

## SOUND SHELL FOR COPELAND™ STREAM COMPRESSORS

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## 1 Introduction

Emerson Climate Technologies has developed a new sound shell for noise sensitive applications. It is designed to be factory-mounted by the equipment manufacturers or to be installed on site with the greatest of ease and speed. This new generation of sound shells perfectly fits the shape of the compressor. Once installed on a compressor in the field, the sound shell is designed in a way that the compressor can be serviced and accessed to quickly, to ensure minimum downtime.

The sound shell fits 4M\* and 6M\* Stream compressors, with or without capacity control, with or without unloaded start, and also 4M\*D and 6M\*D Digital Stream compressors. The sound shell does not fit Stream compressors fitted with a liquid injection circuit for low temperature applications using R407F and R22, and Stream compressors fitted with a head cooling fan. **The sound shells provide an overall sound attenuation of 10 to 16 dB(A) making Stream compressors the quietest solution currently available on the market.**

The sound shell design conforms to IEC 60335-1 with CE certification.

## 2 Operation recommendations



### WARNING

**Burning and fire hazard! Personal injuries!** Release compressor pressure before soldering, brazing or welding. Keep flames, torches, soldering irons and other hot objects away from plastic parts. Failure of pressurized tube can spray flammable oil.

### 2.1 Operating map with sound shell

#### 2.1.1 Operating map with R404A

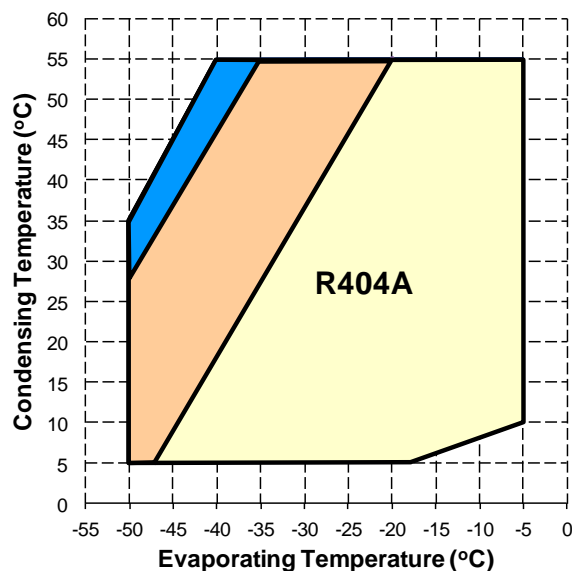
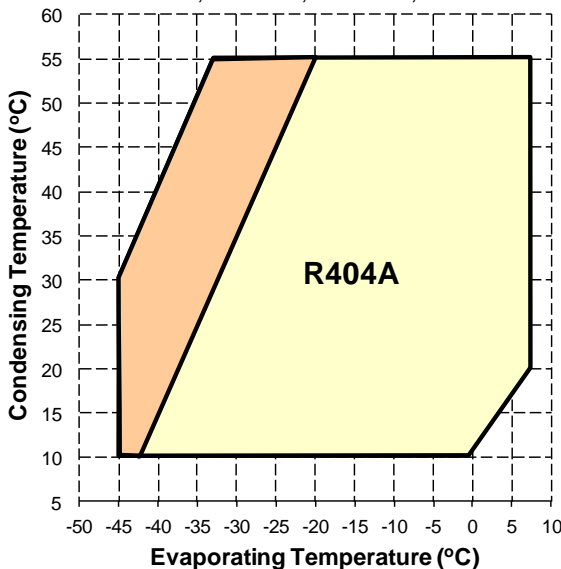
##### 2.1.1.1 Standard Stream in 50 Hz

##### MT models:

4MA-22X, 4MH-25X, 4MI-30X, 4MJ-33X,  
4MK-35X, 6MI-40X, 6MJ-45X, 6MK-50X

##### LT models:

4MF-13X, 4ML-15X, 4MM-20X, 4MT-22X,  
4MU-25X, 6MM-30X, 6MT-35X, 6MU-40X



25°C Suction Gas Return

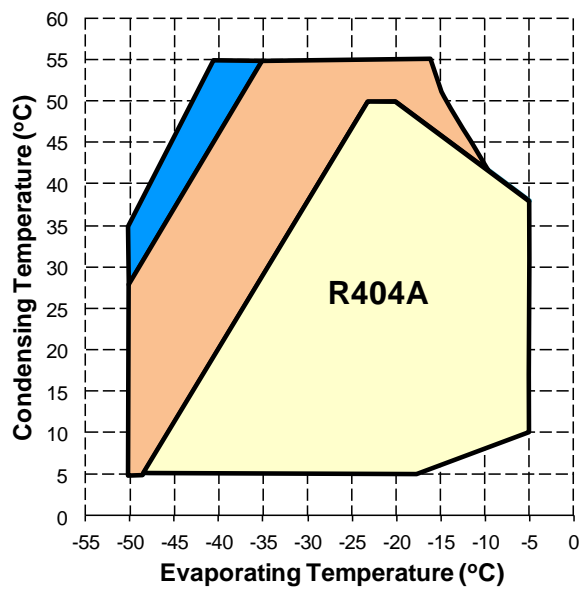
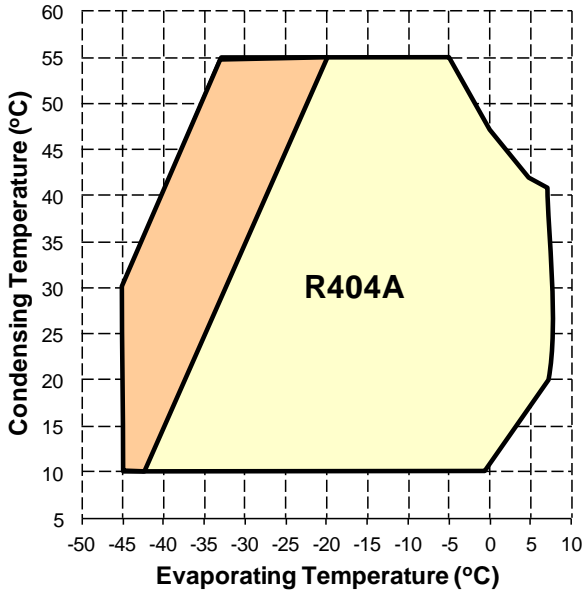
0°C Suction Gas Return

20K Suction Superheat

2.1.1.2 Stream with inverter

**MT models from 51 Hz to 60 Hz:**  
4MA-22X, 4MH-25X, 4MI-30X, 4MJ-33X,  
4MK-35X, 6MI-40X, 6MJ-45X, 6MK-50X

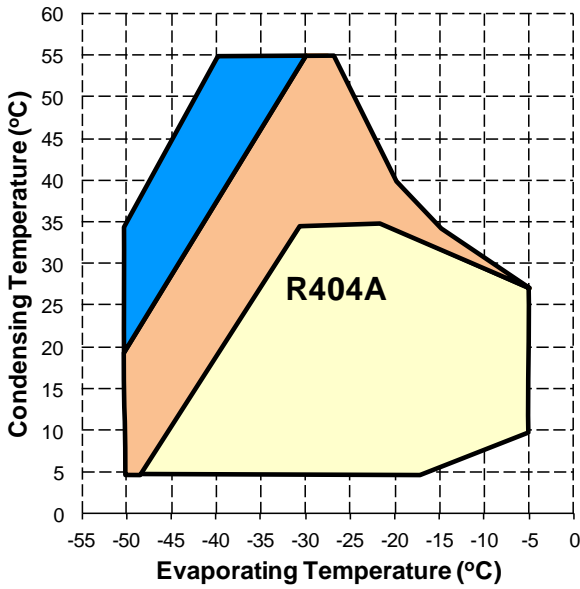
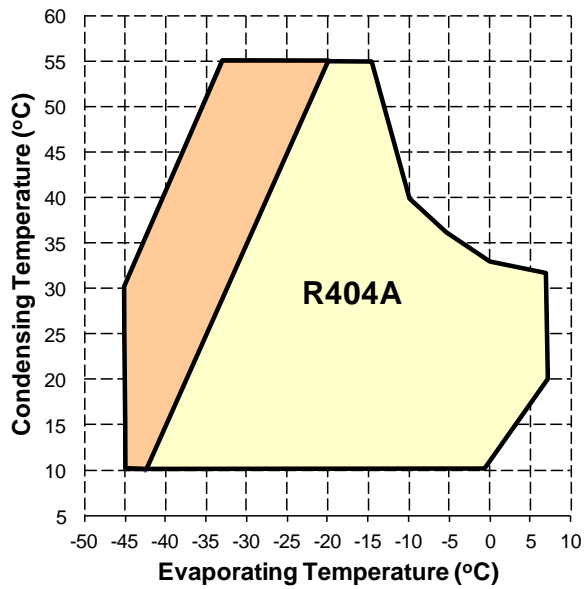
**LT models from 51 Hz to 60 Hz:**  
4MF-13X, 4ML-15X, 4MM-20X, 4MT-22X,  
4MU-25X, 6MM-30X, 6MT-35X, 6MU-40X



25°C Suction Gas Return
  0°C Suction Gas Return
  20K Suction Superheat

**MT models 61 Hz to 70 Hz:**  
4MA-22X, 4MH-25X, 4MI-30X, 4MJ-33X,  
4MK-35X, 6MI-40X, 6MJ-45X, 6MK-50X

**LT models 61 Hz to 70 Hz:**  
4MF-13X, 4ML-15X, 4MM-20X, 4MT-22X,  
4MU-25X, 6MM-30X, 6MT-35X, 6MU-40X

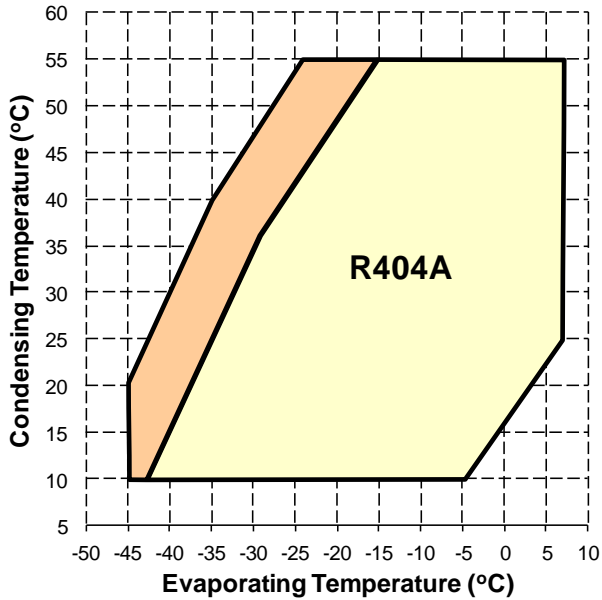


25°C Suction Gas Return
  0°C Suction Gas Return
  20K Suction Superheat

2.1.1.3 4-Cylinder Stream Digital / Capacity control

MT models (Digital, capacity control 50%):

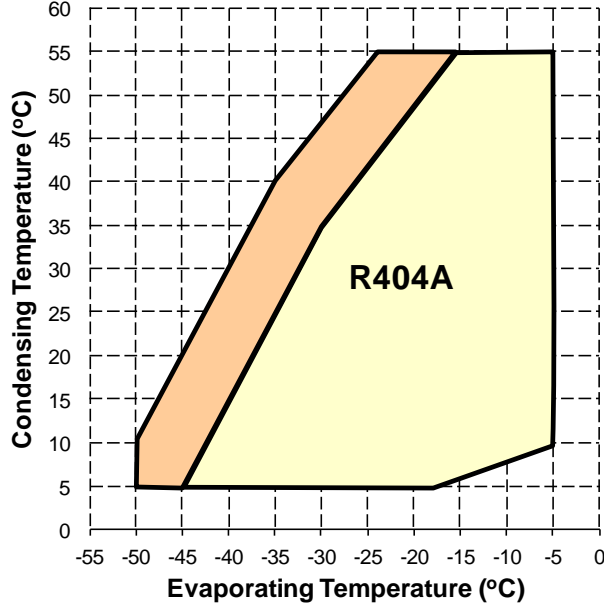
4MA/D-22X, 4MH/D-25X, 4MI/D-30X,  
4MJ/D-33X, 4MK/D-35X



25°C Suction Gas Return

LT models (Digital, capacity control 50%):

4MF/D-13X, 4ML/D-15X, 4MM/D-20X,  
4MT/D-22X, 4MU/D-25X

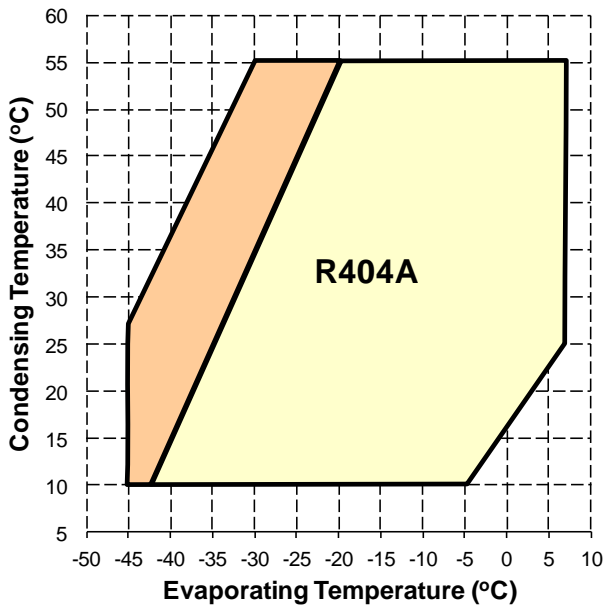


0°C Suction Gas Return

2.1.1.4 6-Cylinder Stream Digital / Capacity control

MT models (Digital, capacity control 67%):

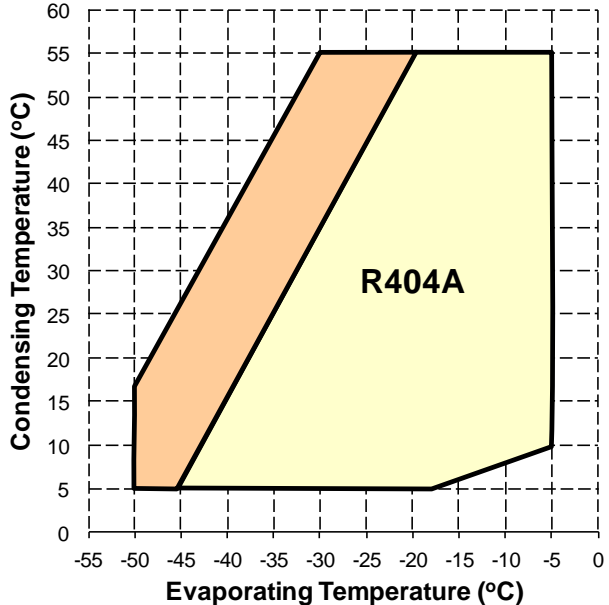
6MI/D-40X, 6MJ/D-45X, 6MK/D-50X



25°C Suction Gas Return

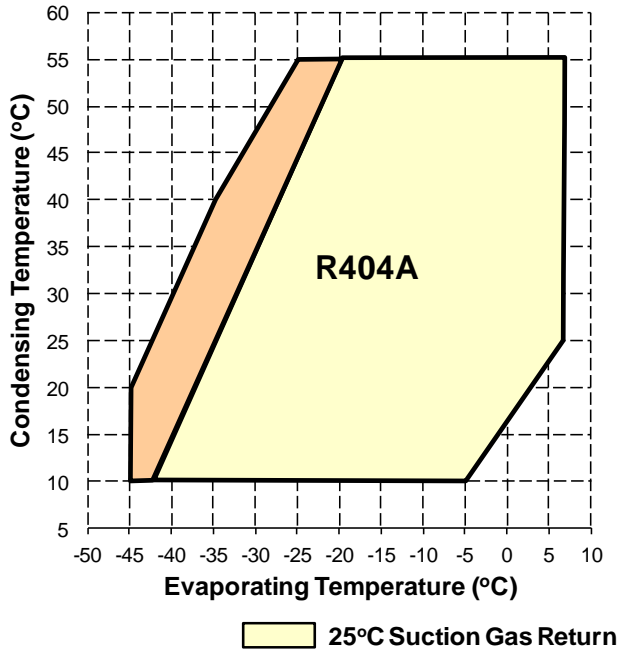
LT models (Digital, capacity control 67%):

6MM/D-30X, 6MT/D-35X, 6MU/D-40X

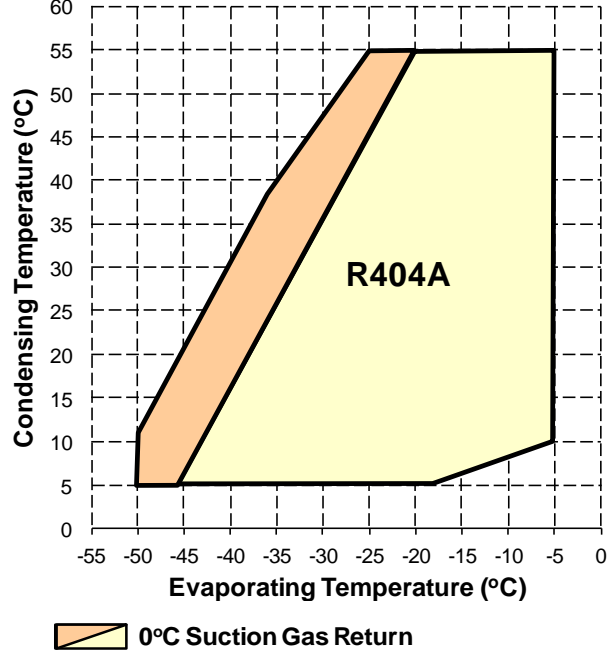


0°C Suction Gas Return

**MT models (Digital, capacity control 33%):**  
6MI/D-40X, 6MJ/D-45X, 6MK/D-50X



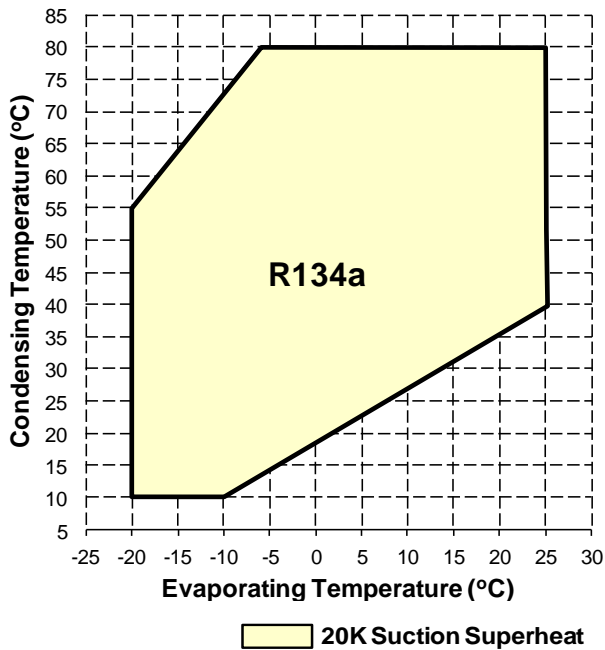
**LT models (Digital, capacity control 33%):**  
6MM/D-30X, 6MT/D-35X, 6MU/D-40X



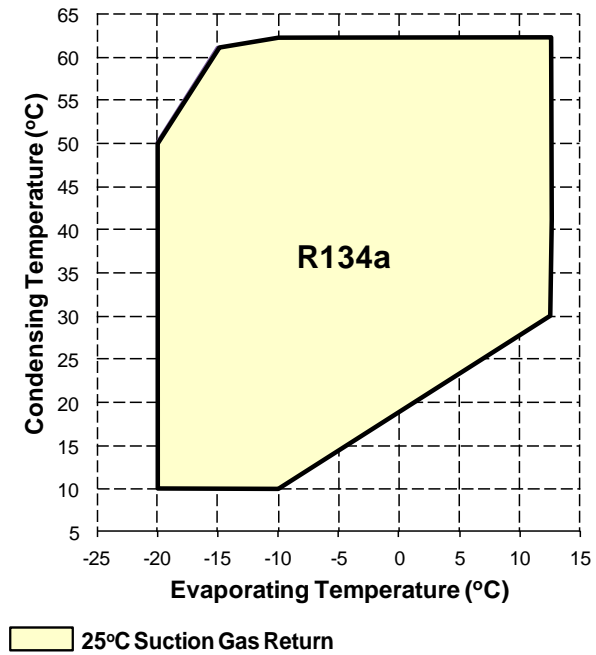
**2.1.2 Operating map with R134a**

**2.1.2.1 Standard Stream in 50 Hz**

**HT models:**  
4MA-22X, 4MH-25X, 4MI-30X, 4MJ-33X,  
4MK-35X, 6MI-40X, 6MJ-45X, 6MK-50X



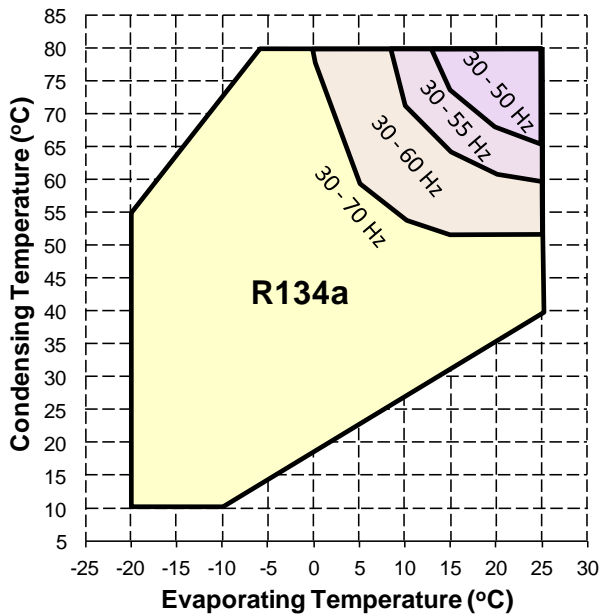
**MT models:**  
4MF-13X, 4ML-15X, 4MM-20X, 4MT-22X,  
4MU-25X, 6MM-30X, 6MT-35X, 6MU-40X



2.1.2.2 Stream with inverter

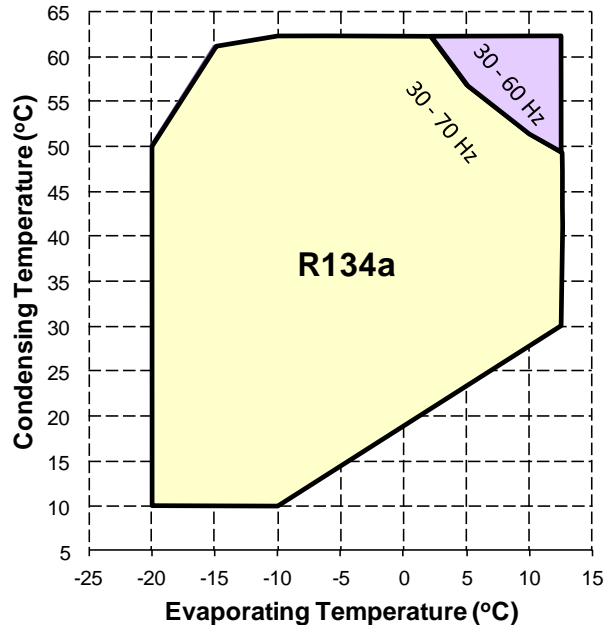
HT models:

4MA-22X, 4MH-25X, 4MI-30X, 4MJ-33X,  
4MK-35X, 6MI-40X, 6MJ-45X, 6MK-50X



MT models:

4MF-13X, 4ML-15X, 4MM-20X, 4MT-22X,  
4MU-25X, 6MM-30X, 6MT-35X, 6MU-40X



20K Suction Superheat

25°C Suction Gas Return

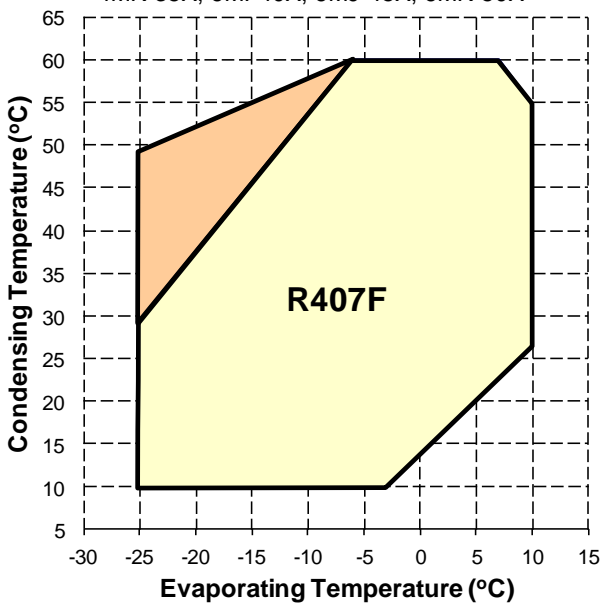
**NOTE:** The sound shell does not reduce the compressor capacity modulation envelope (Digital or blocked suction).

2.1.3 Operating map with R407F

2.1.3.1 Standard Stream in 50 Hz

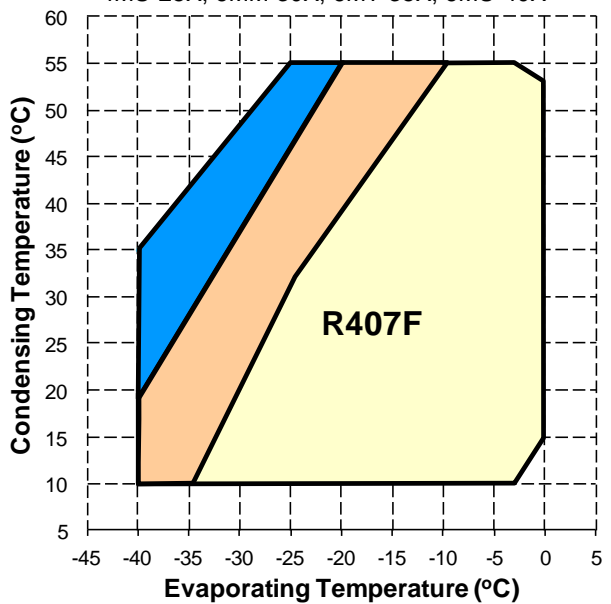
MT models:

4MA-22X, 4MH-25X, 4MI-30X, 4MJ-33X,  
4MK-35X, 6MI-40X, 6MJ-45X, 6MK-50X



LT models:

4MF-13X, 4ML-15X, 4MM-20X, 4MT-22X,  
4MU-25X, 6MM-30X, 6MT-35X, 6MU-40X



20°C Suction Gas Return

0°C Suction Gas Return

20K Suction Superheat

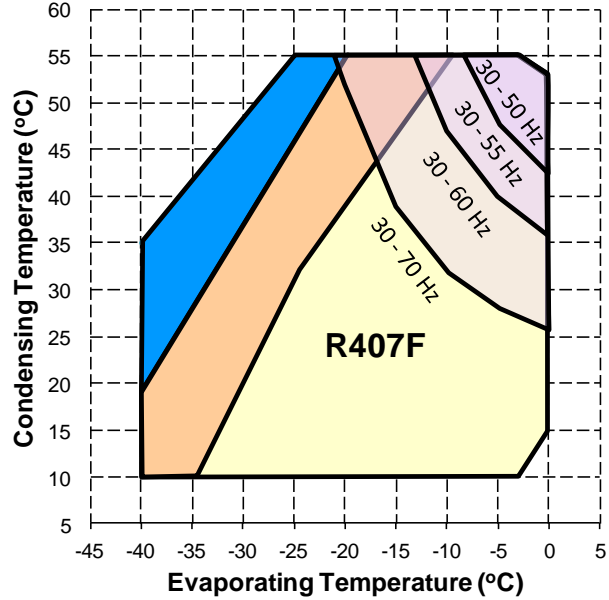
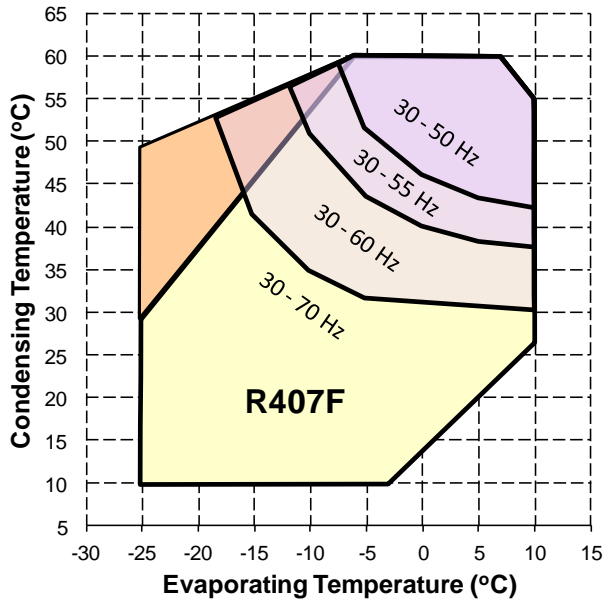
2.1.3.2 Stream with inverter

MT models:

4MA-22X, 4MH-25X, 4MI-30X, 4MJ-33X,  
4MK-35X, 6MI-40X, 6MJ-45X, 6MK-50X

LT models:

4MF-13X, 4ML-15X, 4MM-20X, 4MT-22X,  
4MU-25X, 6MM-30X, 6MT-35X, 6MU-40X



20°C Suction Gas Return    0°C Suction Gas Return    20K Suction Superheat

NOTE: The sound shell does not reduce the compressor capacity modulation envelope (Digital or blocked suction).

2.1.4 Operating map with R407A

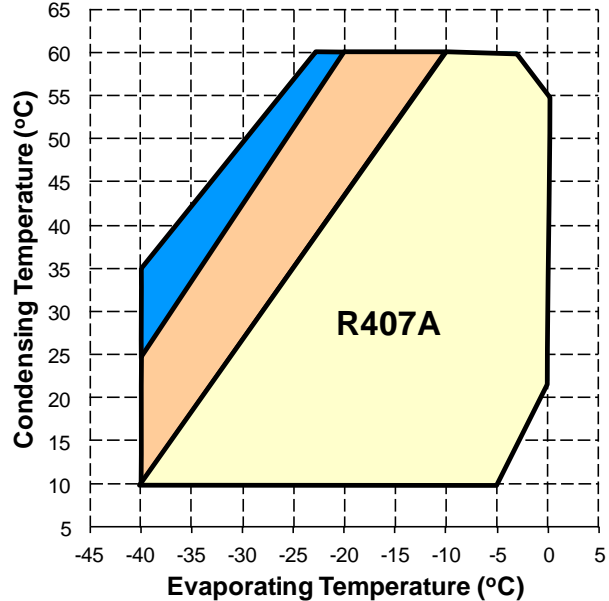
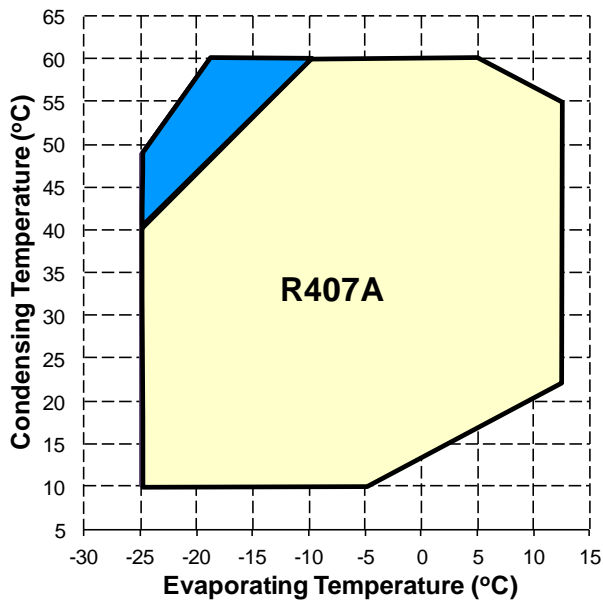
2.1.4.1 Standard Stream in 50 Hz

MT models:

4MA-22X, 4MH-25X, 4MI-30X, 4MJ-33X,  
4MK-35X, 6MI-40X, 6MJ-45X, 6MK-50X

LT models:

4MF-13X, 4ML-15X, 4MM-20X, 4MT-22X,  
4MU-25X, 6MM-30X, 6MT-35X, 6MU-40X



0°C Suction Gas Return    20°C Suction Gas Return    20K Suction Superheat

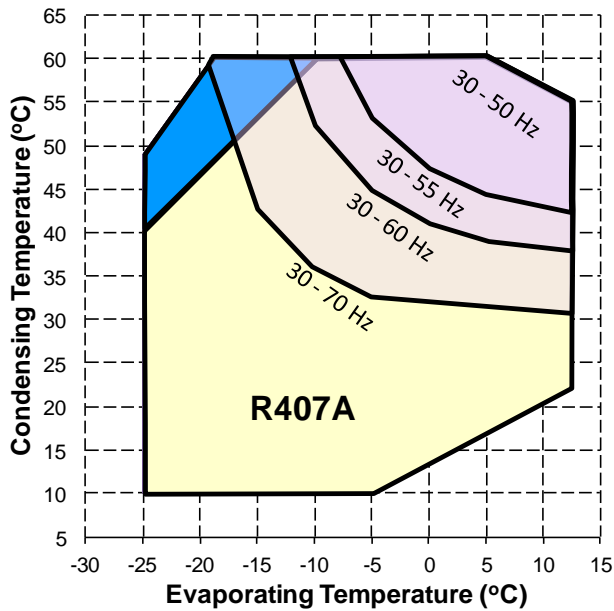
### 2.1.4.2 Stream with Inverter

**MT models:**

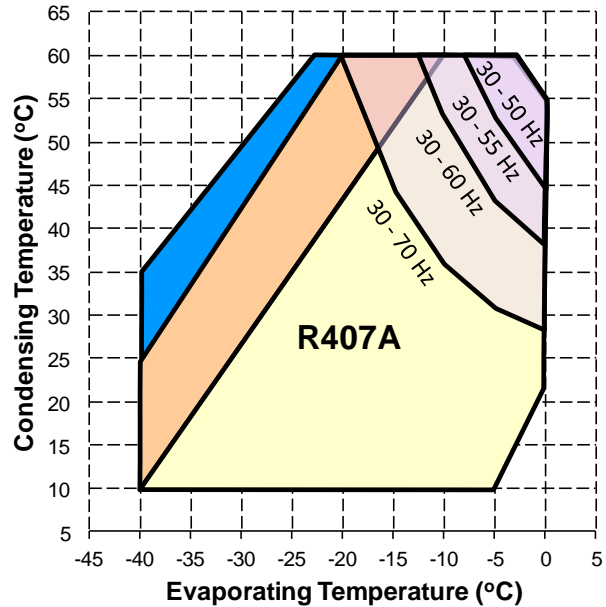
4MA-22X, 4MH-25X, 4MI-30X, 4MJ-33X,  
4MK-35X, 6MI-40X, 6MJ-45X, 6MK-50X

**LT models:**

4MF-13X, 4ML-15X, 4MM-20X, 4MT-22X,  
4MU-25X, 6MM-30X, 6MT-35X, 6MU-40X



20°C Suction Gas Return  
20K Suction Superheat

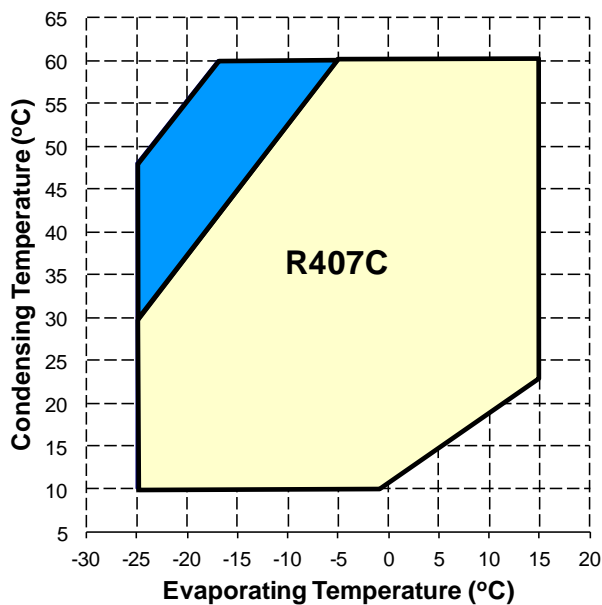


0°C Suction Gas Return  
20K Suction Superheat

**NOTE:** The sound shell does not reduce the compressor capacity modulation envelope (Digital or blocked suction).

### 2.1.5 Operating map with R407C

#### 2.1.5.1 Standard Stream in 50 Hz

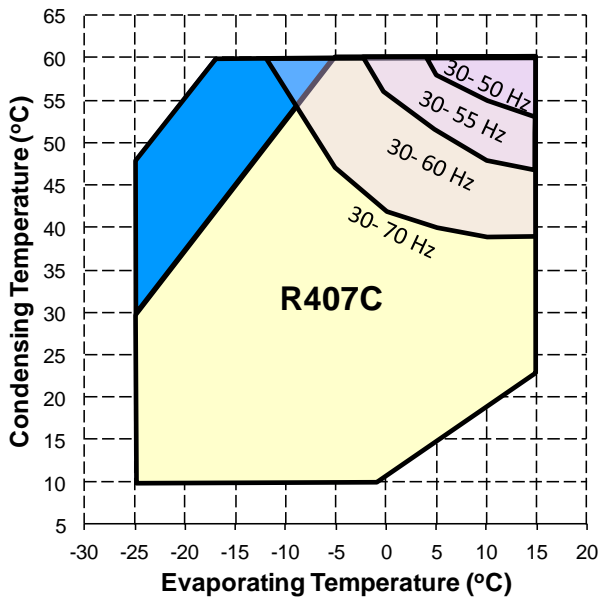


20°C Suction Gas Return  
20K Suction Gas Superheat

**NOTE:** The sound shell does not reduce the compressor capacity modulation envelope (Digital or blocked suction).



### 2.1.5.2 Standard Stream with inverter



-  20°C Suction Gas Return
-  20K Suction Gas Superheat

**NOTE:** The sound shell does not reduce the compressor capacity modulation envelope (Digital or blocked suction).

### 2.2 Voltage range limitation

When using a sound shell the voltage range tolerance is reduced to  $\pm 5\%$ .

For instance: AWM = 380V - 420V / 3Ph / 50 Hz with tolerance  $\pm 5\%$ :

- Minimum voltage = 380V - 5% = 361V
- Maximum voltage = 420V + 5% = 441V

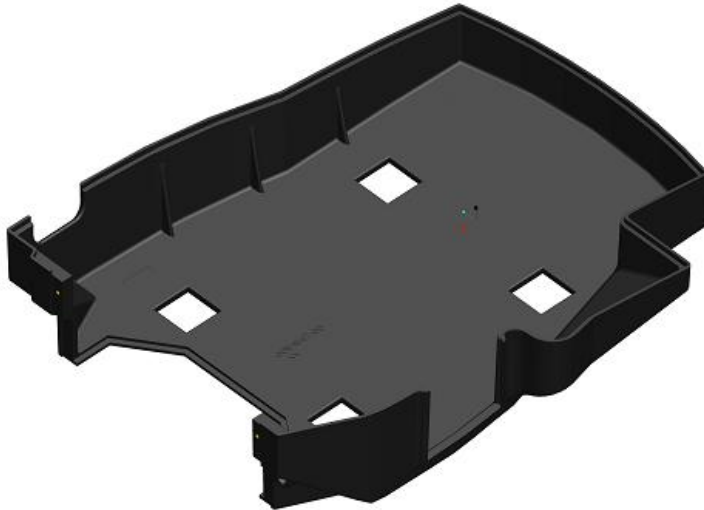
### 3 Sound shell components

The sound shell is made of four main parts that fit the compressor, with enough space for accessory assembling (capacity control, unloaded start, crankcase heater...).

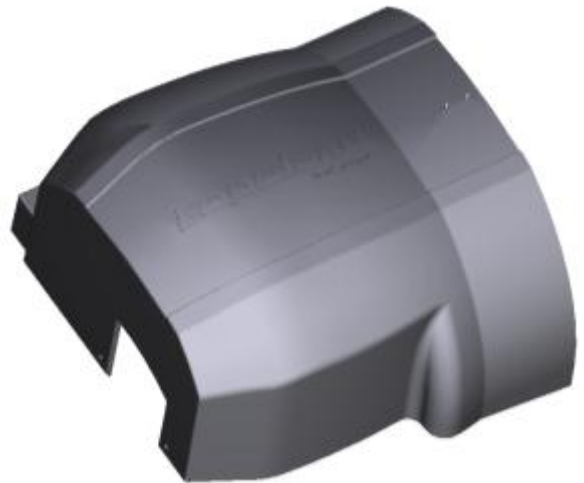
The parts are assembled with Velcro strips, and cuts are ready for openings (suction, discharge, oil level regulator, electrical wires).

The delivery of the sound shell kits also includes the CoreSense™ module bracket, bolts, nuts and washers.

**Bottom part**



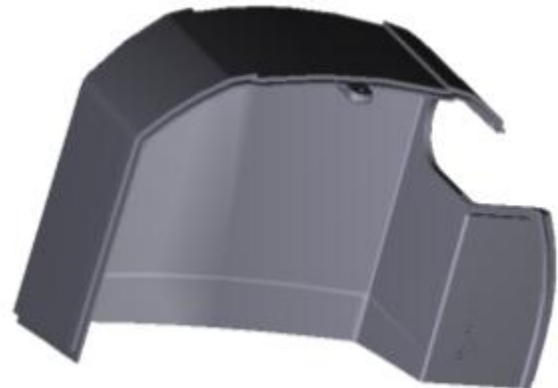
**Top cover**



**Service door**



**Stator cover**



**Oil sight glass door**



**Suction closing**



#### 4 Sound shell installation

A video explaining how to install the sound shell on a Stream compressor is available on Youtube @ <https://www.youtube.com/watch?v=-YwSkvZkplM&feature=youtu.be> or via the QR code.



##### 4.1 Bottom part

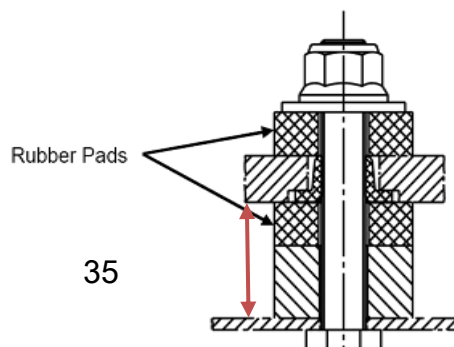
First, release the openings on the bottom shell.

Use mounting part kit N°3063662 (supplied with the sound shell) and assemble it between the frame and the bottom of the sound shell.

It is mandatory to keep a 35-mm mounting height.



We recommend using the factory-supplied rubber mounting kit to avoid too much noise in case of metal-to-metal contact at the foot plate.

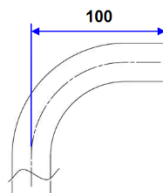


Install the compressor:

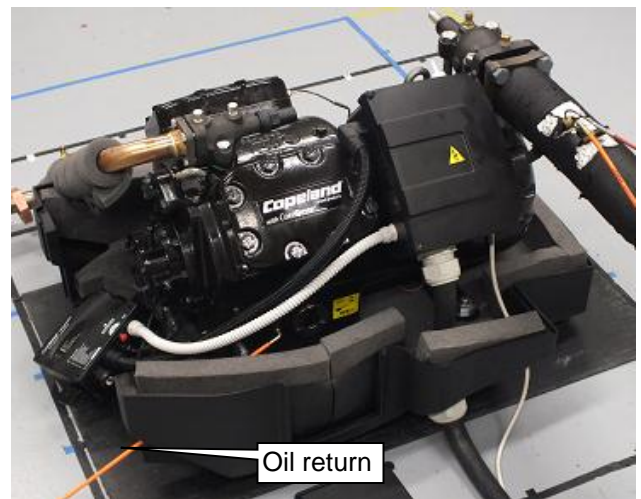
**The discharge and suction lines must be insulated** to prevent noise propagation along the piping outside the sound shell and to prevent water condensation inside the sound shell.

Better performance is achieved with rigid tubing adapted to the compressor discharge and suction dimensions.

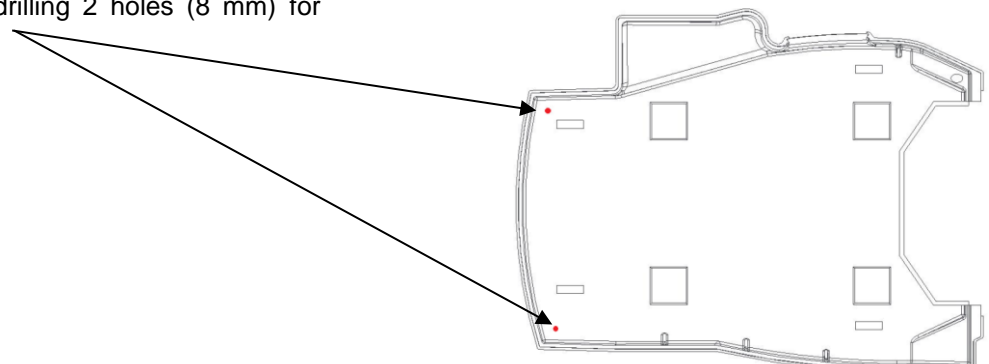
4M\* discharge pipe: maintain a 100-mm distance from the discharge valve to the downward part of the pipe.



If an oil return pipe is used, it can be passed through the 16-mm hole located on the front side of the bottom shell.



In case of a very low condensing temperature or risk of icing at the suction side, we recommend drilling 2 holes (8 mm) for water draining.



#### 4.2 Stator cover

The cable between the CoreSense module and the terminal box must be positioned on the left-hand side of the terminal box.

Always close the lid while opening the knockouts in the terminal box.

Insert power and control cables.

Fit the motor cover.

The stator cover has an opening for the suction tube.

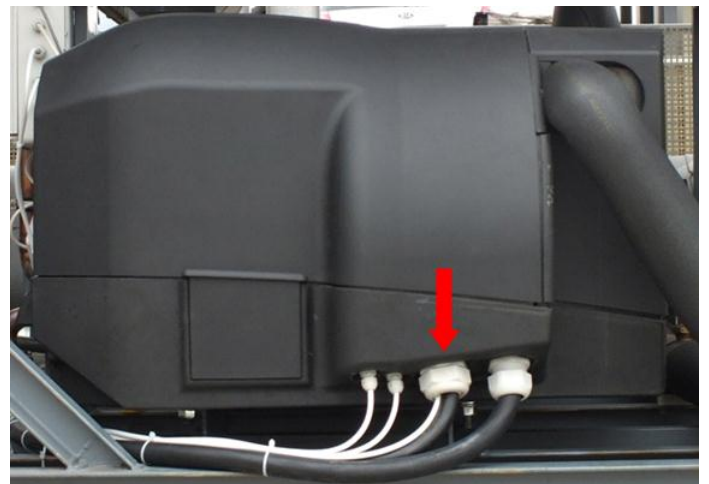
The suction slot is closed by the suction closing.



#### 4.3 Top cover

Prior to the installation of the top cover, remove the CoreSense module (see next chapter).

In case of DOL start which requires a large power cable, it is recommended to pass through the middle cable penetration on the bottom of the bottom shell, to avoid conflicts with the base-frame.

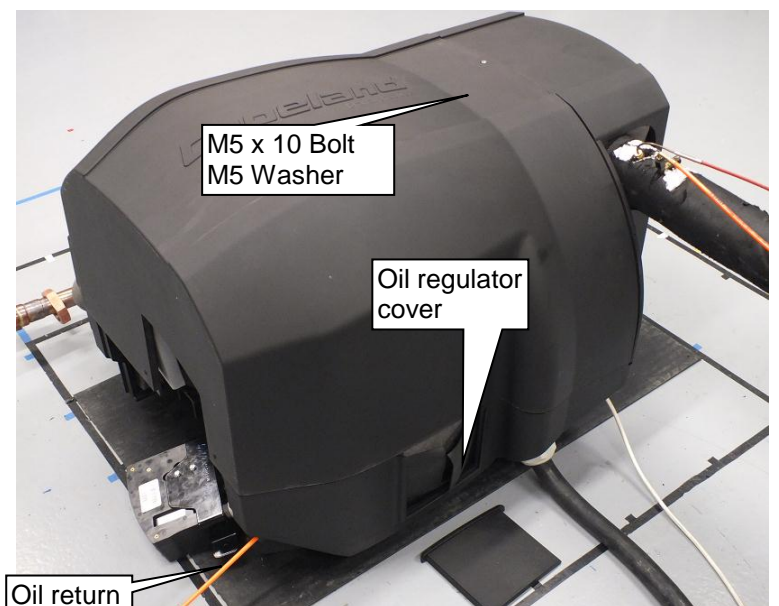


The top cover is installed and secured with washers and M5 x 10 bolts.

The top cover is also compliant with the use of Digital, capacity control and unloaded start on the cylinder head.

The oil regulator cover must be installed in its slot when no oil level regulator or equalization line is connected to the oil sight glass fitting.

Nothing should lie on the top cover.



#### 4.4 CoreSense installation

Remove the CoreSense module from the compressor bracket and fix the module on the sound shell bracket reusing the same pair of M5 bolts.



The CoreSense module fits in the opening in the top cover, so it remains accessible.

The CoreSense bracket is hung to the cover by means of 2 bolts/nuts (M5 x 25) and washers.



**NOTE:** The CoreSense module must be removed from the top cover prior to removing the top cover itself.

#### 4.5 Service door

The service cover is held in place with 2 M5 x 10 bolts and M5 washers.



#### SERVICING:

- **Access to reset button:** open the service cover.
- **Access to shut off valves or terminal box:** remove the CoreSense module from the top cover prior to removing the top cover itself.
- **Oil level check:** remove the oil regulator cover to see the sight glass.

## 5 Compressor accessibility



### WARNING

**Cable damage! CoreSense malfunction!** In case it is needed to access the service valves or the terminal box, the CoreSense module must be removed from the top cover prior to removing the top cover itself. The 3 bolts of the top cover (see above pictures) have to be removed prior to removing the top cover.

- The CoreSense module remains accessible even when the sound shell is in place.
- The oil regulator door allows:
  - the installation of an oil level regulator;
  - any oil return system instead of the oil sight glass;
  - an access to the crankcase pressure plug;
  - a visual control of the oil sight glass.
- The service door gives accessibility for maintenance:
  - access to the CoreSense reset button;
  - access to the magnetic plug;
  - access to the oil filter for cleaning;
  - oil change;
  - crankcase heater replacement;
  - etc...

## 6 Technical data

- Sound attenuation: ..... 10 to 16 dB(A)
- Total weight: ..... 21 kg for 4-cylinder, 22 kg for 6-cylinder compressors
- Flammability: ..... Conforms to IEC 60695-11-10 and IEC 60695-2-11
- Material compliance: ..... Compliant with mineral and polyolester oil and with refrigerants
- Material shell: ..... Elastoflex E 3631-103-BLK reinforced with UNIFILO U101, thickness 10 mm
- Material insulation: ..... ISOPOL T/PES polyurethane foam, thickness 30 mm,  
IPSEMELAMINE foam, thickness 20 mm
- Material heavy layer: ..... Vibrogum G, thickness 2 mm