	920[Δ]	85.5[Δ]	60.3	949[Δ]	88.1[Δ]	60.1
*EH2333**E	760[Δ]	70.6[Δ]	73.6	1126[Δ]	104.6[Δ]	73.8	1162[Δ]	107.9[Δ]	73.5
*EH2333**H	843[Δ]	78.2[Δ]	81.6	1249[Δ]	116.0[Δ]	81.9	1287[Δ]	119.5[Δ]	81.4
EH0983	275	25.5	26.6	407	37.8	26.7	420	39.0	26.6
EH1163	276	25.6	26.7	408	37.9	26.7	422	39.1	26.7
*EH1343**4	331	30.7	32.0	490	45.5	32.1	506	46.9	32.0
*EH1583***E	568[Δ]	52.7[Δ]	55.0	841[Δ]	78.1[Δ]	55.1	868[Δ]	80.6[Δ]	54.9
*EH1583***H	619[Δ]	57.5[Δ]	59.9	917[Δ]	85.2[Δ]	60.1	946[Δ]	87.8[Δ]	59.9
*EH2053***E	732[Δ]	67.9[Δ]	70.8	1084[Δ]	100.7[Δ]	71.0	1119[Δ]	103.9[Δ]	70.8
*EH2053***H	786[Δ]	73.0[Δ]	76.1	1165[Δ]	108.2[Δ]	76.3	1202[Δ]	111.6[Δ]	76.1
EH0423 w/ HG DP	171	15.8	16.5	253	23.4	16.5	261	24.2	16.5
*EH0513**6 w/ HG DP	199	18.4	19.2	295	27.3	19.3	304	28.2	19.2
EH0573 w/ HG DP	210	19.5	20.3	311	28.9	20.4	321	29.8	20.3
EH0713 w/ HG DP	246	22.8	23.8	365	33.8	23.9	376	34.9	23.8
EH0763 w/ HG DP	349	32.3	33.7	516[Δ]	47.9[Δ]	33.8	533[Δ]	49.5[Δ]	33.7
EH0963 w/ HG DP	383	35.5	37.0	567[Δ]	52.6[Δ]	37.1	585[Δ]	54.3[Δ]	37.0
EH03 w/ HG DP	171	15.8	16.5	253	23.4	16.5	261	24.2	16.5
EH0473 w/ HG DP	199	18.4	19.2	295	27.3	19.3	304	28.2	19.2
*EH0513**4 w/ HG DP	210	19.5	20.3	311	28.9	20.4	321	29.8	20.3
EH0653 w/ HG DP	246	22.8	23.8	365	33.8	23.9	376	34.9	23.8
EH0693 w/ HG DP	349	32.3	33.7	516[Δ]	47.9[Δ]	33.8	533[Δ]	49.5[Δ]	33.7
EH0883 w/ HG DP	383	35.5	37.0	567[Δ]	52.6[Δ]	37.1	585[Δ]	54.3[Δ]	37.0
EH1123 w/ HG DP	364	33.8	35.2	539[Δ]	50.0[Δ]	35.3	557[Δ]	51.7[Δ]	35.2
*EH13**6 w/ HG DP	365	33.8	35.3	540[Δ]	50.1[Δ]	35.4	558[Δ]	51.8[Δ]	35.3
EH1563 w/ HG DP and MHV	429	39.8	41.5	635[Δ]	59.0[Δ]	41.6	656[Δ]	60.9[Δ]	41.5

Large Unit Coolers (LUC)

LUC Model	R-455A			R-454C			R-454A		
	Min. Room Area (sq ft)	Min. Room Area (sq m)	Max Releasable Charge (lb)	Min. Room Area (sq ft)	Min. Room Area (sq m)	Max Releasable Charge (lb)	Min. Room Area (sq ft)	Min. Room Area (sq m)	Max Releasable Charge (lb)
EH1823 w/ HG DP and MHV	716Δ	66.5Δ	69.4	1062Δ	98.6Δ	69.6	1095Δ	101.7Δ	69.3
EH2333 w/ HG DP and MHV	945Δ	87.7Δ	91.5	1401Δ	130.1Δ	91.8	1443Δ	134.0Δ	91.3
EH1563 w/ HG DP and Rev Cyc Dual Ckt	451	41.8	43.6	667Δ	61.9Δ	43.7	689Δ	64.0Δ	43.6
EH1823 w/ HG DP and Rev Cyc Dual Ckt	739Δ	68.6Δ	71.5	1095Δ	101.6Δ	71.7	1129Δ	104.9Δ	71.5
EH23 w/ HG DP and Rev Cyc Dual Ckt	972Δ	90.3Δ	94.2	1442Δ	133.9Δ	94.5	1486Δ	138.0Δ	94.0
EH0983 w/ HG DP	364	33.8	35.2	539Δ	50.0Δ	35.3	557Δ	51.7Δ	35.2
EH1163 w/ HG DP	365	33.8	35.3	540Δ	50.1Δ	35.4	558Δ	51.8Δ	35.3
*EH13**4 w/ HG DP and MHV	427	39.6	41.3	632Δ	58.7Δ	41.4	653Δ	60.6Δ	41.3
EH1583 w/ HG DP and MHV	714Δ	66.3Δ	69.2	1059Δ	98.3Δ	69.4	1092Δ	101.4Δ	69.1
EH2053 w/ HG DP and MHV	889Δ	82.6Δ	86.1	1318Δ	122.4Δ	86.4	1360Δ	126.3Δ	86.1
*EH13**4 w/ HG DP and Rev Cyc Dual Ckt	448	41.6	43.4	664Δ	61.7Δ	43.5	686Δ	63.7Δ	43.4
EH1583 w/ HG DP and Rev Cyc Dual Ckt	737Δ	68.4Δ	71.3	1092Δ	101.4Δ	71.5	1126Δ	104.5Δ	71.2
EH2053 w/ HG DP and Rev Cyc Dual Ckt	918Δ	85.2Δ	88.9	1360Δ	126.3Δ	89.1	1404Δ	130.3Δ	88.8

Note:
Δ = Minimum Room Area number with Δ indicates ventilation is required for the refrigerated space. Ventilation requirement could change with larger room area. Check requirement with Heatcraft's etools or representative.

Minimum Room Area is calculated using 20 feet of line length from the Safety Shut-off Valve (SSOV) to the unit cooler. For applications that require other line lengths, please contact Heatcraft representative for Minimum Room Area re-calculation.

HG DP = Hot Gas Drain Pan

MHV = Mohave Model

Rev Cyc Dual Ckt = Reverse Cycle Dual Circuit

Maximum Releasable Charge and Minimum Room Area Tables

Medium Profile Unit Coolers (MP)

MP Model	R-455A			R-454C			R-454A		
	Min. Room Area (sq ft)	Min. Room Area (sq m)	Max Releasable Charge (lb)	Min. Room Area (sq ft)	Min. Room Area (sq m)	Max Releasable Charge (lb)	Min. Room Area (sq ft)	Min. Room Area (sq m)	Max Releasable Charge (lb)
*EM0125*Y6E*	35	3	4	52	5	4	54	5	4
*EM0135*Y6E*	40	4	4	59	5	4	61	6	4
*EM0250*Y6E*	80	7	8	120	11	8	124	12	8
*EM0300*Y6E*	117	11	12	175	16	12	181	17	12
*EM0370*Y6E*	124	12	12	185	17	13	192	18	13
*EM0475*Y6E*	141	13	14	211	20	14	218	20	14
*EM0595*Y6E*	184	17	18	274	25	18	284	26	18
*EM0735*Y6E*	188	17	19	279	26	19	288	27	19
*EM0850*Y6E*	206	19	20	306	28	21	317	29	21
*EM0125*Y4E*	40	4	4	59	5	4	61	6	4
*EM0225*Y4E*	80	7	8	120	11	8	124	12	8
*EM0250*Y4E*	117	11	12	175	16	12	181	17	12
*EM0325*Y4E*	124	12	12	185	17	13	192	18	13
*EM0420*Y4E*	141	13	14	211	20	14	218	20	14
*EM0490*Y4E*	184	17	18	274	25	18	283	26	18
*EM0620*Y4E*	188	17	19	279	26	19	288	27	19
*EM0720*Y4E*	207	19	21	308	29	21	319	30	21
*EM0250*YH6*	80	7	8	120	11	8	124	12	8
*EM0300*YH6*	117	11	12	176	16	12	182	17	12
*EM0370*YH6*	125	12	13	187	17	13	194	18	13
*EM0475*YH6*	142	13	14	212	20	14	219	20	14
*EM0595*YH6*	185	17	18	276	26	19	285	26	19
*EM0735*YH6*	188	17	19	280	26	19	290	27	19
*EM0225*Y4H*	80	7	8	120	11	8	124	12	8
*EM0250*Y4H*	117	11	12	176	16	12	182	17	12
*EM0325*Y4H*	125	12	13	186	17	13	193	18	13
*EM0420*Y4H*	141	13	14	211	20	14	218	20	14
*EM0490*Y4H*	185	17	18	276	26	19	285	26	19
*EM0620*Y4H*	189	18	19	192	18	19	290	27	19
*EM0185*Y8A*	34	3	4	51	5	4	52	5	4
*EM0225*Y8A*	34	3	4	51	5	4	52	5	4
*EM0405*Y8A*	63	6	7	93	9	7	96	9	7
*EM0475*Y8A*	63	6	7	93	9	7	96	9	7
*EM0575*Y8A*	80	7	8	119	11	8	123	11	8
*EM0675*Y8A*	80	7	8	119	11	8	123	11	8
*EM0775*Y8A*	104	10	11	155	14	11	160	15	11
*EM0975*Y8A*	105	10	11	155	14	11	161	15	11
*EM1115*Y8A*	116	11	12	171	16	12	178	17	12

Maximum Releasable Charge and Minimum Room Area Tables

Medium Profile Unit Coolers (MP)

MP Model	R-455A			R-454C			R-454A		
	Min. Room Area (sq ft)	Min. Room Area (sq m)	Max Releasable Charge (lb)	Min. Room Area (sq ft)	Min. Room Area (sq m)	Max Releasable Charge (lb)	Min. Room Area (sq ft)	Min. Room Area (sq m)	Max Releasable Charge (lb)
*EM0250*Y6H* W/ HTG DP	86	8	9	128	12	9	132	12	9
*EM0300*Y6H* W/ HTG DP	123	11	12	184	17	13	190	18	13
*EM0370*Y6H* W/ HTG DP	133	12	13	199	18	14	206	19	14
*EM0475*Y6H* W/ HTG DP	150	14	15	224	21	15	232	22	15
*EM0595*Y6H* W/ HTG DP	196	18	19	291	27	20	302	28	20
*EM0735*Y6H* W/ HTG DP	199	18	20	296	27	20	306	28	20
*EM0225*Y4H* W/ HTG DP	86	8	9	128	12	9	132	12	9
*EM0250*Y4H* W/ HTG DP	123	11	12	184	17	13	190	18	13
*EM0325*Y4H* W/ HTG DP	133	12	13	198	18	13	205	19	13
*EM0420*Y4H* W/ HTG DP	149	14	15	223	21	15	231	21	15
*EM0490*Y4H* W/ HTG DP	196	18	19	291	27	20	302	28	20
*EM0620*Y4H* W/ HTG DP	199	18	20	296	27	20	306	28	20

Note:
Minimum Room Area is calculated using 20 feet of line length from the Safety Shut-off Valve (SSOV) to the unit cooler. For applications that require other line lengths, please contact Heatcraft representative for Minimum Room Area re-calculation.

Maximum Releasable Charge and Minimum Room Area Tables

Low Profile Unit Coolers (LOP)

LP Model	R-455A			R-454C			R-454A		
	Min. Room Area (sq ft)	Min. Room Area (sq m)	Max Releasable Charge (lb)	Min. Room Area (sq ft)	Min. Room Area (sq m)	Max Releasable Charge (lb)	Min. Room Area (sq ft)	Min. Room Area (sq m)	Max Releasable Charge (lb)
*EL0045#Y6A$A	13	1.2	1.2	19	1.8	1.2	20	1.9	1.2
*EL0055#Y6A$A	15	1.4	1.4	22	2.0	1.4	23	2.1	1.4
*EL0060#Y6A$A	15	1.4	1.4	22	2.0	1.4	23	2.1	1.4
*EL0095#Y6A$A	17	1.6	1.6	25	2.3	1.6	25	2.3	1.6
*EL0105#Y6A$A	18	1.7	1.7	26	2.4	1.7	27	2.5	1.7
*EL0115#Y6A$A	21	2.0	2.0	31	2.9	2.0	32	3.0	2.0
*EL0125#Y6A$A	21	2.0	2.0	31	2.9	2.0	32	3.0	2.0
*EL0155#Y6A$A	25	2.3	2.3	36	3.3	2.3	37	3.4	2.3
*EL0190#Y6A$A	30	2.8	2.9	45	4.2	2.9	46	4.3	2.9
*EL0250#Y6A$A	36	3.3	3.4	53	4.9	3.4	54	5.0	3.4
*EL0295#Y6A$A	41	3.8	3.9	61	5.7	4.0	63	5.9	3.9
*EL0350#Y6A$A	44	4.1	4.2	64	5.9	4.2	66	6.1	4.2
*EL0380#Y6A$A	48	4.5	4.6	70	6.5	4.6	73	6.8	4.6
*EL0045#Y4E$A	15	1.4	1.4	22	2.0	1.4	23	2.1	1.4
*EL0070#Y4E$A	18	1.7	1.7	26	2.4	1.7	27	2.5	1.7
*EL0090#Y4E$A	21	2.0	2.0	31	2.9	2.0	32	3.0	2.0
*EL0135#Y4E$A	30	2.8	2.9	44	4.1	2.9	46	4.3	2.9
*EL0180#Y4E$A	36	3.3	3.4	53	4.9	3.5	55	5.1	3.4
*EL0220#Y4E$A	41	3.8	4.0	61	5.7	4.0	63	5.9	4.0
*EL0275#Y4E$A	47	4.4	4.5	70	6.5	4.5	72	6.7	4.5
*EL0040#Y6E$A	14	1.3	1.3	20	1.9	1.3	20	1.9	1.3
*EL0045#Y6E$A	15	1.4	1.4	22	2.0	1.4	23	2.1	1.4
*EL0065#Y6E$A	18	1.7	1.7	26	2.4	1.7	27	2.5	1.7
*EL0080#Y6E$A	18	1.7	1.7	26	2.4	1.7	27	2.5	1.7
*EL0100#Y6E$A	21	2.0	2.0	31	2.9	2.0	32	3.0	2.0
*EL0130#Y6E$A	22	2.0	2.1	33	3.1	2.1	34	3.2	2.1
*EL0155#Y6E$A	31	2.9	2.9	45	4.2	2.9	47	4.4	2.9
*EL0170#Y6E$A	30	2.8	2.8	44	4.1	2.8	45	4.2	2.8
*EL0205#Y6E$A	36	3.3	3.4	53	4.9	3.5	55	5.1	3.4
*EL0240#Y6E$A	41	3.8	4.0	61	5.7	4.0	63	5.9	4.0
*EL0255#Y6E$A	39	3.6	3.7	57	5.3	3.7	59	5.5	3.7
*EL0310#Y6E$A	47	4.4	4.5	70	6.5	4.5	72	6.7	4.5
*EL0045#Y4H$A	15	1.4	1.4	22	2.0	1.4	23	2.1	1.4

Maximum Releasable Charge and Minimum Room Area Tables

Low Profile Unit Coolers (LOP)

LP Model	R-455A			R-454C			R-454A		
	Min. Room Area (sq ft)	Min. Room Area (sq m)	Max Releasable Charge (lb)	Min. Room Area (sq ft)	Min. Room Area (sq m)	Max Releasable Charge (lb)	Min. Room Area (sq ft)	Min. Room Area (sq m)	Max Releasable Charge (lb)
*EL0070#Y4H$A	18	1.7	1.7	26	2.4	1.7	27	2.5	1.7
*EL0090#Y4H$A	21	2.0	2.0	31	2.9	2.0	32	3.0	2.0
*EL0135#Y4H$A	30	2.8	2.9	44	4.1	2.9	46	4.3	2.9
*EL0180#Y4H$A	36	3.3	3.4	53	4.9	3.5	55	5.1	3.4
*EL0220#Y4H$A	41	3.8	4.0	61	5.7	4.0	63	5.9	4.0
*EL0275#Y4H$A	47	4.4	4.5	70	6.5	4.5	72	6.7	4.5
*EL0040#Y6H$A	14	1.3	1.3	20	1.9	1.3	20	1.9	1.3
*EL0045#Y6H$A	15	1.4	1.4	22	2.0	1.4	23	2.1	1.4
*EL0065#Y6H$A	18	1.7	1.7	26	2.4	1.7	27	2.5	1.7
*EL0080#Y6H$A	18	1.7	1.7	26	2.4	1.7	27	2.5	1.7
*EL0100#Y6H$A	21	2.0	2.0	31	2.9	2.0	32	3.0	2.0
*EL0130#Y6H$A	22	2.0	2.1	33	3.1	2.1	34	3.2	2.1
*EL0155#Y6H$A	31	2.9	2.9	45	4.2	2.9	47	4.4	2.9
*EL0170#Y6H$A	30	2.8	2.8	44	4.1	2.8	45	4.2	2.8
*EL0205#Y6H$A	36	3.3	3.4	53	4.9	3.5	55	5.1	3.4
*EL0240#Y6H$A	41	3.8	4.0	61	5.7	4.0	63	5.9	4.0
*EL0255#Y6H$A	39	3.6	3.7	57	5.3	3.7	59	5.5	3.7
*EL0310#Y6H$A	47	4.4	4.5	70	6.5	4.5	72	6.7	4.5
*EL0045#Y4H$A (HG Drainpan)	18	1.7	1.6	26	2.4	1.7	26	2.4	1.6
*EL0070#Y4H$A (HG Drainpan)	21	2.0	2.0	31	2.9	2.0	32	3.0	2.0
*EL0090#Y4H$A (HG Drainpan)	25	2.3	2.3	36	3.3	2.3	37	3.4	2.3
*EL0135#Y4H$A (HG Drainpan)	35	3.3	3.3	51	4.7	3.3	52	4.8	3.3
*EL0180#Y4H$A (HG Drainpan)	42	3.9	4.0	61	5.7	4.0	63	5.9	4.0
*EL0220#Y4H$A (HG Drainpan)	48	4.5	4.6	71	6.6	4.6	73	6.8	4.6
*EL0275#Y4H$A (HG Drainpan)	55	5.1	5.3	81	7.5	5.3	83	7.7	5.2
*EL0040#Y6H$A (HG Drainpan)	16	1.5	1.5	23	2.1	1.5	24	2.2	1.5
*EL0045#Y6H$A (HG Drainpan)	17	1.6	1.6	25	2.3	1.6	26	2.4	1.6

Maximum Releasable Charge and Minimum Room Area Tables

Low Profile Unit Coolers (LOP)

LP Model	R-455A			R-454C			R-454A		
	Min. Room Area (sq ft)	Min. Room Area (sq m)	Max Releasable Charge (lb)	Min. Room Area (sq ft)	Min. Room Area (sq m)	Max Releasable Charge (lb)	Min. Room Area (sq ft)	Min. Room Area (sq m)	Max Releasable Charge (lb)
*EL0065#Y6H$A (HG Drainpan)	21	2.0	2.0	31	2.9	2.0	32	3.0	2.0
*EL0080#Y6H$A (HG Drainpan)	21	2.0	2.0	31	2.9	2.0	32	3.0	2.0
*EL0100#Y6H$A (HG Drainpan)	24	2.2	2.3	36	3.3	2.3	37	3.4	2.3
*EL0130#Y6H$A (HG Drainpan)	27	2.5	2.5	39	3.6	2.5	40	3.7	2.5
*EL0155#Y6H$A (HG Drainpan)	35	3.3	3.4	52	4.8	3.4	53	4.9	3.3
*EL0170#Y6H$A (HG Drainpan)	35	3.3	3.4	52	4.8	3.4	53	4.9	3.4
*EL0205#Y6H$A (HG Drainpan)	42	3.9	4.0	61	5.7	4.0	63	5.9	4.0
*EL0240#Y6H$A (HG Drainpan)	48	4.5	4.6	71	6.6	4.6	73	6.8	4.6
*EL0255#Y6H$A (HG Drainpan)	46	4.3	4.4	68	6.3	4.4	70	6.5	4.4
*EL0310#Y6H$A (HG Drainpan)	55	5.1	5.3	81	7.5	5.3	83	7.7	5.2

Note:
Minumum Room Area is calculated using the Line Length from the Safety Shut-off Valve (SSOV) to the Unit Cooler. For LOP, its either 10' or 20', depending on the # of fans, refer Tech. Bulletin for more details. For applications requiring other line lengths, please contact Application Engineering for Room Area Minimum re-calculation.

Maximum Releasable Charge and Minimum Room Area Tables

Center Mount Unit Coolers (CM)

CM Model	R-455A			R-454C			R-454A		
	Min. Room Area (sq ft)	Min. Room Area (sq m)	Max Releasable Charge (lb)	Min. Room Area (sq ft)	Min. Room Area (sq m)	Max Releasable Charge (lb)	Min. Room Area (sq ft)	Min. Room Area (sq m)	Max Releasable Charge (lb)
*EC0065^Y7AMA	21	2.0	2.0	31	2.9	2.0	32	3.0	2.0
*EC0095^Y7AMA	30	2.8	2.9	45	4.2	3.0	46	4.3	2.9
*EC0130^Y7AMA	30	2.8	2.9	45	4.2	3.0	46	4.3	2.9
*EC0175^Y7AMA	38	3.6	3.7	56	5.3	3.7	58	5.4	3.7
*EC0200^Y7AMA	38	3.6	3.7	56	5.3	3.7	58	5.4	3.7
*EC0225^Y7AMA	44	4.1	4.3	65	6.1	4.3	67	6.3	4.3
*EC0250^Y7AMA	46	4.3	4.4	67	6.3	4.4	70	6.6	4.4
*EC0285^Y7AMA	53	5.0	5.2	79	7.4	5.2	81	7.6	5.2
*EC0360^Y7AMA	63	5.9	6.1	93	8.7	6.1	96	9.0	6.1
*EC0050^Y6EMA	21	2.0	2.0	31	2.9	2.0	32	3.0	2.0
*EC0075^Y6EMA	27	2.6	2.6	39	3.7	2.6	40	3.8	2.6
*EC0120^Y6EMA	34	3.2	3.3	51	4.8	3.3	52	4.9	3.3
*EC0135^Y6EMA	40	3.8	3.9	59	5.5	3.9	61	5.7	3.9
*EC0180^Y6EMA	53	5.0	5.2	79	7.4	5.2	81	7.6	5.2
*EC0255^Y6EMA	63	5.9	6.1	93	8.7	6.1	96	9.0	6.1
*EC0280^Y6EMA	63	5.9	6.1	93	8.7	6.1	96	9.0	6.1

Note:
Minumum Room Area is calculated using the Line Length from the Safety Shut-off Valve (SSOV) to the Unit Cooler. For CM, its either 10' or 20', depending on the # of fans, refer Tech. Bulletin for more details. For applications requiring other line lengths, please contact Application Engineering for Room Area Minimum re-calculation.

Maximum Releasable Charge and Minimum Room Area Tables

Low Velocity Center Mount Unit Coolers (LVCM)

LVCM Model	R-455A			R-454C			R-454A		
	Min. Room Area (sq ft)	Min. Room Area (sq m)	Max Releasable Charge (lb)	Min. Room Area (sq ft)	Min. Room Area (sq m)	Max Releasable Charge (lb)	Min. Room Area (sq ft)	Min. Room Area (sq m)	Max Releasable Charge (lb)
*EV0055^Y6AMA	26	2.5	2.5	38	3.6	2.5	39	3.7	2.5
*EV0080^Y6AMA	26	2.5	2.5	38	3.6	2.5	39	3.7	2.5
*EV0125^Y6AMA	32	3.0	3.1	47	4.4	3.1	49	4.6	3.1
*EV0160^Y6AMA	44	4.1	4.2	64	6.0	4.2	67	6.3	4.2
*EV0180^Y6AMA	46	4.3	4.5	68	6.4	4.5	71	6.6	4.5
*EV0215^Y6AMA	56	5.3	5.4	83	7.8	5.4	86	8.0	5.4
*EV0245^Y6AMA	56	5.3	5.4	82	7.7	5.4	85	7.9	5.4
*EV0290^Y6AMA	68	6.4	6.6	101	9.4	6.6	104	9.7	6.6
*EV0360^Y6AMA	81	7.6	7.9	120	11.2	7.9	124	11.6	7.9
*EV0055^Y6EMA	26	2.5	2.5	38	3.6	2.5	39	3.7	2.5
*EV0080^Y6EMA	26	2.5	2.5	38	3.6	2.5	39	3.7	2.5
*EV0125^Y6EMA	32	3.0	3.1	47	4.4	3.1	49	4.6	3.1
*EV0160^Y6EMA	44	4.1	4.2	64	6.0	4.2	67	6.3	4.2
*EV0180^Y6EMA	46	4.3	4.5	68	6.4	4.5	71	6.6	4.5
*EV0215^Y6EMA	56	5.3	5.4	83	7.8	5.4	86	8.0	5.4
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*EV0290^Y6EMA	68	6.4	6.6	101	9.4	6.6	104	9.7	6.6
*EV0360^Y6EMA	81	7.6	7.9	120	11.2	7.9	124	11.6	7.9
*EV0080^Y6HMA	26	2.5	2.5	38	3.6	2.5	39	3.7	2.5
*EV0125^Y6HMA	32	3.0	3.1	47	4.4	3.1	49	4.6	3.1
*EV0160^Y6HMA	44	4.1	4.2	64	6	4.2	67	6.3	4.2
*EV0180^Y6HMA	46	4.3	4.5	68	6.4	4.5	71	6.6	4.5
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Note:
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NOTES

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