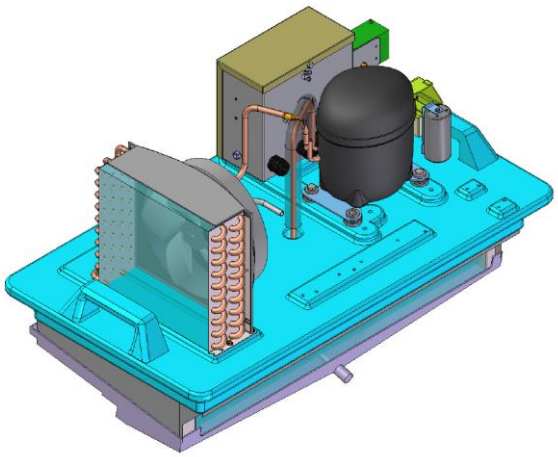
Manufactured for Heatcraft Australia Pty Ltd ACN 000 056 717

KIRBY DROP-IN HANDBOOK

MEDIUM TEMP R134a (& s/seded R22), LOW TEMP R404A

***THANK YOU** FOR CHOOSING THE HEATCRAFT KIRBY DROP-IN UNIT.*
TO ENSURE TROUBLE FREE INSTALLATION AND COMMISSIONING, PLEASE REFER TO THE CONTENTS OF THIS HANDBOOK.



IMPORTANT INFORMATION -
REFER TO THE SECTIONS ON "WARNINGS AND SAFEGUARDS", AND "INSTALLATION INSTRUCTIONS" BEFORE ATTEMPTING TO COMMISSION THIS PRODUCT.

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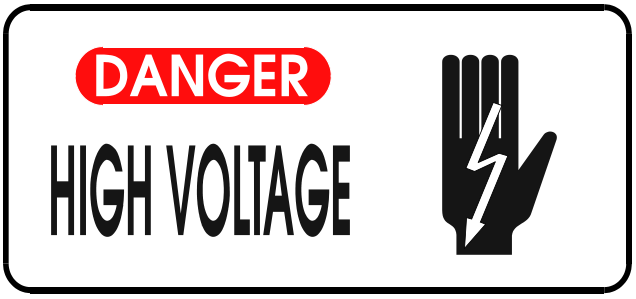
End User Notes



General Notes

Kirby Drop-In units fall under the requirements for commercial electrical equipment as per Standards Australia guidelines. Installation and major service of this unit must be carried out by a licensed contractor and in accordance with local regulatory guidelines.

Kirby Drop-In units are supplied with a prewired connection cord for both single and three phase units.

Under no circumstances should anyone other than a qualified person attempt to gain access to the interior of the unit without first ensuring electric power is disconnected.

Kirby Drop-In units have been designed for use in an outdoor (with a suitable cover) or indoor environment. Kirby Drop-In units are not suitable for mobile and explosion-proof applications.

Auto Start-Up

Kirby Drop-In units may start automatically without any warning.

Auto Reset

Kirby Drop-In units use fans and compressors that are thermally protected. When tripped, these components will not operate. Once sufficiently cooled however, the component will automatically reset and may operate without warning.
The unit is equipped with a High/Low pressure switch as standard. The standard switch is a universal manual or auto-reset type on both high and low sides. Factory setting is auto-reset on both sides.

Routine Maintenance of Unit

Condenser:

Condenser should be cleaned at 3 monthly intervals.

System operation:

System operation should be checked every 6 months. Checks should include:

- Operating conditions such as condensing and evaporating temperatures, compressor discharge temperature, superheat and sub-cooling, etc.
- Electrical connections, current draw and voltage level, etc.

Warnings and Safeguards

Heatcraft Australia is very conscious of safety issues when designing and manufacturing these products, but it is essential that the end user, installer or service personnel also exercises care when working with the units.

Warning	**This indicates contents for which, if disregarded, the possibility of human death or severe injury can be assumed.**
Caution	**This indicates contents for which, if disregarded, the possibility of human injury or the possibility of material damage can be assumed.**

Important Notes

- **Do NOT remove access panels without isolating power.**
- **Do NOT operate unit with access panels removed due to the presence of rotating equipment.**
- **All controls are 230/240V.**

No Smoking

Heatcraft Australia recommends No Smoking within a distance of 15 metres of the unit.

Warning – 

Electrical Hazard

A qualified Electrician must carry out all electrical work. All field wiring must conform to the requirements of the equipment and all applicable National and Local Codes.
Always isolate the power to the unit before checking and / or diagnosing the units. Never work on any electrical item without isolating or disconnecting the power supply.

Caution – Unit Pressurized

All units are supplied pre-charged with the working refrigerant. Do not vent any refrigerant to the atmosphere as this is illegal. If for any reason the unit needs to be altered engage the services of a qualified refrigeration mechanic.

Caution – Refrigerant Type

All units are designed to work effectively with HFC refrigerants R134a (MT units from July 2011) & R404A (LT). Medium temp units made prior to July 2011 used R22 (HCFC) refrigerant. Under no circumstances can a refrigerant such as Ammonia, Hydrocarbon, Water or Glycol be used in this product. Do not change the refrigerant type as the performance of the unit will be affected.

Refrigerant can be harmful if it is inhaled and/or makes contact with exposed skin. Refrigerant must be used and recovered responsibly. Extreme care must be taken when handling refrigerant, as personnel injury or death may occur.

Caution – Lubricant Oil Type

All compressors are charged with PolyolEster (POE) oil. POE can be used with HCFC refrigerants, such as R22 (s/seded MT units), and HFC refrigerants, such as R404A and R134a (MT units from July 2011). Use ONLY POE oil, do NOT mix POE with other oils, when using HFC refrigerants.

Caution – Sharp Edges

All units are manufactured with sheet metal and in this process all care is taken to ensure the edges are concealed. Avoid contact with sheet-metal edges and the coil fins. They can be sharp and are a potential personal injury hazard. Please take care when accessing in or around the unit.

Warning – Qualified Personnel

All units may only be installed, commissioned, decommissioned and serviced by qualified and trained personnel (refrigeration mechanics and/or electricians) who have sufficient knowledge in this type of equipment. It is the purchaser's responsibility to co-ordinate with qualified personnel as required.

Personal Protective Equipment

Heatcraft Australia recommends as a secondary safety precaution that all personnel working with the unit wear appropriate Personal Protective Equipment (PPE) such as gloves, eyewear and footwear.

Caution – Lifting of Unit

Units are shipped in either timber crates or cardboard cartons depending on the size of the unit. These units are generally considered to be heavy and may require special lifting equipment. Units are fitted with either handles or eye bolts for lifting. Do not lift units by pipe work or electrical cable etc. Refer to table 2 in General Outline Drawings for specific unit weights

Always take care to ensure a proper weight balance before lifting and moving unit.

Caution – High and Low Temperatures

Compressor housing and discharge line temperatures may reach 150°C due to failure of system components. Wiring and other materials which could be damaged by these temperatures should not come into contact with the housing or discharge line.

Moreover, even in normal working operation, the unit can generate very high (may exceed 100°C) and very low (below -40°C) temperatures on compressor housing and tubing surfaces resulting in the possibilities of severe contact burns. Special caution must be taken when working around the unit.

Caution – Motor Protection

WARNING: Do not insert any object into operating fans. Ignoring this warning may result in personal injury and/or severe equipment damage and consequences.

Hermetic compressors, and external rotor motor fans, are fitted with inherent internal or external line break motor protection. After opening, the protector may not reset for several hours until the motor cools sufficiently. Do not assume that the motor has suffered an open circuit failure without first allowing it to cool.

Caution – Internal Pressure Relief (IPR) Valve

Some hermetic compressors include an IPR valve. The IPR valve will open when the discharge pressure exceeds the suction pressure by a certain value, which is set by the compressor manufacturer. When it has opened, the compressor sump will become warm and the compressor will trip out on the motor protector. The unit may take 2 to 3 hours to reset and restart automatically if this happens. **"AW"** compressors have an IPR valve.

Do NOT assume that a compressor that is running, but not pumping, is faulty.
Stop the compressor and allow the pressures to balance, and then start the compressor again.

Purpose

Kirby Drop-In units are standard OEM products of Heatcraft Australia including all "high", "medium" and "low" temperature application ranges. They are designed for continuously supplying and receiving the refrigerant to and from the evaporator(s), and rejecting the heat extracted from the cold space to surrounding atmosphere where the units are installed.

Kirby Drop-In units are intended for installing in a typical ventilated indoor or outdoor (with suitable covers) environment (Refer to the General Arrangement Drawing section for details) with the ambient temperature between 10 and 43°C and compressor return vapour temperature no greater than 20°C.
They are not intended for environments that may have harmful, corrosive or flammable atmospheres. Marine environments are considered corrosive; please consult Heatcraft before installing in this environment.

Standard Design Conditions

From July 2011, Medium / High temperature Kirby Drop-In units are designed for refrigerant R134a, to be used in commercial cool room applications ranging from 0°C to +10°C saturated suction. Previous models used R22 refrigerant, and those models MUST not be used with any other refrigerant. The refrigerant used is CLEARLY marked on the unit serial plate.
Low temperature Kirby Drop-In units are designed, for primary refrigerant R404A, to be used in commercial freezer room applications ranging from -35°C to -10°C saturated suction.
Please refer to sales data sheet CL247 for standard Kirby Drop-In unit configurations, options offered and other detailed information such as capacity variations for other refrigerants.

For special design requirements (non standard conditions and/or refrigerants), please inquire with your local representatives and/or Heatcraft Australia local branches, or call our national telephone number 13 23 50 for your nearest available information resources.

Installation Instructions

Kirby Drop-In Units are designed to be installed from the top of the cool/freezer room. As such they should be inserted into the appropriate hole cut in the roof of the room. A roof gasket is provided, to be used between the unit and the roof. Take care to install this gasket correctly otherwise there will be excessive moisture ingress into the room causing reduced operating efficiencies and increased running costs.

Unpacking of Unit

When unpacking, check for any damage to packing material or the unit itself which may affect the unit's performance. **If any such damage is evident, please contact your local Heatcraft branch.**

When the unit has been removed from the packaging under no circumstances is the unit allowed to rest on the evaporator drain tray/covers. Leave the unit on the supporting packaging until ready to install.

Unpacking Timber Crate Units

To remove the unit from the timber crate proceed as follows

1. Remove the top of the timber crate
2. Attach the appropriate lifting equipment to the two (2) eye bolts located at either end of the blue plastic plug.
3. Lift the unit straight up and position in the cool room. Do not allow the unit to rest on the evaporator housing.

Unpacking Cardboard Carton Units

To remove the unit from the cardboard box proceed as follows

1. Open the top of the box
2. Lift the unit straight up using the two (2) handles provided, one at either end of the unit.
3. Position the unit in the cool room. Do not allow the unit to rest on the evaporator housing.

Prior to installing the unit in the cool/freezer room ensure there is sufficient clearance above the room to accommodate the full height of the unit. These units are intended to be dropped-in to the cool room.

Installation Location (Refer to the General Arrangement Drawing section)

If the unit is to be located in close proximity to a wall or similar obstruction, the minimum distance from the condenser coil face to the obstruction must be greater than 400 mm.

It is particularly important for the condensing unit section to allow sufficient unobstructed air-discharge space around the unit to prevent warm air recirculation to the condenser.

Coolroom units-

Coolroom units are induced draft discharging into the cooled space. The evaporator coil face should be maintained at least 300mm from the nearest wall.

Evaporator section should be installed as far as possible from any room access door(s), preferably discharging air towards the access door.

Cabinet Units-

Cabinet unit evaporators are forced draft discharge to the rear of the cabinet. The construction of the unit prevents the evaporator from being installed too close to cabinet walls etc.

Electrical Connection

Kirby Drop-In units are supplied fitted with either a single phase or three phase connecting plug. Single phase units may be fitted with either a 10 Amp or a 15 Amp plug depending on the specific unit. All three phase units are fitted with a 15 Amp three phase and neutral plug.

Pressure Settings

Kirby Drop-In units have a maximum operating pressure of 32 Bar(g) determined on pressure vessels (such as liquid receivers). Pressure limiting device settings such as the HP control must be 29 Bar(g) or lower in accordance with AS1677.2 that the pressure limiting device setting is no greater than 0.9 times the maximum operating pressure.

In general, Heatcraft Australia sets the HP control to allow a maximum condensing temperature of 60°C. The corresponding saturation pressures for the respective refrigerants cut-out points for safety protection purpose are approximately 28 Bar(g) for R404A, 23 Bar(g) for R22 (s/seded MT models), and 16 bar for R134a (MT models from July 2011).

Heatcraft Australia also recommends the LP switch to be used as a safety protection device. Depending on the application and compressor, LP cut-in and differential points should be set with the following considerations:

- Set the cut-out points at 3–5 K below the respective minimum design saturated suction temperatures (Refer to the Standard Design Conditions section for saturated suction temperature ranges).
- Set the differential to no more than 2 Bar.
- The cut-out pressure shall be in the positive pressure region.
- When the unit is installed in a cold ambient, the cut-out pressure shall be lower than the pressure corresponding to the ambient temperature.

Dixell Control Settings

Dixell controls are supplied with factory default setting as listed in the Dixell instruction manual, supplied with individual units. Heatcraft alters some of these setting as listed in the table below.

			TEMPERATURE				
New R134a MT Models from July 2011	Superseded R22 MT Models (prior to July 2011)	CONTROL	SET POINT (Cut In)	Cut Out	DEFROST TERMINATION	FANS STOP	DEFROST TIME
KPC800-6	KPC800-4	XR03CX	3° C	1° C			
KPC1000-6	KPC1000-4	XR03CX	3° C	1° C			
	KPC1200-4	XR03CX	3° C	1° C			
KPC1400-6	KPC1400-4	XR03CX	3° C	1° C			
KPC1700-6	KPC1700-4	XR03CX	3° C	1° C			
	KSC1800-4	XW60K	3° C	1° C			
KSC2000-6	KSC2000-4	XW60K	3° C	1° C			
KSC2700-6	KSC2900-4	XW60K	3° C	1° C			
KSC3500-6	KSC4100-4	XW60K	3° C	1° C			
LT R404A models							
KPF1000-4		XW60K	-15° C	-17° C	2° C	11° C	20 MIN
KPF1200-4		XW60K	-15° C	-17° C	2° C	11° C	20 MIN
KSF1500-4		XW60K	-15° C	-17° C	2° C	11° C	20 MIN
KSF2000-4		XW60K	-15° C	-17° C	2° C	11° C	20 MIN
KSFT2600-4		XW60K	-15° C	-17° C	2° C	11° C	20 MIN

Table 1. Dixell Control Setting

General Commissioning & Decommissioning Guide

Warning – Commissioning

Medium Temp Units from July 2011 use R134a refrigerant, with TX valve refrigerant control. Variation of TX valve setting from factory set up is possible. Changes should ONLY be made by a qualified refrigeration mechanic.
LT units use Capillary refrigerant control and cannot be altered from factory set up.

During commissioning please check the following for correct operation

- Compressors starting and stopping – the compressor should start quickly and take no than 0.5 second to achieve running speed. If the start is slow and the compressor sounds to be "labouring" or the relay "chatters" please investigate to determine the problem. On stopping, the compressor should stop within 1 second, without any knocking noises.
- Temperature Setting – check the unit is cycling on and off as expected.
- Water Drains – check to ensure that water is draining away correctly. A "P" trap should be installed in the drain tube on the outside of the room.
- **TX valve and bulb** (R134a medium temp units from July 2011)- ensure the TX valve insulation is firmly in place (KPC models), and the sensor bulb is firmly in place on the suction line (all R134a MT models).
- **TX valve setting** (R134a medium temp units from July 2011)- Superheat setting is factory set at 4K in normal operating condition (+2°C air on). Some adjustment may be necessary depending on the conditions during initial pulldown of the space. Always return to 4K for normal operation.
- Defrost Heater (LT Units) – manually activate the defrost cycle to make sure the heaters are working correctly.

Warning – Decommissioning

If the unit should need to be decommissioned please proceed as follows

- Remove the unit from the room.
- Have the refrigerant removed from the unit by a licensed refrigeration mechanic.
- Dispose of the unit in an appropriate recycling centre.

Material Safety Data Sheets – M.S.D.S.

These are available from your nearest Heatcraft Branch for all refrigerants that Kirby Drop-In units are approved for, and for oils and other materials as needed.

Important Notes

To ensure Kirby Drop-In units operate efficiently and for a long working life, always obtain genuine replacement parts from your local Heatcraft Wholesale Branch. Genuine replacement parts are covered by the warranty. Refer to the Standard Terms & Conditions of Sale in the Price Guide for warranty statements.

Continuous product improvement is our company policy. Heatcraft Australia reserves the right to make changes in product specifications and/or this instruction manual without notice.

Heatcraft Australia is dedicated to providing safe products and protecting the environment by complying with all applicable national laws and regulations governing environmental protection. New and used refrigerants cannot be vented into atmosphere. Reclaim all used refrigerants. EPA regulations are constantly updated. Ensure your refrigerant handling procedure complies with the relevant regulations.

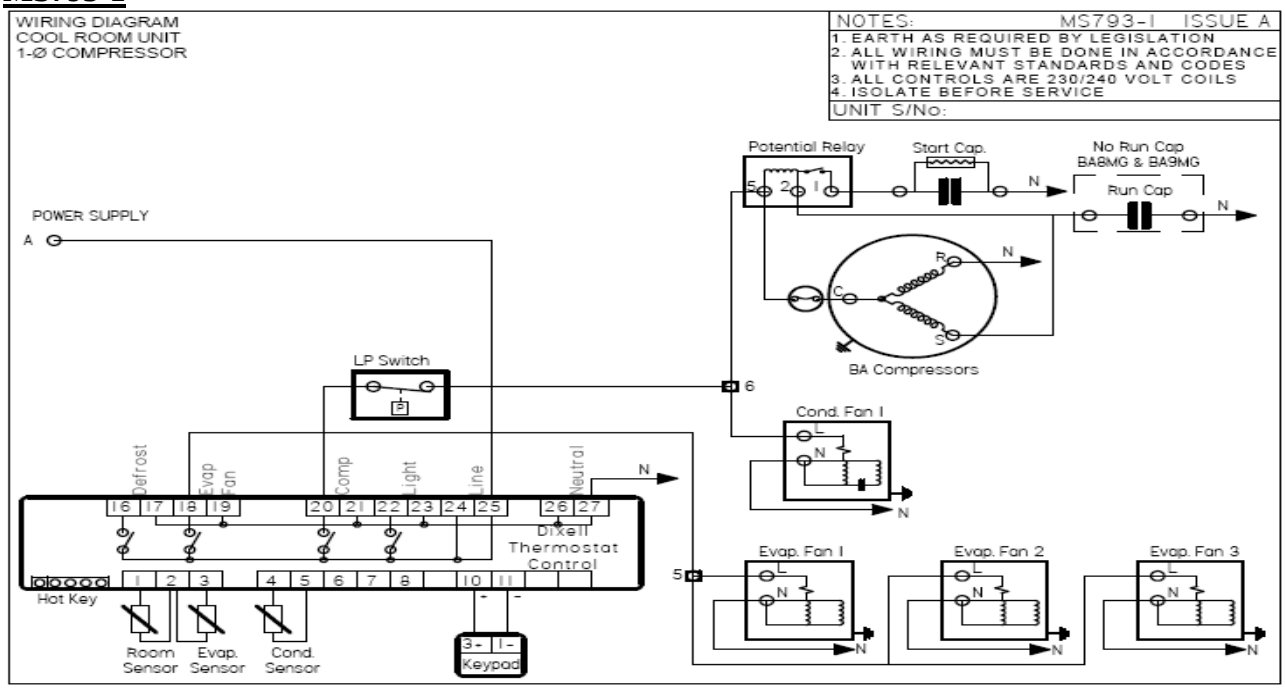
General Schematic Drawing & Outline Drawings

New R134a MT Models from July 2011	Schematic	Outline	Hole Size W x D	Unit Weight Kg
KPC800-6	MS793-8	SK696-2	825X435	31
KPC1000-6	MS793-8	SK696-4	1040X435	33
KPC1400-6	MS793-9	SK696-4	1045X435	50
KPC1700-6	MS793-9	SK696-4	1045X435	58
KSC2000-6	MS793-10	SK696-9	660X550	90
KSC2700-6	MS793-10	SK696-10	1085X665	128
KSC3500-6	MS793-10	SK696-11	1085X665	135
Superseded R22 MT Models (prior to July 2011)	Schematic	Outline	Hole Size W x D	Unit Weight Kg
KPC800-4	MS793-6	SK696-2	825X435	33
KPC1000-4	MS793-6	SK696-2	825X435	33
KPC1200-4	MS793-6	SK696-4	1045X435	46
KPC1400-4	MS793-7	SK696-4	1045X435	50
KPC1700-4	MS793-7	SK696-4	1045X435	58
KSC1800-4	MS793-1	SK696-8	660X550	88
KSC2000-4	MS793-2	SK696-9	660X550	90
KSC2900-4	MS793-2	SK696-10	1085X665	128
KSC4100-4	MS793-2	SK696-11	1085X665	135
LT R404A Models	Schematic	Outline	Hole Size W x D	Unit Weight Kg
KPF1000-4	MS793-4	SK696-13	1045X435	64
KPF1200-4	MS793-4	SK696-13	1045X435	68
KSF1500-4	MS793-4	SK696-9	660X550	92
KSF2000-4	MS793-4	SK696-10	1085X665	135
KSFT2600-4	MS793-5	SK696-18	1085X665	155

Table 2 - Electrical Schematics and General Information

Schematic Drawings

MS793-1



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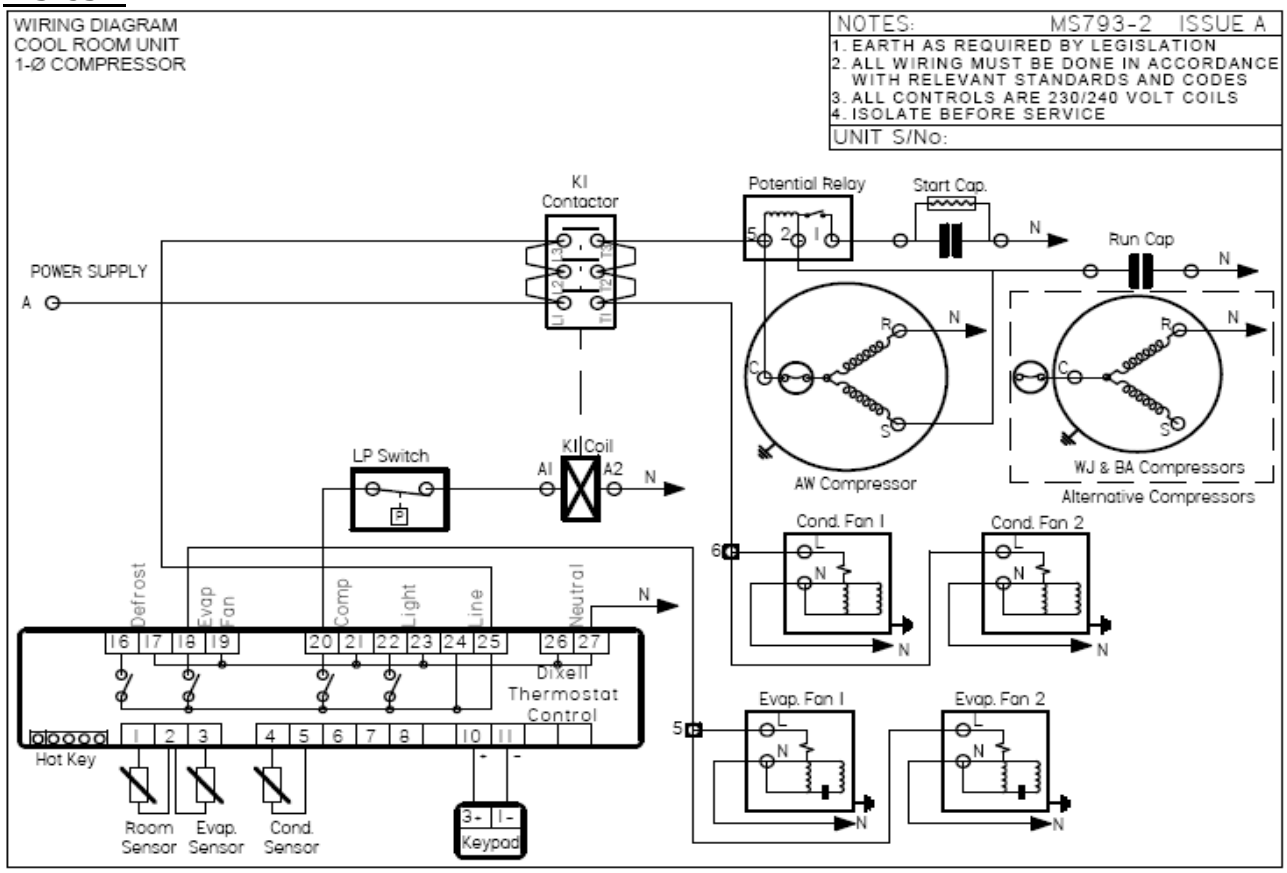

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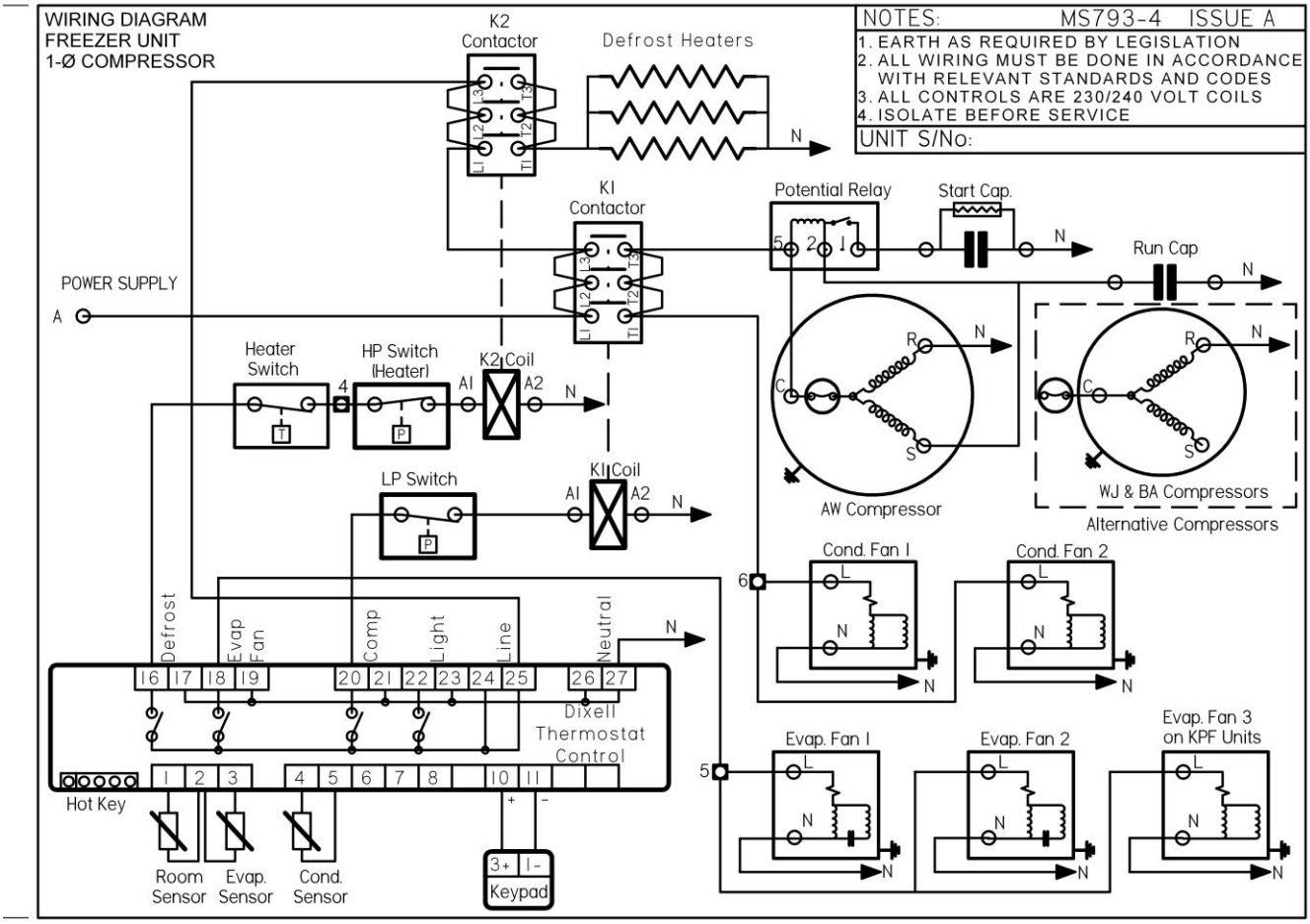

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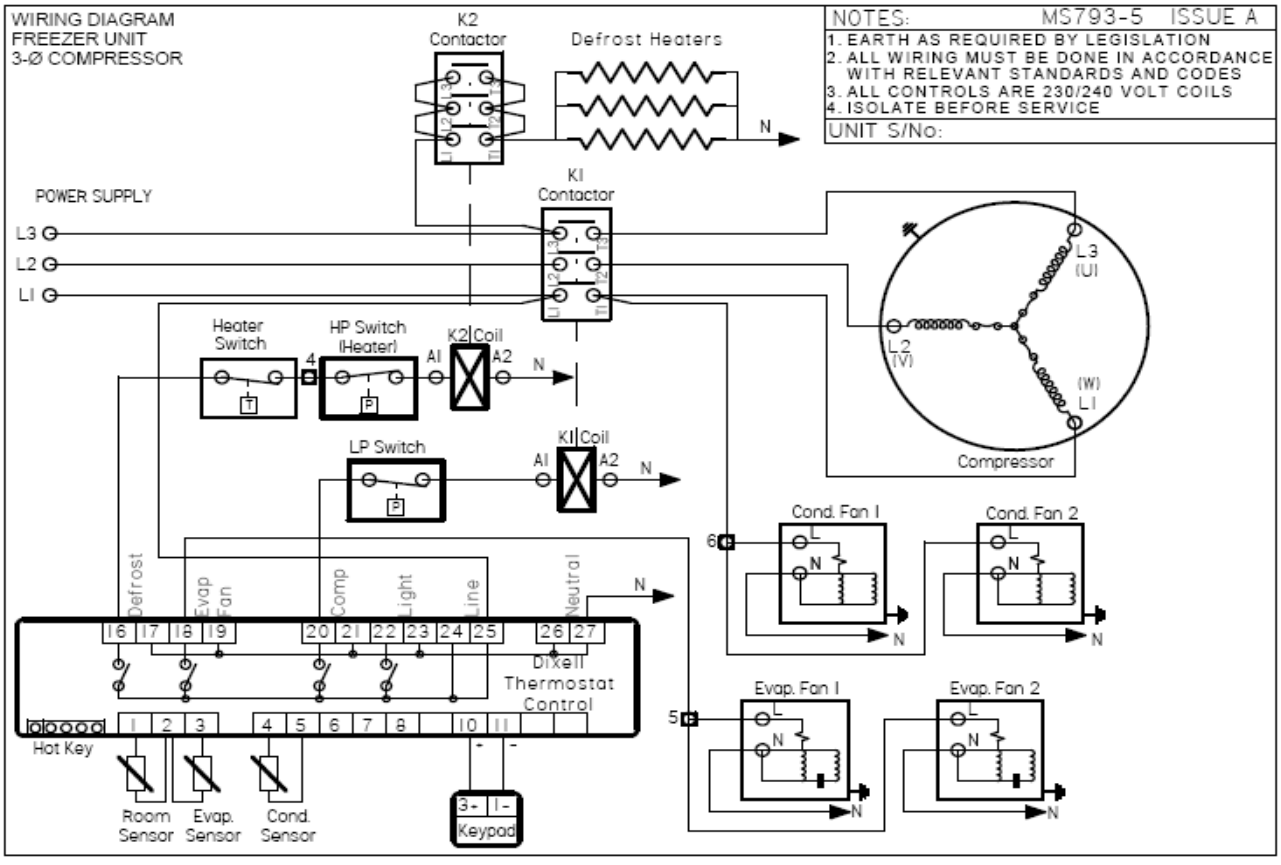

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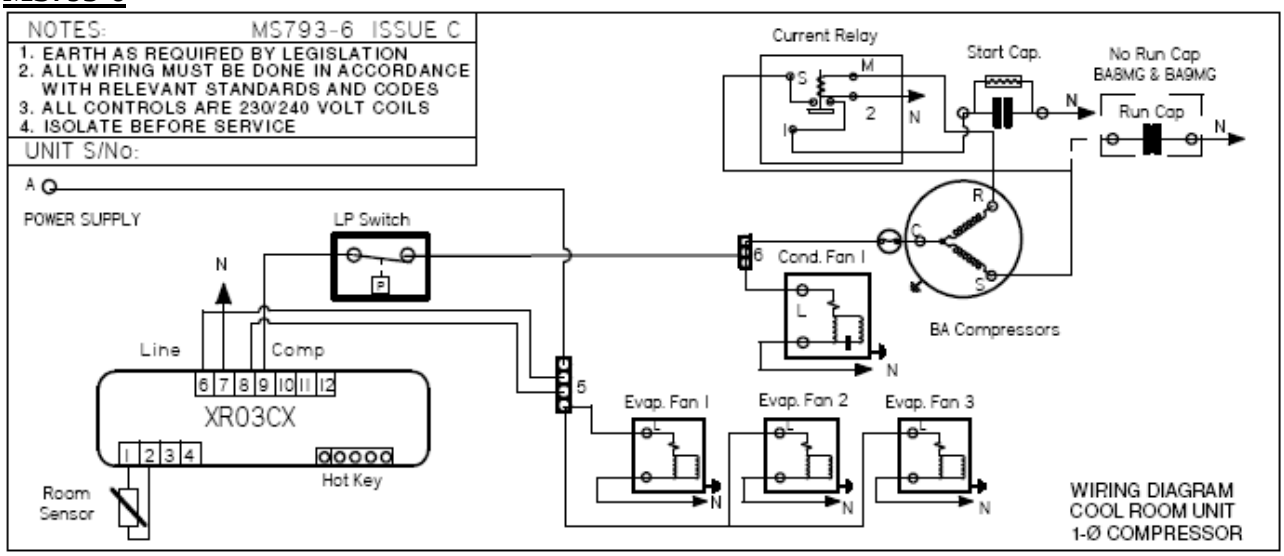

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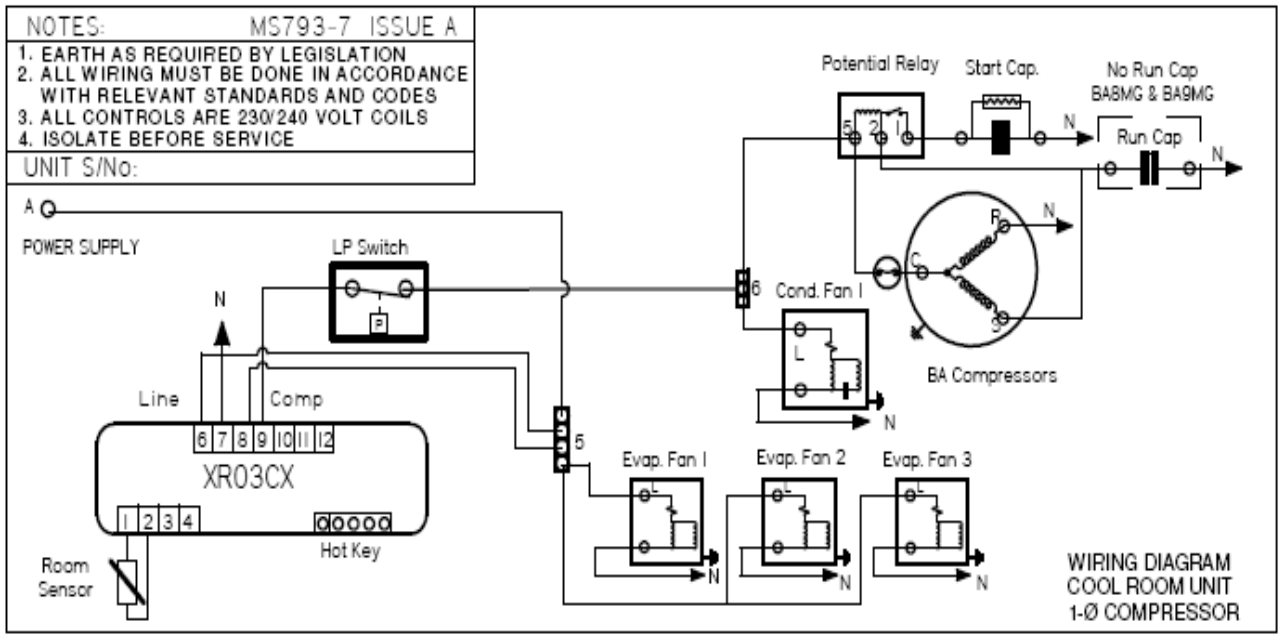

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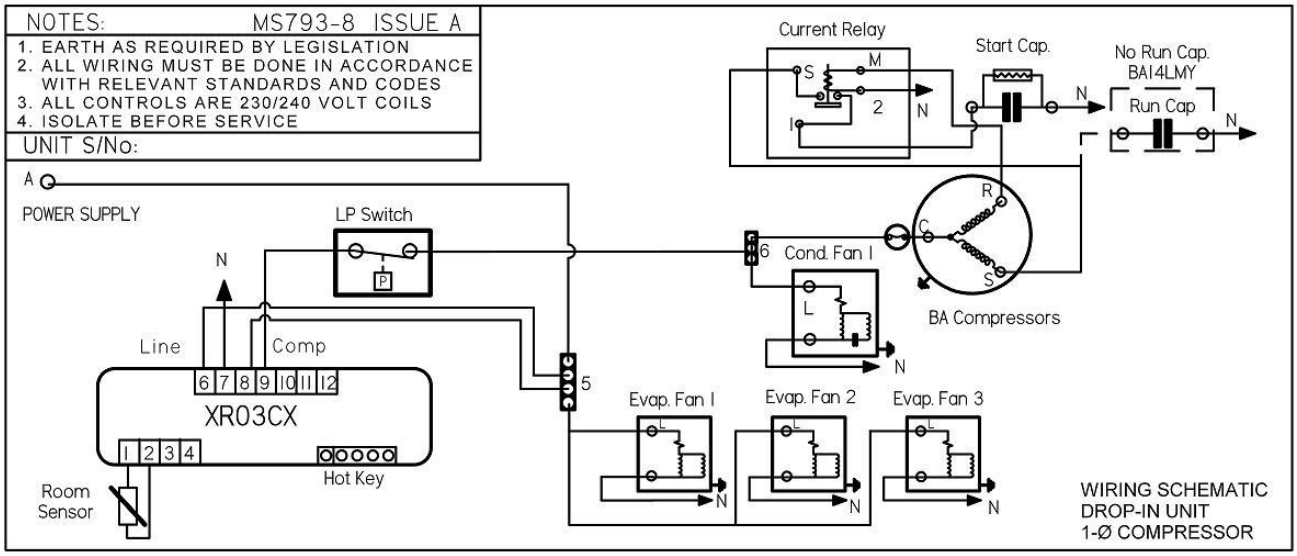

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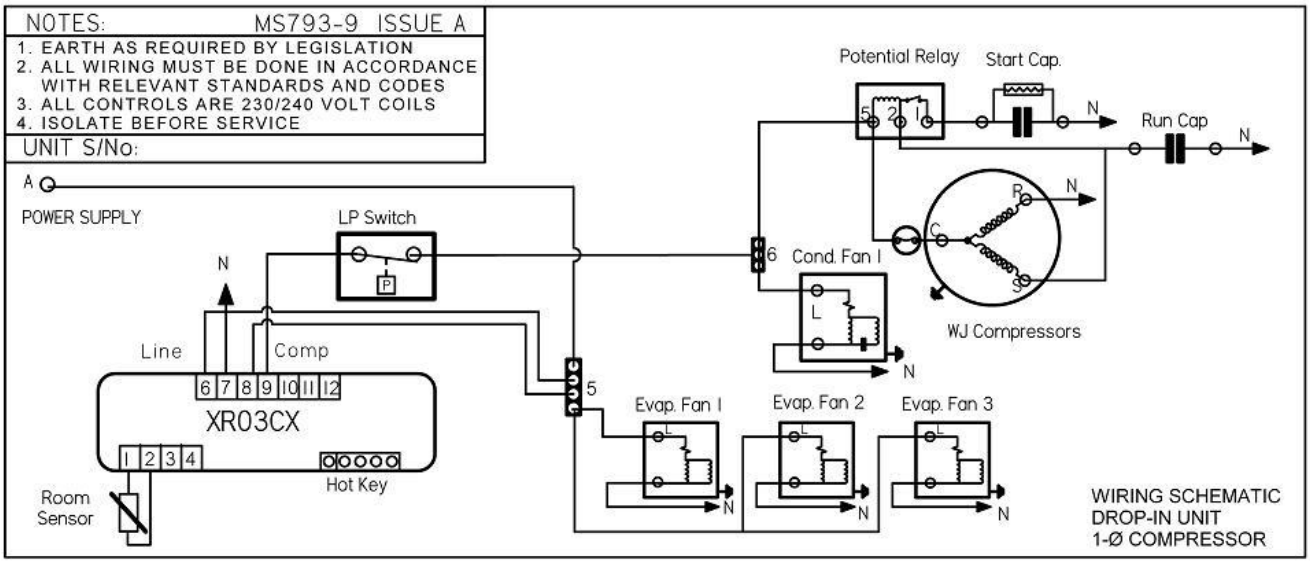

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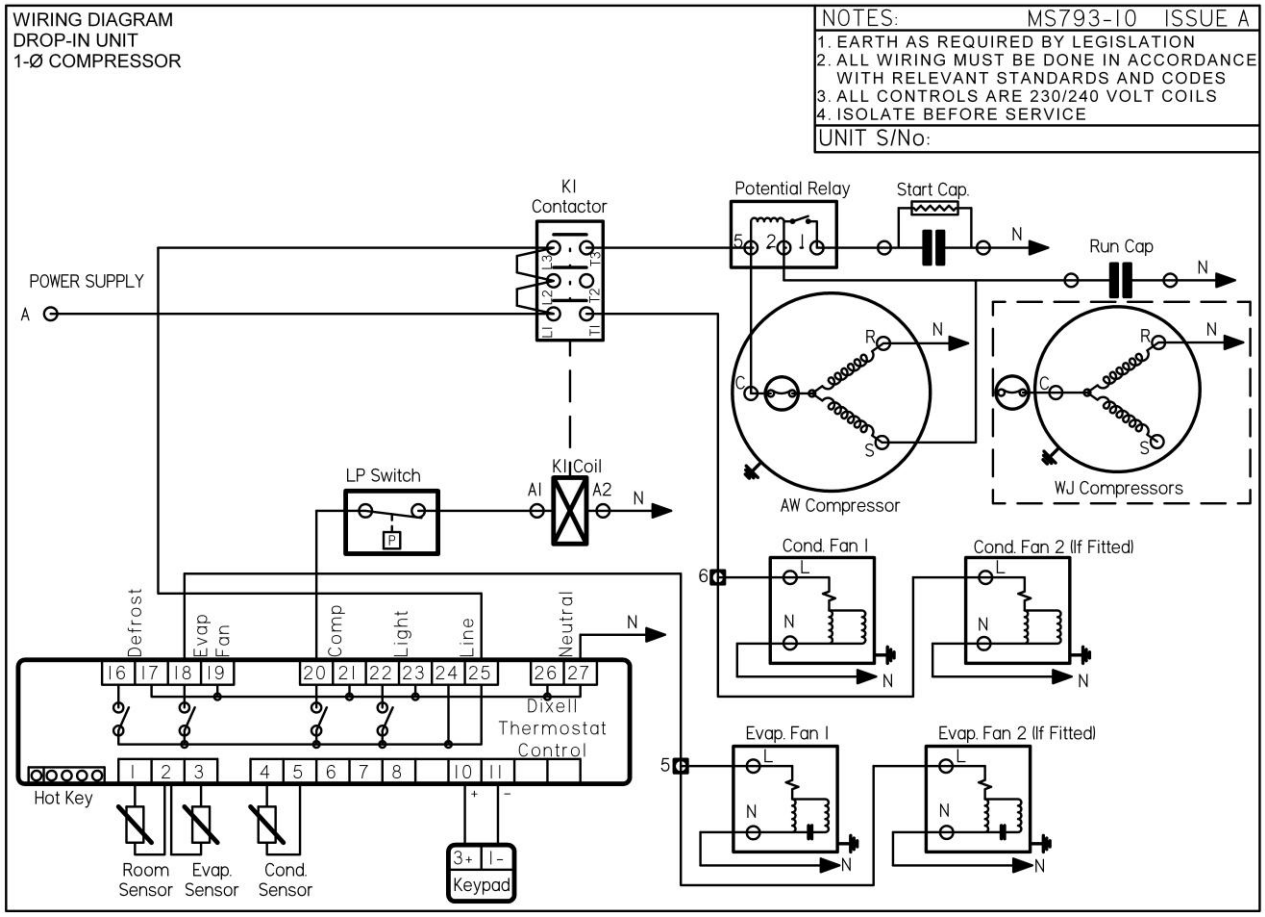

General Outline Drawing

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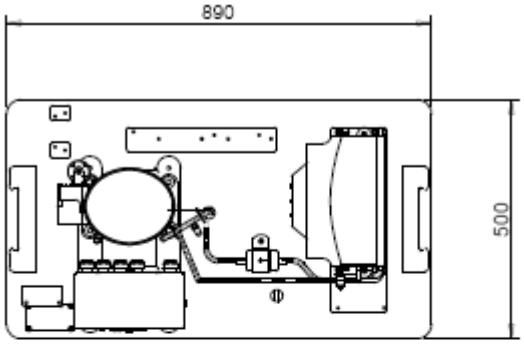

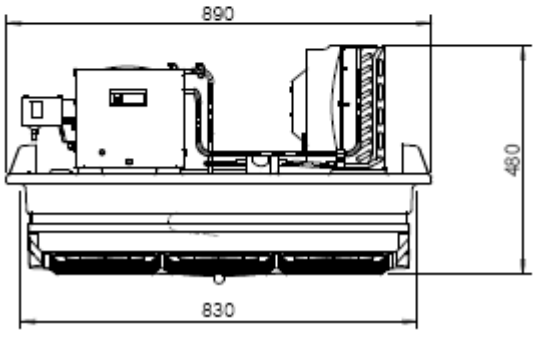

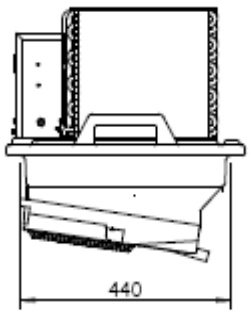

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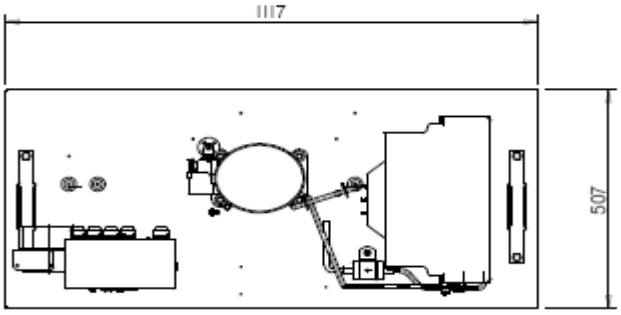

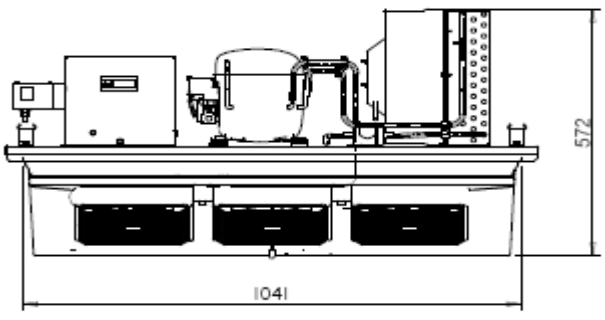

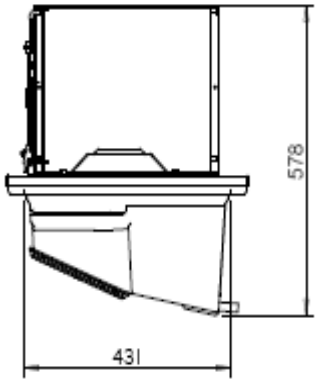

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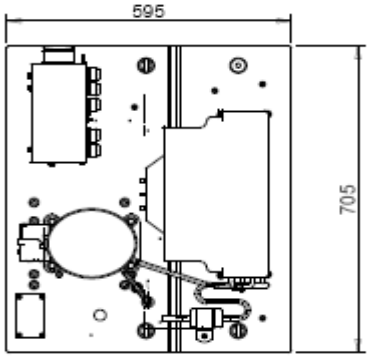

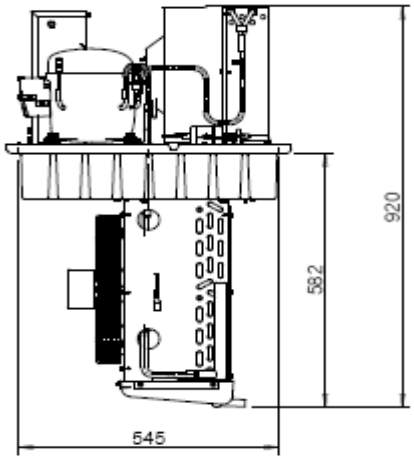

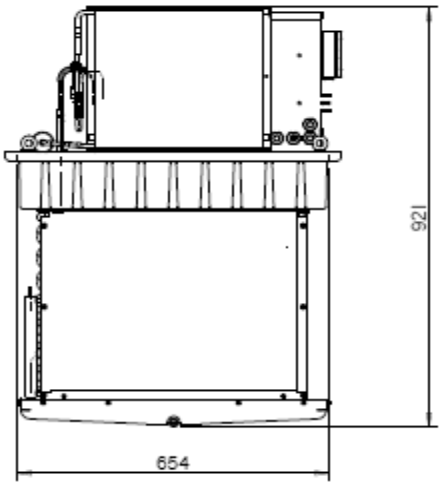

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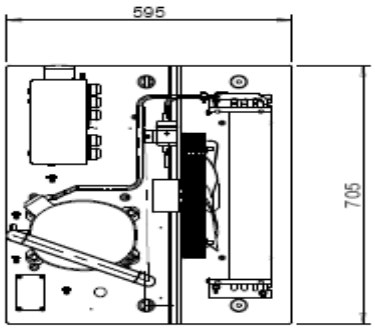

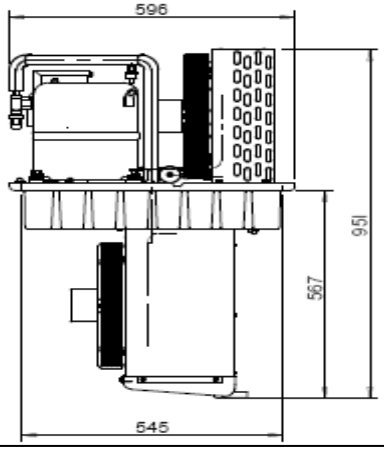

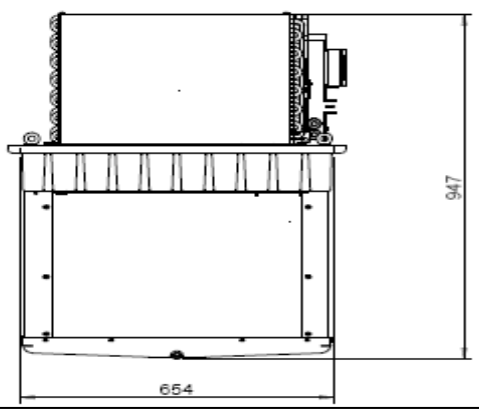

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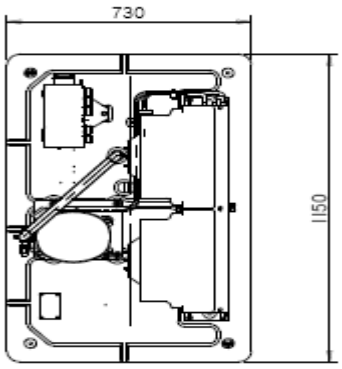
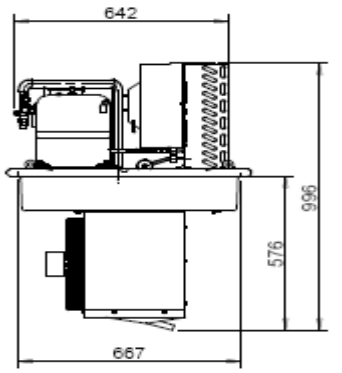
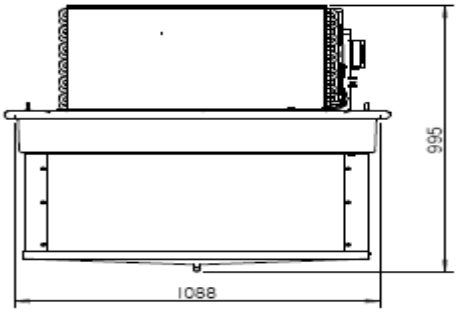
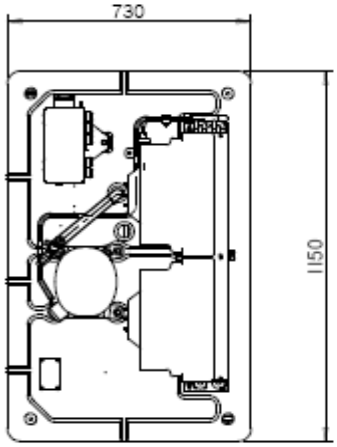
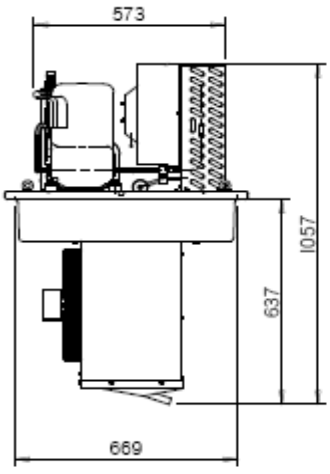


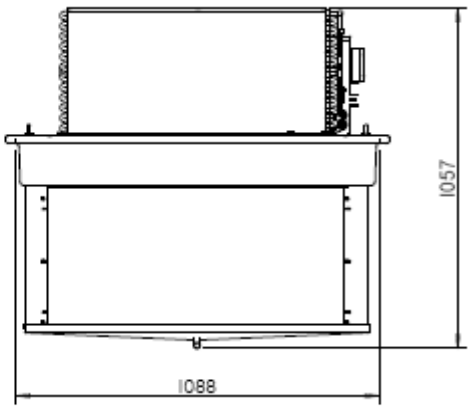




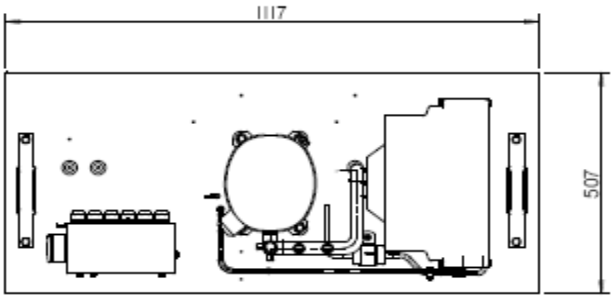
SK696-11

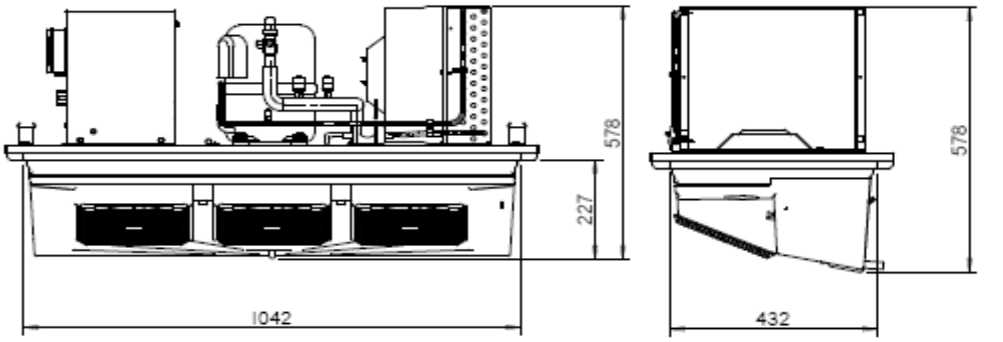




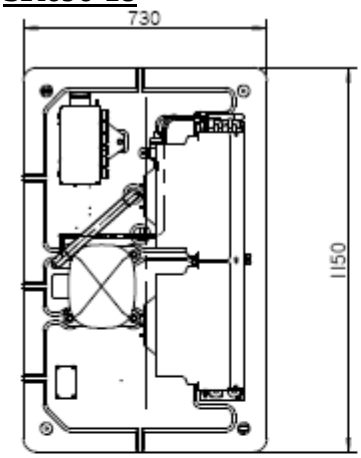


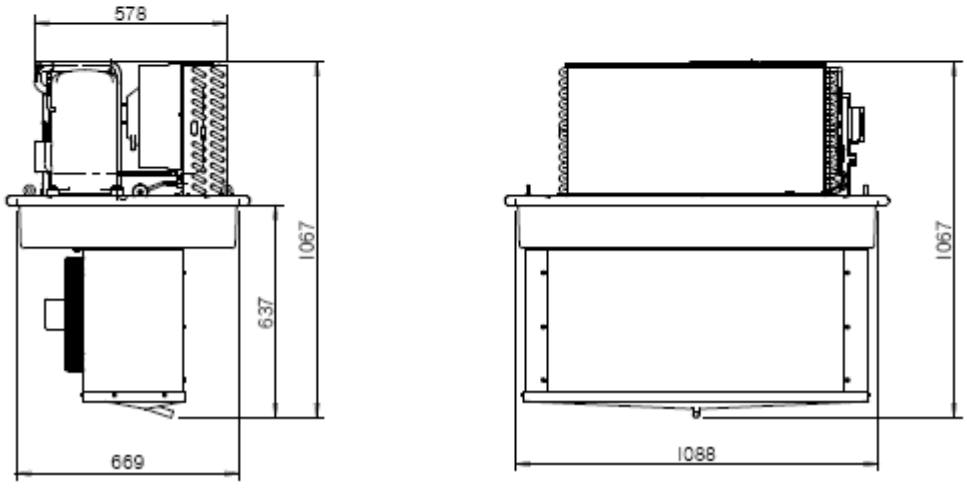
SK696-13





SK696-18





COMMISSIONING NOTES