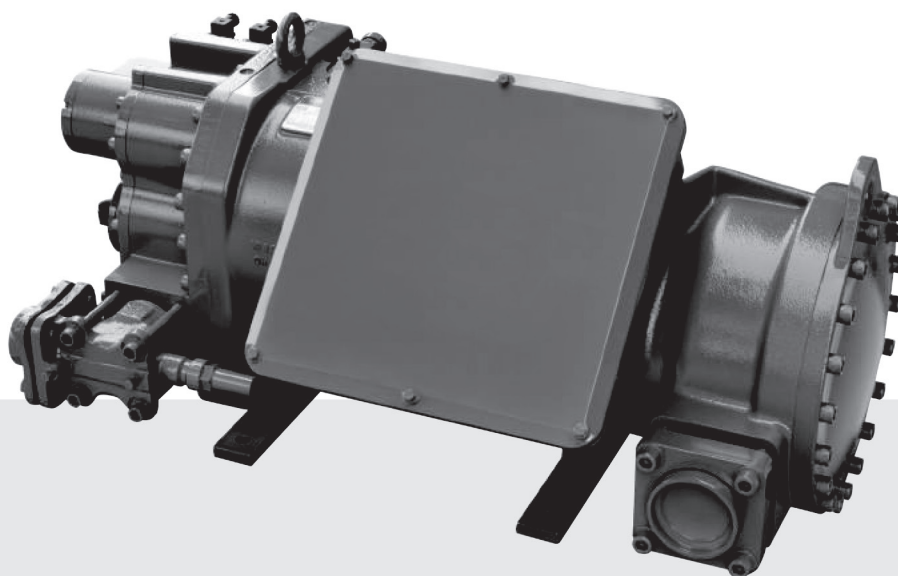


Semi-hermetic Screw Compressors Installation and start-up instructions

半封闭螺杆式压缩机 安装和启动说明书



Index

1. Information
2. Supply conditions
3. Unpacking and handling
4. Safety
5. Application ranges / Lubricants
6. Installation
7. Electrical connections
8. Commissioning
9. Operation / Maintenance
10. De-commissioning

索引

1. 信息
2. 供货状况
3. 开箱和处理
4. 安全须知
5. 适用范围/润滑剂
6. 安装
7. 电气接线
8. 试运转
9. 操作/维护
10. 调试

Before assembling and using the compressor please read carefully these instructions.

This will avoid improper use and incorrect assembly of the compressor that can result in serious or fatal injury and prevent damage.

Observe the safety guidelines contained in these instructions.

These instructions must always accompany the compressor from the manufacturer to the end user.

Identification of safety instructions



DANGER!

Indicates a dangerous situation which, if not avoided, will cause immediate fatal or serious injury.



WARNING!

Indicates a dangerous situation which, if not avoided, may cause fatal or serious injury.



CAUTION!

Indicates a dangerous situation which, if not avoided, may cause minor injuries to persons.



ATTENTION!

Instructions on preventing possible damage to the equipment.



INFORMATION

Instructions and suggestions to facilitate operations.



DANGER!

Voltage hazard, risk of electric shock.

在组装和使用压缩机前，请认真阅读该说明书。

可以避免由于使用不当和压缩机组装不正确造成的严重或致命的伤害，并防止压缩机损坏。

注意阅读说明书中包含的安全指南。

从制造商到用户必须都要遵守这些安全指南。

安全指南说明



危险！

表示这种情况危险，如果不能避免则会立即致命或者造成严重伤害。



警告！

表示这种危险情况危险，如果不能避免则会造成致命或者严重伤害。



小心！

表示这种情况危险，如果不能避免则会对人造成轻微伤害。



注意！

防止对设备造成的损害的说明。



信息

指导和建议。



危险！

电压危险，触电危险。

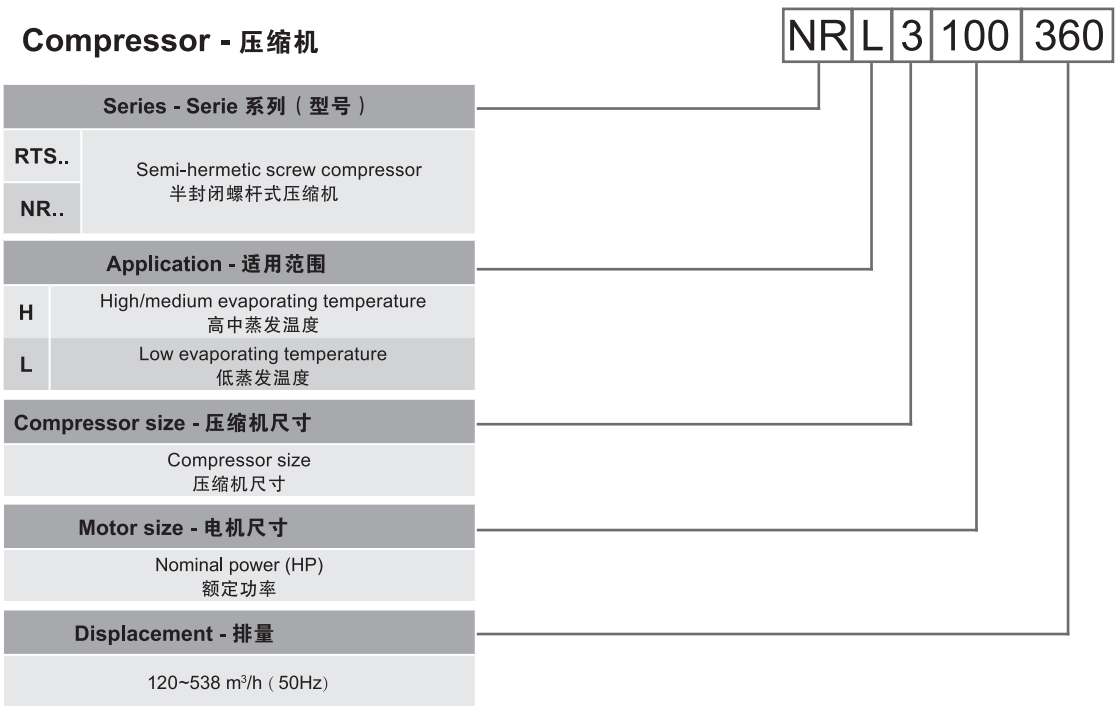
Models Range

型号

High and medium temperature - Motor 1 中高温— 1号电机	Low temperature - Motor 2 低温— 2号电机	R134a application - Motor 3 R134a适用 3号电机
RTSH-40-120	RTSL-30-120	RTSH-30-120
RTSH-50-150	RTSL-40-150	RTSH-40-150
NRH2-60-186	NRL2-50-186	NRH2-50-186
NRH2-70-210	NRL2-60-210	NRH2-60-210
NRH3-80-240	NRL3-70-240	NRH3-70-240
NRH3-90-270	NRL3-80-270	NRH3-80-270
NRH4-100-300	NRL4-90-300	NRH4-90-300
NRH5-120-360	NRL5-100-360	NRH5-100-360
NRH6-110-316	NRL6-125-428	NRH6-110-372
NRH6-125-372	NRL6-160-538	NRH6-115-428
NRH6-140-428	-	NRH6-125-468
NRH6-160-468	-	NRH6-140-538
-	-	NRH6-180-538

Model Designation

型号图示



Name plate

铭牌

Manufacturer
制造商

Compressor model
压缩机型号

FRASCOLD SPA

Type **NRL3-70-240Y**

Nr. **8M001001**

Serial number
序列号

Maximum allowable pressure
允许最大运行排气压力

Maximum allowable standstill pressure
允许最大静止吸气压力

Frequency/ Displacement/ Speed
频率/排量/转速

Three-phase alternating current
三相交流电流

Motor type
电机启动方式

Specified voltages
额定电压

Specified frequencies
额定频率

Hz	Displ. m³/h	RPM
50	240	2900
60	288	3500

Max. Operating Disch. Pressure bar 30

Max. Static Suct. Pressure bar 20,5

CE

Volt		Hz	MRA		LRA	
PW			PW		PWS	DOL
380-420		50	122		298	518
440-480		60	122		298	518

Locked rotor current
堵转电流

PW Locked rotor amperes
PW启动堵转电流

Direct on line locked rotor amperers
直接启动堵转电流

Maximum operating current
最大工作电流

Identification barcode
条码

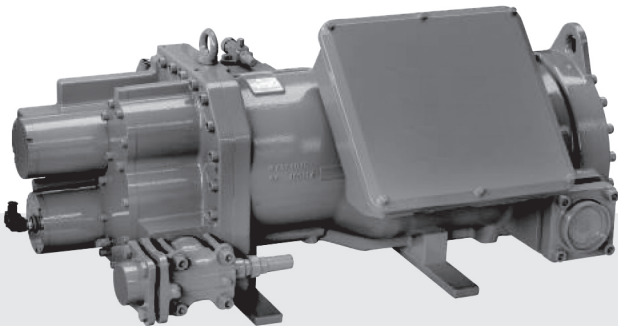
Identification code
识别码

Place of manufacturing
产地

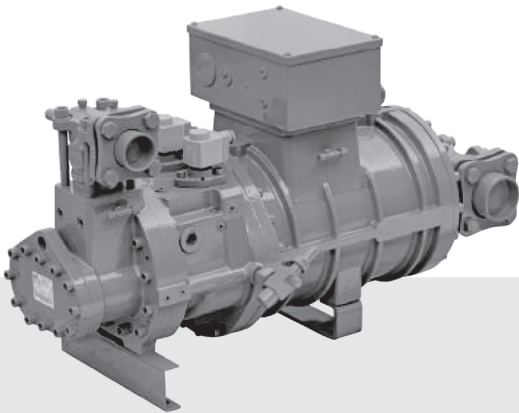
Frascold S.p.A.

NL0702408HM001001

RESCALDINA ITALY



NR_6 Series
NR_6 系列



RTS / NR Series
RTS / NR 系列



When the compressor is unloaded, inspect the crate or cartoon box for any visible damage and make sure it is in good condition. In case any item is damaged, contact your forwarder immediately and send a registered letter to the shipping company, claiming the suffered damage, copy to Frascold for knowledge. Check the contents of the packing, verifying the correspondence with the packing list and/or copy of your order. Contact Frascold or local distributor/agent immediately if there is any item missing.

2.1 Equipment provided separately

The standard supply includes the **Oil circuit kit** delivered in a separate cartoon box. These parts are necessary for the correct operation of the compressor and the installer must take care of the installation (see 5.4 Oil mangement).

Contact the supplier if this additional material is missing.

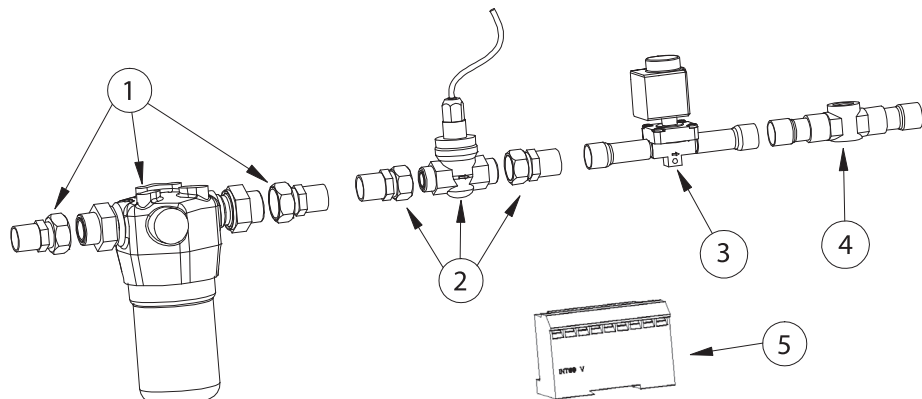
• **RTS and NR models (not NR6)**

POS	N.	OIL CIRCUIT KIT COMPONENTS	CODE
1	1	Oil Filter assembly	T00WP091
	2	Nut 1"1/4 D.22	T00BTWQ11S1
	2	Teflon ring 25X1,5	T00OR5015025
	2	O-ring NBR	T00S3131OR
	2	Rotalock half union joint 1"G - 1"1/4UNF	T00V0001533
2	1	Flowswitch	T00WP160
	2	Rotalock conn. 1"UNS - 22ODS solder	T00RA4001040
	2	Teflon ring 19X1,5	T00OR501501
3	1	Solenoid valve 7/8" ODS solder	T00EC1300
	1	Coil 230V AC 50-60Hz	T00EC1222
	1	Coil Connector	T00EC1304
4	1	Oil sight glass 7/8" ODS solder	T00SOS7
5	1	INT69V oil flow control module	T00EC28

• **NR6 models (includes pos. 3 & 4 only)**

POS	N.	OIL CIRCUIT KIT COMPONENTS	CODE
3	1	Solenoid valve 7/8" ODS solder	T00EC1300
	1	Coil 230V AC 50-60Hz	T00EC1222
	1	Coil Connector	T00EC1304
4	1	Oil sight glass 7/8" ODS solder	T00SOS7

1	Oil filter assembly 过滤器组装
2	Oil flow switch assembly 油流开关组装
3	Solenoid valve 电磁阀
4	Oil sight glass 视油镜
5	Control module 控制模块



卸压缩机时，检查木箱或纸箱是否有任何可见的损坏，以便确保压缩机状况良好。如果有任何物品损坏，请立即联系物流公司，并将一封挂号信寄给运输公司，声称遭受了损害。同时复制一份给富士豪公司。检查和核对实物与收货清单是否一致。如果有任何物品丢失，请立即联系富士豪或当地经销商/代理商。

2.1 单独提供的配件

标准供货包含独立纸箱包装的回油组合包，这些配件是压缩机运行必要的，由专业安装人员负责安装（详见5.4 油路管制）。

如果这些附加的材料丢失请联系供应商。

• **NT S 和 NR 系列（不包含NR6）**

序号	数量	油循环组合包配件	编码
1	1	过滤器	T00WP091
	2	接头1" 1/4 D.22	T00BTWQ11S1
	2	聚四氟乙烯环 25X1,5	T00OR5015025
	2	O-ring 圈	T00S3131OR
	2	接头1" G - 1" 1/4UNF	T00V0001533
2	1	流量开关	T00WP160
	2	接头1" UNS - 22ODS	T00RA4001040
	2	聚四氟乙烯环19X1,5	T00OR501501
3	1	电磁阀7/8" ODS	T00EC1300
	1	线圈230V AC 50-60Hz	T00EC1222
	1	线圈接头	T00EC1304
4	1	视油镜 7/8" ODS	T00SOS7
5	1	INT69V 油流控制模块（视发货情况）	T00EC28

• **NR6 系列(仅包含 序号3和 4)**

POS	N.	COMPONENTI KIT CIRCUITO OLIO	CODICE
3	1	电磁阀7/8" ODS	T00EC1300
	1	线圈230V AC 50-60Hz	T00EC1222
	1	线圈接头	T00EC1304
4	1	视油镜 7/8" ODS	T00SOS7

2. Unpacking and handling

Inspect the packing checking for any visible damage.
Check the contents of the packing, verifying the correspondence with the packing list.

Please make sure the compressor still contains pressurized nitrogen.

WARNING!
The compressors are delivered with a holding charge of nitrogen of, 0.5-1 bar above atmospheric pressure, to avoid moisture contamination. Incorrect handling may cause injury to eyes and skin. Wear safety goggles.
Do not open the connections, before the pressure has been totally released.

DANGER!
Use proper lifting tools, according to the compressor weight. Compressors are heavy machines which may cause injury or death in the event of an accidental drop.

ATTENTION!
Use the lifting points (fig.1a, 1b) for handling.
Avoid any impact of the compressor, solenoid valves and electrical components and pipe work in general.
Danger of compressor damage!

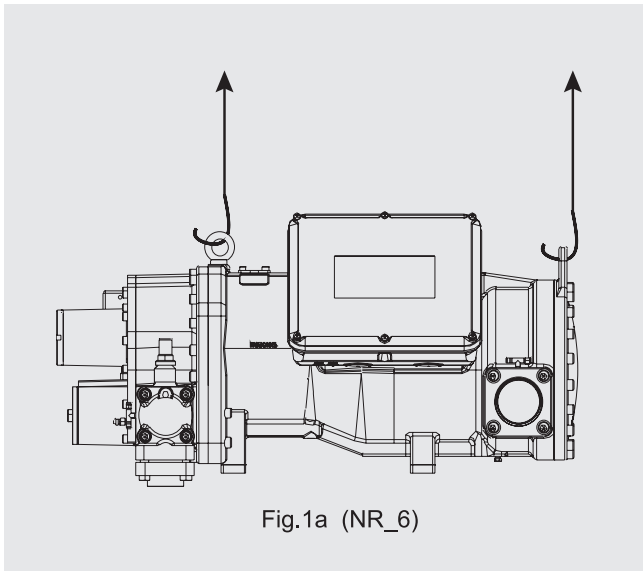


Fig.1a (NR_6)

2. 开箱与处理

检查包装是否有可见破损。
检查包装的内容，逐一与装箱单核对。

请确认压缩机仍含有加压氮气。

警告!
压缩机提供的氮气压高于大气气压0.5-1帕，可以避免受潮。
错误的操作可能伤及眼睛及皮肤，请佩戴防护目镜。
在压力完全被释放前，请不要打开压缩机。

危险!
请根据压缩机的重量使用适当的起重工具。压缩机是重型机械，意外坠落可能造成受伤或死亡。

注意!
使用吊点（图1A，1B）吊起。
一般情况下，在工作时，避免对压缩机，电磁阀和电器元件和管件产生任何碰撞。
压缩机损坏的危险!

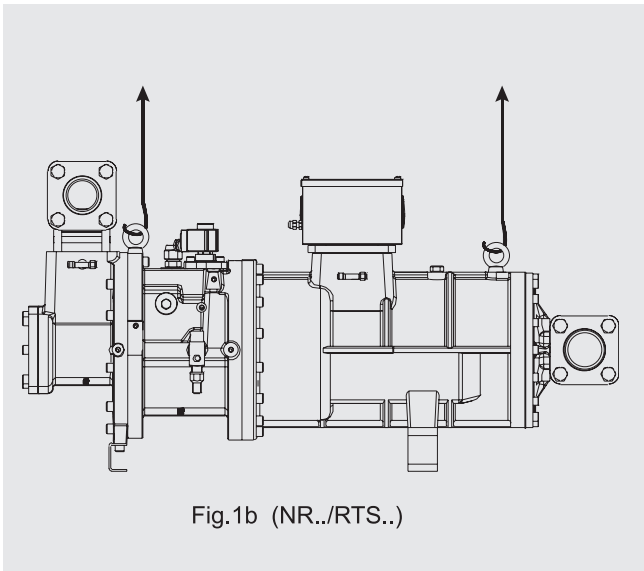


Fig.1b (NR../RTS..)

Model / 型号			Weight / 重量 (+/-10 kg)
RTSH-40-120	RTSL-30-120	RTSH-30-120	180
RTSH-50-150	RTSL-40-150	RTSH-40-150	230
NRH2-60-186	NRL2-50-186	NRH2-50-186	250
NRH2-70-210	NRL2-60-210	NRH2-60-210	300
NRH3-80-240	NRL3-70-240	NRH3-70-240	320
NRH3-90-270	NRL3-80-270	NRH3-80-270	325
NRH4-100-300	NRL4-90-300	NRH4-90-300	350
NRH5-120-360	NRL5-100-360	NRH5-100-360	355
NRH6-110-316	NRL6-125-428	NRH6-110-372	735
NRH6-125-372	-	NRH6-115-428	735
NRH6-140-428	-	NRH6-125-468	740
NRH6-160-468	-	NRH6-140-538	750
-	NRL6-160-538	NRH6-180-538	765

Frascold screw compressors are intended for installation in refrigeration systems.

The machines or partly completed machines shall comply with local safety regulation and standards of the place of installation (within the EU according to the EU Directives 2006/42/EC Machinery Directive, 2014/68/UE Pressure Equipment, 2006/95/EC Low Voltage Directive).

They may be put into operation only if the compressor has been installed in accordance with these assembly instructions.

The commissioning is only possible if the entire system into which it is integrated has been inspected and approved in accordance to the provisions of legal regulations.

The Manufacturer Declaration, describes the standards to be applied. The Manufacturer Declaration of incorporation, according to the 2006/42/EC, is available at: **www.frascold.it**, documentation, manufacturer's declaration.



CAUTION!

Burns or frostbites are possible.

According to operating conditions, compressor surfaces may reach a temperature above 60°C and below 0°C.



ATTENTION!

Danger of major damage to the compressor. Check the specified rotating direction, a screw compressor can only operate in the prescribed direction.

Residual Hazard

Certain residual hazards related to the compressor cannot be avoided. It is therefore necessary that all the personnel must be trained and have read this manual before any maneuvers or maintenance

The personnel, working on the machine shall observe all the specific safety regulations and standards, applicable in the specific case.



DANGER!

QUALIFICATION OF TECHNICAL PERSONNEL

The personnel working on the compressor and the refrigeration system, must be properly trained and qualified.

Personnel must be capable of assessing the maintenance to be carried out, recognizing any potential dangers.



WARNING!

Usage at lower evaporating pressures than atmospheric may cause air and moisture entering the refrigerating circuit.

Risk of chemical reactions and higher pressures than expected.

富士豪螺杆式压缩机适用于安装在制冷系统中。

该机器或半成品应遵循当地安全规定，和安装地的标准（欧盟内，根据欧盟机械指令2006/42/EC，压力设备指令2014/68/UE，低电 压指令2006/95/EC）。

确保压缩机按指令安装后，才可投入使用。

按照法律法规的规定完成检查和批准，才可开始调试。

制造商声明，描述了需要遵循的标准。根据2006/42/EC编写的制造商声明，请访问www.frascold.it，文档，制造商的声明。



小心！

可能导致烧伤或冻伤。

不同的操作条件下，压缩机表面温度可高达60°C以上和0°C以下。



注意！

压缩机严重损坏的风险。检查指定的旋转方向，螺杆式压缩机只能在预定的方向下操作。

残留的危害

压缩机残留的危害是无法避免的。所有的操作和维护必须由经过训练和阅读本手册的人员执行。

在机器旁工作的人员，需仔细遵循所有特定的安全规则和标准，适用于特定情况。



危险！

技术人员资格

使用压缩机和制冷系统的人员，必须经过适当的培训并合格。

操作人员必须能够评估是否可以维修，确认任何潜在的危险。



警告！

在比大气压低的蒸发温度下使用，可能导致空气和湿气进入制冷回路。有化学反应的危险，存在比预期更高的压力。

Authorised refrigerants: HFC and HCFC as indicated in FSS3 selection software; other refrigerants upon request

Allowable pressures: High Pressure side 30 bar
Low pressure side 20.5 bar

Operating limits: See FSS3 selection software

Ambient temperatures: -15°C ...+55°C

Storage temperatures: -30°C...+60°C

Main Voltage (*): +/- 5% in steady operation

Main Voltage (*): +/- 10% during transient

Frequency (*): +/- 2%

(*) Respect to nominal rated value

授权的制冷剂：见选型软件FSS3中所示的HF和HCFC制冷剂；其他制冷剂的应用可按要求提供。

允许的压力值：高压端30bar
低压端20.5bar

操作范围：见选型软件

环境温度：-15°C ... +55°C

存储温度：-30°C ... +60°C

主电压 (*): +/- 5% 稳定运行

主电压 (*): +/- 10% 瞬间运行

频率 (*): +/- 2%

(*)相对于额定值

The selection of the oil depends on the oil properties, operating conditions, the refrigerants, the operating conditions of the system. Oils other than those listed below may be used. Special applications may require different viscosity/oil type, please contact Frascold.

油的使用取决于油的性能，操作条件，制冷剂，系统的操作条件。

除了下面列出的油，其他均不可使用。

特殊的应用可能需要不同的黏度/油型，请联系富士豪。

Type of oil 油型	Alternative oil 代替油	Base 依据	Viscosity at 40°C 粘性 (cSt)	Refrigerant 冷媒	Application 应用
Frascold 170POE 富士豪170POE	Lubrizol CPI Emakarate RL170H 或者同等物	POE	170	R134a / R404A / R507A R407C / R407A / R407F	LT / MT / HT
Frascold 150POE 富士豪150POE	CPI CP 4214-150 或者同等物	POE	150	R22	MT
Frascold 100AB 富士豪100AB	Mobil Zerice S100 或者同等物	AB	100	R22	LT / MT

POE: Polyester
AB: Alkylbenzene
LT: Low temperature
MT: Medium temperature
HT: High temperature

POE: 脂类油
AB: 烷基苯
LT: 低温
MT: 中温
HT: 高温

For handling, please refer to chapter 2.

Semi-hermetic compressors must be installed horizontally.

In case of marine applications, please contact Frascold.

The compressors are not suitable for installation in chemically aggressive or corrosive atmosphere, or combustible environments (Please contact Frascold for special applications).

The compressors must never be installed in rooms or areas where the ambient temperature of the compressor can exceed the specified limits as stated in the previous page.



INFORMATION

Ensure adequate compressor ventilation

Provide adequate clearance for compressor maintenance.

Transport

The compressor can be transported fixed on its pallet or lifted it by using the lifting points as indicated in fig1.

Mounting

Compressors must always be solidly fixed to a frame, suitable to withstand static and dynamic forces originated by the compressor.

The use of vibration dampers is strongly recommended in order to reduce noise/vibration transmission to the frame.

Mount the vibration absorbers following the sequence in fig 2; a slight rubber deformation must be seen.

关于操作，见第2章

半封闭压缩机必须水平安装。

如果在海上应用，请联系富士豪。

压缩机不能在具有化学腐蚀性气体或易燃环境中安装（特殊应用请联系富士豪）。

不可以除了在除了所限定的 压缩机环境温度（请参阅前一页）以外的房间或地方安装。



注意

确保压缩机通风。

为压缩机的维护提供足够的空间。

运送

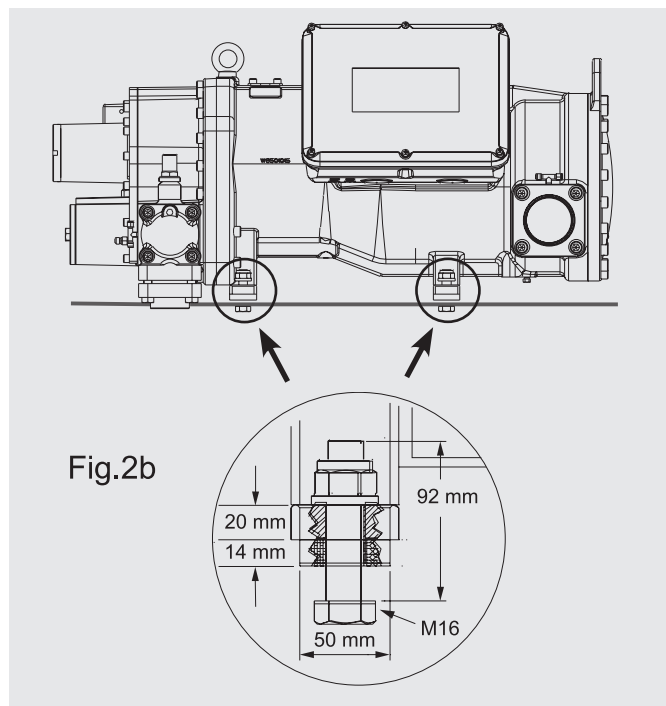
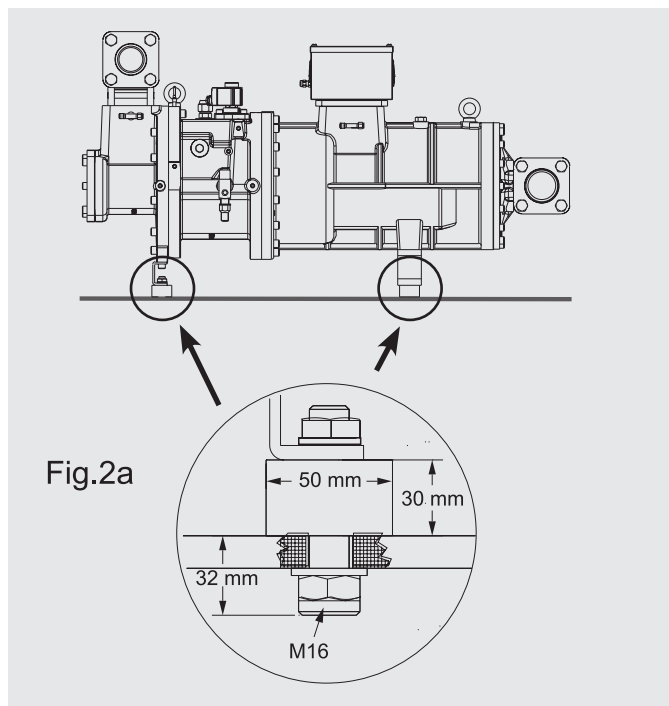
压缩机可以固定在托盘上运送，也可以使用如图1的吊点吊起来运送。

安装

压缩机必须牢固的安装在框架上，它能承受压缩机所产生的静态和动态力。

为了减少噪音/振动传递到框架，强烈建议使用减震器。

按下面的图2中的顺序安装减震器；最好使用橡胶避震垫片。



Model 型号	Figure 图	Fixing 固定	Tightening torque 拧紧力矩	Hardness 硬度
RTSH/L NRH/L 2-3-4-5	2a	M16	30Nm	73 邵尔
NRH/L 6	2b	M16	30Nm	90 邵尔

5.1 Piping

The pipe connections are designed for standard tubes in millimetres (in inches upon request). Use solder connections. According to the size of the valve, pipes can be inserted inside the bushes, make sure that pipe work locates firmly against the shoulder of the bushing.

**WARNING!**

The compressors are delivered with a holding charge of nitrogen of, 0.5-1 bar above atmospheric pressure, to avoid moisture contamination. Incorrect handling may cause injury to eyes and skin. Wear safety goggles.

Before the pressure has been totally released, do not open the connections.

**ATTENTION!**

Overheating may damage the compressor valves and gaskets. Always remove the bushes for welding and brazing. Use inert gas to inhibit the oxidation.

Pipes and system components must be clean, dry and free of scale and metal swarf.

Also rust and phosphate coating must be avoided.

**ATTENTION!**

It is advisable to install a molecular sieve with a 25 micron mesh or less on the suction line.

The additional filter becomes necessary for long pipe layouts and when the correct cleanliness cannot be guaranteed.

**ATTENTION!**

A generously sized filter dryer is mandatory on the liquid line.

**INFORMATION**

Pipe layout of the suction and discharge lines after the compressor must be carried out in order to guarantee a smooth running and vibration behaviour of the entire system.

**ATTENTION!**

Improper piping or its placement may generate cracks than lead to refrigerant losses.

5.1 管道

管道的接头设计是用于以毫米为标准管（有需求可提供英寸为单位的）。采用焊接连接。根据阀门的尺寸，管道可插入衬套，确保管道牢牢固定在衬套上。

**警告！**

压缩机提供的氮气气压高于大气气压0.5-1帕，可以避免受潮。

错误的操作可能伤及眼睛及皮肤，请佩戴防护目镜。

在压力完全被释放前，请不要打开压缩机。

**注意！**

过热会损坏压缩机阀门和垫圈。焊接和钎焊时务必取下衬套。使用惰性气体抑制氧化。

管道和系统部件必须清洁，干燥，避免生垢和切屑。

必须避免生锈和产生磷化膜。

**注意！**

最好在吸气管路上安装一个过滤精度是25微米或者更小精度的吸气过滤器。

当用管道比较长或清洁度不能保证时，附加过滤器就相当必要了。

**注意！**

液体管线上必须安装一个大的干燥过滤器。

**信息！**

为了保证整个系统的稳定运行和符合压缩机的振动特性，

必须要对压缩机的吸气和排气管路进行合理设计。

**注意！**

不恰当的管道布置和管道振动可能会导致管道产生裂缝，进而导致损失制冷剂。

5.2 Capacity control / Start unloading

5.2 能量调节/卸载启动

The position and the logic of the solenoid valves are indicated in the tables / drawings according to the models.

不同型号压缩机，可供实现的能调和电磁阀位置如下图表所示。

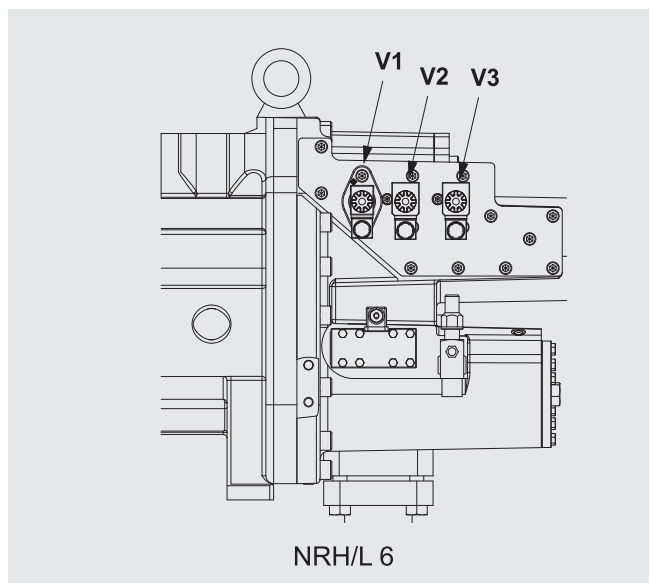
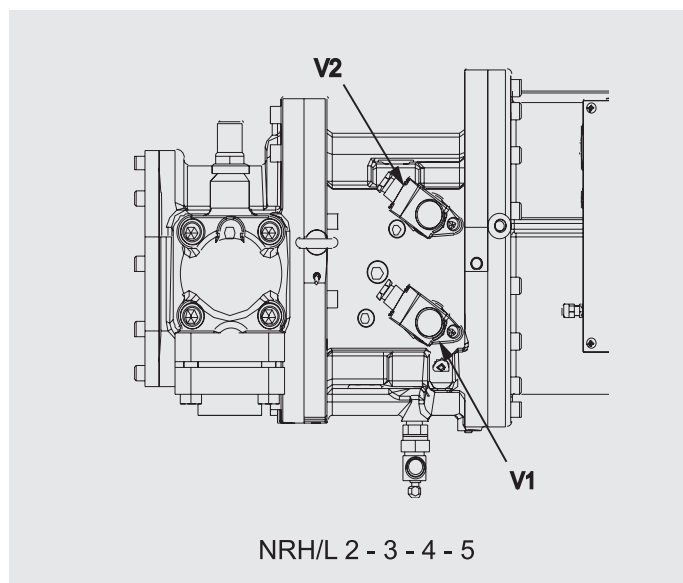
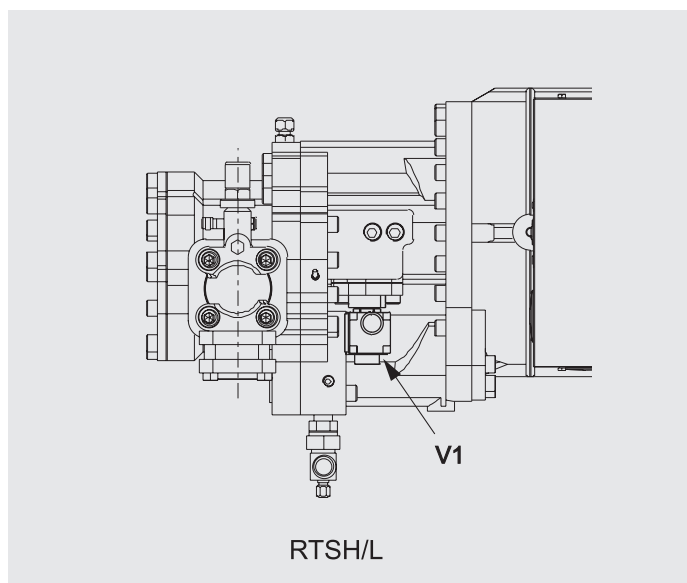
Types 型号	Capacity Control 容量控制			Start / Stop 开/关
	Full load 100% 满负荷100%	1. Step (75%)	2. Step (50%)	
RTSH/L 120 - 150	V1 = ●	V1 = ○	-	-
NRH/L 186 - 210 NRH/L 240 - 270 NRH/L 300 - 360	V1 = ● V2 = ●	V1 = ● V2 = ○	V1 = ○ V2 = ○	-
NRH/L 6	V1 = ● V2 = ○ V3 = ○	V1 = ● V2 = ○ V3 = ●	V1 = ● V2 = ● V3 = ○	V1 = ○ V2 = ○ V3 = ○

1. The effective capacity of the stages depends on operating conditions.
2. Start / Stop can only be used at start-up and shutdown.

1. 阶段75%运行用于能量调节。
2. 阶段50%只用于压缩机的启动和关闭。

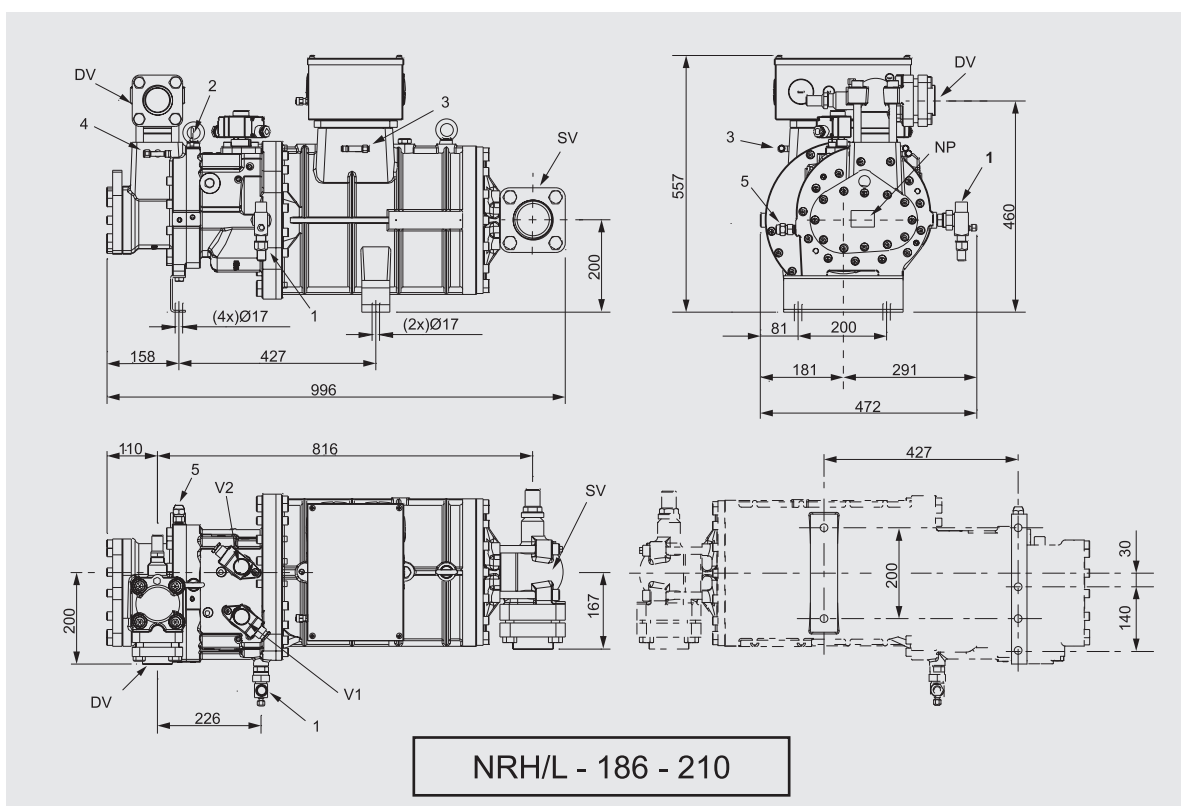
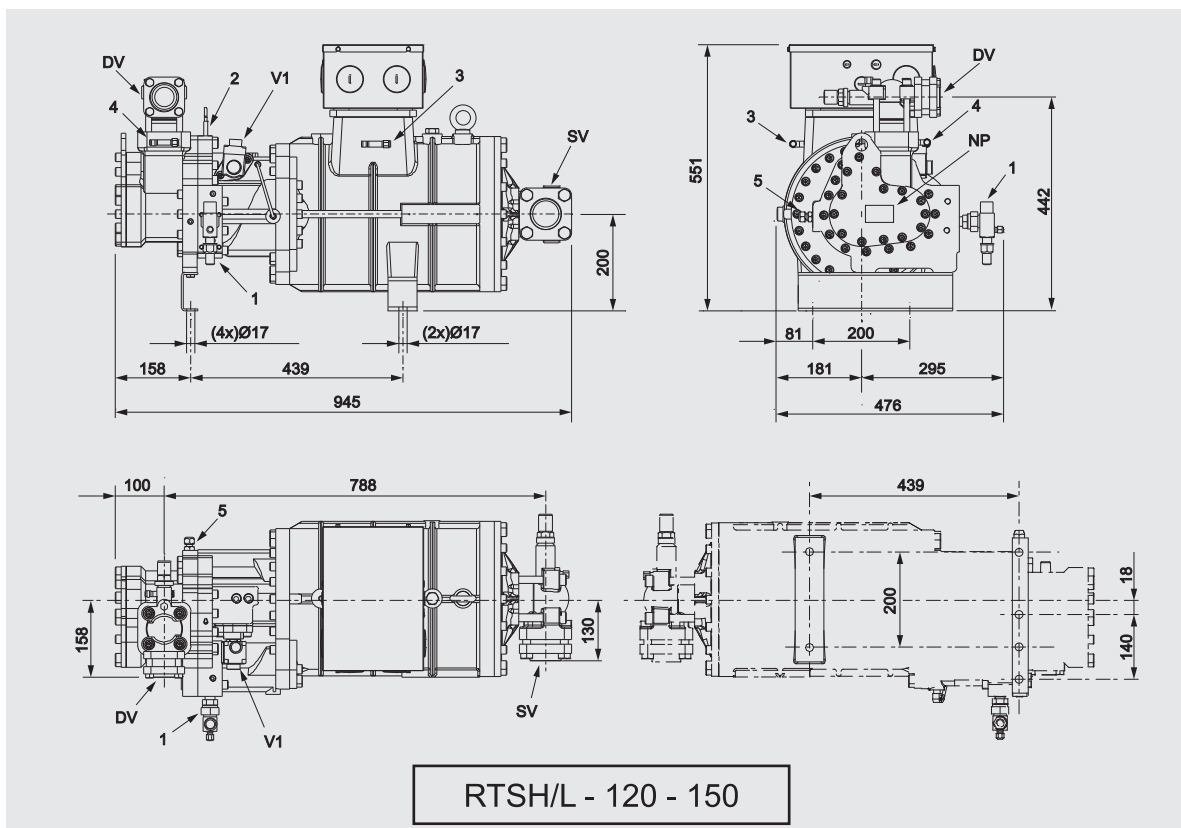
○ Coil de-energized ● Coil energized

○ 阀不通电 ● 阀通电



5.3 Connections

5.3 连接

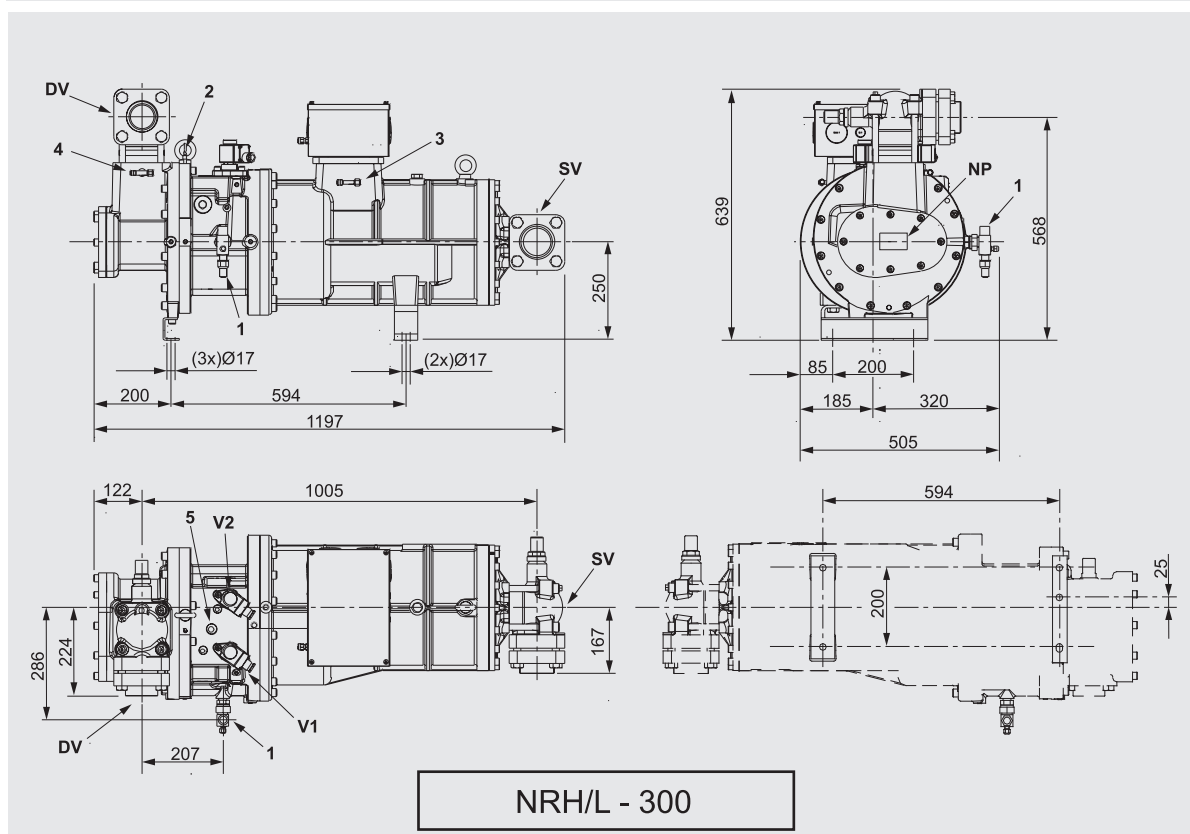
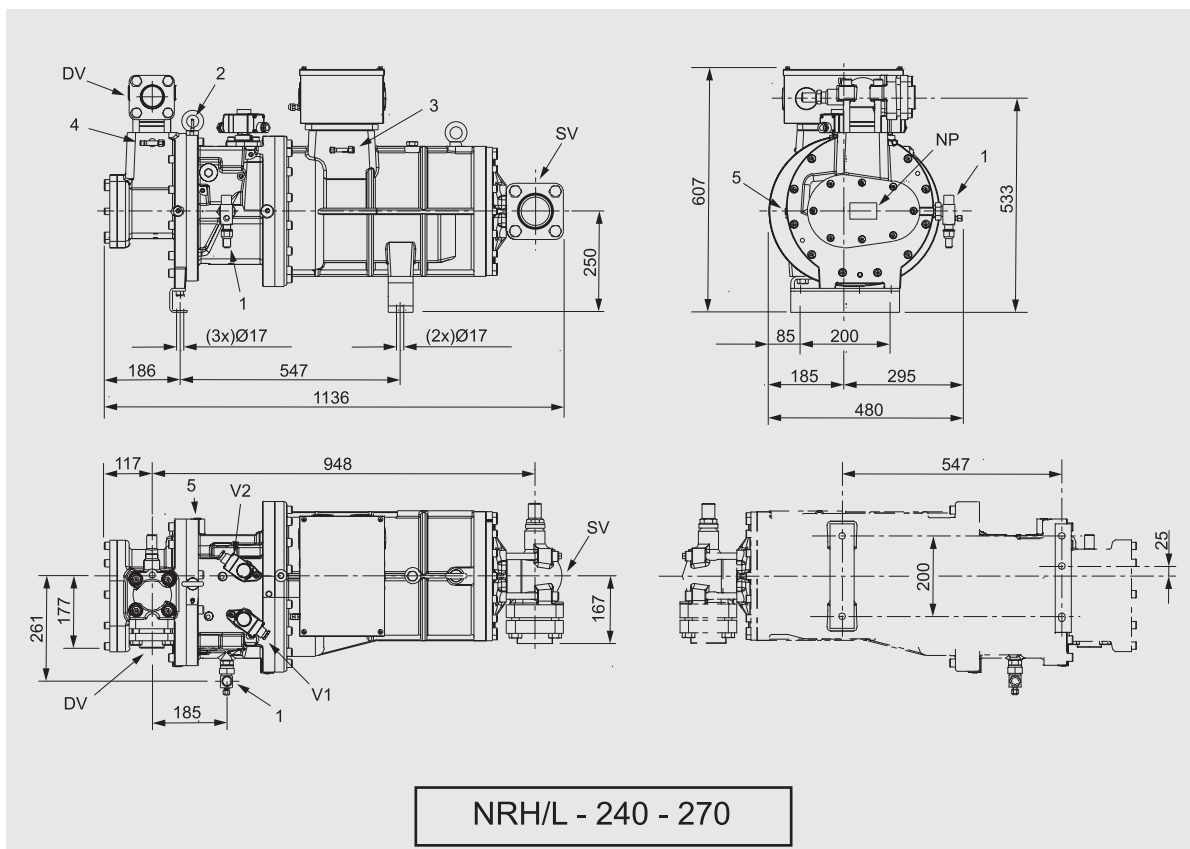


1. Oil return line connection
 2. Discharge temperature sensor
 3. Low pressure connection (LP)
 4. High pressure connection (HP)
 5. Economizer / liquid injection connection
 - V1 Capacity control valve (step 1)
 - NP Nameplate
 - DV Discharge valve
 - SV Suction valve
- | | |
|----------------|--------------------|
| RTSH/L 120-150 | Ø 1" 5/8 - 42,0 mm |
| NRH/L 186-210 | Ø 2" 1/8 - 54,0 mm |
| RTSH/L 120-150 | Ø 2" 1/8 - 54,0 mm |
| NRH/L 186-210 | Ø 3" 1/8 - 79,4 mm |

1. 注油接头
 2. 排气温度传感器
 3. 低压连接
 4. 高压连接
 5. 经济器/喷液连接
 - V1 能量调节阀
 - NP 铭牌
 - DV 排气阀
 - SV 吸气阀
- | | |
|----------------|--------------------|
| RTSH/L 120-150 | Ø 1" 5/8 - 42,0 mm |
| NRH/L 186-210 | Ø 2" 1/8 - 54,0 mm |
| RTSH/L 120-150 | Ø 2" 1/8 - 54,0 mm |
| NRH/L 186-210 | Ø 3" 1/8 - 79,4 mm |

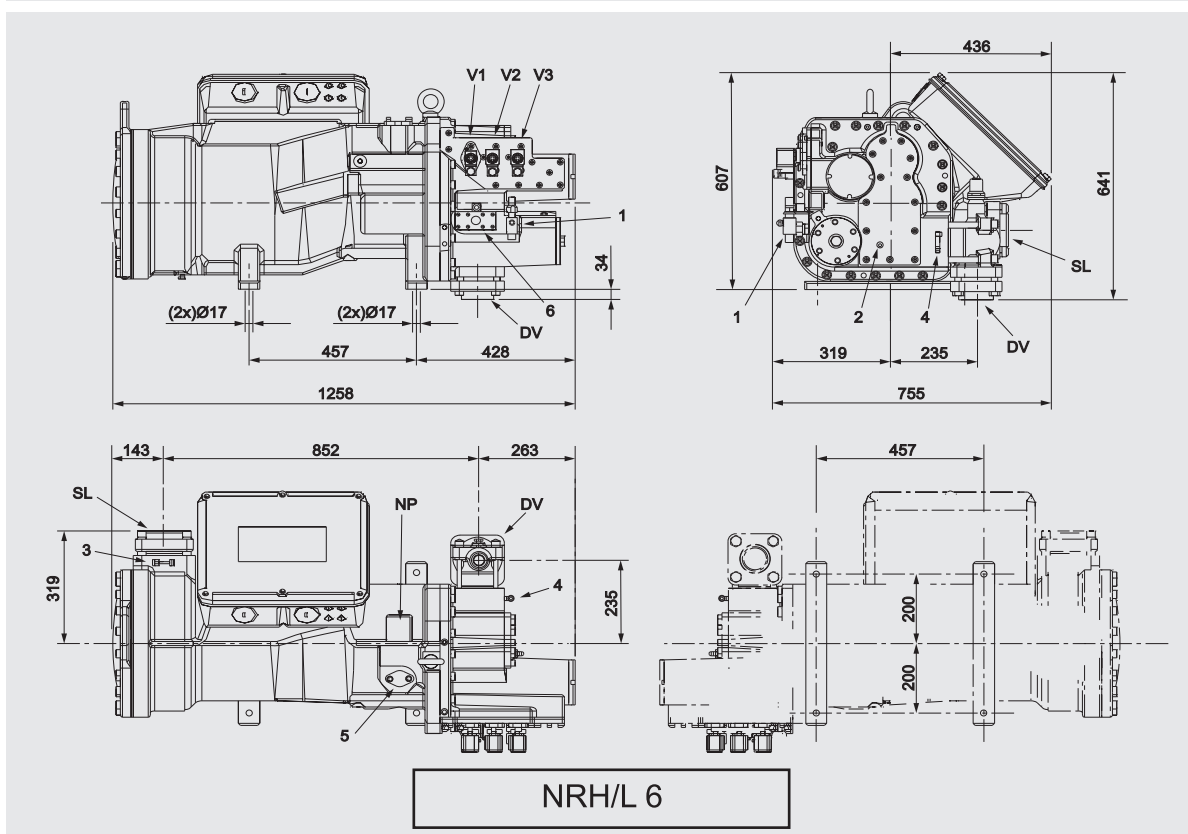
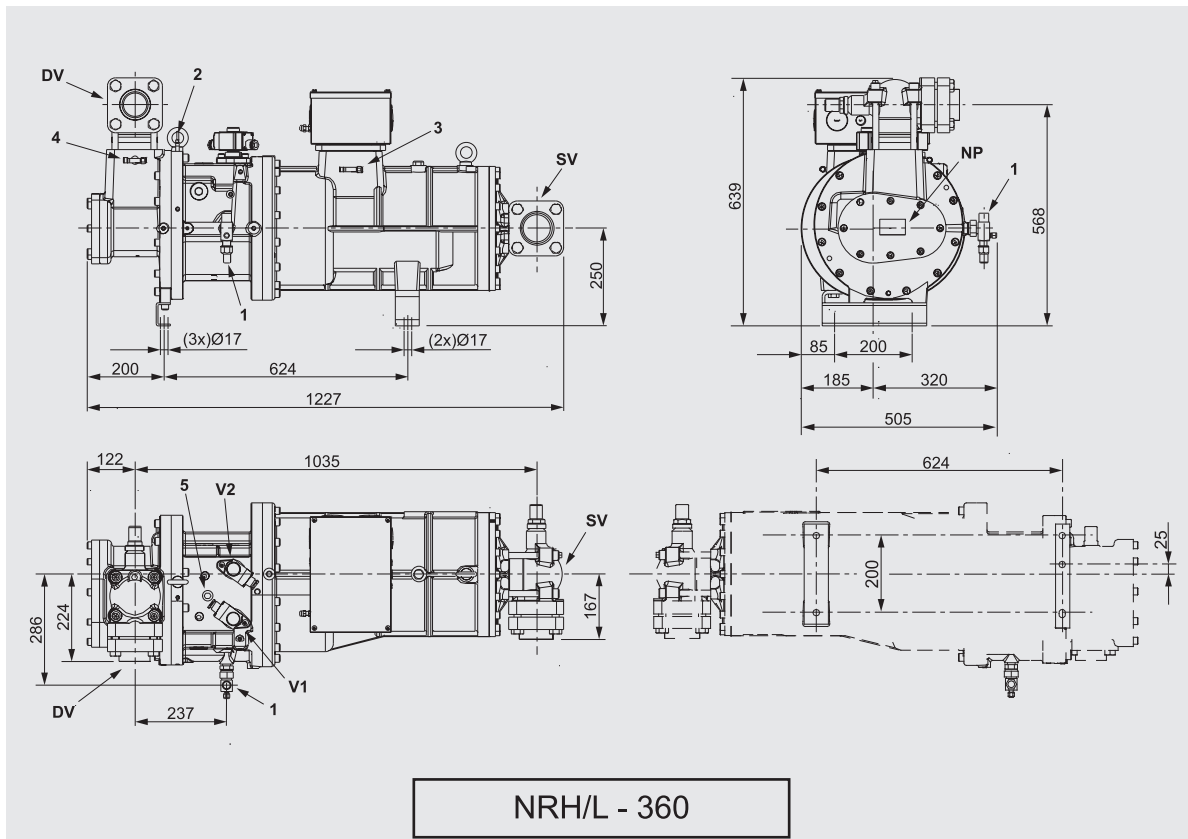
5. Installation

5. 安装



1. Oil return line connection
2. Discharge temperature sensor
3. Low pressure connection (LP)
4. High pressure connection (HP)
5. Economizer / liquid injection connection
- V1 Capacity control valve (step 1)
- V2 Capacity control valve (step 2)
- NP Nameplate
- DV Discharge valve NRH/L 240-270 \varnothing 2" $\frac{1}{8}$ - 54,0 mm
NRH/L 300 \varnothing 2" $\frac{1}{8}$ - 67,0 mm
- SV Suction valve NRH/L 240-270 \varnothing 3" $\frac{1}{8}$ - 79,4 mm
NRH/L 300 \varnothing 3" $\frac{1}{8}$ - 79,4 mm

1. 注油接头
2. 排气温度传感器
3. 低压连接
4. 高压连接
5. 经济器/喷液连接
- V1 能量调节阀
- V2 能量调节阀
- NP 铭牌
- DV 排气阀 NRH/L 240-270 \varnothing 2" $\frac{1}{8}$ - 54,0 mm
NRH/L 300 \varnothing 2" $\frac{1}{8}$ - 67,0 mm
- SV 吸气阀 NRH/L 240-270 \varnothing 3" $\frac{1}{8}$ - 79,4 mm
NRH/L 300 \varnothing 3" $\frac{1}{8}$ - 79,4 mm



1. Oil return line connection
2. Discharge temperature sensor
3. Low pressure connection (LP)
4. High pressure connection (HP)
5. Economizer / liquid injection connection
6. Flowswitch
- V1 Capacity control valve (step 1)
- V2 Capacity control valve (step 2)
- V3 Capacity control valve (step 3)
- NP Nameplate
- DV Discharge valve NRH/L 360 $\varnothing 2\frac{1}{8}$ " - 67,0 mm
- SV Suction valve NRH/L 360 $\varnothing 3\frac{1}{8}$ " - 79,4 mm
- DV Discharge valve NRH/L 6 DN80
- SL Suction bushing NRH/L 6 $\varnothing 4\frac{1}{8}$ " - 105 mm

1. 注油接头
2. 排气温度传感器
3. 低压连接
4. 高压连接
5. 经济器/喷液连接
6. 流量开关
- V1 能量调节阀
- V2 能量调节阀
- V3 能量调节阀
- NP 铭牌
- DV 排气阀 NRH/L 360 $\varnothing 2\frac{1}{8}$ " - 67,0 mm
- SV 吸气阀 NRH/L 360 $\varnothing 3\frac{1}{8}$ " - 79,4 mm
- DV 排气阀 NRH/L 6 DN80
- SL Codolo aspiraz. NRH/L 6 $\varnothing 4\frac{1}{8}$ " - 105 mm

5.4 Oil management

The oil leaving the compressor during running, must be properly separated from the refrigerant, in order to avoid heat exchange problems and guarantee the correct compressor lubrication flowing back to it.

**ATTENTION!**

Possible compressor damage.

Always guarantee the correct oil flow and oil characteristics.

The oil separator is equipped with oil heater and thermostat with the aim to ensure the right oil viscosity and properties. Follow the wiring diagram for electrical connections of the oil heaters, thermostat and oil level control (see 6. Electrical connection). The oil heaters must be energised during standstill. Thermal insulation of the oil separator must be provided for low ambient temperatures.

5.4 油路控制

为了给压缩机降温并保证润滑，随高压气态制冷剂一起排出去的冷冻油必须在油分离器内和制冷剂分离后再回流到压缩机。

**注意！**

可能造成压缩机损坏。

请保证正确的油的流动和油的特性。

油分离器装有油加热器和油恒温器，为了确保正确的油黏度和属性。

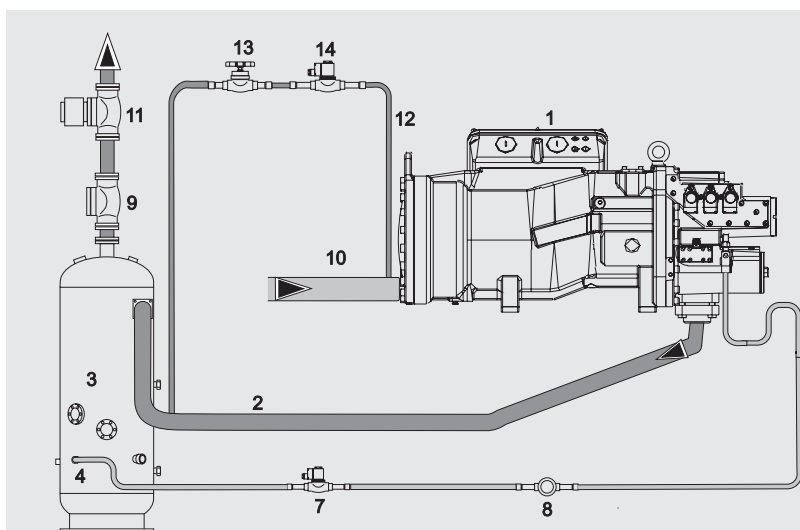
按照接线图完成油加热器、油恒温器和油位控制的电气连接（见电器连接6）。

停机时油加热必须通电。

在低环境温度下必须给油分离器进行热绝缘保温处理。

Oil circuit for NR_6

NR_6油循环



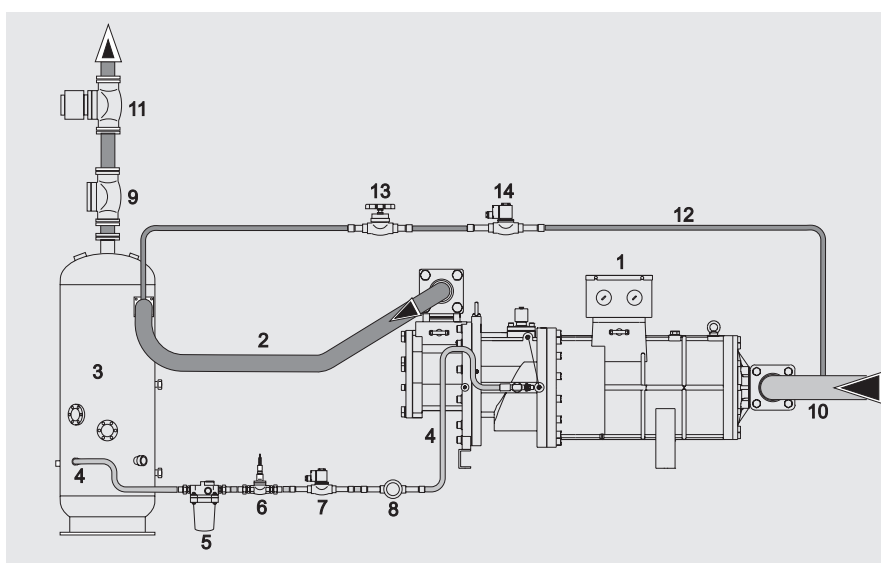
1. 压缩机
2. 排气管
3. 外置油分
4. 回油管
5. 油过滤
6. 油流量开关
7. 回油电磁阀
8. 视油镜
9. 单向阀
10. 吸气管
11. 排气压力控制阀

均衡管路:

12. 压力均衡管路
13. 截止阀
14. 电磁阀

Oil circuit for all other models

其它型号油循环



1. 压缩机
2. 排气管
3. 外置油分
4. 回油管路
5. 油过滤器
6. 油流量开关
7. 回油电磁阀
8. 视油镜
9. 单向阀
10. 吸气管
11. 排气压力控制阀

均衡管路:

12. 压力均衡管路
13. 截止阀
14. 电磁阀

The **Equalization Line** should be provided if the system is not operating for a long time without any possibility of high side and low side pressure equalization. The Equalization Line allows the migration of oil and refrigerant during the off periods, reduces the stress of the oil line components and ensures the highest oil viscosity to the separator at the next restart.

如果系统长时间不运行，且不可能实现高压侧和低压侧压力均衡时，可采用均衡管。均衡管允许油和制冷剂在停机期间的迁移，这样可以降低油管路部件的应力，并确保在下次重新启动时油分内的油达到最高粘度。

6.1 Power cables

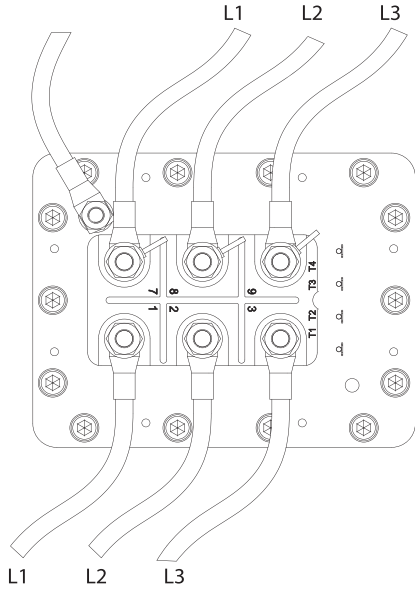
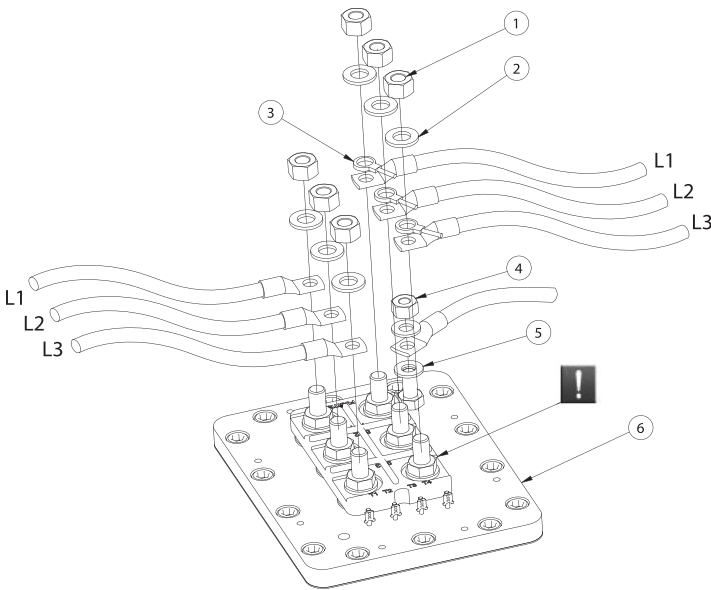
6.1 电缆

The personnel, shall observe all the local safety regulations and standards, applicable in the electrical maintenance and installation. All the electrical connections must be carried out according to the wiring diagrams (Fig. 3, 3b, 4).

工作人员应遵守适用于电气维护和安装的所有当地安全法规 and 标准。所有电气连接必须按照电路图进行 (Fig. 3, 3b, 4) 。

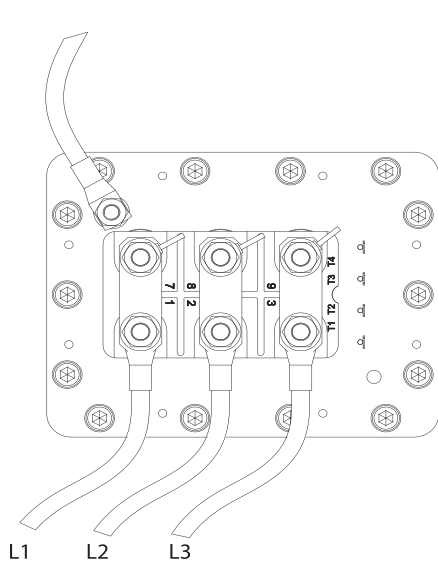
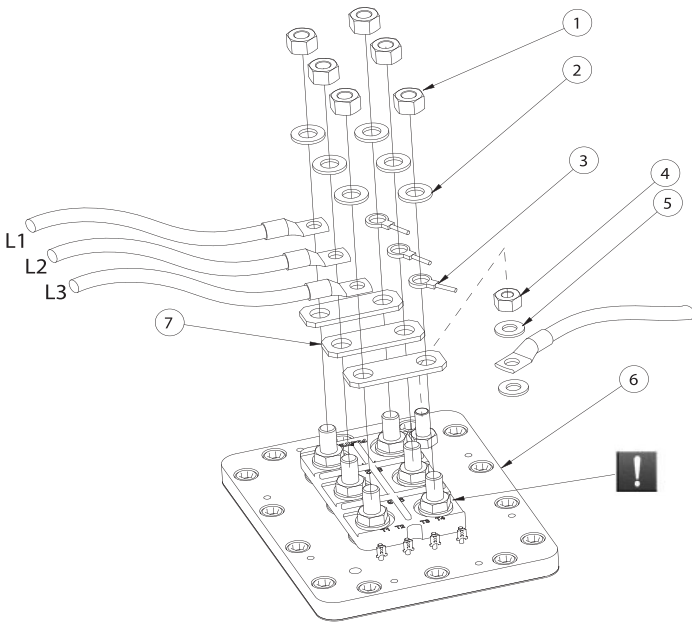
Configuration PART WINDING (PW) / STAR-DELTA (SD)

分绕组 (PW) / 星三角 (SD)



DIRECT ON LINE (DOL) configuration

直接启动 (DOL)



LEGENDA

注解

REF.	DESCRIPTION	Q.TY
1	Brass Nut M12 (tq 30Nm)	6 pcs
2	Brass Washer 12x24	6 pcs
3	Connection for Motor Protection Module	3 pcs
4	Brass Nut M10 (tq 20Nm)	1 pcs
5	Brass Washer 10x20	2 pcs
6	Terminal Plate	1 pcs
7	DOL Connection Bars (optional kit)	3 pcs

REF.	说明	Q.TY
1	黄铜螺栓 M12 (cs 30Nm)	6 pcs
2	黄铜垫圈 12x24	6 pcs
3	电机保护模块的连接	3 pcs
4	黄铜螺栓 M10 (tq 20Nm)	1 pcs
5	黄铜垫圈 10x20	2 pcs
6	接线板	1 pcs
7	直接启动的连接片 (选配套件)	3 pcs

! DO NOT UNFASTEN OR REMOVE THE SIX NUTS LOCKING THE INSULATING BLOCK !

! 不要松开或拆下锁定绝缘块的六个螺母!

Note: Motor PTCs are connected to terminal pins T1 and T2. The wiring parts 1 to 7 are supplied loose and located in the terminal box.

注解: 电机PTC连接至端子针T1和T2
接线部件1至7散装供应, 位于接线盒内。

6. Electrical connection

6. 电气连接



ATTENTION! Risk of compressor seizure.
The compressor can only operate with the rotating direction prescribed.



注意！ 压缩机转动时的风险，
压缩机只能按规定的旋转方向运行。



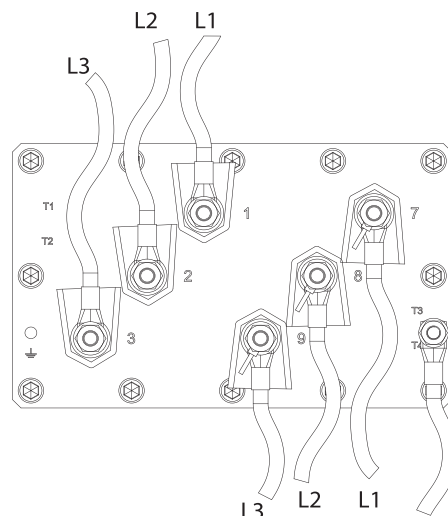
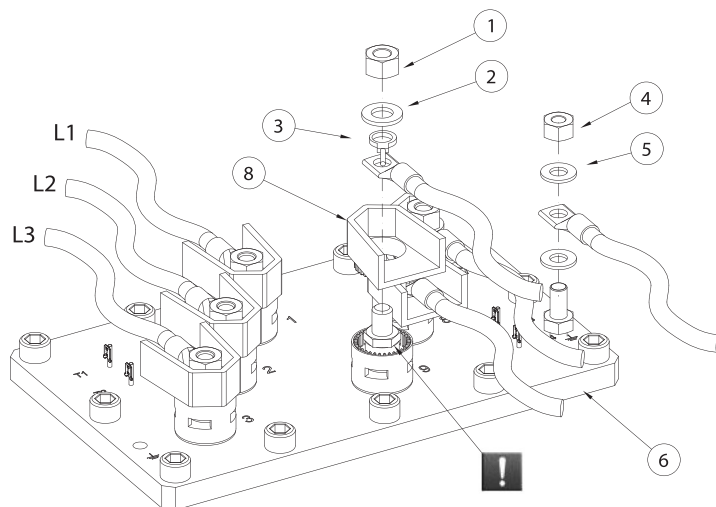
ATTENTION! Risk of motor severe damage.
Wrong and opposite wiring of the two windings leads to locked rotor conditions.



注意！ 电机严重损坏的风险。
两个绕组的错误和相反的接线导致转子状态被锁定。

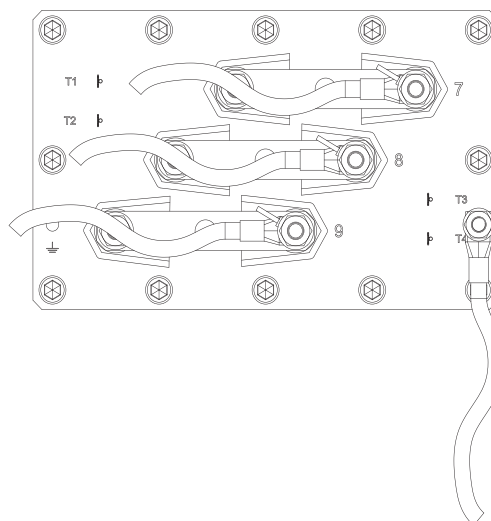
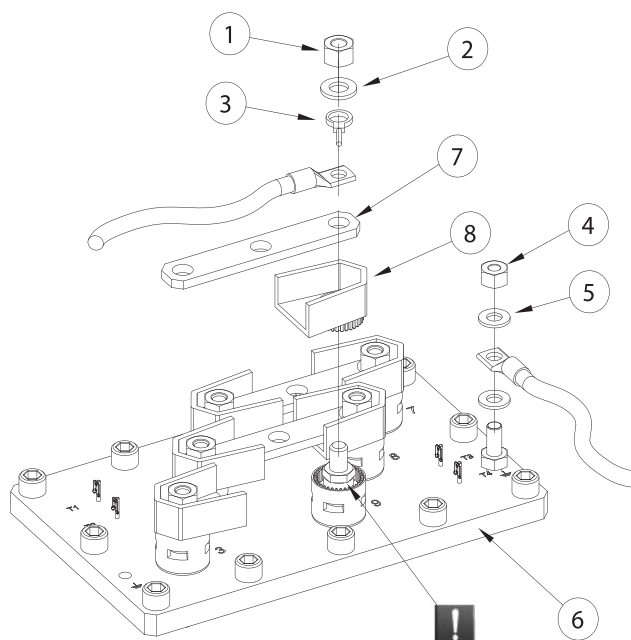
Configuration PART WINDING (PW) / STAR-DELTA (SD)

分绕组 (PW) / 星三角 (SD)



DIRECT ON LINE (DOL) configuration

直接启动 (DOL)



LEGENDA

注解

REF.	DESCRIPTION	Q.TY
1	Brass Nut M12 (tq 30Nm)	6 pcs
2	Brass Washer 12x24	6 pcs
3	Connection for Motor Protection Module	3 pcs
4	Brass Nut M10 (tq 20Nm)	1 pcs
5	Brass Washer 10x20	2 pcs
6	Terminal Plate	1 pcs
7	DOL Connection Bars (optional kit)	3 pcs
8	Insulator Upper part	6 pcs

REF.	说明	Q.TY
1	黄铜螺栓 M12 (cs 30Nm)	6 pcs
2	黄铜垫圈 12x24	6 pcs
3	电机保护模块的连接	3 pcs
4	黄铜螺栓 M10 (tq 20Nm)	1 pcs
5	黄铜垫圈 10x20	2 pcs
6	接线板	1 pcs
7	直接启动的连接片 (选配套件)	3 pcs
8	绝缘体上部	6 pcs

! DO NOT UNFASTEN OR REMOVE THE NUTS LOCKING EACH INSULATORS !

! 不要松开或拆下锁定绝缘块的六个螺母！

Note: Motor PTCs are connected to terminal pins T1 and T2.
The wiring parts 1 to 8 are supplied loose and located in the terminal box.

注解: 电机PTC连接至端子针T1和T2
接线部件1至8散装供应，位于接线盒内。

6.2 Wiring diagrams

6.2 接线图

Part Winding Start (standard setting)

分绕组启动 (标配件)

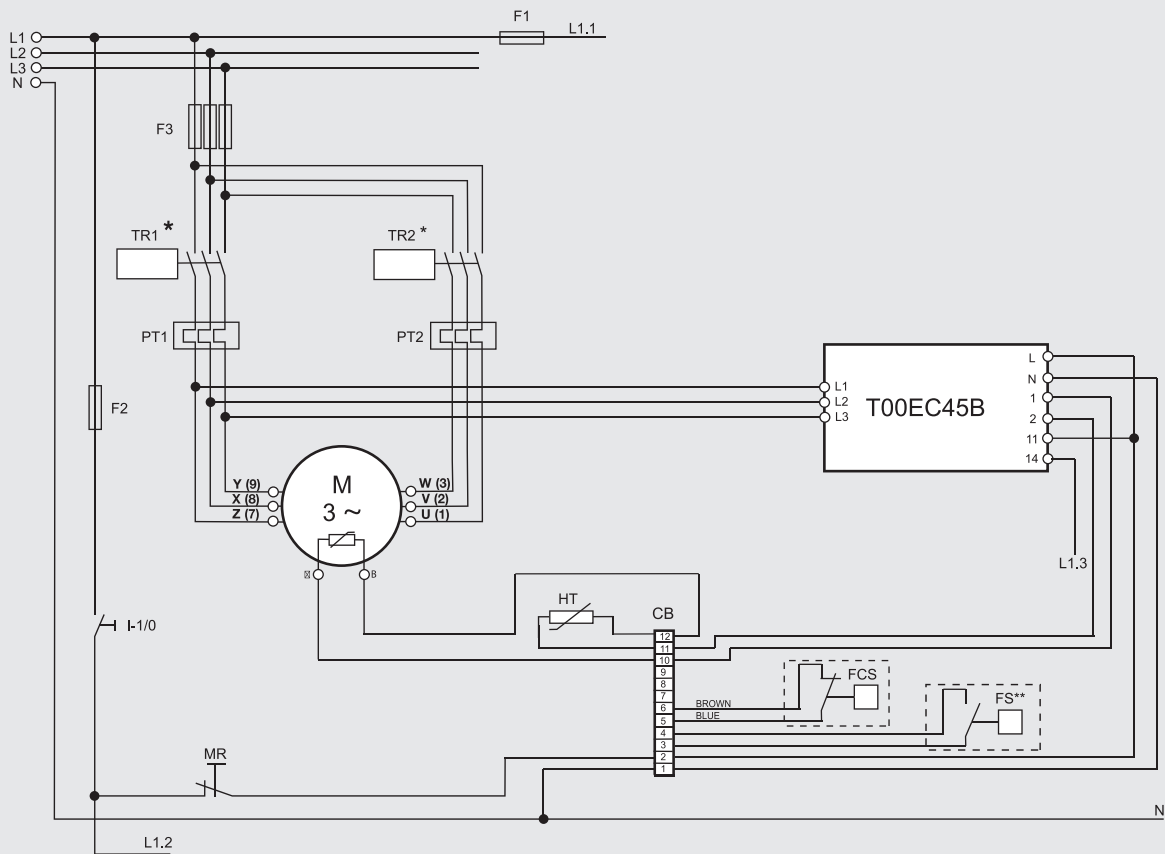


Fig.3

*Comply with the wiring sequence:

TR1 - Z(7) X(8) Y(9) and TR2 - U(1) V(2) W(3)

**Standard equipment sent with the compressor.

To avoid false alarms, installation of delays is required (relays not supplied by Frascold); at the start-up and while in operation.

In case of connection inside the electrical box of the flowswitch, see the wiring diagrams in the next pages.

Delays: 20 seconds at startup, 3 seconds at running.

*按顺序接线:

TR1 – Z(7) X(8) Y(9) 和 TR2 – U(1) V(2) W(3)

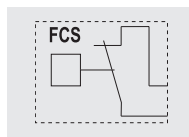
**压缩机标配件.

为了避免误报警，需要在启动和运行时延迟设置（继电器不是由富士豪提供）。

如果在流量开关的电气箱内连接，请参见下一页的电路图。

延迟：启动时20秒，运行时3秒

Optional equipment: it can be wired directly to the PLC.



可以直接连接到PLC

Part Winding Start (optional Diagnose setting)

分绕组启动 (选配件带诊断功能)

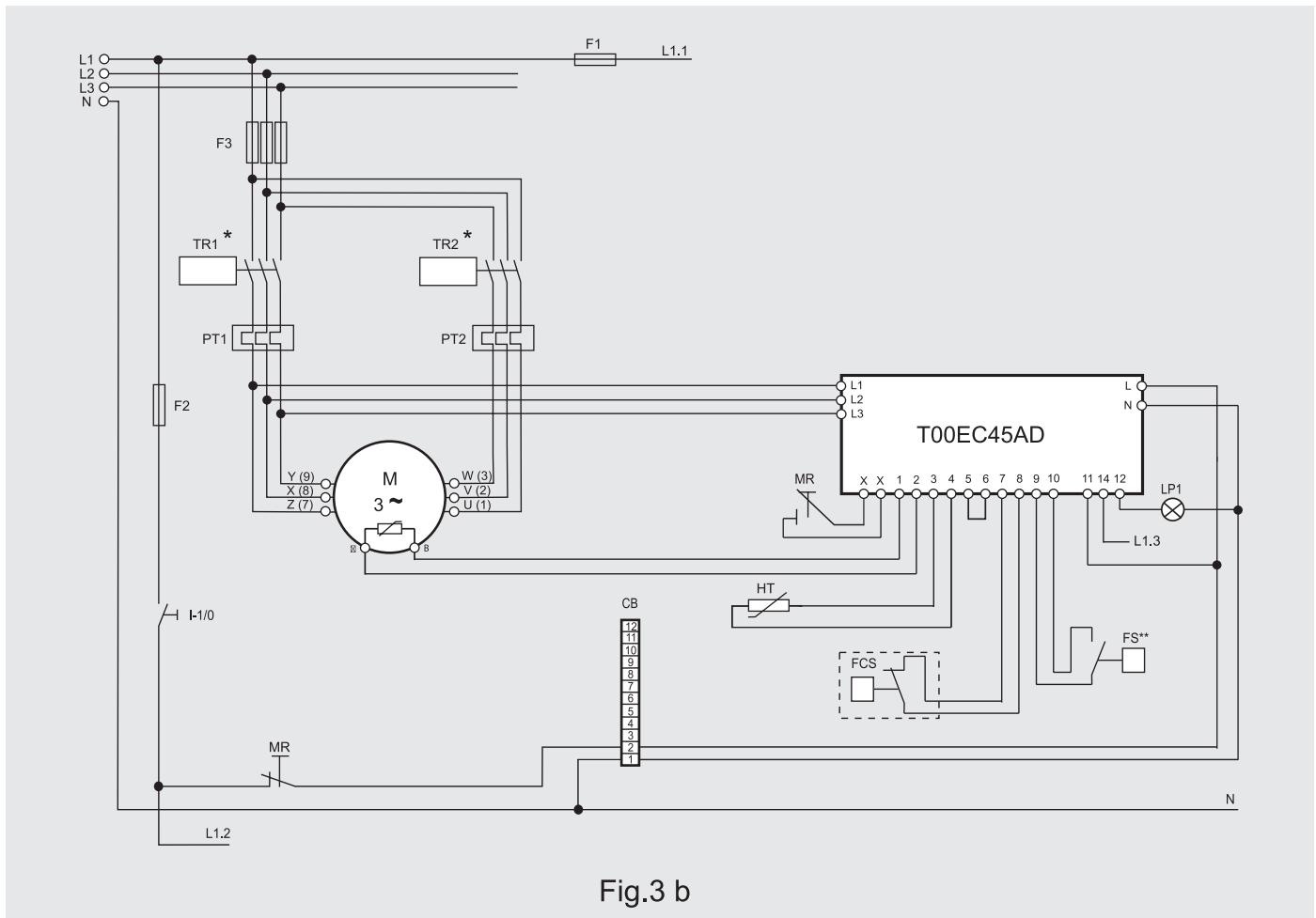


Fig.3 b

*Comply with the wiring sequence:

TR1 - Z(7) X(8) Y(9) and TR2 - U(1) V(2) W(3)

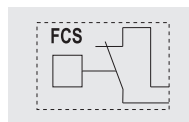
*按顺序接线:

TR1 - Z(7) X(8) Y(9) 和 TR2 - U(1) V(2) W(3)

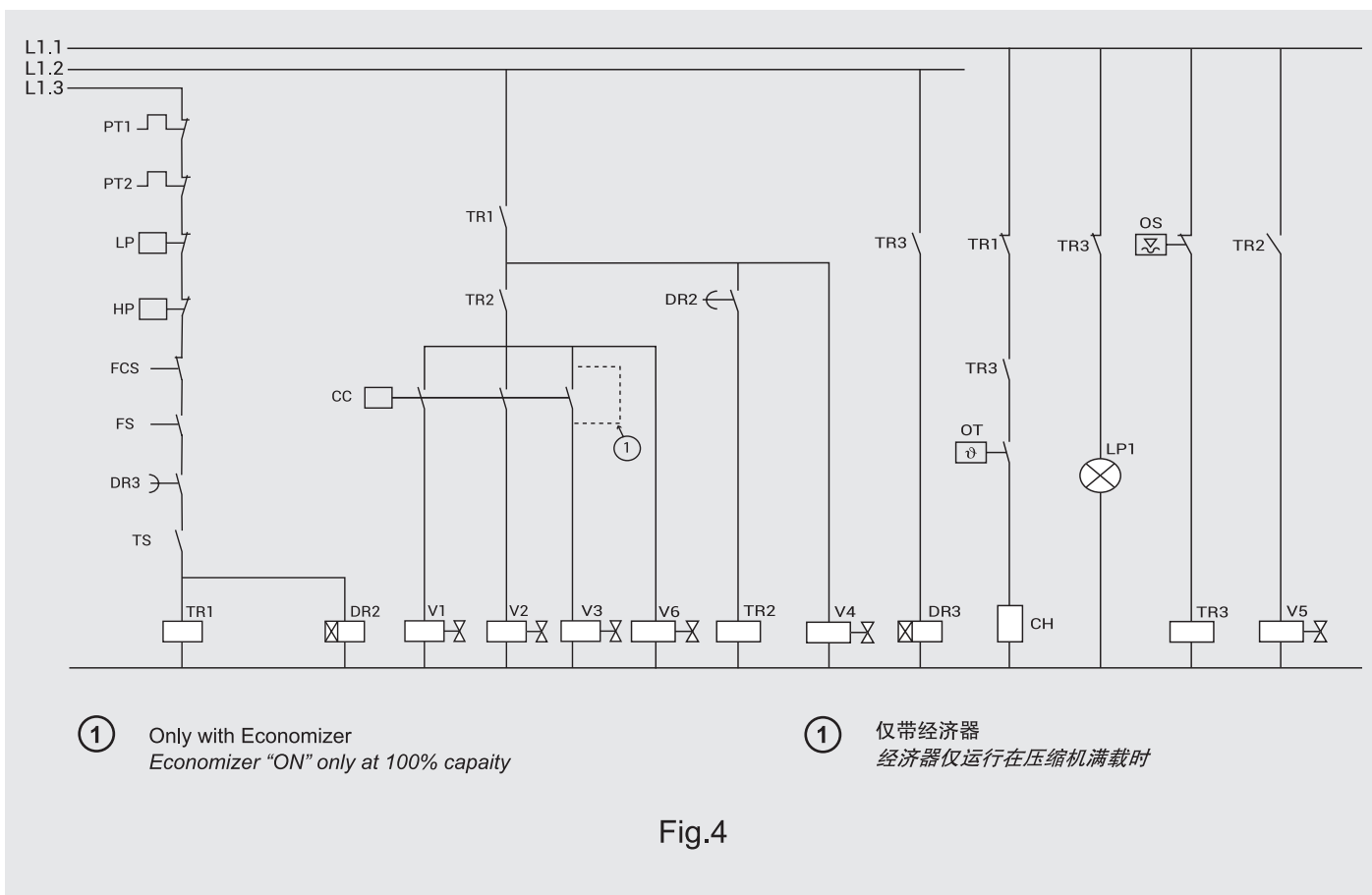
It can be wired directly to the T00EC45AD after the removal of the bridge, the logic of the delays is: 10 seconds at startup, 3 seconds at running.

桥接器拆除后它可以直接连接到T00EC45AD, 延迟为: 启动时10秒, 运行时3秒。

Optional equipment: it can be wired directly to T00EC45AD or to the PLC.



可以直接连接选配件T00EC45AD或PLC。



CB	Electric board of the compressor
CC	Capacity control actuator
CH	Crankcase heater
DR2	Time delay relay on PWS (0,5 ÷ 1 sec.)
DR3	Time delay on level control (120 sec.)
F1	Control circuit fuse
F2	Control circuit fuse
F3	Compressor fuses
FCS	Sensor for oil filter clogging
FS	Flow switch
HP	High pressure switch
HT	Max discharge temperature sensor
I	ON / OFF switch
LP1	"alarm" LED
LP	Low pressure switch
M	Electric motor
MR	Manual reset
OS	Oil level switch
OT	Oil thermostat
PT	Overload protector
TR1	1st PWS start contactor
TR2	2st PWS start contactor
TR3	Oil level control contactor
TS	Safety thermostat
V1	Capacity control valve V1
V2	Capacity control valve V2
V3	Capacity control valve V3
V4	Oil injection solenoid valve
V5	Economizer solenoid valve
V6	Liquid line solenoid valve

CB	压缩机接线板
CC	容量调节控制器
CH	曲轴箱加热器
DR2	PWS上的延时继电器 (0.5 ~ 1秒)
DR3	油位控制的延时 (120秒)
F1	控制电路保险丝
F2	控制电路保险丝
F3	压缩机保险丝
FCS	油过滤器堵塞传感器
FS	流量开关
HP	高压开关
HT	最大排气温度传感器
I	ON / OFF 开关
LP1	LED警报
LP	低压开关
M	电动马达
MR	手动复位
OS	油位开关
OT	油恒温器
PT	超负荷保护装置
TR1	PWS启动主接触器
TR2	PWS启动次接触器
TR3	油位控制接触器
TS	安全恒温器
V1	容量控制阀V1
V2	容量控制阀V2
V3	容量控制阀V3
V4	回油电磁阀
V5	经济器电磁阀
V6	供液电磁阀

6.3 Sizing of protections

Contactors must be chosen in AC3 category.
PWS contactors TR1, TR2 (Fig. 3, 4) must be sized for minimal current of at least 60% of the MRA (Maximum Rated Current) each.
Always check that voltage and frequency on the compressor plate meets the requirement of the power supply of your installation.

6.4 Insulation test

Insulation test has already been performed in our factory according to the EN 60034-1: and it is not necessary to repeat it.
If you need to repeat it anyway, please charge the compressor with nitrogen or refrigerant gas and use a maximum voltage of 1000 Vac.



ATTENTION! Risk of motor severe damage.
Do not run the potential test with the compressor under vacuum.



ATTENTION! Risk of motor severe damage.
Do not test the compressor with more than 1000V.

6.5 Electronic protection module

The compressors are standard supplied with the INT69 FRY® protection module (code T00EC45B).

The module is installed inside the terminal box, already wired to electric motor PTCs, to terminal pins and discharge temperature probe; for NR6 models the temperature probe cable is supplied loose and not wired.

As loose accessory (option) can be supplied a protection module INT69-FRYL® (code T00EC45AD); this module carries diagnostic tools that allows to record different compressor working parameters and alarms. Refer to Frascold bulletin FBUL-0033 (www.frascold.it) and in Fig. 3b for all information and wirings.

With this protection module, each protection device listed here below has its dedicated connection port:

- Motor PTC thermistors (1, 2)
- Oil (discharge) temperature sensor (3, 4)
- Oil filter clogging sensor (7, 8)
- Oil flow switch (9, 10)



ATTENTION!
Risk of motor ptc burn out.
Never apply voltage to thermistor terminals (A,B).



ATTENTION!
Risk of protection module burn out.
Follow the wiring diagram (Fig 3, 3b, 4).



INFORMATION
The protection module serial number is linked to the compressor serial number. Any manipulation or part missing would invalidate the warranty of the product.

6.6 High and low pressure switch

High and low pressure switches must be installed on the dedicated connections of the suction and discharge sides of the compressor (see 5.3).



WARNING!
Inhibiting pressure safety devices can cause explosions
It is strictly forbidden to install pressure switches on the shut off valves plugs.

6.3 分级保护

接触器必须在AC3级别中选择。PWS连接器TR1, TR2(图3,4)必须的最小电流为MRA (最大运行电流) 的60%。
务必检查铭板电压和频率是否匹配现场供给电源。

6.4 绝缘测试

我厂已按照EN 60034-1进行绝缘测试：没必要再重复测试。
如果你需要重复测试，请将压缩机充填氮气和制冷剂气体，并使用电压为1000伏的交流电。



注意！ 严重损坏发动机的风险。
请勿在真空中对压缩机进行绝缘测试。



注意！ 严重损坏发动机的风险。
测试电压请勿超过1000V。

6.5 电子保护模块

压缩机标配保护模块INT69 FRY® (code T00EC45B)。

模块装置在接线盒内，模块出厂已经和电机PTC、接线柱和排气温度传感器相连；对于NR6系统的型号，需客户自己连接。

压缩机选配保护模块 INT69-FRYL® (code T00EC45AD);该模块具备诊断功能，可记录压缩机工作参数和警报信息。参考富士豪公告FBUL-0033 (www.frascold.it)和说明书Fig. 3b可以得到所有信息和接线。

使用此保护模块，下面列出的每个保护设备都有其专用的连接端口：

- 电机 PTC (1, 2)
- 油 (排) 温传感器 (3, 4)
- 油滤芯堵塞传感器 (7, 8)
- 油冷开关 (9, 10)



注意！
发动机PTC老化的风险。
不要在热敏电阻终端上加电压。



注意！
保护模块烧坏的危险。
按照连线图操作（图3,4）。



信息！
保护模块的序列号和压缩机序列号相关联。
由于操作不当或丢失零件，将不能享受保修服务。

6.6 高低压开关

压缩机的高低压开关必须安装在专用的吸排气处。（见5.3）



警告！
未使用适当的压力安全装置会导致爆炸，严禁在截止阀插头上安装压力开关。

7.1 Pressure test

The compressor has undergone a factory-test for pressure resistance, and leak detection.

Therefore it is not necessary to repeat the strength pressure test. If the entire refrigeration circuit is subject to a pressure test, the test must be according to EN 378-2 or a corresponding safety standard.



DANGER!
Burst hazard.
Never exceed the pressures indicated in the name plate of the compressor.

7.2 Leak test

A leak test of the entire refrigeration circuit can be performed in accordance to EN 378-2 or a corresponding safety standard.



DANGER!
Burst hazard.
Never pressurise the compressor with industrial gases containing oxygen. Use only dry nitrogen oxygen free.
Do not mix refrigerant and nitrogen!



DANGER!
Burst hazard.
Never exceed the pressures indicated in the name plate of the compressor.

7.3 Oil charge

Oil must be charged directly into the oil separator (as shown in figure).

The oil level to be reached.

The oil quantity and the charge connection are specified in the FTEC12 (www.frascold.it).

In case an oil cooler is used, this must be filled with oil as well as the oil pipes.



ATTENTION!
Risk of compressor damage.
Do not fill the oil directly into the compressor.



ATTENTION!
Risk of compressor damage.
Keep the oil line returning to the compressor shut (switching off the solenoid valve and closing the oil valve).



INFORMATION
According to the system type, a certain amount of oil, directly proportional to the refrigerant charge must be added.

7.4 Evacuation

Evacuate the system first, then the compressor.

Keep the oil heater energised.

A vacuum level lower than 20 Pa, shall be reached.

After reaching the vacuum level, continue evacuating the circuit until the vacuum level is kept steadily even after the pump switch-off.



ATTENTION!
Risk of motor damage.
It is strictly forbidden to start the compressor when under vacuum.
Do not supply voltage to the motor under vacuum.

7.1 压力测试

压缩机在出厂时已经经过抗压力，泄漏测试和功能测试。

因此，没有必要重复强度压力测试。

如果整个制冷系统要求进行压力测试，则需按EN 378-2或相应的安全标准执行。



危险！
突发危害。
不得超过压缩机铭牌上标明的压力。

7.2 泄漏测试

对整个制冷系统进行泄漏测试，需按EN 378-2或相应的安全标准执行。

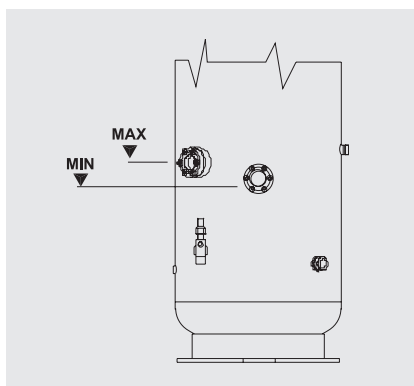


危险！
突发危害。
不能用含有氧气的工业气体给压缩机充压，仅使用干燥的氮气游离氮。不要把制冷剂和氮气混合。



危险！
突发危害。
不得超过压缩机铭牌上标明的压力。

7.3 油填充



油一定要按下图所示油位直接注入油分离器（如图）。

油量和连接见FTEC12 (www.frascold.it)。

若使用油冷却器，必须保证油冷却器和油管道中有足够的油。



注意！
压缩机损坏的风险。
不能把油直接注入压缩机。



注意！
压缩机损坏的风险。
停机状态下，返回到压缩机的油路必须关闭（电磁阀断电后闭合）。



信息！
根据系统的类型，必须充注与冷媒成正比的适量的油。

7.4 抽真空

首先对系统进行抽真空，然后抽空压缩机。

保持油加热器通电。

应达到低于20帕的真空水平。

达到真空水平后继续抽气，直到关闭抽气泵后能依然保持真空状态。



信息！
发动机损坏的风险。
严禁真空状态下启动压缩机。
请勿在真空状态下切断发动机电源。

7.5 Refrigerant charge

Keep the compressor switched off and the oil heaters energized. Charge liquid refrigerant, "breaking the vacuum" into the condenser and receiver.

**INFORMATION**

Zeotropic mixtures can only be charged as liquid.

**ATTENTION!**

Risk of compressor damage.

Do not charge the compressor with liquid refrigerant. Do not allow liquid refrigerant to reach the compressor body during charging operations.

7.6 Final check

Verify that the compressor valves are all open.
Verify that the oil in the oil separator is at the right level (maximum) and at the correct temperature 20-25K above the ambient temperature.
Check the setting of all the time delays.
Verify all the safety switches.
Verify that the oil line stop valve is open.

7.7 Rotation check

Verify the compressor rotation, even if the INT69FRY is supplied as standard. Connect a pressure gauge on the compressor suction side. Verify within a 1 second compressor power on, that the pressure indicated in the pressure gauge installed decreases immediately.

Wrong rotation would lead to an increase in the suction pressure gauge installed on the compressor crankcase suction side. Do not let the compressor run for more than 1-1.5 seconds.
Fix the power wiring by following the wiring diagram Fig 3,3b, 4.

**ATTENTION!**

Danger of major damage to the compressor.

Check the rotating direction, a screw compressor can only operate in the prescribed direction.

If the refrigerant charge needs to be adjusted, a small quantity of vapour (preferably) or liquid refrigerant can be added from suction line at the evaporator inlet.

**ATTENTION!**

Risk of compressor damage.

Must be assured that only superheated gas is entering the compressor. Please check superheat and discharge temperature.

**DANGER!**

Do not overcharge the system with refrigerant, hazard of explosion.

**ATTENTION!**

Risk of compressor damage.

Low refrigerant charge can cause high suction temperature and low pressure difference.

7.5 冷媒填充

关闭压缩机，给油加热器通电。填充液体冷媒，（打破真空）进入冷凝器储液器。

**信息！**

非共沸混合物只能以液体形式填充。

**信息！**

压缩机损坏的风险。

不要给压缩机填充液体冷媒。请务必确保不要在填充过程中让液体冷媒进入压缩机。

7.6 最后检查

检查压缩机阀门是否全部打开。
检查油分离器中的油充足（最大值），高于环境温度20-25K。
检查所有时间延迟的设置。
检查所有安全开关。
检查油路截止阀是否打开。

7.7 旋转检查

即使INT69FRYL是标准供应，也要检查发动机旋转。将压力表连接在压缩机吸气端。在压缩机开启状态下，检查是否在1秒钟内压力表所显示的压力骤降。

错误的旋转会导致安装在压缩机曲轴箱吸气端的吸气压力增加。压缩机运转不能超过1-1.5 秒。
按照接线图3,4固定电源线。

**注意！**

压缩机严重损害的风险。

检查旋转方向，螺杆式压缩机只能按规定的方向运转。

如果需要调整冷媒注入量，可以从蒸发器吸气端 增加少量蒸汽（推荐）或液体冷媒。

**注意！**

压缩机损坏的风险。

确保只有过热气体进入压缩机，检查过热和排气温度。

**危险！**

不要给系统注入过量冷媒，爆炸危险。

**注意！**

压差低和温度过高会导致压缩机损坏。

冷媒过少会导致高吸气温度和低压差。

8.1 Operating data

Verify and record the following data periodically:

- Evaporating pressure.
- Suction temperature.
- Discharge temperature.
- Oil return temperature
- Oil level.
- Number of compressor start/stop (max 8 per hour).
- Minimum ON operating time (5 min).
- Power quality (voltage/current/frequency, must be in accordance with the electrical data in the compressor name plate).
- Economiser parameters (particular attention must be paid at the superheat at the injection port).

Verify that the liquid sight glasses at the expansion valve inlet and ECO expansion valve (if present) are bubble free.

Always guarantee the correct superheat at the compressor suction and ECO inlet (if present).

8.2 Oil flow

At compressor start up, the oil should be seen in the oil sight glass within few seconds. If not, switch off the compressor immediately.

Foam in the oil can be present but must disappear in 2-3 seconds after start-up.

The correct oil flow, controlled by the oil flow switch must be reached in 10-20 seconds.

If the correct flow is not reached check/modify the setting of the condenser pressure regulating valve or verify the presence of liquid in the oil.

8.3 Recommendation

The compressor is equipped as standard with an internal check valve. Verify periodically its tightness by checking the counter-rotation period during compressor switch off.

The internal check valve is intended only for the compressor protection against backward rotation and does not guarantee the sealing during long shut off periods with high pressure difference.

Always avoid refrigerant migration from high to low pressure side, or from low pressure side into the compressor.

Time or pressure pump down should be provided in particular when the evaporator can get warmer than the compressor.

Insulation of the evaporator is often necessary in particular when evaporator can get warmer than the suction side.

The use of suction line accumulator is strongly suggested.



ATTENTION!

Risk of compressor damage due to liquid slugging.

Low temperature application in particular with multiple circuits in common evaporator may require an external check valve.

8.1 操作数据

检查并定期记录以下数据:

- 蒸发压力
- 吸气温度
- 排气温度
- 油出口温度 (如有油冷却器)
- 油位
- 压缩机启动/停止数 (最多每小时8次)
- 最小工作时间 (5分钟)
- 供给电源(电压/电流/频率, 必须按照压缩机铭牌上的电气数据)。
- 经济器参数 (特别注意进口温度过热)

检查在膨胀阀进口和ECO膨胀阀 (如果有的话) 处的视镜, 确保无泡沫。

始终保持压缩机吸气端 和ECO 入口 (如果有的话) 的过热度。

8.2 油流量

压缩机启动后, 几秒钟内油视镜应该可以看到油。

如果看不到立即关掉压缩机。油里可能有泡沫, 但是启动后2-3秒应该消失。

油流量是由油流量开关控制的, 油应该10-20秒能看到。

如果看不到, 检查/修改冷凝压力调节阀的设置或者检查冷冻油里面是否有制冷剂液体。

8.3 建议

按标准, 压缩机配有内置止回阀。定期检查密闭性, 压缩机关闭期间逆时针旋转检查。

内部止回阀只用于防止压缩机反转, 但高压差下长期关闭时的密封性不能保证。

停机时, 避免冷媒从高压端迁移到低压端, 避免冷媒从低压端迁移到压缩机。

当蒸发器的温度比压缩机高时, 需要减少使用时间或者降低压力。

当蒸发器的温度比吸气端高时, 蒸发器的绝缘尤为重要。

强烈建议使用液体分离器。



注意!

液体堵塞会造成压缩机损害。

常用蒸发器在多系统低温的应用, 需要一个外部止回阀。

8.4 Maintenance

Periodic maintenance regular interventions are:

- visual control of the lubricant level inside the oil separator
- check of cable tightening
- check of compressor protection devices

After approx. 100 working hours from the initial compressor start, replace the cartridge of the oil filter

Oil changing is not normally necessary for chiller and package unit with oil filters. The replacement is necessary in case of lack in its properties, detectable via an oil analysis. It is absolutely necessary after a motor burn out.



DANGER!
High voltage, hazard of electrical shock.

The use in low evaporating temperatures and/or high ambient humidity may result in water condensation inside the terminal box. It is mandatory to install cable glands with protection grade IP65 or higher in order to prevent air ingress in the terminal box. The use of heating element in the terminal box or contact grease on the terminals may become necessary.



ATTENTION!
Risk of short circuit due to condensing water into the terminal box.
Do not remove or damage the pins insulator supplied!



WARNING!
Possible injuries due to the oil separator under pressure. Release the pressure before opening .
Wear safety goggles.



Every 5000 working hours

- oil quality analysis
- check tightness of solenoid valve
- check correct operation of oil flow switch
- check cleanliness of suction filter
- check cleanliness of oil filter

Every 40000 working hours

- replace the bearings

8.4 维护

定期维护定期干预:

- 检查油分离器内的润滑油油位。
- 电缆紧固检查。
- 压缩机保护装置检查。

压缩机开始使用后，工作100小时后，更换油过滤器滤芯。

通常来说，冷水机组和带油过滤器的机组换油是没有必要的。通过油品分析，在油性能不足时必须换油。在电机烧坏的情况下，换油是绝对有必要的。



危险!
高压、触电危险。

在低蒸发温度和/或高湿度环境工作时，可能导致接线盒内出现冷凝露水。为了防止空气进入接线盒，必须安装防护等级为IP65或更高的电缆密封套。如果需要，可以在接线盒中使用加热元件或在端子上使用接触润滑脂。



注意!
接线盒内有冷凝水短路的危险。
不要拆下或损坏标配的绝缘板!



警告!
油分离器在压力作用下可能造成危害。
释放压力之前佩戴防护眼镜。



每工作5000小时

- 分析油的质量
- 检查电磁阀封闭性
- 检查油流量开关的好坏
- 检查吸气端过滤器的清洁度
- 检查油过滤器的清洁度

每工作40000小时

- 更换轴承

9. Decommissioning

Close the compressor shut off valves and tighten the valve seals. While keeping the oil heater ON, pump off the refrigerant into a proper container.

Recover the refrigerant from the compressor, dispose it in the proper way

Drain the oil from the compressor, use a proper oil container suitable for exhausted lubricants.



WARNING!

Compressor could be under pressure.

Release the pressure before opening any connection.

Wear safety goggles.



Dispose the waste oil in a proper way.

If the compressor will be repaired, close the suction and discharge valve and charge with 0.5-1 bar of dry nitrogen.

If not, dispose it in the proper way.

9. 拆卸

关闭压缩机截止阀并拧紧阀门的密封。同时保持油加热器处理打开状态，使冷媒流入适当的容器内。

回收压缩机内的冷媒，并以适当的方式处理它。

把油从压缩机中排出，用适合的油容器盛放用过的润滑油。



警告！

压缩机在压力下有损坏的危险。

释放压力之前佩戴防护眼镜。



以适当的方式处理废油。

如果压缩机需要维修，关闭吸气阀和排气阀，并充入 0.5–1.0 bar 的干燥氮气。或者以适当方式处理。

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