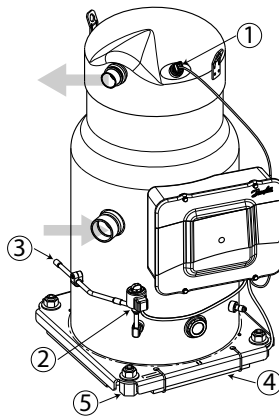
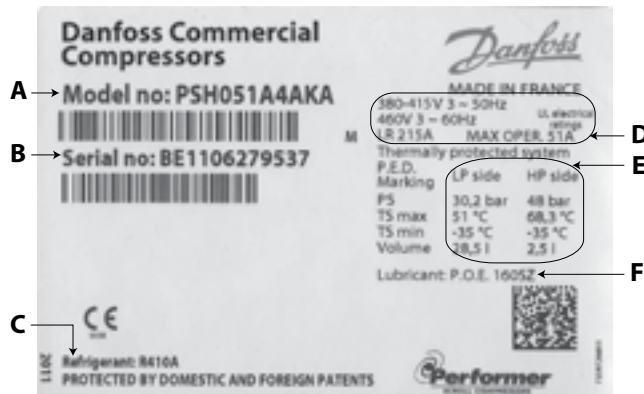


Instructions

Danfoss scroll compressors PSH051-064-077



- 1: Discharge temperature sensor (supplied but need to be connected)
- 2: Liquid Injection Valve (supplied)
- 3: Liquid Injection Valve connection 1/4" ODF
- 4: Surface Sump Heater (SSH) (supplied)
- 5: Rigid mounting spacer (supplied)

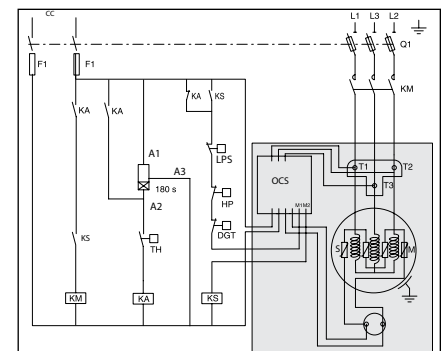
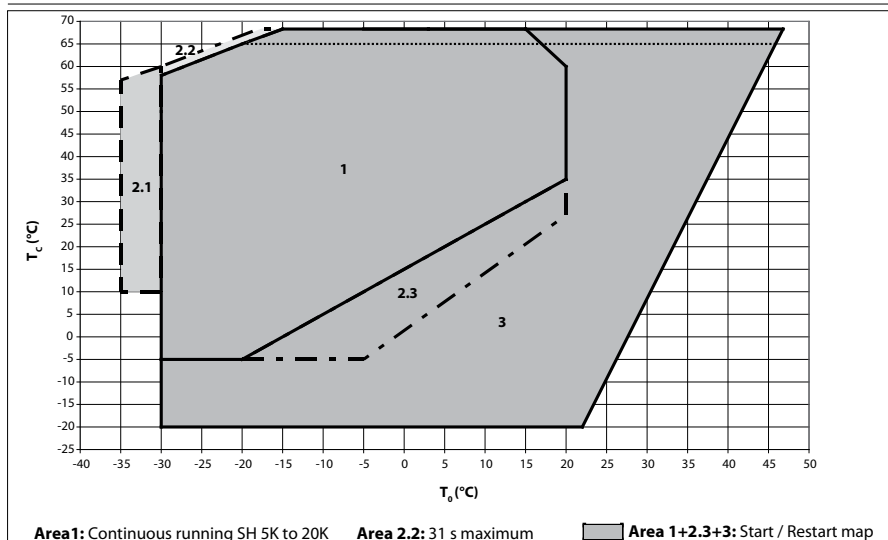


- A: Model number
- B: Serial number
- C: Refrigerant
- D: Supply voltage, Starting current & Maximum operating current
- E: Housing service pressure
- F: Factory charged lubricant



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

Danfoss scroll compressors PSH051-064-077 come equipped with an electronic board OCS (Operating Control System) protecting against phase loss/reversal, motor overheating, high current draw, and giving extra features such as liquid injection, discharge temperature protection, envelope monitoring, data storage, bus communication and crankcase heater control.



- Legend:**
- FusesF1
 - Compressor contactor.....KM
 - Control relay.....KA
 - Safety lock out relay.....KS
 - Optional short cycle timer (3 min) 180 s
 - High pressure safety switch.....HP
 - Control device.....TH
 - Fused disconnect.....Q1
 - Compressor motorM
 - Thermistor chain.....S
 - Safety pressure switch.....LPS
 - Control circuitCC
 - Operating Control SystemOCS

⚠ The compressor must only be used for its designed purpose(s) and within its scope of application (refer to «operating limits»). Consult Application guidelines and datasheet available from cc.danfoss.com

⚠ Under all circumstances, the EN378 (or other applicable local safety regulation) requirements must be fulfilled.

The compressor is delivered under nitrogen gas pressure (between 0.3 and 0.7 bar) and hence cannot be connected as is; refer to the «assembly» section for further details.

The compressor must be handled with caution in the vertical position (maximum offset from the vertical : 15°)

1 – Introduction

These instructions pertain to the PSH scroll compressors used for heat pump and air-conditioning systems. They provide necessary information regarding safety and proper usage of this product.

2 – Handling and storage

- Handle the compressor with care. Use the compressor lifting lugs and use appropriate and safe lifting equipment.
- Avoid any shocks to the liquid Injection valve during handling operations.

- Store and transport the compressor in an upright position.
- Store the compressor between -35°C and 51°C.
- Don't expose the compressor and the packaging to rain or corrosive atmosphere.

3 – Safety measures before assembly

- ⚠ Never use the compressor in a flammable atmosphere.
- The compressor ambient temperature may not exceed 50°C during off-cycle.
- Mount the compressor on a horizontal flat surface with less than 3° slope.

- Verify that the power supply corresponds to the compressor motor characteristics (see nameplate).
- When installing PSH, use equipment specifically reserved for HFC refrigerants which 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.

4 – Assembly

- In parallel assemblies of PSH the compressor

requires a rigid mounting on the rails. Use the pre-mounted rigid spacers.

- Slowly release the nitrogen holding charge through the schrader port.
- Connect the compressor 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 technique and vent piping with nitrogen gas flow.
- Connect the required safety and control devices. When the schrader port is used for this, remove the internal valve.
- The liquid injection valve must be fed by liquid, picked-up on the liquid line of the system, downstream the filter drier.
- Protect the compressor and the liquid injection valve against heat while brazing the liquid line.

5 – Leak detection

⚠ Never pressurize the circuit with oxygen or dry air. This could cause fire or explosion.

- Pressurize the system on HP side first and then on LP side. Never let the pressure on LP side exceed the pressure on HP side with more than 5 bar. Such pressure difference could cause internal compressor damage.
- Do not use dye for leak detection.
- Perform a leak detection test on the complete system.
- The test pressure must not exceed:

Models	LP side	HP side
PSH051.064.077	30 bar	48 bar

- When a leak is discovered, repair the leak and repeat the leak detection.

6 – 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) absolute.
- Do not use a megohmmeter nor apply power to the compressor while it is under vacuum as this may cause internal damage.

7 – Electrical connections



- Switch off and isolate the main power supply.
- All electrical components must be selected as per local standards and compressor requirements.
- The scroll compressor only works correctly in one rotation direction. Line phases L1, L2, L3 must absolutely be connected to compressor terminals T1, T2, T3 to avoid reverse rotation.
- Use ø 4.8 mm (3/16") screws and ¼" ring terminals for the power connection. Fasten with 3 Nm torque.
- The compressor must be connected to earth with the 5 mm earth terminal screw.
- Connect the discharge temperature sensor cable plug to the sensor on the compressor top shell.

- Connect the OCS to power supply and earth
- Connect the low pressure (LP) and high pressure (HP) transmitters to the OCS. These are mandatory for the operating envelope monitoring function.
- Only one set of LP/HP transmitters is mandatory for manifolds.
- Connect the M1-M2 control circuit to the OCS
- Further connections to the OCS are factory-prepared; DGT sensor (Discharge Gas Temperature), Heater (Surface Sump Heater), motor protection, phase monitoring, LIV valve (liquid injection valve). The connector positions are written on the OCS protection cover.

⚠ To avoid personal injury, with 230V OCS, do not forget to connect the earth, and to check for earth continuity.

8 – Filling the system

- Keep the compressor switched off.
- Fill the refrigerant in liquid phase into the condenser or liquid receiver. The charge must be as close as possible to the nominal system charge to avoid low pressure operation and excessive superheat. Never let the pressure on LP side exceed the pressure on HP side with more than 5 bar. Such pressure difference could cause internal compressor damage.
- 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 (kg)
PSH051.064	13.5
PSH077	14.5

9 – 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 and relief valves don't exceed the maximum service pressure of any system component.

- A low-pressure switch is recommended to avoid vacuum operation. Minimum setting for PSH: 2.1 bar g.
- Verify that all electrical connections are properly fastened and in compliance with local regulations.
- Ensure that the liquid injection valve (LIV) coil is correctly positioned on the LIV body: one of the lock pins on the coil must fit into one of the dents on the valve body.

10 – Start-up

- Never start the compressor when no refrigerant is charged.
- All service valves must be in the open position.
- Balance the HP/LP pressure.
- Energize the compressor. It must start promptly. If the compressor does not start, check wiring conformity and voltage on terminals.
- If the internal pressure relief valve is opened (PSH), the compressor sump will be warm and the compressor will trip out on the motor protector.

11 – Check with running compressor

- Check current draw and voltage.
- Check suction superheat to reduce risk of

- slugging.
- Observe the oil level in the sight glass for about 60 minutes to ensure proper oil return to the compressor.
- Check all tubes for abnormal vibration. Movements in excess of 1.5 mm require corrective measures such as tube brackets.
- When needed, additional refrigerant in 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 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.
- Before leaving the installation site, clear eventual warnings and alarms in the OCS to facilitate future maintenance checks.

12 – 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 and can cause severe burns.

⚠ Ensure that periodic service inspections to ensure system reliability and as required by local regulations are performed.

To prevent system related compressor problems, 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.
- Check and clear alarms and warnings.
- Check correct operation of the surface sump heater.

13 - Warranty

Always transmit the model number and serial number with any claim filed regarding this product.

The product warranty may be void in following cases:

- Absence of nameplate.
- External modifications; in particular, drilling, welding, broken feet and shock marks.
- Compressor 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 pertaining to installation, application or maintenance.
- Use in mobile applications.
- Use in explosive atmospheric environment.
- No model number or serial number transmitted with the warranty claim.

14 – Disposal

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