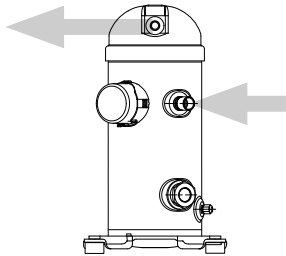


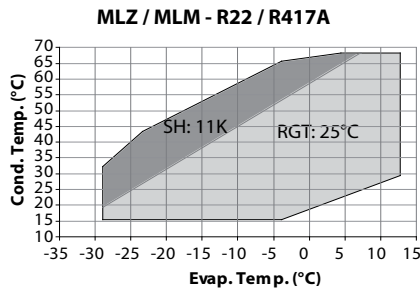
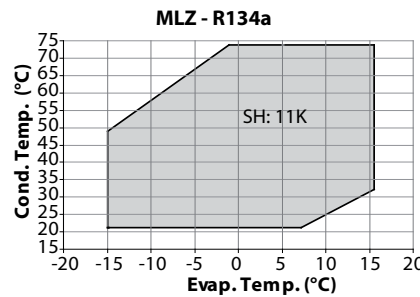
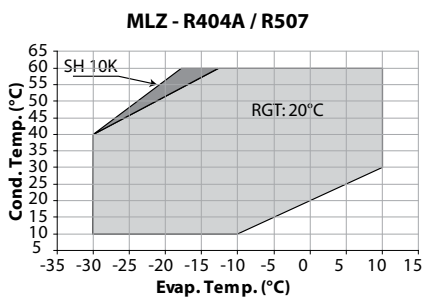
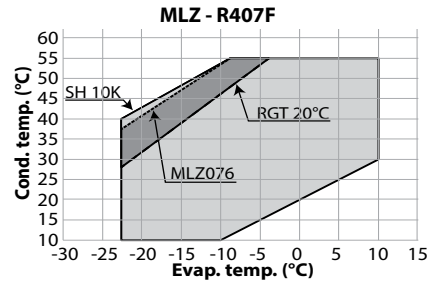
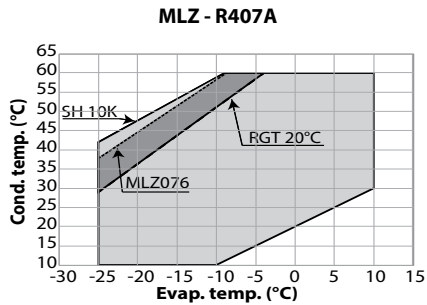
Instructions

# MLZ/MLM compressors



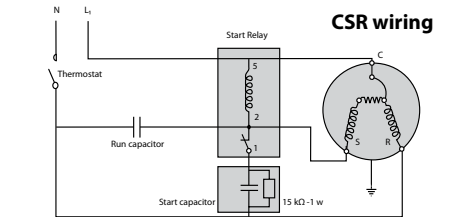
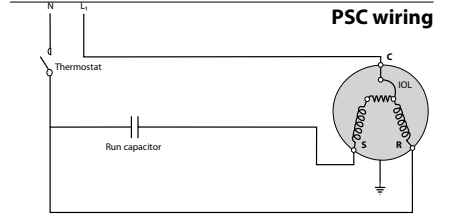
- A: Model number
- B: Technical number
- C: Serial Number
- D: Internal protection
- E: Supply voltage range
- F: Run capacitor
- G: Locked rotor current  
Maximum operating current
- H: Lubricant type and nominal charge
- I: Approved Refrigerant
- J: Manufacturing year

Operating limits



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

Single phase

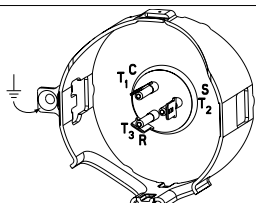


Models	Brazed connection size	Rotolock connection size
MLZ/MLM 015-026	Suction 3/4" Discharge 1/2"	Suction 1 1/4" Discharge 1"
MLZ/MLM 030-045	Suction 7/8" Discharge 1/2"	Suction 1 1/4" Discharge 1"
MLZ/MLM 048	Suction 7/8" Discharge 3/4"	Suction 1 1/4" Discharge 1 1/4"
MLZ/MLM 058-076	Suction 1 1/8" Discharge 7/8"	Suction 1 3/4" Discharge 1 1/4"

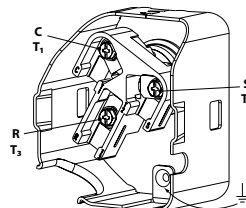
**Installation and servicing of the compressor by qualified personnel only.**  
Follow these instructions and sound refrigeration engineering practice relating to installation, commissioning, maintenance and service.

<p>⚠ 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 <a href="http://cc.danfoss.com">cc.danfoss.com</a></p>	<p>⚠ Never operate compressor without terminal box cover in place and secured.</p>	<p>⚠ Under all circumstances, the EN378 (or other applicable local safety regulation) requirements must be fulfilled. Wear protective goggles and work gloves.</p>
<p>● 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.</p>	<p>● The compressor must be handled with caution in the vertical position (maximum offset from the vertical : 15°).</p>	

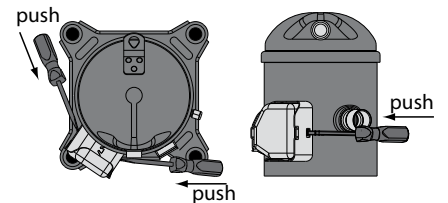
Electrical connections



Quick connect spade terminals  
T and P terminal box type



Ring connect screw terminals  
Q and C terminal box type



## 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 – 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.

## 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 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.

## 4 – Assembly

- Slowly release the nitrogen holding charge through discharge and suction ports.
- 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, if any, is used for this, remove the internal valve.
- For parallel assemblies of the compressors in version C8, contact Danfoss.

## 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.
- Pull down the system under a vacuum of 500 µm Hg (0.67 mbar) / 0.02 inch Hg 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.
- Refer to electrical connections 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  $\varnothing$  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  $\varnothing$  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.
- Never leave the filling cylinder connected to the circuit.

Compressor models	Refrigerant charge limit
MLZ / MLM015-019-021-026	3.6 kg / 8 lb
MLZ / MLM030-038-045-048	5.4 kg / 12 lb
MLZ / MLM058-066-076	7.2 kg / 16 lb

## 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  $\pm$  20 Nm for tightening torque of all rotolock nut.

## 10 – Start-up

- Never start the compressor when no refrigerant is charged.
- Do not provide any power to the compressor 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 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.

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.
- Acid / moisture content in system and oil should be checked regularly.

## 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:

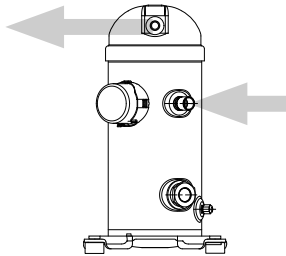
- Absence of nameplate.
- External modifications; in particular, drilling, welding, broken feet and shock marks.
- Compressor opened or returned unsealed.
- Rust, water or leak detection dye inside the compressor.
- Use of a refrigerant or lubricant not approved by Danfoss.
- Any deviation from recommended 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.

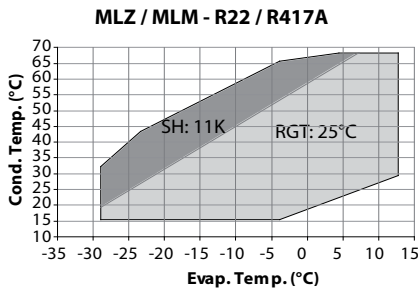
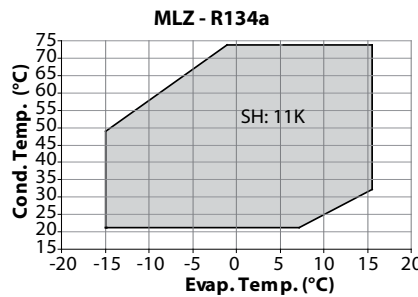
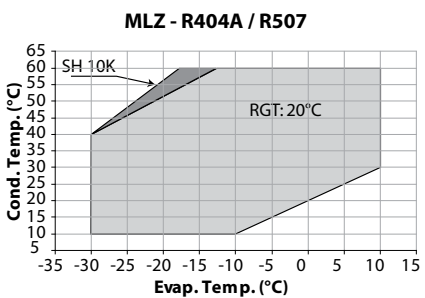
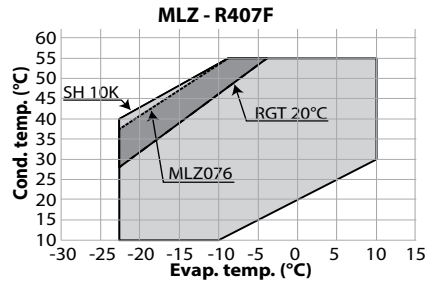
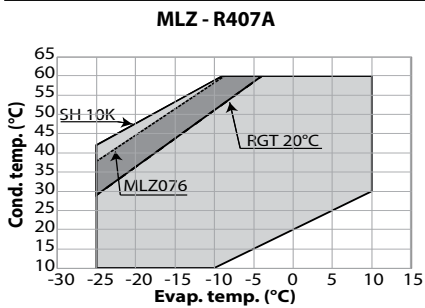
说明

# MLZ / MLM 压缩机



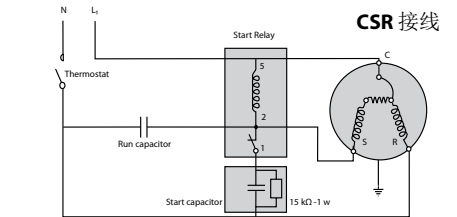
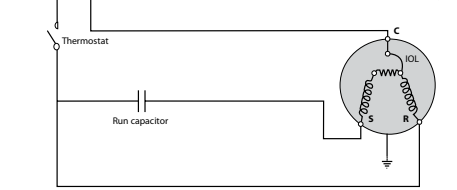
- A: 型号
- B: 技术编号
- C: 序列号
- D: 内部保护
- E: 供电电压范围
- F: 工作电容
- G: 堵转电流  
最大运行电流
- H: 润滑剂类型和额定充注量
- I: 认可的制冷剂
- J: 生产年份

## 使用限制



当 MLM 压缩机与 R417A 一起使用时, 必须将出厂充注的油脂更换为 PVE 油 320HV (12025034)。

## 单相

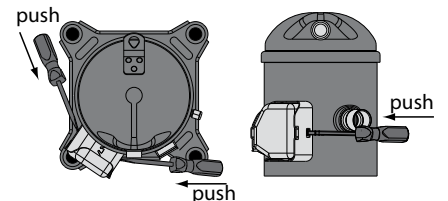
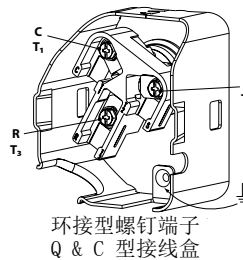
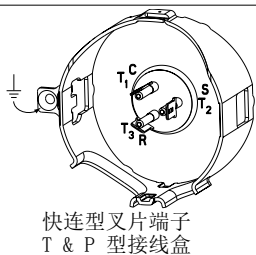


型号	焊接 连接管大小	螺纹连接 连接管大小
MLZ/MLM015-026	吸气口 3/4" 排气口 1/2"	吸气口 1 1/4" 排气口 1"
MLZ/MLM030-045	吸气口 7/8" 排气口 1/2"	吸气口 1 1/4" 排气口 1"
MLZ/MLM048	吸气口 7/8" 排气口 3/4"	吸气口 1 1/4" 排气口 1 1/4"
MLZ/MLM058-076	吸气口 1 1/8" 排气口 7/8"	吸气口 1 3/4" 排气口 1 1/4"

**!** 本压缩机只能由合格人员安装和维护。遵照下面的说明和相关的安装, 调试, 维护及服务的噪声制冷工程惯例。

<p><b>!</b> 该压缩机只能用于指定用途及其应用范围之内 (请参考«使用限制»)。请查阅 cc.danfoss.com 提供的指南和数据表</p>	<p><b>!</b> 如果未安装且固定接线盒盖, 切勿操作压缩机。</p>	<p><b>!</b> 在所有情况下都必须达到 EN378 (或其他适用的当地安全规定) 要求。请佩戴护目镜和工作手套。</p>
<p>该压缩机在交付时带有加压氮气 (0.3 到 0.4 bar/4 到 6 psi)。请勿拆卸螺栓、管堵、管件等, 除非压缩机的所有压力都已卸除。</p>	<p>搬运压缩机时必须注意使其保持垂直 (最多可偏离垂直位置 15°)。</p>	

## 电气连接



## 1 - 概述

这些说明同用于制冷系统的 MLZ/MLM 涡旋压缩机有关。它们提供了有关该产品的安全和正确使用的必要信息。

## 2 - 处理和存储

- 处理压缩机时请小心。请使用包装箱内的专用把手。请使用压缩机的吊环，并采用恰当且安全的起重设备。
- 请将压缩机竖直存储和运输。
- 压缩机应存放在  $-35^{\circ}\text{C}$  到  $70^{\circ}\text{C} / -31^{\circ}\text{F}$  到  $158^{\circ}\text{F}$  的温度范围内。
- 请勿让压缩机和包装箱淋雨或是放在腐蚀性环境中。

## 3 - 组装前的安全措施

- △ 切勿在易燃环境中使用压缩机。**
- 将压缩机安装在坡度小于  $7^{\circ}$  的水平面上。
  - 确保电源与压缩机的电动机特性一致（请参见铭牌）。
  - 安装制冷剂为 R404A、R507、R407A、R407F 或 R134a 的压缩机时，请使用专为 HFC 制冷剂设计的设备。此类设备不得使用 CFC 或 HCFC 作为制冷剂。
  - 请使用干净且已脱水的制冷级铜管和银钎焊合金。
  - 请使用干净且已脱水的系统组件。
  - 与压缩机相连的管道三维必须富有弹性，以降低震动。
  - 务必使用压缩机附随的橡胶垫来安装压缩机。

## 4 - 组装

- 通过排放和吸入端口缓慢释放为了起保护作用而充注的氮气。
- 尽快将压缩机连接至系统，以避免周围环境中的水分污染润滑油。
- 切割管道时，避免材料进入系统。若无法去除毛刺，切勿钻孔。
- 采用最新技术、利用通风管中的氮气流进行铜焊，并且要格外小心。
- 连接所需的保护装置和控制器。当使用可能配备的 schrader 端口来实现这一点时，请拆掉内阀。
- 有关 C8 型压缩机的并行组装，请与 Danfoss 联系。

## 5 - 泄漏检测

- △ 切勿用氧气或干燥空气对回路加压。这会酿成火灾或爆炸。**
- 请勿使用检漏染料。
  - 对整个系统进行泄漏检测。
  - 低侧测试压力不得超过  $31\text{ bar} / 450\text{ psi}$ 。
  - 如果发现泄漏，则检修泄漏并再次进行泄漏检测。

## 6 - 真空脱水

- 切勿使用压缩机将系统排空。
- 将真空泵连接至 LP 和 HP 端。
- 使系统达到下述真空度： $500\ \mu\text{m Hg} (0.67\ \text{mbar}) / 0.02\ \text{inch Hg}$  (绝对值)。
- 在压缩机处于真空状态时，请勿使用兆欧表给压缩机供电，因为这样会内部损伤。

## 7 - 电气连接

- 关闭主电源并将其绝缘。
- 所有电气组件的选择必须依据当地标准和压缩机要求进行。
- 有关电气连接的详细信息，请参考第 3 页。用于三相应用的端子分别标有 T1、T2 和 T3。用于单相应用的端子分别标有 C (公用)、S (启动) 和 R (运行)。
- Danfoss 涡旋压缩机仅在逆时针旋转 (从压缩机顶部看) 时才会对气体进行压缩。由于单相电动机仅单向启动和运行，因此反转

并不是一个需要特别考虑的问题。但根据供电的相位角，三相电动机可能双向启动和运行。为确保压缩机以正确方向工作，在安装期间须给予注意。

- 使用环接型螺钉端子 (C 型) 进行电源连接时，请使用  $\varnothing 4.8\ \text{mm} / \#10 - 32$  螺钉和  $1/4"$  环形端子。以  $3\ \text{Nm}$  的扭矩拧紧。
- 对于快速型叉片端子 (P 型)，请使用  $\varnothing 6.3\ \text{mm}$  连接片。
- 使用自攻螺钉将压缩机接地。

## 8 - 填充系统

- 切断压缩机。
- 如果可能的话，让制冷剂充注量保持在指定的充注限制以下。如果超出该限制；请防止压缩机的抽气周期或吸入管累加器出现液体回液。
- 切勿让充注气瓶一直与回路连接。

压缩机型号	制冷剂充注限量
MLZ / MLM015-019-021-026	3.6 千克/8 磅
MLZ / MLM030-038-045-048	5.4 千克/12 磅
MLZ / MLM058-066-076	7.2 千克/16 磅

## 9 - 运行前的检查工作

- △ 依照通用和当地相关的规定和安全标准，使用安全压力开关和机械卸压阀等保护装置。确保她们运行且状态良好。**
- △ 检查高压开关的设置，确保未超出任何系统组件的最大工作压力。**
- 建议采用低压开关来避免低压工作状态。

针对 R22 的最低设置	1.5 bar (绝对值) / 22 psia
针对 R404A 的最低设置	2.8 bar (绝对值) / 41 psia
针对 R407A 的最低设置	1.7 bar (绝对值) / 25 psia
针对 R407F 的最低设置	1.9 bar (绝对值) / 28 psia
针对 R134a 的最低设置	1.45 bar (绝对值) / 21 psia

- 确保所有电气连接均已正确固定，且符合当地规定。
- 如果需要曲轴箱加热器，则在初次启动之前或长期关闭后再启动之前，必须至少通电 24 个小时。
- 请对所有的螺纹接口螺母用紧固力矩  $90\ \text{Nm} \pm 20\ \text{Nm}$ 。

## 10 - 启动

- 切勿在未充注制冷剂的情况下启动压缩机。
- 如果安装了吸入和排出检修阀，则除非这些阀门已打开，否则请勿给压缩机供电。
- 给压缩机通电。它应会立即启动。如果压缩机没有启动，请检查端子电压以及布线是否一致。
- 可以通过下述现象来确定反转情况：过大噪音；吸入端和排出端之间无压差；以及管路变热而不是立即冷却。为验证供电的相位正确，并且压缩机以正确方向旋转，在初始启动时，应有技术服务人员在场。MLZ/MLM 涡旋压缩机在设计上最长可以反向工作 150 小时，但由于反转情况可能无觉察地持续更长时间，因此建议采用相位监视器。对 MLZ/MLM 048 和更大规格的压缩机来说，相关的所有应用都必须配备相位监视器。Danfoss 建议为商用压缩机提供相位保护。
- 如果内部过载保护器断开，则必须待其冷却至  $60^{\circ}\text{C} / 140^{\circ}\text{F}$  后才能复位。这可能需要几个小时，具体取决于环境温度。

## 11 - 检查压缩机的运行情况

**△ 检查电流和电压。** 在工作状态下测量电流和电压时，必须在供电线路的其他位置执行测量 (不能在压缩机电气盒中执行测量)

- 检查抽吸过热情况，降低水击风险。
- 观察视液镜 (如果配备的话) 中的油位约 60 分钟，确保有适当油量返回压缩机。
- 请遵守运行限制。
- 检查所有管道是否存在异常震动。如果位

移幅度超过 1.5 毫米/0.06 英寸，则须采用管道托架等纠正措施。

- 如有需要，请向低压端添加更多的液相制冷剂，并尽可能远离压缩机。必须在压缩机运行过程中执行该过程。
- 请勿对系统进行过量充注。
- 切勿将制冷剂排到大气中。
- 立刻安装场地之前，执行常规安装检查，涉及清洁度、噪音和泄漏检测。
- 记录制冷剂的类型和充注量以及工作条件，以供将来检查参考。

## 12 - 维护

**△ 内部压力和表面温度均具有危险性，并可能造成永久性伤害。** 维护操作员和安装人员需具备适当技能和工具。管道温度可能超过  $100^{\circ}\text{C} / 212^{\circ}\text{F}$ ，会造成严重烫伤。

**△ 务必根据当地规定定期进行维修检查，以确保系统的可靠性。** 为防止与压缩机相关的系统问题，建议定期进行下列维护操作：

- 检查保护装置是否正确安装和运行。
- 确保系统无泄漏。
- 检查压缩机的最大电流。
- 确保系统按照先前的维护记录和周围环境持续运行。
- 检查所有电气连接是否依然紧固。
- 保持压缩机的清洁，确保压缩机壳体、管道和电气连接没有生锈或氧化。
- 应定期检查系统和油脂中的酸度/湿度。


## 13 - 保修

对该产品进行索赔时，始终需提供其型号和序列号。

产品保修在下列情况下无效：

- 无铭牌。
- 外部改装，尤其是钻孔、焊接、脚垫破损以及撞击痕迹。
- 压缩机已打开或返还未密封。
- 压缩机内生锈，存在水渍或泄漏检测染料。
- 使用未经 Danfoss 批准的制冷剂或润滑油。
- 任何违背有关安装、应用或维护的建议指示的行为。
- 用于移动应用。
- 在爆炸性环境中使用。
- 进行保修索赔时未提供型号或序列号。

## 14 - 处理

 Danfoss 建议由适当的公司在自身设施处回收压缩机和压缩机油。