

ENGINEERING  
TOMORROW

*Danfoss*

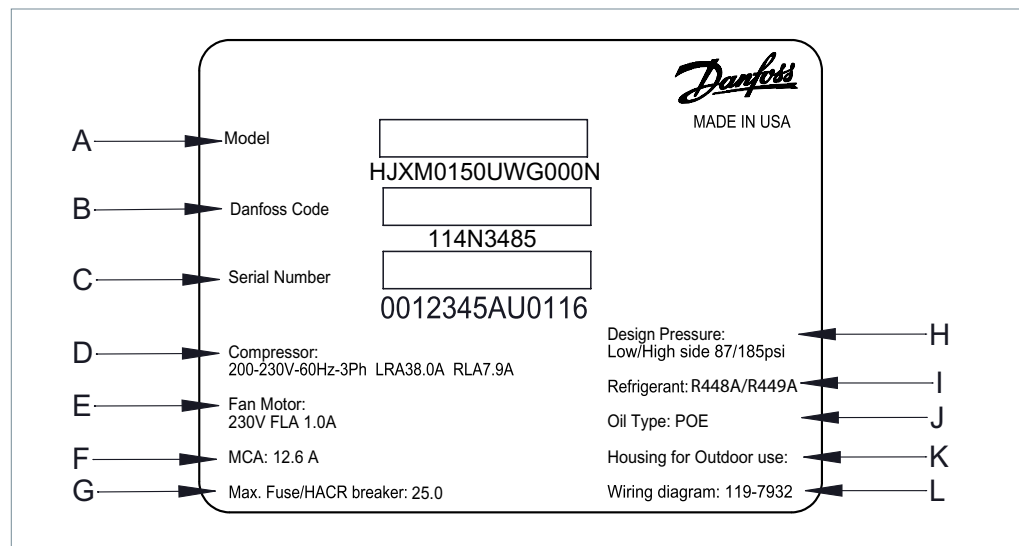
Manual

# Installation and maintenance condensing unit manual

OP-HJXM / HNXM / HRXM / LNYM / LRYM

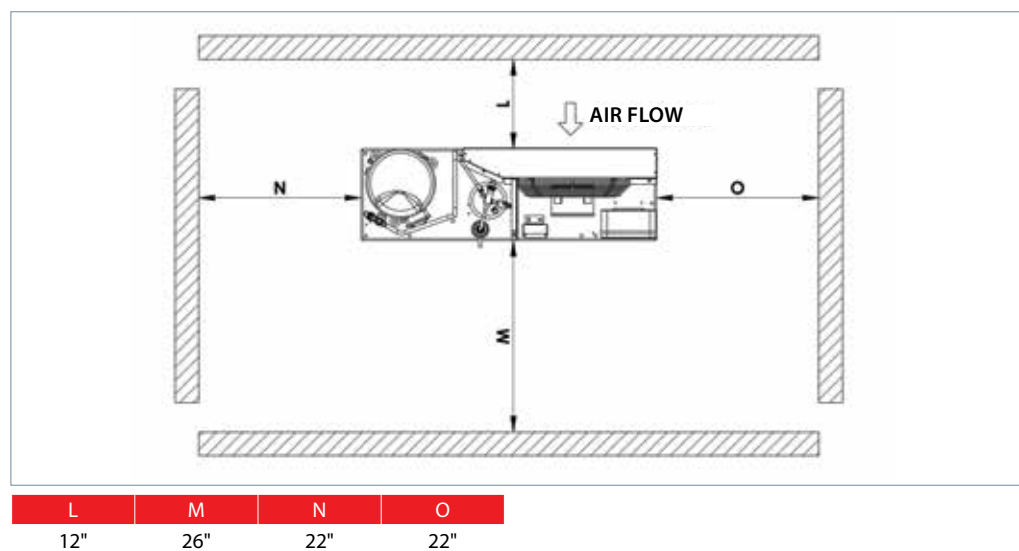


# Label



- A:** Model and bar code
- B:** Unit code and bar code
- C:** Serial number and bar code
- D:** Compressor voltage & Locked rotor amps & Rated load amps
- E:** Fan voltage & Full load amps
- F:** Min. Circuit Ampacity
- G:** Max. Fuse size
- H:** Design pressure
- I:** Refrigerant
- J:** Oil type
- K:** Outdoor housing
- L:** Wiring diagram

**Picture 1 : Minimum mounting distances**



## IMPORTANT

- 1 - Installation and maintenance of the condensing unit must be carried out by qualified personnel only. Follow these instructions and best practices on refrigeration engineering during installation, commissioning, maintenance and servicing tasks.
- 2 - The condensing unit must only be used for its designed purposes and within its scope of application.

- 3 - Under all circumstances, EN 378 (or any other applicable local safety regulation) requirements must be fulfilled.
- 4 - The condensing unit is delivered under nitrogen gas pressure (14.5psi) and hence it cannot be connected as it is; refer to the "Installation" section for further details.
- 5 - The condensing unit must be handled with caution in a vertical position (maximum offset from the vertical: 15°).

**Introduction**

These instructions pertain to OPTYMA™ condensing units (R507A, R404A, R134a, R448A, R449A) used for refrigeration systems.

They provide necessary information regarding safety and proper usage of this product.

**Handling and storage**

It is recommended not to open the packaging before the unit is at the final place for installation.

Handle the unit with care. The packaging allows the use of a forklift or pallet jack for handling. Use appropriate and safe lifting equipment.

- Store and transport the unit in an upright position.
- Store the unit between -30 °F and 120 °F.
- Don't expose the packaging to rain or corrosive atmosphere.
- After unpacking, check that the unit is complete and undamaged.

**Installation precautions**

- ⚠ Do not braze if the condensing unit is under pressure.
- ⚠ Never place the unit in a flammable atmosphere.
- ⚠ Place the unit in such a way that it is not blocking or hindering walking areas, doors, windows or similar.
- Ensure adequate space around the unit for air circulation and to open doors. Refer to picture 1 for minimal values of distance to walls.
- Avoid installing the unit in locations which are daily exposed to direct sunshine for longer periods.
- Avoid installing the unit in aggressive and/or dusty environments.
- Ensure a foundation with horizontal surface (less than 3° slope), strong and stable enough to carry the entire unit weight and to eliminate vibrations and interference.

- The unit ambient temperature may not exceed 120 °F during off-cycle.
- Ensure that the power supply corresponds to the unit characteristics (see nameplate).
- Use clean and dehydrated refrigeration-grade copper tubes and silver alloy brazing material.
- Use clean and dehydrated system components.
- The suction piping connected to the compressor must be flexible in 3 dimensions to dampen vibrations. Furthermore piping has to be done in such a way that oil return for the compressor is ensured and the risk of liquid slug over in compressor is eliminated.

**Installation**

- The unit must be securely installed on a stable and rigid support, and fix from the beginning.
- It is recommended to install the unit on rubber grommets or vibration dampers (not supplied).
- Slowly release the nitrogen holding charge through the Schraeder port.
- Connect the unit to the system as soon as possible to avoid oil contamination from ambient moisture.
- Avoid material entering into the system while cutting tubes. Never drill holes where burrs cannot be removed.
- Braze with great care using state-of-the-art techniques and vent piping with nitrogen gas flow.
- Connect the required safety and control devices. Remove the internal valve when using the Schraeder port for this.
- It is recommended to insulate the suction pipe up to the compressor inlet with 3/4" mm thick insulation.

## Fan speed controller

### ADJUSTING

(Fig.3)

Turn the range

Adjusting screw

to clockwise

(+) for increasing the setting value, and to counterclockwise (-) for decreasing the setting value.

(Please use the right chart as reference for adjusting.)

### ⚠ CAUTION

- Do not move the screw other than the Range Adjusting Screw.
- Do not apply torque that exceeds 0.35 Nm for adjusting screw. Otherwise it may damage part of resin case. Then range adjustment may not be possible.

### OPERATION CHECK

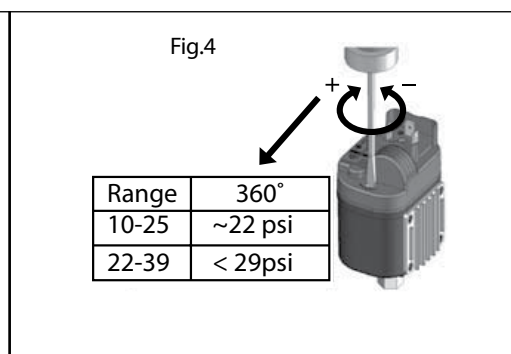
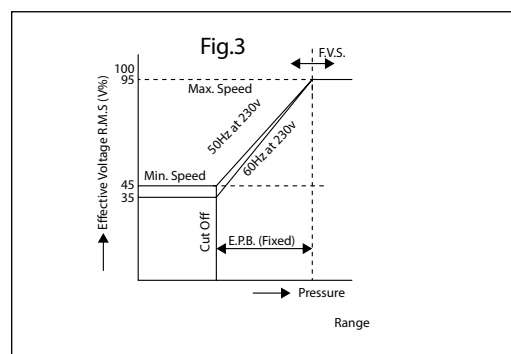
Install and calibrate the product correctly and the check its operation to confirm correct function of the whole system.

| Catalog No. | 1 Turn        |
|-------------|---------------|
| XGE-4*      | Approx, 22psi |
| XGE-6*      | Approx, 36psi |

### ⚠ CAUTION

- It can not be used for ammonia refrigeration system.
- This product is not available for the system which apply pressure more than 681psi (47bar) because the rated maximum working pressure of this product is 681psi (47bar) if the pressure more than the rated maximum working pressure is applied to this product, it causes transformation of characteristics or the destruction. Operation will become unstable when using other than sine waves for the power supply. In this case, proper control may not be achieved.
- To ensure stable operation, sine wave AC power supply must also be stable.

| F.V.S Setting psi(bar) |                 |             | E.P.B.<br>psi<br>(bar) |
|------------------------|-----------------|-------------|------------------------|
| Factory<br>Set         | Adjusting Range |             |                        |
|                        | Min.            | Max.        |                        |
| 276<br>(19)            | 116<br>(8)      | 363<br>(25) | Fixed 87<br>(6)        |



F.V.S.: Full Voltage Set point

The pressure at which the control delivers 95% output effective voltage. (R.M.S.(V%))

E.P.B.: Effective Proportional Band

The decrease in pressure below the calibration set point required to transmit a 45% of effective voltage. (R.M.S.(V%))

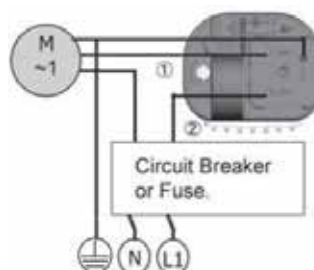
# **Fan speed controller failure**

(If FSC fails, it is possible to run the fan motor full speed)

1. Disconnect the condensing unit from power supply.
2. Remove wire 1 from FSC.
3. Remove wire 2 from FSC.

4. Connect both wires together.
5. Make sure the connection is well insulated and not exposed to rain or in contact with, metallic parts.
6. Connect the condensing unit back to power supply.

Fig.6



# **Leak detection**

- ⚠ Never pressurize the circuit with oxygen or dry air. This could cause fire or explosions.
- Do not use dye for leak detection.
- Perform a leak detection test on the complete system.

- The maximum test pressure is 465psi.
- When a leak is discovered, repair the leak and repeat the leak detection test.

# **Vacuum dehydration**

- Never use the compressor to evacuate the system.
- Connect a vacuum pump to both the LP and HP sides.

- Pull down the system under a vacuum of 500  $\mu$ m Hg (9.7psi) absolute.
- Do not use an ohmmeter nor apply power to the compressor while it is under vacuum as this may cause internal damage.

| Manual                                   | Installation & Maintenance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Electrical connections</b>            | <ul style="list-style-type: none"> <li>• Switch off the system and isolate the main power supply.</li> <li>• Ensure that power supply cannot be switched on during installation.</li> <li>• All electrical components must be selected as per local standards and unit requirements.</li> <li>• Refer to wiring diagram for electrical connections details.</li> <li>• Ensure that the power supply corresponds to the unit characteristics and that the power supply is stable (nominal voltage <math>\pm 10\%</math> and nominal frequency <math>\pm 2.5\text{ Hz}</math>).</li> <li>• Dimension the power supply cables according to unit data for voltage and current.</li> <li>• Protect the power supply and ensure correct earthing.</li> </ul> | <ul style="list-style-type: none"> <li>• Make the power supply according to local standards and legal requirements.</li> <li>• The unit includes high and low-pressure switches which, when activated, cut the power supply to the compressor. Parameters for high and low-pressure cut-outs are to be adjusted by the installer, depending on the compressor model, refrigerant and application. For units with a 3-phase scroll compressor, correct phase sequence for compressor rotation direction shall be observed.</li> <li>• Determine the phase sequence by using a phase meter to establish the phase order of line phases L1, L2 and L3.</li> <li>• Connect line phases L1, L2 and L3 to main switch terminals T1, T2 and T3, respectively.</li> </ul> |
| <b>Filling the system</b>                | <ul style="list-style-type: none"> <li>• Wear protective stuff like goggles and protective gloves.</li> <li>• Never start the compressor under vacuum. Keep the compressor switched off.</li> <li>• Before charging the refrigerant, verify that the oil level is visible in the oil sight glass and between 25% to 75% full.</li> <li>• Use only the refrigerant for which the unit is designed for.</li> <li>• Fill the refrigerant in liquid phase into the condenser or liquid receiver. Ensure a slow</li> </ul>                                                                                                                                                                                                                                  | <p>charging of the system to 58 - 70psi for R404A/ R507A or R22, and approx. 30psi for R134a.</p> <ul style="list-style-type: none"> <li>• Do not put liquid refrigerant through the suction line.</li> <li>• It is not allow to mix additives with the oil and/or refrigerant.</li> <li>• The remaining charge is done until the installation has reached a level of stable nominal condition during operation.</li> <li>• Never leave the filling cylinder connected to the circuit.</li> </ul>                                                                                                                                                                                                                                                                 |
| <b>Verification before commissioning</b> | <p>⚠ Use safety devices (such as safety pressure switches and mechanical relief valves) in compliance with both generally and locally applicable regulations and safety standards. Make sure that the devices are operational and properly set.</p> <p>⚠ Check that the settings of high-pressure switches and relief valves don't exceed the maximum service pressure of any system component.</p>                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>• Verify that all electrical connections are properly fastened and in compliance with local regulations.</li> <li>• When a crankcase heater is required, it must be energized at least 12 hours before initial start-up and start-up after prolonged shut-down or belt type crankcase heaters.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Start-up</b>                          | <ul style="list-style-type: none"> <li>• Never start the unit when no refrigerant is charged.</li> <li>• All service valves must be in the open position.</li> <li>• Check compliance between unit and power supply.</li> <li>• Check that the crankcase heater is working.</li> <li>• Check that the fan can rotate freely.</li> <li>• Check that the protection sheet has been removed from the backside of condenser.</li> <li>• Balance the HP/LP pressure.</li> <li>• Energize the unit. It must start promptly. If the compressor does not start, check wiring conformity, voltage on terminals and sequence phase.</li> </ul>                                                                                                                   | <ul style="list-style-type: none"> <li>• Eventual reverse rotation of a 3-phase compressor can be detected by the following phenomena: unit doesn't start, the compressor doesn't build up pressure, it has abnormally high sound level and abnormally low power consumption. In such case, shut down the unit immediately and connect the phases to their proper terminals.</li> <li>• If the rotation direction is correct, the low-pressure gauge shall show a declining pressure and the high-pressure gauge shall show an increasing pressure.</li> </ul>                                                                                                                                                                                                    |

| Manual                          | Installation & Maintenance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Checks with running unit</b> | <ul style="list-style-type: none"> <li>• Check the fan rotation direction. Air must flow from the condenser towards the fan.</li> <li>• Check current draw and voltage.</li> <li>• Check suction superheat to reduce risk of slugging.</li> <li>• When a sight glass is provided, observe the oil level at start and during operation to confirm that the oil level remains visible.</li> <li>• Respect the operating limits.</li> <li>• Check all tubes for abnormal vibration. Movements in excess of 0.06in require corrective measures, such as tube brackets.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>• When needed, additional refrigerant in the liquid phase may be added in the low-pressure side as far as possible from the compressor. The compressor must be operating during this process.</li> <li>• Do not overcharge the system.</li> <li>• Never release refrigerant to the atmosphere.</li> <li>• Before leaving the installation site, carry out a general installation inspection regarding cleanliness, noise and leak detection.</li> <li>• Record type and amount of refrigerant charge, as well as operating conditions as a reference for future inspections.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Maintenance</b>              | <p>▲ Always switch off the unit at main switch before removing the fan panel.</p> <p>▲ Internal pressures and surface temperatures are dangerous and may cause permanent injury.</p> <p>▲ Maintenance operators and installers require appropriate skills and tools. Tubing temperature may exceed 200 °F and therefore cause severe burns.</p> <p>▲ Ensure that periodic service inspections to ensure system reliability and as required by local regulations are performed.</p> <p>To prevent system related problems, following periodic maintenance is recommended:</p> <ul style="list-style-type: none"> <li>• Verify that safety devices are operational and properly set.</li> <li>• Ensure that the system is leak tight.</li> <li>• Check the compressor current draw.</li> <li>• Confirm that the system is operating in a way consistent with previous maintenance records and ambient conditions.</li> <li>• Check that all electrical connections are still adequately fastened.</li> <li>• Keep the unit clean and verify the absence of rust and oxidation on the unit components, tubes and electrical connections.</li> </ul> | <p>The condenser must be checked at least once a year for clogging and be cleaned if deemed necessary. Access to the internal side of the condenser takes place through the fan panel. Microchannel coils tend to accumulate dirt on the surface rather than inside, which makes them easier to clean than fin-&amp;-tube coils.</p> <ul style="list-style-type: none"> <li>• Switch off the unit at main switch before removing any panel from the condensing unit.</li> <li>• Remove surface dirt, leaves, fibers, etc. with a vacuum cleaner, equipped with a brush or other soft attachment. Alternatively, blow compressed air through the coil from the inside out, and brush with a soft bristle. Do not use a wire brush. Do not impact or scrape the coil with the vacuum tube or air nozzle.</li> </ul> <p>If the refrigerant system has been opened, the system has to be flushed with dry air or nitrogen to remove moisture and a new filter drier has to be installed. If evacuation of refrigerant has to be done, it shall be done in such a way that no refrigerant can escape to the environment.</p> |
| <b>Maintenance</b>              | <p>Always transmit the model number and serial number with any claim filed regarding this product.</p> <p>The product warranty may be void in following cases:</p> <ul style="list-style-type: none"> <li>• Absence of nameplate.</li> <li>• External modifications; in particular, drilling, welding, broken feet and shock marks.</li> <li>• Compressor opened or returned unsealed.</li> <li>• Rust, water or leak detection dye inside the compressor.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"> <li>• Use of a refrigerant or lubricant not approved by Danfoss.</li> <li>• Any deviation from recommended instructions pertaining to installation, application or maintenance.</li> <li>• Use in mobile applications.</li> <li>• Use in explosive atmospheric environment.</li> <li>• No model number or serial number transmitted with the warranty claim.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Disposal</b>                 |  <p>Danfoss recommends that condensing units and oil should be recycled by a suitable company at its site.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

**MBP**

| Unit     | Dimensions [in] |               |              |               |              |             |
|----------|-----------------|---------------|--------------|---------------|--------------|-------------|
|          | Fig.            | Height H [in] | Width W [in] | Length D [in] | Suction line | Liquid line |
| HJXM0150 | 1               | 19.5          | 43.5         | 13.4          | 5/8"         | 3/8"        |
| HNXM0200 | 1               | 22.4          | 47.4         | 16.5          | 7/8"         | 1/2"        |
| HNXM0250 | 1               | 22.4          | 47.4         | 16.5          | 7/8"         | 1/2"        |
| HNXM0300 | 1               | 22.4          | 47.4         | 16.5          | 7/8"         | 1/2"        |
| HNXM0350 | 1               | 28.2          | 47.4         | 16.5          | 7/8"         | 1/2"        |
| HNXM0400 | 1               | 28.2          | 47.4         | 16.5          | 7/8"         | 1/2"        |
| HRXM0500 | 2               | 28.8          | 49.4         | 31.5          | 7/8"         | 1/2"        |
| HRXM0600 | 2               | 28.8          | 49.4         | 31.5          | 7/8"         | 1/2"        |
| HRXM0700 | 2               | 28.8          | 49.4         | 31.5          | 7/8"         | 1/2"        |
| HRXM0750 | 2               | 39.1          | 61.2         | 31.5          | 1 1/8"       | 5/8"        |
| HRXM1000 | 2               | 39.1          | 61.2         | 31.5          | 1 1/8"       | 5/8"        |

**LBP**

| Unit      | Dimensions [in] |               |              |               |              |             |
|-----------|-----------------|---------------|--------------|---------------|--------------|-------------|
|           | Fig.            | Height H [in] | Width W [in] | Length D [in] | Suction line | Liquid line |
| LN YM0400 | 1               | 28.2          | 47.4         | 16.5          | 7/8"         | 1/2"        |
| LN YM0500 | 1               | 28.2          | 47.4         | 16.5          | 7/8"         | 1/2"        |
| LR YM0600 | 2               | 28.8          | 49.4         | 31.5          | 1 1/8"       | 1/2"        |
| LR YM0800 | 2               | 28.8          | 49.4         | 31.5          | 1 1/8"       | 1/2"        |

Figure 1

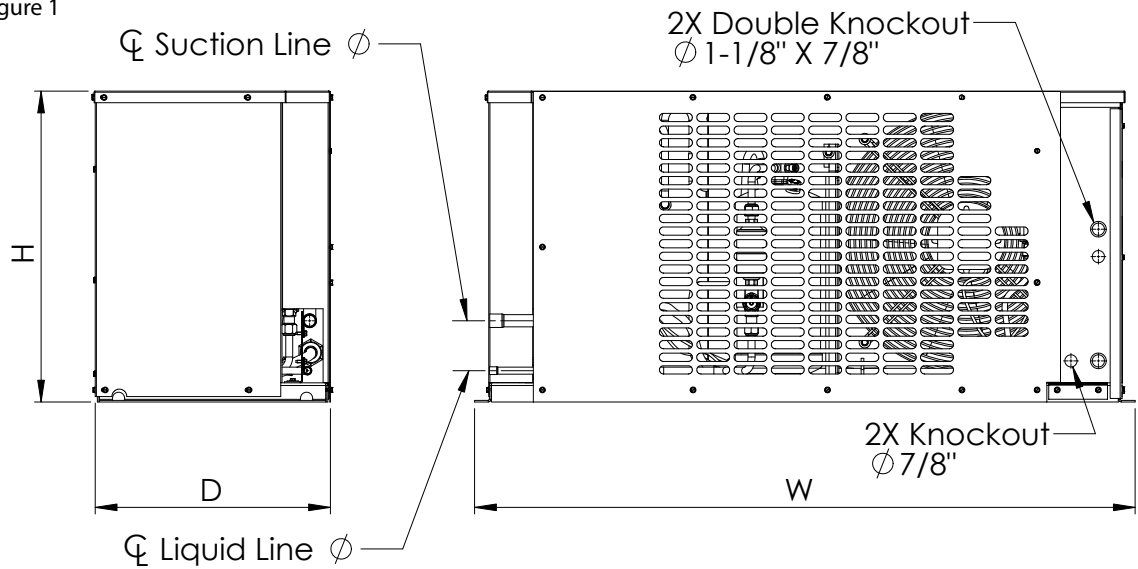
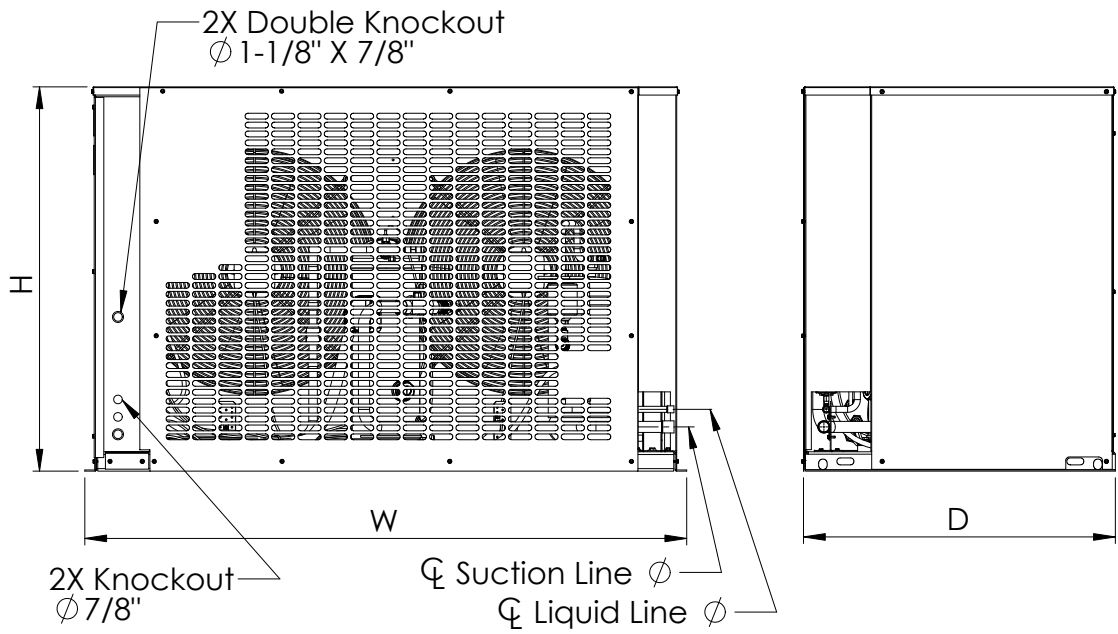
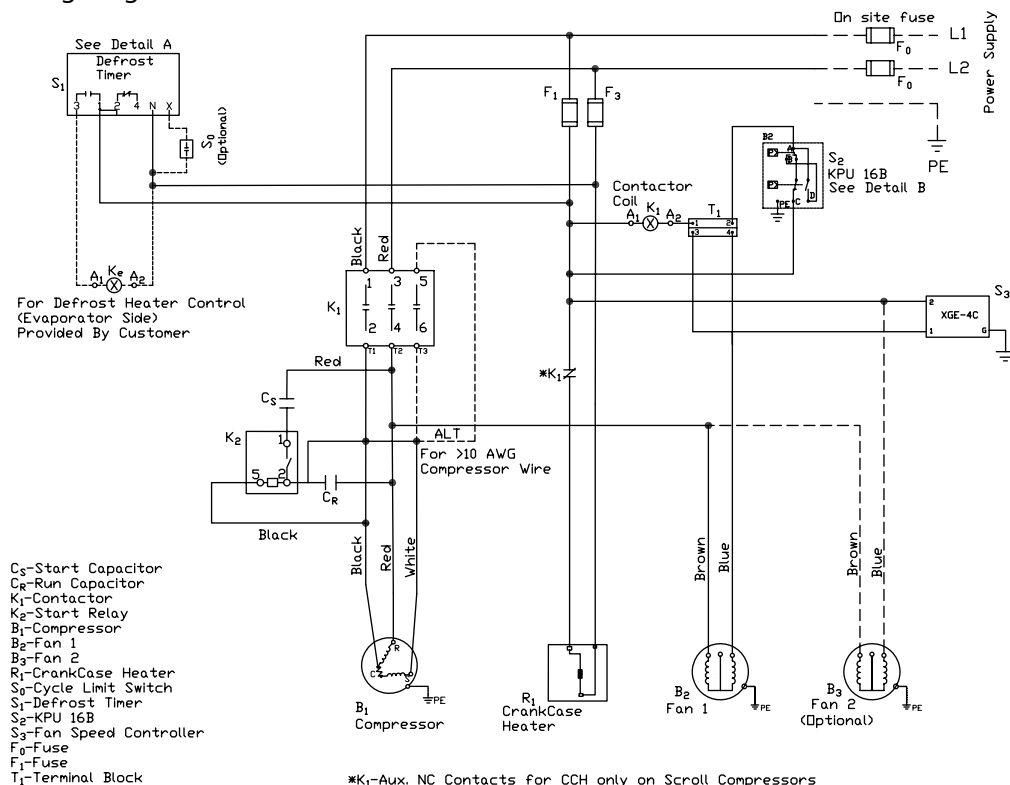


Figure 2



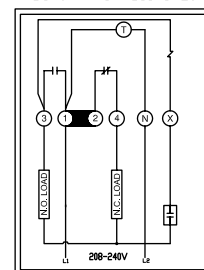
Electrical Code N: HJXM0150, HNXM0200-0400, HRXM0500

Wiring Diagram 119-8312

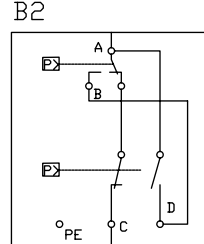


119-8312  
230V 1Ph 60Hz

Detail A of G8145-20

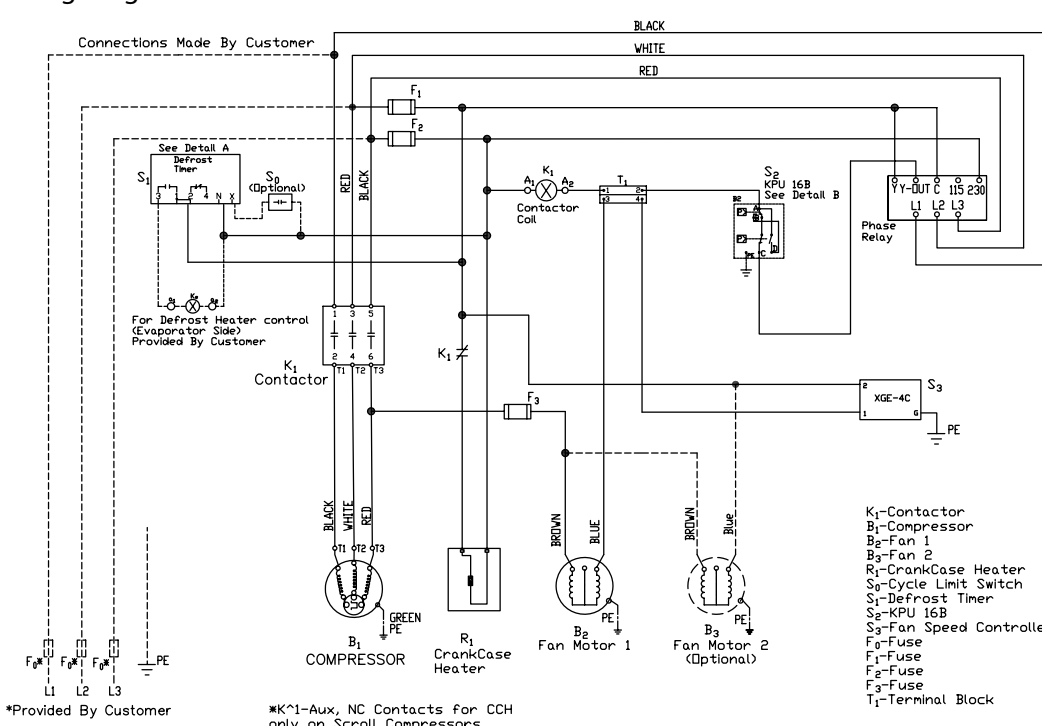


Detail B of KPU 16B



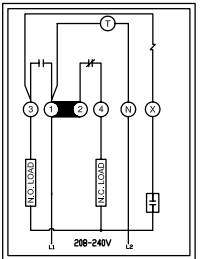
Electrical Code Q: HNXM0200-0400, HRXM0500-1000

Wiring Diagram 119-8313

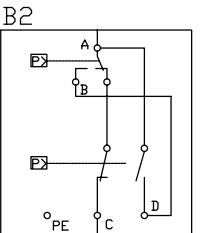


119-8313  
230V 3PH 60Hz

Detail A of G8145-20

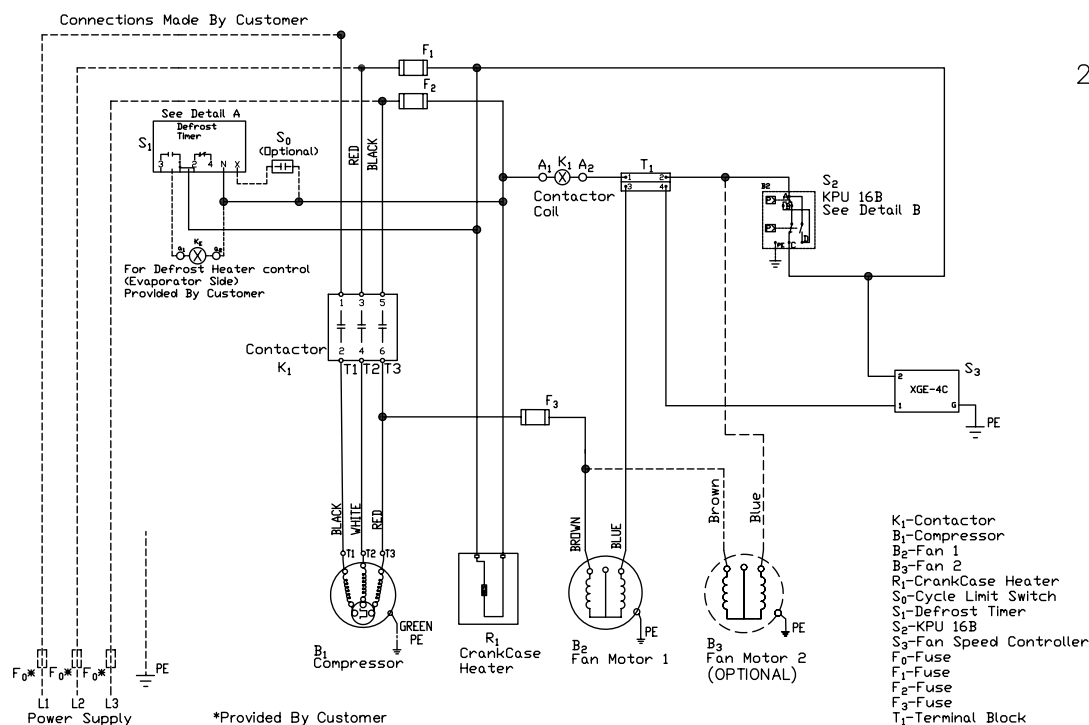


Detail B of KPU 16B



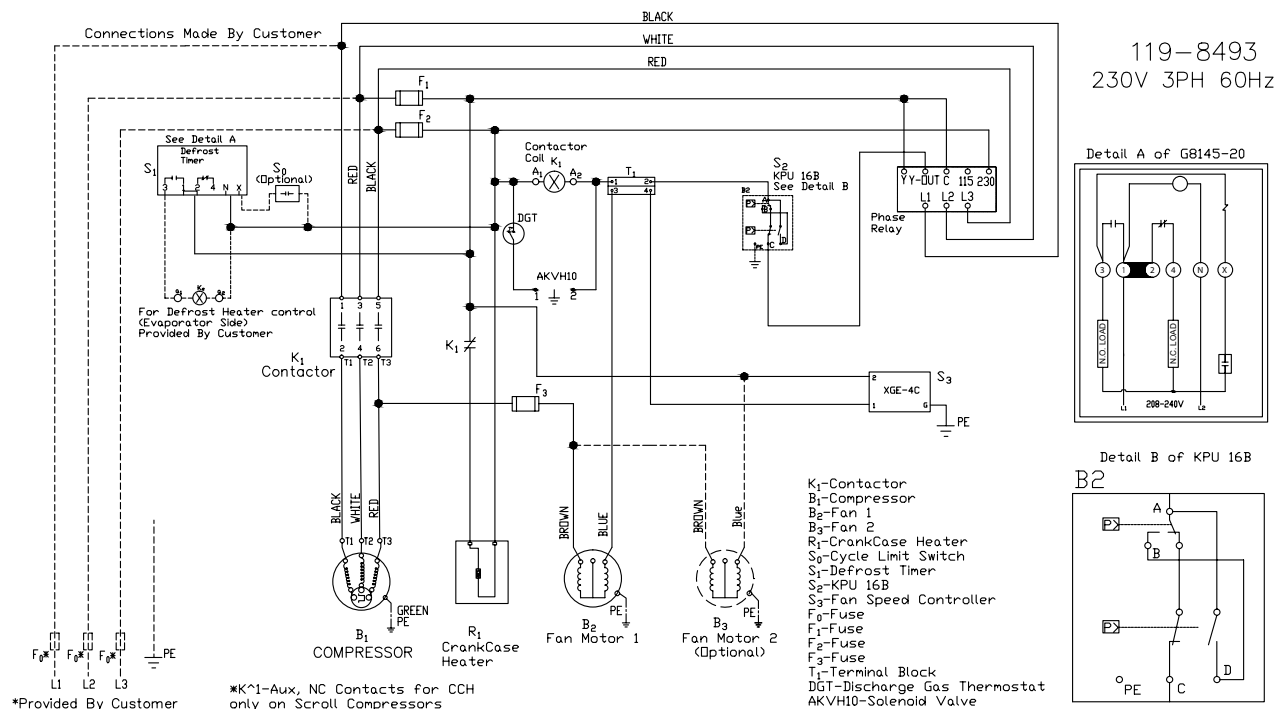
Electrical Code Q: HJXM0150

Wiring Diagram 119-8315



Electrical Code Q: LNYM0400-0500, LRYM0600-0800

Wiring Diagram 119-8493



# Danfoss Commercial Compressors

is a worldwide manufacturer of compressors and condensing units for refrigeration and HVAC applications. With a wide range of high quality and innovative products we help your company to find the best possible energy efficient solution that respects the environment and reduces total life cycle costs.

We have 40 years of experience within the development of hermetic compressors which has brought us amongst the global leaders in our business, and positioned us as distinct variable speed technology specialists. Today we operate from engineering and manufacturing facilities spanning across three continents.



Danfoss Scrolls



Danfoss Inverter Scrolls



Danfoss Light Commercial Refrigeration Compressors



Danfoss Maneurop Reciprocating Compressors



Danfoss Turbocor Compressors



Danfoss Optyma Condensing Units

Our products can be found in a variety of applications such as rooftops, chillers, residential air conditioners, heatpumps, coldrooms, supermarkets, milk tank cooling and industrial cooling processes.

[www.danfoss.us/aftermarket](http://www.danfoss.us/aftermarket)



119-8385B

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