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**arktik**<sup>®</sup>

**1600N – 1600N/T – 2000N – 2500N - 2500N/K – 2000P – 2000P/K**

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## **1 General**

GOVI provides this manual for information purposes only. Information provided in this manual should at no time be regarded as all-inclusive or covering all contingencies. For further information, please contact your GOVI distributor.

Any change and alteration of this trailer refrigeration unit and deviation from the installation process without prior written consent will void GOVI's warranty.

Only use original spare parts or spare parts approved by GOVI. It is explicitly pointed out that original spare parts and accessories which are not supplied by GOVI are neither tested nor approved. GOVI cannot assume any liability or warranty for damage caused by the use of non-original spare parts.

The work on the trailer refrigeration unit described in this manual may only be carried out by persons who, on the basis of the relevant regulations and of their professional training, knowledge and experience, can assess the work to be carried out and identify possible dangers.

GOVI is not responsible for personal injury or material damage which may arise from non-approved modifications.

In order to ensure the durability of GOVI products please follow the instructions in this manual.

### 1.1 Disposal of the Unit

#### WARNING!



**Danger of personal injuries and damage to the environment due to improper disassembly of the trailer refrigeration unit.**

**Only qualified, trained specialists are allowed to disassemble the trailer refrigeration unit.**

**The refrigerant must be handled with care as it poses serious health and environmental hazards.**

The customer is responsible for the proper disposal of the trailer refrigeration unit.

*Tab. 1-1 List of materials*

Designation	Material
Structure	Sheet metal, ferrous material
Condenser, evaporator	Aluminium, copper
Electrical components	Copper, PVC, miscellaneous materials
Compressor	Ferrous materials, copper and other materials
Refrigerant	R452A / R134a
Refrigerant quantity	0,45 / 1,17 kg
Coating	Epoxy compound

Please follow local regulations regarding the disposal of the trailer refrigeration unit and especially its refrigerant. If appropriate, consult professionals or specialists.

## 2 Safety Instructions

### 2.1 Safety Messages and Safety Alert Symbols

#### **DANGER!**



Indicates a hazardous situation that, if not avoided, could result in irreversible personal injury and even death.

#### **WARNING!**



Indicates a hazardous situation that, if not avoided, could result in irreversible personal injury or even death under certain circumstances.

#### **CAUTION!**



Indicates a hazardous situation that, if not avoided, can result in personal injury or damage to objects and the environment.

### 2.2 Other Terms and Symbols

Notices do not indicate safety-related content.

#### **Notice**



Provides useful information and helpful tips.

## 2.3 Safety and Hazard Precautions

### WARNING!

**Electrical hazard!**

Any work on the trailer refrigeration unit is allowed with unplugged main plug only.

Protect the trailer refrigeration unit against being started up while working on it by following suitable measures.

Never attempt to plug in or unplug the trailer refrigeration unit from the power supply when your hands are wet.

### WARNING!

**Electrical hazard!**

The following safety rules must be strictly observed before working on the trailer refrigeration unit:

- Switch off.
- Prevent it from being switched back on again accidentally.
- Check that lines and equipment are without power.
- Ground and short circuit phases.
- Cover, partition or screen of adjacent line sections.

The electrical connection to the trailer refrigeration unit must be made by a licensed electrician.

### WARNING!

**Hazard from toxic gas!**

This refrigeration unit contains a fluorocarbon refrigerant, which, in the presence of an open flame or electrical short, produces toxic gases that are severe respiratory irritants capable of causing death.

The refrigerant tends to displace air and can cause oxygen depletion, which may result in death by suffocation.

Be careful when working on the trailer refrigeration unit, especially in any enclosed or confined area with a limited air supply!

### WARNING!

**Fire and explosion hazard from flammable operating materials!**

Avoid open fire, electrical sparks and ignition sources.

Do not smoke!

Observe measures for fire and explosion protection.



**WARNING!**



**Hazard from improper modifications!**

**Do not drill any additional holes into the trailer refrigeration unit.**

**You may damage major parts. Holes accidentally drilled into electrical wiring or refrigerant pipes can cause fire or explosion.**

**WARNING!**



**Health hazard from refrigerant emissions!**

**During maintenance or repair work on the refrigerant circuit, refrigerant emissions may occur. These emissions can be both liquid and gaseous and pose a threat to humans and the environment.**

**In case of emissions or leaks in the refrigerant circuit, it is mandatory to wear proper protective clothing as goggles, respiratory masks and protective gloves.**

**CAUTION!**



**Burning hazard!**

**Components of the trailer refrigeration unit (such as condenser, evaporator and tubes) may still be hot from operation.**

**Allow a sufficient cooling time of the components when working on the trailer refrigeration unit.**

**CAUTION!**



**Long-term environmental hazard!**

**Operating materials (refrigerant and refrigerant oil) are not biodegradable. Observe the safety data sheet or operating instructions of the materials used.**

**Operating materials and polluted components must be disposed according to locally valid environmental regulations.**

**CAUTION!**



**Injury hazard from rotating fan blades!**

**Keep your hands away from rotating fan blades.**

**Accidental contact with fan blades' sharp edges can cause severe personal injury.**

## 2.4 Safety Precautions Concerning the Refrigerant

Hydrofluorocarbon refrigerants are classified as safe refrigerants. However, certain precautions must be observed during the operation, installation and maintenance of the trailer refrigeration unit.

When released to the atmosphere in the liquid state, hydrofluorocarbon refrigerants evaporate causing rapid freezing.

In contact with parts of the human body, they can cause severe frostbites.

Hydrofluorocarbon refrigerants may generate hazardous gases, which, in the presence of an open flame or electrical short, are severe respiratory irritants and may have fatal consequences.

### 2.4.1 First Aid

In the event of frostbite, you should generally protect the affected area from further injury or contact with the refrigerant and if necessary seek medical advice.

Contact of refrigerant or refrigerant oil with the eyes:

In case of contact with the refrigerant or refrigerant oil, immediately flush eyes with large amounts of lukewarm water (for at least 15 minutes) and get prompt medical attention.

Frostbite of the skin:

Remove clothing and shoes contaminated with refrigerant.

Flush the affected area with large amounts of lukewarm water for a long time.

Do not apply heat (e.g. by rubbing or using a hot water bottle).

Get immediate medical attention. Loosely bandage frost-bite burns with dry, sterile, sizeable dressing to protect from infection or injury.

Inhalation of refrigerant:

Get immediate medical attention. Bring the person to fresh air and, if necessary, carry out resuscitation measures.

### 2.4.2 Environmental Considerations

GOVI trailer refrigeration units are shipped with a suitable charge of refrigerant R452A / R134a.

In case of errors in the refrigerant circuit or fluid leaking out of the trailer refrigeration unit, the unit must be checked by a specialist and be properly repaired. Under no circumstances the refrigerant shall be vented into the atmosphere.

Accurately read the Safety and Hazard Precautions in *section 2.3 Safety and Hazard Precautions*, as well as the data sheet for the refrigerant R452A / R134a provided by the manufacturer.

Defective and reclaimed refrigeration units/sucked fluids must be disposed according to the relevant environmental regulations.

## 2.5 Intended Use

This trailer refrigeration unit is designed for refrigerated trailers at locations without explosion or fire hazards. For that purpose, the trailer refrigeration unit is mounted stationary at the front wall of the refrigerated trailer by a mechanical fastening system (not within the scope of delivery).

At outside temperatures between -20°C and +40°C the trailer refrigeration unit enables inside temperatures from -20°C to 10°C.

- The trailer refrigeration unit is not determined for operation in AP.PE EEx (places with explosion hazard).
- The trailer refrigeration unit is not designed to be used in places with fire hazard.
- The trailer refrigeration unit is not equipped with reinforced electrical or mechanical protective elements to withstand aggressive atmospheric conditions.

Ensure good ventilation of the trailer refrigeration unit when placing the trailer. Ensure proper air circulation and good access for maintenance work when indicated.

Do not expose the trailer refrigeration unit to direct sunlight.

Ensure proper air circulation inside the refrigeration unit when loading the trailer. Do not block the evaporator. Avoid the insertion of heat sources in the refrigeration unit.

- The trailer is designed for no other purpose than the one described above. Any other use is considered improper, for which it is prohibited or requires the manufacturer's approval.

The Intended Use also includes compliance with the specified maintenance and repair work, [see section 10 10](#).

### 3 Technical Data

The trailer refrigeration unit consists of a self-supporting chassis made of galvanized plate and a main cover made of ABS, with paint in standard colour RAL9010.

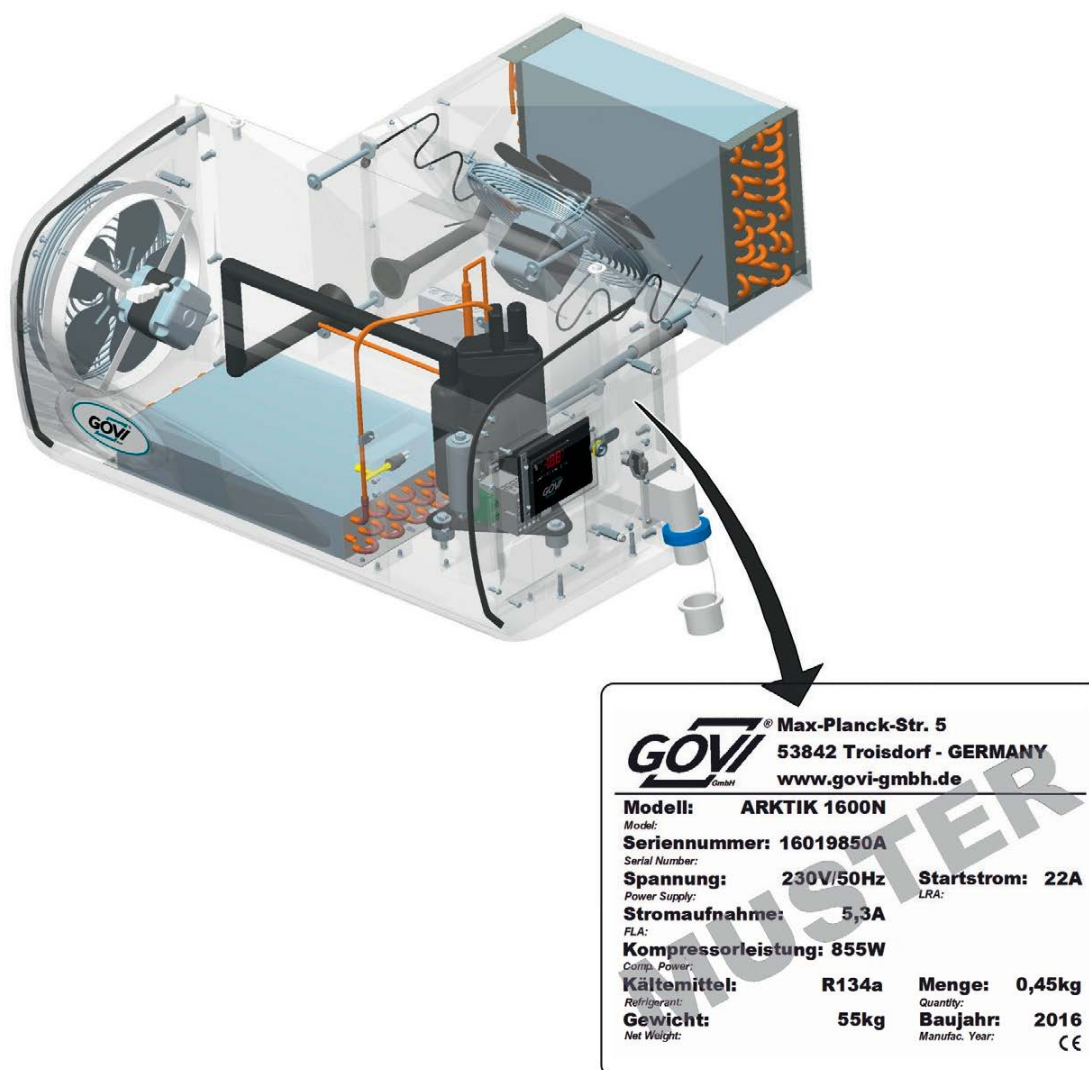
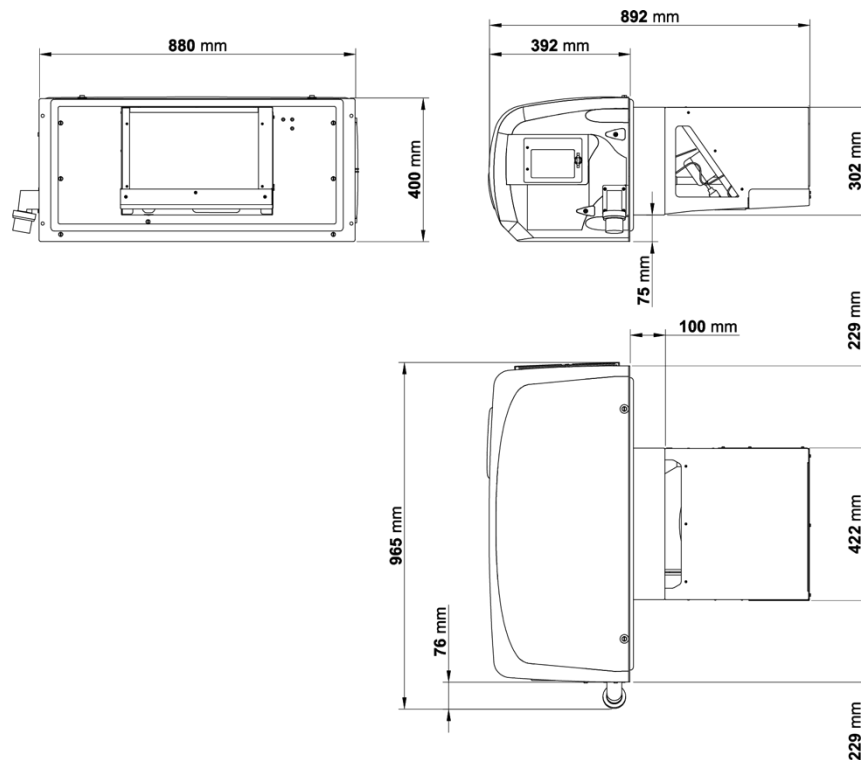


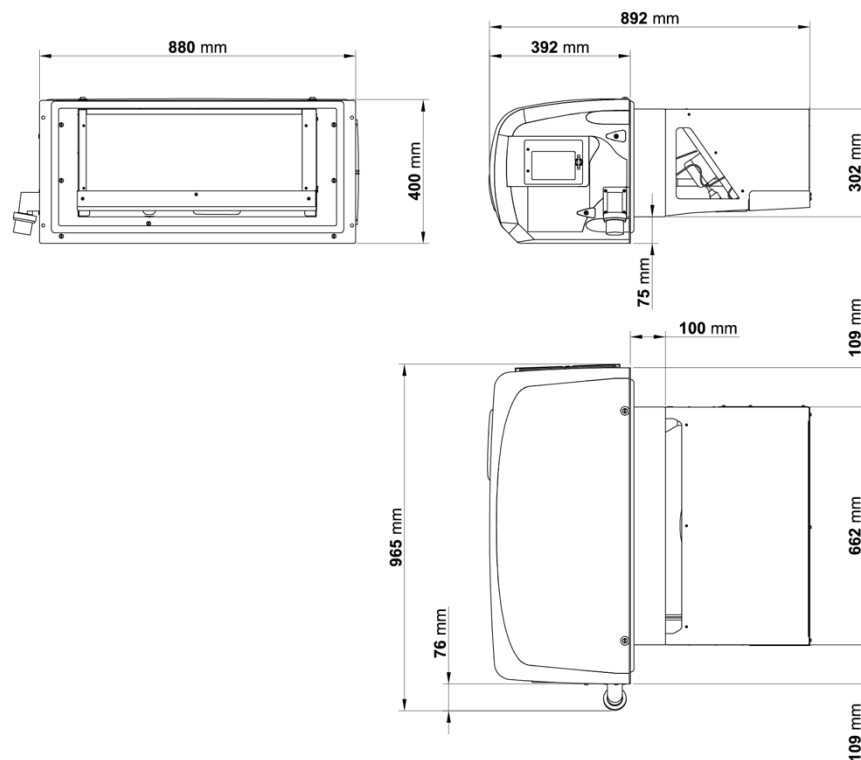
Fig. 3-1 Nameplate

The serial numbers of the trailer refrigeration unit are on the nameplate, together with other important technical data. The nameplate is on the right-hand side of the main cover in the proximity of the electrical connection.

To ensure a fast and smooth processing of your requests, please mention the serial number of the trailer refrigeration unit when asking technical queries.



**arktik 1600N - 1600N/T - 2000N**



**arktik 2500N - 2500N/K - 2000P - 2000P/K**

*Fig. 3-2 Dimensions*

Tab. 3-1 Technical data

Description	Unit	arktik® 1600N	arktik® 1600N/T	arktik® 2000N	arktik® 2500N	arktik® 2500N/K	arktik® 2000P	arktik® 2000P/K
refrigerated trailer internal temperature		T=2 °C	T=2 °C	T=2 °C	T=2 °C	T=2 °C	T=2 °C/ -20 °C	T=2 °C/ -20 °C
power supply	V	230	230	230	230	230	230	230
frequency	Hz	50	50	50	50	50	50	50
cooling capacity	W	1600	1470*	2050	2500	2500	1500/2050	1500/2050
heating capacity	W				-/-	1600	-/-	1600
power consumption	W	855	855	1260	1200	1200	1000/1200	1000/1200
current consumption LRA	A	19,8	19,8	29	32	32	32	32
current consumption FLA	A	4,8	4,8	5,7	7	7	6,5/7,0	6,5/7,0
defrosting	W	340	340	340	340	340	1090	1090
air flow evaporator	m³/h	750	750	750	1100	1100	1100	1100
air flow condenser	m³/h	750	1100	1100	1100	1100	1100	1100
protection class, mounting side	IP	54	54	54	54	54	54	54
refrigerant	Typ	R134a	R134a	R134a	R452A	R452A	R452A	R452A
refrigerant quantity	g	450	450	550	800	800	1170	1170
max. operating temperature	°C	40	45	40	40	40	40	40
weight	kg	55	55	63	63	63	63	63
colour	RAL	9010	9010	9010	9010	9010	9010	9010

CFC-free refrigerant R134a • CFC-free refrigerant R452A •

N = Normal refrigeration • N/T = Normal refrigeration at high outside temperature

P = Polytemperature • K = Climate heater (ensuring the desired temperature in winter)

The refrigeration capacity is based on the following operating conditions:

Outside temperature 30 °C, RH 50% • \* Outside temperature 40 °C, RH 50%

We recommend an insulation with a k value of 0.2 W/m²K

## 4 Package, Transportation and Storage

### 4.1 Package

For safe transportation, the trailer refrigeration unit is securely packed in a box mounted on pallets.

#### CAUTION!



**Damaged appliances can cause skin injuries and property damage due to leakage of the refrigerant.**

**In case of severe external damage to the package and/or on the trailer refrigeration unit, contact immediately your local GOVI dealer for assistance.**

**Do not start with the installation of the trailer refrigeration unit and do not put it into operation.**

1. Upon delivery place the pallet and box on a level ground. Immediately inspect the box and the trailer refrigeration unit for any damage.
2. Inform the carrier about any damage you have discovered.
3. Take pictures of the damage and document them immediately on the bill of delivery.



1 Operation manual    3 Spanner    5 Bulb  
2 Fixing bolts    4 Coupling    6 Lamp

Fig. 4-1 Box



4. Check the contents of the box for completeness.
5. Look for loose parts that may be integral part of the delivery, before disposing of the package.

## 4.2 Transport

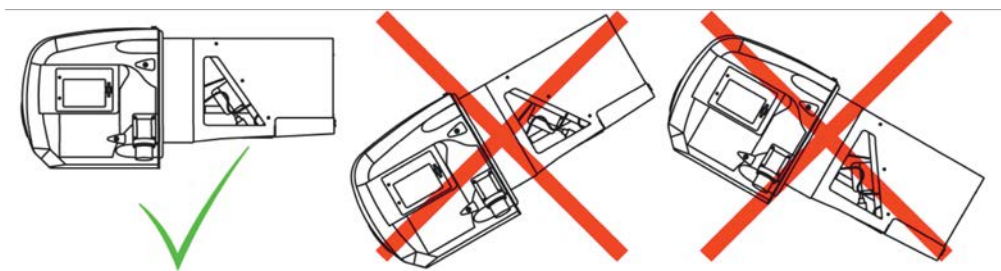
### CAUTION!



**Risk of equipment damage!**

**The trailer refrigeration unit must be transported horizontally.**

**The trailer refrigeration unit must have been in a horizontal position at least six hours prior to its commissioning.**



*Fig. 4-2 Transport and storage*

- Only use suitable lifting equipment for lifting and transport of the trailer refrigeration unit. Look at *section 3 Technical Data* for information about the weight.
- Lift the refrigeration unit for trailers according to *section 6.4 Installation of the Trailer Refrigeration Unit*.

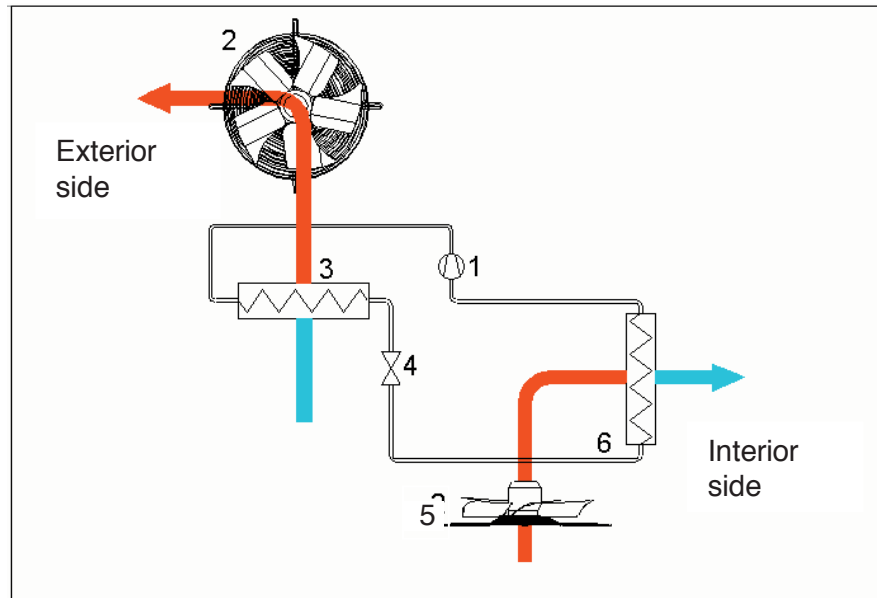
## 4.3 Storage

Observe the following when storing the trailer refrigeration unit:

- The trailer refrigeration unit must be stored horizontally, *see Fig. 4-2*.
- The storage temperature must not exceed 60 °C.
- The trailer refrigeration unit must not be stored in an aggressive environment.
- Direct sunlight at the storage location must be avoided.



## 5 System Description

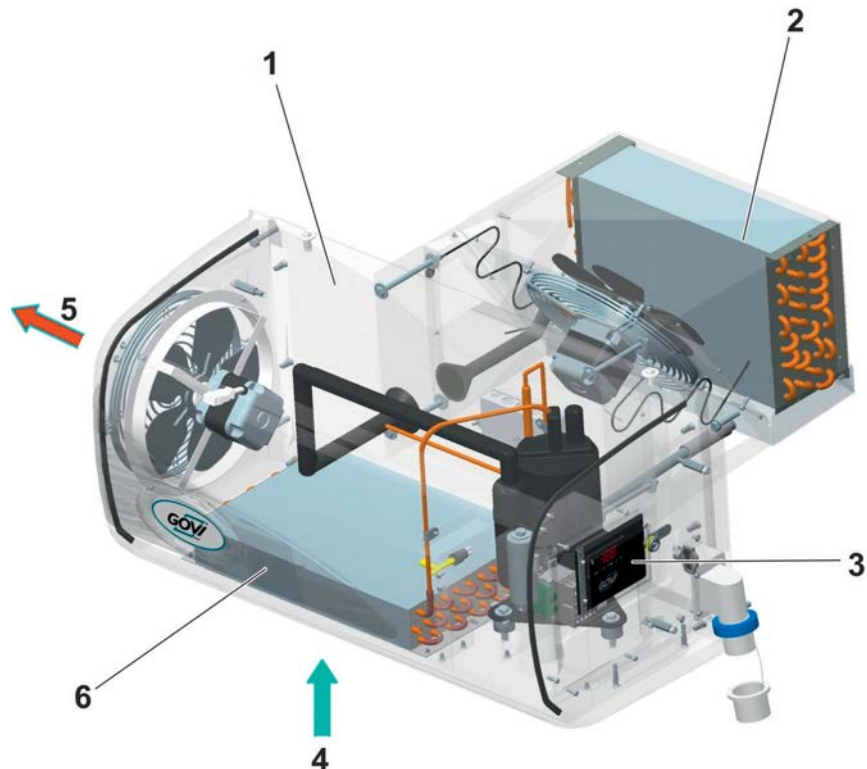


- |                 |                  |
|-----------------|------------------|
| 1 Compressor    | 4 Throttle valve |
| 2 Condenser fan | 5 Evaporator fan |
| 3 Condenser     | 6 Evaporator     |

*Fig. 5-1 Functional diagram*

The unit functioning is based on the cooling cycle principle: heat transfer occurs by means of a refrigerant, which absorbs heat in the evaporator and then releases it in the condenser. All this takes place within a closed loop. The refrigerant is pressurised by an electrically driven compressor, fluidised in the condenser, atomised by means of a throttle valve and evaporated in the evaporator.

The evaporator is located inside the refrigerated trailer, while the condenser on the outside. The trailer refrigeration unit is equipped with a forced-ventilated condenser and evaporator, axial fans and electronic temperature control.



- |  |   |
|--|---|
| 1 Main cover                                     | 4 Air intake<br>(do not obstruct!)              |
| 2 Evaporator<br>(with refrigerant in the system) | 5 Air outlet<br>(do not obstruct!)              |
| 3 Protection cover                               | 6 Condenser<br>(with refrigerant in the system) |

*Fig. 5-2 Overview of the trailer refrigeration unit*

Main cover (1)	The main cover (1) covers the outer parts of the trailer refrigeration unit.
Evaporator (2) and condenser (6)	In the evaporator (2) heat is absorbed by the refrigerant, which is released again in the condenser (6).
Protection cover (3) and setting of nominal temperature	The protection cover (3) shields the control unit from harsh weather and impedes unintended changes of the settings. The nominal temperature is set according to <a href="#">section 9.2 9.2.</a>
Air intake (4) and air outlet (5)	The air intake (4) and air outlet (5) must always be kept free. They must not be covered or obstructed.

## **6 Installation**

### **6.1 Conditions for Installation**

1. Read this manual carefully in order to understand how to properly perform the installation.
2. Verify that the trailer refrigeration unit is delivered according to your order, is in good condition and has no visible damages.
3. Check that all necessary tools and all additionally required parts are not missing and that are in good operating condition.
4. Verify that the installation site of the trailer refrigeration unit provides a flat surface without unevenness, which may cause vibrations.
5. Check that the front wall of the trailer refrigeration unit is able to adequately support its weight.
6. Make sure that the loading crane or lifting device, and the complete lifting cables are of sufficient size to support the weight of the trailer refrigeration units. Look at [section 3 Technical Data](#) for information about the weight.
7. Note that the power supply of the trailer refrigeration unit cannot be connected before the installation of the unit and its accessories has been completed.
8. Provide protection to the trailer's walls and/or internal parts to prevent damage by swarf and alike during the installation process.

## 6.2 Additional Parts and Equipment

Because of the wide variety of installation options available, the trailer refrigeration unit is not shipped with all parts needed for every possible installation situation. The installer needs to make sure that the following parts are available.

We recommend keeping the following additional parts ready in a box before starting the installation process:



2 assembly eyelets M8

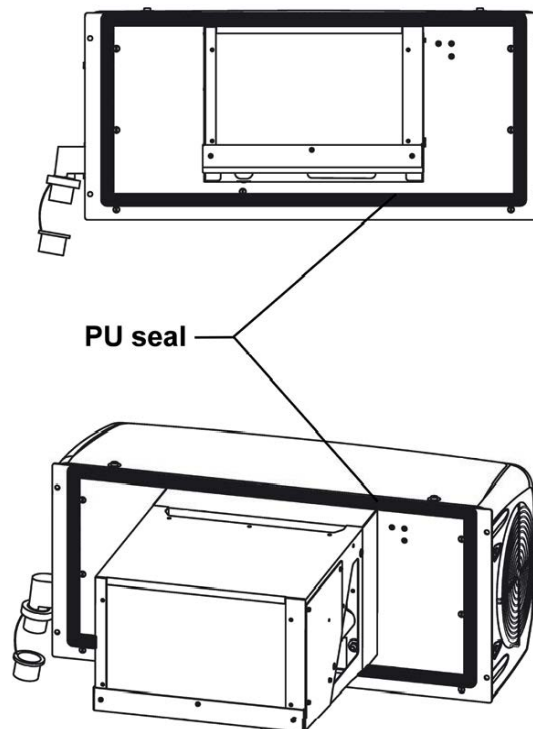


1 condensed water drain hose  
with an internal 15-mm diameter and suitable length.

## 6.3 Preparatory Activities

### 6.3.1 General Preparation

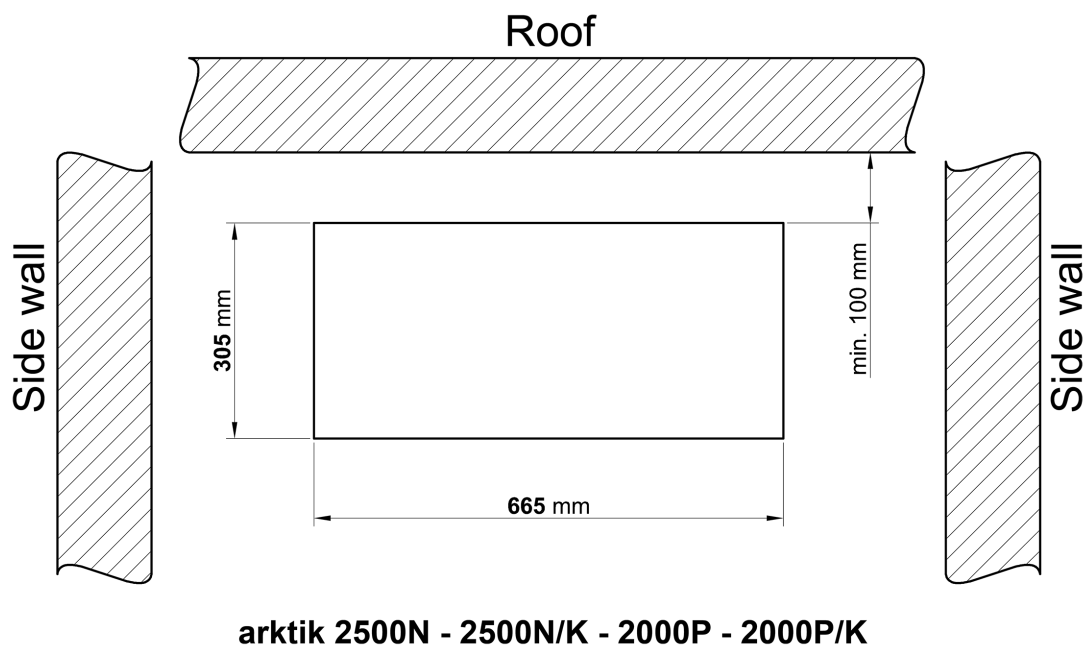
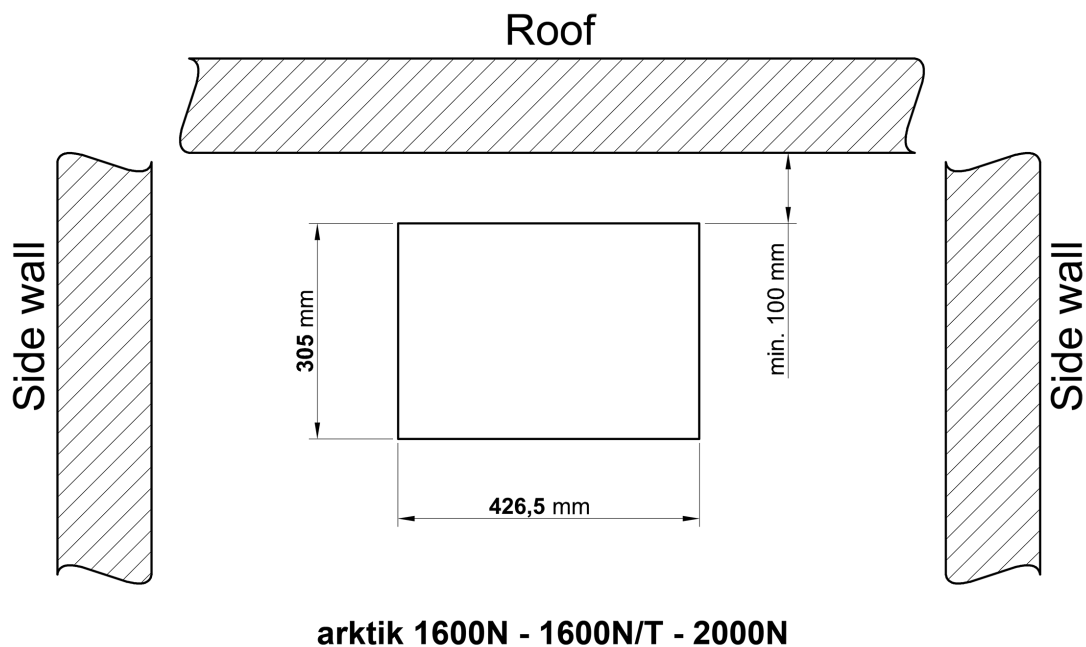
1. Place the refrigerated trailer and trailer refrigeration unit side by side on a dry and clean level ground.
2. Verify that the trailer is in horizontal position.
3. Make sure that the contact area between its front wall and the trailer refrigeration unit is free from impurities.
4. Remove all obstacles from the installation area.
5. Prepare all required tools and equipment and place them in a safe place easily accessible from the installation area.



*Fig. 6-1 PU seal of the trailer refrigeration unit*

6. Verify that the PU seal (1) at the backside of the trailer refrigeration unit is available and intact.

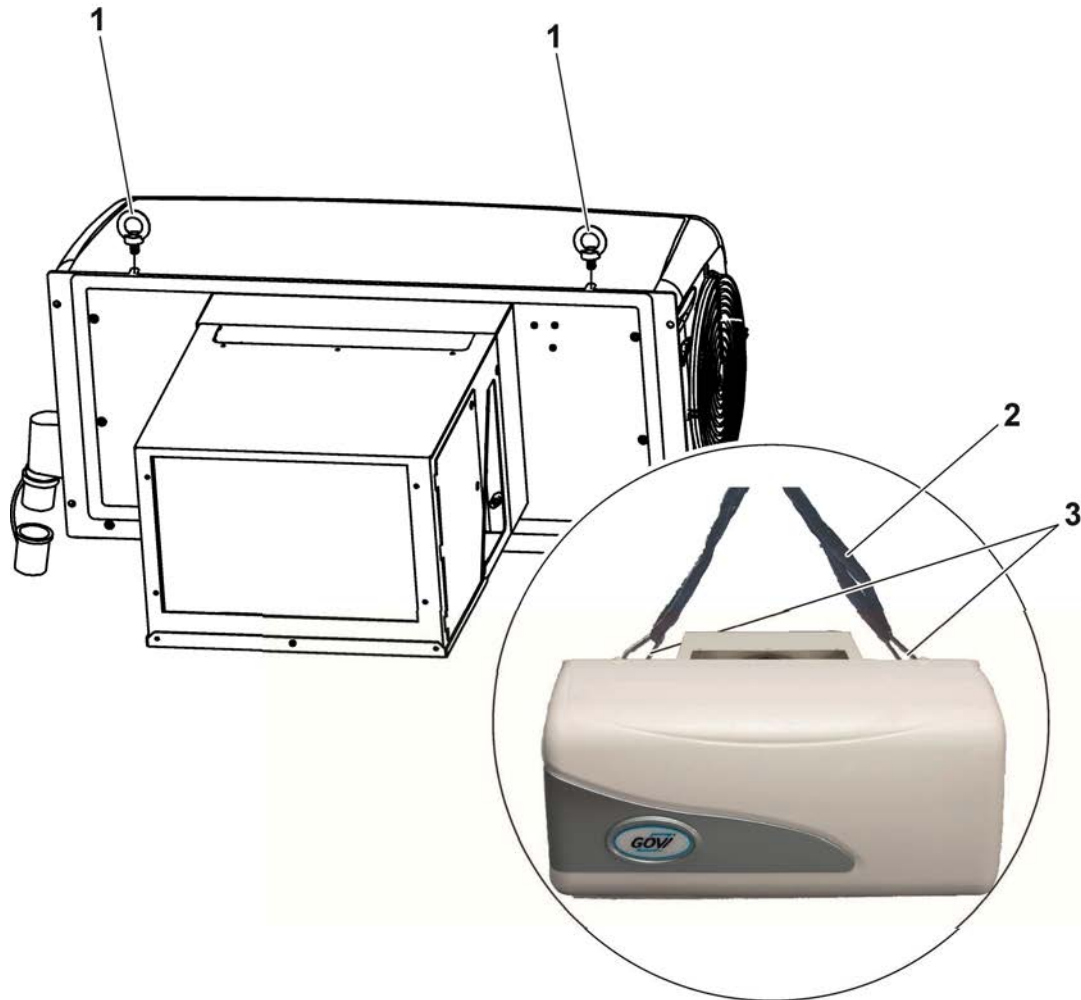
### 6.3.2 Installation Opening of Trailer Wall



*Fig. 6-2 Dimensions of the trailer wall opening*

7. Prepare the wall opening together with 6 drill holes for the fastening elements in the middle of the front wall of the trailer. Make sure that the minimum size for proper operation of the trailer refrigeration unit is observed, [see Fig. 6 2](#).

## 6.4 Installation of the Trailer Refrigeration Unit



1 Eye bolts 2 Carrying rope 3 Spring hook

*Fig. 6-3 Attachment points of the trailer refrigeration unit*

**CAUTION!****Risk of equipment damage!**

Without the main cover, the individual components of the trailer refrigeration unit are vulnerable to damage during the installation.

Leave the main cover during the installation.

1. Remove the hexagon head screws from the mounting holes of the main cover on the top of the trailer refrigeration unit one by one and insert in each free hole one eyebolt (1) from the provided box, *see Fig. 4-1*.

**WARNING!****Injury hazard!**

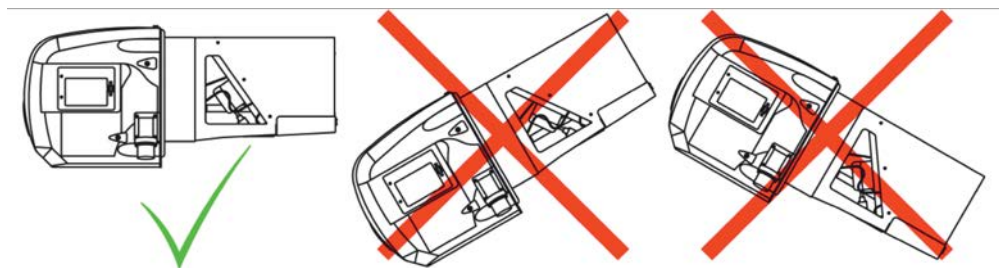
The weight of the trailer refrigeration unit is approximately 63 kg.

Always wear a helmet when lifting and positioning it.

Use only suitable and approved tools.

You must use both lifting points (eye bolts).

2. Attach 2 sufficient dimensioned carrying ropes (2) at both eye bolts (1).



*Fig. 6-4 Mounting alignment*

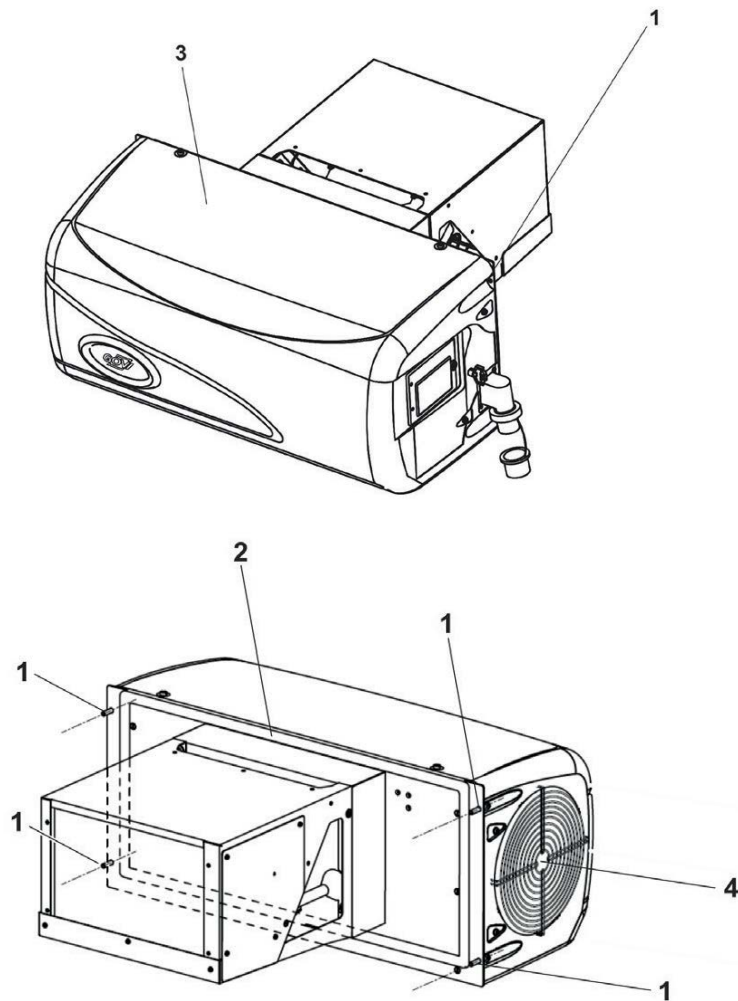
**CAUTION!****Risk of equipment damage!**

The trailer refrigeration unit must be transported horizontally.

The trailer refrigeration unit must have been in a horizontal position at least six hours prior to its commissioning.



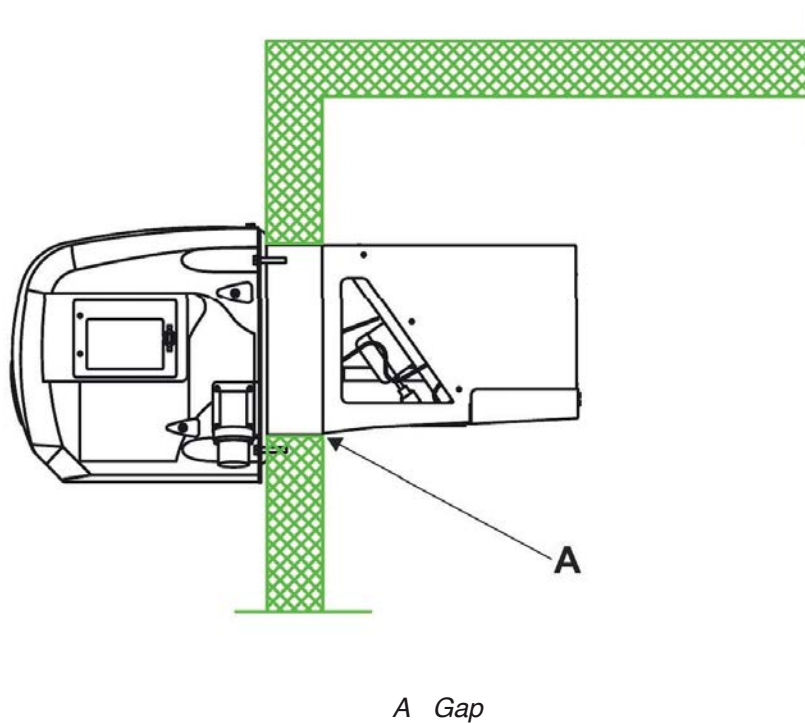
3. Make sure that the trailer refrigeration unit stays in a horizontal position while lifting it carefully out of the box.
4. Position the trailer refrigeration unit in front of the installation opening at its front wall using an adequate lifting device or loading crane.



1 Fixing bolts 2 PU seal 3 Main cover 4 Protective grating

*Fig. 6-5 Attachment of the trailer refrigeration unit*

5. Place the trailer refrigeration unit in the mounting area and make sure that the PU seal (2) does not get damaged.
6. Secure the trailer refrigeration unit with the aid of fixing bolts (1) on the trailer, [see section 6.2 Additional Parts and Equipment](#).
7. Remove eye bolts with the carrying ropes and fasten again the main cover (3) using the screws.



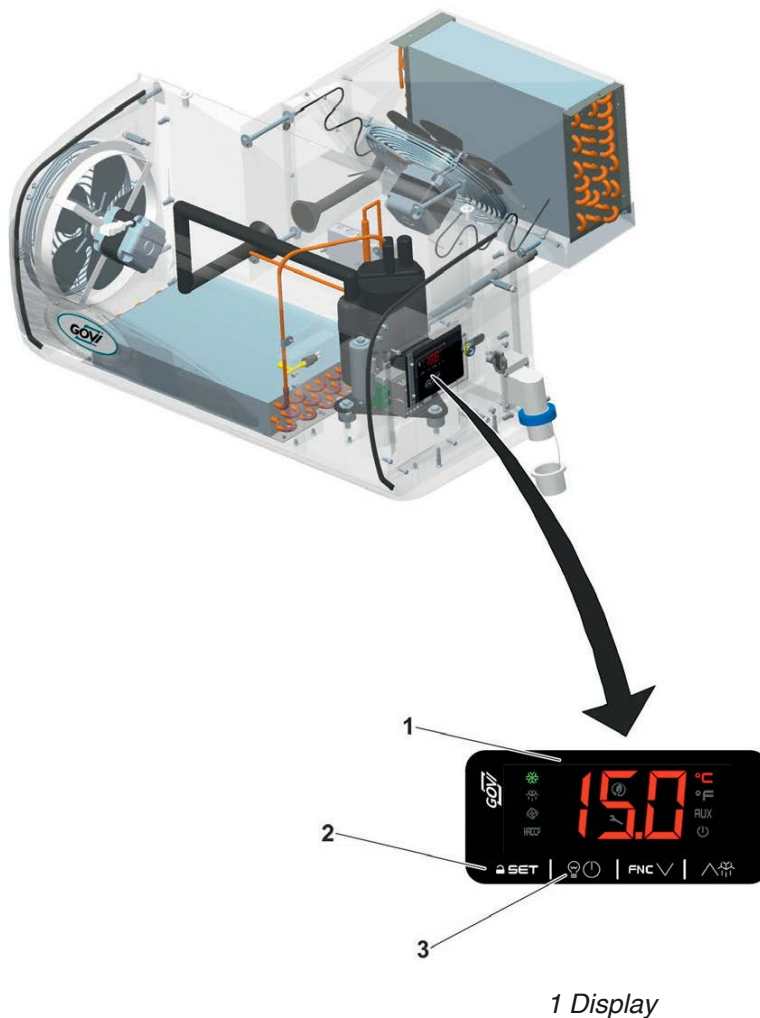
*Fig. 6-6 Sealing inside of the trailer*

8. Inside the refrigeration unit, seal the gap (A) between the front wall of the trailer refrigeration unit and the trailer edge using silicone.
9. If necessary, connect a condensed water drain hose at the bottom of the condenser and make sure that it is not kinked or is positioned in an inclined way, [see section 6.26.2](#).

## 6.5 Installation of Accessories

It is not necessary to open the unit when installing the lighting system. The power supply connection has been prefitted at the factory. The connected cable for the interior lighting is located on the evaporator side panel.

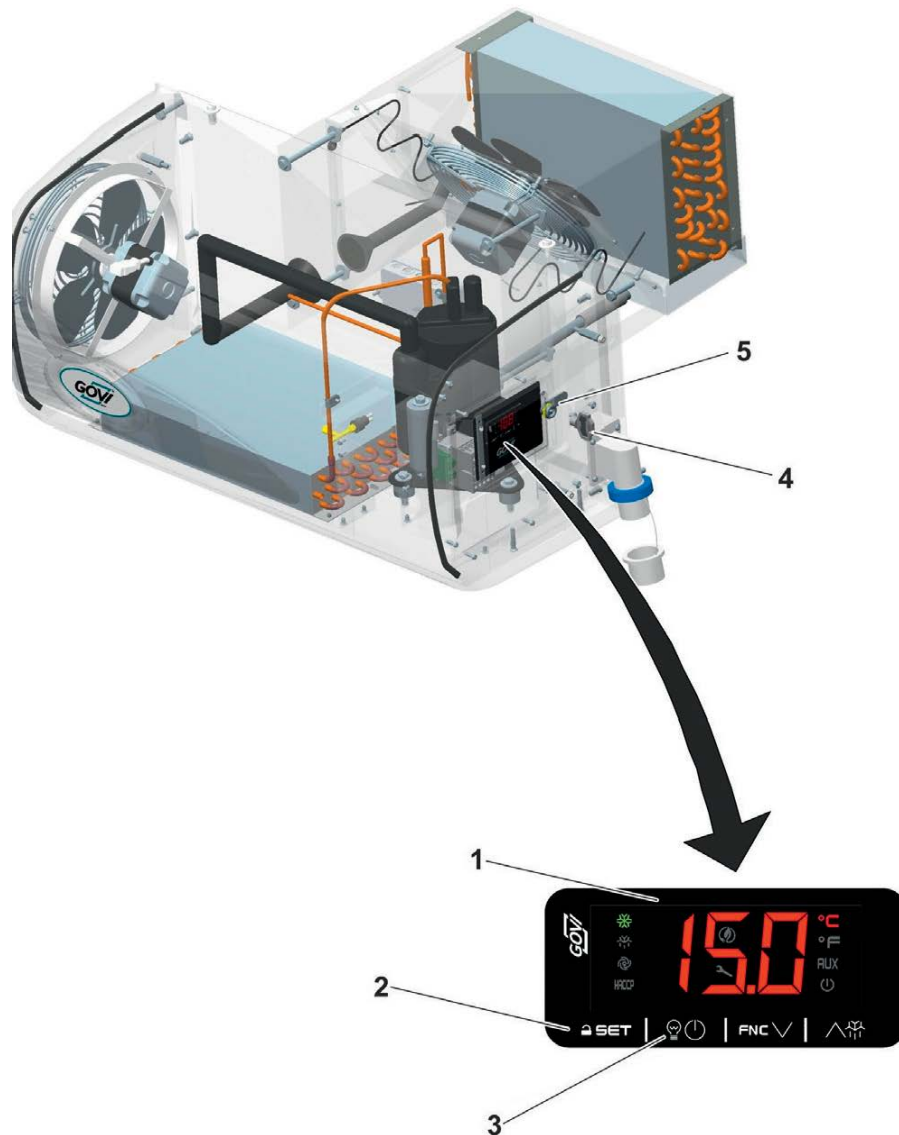
## 7 Operating Elements



*Fig. 7-1 Operating elements*

Display (1)	The display serves to choose and to show the nominal temperature.
Control switch (2)	The control switch (2) enables to switch on and off the control voltage of the trailer refrigeration unit.
Lamp switch (3)	The lamp switch (3) enables to switch on and off the light inside the refrigeration unit.

## 8 Commissioning



- 1 Display      3 Light switch & ON/OFF switch 4 Spanner  
2 Control switch 5 Latch

*Fig. 8-1 Commissioning*

1. Remove protective cover from the power connector.
2. Connect the trailer refrigeration unit by means of a suitable cable (not supplied) to the electric power system.
3. Use the spanner (4) to unlock the latch (5) and open the protection cover.

**CAUTION!**



**Immediately unplug the power supply of the trailer refrigeration unit if you detect smoke, unusual smells or strange noises coming from it.**

**Call for service before operating the trailer refrigeration unit again.**

4. Press the button ON/OFF to activate the trailer refrigeration unit. The symbol ON/OFF blinks until the controller is on. The current temperature is displayed.

If “LoC” is displayed, it means the buttons are locked. In order to unlock them, keep any button pressed until “UnL” is displayed.



Press SET once shortly.

The display now shows the current setting of the nominal temperature.



Adjust the nominal temperature by pressing UP for a higher temperature or DOWN for a lower temperature.



To confirm the nominal value, press the button SET.

5. Make sure that:

- the wall opening and the drill holes of the trailer wall are sealed firmly to prevent moisture or air leakage,
- neither the air outlets and air intakes nor the condenser and the evaporator are obstructed by any material or object,
- the main cover is securely installed and sealed,
- the condensed water drain hose is firmly attached to its discharge outlet,
- all bolts and screws are securely fastened,
- the system operates correctly.

## 9 Operating

### CAUTION!



Immediately unplug the power supply of the trailer refrigeration unit if you detect smoke, unusual smells or strange noises coming from it.

Call for service before operating the trailer refrigeration unit again.



1 Display

2 Control (SET) switch

3 Lamp switch & ON/OFF switch

*Fig. 9-1 Operating*

## 9.1 Switching on/off the Trailer Refrigeration Unit

1. Use the spanner (4) to unlock the latch (5) and open the protection cover.
2. Press and hold the button ON/OFF for 2 seconds.

## 9.2 Setting Nominal Temperature

1. Use the spanner (4) to unlock the latch (5) and open the protection cover.



2. Briefly press the button SET. The display shows the preset nominal value already set.



3. To change the nominal value, press the button UP or DOWN.



4. Confirm your desired temperature by pressing SET again.

## 9.3 Switching on/off the Lamp in the Refrigerated Trailer

1. Use the spanner (4) to unlock the latch (5) and open the protection cover.
2. Briefly press the button ON/OFF. "AUX" lights up.
3. Briefly press again the button ON/OFF in order to switch off the lamp in the trailer. "AUX" goes out.

## 9.4 Manual Defrost

While the trailer refrigeration unit is in use, the evaporator fins will gradually get covered with frost. Defrosting must be carried out regularly in order to avoid losses in the cooling capacity and air flow. It can be done using electric heating elements, which heat the evaporator causing the frost (or ice) to melt. The melted frost runs off through the drain pipes of the unit. During the defrosting procedure, the evaporator fans are stopped.



1. Use the spanner (4) to unlock the latch (5) and open the protection cover.
2. Press "UP" for more than 5 seconds.  
The manual defrost routine will start.

## 10 Maintenance

### Notice



Maintain the trailer refrigeration unit

- every 6 months, or
- after a longer period out of operation or
- immediately after operation in a dusty or moist environment.

Negligent maintenance can lead to malfunction and damage the trailer refrigeration unit.

### 10.1 Manual Defrost During Maintenance

*See section 9.4 9.4.*



## 10.2 Cleaning

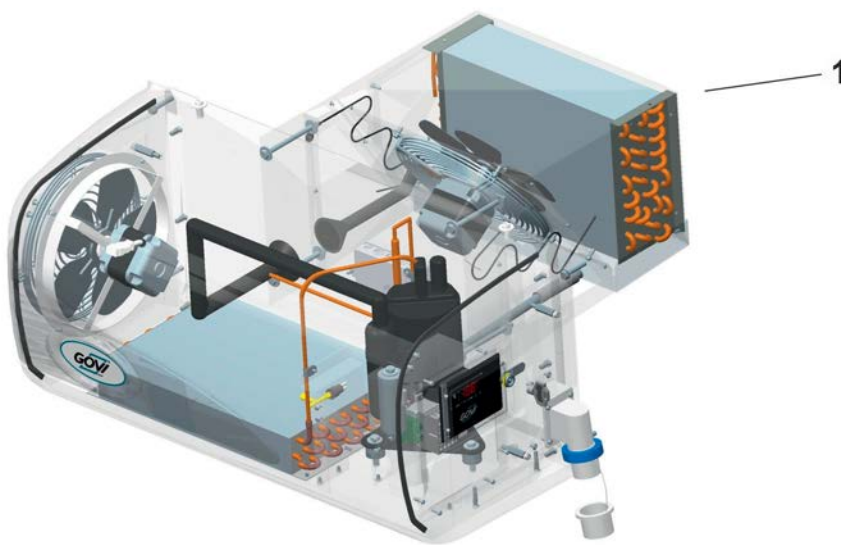
### 10.2.1 Cleaning Parts Inside the Refrigeration Unit

#### WARNING!



**Fire and explosion hazard!**

**Never use flammable solvents such as alcohol, benzene or thinners for cleaning.**

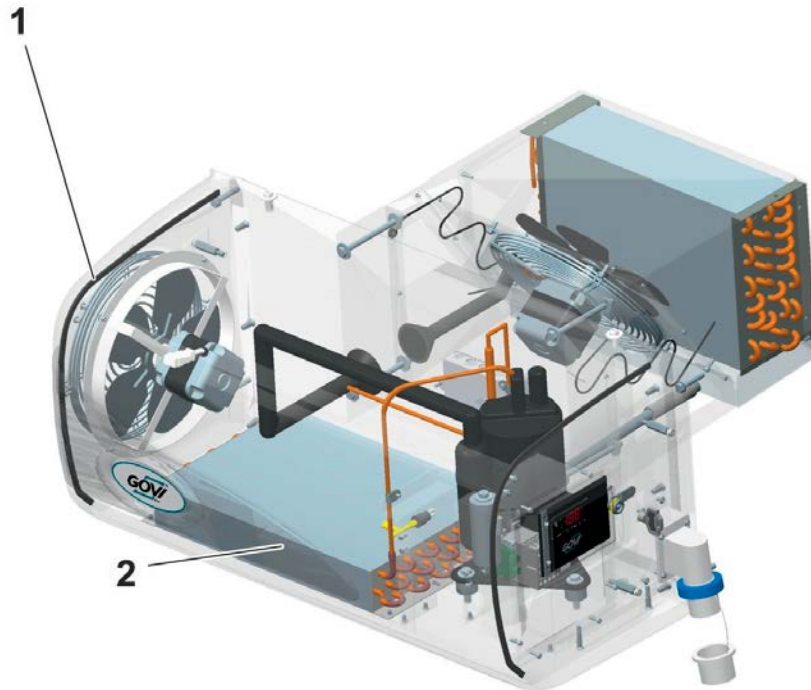


1 Evaporator

*Fig. 10-1 Cleaning parts inside the refrigeration unit*

1. Clear the refrigeration unit of all goods and merchandise.
2. Disconnect the trailer refrigeration unit from the power supply by pulling the main plug.
3. Clean the evaporator by applying compressed air from an appropriate distance.
4. Connect again the trailer refrigeration unit to the power supply by inserting the main plug.

### 10.2.2 Cleaning Parts Outside the Refrigeration Unit



1 Main cover 2 Condenser

*Fig. 10-2 Cleaning parts outside the refrigeration unit*

1. Disconnect the trailer refrigeration unit from the power supply by pulling the main plug.
2. Loosen and remove the five screws on the upper side of the trailer refrigeration unit and take off the main cover (1).
3. Clean the condenser (2) by blowing compressed air from top to bottom through the cooling fins from an appropriate distance.  
If necessary, align fins after the cleaning procedure.
4. Fasten the main cover (1) using the screws.
5. Connect again the trailer refrigeration unit to the power supply by inserting the main plug.

## 11 Troubleshooting

Tab. 11-1 Troubleshooting

Errors / Failure	Problem	Solution
The trailer refrigeration unit does not start.	No power.	<ol style="list-style-type: none"> <li>1. Check that the display is on (button ON/OFF).</li> <li>2. Check the connection to the power supply.</li> </ol>
	The fuses of the power line are blown.	Call for GOVI service.
The trailer refrigeration unit does not cool; the fan inside the refrigerated trailer does not work.	No power.	<ol style="list-style-type: none"> <li>1. Check that the display is on (button ON/OFF).</li> <li>2. Check the connection to the power supply.</li> </ol>
The trailer refrigeration unit does not cool; the fan inside the refrigeration unit works.	The nominal temperature is set too high.	Set the nominal temperature to the desired temperature.
	Malfunction of thermostat.	Call for GOVI service.
	The high-pressure switch is tripped.	<ol style="list-style-type: none"> <li>1. Make sure that the condenser is clean and that the outer fan is turning.</li> <li>2. Make sure that the main cover is mounted correctly.</li> <li>3. Call for GOVI service.</li> </ol>

Errors / Failure	Problem	Solution
The trailer refrigeration unit does not provide sufficient cooling.	The ambient temperature is too high.	<ol style="list-style-type: none"> <li>1. Check the refrigeration unit for leaks.</li> <li>2. Choose a colder location for the refrigeration unit.</li> </ol>
	The refrigerant is leaking.	Call for GOVI service.
	The condenser is obstructed.	Clean the condenser.
	Malfunction of fans.	Call for GOVI service.
	The air circulation in the condenser section is blocked.	<ol style="list-style-type: none"> <li>1. Make sure that there is sufficient space for proper air circulation in the trailer refrigeration unit.</li> <li>2. Remove any obstructing objects from the air circulation area.</li> </ol>
The trailer refrigeration unit switches itself on and off automatically.	The air circulation inside the refrigeration unit is impaired.	Check objects in the refrigeration unit. Position the objects so that the air circulation is not obstructed.
	No nominal temperature has been set.	Set the nominal temperature to the desired temperature.
Water leaks out of the trailer refrigeration unit.	Defective temperature sensor.	Call for GOVI service.
	The drain hose is obstructed.	Remove objects that obstruct the drain hose by using compressed air.
Icing of the evaporator.	The door of the refrigeration unit is open.	Close the door of the refrigeration unit.
	Defective fan inside the refrigeration unit.	Call for GOVI service.
	Malfunction of defrost heating.	Call for GOVI service.

Errors / Failure	Problem	Solution
The lighting in the trailer does not work.	No power.	<ol style="list-style-type: none"> <li>1. <b>Briefly</b> press the button ON/OFF. "AUX" lights up.</li> <li>2. Check that the bulb in the refrigeration trailer works.</li> <li>3. Check the power supply to the lights.</li> <li>4. Call for GOVI service.</li> </ol>

## 12 Summary

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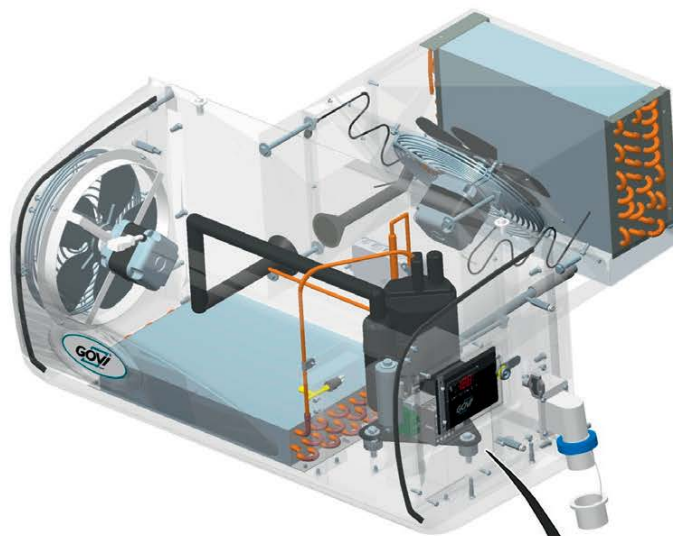
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## 13 Appendices

### 13.1 Operation Manual

The operation manual is placed below the control unit outside the trailer refrigeration unit.



Bedienungsanleitung <span style="float: right;">(D)</span>	User Manual <span style="float: right;">(GB)</span>
	<p><b>SET</b> SET-Taste / button SET</p> <p><b>ON/OFF</b> ON/OFF-Taste / button ON/OFF</p> <p><b>AUF</b> AUF-Taste / button UP</p> <p><b>AB</b> AB-Taste / button DOWN</p>
<p><b>Entsperren der Bedienoberfläche:</b> Halten Sie die SET-Taste für 2 Sekunden gedrückt.</p> <p><b>Ein/Ausschalten der Lampe:</b> Drücken Sie kurz die ON/OFF-Taste</p> <p><b>Ein/Ausschalten des Geräts:</b> Halten Sie die ON/OFF-Taste für 2 Sekunden gedrückt.</p> <p><b>Einleitung der manuellen Abtaugung:</b> Halten Sie die AUF-Taste für 5 Sekunden gedrückt.</p> <p><b>Einstellung der Raumtemperatur:</b> Drücken Sie kurz die SET-Taste. Im Display erscheint der bereits eingestellte Sollwert. Zum ändern des Sollwerts drücken Sie die AUF- oder AB-Taste. Bestätigen Sie den Sollwert mit der SET-Taste.</p>	<p><b>Unlocking the user interface:</b> Press and hold the button SET for 2 seconds.</p> <p><b>Turning on/off the lamp:</b> Briefly press the button ON/OFF.</p> <p><b>Turning on/off the device:</b> Press and hold the button ON/OFF for 2 seconds.</p> <p><b>Initiating manual defrosting:</b> Press and hold the button UP for 5 seconds.</p> <p><b>Setting the room temperature:</b> Briefly press the button SET. The display shows the preset nominal value already set. To change the nominal value, press the button UP or DOWN. To confirm the nominal value, press the button SET.</p>

Fig. 13-1 Operation manual

## 13.2 Wiring Diagrams

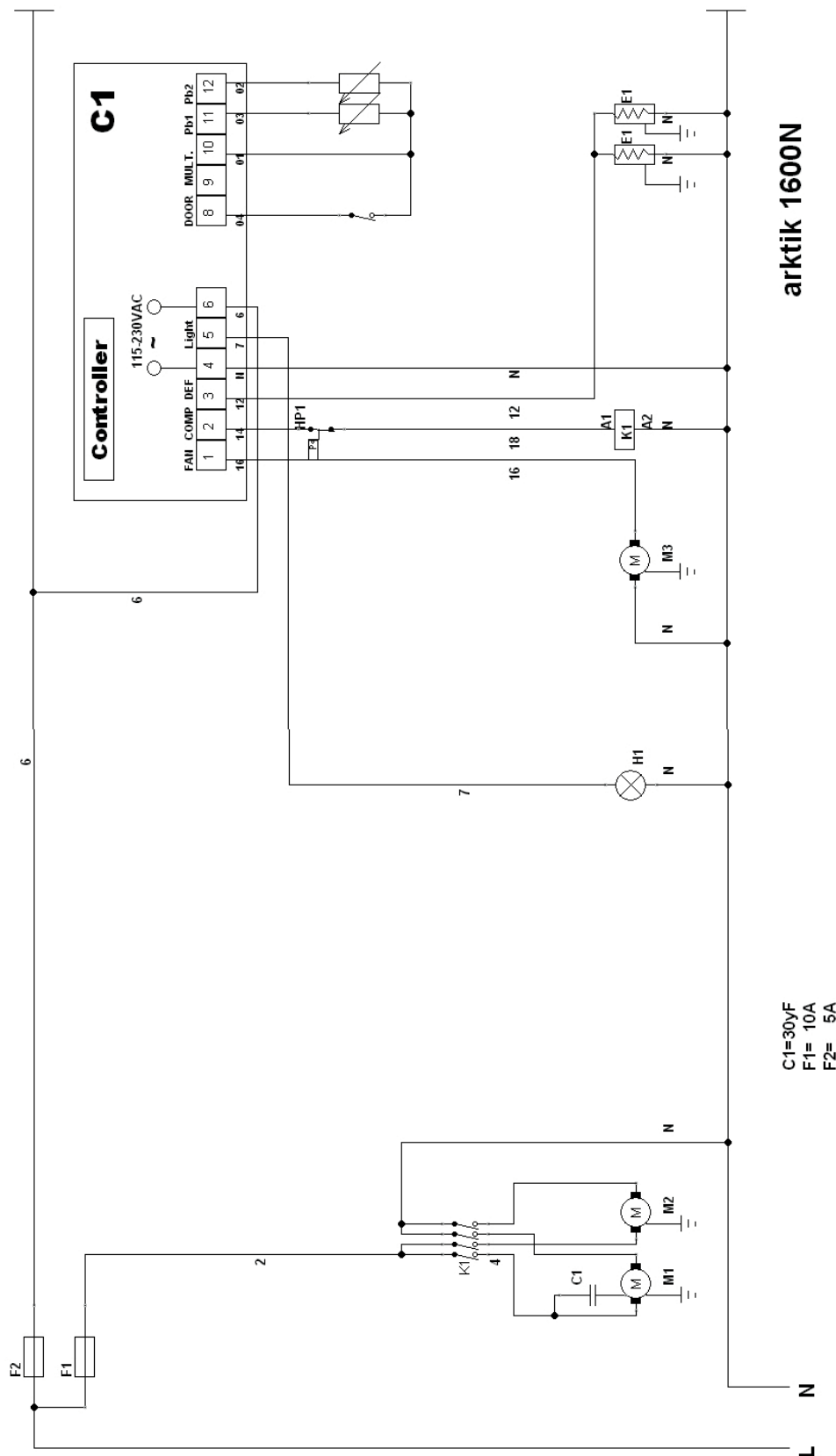
The wiring diagram is placed inside the main cover of the trailer refrigeration unit.

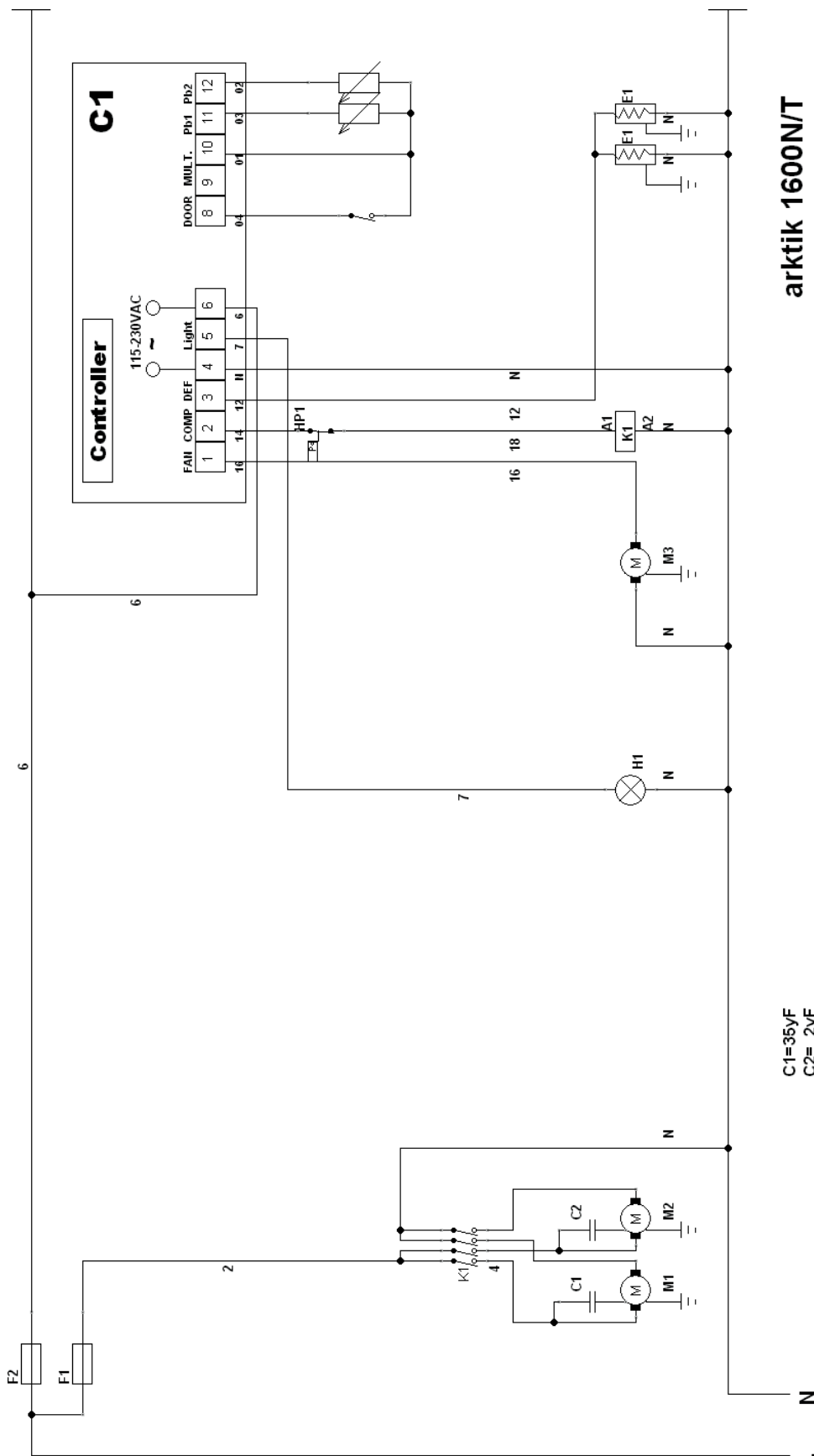
### Legend of the wiring diagram

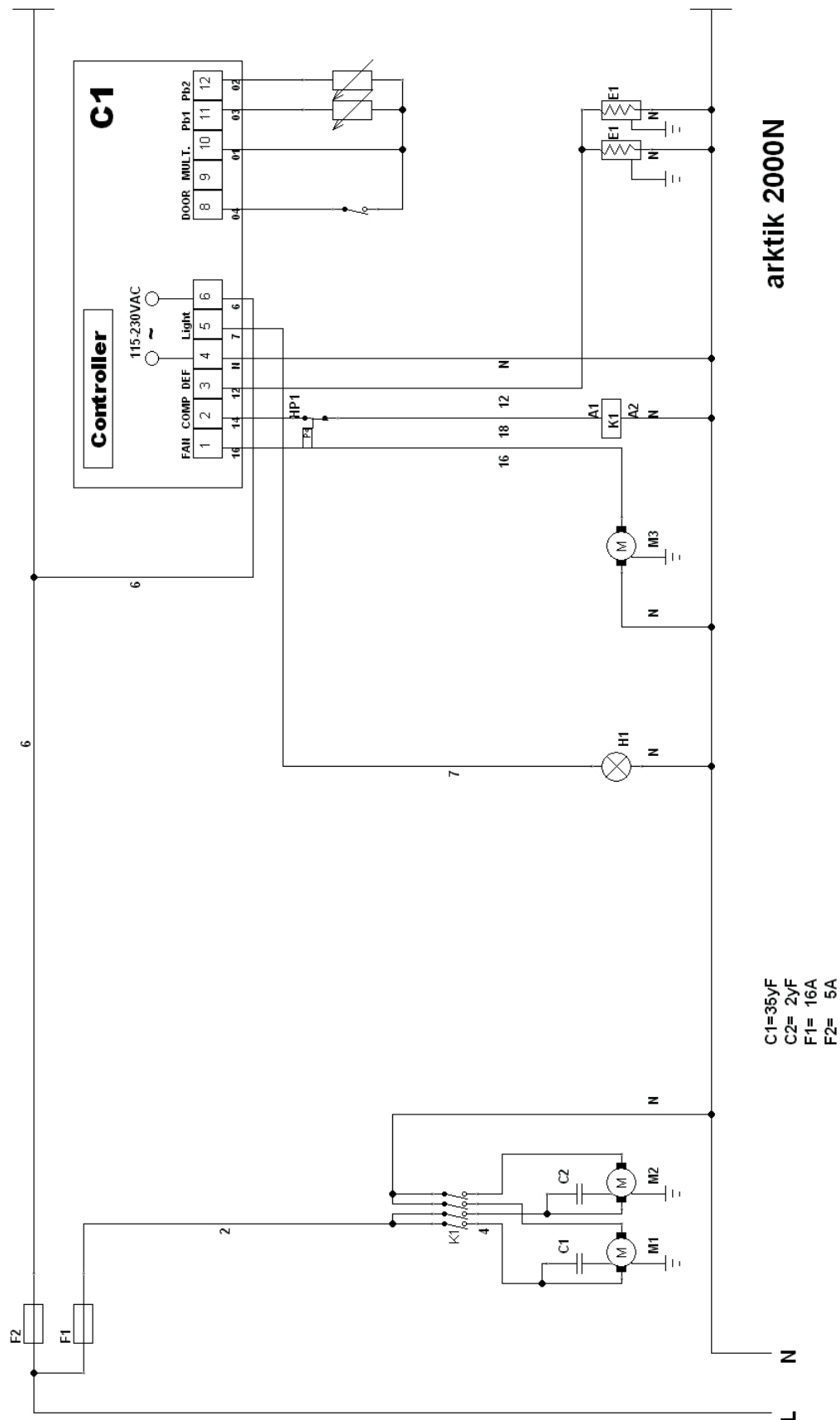
F1	Main fuse
F2	Control switch
M1	Compressor motor
M2	Condenser fan motor
M3	Evaporator fan motor
E1	Defrosting
E2	Sump heating
E3	Drain heater
K1	Relay compressor
HP1	Pressure control (HP)
HP2	Pressure switch condenser fan
C1	Temperature controller
Pb2	"Defrost" sensor
Pb1	"Room temperature" sensor
S1	"Interior lighting" switch
S2	"On/off" switch
H1	Interior lighting
Door	Door contact switch
K2	Contactor heat
K3	Contactor evaporator fan
TR	Transformer
R4	Roomheater
R5	Roomheater
2R1	Defrosting
2R2	Sump heating
2R3	Drain pipe heater
T	Overheatprotector
IC974LX	- Temperature controller

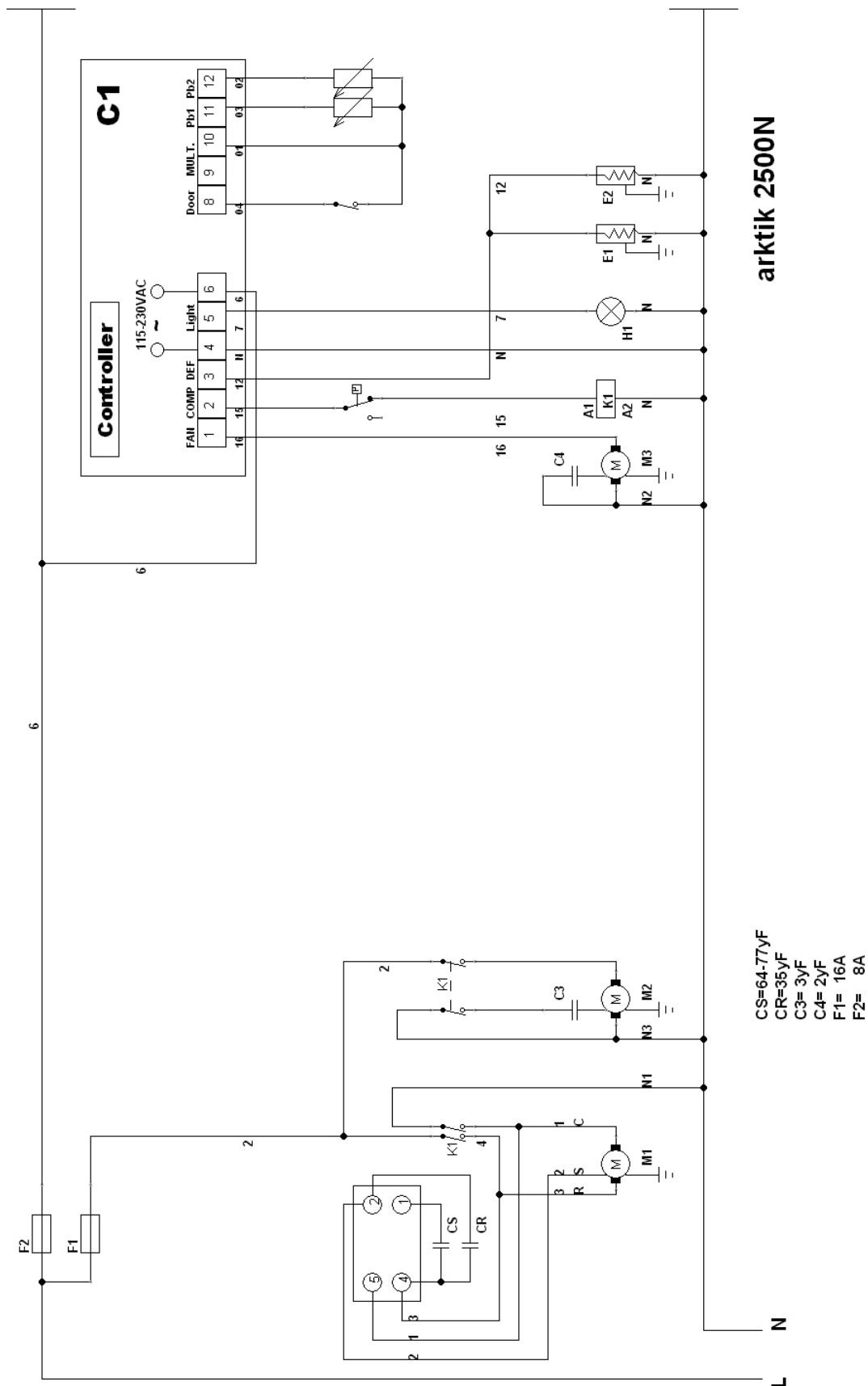


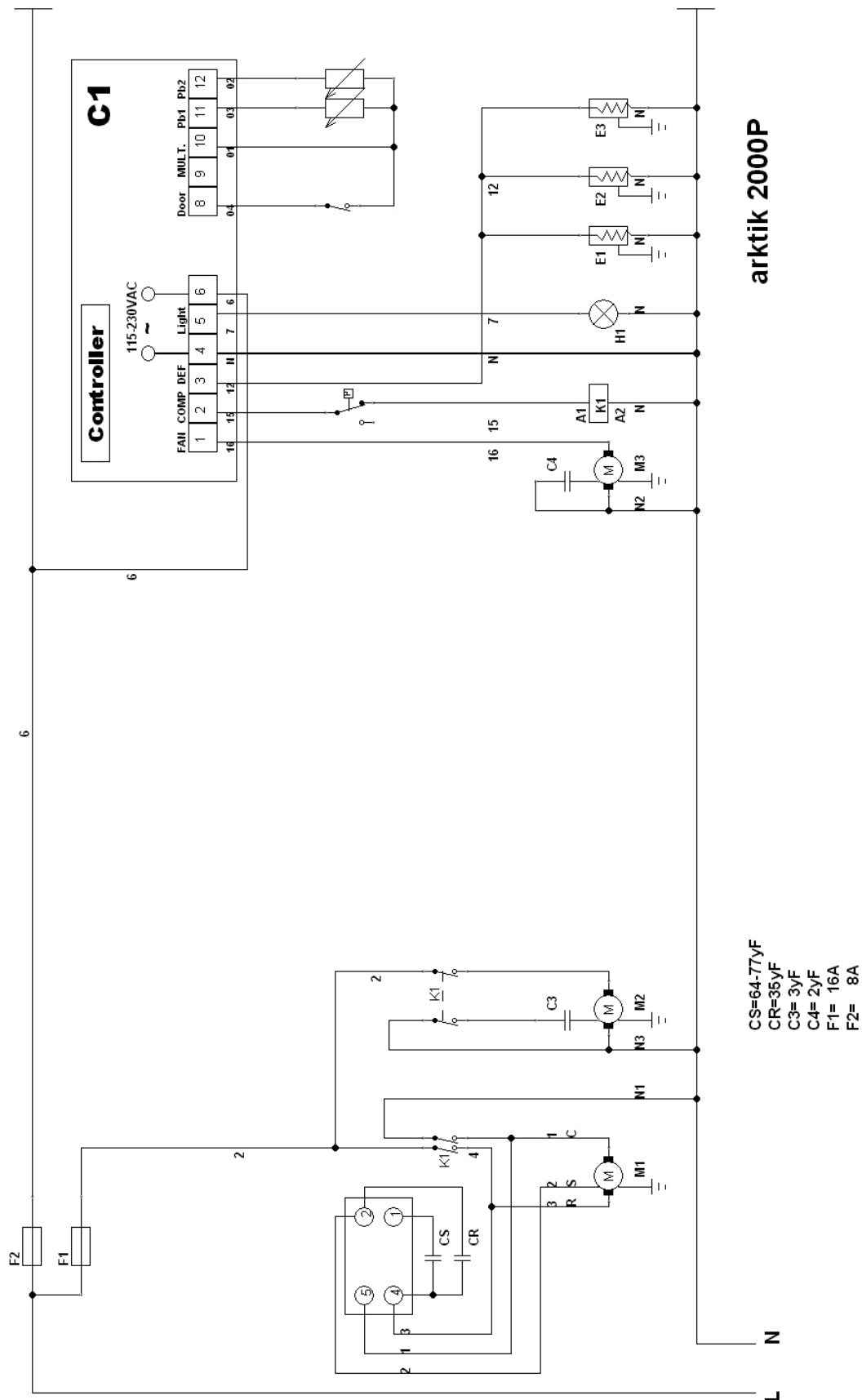
Fig. 13-2 Wiring diagrams

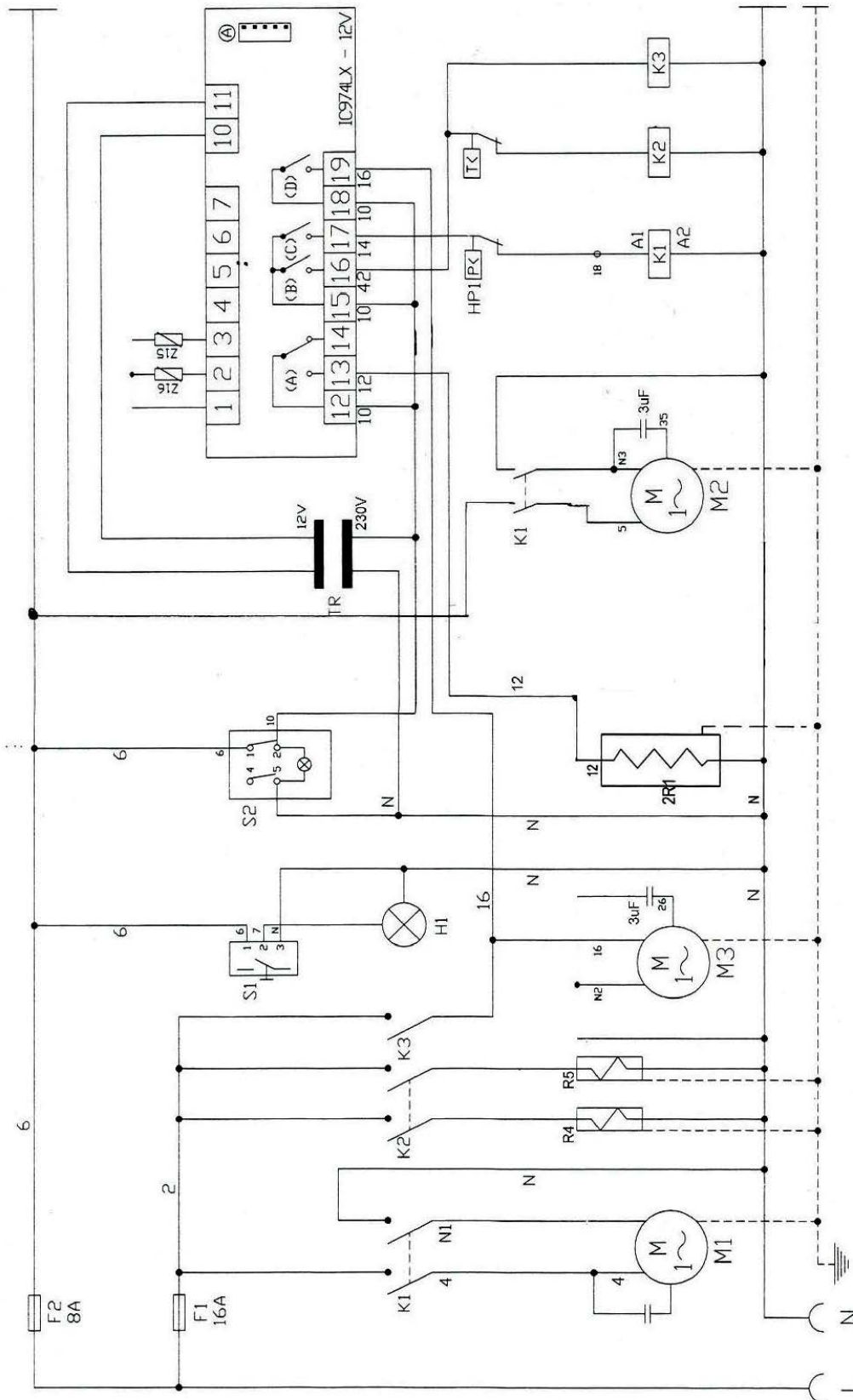




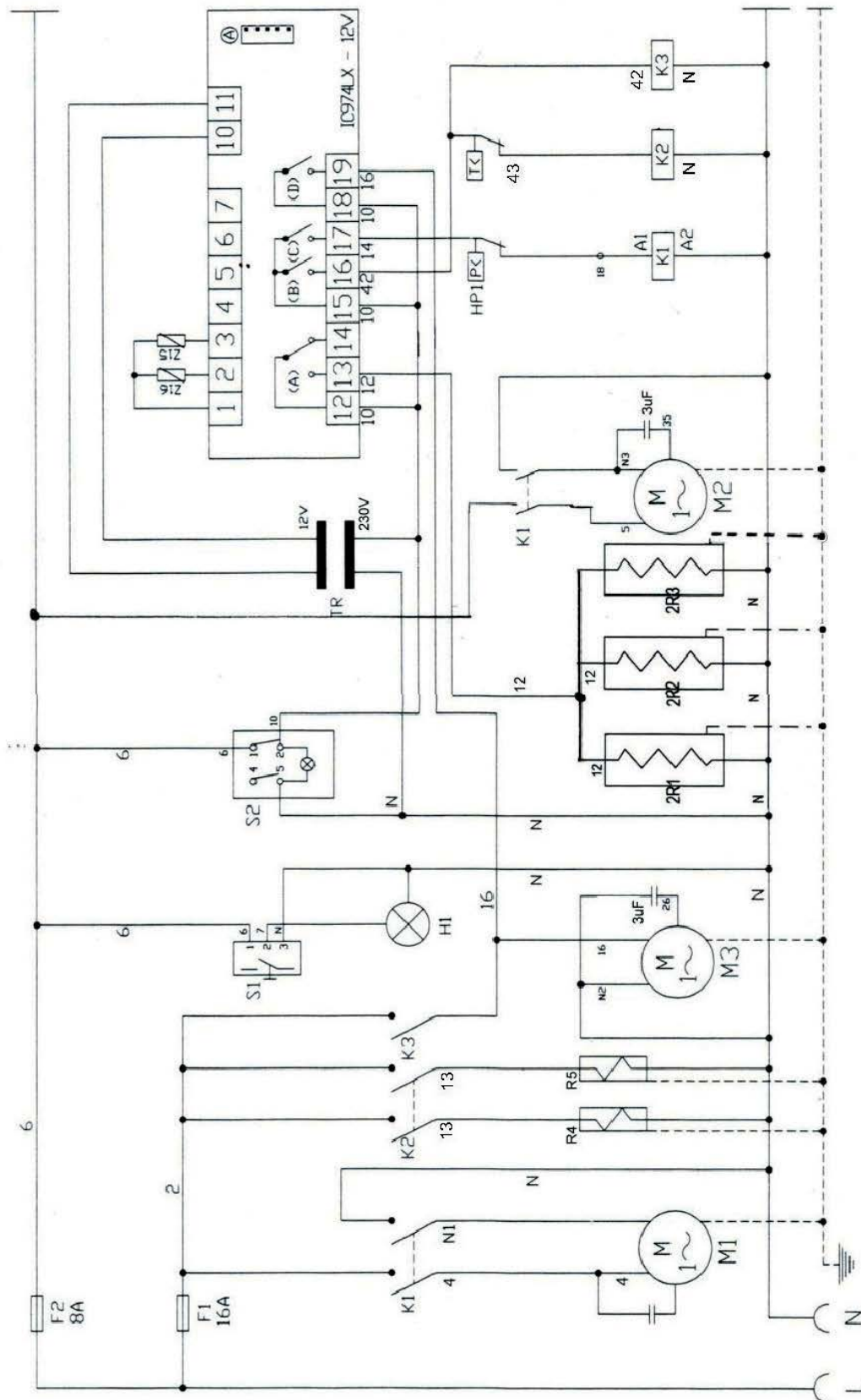








**arktik 2500N/K**



arktik 2000P/K

### 13.3 Safety Data Sheets

Safety data sheet in accordance with 1907/2006/EC **TEGA**

Trade name: R134a  
Product no.: R134a  
Current version: 1.0.0, issued: 13.03.2019 Replaced version: -, issued: - Region: GB

**SECTION 1: Identification of the substance/mixture and of the company/undertaking**

**1.1 Product identifier**  
Trade name  
**R134a**  
Substance name 1,1,1,2-tetrafluoroethane  
REACH registration no. 01-2119459374-33  
Identification numbers  
CAS no. 811-97-2  
EC no. 212-377-0


**1.2 Relevant identified uses of the substance or mixture and uses advised against**  
**Relevant identified uses of the substance or mixture**  
Industrial Use  
Professional use  
Refrigerant  
**Uses advised against**  
Consumer use

**1.3 Details of the supplier of the safety data sheet**  
**Address**  
TEGA - Technische Gase und Gasetechnik GmbH  
Werner-von-Siemens-Straße 18  
97076 Würzburg  
Telephone no. +49 931 2093-220  
Fax no. +49 931 2093-180  
e-mail kaefemite@tega.de  
**Advice on Safety Data Sheet**  
sds\_info@tega.de

**1.4 Emergency telephone number**  
For medical advice (in German and English):  
+49 (0)551 192 40 (SifInformationszentrum Nord)

**SECTION 2: Hazards identification**

**2.1 Classification of the substance or mixture**  
**Classification in accordance with Regulation (EC) No 1272/2008 (CLP)**  
Press. Gas liq. H280  
**Classification information**  
This product is assessed and classified using the methods and criteria below referred to in Article 9 of Regulation (EC) n° 1272/2008:  
Physical hazards: determined through assessment data based on the methods or standards referred to in part 2 of Annex I to CLP  
Health hazards and environmental hazards: determined through toxicological and ecotoxicological assessment data based on the methods or standards referred to in Part 3 and 4 of Annex I to CLP.

**2.2 Label elements**  
**Labelling according to Regulation (EC) No 1272/2008 (CLP Regulation)**  
Product identifier  
811-97-2 (inforfuran)  
Hazard pictograms  
  
GHS04

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Safety data sheet in accordance with 1907/2006/EC **TEGA**

Trade name: R134a  
Product no.: R134a  
Current version: 1.0.0, issued: 13.03.2019 Replaced version: -, issued: - Region: GB

**Signal word**  
Warning  
**Hazard statement(s)**  
H280 Contains gas under pressure; may explode if heated.  
**Hazard statements (EU)**  
EUH018 In use may form flammable/explosive vapour-air mixture.  
**Precautory statements(s)**  
P410+P403 Protect from sunlight. Store in a well-ventilated place.  
**Supplemental label elements**  
Contains fluorinated greenhouse gases: HFC-134a

**2.3 Other hazards**  
Danger of suffocation by displacement of air / oxygen. Contact with the liquid can cause cold burns or frostbite. Please observe the information given in this safety data sheet.  
PBT assessment  
The product is not considered to be a PBT.  
vPvB assessment  
The product is not considered to be a vPvB.

**SECTION 3: Composition/information on ingredients**

**3.1 Substances**  
**Chemical characterization**  
Substance name 1,1,1,2-tetrafluoroethane  
Formula C2H2F4  
Molecular weight 102.04  
**Identification numbers**  
CAS no. 811-97-2  
EC no. 212-377-0

**3.2 Mixtures**  
Not applicable. The product is not a mixture.

**SECTION 4: First aid measures**

**4.1 Description of first aid measures**  
**General information**  
In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Remove affected person from danger area, lay him down. Seek medical advice immediately.  
**After inhalation**  
Remove affected persons from dangerous area by observing suitable respiratory protection measures. Ensure supply of fresh air. Irregular breathing/no breathing: artificial respiration. Call a doctor immediately.  
**After skin contact**  
In case of contact with skin wash off immediately with soap and water. Rinse with much water in case of frostbites. Remove clothes only after unfreezing. Cover wounds with sterile dressing. Call a doctor immediately.  
**After eye contact**  
Remove contact lenses. Rinse eye thoroughly under running water keeping eyelids wide open and protecting the unaffected eye (at least 10 to 15 minutes). Seek medical assistance.  
**After ingestion**  
Rinse mouth thoroughly with water. Do not induce vomiting. Never give anything by mouth to an unconscious person.

**4.2 Most important symptoms and effects, both acute and delayed**  
**Symptoms**  
The following symptoms may occur: respiratory arrest. Shortness of breath; Dizziness; muscle incoordination; Unconsciousness; cardiac arrhythmia; Nausea; headaches. Contact with liquefied gas can cause damage (frostbite) due to rapid evaporative cooling. May be fatal if inhaled.

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Safety data sheet in accordance with 1907/2006/EC **TEGA**

Trade name: R134a  
Product no.: R134a  
Current version: 1.0.0, issued: 13.03.2019 Replaced version: -, issued: - Region: GB

**4.3 Indication of any immediate medical attention and special treatment needed**  
Do not administer any preparations of the adrenaline-epinephrine group. Treat symptomatically.

**SECTION 5: Firefighting measures**

**5.1 Extinguishing media**  
**Suitable extinguishing media**  
Extinguishing powder, Water spray jet, Water mist, Foam; Carbon dioxide; Extinguishing measures to suit surroundings.  
**Unsuitable extinguishing media**  
High power water jet

**5.2 Special hazards arising from the substance or mixture**  
In the event of fire, the following can be released: Carbon monoxide and carbon dioxide; Hydrogen fluoride (HF); Carbonyl fluoride. May explode if exposed to heat. Liquefied gas. Spilled liquid can cause cold burns. This gas is heavier than air and may accumulate in low areas.

**5.3 Advice for firefighters**  
Use self-contained breathing apparatus. Wear full protective suit. Containers close to fire should be transferred to a safe place. Cool closed containers exposed to fire with water. Pressure increases, bursting and explosion hazard during heating. Fire residues and contaminated firefighting water must be disposed of in accordance with the local regulations.

**SECTION 6: Accidental release measures**

**6.1 Personal precautions, protective equipment and emergency procedures**  
**For non-emergency personnel**  
Refer to protective measures listed in sections 7 and 8. Provide good room ventilation even at ground level (vapours are heavier than air). Do not breathe gas. Keep away sources of ignition. Use personal protective clothing. Cordons and mark contaminated area. Remove persons to safety.  
**For emergency responders**  
No data available. Personal protective equipment (PPE) - see Section 8.

**6.2 Environmental precautions**  
Avoid release in the environment. Suppress gases/vapours/mists with water spray jet.

**6.3 Methods and material for containment and cleaning up**  
Ensure adequate ventilation. Dispose of absorbed material in accordance with the regulations.

**6.4 Reference to other sections**  
Information regarding safe handling, see chapter 7. Information regarding personal protective measures, see chapter 8. Information regarding waste disposal, see chapter 13.

**SECTION 7: Handling and storage**

**7.1 Precautions for safe handling**  
**Advice on safe handling**  
Only qualified and trained persons are authorised to handle. Provide good ventilation at the work area (local exhaust ventilation, if necessary). To be used only according to instructions for use. Do not pressurize, cut, weld, freeze, solder, drill, grind, or expose containers heat or sources of ignition. In case of accidental release: danger due to low temperature of the liquid product. The product should only be used in areas from which all naked lights and other sources of ignition have been excluded. Prevent the creation of flammable or explosive concentrations of vapour in air and avoid vapour concentration higher than the occupational exposure limits. Pressurized container: protect from sunlight and do not expose to temperatures exceeding 50 °C. Do not pierce or burn, even after use. Comply with the health and safety at work laws.  
**General protective and hygiene measures**  
Wash hands before breaks and after work. Do not eat, drink or smoke during work time. Keep away from foodstuffs and beverages. Have emergency shower available.

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Safety data sheet in accordance with 1907/2006/EC **TEGA**

Trade name: R134a  
Product no.: R134a  
Current version: 1.0.0, issued: 13.03.2019 Replaced version: -, issued: - Region: GB

**Advice on protection against fire and explosion**  
The product is not combustible. The substance can form a combustible mixture with air at elevated pressure. Isolate from sources of heat, sparks and open flame. Take precautionary measures against electrostatic loading (earthing necessary during loading operations). Electrical equipment should be protected to the appropriate standard.

**7.2 Conditions for safe storage, including any incompatibilities**  
**Technical measures and storage conditions**  
Keep container tightly closed in a cool, well-ventilated place, open and handle carefully. Protect from heat and direct sunlight.  
**Recommended storage temperature**  
Value < 50 °C  
**Requirements for storage rooms and vessels**  
Containers which are opened must be carefully closed and kept upright to prevent leakage. Always keep in containers of same material as the original one.  
**Advice on storage assembly**  
Substances to be avoided, pls. See chapter 10.

**7.3 Specific end use(s)**  
No data available.

**SECTION 8: Exposure controls/personal protection**

**8.1 Control parameters**  
**Occupational exposure limit values**

No	Substance name	CAS no.	EC no.
1	norflurane	811-97-2	212-377-0
<b>List of approved workplace exposure limits (WELs) / EH40</b>			
1,1,1,2-Tetrafluoroethane (HFC 134a)			
	WEL long-term (8-hr TWA reference period)	4240	mg/m <sup>3</sup> 1000 ppm

**DNEL, DMEL and PNEC values**

**DNEL values (worker)**

No	Substance name	Exposure time	Effect	CAS / EC no	Value
1	norflurane	Long term (chronic)	systemic	811-97-2 / 212-377-0	1398 mg/m <sup>3</sup>
<b>DNEL value (consumer)</b>					
No	Substance name	Exposure time	Effect	CAS / EC no	Value
1	norflurane	Long term (chronic)	systemic	811-97-2 / 212-377-0	2476 mg/m <sup>3</sup>

**PNEC values**

No	Substance name	ecological compartment	Type	CAS / EC no	Value
1	norflurane			811-97-2 / 212-377-0	
	water	fresh water	0.1	mg/L	
	water	marine water	0.01	mg/L	
	water	fresh water sediment	0.75	mg/kg dry weight	
	water	Aqua Intermittent	1	mg/L	
	sewage treatment plant	-	73	mg/L	

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### Safety data sheet in accordance with 1907/2006/EC

**TEGA**

Trade name: R134a

Product no.: R134a

Current version : 1.0.0, issued: 13.03.2019

Replaced version: -, issued: -

Region: GB

#### 8.2 Exposure controls

##### Appropriate engineering controls

Ensure adequate ventilation, local exhaust at the work station if necessary. If these are not sufficient to maintain concentrations of particulates and solvent vapour below the OEL, suitable respiratory protection must be worn.

##### Personal protective equipment

###### Respiratory protection

Self-contained breathing apparatus. In case of insufficient ventilation or long-term effect use breathing apparatus. Danger of suffocation due to high concentrations in breathing air.

Respiratory filter (gas): AX

###### Eye / face protection

Tightly fitting safety glasses (EN 166).

###### Hand protection

Low-temperature-resistant gloves (EN 511). Sufficient protection is given wearing suitable protective gloves checked according to i.e. EN 374, in the event of risk of skin contact with the product. Before use, the protective gloves should be tested in any case for its specific work-station suitability (i.e. mechanical resistance, product compatibility and artistic properties). Adhere to the manufacturer's instructions and information relating to the use, storage, care and replacement of protective gloves. Protective gloves shall be replaced immediately when physically damaged or worn. Design operations thus to avoid permanent use of protective gloves.

Appropriate Material: leather

###### Other

Chemical-resistant work clothes. Protective shoes.

###### Environmental exposure controls

Information regarding waste disposal, see chapter 13.

#### SECTION 9: Physical and chemical properties

##### 9.1 Information on basic physical and chemical properties

<b>Form/colour</b>	
liquefied gas	
colourless	
<b>Odour</b>	
slightly like ether	
<b>Odour threshold</b>	
No data available	
<b>pH value</b>	
No data available	
<b>Boiling point / boiling range</b>	
Value	-26 °C
Reference pressure	1013 hPa
<b>Melting point / melting range</b>	
No data available	
<b>Setting point / solidification range</b>	
Value	-108 °C
Reference pressure	1013 hPa
<b>Decomposition point / decomposition range</b>	
No data available	
<b>Flash point</b>	
No data available	
<b>Auto-ignition temperature</b>	
Value	743 °C
<b>Oxidizing properties</b>	
The product does not have oxidizing properties.	

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### Safety data sheet in accordance with 1907/2006/EC

**TEGA**

Trade name: R134a

Product no.: R134a

Current version : 1.0.0, issued: 13.03.2019

Replaced version: -, issued: -

Region: GB

#### Explosive properties

No data available

#### Flammability (liquid, gas)

The product is non-flammable.

#### Lower flammability or explosive limits

No data available

#### Upper flammability or explosive limits

No data available

#### Vapour pressure

Value 5700 hPa |Reference temperature 20 °C |

#### Vapour density

No data available

#### Evaporation rate

Value 1 |Comments CCM = 1 |

#### Relative density

Value 4.24 |Reference temperature 20 °C |

#### Density

No data available

#### Solubility in water

Value 1 g/l |Reference temperature 25 °C |

#### Solubility(s)

No data available

#### Partition coefficient: n-octanol/water

No Substance name | CAS no. | EC no. |1 norflurane | 811-97-2 | 212-377-0 |log Pow 1.08 |Reference temperature 25 °C |with reference to pH 6.0 |Method OECD 107 |Source ECHA |

#### Viscosity

No data available

#### 9.2 Other information

##### Other information

No data available.

#### SECTION 10: Stability and reactivity

##### 10.1 Reactivity

Dangerous reactions are not expected if the product is handled according to its intended use. For the avoidance of thermal reaction does not overheat.

##### 10.2 Chemical stability

Stable under recommended storage and handling conditions (See section 7).

##### 10.3 Possibility of hazardous reactions

Stable under recommended storage and handling conditions (See section 7).

##### 10.4 Conditions to avoid

Temperatures > 50°C. Heat, naked flames and other ignition sources.

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### Safety data sheet in accordance with 1907/2006/EC

**TEGA**

Trade name: R134a

Product no.: R134a

Current version : 1.0.0, issued: 13.03.2019

Replaced version: -, issued: -

Region: GB

#### 10.5 Incompatible materials

Alkali metals; Earth alkali metals; Metal as powder; powdered metal salts

#### 10.6 Hazardous decomposition products

None, if handled according to intended use. In case of fire: see section 5.

#### SECTION 11: Toxicological information

##### 11.1 Information on toxicological effects

0.1.1 Information on toxicological effects			
<b>Acute oral toxicity</b>			
No data available			
<b>Acute dermal toxicity</b>			
No data available			
<b>Acute inhalational toxicity</b>			
No data available			
<b>Skin corrosion/irritation</b>			
No data available			
<b>Serious eye damage/irritation</b>			
No data available			
<b>Respiratory or skin sensitisation</b>			
No data available			
<b>Gen. cell mutagenicity</b>			
No	Substance name	CAS no.	EC no.
1	norflurane	811-97-2	212-377-0
Type of examination		Genotoxicity in vitro	
Species		Salmonella typhimurium	
Method		OECD 471	
Source		ECHA	
Evaluation/classification		Based on available data, the classification criteria are not met.	
Type of examination		Genotoxicity in vitro	
Species		Human Lymphocyte	
Method		OECD 473	
Source		ECHA	
Evaluation/classification		Based on available data, the classification criteria are not met.	
Route of exposure		inhalational	
Type of examination		Genotoxicity in vivo	
Species		mouse	
Method		EPA	
Source		ECHA	
Evaluation/classification		Based on available data, the classification criteria are not met.	
<b>Reproduction toxicity</b>			
No	Substance name	CAS no.	EC no.
1	norflurane	811-97-2	212-377-0
Route of exposure		inhalational	
Species		mouse	
Source		ECHA	
Evaluation/classification		Based on available data, the classification criteria are not met.	
<b>Carcinogenicity</b>			
No	Substance name	CAS no.	EC no.
1	norflurane	811-97-2	212-377-0
Route of exposure		inhalational	
Species		rat	
Source		ECHA	
Evaluation/classification		Based on available data, the classification criteria are not met.	

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#### STOT - single exposure

No data available

#### STOT - repeated exposure

No Substance name | CAS no. | EC no. |1 norflurane | 811-97-2 | 212-377-0 |Route of exposure inhalational |Species rat |Method OECD 453 |Source ECHA |

Based on available data, the classification criteria are not met.

#### Aspiration hazard

No data available

#### SECTION 12: Ecological information

##### 12.1 Toxicity

###### Toxicity to fish (acute)

No Substance name | CAS no. | EC no. |1 norflurane | 811-97-2 | 212-377-0 |LC50 450 |Duration of exposure 96 |Species Salmo gairdner |Method EU C.1 |Source ECHA |

Based on available data, the classification criteria are not met.

###### Toxicity to fish (chronic)

No data available

###### Toxicity to Daphnia (acute)

No Substance name | CAS no. | EC no. |1 norflurane | 811-97-2 | 212-377-0 |EC50 580 |Duration of exposure 48 |Species Daphnia magna |Method EU C.2 |Source ECHA |

Based on available data, the classification criteria are not met.

###### Toxicity to Daphnia (chronic)

No data available

###### Toxicity to algae (acute)

No data available

###### Toxicity to algae (chronic)

No data available

###### Bacteria toxicity

No data available

##### 12.2 Persistence and degradability

###### Biodegradability

No Substance name | CAS no. | EC no. |1 norflurane | 811-97-2 | 212-377-0 |Type aerobic biodegradation |Value 3 |Duration 28 |Method OECD 301 D |Source ECHA |Evaluation not readily biodegradable |

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#### 12.3 Bioaccumulative potential

No.	Substance name	CAS no.	EC no.
1	1,1,1,2-tetrafluoroethane	811-97-2	212-377-0
	log Pow		1,05
	Reference temperature		25 °C
	pH 6.0		
	Method	OECD 107	
	Source	ECHA	

#### 12.4 Mobility in soil

No data available.

#### 12.5 Results of PBT and vPvB assessment

Results of PBT and vPvB assessment
PBT assessment
vPvB assessment

#### 12.6 Other adverse effects

Other adverse effects
Global Warming Potential (GWP): 1430

#### 12.7 Other information

Other information
Do not discharge product unmonitored into the environment.

### SECTION 13: Disposal considerations

#### 13.1 Waste treatment methods

**Product**  
disposes of in accordance with local regulation.  
Allocation of a waste code number, according to the European Waste Catalogue, should be carried out in agreement with the regional waste disposal company.

**Packaging**  
Compressed gas packaging under pressure. Do not open by force. Do not heat above 50°C. Dispose of compressed gas packaging only if completely discharged. Do not burn empty compressed gas packaging. Do not pierce, cut or weld undamaged containers.

### SECTION 14: Transport information

<b>14.1 Transport ADR/RID/ADN</b>	2
Class	2A
Hazard identification no.	20
UN number	UN3159
Proper shipping name	1,1,1,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 134a)
Tunnel restriction code	CE
Label	2.2 RID: (+13)
<b>14.2 Transport IMDG</b>	2.2
Class	UN3159
UN number	1,1,1,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 134a)
Proper shipping name	F-C, S-V
EmS	2.2
Label	
<b>14.3 Transport ICAO-TI / IATA</b>	2.2
Class	UN3159
UN number	1,1,1,2-Tetrafluoroethane
Proper shipping name	2.2
Label	

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#### 14.4 Other information

No data available.

#### 14.5 Environmental hazards

Information on environmental hazards, if relevant, please see 14.1 - 14.3.

#### 14.6 Special precautions for user

To be transported always in closed, upright and safe containers. Make sure that persons handling these containers are aware of the rules of conduct in case of incident or spillage.

#### 14.7 Transport in bulk according to Annex II of Marpol and the IBC Code

Not relevant.

### SECTION 15: Regulatory information

#### 15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

<b>Regulation (EC) No 1907/2006 (REACH) Annex XIV (List of substances subject to authorisation)</b>
In accordance with the Reach regulation (EC) 1907/2006, the product does not contain any substances that are considered as subject to listing in annex XIV, inventory of substances requiring authorisation.
<b>REACH candidate list of substances of very high concern (SVHC) for authorisation</b>
In accordance with article 57 and article 59 of the Reach regulation (EC) 1907/2006, this substance is not considered as subject to listing in annex XIV, inventory of substances requiring authorisation. ("authorisation list")
<b>Regulation (EC) No 1907/2006 (REACH) Annex XVII: RESTRICTIONS ON THE MANUFACTURE, PLACING ON THE MARKET AND USE OF CERTAIN DANGEROUS SUBSTANCES, PREPARATIONS AND ARTICLES</b>
The substance is not subject to the provisions of annex XVII (restriction entries) of the Reach regulation (EC) 1907/2006.
<b>Directive 2012/18/EU on the control of major-accident hazards involving dangerous substances</b>
This substance is not subject to Part I or 2 of Annex I
<b>Other regulations</b>
REGULATION (EU) No 517/2014 on fluorinated greenhouse gases
Adhere to the national safety and occupational safety regulations when using this product.

#### 15.2 Chemical safety assessment

A chemical safety assessment has been carried out for this substance.

### SECTION 16: Other information

**Sources of key data used to compile the data sheet:**  
Regulation (EC) No 1907/2006 (REACH), 1272/2008 (CLP) as amended in each case.  
EC Directives 2000/39/EC, 2006/15/EC, 2009/16/EC  
National Threshold Limit Values of the corresponding countries as amended in each case.  
Transport regulations according to ADR, RID, IMDG, IATA as amended in each case.  
The data sources used to determine physical, toxic and ecotoxic data, are indicated directly in the corresponding chapter.

**Department issuing safety data sheet**  
UMCO GmbH  
This information is based on our present knowledge and experience.  
The safety data sheet describes products with a view to safety requirements.  
It does not however, constitute a guarantee for any specific product properties and shall not establish a legally valid contractual relationship.

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#### SECTION 1: Identification of the substance/mixture and of the company/undertaking

##### 1.1 Product identifier

Trade name

**R452A**

##### 1.2 Relevant identified uses of the substance or mixture and uses advised against

**Relevant identified uses of the substance or mixture**

Industrial Use

Professional use

Refrigerant

**Uses advised against**

Consumer use

##### 1.3 Details of the supplier of the safety data sheet

**Address**

TEGA - Technische Gase und Gasetechnik GmbH

Weimer-von-Siemens-Straße 19

Würzburg

Telephone no. +49 931 2093-220

Fax no. +49 931 2093-180

e-mail kaelertitel@tega.de

sfb\_info@tmco.de

**Advice on Safety Data Sheet**

##### 1.4 Emergency telephone number

For medical advice (in German and English):

+49 (0)51 192 40 (GiftoInformationszentrum Nord)

#### SECTION 2: Hazards identification

##### 2.1 Classification of the substance or mixture

**Classification in accordance with Regulation (EC) No 1272/2008 (CLP)**

Press. Gas liq.; H280

**Classification information**

This product is assessed and classified using the methods and criteria below referred to in Article 9 of Regulation (EC) No 1272/2008:

Physical hazards: determined through assessment data based on the methods or standards referred to in part 2 of Annex I to CLP

Health hazards and environmental hazards: determined through toxicological and ecotoxicological assessment data based on the methods or standards referred to in Part 3, 4 and 5 of Annex I to CLP.

##### 2.2 Label elements

**Labelling according to Regulation (EC) No 1272/2008 (CLP Regulation)****Hazard pictograms**

Signal word

Warning

**Hazard statement(s)**

H280

Contains gas under pressure; may explode if heated.

**Hazard statements (EU)**

EUH018

EUH029

In use may form flammable/explosive vapour-air mixture.

Can become highly flammable in use.

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#### Precautionary statement(s)

P410+P403 Protect from sunlight. Store in a well-ventilated place.

#### Supplemental label elements

Contains fluorinated greenhouse gases (HFC-125, HFC-1234yf, HFC-32)

##### 2.3 Other hazards

Danger of asphyxiation by displacement of air / oxygen. Contact with the liquid can cause cold burns or frostbite. Abuse or intentional inhalation can be fatal as a result of effects on the heart without alarming symptoms.

PBT assessment

The product is not considered to be a PBT.

vPvB assessment

The product is not considered to be a vPvB.

#### SECTION 3: Composition/information on ingredients

##### 3.1 Substances

Not applicable. The product is not a substance.

##### 3.2 Mixtures

**Chemical characterization**

Fluorinated hydrocarbons

Hazardous ingredients				
No	Substance name	Classification (EC) 1272/2008 (CLP)	Additional information	
			Concentration	%
1	CAS / EC / Index / REACH no <b>pentafluoroethane</b>	354-33-8 206-557-8 01-2119485636-25	Press. Gas liq.; H280	>= 50.00 - < 70.00 Vol%
2	<b>2,3,3,3-tetrafluoroprop-1-ene</b>	754-12-1 468-710-7 01-0000019665-61	Flam. Gas 1; H220 Press. Gas liq.; H280	>= 25.00 - < 50.00 Vol%
3	<b>difluoromethane</b>	75-10-5 200-839-4 01-2119471312-47	Flam. Gas 1; H220 Press. Gas liq.; H280	>= 10.00 - < 25.00 Vol%

Full Text for all H-phrases and EUH-phrases: pls. see section 16

#### SECTION 4: First aid measures

##### 4.1 Description of first aid measures

**General information**

In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Remove affected person from danger area, lay him down. Seek medical advice immediately.

**After inhalation**

Remove affected persons from dangerous area by observing suitable respiratory protection measures. Ensure supply of fresh air. Irregular breathing/no breathing: artificial respiration. Call a doctor immediately.

**After skin contact**

In case of contact with skin wash off immediately with soap and water. Rinse with much water in case of frostbites. Remove clothes only after unfreezing. Cover wounds with sterile dressing. Call a doctor immediately.

**After eye contact**

Remove contact lenses. Rinse eye thoroughly under running water keeping eyelids wide open and protecting the unaffected eye (at least 10 to 15 minutes). Seek medical assistance.

**After ingestion**

Rinse mouth thoroughly with water. Do not induce vomiting. Never give anything by mouth to an unconscious person.

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#### 4.2 Most important symptoms and effects, both acute and delayed

**Symptoms**

The following symptoms may occur: cardiac arrhythmia; anaesthetic effect; Dizziness; Dizziness; confusion; Unconsciousness; muscle incoordination; respiratory arrest. Contact with liquefied gas can cause damage (frostbite) due to rapid evaporative cooling.

#### 4.3 Indication of any immediate medical attention and special treatment needed

Treat symptomatically and supportively.

#### SECTION 5: Firefighting measures

##### 5.1 Extinguishing media

**Suitable extinguishing media**

Product itself is non-combustible; adapt fire extinguishing measures to surrounding areas.

**Unsuitable extinguishing media**

High power water jet

##### 5.2 Special hazards arising from the substance or mixture

In the event of fire, the following can be released: Carbon monoxide and carbon dioxide; Hydrogen fluoride (HF); Carbonyl fluoride; fluorine compounds; Liquefied gas. Spilled liquid can cause cold burns. This gas is heavier than air and may accumulate in low areas. The product is not flammable. Exposure to heat may cause bursting of the vessels.

##### 5.3 Advice for firefighters

Use self-contained breathing apparatus. Wear full protective suit. Containers close to fire should be transferred to a safe place. Cool closed containers exposed to fire with water. Pressure increase, bursting and explosion hazard during heating. Fire residues and contaminated firefighting water must be disposed of in accordance with the local regulations.

#### SECTION 6: Accidental release measures

##### 6.1 Personal precautions, protective equipment and emergency procedures

**For non-emergency personnel**

Refer to protective measures listed in sections 7 and 8. Provide good room ventilation even at ground level (vapours are heavier than air). Do not breathe gas. Keep away sources of ignition. Use personal protective clothing. Contain and mark contaminated area. Remove persons to safety. Avoid skin contact with leaking liquid (danger of frostbite).

**For emergency responders**

No data available. Personal protective equipment (PPE) - see Section 8.

##### 6.2 Environmental precautions

Avoid release in the environment. Suppress gases/vapours/mists with water spray jet.

##### 6.3 Methods and material for containment and cleaning up

Ensure adequate ventilation. Dispose of absorbed material in accordance with the regulations.

##### 6.4 Reference to other sections

Information regarding safe handling, see chapter 7. Information regarding personal protective measures, see chapter 8. Information regarding waste disposal, see chapter 13.

#### SECTION 7: Handling and storage

##### 7.1 Precautions for safe handling

**Advice on safe handling**

Only qualified and trained persons are authorised to handle. Provide good ventilation at the work area (local exhaust ventilation, if necessary). To be used only according to instructions for use. Do not pressurecut, cut, weld, braze, solder, drill, grind, or expose containers heat or sources of ignition. In case of accidental release: danger due to low temperature of the liquid product. The product should only be used in areas from which all naked lights and other sources of ignition have been excluded. Prevent the creation of flammable or explosive concentrations of vapour in air and avoid vapour concentration higher than the occupational exposure limits. Pressurized container: protect from sunlight and do not expose to temperatures exceeding 50 °C. Do not pierce or burn, even after use. Comply with the health and safety at work laws.

**General protective and hygiene measures**

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Wash hands before breaks and after work. Do not inhale gases. Do not eat, drink or smoke during work time. Keep away from foodstuffs and beverages. Have emergency shower available. Provide eye wash fountain in work area.

**Advice on protection against fire and explosion**

The product is not combustible. Isolate from sources of heat, sparks and open flame. Take precautionary measures against electrostatic loading (earthing necessary during loading operations). Electrical equipment should be protected to the appropriate standard.

#### 7.2 Conditions for safe storage, including any incompatibilities

**Technical measures and storage conditions**

Keep container tightly closed in a cool, well-ventilated place, open and handle carefully. Protect from heat and direct sunlight.

**Recommended storage temperature**

Value &lt; 50 °C

**Storage stability**

Value &gt; 10 a

Comments When stored properly, the storage life is unlimited.

**Requirements for storage rooms and vessels**

Containers which are opened must be carefully closed and kept upright to prevent leakage. Always keep in containers of same material as the original one.

**Incompatible products**

Do not store together with: self-heating substances and mixtures; self-reactive substances and mixtures; flammable substances; oxidizing agents; pyrophoric substances; explosives; toxic substances and mixtures; toxic substances and mixtures.

#### 7.3 Specific end use(s)

No data available.

#### SECTION 8: Exposure controls/personal protection

##### 8.1 Control parameters

**DNEL, DMEL and PNEC values**

<b>DNEL values (worker)</b>				
No	Substance name	Exposure time	Effect	CAS / EC no
1	pentafluoroethane	Route of exposure	Value	Value
		inhalative	354-33-8	206-557-8
		inhalative	16444	mg/m³
2	2,3,3,3-tetrafluoroprop-1-ene	Long term (chronic)	systemic	754-12-1
		inhalative	468-710-7	mg/m³
3	difluoromethane	Long term (chronic)	systemic	950
		inhalative	75-10-5	200-839-4
		inhalative	7035	mg/m³

<b>DNEL value (consumer)</b>				
No	Substance name	Exposure time	Effect	CAS / EC no
1	pentafluoroethane	Route of exposure	Value	Value
		inhalative	354-33-8	206-557-8
2	2,3,3,3-tetrafluoroprop-1-ene	Long term (chronic)	systemic	1753
		inhalative	468-710-7	mg/m³
3	difluoromethane	Long term (chronic)	systemic	18400
		inhalative	75-10-5	200-839-4
		inhalative	750	mg/m³

<b>PNEC values</b>		CAS / EC no
No	Substance name	

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ecological compartment	Type	Value
1 pentfluoroethane		354-33-6 206-557-8
water	fresh water	0.1 mg/L
water	fresh water sediment	0.6 mg/kg dry weight
water	Aqua intermittent	1 mg/L
2 2,3,3,3-tetrafluoroprop-1-ene		754-12-1 468-710-7
water	fresh water	0.1 mg/L
water	Aqua intermittent	0.1 mg/L
3 difluoromethane		75-10-5 200-439-4
water	fresh water	0.142 mg/L
water	Aqua intermittent	1.42 mg/L
water	fresh water sediment	0.543 mg/kg dry weight

#### 8.2 Exposure controls

##### Appropriate engineering controls

Ensure adequate ventilation, local exhaust at the work station if necessary. If these are not sufficient to maintain concentrations of particulates and solvent vapour below the OEL, suitable respiratory protection must be worn.

##### Personal protective equipment

**Respiratory protection**  
Self-contained breathing apparatus. In case of insufficient ventilation or long-term effect use breathing apparatus. Danger of suffocation due to high concentrations in breathing air.  
Respiratory filter (gas): AX

##### Eye / face protection

Tightly fitting safety glasses (EN 166).

##### Hand protection

Low-temperature-resistant gloves (EN 511). Sufficient protection is given wearing suitable protective gloves checked according to i.e. EN 374, in the event of risk of skin contact with the product. Before use, the protective gloves should be tested in any case for its specific work-station suitability (i.e. mechanical resistance, product compatibility and antistatic properties). Adhere to the manufacturer's instructions and information relating to the use, storage, care and replacement of protective gloves. Protective gloves shall be replaced immediately when physically damaged or worn. Design operations thus to avoid permanent use of protective gloves.

Appropriate Material leather

Other Chemical-resistant work clothes. Protective shoes.

##### Environmental exposure controls

Information regarding waste disposal, see chapter 13.

### SECTION 9: Physical and chemical properties

#### 9.1 Information on basic physical and chemical properties

<b>Form/Colour</b>	
Liquid/gas	
Colourless, clear	
<b>Odour</b>	
Slightly like ether	
<b>Odour threshold</b>	
No data available	
<b>pH value</b>	
No data available	
<b>Boiling point / boiling range</b>	
Value	< -47 °C

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Source	supplier		
<b>Melting point / melting range</b>			
No data available			
<b>Decomposition point / decomposition range</b>			
No data available			
<b>Flash point</b>			
No data available			
<b>Auto-ignition temperature</b>			
No data available			
<b>Oxidizing properties</b>			
not oxidizing			
<b>Explosive properties</b>			
The product does not have explosive properties.			
<b>Flammability (solid, gas)</b>			
The product is not combustible.			
Source	supplier		
<b>Lower flammability or explosive limits</b>			
none			
Method	ASTM E 681		
Source	supplier		
<b>Upper flammability or explosive limits</b>			
none			
Method	ASTM E 681		
Source	supplier		
<b>Vapour pressure</b>			
Value	13158 hPa		
Reference temperature	25 °C		
Source	supplier		
<b>Vapour density</b>			
Value	3.64		
Source	supplier		
Comments	Air = 1		
<b>Evaporation rate</b>			
Value	> 1		
Source	supplier		
Comments	CCl <sub>4</sub> = 1		
<b>Relative density</b>			
Value	1.13		
Reference temperature	25 °C		
Source	supplier		
<b>Density</b>			
No data available			
<b>Solubility in water</b>			
No data available			
<b>Solubility(ies)</b>			
No data available			
<b>Partition coefficient: n-octanol/water</b>			
No	Substance name	CAS no.	EC no.
1	perfluoroethane	354-33-6	206-557-8
log Pow			1.48
Reference temperature			25 °C

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with reference to Method	pH 6.34
Source	OECD 107
2 2,3,3,3-tetrafluoroprop-1-ene	
log Pow	appr. 2
Reference temperature	25 °C
with reference to Method	pH 7
Source	OECD 117
3 difluoromethane	
log Pow	75-10-5
Reference temperature	0.21
with reference to Method	25 °C
Source	pH 6.1
	OECD 107
	ECHA

#### 9.2 Other information

##### Other information

No data available.

### SECTION 10: Stability and reactivity

#### 10.1 Reactivity

This material is considered to be non-reactive under normal use conditions.

#### 10.2 Chemical stability

The product is chemically stable under recommended conditions of storage, use and temperature.

#### 10.3 Possibility of hazardous reactions

Reacts with strong oxidizing agents.

#### 10.4 Conditions to avoid

Heat, naked flames and other ignition sources. Temperatures > 50 °C.

#### 10.5 Incompatible materials

strong oxidizing agents

#### 10.6 Hazardous decomposition products

None if stored, handled and transported properly. In case of fire: see section 5.

### SECTION 11: Toxicological information

#### 11.1 Information on toxicological effects

1. Information on toxicological effects			
Acute oral toxicity			
No data available			
Acute dermal toxicity			
No data available			
Acute inhalational toxicity			
No	Substance name	CAS no.	EC no.
1	pentfluoroethane	354-33-6	206-557-8
ATE			800000
	Duration of exposure	Gas	h
	State of aggregation	rat	
	Species	OECD 403	
	Method	ECHA	
	Source	Based on available data, the classification criteria are not met.	
	Evaluation/classification		
2	2,3,3,3-tetrafluoroprop-1-ene	754-12-1	468-710-7
	LC50	405800	

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Duration of exposure	Gas	4	h
State of aggregation	rat		
Species	OECD 403		
Method	ECHA		
Source			
<b>Skin corrosion/irritation</b>			
No data available			
<b>Serious eye damage/irritation</b>			
No data available			
<b>Respiratory or skin sensitisation</b>			
No data available			
<b>Germ cell mutagenicity</b>			
No	Substance name	CAS no.	EC no.
1	pentfluoroethane	354-33-6	206-557-8
Type of examination	In vitro gene mutation study in bacteria		
Species	Salmonella typhimurium / Escherichia coli		
Method	OECD 471		
Source	ECHA		
Evaluation/classification	Based on available data, the classification criteria are not met.		
Type of examination	In vitro Mammalian Chromosomal Aberration Test		
Species	Chinese hamster Ovary (CHO)		
Method	OECD 473		
Source	ECHA		
Evaluation/classification	Based on available data, the classification criteria are not met.		
<b>Route of exposure</b>			
Type of examination	Mammalian Erythrocyte Micronucleus Test, In vivo		
Species	rodent		
Method	OECD 474		
Source	ECHA		
Evaluation/classification	Based on available data, the classification criteria are not met.		
2 2,3,3,3-tetrafluoroprop-1-ene		754-12-1	468-710-7
Type of examination	Genotoxicity in vitro		
Source	ECHA		
Evaluation/classification	Based on available data, the classification criteria are not met.		
Type of examination	Genotoxicity in vivo		
Source	ECHA		
Evaluation/classification	Based on available data, the classification criteria are not met.		
3 difluoromethane		75-10-5	200-439-4
Type of examination	In vitro gene mutation study in bacteria		
Species	Salmonella typhimurium / Escherichia coli		
Method	OECD 471		
Source	ECHA		
Evaluation/classification	Based on available data, the classification criteria are not met.		
Type of examination	In vitro Mammalian Chromosomal Aberration Test		
Species	Human Lymphocyte		
Method	OECD 473		
Source	ECHA		
Evaluation/classification	Based on available data, the classification criteria are not met.		
<b>Reproduction toxicity</b>			
No	Substance name	CAS no.	EC no.
1	2,3,3,3-tetrafluoroprop-1-ene	754-12-1	468-710-7
Type of examination	2 generation study		
Method	OECD 416		
Source	ECHA		
Evaluation/classification	Based on available data, the classification criteria are not met.		
Type of examination	Pre-natal Developmental Toxicity Study		
Method	OECD 414		
Source	ECHA		
Evaluation/classification	Based on available data, the classification criteria are not met.		

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**Carcinogenicity**

No data available

**STOT - single exposure**

No data available

**STOT - repeated exposure**

No data available

No.	Substance name	CAS no.	EC no.
1	pentafluoroethane	354-33-6	206-557-8
Route of exposure	inhalational		
Species	rat		
Method	OECD 413		
Source	ECHA		
Evaluation/classification	Based on available data, the classification criteria are not met.		
2	2,3,3,3-tetrafluoroprop-1-ene	754-12-1	468-710-7
Route of exposure	inhalational		
Species	rat		
Method	OECD 413		
Source	ECHA		
Evaluation/classification	Based on available data, the classification criteria are not met.		
3	diffuoromethane	75-10-5	200-839-4
Route of exposure	inhalational		
Species	rat		
Method	ECHA		
Evaluation/classification	Based on available data, the classification criteria are not met.		

**Aspiration hazard**

No data available

**SECTION 12: Ecological information****12.1 Toxicity****Toxicity to fish (acute)**

No.	Substance name	CAS no.	EC no.
1	2,3,3,3-tetrafluoroprop-1-ene	754-12-1	468-710-7
LC50	> 197 mg/l		
Duration of exposure	96 h		
Species	Cyprinus carpio		
Method	OECD 203		
Source	ECHA		

**Toxicity to fish (chronic)**

No data available

**Toxicity to Daphnia (acute)**

No.	Substance name	CAS no.	EC no.
1	2,3,3,3-tetrafluoroprop-1-ene	754-12-1	468-710-7
EC50	> 83 mg/l		
Duration of exposure	48 h		
Species	Daphnia magna		
Method	OECD 202		
Source	ECHA		

**Toxicity to Daphnia (chronic)**

No data available

**Toxicity to algae (acute)**

No.	Substance name	CAS no.	EC no.
1	2,3,3,3-tetrafluoroprop-1-ene	754-12-1	468-710-7
EC50	> 100 mg/l		
Duration of exposure	72 h		
Species	Pseudokirchneriella subcapitata		
Method	OECD 201		
Source	ECHA		

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**Toxicity to algae (chronic)**

No data available

**Bioester toxicity**

No data available

**12.2 Persistence and degradability****Biodegradability**

No.	Substance name	CAS no.	EC no.
1	pentafluoroethane	354-33-6	206-557-8
Type	aerobic biodegradation		
Value	appr.	5	%
Duration	Closed bottle Test (OECD 301D)		
Source	ECHA		
Evaluation	not readily biodegradable		
2	2,3,3,3-tetrafluoroprop-1-ene	754-12-1	468-710-7
Type	aerobic biodegradation		
Value	<	5	%
Duration	28 d		
Method	OECD 301 F		
Source	ECHA		
Evaluation	not readily biodegradable		
3	diffuoromethane	75-10-5	200-839-4
Type	aerobic biodegradation		
Value	5		
Duration	28 d		
Method	OECD 301 D		
Source	ECHA		
Evaluation	not readily biodegradable		

**12.3 Bioaccumulative potential**

No.	Substance name	CAS no.	EC no.
1	pentafluoroethane	354-33-6	206-557-8
log Pow	1.43		
Reference temperature	25 °C		
with reference to	pH 8.34		
Method	OECD 107		
Source	ECHA		
2	2,3,3,3-tetrafluoroprop-1-ene	754-12-1	468-710-7
log Pow	appr. 2		
Reference temperature	25 °C		
with reference to	pH 7		
Method	OECD 117		
Source	ECHA		
3	diffuoromethane	75-10-5	200-839-4
log Pow	0.21		
Reference temperature	25 °C		
with reference to	pH 6.1		
Method	OECD 107		
Source	ECHA		

**12.4 Mobility in soil**

No data available.

**12.5 Results of PBT and vPvB assessment**

Results of PBT and vPvB assessment	The product is not considered to be a PBT.
vPvB assessment	The product is not considered to be a vPvB.

**12.6 Other adverse effects**

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**Other adverse effects**Contains fluorinated greenhouse gases.  
Product: Global warming potential within 100 years: 2,140.45**12.7 Other information****Other information**

Do not discharge product uncontrolled into the environment.

**SECTION 13: Disposal considerations****13.1 Waste treatment methods****Product**  
dispose of in accordance with local regulation.  
Allocation of a waste code number, according to the European Waste Catalogue, should be carried out in agreement with the regional waste disposal company.**Packaging**

Disposal should be observed in conformity with the Regional Waste Disposal Authority.

**SECTION 14: Transport information****14.1 Transport ADR/RID/ADN**

Class	2
Classification code	2A
Hazard identification no.	20
UN number	UN1078
Proper shipping name	REFRIGERANT GAS, N.O.S.
Technical name	pentafluoroethane
Tunnel restriction code	2,3,3,3-tetrafluoroprop-1-ene
Label	C/E 2.2 RID: (+13)

**14.2 Transport IMDG**

Class	2.2
UN number	UN1078
Proper shipping name	REFRIGERANT GAS, N.O.S.
Technical name	pentafluoroethane
EnS	2,3,3,3-tetrafluoroprop-1-ene
Label	F/C, S-V 2.2

**14.3 Transport ICAO-TI / IATA**

Class	2.2
UN number	UN1078
Proper shipping name	Refrigerant gas, n.o.s.
Technical name	pentafluoroethane
Label	2,3,3,3-tetrafluoroprop-1-ene 2.2

**14.4 Other information**

No data available.

**14.5 Environmental hazards**

Information on environmental hazards, if relevant, please see 14.1 - 14.3.

**14.6 Special precautions for user**

To be transported always in closed, upright and safe containers. Make sure that persons handling these containers are aware of the rules of conduct in case of incident or spillage.

**14.7 Transport in bulk according to Annex II of Marpol and the IBC Code**

Not relevant

**SECTION 15: Regulatory information****15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**

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**EU regulations****Regulation (EC) No 1907/2006 (REACH) Annex XIV (List of substances subject to authorisation)**  
According to the data available and/or specifications supplied by upstream suppliers, this product does not contain any substances considered as substances requiring authorisation as listed in Annex XIV of the REACH regulation (EC) 1907/2006.**REACH candidate list of substances of very high concern (SVHC) for authorisation**  
According to available data and the information provided by preliminary suppliers, the product does not contain substances that are considered substances meeting the criteria for inclusion in Annex XIV (List of Substances Subject to Authorisation) as laid down in Article 57 and article 59 of REACH (EC) 1907/2006.**Regulation (EC) No 1907/2006 (REACH) Annex XVII: RESTRICTIONS ON THE MANUFACTURE, PLACING ON THE MARKET AND USE OF CERTAIN DANGEROUS SUBSTANCES, PREPARATIONS AND ARTICLES**  
According to the data available and/or specifications supplied by upstream suppliers, this product does not contain any substances requiring authorisation as listed in Annex XVII of the REACH regulation (EC) 1907/2006.**Directive 2012/18/EU on the control of major-accident hazards involving dangerous substances**

This product is not subject to Part 1 or 2 of Annex I.

**Other regulations**REGULATION (EU) No 517/2014 on fluorinated greenhouse gases  
Adhere to the national sanitary and occupational safety regulations when using this product.**15.2 Chemical safety assessment**

Chemical safety assessments have been conducted for the substances in this mixture. For a mixture a chemical safety assessment according to (EC) 1907/2006 is not mandatory.

**SECTION 16: Other information****Sources of key data used to compile the data sheet:**Regulation (EC) No 1907/2006 (REACH), 1272/2008 (CLP) as amended in each case.  
EC Directives 2000/39/EC, 2006/15/EC, 2009/16/EC  
National Threshold Limit Values of the corresponding countries as amended in each case.  
Transport regulations according to ADR, RID, IMDG, IATA as amended in each case.  
The data sources used to determine physical, toxic and ecotoxic data, are indicated directly in the corresponding chapter.**Full text of the H- and EUH- phrases drawn up in sections 2 and 3 (provided not already drawn up in these sections)**

H220 Extremely flammable gas.

**Department issuing safety data sheet**

UMCO GmbH

This information is based on our present knowledge and experience.

The safety data sheet describes products with a view to safety requirements.

It does not however, constitute a guarantee for any specific product properties and shall not establish a legally valid contractual relationship.

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Prod-ID 758265

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**KONFORMITÄTSERKLÄRUNG  
CONFORMITY DECLARATION  
DECLARATION DE CONFORMITE  
DECLARACION DE CONFORMIDAD**

**KOMPAKTKÄLTESATZ  
REFRIGERATION UNIT  
GROUPE FRIGORIFIQUE  
EQUIPO COMPACTO**

Model – Modell – Modèle – Modelo

**ARKTIK 1600N – ARKTIK 1600N/T – ARKTIK 2000N – ARKTIK 2500N – ARKTIK 2000P  
ARKTIK 2500N/K – ARKTIK 2000P/K**

Die Unterzeichneten erklären in alleiniger Verantwortung, daß das betreffende Gerät den Bestimmungen aus den EG-Richtlinien und Normen:	We subscribers declare under our own responsibility that this unit is conforming with the EC Directives and norms:	Nous, les signataires de la présente, déclarons sous notre responsabilité que l'unité en question est conforme aux prescriptions des Directives et normes:	Nosotros, firmantes del presente, declaramos bajo nuestra responsabilidad que esta unidad esta conforme a las directivas y normas de EC
Niederspannung	Low voltage	Basse tension	Baja tension
73/23/EEC => 93/68/EEC / EN 60 335-1			
EMV	Electromagnetic Compatibility	Compatibilité électromagnétique	Compatibilidad electromagnetica
89/336/EEC => 92/31/EEC => 93/68/EEC / EN 55014, EN61000-3-2, EN61000-3-3			

HERSTELLER / MANUFACTURER / FABRICANT / PRODUCTOR



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**Geschäftsführer / Managing Director / CEO  
Gérant / Gerente**

**Lamberto Govi**

