Danfoss SH161A4A Scroll Compressors Installation Guide

Contents

Danfoss SH161A4A Scroll Compressors

Specifications

- Model Number: Danfoss scroll compressors DCJ / H series
- Manufacturing Year: N/A
- Internal Protection: N/A
- Supply Voltage Range: N/A
- Lubricant Type and Nominal Charge: N/A
- Approved Refrigerant: N/A

Product Usage Instructions

Safety Guidelines

1. Wear protective goggles and work gloves during installation and servicing.
2. The compressor must be handled with caution in the vertical position.
3. Do not disassemble bolts, plugs, fittings, etc., unless all pressure has been relieved from the compressor.

Electrical Connections

Refer to the provided electrical connection diagrams for single pack and CSR wiring setups. Ensure correct connection sizes based on the compressor model to avoid any electrical issues.

Installation

1. Installation and servicing should be carried out by qualified personnel only.
2. Follow the instructions provided and sound refrigeration engineering practices for installation, commissioning, maintenance, and service.

Handling and Operation

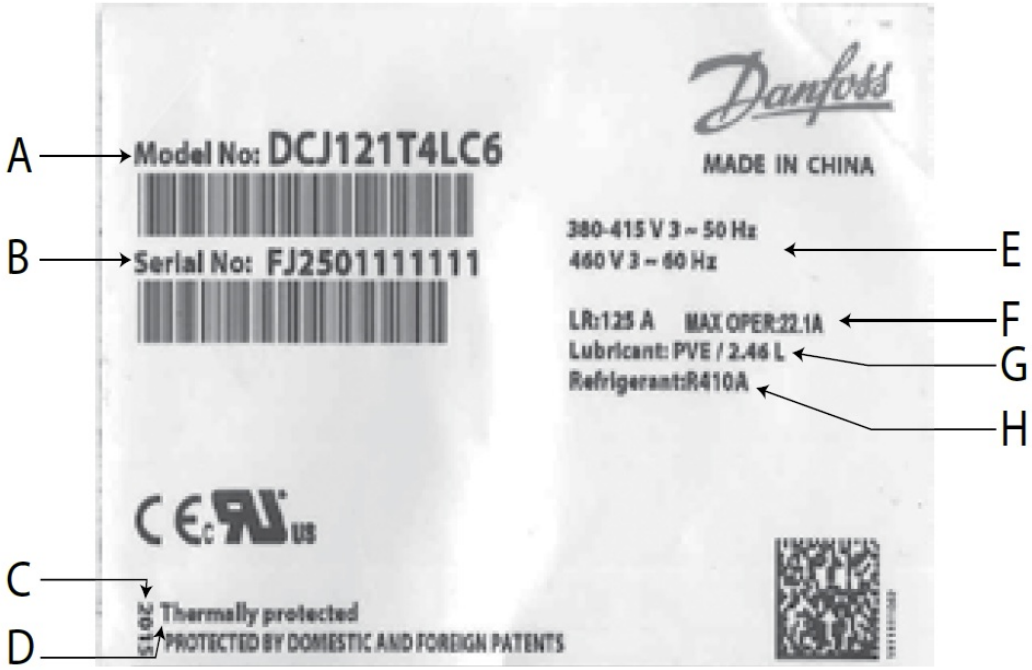
1. The compressor is delivered under nitrogen gas pressure; handle with care.
2. Only operate the compressor within its designed purpose(s) and scope of application.
3. Never operate the compressor without the terminal box cover in place.

Maintenance
Regular maintenance checks should be conducted as per the guidelines provided in the application guidelines and datasheet.

Introduction

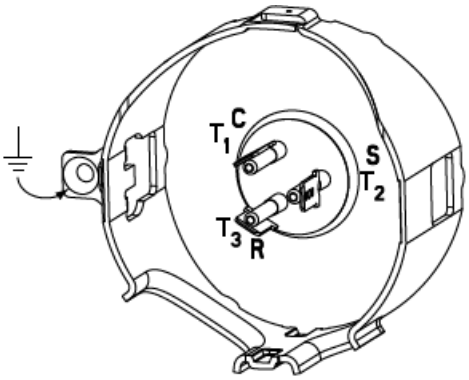
These instructions pertain to the Danfoss scroll compressors used for HVAC systems. They provide necessary information regarding safety and proper usage of this product.

Nameplate

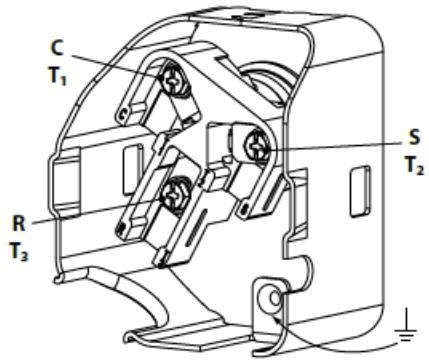


- Model number
- Serial Number
- Manufacturing year
- Internal protection
- Supply voltage range
- Locked rotor current
- Maximum operating current
- Lubricant type and nominal charge H: Approved Refrigerant

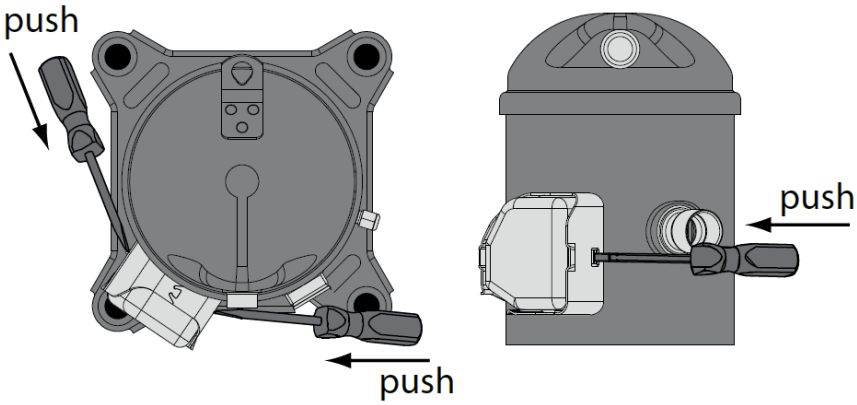
Electrical connections



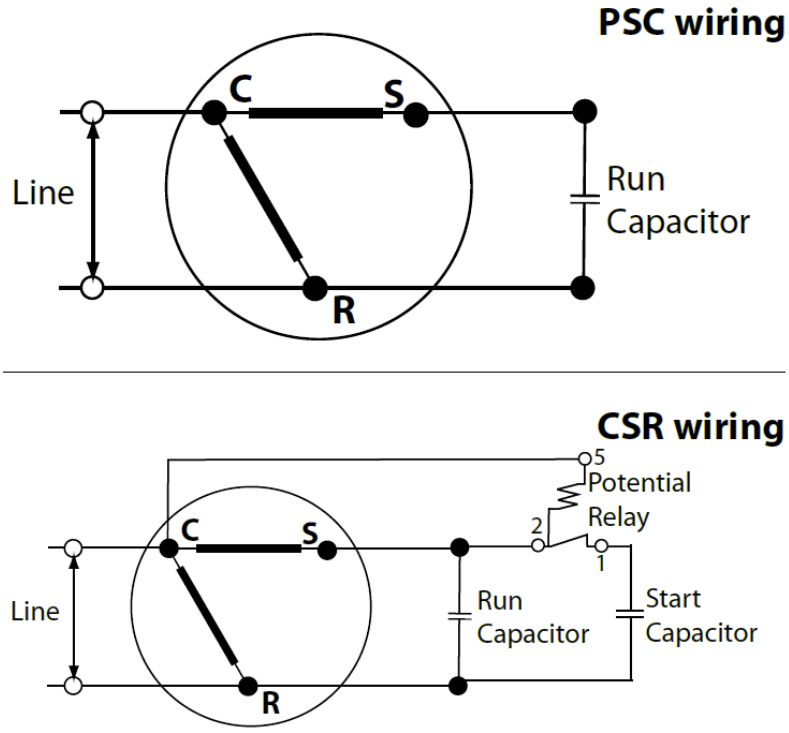
Quick connect spade terminals
P & T terminal box type



Ring connect screw terminals
C & Q terminal box type



Single pack



Connections size

Brazed conne Models	ction Connec. size	Rotolock c Models	Connection Connec. size
HRM032-042 HRP034-042 HRM/HRP045-047 HRH029-040	Suction 3/4″ Disch. 1/2″	–	–
HRM/HRP048-060 HLM/HLP068-075 HRH041-056 HLH061-068 HLJ061-068	Suction 7/8″ Disch. 1/2″	HRH044- 056 HLH061-068 HLJ072-083	Suct. 1″1/4 Disch. 1″
HLM/HLP078-081	Suction 7/8″ Disch. 3/4″	–	–
HCM/HCP094-120 HCJ090-121 DCJ091-121	Suct. 1″1/8 Disch. 7/8″	–	–

Installation and servicing of the compressor by qualiÿed personnel only. Follow these instructions and sound refrigeration engineering practice relating to installation, commissioning, maintenance and service.

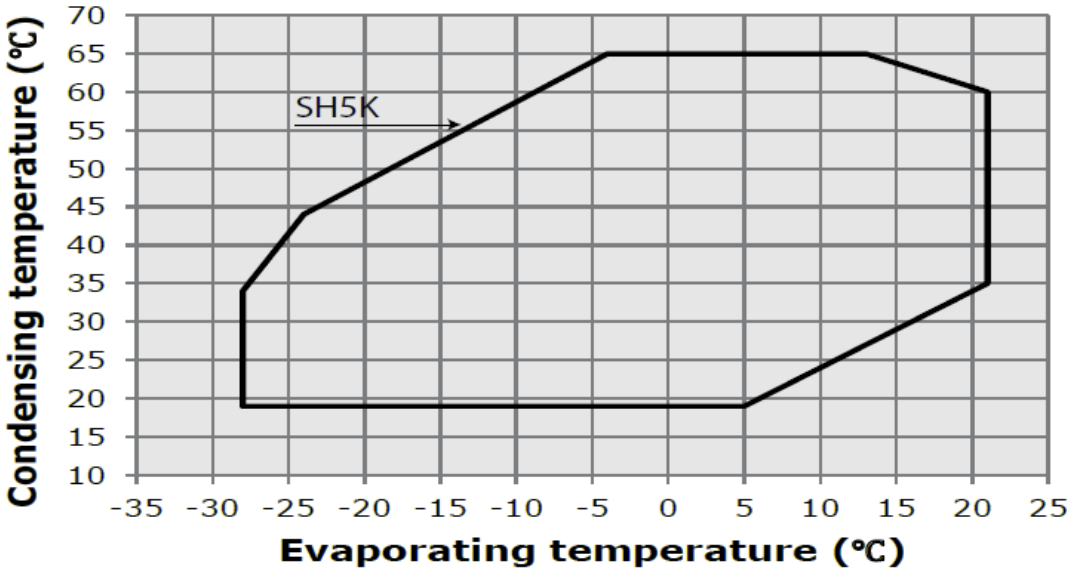
- The compressor must only be used for its designed purpose(s) and within its scope of application (refer to «operating limits»). Consult the Application guidelines and datasheet available from **danfoss.com**.
- Never operate the compressor without the terminal box cover in place and secured.
- Under all circumstances, the EN378 (or other applicable local safety regulation) requirements must be fulfilled.

Wear protective goggles and work gloves.

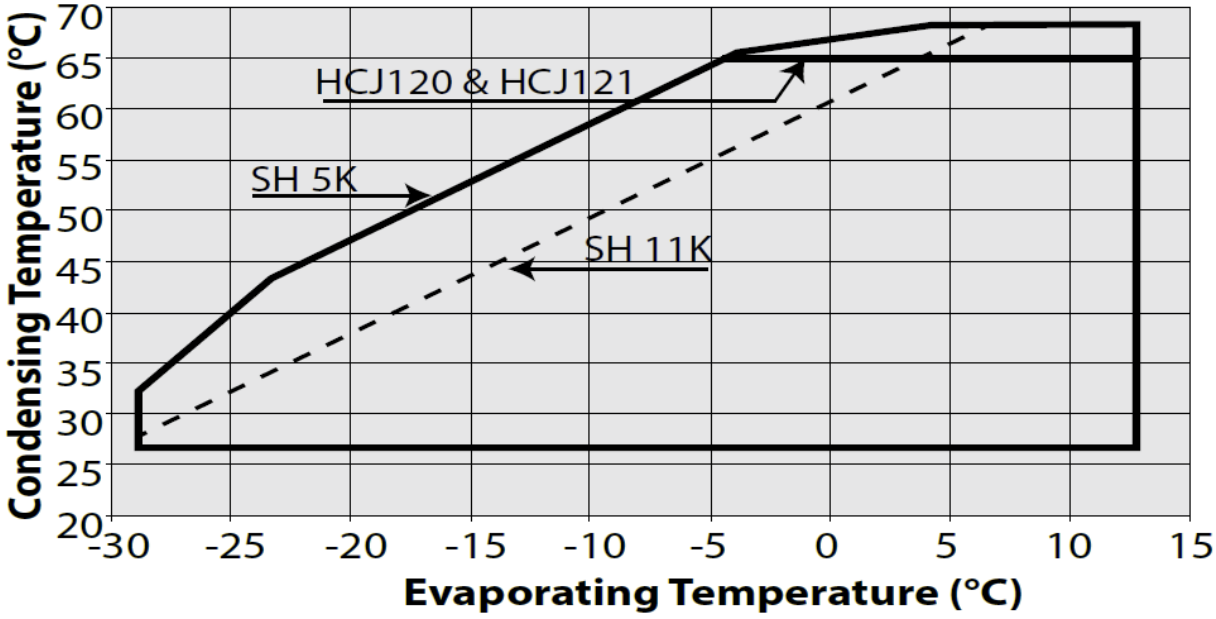
- The compressor is delivered under nitrogen gas pressure (between 0.3 and 0.4 bar / 4 and 6 psi). Do not disassemble bolts, plugs, fittings, etc, unless all pressure has been relieved from the compressor.
- The compressor must be handled with caution in the vertical position (maximum offset from the vertical: 15°).

Operating map

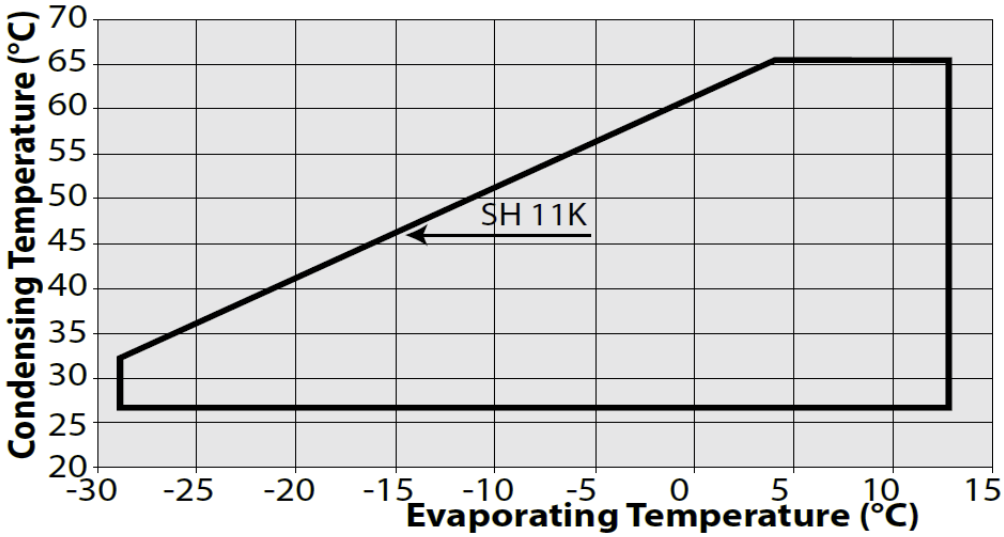
DCJ (R410A)



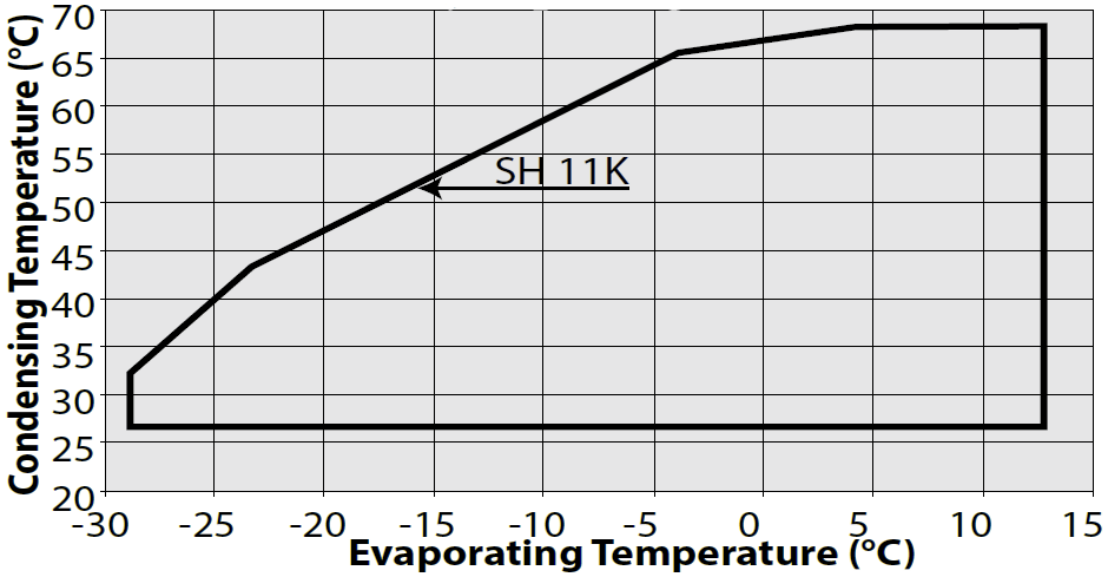
HRH/HLH/HLJ/HCJ Model variation T (R410A)



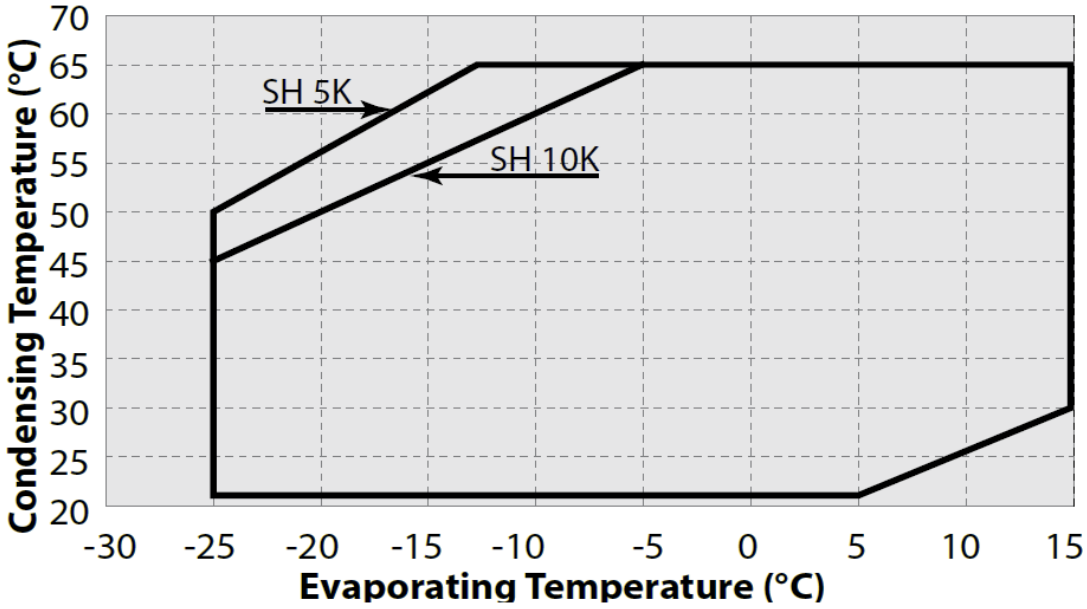
HRM/HLM/HCM ~ HRH/HLH/HLJ/HCJ Model variation U (R22 / R410A)



HRM/HLM/HCM˜HRP/HLP/HCP Model variation T (R22/407C)



HHP (R407C)



When HRM compressors are used with R417A, the factory-charged oil must be replaced by PVE oil 320HV (120Z5034).

Handling and storage

- Handle the compressor with care. Use the dedicated handles in the packaging. Use the compressor lifting lug and use appropriate and safe lifting equipment.
- Store and transport the compressor in an upright position.
- Store the compressor between -35°C and 70°C (31°F and 158°F).
- Don’t expose the compressor and the packaging to rain or corrosive atmosphere.

Safety measures before assembly
Never use the compressor in a flammable atmosphere.

- Mount the compressor on a horizontal flat surface with less than 7° s
- Verify that the power supply corresponds to the compressor motor characteristics (see nameplate).
- When installing a compressor model, use equipment specifically reserved for HFC refrigerants that was never used for CFC or HCFC refrigerants.
- Use clean and dehydrated refrigeration-grade copper tubes and silver alloy brazing material.
- Use clean and dehydrated system components.
- The piping connected to the compressor must be flexible in 3 dimensions to dampen vibrations.
- The compressor must always be mounted with the rubber grommets supplied with the compressor.

Assembly

- Slowly release the nitrogen holding charge through the discharge and suction ports.
- Connect the compressor 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.
- Brace with great care using state-of-the-art techniques and vent piping with nitrogen gas flow.
- Connect the required safety and control devices. When the schrader port, if any, is used for this, remove the internal valve.
- For parallel assemblies of the compressors in version C8, contact Danfoss.

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

- Do not use leak detection dye.
- Perform a leak detection test on the complete
- The low side test pressure must not exceed 31 bar /450 psi.
- When a leak is discovered, repair the leak and repeat the leak detection.

Vacuum dehydration

- Never use the compressor to evacuate the system.
- Connect a vacuum pump to both the LP & HP sides.
- Pull down the system under a vacuum of 500 µm Hg (0.67 mbar) / 0.02 inch Hg absolute.
- Do not use a megohmmeter or apply power to the compressor while it is under vacuum, as this may cause internal damage.

Electrical connections

- Switch off and isolate the main power supply.
- All electrical components must be selected as per local standards and compressor requirements.
- Refer to page 1 for electrical connection details. For three-phase applications, the terminals are labeled T1, T2, and T3. For single-phase applications, the terminals are labeled C (common), S (start), andrunn).
- Danfoss scroll compressors will only compress gas while rotating counter-clockwise (when viewed from the compressor top.
- Since single-phase motors will start and run in only one direction, reverse rotation is not a major consideration.
- Three-phase motors, however, will start and run in either direction, depending on the phase angles of the supplied power. Care must be taken during installation to ensure that the compressor operates in the correct direction.
- Use ø 4.8 mm / #10 – 32 screws and ¼” ring terminals for the power connection with ring connect screw terminal (C type). Fasten with 3 Nm torque.
- Use ø 6.3 mm tabs quick-connect spade terminals (P type).
- U se a self tapping screw to connect the compressor to earth.

Filling the system

- Keep the compressor switched off.
- Keep the refrigerant charge below the indicated charge limits if possible. Above this limit; protect the compressor against liquid flood-back with a pump-down cycle or suction line accumulator.
- Never leave the filling cylinder connected to the circuit.

Compressor models	Refrigerant charge limit
HRM032-034-038-040-042-045-047	
HRP034-038-040-042-045-047 / HHP015-019-021-026 /	3.6 kg / 8 lb
HRH031-032-034-036-038-040	
HRM048-051-054-058-060 /	
HLM068-072-075-078-081 /	
HRP048-051-054-058-060 /	
HLP068-072-075-081 /	5.4 kg / 12 lb
HHP030-038-045 /	
HRH044-049-051-054-056 /	
HLH061-068 – HLJ072-083	
HCM094-109-120 /	
HCP094-109-120 / HCJ090-091-105-106-120-121 /	7.2 kg / 16 lb
DCJ091-106-121	

Verification before commissioning

- Use safety devices such as safety pressure switch and mechanical relief valve in compliance with both generally and locally applicable regulations and safety standards. Ensure that they are operational and properly set.
- Check that the settings of high-pressure switches don’t exceed the maximum service pressure of any system component.
- A low-pressure switch is recommended to avoid low-pressure operation.

Minimum setting for R22	1.5bar (absolute)/22 psia
Minimum setting for R407C	
Minimum setting for R410A	2.5bar (absolute)/36 psia

- Verify that all electrical connections are properly fastened and in compliance with local regulations.
- When a crankcase heater is required, it must be energized at least 24 hours before initial start-up and start-up after prolonged shutdown.
- Please respect a 90 Nm ± 20 Nm for the tightening torque of all rotolock nuts.

Start-up

- Never start the compressor when no refrigerant is charged.
- Do not provide any power to the compresor unless suction and discharge service valves are open, if installed.
- Energize the compressor. It must start promptly. If the compressor does not start, check wiring conformity and voltage on terminals.
- Eventual reverse rotation can be detected by the following phenomena: excessive noise, no pressure differential between suction and discharge, and line warming rather than immediate cooling. A service technician should be present at initial start-up to verify that supply power is properly phased and that the compressor is rotating in the correct direction.
- H-series Scroll compressors are designed to operate for a maximum of 150 hours in reverse, but as a reverse rotation situation can go unnoticed for longer periods, phase monitors are recommended. For compressors HLM078, HLP081, HLJ083, and larger, phase monitors are required for all applications. Danfoss recommends phase protection for residential compressors.
- If the internal overload protector trips out, it must cool down to 60°C / 140°F to reset. Depending on ambient temperature, this may take up to several hours.

Check with the running compressor
Check the current draw and voltage. Measurement of amps and volts during running conditions must be taken at other points in the power supply, not in the compressor electrical box.

- Check suction superheat to reduce the risk of slugging.
- Observe the oil level in the sight glass (if provided) for about 60 minutes to ensure proper oil return to the compressor.
- Respect the operating limits.
- Check all tubes for abnormal vibration. Movements over 1.5 mm / 0.06 in 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 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 char,,ge as well as operating conditions, as a reference for future inspections.

Maintenance
Internal pressure and surface temperature are dangerous and may cause permanent injury. Maintenance operators and installers require appropriate skills and tools. Tubing temperature may exceed 100°C / 212°F and can cause severe burns. Ensure that periodic service inspections to ensure system reliability, nd as required by local regulations, are performed. To prevent system-related compressor 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 compressor clean and verify the absence of rust and oxidation on the compressor shell, tubes, and electrical connections.
- Acid/moisture content in the system and oil should be checked regularly.

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.
- Using the explosive atmospheric environment.
- No model number or serial number was transmitted with the warranty claim.

Disposal

 Danfoss recommends that compressors and compressor oil be recycled by a suitable company at its site.

Danfoss A/S, 6430 Nordborg, Denmark

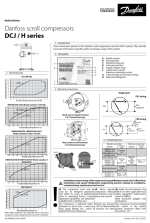
FAQs

Q: What should I do if I need to replace the factory-charged oil?
A: If using HRM compressors with R417A, replace the factory-charged oil with PVE oil 320HV (120Z5034).

Q: What are the recommended safety measures when using the compressor?
A: Wear protective goggles and work gloves during installation and servicing. Always handle the compressor with caution.

Q: How should I connect the compressor electrically?
A: Refer to the provided electrical connection diagrams for single pack and CSR wiring setups. Ensure correct connection sizes based on the compressor model.

Documents / Resources

	**Danfoss SH161A4A Scroll Compressors** [pdf] Installation Guide DCJ, H series, HCJ120, HCJ121, HRM, HLM, HCM, HRH, HLH, HLJ, HRP, HLP, HCP, SH161A 4A Scroll Compressors, SH161A4A, Scroll Compressors, Compressors

References

- **User Manual**