Instructions

MLZ/MLM compressors

A: Model number
B: Technical number
C: Serial Number
D: Internal protection
E: Supply voltage range
F: Run capacitor
G: Locked rotor current
H: Lubricant type and nominal charge
I: Approved Refrigerant
J: Manufacturing year

Operating limits

MLZ - R407A

MLZ - R134a

MLZ - R404A / R507

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

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.

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

Never operate the compressor without 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°).

Electrical connections

Quick connect spade terminals
T and P terminal box type

Ring connect screw terminals
Q and C terminal box type

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1 – Introduction

These instructions pertain to the MLZ / MLM scroll compressors used for refrigeration systems. They provide necessary information regarding safety and proper usage of this product.

2 – Storing 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 – 158°F.
- 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.
- Mount the compressor on a horizontal flat surface with less than 7° slope.
- Verify that the power supply corresponds to the compressor motor characteristics (see nameplate).
- When installing a compressor for R404A, R507, R407A, R407F or R134a, 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 connections 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.

4 – Assembly

- Slowly release the nitrogen holding charge through discharge and suction ports.
- Connect the compressor to the system as soon as possible.
- When the refrigerant charge does not exceed 31 bar / 450 psi.
- Use clean and dehydrated system components.
- Do not make any modifications to the compressor.
- Use clean and dehydrated refrigeration-grade copper tubes and silver alloy brazing material.
- Use clean and dehydrated system components.
- The piping connections 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.

5 – Leak Detection

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

6 – Vacuum Dehydration

Never use the compressor to evacuate the system.
- Connect a vacuum pump to both the LP & HP sides.
- Never use the compressor to evacuate the system.
- Connect the compressor to the system as soon as possible.
- Slowly release the nitrogen holding charge through discharge and suction ports.
- Use clean and dehydrated refrigeration-grade copper tubes and silver alloy brazing material.
- Use clean and dehydrated system components.
- The piping connections 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.

7 – Electrical Connections

Switch off and isolate the main power supply.
- All electrical components must be selected as per local and national electrical code requirements.
- Refer to 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), and R (run).
- 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 a 48 mm / #10 – 32 screws and h" ring terminals for the power connection with ring connect screw terminal (C type). Fasten with 3Nm torque.
- Use a 6.3 mm tabs for quick connect spade terminals (P type).
- Use a self tapping screw to connect the compressor to earth.

8 – 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.
- When installing a compressor for R404A, R507, R407A, R407F or R134a, 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 connections 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.

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 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 1.5 bar (absolute) / 22 psia
- Minimum setting for R404A 2.8 bar (absolute) / 41 psia
- Minimum setting for R407A 1.7 bar (absolute) / 25 psia
- Minimum setting for R407F 1.9 bar (absolute) / 28 psia
- Minimum setting for R134a 1.45 bar (absolute) / 21 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 tightening torque of all flouick nut.

10 – Start-up

Never start the compressor when no refrigerant is charged.
- Do not provide any power to the compressor.
- 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 following phenomena; the 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. MLZ / MLM 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 MLZ / MLM 048 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.

11 – Check with running compressor

Check 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 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 in excess of 1.5 mm / 0.06 in 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.

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 / 212°F and can cause severe burns.
- Ensure that periodic service inspections to ensure system reliability and as required by local regulations are performed.
- Prevent system related compressor problems, following periodic maintenance is recommended:
- Always transmit the model number and serial number with any claim filed regarding this product. The product warranty may be void in following cases:
- Abrasion of nameplate.
- External modifications; in particular, drilling, welding, broken feet and shock marks.
- Compressor opened or returned unsealed.
- External modifications; in particular, drilling, welding, broken feet and shock marks.

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:
- Abrasion of nameplate.
- External modifications; in particular, drilling, welding, broken feet and shock marks.
- Compressor opened or returned unsealed.
- External modifications; in particular, drilling, welding, broken feet and shock marks.
- Use of a refrigerant or lubricant not approved by Danfoss.
- Any deviation from recommended instructions pertaining to installation, application or maintenance.
- Use in explosive atmospheric environment.
- Acid / moisture content in system and oil should be checked regularly.

14 – Disposal

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