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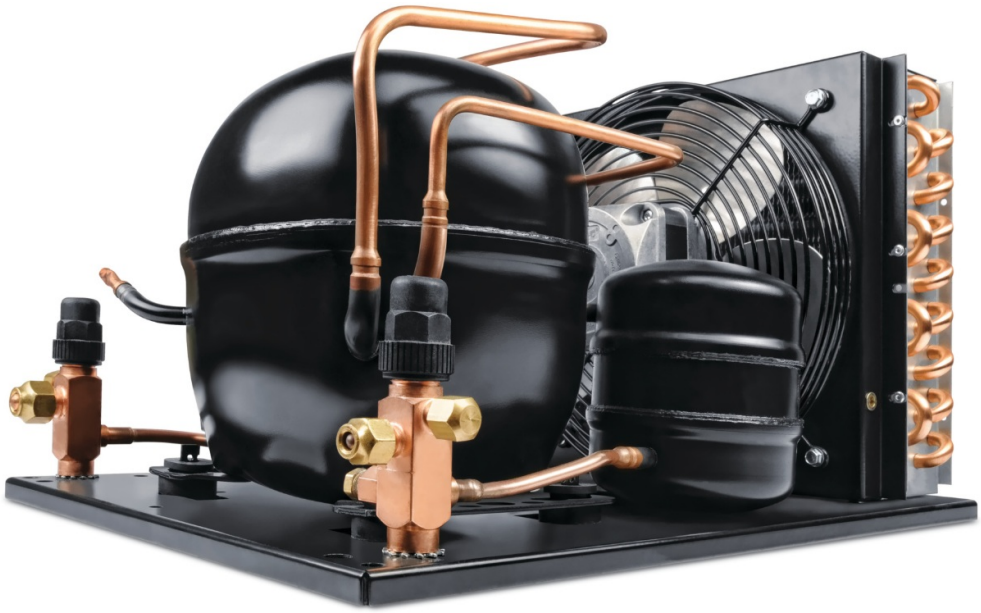
Danfoss R290 Optyma Condensing Units



Specifications

- **Model**: OptymaTM R290
- **Model Numbers**: OP-LGNM0100RWA000N, OP-LGNM0120RWA000N, OP-LGNM0140RWA000N, OP-LGNM0150RWA000N
- **Electrical Diagram Code N**: 230V / 1 Ph / 60 Hz
- **Dimensions (W x H x D):** 28.07″ x 11.81″ x 13.78″ (713mm x 300mm x 350mm)

Warnings

- The condensing unit must only be used for its designed purpose(s) and within its scope of application.
- Under all circumstances, the ASHRAE15 or UL60335 (or other applicable local safety regulation) requirements must be fulfilled.
- The condensing unit is delivered under nitrogen gas pressure (1 bar), and hence it cannot be connected as it is; refer to the «installation» section for further details.
- It does not contain refrigerant on delivery.
- The condensing unit must be handled with caution in the vertical position (maximum offset from the vertical: 15°)
- Installation and servicing of the condensing units by qualified personnel only. Follow these instructions and sound refrigeration engineering practice relating to installation, commissioning, maintenance, and service.
- This product is designed to be integrated into an Indoor End-Product as a Refrigerated display case. Any different Application shall be according withthe the UL

Standard or comply with National Regulations. The installation of the condensing unit in a refrigeration system is the responsibility of the system designer.

Introduction

These instructions pertain to Optyma condensing units (R290) used for refrigeration systems. They provide necessary information regarding safety and proper usage of this product. The condensing unit includes the following:

- Reciprocating Compressor
- Microchannel heat exchanger
- EC Fan Motor
- Filter Drier

Handling and storage

- It is recommended not to open the packaging before the unit is in its final place for installation.
- Handle the unit with care. The packaging allows for the use of a forklift or pallet jack. Use appropriate and safe lifting equipment.
- Store and transport the unit in an upright position.
- Don’t expose the packaging to rain or a corrosive atmosphere.
- Store the unit between -31°F to 122°F (-35°C to 50°C).
- After unpacking, check that the unit is complete and undamaged.

Installation precautions

Warning: Do not braze as long as the condensing unit is under pressure.
Warning: A brazed or welded connection shall be made before opening the valves to permit refrigerant to flow between the refrigerating system parts.
Warning: Never place the unit in a flammable atmosphere.
Warning: Place the unit in such a way that it does not block or hinder walking areas, doors, windows, or similar.

- The installation instructions shall be installed by the Safety Standard for Refrigeration Systems, ANSI/ASHRAE 15, or in Compliance with National Regulations.

- The Installation shall include protection from physical damage in operation and service and comply 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 before being covered or enclosed.
- Ensure adequate space around the unit for air circulation.
- Avoid installing the unit in aggressive and dusty environments.
- Ensure a foundation with a 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 122°F (50°C) during off-cycle.
- Ensure that the power supply corresponds to the unit characteristics (see nameplate).
- When installing units for HC refrigerants, use equipment specifically reserved for HC refrigerants which was never been used for HFO, CFC, or HCFC refrigerants.
- 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 must be done in such a way that oil return for the compressor is ensured and the risk of liquid slug over in the compressor is eliminated.

Installation

- This product is to be installed according to the requirements in ANSI/ASHRAE 15 or in Compliance with National Regulations. The condensing unit itself is not a “unit” in the scope of this directive.
- The unit must be securely installed on a stable and rigid support and fixed from the beginning.
- It is recommended to install the unit on rubber grommets or vibration dampers (Not supplied).
- Slowly release the nitrogen holding charge.
- Connect the unit to the system as soon as possible to avoid oil contamination from ambient moisture.
- Avoid material entering 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.
- It is recommended to insulate the suction pipe up to the compressor inlet with 0.75 in (19 mm) thick insulation.
- Copper piping material should comply with ASHRAE 15.
- Connecting pipes shall be made before opening the valves to permit refrigerant to flow between the refrigerating system parts.

Leak detection

Warning: Never pressurize the circuit with oxygen or dry air. This could cause a fire or an explosion.

- Do not use dye for leak detection.
- Perform a leak detection test on the complete system.
- The maximum test pressure is 464 psi (32 bar).
- When a leak is discovered, repair the leak, and repeat the leak detection.

Electrical connections

- Switch off and isolate the main power supply.
- Ensure that the power supply cannot be switched on during installation.
- All electrical components must be selected as per local standards and unit requirements.
- Refer to the wiring diagram for electrical connection details.
- Ensure that the power supply corresponds to the unit characteristics and that the power supply is stable (nominal voltage ‡ 10% and nominal frequency +2,5 Hz).
- Dimension the power supply cables according to the data for voltage and current.
- Protect the power supply and ensure correct grounding.
- Make the power supply according to local standards and legal requirements.
- The supply cable must be sized for the electrical characteristics mentioned on the nameplate.
- The power supply must be connected with electrical connectors or cable glands, with a degree of protection equal to or greater than IP54, in the electrical box in such a way that no external force is exerted on the terminals.

- The unit is equipped with high-and low-pressure switches, which directly cut the power supply to the compressor in case of activation.

Filling the system

Warning: Assure that the Condensing Unit (partial unit) shall only be connected to an appliance suitable for the same refrigerant.

- Wear protective stuff like goggles and protective gloves.
- Never start the compressor under vacuum. Keep the compressor switched off.
- The vacuum system shall be approved for A3.
- Use only the refrigerant for which the unit is designed.
- Only fill the refrigerant in the liquid phase into the condenser or liquid receiver. Ensure a slow charging of the system, 58 to 72 psi (4 – 5 bar).
- Do not put liquid refrigerant through the suction line.
- It is not allowed to mix additives with the oil and/ or refrigerant.
- The remaining charge is done until the installation has reached a level of stable nominal condition during operation.
- Never leave the filling cylinder connected to the circuit.

Verification before commissioning

Warning: Use safety devices such as a safety pressure switch and a mechanical relief valve in compliance with both generally and locally applicable regulations and safety standards. Ensure that they are operational and properly set.

Warning: Check that the settings of high-pressure switches and relief valves don’t exceed the maximum service pressure of any system component (Not supplied).

- Verify that all electrical connections are properly fastened and in compliance with local regulations.

Start-up

- Never start the unit when no refrigerant is charged.
- All service valves must be in the open position.
- Check compliance between the unit and the power supply.
- Check that the fan can rotate freely.

- Check that the protection sheet has been removed from the backside of the condenser.
- Balance the HP/LP pressure.

Check with the running unit.

- Check the fan rotation direction. Air must flow from the condenser towards the fan.
- Check the current draw and voltage.
- Check suction superheat to reduce the risk of slugging.
  Warning: The minimum recommended compressor suction superheat is 11°F (6K). The maximum allowed superheat is 54°F (30K).
- When a sight glass is provided, observe the oil level at start and during operation to confirm that the oil level remains visible.
- Respect the operating limits.
- Check all tubes for abnormal vibration. Movements in excess of 0.06 in (1.5 mm) require corrective measures such as tube brackets.
- When needed, additional refrigerant in the liquid phase may be added in the low-pressure side as far away as possible from the compressor. The compressor must be operating during this process.
- Do not overcharge the system.
- Never release refrigerant to the atmosphere.
- Before leaving the installation site, carry out a general installation inspection regarding cleanliness, noise, and leak detection.
- Record type and amount of refrigerant charge, as well as operating conditions, as a reference for future inspections.

Compressor failure to build up pressure: Check all bypass valves in the system to ensure that none of these have been opened. Also, check that all solenoid valves are in their proper position.

- **Abnormal running noise**: Ensure the absence of any liquid flood-back to the compressor by means of measuring the return gas superheat and compressor sump temperature. The sump should be at least 11°F (6K) above the saturated suction temperature under steady-state operating conditions.

Maintenance

Warning: Always switch off the unit at the main switch before removing the fan panel.
Warning: Internal pressure and surface temperature are dangerous and may cause permanent injury.
Warning: Maintenance operators and installers require appropriate skills and tools. Tubing temperature may exceed 212°F (100°C) and can cause severe burns.
Warning: Ensure that periodic service inspections are performed to ensure system reliability, and as required by local regulation, are performed.
Warning: Risk Of Fire Or Explosion. Flammable Refrigerant Used. To Be Repaired Only By Trained Service Personnel. Do Not Puncture Refrigerant Tubing.
To prevent system-related problems, the following Periodic maintenance is recommended:

- Verify that safety devices are operational and properly set.
- Ensure that the system is leak-tight.
- Check the compressor current draw.
- Confirm that the system is operating in a way consistent with previous maintenance records and ambient conditions.
- Check that all electrical connections are still adequately fastened.
- Keep the unit clean and verify the absence of rust and oxidation on the unit components, tubes, and electrical connections.

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-&-tube coils.

- Switch off the unit at the main switch before removing any panels from the condensing unit.
- 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.

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.

Warranty

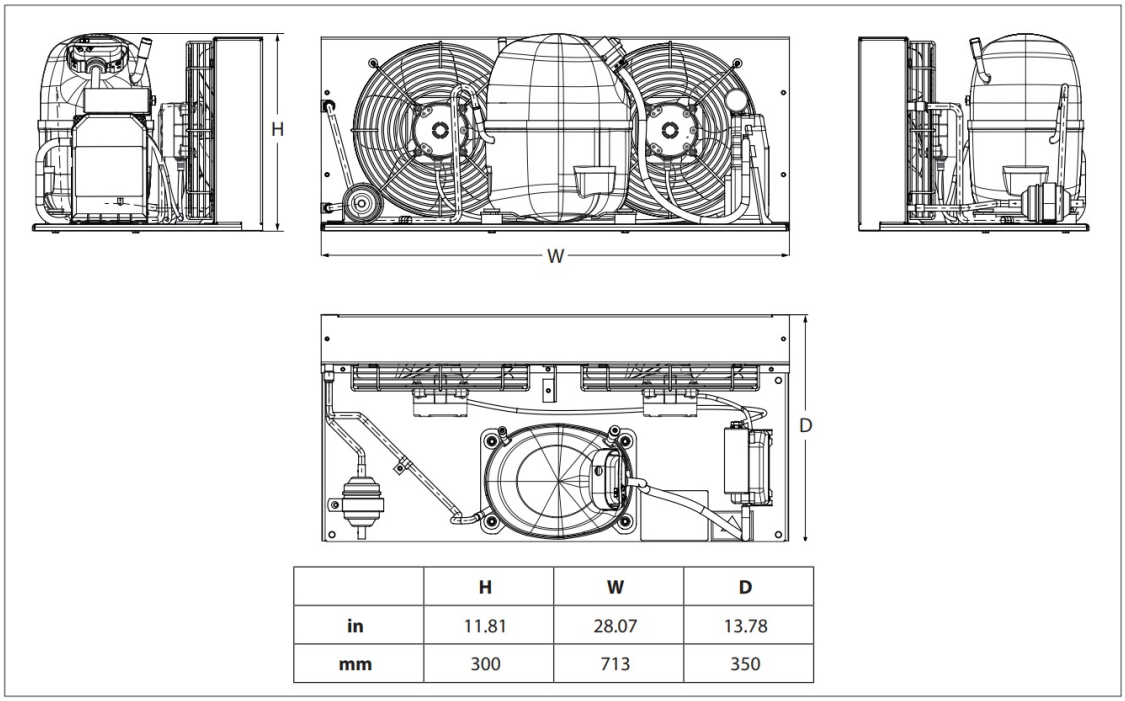
Always transmit the model number and serial number with any claim filed regarding this product. The product warranty may be void in the following cases:

- Absence of nameplate.
- External modifications, in particular, drilling, welding, broken feet, and shock marks.
- The compressor was opened or returned unsealed.
- Rust, water, or leak detection dye inside the compressor.
- Use of a refrigerant or lubricant not approved by Danfoss.
- Any deviation from recommended instructions about installation, application, or maintenance.
- Use in mobile applications.
- Use an explosive atmospheric environment.
- No model number or serial number was transmitted with the warranty claim.

Disposal

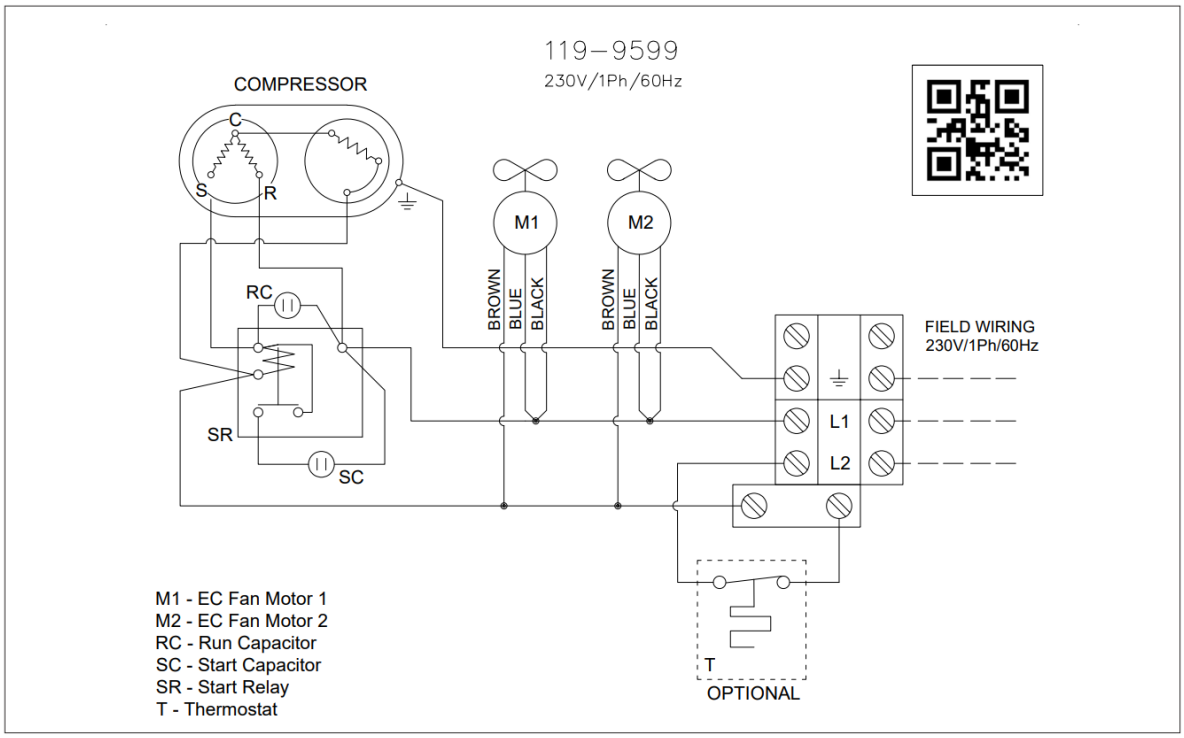
: Danfoss recommends that condensing units and oil should be recycled by a suitable company at its site.

General Assembly Drawing



	H	W	D
in	11.81	28.07	13.78
mm	300	713	350

Electrical Diagram Code N : 230V / 1 Ph / 60 Hz



Danfoss A/S

Climate Solutions

danfoss.us

+ 1 888 326 3677

baltimore@danfoss.com

FAQs

Q: How often should I clean the condenser?

A: The condenser must be checked at least once a year for clogging and cleaned if necessary.

Q: What should I do if the refrigerant system is opened?

A: If the system is opened, flush it with dry air or nitrogen to remove moisture and install a new filter drier.

Documents / Resources

	Danfoss R290 Optyma Condensing Units [pdf] Instructions OP-LGNM0100RWA000N, OP-LGNM0120RWA000N, OP-LGNM0140RWA000N, OP-LGNM0150RWA000N, R290 Optyma Condensing Units, R290 Optyma, Optyma Condensing Units, Condensing Units

References

- User Manual

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Condensing Units, Danfoss, OP-LGNM0100RWA000N, OP-LGNM0120RWA000N, OP-LGNM0140RWA000N, OP-LGNM0150RWA000N, OPTYMA Condensing Units, R290 Optyma, R290 Optyma Condensing Units

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